US Army Corps
of Engineers
Alaska District

Final Environmental Impact Statement

Alaska Stand Alone Gas Pipeline

October 2012

Volume 3

Appendices A through I

United States Army Corps of Engineers
Alaska District

Final Environmental Impact Statement
Alaska Stand Alone Gas Pipeline

October 2012

In cooperation with:

Alaska Department of Natural Resources, State Pipeline Coordinator's Office (ADNR, SPCO)

U.S. Coast Guard (USGS)

U.S. Department of the Interior, Bureau of Land Management (BLM)

U.S. Department of the Interior, National Park Service (NPS)

U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (USDOT, PHMSA)

U.S. Environmental Protection Agency (EPA)

Volume 3
Appendices A through I

Photo credits (cover): Michael Baker Corp. (top left and middle); Ryan Hagerty (top right); and Carl Johnson (bottom).

Appendix A

404(b)(1) Guideline Checklist

404(B)(1) GUIDELINES CHECKLIST

THE FOLLOWING QUESTIONS WILL BE ADDRESSED IN THE USACE DECISION DOCUMENT WHICH WILL BE COMPLETED AFTER THE PUBLIC NOTICE PERIOD OF THE PERMITTING ACTION.

ALTERNATIVES TEST (40 CFR 230.10(A)).

Based on the Alternatives discussion are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the U.S." or at other locations within these waters?

Based on the Alternative discussion, if the project is in a special aquatic site and is not water dependent, has the applicant clearly demonstrated that there are no practicable alternative sites available?

Special Restrictions (40 CFR 230.10(b)). Will the discharge:

Violate state water quality standards?

Violate toxic effluent standards [under Section 307] of the Clean Water Act?

Jeopardize endangered or threatened species or their critical habitat?

Violate standards set by the Department of Commerce to protect marine sanctuaries?

Other restrictions (40 CFR 230.10(c)): Will the discharge contribute to significant degradation of "waters of the U.S." through adverse impacts to:

Human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and/or special aquatic sites?

Life stages of aquatic life and/or wildlife?

Diversity, productivity, and stability of the aquatic life and other wildlife? Or wildlife habitat or loss of the capacity of wetlands to assimilate nutrients, purify water or reduce wave energy?

Recreational, aesthetic, and/or economic values?

Actions to minimize potential adverse impacts [mitigation](40 CFR 230.10(d)). Will all appropriate and practicable steps [40 CFR 230.70-77] be taken to minimize adverse impacts of the discharge on the aquatic ecosystem?

Appendix B

Scoping Report

Scoping Report
Alaska Stand Alone Pipeline (ASAP)
Environmental Impact Statement

Submitted By:

ENTRIX, Inc.
1600 A Street
Anchorage, Alaska
99501-5148

Contact:

Sue Ban
Tel: 907.563.0438
Fax: 907.563.0439

Submitted To:

U.S. Army Corps of Engineers
Serena E. Sweet
Project Manager
CEPOA-RD-S
P.O. Box 6898
Elmendorf, AFB, Alaska
99506-6898

May, 2010

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ASAP	Alaska Stand Alone Pipeline
BLM	Bureau of Land Management
Corps	United States Army Corps of Engineers
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOAA	National Oceanic and Atmospheric Association
NPS	National Park Service
ROD	Record of Decision
ROW	Right-Of Way
SPCO	State Pipeline Coordinator’s Office
TAPS	Trans-Alaska Pipeline System

1.0 INTRODUCTION

The United States Army Corps of Engineers (Corps) Alaska District is preparing an Environmental Impact Statement (EIS) to analyze the Alaska Stand Alone Pipeline (ASAP) as proposed by the Alaska Department of Natural Resources. Cooperating agencies include the Bureau of Land Management (BLM), Environmental Protection Agency (EPA), National Park Service (NPS), and the State Pipeline Coordinator's Office (SPCO). As lead agency, the Corps is responsible for the development of the EIS, as well as all necessary permits within its jurisdiction. The cooperating agencies join in this effort so that the EIS provides the basis for permits and the right-of way (ROW) grants to be issued.

The Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on December 4, 2009. The scoping period, during which issues and concerns are identified, was initiated December 7, 2009. As specified in the NOI the original scoping period was scheduled to end February 5, 2010. Responding to a request from a project stakeholder the decision was made to extend the scoping period. A Public Notice was distributed to the original mailing list on February 5, 2010 noting an extension of the scoping period to March 8, 2010. Scoping comments were received through March 8, 2010.

1.1 Scoping Overview

The Corps hosted public scoping meetings for the ASAP EIS to disseminate information about the proposed project and to identify issues and concerns that should be addressed in the EIS (Table 1). Identical formats were followed for each meeting, and the same project information was presented. The meetings combined an open house with a brief, formal presentation, followed by a public question and comment opportunity using the following agenda:

1.0 hour	Open House
0.5 hour	Project Presentation
1.5 hours	Public Question and Comment Period

A court reporter recorded transcripts of each of the public scoping meetings. These transcripts are included in Appendix F.

TABLE 1. SCOPING MEETINGS, LOCATIONS, DATES & TIMES

Date	Time	Meeting	Location
December 8, 2009	5-8 PM	Glennallen Public Scoping Meeting	Tazlina Village Hall Mile 110.5 Richardson Highway, Glennallen
December 9, 2009	5-8 PM	Delta Junction Public Scoping Meeting	Delta Junction Community Center 2287 Deborah Street, Delta Junction
December 10, 2009	11 AM - 1 PM	Nenana Public Scoping Meeting	Nenana Civic Center 723 North A Street, Nenana
December 10, 2009	5-8 PM	Fairbanks Public Scoping Meeting	Pioneer Hall at Pioneer Park 2300 Airport Way, Fairbanks
December 11, 2009	11 AM - 1 PM	Denali National Park/ McKinley Village Public Scoping Meeting	McKinley Park Community Center Mile 230 Parks Highway, McKinley Park
December 14, 2009	5-8 PM	Anchorage Public Scoping Meeting	Anchorage Senior Activity Center 1300 East 19th Avenue, Anchorage

Date	Time	Meeting	Location
December 15, 2009	5-8 PM	Wasilla Public Scoping Meeting	Curtis D Menard Memorial Sports Center 1001 South Mack Drive, Wasilla
December 17, 2009	2-6 PM	Barrow Public Scoping Meeting	Inupiat Heritage Center 5421 North Star Street, Barrow
December 18, 2009	1-4 PM	Agency Scoping Meeting	Federal Building, Bureau of Land Management Office 222 West 7th Avenue, Anchorage

The Corps hosted an agency scoping meeting, beginning at 1:00 pm on December 18, 2009 in Anchorage. This meeting provided a specific opportunity for agencies to hear the scoping meeting presentation and to ask questions of clarification regarding the ASAP EIS project. The presentation and discussion served as a common foundation for identification of issues and concerns by federal and state agencies with jurisdiction and responsibility for resources potentially affected by the project.

This document is a public record of the scoping activities conducted for the ASAP EIS project from the issuing of the NOI through the close of the scoping period. Comments received during scoping are summarized and presented in this document. Comments received after the close of scoping will be considered during the development of the EIS, but are not part of this report.

The organization of this report begins with an overview of the outreach to notify the public and convene the scoping meetings. The body of this report then provides a brief summary of issues and comments offered by the agencies and the general public. The concluding section describes the next steps in the planning process.

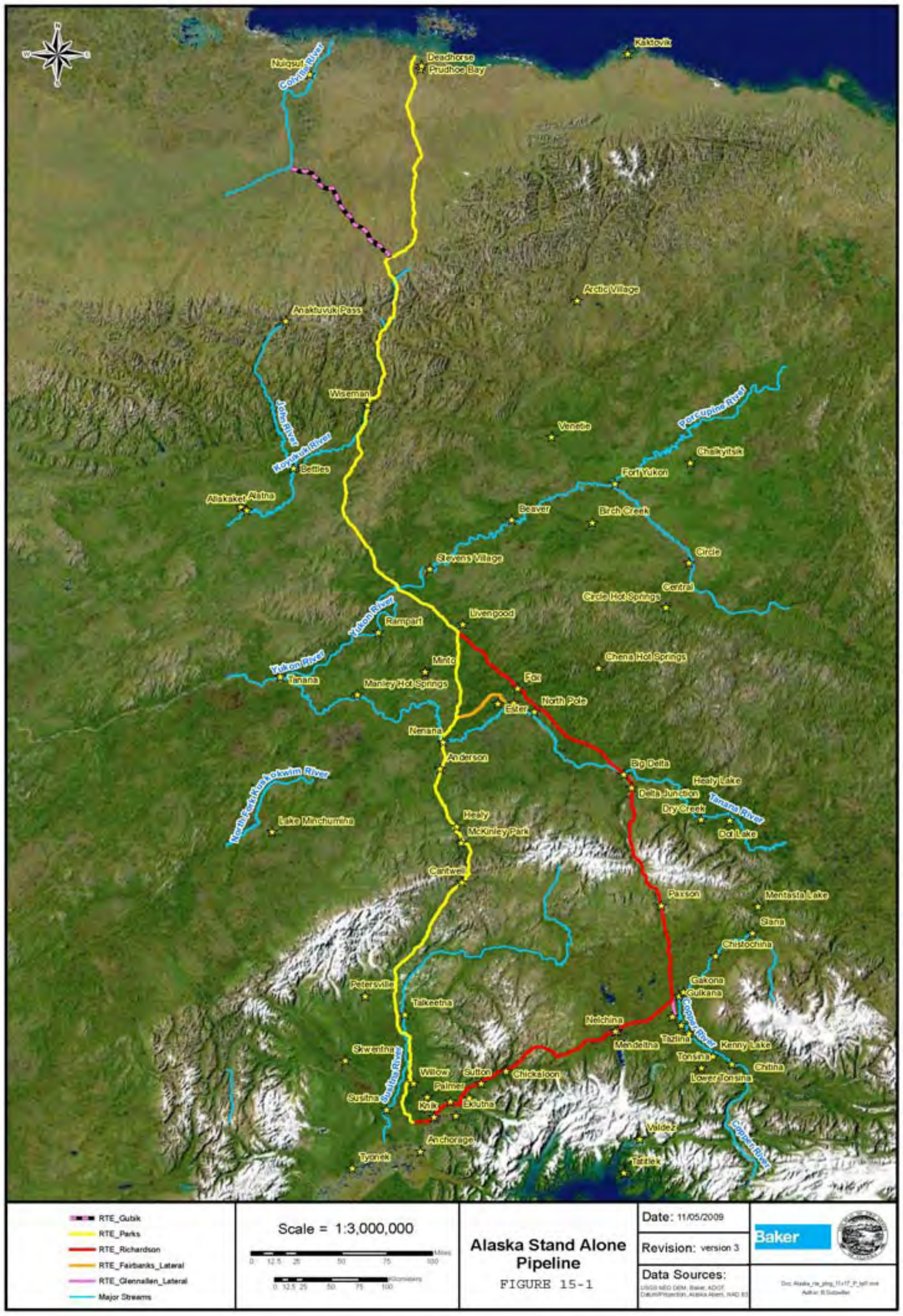
A series of appendices compile the supporting materials for the summaries provided in this report. Detailed materials regarding public notice and outreach are found in Appendix A through Appendix C. Appendices D and E provide a compilation of the original agency, general public and stakeholder comments. Finally, Appendix F includes the original transcripts from the scoping meetings.

1.2 Proposed Project Overview

Alaska Department of Natural Resources proposes a project to construct a 737-mile natural gas pipeline from Prudhoe Bay, located in Alaska's North Slope, to Cook Inlet in South-central Alaska (Figure 1). This pipeline is known as the ASAP project.

The ASAP EIS project area is primarily within existing transportation corridors, consistent with state and federal recommendations to consolidate such activities. The proposed pipeline and associated facilities would primarily cross state lands, although it would also cross federal (BLM), municipal, Native Corporation, Native allotment, and other private lands.

FIGURE 1. PROPOSED ALASKA STAND ALONE PIPELINE



1.3 Purpose of the Proposed Project

The ASAP project would help supply the energy needs of the Interior and South-central regions of Alaska. The pipeline would deliver natural gas and help decrease heating costs in the Interior and provide natural gas storage for periods of peak energy demand in South-central Alaska.

2.0 SCOPING METHODS

Scoping is designed to be an open, public process for identifying the scope of significant physical, biological, and social environmental issues related to the proposed project that should be addressed through the National Environmental Policy Act (NEPA) process. Scoping provides persons potentially affected by the project an opportunity to express their views and offer any suggestions they may have regarding the project and is typically accomplished through written correspondence, public scoping meetings, use of electronic media, and formal and informal consultation with agency officials, interested individuals, and groups.

The scoping process is the first phase of an ongoing public participation program, which keeps relevant agencies and the interested public engaged in the project's progress and informed of opportunities to participate in the preparation of the EIS. In the scoping phase, stakeholders, general public and agencies have an opportunity to 1) bring local issues and concerns within the project area to light, and 2) make comments and suggestions that will help develop a reasonable range of alternatives to be evaluated within the EIS.

The scoping process utilized a number of techniques to ensure that agencies, officials, stakeholders, and members of the public were informed of the project, including:

- Development of a project mailing list
- Newspaper and online notices of scoping meetings
- Public service announcements of scoping meetings
- Public scoping meetings in Glennallen, Delta Junction, Fairbanks, Nenana, McKinley Village, Wasilla, Anchorage, and Barrow
- Agency scoping meeting in Anchorage
- Project email address for comments (info@asapeis.com)
- Project website for project information and electronic comment submission form (http://www.asapeis.com)

2.1 Scoping Activities

The scoping activities conducted during the scoping period are summarized in the following sub-sections. Comments received during scoping are discussed and summarized in Section 3.0.

2.1.1 Project Scoping Announcements

The ASAP EIS process began with publication of the NOI in the *Federal Register* on December 4, 2009. A copy of the NOI is included in Appendix A.

On December 4, 2009, the Corps sent a public notice to affected parties regarding the EIS public scoping meetings and how to obtain more information. On February 5, 2010, the Corps sent out a second public notice to the original mailing list noting an extension of the scoping period and how to obtain more information.

Newspaper announcements for the scoping meetings were advertised in the *Copper River Record* on December 3, 2009; the *Delta Wind* online edition on December 7, 2009; the *Fairbanks Daily News Miner* December 9-10, 2009; the *Anchorage Daily News* on December 14, 2009; the *Mat-Su Valley Frontiersman* on December 10 and 15, 2009; and the *Arctic Sounder* on December 17, 2009. A public service announcement was emailed on December 1, 2009 to the KXGA radio station. Online announcements were posted on the Delta News Web calendar on December 2, 2009; the KSKA Anchorage Public Radio datebook calendar on December 10, 2009. This information is included in Appendix B.

Scoping period deadline reminders were advertised in newspaper announcements in the *Mat-Su Valley Frontiersman* on January 17, 19, and 22, 2010; the *Copper River Record*, *Delta Wind*, and the *Arctic Sounder* January 21, 2010; and the *Fairbanks Daily News Miner* January 22-28, 2010. An online reminder announcement with a link to the ASAP EIS website was posted on the *Anchorage Daily News* homepage January 18-24, 2010 and Peg Tileston's What's Up on January 22, 2010. This information is included in Appendix B.

An extension of the scoping period was advertised in newspaper announcements in the *Copper River Record*, *Delta Wind*, and the *Arctic Sounder* on February 18, 2010; and the *Mat-Su Valley Frontiersman* February 19, 21 and 23, 2010. Online extension announcements with a link to the ASAP EIS website were posted on the *Anchorage Daily News* and *Fairbanks Daily News Miner* homepages February 19-26, 2010. This information is included in Appendix B.

2.1.2 Public Scoping Meetings

Eight public scoping meetings were conducted in December 2009. Exact dates and locations of each meeting are detailed in Table 1. The scoping meeting format and information presented was the same at each public meeting. The open house session, during the first hour, was an opportunity for attendees to view display boards and maps that presented project information and were able to ask questions of the project team. A project overview, including an introduction to the NEPA process, was presented during the following half hour. The public question and comment period began immediately following the presentation with a court reporter recording public testimony.

Comment forms were made available at the meetings in order for attendees to submit written comments during the meeting or mail them at a later date. Supporting information for the public scoping meetings, including display boards and the formal presentation, is included in Appendix C.

2.1.3 Agency Scoping Meeting

An agency scoping meeting was held on December 18, 2009 at 1:00 p.m. at the Bureau of Land Management Office in Anchorage. Agencies received the same formal presentation as the public. Following the presentation, there were a few questions regarding project design components. The intent of the meeting was to provide agencies with an overview of the project. The agencies were asked to provide their scoping comments in writing. Comment submissions are included in Appendix D.

3.0 SUMMARY OF COMMENTS RECEIVED

The ASAP EIS scoping meetings were minimally attended with a few public comments in some locations. Three scoping meetings did not receive any attendees. Much of the discussion of those in attendance focused on details regarding design, alignment, and the relationship to other gas pipeline projects. Seventeen unique comment submissions were received, including four from state or federal agencies, one from local government, one State Representative and eleven from non-profits, businesses and the general public. In addition, oral comments were provided and recorded at all meetings, with the exception of the agency meeting in Anchorage and the scoping meetings with no attendance (Glennallen, Delta Junction, and Wasilla).

Comments received from both agency and public scoping meetings were received in several ways:

- Oral discussion or testimony from the public scoping meeting transcripts
- Written comments received during the public scoping meetings
- Written comments received by postal mail or by fax
- Written comments submitted electronically by email or through the project website

Comments were assigned subject category codes to describe the content of the comment. The issue categories are listed below in Section 3.1. Group affiliations of those that submitted comments include: federal and state agencies, local governments, businesses, special interest groups, and individuals. The complete text of agency and public comments received are in Appendices D and E respectively.

3.1 Issues Identified During Scoping

The comments received during the scoping period fell into the ten impact categories described as follows:

- Cultural Resources
- Communication
- Engineering, including route alternatives
- Cumulative Impacts
- Land Use
- Operations
- Safety
- Socioeconomic
- Surface water and wetlands
- Wildlife and Fisheries

3.2 Agency Comments

Agency scoping comments focused primarily on project definition, route and system alternatives, cumulative impacts and land use. The NPS submitted unique comments regarding the alternative route of the pipeline through Denali National Park. The NPS commented that existing regulations do not allow NPS to grant a right-of-way through the national park. NPS commented that federal legislation has been introduced to allow NPS to grant a right-of-way through national park lands. NOAA specifically identified the Beluga Whale and designated critical habitat in connection with plans for a fractionation plant in Cook Inlet.

For specific agency comments received, see Appendix D.

3.3 Public Comments

All comments received at public scoping meetings, by mail, and email, were assigned to issue categories based on the content of the comment (see Section 3.1). Individual comments are located in Appendix E. Below is a summary of the most common issues encountered during scoping including pipeline routing, facility siting and coordination with other projects. All scoping submissions and comments from members of the public can be seen in their entirety in Appendix E.

- Cumulative Impacts: Comments were received regarding cumulative impacts, fish and wildlife habitat impacts, future development of minerals and petroleum products
- Communication: Comments were received regarding communication and outreach to communities and with other projects. One commenter suggested a citizen's advisory group for the project. Comments were received regarding other in-state and inter-state pipeline projects.
- Engineering/Design/Construction: One comment requested an oil line in addition to the proposed gas line from Gubik. Another comment requested Gubik region gas to be a source option for the proposed gas line. One commenter suggested the East Curry Route Alternative, not included in the project documents, which would by-pass the Parks Highway.
- Land Use/Recreation: Comments identified competing land use along the proposed route. One commenter submitted 225 signatures on a petition to include multi-use paths in the project design.
- Socioeconomic: Comments suggested the EIS include a cost/benefit analysis of the project, local use of natural gas, health impact analysis and environmental justice.
- Wildlife and Fisheries: Comments were received identifying impacts to wildlife and fisheries habitat.

4.0 NEXT STEPS IN THE PLANNING PROCESS

4.1 Develop Alternatives

A reasonable range of alternatives that meet the purpose and need of the project will be identified and examined in the EIS. Applicable input from the scoping process will be incorporated into the range of potential alternatives. This ensures the entire range of positions expressed by participants in the scoping process has been considered. Eliminated alternatives and their justifications will be identified in the EIS. Viable alternatives will be developed with conceptual plans by utilizing available information, or by identifying additional information to be obtained in order to evaluate each alternative on an equal basis. This step of the process will begin May 2010.

4.2 Study of the Affected Environment

All available environmental information associated with the identified issue categories will be reviewed and summarized. The summary will include the most recent scientific research available and all pertinent studies and surveys required for areas that would be potentially impacted by all viable alternatives. This information will be presented in the *Affected Environment* chapter of the EIS. This step of the process will begin April 2010.

4.3 Assess Environmental Consequences of Alternatives

Potential environmental consequences of alternatives will be evaluated, including direct, indirect, and cumulative effects. NEPA compliance associated with federal, state, and local agency permits will be identified and incorporated into the analysis of potential effects. This step of the process will be conducted concurrently with the *Affected Environment* summary and will begin in May 2010.

4.4 Issue the Draft EIS

The Draft EIS will be prepared and made available for review by the public, Tribal Governments, local, state, and federal agencies. The Corps will identify the least environmentally damaging practicable alternative in the final stage of the EIS, namely the Record of Decision (ROD). The Draft EIS will be available for a 60-day review after the Notice of Availability has been published is the *Federal Register*. The public hearings will offer another opportunity for public comment on the Draft EIS. An additional agency meeting will also be held. The public comment period, for inclusion in the Final EIS, is estimated to be from August 2010 to September 2010.

4.5 Issue the Final EIS and Record of Decision

To prepare the Final EIS, revisions will be made on the Draft EIS upon analysis of public comments received. The Final EIS will include submitted comments on the Draft EIS, including revisions made to the EIS in response to comments. This step of the process will include public notice of document availability, the distribution of the document, and a 30-day waiting period on the final document. This step is anticipated to occur from November 2010 to February 2011.

The ROD issued by the Corps concludes the EIS process in February 2011. In their ROD, the Corps will identify the least environmentally damaging practicable alternative, based upon the technical analysis of the EIS and the public comments on the Draft EIS. The Corps in their

ROD will cite the rationale for their conclusions regarding the environmental effects and appropriate mitigation measures for the proposed Alaska Stand Alone Pipeline project.

5.0 CONTACTS

Lead Agency

U.S. Army Corps of Engineers
Ms. Serena E. Sweet
Project Manager
CEPOA-RD-S
P.O. Box 6898
Elmendorf, AFB, Alaska 99506-0898
Phone: (907) 753-2819
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil

Cooperating Agencies

Bureau of Land Management
Mr. Ron Dunton
Gas Pipeline Project Manager
222 West 7th Avenue, #13
Anchorage, Alaska 99513-7599
Phone: (907) 271-3132
Email: Ronald_Dunton@blm.gov

Environmental Protection Agency
Mr. Mark Jen
222 West 7th Avenue, #19
Anchorage, Alaska 99513-7504
Phone: (907) 271-3411
Email: Jen.Mark@epa.gov

National Parks Service
Mr. Bud Rice
Environmental Protection Specialist
240 West 5th Avenue, Suite 114
Anchorage, Alaska 99501
Phone: (907) 644-3530
Email: Bud_Rice@nps.gov

State Pipeline Coordinator's Office
Mr. Mike Thompson
State Pipeline Coordinator
411 W.4th Avenue, 2nd Floor
Anchorage, AK 99501
Phone: (907) 257-1303
Email: mike.thompson@alaska.gov

Project Website: www.asapeis.com

Project Email: info@asapeis.com

APPENDIX A

Public Notices

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement (DEIS) for the State of Alaska's Proposed Alaska Stand Alone Pipeline (ASAP) Natural Gas Transportation Pipeline

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent.

SUMMARY: The Alaska District, U.S. Army Corps of Engineers (Corps) intends to prepare a Draft Environmental Impact Statement (DEIS) to identify and analyze the potential impacts associated with the construction of the proposed Alaska Stand Alone Pipeline (ASAP) natural gas transportation pipeline. The Corps is the lead federal agency and the Bureau of Land Management (BLM), National Park Service (NPS) and Environmental Protection Agency (EPA) are participating as cooperating agencies in the DEIS development process. The Environmental Impact Statement (EIS) will be used as a basis for the Corps permit decision and to ensure compliance with the National Environmental Policy Act (NEPA). The Corps will be evaluating a permit application for work under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Because ASAP would require decisions and actions by other federal agencies (such as right-of-way grants and other permits), this DEIS will also fulfill the NEPA responsibilities of those federal agencies.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the DEIS can be answered by: Ms. Serena Sweet, Regulatory Division, telephone: (907) 753–2819, toll free in AK: (800) 478–2712, fax: (907) 753–5567, e-mail: *serena.e.sweet@usace.army.mil,* or mail: U.S. Army Corps of Engineers, CEPOA–RD, Post Office Box 6898, Elmendorf AFB, Alaska 99506–0898. Additional information may be obtained at *http://www.asapeis.com.*

SUPPLEMENTARY INFORMATION:

1. The permit applicant, the State of Alaska, is proposing to construct a 24-inch diameter, high-pressure pipeline from Alaska's North Slope to Cook Inlet to transport North Slope natural gas to in-state Alaska markets. The pipeline would be located entirely within the State of Alaska. Gas off-take would be provided for the Fairbanks Area and in other locations along the route. The Alaska Stand Alone Pipeline project includes a Gas Conditioning Plant on the North Slope prior to the pipeline inlet, compressor stations along the pipeline, and natural gas liquid (NGL) extraction facilities to produce utility-grade natural gas. The gas reserves in the Prudhoe Bay field are some of the largest on the North Slope and represent the most likely sources of gas for the pipeline system.

2. *Alternatives:* Two routing options are being considered to bring the gas from the North Slope to Alaska consumers. These two options follow routings from Prudhoe Bay to Cook Inlet via the Parks Highway and the Richardson Highway. Both route options share the same starting point at Prudhoe Bay and ending point (at Mile Post 55 of the Beluga Pipeline) as well as a common routing from Prudhoe Bay to the Livengood area. In addition, two spur line options and two pre-build options, using a proposed Alaska-Canada Gasline as the transport to the takeoff points will be included in this analysis.

a. *Stand Alone Alternative Routes:*

i. Parks Highway Stand Alone—from Prudhoe Bay to Livengood, then to Cook Inlet generally following the Parks Highway; includes service to Fairbanks.

ii. Richardson Highway Stand Alone—from Prudhoe Bay to Livengood, to Fairbanks, then generally following the Trans Alaska Pipeline alignment to Delta Junction, to north of Glennallen via the Richardson Highway, then to Cook Inlet via the Glenn Highway; includes service to Glennallen.

b. *Spur Alternative Routes:*

i. Parks Highway Spur—from Fairbanks to Cook Inlet generally following the Parks Highway.

ii. Richardson Highway Spur—from Delta Junction to north of Glennallen via the Richardson Highway, then to Cook Inlet via the Glenn Highway; includes service to Glennallen.

c. *Pre-Build Alternative Routes:*

i. Parks Highway Pre-Build—from Cook Inlet to Fairbanks generally following the Parks Highway.

ii. Richardson Highway Pre-Build—from Cook Inlet via the Glenn Highway to north of Glennallen then to Delta Junction via the Richardson Highway, then generally following the Trans Alaska Pipeline alignment to Fairbanks (with a smaller diameter pipeline).

d. *Gas Source Alternatives:*

i. *Prudhoe Bay Gas Source:* Natural gas from the Prudhoe Bay gas fields would require treatment at a gas treatment plant that would likely be located at Prudhoe Bay. From Prudhoe Bay the gas pipeline would generally follow the existing Trans Alaska Pipeline System (TAPS) corridor across the North Slope and enter the Brooks Range near Galbraith Lake.

ii. *Gubik Gas Source:* The Gubik Gas Field is located 19 miles east of Umiat and approximately 70 miles west of TAPS Pump Station #2. The pipeline from the Gubik Field would parallel a proposed road alignment to the east, crossing the Anaktuvuk River, and proceeding southeast to the Itkillik River. The route would then parallel the Itkillik River to the east side of Itigaknit Mountain then south to connect with the TAPS Corridor near Toolik Lake. The exact location of the Gubik production facilities has not been selected. The length of the Gubik Pipeline route to the TAPS corridor is estimated to be about 90 miles.

3. *Scoping Process:* The scoping period will begin on December 7, 2009, and end on February 5, 2010.

a. The Corps invites full public participation to promote open communication on the issues surrounding the proposal. All federal, state, Tribal, local agencies, and other persons or organizations that have an interest are urged to participate in the NEPA scoping process. Scoping meetings will be held to receive public input on the proposed purpose and need of the project, to identify significant issues and to discuss proposed alternatives. The scoping process will help to further explain the purpose and need plus the alternatives to be reviewed in the DEIS.

b. The scoping meetings are tentatively planned for the dates and locations listed at *http://www.asapeis.com* (please consult website for any changes and additional information including the scoping summary). The Corps expects to hold scoping meetings in Anchorage, Barrow, Delta Junction, Fairbanks, Glennallen, McKinley Park, Nenana, and Wasilla.

4. The lands along the proposed pipeline corridor and one or more of its alternatives are owned by numerous entities; including, federal and state governments, the State of Alaska, and private land holders. These federal land managers include the BLM, NPS and the Department of Defense. Private landholders include Native corporations, Native allottees, and land owned by other private individuals.

5. The DEIS will analyze the potential social, economic, and environmental impacts to the affected areas. The following major issues will be analyzed in depth in the DEIS: the natural gas delivery system construction and operation and its affect upon the surrounding communities; essential fish

habitat; threatened and endangered species including critical habitat; cultural resources; socioeconomics; and secondary and cumulative impacts.

6. It is anticipated that the DEIS will be available August 2010 for public review.

Dated: November 23, 2009.

Serena E. Sweet,

Project Manager, Alaska District, U.S. Army Corps of Engineers.

[FR Doc. E9–28865 Filed 12–3–09; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement (DEIS) for the Proposed Point Thomson Project To Develop the Thomson Sand Reservoir by Extracting Gas Condensate and Oil for the Purpose of Commercial Production as Proposed by the Exxon Mobil Corporation (ExxonMobil)

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent.

SUMMARY: The Alaska District, U.S. Army Corps of Engineers (Corps) intends to prepare a Draft Environmental Impact Statement (DEIS) to identify and analyze the potential impacts associated with the development of the Thomson Sand Reservoir, including construction and operation of the proposed project. The Corps will be evaluating a permit application for work under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. The Environmental Impact Statement (EIS) will be used as a basis for the permit decision and to ensure compliance with the National Environmental Policy Act.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the DEIS can be answered by: Ms. Julie McKim, Regulatory Division, telephone: (907) 753–2773, toll free in AK: (800) 478–2712, Fax: (907) 753–5567, e-mail: *julie.w.mckim@usace.army.mil,* mail: U.S. Army Corps of Engineers, CEPOA–RD, Post Office Box 6898, Elmendorf AFB, Alaska 99506–0898. Additional information may be obtained at *http://www.pointthomsonprojecteis.com.*

SUPPLEMENTARY INFORMATION:

1. *Background Information:* The Environmental Protection Agency (EPA) previously issued a notice of intent to prepare a DEIS on April 19, 2002 for a similar proposal to develop oil and gas reserves in or near the Point Thomson Unit, potentially including designation of ocean dredged material disposal site(s). The EPA was the lead Federal Agency because the proposed project would have required authorization under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA), with the Corps as a Cooperating Agency. Per the applicant's request, the agreement to pursue the EIS was terminated between the EPA and the applicant, Exxon Mobil Corporation (ExxonMobil). In October 2009, ExxonMobil submitted a new proposed project that would not be subject to Section 102 of the MPRSA but would require authorization from the Corps under Section 10 of the Rivers Harbors Act of 1899 and Section 404 of the Clean Water Act. Therefore, the Corps has been designated the lead Federal agency for the revised proposed project.

2. The permit applicant, ExxonMobil, is proposing to develop the Thomson Sand Reservoir located approximately 60 miles east of Deadhorse on the Beaufort Sea coast, in the State of Alaska. A minimum of five wells would be drilled from three pads: a Central Pad, and East and West Pads located to access the eastern and western extent of the reservoir. The applicant would produce gas from the reservoir to recover liquid condensate from natural gas and re-inject the residual gas back into the reservoir, conserving it for future use. Hydrocarbon liquid condenses from the produced natural gas when pressure and temperature are lowered below original reservoir conditions during production at surface processing facilities. ExxonMobil proposes to develop offshore portions of the reservoir using long reach directional drilling techniques from the onshore pads. The produced hydrocarbon liquids (condensate and oil) would be shipped through a new 22-mile long, elevated pipeline from Point Thomson to the existing Badami Development. This pipeline would then tie into the existing Badami common carrier pipeline, which connects with the existing common carrier oil sales pipeline system to the Trans-Alaska Pipeline System Pump Station No. 1. The Central Pad would also include infrastructure to support operations and drilling, such as temporary construction and permanent camps; offices, warehouses, and shops; electric power generating and distribution facilities; diesel fuel, water, and chemical storage; treatment systems for drinking water and wastewater; a grind and inject module; waste management facilities; and communications facilities. Other project facilities, in addition to the drilling pads, would include a gravel airstrip, a bulkhead and dolphins, in-field gravel roads, ice roads, in-field pipelines, and a gravel mine. Dredging may be required at the bulkhead.

3. *Alternatives:* Reasonable alternatives will be identified and evaluated throughout the Scoping and EIS process.

4. *Scoping:* The scoping period will begin on January 11, 2010 and end on February 25, 2010.

a. The Corps invites full public participation to promote open communication on the issues surrounding the proposal. All Federal, State, Tribal, local agencies, and other persons or organizations that have an interest are urged to participate in the NEPA scoping process. Meetings will be held to receive public input on the proposed purpose and need of the project, to identify significant issues and to discuss proposed alternatives. The scoping process will help to further explain the purpose and need plus the alternatives to be reviewed in the DEIS.

b. The DEIS will analyze the potential social, economic, physical, and biological impacts to the affected areas. The following major issues will be analyzed in depth in the DEIS: threatened and endangered species including critical habitat; hydrology and wetlands; fish and wildlife; the construction and operation of the facilities and their effect upon the surrounding communities; cultural resources; socioeconomics; alternatives; secondary and cumulative impacts.

c. The Corps will serve as the lead Federal agency in the preparation of the DEIS. The Environmental Protection Agency, United States Fish and Wildlife Service, and State of Alaska Department of Natural Resources are participating as cooperating agencies.

5. The Corps expects to hold scoping meetings in Anchorage, Barrow, Fairbanks, Kaktovik, and Nuiqsut. Further information about these meetings will be published locally, on the project Web site *http://www.pointthomsonprojecteis.com,* or can be obtained by contacting the Corps as described above. A description of the proposed project will be posted on the project Web site prior to these meetings to help the public focus their scoping comments.

6. It is anticipated that the DEIS will be available November 2010 for public review.

Dated: November 23, 2009.

US Army Corps
of Engineers
Alaska District

Regulatory Division (1145)
CEPOA-RD
Post Office Box 6898
Elmendorf AFB, Alaska 99506-0898

Public Notice for Environmental Impact Statement

PUBLIC NOTICE DATE: **December 4, 2009**

REFERENCE NUMBER: **POA-2009-651**

The Alaska District, U.S. Army Corps of Engineers (Corps) intends to prepare a Draft Environmental Impact Statement (DEIS) to identify and analyze the potential impacts associated with the construction of the proposed Alaska Stand Alone Pipeline (ASAP) natural gas transportation project.

The Corps is the lead federal agency and the Bureau of Land Management (BLM), National Park Service (NPS) and Environmental Protection Agency (EPA) are participating as a cooperating agency in the DEIS development process.

The DEIS will be used as a basis for the permit decision and to ensure compliance with the National Environment Policy Act (NEPA). The Corps will be evaluating a permit application for work under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Because ASAP would require decisions and actions by other federal agencies (such as right-of-way grants and other permits), this DEIS will also fulfill the NEPA responsibilities of those federal agencies.

The project would consist of a small diameter, high-pressure pipeline from Prudhoe Bay to Cook Inlet to transport North Slope natural gas to in-state Alaska markets. The pipeline would be located entirely within the State of Alaska with gas takeoff points proposed along the route, including Fairbanks. The Stand Alone Pipeline project would include a gas conditioning plant on the North Slope prior to the pipeline inlet, compressor stations along the pipeline, and natural gas liquid (NGL) extraction facilities to produce utility grade natural gas.

The EIS scoping period will begin on December 7, 2009, and end on February 5, 2010. The scoping meetings are tentatively planned for the dates and locations listed at www.asapeis.com (please consult website for any changes and additional information including the scoping summary). The Corps expects to hold scoping meetings in Anchorage, Barrow, Delta Junction, Fairbanks, Glennallen, McKinley Park, Nenana, and Wasilla.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the DEIS can be answered by: Ms. Serena Sweet, Regulatory Division, telephone: (907) 753-2819, toll free in AK: (800) 478-2712, fax: (907) 753-5567, email: serena.e.sweet@usace.army.mil, or mail: U.S. Army Corps of Engineers, CEPOA-RD, Post Office Box 6898, Elmendorf AFB, Alaska 99506-0898. Additional information may be obtained at www.asapeis.com.

NOTICE TO POSTMASTERS: Please post continuously until February 4, 2010.

District Engineer
U.S. Army, Corps of Engineers

US Army Corps
of Engineers
Alaska District

Regulatory Division (1145)
CEPOA-RD
Post Office Box 6898
Elmendorf AFB, Alaska 99506-0898

Public Notice for Environmental Impact Statement

PUBLIC NOTICE DATE: **February 5, 2010**

REFERENCE NUMBER: **POA-2009-651**

*****PUBLIC NOTICE REVISION*****

On December 4, 2009, a Public Notice was distributed stating that the Alaska District, U.S. Army Corps of Engineers (Corps) intends to prepare a Draft Environmental Impact Statement (DEIS) to identify and analyze the potential impacts associated with the construction of the proposed Alaska Stand Alone Pipeline (ASAP) natural gas transportation project. In that notice, the Corps stated that the scoping period would end on February 5, 2010. **In response to several requests, the Alaska District has decided to extend the scoping period to March 8, 2010.**

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the DEIS can be answered by: Ms. Serena Sweet, Regulatory Division, telephone: (907) 753-2819, toll free in AK: (800) 478-2712, fax: (907) 753-5567, email: serena.e.sweet@usace.army.mil, or mail: U.S. Army Corps of Engineers, CEPOA-RD, Post Office Box 6898, Elmendorf AFB, Alaska 99506-0898. Additional information may be obtained at www.asapeis.com.

NOTICE TO POSTMASTERS: Please post continuously until **March 8, 2010**.

District Engineer
U.S. Army, Corps of Engineers

APPENDIX B

Media Advertisements

Media Advertisements

December 2009

Tanana Valley Meats in Trouble over Moose Processing

FAIRBANKS, Alaska (AP) – Alaska State Troopers in Fairbanks have received numerous complaints from hunters who took their moose, caribou and sheep meat to Tanana Valley Meats to be processed, said Sgt. Scott Quist with Alaska Wildlife Troopers in Fairbanks.

``We talked to the (Department of Environmental Conservation) about it at length about a month ago, and we recently got a new rash of complaints about people getting rotten meat back or no meat back at all," said Quist.

The state Department of Environmental Conservation visited the plant on two occasions in response to complaints, one from troopers and one from a customer, but didn't issue any citations.

``We went out and did a pretty extensive investigation to the extent that any (game meat) products may have impacted products in the part of plant we regulate," said Lorinda Lhotka, an environmental health officer with DEC in Fairbanks. ``We had to work with them on some storage issues and notified the USDA of those issues."

While the slaughtering of domestic livestock is highly regulated by the DEC and USDA, wild game meat processing doesn't fall under the authority of any state or federal agency.

The state's wanton waste law applies to hunters who salvage meat from animals, not processors who cut it up, Quist said.

The DEC regulates sanitary conditions in relation to how commercial meat is stored and sold.

``We don't have clear regulatory authorities to regulate custom processing for game submitted by hunters," said Ron Klein, food safety and sanitation program manager for the DEC in Anchorage. ``There is no agency that does that. It really is a gray area."

With game animals, nobody except the hunter has any control how an animal is butchered or handled in the field, he said. ``Those issues make it difficult for us to regulate game meat processing," he said. ``Whether the state should be doing that or not is a policy decision for public or the legislature to make."

The USDA's Food Safety Inspection Service oversees the slaughtering and processing of animals at processing plants, but it does not have jurisdiction over wild game unless it's affecting the facility's USDA requirements, said Mark Aherns with the USDA in Anchorage. Aherns would not confirm or deny the USDA had received any complaints about Tanana Valley Meats.

Tanana Valley Meats manager and head meat cutter Stacy Hansen, as well as plant president Scott Miller, acknowledge mistakes were made in the plant's game processing this fall, and Miller said he is ``trying to make it right" with dissatisfied customers.

The problem, both men said, was that the plant got overwhelmed with moose in September and didn't have enough meat cutters to deal with it. Hansen doesn't know how many moose they took in but figures it was more than 200.

Tanana Valley Meats has gone through a tumultuous few years. Started as B-Y Farms in 1989, the plant was purchased by a group of local investors in 2007 when the original owners, Bob and Yvonne Franklin, went out of business.

The slaughterhouse operated without a USDA certificate for nearly two years, doing custom processing, before finally regaining its USDA certification in June.

Information from: Fairbanks Daily News-Miner, http://www.newsminer.com move gradually toward running the count pretty much the same way each year, even with the same people counting the same areas,"

area. Feeder counters count the largest number of birds for each species seen together at the feeder

or dessert to share.

Contact outdoors editor Tim Mowry at 459-7587.

South Fairbanks — Ken Rus... gov

White Mountains caribou hunt closes at

By TIM MOWRY
tmowry@newsminer.com

With the average harvest running at one caribou per day, the Alaska Department of Fish and Game announced the state and federal winter registration permit hunts for the White Mountains Caribou Herd in game management units 20B, 20F and 25C will close today at 11:59 p.m.

The harvest quota for the hunt is 11 caribou and hunters had reported a harvest of eight caribou as of Tuesday, an average of one a day. The hunt opened on Dec. 1.

"Weather has been fairly mild, the harvest has been steady, and we expect the quota to be reached by Thursday," Fairbanks assistant area biologist Tom Seaton with the Alaska Department of Fish and Game said.

The below-average snowfall didn't seem to prevent hunters from finding animals on snowmachines and four-wheelers.

"Snow depths are low so far this winter, but hunters have been able to access caribou," Seaton said. "Mostly they're getting them from the Steese Highway with highway vehicles. Most of the (kills) are real close to the Steese."

At around just 750 animals, the White Mountains herd is relatively small. It supports an annual harvest quota of 23 caribou, which is divided into a fall general hunt for any bull and a winter registration permit hunt for any caribou. Hunters killed 12 caribou in the fall hunt, leaving 11 for the winter hunt, Seaton said.

The winter hunt usually lasts most of the winter but Seaton suspects there are some stragglers from the larger Fortymile Caribou Herd in the White Mountains hunt area that hunters are taking. There's no way to tell the difference between the two herds a... tymile carib... White Moun... area they're... Seaton said.

Hunters ... their kills w... of the kill o... at http://hu... or in person... the ADF&G... banks at 45... ers who rep... must also m... reports or d... the ADF&G...

The dea... ing permit h... up. Mailed ... and the dea... Dec. 31. Pa... Department... license ven... for more inf...

Home News Blogs Calendar Classified Archives

Hover over or click on event below for complete information

Public Scoping Meeting

Description: Alaska Stand Alone Pipeline
Environmental Impact Statement

The U.S. Army Corps of Engineers, with participation by the Bureau of Land Management, the Environmental Protection Agency, and the National Park Service as cooperating agencies, invite the public to an open house and scoping meeting. An Environmental Impact Statement (EIS) is being prepared to analyze the construction of the Alaska Stand Alone Pipeline proposed by the Alaska Department of Natural Resources.

The public scoping meeting provides an opportunity to express your views and identify issues to address in the EIS process. The meeting will include background information on the Alaska Stand Alone Pipeline and the process of preparing an EIS.

Visit the project website for more information: www.asapeis.com.

Delta Junction Meeting
December 9, 2009
5:00 - 6:00 pm: Open House
6:00 - 6:30 pm: Presentation
6:30 - 8:00 pm: Public Questions and Comments
Delta Junction Community Center; 2287 Deborah Street

Location: Delta Junction Community Center; 2287 Deborah Street
Date: Wednesday, December 9, 2009
Time: 5:00pm-8:00pm AKST
Duration: 3 hours
Created by: Kacy Hillman
Updated: Wednesday, December 2, 2009 9:09pm GMT

Delta Junction, Alaska ~ Delta News Web HOME | Bulletin Boards | Calendar | Classifieds | Archives
Submit event - Submit news - Submit pictures - Submit classified ad

Delta area info ~ Home | Visitor Information | Business Information

PO Box 609 Delta Junction, AK 99737-0609
Tel. 907/895-4919
webeditor@deltanewsweb.com

Delta Wind

CHINOOK! A feature by George M. Hewer II

Crafted Gourmet

December 09, 2009 Delta Junction, Alaska

Home
Calendar
Classified Ads
News
Photo Gallery
Info Submission Forms
Features
E-Games New!
Community Links New!

Features
Local TV Listings
Search
Archives GO!
Search tips | Advanced
Search Google
Go

Search Results

» View MY Classifieds

Classifieds > Notice/Legal

Public Scoping Meeting Save this Ad

12/07/09

Public Scoping Meeting Alaska Stand Alone Pipeline Environmental Impact Statement The U.S. Army Corps of Engineers, with participation by the Bureau of Land Management, the Environmental Protection Agency, and the National Park Service as cooperating agencies, invite the public to an open house and scoping meeting. An Environmental Impact Statement (EIS) is being prepared to analyze the construction of the Alaska Stand Alone Pipeline proposed by the Alaska Department of Natural Resources. The public scoping meeting provides an opportunity to express your views and identify issues to address in the EIS process. The meeting will include background information on the Alaska Stand Alone Pipeline and the process of preparing an EIS. Visit the project website for more information: www.asapeis.com. Delta Junction Meeting December 9, 2009 5:00 - 6:00 pm: Open House 6:00 - 6:30 pm: Presentation 6:30 - 8:00 pm: Public Questions and Comments Delta Junction Community Center; 2287 Deborah Street

FALL OF AMERICA Save this Ad

11/30/09

AND THE WESTERN WORLD. You are invited to come and see this nine part series, a critical analysis of the ongoing destruction of our political and economic free market system. Twelve world class experts from government, journalism, and politics discuss the final outcome: world government. THE REMNANT ROOM at M.P. 273.5 Richardson Hwy. hosts this movie and informal round-table on Friday and Saturdays at 6 pm and Sunday at 3 pm.

CITY COUNCIL MINUTES Save this Ad

09/07/09

The minutes of the Delta Junction City Council meetings can be read at www.ci.delta-junction.ak.us. or copies can be requested from City Hall at 895-4656.

LEPC MINUTES AVAILABLE Save this Ad

09/07/09

The minutes of the most recent Delta Greely Local Emergency Planning Committee meeting can be read at www.ci.delta-junction.ak.us/lepc/index.htm. LEPC meetings are the second Tuesday of even-numbered months at 6 pm in the old fire station. Call 895-4656 for more information.

Alcoholics Anonymous Save this Ad

09/07/09

meets Mondays and Thursdays at 7 pm in the Presbyterian/Lutheran Church. Call 895-5260 or 895-4400

Emotions Anonymous Save this Ad

09/07/09

Tuesdays 7-8 pm for men and women. Meetings held at cabin at Delta Concrete. For more information call Tena Walker 590-0776 or 895-5401.

Women's recovery Save this Ad

09/07/09

meeting each Tuesday 6-7 pm at a cabin at Delta Concrete. For more information call Tena Walker at 590-0776 or 895-5401

ATTENTION NON-PROFITS Save this Ad

09/07/09

HIGH SCHOOL VOLLEYBALL

Point Hope puts it into overdrive for No. 5

Four-set victory over Golovin secures title

VAN WILLIAMS
vwilliams@alaskanewspapers.com

Raymond Koenig came up big when his team needed him most, and as a result, he and the rest of the Point Hope coed volleyball players are celebrating another championship.

Koenig was named the match MVP to key a 26-28, 25-18, 25-14, 25-16 victory over Golovin in the title tilt of the ASAA Mixed Six Volleyball State Tournament in Anchorage.

Point Hope has a 5-1 all-time record in the championship match, winning in 2009, 2008, 2006, 2005, 2001).

Koenig and teammate George Vincent were both selected to the all-tournament team.

Vincent played a big role in helping the Arctic Conference champions avoid disaster in the first round, overcoming an early deficit to pull out a thrilling 27-25, 22-25, 17-25, 25-16, 15-11 win over Unalakleet.

Point Hope then beat Southwest champion Newhalen in the semifinals to reach the championship match.

In the ASAA Class 1A-2A state tournament also held at Dimond High School, Klawock beat Skagway in the championship match between two Southeast teams.

ASAA mixed-six volleyball state tournament

At Dimond High, Anchorage

Championship

Point Hope def. Golovin, 26-28, 25-18, 25-14, 25-16. Match MVPs – Raymond Koenig, Point Hope; Frank Amaktoolik Jr., Golovin.

Third place

Newhalen def. Kwethluk, 18-25, 25-18, 25-18, 25-19. Match MVPs – Matthew Askoak, Newhalen; Carlton Hautala, Kwethluk

Fourth place

Unalakleet def. Noatak, 25-15, 14-25, 25-18, 25-23. Match MVPs – Pete Katongan, Unalakleet; Fred Luther Jr., Noatak

All-Tournament Players

Shralyn Sockpealuk, Golovin; Matthew Akoak, Newhalen; Fred Luther Jr., Noatak; Katiya Erickson, Unalakleet; Freddi Wassillie, Newhalen; Joshua Sergie, Kwethluk; Tammy Papp, Marshall; George Vincent, Point Hope; Pete Katongan, Unalakleet; Bruce Morgan, Russian Mission; Raymond Koenig, Point Hope; Frank Amaktoolik Jr., Golovin.

Awards

Server – Pete Katongan, Unalakleet. Setter – Katiya Erickson, Unalakleet. Hitter – Frank Amaktoolik, Golovin. Defense – Robert Moses Jr., Golovin.

ASAA Class 1A/2A Volleyball State Tournament

At Dimond High, Anchorage

Championship

Klawock def. Skagway, 25-25, 25-19, 25-23. Match MVPs – Tess Larson, Klawock; Elis Doland, Skagway.

Third place

Kalskag def. Koliganek, 25-20, 25-17, 25-13. Match MVPs – Sophia Levi, Kalskag; Brianna Nelson, Koliganek.

Fourth place

Kenny Lake def. Tok, 25-19, 25-14, 19-25, 25-22. Match MVPs – Hannah Rosenkrans, Kenny Lake; Jaycee Peet, Tok.

All-tournament players

Chelsey Kasayulie, Koliganek; Tori Carl, Klawock; Cassie Fefelov, Ninilchik; Reid Goneau, Tok; Sarah O'Leary, Seldovia; Ariel Ramadanovic, Kalskag; Brianna Nelson, Koliganek; Hannah Rosenkrans, Kenny Lake; Elise Doland, Skagway; Patricia Holmber, Kalskag; Tess Larson, Klawock; Jesse Ellis, Skagway.

Awards

Server – Elise Doland, Skagway. Setter – Rebecca Armour, Klawock. Hitter – Ariel Romadanovic, Kalskag. Defense – Hannah Rosenkrans, Kenny Lake.

Above: Robert Moses Jr. (31) of Golovin returns the ball to waiting Noatak Lynx defenders Ezra Adams (5), Brett Kirk (21) and Brianna Kirk (13).

Right: Tikigaq's Heather Minix digs in to return a ball.

datebook49

Alaska Stand Alone Pipeline, Environmental Impact Statement, Public Scoping Meeting

WHEN	Monday, December 14, 2009, 5 – 8pm
WHERE	Anchorage Senior Center, 1300 East 19th Avenue
EVENT TYPE	Community

NOTE

The U.S. Army Corps of Engineers, with participation by the Bureau of Land Management, the Environmental Protection Agency, and the National Park Service as cooperating agencies, invite the public to an open house and scoping meeting. An Environmental Impact Statement (EIS) is being prepared to analyze the construction of the Alaska Stand Alone Pipeline proposed by the Alaska Department of Natural Resources.

The public scoping meeting provides an opportunity to express your views and identify issues to address in the EIS process. The meeting will include background information on the Alaska Stand Alone Pipeline and the process of preparing an EIS.

Visit the project website for more information: www.asapeis.com.

Anchorage Meeting
December 14, 2009
5:00 - 6:00 pm: Open House
6:00 - 6:30 pm: Presentation
6:30 - 8:00 pm: Questions and Comments

Cookies and coffee will be served. Please come join us!

LINK www.asapeis.com

Printed: Wednesday, December 16, 2009 at 11:39 AM PST

Media Advertisements

January 2010

Anchorage Daily News

26° 29° | 18°
forecast | statewide
Daylight : 9:52 AM - 4:30 PM

Escort tugs rescue drifting oil tanker

An Exxon tanker carrying more than 25 million gallons of Alaska crude oil lost power early Sunday while leaving Prince William Sound and had to be towed to safety, the U.S. Coast Guard said. 7:36 AM

High oil prices open funding doors for Alaska Legislature

Alaska lawmakers are going into the 2010 legislative session planning to spend more money on hometown projects, possibly cover college tuition and consider what to do about the high cost of energy.

Lawmakers reconsider oil taxes

Exxon spill oil persistence may be explained by new study

For nearly a decade, scientists have puzzled over the persistence of oil from the Exxon Valdez oil spill. A pair of Lower 48 researchers on Sunday published the first study to attempt an explanation.

Exxon Valdez background

Kotzebue musher Baker pulls away to win Kuskokwim 300

John Baker of Kotzebue beat the elements and a pair of Iditarod champions, breaking away from Lance Mackey and Martin Buser early Sunday and cruising to victory in the Kuskokwim 300 sled dog race.

Bands play, crowds gather to help wounded policeman

An empty beer pitcher labeled "donations" sat on the wooden bar and rock music shook the walls Sunday night at Chilkoot Charlie's as a local bands performed a five-hour benefit concert for the Anchorage police officer shot Jan. 9.

Law-enforcement agencies join investigation of officer shooting

Troops with the 82nd Airborne Division distribute water in Port-au-Prince.

Chaos overwhelms Haiti as aid effort falters

Prayers of thanksgiving and cries for help rose from Haiti's huddled homeless Sunday, the sixth day of an epic humanitarian crisis that is straining the world's ability to respond and igniting flare-ups of violence amid the rubble of Port-au-Prince.

Photos: The situation in Haiti Sunday

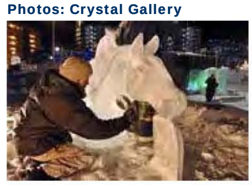
Under the rubble, a few are still alive

Photos Video Featured Reader-submitted Most popular +

Photos: Alyeska's halfpipe

Skiers and snowboarders dropped into Alyeska's new Super Pipe to warm up and compete in the Alyeska Pipeline Masters competition.

Photos: Crystal Gallery



Blocks of ice are brought to life as ice carvers create shapes of all kinds in downtown Anchorage's Crystal Gallery of Ice Carving.

Top Jobs

all 79 top jobs

alaskacareerbuilder

find

Place an ad | Advanced search

Accounting/Banking/Finance
Item Processing Specialist
Northrim Bank

Health Care Services
Senior Compliance Analyst
Southcentral Foundation

Skilled/Trades
Mill Manager
Coeur Alaska

Executive/Professional
Technology Manager
Kodiak Island Borough School District

News

Anchorage | Mat-Su | Crime | Politics More +

Navy defends sonar training in Gulf of Alaska

Environmentalists are speaking out against Navy plans to train with sonar in the Gulf of Alaska.

Martin Luther King Jr. Day closures

Under pay pressure, Juneau will lay off 10

Politics

Ramras wants constitutional amendment on gas pipeline tax

Palin lands VIP gig at NASCAR's Daytona 500 with other celebs

Alaska Ear

COLUMN
Julia O'Malley

Alaska life, one story at a time.

RURAL BLOG
The Village

Blogging about life and politics in rural Alaska.

Photos: Life in the Bush

Alaska Newsreader

More +

Midtown Anchorage grocery catering to Muslims is Alaska's first

Anchorage is now home to nearly 4,000 Muslims, and in December, Lamin Jobarteh left his career as a business banker to open Alaska Halal Grocery on International Airport Road near C Street.

Vandals wreck 'wannabe Eskimo's' igloo in England 9:02 AM

When built-in antifreeze beats a winter coat 9:58 AM

Aleut baidarka to circumnavigate Puget Sound waters 9:50 AM

Even hardiest Fairbanksans set limits for cold

Reid confronts Murkowski over attack on EPA

Multimedia

Homes By Prudential

more

2629 Puffin Point

Home is a delight w/soaring ceilings wall of windows, fresh paint new carpet remodeled bathrooms new doors hardware & lighting 3 bdr, 2.5 ba.

◂ 9 of 9 ▸

HomeFinder

find

Search ADN Real Estate | Place a homes ad
Realtor Market Place | Homebook

Top Rentals

more

****February 4**
Deadline for comments on the draft Environmental Assessment (EA) for the proposed **EXTENSION FOR THE TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT (ANC) RUNWAY 7R** that includes extending the runway 1,500 feet to the west. For more information, go to www.anc7Rrunwayextensionproject.net. For more information, contact Gary Lincoln at 907-269-0606 or Julianne Hanson at 907-269-0473.

****February 4**
Comments are due on an application for amendment of **AN OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN** from Alaska Tanker Company, LLC, BP Oil Shipping Company, USA, Chevron Shipping Company, LLC, Polar Tankers, Inc., SeaRiver Maritime, Inc., and Tesoro Alaska Company. The plan holders propose amending the approved plans which allow the applicants to conduct oil transfer operations using tank vessels to transport crude oil from the Valdez Marine Terminal, commonly known as TAPS Trade Vessels. The shipping vessels carry a maximum of 1,484,829 barrels of crude oil while in State waters. An oil discharge prevention and contingency plan is required that will commit adequate resources to plan for containment, control, and cleanup of crude oil equal to the discharge response planning standard volumes for these vessels. The review document consists of amendments to the Prince William Sound Tanker Oil Discharge Prevention and Contingency Plan (Core Plan) and the Ship Escort Response Vessel Service (SERVS) Technical Manual submitted December 21, 2009. Copies of the amendment application are available for review at the Alaska Department of Environmental Conservation Anchorage office located at 555 Cordova Street (please call (907) 269-3094 to schedule an appointment); the public libraries in Cordova, Homer, Kenai, Kodiak, Seward and Valdez; the Whittier Harbor Master's office; and the Loussac Public Library in Anchorage. For more information or to submit comments, contact John Kotula at john.kotula@alaska.gov or Fax 907-835-2429.

****February 5**
Deadline for response to **THE ALASKA CENTER FOR OCEAN SCIENCE EDUCATION EXCELLENCE** (COSEE) and the **INTERNATIONAL ARCTIC RESEARCH CENTER** (IARC) a **SURVEY OF ALASKAN TEACHER NEEDS** for resources and training to teach about climate change and marine environments in Alaska. If you are an Alaskan teacher, please fill out a short survey to inform them about what you are doing now and your highest needs for additional resources and training. To take the survey, please click on this link: http://www.surveymonkey.com/s/T3MQZNT. For more information about the survey,
contact Marilyn Sigman msigman@alaska.edu.

****February 5**
Deadline for scoping comments for the **ALASKA STAND ALONE PIPELINE (ASAP) ENVIRONMENTAL IMPACT STATEMENT (EIS**). Comments can be submitted easily at the ASAP EIS website at: www.asapeis.com. The website also includes links to project documents, maps and the EIS schedule. For more information contact Serena Sweet by mail at U.S. Army Corps of Engineers, CEPOA-RD, P.O. Box 6898, Elmendorf AFB, AK, 99506-0898; or by fax at 907-753-5567.

Back to top

EVENTS & MEETINGS - ANCHORAGE - EAGLE RIVER & GIRDWOOD

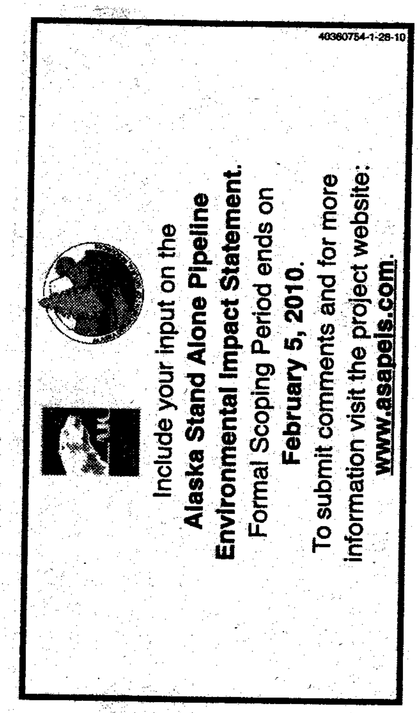
January 22
OUTDOOR RECREATIONAL TRAILS ADVISORY BOARD (ORTAB) will meet from 8;30 to 4:30 in Suite 240, Atwood Building. ORTAB consists of nine members that are regionally selected from areas across Alaska. The primary purpose of the group is to advise the Division of Parks and Outdoor Recreation Director, James King on funding for eligible grant projects under the Recreational Trail Grant Program, the Land & Water Conservation Fund and the Alaska Trails Initiative. Grant funds are used to support trail development and maintenance projects, as well as safety and education programs. Agenda: Recommend funding for the 2010 Recreation Trail Grant Program. Public participation is welcome. For more information, go to http://www.alaskastatetrails.org/ or contact Bill Luck at 269-8699.

****January 23**
GIRDWOOD - **SUSTAINABLE GIRDWOOD FUNDRAISER** will be held from 7 to 9pm hosted by the new Babes in the Woods Art Gallery, along the boardwalk at the Sitzmark Building (109 & 111 Olympic Mountain Loop—the old Java Haus location). The event features musical guest "DJ Militant," and light food and beverage will be provided. There is a $3.00 suggested door donation, but you are welcome even if penniless! The door donation and a portion of any art sales will go to support Sustainable Girdwood's Produce Consumption Survey. If you bring an earth friendly, reusable shopping bag, you will get 10% off your purchase. For more information, contact Evan Cutler at (907) 783-3826 or email EvanAlaska@aol.com.

****January 23**
CRUDE AWAKENING will be shown at 8pm at Organic Oasis, 2610 Spenard Road. Award-winning filmmakers **BASIL GELPKE** and **RAY MCCORMACK** examine the world's dependency on oil and the impending chaos that's sure to follow when the resource is dry in this straight-from-the-headlines

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA } SS.
FOURTH DISTRICT



Before me, the undersigned, a notary public, this day personally appeared Marena Burnell, who, being first duly sworn, according to law, says that he/she is an Advertising Clerk of the Fairbanks Daily News-Miner, a newspaper (i) published in newspaper format, (ii) distributed daily more than 50 weeks per year, (iii) with a total circulation of more than 500 and more than 10% of the population of the Fourth Judicial District, (iv) holding a second class mailing permit from the United States Postal Service, (v) not published primarily to distribute advertising, and (vi) not intended for a particular professional or occupational group. The advertisement which is attached is a true copy of the advertisement published in said paper on the following day(s):

1/24/10 1/25/10 1/26/10
1/22/10 1/23/10 1/27/10 1/28/10

NAT RESOURCE GROUP

~~4 1~~

AK STAND ALONE
233794 40360754

and that the rate charged thereon is not excess of the rate charged private individuals, with the usual discounts.

Subscribed and sworn to before me on this 31 day

of January, 2010

Notary Public in and for the State Alaska.

My commission expires June 3, 2013

ALLISON DONOVAN
My Commission Expires
NOTARY PUBLIC
June 3, 2013
STATE OF ALASKA

Delta's newest stylist offers unique services

By MICHELE TRAINOR
Delta Wind

A new hairdresser is in town, and she is busy cutting, styling, and coloring the hair of Delta area residents. Theo Davis, who grew up in Delta Junction, came back to Delta in August and shortly thereafter set up shop.

"We came back just in time for my boys to start school," smiled Davis. "We arrived in Delta the day before school started."

Davis spent the last seven years in Utah working as a hair stylist. However, as her family still resided in Delta Junction, she made the decision to return. In December she formally opened her business, Theo's Salon, in the Jarvis West Building. Theo also offers microdermabrasion, chemical peels, eyelash extensions, brow and lash tints, lash perms, hair extensions, manicures, and pedicures.

"I enjoy doing a variety of things," said Davis. "It keeps me from becoming stagnated, and I like to keep abreast of new styles and trends."

"Theo is fun, has a great imagination and is always ready to try out new, fresh ideas," said client Anne Marie Mills, who was at the salon getting a completely new hairstyle. "She isn't afraid to tell you what looks good, what doesn't, and is always willing to try something new and different. I love it!"

Theo's Salon is open Tuesday through Saturday from 10 a.m. to 6 p.m. and Mondays by appointment only.

She can be reached at 895-5004.

Following a cut and color, Theo Davis, owner of Theo's Salon, puts the finishing touches on AnneMarie Mills hair.

Fair looking for 2010 theme

Attention all budding artists and creative minds. The Deltana Fair Association is in need of a logo and theme for the 2010 fair. Grab a pencil and sheet of paper and start doodling.

Here are a few pointers to remember as you design your award-winning logo. It should be easily reproduced in black and white; however, an additional color version is a plus. It should be readable when reduced in size. While the theme and design rests upon your gifted shoulders, the fair pennant, the words "Deltana Fair, Delta Junction, Alaska, July 30-August 1, 2010" should be incorporated in the logo.

Still need some inspiration or a few good ideas to get started? Visit www.deltanafair.com for past themes and logos.

Mail entries to Deltana Fair Association, P.O. Box 408, Delta Junction, Alaska 99737 or email them to info@deltanafair.com. For more information, contact fair manager Eileen Williams at 895-9870. Entries are due by February 15.

Become a Deltana Fair fan - on Facebook. In just three days, over 100 fans have joined the Deltana Fair. As we continue to grow, you too can become a fan, post your favorite pictures, connect with other fans, and make suggestions as we plan this year's exciting events.

Anyone interested in becoming involved in the fair is encouraged to attend the annual membership meeting scheduled for February 4 at 5:30 p.m. in the Jarvis West building.

Three board seats are up for election: one 1-year seat, one 2-year seat, and one 3-year seat. Current board members will vote to fill these openings during the annual meeting. Don't miss your opportunity to join the board.

Individual Deltana Fair memberships cost $25 per year and include one 3-day adult pass to the fair and one vote at the general membership meeting.

See FAIR, page 20

Who's Driving?

by Mary Odden

We Still Don't 'Get It'

How discouraging to read in the Anchorage Daily News this morning that Martin Luther King's "I Have a Dream" speech was a "rallying cry for black Americans and a classic of world oratory."

Really? Is that all? Just for black people? Just oratory?

I thought it was for everybody.

I listened to a talk by Rudolpho Anaya one time that made me cry, though the latter is in itself not much of an accomplishment.

Anaya, a Hispanic man born in New Mexico in 1937 who never spoke or read or wrote English until he went to school, has written a roomful of beautiful books – novels, children's books, non-fiction, anthologies, poetry, and plays. He said the great civil-war era poet Walt Whitman made him want to be a writer and gave him his first generous understanding of America – its endless varieties and its inclusiveness.

Anaya was discouraged to be told – often throughout his career, he said – that Whitman belonged to a different America than he did, and for Anaya's voice to be authentic he'd have to leave Whitman behind.

Listening to Anaya, I realized I felt the same – the America inside me is so very much Walt Whitman and Robert Frost. Nevermind that they are "white headed men of New England," and I will never be anything but one out of three of those things.

I can claim their voices – the celebration of America's clamour and trade, the silence of a forest profound with mortality, the bodies on our many battlefields, the road not taken – because I am a human being, and I can take the experiences of others into my treasure trove.

Are we a country where only Native Americans can learn from Native Americans, only women can speak for women? That is the tyranny of the "politically correct."

Separate is never equal. Do we wish to be parallel Americas, with fortifications raised around each ethnicity and each gender and each geography so that no one, no experience, no wisdom can get out or in?

I don't believe in reparations or special accommodations made on purely racial grounds – because these trade past injustice for a present injustice – that festers in us and our children.

But that doesn't mean that we should erase history, or cease to acknowledge that terrible things have happened, or give up on the striving toward "justice for all" which we mouth each time we turn to the flag.

I was surprised to learn (I'm always surprised to learn) during the last week's news and commentaries about Haiti, that the rising revolution in then Saint-Domingue (inspired by France's revolution and our own) which culminated in its separation from France in 1804 probably enabled the U.S. to acquire the "Louisiana Purchase."

That is, we have the middle third of the present continental United States because Napoleon Bonaparte got discouraged when he lost his new world empire built on coffee and sugar, indigo and cotton.

I looked in several sources, none of which students are accountable for in the readin', writin', and 'rithmatic of No Child Left Behind, to find out that France charged Haiti 150 million francs (est. 21 billion present dollars) for the lost of "economic and human property."

Haiti paid most of this, with a crippled and barricaded economy, between 1825 and 1947.

The expressed logic: France had poured Africans into Haiti until slaves outnumbered colonists 10 to 1, and they wanted reparation for their loss of those slave bodies. This, I think, casts complication on the word "reparation."

Meanwhile, a lot of other things happened on the island, among them an impersonal shaking of the earth last week.

It was hard to ignore the feeling that the victims were a "them."

Avoiding my work at hand, I paged through online photos of the disaster. I stopped at the photo of a woman's body in the rubble and my eye followed the line of her arm to its hand, and in her hand, the hand of a child, the body it belonged to not visible.

The caption on the picture noted that it was a woman's body, and that she was a victim of the earthquake. The photographer must have seen the child's hand. The Associated Press caption writer must have seen it too.

But for some reason they left unsaid what could clearly be seen, and so I "found" the subject of that photo for myself. And then I looked up at the bolts holding the beams of my own house.

WILDLIFE NOTES: Tracks Left Behind

I think of all the animals, never seen, whose paths crossed with mine: fresh fox prints at night in a blizzard; the pack of wolves who walked in my trail for twenty miles; the waist-deep trenches untold thousands of caribou left in the Cutler Valley one spring; the enormous male grizzly who walked over frosted ground, ka-runch, ka-runch, within fifty feet of my tent, then stopped, considered, and skirted into the trees, leaving me to a long, sleepless, rifle-clutching night.

Following the signs of wild creatures is an exercise of memory, imagination, and observation, an unending process that leads the tracker farther and farther from himself, into the secret lives of beings that move almost silently, often in darkness, flowing through the spaces we leave vacant.

This note is from Tracks of the Unseen by Alaskan Nick Jans. Each short chapter begins with one of his brilliant photos. The book can be found at the Kenny Lake Public Library. Wildlife Notes are brought to you by Copper Country Alliance.

LEGISLATIVE REPORT: REPRESENTATIVE JOHN HARRIS

January 18, 2010

Oil taxes are once again taking center stage in Juneau.

To spur more oil drilling, Governor Parnell and some legislators want to revise the current oil tax regime known as Alaska's Clear and Equitable Share, a law that went into effect in 2007. The governor has called for expanding tax credits while a couple of Anchorage lawmakers want to reduce the basic tax rate of 25 percent.

I will support a prudent measure that clearly helps stem the decline in the amount of oil flowing down the trans Alaska pipeline, which dropped another five percent over the past year. If companies show that lowering taxes or offering credits will lead to more private sector investment that creates more local jobs and more oil production, then I will vote in favor of it.

Oil taxes are never easy to change. The topic is so big and the stakes are so high that they usually suck a lot of the air out of the room, providing little oxygen for other issues to thrive. Be that as it may, I expect a lot of legislative attention on developing Alaska gas, be it a big pipeline from the North Slope down the highway to Valdez or elsewhere, a smaller in-state line, or encouraging more storage capacity for Cook Inlet gas.

Producers who are interested in a large-diameter pipeline want long-term fiscal certainty – another way of saying they want a gas-tax freeze lasting many years. Whether this is addressed this session remains to be seen, but there is new legislation on this topic that could generate a lot of discussion. All this will happen as two pipeline groups – one led by TransCanada, the other by BP and ConocoPhillips – gear up to hold open seasons after the legislature ends the regular session in April.

And then there's energy. Legislative committees spent time traveling across the state over the past few months, crafting plans to provide more affordable energy to Alaskans be it in the form of natural gas, hydroelectricity, wind power, river or tidal turbines, or other ways to tap the state's vast resources. The governor has proposed adding another $25 million to the renewable energy fund, a program that my colleague from Haines, Representative Bill Thomas, and I worked together to create. I'm encouraged to see continued dedication to this idea as well as efforts to increase state support of weatherization and other energy conservation measures.

One thing I don't want to see happen is another federal economic stimulus package akin to the one approved last year. There's another one making the rounds of Congress these days; only this time, it's being called a "jobs bill" and totals $174 billion.

I oppose this because I believe we must stop building up a mountain of government debt and more bureaucratic red tape with which to burden future generations. Instead, we need to create an environment for the private sector to grow by providing more incentives for American companies to do more business in this country. Repairing roads, airports, and railroads and improving infrastructure are fine. But let's not dump more money into things that don't produce tangible results and only rack up the national debt.

*****

A big heads-up to anyone who has a halibut charter business in Prince William Sound: the National Oceanic and Atmospheric Administration requires operators to apply between February 4 and April 5 for a new limited-entry license.

This is a one-time opportunity. Those who don't apply will lose out even if they qualify for a permit. The agency says the new program is needed to keep charter boats from overfishing for halibut. Charter boat operators will be required to carry permits starting February 1, 2011.

*****

And finally, our prayers go out to the victims of the recent 7.0 earthquake that devastated Haiti.

CHANGE FROM ATS

Renamed Ryan Air celebrates 'toughest on Earth'

Longtime Alaskans in air cargo industry honored

ALASKA NEWSPAPERS STAFF
editor@alaskanewspapers.com

At a celebratory event held in Anchorage last week, rural Alaska cargo carrier Arctic Transportation Services dedicated an evening to celebrating "the toughest people on Earth"—some of the great Alaskans that helped to build the state and the air cargo industry, a news release said.

Those honored were: Eben Hopson, Howard Rock, Eddie Hoffman, Robert G. "Bobby" Sholton, Holger "Jorgy" Jorgensen, Raymond I. Petersen, Frank Ferguson, Neal "Willie" Foster, Martin L. Olson, Wilfred P. Ryan Sr. and Eva Ryan.

At the event, Wilfred "Boyuck" Ryan Jr., ATS president, also paid tribute to his own family and announced that the company was returning to its previous name, Ryan Air. "We have operated for just over 10 years as Arctic Transportation Services, but for more than four decades we ran the business under our family name, Ryan. We are still a family business and tonight we are reclaiming our heritage."

"Moving forward ATS will now operate as Ryan Air, once again," he said.

The name change takes effect immediately and was featured in a roll-out of a new look and identity for the carrier.

Ryan said it was fitting that his parents, Wilfred P. Ryan Sr. and Eva Ryan, the founders of the company, were amongst the toughest people on Earth honored.

"It takes a person with grit and nerves of steel to fly in 50-below-zero weather with radial engines and an 800-foot dirt airstrip. Someone like Dad, who was the sole pilot in the early days of the business," he said.

Alongside Wilfred Sr. in the family business was his wife, Eva. Who, Ryan says, was even tougher than her husband. While Wilfred Sr. was in the turbulent skies, Eva was on the ground raising nine children, holding down a fulltime teaching job and managing Unalakleet Air Taxi (the company's original trading name).

"Air transportation is a lifeline to villages throughout the Bush. Mom and Dad understood this and took this fact to heart. Their unwavering dedication to raising the aspirations and quality of life of Bush Alaskans is what makes them two of the toughest people on Earth."

Ryan acknowledged the contribution that all of the honorees had made not only to the state but also to the air cargo business, who along with friends, employees and customers had helped Ryan Air get to where it is today—one of the largest Bush cargo carriers in the state.

Ryan urged all guests to keep tackling hurdles every day and to continue to build Alaska. "No matter what is thrown at us, no matter what the season, no matter how tough the challenge, I urge each and everyone of you here tonight to continue the work of our honorees, to keep looking forward and to keep building our great state. Let's move ahead and do the best job we can!"

FISH DELIVERY FINISHED

PETTY OFFICER THIRD CLASS JONATHAN LALLY/USCG

A Coast Guard Air Station Kodiak HC-130 Hercules aircraft delivers eight pallets of silver salmon fillets to Kotzebue on Jan. 7. The shipment completed the donations of a food drive that contributed 13 tons of frozen fish to the Northwest Arctic village.

FEDERAL DOLLARS FOR EDUCATION

Hurry before Chukchi flat-rate flies

Grant offers discount courses in aviation, alternative energy

VICTORIA BARBER
vbarber@alaskanewspapers.com

Northwest residents who want to earn their pilot license or get low-cost power in their house should check out a couple new courses at University of Alaska Fairbank's Chukchi Campus in Kotzebue.

This semester, a Title III grant from the U.S. Department of Education has allowed the college to offer several new courses in aviation and alternative energy systems without the expensive fees that students would normally pay. That flat rate may apply to only this semester, which is fast approaching, so those that act fast will reap the rewards.

"It's like getting Cokes on sale, you're never going to get to take these classes on this price," said Dr. Robert Mackey III, village access coordinator for Chukchi Campus.

In Introduction to Renewable Energy Systems, students will install two wind turbines and work with solar panels. The distance course will be taught by Dr. Andy Soria at the Fairbanks campus, and students will learn to work with a new technology called a "flow battery." The course begins Feb. 2, so interested students will need to enroll soon.

Mackey said the alternative energy course is aimed at "do it yourselfers" who want to learn to install a small-scale wind turbine or solar cell energy system for their home or camp. No previous experience working with electronic systems is required to take the course, though Mackey said that should not discourage carpenters or electricians from signing up.

"Just as we need people who can work on diesel engines now, we're going to need windmill mechanics in the future," said Mackey. "If you're a trade worker, especially, this is a great skill to put into your tool kit, because alternative energy is coming down the pipe."

While the course is taught by distance, students must be in Kotzebue to take the class.

The school is also offering three aviation courses, private ground school, instrument ground school, and a credit hour in which students can log 20 hours in a flight simulator. The goal of the courses is to allow students to complete the written portions of their pilots' exams and prepare for private flying time.

"The region is always in need of good pilots, and no one is going to be able to fly this region like pilots from the region," said Mackey.

Mackey said that school administrators hope to extend and expand on these course offerings in the future, but it will depend on student interest and funding. For more information about these or any other classes, contact the UAF Chukchi Campus at 800-478-3402.

Victoria Barber can be reached at 907-348-2424 or toll free at 800-770-9830 ext. 424.

AROUND THE ARCTIC

NW Arctic planning commission to meet

The Northwest Arctic planning commission will meet in Kotzebue on Feb. 2 for its quarterly meeting from 9 a.m. to 4:30 p.m. at the Northwest Arctic Borough Assembly Chambers. Teleconferencing is available at 800-315-6338 code 0104#.

On Feb. 3 the Planning Commission will have a special joint meeting with the City of Kotzebue from 9 a.m. to 2 p.m. at the Northwest Arctic Borough Assembly Chambers to discuss the 2010 Census, the Cape Blossom Road project and the upcoming Arctic Mining Conference, April 6-8, in Kotzebue. Teleconferencing is available at 800-315-6338 code 0104#

The public is invited and encouraged to attend. For more information about this meeting and all Planning Commission meetings, contact Ukallaysaaq, planning director, at the Borough Planning Department, 442-2500 or toll free at 800-478-1110.

BIRTHS

Gerald Bud Lee Kanayuq Taalak Kanayurak

Martha Itta and Gilbert J. Kanayurak, of Barrow, announce the birth of their son, Gerald Bud Lee Kanayuq Taalak Kanayurak, at 8:39 a.m. on Sept. 30, 2009, at the Alaska Native Medical Center in Anchorage. He weighed 6 pounds, 9 ounces and measured 19 inches. Gerald joins siblings, Samantha, Keifer, Simmik, Aviuk, Mackenzie, Cody, Elizabeth, Cynthia I., Ittaaq and Cynthia K. His grandparents are Joseph and Nancy Nukapigak, Fred Kanayurak, Anna Jack and Virginia Spaulding.

Cale Holmes Stoops

Nicole and Jake Stoops, of Kotzebue, announce the birth of their son, Cale Holmes Stoops, at 4:59 a.m. on Dec. 31, 2009, at the Maniilaq Health Center in Kotzebue

Media Advertisements

February 2010

register | create a profile | log in | e-mail news

ALASKA'S NEWSPAPER

Help | Follow on Twitter | alaska.com

Anchorage Daily News

Subscribe | manage subscription | E-Edition

37° 39° | 32°
forecast | statewide
Daylight : 8:32 AM - 5:58 PM

adn.com **yellow pages** Web Search powered by YAHOO! SEARCH **find »**

News | Sports | Outdoors | Features | Money | Entertainment | Opinion | Blogs | Multimedia | Classifieds

Home | Alaska Newsreader | Obituaries | Archives TV Listings | Movies | Music | Restaurants | Submit Event Legals Jobs Homes Cars Rentals

Anchorage zoning code en route to an update

A years-long effort to make Anchorage's strip malls, stores, office buildings and other commercial structures more visually appealing and accessible is headed for an Assembly vote this spring. But opposition is also rising.

PDF: Photographs illustrating the intent of the commercial design standards

PDF: Commercial design standards as OK'd by Planning and Zoning Commission

Anchor Point vigilantes nab suspects; troopers investigating

Alaska State Troopers are reviewing the actions of a pair of vigilantes alleged to have made citizens arrests of two young fugitives accused in a series of burglaries in the Anchor Point area.

Problems plague child protection office in Bethel

The state is finding it difficult to protect children from abuse and neglect in Bethel and surrounding villages because of high worker turnover, records problems and distant managers, Alaska lawmakers were told Thursday.

2010 ALASKA LEGISLATURE

Murkowski: Alaska needs economic 'soul searching'

Alaska's economy faces threats from environmentalists, federal regulations and even from within, U.S. Sen. Lisa Murkowski told a joint session of the Legislature on Thursday. But Alaskans must do some "soul searching" about the future.

ACLU objects to subpoenas in child exploitation cases

More on the legislative session

2010 WINTER OLYMPICS

Jay Hakkinen eyes a target at the shooting range Thursday.

Hakkinen way off targets in 20-K biathlon

Hakkinen, a four-time Olympian from Kasilof, turned in one of the most disastrous big-moment shooting performances of his career, finishing 76th in the 20-kilometer individual biathlon race Thursday at Whistler Olympic Park.

Photos: Alaskans at the Olympics

Photos: Olympics Day 6

Alaska Olympians: Dispatches, schedule

2010 Olympics coverage

Photos Video Featured Reader-submitted Most popular +

Profiles: Iron Dog racers

Read-up on the 58 racers competing in the world's longest snowmachine race this year, with bios, bibs, and race history. **- race map**

2010 Winter Olympics

Follow the action from Vancouver, and keep tabs on Alaska's seven Olympians.

Top Jobs

all 107 top jobs

alaskacareerbuilder

find

Place an ad | Advanced search

Executive/Professional
Tribal Rights Attorney
The Association of Village Council Presidents

Management
Member Services Supervisor
Homer Electric Association

Construction
Heavy Equipment Operator
Enstar

Health Care Services
Physician or Certified Physician Assistant
First Care Medical Center

Executive/Professional
Director, Student Services
Ilisagvik College - Barrow

News

Anchorage | Mat-Su | Crime | Politics More +

Gay rights group asks university to update policy

Members of the gay-straight alliance at the University of Alaska Fairbanks have again asked the Board of Regents to add sexual orientation to the UA nondiscrimination policy. 9:52 AM

Violent downtown robbery leaves victim in critical condition 7:27 AM

Seward Highway reopens after slide 5:06 AM

Mat-Su

Wasilla now has Wings 'n Things; brewery to follow

New organization aims to keep business owners informed

In Brief: Mat-Su

BLOG
Julia O'Malley

Alaska life, one story at a time.

SECTION
Legislative session

Follow the progress of the 26th Legislative session with daily reports from Juneau

Alaska Newsreader

More +

Voice of Down syndrome on 'Family Guy' calls Palin humorless

An actress who has Down syndrome and who voiced the Down syndrome character in a recent "Family Guy" episode says Sarah Palin "does not have a sense of humor."

State grants Old Believer kids alternative test dates 8:30 AM

New study: Why are village fuel prices so high? 9:50 AM

Grandpa reflects on life ahead for newborn Alaskan 9:28 AM

Felt-soled fishing shoes banned in Southeast

George Will: Palin and the limits of populism

play Find a restaurant | Events

Top Homes by Prudential

more

6320ConnorsTrailCircle
Backs up to perpetual green space. Recently updated kitchen, new windows throughout home.Beautiful mountain and wetland views. 3BR /2BA / 2GAR /1964SF.

◀ 5 of 12 ▶

HomeFinder.com

find

Search ADN Real Estate | Place a homes ad
Realtor Market Place | Homebook

Home Subscribe Marketplace Classifieds My Content ArcticCam News Opinion Sports Features Multimedia Community

articles search

sign in

Top Stories

Opinion Sports News Features Our Town

Flint Hills apologizes for contamination, but residents remain concerned

NORTH POLE — A Flint Hills Resources spokesman told a roomful of people the company is sorry for a chemical spill that contaminated dozens of private wells and, to a lesser degree, a municipal...

9 hrs ago | 21 | 5 | full story

Media circus engulfs Vonn after Thursday ski crash

• For complete Olympic coverage, visit our Olympics page. • Matias Saari is in Vancouver for the 2010 Winter Games. Get the Alaska perspective here. WHISTLER CREEKSIDE — I experienced...

9 hrs ago | 0 | 4 | full story

Patty Center rink closure indefinite

FAIRBANKS – On Tuesday afternoon, a maintenance worker at the Patty Center ice arena found a soft spot of discolored ice in a corner of the rink, roughly the size of an orange. That small...

9 hrs ago | 1 | 4 | full story

Railbelt utility partnership plan strengthens

JUNEAU — Reworked plans for a big utility partnership have emerged, carrying with them signals of support from most or all the entities involved. The new plan follows months of mutual work by d...

9 hrs ago | 1 | 4 | full story

- Anchorage zoning update heading for spring vote
- Alaska lawmakers to introduce campaign spending bills
- Anchorage hotel workers plan protest over firings
- Trout Unlimited calls for river protection near Pebble Mine

Stacked lenticular clouds over the Wrangell Mountains reflect the early morning sunlight from Glennallen, Alaska, on Friday, Feb. 19, 2009. Michelle Eastty photo

Reports: Alaska market conditions drive high fuel prices

by The Associated Press

3 hrs 14 mins ago | 3 | 3 |

JUNEAU, Alaska - The attorney general and researchers at the University of Alaska Anchorage are attributing high gasoline and heating fuel costs in rural Alaska to market conditions. Two independe...

Calendar

? February, 2010

« ‹ › »

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

Select date

Friday, 19, 2010

post a new event

ALASKA Men's Ice Hockey *7:00 PM*

ALASKA NANOOK Men's Ice Hockey VS. Lake Su...

Valentine concert with... *10:00 PM*

FRIDAY FEBRUARY 12 @ 10pm doors (9:30 door...

Oceans Film Festival *8:00 PM*

A huge movie event, every year it sells ou...

Fairbanks, AK

Currently | Hourly Info | 15 Days | Videos

Mostly cloudy 15°F RealFeel®: 22°F Winds: Calm

Your Extended Forecast

Today	Tomorrow
High 34°/Low 9° Partly cloudy	High 29°/Low 9° Partly cloudy
Sunday	**Monday**
High 29°/Low 9° Mostly cloudy	High 29°/Low 8° Partly cloudy

Weather Forecast | Weather Maps | Weather Radar pulling a small trailer. The vehicle left the roadway and separated within the ditch. Both Krutskikh and his passenger were transported to Fairbanks Memorial Hospital and treated for minor injuries. Damage to the vehicle and trailer was minimal.

DELTA WIND 2\18\10

AS A RS 2477 RIGHT OF WAY

The State of Alaska Department of Natural Resources will make a determination as to whether the Chitina Cemetery Road is a valid right of way under Revised Statute 2477 43 U.S.C. § 932 (commonly referred to as RS 2477 rights of way).

The department has considered the following as required by 11 AAC 51.055(b):

(1) The Chitina Cemetery Road was delineated on the McCarthy Road Improvement Project, Cultural Resource Survey, September, 2003 by Rolfe Buzzell. The scale of the map is one inch to less than one mile as required by 11AAC 51.055(b)(1).

(2) The road was constructed across Federally-owned vacant land when the land was not appropriated or reserved for public use. The land was patented May 3, 1916. The construction and use of the road started in 1910 and meets the requirement of 11 AAC 51.055(b)(2)

(3) Evidence exists of the historic use of this road beginning September 1910 and the cemetery beginning February 15, 1911 which constitutes public acceptance of the right of way. The evidence is set forth in the History of the Chitina Cemetery Road by Kevin Sorensen. The evidence must meet the requirement of 11 AAC 51.055(b)(3)(A).

You may review the evidence at the address below, at the Chitina Alaska Post Office or at http//dnr.alaska.gov/mlw/hottopics/pdfs/chitina_cemetery_roadinfopacket.pdf.

Pursuant to 11 AAC 51.055(c)(1), the department will consider relevant evidence, contrary to or in support of the evidence identified above, that is offered during the public comment period that shall end March 26, 2010. After the public comment period ends, a decision to identify will be issued by the department which may be appealed under 11 AAC 02.

Submit comments to: Public Access Assertion Defense Unit
Department of Natural Resources
State of Alaska
550 West 7th Ave., Suite 1420
Anchorage, AK 99709-3844

State of Alaska v. Justin S. Norberg (5-21-73), guilty of guide-commit, aid, or allow violation, date of offense 8-13-09. Defendant will pay a $50 titution in the amount of $2200 to the Alaska Wildlife Troopers and he is placed on probation until 1-26-2015.

Copper River Record 2/18/10

TEACHING WITH ANIMALS

Volunteers help second-grade students dream big

'I Know I Can' is focus of afternoon program

LARRY KAIRAIUAK AND CATHY EWING
For The Arctic Sounder

University of Alaska alumni and other volunteers will be at Fred Ipalook Elementary School in Barrow on Feb. 25-26 to share a colorful picture book about dreaming big.

Now in its fourth consecutive year, the UA College Savings Plan's "I Know I Can" outreach program will reach 794 second-grade children in 18 schools statewide.

"I Know I Can," a picture book, features animal characters who prompt children to start thinking about career choices and the need for college now. Sponsored as a UA College Savings Plan – Alaska Commission on Postsecondary Education (ACPE) partnership, this initiative has continued to expand.

The book follows a class of animal characters thinking about what they want to be when they grow up. A little mouse character donning a cap and gown hides on each page, thinking "I Know I Can" to himself as the story unfolds.

The teacher, Mrs. Walker, explains to the children that they should start thinking about their futures now, and she gives them lots of ideas, such as being a house builder, farmer, doctor or nurse. "You can become whatever you want if you try," Mrs. Walker says. She even gains the acceptance of one reluctant character, O'Toot the owl, who thinks he already knows everything.

Linda English, director of the UA College Savings Plan, says the primary initiative of the program is to help youngsters think about exciting opportunities that can be ahead for them in life.

"Young children love to think about what they're going to be when they grow up, but we have to make sure they know it requires effort on their part," English said. "We know not every job requires a four-year college degree but most careers require some level of postsecondary training and workforce education beyond high school. Children need positive encouragement beginning at an early age to think about all of the possibilities for their life, including college."

After hearing the story, students draw a picture on a postcard showing what they want to be when they grow up. The postcard is mailed back to the students in a future year as a reminder of their goals. Each student receives their own copy of the book to take home.

The UA College Savings Plan fully funds the project, with operational support from the ACPE. I Know I Can is a nonprofit, national organization based in Ohio.

The UA College Savings Plan offers tax-advantaged savings plans to residents in Alaska and throughout the United States. Students who use the plan to pay for college can attend any qualified school, not just UA.

ACPE is the state's higher education agency, providing promotion, support and access to higher education through a package of financial aid and early education awareness services.

Visit www.alaska.edu/studentservices/outreach/i_know_i_can/index.xml for more information on the "I Know I Can" program, including pictures of postcards drawn by the children, or contact Pearl Brower at Ilisagvik College, 852-1833.

LAWRENCE KAIRAIUAK/COURTESY PHOTO

A student in Anchorage draws a postcard of what he'd like to be when he grows up after reading "I Know I Can." The book is part of an outreach program coming to Barrow that is aimed at getting young students started thinking about their futures.

LOOKING BACK

FEB. 21, 1992

Bill certifying educators of Inupiaq gains in House

A bill that some lawmakers and local educators say would give teachers of Native language and culture the recognition they deserve is moving through the Alaska House of Representatives.

The bill would allow for limited certification of instructors who teach subjects where college training isn't usually available, such as Native culture, language and military science.

The certifications would resolve a long-standing problem of employment equity for these instructors, according to proponents of the bill, because they already perform duties similar to certified teachers with bachelor degrees, yet do not get the same encouragement, recognition or pay that fully certified teachers do.

"If you're going to put teachers in the classroom and give them primary responsibility for the classroom, then they should be certified as teachers," said David Harding, a legislative aide, to the bill's sponsor, Rep. Eileen P. MacLean of Barrow.

"The inequities stem from people teaching but not being called teachers," he said, adding that teachers of Native language and culture are currently called "recognized experts" rather than teachers.

Bob Mulluk, a former Inupiaq instructor and currently an intern assistant principal at Kotzebue Elementary School, said the bill is long overdue, particularly since "our language is in jeopardy of being lost."

Harding said, the bill has the support it needs to pass the full Legislature this session. "Pretty much all of the representative groups that have an interest in it have support for it, so that's why we are confident it will pass."

Rookie credits luck, Snyder's 'Cheers' for win

Rookie dog musher Bish Gallahorn of Kotzebue could list a couple of factors that may have helped him win his second sprint race in a row last weekend. But, neither factor had anything to do with his sled dog racing ability.

Reason No. 1. "I consider it luck. After the dogs teach me a few more things it should go a lot smoother."

Reason No. 2. "I think Snyder was probably up there somewhere cheering for me."

Regardless which one in was , something propelled Gallahorn to the finish line first in all three heats of the first funning of the Dan Snyder Sr. Memorial Feb. 14-16 on Kotzebue Sound. Although Gallahorn also won the Paul Brown Memorial two weeks ago in Noorvik, he said last weekend's victory was particularly satisfying.

"Winning this race has special meaning to me because Snyder was a pretty good friend of mine," he said, "So I am pretty excited about that."

Snyder a longtime sled dog racing enthusiast and an accomplished musher himself, died last fall when his snow machine and sled broke through thin ice on a channel of the Kobuk river about 20 miles east of Kotzebue.

BIRTHS

Kasey Pearl Hopson

Tammy Hopson and Curtis Hopson, of Barrow, announce the birth of their daughter, Kasey Pearl Hopson, at 12:42 a.m. Dec. 14, 2009, at the Alaska Native Medical Center in Anchorage. She weighed 6 pounds, 10.6 ounces and measured 19-3/4 inches. Kasey joins family members, John Cody, Heather and Arlene.

Gabriel Gage Anurvak Nayukuk Swan

Patricia Swan and Darin "Tiny" Swan Sr., of Kotzebue, announce the birth of their son, Gabriel Gage Anurvak Nayukuk Swan, at 12:04 p.m. Jan. 30, 2010, at the Alaska Native Medical Center in Anchorage. He weighed 8 pounds, 13 ounces and measured 20-1/2 inches. Family members include, Andrea, Roberta, Dustin and Darin "Tiny" Swan Jr.

APPENDIX C

Meeting Materials

WELCOME!

The U.S. Army Corps of Engineers (USACE),
Bureau of Land Management (BLM),
Environmental Protection Agency (EPA),
National Parks Service (NPS),
Alaska Department of Natural Resources (ADNR),
and ENTRIX Inc.

Welcomes you to the

Alaska Stand Alone Pipeline (ASAP)
Environmental Impact Statement

Public Scoping Meeting

ENTRIX
Down to Earth. Down to Business.

Alaska Stand Alone Pipeline (ASAP)

Environmental Impact Statement

ASAP Project Area and Alternatives

Route Alternatives
Parks Highway Route
Richards Highway Route

Spur Line Alternatives
Parks Highway Spur
Richardson Highway Spur

Pre-Build Alternatives
Parks Highway Pre-Build
Richardson Highway Pre-Build

ENTRIX
Down to Earth. Down to Business.

Scoping

The Council on Environmental Quality (CEQ) defines scoping as an *“early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.”*

Objectives of the scoping process:

- identify potentially interested parties
- identify public and agency concerns with a project
- define the range of issues that will be examined in a project
- ensure that relevant issues be identified early and drive the analysis, and
- establish a public record

EIS Process

	Step	Steps in the NEPA Process
	1	**Federal Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS)** December 4, 2009
We Are Here	2	**Scoping** Scoping Period: December 7, 2009 to February 5, 2010 Public Scoping Meetings: December 8 to December 18, 2009 Scoping Report: Estimated Release March 2010
	3	**Analysis of Alternatives and Field Investigations**
	4	**BLM Identifies Preferred Alternative**
	5	**Issue Draft EIS** Estimated Release: Late July 2010 Available for 45-day public review through mid-September 2010
	6	**Public Hearing on Draft EIS** Estimated: August 2010
	7	**Public Comment Review and Synthesis** Comment Analysis Report available, estimated: September/October 2010
	8	**Respond to Comments/Prepare Final EIS** Estimated: October 2010
	9	**Issue Final EIS** Estimated: January 2011 Available for minimum 30-day public review
	10	**Record of Decision** USACE identifies preferred alternative Public statements of agency decisions Estimated: February 2011

Proposed Alaska Stand Alone Pipeline Environmental Impact Statement (EIS) Estimated Schedule

February 5, 2010	End of Scoping Period
March 2010	Scoping Report Released
July 2010	Draft EIS Released
August 2010	Public Hearings on Draft EIS
October 2010	Comment Analysis Report Available
January 2011	Final EIS Released
February 2011	Record of Decision

Alaska Stand Alone Pipeline (ASAP)

Environmental Impact Statement

Opportunities for submitting scoping comments

DEADLINE for scoping comments is **February 5, 2010**

Ways to Submit Comments:

- Provide oral comments at a scoping meeting
- Submit a comment form
- Submit comment through the project website: www.ASAPEIS.com
- Email to: info@asapeis.com
- Fax to: 907.753.5567
- Mail to: Serena E. Sweet

U.S. Army Corps of Engineers
CEPOARD
P.O. Box 6898
Elmendorf AFB, AK 995060898

ENTRIX
Down to Earth. Down to Business.

Next Steps

- Review and analyze scoping comments
- Prepare and release scoping report
- Identify alternatives for the Draft EIS and select a reasonable range that meets the Purpose & Need
- Describe the environment affected by the proposed action
- Evaluate environmental consequences of the proposed action and alternatives
- Prepare the Draft EIS for release to the public

Anticipated EIS Schedule

February 5, 2010	End of Formal Scoping Period
March 2010	Scoping Report Released
July 2010	Draft EIS Released
August 2010	Public Hearings on Draft EIS
October 2010	Comment Analysis Report
January 2011	Final EIS Released
February 2011	Record of Decision

Ways to Submit Comments:

- Provide oral comments at a scoping meeting
- Submit a comment form
- Submit comment through the project website: www.ASAPEIS.com
- E-mail to: info@asapeis.com
- Fax to: 907.753.5567
- Mail to: Serena E. Sweet

  U.S. Army Corps of Engineers

  CEPOA-RD

  P.O. Box 6898

  Elmendorf AFB, AK 99506-0898

Formal Scoping Period ends February 5, 2010

Comments will be accepted any time during the EIS process.

Alaska Stand Alone Pipeline (ASAP)
Environmental Impact Statement

Scoping Notice

The US Army Corps of Engineers (Corps) is preparing an Environmental Impact Statement (EIS) to analyze the Alaska Stand Alone Pipeline (ASAP) proposed by the Alaska Department of Natural Resources. The Bureau of Land Management, Environmental Protection Agency and National Park Service are participating in this effort as cooperating agencies.

Proposed Project Description

The State of Alaska is proposing to construct a 24-inch diameter, high-pressure pipeline from Alaska's North Slope to Cook Inlet to transport North Slope natural gas to in-state Alaska markets. The pipeline would be located entirely within the State of Alaska. Gas off-take would be provided for the Fairbanks Area and in other locations along the route. The Alaska Stand Alone Pipeline includes a Gas Conditioning Plant on the North Slope, compressor stations along the pipeline, and natural gas liquid extraction facilities to produce utility-grade natural gas.

The formal scoping period for the ASAP EIS begins December 7, 2009 and ends February 5, 2010. Comments will be accepted at any time during the EIS process.

www.ASAPEIS.com

Alaska Stand Alone Pipeline
Alternatives Map

Alaska Stand Alone Pipeline
Project Description

Gas Conditioning Plant

Remove carbon dioxide, hydrogen sulfide and water;
Carbon dioxide and hydrogen sulfide re-injected into a North Slope reservoir;
Compression to increase gas pressure to 2500 pounds per square inch gauge (psig);
Cooling and mechanical refrigeration to cool gas to 30° F.

Pipeline

24-inch diameter;
X70 (nominal 0.6 inch wall thickness);
2500 psig maximum operating pressure;
Two compressor stations;
Buried pipeline except at major river and fault crossings;
Horizontal Directional Drilling as preferred major water body crossing technique where feasible;
Chilled/ambient operating temperature.

Compressor Stations

Centrifugal gas compressors driven by natural gas;
Fuel supplied from the pipeline;
Northern stations equipped with refrigeration for chilled operation;
Southern stations may or may not be equipped with coolers.

Natural Gas Liquid (NGL) Extraction Plant

Required to produce utility grade natural gas;
Standard turbo-expander process;
NGL fractionation;
Small plant in Fairbanks with main plant in Cook Inlet;
Propane used for in-state demand;
Potential for export if available from the North Slope.

Project Alternatives

Route Alternatives

Parks Highway Route
Richardson Highway Route

Spur Line Alternatives

Parks Highway Spur
Richardson Highway Pre-Build

Pre-Build Alternatives

Parks Highway Pre-Build
Richardson Highway Spur

Alaska Stand Alone Pipeline
Environmental Impact Statement

COMMENT FORM

December 2009

Your input is an important element in the scoping phase of this project. To help us consider your views and suggestions, please write them down on this sheet and mail to our address, which is preprinted on the back of this form. Please write legibly (printing is appreciated) and you may attach additional sheets if necessary. Your comments can be submitted via mail; emailed to **info@asapeis.com**; or through the comment section of the website at www.asapeis.com.

Name (PLEASE PRINT):

Address:

City, State, Zip Code:

Telephone (Optional):

Email (Optional):

- ☐ **Please retain or add my name to the project mailing list. I wish to receive information in the mail.**
- ☐ **Please add my name and email address to the list. I wish to receive information by electronic mail.**

COMMENTS:

Note: To mail, fold page in half along the dashed line on the back of this sheet so that the address shows. Tape shut and affix a standard first class postage stamp.

Thank you for your participation!

-------------------------------------FOLD HERE-------------------------------------

Place a
First Class
Postage
Stamp
Here

Serena E. Sweet, Project Manager
U.S. Army Corps of Engineers
CEPOA-RD
P.O. Box 6898
Elmendorf AFB, Alaska 99506-0898

Environmental Impact Statement for the Alaska Stand Alone Pipeline (ASAP) Project

Public Scoping Meeting

Welcome and Introductions

- US Army Corps of Engineers (Corps)
- Bureau of Land Management (BLM)
- Environmental Protection Agency (EPA)
- National Park Service (NPS)
- Alaska Department of Natural Resources (ADNR) representing Office of the Governor
- ENTRIX Inc. (ENTRIX)
- ASRC Energy Services (AES)

- **Moderator: Serena Sweet, Corps**

Scoping Meeting Agenda

- Information on Scoping Process
- Background on NEPA Process
- Overview of the Alaska Stand Alone Pipeline (ASAP) Project
- Upcoming Steps for ASAP EIS process
- Public Comment Period

What is included in an Environmental Impact Statement?

- Purpose and need for proposed action
- Reasonable range of alternatives that meet project purpose and need
- Description of the affected environment
- Analysis of environmental consequences of the alternatives

Scoping

- The Council on Environmental Quality (CEQ) defines scoping as an

  “early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action” (40 CFR 1501.7).

- Objectives of the scoping process:
  - identify potentially interested parties
  - identify public and agency concerns with a project
  - define the range of issues that will be examined in a project
  - ensure that relevant issues be identified early and drive the analysis, and
  - establish a public record

Public Scoping Meeting Schedule

December 08, 2009 – Glennallen Public Meeting

December 09, 2009 – Delta Junction Public Meeting

December 10, 2009 – Nenana Public Meeting

December 10, 2009 – Fairbanks Public Meeting

December 11, 2009 – McKinley Village Public Meeting

December 14, 2009 – Anchorage Public Meeting

December 15, 2009 – Wasilla/Palmer Public Meeting

December 17, 2009 – Barrow Public Meeting

Scoping Meeting Procedures

- Please sign in at the registration table
- If you would like to speak, please check the box on the sign-in form
- You may submit written comments today using the comment forms provided at the registration table
- The Q&A and comment portion of this meeting will be transcribed by a court reporter

The NEPA Process

Purpose of the National Environmental Policy Act (NEPA):

- Ensure agency decision-makers take environmental factors into account before making a decision and implementing an action

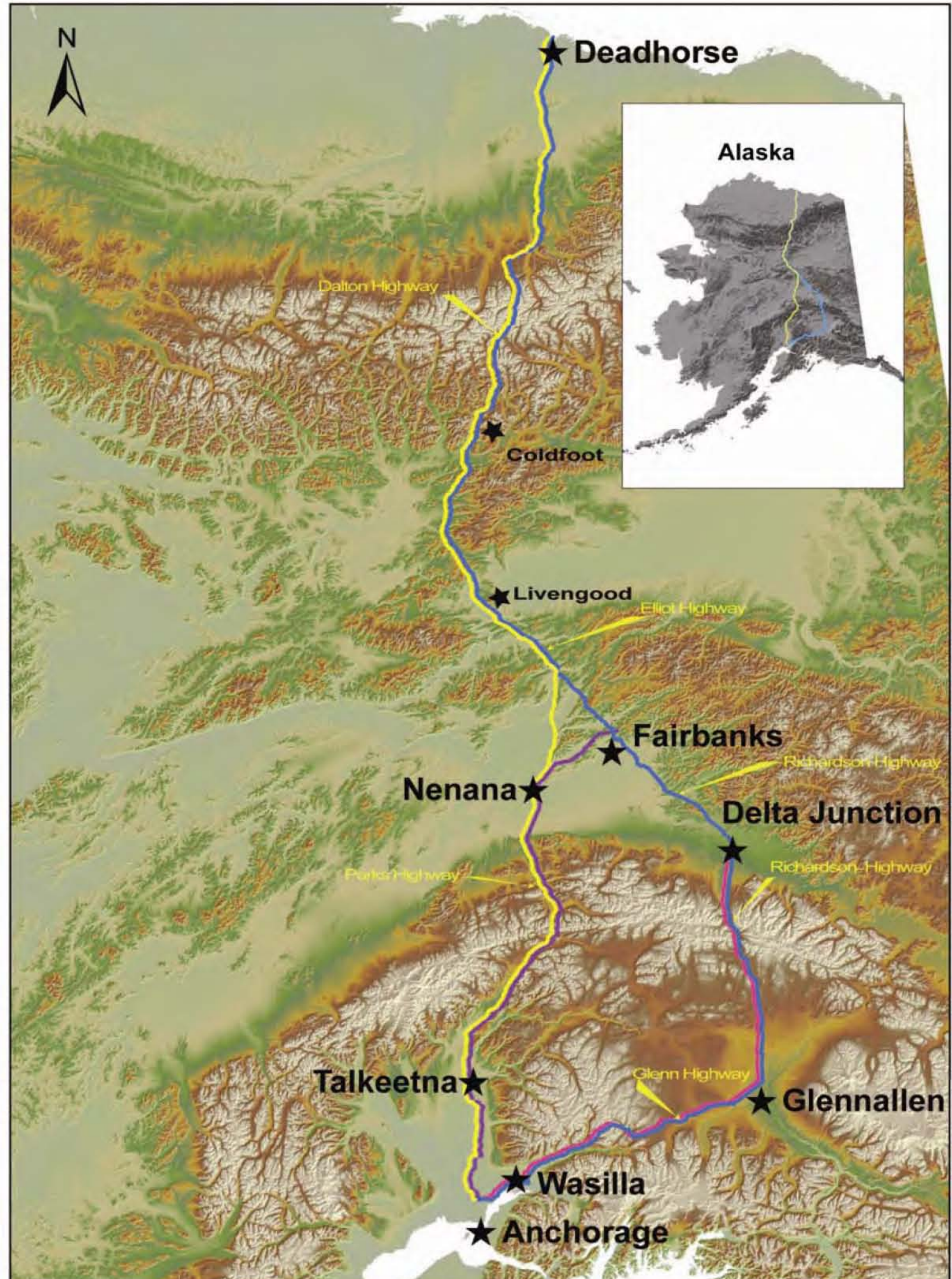
NEPA is a procedural law that mandates technical analysis and public review, but does not direct decision outcomes

Requirements of NEPA

- Assess potential environmental impacts of proposed federal agency actions
- Consider environmental consequences early in decision-making to reduce, prevent, or eliminate environmental damage
- Seek out public comments on issues and alternatives to be addressed during scoping

Stand Alone Routes Evaluated

- ❑ Two Stand Alone Routes
  - ■ Parks Highway Corridor
  - ■ Richardson Highway Corridor
- ❑ Routes are common to Livengood
- ❑ Pipeline ends at Milepost 39 of the Beluga Pipeline



Stand Alone Route Comparison

Stand Alone Routes	Length (Miles)	Difference (Miles)	Terrain (Miles)		
			Flat	Hilly	Mountain
Parks Highway Stand Alone (Applicant Proposed Route)	737		422	295	20
Richardson Highway Stand Alone (Alternative Route)	829	+92	360	449	20

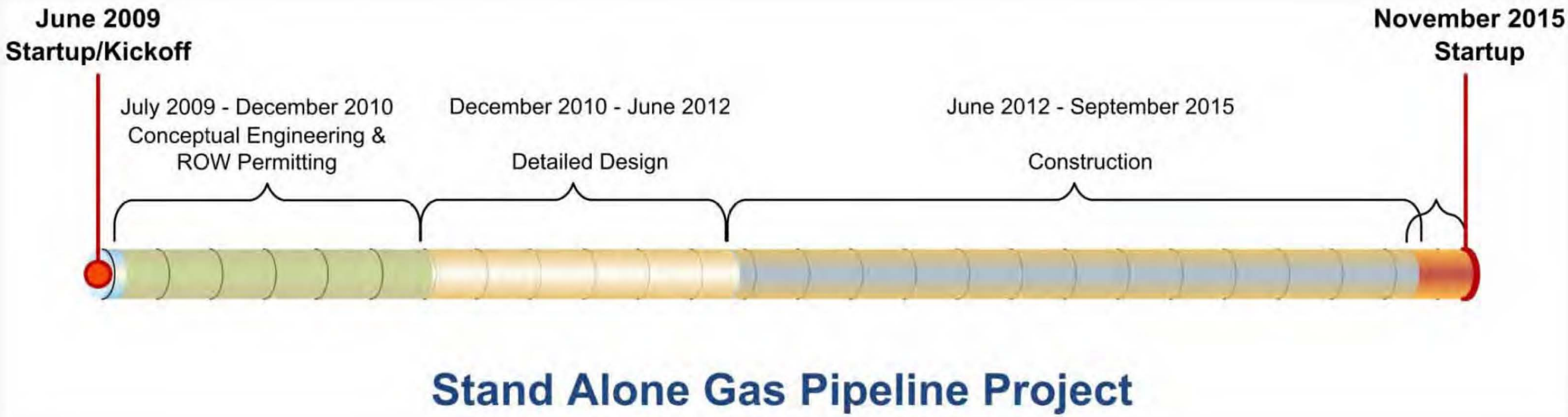
Proposed Pipeline Route Configuration

- 2,000 foot wide analysis corridor
- 100 foot right-of-way
- Pipeline route = 737 miles
- 24” diameter pipeline
- Gas pressurized at 2500 psi
- Prudhoe Bay gas supply
- Gas conditioning at Prudhoe Bay

Pipeline Flow Rate Configurations

- Pipeline Flow Rates
  - 250 Million Standard Cubic Feet/Day (MMscfd)
    - Lower flow configuration will evaluate 16-18 inch Pipeline
  - 500 MMscfd
    - Two Compressor Stations
  - 750 MMscfd
    - Five Compressor Stations
  - 1000 MMscfd
    - Up to eleven compressor stations

Applicant’s Project Schedule



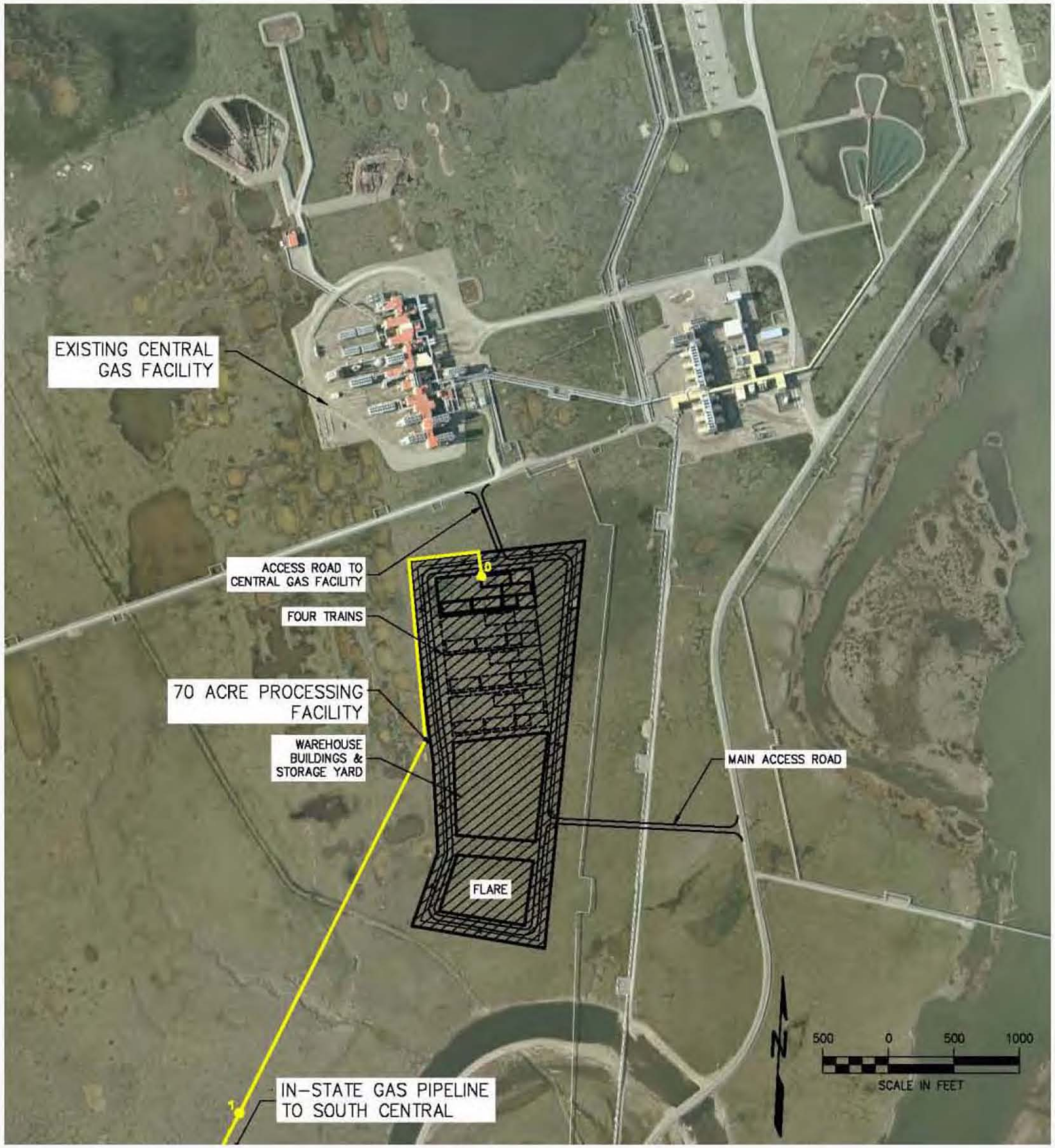
Common Route

- Prudhoe Bay

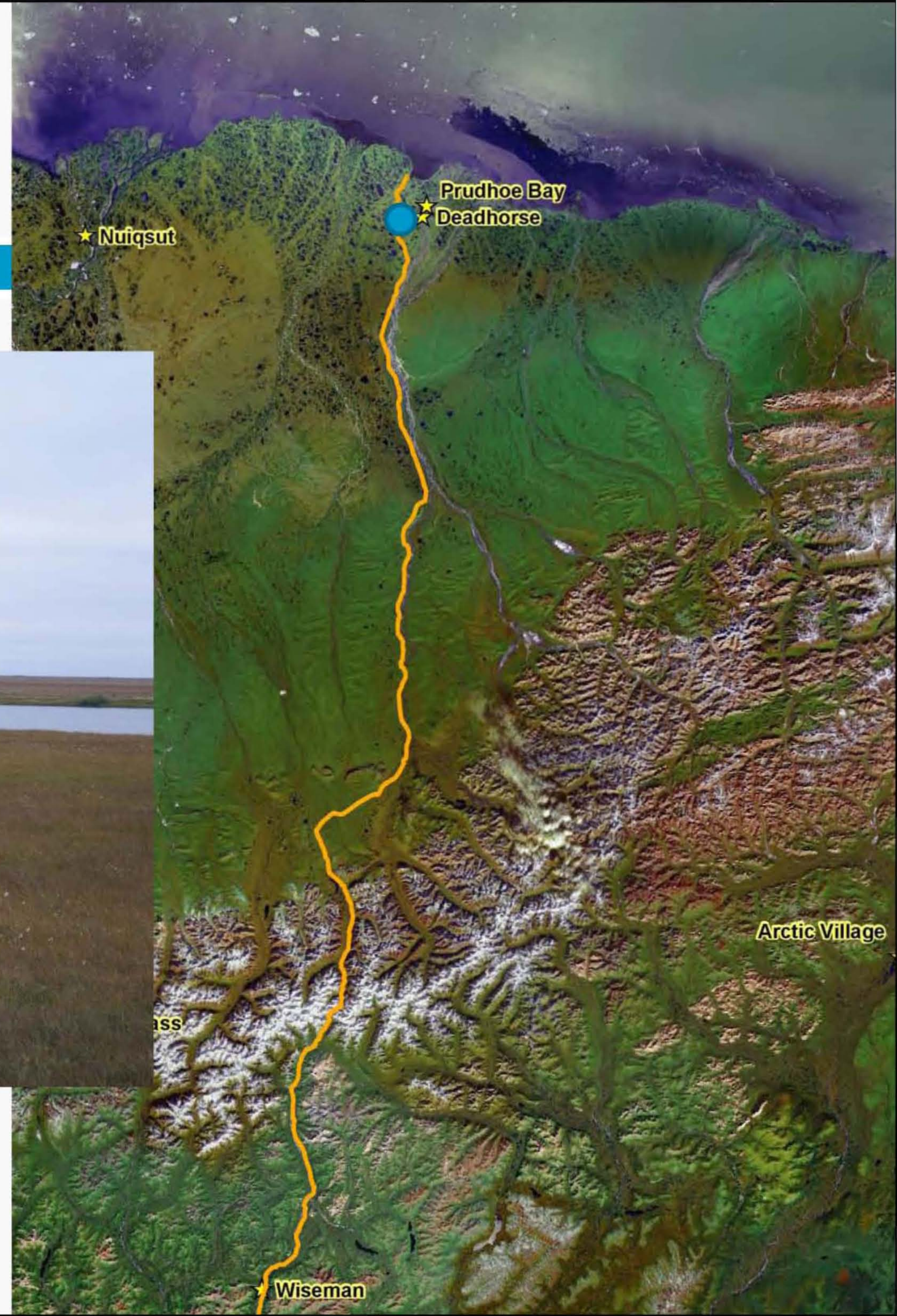
  to

- Livengood

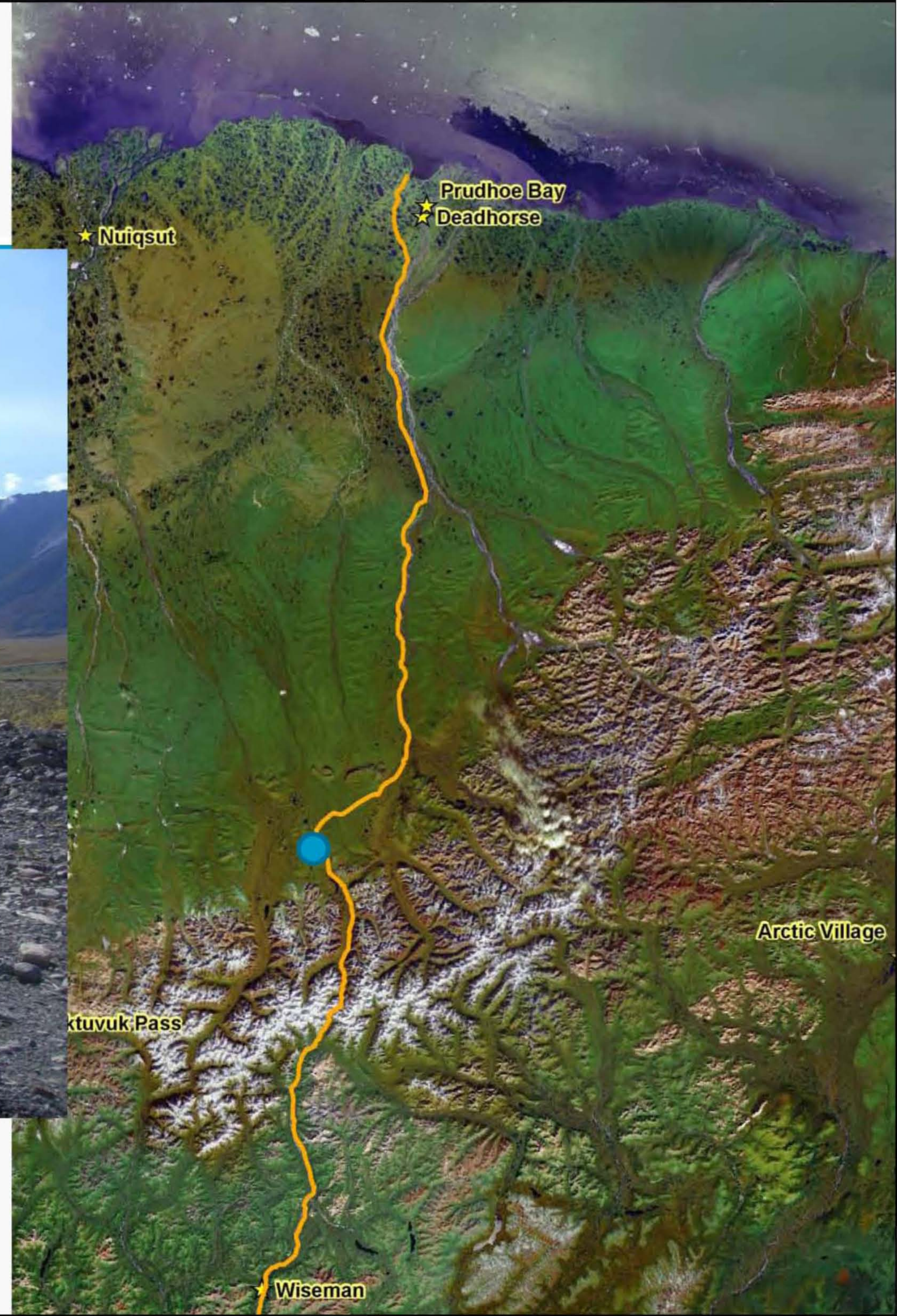
Gas Conditioning Facility – North Slope



North Slope

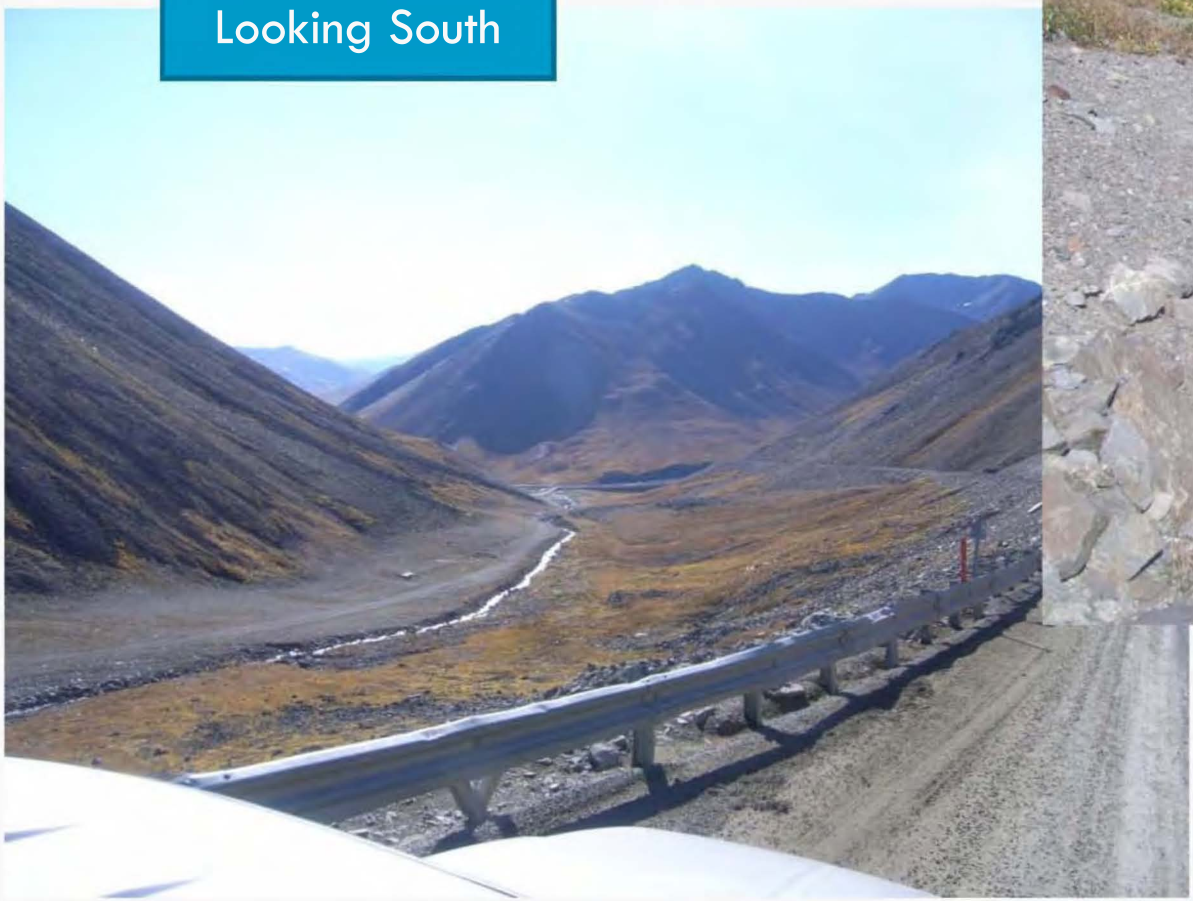


Atigun River Valley



Atigun Pass

Looking South



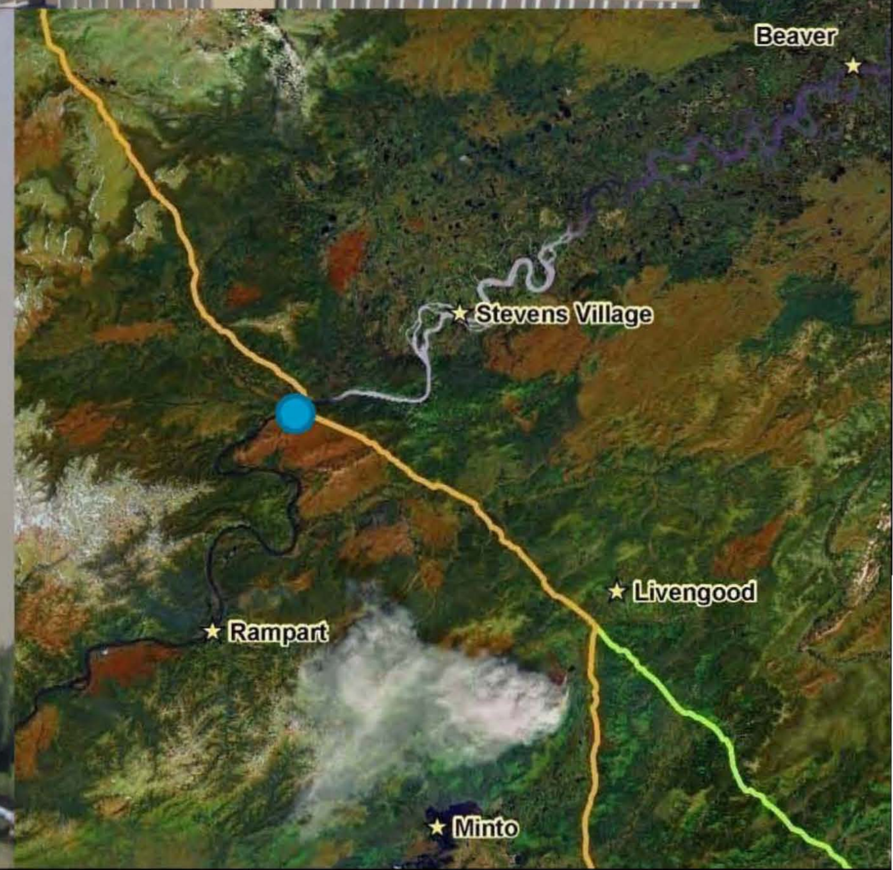
Looking North

North of Coldfoot

Jim River
North of Prospect

Finger Mountain

Yukon River Bridge



Lost Creek

Parks Highway Stand Alone

- Livengood

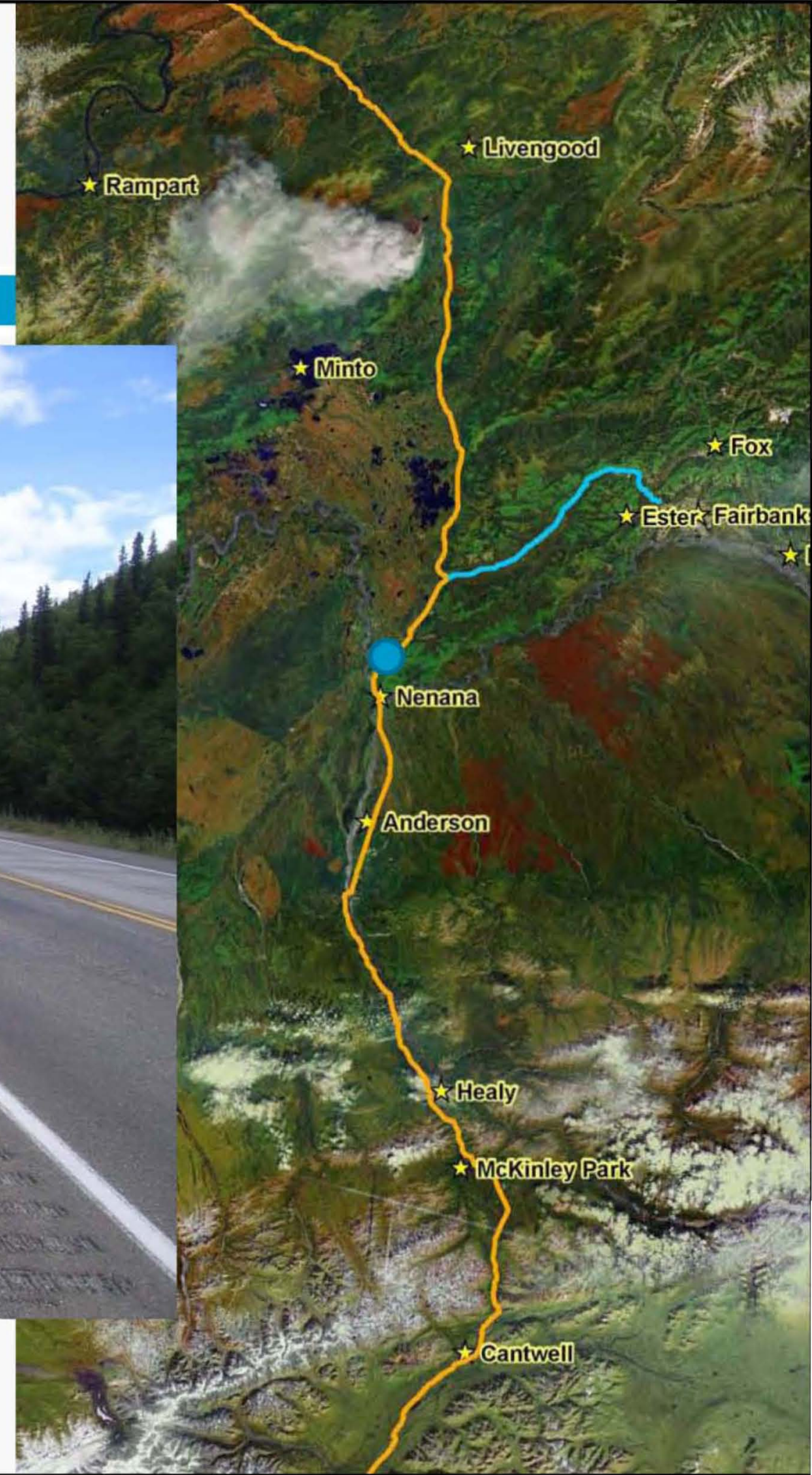
  to

- MP 39 Beluga Pipeline

via Parks Highway

- 12-in diameter pipeline from Dunbar to Fairbanks following Alaska Railroad

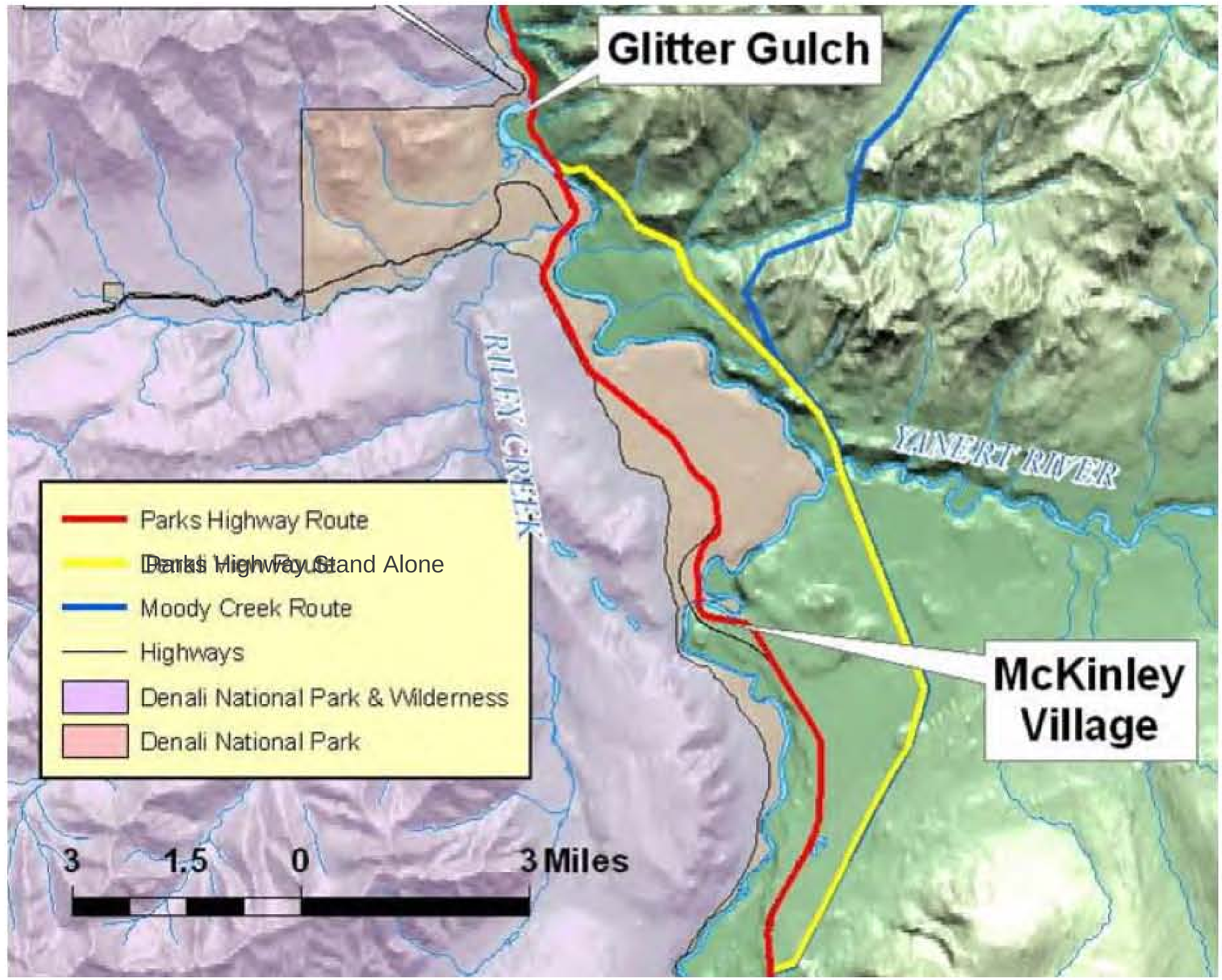
Looking South Up the Nenana Canyon



Denali Village (Glitter Gulch)

Denali National Park & Preserve Area

- Feasible and economic route (Yellow Route) avoids the National Park
- 0.1 mile difference

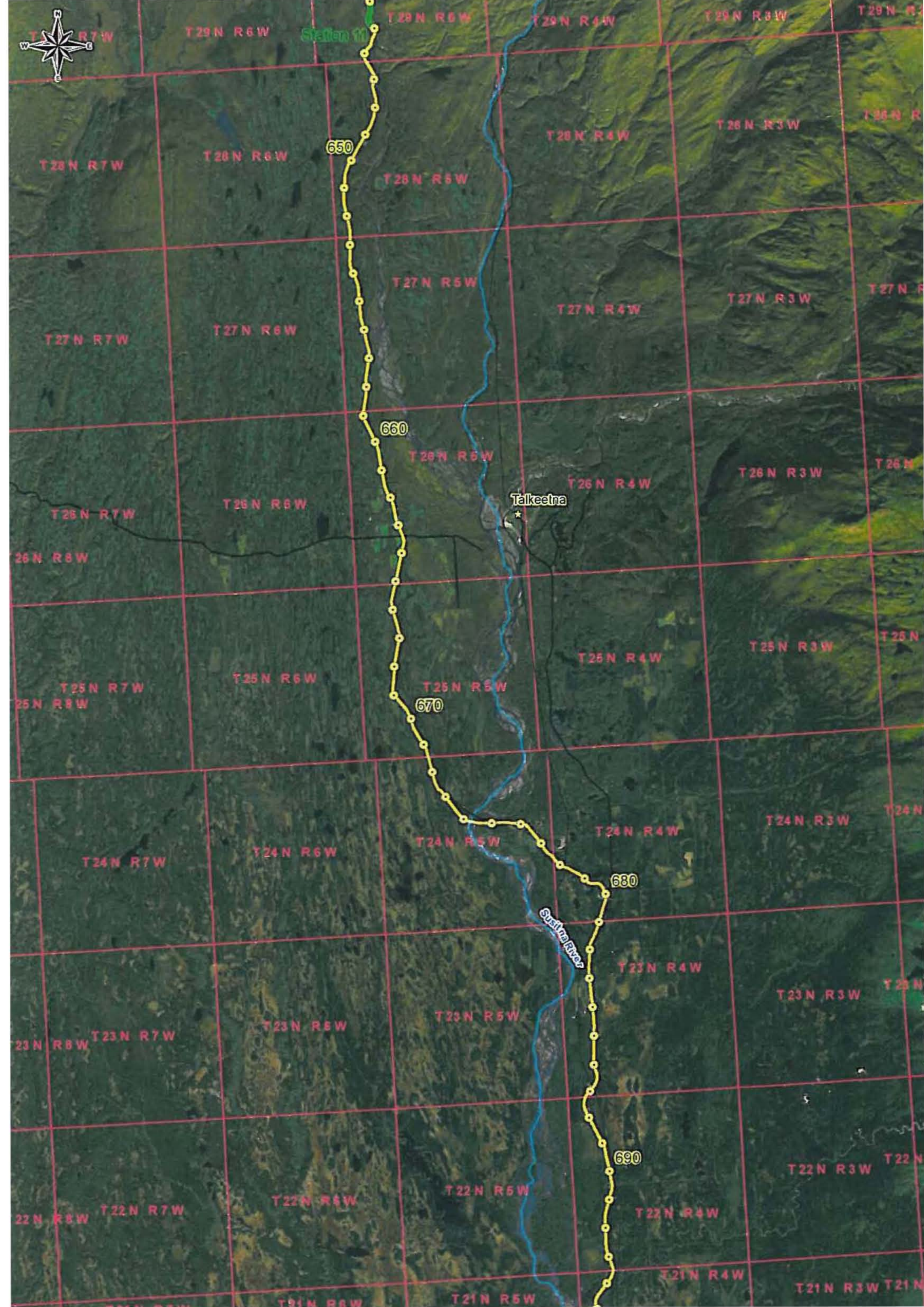


Talkeetna South

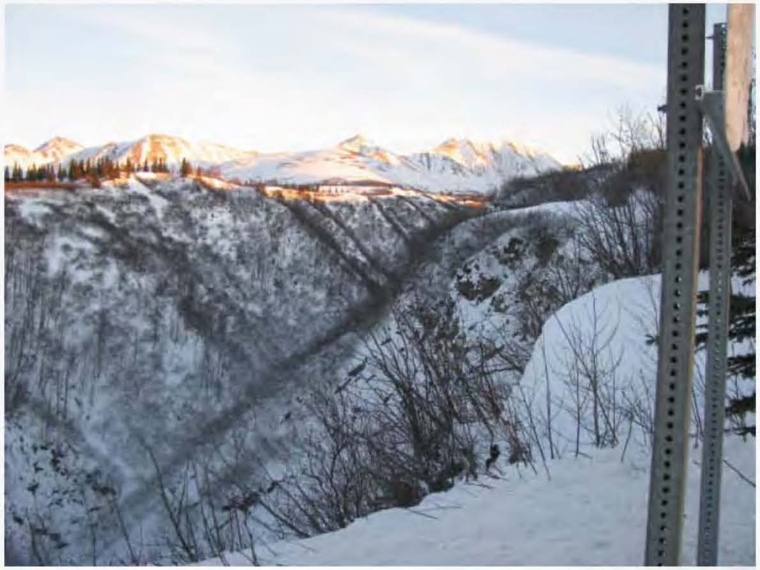
- Pipeline to be located west of Talkeetna

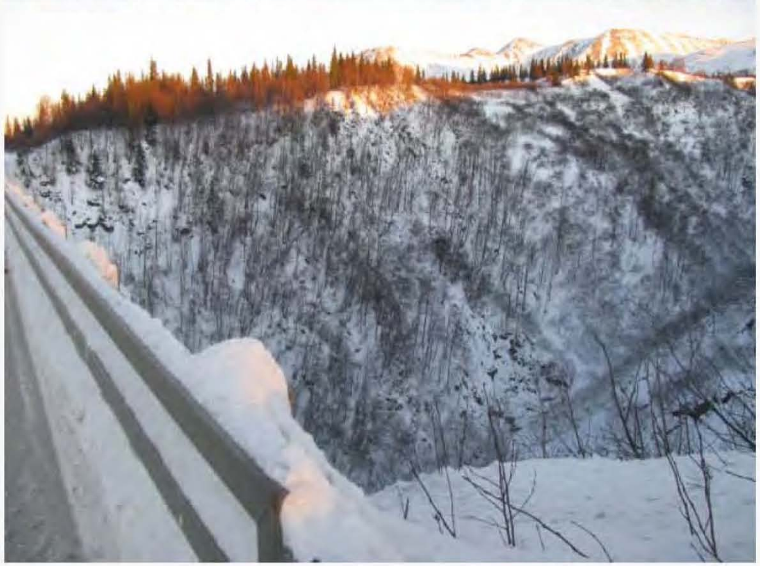
 and Parks Highway

- Crosses Susitna River

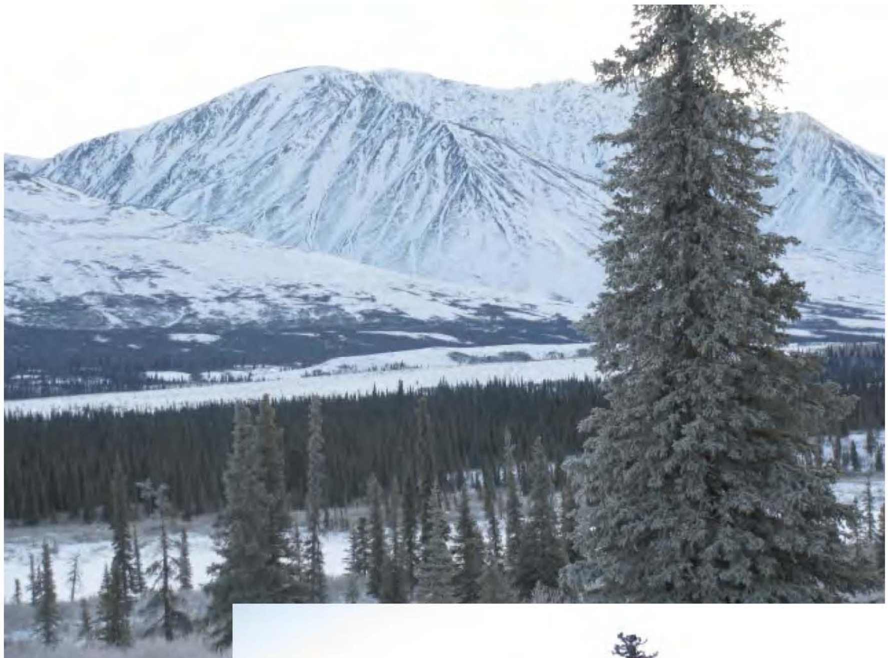


Hurricane Gulch (looking north)





Broad Pass Area



- Pipeline to be located on the east side of the Parks Highway

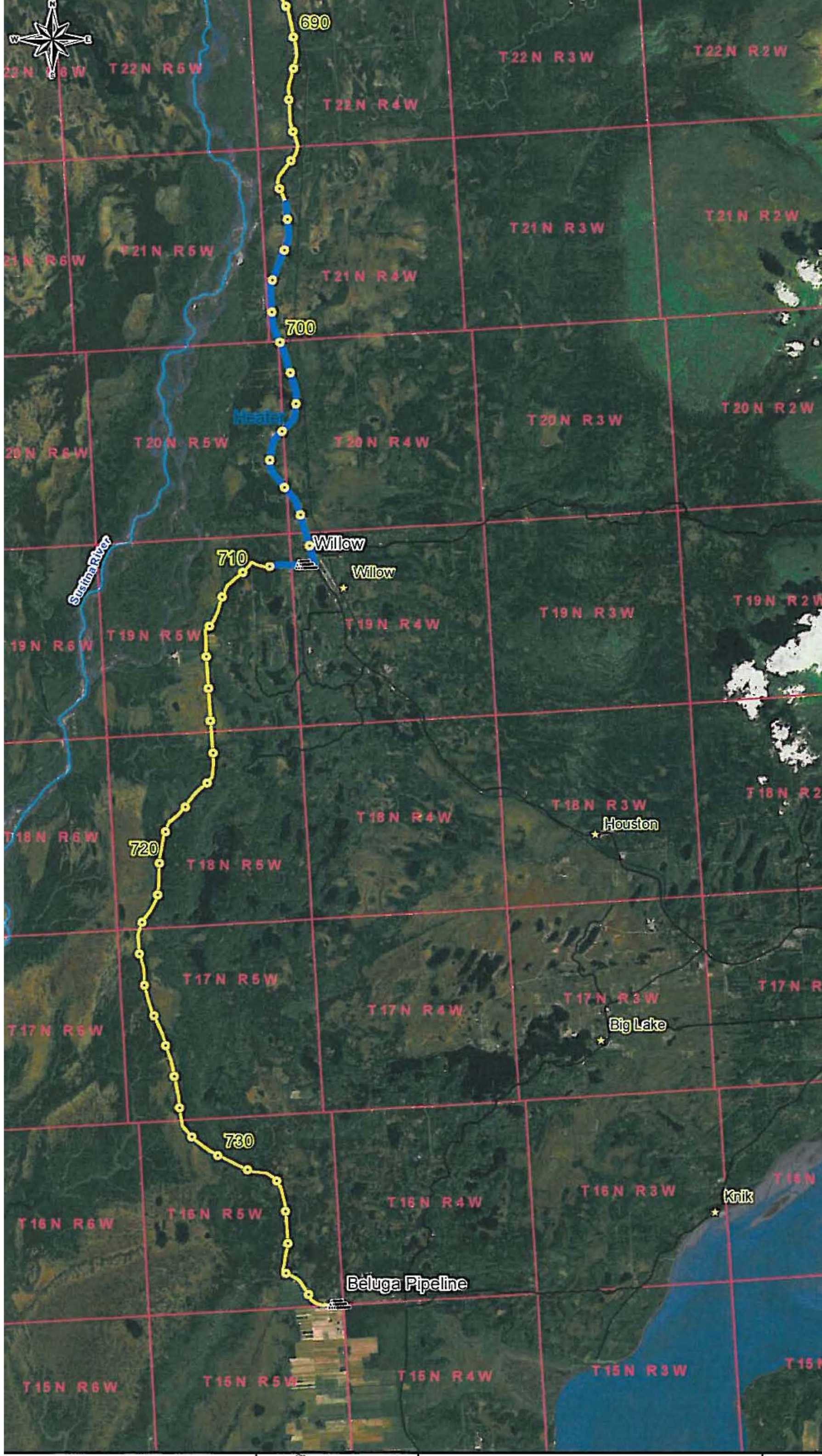
Willow to
MP 39 Beluga Pipeline

- Heads west near

Willow

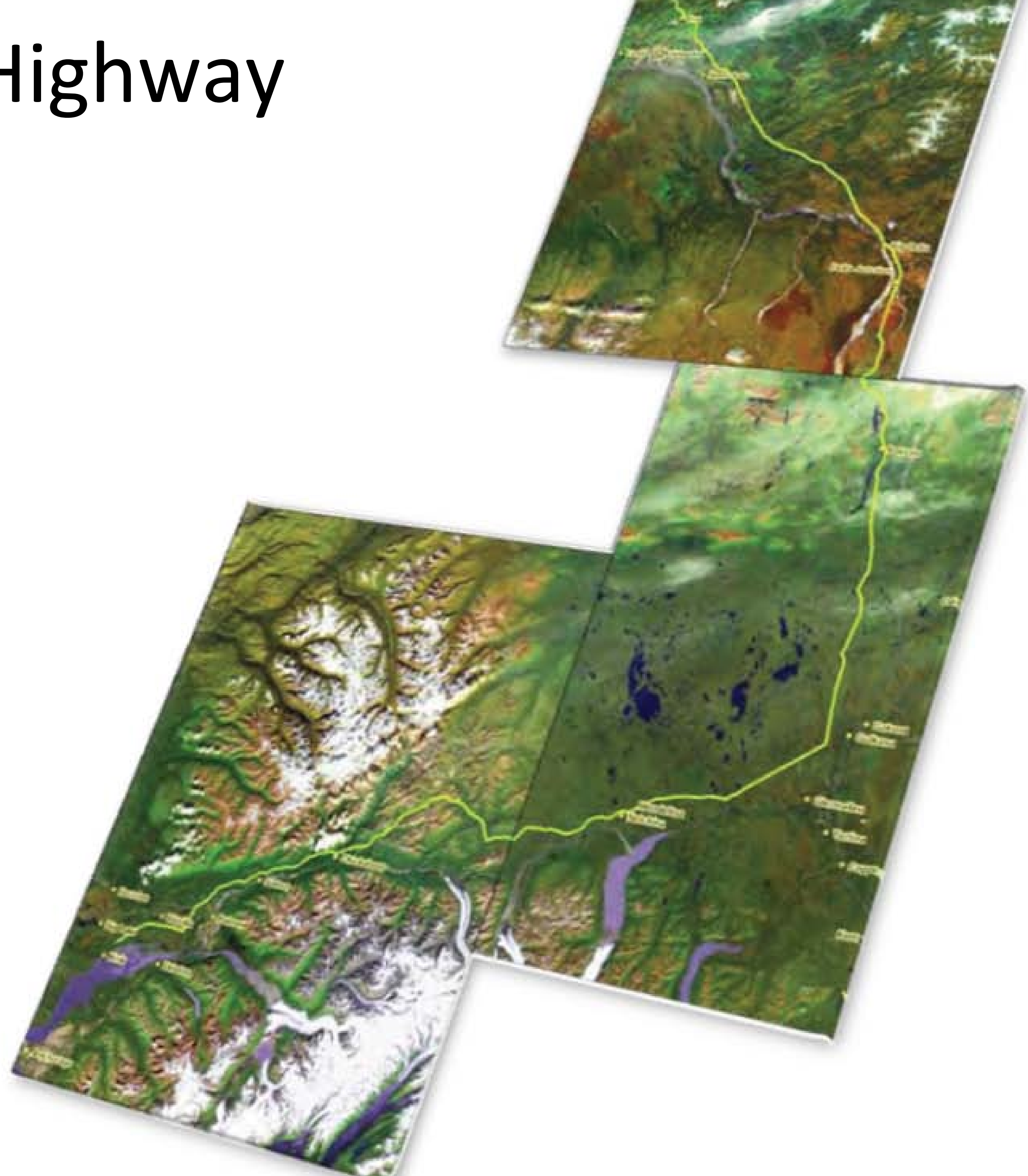
- Houston
- Big Lake area

- MP 39 Beluga Pipeline



Richardson Highway Stand Alone

- Livengood to Delta Junction to north of Glennallen
- to MP 39 Beluga Pipeline via Richardson and Glenn Highways



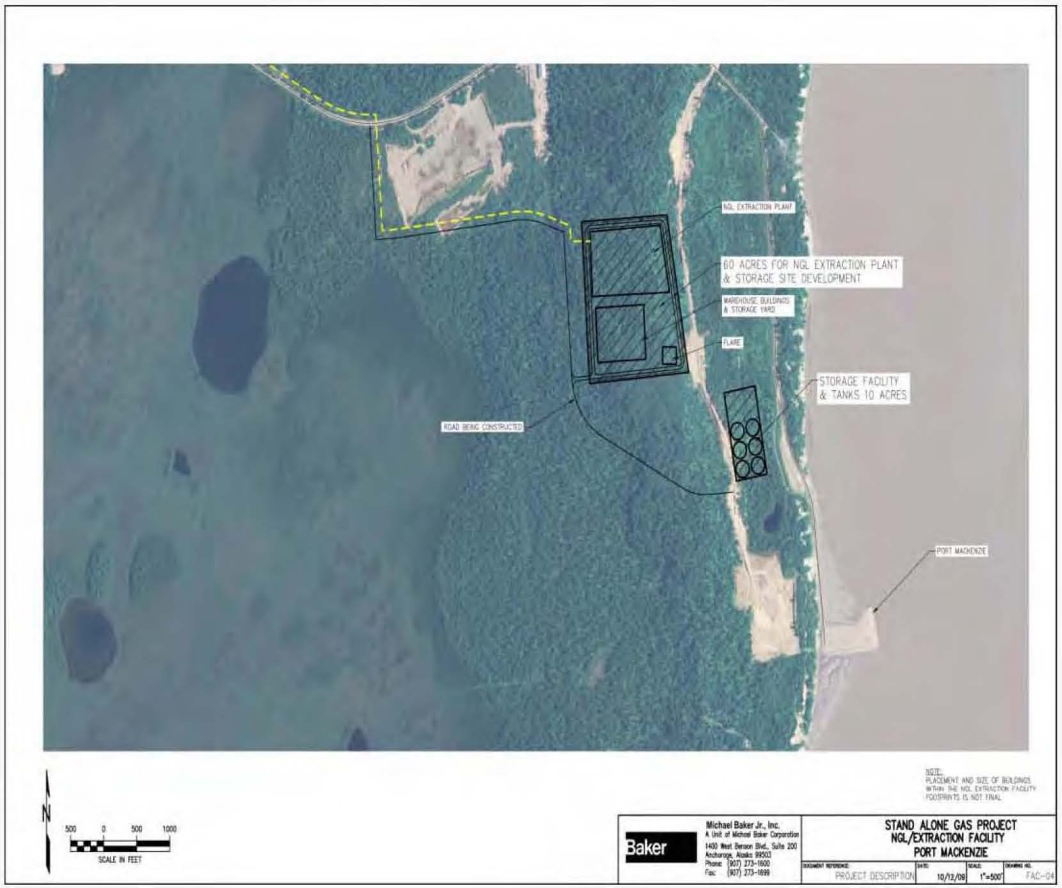
Donnelly Dome

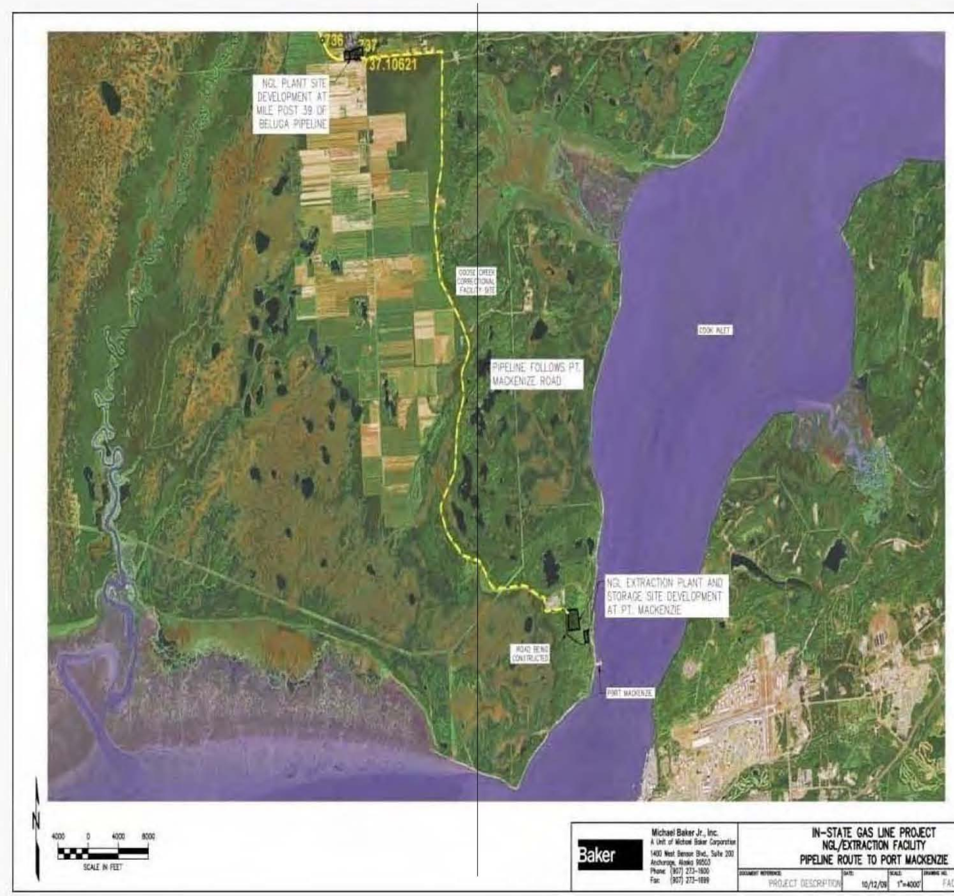
Denali Fault Crossing

Alaska Range

Beluga NGL Facility

Point MacKenzie – NGL Extraction Facility and Pipeline





Stand Alone Route Comparison – Environmental

Routes	Special Land Use Areas (Crossed)	Special Land Use Areas (Adjacent)	Impacted Wetland Acres	Fish Streams
Parks Highway Stand Alone	19	16	1,288	480
Richardson Highway Stand Alone	18	28	1,735	515

- Special Land Use Areas include local, state, and federal parks, recreation areas, and trails.
- No Federally-designated (per ANILCA) Conservation System Units crossed.
- No new permanent public vehicular access roads proposed.

Field Programs

- 2008 – 2009
  - Wetlands
  - Cultural Resources
- 2010
  - Wetlands
  - Cultural Resources
  - Lake Studies
  - Wildlife

Permit Status

- U.S. Army Corps of Engineers Section 404/10
  - Filed November 16, 2009
- State of Alaska Title 38 Right-of-Way
  - Filed November 25, 2009
- Bureau of Land Management Right-of-Way
  - Filed November 25, 2009

Steps in the NEPA Process

- Federal Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS)
- Scoping
- Analysis of Alternatives
- Issue Draft EIS
- Public Hearing on Draft EIS
- Public Comment Review and Synthesis
- Respond to Comments/Prepare Final EIS
- Issue Final EIS
- Record of Decision

Ways to Submit Comments

- Provide oral comments at a scoping meeting
- Submit a comment form
- Submit comment through the project website: www.ASAPEIS.com
- E-mail to: info@asapeis.com
- Fax to: 907.753.5567
- Mail to:

Serena E. Sweet
U.S. Army Corps of Engineers
CEPOA-RD
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Formal Scoping Period ends **February 5, 2010**

Comments will be accepted any time during the EIS process.

APPENDIX D

Agency Comments

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Monday, March 08, 2010 6:11 PM
To: Mary Goode
Subject: ASAP EIS Comment
Attachments: COE Ak Stand Alone gas pipeline scoping -ac-3-8-10.pdf

Thank you for your letter regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

-----Original Message-----
From: Mary Goode [mailto:Mary.Goode@noaa.gov]
Sent: Monday, March 08, 2010 11:59 AM
To: Sweet, Serena E POA
Subject: PDF AK Stand alone gas Pipeline PDF

--
Mary B. Goode
Administrative Assistant
NOAA Fisheries, Alaska Region
mary.goode@noaa.gov
(907) 586-7636

UNITED STATES DEPARTMENT OF COMME
National Oceanic and Atmospheric Administra
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

March 8, 2010

Colonel Reinhard W. Koenig
District Engineer, Alaska District
U.S. Army Corps of Engineers
P.O. Box 898
Anchorage, AK 99513

Re: POA 2009-651
Alaska Stand Alone Gas Pipeline Project
Scoping Comments

Attn: Serena Sweet

Dear Colonel Koenig:

The National Marine Fisheries Service (NMFS) has reviewed the request for scoping comments on the proposed Alaska Stand Alone Gas Pipeline (ASAP) Project. NMFS offers the following comments under the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Background

Prior to this scoping notice, NMFS reviewed the State of Alaska Draft 11-16-2009 Stand Alone Gas Pipeline Project Description/ Plan of Development and the U.S. Army Corps of Engineers (Corps) Notice of Intent to Prepare a Draft Environmental Impact Statement (DEIS) for the State of Alaska's Proposed Alaska Stand Alone Pipeline (ASAP) Natural Gas Transportation Pipeline [Federal Register / Vol. 74, No. 232 / Friday, December 4, 2009]. The State of Alaska proposes to develop a gas pipeline system to transport natural gas, and possibly additional natural gas liquids (NGL), from the North Slope to in-state Alaska markets. Two primary sources of natural gas have been identified as 1) residue gas from the Prudhoe Bay Central Gas Facility (CGF) and 2) produced gas from the Gubik field located in the northern foothills of the Brooks Range. A third potential source is the CGF stabilizer overhead vapor that is currently being re-injected for enhanced oil recovery on the North Slope.

Two alternative routes are proposed and begin at the two primary potential gas sources, then follow the same alignment from the North Slope to Livengood, Alaska (approximately 80 miles north of Fairbanks). The two alternative routes diverge at Livengood. One alternative, the Parks Highway Stand Alone Route, is from Prudhoe Bay to Livengood, then to Cook Inlet. The line generally follows the Parks Highway and includes service to Fairbanks. The second alternative, the Richardson Highway Stand Alone Route, is from Prudhoe Bay to Livengood to Fairbanks, and then generally follows the Trans Alaska Pipeline (TAPS) alignment to Delta Junction. The line then extends to north of Glennallen (via the Richardsen Highway), then to Cook Inlet via the Glenn Highway. This route includes service to Glennallen. Both routes end at Mile Post 55 of the Beluga Pipeline. In addition, the Corps NOI notes two spur line options and two pre-build options as take-off points for any subsequent Alaska-Canada Gas line.

Proposed work includes the construction, operation and maintenance of a 24-inch diameter, high pressure natural gas pipeline system extending about 750 miles from the North Slope of Alaska to the Cook Inlet area. Various project components include pipelines, compressor stations, metering stations, regional operation and maintenance centers, gas conditioning facilities at Prudhoe Bay, natural gas liquid (NGL) extraction facilities in Fairbanks, and NGL extraction, fractionation and storage facilities in Cook Inlet. The project also includes numerous temporary facilities used for construction and staging, such as material sites, access roads, work pads, and construction camps.

The pipeline will longitudinally bisect Alaska from north to south (similar to the existing Trans-Alaska oil pipeline) and cross mountain ranges, vast muskeg and tundra areas, rivers, numerous anadromous fish bearing streams and terminate at marine headlands. The line will be routed near existing infrastructure wherever possible.

Threatened and Endangered Species / Marine Mammals

NMFS has management responsibility for all marine mammals in Alaska except sea otter, walrus, and polar bear, including several species listed as threatened or endangered under the Endangered Species Act. Section 7(a)(2) of the ESA directs federal interagency cooperation "to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species" or result in the destruction or adverse modification of critical habitat.

The ASAP draft project description/ plan of development notes that 60 acres of Port Mackenzie would be used for NGL extraction and handing facilities. On page 3-15, the document also notes that "depending on the volume of NGL products, it may be necessary to locate the NGL fractionation and storage facilities at tidewater to allow product loading into ocean going vessels." In October 2008, NOAA listed the Cook Inlet beluga whales as endangered. Also, on December 1, 2009, NOAA proposed critical habitat for the Cook Inlet beluga whales. Please be advised that the Cook Inlet beluga whales have been observed in the waters adjacent to the project's Port Mackenzie component and must be considered when evaluating the effects of this project. This portion of Cook Inlet also includes proposed Critical Habitat for Cook Inlet beluga whales. Please visit our web sites http://www.nmfs.noaa.gov/pr/species/esaspecies.htm, http://www.fakr.noaa.gov/ for additional information.

The Marine Mammal Protection Act of 1972 prohibits, with few exceptions, injury, harm or harassment of marine mammals. Under the 1994 Amendments to the MMPA, harassment isdefined as any act of pursuit, torment, or annoyance which has the potential to injure or disturb a marine mammal causing disruption of behavioral patterns including migration, breathing, nursing, breeding, feeding or sheltering. Any unintentional and incidental take of marine mammals by U.S. citizens may be authorized under section 101 (a)(5) of the MMPA. Further information on this program may be found at our web site: http://www.nmfs.noaa.gov/pr/permits/incidental.htm.

Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Act requires federal agencies to consult on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. If a federal action agency determines that an action will not adversely affect EFH, no consultation is required, and the federal action agency is not required to contact NMFS about their determination. Please see our website for more information: http://www.fakr.noaa.gov/habitat/efh.htm .

EFH resources within the pipeline corridor include freshwater life stages of Pacific salmon species. EFH resources at marine terminal facilities may include sculpin, Pacific cod, walleye pollock, sand lance, eulachon, and marine life stages of Pacific salmon.

General Comments

NMFS looks forward to receiving more information about the Point Mackenzie aspect of the project. The project's DEIS should address any necessary harbor work, increased vessel traffic, and possible future interactions with any other foreseeable developments in Cook Inlet.

With regard to EFH, NMFS encourages the use of horizontal directional drill crossing methods for buried pipeline and when necessary aerial crossings for unburied pipeline for stream and river crossings. NMFS also encourages that in-water construction avoid times when Pacific salmon concentrate in freshwater areas and occur when activities pose the least impact on sensitive habitats.

In addition, NMFS recommends including specific information in the DEIS on the amount and locations of possible water intakes and/or discharges which may be associated with the NGL extraction facilities. Specifically, NMFS is concerned with any potential water withdraws or discharges into streams and marine waters.

Thank you for the opportunity to coordinate and comment early in the process. We look forward to receiving future updates on the project and to offering additional comments. Should you have any questions, please contact LT Amy Cox by email at amy.b.cox@noaa.gov, or by telephone at (907) 271-6620.

Sincerely,

James W. Balsiger, Ph.D
For Administrator, Alaska Region

cc: brad.smith@noaa.gov
jeanne.hanson@noaa.gov
Cristi.Reid@noaa.gov
Louise_Smith@fws.gov
Julie.W.Mckim@usace.army.mil
rockwell.theodore@epa.gov

g/COE/2010/HCD/Amy Cox/Alaska Stand Alone Pipeline (ASAP) Scoping Comments 3-8-10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

March 8, 2010

Ms. Serena Sweet, Project Manager
U.S. Army Corps of Engineers
CEPOA-RD
Post Office Box 6898
Elmendorf AFB, Alaska 99506-0898

Ref: 09-054-DOD

RE: SCOPING COMMENTS - U.S. Army Corps of Engineers Alaska Stand Alone Pipeline (ASAP) Natural Gas Transportation Project Environmental Impact Statement Proposed by the State of Alaska

Dear Ms. Sweet:

The U.S. Environmental Protection Agency (EPA) has reviewed the Notice of Intent (NOI) to prepare a Draft Environmental Impact Statement (EIS) for the State of Alaska's Proposed **Alaska Stand Alone Pipeline (ASAP) Natural Gas Transportation Pipeline** published in the *Federal Register (Vol. 74. No. 232: December 4, 2009)*. Our review of the NOI was conducted in accordance with our responsibilities as a Cooperating Agency, and pursuant to the National Environmental Policy Act (NEPA), Clean Air Act (CAA) Section 309, and the Clean Water Act.

Section 309 of the CAA specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our Section 309 authority, our review of the Draft EIS that will be prepared for the proposed project will consider the expected environmental impacts, and the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

According to the NOI, the State of Alaska is proposing to construct a 24-inch diameter, high-pressure pipeline from Alaska's North Slope to Cook Inlet in order to transport North Slope natural gas to in-state markets. The pipeline would be located entirely within the State of Alaska. Gas off-take would be provided for the Fairbanks Area and in other locations along the route. The project includes a Gas Conditioning Plant (GCP) on the North Slope, compressor stations along the pipeline route, and natural gas liquid (NGL) extraction facilities to produce utility grade natural gas. The Corps is the lead agency on this project. The Bureau of Land Management (BLM), National Park Service, and EPA are cooperating agencies.

We appreciate the opportunity for early involvement in the planning process by providing scoping comments on the proposed ASAP Project. The attached detailed comments (Enclosure 1) are provided to inform the U.S. Army Corps of Engineers (Corps) of issues that warrant consideration during the planning process for the EIS. In providing these comments, it is our goal to have these issues addressed in the draft EIS.

As a Cooperating Agency, we would appreciate continued early coordination and involvement with your office throughout the development of this EIS. We would be available to work with your agency to review and comment on preliminary sections of the document. If you have any questions regarding our comments, please do not hesitate to contact me at (907) 271-3411 or by email at jen.mark@epa.gov. We look forward to continued involvement in this important project.

Sincerely,

Mark S. Jen

Mark S. Jen, Project Manager
Environmental Review and Sediment Management Unit

Enclosures

ENCLOSURE 1

EPA Region 10
Scoping Comments for the Alaska Stand Alone Pipeline (ASAP)
Natural Gas Transportation Project

Purpose and Need

EPA recommends that the EIS include a clear and concise statement of the underlying purpose and need for the proposed project, consistent with the implementing regulations for NEPA (see 40 CFR 1502.13). In presenting the purpose and need for this project, the EIS should reflect not only the applicant's purpose and need, but also the broader public interest and need. Given the size of this project area, a concise statement is of critical importance in developing the analysis of alternatives, which could range from being narrowly focused to too broad depending on how the purpose and need statement is written.

In supporting the statement of purpose and need, the EIS should discuss the proposed project in the context of the Alaska energy market, including identification of existing gas providers and sources, public and private demands, existing and proposed natural gas transmission systems, and clearly describe how the need for the proposed action has been determined.

Range of Alternatives

Alternatives Criteria Development

EPA recommends that the EIS identify specific criteria that would be used to (1) develop a range of reasonable alternatives, (2) eliminate alternatives considered, (3) identify the environmentally preferred alternative, and (4) select the agency preferred alternative. For example, criteria could be based on factors such as conservation of important aquatic and terrestrial habitats, maintaining wildlife and fish passage, economics, subsistence resources, public safety, etc. The alternatives criteria should also incorporate substantive issues identified during the public scoping process, and tribal consultation. The EIS should provide the rationale and basis for how these criteria were developed.

Range of Reasonable Alternatives

EPA recommends that the EIS include a range of reasonable alternatives that meet the stated purpose and need for the project and that are responsive to the issues identified during the scoping process and through tribal consultation. A range of reasonable alternatives will ensure that the EIS provides the public and the decision-maker with information that sharply defines the issues and identifies a clear basis for choice among alternatives as required by NEPA. The Council on Environmental Quality (CEQ) recommends that all reasonable alternatives be considered, even if some of them could be outside the capability or the jurisdiction of the agency preparing the EIS for the proposed action. We recommend the Corps evaluate other transportation systems to distribute natural gas between the North Slope and south central/interior regions of Alaska, depending on the purpose and need of the project.

The environmental impacts of the proposal and alternatives should be presented in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. The potential impacts of each alternative should be quantified to the greatest extent possible. We recommend listing each alternative action's impacts and corresponding mitigation measures in a summary format. EPA encourages selection of practicable alternatives that will avoid and minimize environmental degradation.

Cost Benefit Analysis

We recommend that a general life cycle economic cost analysis be developed for each alternative, which would be used as a comparison in evaluating choices among the action alternatives against the proposed action. The Clean Water Act §404(b)(1) Guidelines require this information in order to determine the practicability of the alternatives in meeting the least environmentally damaging practicable alternative (LEDPA) threshold. This economic cost analysis should be developed early in the planning process and incorporated into the EIS.

Preferred Alternative

Least Environmentally Damaging Practicable Alternative (LEDPA)

To integrate the procedural requirements of NEPA and the requirements of the Clean Water Act, EPA recommends that the Preferred Alternative complies with the Clean Water Act §404(b)(1) Guidelines, which allow only the Least Environmentally Damaging Practicable Alternative (LEDPA) to be issued a Section 404 permit. To expedite the Section 404 permitting process, EPA recommends that a draft §404(b)(1) compliance determination be included in the EIS as an Appendix.

As required under the CWA 404(b)(1) Guidelines, the EIS should discuss alternatives to avoid and minimize potential impacts to wetlands and aquatic resources. For those unavoidable wetland impacts, compensatory mitigation should be evaluated. The EIS should include:

- Acreage and habitat type of waters of the U.S. that would be created or restored.
- Water sources to maintain the mitigation area.
- Re-vegetation plans, including the numbers and species to be planted, as well as special techniques that may be necessary for planting.
- Maintenance and monitoring plans, including performance standards to determine mitigation success.
- Size and location of mitigation zones.
- Parties that would be ultimately responsible for the plan's success.
- Contingency plans that would be enacted if the original plan fails.

The EIS should also discuss the project's compliance with the *Compensatory Mitigation for Losses of Aquatic Resources; Final Rule* (commonly referred to as the Final Mitigation Rule). The regulations establish performance standards and criteria for the use of permittee-responsible compensatory mitigation, mitigation banks, and in-lieu programs to improve the quality and success of compensatory mitigation projects for activities authorized by Corps permits. The EIS should include a compensatory mitigation plan that evaluates the appropriate level of compensation based on the functional assessment of unavoidable wetland impacts.

Integrating In-State Gas Pipeline Projects

On March 13, 2010, EPA provided your office with scoping comments on the Beluga to Fairbanks (B2F) Natural Gas Transportation Pipeline EIS proposed by the Alaska Natural Gas Development Authority (ANGDA). The State of Alaska is the applicant for both the B2F and ASAP projects. The purpose and need for both projects appear to be similar. The ASAP EIS would evaluate alternative pipeline route alignments and configurations that include the B2F pipeline route. Consistent with NEPA, we recommend the Corps integrate the planning and environmental review procedures for both the ASAP and B2F pipeline projects so that both projects run concurrently rather than consecutively. This could be accomplished through the development of a single comprehensive EIS to evaluate the environmental effects of both the ASAP and B2F pipeline projects.

Air Quality

We recommend the EIS provide a detailed discussion of the ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards (NAAQS), and criteria pollutant non-attainment areas within the pipeline corridor and adjacent project areas. The EIS should estimate emissions of criteria pollutants for the pipeline corridor, as well as ancillary facilities, mobile and non-mobile sources from construction and operation phases, and discuss the timeframe for release of these emissions over the entire lifespan of the project.

EPA recommends the EIS include analysis of the potential impacts to air quality (including cumulative and indirect impacts) from the project, especially during construction. The EIS should identify specify emission sources, such as the GCP, NGL and Fractionation Facilities, Compressor Stations, etc. and quantify these emissions. Such an evaluation is necessary to assure compliance with State and federal air quality regulations, State Implementation Plans (SIPs), and to disclose the potential impacts from temporary or cumulative degradation of air quality. The EIS should include:

- Detailed information about ambient air conditions, NAAQS, and criteria pollutant non-attainment areas in all areas considered for the pipeline corridor and ancillary facilities;
- Data on emissions of criteria pollutants from the proposed project and discuss the timeframe for release of these emissions over the lifespan of the project;
- Specific information about pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention; and
- An Equipment Emissions Mitigation Plan that identifies actions to reduce diesel particulate, carbon monoxide, hydrocarbons, and NOx associated with construction activities;

<u>General Conformity Analysis</u>

EPA has designated a boundary for the Fairbanks area resulting from the non-attainment of the NAAQS for $PM_{2.5}$ (fine particulate matter that is 2.5 micrometers in diameter or smaller). The CAA requires a general conformity analysis be conducted for any project emissions occurring in an area designated as nonattainment or maintenance from the NAAQS. As part of the analysis, a determination should be made that the emissions (either direct or indirect) from a federal action will not exceed a *de minimis* threshold level (measured in tons per year) for the criteria pollutant of concern ($PM_{2.5}$). If the determination indicates that the proposed ASAP project could contribute to the exceedence of the *de minimis* level, then a general conformity analysis is required to document how the federal action will affect implementation of the Alaska State Implementation Plan (SIP) to reach attainment for $PM_{2.5}$. EPA recommends the EIS discuss whether general conformity analysis is required (i.e., whether the relevant emissions for $PM_{2.5}$ exceed the *de minimis* thresholds) and how the proposed action would comply with the Alaska SIP. If a general conformity analysis is necessary, we recommend that it be integrated with the NEPA process and incorporated into the EIS.

Class I Designation

In Alaska, Denali National Park and Preserve is the only national park designated as Class I under the Clean Air Act (CAA) due to the special features of the area. Federal Class I areas have special protection under the CAA Prevention of Significant Deterioration (PSD) program. The purpose of the PSD program is "to preserve, protect and enhance the air quality in national parks, wilderness areas and other areas of natural, recreational, scenic or historic values and to insure economic growth will occur in a manner consistent with the preservation of existing clean air resources." (42 U.S.C. 7470). As proposed, the ASAP route alignment paralleling to the Parks Highway may extend adjacent to or within Denali National Park and Preserve. Depending on the route location and proximity of the pipeline from the Class I area, a PSD review for pollutants, which could impact the air quality of Denali National Park and Preserve may be required. If a PSD review for pollutants is necessary for this project, then we recommend that it be integrated with the NEPA process and incorporated into the EIS.

Water Resources

§303(d) Listed Water Bodies

Water quality degradation is one of EPA's primary concerns. CWA §303(d) requires States to identify water bodies that do not meet water quality standards and to develop water quality restoration plans to meet established water quality criteria and associated beneficial uses. We recommend the EIS disclose which water bodies may be impacted by the project, the nature of potential impacts, and specific pollutants likely to impact those waters. The EIS should also report those water bodies potentially affected by the project that are listed on the Alaska's most current EPA approved §303(d) list. The EIS should describe enhancement efforts for those waters, how the proposed project will coordinate with on-going protection efforts, and any mitigation measures that will be implemented to avoid further degradation of impaired waters.

Source Water Protection

Public drinking water supplies and/or their source areas often exist in many watersheds. It is possible that source water areas may exist within watersheds in which the ASAP pipeline and associated facilities would be located. Source water is from streams, rivers, lakes, springs, and aquifers, which is used as a supply of drinking water. Source water areas are delineated and mapped by the states for each federally-regulated public water system. The 1996 amendments to the Safe Drinking Water Act (SDWA) require federal agencies to protect sources of drinking water for communities. As a result, state agencies have been delegated responsibility to conduct source water assessments and provide a database of information about the watersheds and aquifers that supply public water systems.

Since construction and operation of the ASAP project may impact sources of drinking water, EPA recommends that the Alaska Department of Environmental Conservation (ADEC) be contacted to identify source water protection areas within the project area. Typical databases may contain information of the watersheds and aquifer recharge areas, the most sensitive zones within those areas, and the numbers and types of potential contaminant sources identified for each system. The EIS document should:

- Identify all source water protection areas within the project area;
- Identify all activities that could potentially affect source water areas;
- Identify all potential contaminants that may result from the proposed project; and
- Identify all measures that would be taken to protect the source water protection areas in the EIS.

Storm Water Management

Under the CWA, any construction project disturbing a land area of one or more acres requires a construction storm water discharge permit for industrial activities under the Alaska Pollutant Discharge Elimination System (APDES) permit program. The EIS should document the project's consistency with applicable storm water permitting requirements and should discuss specific BMPs, erosion and sediment control mitigation measures that may be necessary or beneficial in reducing adverse impacts to surface water quality. Additionally, if the discharge of pollutants from a point source into waters of the U.S. will be necessary, appropriate APDES requirements should be discussed as well.

Anti-degradation Provisions

Anti-degradation provisions of the CWA apply to those water bodies where water quality standards are currently being met. This provision prohibits degrading water quality unless an analysis shows that important economic and social development necessitates degrading water quality. The EIS should indicate how the anti-degradation provisions would be met.

Water Body Crossings

EPA recommends alternatives for pipeline crossing major streams and rivers which would minimize adverse impacts to fisheries and subsistence resources, such as vertical support members, trenching, horizontal directional drilling (HDD), ultra extended reach drilling, and bridges. The EIS should include an analysis of impacts associated with each type of pipeline crossing. We encourage the incorporation of pipeline HDD for major stream crossings. The EIS should adequately characterize the stream/river crossing and identify the types of construction or structure that would be implemented for specific types of waterbody crossings.

Wetlands and other Aquatic Resources

EPA recommends the EIS describe all types of waters of the United States that could be affected by the proposed project and alternatives, and include maps that clearly identify all waters within the project area. The discussion should include acreages, habitat types, values, and functions of these waters. For each alternative pipeline route alignment evaluated in the EIS, we recommend that jurisdictional waters be mapped using aerial interpretation within a minimum 1,000-ft wide corridor. Field delineation of wetlands should be conducted within a minimum 300-ft wide corridor. This is consistent with requirements agreed to for other pipeline projects in Alaska. The EIS should identify and describe the methodology for evaluating wetlands condition and functional assessment consistent with determining compensatory mitigation.

Dredging and Open Water Disposal

EPA recommends the EIS describe how construction and infrastructure materials and modules would be mobilized for this project. For example, the proposed 70-acres Gas Conditioning Plant (GCP) in Prudhoe Bay may require sealift transport to the North Slope and subsequent dredging of a navigational channel. If marine dredging and ocean disposal would be required for this project, please coordinate with EPA pursuant to the Marine Protection, Research, and Sanctuaries Act (MPRSA). If dredging will be required for this project, then the EIS should evaluate the effects of dredging and dredge material disposal on the marine environment. Based on the types of dredging methods proposed, the environmental impacts should be disclosed and mitigation measures identified. The EIS should evaluate ocean disposal sites, upland disposal and/or open water disposal of dredged material. A dredging plan should be developed and included in the EIS. If site designation for open water disposal is required by EPA under §102 MPRSA, then please coordinate early with our office.

Hazardous Materials

EPA recommends the EIS address potential direct, indirect and cumulative impacts of hazardous materials from construction and operation of the project. Natural gas would be transported through communities, as well as rural, unincorporated areas. Although pipeline transport is presumed to be safe, the risk of possible accidental releases of natural gas to the environment is real. Therefore, the EIS should describe measures that will be taken to minimize the chances of such an accident, and emergency planning, response, and clean up measures that would be taken should an accident occur.

We recommend the EIS address the applicability of state and federal hazardous waste requirements, and appropriate mitigation measures to minimize the generation of hazardous materials. The requirements should be consistent with the Natural Gas Pipeline Safety Act (see http://ops.dot.gov/init/partner/partnership.htm). The EIS should also address the issue of spill and leak prevention, planning, and clean up.

Invasive Species

If pesticides and herbicides will be applied during construction, operation, and maintenance of the project, we recommend the EIS address any potential toxic hazards related to the application of the chemicals, and describe what actions will be taken to assure that impacts by toxic substances released to the environment will be minimized. Executive Order 13112, *Invasive Species* (February 3, 1999), mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.

In particular, construction activities which disturb the ground may expose areas and could facilitate propagation of invasive species. Climate change resulting in warmer temperatures may encourage invasive species which may not normally occur at this climate zone. Mitigation, monitoring, and control measures should be identified and implemented to manage establishment of invasive species throughout the entire pipeline corridor right-of-way from Alaska's North Slope to South Central. We recommend the EIS include a project design feature that calls for the development of an invasive plant management plan to monitor and control noxious weeds, and to utilize native plants for restoration of disturbed areas after construction.

Permafrost

EPA recommends options for avoiding and minimizing adverse impacts to permafrost resulting from the construction and operation of a buried, high pressure, chilled pipeline. Furthermore, the EIS should also evaluate surface disturbance activities to permafrost resulting from the placement of gravel pads for the GTP, compressor stations, NGL and fractionation facility, gas take off delivery facilities, gravel sources, roads, and bridge crossing, etc. In order to avoid impacts to permafrost areas, we recommend the EIS consider an above ground pipeline alternative.

Seismic and Other Risks

Construction and operation of the proposed gas pipeline may cause or be affected by increased seismicity (earthquake activity) in tectonically active zones. Therefore, we recommend the EIS discuss the potential for seismic risk and how this risk will be evaluated, monitored, and managed. A seismic map should either be referenced or included in the EIS. The construction of the proposed project must use appropriate seismic design and construction standards and practices.

Since it is possible that the project activities will have impacts to geologic resources, a study of the geologic resources within the pipeline corridor should be conducted and the results presented in the EIS. Ground movement on these faults can cause a pipeline to rupture, resulting in discharge of gas and subsequent explosion. In particular, potential geologic faults should be identified and described in the EIS.

Blasting

During project construction, blasting may be required in certain areas along the pipeline route corridor, resulting in increased noise and related effects to local residents, and disruption and displacement of wildlife species. We recommend the EIS discuss where blasting in the project area would be required, blasting methods that will be used, and how blasting effects will be controlled and mitigated. Noise levels in the project area should be quantified and the effects of blasting to the public and to wildlife should also be evaluated in the EIS. We recommend a blasting management plan be developed and the environmental impacts evaluated in the EIS.

Protected Species

The proposed project may impact protected species listed under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), their habitats, as well as state sensitive species. Evaluation of the proposed project should identify the endangered, threatened, and candidate species under ESA and MMPA, and other sensitive species within the project corridor and surrounding areas. The EIS should describe the critical habitat for the species; identify any impacts the project will have on the species and their critical habitats; and how the proposed project will meet all requirements under ESA and MMPA, including consultation with the U.S. Fish and Wildlife Service (FWS) and National Oceanographic Atmospheric Administration (NOAA). The EIS may need to include a biological assessment and a description of the outcome of consultation with the FWS and NOAA under Section 7 of the Endangered Species Act. The Corps' actions should promote the recovery of declining populations of species.

Social-Cultural Impacts

Socioeconomic Impact

We anticipate that the project will result in direct and indirect employment opportunities for Alaska Native residents. We also anticipate that there will be local and corporation revenues generated from this project. While employment opportunities and local revenues generally increase a community's standard of living (even temporarily), there can also be negative impacts to families, communities, and cultures, especially in areas where residents are participating in traditional cultural practices. These impacts associated with this project, as well as cumulative impacts, should be fully evaluated and disclosed in the EIS.

Project Area Access

We recognize that there will need to be restrictions or limitations imposed on residents that currently use the project area for recreation, subsistence, and travel to other areas. Such restrictions and possible mitigation of these impacts should be developed in close coordination with the users, and impacts should be thoroughly analyzed and reported in the EIS. We recommend the EIS disclose all impacts associated with such activities and describe what actions will be taken to manage and maintain recreational and access opportunities in the project area.

Traditional Knowledge

EPA acknowledges the need to provide meaningful public involvement in the preparation of an EIS and recommends the identification, inclusion, and integration of Traditional Knowledge (TK) into the EIS analysis, as appropriate. TK, in coordination with empirical scientific data, should be used to develop and evaluate alternatives and potential mitigation measures.

We recommend that in addition to reviewing any information available from previous EIS processes regarding subsistence resources, gaps in TK should be identified, and additional TK studies be conducted as necessary to clearly identify concerns and potential impacts, including cumulative, from the proposed project and proposed alternatives. This information should be reviewed and included in the EIS to the extent possible and utilized in the development of the current analysis. For example, additional TK data gaps may include construction timing windows to avoid and minimize critical subsistence harvest activities and wildlife migration periods.

Climate Change and Greenhouse Gas (GHG) Emissions

As you are aware, on February 18, 2010, the CEQ issued draft guidance to Federal Agencies on analyzing the effects of GHG emissions and climate change when describing the environmental effects of a proposed agency action in accordance with NEPA. A copy of the draft guidance is available at:
http://ceq.hss.doe.gov/current_developments/new_ceq_nepa_guidance.html.

EPA recommends evaluation and disclosure of GHG emissions and climate change effects resulting from the proposed pipeline projects, including all elements and phases (e.g., gas conditioning plant, compressor stations, natural gas liquid extraction/storage facilities, etc. and mobilization, staging, construction, and operation). The EIS should establish reasonable spatial and temporal boundaries for this analysis. We recommend that the EIS quantify and disclose the expected annual direct and indirect GHG emissions for the proposed action. In the analysis of direct effects, the EIS should quantify cumulative emissions over the life of the project, discuss measures to reduce GHG emissions, including consideration of reasonable alternatives, and qualitatively discuss the link between such GHG emissions and climate change.

The draft CEQ guidance references a number of technical documents, which provides reporting protocols for quantifying GHG emissions. The EIS should consider the emissions source categories, measurement methodologies and reporting criteria for determining and reporting emissions. The evaluation should consider impacts of climate change on vulnerable communities, such as Tribal and Alaska Native communities. We recommend the EIS consider mitigation measures and reasonable alternatives to reduce action-related GHG emissions. The EIS should include a discussion of cumulative effects to GHG emissions related to the proposed action, which should focus on an assessment of annual and cumulative emissions of the proposed action and the difference in emissions associated with the alternatives.

Cumulative Impacts

The CEQ definition of *cumulative impact* is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." The cumulative impacts analysis should therefore provide the context for understanding the magnitude of the impacts of the alternatives by analyzing the impacts of other past, present, and reasonably foreseeable projects or actions and then considering those cumulative impacts in their entirety. The EIS should include and analyze present and reasonably foreseeable projects and actions proximate to the pipeline corridor and vicinity, such as the proposed larger diameter pipelines proposed by Denali and TransCanada. Where adverse cumulative impacts may exist, the EIS should disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.

We recommend the EIS clearly identify the resources that may be cumulatively impacted, the time over which impacts are going to occur, and the geographic area that will be impacted by the proposed project. The focus should be on resources of concern - those resources that are at risk and/or are significantly impacted by the proposed project before mitigation. In the introduction to the *Cumulative Impacts Section*, identify which resources are analyzed, which ones are not, and why. For each resource analyzed, the EIS should:

- Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date.
- Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or in stasis.
- Identify the future condition of the resource based on an analysis of the cumulative impacts of reasonably foreseeable projects or actions added to existing conditions and current trends. For example, what will the future condition of the watershed be?
- Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives.
- Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.
- Identify opportunities to avoid and minimize impacts, including working with other entities.

Mitigation and Monitoring

As you are aware, on February 18, 2010, the Council of Environmental Quality (CEQ) issued draft guidance for NEPA Mitigation and Monitoring. This guidance seeks to enable agencies to create successful mitigation planning and implementation procedures with robust public involvement and monitoring programs. A copy of the draft guidance is available online at: http://ceq.hss.doe.gov/current_developments/new_ceq_nepa_guidance.html.

The EIS should include a discussion and analysis of proposed mitigation measures and compensatory mitigation under CWA §404. The EIS should identify the type of activities which would require mitigation measures either during construction or operational phases of this project. To the extent possible, mitigation goals and measureable performance standards should identified in the EIS to reduce impacts to a particular level or adopted to achieve an environmentally preferable outcome.

Mitigation measures could include best management practices and options for avoiding and minimizing impacts to important aquatic habitats and to compensate for the unavoidable impacts. Compensatory mitigation options could include mitigation banks, in-lieu fee, preservation, conservation fund, etc. and should be consistent with the *Compensatory Mitigation for Losses of Aquatic Resources; Final Rule* (33 CFR Parts 325 and 332 and 40 CFR Part 230). A mitigation plan should be developed in compliance with 40 CFR Part 230 Subpart J 230.94, and included in the EIS.

An environmental monitoring program should be designed to assess both impacts from the project and that mitigation measures being implemented are effective. The EIS should identify clear monitoring goals and objectives, such as what parameters are to be monitored, where and when monitoring will take place, who will be responsible, how the information will be evaluated, what actions (contingencies, triggers, adaptive management, corrective actions, etc.) will be taken based on the information. Furthermore, the EIS should discuss public participation , and how the public can get information on mitigation effectiveness and monitoring results.

Consultation with Federally-Recognized Tribal Governments

We commend the Corps for your early initiation of Tribal government-to-government consultation for this project. We encourage the Corps to continue effective and early consultation and communication with interested tribal governments as this project moves forward.

The proposed ASAP project may potentially affect traditional subsistence and cultural practices and resources of certain tribal members living near and/or utilizing resources in the project area. In addition, there is potential for those that obtain subsistence resources and other traditional or cultural resources through barter and trade to be impacted. Tribal governments whose members or traditional resources may be impacted, either directly and indirectly, by this action, should be invited to consult on a government-to-government basis on this project consistent with *Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000)*. EO 13175 indicates that the U.S. government will continue "to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights." Documentation of these consultations should be included in the EIS, as should any activities to address any concerns identified by tribal governments.

Tribal Consultation Plan

We recommend the Corps develop a Tribal Government-to-Government Consultation Plan which would outline the process for working effectively with tribal governments during the EIS development process. This plan would be useful in determining the best timing for conducting the consultation meetings which would avoid conflict with Alaska Native Village subsistence seasons, which vary depending on the community. This plan should be developed in collaboration with affected and/or interested tribal governments.

Consultation Process

The EIS should document the tribal consultation and coordination process by providing a chronology with the dates and locations of meetings with tribal governments, results of the meetings, and a discussion of how the tribal governments' input was used to develop the EIS. The consultation and coordination with tribal governments should continue throughout the EIS development phase. Additional attention should be given to schedule meetings and program decision points in the EIS process to avoid conflicts with subsistence and other traditional activities whenever possible.

As you are aware, the July 28, 1999, CEQ Memorandum to Heads of Federal Agencies addresses the designation of non-Federal agencies, such as Alaska Tribal governments, to be cooperating agencies in the implementation of NEPA. We recommend the Corps invite affected Tribal governments to participate in the ASAP EIS development as a cooperating agency. This would provide for the establishment of a mechanism for addressing inter-governmental issues throughout the EIS development process.

Environmental Justice and Public Participation

EPA recommends the EIS clearly disclose what efforts were taken to ensure effective public participation in the scoping process and throughout the development of the EIS. In addition, since low income, minority and/or Alaska Native communities could be impacted by the proposed project, the EIS should disclose what efforts were taken to meet environmental justice requirements consistent with EO 12898 (*Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*). We recommend that this should include the following:

- A description of the methodology and criteria utilized for identifying low income and people of color communities, if appropriate; the sources of data utilized for these analyses, and the references utilized for establishing the criteria.
- A comprehensive accounting of all impacts on low income or minority communities, including (but not limited to) cumulative and indirect impacts, exposure pathways unique to the impacted communities, historic exposures, and impacts to cultural, historic and protected resources. In addition, the EIS needs to determine if the impacts to these communities will be disproportionately higher than those on non-low income or non-minority communities. For such a determination, the EIS must identify a reference community, provide a justification for utilizing this reference community, and include a discussion of the methodology for selecting the reference community.
- The EIS should demonstrate that communities, if any, bearing disproportionately high and adverse effects have had the opportunity for meaningful input into the decisions being made about the project. The EIS should describe what was done to inform the communities about the project and the potential impacts in will have on their communities (notices, mailings, fact sheets, briefings, presentations, exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on scene information), what input was received from the communities, and how that input was utilized in the decisions that were made regarding the project.

Extra attention should be given to schedule meetings and decision points in the EIS process to avoid conflicts with subsistence and other traditional activities whenever possible. We also recommend that particular attention be given to consideration of the dependence of local communities on local and regional subsistence resources, access to those resources, and perception of the quality of those resources. Various EJ assessment tools are available at: http://www.epa.gov/compliance/resources/policies/ej/index.html#tools.

Health Risk or Impact Analysis

Consistent with Sections 4321 and 4331 of NEPA, and the goals of EO 12898 and 13045, if human health could be impacted by the proposed project, we recommend the Corps undertake a screening process to determine which aspects of health (including, but not limited to public, environmental, mental, social, cultural health, etc.) could be impacted. Depending on the results of the screening, an analysis of health effects, such as a health risk assessment (HRA) or Health Impact Assessment (HIA), may need to be conducted in order to determine the direct, indirect and cumulative impacts to health. This analysis will likely need as much time to complete as the EIS, so early screening is essential to ensuring a timely analysis. EPA recommends the Corps partner directly with local, state, tribal and federal health officials to conduct the appropriate analysis, and to determine appropriate and effective mitigation of health impacts.

Scope of the Health Assessment in EIS

Health effects from development projects or programs are often more far-reaching than is commonly recognized by project proponents and non-health agencies that are considering development decisions or planning land-use policy. Contaminant exposure or cancer risks are common areas for impact assessment; however numerous other health impacts that could occur as a result of a new project, program or policy are often overlooked.

For example, this EIS should look for information that can be used to assess the project's effects by looking at how income from new jobs can have positive health impacts by increasing socioeconomic status or increasing access to health care. This income has also been associated with decreased access to health care by changing someone's eligibility for public assistance programs. Income from new jobs has also been associated with increased rates of alcohol and drug use, and domestic violence and child abuse due to increased discretionary income, rapid social and community change (particularly in rural areas) and disrupted family structure due to unusual work schedules. Increased income can also result in increased ownership of motorized vehicles, which often results in less physical activity, particularly in the village setting. Although such health impacts have been documented for other projects on numerous occasions, they are rarely addressed in project development or permitting.

Data Collection

In order to appropriately evaluate health, specific health data are required that may not be routinely collected as part of the scoping process. In order to ensure that the necessary data are available for this evaluation, it is important to involve public health professionals in the NEPA process. For large projects, this should occur early in the process, such as before or during project scoping and/or prior to submitting permit applications.

Public health data and expertise for prospective health impact analysis, or for providing input on health issues, may be available from local and state health departments, tribal health agencies, or federal public health agencies such as the U.S. Centers for Disease Control and Prevention's National Center for Environmental Health, U.S. Agency for Toxic Substances and Disease Registry, or Indian Health Service.

Methods and Tools

a. *Health Impact Assessment (HIA)*

The framework known as Health Impact Assessment (HIA) is a combination of procedures, methods and tools that enables systematic analysis of the potential positive or negative effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. [1] HIA identifies appropriate actions to manage or mitigate negative effects. HIA is currently the only widely accepted methodology or framework used to provide decision-makers with information about how a specific policy, project or program may affect human health.

The World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention support the use of HIA as a tool to address health impacts when policies, programs or projects are being developed. Many other countries have successfully used HIA for these purposes. The International Finance Corporation, a member of the World Bank Group, has adopted HIA as the standard for evaluating health and requires it of any projects for which it provides funding.

b. *Guidelines and Resources*

Guidelines for conducting HIA are available from various sources.[2] WHO has links to many of these at: http://www.who.int/hia/about/guides/en/. The International Finance Corporation has developed detailed guidelines for conducting HIA. A draft version of these guidelines can be found at: http://www.ifc.org/ifcext/sustainability.nsf/Content/PublicComment_HealthImpactAssessment.

Historical and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires Federal agencies to take into account the effects of their undertakings on historic properties. Since the ASAP project area may represent a frequent historical use by native Tribes, the State Historic Preservation Officer (SHPO) will need to be consulted. In addition, we recommend the Corps involve the public and local governments, as well as identify other potential consulting parties.

The 1992 amendments to NHPA placed major emphasis on consultation with tribal governments. Consultation must respect tribal sovereignty and the government-to-government relationship between the Federal and tribal governments, as discussed above. Consultation for tribal cultural resources is required under Section 106. Tribal governments must be consulted about actions on or affecting their lands or resources on the same basis and in addition to the SHPO. The EIS should evaluate the historic extent and condition of the environment to adequately address impacts to cultural resources of concern to tribal governments. Potential impacts to resources of concern to the tribes may include, but are not limited to, impacts to cultural resource areas, archaeological sites, traditional cultural properties of landscapes, sacred

[1] This definition is from the International Association for Impact Assessment (IAIA), which modified from the World Health Organization's Gothenberg consensus statement (1999).

[2] EPA does not endorse or recommend use of any single or particular guidance on HIA These references are provided as general information and to assist permitting agencies with identifying additional resources on HIA.

sites, and environments with cultural resources significance. The EIS should disclose the Native Alaskan historical and traditional significance of the project area, the importance of ethno-botany, hunting, fishing, and gathering uses of the area by Alaska Natives, any long term traditional ecological management of the area, and any significant historical events that took place there. The tribal government(s) must be specifically engaged and consulted with in accordance with Section 106 of the NHPA.

EPA recommends the Corps initiate consultation with the potentially affected tribal government(s) specific to their interests and concerns about traditional and cultural resources. The scope of impacts to these resources should include the direct, indirect, and cumulative impacts to:

- Sacred sites;
- Traditional cultural properties or landscapes;
- Hunting, fishing, gathering areas (including impacts to ecosystems that support animals and plants that are or once were part of the Tribes and tribal descendants traditional resource areas);
- Access to traditional and current hunting, fishing and gathering areas and species;
- Changes in hydrology or ecological composition of springs, seeps, wetlands and streams, that could be considered sacred or have traditional resource use associations;
- Travel routes that were historically used, and travel routes that may be currently used;
- Historic properties, districts or landscapes.

To determine whether the area of potential effect would be eligible for the National Register of Historic Places, the perspectives of the tribal government(s) should be considered. Such considerations should include the list above as well as significant events that may have taken place in the past (tribal wars, establishment of trade routes, etc.).

EPA further recommends that a Record of Decision (ROD) not be completed until the 106 consultation process has been fully completed. If adverse effects to traditional cultural properties, sacred sites, or other areas of cultural resource concern are identified, any Memorandum of Agreement (MOA) developed to resolve these concerns under Section 106 should be addressed in the ROD. Unless there is some compelling reason to do otherwise, the Section 106 MOA should be fully executed before the ROD is issued, and the ROD should provide for implementation of the terms of the MOA.

United States Department of the Interior

NATIONAL PARK SERVICE
Alaska Region
240 West 5th Avenue, Room 114
Anchorage, Alaska 99501

IN REPLY REFER TO

L7619 (AKRO-EPC)

MAR 08 2010

Serena Sweet
EIS Project Coordinator
U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, Alaska 99506-0898

Dear Ms. Sweet:

Thank you for the opportunity to provide agency scoping comments for the draft environmental impact statement (EIS) on the Alaska Stand Alone Pipeline (ASAP). The National Park Service (NPS) has three primary concerns with the ASAP, which are discussed in this letter. First, we do not yet have a signed agreement with the State of Alaska or Bureau of Land Management (BLM), the lead bureau for the U.S. Department of the Interior on this EIS, for cost recovery to participate in the EIS as provided in the BLM cost recovery procedures and regulations implementing section 304 of FLPMA (43 U.S.C. 1734). Second, the NPS is interested in knowing how a gas pipeline along the Parks Highway route would affect the resources and values of Denali National Park and Preserve, whether the proposed route would by-pass the park or would cross it. Third, the NPS has a responsibility to protect other park and recreational resources in Alaska pursuant to section 6(f)(3) of the Land and Water Conservation Fund Act.

The State of Alaska has submitted applications to federal agencies to obtain permits for a proposal to build a 20-inch to 24-inch diameter natural gas pipeline from Gubik and/or Prudhoe Bay fields on the North Slope of Alaska to South-central Alaska. Depending on the throughput rates, the gas pipeline would transport natural gas up to 1 million standard cubic feet per day at a maximum of 2,500 pounds per square inch (psi). The State is examining two alternative routes with variations. Both routes would parallel the Trans-Alaska Pipeline System (TAPS) route from the North Slope to a point north of Fairbanks near Livengood. From there the preferred Parks Highway Alternative route would proceed south along the eastern edge of the Minto Flats and connect to the Parks Highway north of Nenana and follow that highway south to near Willow, and then go overland to the Beluga Pipeline station north of Cook Inlet. The Richardson Highway Alternative route would follow the Elliot Highway and TAPS past Fairbanks and Eielson AFB after which it would follow TAPS or the Richardson Highway to north of Glennallen, and then along the Glenn Highway to Wasilla and over to Beluga Pipeline station. If this project is delayed and a large (48-inch diameter) natural gas pipeline is built from the North

Slope to the 48 contiguous States, then a smaller diameter pipeline to South-central Alaska could still be built as a pre-built spur line along either alternative route.

The NPS has been designated as a cooperating agency on the EIS because one alternative, a variation of the Parks Highway route alternative, would traverse about 7 miles of Denali National Park and Preserve in its eastern end. Congress originally established this park as Mount McKinley National Park in 1917 to "set apart as a public park for the benefit and enjoyment of the people" a "game refuge" to be managed for "the freest use … for recreation purposes by the public and for the preservation of animals, birds, fish, and … the natural curiosities and scenic beauties thereof." Subsequent legislation expanded the park eastward to the Nenana River for wildlife protection and to provide appropriate land for park visitor facilities. This area includes the railroad easement, train depot, Parks Highway, park transportation center, Denali Visitor Center, Murie Science and Learning Center, Riley Creek Campground, Camper Convenience Center, concessioner and researcher housing, and the U.S. Post Office. The park's purposes were rededicated when ANILCA expanded and redesignated the unit as Denali National Park and Preserve "to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation... and undisturbed ecosystems. " The lands between the AKRR easement and the Nenana River are part of the one percent of the former Mt. McKinley National Park currently evaluated as ineligible for wilderness designation.

The route proposed by the applicant avoids lands in Denali National Park and Preserve (DNP), passing to the east of DNP. An alternative route to the proposed route would cross approximately seven miles of DNP. This would require a right of way (ROW) under Title XI of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). Title XI prescribes the process for application, evaluation, and approval/disapproval of a ROW through a conservation system unit (CSU) in Alaska. Currently the NPS does not have legislative authority to issue a ROW for a natural gas pipeline. Under the Title XI process, a land managing agency without authority to issue a ROW for a facility (a natural gas pipeline in this case) must make a preliminary recommendation on the application to the President of the United States. If the President approves the application, he must recommend approval to Congress. To approve the application and authorize the ROW, Congress must pass a joint resolution.

Senator Murkowski introduced a bill in Congress in April 2009 (S. 766) which, as currently written, would provide authority for the NPS to issue a ROW for the proposed pipeline through DNP. This bill was revised and incorporated into section 354 of the American Clean Energy Leadership Act of 2009 (S. 1462). Neither of these bills has yet come up for a full vote on the Senate floor.

The NPS believes any decision considering a gas pipeline route through DNP should be based on the existing ANILCA Title XI process, including the preparation of an EIS. If, after review of public comments from the scoping period, or later on the draft EIS, the State of Alaska wishes to change its preferred alternative to a route traversing DNP, then a revised application must be submitted to all the permitting federal agencies in accordance with the Title XI process. This may restart the EIS process.

Before recommending approval or disapproval of a natural gas pipeline ROW through the DNP, the NPS must consider the EIS analysis of impacts and the decision process provided in Title 43

Code of Federal Regulations (CFR) § 36.7, and whether the proposed pipeline may be legally permitted through the park. The regulations at 43 CFR § 36.7 (a)(2) specify nine factors that must be considered by all appropriate federal agencies, including the NPS. If such a route is selected, the NPS would work with the applicant to minimize visual and other impacts along the highway corridor in the park. Construction of a public multi-use trail over the ground disturbed by the pipeline installation may be an option.

If a natural gas pipeline is constructed in or near the park, the NPS would be interested in obtaining natural gas from the line to facilitate conversion of heating and fueling operations at the park from fuel oil and diesel to the less polluting natural gas. This would reduce total air pollution and the potential for fuel oil spills in the front country of the park. We understand a conditioning plant may be required to strip methane from the pipeline stream if mixed natural gases are shipped down the pipeline. Adjacent sizeable tourism businesses and residences could also be serviced, further reducing air pollutants in the front country area of the park.

If a natural gas pipeline is built and operating pressure approaches the maximum of 2,500 psi, then, according to the U.S Department of Transportation Pipeline Hazardous Materials and Safety Administration, a gas pipeline explosion along such a facility could devastate a large area. The engineering, operations, and safety of such a proposed natural gas pipeline must take into consideration public health and safety in the heavily used front country of the park and in the adjoining developed areas both north and south of the park boundary.

The NPS has oversight responsibility for certain state and local recreational resources pursuant to section 6(f)(3) of the Land and Water Conservation Fund Act (Public Law 88-198) and its implementing regulations at 36 CFR Part 59. It appears this project has the potential to impact state and/or local parks subject to Section 6(f)(3), such as Denali State Park and the Nancy Lakes State Recreation Area. Section 6(f)(3) prohibits conversion, either permanently or temporarily, of qualifying park resources to other than public outdoor recreation use without approval by the Secretary of Interior, as delegated to NPS. Conversion of park resources to other uses may occur only where it can be demonstrated that all practical alternatives have been considered. A replacement park of equal or greater fair market value and similar usefulness and equivalent location is required for all conversion approvals. In Alaska this program is administered by the Alaska Division of Parks and Outdoor Recreation (ADPOR). NPS recommends that the applicant contact ADPOR to determine whether any of the proposed routes will impact recreational resources subject the provisions of section 6(f)(3).

James King, Director
Alaska Division of Parks and Outdoor Recreation
550 West 7th Avenue, Suite 1380
Anchorage, AK 99501-3561
(907) 269-8700

Please direct questions or comments about these comments to Bud Rice at 907-644-3530 or Bud_Rice@nps.gov.

Sincerely,

Sue E. Masica

Sue E. Masica
Regional Director, Alaska Region

cc:
Ron Dutton, BLM-USDI ASAP Project Lead
James King, Director, ADPOR

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Thursday, February 04, 2010 3:44 PM
To: Winters, Jack F (DFG)
Cc: Tricia Waggoner; asap@entrix.com
Subject: RE: Alaska Stand Alone Pipeline Scoping Comments
Attachments: ASAP Scoping Comments .PDF

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

-----Original Message-----
From: Winters, Jack F (DFG) [mailto:jack.winters@alaska.gov]
Sent: Monday, February 01, 2010 4:00 PM
To: Thompson, Mike; Brown, Anne L (JPO); Weaver, Aaron
Cc: Roach, Don; Taube, Tom; James, David ; Nowlin, Roy A (DFG); Simon, Jim; McLean, Mac; Ott, Alvin G (DFG); Howard, Kerry; Fleener, Craig L (DFG); See, Marianne G (DFG); Bethe, Michael L (DFG); Daigneault, Michael J (DFG); Hilsinger, John R (DFG); Bergstrom, Daniel J (DFG); Regnart, Jeff; Lingnau, Tracy L (DFG); Kavalok, Tony (DFG); Parker, Fronty (DFG); Dubois, Steve; Miller, Matthew G (DFG); Swanton, Charlie; Small, Bob; DelFrate, Gino (DFG); Tobey, Robert W (DFG); Somerville, Mark A (DFG); Rutz, David S (DFG); Hasbrouck, James J (DFG); Larsen, Douglas N (DFG); Borba, Bonnie M (DFG); Schwanke, Becky A (DFG); Lenart, Beth ; Caikoski, Jason; Young, Donald D (DFG); Vania, Tom D (DFG); Brookover, Thomas E (DFG); Simpson, Ellen M (DFG); Weiss, Ed; McKim, Julie W POA; Sweet, Serena E POA; Perrin, Don ; Brase, Audra; Burr, John; Scanlon, Brendan; Morris, Bill
Subject: Alaska Stand Alone Pipeline Scoping Comments

Aaron,

Attached are the ADF&G scoping comments for submittal to the US Army Corps of Engineers for the environmental impact statement for the proposed Alaska Stand Alone Natural Gas Pipeline.
Call me if you have
any questions. Thanks.

Jack
459-7285

MEMORANDUM

Department of Fish and Game

STATE OF ALASKA

Division of Habitat

TO:	Aaron Weaver Natural Resource Specialist State Pipeline Coordinator's Office Department of Natural Resources Anchorage	DATE:	February 1, 2010
		TELEPHONE: FAX:	459-7285 459-7303
FROM:	Jack Winters Acting Regional Supervisor Department of Fish and Game Division of Habitat	SUBJECT:	Alaska Stand-Alone Pipeline EIS Scoping Comments

The Alaska Department of Fish and Game (ADF&G) has reviewed several documents submitted by the State of Alaska to the US Army Corps of Engineers (USACE) for the Alaska Stand-Alone Gas Pipeline (ASAP) Environmental Impact Statement (EIS) development process. These documents include: *the Stand-Alone Gas Pipeline Project Description/Plan of Development*; the *Stand-Alone Gas Pipeline Route Alternatives Analysis*, and the *Parks Highway Stand-Alone Gas Pipeline State of Alaska ROW Permit Application*. The following comments are the ADF&G's EIS scoping comments on the proposed project and submitted project documents. While comments on the *Parks Highway Stand-Alone Gas Pipeline State of Alaska ROW Permit Application* are more focused on clarifications or additional information needs for the state right-of-way permit, some of the issues raised can be used to further refine the analysis of issues in the EIS.

General Comments

One of the difficulties in assessing and evaluating potential environmental impacts of this 700 to 800 mile long pipeline, depending on the selected route, is the lack of detailed design information for many of the project components. For example, summer versus winter construction, and gravel or ice workpads will each have differing environmental effects. Depending on the extent of use of any of these modes of construction, considerably different degrees of effects could be encountered. Similarly, the number and location of material sites, the volume of gravel needed for roads, pads, and pipeline bedding, ditch spoil disposal sites, and predicted disposal volumes all may affect the analysis, depending on estimates used for each of these project components. The lack of detailed design information for this project compromises the completeness and detail of the environmental analysis for the project. Considerable care will be needed to ensure each of the project components and environmental effects are adequately evaluated during the EIS process.

The EIS should carefully assess the effects of the buried pipeline on permafrost integrity, pipeline stability and integrity, erosion susceptibility and integrity of the pipeline ditch backfill, and stream bank stability for buried pipeline crossings before the pipeline becomes operational and charged with chilled gas (potentially one or more years). The lack of chilled gas in the line may reduce the ability of the disturbed soils to quickly return to their former temperature equilibrium. A similar situation will also occur upon pipeline abandonment when chilled gas is no longer cooling the ditch backfill. This analysis will be particularly important for the northern sections of the pipeline where the pipeline is buried in soils with continuous permafrost or extensive discontinuous permafrost.

The EIS should carefully assess the effects of soil disturbance caused by burial of the pipeline to permafrost integrity, particularly through streambanks and wetlands. Ditching through stream banks, especially in unstable, ice-rich soils, may cause physical and thermal degradation , causing loss of riparian habitat, drainage of wetland complexes, potential changes in stream morphology, and increased sedimentation, with a resultant loss of aquatic habitat. The pipeline ditch can intercept overland flow that may erode backfill material from the pipeline ditch and potentially serve as a canal carrying water with a high sediment load into nearby streams or wetlands. The interception of stream flow and wetland cross drainage can pose significant problems, particularly in areas of continuous and discontinuous permafrost in rolling or mountainous terrain. Rehabilitation, especially in ice-rich soils, may require extensive, repeated ditch maintenance and long-term thermal stabilization activities before the habitat can return to its former stability and productivity.

The EIS should carefully assess the effects to fish and aquatic mammals of not only increased sedimentation and structural changes to streams from the buried pipeline intersecting streams, but also the physical effects of the chilled pipeline on water temperature and ice formation. The chilled pipeline may create ice dams at streams or create aufeis fields that then cause substantial erosion and sedimentation during breakup. Ice dams created by the chilled pipeline at stream crossings could reduce water flow into fish overwintering areas either by diverting it or by locking it up in aufeis. The chilled pipeline could lower water temperature, causing changes in the timing of spawning for those species that rely on water temperature cues for migration and spawning. This may delay spawning enough for some species such that spawning is precluded or carried out with reduced success. For fish that use water temperature as a cue to move to overwintering areas, the chilled pipeline could accelerate freeze-up in fall, potentially preventing fish from reaching suitable overwintering areas. The chilled pipeline could lower background water temperatures with direct effects on the time required for fish eggs to develop (e.g., small decreases in water temperature could delay hatching to a time period not conducive to survival of the newly hatched fish).

The EIS should examine the effects of blasting on aquatic and terrestrial biological resources. Blasting during sensitive life stages of wildlife (e.g., Dall sheep lambing, raptor nesting, bear denning) can impact reproduction or survival. Blasting of the pipeline ditch in or near streams could cause mortality of adult and juvenile fish as well as developing eggs.

The Stand-Alone Gas Pipeline Project Description/Plan of Development

Page 1.1. The Gubik gas field has been identified as one of the potential sources of gas for the proposed pipeline. However, no complete pipeline alignment to Gubik from the main pipeline is depicted in the project documents.

Page 1-5. The text indicates "a smaller pipeline to supply the demand in Fairbanks is part of this system and is called the "Fairbanks Lateral." If the Fairbanks Lateral is part of this pipeline system, then it should be fully evaluated as part of the EIS process. Considerable additional detail is needed for this component.

Page 2.3. The text states the gas conditioning facility will chill the gas to 30° F. In areas of continuous permafrost, will gas at 30° F be adequately chilled to maintain permafrost conditions along the line?

Page 3.1. A material site location and its mining plan should be provided for the Prudhoe Bay gas conditioning facility.

Page 4.9. Temporary work camps as well as permanent facilities need to be surrounded by electric fences to minimize human interactions with foxes, and brown and black bears that were common during construction of the Trans-Alaska Pipeline. The temporary storage and proper disposal of putrescible wastes will be an important part of minimizing human/carnivore interactions, as well as the prohibition of direct feeding of animals.

Page 4-11. The text states " to reduce the amount of disposal required, downed brush and timber, other than marketable timber, will be stockpiled on the right-of-way and burned." Hydroaxing, chipping or mulching the timber and shrubs and leaving it within the right-of-way would be a better alternative to burning. Burning this material on the right-of-way, particularly if the right-of-way is cleared one year before actual construction, could lead to permafrost degradation, site instability, and loss of material that could be used in rehabilitation of the right-of-way.

Page 4-13. Ditching and pipe stringing operations need to consider wildlife movements. Extensive lengths of ditch or pipe either awaiting welding or laying, can deflect or form barriers to wildlife movement (moose migration between summer and winter range; caribou seasonal migrations). In the worst case, open ditch could result in animal entrapment. These activities will need to be scheduled to avoid times of the year when major movements of these animals occur across the right-of-way. Cross-right-of-way access will also need to be maintained for resident animals during non-migratory periods. Similarly, ditching and pipe installation across some fish streams may need to be scheduled to minimize disruption to fish passage or fish spawning.

Page 5-1. Water for camps as well as for ice work pads, laydown areas, drive lanes in areas where winter construction is proposed needs to be carefully evaluated to determine if adequate quantities exist. In areas where water or ice sources are limited, modified or alternative construction techniques may be required to avoid the use of gravel for construction purposes.

Page 5-6. For areas with a permanent drivable workpad or permanent access roads, designed low water crossings will need to established for small streams crossing the pipeline right-of-way.

Parks Highway Stand-Alone Gas Pipeline State of Alaska ROW Permit Application.

Section 8.0. This section requires both depth and width of streams and waterbodies crossed by the pipeline. However, in Attachment 2, only approximate width information is provided. Depth information is important as it will have an effect on the right-of-way width needed to accommodate ditch spoil and safety needs at the deeper stream crossings.

Section 13.0. The subsection on the gas conditioning facility states that an unconditioned option – transportation of the gas with CO_2 – is being considered. If this is the case, then the analysis for the right-of-way application and the analysis for the EIS should include discussions of the effects of CO_2 transport with the gas stream and the necessary facilities at the southern end of the pipeline to remove and dispose of this product.

Section 44.0. The Fairbanks Gas Take-off Facility depicted on Figure 43-1 should have the route by which the facility is connected to the existing road system shown on this figure.

Section 46.0. This section notes burning of slash may impact air quality. As noted in the comments on the project description, burning this material on the right-of-way, particularly if the right-of-way is cleared one year before actual construction, could lead to permafrost degradation, site instability, and loss of material that could be used in rehabilitation of the right-of-way.

Section 49.0. Wildlife mitigation measures that also need to be included during project construction include bear (carnivore) interaction plans and the fencing of all permanent facilities as well as construction camps and facilities. Plans for different segments of mainline construction (dependent on likelihood of carnivore presence on that segment) should also be prepared. The temporary storage and proper disposal of putrescible wastes will be an important part of minimizing human/carnivore interactions, as well as the prohibition of direct feeding of animals.
Cook Inlet beluga whales should be added to the list of threatened and endangered species that are known to occur in the project area.

Section 52.0. It is unclear how freeze-protected hydrotest water will be treated and discharged following pipeline testing.

Section 54.0. Table 54-1 lists likely subsistence/personal use communities. Additional communities that should be considered include Alatna, Stevens Village, Gakona, and Gulkana.

Section 54.0. Table 54-2 lists federally recognized tribes by region. Additional tribes that should be considered for inclusion in this list include Alatna Village, Native Village of Stevens, Native Village of Gakona, and Gulkana Village.

Section 59.0. This section lists references that may be of use in evaluating this right-of-way application. However, it does not include any documents for the Richardson Highway Alternative.

Attachment 2, Stream Crossing Data, Parks Highway and Richardson Highway Alternatives. These data tables need to be re-examined to correctly note which streams contain anadromous fish. There are numerous streams, particularly north of the Alaska range that contain anadromous fish but are not identified as such in these tables.

Attachment 9, Sensitive Areas/Habitats along ROW. The tables in this section listing previously identified areas and periods of sensitivity along the gas source routes and pipeline routes are overly simplified to the point of being inaccurate, particularly where groups of species are listed for large geographical areas; identify sensitive areas that are hundreds of miles from the pipeline route (e.g., caribou calving areas in the Utukok Hills); and have incorrect periods of sensitivity (e.g., whitefishes spawn in September or October – not in July and August). These tables need to be rewritten to simplify, clarify, and directly delineate sensitive species, sensitive areas and periods of sensitivity.

Some of the public roadways along the pipeline alignment have seasonally heavy traffic to and from the Susitna Flats, Goose Bay and Palmer Hayflats State Game Refuges and other sites accessed for hunting and fishing. Maintaining vehicular traffic for vehicles with boats, trailers, RV's will be an issue during construction. Specifically, the narrow gravel route into to the Little Susitna Public Use facility (Point McKenzie Road to Ayshire Road to Little Susitna River Access Road) is heavily used seasonally.

Pipeline construction would occur along about 1.5 miles of the Little Susitna Access Road northwest of the existing gas pipeline and facility. The pipeline also takes off cross country from the Little Susitna Access Road to eventually intersect with the Parks Highway near Willow. In the area just north of the Little Susitna Access Road the line parallels the Susitna Flats State Game Refuge border. Separation of the pipeline right-of-way from the refuge border will avoid or minimize incursions of all terrain vehicles and other vehicular traffic into the refuge. Gating or otherwise blocking access along the line where it intersects existing access roads will also minimize incursions into the refuge. Similar concerns also apply to the pipeline routing along and through the Minto Flats State Game Refuge.

Richardson Highway Alternative – Palmer to Glennallen; Wildlife

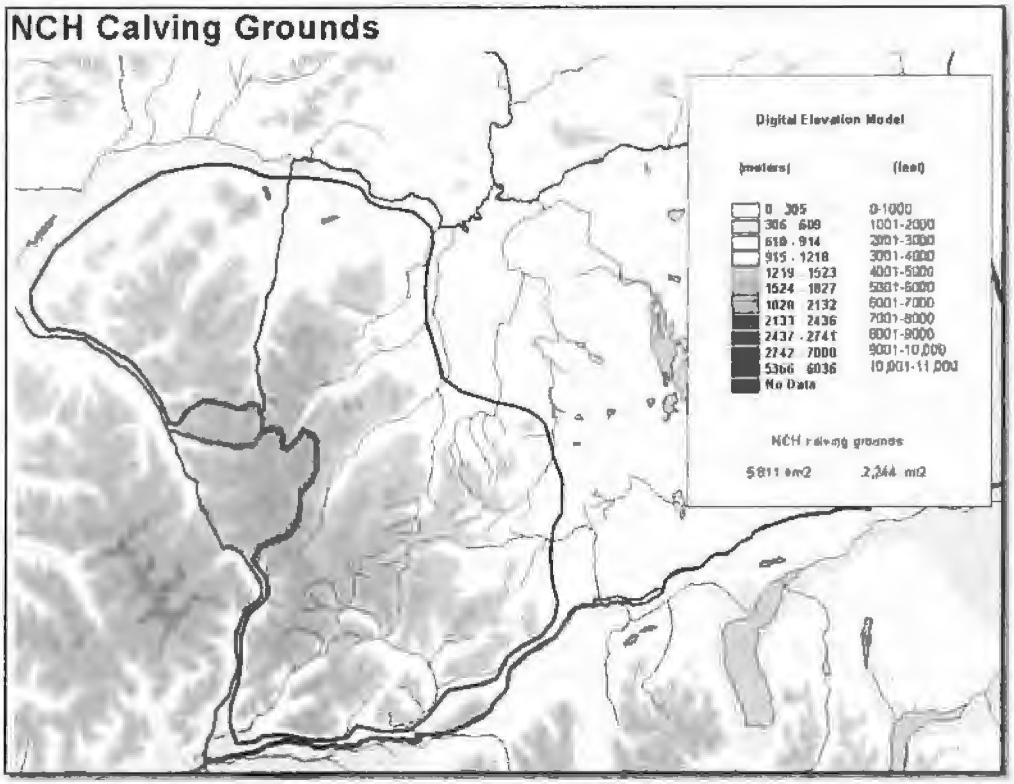
The following comments regarding wildlife along the Glennallen to Palmer pipeline route were originally submitted as part of the ADF&G comments on the Alaska Natural Gas Development Authority (ANGDA) proposed Beluga to Fairbanks (B2F) natural gas pipeline. Although the ASAP project differs from the B2F line, the routing from Glennallen to Palmer is essentially the same and the expected effects to wildlife would be the same. The comments have been modified to delete references to specific aspects of the B2F line. The route as proposed cuts through key habitats for caribou, moose, grizzly bear, Dall sheep, wolverine, as well as important non-game species like birds-of-prey.

Pipeline construction through the Chitna Pass area during Dall's sheep lambing and Nelchina caribou calving, roughly 1 May to 15 June, may negatively impact reproductive success of sheep and caribou in the area. Similarly, disturbance to sheep and caribou hunting parties (as well as moose and bear hunters) in this same area is likely to occur during the period 10 August to 20 September.

The route through the Chitna Pass area needs to be made impassible to motorized vehicles once pipeline construction is finished. Creating a new access road up Caribou Creek, across Chitna Pass, and down Boulder Creek would lead to increased hunter access via ATV to areas that currently serve as refugia. This could lead directly to new restrictions being imposed on hunters, and hunting opportunity being restricted to help conserve the wildlife populations in the area.

<u>CARIBOU</u>

Use north of the Glenn Highway by caribou from the Nelchina Caribou Herd (NCH) has been documented during the calving and post-calving period (15 May - 30 July), where the pipeline route is proposed. Concentrations of post-calving caribou have been found on a regular basis from the Upper Oshetna River, south to Mazuma Creek and into Caribou Creek (Map 2). The NCH very rarely uses the Matanuska valley south of the Glenn Highway.



Map 2. Elevation map of the NCH calving grounds, the most sensitive habitat of the herd. The NCH ranges year-round from Chickaloon (at the lower left corner of this map), throughout Unit 13, northeast to Chicken along the Taylor Highway in Game Management Unit 20E.

During calving and post-calving, caribou generally avoid construction activities and travel routes. If such activities are allowed in this area, calf survival and recruitment may be compromised if animals are forced to move out of the area.

Beginning in late June, the herd can begin to disperse. Caribou move down into the proposed area of concern (Boulder Creek to Squaw Creek) in larger numbers during July and August in preparation for the rut and winter. Although caribou harvest is reliant upon annual caribou movements, historic hunt records reveal the importance of the entire area from Chickaloon, east to the Syncline Mountains for Tier II caribou hunters. The fall caribou hunt runs 10 August – 20 September.

MOOSE

Moose calve throughout the proposed area, and spend a considerable portion of late summer and fall above treeline within the area of concern. The calving period (15 May - 15 June) should be avoided for any construction related activities that may disrupt these animals during this period.

The area of concern is also very important to fall moose hunters. In 2007, approximately 305 hunters pursued moose in the area, and 59 moose were harvested. Both general season hunters and tier II hunters consistently use this area. Moose hunting runs 15 August – 20 September. Moose will remain above treeline in the high country until mid-December to late-January, when the increasing snow depth forces them down to lower wintering areas. This area then becomes a migration corridor for moose.

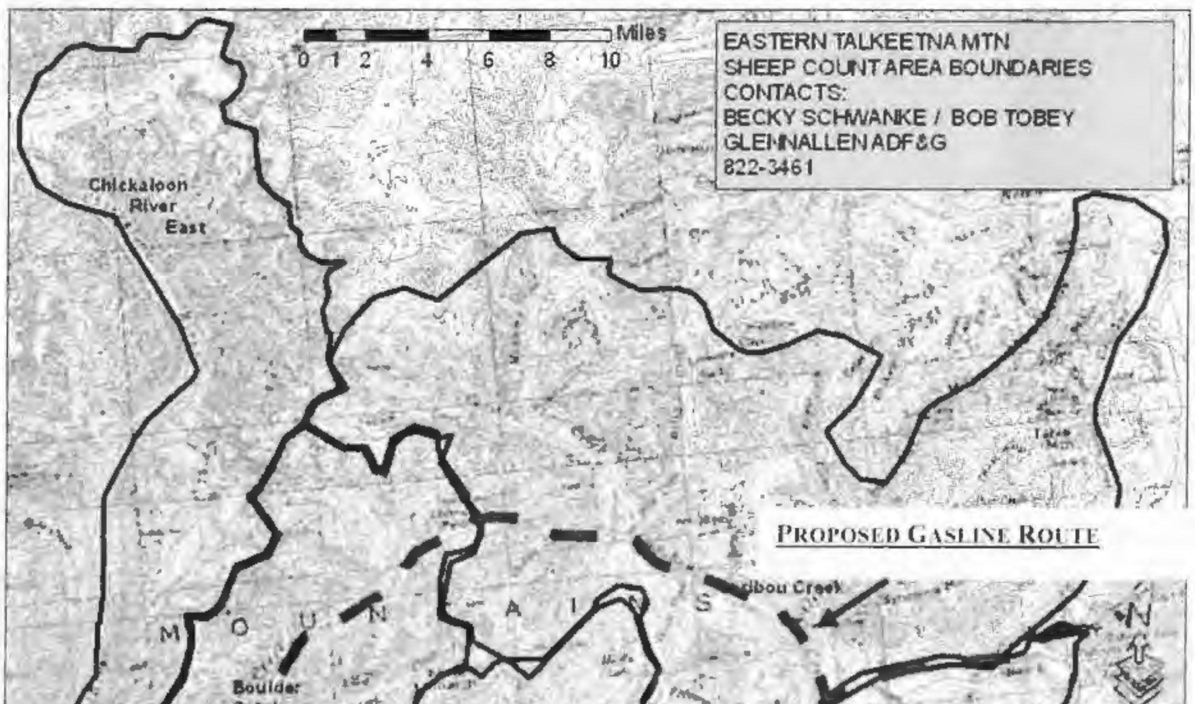
GRIZZLY BEAR

Grizzly bears may be found throughout the area of concern, however they are most vulnerable during their hibernation period (15 October – 15 May). If bears are disrupted during this period, they may have difficulty surviving the winter. The high country in this area of concern is especially critical denning habitat for sows with young cubs. From earlier work with radiocollared bears, we know that bear dens occur throughout the proposed route area, though we do not keep an updated file of bear den locations for this area.

DALL SHEEP

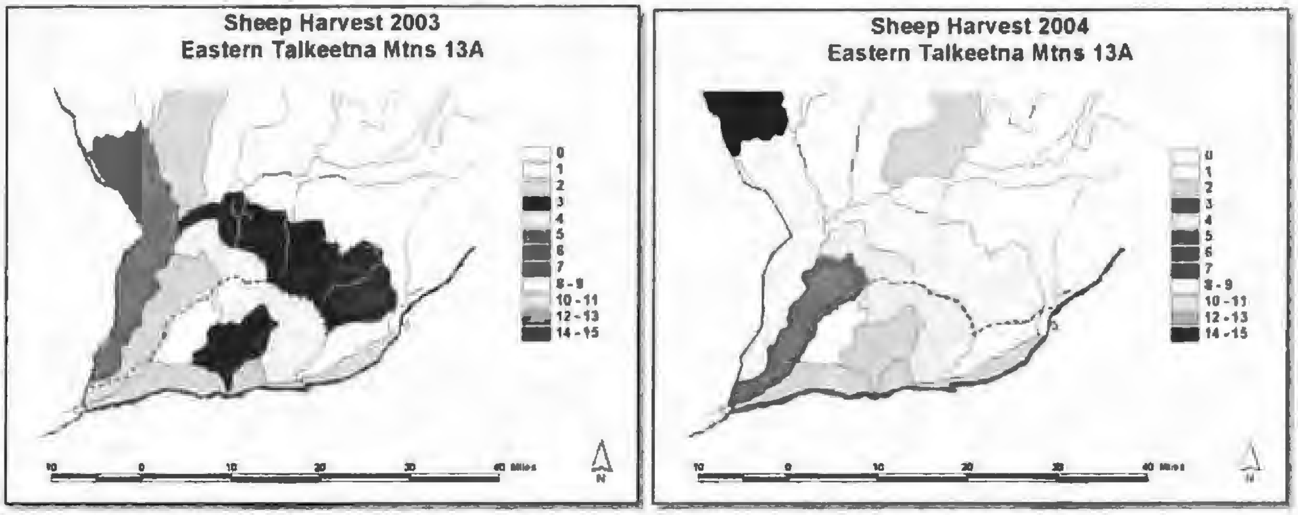
Dall sheep will likely be impacted the most by this proposed route, which cuts through the center of prime sheep habitat. The importance of Dall sheep in this area has long been recognized, and the Sheep Mountain viewing area (which is closed to the taking of Dall sheep) was established specifically to safeguard this resource. The most recent comprehensive sheep survey data we have within this area (Map 3) are from 2007 when 872 sheep were observed in this area, which is down from 1,081 observed in 2003. The decline was largely attributable to increased over-winter mortality in 2004-05, showing the sensitivity of this population.

One concern is with the route along the north side of Sheep Mountain. Sheep must have continual access between the island Sheep Mountain and the Syncline Mountains just to the north across Squaw Creek. Any construction activities in this drainage could be detrimental to sheep movements. In addition to this particular area, sheep move freely throughout the entire area searching out vital mineral licks, following green up, and seeking critical escape terrain. Upper Caribou Creek and Boulder Creek in particular are home to the highest concentrations of sheep year round for this area. Construction activity anywhere in these upper drainages may have adverse effects to sheep.



Map 3. Sheep count areas in the eastern Talkeetna Mountains, with proposed gas line route.

In addition to the area being very important year-round sheep habitat, it is also very important for a large number of sheep hunters. The harvest maps below (Map 4), show the area receives phenomenal pressure from sheep hunters on an annual basis. Most recently, in 2007, nearly 140 sheep hunters pursued sheep in this area, and 20 rams were harvested (down from the 2003 and 2004 harvests due to higher natural mortality in 2004-05). The sheep hunting season runs 10 August – 20 September.



Map 4. Sheep harvest in the eastern Talkeetna Mountains, with proposed gas line route.

Of particular concern would be increased public access along the proposed route. Declining sheep populations around the state have led to increased public concern for sheep and the future of sheep hunting. The Chugach Mountains just south of this area were recently converted from a general season to a limited entry drawing hunt due to heavy hunting pressure in the face of declining sheep numbers. The public is already concerned about the potential displacement of hunters to areas such as this, and the effect that will have on the already depressed sheep population. Creating additional access at this point should be highly discouraged. If access is improved and exploitation of this wildlife resource increases, there could be a cascade of changes in sheep management in this area.

Currently there is an impasse along Caribou Creek just above the confluence with Alfred Creek. Hunters using off-road vehicles (ORVs) to sheep hunt in this area are stopped at this impasse, and are forced to use much longer and more difficult routes to access the upper valley. Currently the area is accessed mostly by aircraft, a much more expensive and limited mode of transportation. By allowing the pipeline to run up Caribou Creek, the impasse could be removed and replaced with a dirt road, or a trail at the very least running along the pipeline (residual from pipeline construction and/or for maintenance purposes). Even if a locked gate were installed, hunters would still be expected to find a way to utilize this route. Access would thus be improved, and further exploitation of the sheep population would be expected. Restoration of this impasse is crucial to maintaining the status quo in respect to this resource issue. We recommend against any pioneering of new access routes ORV users could capitalize on in this remote habitat unless it is developed as part of a unit-wide, multiple land owner/user group planning process.

Additionally, any increased winter snowmachine access around critical sheep wintering habitat and escape cover could result in displacement of sheep and an increase in overwinter mortality. Bringing snowmachine access closer to wintering areas allows easier travel for wolves and coyotes on trails and could give predators increased mobility allowing higher rates of predation.

NON-GAME

This area is very important wolverine habitat. Wolverines using this area are important as a source population for maintaining wolverine numbers in the Copper River Basin. The area is productive, and wolverine have been documented emigrating out of the area to other habitats.

This area is also a world-class raptor migratory corridor and nesting area. Of particular importance is nesting habitat for golden eagles. The cliffs are suitable for nesting because of their physical structure and proximity to large numbers of neonatal sheep and caribou that are heavily utilized as prey for the first two months of nesting by eagles.

This concludes our scoping comments on the proposed Alaska Stand-Alone Gas Pipeline Project. If you have any questions regarding these comments, please contact me at 459-7285 or jack.winters@alaska.gov.

ecc:
Al Ott, ADF&G, Fairbanks
Mac McLean, ADF&G, Fairbanks
Mike Thompson, SPCO, Anchorage
Tom Taube, ADF&G, Fairbanks
John Burr, ADF&G, Fairbanks
Bonnie Borba, ADF&G, Fairbanks
Roy Nowlin, ADF&G, Fairbanks
Jason Caikoski, ADF&G, Fairbanks
Fronty Parker, ADF&G, Delta
Mike Bethe, ADF&G, Palmer
Mark Somerville, ADF&G, Glennallen
Bob Tobey, ADF&G, Glennallen
Ellen Simpson, ADF&G, Anchorage
Charlie Swanton, ADF&G, Juneau
Doug Larsen, ADF&G, Juneau
Dan Bergstrom, ADF&G, Anchorage
Tony Kavalok, ADF&G, Anchorage
Gino DelFrate, ADF&G, Anchorage
James Hasbrouck, ADF&G, Anchorage
Jim Simon, ADF&G, Fairbanks
Marianne See, ADF&G, Anchorage
Julie McKim, USACE, Anchorage
Don Perrin, ADNR, Anchorage
Kerry Howard, ADF&G, Juneau
Bill Morris, ADF&G, Fairbanks
Don Roach, ADF&G, Fairbanks
Brendan Scanlon, ADF&G, Fairbanks
Audra Brase, ADF&G, Fairbanks
David James, ADF&G, Fairbanks
Beth Lenart, ADF&G, Fairbanks
Don Young, ADF&G, Fairbanks
Steve Dubois, ADF&G, Delta
Mike Daigneault, ADF&G, Anchorage
Becky Schwanke, ADF&G, Glennallen
Ed Weiss, ADF&G, Anchorage
Tom Brookover, ADF&G, Anchorage
Bob Small, ADF&G, Juneau
Tracy Lingnau, ADF&G, Anchorage
Jeff Regnart, ADF&G, Anchorage
Matthew Miller, ADF&G, Anchorage
David Rutz, ADF&G, Palmer
Tom Vania, ADF&G, Anchorage
Craig Fleener, ADF&G, Juneau
John Hilsinger, ADF&G, Juneau
Serena Sweet, USACE, Anchorage
Anne Brown, SPCO, Anchorage

JFW/jfw

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Thursday, February 04, 2010 7:55 PM
To: Palmer, Sean P (DEC)
Cc: Tricia Waggoner; asap@entrix.com
Subject: RE: ASAP Draft EIS

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

-----Original Message-----
From: Palmer, Sean P (DEC) [mailto:sean.palmer@alaska.gov]
Sent: Thursday, January 14, 2010 9:30 AM
To: Sweet, Serena E POA
Subject: ASAP Draft EIS

Hi Serena,

ADEC would like to see the following addressed in the Draft EIS for the Alaska Stand Alone Pipeline Project.

1. What sort of BMPs will be implemented to protect water quality during construction activities?
2. How does the applicant plan on mitigating for impacts to wetlands?
3. During construction, how does the applicant plan to protect water quality from sediment transport and hydrocarbon leakage?
4. For Purposes of the Antidegradation Policy of the Alaska Water Quality Standards, hopefully the EIS will address the questions below.
a. Describe how allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.
b. Explain by reducing water quality how this will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.
c. During construction and operation activities, describe how the resulting water quality will be adequate to fully protect existing uses of the water.
d. How will the methods of pollution prevention, control, and treatment found by ADEC to be most effective and reasonable be applied to all wastes and other substances to be discharged.
e. Explain how all wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

If you have any questions please call or email me. Thanks and have a good day.

Thanks,
Sean Palmer
Alaska Department of Environmental Conservation Division of Water

555 Cordova Street - Anchorage, AK 99501-2617
(907) 269-7564, fax (907) 334-2415

"Eventually, all things merge into one, and a river runs through it. The river was cut by the world's great flood and runs over rocks from the basement of time. On some of those rocks are timeless raindrops. Under the rocks are the words, and some of the words are theirs. I am haunted by waters." -Norman Maclean

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
Planning Division
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 745-9833 • Fax (907) 745-9876
www.matsugov.us • planning@matsugov.us

March 8, 2010

Serena Sweet
U.S. Army Corps of Engineers
CEPOA-RD
PO Box 6898
Elmendorf AFB, Alaska 99506-0898

RE: POA-2009 651 DEIS – Proposed Alaska Stand Alone Pipeline (ASAP) Natural Gas Transportation Project.

Dear Ms. Sweet:

Following are the borough's comments on the intent to prepare a Draft Environmental Statement (DEIS) for the proposed Alaska Stand Alone Pipeline Natural Gas Transportation Project.

The borough owns a majority of the property bordering the Parks Highway between Petersville Road and the Denali State Park. Currently, the Matanuska-Susitna Borough, in cooperation with the National Parks Service, and the State of Alaska, Department of Natural Resources, Division of Parks, is in the process of implementing recommendations in the South Denali Implementation Plan (SDIP). The cooperative agencies are dedicated to ensure that development in the area takes into consideration the intrinsic and historic values of the area, and that it does not detract from the proposed development associated with the SDIP. Should the Parks Highway be identified as the preferred route for the ASAP, the borough recommends that as much of the proposed development as possible occur within the State of Alaska, Department of Transportation, Parks Highway right-of-way, and that it be constructed underground, to minimize potential negative impacts to the scenic qualities of the South Denali area. See this website for further information on the South Denali project http://www.southdenali.alaska.gov/

In addition, the borough is anticipating an impending decision from the Federal Surface Transportation Board, concerning a route for the proposed rail spur to Port MacKenzie. Once the rail route is determined, the ASAP project could consider this route as another possible option for the project route. See this website for further information on the rail extension project: http://www portmacrail.com/

The Port MacKenzie industrial area is available for locating processing and exporting facilities related to the gas line and may be considered for your future facilities. See this website for further information on the Port MacKenzie facilities: http://www.matsugov.us/Port/

Electrical utilities in the State, and particularly in the rail belt, are considering alternative, and cooperative options for electrical generation and transmission throughout the rail belt region. Our local electrical coop, Matanuska Electric Association, has information on their website (http://www.mea.coop/) about options for new generation and transmission options (click on New Generation in the left column). Discussion should also take place with these rail belt electrical utilities on possible routes for the ASAP, to identify the best possible options to accomplish a variety of statewide utility needs.

Finally, the Parks Highway route of the pipeline will likely pass through the Trapper Creek, Susitna, Willow, Big Lake and Point MacKenzie Community Councils. These communities each have a comprehensive plan which should be consulted during the evaluation of pipeline routes. The comprehensive plans are available on the Matanuska Susitna Borough webpage (www.matsugov.us) under the planning division. Contact information for the councils is available on request.

Thank you for the opportunity to comment on this preparation of the EIS for the Alaska Stand Alone Pipeline Natural Gas Transportation Project. We look forward to continued participation in the process. Should you have further questions please contact me at (907) 746-7431.

Respectfully,

Eileen Probasco

Eileen Probasco
Chief of Planning

Cc: Dave Heier, Chief of Land & Resource Management, MSB
Brad Sworts, Transportation & Environmental Planner, MSB
Joe Griffith, General Manager, Matanuska Electric Association

APPENDIX E

Public Comments

Kacy Hillman

From: Tricia Waggoner
Sent: Monday, January 11, 2010 11:33 AM
To: Kacy Hillman
Subject: FW: ASAP EIS Scoping Comment Response

Follow Up Flag: Follow up
Flag Status: Completed

Tricia Waggoner
pmwaggoner@nrg-llc.com
(907) 263-8103 Direct
(907) 575-7300 Cell
(907) 263-8110 Fax

From: Sweet, Serena E POA [mailto:Serena.E.Sweet@usace.army.mil]
Sent: Monday, January 11, 2010 11:33 AM
To: Mark Landt
Cc: asap@entrix.com; Tricia Waggoner
Subject: ASAP EIS Scoping Comment Response

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Serena E. Sweet
Project Manager | (907) 753-2819

U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, AK 99506-0898
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil
www.poa.usace.army.mil/reg

-----Original Message-----
From: Mark Landt [mailto:MLandt@renaissancealaska.com]
Sent: Tuesday, January 05, 2010 6:49 AM
To: Sweet, Serena E POA
Subject: Pipeline to Gubik

Serena,

Does the Draft EIS for the SOA's proposed ASAP include a pipeline corridor to Gubik? If so, as owners of the oil field at Umiat we would like to insure that the corridor includes an oil line in addition to the gas line. Please feel free to call me if you have any questions. We are also available to meet and review with you our plans at Umiat.

Thanks,

Mark

Mark R. Landt

Renaissance Alaska, LLC

2500 Tanglewilde Ave., Suite 340

Houston, Texas 77063

(281) 768-7650 Wk

(214) 738-6945 Cell

(832) 201-7495 Fax

mlandt@renaissancealaska.com

Kacy Hillman

From: Tricia Waggoner
Sent: Monday, January 11, 2010 11:16 AM
To: Kacy Hillman
Subject: FW: ASAP EIS Scoping Comment Response

Follow Up Flag: Follow up
Flag Status: Completed

Tricia Waggoner
pmwaggoner@nrg-llc.com
(907) 263-8103 Direct
(907) 575-7300 Cell
(907) 263-8110 Fax

From: Sweet, Serena E POA [mailto:Serena.E.Sweet@usace.army.mil]
Sent: Monday, January 11, 2010 11:13 AM
To: Hanley, Mark
Cc: asap@entrix.com; Tricia Waggoner
Subject: ASAP EIS Scoping Comment Response

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Serena E. Sweet
Project Manager | (907) 753-2819

U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, AK 99506-0898
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil
www.poa.usace.army.mil/reg

-----Original Message-----
From: Hanley, Mark [mailto:Mark.Hanley@anadarko.com]
Sent: Friday, January 08, 2010 12:00 PM
To: Sweet, Serena E POA
Subject: Distribution list and Gubik gas

Hi Serena,

My name is Mark Hanley and I am the Public Affairs Manager here in Alaska for Anadarko Petroleum. Can you please add me to your distribution list for any information that is sent out regarding the Alaska Stand Alone Pipeline Environmental Impact Statement? Thanks, my information is below:

Mark Hanley
Alaska Public Affairs Manager
Anadarko Petroleum Corporation
3201 C Street, Suite 603
Anchorage, AK 99503
(907)273-6310 direct phone
(907)227-2718 cell phone
(907)563-9479 fax
mark.hanley@anadarko.com email

As background, Anadarko is currently operating a gas exploration program in the Foothills of Alaska's North Slope. Many refer to this as the Gubik area, since our exploration acreage encompasses the Gubik gas field which was discovered in the late 1950's. We have exploration access to over a million gas prone acres in the area around Umiat and Gubik, made up of state, federal and Arctic Slope Regional Corporation land. We drilled four wells in the past two seasons, all of which encountered gas, and we are continuing to try and evaluate the potential commerciality of gas from the region.

A key consideration for us will be the ability to transport potential future gas to market, so we are very interested in the work being done for an Alaska Stand Alone Pipeline. In reviewing the documents on your website, I noticed that some, like the 11-16-09 Draft Project Description/Plan of Development and the maps under the maps tab, include Gubik gas as a potential supply option, which we appreciate. I did notice that the map in the Scoping Presentation does not show gas from the Gubik region as an option. It makes sense to us to include Gubik region gas as an option, so that all possibilities are considered as you go through the public process of evaluating a Stand Alone Gas Pipeline project and so additional work in the future can be avoided if Gubik region gas turns out to be an initial or supplemental supply of gas for the pipeline.

While gas from Prudhoe already exists and gas from our exploration area may not be ready to produce by the proposed pipeline start up in 2016, our gas appears to be "dry", which means we won't likely need as much conditioning and treatment as gas from Prudhoe. NGL extraction plants in Fairbanks and Cook Inlet would also not likely be necessary, reducing some costs for our gas relative to gas from Prudhoe. Anyhow, gas from different areas has different advantages and disadvantages and it seems prudent to consider multiple supply options as the Environmental Impact Statement is developed for the Stand Alone Gas Pipeline Project.

Thanks for adding me to your distribution list and if you have questions or would like more information about our gas exploration activities in the Foothills, please don't hesitate to contact me.

Sincerely,

Mark Hanley

Pat Winklmann
P.O. Box 62
Healy, Alaska 99743
(907)683-2305

January 25, 2010

USACE
RECEIVED
JAN 2 8 2010
AK REGULATORY

Serena Sweet, Project Manager
U.S. Army Corps of Engineers
P.O. Box 6898
Elmendorf AFB, Ak 99506

Dear Serena:

Enclosed with this letter is a petition I circulated throughout the Denali Borough for the last month in support of including trail ways / pathways for public use along the course of the pipeline (A.S.A.P.) if the project is completed . I am very pleased that well over 200 residents, adults and students alike were inclined to sign on in support of this idea.

When it comes to decisions, I hope that you take into consideration the support these residents have for community friendly, multi use trails in conjunction with the pipeline.

Thank you – feel free to contact me at the above address or phone number if necessary.

Sincerely,

Pat Winklmann

Pat Winklmann

January 2010

Are you interested in having the safety of bike paths, side walks and running trails for Denali Borough residents and visitors?

For Your Information . . .

The **Alaska Stand Alone Pipeline** (ASAP) is a project proposed by the Alaska Department of Natural Resources to deliver natural gas from the North Slope to in-state markets in Interior and South Central Alaska. This project is currently in the planning stages.

At a recent meeting locally it was noted that a gas pipeline project through the Denali Borough by 'ASAP' may easily incorporate a "bike/pedestrian" path into its design and construction as part of the project, ***if there is ample interest in doing this.***

A 'Multi Use Pathway' project is now being considered by our Borough Assembly.

The comment period for the 'ASAP' project is over on February 5, 2010.

So, if you would like to see the development of Multi-use pathways in our borough, voice your opinion by signing the attached petition.

Thanks,

'Multi Use Trails' supporters (There are a lot of us)

For further information contact:
Pat Winklmann 683-2305 PO Box 62 Healy, Alaska 99743
winklmann@ hotmail.com

Address & Email added on 2/3/10

Alaska Stand Alone Pipeline
Environmental Impact Statement

COMMENT FORM

December 2009

Your input is an important element in the scoping phase of this project. To help us consider your views and suggestions, please write them down on this sheet and mail to our address, which is preprinted on the back of this form. Please write legibly (printing is appreciated) and you may attach additional sheets if necessary. Your comments can be submitted via mail; emailed to **info@asapeis.com**; or through the comment section of the website at www.asapeis.com.

Name (PLEASE PRINT): HAROLD HEINZE

Address: 1336 STAUBBACH CIRCLE

City, State, Zip Code: ANCHORAGE AK 99508

Telephone (Optional): (907) 257-1347

Email (Optional): heinze@acsalaska.net

☒ **Please retain or add my name to the project mailing list. I wish to receive information in the mail.**

☒ **Please add my name and email address to the list. I wish to receive information by electronic mail.**

COMMENTS: I BELIEVE THAT AN ALTERNATIVE PROJECT WOULD INCLUDE A GLENNALLEN TO VALDEZ SEGMENT. THE POTENTIAL SHIPMENT OF GAS FROM VALDEZ WOULD SIGNIFICANTLY LOWER ALASKA CONSUMER COSTS.

Note: To mail, fold page in half along the dashed line on the back of this sheet so that the address shows. Tape shut and affix a standard first class postage stamp.

Thank you for your participation!

Alaska Stand Alone Pipeline
Environmental Impact Statement

COMMENT FORM

December 2009

Your input is an important element in the scoping phase of this project. To help us consider your views and suggestions, please write them down on this sheet and mail to our address, which is preprinted on the back of this form. Please write legibly (printing is appreciated) and you may attach additional sheets if necessary. Your comments can be submitted via mail; emailed to **info@asapeis.com**; or through the comment section of the website at www.asapeis.com.

Name (PLEASE PRINT): HAROLD HEINZE

Address: 1336 STAUBBACH CIRCLE

City, State, Zip Code: ANCHORAGE AK 99508

Telephone (Optional): (907) 257-1347

Email (Optional): heinzye@acsalaska.net

☒ **Please retain or add my name to the project mailing list. I wish to receive information in the mail.**

☒ **Please add my name and email address to the list. I wish to receive information by electronic mail.**

COMMENTS: I BELIEVE THE ROUTE SEGMENT BETWEEN SOUTH OF GULKANA AND EUREKA WILL CREATE A SUPER HIGHWAY OF TRESPASS. AN ALTERNATIVE FOLLOWING THE TAPS + GLENN HIGHWAY CORRIDORS SHOULD BE INCLUDED

Note: To mail, fold page in half along the dashed line on the back of this sheet so that the address shows. Tape shut and affix a standard first class postage stamp.

Thank you for your participation!

Sweet, Serena E POA

From: Sweet, Serena E POA
Sent: Thursday, February 04, 2010 1:31 PM
To: 'heinze@acsalaska.net'
Subject: ASAP EIS Scoping Comment Response

Thank you for submitting comments regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Tricia Waggoner

From:	webmaster@asapeis.com
Sent:	Friday, February 05, 2010 3:32 PM
To:	info@asapeis.com
Subject:	SPAM-LOW: Added Comment

First Name: Becky
Last Name: Long
Mailing Address: PO Box 320
City: Talkeetna
State: Alaska
Zip: 99676
Phone: 9073739773
Email: issues320@hotmail.com
Comment: 2/5/10 This is a scoping comment. 1. There needs to be an assessment of impacts on the lives and access of remote residential residents and property owners near the pipeline route. 2. The pipeline route should not use the electrical intertie route that is east of the Talkeetna area. Remote residential residents and property owners do not want the negative impacts to their access and way of life if the pipeline uses the electrical intertie transmission route. 3. Must scope the impacts on remote residents and property owners and the habitat and wildlife populations that would be in the vicinity of the compressor statements. Comments representing the Board of Directors of Alaska Survival.

Please do not reply to this email

Tricia Waggoner

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Monday, February 08, 2010 1:19 PM
To: issues320@hotmail.com
Cc: Tricia Waggoner; asap@entrix.com
Subject: RE: SPAM-LOW: Added Comment

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

From: webmaster@asapeis.com[SMTP:WEBMASTER@ASAPEIS.COM]
Sent: Friday, February 05, 2010 6:32:27 PM
To: info@asapeis.com
Subject: SPAM-LOW: Added Comment
Auto forwarded by a Rule

First Name: Becky
Last Name: Long
Mailing Address: PO Box 320
City: Talkeetna
State: Alaska
Zip: 99676
Phone: 9073739773
Email: issues320@hotmail.com
Comment: 2/5/10 This is a scoping comment. 1. There needs to be an assessment of impacts on the lives and access of remote residential residents and property owners near the pipeline route. 2. The pipeline route should not use the electrical intertie route that is east of the Talkeetna area. Remote residential residents and property owners do not want the negative impacts to their access and way of life if the pipeline uses the electrical intertie transmission route. 3. Must scope the impacts on remote residents and property owners and the habitat and wildlife populations that would be in the vicinity of the compressor statements. Comments representing the Board of Directors of Alaska Survival.

US Army Corps of Engineers
Alaska District

CONVERSATION RECORD

VISIT____
CONFERENCE____
TELEPHONE
INCOMING____
OUTGOING X

DATE 2/15/10

TIME 10:00am

Name of Person(s) Contacted or in Contact with you:	Their Organization:	Their Telephone #:
Ruth McHenry	Copper Country Alliance	907-822-3644

Subject:
ASAP EIS Scoping Comments

Summary:

2/16: I called Ms. McHenry to discuss her email question sent on 2/15/10. I explained that although there is a route selected by the applicant as their preffered alternative, the NEPA process will require us to identify and analyze alternatives to that route and/or design that may be feasible and meet the project purpose. She stated that that answered her question.

2/24: I called Ms. McHenry again regarding her email question on 2/17/10. I stated that the preffered route (proposed by the applicant) would follow a path through Chitna pass; however we are still in the scoping phase of the EIS development and would welcome any input on alternatives to the proposed route. I also stated that a route along the highway has been identified as a potential alternative and will be analyzed in the EIS. (I also explained that the ASAP EIS is proposed to follow the Parks Highway as the preffered route)

Name of Person Documenting Conversation	Signature	Date
Serena Sweet	[signature]	2/24/10

Sweet, Serena E POA

From: Ruth McHenry [cca@coppervalleyak.net]
Sent: Monday, February 15, 2010 8:48 AM
To: Sweet, Serena E POA
Subject: Stand Alone Gas Pipeline Routes

Dear Serena,

Someone just told me that the routes for the Stand Alone Gas Pipeline routes had already been signed off before Scoping. Is that true? If so, what kind of public process was there? Is there any prospect of them changing as a result of public input?

Ruth

--

Ruth McHenry, Volunteer staff
Copper Country Alliance
HC 60 Box 306T, Copper Center AK 99573
907-822-3644

Sweet, Serena E POA

From: Ruth McHenry [cca@coppervalleyak.net]
Sent: Wednesday, February 17, 2010 7:04 AM
To: Sweet, Serena E POA
Subject: Chitna Pass deviation on Richardson route

Good morning, Serena,

Thank you for your call yesterday. I neglected to ask specifically about the Chitna Pass section of the Richardson route. As you'll see in my comments, that's the area we're most concerned about. We've also heard that geological difficulties have put a route closer to the highway "off the table". Do you know if that section is open to more discussion?

Thanks,
Ruth
--
Ruth McHenry, Volunteer staff
Copper Country Alliance
HC 60 Box 306T, Copper Center AK 99573
907-822-3644

COPPER COUNTRY ALLIANCE
HC 60 Box 306T
Copper Center, Alaska 99573
Phone (907) 822-3644 Fax (907) 822-3644
e-mail cca@coppervalleyak.net

"Protecting the rural and wild natural environment of the Wrangell Mountains/Copper Basin region."

February 9, 2010

U. S. Army Corps of Engineers
ATTN: Serena Sweet, Project Manager — via e-mail to Serena.E.Sweet@usace.army.mil
PO Box 6898
Elmendorf AFB, AK 99506-0898

Re: Alaska Stand Alone Gas Pipeline Project

Dear Ms. Sweet:

Copper Country Alliance is a grassroots 501(c)(3) organization that addresses conservation issues in the Copper Basin. Most of our members are Copper Basin residents. In this letter, we are providing EIS Scoping comments on the Stand Alone Gas Pipeline Project. We are limiting our comments to the portion we know best--the "Richardson Highway " route from Isabel Pass to Chickaloon River.

These comments are in response to materials provided in the Draft *Alaska Stand Alone Gas Pipeline Project Description/Plan of Development.* We have not read the *Alternatives Analysis*, because it is too large a document for us to download.

Copper Country Alliance supports the goal of distributing Alaska's natural gas within the state as a short-term, more affordable, lower pollution alternative to diesel and heating oil. We strongly urge, however, that the Stand-Alone Gas Pipeline project be done in the best possible way, in order to minimize habitat and wildlife disturbance and maximize benefits to Alaskans, both in terms of jobs and of a lasting legacy of healthy public lands, clean air, and clean water.

Members of our organization served for several years on the Yukon Pacific Corp.'s (YPC's) Trans-Alaska Gas System Environmental Review Committee (TAGS-ERC). Many of our following comments are based on that process:

FISH AND WILDLIFE:

- In addition to fish and wildlife considerations mentioned elsewhere, the EIS should consider:
    - Construction and post-construction impacts to subsistence, due to temporary or permanent increases in the hunting and fishing population, increased access, disruption of wildlife behavior, habitat impacts, and other factors.
    - Construction timing to avoid critical periods for various species; e.g., the Nelchina caribou herd's migration, the calving and lambing seasons for moose, caribou, and sheep, and waterfowl nesting periods.
    - Construction timing to avoid periods when large numbers of hunters are in certain areas; e.g., August 10 through September 20 for caribou and sheep.
    - Periods when helicopter-ferrying should be avoided, in order to avoid disturbing wildlife and hunters' efforts to obtain food for their families.

- Food and garbage handling procedures to avoid attracting and habituating carnivores and scavengers.
- The Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the Southcentral Alaska Regional Subsistence Advisory Council should be closely consulted on an ongoing basis (during the EIS process and construction) regarding these and other fish and wildlife issues.

OFF-ROAD VEHICLES:
Off-road vehicles (OHVs) can have severe impacts on wildlife, their habitats, vegetation, soils, and water quality. OHV riders also (probably mostly unintentionally) sometimes trespass on Native Corporation and other private lands. Therefore, it is important that the EIS give increased attention to preventing increased OHV access along its route, both on the right-of-way and via access roads.

The *Project Description/Plan of Development* states that, "None of the temporary or permanent access roads will be available for public use during or after construction." How will that be accomplished? The EIS should specify barrier techniques and require enforcement. Some suggestions:

- Temporary winter access roads could cross lakes, making summer ATV use unfeasible.
- Where feasible, access roads could be routed to make use of natural topographic and vegetative pinch points where barricades are more effective.
- Increase enforcement efforts at times (e.g., hunting season, holiday weekends) when OHV use peaks.

ROUTING:
The *Project Description* (Section 5, first paragraph) makes a good case for adhering to established corridors:

> "The location of the Project facilities parallel existing transportation corridors and was selected specifically to minimize impacts. This early planning reduces the need to extend new roads into pristine lands to create access to construct and operate the pipeline and compressor stations. Existing right-of-way, terrain, TAPS and other pipelines, and roads limit specific route locations within these corridors to some extent in certain locations."

In spite of that, however, sections of the proposed Richardson Highway route deviate significantly from established corridors--the Richardson Highway, the Glenn Highway, and TAPS. These sections amount to about **40%** of the Isabel Pass to Chickaloon River part of the route. They are, from north to south (*using approximate project mileposts and place name locations*):

- Hogan Hill to west of Gulkana River (Milepost 655-675: The route runs east of TAPS and the highway for a number of miles, crosses the highway, then crosses the Gulkana River several miles downstream of the TAPS bridge. Before rejoining TAPS, it crosses lake-rich wetlands populated with nesting swans. This was identified as an area of wildlife concern in the TAGS-ERC process.

- Gakona to Upper Tazlina (Milepost 689-696): The route takes a straight diagonal course to the Southwest, bypassing Glennallen. Increased ATV access and fish and wildlife habitat are concerns.

- Tahneta to Chickaloon River (Milepost 745-792): The proposed route would deviate from the Glenn Highway and go behind Sheep Mountain. It would go along Squaw, Caribou, Chitna and Boulder Creeks, traversing some of the region's best habitat for Dall sheep, as well as important caribou and moose habitat. A major concern is whether gas line construction would "improve" access and increase the amount and range of ATV traffic. (There is, for instance, a natural barrier up Caribou Creek. If this were blasted, it would provide ATV access.) This in turn could be expected to affect wildlife.

According to ADFG data, the 2007 harvest for that area included 59 Dall rams, 49 caribou, 59 moose, 8 grizzly bear, and 8 black bear. These are significant numbers. Therefore, a project that could impact wildlife is of considerable concern to ADFG biologists, hunters, local residents, photographers, and recreationists. Also, the deviation goes through a highly scenic hiking route, one of those described in *55 Ways to the Wilderness* by Helen Nienhueser and John Wolfe, Jr. ATV traffic has impaired this wilderness experience; it would be important to understand if construction of the gas line would lead to even more motorized recreation. We urge more studies of a route which instead stays close to the Glenn Highway.

We appreciate your keeping to the east side of Summit Lake, as the highway and TAPS do. A route around the west side of Summit Lake would meet considerable opposition. The high, open country in that vicinity makes it vulnerable to ATV impacts. Scenic vistas, especially from the Denali Highway, would be impaired. It is also part of a valuable wintering area for the Nelchina caribou herd.

Deviations from existing rights-of-way always raise important questions about fish and wildlife, their habitats, and OHV impacts. As the route selection process continues, relevant agencies, Native organizations, and the general public should be closely consulted about route specifics, and should be kept fully informed if any additional route deviations are considered.

We appreciate that the document provides early information about construction details. Therefore, we have very little to add, as follows:

RIGHT-OF-WAY CLEARING:

- Consider using a hydroaxe on some sections, so that only the narrow trench for the pipe is disturbed. A hydroaxe shreds timber and maintains the natural ground surface and cover.
- Large diameter trees should be logged (rather than mowed down by dozer), decked, and made available for commercial use. Smaller trees and limbs should be made available for chipping and pelleting operations. Where there is feasible access, close to the highway, consider making firewood available for households. Many residents burn wood; some are having difficulty obtaining enough.
- To minimize the spread of spruce bark beetles, spruce not otherwise utilized should be chipped and spread or buried in the work-pad. Because of global warming, it should not be burned.

WORK-PAD AND ACCESS ROAD CONSTRUCTION AND REHABILITATION

- Material site development constitutes one of the major surface disturbances. Given the difficulties of rehabilitation, and the potential for spread of invasive species, siting is critical. We appreciate the requirement to use existing sites as much as possible.
- We appreciate that the document recognizes the importance of revegetating with native species. During pipeline construction and operation, we urge continued consultation with the National Park Service, the Alaska Plant Materials Center, and other agencies that have expertise in revegetation with native species and in techniques to avoid introducing and spreading invasive species. Some past right-of-way projects in the Copper River Basin have failed to take precautions against invasive species, with the consequent spread of such species as Narrowleaf Hawksbeard and Wild Sweetclover.

DITCHING (TRENCHING), PIPE-LAYING, AND BACKFILL

- River training structures, intended to protect pipeline crossings, present long-term maintenance challenges, tend to block side channels, and commonly fail to accommodate natural changes in river channels.
- Dust control will be necessary.

ABOVE-GROUND PIPE

- If there are any significant distances of above-ground pipe, adequate crossings should be provided for wildlife. TAPS moose crossings were often in the wrong places; caribou crossings were often ineffective. ADFG should play a key role.

COMPRESSOR STATIONS:

- The effects of compressor activities and operating noise on wildlife must be considered when siting compressor stations. ADFG should play a key role.
- "Blow-downs" can happen at compressor stations. The result can be a very loud screech. Can this problem be eliminated through design? If not, impacts to wildlife and humans must be considered.

CATASTROPHIC EVENTS:

- Potential catastrophic events include, but are not limited to:
    - Earthquake (fault zones such as Donnelly Dome, McGinnis Glacier, and Denali)
    - Flood
    - Explosion
- Potential catastrophic events should be identified and evaluated. Prevention of damage from such events should be part of the design process. Appropriate responses should be planned.

CONSTRUCTION MONITORING:

- A strong Quality Control (QC) program is necessary to avoid rework during operations and to ensure adherence to requirements resulting from the EIS process.
- An observer should be assigned to each piece of equipment that operates close to TAPS. An example of what can happen without an observer was provided in 2000, when work was being done on TAPS to correct leaning Vertical Support Members and off-center "shoes" at Squirrel Creek. In that instance, a backhoe accidentally hit the elevated oil pipeline, penetrating the insulation but fortunately not damaging the pipe.
- Construction impact minimization requires sufficient oversight, interagency coordination, and delegation of authority. A biologist and an engineer should always be on-site.
- Project sponsors, contractors, and subcontractors must commit to doing the job in the environmentally preferred manner, the first time. Corporate commitment to quality and regulatory compliance is essential to environmentally responsible construction and operation.

CITIZEN OVERSIGHT: As mentioned above, members of our organization served on the Trans-Alaska Gas Pipeline Environmental Review Committee (TAGS-ERC). This committee, composed of representatives of various conservation and Alaska Native groups and funded by YPC, worked with YPC to identify environmental concerns *in advance of construction.* By identifying problem areas in advance, conservation groups and YPC were able to work together on solutions rather than waste time and money in litigation or in pursuing unsuitable options. This process was far more detailed, and involved considerably more sharing of technical information, than the usual public involvement aspects of an EIS process.

- We strongly believe that a Citizens' Oversight Group (similar to TAGS-ERC, but with independent science advisors) would be a huge benefit to the people of this state (who, after all, own the gas and own much of the land through which the gas line would pass). This group would see the project through from beginning to end (design/construction/operation).
- There should be an environmental subcommittee to oversee issues like wildlife, erosion and stream crossings. There should also be a socio-economic subcommittee to deal with issues like local hire, job

training, and cultural resource protection, and to see that maximum benefit flows to Alaskan communities. The group should be funded and staffed, have independent science advisors, and be independent of project sponsor control.

- We request that establishment and funding of a Citizens' Oversight Group, as described above, be a condition of the right-of-way lease.
- A Citizens' Oversight Group would have the same purpose as the ERC did—to help make this the best possible pipeline from environmental and socio-economic viewpoints. Alaska Natives, environmental organizations, unions, landowners' associations, and groups like the Copper Valley Development Association would have places at the table.

Thank you for the opportunity to comment. We look forward to seeing our concerns, questions, and requests addressed in the EIS.

Sincerely,

COPPER COUNTRY ALLIANCE

Ruth McHenry
Volunteer Staff

Tricia Waggoner

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Thursday, February 11, 2010 12:57 PM
To: Ruth McHenry
Cc: Tricia Waggoner; asap@entrix.com
Subject: RE: Scoping comments

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

-----Original Message-----
From: Ruth McHenry [mailto:cca@coppervalleyak.net]
Sent: Tuesday, February 09, 2010 8:53 AM
To: Sweet, Serena E POA
Subject: Scoping comments

Dear Ms. Sweet:

Our comments for the Alaska Stand Alone Gas Project EIS Scoping are attached.
Thank you for telling me about the deadline extension!

Ruth McHenry
--
Ruth McHenry, Volunteer staff
Copper Country Alliance
HC 60 Box 306T, Copper Center AK 99573
907-822-3644

US Army Corps of Engineers
Alaska District

CONVERSATION RECORD

VISIT____
CONFERENCE____
TELEPHONE
INCOMING X
OUTGOING____

DATE 2/19/10
TIME 2:00pm

Name of Person(s) Contacted or in Contact with you:	Their Organization:	Their Telephone #:
Gilbert Venton		907-968-2239

Subject: ASAP EIS Scoping Comments

Summary:
Mr. Venton left a voicemail on 2/19/10 stating that he was interested in the ASAP EIS because he had received a copy of the revised public notice. I was able to get back in contact with Mr. Venton on 2/22/10. I asked if he had been able to view the website. He stated that the internet was currently down, so I told him I would send a CD to him containing the project information. I sent the CD to him at PO Box 50, Allakaket, AK 99720 on 2/24/10

Name of Person Documenting Conversation	Signature	Date
Serena Sweet	[signature]	2/24/10

US Army Corps of Engineers
Alaska District

CONVERSATION RECORD

VISIT______
CONFERENCE______
TELEPHONE
INCOMING______
OUTGOING X

DATE 2/23/10

TIME 10:00am

Name of Person(s) Contacted or in Contact with you:	Their Organization:	Their Telephone #:
Lloyd Paningona	Inupiat Community of the Arctic Slope	907-852-4227

Subject: ASAP EIS Scoping Comments

Summary:

I called Mr. Paningona per his request by email on 2/17/10. He asked where he could obtain information related to the ASAP EIS process & project. I told him about the project website, but he stated that he would prefer a CD containing the information. I sent him a CD at the address below on 2/24/10.

Address:
Lloyd Paningona
Inupiat Community of the Arctic Slope
P.O. Box 934
Barrow, Ak 99723

Name of Person Documenting Conversation	Signature	Date
Serena Sweet	[signature]	2/24/10

Sweet, Serena E POA

From: Lloyd Paningona [icas.realty@barrow.com]
Sent: Wednesday, February 17, 2010 4:37 PM
To: Sweet, Serena E POA
Subject: AK Stand Alone Pipeline

Attachments: Glacier Bkgrd.jpg

CD sent on 2/24/10

Glacier Bkgrd.jpg (4 KB)

Serena,

My name is Lloyd Paningona, I am the Realty Director with the Inupiat Community of the Arctic Slope a federally recognized tribal government in Barrow AK. I just received the extension notice on the scoping period for the ASAP project. I have been involved with other projects here on the slope and I would like additional information if you would enlighten me on this. Please contact me at my office briefly at 907-852-4227 if you would, Thanks.

Lloyd Paningona, Realty Director
Inupiat Community of the Arctic Slope
P.O. Box 934
Barrow, AK 99723-0934
Phone # 907-852-4227 ext 227
Fax # 907-852-4234
icas.realty@barrow.com

Dear Serena,

Here is my reply to the plans for the Alaska Stand Alone Pipeline Project:

My name is Jean Carey Richardson and I own the property at mile 134 on The Parks Highway. This 160 acres was homesteaded by my mother, Mary Carey. Mother had been the first high school teacher in Talkeetna, when Talkeetna was a fly-in area, and discovered this area flying with Don Sheldon. She thought it had the best view of McKinley in Alaska, even better than the National Park. After she homesteaded there, she started a campaign for a road through the area so "Everyone could enjoy the view." When the highway finally came through in 1972 she opened a business which the family is still operating today.
Our small motel, 8 rooms, is popular with traveler's who want to get away from hectic modern life and enjoy the peace and tranquility here, we don't even have TV in the rooms.
Our reservations for the coming summer includes a group of Lutheran Pastors, who have chosen our lodge as a place to retreat, relax and meditate. I don't believe that they or any of our other guests would appreciate the sounds of bulldozers and backhoes.
I believe a much better route for the pipeline through our area would be to follow the railroad right of way from where it crosses the Parks Highway north of Curry Ridge and travels along the east side of Curry Ridge past the old ghost town of Curry. This is the easiest route through this area with lower elevations, which is why the railroad chose that route. The main reason the Parks Highway diverts from the railroad route in our area is because Mother put so much pressure on Governors Egan and Hickel to have a highway with a spectacular view. I don't believe the view would be of any importance to the pipeline.

Other reasons for the East of Curry Ridge Route:
1. It would be further from the Alaska Fault Zone. We had a 7.2 earthquake northwest of the lodge a few years ago that might have destroyed or damaged a pipeline.
2. The east side of Curry Ridge is almost uninhabited, and fewer people would be disrupted.
3. Rights of Way could be more easily negotiated with the railroad.
4. Heavy equipment could be dropped anywhere in route by the train.
5. This is a shorter, easier route, and should be quite a bit less expensive.

Thank you for the opportunity to give my opinion on this matter.

Jean Carey Richardson

-----Original Message-----
From: Sweet, Serena E POA <Serena.E.Sweet@usace.army.mil>
To: alaskajean907@aol.com
Sent: Mon, Feb 22, 2010 1:35 pm
Subject: For your reply

Serena E. Sweet
Project Manager | (907) 753-2819

U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, AK 99506-0898
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil
www.poa.usace.army.mil/reg

Tricia Waggoner

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Thursday, February 25, 2010 3:13 PM
To: darkwalking@yahoo.com
Cc: Tricia Waggoner; asap@entrix.com
Subject: ASAP EIS Scoping Comment Response

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Tricia Waggoner

From: webmaster@asapeis.com
Sent: Thursday, February 25, 2010 11:30 AM
To: info@asapeis.com
Subject: SPAM-LOW: Added Comment

First Name: Tom
Last Name: Starr
Mailing Address: 6070 w/beverly lk rd
City: Wasilla
State: Alaska
Zip: 99654
Phone: 9073737317
Email: darkwalking@yahoo.com
Comment: As a lifetime Alaskan I have been a proponent of a gas line since oil and gas discovery even prior to statehood. Bullet line, well yesss.In my closet theres a T-shirt depicting a laughing figure asking what gasline circa 1973..we have The Alaska Railroad corp, and a well done to the folks responsible for that now lets have the Alaska Pipeline corp.There is no need for Alaskans to be held hostage over their resources by big oil, or big corporations. Lets get er done kids

Please do not reply to this email

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Friday, February 26, 2010 12:19 PM
To: tom starr
Cc: Tricia Waggoner; asap@entrix.com
Subject: ASAP EIS Comment Response

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

-----Original Message-----
From: tom starr [mailto:darkwalking@yahoo.com]
Sent: Thursday, February 25, 2010 5:42 PM
To: Sweet, Serena E POA
Cc: xanadu@mtaonline.net
Subject: asap

hi
knowing the changes necessary to develop a project of both this magnitude, and importance to local economies, and for service to the populace of Alaska in general, I would hope that the corps would consider the obvious need to begin such a project, as well as the many future economic benefits to Alaska and the nation. I know little of your requirements for the EIS or for that matter for prerequisite requirements for the expeditious construction phases of such a project. I have worked on the trans Alaska pipeline oil project, the Beluga to Anchorage natural gas project and was Employed for thirty one years in the laborers local 341 in Anchorage as a pipe layer.. I know that the expense of such a project as the ASAP is not an issue with your agency so much as the necessary protection of both the environment now, as well as the safety,functionality and lasting durability of the finished product now and far into the future.
Thank you for the opportunity to comment and may I urge you and your department,(agency) to act swiftly and fairly for the good of all concerned.

Thank you again

Tom Starr

Tricia Waggoner

From: webmaster@asapeis.com
Sent: Tuesday, March 02, 2010 7:10 AM
To: info@asapeis.com
Subject: SPAM-LOW: Added Comment

First Name: Land
Last Name: Cole
Mailing Address: po box 41
City: Denali Park
State: Alaska
Zip: 99755
Phone:
Email: landcole@mtaonline.net
Comment: As a Parks Highway resident I believe that the footprint and impact of the pipeline construction makes it unacceptable for the parks highway route. The majority of Alaska's tourism activity occurs along the Parks highway corridor and the development of a pipeline in this area would permanently change the experience of traveling the parks highway. I also do not want to look at another scar across the landscape as we already have the intertie which has had limited usefulness in comparison to its cost of development and impact to the environment. I appreciate that burying the pipeline would lessen its visual impact however the 100' wide construction platform would be a permanent scar that is incompatible with other uses of this area be they tourism, hunting or recreation. Thank you for your time. Land Cole 38 yr resident of the Parks Highway

Please do not reply to this email

Tricia Waggoner

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Monday, March 08, 2010 2:51 PM
To: landcole@mtaonline.net
Cc: Tricia Waggoner; asap@entrix.com
Subject: ASAP EIS Comment

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

US Army Corps of Engineers
Alaska District

CONVERSATION RECORD

VISIT______
CONFERENCE______
TELEPHONE
INCOMING______
OUTGOING X

DATE 3/8/10
TIME 1:30pm

Name of Person(s) Contacted or in Contact with you:	Their Organization:	Their Telephone #:
Arlene Spurgin		907-322-7878

Subject: ASAP EIS Question

Summary:

I called Ms. Spurgin back to answer questions related to the ASAP EIS process. She wanted to know when the pipeline would be built. I explained that we were still in the process of collecting information to include in our analysis. She stated that she wanted more information about the location in relation to her property. I stated I would send her a CD containing the project information at the address below.

*Note: on 3/5/10 Julie McKim also contacted Ms. Spurgin to return her phone call. She provided her with answers to questions regarding the size of the pipe, how the route would be maintained and if the pipe would be buried. She also provided her with the project website (www.asapeis.com)

→Address: 246 Charles Street, Fairbanks, Ak 99701

Name of Person Documenting Conversation	Signature	Date
Serena Sweet	[signature]	3/8/10

Representative Chris Tuck

Alaska State Legislature
District 29 - Representing Dimond Estates, Foxridge, Taku, Southwood Manor, Campbell, and Independence Park

March 8, 2010

Serena Sweet
Regulatory Division
U.S. Army Corps of Engineers, CEPOA-RD
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Re: Intent to Prepare a Draft Environmental Impact Statement for the State of Alaska's Proposed Alaska Stand Alone Natural Gas Transportation Pipeline, 74 Federal Register 232 (December 4, 2009)

Dear Ms. Sweet:

These comments are in response to the Notice of Intent to prepare a Draft Environmental Impact Statement on the Stand Alone Gas Pipeline.

Securing a reliable low cost source of natural gas is a vital economic driver for Alaska, promoting jobs and opportunities for families.

By improving Alaska's energy outlook, we can make it easier for businesses to flourish and families to survive. Low cost energy will allow families more disposable income, as well as help sustain local businesses, promote new industries, and keep money flowing into our local economy. Reasonable energy prices will also help community organizations, schools and municipalities reduce taxpayer burden and use scarce funds for other needs.

Any natural gas development will help get us closer to the energy security that's crucial to Alaska's economic independence.

I therefore urge you to complete all necessary reviews on the stand alone gas line in a timely fashion, so that Alaska can progress forward.

Thank you for the opportunity to comment.

Chris Tuck

Representative Chris Tuck

Year-Round
Phone (907) 269-0240
Toll-free (866) 465-2095
Rep.Chris.Tuck@legis.state.ak.us

May-December
716 W. 4th Ave. Rm 370
Anchorage, AK 99501
Fax (907) 269-0242

January-April
State Capitol Bldg. Rm 426
Juneau, AK 99801
Fax (907) 465-3810

From: Sweet, Serena E POA [Serena.E.Sweet@usace.army.mil]
Sent: Monday, January 11, 2010 2:34 PM
To: Bob Sattler
Cc: asap@entrix.com; Tricia Waggoner
Subject: ASAP EIS Scoping Comment Response

Thank you for your email regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Serena E. Sweet
Project Manager | (907) 753-2819

U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, AK 99506-0898
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil
www.poa.usace.army.mil/reg

Serena E. Sweet
Project Manager | (907) 753-2819

U.S. Army Corps of Engineers
CEPOA-RD-S
P.O. Box 6898
Elmendorf AFB, AK 99506-0898
Fax: (907) 753-5567
Email: Serena.E.Sweet@usace.army.mil
www.poa.usace.army.mil/reg

-----Original Message-----
From: Bob Sattler [mailto:bob.sattler@tananachiefs.org]
Sent: Friday, January 08, 2010 11:28 AM
To: Sweet, Serena E POA
Subject: ASAP gas pipeline NEPA review

Please add Tanana Chiefs Conference to your contact list for information, announcements, meetings, communications and as a key stakeholder in the proposed Alaska Stand Alone Pipeline. I'm not aware of any communications between the COE and TCC and its affiliated Tribes on this project. Are you aware of the GtoG report done by the Morris Udall Foundation on the relations between TCC and the DoD? You may know that TCC is a tribal consortium for the Interior region of the State and we've been involved in pre-scoping for the large pipeline for several years and intensively involved in the environmental restoration of the old military pipelines through the region for more than a decade with the COE. I'll prepare copies of our series of reports and send them to you for material to be tiered into your NEPA process. On another topic, TCC manages a self-governance compact for Realty Services over Native allotments and you mention in the federal register that there are allotments along the route of the proposed line. For those lands, legal jurisdiction is vested with the Bureau of Indian Affairs and we work with them to counsel allotment owners, issue access permits, right-of-ways and so forth with the consent of the land owners. Has the COE or anyone else associated with your project sent notices of your scoping meetings to the potentially affected Native allotment owners and to the Tribal governments listed in the appendix of the project application for a ROW? For more information about TCC take a look as www.tananachiefs.org. We'll talk on the phone at some point - Bob Sattler (Environmental Quality Analyst)

Tanana Chiefs Conference

Chief Peter John Tribal Building
122 First Avenue, Suite 600
Fairbanks, Alaska 99701-4897
(907) 452-8251 Fax: (907) 459-3850

SUBREGIONS

UPPER KUSKOKWIM
McGrath
Medfra
Nikolai
Takotna
Telida

LOWER YUKON
Anvik
Grayling
Holy Cross
Shageluk

UPPER TANANA
Dot Lake
Eagle
Healy Lake
Northway
Tanacross
Tetlin
Tok

YUKON FLATS
Arctic Village
Beaver
Birch Creek
Canyon Village
Chalkyitsik
Circle
Fort Yukon
Venetie

YUKON KOYUKUK
Galena
Huslia
Kaltag
Koyukuk
Nulato
Ruby

YUKON TANANA
Alatna
Allakaket
Evansville
Fairbanks
Hughes
Lake Minchumina
Manley Hot Springs
Minto
Nenana
Rampart
Stevens Village
Tanana

March 8, 2010

Alaska Stand Alone Pipeline Natural Gas Transportation Pipeline
U.S. Army Corps of Engineers CEPOA-RD
Post Office Box 5898
Elmendorf AFB, Alaska 99506-0898

Dear Ms. Sweet:

Tanana Chiefs Conference (TCC) is the Alaska regional non-profit Native corporation representing the Interior region of Alaska. The Alaska Stand Alone Pipeline (ASAP) traverses more land through the TCC region compared to any other region in Alaska. Interest in the ASAP line by TCC and its member Tribes will grow as more information becomes available about the project and as you expand public outreach and Tribal consultation. TCC and its member Tribes may seek to influence the socioeconomic components throughout the NEPA process. The COE should anticipate that the level of participation in the NEPA process by TCC and its member Tribes will evolve as the Tribal leadership becomes more familiar with the project.

My review of project documents on the ASAP website leads me to conclude that the administrative record thus far is heavy on the natural environment and light on the human environment. Given the nature of the project, which is to bring lower cost energy to Alaskans, the treatment of impacts to the human environment should be commensurate with the probable effects of the project. My reading of the available project documents is that they do not contain substantive analysis of probable socioeconomic benefits, such as the percentage reduction in homeowner cost for heating and electricity in urban and rural settings.

As far as I am aware, TCC had not received formal notices of the public scoping meetings convened in December of last year. Please add us to your distribution list for any notices, announcements or scheduled activities relating to the federal environmental review. It would also be prudent to expand your mailing list with all of the federally recognized Tribes identified in the preliminary project documents. In regard to the Tribal entities, one of the project documents makes reference to Healy Tribal Council in the TCC region, and I presume you meant Healy Lake Tribe. I'm not aware of a Tribe in the town of Healy, but there are Tribes in Nenana and Cantwell. Nenana and Healy Lake are members of TCC and the regional for-profit Native corporation (Doyon, Limited), but Cantwell is a member of the Ahtna region.

You may know that the Native villages of the TCC region were involved in settling the aboriginal land claims in Alaska with respect to the Trans-Alaska Pipeline (TAPS) many years ago. With that behind them, the "Pipeline Tribes" of the TCC region have extensive histories on the topic of pipelines in Interior Alaska. The "TAPS experience" by those Tribes should be drawn into the affected environment and incorporated into the interdisciplinary analysis for the ASAP line as a proxy to better understand the socioeconomic components of the human environment.

The socioeconomic analysis for your project should also include an analysis of the capacities developed by the regional and village entities that were created by the Alaska Native Claims Settlement Act (ANCSA). One project document states: "*Because of its overland route through interior Alaska, an in-state pipeline will also provide construction and operational jobs and new business opportunities for Alaskan citizens.*" *(Parks Highway Stand Alone Gas Pipeline ROW Permit Application and Bureau of Land Management Plan of Development.* Alaska Department of Transportation and Public Facilities, November 2009, Page 30-31). The contribution that the ASAP line may provide for employment and business opportunities to those ANCSA entities is a critically important topic for socioeconomic analysis. Perhaps this could be accomplished by some level of comparison on how the ASAP may be similar or different from the TAPS development.

The following section highlights six topics of interest:

1. Bringing energy relief to rural Alaska

An in-state gas pipeline provides obvious synergies to serve demand for natural gas not only in the Anchorage bowl area, but also along the route. The residents of these areas currently are confronted with extraordinarily high-energy costs. A gas pipeline will provide to these residents, for the first time, low cost clean natural gas for home heating, electricity generation, and potential industrial development (in Parks Highway Stand Alone Gas Pipeline ROW Permit Application and Bureau of Land Management Plan of Development. *Alaska Department of Transportation and Public Facilities, November 2009, Page 30-31).*

This statement should be expanded to identify an implementation plan for bringing low cost energy to rural Alaska. This purported first-time service for rural residents would be a remarkable development and ASAP should make it clear how the pipeline project will ensure deliver of natural gas products to bring energy (and economic) relief to rural residents. Thus far, the in-state gas studies have suggested that propane is the only economic source to deliver to rural Alaska. The plan by the ASAP developers to implement that goal is significant. In lieu of a delivery system to rural areas, a revenue-sharing mechanism similar to the power-cost equalization could be proposed that lowers or stabilizes the cost of energy generation with diesel systems currently installed in rural villages.

Possibly the ASAP project should include a separate alternative to address rural energy issues and how the project may contribute to those issues. Elements of the implementation plan might include: 1) needs, opportunities and constraints of bringing a gas liquid energy source to rural villages, 2) an analysis of capitalization costs associated with converting home heating and electrification in villages to a gas liquid source 3) transportation needs for delivering a gas liquid to roadless villages, 4) a cost-benefit analysis of a diesel to gas liquid conversion, and 5) an analysis of the power-cost equalization program and its applicability to the transition from diesel to a gas liquid source. If carried through by ASAP delivery of a lower cost source of energy, rural villages in the TCC region may experience a phase of revitalization.

2. Tribal Consultation

Project documents state:

The project developer will assist the BLM and USACE in government to government consultation with federally-recognized Alaska Native tribes as requested. The project developer will also consult with and negotiate land-access permits with each tribal landowner prior to taking actions that have substantial direct effects on federally recognized tribal governments in conformance with Executive Order 13175.

The project developer will prepare an integrated stakeholder engagement strategy and implementation plan as part of its land acquisition program and work with the BLM and USACE during the preparation of the third party EIS. The EIS meets the intent of the provisions for environmental justice and includes the fair treatment and meaningful involvement of all potentially affected individuals with respect to the proposed pipeline project; including strategies for providing equal access to the decision-making processes. (in *Parks Highway Stand Alone Gas Pipeline ROW Permit Application and Bureau of Land Management Plan of Development.* Alaska Department of Transportation and Public Facilities, November 2009, Page 35).

Close consultation with directly impacted Tribes should be further developed for this project. The ASAP commitment to provide equal access to the decision-making process is commendable. You may know that TCC and some of its member Tribes have a long history of collaborating with the COE, particularly on environmental restoration of formerly used defense sites in the Upper Tanana River region. The current NEPA process of the ASAP line may borrow from a previous study resulting from a former cooperative agreement entitled *Situation Assessment and Recommendations for Government-to-Government consultations between Interior Alaska Tribes and the U.S. Department of Defense on Military Impacts in*

Interior Alaska. You may find some guiding elements in this report that the COE and/or cooperating agencies for the ASAP project may adopt in the NEPA review.
The quoted passage above implies that the State of Alaska or its agent developer will specifically consult with Tribal landowners. Procedurally the lead agency is responsible for consultations in areas other than land ownership, but it is critically important for the COE to understand the land tenure policies in Alaska. You may know that the Alaska Native Claims Settlement Act provided fee simple ownership of land selections to non-tribal ANCSA village corporations. With few exceptions, the ANCSA legislation left Alaska Native villages as "landless Tribes". This is a subject that should be understood clearly by the lead federal agency and its cooperating agencies in order to meet with the right Native organizations for land under different jurisdictions. For TCC, you will need to meet with us on any land issue concerning Native allotments and I elaborate on this below.

The project documents cite subsistence as an environmental justice issue and it may also need to be addressed as a health issue. Other environmental justice issues may concern: 1) employment and training, 2) understanding potential health impacts such as infectious and chronic diseases posed by a large transient workforce, 3) implementing fair and just compensation for any taking of Native lands, 4) providing for energy relief to villages (as stated above) and 5) respecting the legal authority provided to federally recognized Tribal governments. It is likely that universal issues among numerous directly impacted villages may relate to employment and energy. The potential for the gas pipeline to reduce energy costs in rural Alaska may be the most significant environmental justice issue.

3. Native allotments

The ASAP documentation mentioned that as many as 56 Native allotments may be potentially affected by the project; However, there is no mention of the Bureau of Indian Affairs (BIA) as the federal agency exercising legal jurisdiction over those lands. Similar to the BIA authority is TCC's self-governance compact with the BIA that delegates the day to day management of the Native allotment lands. For any potentially affected Native allotment, the applicant and lead federal agency should communicate with the allotment owner(s) and TCC. The delegated authority to TCC's Real Estate Services program includes land status, ownership, counseling allotment owners, along with duties to prepare the administrative record for land transactions such as access permits and rights-of-ways.

A side topic regarding Native allotments concern outstanding trespass cases the pose a potential cloud to title. Specifically, there are some unresolved trespasses with the Parks Highway right-of-way that should be resolved before the ASAP advances to right-of-way acquisition. With that said, some allotment owners are likely to be interested in leasing their land for the ASAP right-of-way and selling aggregate material for the project. Those opportunities should be further explored in consultation with allotment owners and the TCC Real Estate Services program.

4. Health impacts

TCC has initiated a project to begin understanding potential health impacts posed by the multiple gasline projects in Interior Alaska. The COE may not be familiar with the health impact assessment (HIA) conducted in recent years for the environmental review on proposed federal leasing in the National Petroleum Reserve. That work was conducted by the Alaska Native Tribal Health Consortium and is a model to expand HIA analysis in Alaska. TCC currently has a proposal pending with the Health Impact Project, an NGO funded by the PEW Charitable Trust and the Robert Wood Johnson Foundation. Funded projects receive technical assistance to initiate the HIA analysis. In our case, should this project be funded, TCC will invite federal officials involved in all of the gasline projects to our orientation meeting. The TCC study would produce a written report specific to the parameters of a pipeline project that could be tiered into any NEPA review. In very general terms, the TCC initiative would assess health impacts such as: 1) infectious and chronic diseases posed by a large transient workforce, 2) how a large pipeline project through the Interior would affect the diverse health services programs at TCC, and 3) to develop series of demographic health profiles for directly affected Native villages.

The ASAP documents identify the rural medical clinics in some TCC villages as facilities that may be considered by the project sponsor for services. However, there is no documentation on the resources available at the clinics, nor the range of medical and auxiliary services that may be available. More importantly, there is no mention under what conditions the clinics would be able to provide services to non-beneficiaries (i.e., pipeline construction workers). Consequently, there is a need to consult with TCC and the Tribal leadership about what service may be requested by the project sponsors. TCC has added telemedicine capabilities at several of its village-based clinics and those services may be sought after by a project sponsor.

5. Cultural Resources

The project document states:

Inventory, documentation, and preservation of cultural resources and mitigation of adverse effects to cultural resources will be based on a programmatic agreement between the concerned federal permitting entities, State Historic Preservation Officer, and the Advisory Council on Historic Preservation. The agreement will clarify the procedures for considering cultural resources and will formalize the relationships between the various agencies. The relevant federally-recognized Tribes and the public will participate in the implementation of the agreement, as required by Section 106. (*Parks Highway Stand Alone Gas Pipeline ROW Permit Application and Bureau of Land Management Plan of Development.* Alaska Department of Transportation and Public Facilities, November 2009, Page 36).

One of the components of the TCC Real Estate Services Program is to comply with the National Historic Preservation Act on Native allotment lands. If Native allotments are in the area of potential affects for the ASAP, TCC and the Bureau of Indian Affairs may need be included as a consulting party on the programmatic agreement.

6. Other

TCC issued a notice in their newspaper, *The Council*, last month encouraging constituents to contact COE on this project. We are also sponsoring a forum on the gas pipeline projects at the annual TCC convention on March 15, 2010. A representative of the State of Alaska has agreed to speak about the ASAP line to potential stakeholders at the TCC convention.

This letter reflects a compilation of my observations as a profession staff member of TCC and, my preliminary comments are not official positions endorsed by TCC or its member Tribes. My opinions here are subject to revision as I learn more about the ASAP project. Views expressed in this initial comment letter should not be misconstrued to represent the interests of any federally recognized Tribe that may be affected by the project. The COE will need to consult with each Tribe to understand their interest in the project, and their issues, concerns and priorities.

Should you have any questions, I can be reached at 907-452-8251, ext. 3343.

Sincerely,

Robert Sattler
Senior Archaeologist/Environmental Quality Analyst

TRUSTEES FOR ALASKA

A Nonprofit Public Interest Law Firm Providing Counsel to Protect and Sustain Alaska's Environment

1026 W. 4th Ave. Ste 201 ♦ Anchorage, AK 99501 ♦ 907.276.4244(v) ♦ 907.276.7110(f) ♦ ecolaw@trustees.org Web Address: www.trustees.org

March 8, 2010

Serena Sweet
Regulatory Division
U.S. Army Corps of Engineers, CEPOA-RD
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Re: Intent to Prepare a Draft Environmental Impact Statement for the State of Alaska's Proposed Alaska Stand Alone (ASAP) Natural Gas Transportation Pipeline, 74 Federal Register 232 (December 4, 2009)

Dear Ms. Sweet:

These comments regarding the proposed Alaska Stand Alone Pipeline are submitted on behalf of the Copper River Watershed Project, Northern Alaska Environmental Center, and the Sierra Club, Alaska Chapter. These comments are in response to the Notice of Intent ("NOI") to prepare a Draft Environmental Impact Statement ("DEIS" or "EIS") and provide advice on the scope of the EIS, including significant issues to be addressed and relevant information that should be considered. *See* 74 Fed. Reg 232 (December 4, 2009).

The State of Alaska has proposed the construction of a pipeline to deliver natural gas from the Prudhoe Bay area to the Cook Inlet region to providing needed energy resources to the Fairbanks and Southcentral regions of Alaska. The pipeline would begin either at Prudhoe Bay or the Gubik field in the northeastern Brooks Range. From either location, the pipeline would intersect with the Dalton Highway, and essentially follow the Trans Alaska Pipeline corridor to Livengood. From there, the pipeline would follow one of two routes to the Wasilla area: the Parks Highway route or the Richardson Highway route. The Parks Highway route would proceed through the east side of Minto Flats to the Parks Highway and follow it down to Wasilla. The Parks Highway route would include a smaller pipeline to provide natural gas to Fairbanks (the "Fairbanks Lateral"). The Richardson Highway route would continue to Fairbanks, following the Richardson Highway to Delta Junction, to just north of Glennallen, and then follow the Glenn Highway to the Wasilla area. The Richardson Highway route would include a small spur line to Glennallen (the "Glennallen Lateral"). From Wasilla, the pipeline would proceed to Point Mackenzie, intersecting the Beluga Pipeline at mile 39.

The commenters are generally in favor of the delivery of Prudhoe Bay "stranded" natural gas to Alaska's communities to provide energy for electricity production and heating of residences and businesses. Natural gas is a cleaner-burning fossil fuel than oil or coal that will provide energy as we develop more renewable energy sources. As noted in detail below, however, there are numerous factors that must be considered in the preparation of the DEIS.

I. PURPOSE OF SCOPING UNDER NEPA

The planned permitting associated with construction of the Alaska Stand Alone Pipeline is a major federal action with the potential to significantly affect the environment; therefore, the Army Corps of Engineers ("Corps") must comply fully with the National Environmental Policy Act ("NEPA") before moving forward with the proposal. The purpose of scoping under NEPA is to establish the scope of the project and alternatives and the significant issues that will require in-depth analysis in the EIS. 40 C.F.R. § 1501.7(a)(2). The purpose of the EIS is to "provide full and fair discussion of significant environmental impacts and [to] inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1.

II. PURPOSE AND NEED

The EIS must provide a description of the underlying need and purpose to which the agency is responding in proposing the alternatives including the proposed action. 40 C.F.R. § 1502.13. The EIS must succinctly describe the environment of the area(s) that will be affected by the project and alternatives. 40 C.F.R. § 1502.15. The EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives[.]" 40 C.F.R. § 1502.14. This alternatives requirement is "the heart" of the EIS. 40 C.F.R. § 1502.14. To satisfy the alternatives requirement, the EIS must consider a reasonable range of alternatives to a given project, and it must rigorously explore and objectively evaluate those alternatives. 40 C.F.R. § 1502.14(a). Descriptions must be given for any alternatives eliminated from detailed study. *Id.*

In this case, the project proponent, the State of Alaska, has very loosely identified the purpose and need. In the *Stand-Alone Gas Pipeline Project Description / Plan of Development* (Draft 11-16-09), the State of Alaska asserts a variety of reasons for promoting the project. It first discusses the various unsuccessful efforts in shipping natural gas from the North Slope to "North America, Asia, or both." *Id.* at 1-1. It then discusses the various projects moving forward as a result of the Alaska Gasline Inducement Act ("AGIA") Trans-Canada Pipeline and projects competing with the AGIA pipeline (the Denali Pipeline). Then, the State of Alaska discusses the residential and commercial needs for natural gas in the Cook Inlet and Fairbanks areas. *See id.* at 1-2. But, apparently, the purpose of this project is not to meet the natural gas needs of the Cook Inlet and Fairbanks regions, nor meeting the needs of any other communities in Alaska. Rather, it is being pursued as a back-up in case the "spur line" from the Alaska-

Canada Gasline, whether the AGIA or Denali line, does not happen. *See id.* So, rather than being the ASAP line, it is the Just-in-Case line.

The commenters' first suggestion is that the purpose and need be stated more clearly, deliberately and concisely in the DEIS. Is the purpose and need to simply build a pipeline, or is it to deliver natural gas to Fairbanks and the Cook Inlet region? Is the State of Alaska pursuing design of a pipeline that is not, at this time, planned to actually be constructed? Is this a paper exercise that is a waster of the public's time and money? Does the State's project proposal duplicate other environmental review efforts for the Enstar Natural Gas company's proposed "bullet line"? What is the relationship of this project with the studied road routes to Umiat in the Alaska Department of Transportation's proposed Foothills Pipeline Access Project? What is the total quantity of natural gas proposed to be transported, over what period of time? Is this project considered an Alaska Natural Gas Pipeline project? How will this project contribute to meeting the energy needs of the United States? The lead agency should inquire more fully with the State of Alaska to determine the answers to these questions and draft a purpose and need statement that provides a meaningful understanding of the true purpose and need for the project. Only then will the Corps be able to appropriately define the various alternatives, whether accomplished by a natural gas pipeline or other means, that may accomplish the goals expressed in the purpose and need.

III. ENVIRONMENTAL CONSEQUENCES

A. Considerations Under NEPA and ANILCA

The EIS must include a discussion of the environmental consequences of the proposed action and alternatives, including the environmental impacts of each alternative, any adverse environmental effects that cannot be avoided if the proposal is implemented, and any irreversible and irretrievable commitments of resources. 40 C.F.R. § 1502.16. This section must include discussions of the direct and indirect, including cumulative, effects of the proposed project on the human environment, as well as means to mitigate adverse environmental impacts. 40 C.F.R. §§ 1502.16, 1508.25(c). The effects and impacts to be analyzed include ecological, aesthetic, historical, cultural, economic, social, and health impacts. 40 C.F.R. § 1508.8.

Direct effects are those that are caused by the project and that occur in the same time and place. 40 C.F.R. § 1508.8(a). Indirect effects are those that are somewhat removed in time or distance from the project, but nonetheless reasonably foreseeable. 40 C.F.R. § 1508.8(b). "Cumulative impact" is defined as:

> [T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. Thus, the proposal must be analyzed as it relates to other actions that are individually insignificant but cumulatively significant. *See* 40 C.F.R. § 1508.27(b)(7).

The EIS must also consider actions that are connected with, or closely related to, the project in question. 40 C.F.R. § 1508.25(a)(1). Actions are connected for the purpose of EIS analysis if they are automatically triggered by the proposed action, cannot or will not proceed without the proposed action, or, together with the proposed action, are interdependent parts of a larger action. 40 C.F.R. § 1508.25(a)(1).

For the purpose of evaluating significant impacts in the EIS, if there is relevant information that is lacking and the information is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the information must be included in the EIS. 40 C.F.R. § 1502.22(a).

In preparing the EIS and complying with NEPA, "all agencies of the Federal Government shall recognize the worldwide and long-range character of environmental problems." 16 U.S.C. § 102(2)(F). This is particularly true where both the proposed action and its effects occur in U.S. territory. *See Envtl. Defense Fund v. Massey*, 986 F.2d 528, 536 (D.C. Cir. 1993).

The Corps must also examine the existing comprehensive conservation plans for the various national parks, national wildlife refuges, and state parks and evaluate whether the pipeline, along either route, is consistent with the uses and management specified in those plans. ANILCA § 304(g)(3)(A)(iii). The Corps must also conduct a subsistence evaluation under section 810(a) of ANILCA, to determine whether the proposed construction and operation of a natural gas pipeline would significantly restrict subsistence uses and resources. *See* 16 U.S.C. § 3120(a). If the Corps determines that the construction and operation of a natural gas pipeline would significantly restrict subsistence uses, then it must undertake the steps identified in Section 810(a) of ANILCA before proceeding. Additionally, the Corps must address any legal requirements there may be regarding adjacent land designations, including the compatibility of transportation corridors for these units or impacts within them as a result of pipeline construction and operation.

The following sections address issues of particular importance that should be analyzed and addressed.

B. Ecological Considerations

Lands adjacent to the joint and separate routes for the proposed pipeline involve nationally and internationally significant fish and wildlife resources. The DEIS should carefully consider and analyze the following general principles:

- The overall purposes and ecological significance of the Arctic National Wildlife Refuge, Gates of the Arctic National Park & Preserve, Kanuti National Wildlife Refuge, Yukon Flats National Wildlife Refuge, Wrangell-St. Elias National Park & Preserve, Denali National Park & Preserve, Chugach National Forest, Chugach State Park, White Mountains National Recreation Area, Colville River Special Area within the National Petroleum Reserve-Alaska, Minto Flats State Game Refuge and other State of Alaska refuges, critical habitat areas, and research natural areas should be addressed in all appropriate sections of the document (description of the existing environment, impacts of various alternatives, irreversible losses etc.). This analysis should address the species and their habitats that may be affected, wilderness values, subsistence and recreation uses, as well as the other purposes of these public lands.

- The impacts of the proposed action over a broad enough time scale to realistically identify the full consequences that might occur during the duration of the pipeline's operation, and beyond through the recovery phase after the extraction and transport of natural gas has ceased. This period could conceivably extend over 100 years.

- The potential effects of both acute and chronic pollution of the watersheds near the gas conditioning facility, NGL extraction facilities, and pipeline crossings with special attention to the downstream environments where toxic substances may be transported to, and accumulate over time. This watershed analysis should address the potential degradation of habitat values over the long term for lands adjacent to and downstream of all stand alone pipeline-related facilities. The potential for pollution extending down the streams and rivers should also be addressed.

- Air quality baseline needs to be available and impacts addressed throughout the pipeline routes, including Gubik pipeline route. The impacts of priority pollutants, toxic pollutants, and greenhouse gas emissions including black carbon and mitigation plans for operations associated with gas wells and extraction, processing operations, gas conditioning facility, NGL extraction facilities, pipelines need to be assessed. The cumulative impacts of the gas line project with Prudhoe Bay oil field emissions need to be assessed.

- Human health impact assessment should be conducted for the cumulative impacts of this project combined with other activities, particularly on the North Slope.

- Full consideration of the physical environment and how it might be altered from the proposed action and its implications for fish, wildlife and habitat values must be addressed. For example, issues such as the disturbance of sensitive loess soils and permafrost both in the area of gas conditioning and NGL extraction, as well as the proposed pipeline routes. Potential impacts to soils, vegetation, including rare and sensitive plants, water quality and quantity, wetlands, and habitat values, including fragmentation, should be fully described and discussed.

- Any known or suspected animal migrations including caribou, moose, fish, and others that could be impeded or impacted by proposed construction and operation activities related to the pipeline and accompanying road, along both proposed routes, should be identified and fully evaluated in the impact sections of the DEIS. Background noise and disturbance levels need to be assessed for all facilities, road traffic, construction noise, to fish and wildlife habitats and populations as well as subsistence resources and activities, and wilderness values in parks, refuges, etc.

- All known or suspected threatened or endangered species that may be present or impacted should also be fully addressed.

- The existing environment values for the Toolik Lake Research Natural Area and University Toolik Field Station and broader areas where invaluable long-term ecological research is being conducted.

- What will be the impacts to migratory birds from bird strikes to facilities such as gas conditioning facilities?

- A thorough cumulative impacts analysis that considers the proposed pipeline and alternatives together with the impacts of other activities in the affected regions, both current and in the reasonably foreseeable future. For example, cumulative impact analysis of the Gubik field gas source should include potential impacts of additional oil development at nearby Umiat and gas development within the National Petroleum Reserve-Alaska, various proposed road projects in the area, such as the State of Alaska's proposed Umiat road and road to Nome.

- Finally, the DEIS should in all of its analyses assume scenarios, and conduct the appropriate analysis, for the various pipeline projects, including the AGIA or Denali pipeline and "spur line," Enstar Natural Gas Company's proposed "bullet line" project; and the "All Alaska Pipeline" which would follow the existing Trans-Alaska Pipeline route to Valdez for shipment of LNG.

C. Climate Change Considerations

The significant adverse impacts of global climate change on the United States and the world have long been recognized by Congress (*see, e.g.,* Global Change Research Act of 1990, Public Law 101-606, 104 Stat. 3096-3104 (1990), codified at 15 U.S.C. §§ 2921 *et seq.*), the courts (*see, e.g. Massachusetts v. Envtl. Prot. Agency*, 127 S. Ct. at 1455 ("The harms associated with climate change are serious and well recognized.")), and the Department of Interior itself (*see, e.g.* Secretarial Order 3226, Evaluating Climate Change Impacts in Management Planning (Jan. 19, 2001) *available at* http://elips.doi.gov/elips/sec_orders/html_orders/3226.htm ("There is a consensus in the international community that global climate change is occurring and that it should be addressed in governmental decision making.").

The Arctic has experienced some of the most severe and rapid warming associated with global climate change. Already the average temperature in the Arctic has risen at almost twice the rate as the rest of the world, and Alaska has warmed an average of 4° F over the past half century. Warming has ushered in a host of alarming ecological changes including the loss of sea ice, shifts in vegetation zones and species' diversity and ranges, and the thawing of permafrost. *See Ctr. for Biological Diversity v. Nat'l Highway Transp. Safety Admin.*, 508 F.3d 508, 523 (9th Cir. 2007) ("recent evidence shows that there have already been severe impacts in the Arctic due to warming").

The impacts of global climate change on the Arctic are expected to greatly accelerate due to increased global concentrations of carbon dioxide and other greenhouse gases, primarily from the burning of fossil fuels. The decline in the extent of sea-ice has reached its lowest coverage and stability in recent years, with some models showing the disappearance of most summer sea ice by the end of this century and more recent data pointing to a complete loss of sea ice by mid-century or sooner. Similarly, melting of the Greenland ice sheet in 2004 was ten times the rate observed in 2000. Indeed, Greenland's ice and polar ice are now losing mass at rates not thought possible several years ago.

The proposed natural gas pipeline, if constructed, would likely remain in operation as long as oil and gas production activities in the Prudhoe Bay and offshore (which appears imminent) regions continue. This would result in active operations for at least 50 years, if not more. The well-documented climate warming that is now under way will likely result in significant changes over the next 50 or 100 years as well. Because of the potential time scales involved, it is imperative that the DEIS address several aspects of climate change in relation to both the description of the environment and impact assessments for the various alternatives, including assumptions of exploration and development scenarios. There should be a presentation and analysis of the known climate-driven changes that are currently occurring in the Arctic and Interior regions, as well as a description of expected changes over the next 50 to 100 years. This may require additional baseline studies or modeling analysis and incorporation of traditional knowledge to be undertaken for the DEIS.

Some of the known or expected changes that have been identified so far include: warmer, dryer summers, increased incidence of wild fires, thawing of permafrost, forest disease and insect infestations, changes in precipitation, drying of wetlands and water bodies, increased water temperature in the various rivers crossed by the pipeline, and changes in frequency of river flooding during spring breakup, and changes to salmon health, populations and distributions. All of these and perhaps other factors have the potential to alter vegetation, water regimes, water quality, habitat values for fish and wildlife, and subsistence resources and hunting and fishing as we have known them up to this point. For example, (1) continued warming may create new or more challenging design and construction problems where proposed development and transportation access routes encounter areas of unstable permafrost and loess soils; (2) there may not be adequate water quantity for wildlife and other refuge purposes and also oil and gas development activities such as ice roads, drilling, etc.; (3) the consequences for sensitive habitat areas downstream of development activities under such changing conditions are unknown; and (4) how climate change will affect the values of the lands involved in the exchange is unknown. It will be critical to have the best possible description and analysis of the long-term environmental trends (up to 100 years) so that impacts associated with the proposed action and alternatives can be reasonably assessed.

Fossil fuel emissions including black carbon are the major contributor to human-induced climate change and therefore the DEIS must evaluate the contribution of this project to greenhouse gas emissions both in the pipeline-related facilities and operations, as well as the increased consumption of natural gas and production of electricity that will result from the residential and commercial use of the natural gas. Finally, global warming has the potential to have profound effects on the planning areas throughout the state.

As such, the direct and indirect effects of global warming must be analyzed and considered by the Corps in the DEIS.

D. Pipeline Construction and Operation-Related Impacts

In addition to some of the issues addressed elsewhere in this letter, the following are some, but not all, of the potential impacts of construction and operation of the pipeline that need to be considered by the Corps in preparing the DEIS[1]:

- Impacts from biodiversity loss, habitat loss and degradation, noise disturbance to wildlife, including musk ox, moose, caribou, wolves, wolverine, lynx, other furbearers, Dall sheep, golden eagle and other raptors, waterfowl, other migratory birds, and salmon and other fish.

- Impacts to water quality and quantity, including water uses and potential water pollution.

- Impacts to tundra, permafrost, vegetation, wetlands, rivers, and other surface areas as a result of creation and use of material sites for gravel and other materials for construction of the pipeline.

- Impacts to native plants, soils and water quality from seeding and fertilization during the restoration phase of construction.

- Impacts to fish and wildlife habitat as a result of blasting and drilling, road traffic, during construction, and operation of gas handling and processing facilities.

[1] The commenters also suggest that the Corps review the analysis in the original EIS for the construction of the Trans Alaska Pipeline for its accuracy and completeness. Such a review will likely provide the Corps with valuable insight into the potential impacts to consider and analyze for such a large-scale project.

- Impacts to roadway integrity as a result of boring for portions of the pipeline where pipe will be buried underneath the ground or road bed.

- Impacts to soils, fish and wildlife habitat, water quality, and area ecology as a result of using landfill sites for disposal of scrap materials, timber, and other debris. The DEIS should also consider if long-term monitoring of such landfill sites will be necessary in order to ensure these values are protected.

- Impacts to subsistence resources and access, traditional land use areas, historic sites, and Alaska Native cultures.

- Impacts to air quality and from air emissions including greenhouse gas emissions to the local, regional and global environment.

- Impacts to air quality and pollution in the villages and communities along the pipeline corridor, taking into consideration air flow and/or lack thereof within the Yukon Flats and Fairbanks, particularly in cold winter temperatures when air quality attainment is an issue and considering human health effects and ecological impacts.

- Impacts to conservation system unit, recreation area, critical habitats and other public land values including the environment, fish and wildlife, subsistence resources and wilderness from potential spills and contamination.

- Hydrology changes, impacts to wetlands and floodplains, watershed changes and other modifications of stream flow and sediments as a result of construction of river and stream crossings.

- The DEIS should be very specific in detailing exactly the streams, creeks and rivers that will be crossed, and where.

- Effects on fish, wildlife, subsistence and the environment throughout the Colville River, Itkillik River, Yukon River, Tanana River, Susitna River, Copper River and other watersheds.

- Impacts from worker camp construction and operation, including wildlife fragmentation, noise, dust, increased human access, habitat, waste production and disposal and hydrological impacts. Cumulative impacts from associated seismic and drilling operations to these resources.

- Impacts from road and pipeline routes through ecological, scientific, wild, recreational, subsistence and other resources of the various creeks, streams and rivers and parks and refuges to be crossed during construction and operation.

- Impacts from construction, particularly where pipeline crossings of roadways will involve trenching and shut down road use, on recreational and commercial users of the roadways and well as wilderness recreation affected. This analysis should consider broad economic impacts associated with such impacts, particularly in areas that will be acutely impacted, such as the McKinley Village area and Minto Flats State Game Refuge.

- Impacts to access of park, refuge, recreation area lands by the public, particularly during the high use periods of the summer and winter seasons.

- A comprehensive analysis of the socioeconomic and cultural impacts from delivery of natural gas to targeted communities.

- Community health-related impacts, including water and air quality issues and an analysis of health problems in other regions of the state with significant long-term construction projects.

- Impacts to fire management due to construction activities during times and locations where there is likely wildfire activity, as well as impacts on fire management as a result of the constructed pipeline. This will be particularly crucial during right-of-way clearing which, according to Section 4.3.3 of the State of Alaska Draft Plan of Development, will involve clearing and burning of timber on the right-of-way as it is cleared.

- Impacts on archaeological and historical resources along the pipeline routes.

- Impacts to rare and sensitive plants.

- Loss of intact and undisturbed Arctic and subarctic ecosystems as a scientific benchmark for long-term studies.

- How construction and operation of the pipeline affects Environmental Justice concerns.

Mitigation measures to address these impacts must also be developed and analyzed. This should include adequate spill protection and prevention along the Yukon River, Copper River, or any other major anadromous stream or river, and its tributaries and nearby fish streams are designated as "environmentally sensitive areas."

In addition, the Corps should consider, analyze and ensure that there are binding plans, funding and provisions for decommissioning, dismantling, and removal of the infrastructure when the pipeline is no longer operational.

E. Consideration of Alternative Routes

In all of the alternatives analyzed in the DEIS, the Corps needs to comprehensively address the socioeconomic, environmental and cultural impacts, both direct and indirect, of the alternatives. The Corps should also consider how this proposed project relates to other concurrently proposed natural gas pipeline projects in order to comprehensively address the full range of alternatives and not consider projects in an incremental, piecemeal fashion nor through redundant environmental review processes.

The Corps must also analyze what, if any, changes would occur to fire cycles and fire-fighting plans in the region resulting from the various alternatives. The Corps should also consider whether construction of the natural gas pipeline will lead to further tourism to see the pipeline and its adjacent lands, as with the Trans-Alaska Pipeline, and any impacts as a result thereof. The Corps also needs to analyze any impacts to wilderness values and lands. If there is any local opposition at any point along the proposed routes, the Corps must take that into consideration with regard to the desirability of those routes. The Corps is also encouraged to seek and take into account traditional knowledge of local residents at all locations along the proposed routes and areas it will affect when seeking baseline data and determining direct, indirect and cumulative impacts. The Corps and its cooperating agencies should conduct an in-depth analysis and comparison of waterfowl, wildlife and fish and subsistence values of the lands to be impacted by the construction of all possible pipeline alternatives. If there is insufficient information upon which to conduct this analysis, particularly field site visits conducted on the ground, such baseline information should be gathered and incorporated into the DEIS.

1. Common Pipeline Route

As noted previously, the Alaska Stand Alone Pipeline would generally follow the Dalton Highway, and essentially follow the Trans-Alaska Pipeline corridor to Livengood. This route would cross or parallel several major rivers and streams, including the Colville River, Itkillik River, Atigun River, Hammond River, Middle Fork Koyukuk River, and Yukon River, to name a few. It would pass between the Arctic National Wildlife Refuge and Gates of the Arctic National Park & Preserve as it passes through the Galbraith Lake area. These two parks are pristine Arctic wilderness areas, important for fish and wildlife habitat, subsistence use and recreational use. Further south, it would pass between Yukon Flats National Wildlife Refuge and Kanuti National Wildlife Refuge, and then near to White Mountains National Recreation Area. All impacts identified under Section III.D above should be considered for these areas. Additionally, the cumulative impacts of various other northern Arctic projects, planned and existing, must be considered, namely the roads to Umiat and Nome and any oil and gas production and development in the National Petroleum Reserve – Alaska ("NPRA").

2. The Parks Highway Alternative

As noted previously, the Parks Highway route would depart Livengood and proceed with new road constructed through the east side of Minto Flats within the Minto

Flats State Game Refuge that bypasses Fairbanks to the Parks Highway and follow it down to Wasilla. Any analysis should consider whether completely bypassing Fairbanks, and providing only a "lateral" line, is the best way and most cost-effective to deliver natural gas to the Fairbanks area. This route would cross or parallel several major rivers and streams, including, but not limited to, the Tanana River and Susitna River. It would pass through Denali National Park & Preserve, the most visited national park in Alaska, and Denali State Park. These two parks are part of a contiguous ecosystem, representing important fish and wildlife habitat, and providing valuable resources for subsistence use, recreational use and significant economic development through tourism. All impacts identified under Section III.D above should be considered for these areas.

3. The Richardson Highway Alternative

The Richardson Highway route would continue to Fairbanks, following the Richardson Highway to Delta Junction, to just north of Glennallen, and then follow the Glenn Highway to the Wasilla area. A considerable amount of the route departs from existing rights-of-way, namely the stretch of pipeline from just south of Station 10 of the Trans-Alaska Pipeline to Tolsona. Since this is area is undisturbed, baseline data and studies must be undertaken to assess the actual impacts of the project. This route would closely follow and cross the Tanana River, parallel the Matanuska River, and would parallel the important Copper River, one of the most important watersheds, for subsistence as well as commercial fishing, of salmon in the state. This route would also parallel the boundary of Wrangell-St. Elias National Park & Preserve and pass through Chugach State Park. While not directly involved in this route, the Chugach National Forest lies downstream along the Copper River and must be considered in all analyses. All impacts identified under Section III.D above should be considered for these areas.

4. Prudhoe Bay source versus Gubik Field source

One of the possible sources for gas identified in the State of Alaska's draft Plan of Development is Prudhoe Bay. While extraction from this natural gas source would involve fewer disturbances of pristine areas, the Corps should consider the direct and indirect impacts of a gas conditioning facility and pipeline outfall on the existing infrastructure, and how that infrastructure is capable of handling the new facility and pipeline. For the Gubik Field, the Corps should consider all socioeconomic, cultural, subsistence and ecological impacts identified in Section III.D. The cumulative impacts must be addressed on the Colville River and Utukok Special Areas in the National Petroleum-Reserve Alaska. The Corps should place considerable emphasis on analyzing cumulative impacts when evaluated in connection with the planned roads to Nome and Umiat.

In conclusion, we strongly urge the Corps to comply with NEPA requirements and take a thorough, hard look at the direct, indirect and cumulative impacts of such a large construction project and operation of such a pipeline. Given the vagueness of the defined purpose and need, it is difficult to provide more detailed scoping comments since the purpose and need generally dictate the issues for analysis and level of analysis required. Given the large number of rivers and streams that the pipeline will cross, and the valuable parks and refuges along all proposed routes, the Corps must adequately consider the risks to the environment, economy, subsistence, and wildlife involved in such a large construction project that will take considerable time to complete. Then, the Corps must address the long-term impacts as this pipeline will likely remain for 50-100 years.

Thank you for the opportunity to submit these scoping comments. If you have any questions, please contact me at (907) 276-4244, ext 115 or cjohnson@trustees.org.

Sincerely,

Carl H. Johnson
Staff Attorney

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
REGULATORY DIVISION
P.O. BOX 6898
ELMENDORF AFB, ALASKA 99506-0898

REPLY TO
ATTENTION OF:

MAR 22 2010

Regulatory Division
POA-2009-651

Mr. Robert Sattler
Tanana Chiefs Conference
122 First Avenue, Suite 600
Fairbanks, Alaska 99701-4897

Dear Mr. Sattler:

Thank you for your letter regarding the Alaska Stand Alone Pipeline (ASAP) Environmental Impact Statement (EIS). Your comments have been placed in the official record and will be given full consideration during the EIS development process.

Additionally, your contact information has been added to our EIS distribution list. You will receive newsletters and other information distributed throughout the EIS development process.

If you have any questions, you may contact Ms. Serena Sweet (Lead Project Manager, U.S. Army Corps of Engineers) by phone at (907) 753-2819, or toll free from within Alaska at (800) 478-2712, or by email at serena.e.sweet@usace.army.mil.

For additional information regarding the ASAP EIS process, please visit the project website at www.asapeis.com.

Sincerely,

Serena Sweet
Project Manager

APPENDIX F

Scoping Meeting Transcripts

Anchorage, Alaska

December 14, 2009

ALASKA STAND ALONE PIPELINE

ENVIRONMENTAL IMPACT STATEMENT

PUBLIC SCOPING MEETING

ANCHORAGE, ALASKA

SENIOR CENTER

December 14, 2009

P R O C E E D I N G S

(Anchorage, Alaska - 12/14/2009)

(Presentation)

(On record)

MR. LAKOSH: Questions?

MS. BENSON: Sure.

MR. LAKOSH: From the State's -- I've got several questions. The State isn't actually going to build this thing?

MS. BENSON: No, in fact I should have made that point. The State is just doing the pre-work, the -- to facilitate the purchase by private pipeline developers. Neither -- we will not -- the State -- I don't work for the State, the State won't be building the project, it'll be sold to pipeline development entities.

MR. LAKOSH: So all these costs for doing this are going to be recovered from the final.....

MS. BENSON: I don't know exactly how that works, but -- I don't know exactly how that works. We could -- we could find that out and get that back to you.

MR. LAKOSH: Well, I think.....

MS. BENSON: And the pipeline developer will not own the gas either, they will have to purchase the gas from local producers, they will just be building the pipeline.

MR. LAKOSH: So when is the open season supposed to be on this?

MS. BENSON: July, 2000 -- oh, this doesn't have an open season. This is different than the big line as I understand.

MR. KENDALL: Well, Tom, if I might. Are you telling me the gas coming out of the North Slope is not ours, are you telling me it belongs to the producers as opposed to being Alaskan gas?

MS. BENSON: No, who builds this pipeline will not own the gas that goes in it, they'll have to purchase it from the North Slope producers.

MR. KENDALL: I thought it was our gas. So we have no access to our gas, we're building a pipeline for somebody else, paying dividends for their gas?

MS. BENSON: This pipeline project that we're reviewing tonight in EIS is actually not about building the pipeline, we're -- the state of Alaska's not building the pipeline, it's going to be sold, this package of permits will be sold to someone or a company that wants to build the pipeline. We're just at the very beginning stages so this will be bundled up into a package of permits and environmental information and the project's builder will buy that and then build a pipeline assuming it's feasible.

MR. LAKOSH: Now what's the relationship -- I was told when I came in by the alumni that this wouldn't go through if the main line goes through. So is there a special relationship and is there a fixed relationship to the main line as far as go or no go, proceed or not proceed on this -- at least the northern half of this project or what?

MS. BENSON: If the big line is built in a timely way this would become a spur line to supply Anchorage's south side.

MR. LAKOSH: So.....

MS. BENSON: Because neither one of the big lines comes south. So.....

MR. LAKOSH: Well, the question is I'm worried about paying $3 billion in tariffs for a pipeline that becomes obsolete two years after it's built and has to be torn out. So what -- I'd like to know what -- is there anything in writing that creates a fixed relationship between -- you know, a decision point between the main line going through, how long you've got to wait for the main line to go through, how much delay and wait in the main line is an acceptable delay before this -- more than half of this project will go through?

MS. BENSON: Those are all really good questions. I don't have the answer to that. If the big line is built in a timely fashion and actually beats this construction schedule, then this would become a spur line off the big line. If it's not this project, if it receives all its permits and received the record of decision underneath us would be the line. So they're not linked.

MS. SWEET: And I -- from a corps of engineers standpoint I just wanted to speak to the corps requirements. One of the purposes of looking at all of these different aspects of the project is to incorporate into the analysis the possibility that the big line may or may not be constructed within a timely manner. So we're trying to cover all bases to make sure that if a big line does come on line in 10 years, it could become a spur line very easily without having to duplicate this environmental analysis, however if it does not come on line there's a backup plan that could be used to bring the gas south from the North Slope.

MR. LAKOSH: Well, that -- okay. So this is part of the alternatives decision that the corps is going to make?

MS. SWEET: Well, I guess alternatives speak to different projects that fit the purpose and need. If you're talking about a spur line that's a different purpose and need than say a stand alone line from the North Slope. What we're trying to make sure is that we include all the possibilities.

MR. LAKOSH: Well, that's the point here for the -- my beef -- you know, I could argue about a spur line too, but my biggest beef is building a $3 billion pipeline north of Fairbanks that is going to be obsolete with a 48. Nobody's going to put gas in a 24 line when they can get it cheaper out of a 48.

MS. SWEET: Certainly.

MR. LAKOSH: So why would we want -- why would the

State even pursue such a boondockle (ph) and what is the alternative process for looking at the alternative of 48 to Fairbanks versus a 24 to Fairbanks. Is there a firm position of the corps on that alternative and where is the breakdown on how much delay in development of the main line is acceptable before you permit this 24 inch line north of Fairbanks?

MS. SWEET: And there isn't a firm agreement or firm termination at this point, but one of the things we are looking at is the possibility of examining perhaps a large diameter line versus just a 24 inch line at this point, but we need that kind of input and this is -- this is exactly the kind of information we're looking at from the public and to incorporate in our analysis. So like I said we're very early on and we're trying to get all the feedback we can. So this is going to help us when we go down the road.

MR. LAKOSH: I mean how does the corps assess impediment to high velocity flow through the active layer above the permafrost. Most of this stuff north of Fairbanks is going to only have a few feet of active sub-strait, you know, it's going to be frozen two to three feet down and you're talking about blocking that cross flow across that area. What is the standard -- the corps of engineers standard regarding that, you may have to build below the line, can they -- is a berm above that active layer the preferred method, what -- what's the standard of construction?

MS. SWEET: At this point we don't have a stan -- a position on the standard of construction, but again any information you have, any ideas you have that we could look at, we're definitely looking for that kind of input. Did you have any other.....

MR. LAKOSH: So there's no standard for Arctic construction under the corps for -- in permafrost?

MS. SWEET: At this point we don't have a standard for permitting. We look at the project as proposed and receive public input.

MS. SWEET: Did you have any other comments or questions?

MR. LAKOSH: Oh, I got a lot. I'll give somebody else a chance.....

MS. SWEET: Okay. If you could just.....

MR. LAKOSH: They're all -- they're all on the dole here so I don't.....

MS. SWEET: Yeah. We -- do you mind stating your name at the beginning and coming to the mic so we make sure he can get it on the.....

MR. ROGERS: My name is Mike Rogers and I'll followup on the gentleman who just spoke concerns about everything from boondockles through environmental hazards. As I hear a presentation revolving around an alternative, either or, a preferred route versus an alternative route, I'm inclined to wonder if for whatever reasons brought up just a moment ago, boondockle or disaster for the environment, any reason, at this time can you preclude the possibility that there would be no pipeline, that it will either be a or be, or, is, in fact, it possible that the direct environmental impact statement will recommend do nothing?

MS. SWEET: One of the alternatives always examined in the development of an EIS is the no action alternative and that will be incorporated in the analysis so that will be put into the document and put forward for public comment also.

MR. KENDALL: Well, thank you. My name's Paul, middle initial P, Kendall. And I guess first of all I really -- you need to get some cameras, ladies and gentlemen. I -- these moments should be on camera going out to 700,000 people in Alaska so we can all be learning together. We miss these golden moments, everybody here will walk away feeling more intelligent than the next person and you should see -- the leaders should take trips to these classes and seminars. They come back thinking they're Einsteins and that we have no relevance. And by bringing a camera to these meetings we can -- we can educate everybody. And I think you're missing a golden opportunity, especially in the -- in the era of U-Tube and I'd like to see your questions go around repeatedly in turn.

And I guess my next question is I'd like to see an instrument, a legal instrument from the oil companies that says they're not going to use that TAPS line to move gas. I'm very concerned that TAPS line's two-thirds empty and I do not think any more oil is going to leave Alaska which is a bigger discussion. But if they had planned the demise of that pipeline through some technological reconstructs of the carbon and the hydrogen and are able to move it they will really have scooped everything here and all this is for naught. And I think the confusion lies in not having clear signals from the oil companies to us as a community.

And I'll -- I have lots of questions, but I'll wait for everybody to have a turn. And I'm really curious how many citizens are here as opposed to all you working groups, eight or 10 of you, I'm sure you all met together before. So I'd like to hear the little people's voices so instead of -- instead of hearing each one of you jump in because we're beginning to see that too, we have meetings and all the groups are being paid and it becomes this inside discussion and not us.

MR. LAKOSH: About this section through the Park, why are they going through the Park when they have a utility corridor.....

MS. SWEET: We'll just.....

MR. LAKOSH: My name's Tom Lakosh, L-A-K-O-S-H. What's this about going through the Park when there's clearly a powerline corridor on the other side of the road, can the State explain this?

MR. CARWILE: Well, there's also the state highway, the Parks Highway, going through the Park for about seven miles. And the intertie does take off from Carlo and heads across Theanner (ph), but then it diverges away from Healy Canyon and goes through some very ravine filled tributaries of the creek tributary to Healy Creek and comes out at Healy eventually in the coalmine area and powerplant. But it's a -- it's challenging country for a pipeline.

MR. LAKOSH: So they -- so technically since they're on the road they're in the Park and that's why they have to go through the Park permit process?

MR. CARWILE: Well, they -- if -- yes, they would need a permit both from DOT and the Park Service to go through the Park on the Parks Highway. But the.....

MR. RICE: Let me just clarify for the record that I'm Bud Rice and that was Steve Carwile with Denali National Park. I'm Bud Rice with the National Park Service.

And also if -- and the alternative looks at a route through the Park, we had to do a finding that -- we have a finding that indicates whether or not there is a prudent, feasible alternative outside the Park. Because one of the purposes for ANILCA which is the Alaska National Interest Lands Conservation Act, was to protect these conservation system units and we don't want to degrade them even for something as important to the state of Alaska as a gas line. But even if we had a finding that a route through the Park -- there was another alternative feasible route and I think there is one because that's the proposal, there could still be a decision by the Park Service if we get authorization from Congress to allow a gas pipeline through the Park, that there might be more benefits than adverse problems, in other words the national park would like to get natural gas to run its bus fleet, to heat buildings, et cetera, in the summer, and then even the superintendent's interested in having a route that's a little ways away from the road and it would be a bike path and you can lay the gas line underneath that. So there's some interest, but I'm not sure it outweighs the adverse impacts to the Park. We would go through that decision process.

MR. LAKOSH: Yeah, can we get all of the resource agencies, that put links on the -- Tom Lakosh -- to put links on the website for all of the applicable regulatory requirements so we can have a full set of regs that will allow us to look at -- you know, for scoping and EIS purposes or for the entire permitting process, not just the -- me, but EIS stuff.

MS. SWEET: That's an excellent suggestion, we'll definitely take that down to make sure that gets incorporated onto the website.

Other comments or questions?

MR. LAKOSH: Yeah, the -- like I said my primary concern -- Tom Lakosh again. The primary concern regarding this project is an obsolete northern half of the line that's going to cost us somewhere close to $3 billion to put in as opposed -- you know, right next to a -- the 48 inch line. And when I took a look at the plan before I came down here I noticed there was no removal and restoration for particularly hydrologic obstructions, river crossings, abutments, bridges, stuff like that. Isn't that a requirement for the EIS, I mean, isn't that a written prerequisite to have, you know, removal plans in place?

MS. SWEET: This is Serena Sweet for the corps. Yes, that is a requirement and it's something that we maybe don't have the details of just yet, but we are working on solving with the applicant. So that information will also be incorporated in the draft EIS, we just don't have it to date.

MR. LAKOSH: Well, wouldn't you check the application, is it sufficient for you without that in there?

MS. SWEET: Not necessarily.

MR. CARWILE: Is the question about the removal of the permitted facilities should they become obsolete?

MR. LAKOSH: Well, the river crossings, you can't leave an obstruction over a waterway, bridge abutments are going to obstruct the actual river flow, you're going to have a pipeline that's, you know, undoubtedly going to affect the hydrologic flow of the permafrost, you've got all kinds of problems here, you know, with leaving, you know, bridges, abutments, the piping some places, facilities, roads, you know, access road, all of things can become obsolete two years, a year, two years, three years after the northern half is built.

And I just don't understand, you know, why there isn't a set in stone relationship to the main line here and, you know, a fixed, you know, period of time of delay that is an acceptable delay, level of delay, say five years, say 2022 or something before you'll even okay a permit on this or the State will even go forward or any third party that's going to actually build this and I think the State, you know, ought to get serious here and not waste all these folks' time with a permitting process, they've got better things to do than to -- to review a phony EIS for a nonexistent project. And before you guys -- you know, we haven't even gotten to the open season yet and you guys are talking about duplicating the route, essentially building a 24 right next to a 48, for $3 billion. And the State ought to just withdraw the application and come back with a set, you know, relationship between the 48 and the 24 because this is a waste of everybody's time until we know what's going to go on here. I could see, you know, planning out a spur line, but clearly north of Fairbanks there's no reason to put these guys through a permitting process.

MR. CARWILE: So that could be a condition of the 48 inch line to hey, you remove the 24.

MR. LAKOSH: Yeah, right. So you better pay for Enstar.

MR. McDONNELL: I don't need a mic, I can speak without a mic. I'm just a private citizen, I don't belong to one of the sinister groups you're referring to here. And I appreciate all the -- I appreciate all the comments you're making, but, you know, Occam's Razor, are you familiar with that one, never make more assumptions than the minimum needed. I think all of a sudden you got way ahead of the game here and you're way up -- way out there. You know what these folks are trying to do is something that's very preliminary right now, just a governmental study to find out feasibility, you know, all of a sudden we're leaping way ahead here, years and years in advance. And you bring up some interesting points that I agree with you, but however I think we're -- instead of wasting a lot of time doing that, you know, what they're proposing here is trying to -- feasibility is just going to happen, we don't know it's going to happen, we don't know if anybody's going to buy the gas, we don't know if they're even going to make the thing, okay, going to build the line. But, again, don't make more assumptions than the minimum needed, (indiscernible) okay.

And I think if you keep that in mind and all the good points you brought up I think are well worth -- well worth consideration, you should think about them. But I don't see anything wrong with what's going on right now in just trying to find out if it's possible. I mean we've got -- the legislature in our State is behind this thing, okay, our economy of the state unfortunately is tied to oil and gas. And personally I would like to see us put more money toward research and development for more green technologies, but it just so happens that here in Alaska we seem to be stuck with this right now. And we're going to be in this position for the next two or three generations, we're not going to run out of oil in 50 years, we're not going to run out of oil perhaps even for 100 years. We should be thinking ahead, but right now this is just one little piece of the pie.

And that's my personal comment and I'm just an average citizen, I don't belong to any of you sinister groups, okay.

MS. SWEET: You want to state your name also.

MR. McDONNELL: Oh, Jerry McDonnell.

MS. SWEET: Thank you.

MR. KENDALL: Well, I don't know if it's sinister or not, but I do think my country's on a wayward path, I think Alaska's a very special place. I think we're obligated to raise these far reaching concerns, but I do understand your need to stay positive, okay, and to cheerlead which is what you're really talking about. And I'm for that, but it seems to me that if I'm in a quandary and I'm the average person, everybody else must be in a quandary too. And I don't understand the paralysis. And it would seem to me we would have put out a worldwide RFP in participates or a deed or an open -- open season. They come up with this trick techno -- tech terms and the stakeholders and things like that. We should have put out a list, a request for those people interested in gas and then we should be going from there. I don't think this chesting out if you will or this false sense of intimidation's going to work. And here's why I don't if I might. And I think this is an important discussion, both yours and Mr. Lakosh's, and I'm sure you folks, you gentlemen and ladies obviously could take up the whole night with just some smaller detailing.

But I'm concerned that Obama and the rest of the world is these boys are headed to de-carbon, don't you think for a minute they're not. So I'm talking this is a serious move here, the free enterprise market's coming with a force I've never seen before to move away from carbon. And here we are gambling everything on carbon and everything is set to leave. If you have not -- if you don't expect the oil -- the oil of Alaska's done for, ladies and gentlemen, it's never leaving Alaska again, 70 percent of that oil is used for transportation and the rest of the world if you'll go to my blog spot, mfh20magneticfields -- mfh20.(indiscernible).com.

So here's my concern, I want the oil companies here, I want them here building testimony that goes to a factual record that is introducible to a court for an action of law or accountability. We continue to have this discussion outside of the principals out of some fear based mentality. And the minute that you realize there is no more oil free money as has been constructed or gas quite frankly, then I think we can begin to rebuild Alaska and find its true value.

And I don't want to stay up here all night. I'm for a redundant line, a gas line, but I was under the impression it was our gas, our gas. I'm not going to pay Exxon $3 billion and some of the biggest corporations and the most influential corporations in the world to lay a pipeline for me so we can try to intimidate them while they run off somewhere else and I'm left, you know, with my people and their homes being hammered under some economic means of subjugation for Enstar and some bankers. Now so we need some reasonable discussions on this thing, but we need principals, we need those people who can be held to account with their public testimony as a matter of record. And the really sad thing I'm still -- it's so magnificent the time you're living in it's hard to shut me up because I feel like I should just -- if you could only see what's coming your way and how special you are, you're being diverted by all these trivial carbon conversations.

But if I might the carbon line would be a good line to lay in, that's what is -- it's a hydrogen with carbon line, in the event you have some catastrophic event that was unpredictable and the reason that bullet line is a good thing is because you represent a land with vast amounts of resources and special challenges and then those challenges are additional resources. So Obama should be here along with you and the oil companies and they should be defining for us our role and their participation along with the respective corps of army engineers and the budget overflow, oversight committees and we should be developing Alaska as a very, very special place. But somehow I -- we can't seem -- the oil seems to be so part and parceled out that we can seem to get traction. And I blame it on the oil companies because they are not coming forward. And when you get a relationship like that where it's not clearly defined or showing you the look, we know what that means and believe me if you don't know what it means you'll do some research, you'll see that they don't need us and they're preparing to go carbon free in all their operations. Vallero (ph) put in 33 wind farm -- wind turbines, they just did a big contract with renewable oils from Prada, your Alaskan tankers just went to all gas to all electric unloading in San Diego, BP just put in a big 180 mile underground electric cable to an offshore gas platform, took the gas off, put in electricity and put in direct cable from Norway and there was -- BP's involved in the EV project, if you look that up there's 11 cities that are going -- well, I'm going -- I'm going to get back to your pipeline. But I'm trying to show you that you're in the midst of some very special times here and what's happening is incredible, intelligent, loyal servants to the public are being distracted in some of these projects I think that are just not being well founded or well grounded in where we're going.

And again in closing -- let me say that a few more times, I'm real concerned about that pipeline, ladies and gentlemen, you can't lose $24 billion a year going two-thirds empty, I mean, it's -- it's -- it is for all practical purposes your TAPS line could shutdown, they can shut that baby down within the hour. If that's the case, that would be a coupd'tat if they could run those carbons through that pipeline and we need to know what their intentions are because all this other stuff is just diverting us.

Sorry for the long time, but.....

MS. SWEET: Any other comments or questions at this point? Anyone else have anything else before I.....

MR. LAKOSH: Comment.

MS. SWEET: Comments. Okay. One last comment and then we're going to close up, but we can chat more if that works.

MR. LAKOSH: Okay. A comment. The scope -- scoping should necessarily include alternative service of Fairbanks and points south through the Trans-Canada Pipeline, 48 inch main line as an alternative to the northern section. The alternatives that should be reviewed and evaluated should necessarily also include service of Fairbanks with propane truck from the North Slope and distributed through a pipeline system through a regas -- through a gassification of pipe -- pipeline distribution system for the Fairbanks area as opposed to our illustrious Mr. Ramos' concern that individual tanks might fail. In other words, distribution through a pipeline system, through gassification pipeline system won't gel because it's all buried and below the frost line. And for service of southcentral Alaska of importation of liquified natural gas, cancellation of the export license and exploration and production of the remaining 2 TCF of natural gas in the Cook Inlet region.

To the extent that there are going to be -- that the application and EIS must necessarily have a retirement, removal and restoration plan associated with it for removal of all obstructions to hydrological flows including all abutments and pikes within potential channel of all rivers and for all areas where there is hydrological flow, again active sub-strait above permafrost and such that that obstruction to flow in that circumstance be considered for the life of the physical presence of the pipeline. In other words, this pipeline may be there for 1,000 years and the change in permafrost levels may preclude putting -- may require building the pipeline, digging the pipeline much deeper to prevent hydrological obstruction in the future, it may require building a berm above and that may settle over long time reduction in permafrost, that there be an evaluation of the impacts to ecosystems from construction of a berm above the normal terrain, that there be a plan to most definitely remove all pipeline sections and physical facilities and structure after the useful lifetime and that includes under circumstances where the vast majority of flow through the 24 inch line is being better served by a 48 inch line so that the -- there be a cost benefit analysis be done as to the impact to -- the continued impact from minimal flows through the northern section of the pipeline where the pipeline no longer serves the original intended purpose of bringing 500 BCF or whatever or .5 BCF to Fairbanks and southcentral Alaska, there has to be a cutoff point where the flow -- sections that are not under active flow or under minimal flow be removed if they create an obstruction in adverse to hydrologic flow or other adverse environmental impact.

MS. SWEET: If you want we can chat more maybe with these other people and then we'll close up the meeting and we've got lots of time, we're going to be here until 8:00 o'clock and we'll just talk more if that's all right.

MR. LAKOSH: It's your meeting.

MS. SWEET: Thank you everyone, do we have any other quick comments or questions before I close it up formally?

MR. KENDALL: Can you stay on the microphone and continue to chat, just let those people leave, shut down the official meeting, it would be nice to talk with you and still.....

MS. SWEET: We can do that, yeah. Let's go -- maybe move to the edge of the room so that people can move out. Will that work? Let's keep the court reporter on for a few minutes until we've captured everything I think, this is good dialogue.

MR. KENDALL: I'd like to give another comment, but I'd like -- I want to hear other people, you know, we're all here to listen. If I might -- I would enjoy a casual conversation. I'd like to add to it if I might that this really needs to be looked at from a hydrogen shipping point of view.

And I'm surprised that Obama and Mr. Chew -- let me tell you something, ladies and gentlemen, these people come out of Chicago, these boys have seen every con game in the world. They're moving to new energies with a swiftness and dedication I've never seen in my lifetime. And the home unit, they're now putting out home units, MIT just patented a home unit that on five meters of water can run your entire home and drive 500 miles. So the new reasoning has to be around hydrogen. And if you're not checking all of this piping with some hydrogen flow contents of energy (indiscernible) I think you're making a mistake there. So.....

UNIDENTIFIED VOICE: Was it you who said you're all bureaucrats?

MS. SWEET: We're not all bureaucrats.

UNIDENTIFIED VOICE: I just see you as all people, myself and lots of other (indiscernible), I don't know.

MS. SWEET: I think at this point we'll go ahead and formally close the meeting. As I said most of us will still be here for a while and we can chat if you have any other questions or comments.

Thank you all for coming and this ends the presentation. Thank you.

(Off record)

(END OF PROCEEDINGS)

TRANSCRIBER'S CERTIFICATE

I, Salena A. Hile, hereby certify that the foregoing pages numbered 02 through 23 are a true, accurate, and complete transcript of proceedings, transcribed under my direction from a copy of an electronic sound recording to the best of our knowledge and ability.

DATE SALENA A. HILE

Nenana, Alaska

December 10, 2009

U.S. ARMY CORPS OF ENGINEERS

STATE OF ALASKA

ALASKA STAND ALONE PIPELINE (ASAP)
ENVIRONMENTAL IMPACT STATEMENT

PUBLIC HEARING AND PUBLIC COMMENT PERIOD

NENANA, ALASKA

DECEMBER 10, 2009

APPEARANCES:

MS. SERENA SWEET, U.S. Army Corps of Engineers

MR. MIKE SOTAK, ASRC Energy Services

* * * *

P R O C E E D I N G S

(Presentation given by Mr. Mike Sotak)

PUBLIC TESTIMONY

MS. SERENA SWEET: I think at this point, we'll open up the floor for comments and questions.

MR. JIM SACKETT: I have a question. Jim Sackett with Toghotthele Corporation, T-o-g-h-o-t-t-h-e-l-e. Jim, J-i-m, last name Sackett, S-a-c-k-e-t-t.

What impact would the large diameter pipeline that Denali and TransCanada are considering have in terms of impact on this? If those go, does the stand-alone -- has that been taken off the table, or is this going to be based on its own merits separate from that, or will the large diameter pipeline have an impact?

MR. MIKE SOTAK: If the stand-alone -- or if the big line were to go within a reasonable period of time, this stand-alone would fall -- would fold up and collapse. It doesn't make sense if the -- if the big line is going to go in a reasonable period of time for the stand-alone to go forward, because as I showed you on the first slide -- I don't know if you can go back to that -- we looked at the options of the spur lines from the big line.

And so our conclusion was that if the big line were to go within a reasonable period of time, let's say, 2020, -19, -20, -21, you wouldn't build a spur line -- or the stand-alone.

MR. JIM SACKETT: I thought you had a completion date of 2014 on this one.

MR. MIKE SOTAK: 2015.

MR. JIM SACKETT: 2015?

MR. MIKE SOTAK: We do.

MR. JIM SACKETT: So it would already have been built for four years?

MR. MIKE SOTAK: Well, it would -- we're going to see -- you know, all of this is going to be the same time that the open season is going to be occurring for both -- for the big line. And so you're going to have some sense of where the -- you are with the big line after the open season.

MR. JIM SACKETT: At Mile Post 39 at Beluga, does Enstar own the pipeline from there down?

MR. MIKE SOTAK: Enstar owns the whole -- they're the local distribution company for all natural gas in the Anchorage area.

MR. JIM SACKETT: So would they, in a sense, become a gatekeeper of sorts? You build this 700 miles of pipeline, but at the very end you turn control over to a private company?

MR. MIKE SOTAK: They would have to work out an arrangement with the purchasers of the gas from the North Slope, people who bought gas and are transporting it through the system. Then they would be -- they would be transporting within their own system to the same purchasers. They're a common carrier pipeline, so they must provide service, and they just have to provide their rates. Their rates are regulated.

The one thing I guess I didn't say to everybody -- I think we talked about it earlier -- is that this pipeline would be a common carrier pipeline, and whoever builds this project does not own the gas that's in the pipeline. Whoever builds this project is building it and will transport gas through it at -- for a cost.

MS. SERENA SWEET: Thank you, Mike. Were there any other questions at this point? Comments? Thank you all for coming.

(Off record)

(END OF PROCEEDINGS)

* * * *

C E R T I F I C A T E

UNITED STATES OF AMERICA)ss.
STATE OF ALASKA)

I, Elizabeth D'Amour, Notary Public in and for the State of Alaska, residing at Fairbanks, Alaska, and court reporter for Liz D'Amour & Associates, Inc., do hereby certify that the annexed and foregoing ALASKA STAND ALONE PIPELINE ENVIRONMENTAL IMPACT STATEMENT PUBLIC SCOPING MEETING was taken before Lynn DiPaolo on the 10th day of December, 2009, beginning at the hour of 12:00 o'clock p.m. at Nenana, Alaska; and thereafter transcribed by Lynn DiPaolo; that the hearing has been retained by me for the purpose of filing the same with U.S. Army Corps of Engineers, CEPOA-RD, P.O. Box 6898, Elmendorf AFB, Alaska, as required by the U.S. Army Corps of Engineers; that I am not a relative or employee or attorney or counsel of any of the parties, nor am I financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 29th day of December, 2009.

____

Elizabeth D'Amour

S E A L

Notary Public in and for Alaska

My commission expires: 12/28/2010

Fairbanks, Alaska

December 10, 2009

U.S. ARMY CORPS OF ENGINEERS

STATE OF ALASKA

ALASKA STAND ALONE PIPELINE (ASAP)
ENVIRONMENTAL IMPACT STATEMENT

PUBLIC HEARING AND PUBLIC COMMENT PERIOD

FAIRBANKS, ALASKA

DECEMBER 10, 2009

APPEARANCES:

MS. SERENA SWEET, U.S. Army Corps of Engineers

MR. MIKE SOTAK, ASRC Energy Services

* * * *

P R O C E E D I N G S

(Presentation given by Mr. Mike Sotak)

PUBLIC TESTIMONY

(No public testimony was given following the presentation)

* * * *

C E R T I F I C A T E

UNITED STATES OF AMERICA)ss.
STATE OF ALASKA)

I, Elizabeth D'Amour, Notary Public in and for the State of Alaska, residing at Fairbanks, Alaska, and court reporter for Liz D'Amour & Associates, Inc., do hereby certify that the annexed and foregoing ALASKA STAND ALONE PIPELINE ENVIRONMENTAL IMPACT STATEMENT PUBLIC SCOPING MEETING was taken before Lynn DiPaolo on the 10th day of December, 2009, beginning at the hour of 6:00 o'clock p.m. at Fairbanks, Alaska; and thereafter transcribed by Lynn DiPaolo; that the hearing has been retained by me for the purpose of filing the same with U.S. Army Corps of Engineers, CEPOA-RD, P.O. Box 6898, Elmendorf AFB, Alaska, as required by the U.S. Army Corps of Engineers; that I am not a relative or employee or attorney or counsel of any of the parties, nor am I financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 29th day of December, 2009.

____

Elizabeth D'Amour

S E A L Notary Public in and for Alaska

My commission expires: 12/28/2010

Denali Park, Alaska

December 11, 2009

U.S. ARMY CORPS OF ENGINEERS

STATE OF ALASKA

ALASKA STAND ALONE PIPELINE (ASAP)

ENVIRONMENTAL IMPACT STATEMENT

PUBLIC HEARING AND PUBLIC COMMENT PERIOD

DENALI PARK, ALASKA

DECEMBER 11, 2009

APPEARANCES:

MS. SERENA SWEET, U.S. Army Corps of Engineers

MR. MICHAEL SOTAK, ASRC Energy Services

* * * *

P R O C E E D I N G S

(Presentation given by Mr. Michael Sotak)

(On record)

PUBLIC TESTIMONY

MS. SERENA SWEET: I know a few of you came in a little bit after. We can fill you in maybe after this, but if -- does anyone have anything to add?

MR. CASS RAY: Could you take us back -- just for one second back to the slide that shows Glitter Gulch.

MS. TRICIA WAGGONER: It takes just a second.

MS. SERENA SWEET: This one?

MR. CASS RAY: Yes.

MS. SERENA SWEET: One more forward.

MS. TRICIA WAGGONER: You wanted the other one?

MR. CASS RAY: The next one.

MS. SERENA SWEET: Yes.

MR. CASS RAY: That's the one. Thank you.

AUDIENCE MEMBER: Is that the power line, the yellow line? The same route as the Intertie?

MS. SERENA SWEET: Is that yellow line the power line route?

MR. MICHAEL SOTAK: There will be a little bit of it along the power line, but not -- for the most part it probably won't. I would think that possibly right in this area here will be along the Intertie. But remember, the Intertie can go across large spans where you can't put pipelines. That's why, you know, the Intertie comes through what is -- what is the -- into this. The blue Intertie is here. Okay. Well, no, I'm sorry. This is.....

AUDIENCE MEMBER: That's not the intertie.

MR. MICHAEL SOTAK: What is that canyon? Moody -- I want to say Moody Creek. Is it Moody Canyon? Okay. Moody Canyon was looked at many years ago and dropped because of its difficulty of construction and terrain. You know, in a lot of areas you can put power lines across large spans, and you can do that through Moody Canyon, but you could not put a pipeline in there because you have the steep hills and ravines that go back and forth and back and forth and back and forth. And you're so isolated there, if you have an avalanche or something, the pipeline goes out, your whole supply to Anchorage is out for a long period of time, and you have no other option or alternative.

So this route is a very stable route and a very easy route, really to construct. Some people suggested that, yeah, it might be a difficult route. We looked at it, and it's very easy to move across.

AUDIENCE MEMBER: Is that a bridge?

MR. MICHAEL SOTAK: I'm sorry?

AUDIENCE MEMBER: Would it be a bridge?

MR. MICHAEL SOTAK: No. It will be open cut.

AUDIENCE MEMBER: I mean, under the Yanert?

MR. MICHAEL SOTAK: I'm sorry?

MS. PAT WINKLMANN: You'd be going under the Yanert?

MR. MICHAEL SOTAK: You would go in and excavate the river bottom, put the pipe in, and then cover it back up. And you just are -- you have to put the pipe in -- if it's solid rock, then it's easy to blast. You put the pipe in the trench, and then you cover it over, and that pipe is going to stay in that solid rock.

If it's material that's -- you know, that can't -- you know, erode, you just have to put it down deep enough so that you get away from the scour area. And open river crossings are the easiest way to do it and the most effective way, because once it's in underneath the river and placed -- and the banks were restored, you don't even know the pipeline is there. Yes.

AUDIENCE MEMBER: What are the Title 11 issues that you mentioned?

MR. MICHAEL SOTAK: Well Title 11, you know, a pipeline is -- under Title 11 -- you can do a lot of things under Title 11, but you can't put a pipeline into a National Park under Title 11.

MS. SERENA SWEET: Ron, would you mind giving us a few pointers on Title 11 requirements real quick.

MR. RON DUTON: A Title 11 allows transportation assistance to go through some of the conservation units that were created. In the case of Denali National Park, the Park Service is not authorized to grant a right of way for a pipeline. Therefore, the process -- it's still conceivable that it could happen, but it ends up going to Congress after a lengthy review, and then to the President for approval.

There is legislation that's been proposed by Senator Murkowski. It passed out of committee, it's part of a much larger bill. We have no idea if it's going to move. But there is legislation that would authorize the Park Service -- or give the Park Service authority to grant right of way. We would still have to go through the Title 11 process.

And that's one of the reasons we're looking at this as an alternative. If the legislation passes in time, the alternative could be accepted and go through the park. But it would have to pass prior to the Draft EIS. Because there's certain steps that -- either that or we'd have to start over the entire process.

MR. MICHAEL SOTAK: And the draft EIS would have to identify, as part of Title 11, that this is the preferred option to the other one. And a hearing would have to be held in Washington DC during the public hearing process. Those things would have to go forward to be in compliance with

Title 11.

MS. SERENA SWEET: And, sir, do you mind stating your name just so we can get that on the.....

MR. JOHN WINKLMANN: You bet. John Winklmann.

MS. SERENA SWEET: Thank you.

MR. JOHN WINKLMANN: I'm from Healy.

MS. SERENA SWEET: Excellent. Thank you very much. Other comments, questions?

MR. CASS RAY: Do you know what milepost the river will rejoin the highway there in the south? Do you know about what milepost that is?

MR. MICHAEL SOTAK: I don't, but right now we're -- right here is where we are at milepost -- what is it -- 2.....

MR. CASS RAY: 230.

MR. MICHAEL SOTAK: .....230, and this is roughly six miles from this point down to this point. So I would say this is probably about 235, 236, somewhere in there would be my guess.

AUDIENCE MEMBER: That's 224; the other direction. Yeah.

MR. MICHAEL SOTAK: I'm sorry. 224, 225. I'm doing the opposite.

AUDIENCE MEMBER: We understand it.

MS. SERENA SWEET: And, I'm sorry. Could we get your name, also, on the.....

MR. CASS RAY: Cass Ray.

MS. SERENA SWEET: Thank you. Do we have anyone else at this point? Well, we're going to be here for several more minutes, and there's information around the room if you want to take a look at that, and we can answer any questions you have. And like I said, thank you for coming, and we'll be here. Thank you.

(Off record)

(END OF PROCEEDINGS)

* * * *

C E R T I F I C A T E

UNITED STATES OF AMERICA)
) ss.
STATE OF ALASKA)

I, Crystal D. Scotti, Notary Public in and for the State of Alaska, residing at North Pole, Alaska, and court reporter for Liz D'Amour & Associates, Inc., do hereby certify:

That the annexed and foregoing ALASKA STAND ALONE PIPELINE ENVIRONMENTAL IMPACT STATEMENT PUBLIC SCOPING MEETING was taken before me on the 11th day of December 2009, beginning at the hour of 11:53 a.m., at Denali Park, Alaska;

That this hearing, as heretofore annexed, is a true and correct transcription of the hearing, taken by me and thereafter transcribed by me;

That the original of this hearing has been retained by me for the purpose of filing the same with the U.S. Army Corps of Engineers, CEPOA-RD, P.O. Box 6898, Elmendorf AFB, Alaska, as required by the U.S. Army Corps of Engineers;

That I am not a relative or employee or attorney or counsel of any of the parties, nor am I financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 7th day of January 2010.

____
Crystal D. Scotti
Notary Public in and for Alaska
My Commission Expires: 9/15/2010

S E A L

Barrow, Alaska

December 17, 2009

ALASKA STAND ALONE PIPELINE

ENVIRONMENTAL IMPACT STATEMENT

PUBLIC SCOPING MEETING

BARROW, ALASKA

HERITAGE CENTER

December 17, 2009

P R O C E E D I N G S

(Barrow, Alaska - 12/17/2009)

(On record)

(Invocation by Elder)

(Presentation)

MR. NAGEAK: How many fault lines long the.....

MS. SPRETER: I -- you know, I don't know. I don't have that answer. Does anybody here have the answer of exactly how many faults -- our person who's the expert in that is on his way to Hawaii. He's been going up and down this highway for over 30 years and I think he knows every fault.

MR. NAGY: You have mentioned in the past that there's potentially one in the Yukon River, which is the reason for the aerial crossing.....

MS. SPRETER: Right.

MR. NAGY: .....there, so that's at least two.

MS. SPRETER: Okay. There's two. Okay.

(Presentation continues)

MR. NAGEAK: Are there trees to be cut, willow, you know, and that other stuff or -- for the roads, and what would happen to all that.....

MS. SPRETER: It's restored.

MR. NAGEAK: Huh?

MS. SPRETER: It's -- anything that -- along the route, if I'm not mistaken.

MS. SWEET: The details of the restoration work have not been finalized, but input as far as what you would recommend would be good. We're going to be working on those details as we move through the process and.....

MR. NAGEAK: And what's the -- what's the width for that right-of-way?

MS. SWEET: I believe.....

MR. DUTTON: Fifty foot on federal -- fifty foot from BLM, 30 from the State, I believe, plus the width of the pipe.

MR. NAGEAK: How much?

MS. SPRETER: Going across State land it would be 30. If it's going across federal land, it's 50.

MR. DUTTON: Plus the width of the pipe.

MS. SPRETER: And then that one path I showed you where it would have reclaimed there, there's that one fault line that I showed you. Yes.

MR. HERREMAN: And in your corridors, you mentioned a 2000 foot wide corridor to start with, and then you said you're only doing 300 foot for your analysis for as far as wildlife impacts. So is your 2000 foot corridor, is that what's actually being -- what's the actual imprint during the construction?

MS. SWEET: The way this is being looked at is a 2,000 foot, it's a biological assessment corridor. That 300 foot corridor is speaking to the Watley's type survey. And then 100 foot corridor is the construction.....

MR. DUTTON: Yes.

MS. SWEET: .....corridor. So it's kind of necking down as you get more detailed to a smaller width, but they're still trying to incorporate the total footprint within the corridor so that additional data collection later on wouldn't be necessary if the pipe had been moved around a little bit within that -- when they do the actual design and engineering if it's just a light shift that's necessary, ideally it would be within that corridor.

MR. HERREMAN: And when you start looking at accuracy.....

MS. VORDERSTRASSE: Excuse me, can ask you the individuals asking questions to state their name and who they represent so that.....

MR. HERREMAN: I'm sorry.

MS. VORDERSTRASSE: .....we as a community who is speaking? Thank you.

MR. HERREMAN: Sorry. I'm Jason Herreman. I'm one of the biologists with the North Slope Borough.

REPORTER: Thank you.

MR. HERREMAN: So when you start talking about just raptor issues you know, you're looking -- you're looking at a half mile to a mile that you're required to stay away from some of these nests, so I'm kind of wondering why you're only looking at wildlife at a 300 foot corridor when you're going to be dealing with these issues directly on constructing this pipeline. I mean, that's -- just right there, that's one that just pops out right away for issues as far as wildlife.

MS. SWEET: Okay. And I think that's the kind of information that we're looking for is what sort of factors are going to be needed for the different agencies to make their -- their permitting decisions or different local decisions, so if you just provide us with that, that's -- we will take into consideration certainly.

Real quick before we move forward, I just have two other quick points I wanted to make. The scoping process, as I said, is one of the earliest processes in the development of environmental impact statement. I also wanted to point out the timing that we expect the draft environmental impact statement to be completed, and that will be in probably July of 2010. We expect public hearings on the draft environmental impact statement of August of that year. And finally I just want to put up some information on -- my contact information and other ways to submit comments. This information is also available in that folded handout in the back of the room, so if you want to grab one of those, you're welcome to have that all written down. At this point, I would like to open it up to public comment and question, and as I said, if you could state your name we'd appreciate that and go ahead.

MS. VORDERSTRASSE: Edith Vorderstrasse from UIC UMIAQ. The presentation that was just presented today, is that available.....

MS. SWEET: Yeah, that's available on our website. And it's actually on the link for scoping meetings, I believe at the bottom it can be downloaded. And that website is -- it's the one up there. It's also on that handout.

MR. NAGEAK: Is that -- is that where we can get that -- your presentation today?

MS. SWEET: Yeah. On that website on the link that says scoping meetings you can download these slides that we -- we gave today.

MR. NAGEAK: Okay. Good. This one on the top?

MS. SWEET: Yeah. And I can get you a handout too that has it also.

MS. VORDERSTRASSE: It's on this thing, the (In Inupiat) that we got at the door.

MR. NAGEAK: Okay.

MS. SWEET: Yeah.

MR. NAGEAK: Thank you. Okay.

MS. SWEET: There have been a few technical issues in the last few days with some of the items on the website, so give us a couple of days and it'll be ready. We've been on the road, so we haven't been able to deal with them maybe, but we'll have it up for sure. And if for reason it doesn't work, get a hold of me and I'll make sure you get a copy. If nothing else, we can get you a CD or something else to make sure you get it.

I also wanted to mention quickly the formal scoping period ends on February 5th. That's when we're going to cut off the comments accepted to be included within our scoping report. However, we will be accepting comments throughout the EIS process, so.....

MR. NAGEAK: So the -- I'm sorry.....

REPORTER: State your name.

MR. NAGEAK: Ben Nageak, BLM, Barrow. So the -- the agencies are working towards this project, they will be working on some of the issues themselves that might come up with the -- especially in the BLM area?

MS. SWEET: Right. The purpose of the environmental impact statement is ideally to get all of the information together in one place so that all the decision-makers can look at the same set of information and make educated decisions. Yes.

MR. JEMMING: Is the United States Fish and Wildlife going to be a cooperating agency as well? And this is -- my name is Jonny Jemming from North Slope Borough law department.

MS. SWEET: They have not signed on yet as a cooperating agency. That doesn't mean that they can't further on. There's no deadline to sign on as cooperating agency, but they have not yet indicated that they are interested in being involved.

MR. JEMMING: Okay.

MS. SWEET: Other comments or questions at this point?

MR. BROWER: In the August, later, in the impact statement, and then after, at a more appropriate, are you going to come back to Barrow with that information?

MS. SWEET: We will send out notifications when the draft EIS is done so that everybody will get a chance to take a look at it and then we'll come back after you've had -- I think it's a -- there's a waiting period of about a month that we give the individuals. And then we come back and we'll -- we'll let everybody talk about it and have another meeting and discuss your concerns or issues at that point. So we expect that to be in August, but, you know, the best laid plans don't always go -- things may -- may change. That's our anticipated date. Yes.

MR. JEMMING: This is Jonny Jemming again with the North Slope Borough law department. If we're on the record, we'll submit comments in writing as well, but some of the things that we've been asking from other agencies is that in an environmental planning and review is for health impact assessments of projects and included in health impact assessments are analyses related to impacts of air emissions that are connected to the action, possible water quality impacts that we know you'll be looking at anyway, but we want to have those directly tied into the public and community health, specifically when you're looking at disproportionate impacts to village communities such as whether it be areas like Nuiqsut or others. But we know that with air quality in particular that we have a lot of interest in knowing where additional emission sources will be occurring, because the concentrations in areas like Nuiqsut are elevated. And so we're trying to keep track of those trends as we look at the health impacts on those types of communities. So we would hope that you would look at those types of impacts.

And then we also have been asking for more indirect analyses on the possible habitat impact. And those, we'll get from wildlife and we'll submit them.

But the question that I have related to those comments is can you indicated to where you preliminary identified any compressor stations?

MS. SWEET: There -- there -- we're calling them compressor station envelopes at this point and actually within the -- I think it's the department of the army permit application, there's a set of maps that include the locations along the pipe where compressor stations could be. So take a look at those maps and that should give you an indication of a general area where they're proposed to be, the exact location and has not been finalized, so.....

MR. BROWER: Those compressor stations (indiscernible) that we can -- that you can give to the (indiscernible).....

MS. VORDERSTRASSE: Repeat the question. It's hard to hear you.

MS. SWEET: Yeah.

REPORTER: Speak up. Speak up, Arnold.

MS. SWEET: I think the question was related to is the compressor station going to be able to be used for LNG for smaller communities along the pipe or other.....

MR. BROWER: Private.

MS. SWEET: .....private entities?

MR. BROWER: Entrepreneurs that want to sell the (indiscernible) gas?

MS. SWEET: I think at this point that's not part of the proposal, but I don't think it's restricted, but -- and that's a good question and we're -- I think it's something that the State needs to -- to consider. And but if you wanted to include -- we'll include this in our comments so that they can definitely consider it.

MR. BROWER: For my area -- it's coming up on my area and that we're -- we certainly would like to be enjoying some benefit as the State.

MS. SWEET: Certainly.

MR. BROWER: And not pay $9 a gallon for our (indiscernible).

MS. VORDERSTRASSE: Please speak up.

MS. SWEET: Other comments or questions at this point? Yes.

MR. JEMMING: Relating to the comment just provided, we also -- one of the comments that we'll also submit in writing to have on the record is relating to Executive Order 12898, an environmental justice analysis and talking about benefits to communities that will obviously be suffering some of the impacts of any possible impacts to be occurring; but Executive Order

12898 would ask that you -- and we would encourage you to look at an environmental justice analysis, identify possible benefits to the communities to offset any disproportional impacts, especially since we have a lot of indicators that these types of actions may have possible impacts on subsistence use. So we try to identify other ways to mitigate that.

MS. SWEET: Other comments or questions?

(No comments)

MS. SWEET: I think we're -- we're going to be here and we're giving this same presentation starting at 5:00 o'clock for those of you who may have come in a little bit late. But in the meantime we'll be here answering questions and be available.

So thank you for all for coming.

We really appreciate and thank you.

(Off record)

(END OF PROCEEDINGS)

TRANSCRIBER'S CERTIFICATE

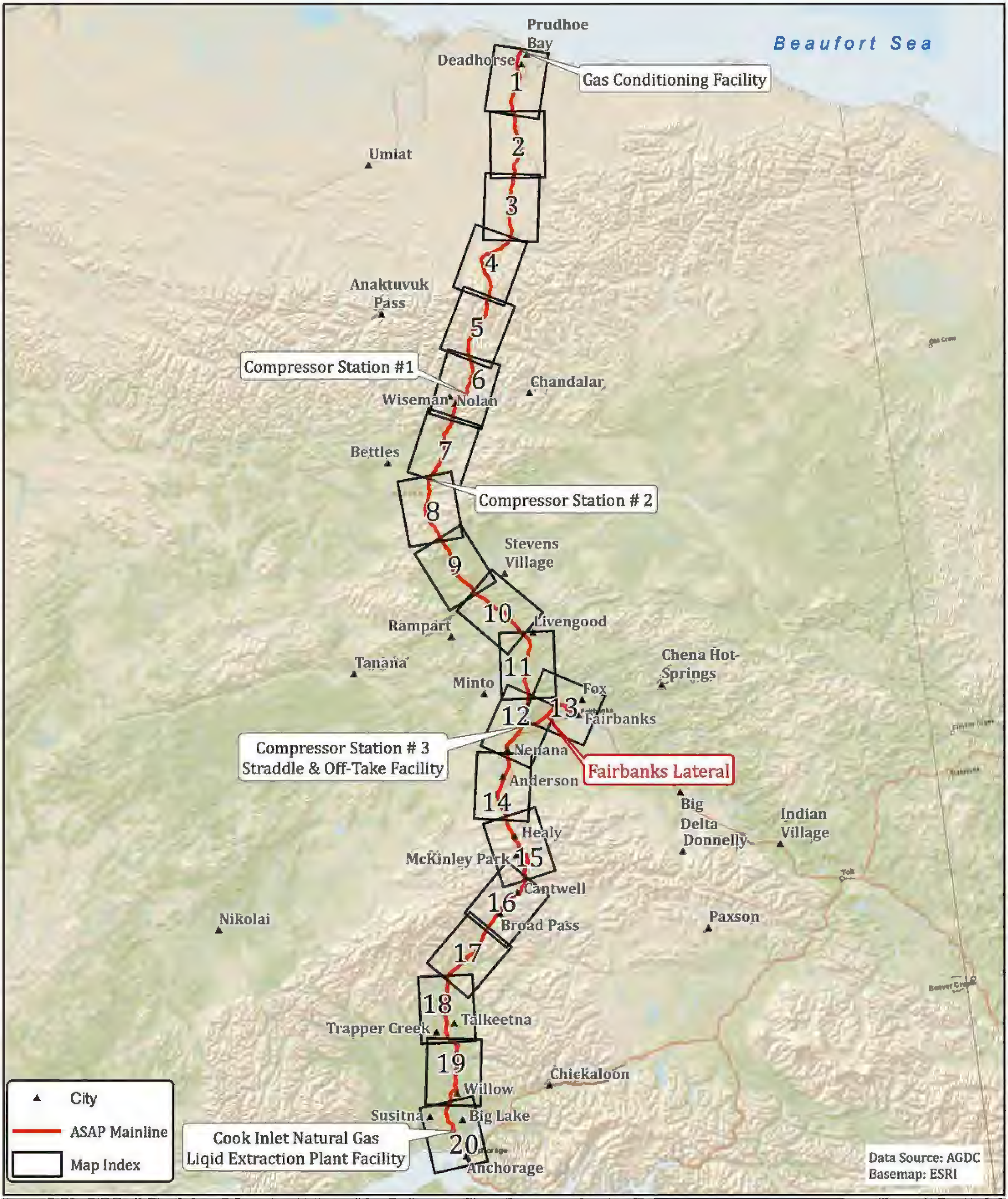
I, Salena A. Hile, hereby certify that the foregoing pages numbered 02 through 11 are a true, accurate, and complete transcript of proceedings, transcribed under my direction from a copy of an electronic sound recording to the best of our knowledge and ability.

______________________ ______________________________

DATE SALENA A. HILE

Appendix C

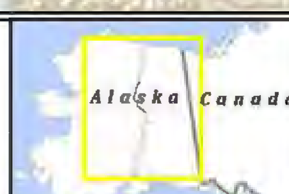
Project Maps



N

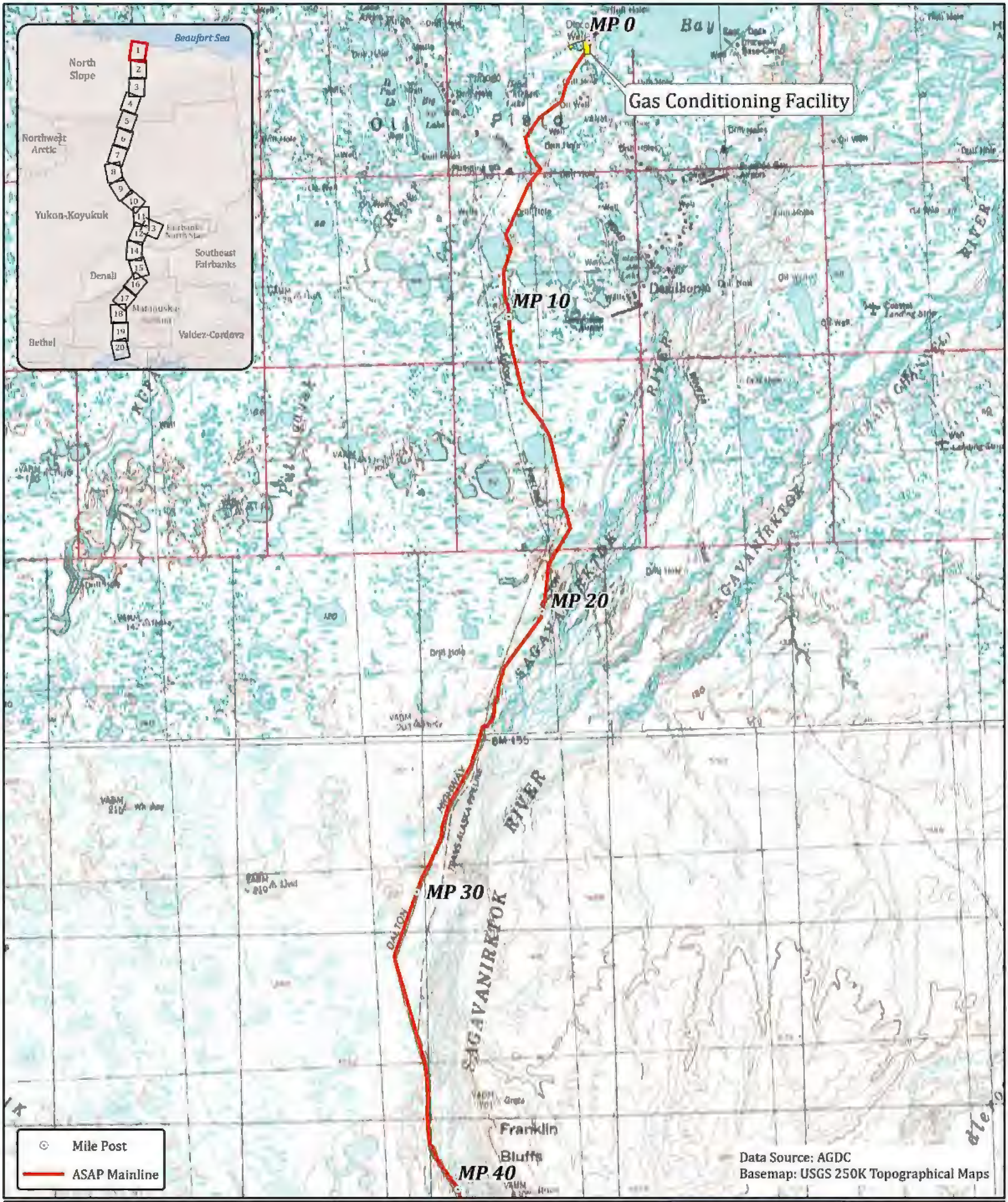
Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 50 100 Miles



May 2012

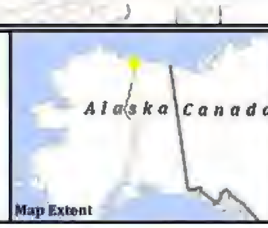
NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles



May 2012

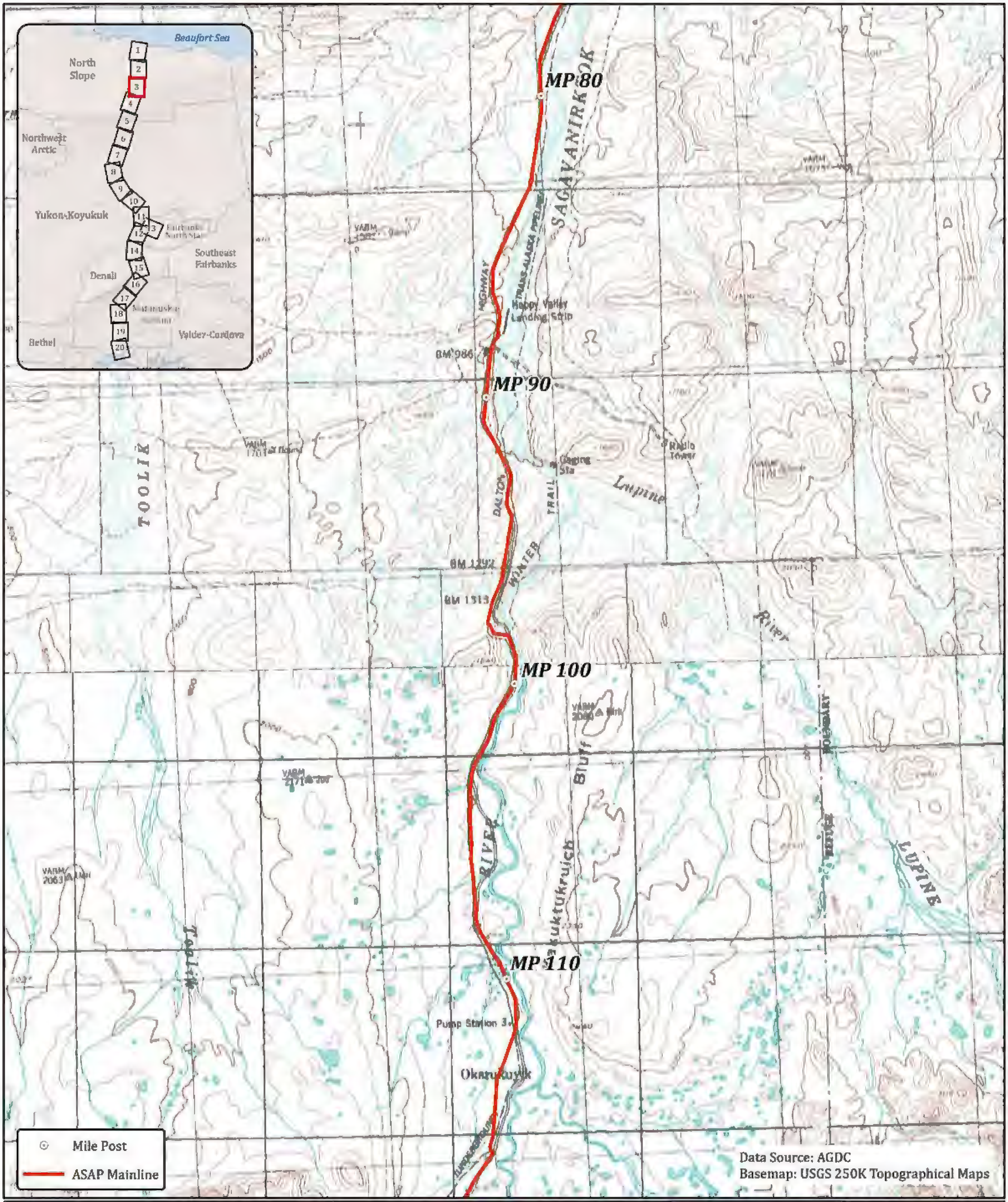
NAD 1983 State Plane Alaska

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska



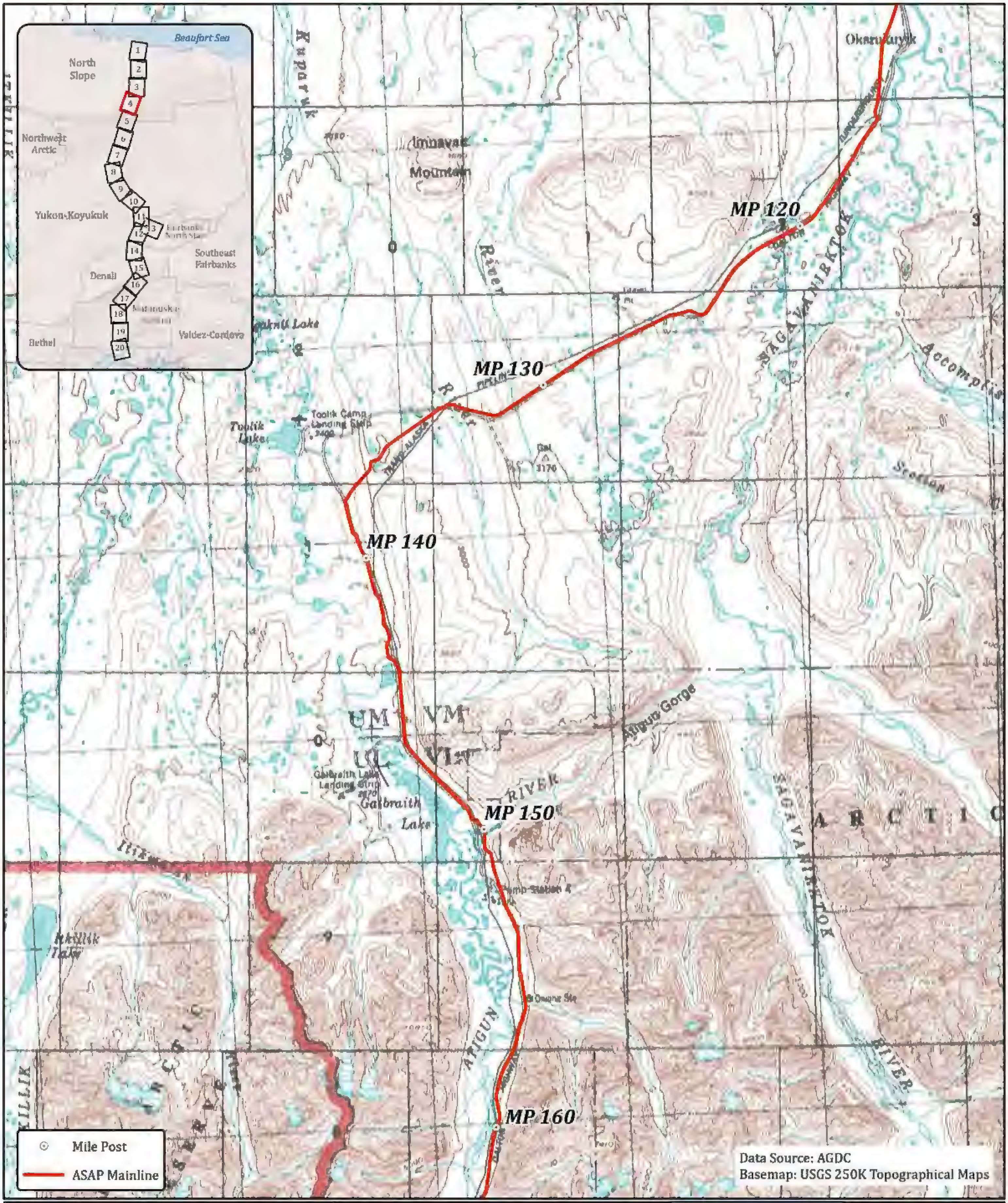
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Page 4 of 20

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

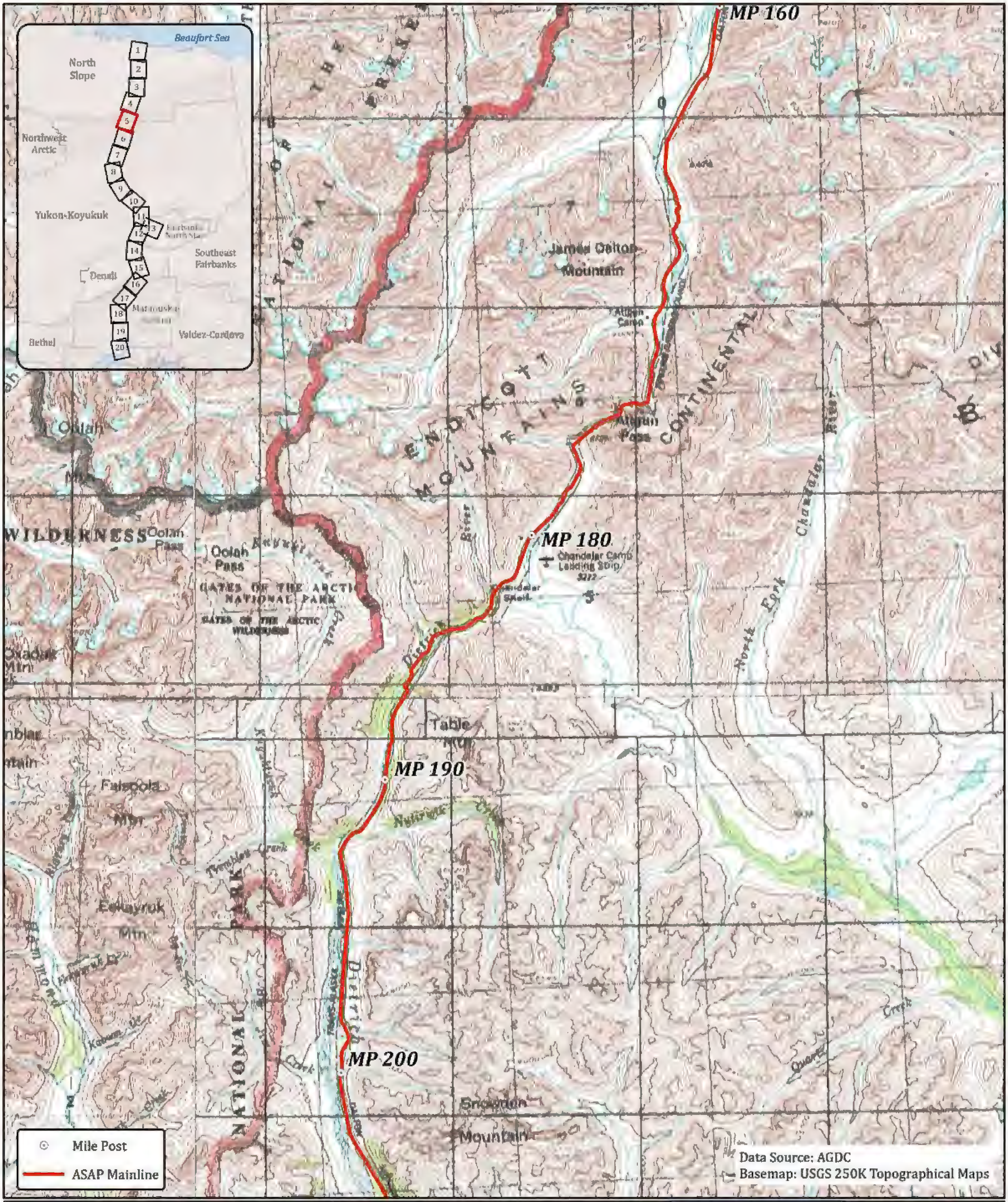
0 2.5 5 Miles

Alaska Canada

Map Extent

May 2012

NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

Alaska Canada
Map Extent

May 2012

NAD 1983 State Plane Alaska

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

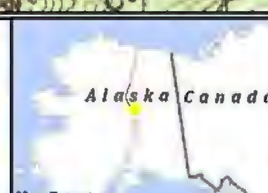
May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles



May 2012
NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 2.5 5 Miles

May 2012

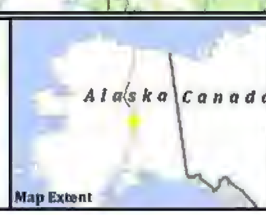
NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Page 12 of 20

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles



May 2012
NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Page 13 of 20

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

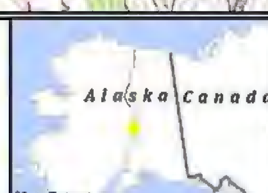
NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Page 14 of 20

Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 2.5 5 Miles



May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

N

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

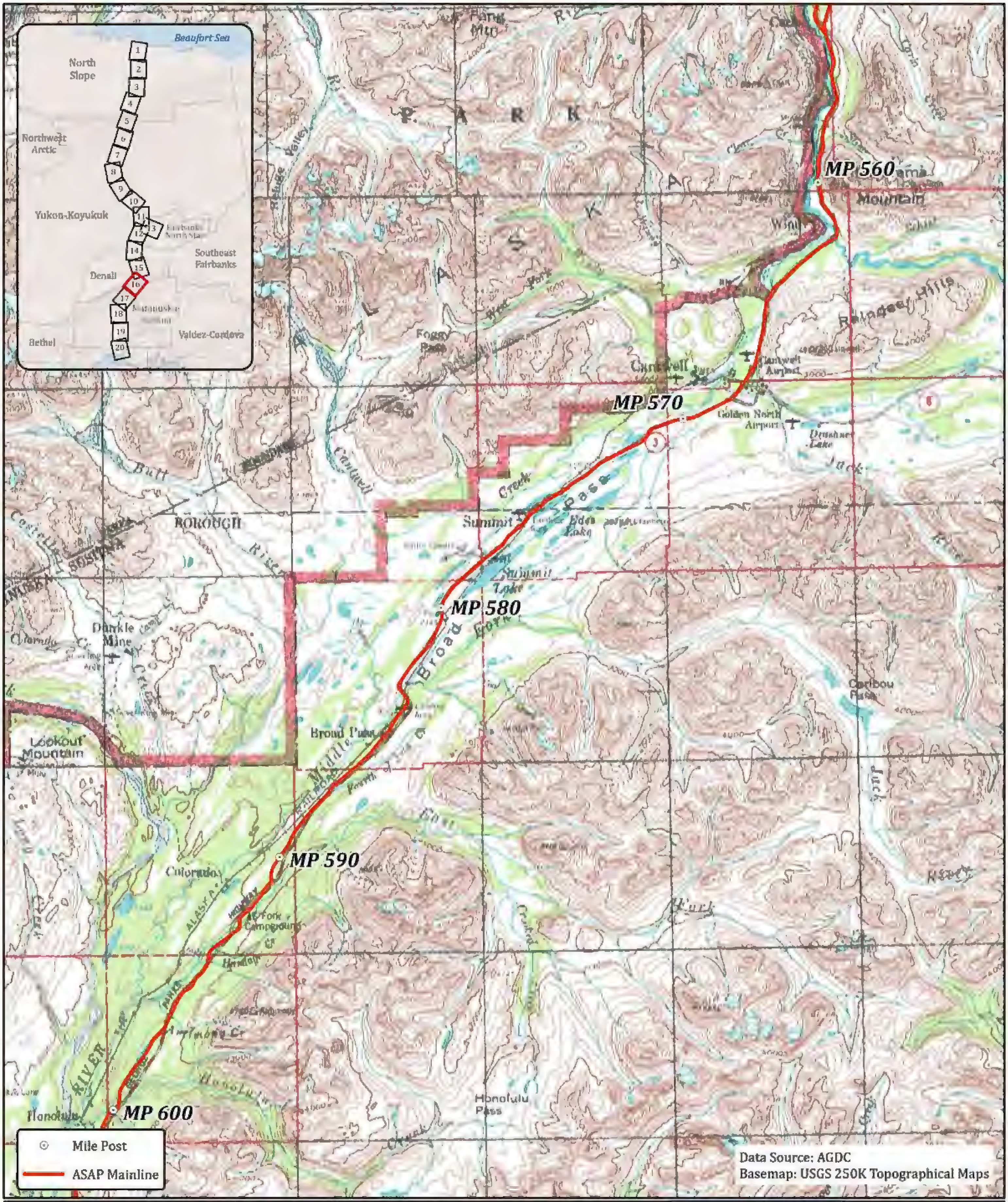
0 2.5 5 Miles

Alaska Canada

Map Extent

May 2012

NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline Proposed Project USGS Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Proposed Project USGS
Topographical Maps Index

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska

Appendix D

Access Roads

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-P-5.54	MP-P-5.54	New	Permanent	Gravel	Spine Rd.	-148.60727	70.24553	2,430.9	Laydown yard 1
AR-P-20.00	MP-P-20.00	New	Permanent	Gravel	James Dalton Hwy	-148.59348	70.05539	506.4	Block Valve 1
AR-P-30.61	MP-P-30.61	New	Temporary	Ice	James Dalton Hwy	-148.77795	69.91971	67.7	
AR-P-35.46	MP-P-35.46	New	Temporary	Ice	James Dalton Hwy	-148.76485	69.85284	102.7	
AR-P-40.00	MP-P-40.00	New	Permanent	Gravel	James Dalton Hwy	-148.72250	69.79116	49.0	Block Valve 2
AR-P-41.66	MP-P-41.66	New	Permanent	Gravel	James Dalton Hwy	-148.70611	69.76783	84.8	
AR-P-45.00	MP-P-45.00	New	Permanent	Gravel	James Dalton Hwy	-148.70960	69.72112	100.4	Laydown yard 2
AR-P-48.29	MP-P-48.29	New	Temporary	Ice	James Dalton Hwy	-148.70642	69.67428	91.4	
AR-P-53.36	MP-P-53.36	New	Temporary	Ice	James Dalton Hwy	-148.64415	69.60527	157.7	
AR-P-60	MP-P-60	New	Permanent	Gravel	Dalton Hwy	-148.58025	69.51227	44.7	Block Valve 3
AR-P-67.06	MP-P-67.06	New	Temporary	Ice	James Dalton Hwy	-148.65697	69.42702	389.0	
AR-P-80.16	MP-P-80.16	New	Permanent	Gravel	Dalton Hwy	-148.76869	69.26068	91.7	Block Valve 4
AR-P-91.93	MP-P-91.93	Existing	Temporary	Gravel	James Dalton Hwy	-148.83057	69.09687	70.3	
AR-P-98.66	MP-P-98.66	Existing	Permanent	Gravel	James Dalton Hwy	-148.82127	69.01038	134.4	Block Valve 4
AR-P-717.17	MP-P-100	New	Permanent	Gravel	Dalton Hwy	-148.81705	68.99158	154.3	Block Valve 5
AR-P-106.73	MP-P-106.73	Existing	Permanent	Gravel	James Dalton Hwy	-148.86871	68.89920	776.6	
AR-P-108.54	MP-P-108.54	Existing	Permanent	Gravel	James Dalton Hwy	-148.86239	68.87445	209.3	

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	Mile Post	Status	Type	Material	Route Name	Longitude	Latitude	Length (feet)	Comments
AR-P-110.98	MP-P-110.98	Existing	Permanent	Gravel	James Dalton Hwy	-148.82211	68.84267	256.4	APL Pump Station #3
AR-P-120	MP-P-120	New	Permanent	Gravel	Dalton Hwy	-148.95681	68.72775	68.4	Block Valve 6
AR-P-133.5	MP-P-133.5	Existing	Permanent	Gravel	Dalton Hwy	-149.41306	68.64667	343.7	
AR-P-140	MP-P-140	New	Permanent	Gravel	Dalton Hwy	-149.50800	68.57789	64.6	Block Valve 7
AR-P-145.99	MP-P-145.99	Existing	Permanent	Gravel	James Dalton Hwy	-149.46161	68.49603	101.5	Galbraith Lake access road
AR-P-146.75	MP-P-146.75	New	Permanent	Gravel	James Dalton Hwy	-149.44835	68.48680	80.2	Laydown yard 5
AR-P-160	MP-P-160	New	Permanent	Gravel	Dalton Hwy	-149.35272	68.31622	46.6	Block Valve 8
AR-P-160.8	MP-P-160.8	Existing	Permanent	Gravel	James Dalton Hwy	-149.36009	68.30389	48.3	
AR-P-170.7	MP-P-170.7	New	Permanent	Gravel	James Dalton Hwy	-149.43280	68.17543	84.4	Block Valve 7
AR-P-176.48	MP-P-176.48	New	Permanent	Gravel	James Dalton Hwy	-149.53704	68.11337	1,169.9	
AR-P-179.9	MP-P-179.9	New	Permanent	Gravel	Dalton Hwy	-149.58711	68.07496	81.6	Block Valve 9
AR-P-192.76	MP-P-192.76	New	Temporary	Gravel	James Dalton Hwy	-149.82481	67.93061	92.5	
AR-P-193.27	MP-P-193.27	New	Permanent	Gravel	James Dalton Hwy	-149.82349	67.92322	40.3	
AR-P-199.9	MP-P-199.9	New	Permanent	Gravel	Dalton Hwy	-149.82570	67.82933	158.1	Block Valve 10
AR-P-202.59	MP-P-202.59	Existing	Permanent	Gravel	James Dalton Hwy	-149.80628	67.79223	268.7	
AR-P-210.5	MP-P-210.5	New	Permanent	Gravel	James Dalton Hwy	-149.72568	67.68392	62.4	
AR-P-215.68	MP-P-215.68	New	Temporary	Gravel	James Dalton Hwy	-149.78767	67.62254	334.1	New access road to Extra temporary

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
									workspace, aded 3/30/10
AR-P-219.9	MP-P-219.9	New	Permanent	Gravel	Dalton Hwy	-149.82429	67.56587	35.6	Block Valve 11
AR-P-228.56	MP-P-228.56	New	Temporary	Gravel	James Dalton Hwy	-149.96593	67.46919	59.2	
AR-P-239.9	MP-P-239.9	New	Permanent	Gravel	Dalton Hwy	-150.14340	67.33965	43.1	Block Valve 12
AR-P-251.5	MP-P-251.5	Existing	Permanent	Gravel	Dalton Hwy	-150.27814	67.19599	85.4	
AR-P-257.05	MP-P-257.05	Existing	Permanent	Gravel	James Dalton Hwy	-150.35689	67.14120	5,299.3	
AR-P-259.9	MP-P-259.9	New	Permanent	Gravel	Dalton Hwy	-150.34996	67.08781	40.1	Block Valve 13
AR-P-267.57	MP-P-267.57	Existing	Permanent	Gravel	James Dalton Hwy	-150.30152	66.99244	65.5	
AR-P-276.08	MP-P-276.08	New	Temporary	Gravel	James Dalton Hwy	-150.47973	66.89743	208.6	
AR-P-279.9	MP-P-279.9	Existing	Permanent	Gravel	Dalton Hwy	-150.57827	66.84633	485.1	Block Valve 14
AR-P-279.9	MP-P-279.9	New	Permanent	Gravel	Dalton Hwy	-150.56335	66.84760	6,630.5	Block Valve 14
AR-P-289.14	MP-P-289.14	Existing	Temporary	Gravel	James Dalton Hwy	-150.68322	66.74734	5,925.6	MP and AR edited 2/22/10, Access road length cut short due to existing road
AR-P-291	MP-P-291	Existing	Permanent	Gravel	James Dalton Hwy	-150.66692	66.71714	1,434.3	
AR-P-293.68	MP-P-293.68	Existing	Permanent	Gravel	James Dalton Hwy	-150.65949	66.68585	1,987.0	
AR-P-295.01	MP-P-295.01	Existing	Permanent	Gravel	James Dalton Hwy	-150.66188	66.66574	666.0	
AR-P-295.45	MP-P-295.45	Existing	Permanent	Gravel	James Dalton Hwy	-150.66670	66.65791	1,671.3	
AR-P-297.6	MP-P-297.6	Existing	Permanent	Gravel	James Dalton Hwy	-150.67748	66.62996	950.3	

ASAP Appendix D Final Access Road Table (09-13-12)

Mainline Access Roads									
Name	Mile Post	Status	Type	Material	Route Name	Longitude	Latitude	Length (feet)	Comments
AR-P-301.11	MP-P-301.11	Existing	Permanent	Gravel	James Dalton Hwy	-150.76097	66.58393	9,985.2	Field verify if we can cross TAPS, Access road length cut short due to existing road
AR-P-304.64	MP-P-304.64	New	Permanent	Gravel	James Dalton Hwy	-150.72529	66.53423	497.4	Block Valve 13
AR-P-305.6	MP-P-305.6	Existing	Permanent	Gravel	Dalton Hwy	-150.74015	66.51960	6,535.1	Block Valve 15
AR-P-305.6	MP-P-305.6	New	Permanent	Gravel	Dalton Hwy	-150.71691	66.51812	661.8	Block Valve 15
AR-P-310.1	MP-P-310.1	New	Temporary	Gravel	James Dalton Hwy	-150.65463	66.46669	135.6	
AR-P-323.81	MP-P-323.81	Existing	Permenant	Gravel	James Dalton Hwy	-150.40044	66.30546	52.5	Block Valve 14
AR-P-325.6	MP-P-325.6	New	Permanent	Gravel	Dalton Hwy	-150.36275	66.28092	32.0	Block Valve 16
AR-P-335.74	MP-P-335.74	Existing	Temporary	Gravel	James Dalton Hwy	-150.19433	66.15995	67.8	
AR-P-339.8	MP-P-339.8	New	Permanent	Gravel	Elliot Hwy	-148.60131	65.02655	47,188.2	Block Valve 22
AR-P-345.6	MP-P-345.6	New	Permanent	Gravel	Dalton Hwy	-150.11901	66.02533	56.4	Block Valve 17
AR-P-347.6	MP-P-347.6	Existing	Permanent	Gravel	James Dalton Hwy	-150.08733	66.00884	1,846.0	
AR-P-355.86	MP-P-355.86	Existing	Permanent	Gravel	James Dalton Hwy	-149.86751	65.93771	2,888.9	Laydown Yard 9, footprint added 2/17/10, MP and AR edited 2/22/10
AR-P-360	MP-P-360	New	Permanent	Gravel	Dalton Hwy	-149.75141	65.89344	36.7	
AR-P-365.78	MP-P-365.78	New	Permanent	Gravel	James Dalton Hwy	-149.64863	65.83608	1,547.8	
AR-P-368.21	MP-P-368.21	Existing	Permanent	Gravel	James Dalton Hwy	-149.57074	65.82128	523.7	existing road is 25 feet wide, will need to be widened
AR-P-372.89	MP-P-372.89	Existing	Temporary	Gravel	James Dalton Hwy	-149.43935	65.78443	759.0	

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-P-380	MP-P-380	New	Permanent	Gravel	Dalton Hwy	-149.24624	65.71695	1,446.3	
AR-P-382.65	MP-P-382.65	Existing	Permanent	Gravel	James Dalton Hwy	-149.17931	65.70582	1,072.3	Block Valve 16
AR-P-385.34	MP-P-385.34	Existing	Permanent	Gravel	James Dalton Hwy	-149.09540	65.68738	229.8	
AR-P-387.13	MP-P-387.13	Existing	Permenant	Gravel	James Dalton Hwy	-149.06161	65.66746	5,092.8	
AR-P-400.05	MP-P-400.05	Existing	Permanent	Gravel	James Dalton Hwy	-148.80793	65.51804	3,329.3	In-State Compressor Station #7
AR-P-405	MP-P-405	New	Permanent	Gravel	Elliot Hwy	-148.66270	65.47958	754.0	Block Valve 20
AR-P-406.28	MP-P-406.28	New	Permanent	Gravel	Elliot Hwy	-148.63902	65.46863	586.8	Laydown yard 10
AR-P-412.5	MP-P-412.5	New	Temporary	Gravel	Elliot Hwy	-148.54321	65.37728	16,920.7	Wilber Creek Extention Road
AR-P-417	MP-P-417	New	Permanent	Gravel	Elliot Hwy	-148.66541	65.31934	11,619.6	Block Valve 17
AR-P-419.8	MP-P-419.8	New	Permanent	Gravel	Elliot Hwy	-148.66153	65.33217	38,967.1	Wilber Creek Extention Road, Block Valve 21
AR-P-434.76	MP-P-434.76	New	Permanent	Gravel	Elliot Hwy	-148.14042	65.21697	111,705.6	Block Valve 18
AR-P-441.87	MP-P-441.87	New	Permanent	Gravel	Murphy Dome Rd	-148.20715	64.90999	108,094.8	AR- Murphy Dome Road, Status, Access road length cut short due to existing road
AR-P-458.23	MP-P-458.23	New	Permanent	Gravel	Parks Hwy	-148.93446	64.66916	43,642.3	
AR-P-475.94	MP-P-475.94	Existing	Temporary	Gravel	Parks Hwy	-149.10119	64.56347	288.2	
AR-P-478	MP-P-478	New	Permanent	Gravel	Parks Hwy	-149.09887	64.53642	335.3	Block Valve 24
AR-P-481.6	MP-P-481.6	New	Permanent	Gravel	Parks Hwy	-149.08637	64.48017	858.0	Block Valve 20 Existing access road- No work required

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-P-498	MP-P-498	Existing	Permanent	Gravel	Parks Hwy	-149.22247	64.25565	2,901.6	Block Valve 25
AR-P-498	MP-P-498	New	Permanent	Gravel	Parks Hwy	-149.21380	64.25676	6,995.3	Block Valve 25
AR-P-511.24	MP-P-511.24	Existing	Permanent	Gravel	Parks Hwy	-149.22693	64.09245	82.2	Block Valve 22
AR-P-518	MP-P-518	Existing	Permanent	Gravel	Parks Hwy	-149.13751	64.00444	172.3	Block Valve 26
AR-P-523.32	MP-P-523.32	Existing	Temporary	Gravel	Parks Hwy	-149.10571	63.93653	78.2	
AR-P-523.56	MP-P-523.56	Existing	Temporary	Gravel	Parks Hwy	-149.10050	63.93389	172.1	Existing road is 13 feet wide
AR-P-528.94	MP-P-528.94	New	Permanent	Gravel	Parks Hwy	-149.02290	63.86794	188.7	Laydown yard 11
AR-P-532.33	MP-P-532.33	Existing	Permanent	Gravel	Parks Hwy	-148.99007	63.82300	58.7	Existing road is 30' wide
AR-P-534.57	MP-P-534.57	New	Permanent	Gravel	Parks Hwy	-148.93588	63.80363	1,331.9	Access road to Nenana xing at rex, crossing the RR tracks, added 3/30/10
AR-P-534.87	MP-P-534.87	New	Permanent	Gravel	Parks Hwy	-148.92155	63.79327	2,829.7	Access road to Nenana River at Rex, added 3/30/10
AR-P-537	AR-P-537	New	Permanent	Gravel	Parks Hwy	-148.91146	63.77003	43.5	Block Valve 27
AR-P-547.54	MP-P-547.54	New	Permanent	Gravel	Parks Hwy	-148.77391	63.65173	4,160.0	New access road extension to the existing Yanert road, added 3/30/10
AR-P-557	MP-P-557	New	Permanent	Gravel	Parks Hwy	-148.80170	63.52232	100.7	Block Valve 28
AR-P-568.28	MP-P-568.28	Existing	Permanent	Gravel	Parks Hwy	-148.91251	63.38670	906.0	Laydown yard #11
AR-P-570.23	MP-P-570.23	New	Permanent	Gravel	Parks Hwy	-148.96338	63.37446	119.2	In-State Compressor Station #10
AR-P-577	MP-P-577	New	Permanent	Gravel	Parks Hwy	-149.14699	63.31956	94.2	Block Valve 29

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-P-588.9	MP-P-588.9	Existing	Permanent	Gravel	Parks Hwy	-149.36246	63.18811	60.2	
AR-P-597	MP-P-597	New	Permanent	Gravel	Parks Hwy	-149.50307	63.09521	23.0	Block Valve 30
AR-P-603.98	MP-P-603.98	New	Temporary	Gravel	Parks Hwy	-149.59228	63.01309	173.4	South Bank Hurricane Gulch
AR-P-617	MP-P-617	New	Permanent	Gravel	Parks Hwy	-149.83809	62.87492	85.6	Block Valve 31
AR-P-630.45	MP-P-630.45	New	Temporary	Gravel	Parks Hwy	-150.12904	62.74755	100.0	
AR-P-637	MP-P-637	New	Temporary	Gravel	Parks Hwy	-150.23313	62.67252	61.1	Block Valve 32
AR-P-644.98	MP-P-644.98	Existing	Permanent	Gravel	Parks Hwy	-150.23194	62.56644	111.5	AR North Chulitna River Bank, MP and AR edited 2/22/10
AR-P-651.3	MP-P-651.3	Existing	Temporary	Gravel	Parks Hwy	-150.27548	62.48288	87.3	
AR-P-657	MP-P-657	New	Permanent	Gravel	Parks Hwy	-150.26222	62.39792	84.1	Block Valve 33
AR-P-670.08	MP-P-670.08	Existing	Temporary	Gravel	Parks Hwy	-150.23271	62.22035	96.3	
AR-P-673.74	MP-P-673.74	New	Temporary	Gravel	Parks Hwy	-150.18361	62.17812	2,127.7	North Susitna River bank
AR-P-674.14	MP-P-674.14	New	Temporary	Gravel	Parks Hwy	-150.17087	62.17431	941.6	Length:335' Approx. New AR for the most part, ex road is 28" wide, 533 ft long
AR-P-677	MP-P-677	New	Permanent	Gravel	Parks Hwy	-150.09506	62.15345	72.7	Block Valve 34
AR-P-690.47	MP-P-690.47	New	Temporary	Gravel	Parks Hwy	-150.05287	61.98399	66.3	
AR-P-697	MP-P-697	New	Permanent	Gravel	Parks Hwy	-150.08207	61.89181	34.8	Block Valve 35
AR-P-697.5	MP-P-697.5	Existing	Permanent	Gravel	Parks Hwy	-150.08817	61.88552	35.6	

ASAP Appendix D **Final Access Road Table (09-13-12)**

Mainline Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-P-700.63	MP-P-700.63	Existing	Temporary	Gravel	Parks Hwy	-150.07606	61.84491	163.2	
AR-P-712.1	MP-P-712.1	Existing	Temporary	Gravel	Parks Hwy	-150.16415	61.72285	1,857.3	
AR-P-716	MP-P-716	New	Temporary	Gravel	Nancy Lake Pkwy	-150.15715	61.66670	4,128.4	
AR-P-717.17	MP-P-717.17	New	Permanent	Gravel	Parks Hwy	-150.18787	61.65789	10,248.9	Block Valve 31
AR-P-717	MP-P-717	New	Permanent	Gravel	Nancy Lake Pkwy	-150.18489	61.65725	8,026.2	Block Valve 36
Fairbanks Lateral Access Roads									
Name	**Mile Post**	**Status**	**Type**	**Material**	**Route Name**	**Longitude**	**Latitude**	**Length (feet)**	**Comments**
AR-F-4.15	MP-F-4.15	Existing	Permanent	Gravel	Parks Hwy	-148.58650	64.71542	42,309.2	AR-Old Nenana Hwy and Standard Creek Road, MP and AR edited 2/22/10
AR-F-12.02	MP-F-12.02	Existing	Permanent	Gravel	Parks Hwy	-148.19959	64.79116	54,267.7	AR-Parks Hwy 2nd Access Road, MP and AR edited 2/22/10
AR-F-21.25	MP-F-21.25	Existing	Permanent	Gravel	Parks Hwy	-148.19312	64.89915	5,328.8	Existing road
AR-F-24.75	MP-F-24.75	Existing	Permanent	Gravel	Parks Hwy	-148.10697	64.92647	1,434.6	Existing road
AR-F-28.25	MP-F-28.25	Existing	Permanent	Gravel	Parks Hwy	-147.98530	64.92409	2,031.1	Existing road

Source: Access Roads ASAP v5 WMS service and refined by AES 2012 Access Roads (June 13, 2012).

Appendix E

Stream Crossings Tables

ASAP Appendix E - Stream Crossings

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_1	0.78	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_2	3.24	Gas Conditioning Facility to Mile 540	Arctic	Putuligayuk R	Artificial Path	HDD	Winter 1	Y	Y
ST_3	9.36	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	HDD	Winter 1	Y	
ST_4	16.91	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_5	17.05	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_6	17.38	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_7	23.02	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_8	28.04	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_9	36.02	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_10	36.4	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_11	38.47	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_12	39.03	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_13	39.24	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_14	39.66	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_14_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_15	40.48	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_16	40.94	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_17	41.26	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_17_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_17_2	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_18	42.75	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_19	43.58	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_19_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Stream	open cut	Winter 1	Y	Y
ST_20	44.37	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Stream	open cut	Winter 1	Y	Y
ST_21	44.59	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_22	44.69	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_23	57.19	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_24	58.89	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_24_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_25	61.21	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_26	64.84	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_27	69.82	Gas Conditioning Facility to Mile 540	Arctic	Spoiled Mary Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_28	71.36	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Intermittent Stream/River	open cut	Winter 1	Y	Y
ST_29	74.39	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 1	N	
ST_30	76.63	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_31	76.81	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_32	82.59	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_33	83.81	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_34	86.19	Gas Conditioning Facility to Mile 540	Arctic	Lori Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_35	86.54	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_36	87.31	Gas Conditioning Facility to Mile 540	Arctic	Stump Cr	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_37	87.87	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	HDD	Winter 1	Y	Y
ST_38	91.77	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	HDD	Winter 2	Y	Y
ST_39	93.85	Gas Conditioning Facility to Mile 540	Arctic	Arthur Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_40	94.95	Gas Conditioning Facility to Mile 540	Arctic	Gustafson Gulch	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_41	98.38	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_42	99.64	Gas Conditioning Facility to Mile 540	Arctic	Polygon Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_43	100.09	Gas Conditioning Facility to Mile 540	Arctic	Poison Pipe Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_44	102.43	Gas Conditioning Facility to Mile 540	Arctic	Climb Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_45	102.78	Gas Conditioning Facility to Mile 540	Arctic	Dennis Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_46	104.93	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_47	105.69	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_48	106.61	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_49	106.95	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_50	107.41	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_51	109.15	Gas Conditioning Facility to Mile 540	Arctic	Oksrukuyik Cr	Perennial Stream/River	open cut	Winter 2	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_52	109.17	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_53	110.60	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_54	112.00	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_55	116.13	Gas Conditioning Facility to Mile 540	Arctic	Toolik R	Perennial Stream/River	open cut	Winter 2	N	Y
ST_56	124.65	Gas Conditioning Facility to Mile 540	Arctic	E. F. Kuparuk R	Perennial Stream/River	open cut	Winter 2	N	Y
ST_57	127.23	Gas Conditioning Facility to Mile 540	Arctic	Kuparuk R	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_58	128.70	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_59	130.68	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_60	131.11	Gas Conditioning Facility to Mile 540	Arctic	Toolik R	Perennial Stream/River	open cut	Winter 2	N	
ST_60_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 2	N	
ST_60_2	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 2	N	
ST_61	131.79	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_62	133.62	Gas Conditioning Facility to Mile 540	Arctic	Kuparuk R	Perennial Stream/River	HDD	Winter 2	N	
ST_63	137.87	Gas Conditioning Facility to Mile 540	Arctic	Terry Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_64	138.07	Gas Conditioning Facility to Mile 540	Arctic	Terry Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_65	138.74	Gas Conditioning Facility to Mile 540	Arctic	Mack Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_66	139.61	Gas Conditioning Facility to Mile 540	Arctic	Ed Cr	Stream	open cut	Winter 2	N	Y
ST_67	139.93	Gas Conditioning Facility to Mile 540	Arctic	Jill Cr	Stream	open cut	Winter 2	N	Y
ST_68	140.00	Gas Conditioning Facility to Mile 540	Arctic	Galbraith L trib	Intermittent Stream/River	open cut	Winter 2	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_69	140.42	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_70	140.78	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_70_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 2	N	
ST_71	140.96	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_72	141.69	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_73	141.98	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	HDD	Winter 2	N	Y
ST_74	142.72	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_75	145.79	Gas Conditioning Facility to Mile 540	Arctic	Tee Lake Outlet	Artificial Path	open cut	Winter 2	N	Y
ST_76	146.58	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_77	147.29	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_78	147.69	Gas Conditioning Facility to Mile 540	Arctic	Vanish/Holden Cr	Stream	open cut	Winter 2	N	Y
ST_79	147.92	Gas Conditioning Facility to Mile 540	Arctic	Mainline Spring Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_80	149.26	Gas Conditioning Facility to Mile 540	Arctic	Roche Moutonee Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_81	150.13	Gas Conditioning Facility to Mile 540	Arctic	Atigun R	Artificial Path	HDD	Winter 2	N	
ST_82	150.30	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_83	151.66	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_84	152.80	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_85	153.11	Gas Conditioning Facility to Mile 540	Arctic	Waterhole Cr	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_86	153.48	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_87	154.78	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_88	155.83	Gas Conditioning Facility to Mile 540	Arctic	Tyler Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_89	157.11	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_90	158.07	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_91	158.14	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_92	158.96	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_93	160.02	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_94	160.52	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_95	161.21	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_96	162.18	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Perennial Stream/River	open cut	Winter 2	N	Y
ST_96_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Winter 2	N	
ST_97	162.33	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_98	163.00	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_99	163.28	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_99_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Summer 1	N	
ST_100	165.48	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_101	167.09	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_102	167.67	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Artificial Path	open cut	Summer 1	N	
ST_103	168.00	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_104	168.57	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_105	170.02	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Stream	open cut	Summer 1	N	
ST_106	170.19	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_107	170.38	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_108	170.53	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_109	171.04	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Summer 1	N	
ST_110	171.12	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Artificial Path	open cut	Summer 1	N	
ST_111	171.19	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_112	171.61	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_113	172.61	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_114	173.16	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_115	173.93	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 1	N	Y
ST_116	175.04	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_117	176.66	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_118	178.17	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_119	178.28	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_120	178.62	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_121	180.02	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 2	N	Y
ST_122	183.28	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_123	183.30	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_124	183.32	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_125	183.32	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_126	183.37	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_127	183.42	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	N	Y
ST_128	183.48	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 2	N	Y
ST_129	183.76	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 2	N	
ST_130	183.92	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Summer 2	N	Y
ST_131	183.94	Gas Conditioning Facility to Mile 540	Interior	Unnamed	Artificial Path	open cut	Summer 2	N	Y
ST_132	184.00	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	N	Y
ST_133	184.01	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	N	Y
ST_134	184.13	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	N	Y
ST_135	184.16	Gas Conditioning Facility to Mile 540	Interior	Nutirwik Cr	Artificial Path	open cut	Winter 1	N	Y
ST_135_1	unk	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Stream	open cut	Winter 1	N	Y
ST_135_2	unk	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Stream	open cut	Winter 1	N	Y
ST_136	184.29	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	N	Y
ST_137	184.36	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	N	Y
ST_138	185.52	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_139	186.29	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_139_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_140	186.75	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_141	187.82	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_142	189.42	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_142_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_143	189.96	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_143_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_144	192.37	Gas Conditioning Facility to Mile 540	Interior	Nutirwik Cr	Artificial Path	open cut	Winter 1	N	Y
ST_145	193.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_146	193.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_146_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_147	194.02	Gas Conditioning Facility to Mile 540	Interior	Snowden Cr	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_148	194.51	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_149	194.79	Gas Conditioning Facility to Mile 540	Interior	Sahr's Slough	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_150	195.50	Gas Conditioning Facility to Mile 540	Interior	Disaster Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_151	197.92	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_151_1	uknk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_151_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_151_3	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_152	198.81	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_153	200.03	Gas Conditioning Facility to Mile 540	Interior	Big Jim Cr	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_154	201.23	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	N	Y
ST_155	202.51	Gas Conditioning Facility to Mile 540	Interior	Eva Cr	Stream	open cut	Winter 1	N	Y
ST_155_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_156	202.57	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_157	202.93	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_158	203.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_159	204.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_160	205.41	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_160_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_161	205.80	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_162	206.67	Gas Conditioning Facility to Mile 540	Interior	Snowden Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_163	207.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_163_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_164	208.23	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_165	209.51	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_166	210.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_167	210.76	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_168	210.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	Y	Y
ST_169	211.04	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	Y	Y
ST_170	211.56	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	Y	Y
ST_171	212.26	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_172	213.55	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	N	Y
ST_172_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_172_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_173	213.95	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_173_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_173_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_174	215.47	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_174_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_174_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_175	215.89	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Artificial Path	open cut	Winter 1	Y	
ST_176	217.98	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_177	219.37	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_178	223.38	Gas Conditioning Facility to Mile 540	Interior	Linda Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_179	223.92	Gas Conditioning Facility to Mile 540	Interior	Gold Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_180	224.43	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_181	224.69	Gas Conditioning Facility to Mile 540	Interior	Sheep Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_182	225.21	Gas Conditioning Facility to Mile 540	Interior	Wolf Pup Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_182_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_183	225.64	Gas Conditioning Facility to Mile 540	Interior	Nugget Cr	Perennial Stream/River	open cut	Winter 1	N	Y
ST_184	227.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_185	228.11	Gas Conditioning Facility to Mile 540	Interior	Rainbow Gulch	Intermittent Stream/River	open cut	Winter 1	Y	Y
ST_186	229.53	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_187	229.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_188	230.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_189	230.28	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Artificial Path	open cut	Winter 1	Y	Y
ST_189_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_189_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_189_3	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_190	230.60	Gas Conditioning Facility to Mile 540	Interior	Hammond R	Artificial Path	open cut	Winter 1	Y	Y
ST_191	232.70	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Perennial Stream/River	open cut	Winter 1	Y	
ST_192	233.95	Gas Conditioning Facility to Mile 540	Interior	Minnie Cr	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_193	235.25	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_194	235.37	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_195	235.99	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_196	236.59	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_197	237.35	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_198	237.42	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_199	237.95	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_199_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_200	238.72	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y
ST_200_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_201	238.80	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_202	239.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	Y
ST_203	239.43	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_203_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_203_2	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	
ST_204	240.40	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_205	240.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_206	241.22	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_207	241.39	Gas Conditioning Facility to Mile 540	Interior	Marion Cr	Perennial Stream/River	open cut	Winter 1	Y	
ST_208	242.49	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_209	242.82	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_210	243.84	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_211	244.82	Gas Conditioning Facility to Mile 540	Interior	Clara Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_212	245.00	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_213	246.04	Gas Conditioning Facility to Mile 540	Interior	Slate Cr	Perennial Stream/River	open cut	Winter 1	Y	
ST_214	247.56	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	N	
ST_215	249.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_216	251.50	Gas Conditioning Facility to Mile 540	Interior	Rosie Cr	Perennial Stream/River	open cut	Winter 2	Y	Y
ST_217	251.64	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_218	252.22	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	Y	Y
ST_219	252.40	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	
ST_220	252.50	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	Y
ST_221	252.84	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_222	252.97	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_223	254.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	Y
ST_224	255.33	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_225	256.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_226	258.17	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_227	258.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_228	259.28	Gas Conditioning Facility to Mile 540	Interior	Chapman Cr	Perennial Stream/River	open cut	Winter 2	N	Y
ST_229	259.88	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_230	260.52	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_231	263.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	Y
ST_232	265.41	Gas Conditioning Facility to Mile 540	Interior	South Fork Koyukuk R	Artificial Path	HDD	Winter 2	Y	Y
ST_233	265.69	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	
ST_234	266.87	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_235	267.53	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_236	268.26	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_237	268.90	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	
ST_238	269.63	Gas Conditioning Facility to Mile 540	Interior	Finger Mtn Cr	Stream	open cut	Winter 2	N	Y
ST_239	270.10	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_240	270.36	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_241	271.46	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_242	272.99	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_243	273.34	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_244	275.06	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_245	277.34	Gas Conditioning Facility to Mile 540	Interior	Jim R	Artificial Path	open cut	Winter 2	Y	
ST_246	277.96	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_247	279.52	Gas Conditioning Facility to Mile 540	Interior	Douglas Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_248	280.90	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_249	283.41	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_250	283.97	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_251	284.60	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_252	285.97	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	Y
ST_253	286.63	Gas Conditioning Facility to Mile 540	Interior	Prospect Cr	Perennial Stream/River	open cut	Winter 2	Y	Y
ST_254	286.96	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	N	
ST_255	290.99	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_256	291.28	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_257	293.60	Gas Conditioning Facility to Mile 540	Interior	North Fork Bonanza Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_257_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Summer 1	N	
ST_258	295.17	Gas Conditioning Facility to Mile 540	Interior	Bonanza Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_259	298.76	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_260	301.82	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_261	303.41	Gas Conditioning Facility to Mile 540	Interior	Fish Cr	Perennial Stream/River	open cut	Summer 1	N	Y
ST_261_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Summer 1	N	
ST_262	305.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_263	306.18	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_264	309.51	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_265	309.93	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_266	311.78	Gas Conditioning Facility to Mile 540	Interior	Kanuti R	Artificial Path	new bridge	Summer 1	N	Y
ST_267	314.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_268	315.20	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_269	315.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_270	317.32	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_271	317.66	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_272	320.67	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_273	321.07	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_274	321.95	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_275	323.50	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_276	323.75	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_276_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Summer 1	N	
ST_277	324.23	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_278	324.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_279	326.59	Gas Conditioning Facility to Mile 540	Interior	Dall Cr	Perennial Stream/River	open cut	Summer 1	N	Y
ST_280	327.92	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_281	328.46	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_282	328.63	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_283	330.39	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_284	332.36	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_285	332.64	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_286	333.30	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	Y
ST_287	334.02	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_288	338.70	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_289	340.82	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_290	342.10	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_291	345.22	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_292	346.34	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	N	
ST_293	347.94	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Summer 1	N	
ST_294	349.37	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_295	350.77	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_296	352.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_297	353.74	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_298	355.26	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	N	
ST_299	355.82	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_300	358.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_301	359.27	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_302	360.19	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_303	361.08	Gas Conditioning Facility to Mile 540	Interior	Yukon R	Artificial Path	new bridge	Summer 1	Y	
ST_304	369.20	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_305	370.47	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_306	371.30	Gas Conditioning Facility to Mile 540	Interior	Isom Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_307	374.10	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_308	375.77	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_309	376.58	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_310	378.39	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_311	380.01	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_312	381.24	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_313	382.25	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	HDD	Summer 1	N	
ST_314	384.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	HDD	Summer 1	Y	
ST_315	386.21	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_316	386.42	Gas Conditioning Facility to Mile 540	Interior	Hess Cr	Artificial Path	open cut	Summer 1	N	
ST_317	386.52	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_318	390.28	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_319	392.52	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_320	395.87	Gas Conditioning Facility to Mile 540	Interior	Erickson Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_321	400.21	Gas Conditioning Facility to Mile 540	Interior	Lost Cr	Perennial Stream/River	open cut	Summer 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_322	403.40	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_323	404.11	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_324	406.58	Gas Conditioning Facility to Mile 540	Interior	East Fork Tolovana R	Perennial Stream/River	open cut	Winter 1	Y	
ST_325	407.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_326	409.61	Gas Conditioning Facility to Mile 540	Interior	Winter Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_327	411.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_328	412.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_329	412.88	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_330	413.02	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_331	413.67	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_332	414.72	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_333	415.40	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_334	416.32	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_335	417.11	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_336	417.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_337	418.7	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_338	419.42	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_339	419.47	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_340	421.66	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_341	422.27	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_342	423.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_343	423.47	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_344	424.01	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_345	425.35	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_346	426.28	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_347	432.78	Gas Conditioning Facility to Mile 540	Interior	Tatalina R	Perennial Stream/River	open cut	Winter 1	Y	
ST_348	433.18	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_349	433.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_350	435.29	Gas Conditioning Facility to Mile 540	Interior	Washington Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_351	435.66	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_352	441.26	Gas Conditioning Facility to Mile 540	Interior	Chatanika R	Artificial Path	HDD	Winter 1	Y	Y
ST_353	441.84	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_354	444.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_355	445.98	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_356	446.5	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_357	447.08	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_358	448.46	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_359	449.47	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_360	450.49	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_361	452.01	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_362	457.5	Gas Conditioning Facility to Mile 540	Interior	Goldstream Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_363	458.36	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_364	465.88	Gas Conditioning Facility to Mile 540	Interior	Little Goldstream Cr	Perennial Stream/River	open cut	Winter 1	N	
ST_365	469.37	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_366	471.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	Y
ST_367	475.55	Gas Conditioning Facility to Mile 540	Interior	Tanana R	Artificial Path	HDD	Winter 2	Y	
ST_368	482.18	Gas Conditioning Facility to Mile 540	Interior	Fish Cr	Perennial Stream/River	open cut	Winter 2	N	
ST_369	484.32	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_370	484.82	Gas Conditioning Facility to Mile 540	Interior	Julius Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_371	485.46	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_372	486.29	Gas Conditioning Facility to Mile 540	Interior	Julius Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_373	487.74	Gas Conditioning Facility to Mile 540	Interior	Glacier Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_374	501.38	Gas Conditioning Facility to Mile 540	Interior	Nenana R	Artificial Path	open cut	Winter 2	Y	
ST_375	501.92	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_376	503.04	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_377	504.74	Gas Conditioning Facility to Mile 540	Interior	Birch Cr	Perennial Stream/River	open cut	Winter 2	N	
ST_378	506.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_379	507.9	Gas Conditioning Facility to Mile 540	Interior	Bear Cr	Perennial Stream/River	open cut	Winter 2	Y	Y
ST_380	508.22	Gas Conditioning Facility to Mile 540	Interior	June Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_381	511.09	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_382	516.08	Gas Conditioning Facility to Mile 540	Interior	Rock Cr	Perennial Stream/River	open cut	Winter 2	N	
ST_383	519.53	Gas Conditioning Facility to Mile 540	Interior	Slate Cr	Perennial Stream/River	open cut	Winter 2	N	
ST_384	523.25	Gas Conditioning Facility to Mile 540	Interior	Little Panguingue Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_385	524.76	Gas Conditioning Facility to Mile 540	Interior	Panguingue Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_386	527.58	Gas Conditioning Facility to Mile 540	Interior	Dry Cr	Artificial Path	open cut	Winter 2	N	
ST_387	528.10	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	HDD	Winter 2	N	
ST_388	532.76	Gas Conditioning Facility to Mile 540	Interior	Antler Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_389	533.81	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_390	534.51	Gas Conditioning Facility to Mile 540	Interior	Nenana R	Artificial Path	open cut	Summer 1	Y	
ST_391	534.77	Gas Conditioning Facility to Mile 540	Interior	Coyote Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_392	535.11	Gas Conditioning Facility to Mile 540	Interior	Dragonfly Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_393	535.50	Gas Conditioning Facility to Mile 540	Interior	Eagle Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_394	536.28	Gas Conditioning Facility to Mile 540	Interior	Fox Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	Y
ST_395	536.62	Gas Conditioning Facility to Mile 540	Interior	Grizzly Cr	Perennial Stream/River	existing bridge	Fall 1/Winter 2	N	
ST_396	537.26	Gas Conditioning Facility to Mile 540	Interior	Hornet Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_397	537.45	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Fall 1/Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_398	538.47	Gas Conditioning Facility to Mile 540	Interior	Junco Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_399	539.24	Gas Conditioning Facility to Mile 540	Interior	Kingfisher Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_400	540.23	Mile 540 to Mile 555	Interior	Lynx Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_401	540.9	Mile 540 to Mile 555	Interior	Montana Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_402	541.8	Mile 540 to Mile 555	Interior	Name Unknown	Perennial Stream/River	open cut	Fall 1/Winter 2	N	
ST_403	543.84	Mile 540 to Mile 555	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_404	545.16	Mile 540 to Mile 555	Interior	Yanert Fork	Artificial Path	open cut	Summer 1	N	
ST_405	553.57	Mile 540 to Mile 555	Interior	Carlo Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_406	555.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_407	556.43	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_408	556.56	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_409	556.91	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_410	557.99	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Slime Cr	Perennial Stream/River	HDD	Summer 1	N	
ST_411	561.4	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_412	561.92	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Nenana R	Artificial Path	open cut	Summer 1	Y	Y
ST_413	562.29	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_414	565.77	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_415	568.07	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Jack R	Perennial Stream/River	HDD	Summer 1	N	
ST_416	569.57	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Summer 1	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_417	577.54	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_418	583.12	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Middle Fork Chulitna R	Artificial Path	HDD	Summer 1	Y	
ST_419	587.32	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Fourth of July Cr	Perennial Stream/River	open cut	Summer 1	N	
ST_420	592.56	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	East Fork Chulitna R	Perennial Stream/River	HDD	Summer 1	Y	
ST_421	593.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Hardage Cr	Perennial Stream/River	HDD	Summer 1	Y	
ST_422	594.22	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	Y
ST_423	596.4	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Antimony Cr	Perennial Stream/River	HDD	Summer 1	N	Y
ST_424	596.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	N	
ST_425	599.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Honolulu Cr	Perennial Stream/River	open cut	Summer 1	Y	Y
ST_426	600.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	Y	
ST_427	601.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Honolulu Cr	Perennial Stream/River	open cut	Summer 1	Y	
ST_428	603.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Hurricane Gulch	Perennial Stream/River	existing bridge	Winter 1	N	
ST_429	606.67	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Granite Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_430	609.57	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Division Cr	Perennial Stream/River	open cut	Winter 1	Y	
ST_431	610.66	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_432	612.05	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Pass Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_433	614.28	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Coal Cr	Perennial Stream/River	existing bridge	Winter 1	Y	
ST_434	616.23	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_435	617.7	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Horseshoe Cr	Perennial Stream/River	open cut	Winter 1	Y	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_436	633.68	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Byers Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_437	637.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_438	640.25	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Troublesome Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_439	640.52	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_440	640.9	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_441	641.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	Y
ST_442	642.19	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_443	644.53	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_443_1	unk	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_444	644.79	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Chulitna R	Artificial Path	existing bridge	Winter 1	Y	
ST_445	649.10	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_446	649.69	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_447	650.10	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	Y
ST_448	651.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_449	653.06	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Winter 1	Y	
ST_450	656.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_451	657.35	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Winter 1	Y	
ST_452	658.30	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_453	660.18	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Drywater Cr	Perennial Stream/River	HDD	Winter 1	Y	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_454	660.54	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_455	661.13	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_456	662.00	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Trapper Cr	Perennial Stream/River	HDD	Winter 1	Y	Y
ST_457	665.05	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Winter 1	Y	
ST_458	665.49	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_459	666.17	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_460	668.06	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Sawmill Cr	Perennial Stream/River	open cut	Winter 1	Y	
ST_461	670.03	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	Y	
ST_462	670.19	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	N	
ST_463	672.04	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Queer Cr	Perennial Stream/River	open cut	Winter 1	Y	
ST_464	672.12	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Rabideux Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_465	673.28	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Rabideux Cr	Perennial Stream/River	HDD	Winter 1	Y	
ST_466	673.71	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Susitna R	Artificial Path	HDD	Winter 2	Y	
ST_467	675.78	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_468	676.77	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	
ST_469	678.79	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Montana Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_470	681.53	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Montana Cr	Perennial Stream/River	HDD	Winter 2	Y	
ST_471	681.68	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_472	684.50	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Goose Cr	Perennial Stream/River	open cut	Winter 2	Y	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_473	685.67	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	
ST_474	685.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	
ST_475	689.35	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Sheep Cr	Perennial Stream/River	HDD	Winter 2	Y	
ST_476	692.78	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Caswell Cr	Perennial Stream/River	open cut	Winter 2	Y	
ST_477	694.54	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_478	694.68	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Kashwitna R	Artificial Path	HDD	Winter 2	Y	
ST_479	696.60	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	197 1/2 Mile Cr	Perennial Stream/River	HDD	Winter 2	Y	
ST_480	703.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Willow Cr	Perennial Stream/River	HDD	Winter 2	Y	
ST_481	706.05	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Stream	open cut	Winter 2	N	
ST_482	706.09	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_483	706.32	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Willow Cr	Artificial Path	HDD	Winter 2	Y	
ST_484	708.40	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	
ST_485	710.82	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	Y	
ST_486	715.33	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Rolly Cr	Perennial Stream/River	HDD	Winter 2	N	
ST_487	717.46	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_488	719.36	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_489	722.56	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Fish Cr	Perennial Stream/River	HDD	Winter 2	Y	
ST_490	724.26	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_491	724.47	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_492	730.13	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 2	N	
ST_493	730.55	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Susitna R	Artificial Path	HDD	Winter 2	Y	
ST_494	732.09	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Winter 2	Y	
ST_495	734.36	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	HDD	Winter 2	Y	
ST_N1	unk	Denali National Park Route Variation	Interior	Nenana River	Perennial Stream/River	existing bridge	Summer 1	Y	
ST_N2	unk	Denali National Park Route Variation	Interior	Nenana River	Perennial Stream/River	HDD	Fall 1/Winter 2	Y	
ST_F1	unk	Fairbanks Lateral	Interior	Goldstream Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F2	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F3	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F4	unk	Fairbanks Lateral	Interior	Glacier Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F5	unk	Fairbanks Lateral	Interior	Standard Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F6	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F7	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F8	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F9	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F10	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F11	unk	Fairbanks Lateral	Interior	Cache Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F12	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F13	unk	Fairbanks Lateral	Interior	Lincoln Creek	Perennial Stream/River	Open cut	Summer 2	N	

TABLE E-1 Stream Crossings Proposed for the ASAP Project ROW

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Anadromous* [a,b]	Resident Fish** [c,d]
ST_F14	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F15	unk	Fairbanks Lateral	Interior	Spinach Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F16	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F17	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	
ST_F18	unk	Fairbanks Lateral	Interior	Moose Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F19	unk	Fairbanks Lateral	Interior	Goldstream Creek	Perennial Stream/River	Open cut	Summer 2	N	
ST_F20	unk	Fairbanks Lateral	Interior	Name Unknown	Perennial Stream/River	Open cut	Summer 2	N	

Key: N=No, Y=Yes, Y-NOM= nominated anadromous stream, HDD= Horizontal Directional Drilling.*Streams that have been nominated as anadromous were considered anadromous. ** Resident fish data is incomplete.

[a] Johnson and Blanche 2011.

[b] AGDC 2011b. ASAP 2010 Lake Studies Completion Report Prudhoe Bay to Galbraith Lake

[c] ADF&G 2011b. Alaska Freshwater Fish Inventory (AFFI)

[d] BLM 2002. Renewal of the TAPS ROW Final EIS.

[e] AGDC 2011a. ASAP Plan of Development Revision 1.

See Section 5.6 (Fish) for Full References.

TABLE E-2 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Anadromous Fish

Stream Crossing ID	Milepost	Segment	Hydrologic Region	Waterbody Name	Construction Season [c]	Crossing Mode	Anadromous Species and Life Stage [a, b]
ST_2	3.24	Gas Conditioning Facility to Mile 540	Arctic	Putuligayuk R	Winter 1	HDD	Wr,BCr,DVr,LCr,OMp,Wr
ST_3	9.36	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Winter 1	HDD	BCp,DVp,Wp
ST_7	23.02	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_8	28.04	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_9	36.02	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_10	36.4	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_11	38.47	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_12	39.03	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_13	39.24	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_14	39.66	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_19_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_20	44.37	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_21	44.59	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_25	61.21	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_26	64.84	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_28	71.36	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_33	83.81	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	open cut	CHp,Pp,BCp,DVr,LCp,Wp
ST_36	87.31	Gas Conditioning Facility to Mile 540	Arctic	Stump Cr	Winter 1	open cut	DVp
ST_37	87.87	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 1	HDD	CHp,Pp,BCp,DVr,LCp,Wp
ST_38	91.77	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Winter 2	HDD	DVp
ST_168	210.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_169	211.04	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_170	211.56	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_171	212.26	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	DVp

TABLE E-2 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Anadromous Fish

Stream Crossing ID	Milepost	Segment	Hydrologic Region	Waterbody Name	Construction Season [c]	Crossing Mode	Anadromous Species and Life Stage [a, b]
ST_173	213.95	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	DVp
ST_175	215.89	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Winter 1	open cut	CHp,Kp,SFp,Wp
ST_185	228.11	Gas Conditioning Facility to Mile 540	Interior	Rainbow Gulch	Winter 1	open cut	
ST_188	230.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_189	230.28	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Winter 1	open cut	CHp,Kp,SFp,Wp
ST_190	230.60	Gas Conditioning Facility to Mile 540	Interior	Hammond R	Winter 1	open cut	CHr,Kp
ST_191	232.70	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Winter 1	open cut	CHp,Kp,SFp,Wp
ST_192	233.95	Gas Conditioning Facility to Mile 540	Interior	Minnie Cr	Winter 1	open cut	Kr
ST_207	241.39	Gas Conditioning Facility to Mile 540	Interior	Marion Cr	Winter 1	open cut	Kp
ST_213	246.04	Gas Conditioning Facility to Mile 540	Interior	Slate Cr	Winter 1	open cut	CHp,Kp
ST_216	251.50	Gas Conditioning Facility to Mile 540	Interior	Rosie Cr	Winter 2	open cut	CHs,Kr
ST_218	252.22	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 2	open cut	Kr
ST_223	254.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 2	open cut	Kp
ST_232	265.41	Gas Conditioning Facility to Mile 540	Interior	South Fork Koyukuk R	Winter 2	HDD	CHp,Kp,Wp
ST_245	277.34	Gas Conditioning Facility to Mile 540	Interior	Jim R	Winter 2	open cut	CHs,Ks
ST_247	279.52	Gas Conditioning Facility to Mile 540	Interior	Douglas Cr	Winter 2	open cut	Kr
ST_253	286.63	Gas Conditioning Facility to Mile 540	Interior	Prospect Cr	Winter 2	open cut	Ks
ST_303	361.08	Gas Conditioning Facility to Mile 540	Interior	Yukon R	Summer 1	new bridge	CHp,COp,Kp,Pp,Sp,SFp,Wp
ST_314	384.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Summer 1	HDD	
ST_324	406.58	Gas Conditioning Facility to Mile 540	Interior	East Fork Tolovana R	Winter 1	open cut	CHp,COp,Kp
ST_336	417.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_341	422.27	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_342	423.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	

TABLE E-2 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Anadromous Fish

Stream Crossing ID	Milepost	Segment	Hydrologic Region	Waterbody Name	Construction Season [c]	Crossing Mode	Anadromous Species and Life Stage [a, b]
ST_346	426.28	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Winter 1	open cut	
ST_347	432.78	Gas Conditioning Facility to Mile 540	Interior	Tatalina R	Winter 1	open cut	
ST_352	441.26	Gas Conditioning Facility to Mile 540	Interior	Chatanika R	Winter 1	HDD	CHp,COp,Kp
ST_367	475.55	Gas Conditioning Facility to Mile 540	Interior	Tanana R	Winter 2	HDD	CHp,COp,Kp
ST_370	484.82	Gas Conditioning Facility to Mile 540	Interior	Julius Cr	Winter 2	open cut	CHp,COp,Kp
ST_372	486.29	Gas Conditioning Facility to Mile 540	Interior	Julius Cr	Winter 2	open cut	CHp,COp,Kp
ST_373	487.74	Gas Conditioning Facility to Mile 540	Interior	Glacier Cr	Winter 2	open cut	COp,Ks
ST_374	501.38	Gas Conditioning Facility to Mile 540	Interior	Nenana R	Winter 2	open cut	CHp,COp,Kp
ST_379	507.9	Gas Conditioning Facility to Mile 540	Interior	Bear Cr	Winter 2	open cut	CHs,COs
ST_380	508.22	Gas Conditioning Facility to Mile 540	Interior	June Cr	Winter 2	open cut	CHs,COs
ST_384	523.25	Gas Conditioning Facility to Mile 540	Interior	Little Panguingue Cr	Winter 2	open cut	COs
ST_385	524.76	Gas Conditioning Facility to Mile 540	Interior	Panguingue Cr	Winter 2	open cut	COsr
ST_390	534.51	Gas Conditioning Facility to Mile 540	Interior	Nenana R	Summer 1	open cut	CHp,COp,Kp
ST_412	561.92	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Nenana R	Summer 1	open cut	CHp, COp, Kp
ST_418	583.12	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Middle Fork Chulitna R	Summer 1	HDD	CHs, COp, Kp, Pp, Sp
ST_420	592.56	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	East Fork Chulitna R	Summer 1	HDD	COp, Ks, Sp
ST_421	593.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Hardage Cr	Summer 1	HDD	Kr
ST_425	599.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Honolulu Cr	Summer 1	open cut	COpr, Ks
ST_426	600.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Summer 1	open cut	COr
ST_427	601.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Honolulu Cr	Summer 1	open cut	Ks
ST_429	606.67	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Granite Cr	Winter 1	HDD	Sp, COpr, Kr
ST_430	609.57	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Division Cr	Winter 1	open cut	Kr
ST_432	612.05	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Pass Cr	Winter 1	HDD	CHp, COpr, Kpr, Pp, Sp
ST_433	614.28	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Coal Cr	Winter 1	existing bridge	CHp

TABLE E-2 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Anadromous Fish

Stream Crossing ID	Milepost	Segment	Hydrologic Region	Waterbody Name	Construction Season [c]	Crossing Mode	Anadromous Species and Life Stage [a, b]
ST_434	616.23	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	CHp, COp, Kp, Pp
ST_435	617.7	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Horseshoe Cr	Winter 1	open cut	CHp, COpsr, Kp, Pp, Sp
ST_436	633.68	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Byers Cr	Winter 1	HDD	CHps, COps, Kps, Sp
ST_438	640.25	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Troublesome Cr	Winter 1	HDD	CHs, COs, Ks, Ps
ST_440	640.9	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COr
ST_441	641.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COr
ST_444	644.79	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Chulitna R	Winter 1	existing bridge	CHs, COp, Kp, Pp, Sp
ST_445	649.10	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COs, Ps
ST_448	651.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COp
ST_449	653.06	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	HDD	COps
ST_450	656.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COp
ST_451	657.35	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	HDD	COp
ST_452	658.30	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COp
ST_453	660.18	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Drywater Cr	Winter 1	HDD	COsr, ALpr
ST_455	661.13	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COpr
ST_456	662.00	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Trapper Cr	Winter 1	HDD	COpsr, Kr
ST_457	665.05	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	HDD	COsr,Kr
ST_459	666.17	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COr
ST_460	668.06	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Sawmill Cr	Winter 1	open cut	COpsr
ST_461	670.03	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 1	open cut	COr, Kr
ST_463	672.04	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Queer Cr	Winter 1	open cut	COr
ST_464	672.12	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Rabideux Cr	Winter 1	HDD	COsr, Kr
ST_465	673.28	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Rabideux Cr	Winter 1	HDD	COr
ST_466	673.71	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Susitna R	Winter 2	HDD	CHp, COs, Kp, Pp, Sp, ALp, DVp, Wp, OUs

TABLE E-2 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Anadromous Fish

Stream Crossing ID	Milepost	Segment	Hydrologic Region	Waterbody Name	Construction Season [c]	Crossing Mode	Anadromous Species and Life Stage [a, b]
ST_468	676.77	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	open cut	COr
ST_469	678.79	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Montana Cr	Winter 2	open cut	COr
ST_470	681.53	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Montana Cr	Winter 2	HDD	CHs, COr, Ksr, Ps
ST_472	684.50	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Goose Cr	Winter 2	open cut	CHs, COsr, Ksr, Ps
ST_473	685.67	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	open cut	COr
ST_474	685.73	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	open cut	COr
ST_475	689.35	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Sheep Cr	Winter 2	HDD	CHs, COs, Ksr, Ps
ST_476	692.78	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Caswell Cr	Winter 2	open cut	COsr
ST_478	694.68	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Kashwitna R	Winter 2	HDD	CHs, COs, Kpr, Pp, DVp
ST_479	696.60	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	197 1/2 Mile Cr	Winter 2	HDD	COpr, Kr
ST_480	703.11	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Willow Cr	Winter 2	HDD	CHp, COsr, Ksr, Ps
ST_483	706.32	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Willow Cr	Winter 2	HDD	CHs, COsr, Ksr, Ps
ST_484	708.40	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	open cut	COpr
ST_485	710.82	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	open cut	COr
ST_489	722.56	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Fish Cr	Winter 2	HDD	COp, Kp, Pp, Sp
ST_493	730.55	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Little Susitna R	Winter 2	HDD	CHp, COp, Kp, Pp, Sp
ST_494	732.09	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	HDD	COsr, Ps
ST_495	734.36	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Winter 2	HDD	COpr

Key: N=No, Y=Yes, Y-NOM= nominated anadromous stream, HDD= Horizontal Directional Drilling.
*Streams that have been nominated as anadromous were considered anadromous.
Species Codes: AL=Arctic Lamprey, BC=Broad Whitefish, CH=Chum Salmon, CO=Coho Salmon, DV=Dolly Varden, K=Chinook (King) Salmon, P=Pink Salmon, S=Sockeye Salmon, W=Whitefishes undifferentiated, SF = Sheefish, LC = Least cisco, OU = Eulachon
Life Stage Codes: m=migration, p=present, r=rearing, s=spawning, juv=juvenile.
[a] Johnson and Blanche 2011.
[b] ADF&G 2011b. Alaska Freshwater Fish Inventory (AFFI)
[c] AGDC 2011a. ASAP Plan of Development Revision 1.
See Fish Section (5.6) for Full References.

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_1	0.78	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	W
ST_2	3.24	Gas Conditioning Facility to Mile 540	Arctic	Putuligayuk R	Artificial Path	HDD	Winter 1	W, CA, LT, SB, CS
ST_7	23.02	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 1	W
ST_8	28.04	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	CN, GR, W
ST_9	36.02	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	BB, GR
ST_10	36.4	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	BB, GR
ST_11	38.47	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	BB, W
ST_12	39.03	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	BB, W
ST_13	39.24	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	BB, W
ST_14	39.66	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	GR
ST_19_1	unk	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Stream	open cut	Winter 1	GR
ST_20	44.37	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Stream	open cut	Winter 1	W
ST_21	44.59	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_25	61.21	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	GR
ST_26	64.84	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	GR
ST_27	69.82	Gas Conditioning Facility to Mile 540	Arctic	Spoiled Mary Cr	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_28	71.36	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Intermittent Stream/River	open cut	Winter 1	BB, W, CA, CN, CS, GR,
ST_33	83.81	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	open cut	Winter 1	GR, CD
ST_34	86.19	Gas Conditioning Facility to Mile 540	Arctic	Lori Cr	Perennial Stream/River	open cut	Winter 1	GR
ST_36	87.31	Gas Conditioning Facility to Mile 540	Arctic	Stump Cr	Perennial Stream/River	open cut	Winter 1	CN, GR, LT

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Constructio n Season [e]	Resident species [a, b, c, d] **
ST_37	87.87	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	HDD	Winter 1	CN, GR
ST_38	91.77	Gas Conditioning Facility to Mile 540	Arctic	Sag R side channel	Perennial Stream/River	HDD	Winter 2	GR
ST_39	93.85	Gas Conditioning Facility to Mile 540	Arctic	Arthur Cr	Perennial Stream/River	open cut	Winter 2	BB, CN, GR
ST_40	94.95	Gas Conditioning Facility to Mile 540	Arctic	Gustafson Gulch	Intermittent Stream/River	open cut	Winter 2	BB, CN, GR
ST_42	99.64	Gas Conditioning Facility to Mile 540	Arctic	Polygon Cr	Perennial Stream/River	open cut	Winter 2	BB, CN, GR
ST_43	100.09	Gas Conditioning Facility to Mile 540	Arctic	Poison Pipe Cr	Perennial Stream/River	open cut	Winter 2	CN, GR
ST_44	102.43	Gas Conditioning Facility to Mile 540	Arctic	Climb Cr	Perennial Stream/River	open cut	Winter 2	GR
ST_45	102.78	Gas Conditioning Facility to Mile 540	Arctic	Dennis Cr	Perennial Stream/River	open cut	Winter 2	GR
ST_48	106.61	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Perennial Stream/River	open cut	Winter 2	GR
ST_51	109.15	Gas Conditioning Facility to Mile 540	Arctic	Oksrukuyik Cr	Perennial Stream/River	open cut	Winter 2	CN, GR, LT, DV
ST_55	116.13	Gas Conditioning Facility to Mile 540	Arctic	Toolik R	Perennial Stream/River	open cut	Winter 2	GR
ST_56	124.65	Gas Conditioning Facility to Mile 540	Arctic	E. F. Kuparuk R	Perennial Stream/River	open cut	Winter 2	GR
ST_57	127.23	Gas Conditioning Facility to Mile 540	Arctic	Kuparuk R	Intermittent Stream/River	open cut	Winter 2	CN,GR
ST_63	137.87	Gas Conditioning Facility to Mile 540	Arctic	Terry Cr	Intermittent Stream/River	open cut	Winter 2	GR
ST_64	138.07	Gas Conditioning Facility to Mile 540	Arctic	Terry Cr	Intermittent Stream/River	open cut	Winter 2	GR
ST_65	138.74	Gas Conditioning Facility to Mile 540	Arctic	Mack Cr	Intermittent Stream/River	open cut	Winter 2	GR
ST_66	139.61	Gas Conditioning Facility to Mile 540	Arctic	Ed Cr	Stream	open cut	Winter 2	GR
ST_67	139.93	Gas Conditioning Facility to Mile 540	Arctic	Jill Cr	Stream	open cut	Winter 2	GR
ST_68	140.00	Gas Conditioning Facility to Mile 540	Arctic	Galbraith L trib	Intermittent Stream/River	open cut	Winter 2	LT, GR
ST_73	141.98	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	HDD	Winter 2	BB, CN, GR, LT, W

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_75	145.79	Gas Conditioning Facility to Mile 540	Arctic	Tee Lake Outlet	Artificial Path	open cut	Winter 2	BB, CN, GR, LT, W
ST_78	147.69	Gas Conditioning Facility to Mile 540	Arctic	Vanish/Holden Cr	Stream	open cut	Winter 2	CN, GR, W
ST_79	147.92	Gas Conditioning Facility to Mile 540	Arctic	Mainline Spring Cr	Intermittent Stream/River	open cut	Winter 2	BB, CN, GR, W
ST_80	149.26	Gas Conditioning Facility to Mile 540	Arctic	Roche Moutonee Cr	Intermittent Stream/River	open cut	Winter 2	CN, GR, LT, W
ST_85	153.11	Gas Conditioning Facility to Mile 540	Arctic	Waterhole Cr	Intermittent Stream/River	open cut	Winter 2	GR
ST_87	154.78	Gas Conditioning Facility to Mile 540	Arctic	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR
ST_88	155.83	Gas Conditioning Facility to Mile 540	Arctic	Tyler Cr	Perennial Stream/River	open cut	Winter 2	CN, GR, W
ST_94	160.52	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Intermittent Stream/River	open cut	Winter 2	GR, CN, W
ST_95	161.21	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Intermittent Stream/River	open cut	Winter 2	GR, CN, GR, W
ST_96	162.18	Gas Conditioning Facility to Mile 540	Arctic	Atigun R floodplain	Perennial Stream/River	open cut	Winter 2	GR, CN, W
ST_108	170.53	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	GR
ST_111	171.19	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	CN, GR, W
ST_113	172.61	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 1	CN, DV, GR, W
ST_114	173.16	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 1	CN, DV, GR, W
ST_115	173.93	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 1	CN, DV, GR, W
ST_116	175.04	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_117	176.66	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_118	178.17	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_119	178.28	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_120	178.62	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_121	180.02	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_122	183.28	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	GR, CN, DV, W
ST_123	183.30	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_124	183.32	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_125	183.32	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_126	183.37	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_127	183.42	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_128	183.48	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Intermittent Stream/River	open cut	Summer 2	CN, DV, GR, W
ST_130	183.92	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Summer 2	CN, DV, GR, W
ST_131	183.94	Gas Conditioning Facility to Mile 540	Interior	Unnamed	Artificial Path	open cut	Summer 2	GR, CN
ST_132	184.00	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	BB, CN, DV, GR, LS, W
ST_133	184.01	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	BB, CN, DV, GR, LS, W
ST_134	184.13	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	BB, CN, DV, GR, LS, W
ST_135	184.16	Gas Conditioning Facility to Mile 540	Interior	Nutirwik Cr	Artificial Path	open cut	Winter 1	GR, CN, DV
ST_135_1	unk	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Stream	open cut	Winter 1	BB, CN, DV, GR, LS
ST_135_2	unk	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Stream	open cut	Winter 1	BB, CN, DV, GR, LS
ST_136	184.29	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	GR, CN, DV, BB, LS
ST_137	184.36	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	GR, CN, DV, BB, LS
ST_138	185.52	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR, CN, DV, BB, LS
ST_140	186.75	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_144	192.37	Gas Conditioning Facility to Mile 540	Interior	Nutirwik Cr	Artificial Path	open cut	Winter 1	GR, CN
ST_145	193.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	GR, CN
ST_146	193.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	GR, CN
ST_147	194.02	Gas Conditioning Facility to Mile 540	Interior	Snowden Cr	Intermittent Stream/River	open cut	Winter 1	CN, DV, GR
ST_149	194.79	Gas Conditioning Facility to Mile 540	Interior	Sahr's Slough	Intermittent Stream/River	open cut	Winter 1	GR, CN
ST_150	195.50	Gas Conditioning Facility to Mile 540	Interior	Disaster Cr	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_153	200.03	Gas Conditioning Facility to Mile 540	Interior	Big Jim Cr	Intermittent Stream/River	open cut	Winter 1	GR, CN, DV, W
ST_154	201.23	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Perennial Stream/River	open cut	Winter 1	BB, CN, GR, LS, W
ST_155	202.51	Gas Conditioning Facility to Mile 540	Interior	Eva Cr	Stream	open cut	Winter 1	GR
ST_156	202.57	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	CN, DV, GR, LS, W, BB
ST_157	202.93	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, DV, GR
ST_158	203.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	GR
ST_159	204.73	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_160	205.41	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_160_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	GR
ST_161	205.80	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, GR
ST_162	206.67	Gas Conditioning Facility to Mile 540	Interior	Snowden Cr	Perennial Stream/River	open cut	Winter 1	CN
ST_163	207.55	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	CN, GR
ST_164	208.23	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	CN
ST_167	210.76	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, DS, DV, GR, LS, W

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_168	210.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, DS, DV, GR, LS, W
ST_169	211.04	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, DV, GR, W
ST_170	211.56	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	CN, DS, DV, GR, LS, W
ST_171	212.26	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR, BB, CN, DV, LS, W
ST_172	213.55	Gas Conditioning Facility to Mile 540	Interior	Dietrich R	Artificial Path	open cut	Winter 1	DV, GR, CN
ST_172_1	unk	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	DV, GR, CN
ST_173	213.95	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR, CN
ST_180	224.43	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, DV, GR, KS, W
ST_181	224.69	Gas Conditioning Facility to Mile 540	Interior	Sheep Cr	Perennial Stream/River	open cut	Winter 1	BB, CN, GR, LS, W
ST_182	225.21	Gas Conditioning Facility to Mile 540	Interior	Wolf Pup Cr	Perennial Stream/River	open cut	Winter 1	CN, GR
ST_183	225.64	Gas Conditioning Facility to Mile 540	Interior	Nugget Cr	Perennial Stream/River	open cut	Winter 1	GR
ST_185	228.11	Gas Conditioning Facility to Mile 540	Interior	Rainbow Gulch	Intermittent Stream/River	open cut	Winter 1	GR, CN, DV, W
ST_186	229.53	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	GR
ST_187	229.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	GR
ST_188	230.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR
ST_189	230.28	Gas Conditioning Facility to Mile 540	Interior	Middle Fork Koyukuk R	Artificial Path	open cut	Winter 1	CN, GR, W
ST_190	230.60	Gas Conditioning Facility to Mile 540	Interior	Hammond R	Artificial Path	open cut	Winter 1	LS, CN
ST_192	233.95	Gas Conditioning Facility to Mile 540	Interior	Minnie Cr	Perennial Stream/River	open cut	Winter 1	GR, CN
ST_197	237.35	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	GR
ST_200	238.72	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	CN, GR, LS, W

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_202	239.13	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 1	CN, GR
ST_210	243.84	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 1	BB, CN, GR, W, LS, NP
ST_212	245.00	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	CN, GR, KS
ST_216	251.50	Gas Conditioning Facility to Mile 540	Interior	Rosie Cr	Perennial Stream/River	open cut	Winter 2	GR, CN
ST_217	251.64	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR, CN
ST_218	252.22	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	CN, GR, LS, NP, W
ST_220	252.50	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	CN, GR, W
ST_222	252.97	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	BB, CN, GR, LS, W, NP
ST_223	254.29	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	GR, CN, BB, LS, W, NP
ST_224	255.33	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR
ST_225	256.83	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	CN
ST_226	258.17	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	CN, GR, LS, W, SK
ST_227	258.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	CN, GR, W
ST_228	259.28	Gas Conditioning Facility to Mile 540	Interior	Chapman Cr	Perennial Stream/River	open cut	Winter 2	CN, GR
ST_231	263.31	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Stream	open cut	Winter 2	BB, CN, GR, NP, W
ST_232	265.41	Gas Conditioning Facility to Mile 540	Interior	South Fork Koyukuk R	Artificial Path	HDD	Winter 2	GR
ST_238	269.63	Gas Conditioning Facility to Mile 540	Interior	Finger Mtn Cr	Stream	open cut	Winter 2	GR
ST_242	272.99	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR
ST_244	275.06	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR
ST_252	285.97	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Winter 2	GR

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_253	286.63	Gas Conditioning Facility to Mile 540	Interior	Prospect Cr	Perennial Stream/River	open cut	Winter 2	CN, GR, LS, NP, W
ST_256	291.28	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	GR, W, NP
ST_261	303.41	Gas Conditioning Facility to Mile 540	Interior	Fish Cr	Perennial Stream/River	open cut	Summer 1	GR, CN, W
ST_264	309.51	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	GR
ST_265	309.93	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	BB
ST_266	311.78	Gas Conditioning Facility to Mile 540	Interior	Kanuti R	Artificial Path	new bridge	Summer 1	BB, BC, W, CA, CN, DS, GR
ST_268	315.20	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	GR
ST_273	321.07	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	GR
ST_278	324.91	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	BC, W, CN, CS, DS, GR, IN, LS, NP
ST_279	326.59	Gas Conditioning Facility to Mile 540	Interior	Dall Cr	Perennial Stream/River	open cut	Summer 1	BC, W, CN, CS, DS, GR, IN, LS, NP
ST_280	327.92	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	GR, LS
ST_283	330.39	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	GR, W
ST_286	333.30	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Intermittent Stream/River	open cut	Summer 1	BB, CI, GR, W, IN
ST_288	338.70	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Summer 1	BB, GR, CN
ST_335	417.11	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 1	GR
ST_352	441.26	Gas Conditioning Facility to Mile 540	Interior	Chatanika R	Artificial Path	HDD	Winter 1	CN
ST_366	471.54	Gas Conditioning Facility to Mile 540	Interior	Name Unknown	Perennial Stream/River	open cut	Winter 2	CN
ST_379	507.9	Gas Conditioning Facility to Mile 540	Interior	Bear Cr	Perennial Stream/River	open cut	Winter 2	CN
ST_394	536.28	Gas Conditioning Facility to Mile 540	Interior	Fox Cr	Perennial Stream/River	open cut	Fall 1/Winter 2	CN
ST_407	556.43	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	LC

TABLE E-3 Stream Crossings Proposed for the ASAP Project ROW Known to Inhabit Resident Fish

Stream Crossing	Milepost	Segment	Hydrologic Region	Waterbody Name	Description	Cross Mode	Construction Season [e]	Resident species [a, b, c, d] **
ST_412	561.92	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Nenana R	Artificial Path	open cut	Summer 1	SB, CN
ST_422	594.22	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Summer 1	GR, SB
ST_423	596.4	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Antimony Cr	Perennial Stream/River	HDD	Summer 1	SB, CN
ST_425	599.63	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Honolulu Cr	Perennial Stream/River	open cut	Summer 1	SB
ST_441	641.61	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	SB, DV, CN
ST_446	649.69	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	CN
ST_447	650.10	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Name Unknown	Perennial Stream/River	open cut	Winter 1	DV
ST_456	662.00	Mile 555 to Cook Inlet NGLEP Facility	Southcentral	Trapper Cr	Perennial Stream/River	HDD	Winter 1	CN

Key: HDD = Horizontal Directional Drilling.
** Resident fish data is incomplete.
Species Codes: BB = burbot, CN = slimy culpin, GR = Arctic grayling, LS = Longnose sucker, DV = Dolly Varden, W = Whitefish, SB = Stickleback, NP = Northern Pike, CS = Least cisco, LT = Lake trout, CA = Arctic cisco CD = Sculpin, CI = Cisco, LC = Lake chub
[a] Johnson and Blanche 2011.
[b] AGDC 2011b. ASAP 2010 Lake Studies Completion Report Prudhoe Bay to Galbraith Lake
[c] ADF&G 2011b. Alaska Freshwater Fish Inventory (AFFI)
[d] BLM 2002. Renewal of the TAPS ROW Final EIS.
[e] AGDC 2011a. ASAP Plan of Development Revision 1.
See Section 5.6 (Fish) for Full References.

Appendix F

National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	118352.947	64° 52' 20.199" N	147° 56' 42.989" W	0.364	0.001	0	19040506007001	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	117258.111	64° 52' 50.838" N	147° 56' 50.339" W	0.610	0.002	0	19040506006989	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	119962.265	64° 52' 55.106" N	147° 55' 43.909" W	0.383	0.002	0	19040506006987	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	118396.391	64° 52' 23.460" N	147° 56' 33.860" W	3.135	0.013	0	19040506007000	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	120255.736	64° 52' 57.755" N	147° 55' 35.699" W	0.183	0.001	0	19040506006985	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	122540.355	64° 52' 5.863" N	147° 55' 9.031" W	1.558	0.006	0	19040506007007	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	125145.529	64° 52' 11.153" N	147° 54' 3.868" W	1.901	0.008	0	19040506007002	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	119996.198	64° 52' 52.845" N	147° 55' 43.020" W	0.440	0.002	0	19040506006988	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	443	130141.758	64° 51' 55.289" N	147° 51' 59.217" W	23.273	0.094	0	19040506007010	39004	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	447	120107.518	64° 51' 44.537" N	147° 56' 6.537" W	19.033	0.077	576	19040506007013	39009	Perennial	19040506	Fairbanks Lateral
Chena River	Lake/Pond: Hydrographic Category = Perennial	447	125052.408	64° 51' 18.381" N	147° 54' 19.501" W	1.424	0.006	0	19040506007196	39004	Perennial	19040506	Fairbanks Lateral
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	4953.996	63° 18' 24.547" N	149° 8' 5.901" W	0.761	0.003	0	19020502005734	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	4266.720	63° 18' 34.980" N	149° 7' 52.739" W	1.109	0.004	0	19020502005735	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	5388.519	63° 18' 27.277" N	149° 7' 29.266" W	7.987	0.032	0	19020502005736	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	4856.009	63° 18' 26.495" N	149° 7' 52.415" W	2.810	0.011	0	19020502005737	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	4811.278	63° 18' 36.628" N	149° 7' 31.590" W	0.390	0.002	0	19020502005733	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	577	4306.902	63° 18' 29.928" N	149° 8' 6.826" W	1.101	0.004	0	19020502005738	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4510.772	63° 17' 53.827" N	149° 9' 44.974" W	0.452	0.002	0	19020502005744	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4180.522	63° 17' 58.073" N	149° 9' 31.240" W	4.906	0.020	0	19020502005742	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4715.172	63° 18' 19.862" N	149° 8' 32.127" W	4.424	0.018	0	19020502005739	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4108.870	63° 18' 3.276" N	149° 9' 22.894" W	1.196	0.005	0	19020502005743	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4163.382	63° 18' 10.229" N	149° 9' 2.405" W	3.557	0.014	0	19020502005740	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	578	4123.376	63° 18' 7.114" N	149° 9' 13.518" W	0.308	0.001	0	19020502005741	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	579	5276.434	63° 17' 35.870" N	149° 10' 0.591" W	2.612	0.011	0	19020502004151	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	579	5326.416	63° 17' 32.602" N	149° 10' 5.574" W	0.280	0.001	0	19020502004155	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	579	5453.656	63° 17' 39.478" N	149° 9' 54.273" W	0.373	0.002	0	19020502004148	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	579	5111.079	63° 17' 38.667" N	149° 10' 3.896" W	0.462	0.002	0	19020502004149	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	1762.077	63° 17' 30.069" N	149° 12' 14.456" W	0.400	0.002	0	19020502005746	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	975.020	63° 17' 34.096" N	149° 12' 58.016" W	13.546	0.055	0	19020502005747	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	2178.451	63° 17' 33.293" N	149° 12' 7.330" W	0.773	0.003	0	19020502005745	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	2199.233	63° 17' 39.336" N	149° 13' 19.136" W	1.732	0.007	0	19020502005749	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	941.008	63° 17' 10.693" N	149° 13' 2.708" W	3.517	0.014	0	19020502004165	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	2818.083	63° 17' 3.903" N	149° 13' 41.612" W	0.850	0.003	0	19020502004173	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	580	1142.984	63° 17' 25.519" N	149° 12' 21.882" W	1.686	0.007	0	19020502005748	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	581	2638.763	63° 16' 9.383" N	149° 12' 40.233" W	0.828	0.003	0	19020502004207	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	582	2003.088	63° 15' 31.918" N	149° 14' 42.610" W	0.261	0.001	0	19020502004237	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	582	2195.238	63° 15' 30.236" N	149° 14' 46.340" W	0.331	0.001	0	19020502004238	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	583	2437.242	63° 15' 27.422" N	149° 14' 51.778" W	0.369	0.001	0	19020502004242	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	583	1928.497	63° 14' 50.275" N	149° 14' 48.297" W	6.644	0.027	0	19020502004280	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	583	2012.169	63° 15' 25.173" N	149° 14' 56.768" W	0.858	0.003	0	19020502004245	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	583	1786.498	63° 15' 26.952" N	149° 15' 16.349" W	1.860	0.008	0	19020502004240	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	5515.471	63° 14' 41.501" N	149° 13' 27.063" W	0.729	0.003	0	19020502004291	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	2547.432	63° 13' 58.655" N	149° 15' 22.637" W	2.087	0.008	0	19020502004320	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	3887.053	63° 14' 23.506" N	149° 16' 51.820" W	0.378	0.002	0	19020502004299	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	1879.180	63° 14' 11.859" N	149° 14' 56.372" W	0.548	0.002	0	19020502004310	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	2235.172	63° 14' 3.999" N	149° 15' 11.841" W	0.730	0.003	0	19020502004315	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	833.426	63° 14' 43.637" N	149° 15' 24.262" W	11.498	0.047	0	19020502004281	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	2764.346	63° 14' 20.327" N	149° 14' 23.960" W	0.864	0.003	0	19020502004303	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	584	1962.093	63° 14' 23.912" N	149° 14' 39.962" W	1.193	0.005	0	19020502004301	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	585	4820.560	63° 14' 2.543" N	149° 18' 11.006" W	0.570	0.002	0	19020502004312	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	585	1413.294	63° 13' 52.257" N	149° 17' 2.672" W	2.609	0.011	0	19020502004325	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	188.507	63° 13' 12.410" N	149° 17' 45.127" W	7.684	0.031	0	19020502004342	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	1607.255	63° 13' 1.439" N	149° 18' 27.170" W	0.340	0.001	0	19020502004349	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	3264.050	63° 12' 33.319" N	149° 17' 21.178" W	8.924	0.036	0	19020502004359	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	1226.465	63° 12' 54.598" N	149° 18' 4.204" W	0.441	0.002	0	19020502004352	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	2030.193	63° 12' 46.743" N	149° 17' 26.628" W	0.826	0.003	0	19020502004354	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	586	4855.592	63° 12' 18.034" N	149° 17' 23.017" W	1.031	0.004	0	19020502004362	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	4704.221	63° 11' 50.107" N	149° 18' 30.420" W	0.969	0.004	0	19020502004371	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	3365.948	63° 12' 2.949" N	149° 18' 31.164" W	4.283	0.017	0	19020502004366	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	4296.613	63° 11' 57.092" N	149° 18' 25.085" W	0.397	0.002	0	19020502004370	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	5011.616	63° 11' 44.278" N	149° 18' 44.892" W	0.972	0.004	0	19020502004375	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	3570.339	63° 12' 16.630" N	149° 18' 4.196" W	2.101	0.009	0	19020502004363	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	1336.585	63° 12' 35.092" N	149° 18' 47.864" W	0.427	0.002	0	19020502004358	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	3865.130	63° 12' 10.519" N	149° 18' 7.282" W	0.909	0.004	0	19020502004365	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	5077.111	63° 11' 56.658" N	149° 17' 48.148" W	37.423	0.151	0	19020502004367	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	587	5269.107	63° 13' 8.389" N	149° 20' 46.940" W	4.550	0.018	0	19020502004344	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	588	3854.885	63° 11' 33.919" N	149° 19' 21.248" W	2.225	0.009	0	19020502004378	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	588	5115.959	63° 12' 34.510" N	149° 21' 46.833" W	1.456	0.006	0	19020502004356	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	588	5484.582	63° 11' 34.938" N	149° 18' 42.365" W	1.112	0.005	0	19020502004379	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	589	3743.865	63° 10' 56.054" N	149° 20' 36.456" W	0.833	0.003	0	19020502004388	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	589	5068.329	63° 11' 53.287" N	149° 23' 11.325" W	1.396	0.006	0	19020502004369	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	589	3884.325	63° 10' 58.382" N	149° 20' 31.564" W	0.437	0.002	0	19020502004387	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	589	4837.248	63° 11' 30.809" N	149° 23' 33.729" W	2.361	0.010	0	19020502004377	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	589	3810.379	63° 11' 4.410" N	149° 20' 28.192" W	1.043	0.004	0	19020502004386	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	590	2503.691	63° 10' 13.144" N	149° 23' 30.156" W	0.892	0.004	0	19020502004396	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	590	1999.695	63° 10' 16.509" N	149° 23' 24.021" W	1.367	0.006	0	19020502004393	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	591	2976.513	63° 9' 48.814" N	149° 24' 39.001" W	0.673	0.003	0	19020502004401	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	591	3327.678	63° 9' 42.321" N	149° 24' 47.955" W	1.410	0.006	0	19020502004404	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	591	4145.089	63° 9' 46.848" N	149° 25' 35.954" W	33.684	0.136	0	19020502004399	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	591	4193.351	63° 9' 17.486" N	149° 22' 20.885" W	1.030	0.004	0	19020502004415	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	591	2715.221	63° 10' 12.626" N	149° 23' 46.574" W	1.681	0.007	0	19020502004395	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	5687.483	63° 9' 21.869" N	149° 26' 43.415" W	0.323	0.001	0	19020502004409	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	1764.415	63° 9' 7.701" N	149° 25' 27.597" W	3.190	0.013	0	19020502004419	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	3598.110	63° 9' 36.128" N	149° 25' 28.395" W	2.985	0.012	0	19020502004407	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	5364.729	63° 9' 15.012" N	149° 26' 41.881" W	0.867	0.004	0	19020502004414	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	2398.902	63° 9' 5.685" N	149° 25' 39.199" W	0.667	0.003	0	19020502004421	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	4407.179	63° 9' 33.389" N	149° 25' 57.915" W	0.469	0.002	0	19020502004408	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	4241.620	63° 9' 38.822" N	149° 25' 41.914" W	4.954	0.020	0	19020502004405	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	592	1992.961	63° 9' 16.224" N	149° 25' 24.282" W	1.576	0.006	0	19020502004413	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	593	5268.708	63° 9' 4.395" N	149° 27' 7.839" W	1.768	0.007	0	19020502004420	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	593	5503.313	63° 9' 8.657" N	149° 27' 0.350" W	0.362	0.001	0	19020502004418	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	4746.862	63° 8' 27.690" N	149° 28' 21.994" W	1.176	0.005	0	19020502004435	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	4342.905	63° 8' 31.524" N	149° 27' 50.164" W	1.054	0.004	0	19020502004434	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	5059.318	63° 8' 24.042" N	149° 28' 37.784" W	0.751	0.003	0	19020502004436	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	2900.125	63° 8' 2.035" N	149° 28' 13.247" W	2.069	0.008	0	19020502004445	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	5153.687	63° 8' 36.227" N	149° 28' 9.358" W	0.840	0.003	0	19020502004433	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	4497.799	63° 8' 14.112" N	149° 28' 43.480" W	7.032	0.028	0	19020502004438	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	5572.570	63° 8' 42.512" N	149° 28' 1.087" W	0.682	0.003	0	19020502004429	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	3520.774	63° 7' 46.199" N	149° 28' 29.888" W	0.714	0.003	0	19020502004449	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	2167.842	63° 8' 6.199" N	149° 27' 51.180" W	1.974	0.008	0	19020502004441	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	4580.108	63° 8' 1.341" N	149° 28' 51.147" W	0.506	0.002	0	19020502004446	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	5173.289	63° 8' 40.642" N	149° 27' 44.360" W	0.551	0.002	0	19020502004430	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	594	3460.170	63° 8' 12.073" N	149° 28' 20.504" W	10.861	0.044	0	19020502004439	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	595	3851.688	63° 7' 29.173" N	149° 29' 17.887" W	0.596	0.002	0	19020502004452	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	595	4348.058	63° 7' 11.804" N	149° 29' 42.752" W	1.064	0.004	0	19020502004462	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	595	4020.536	63° 7' 24.837" N	149° 29' 28.967" W	1.926	0.008	0	19020502004453	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	595	5908.432	63° 7' 23.369" N	149° 30' 12.380" W	0.487	0.002	0	19020502004816	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	595	669.407	63° 7' 14.007" N	149° 28' 16.760" W	4.084	0.017	0	19020502004460	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	597	1977.222	63° 5' 23.927" N	149° 30' 32.677" W	0.647	0.003	0	19020502004886	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	597	1386.943	63° 5' 36.129" N	149° 30' 40.727" W	1.086	0.004	0	19020502004873	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	597	3280.731	63° 5' 37.491" N	149° 31' 24.271" W	1.194	0.005	0	19020502004871	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	597	2291.981	63° 5' 43.996" N	149° 29' 18.972" W	1.029	0.004	0	19020502004471	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	598	4237.591	63° 5' 36.155" N	149° 32' 14.708" W	2.030	0.008	0	19020502004874	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	598	290.813	63° 5' 10.865" N	149° 31' 14.750" W	26.419	0.107	0	19020502004888	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	598	2587.285	63° 5' 20.710" N	149° 31' 58.261" W	1.482	0.006	0	19020502004892	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	598	3961.834	63° 4' 34.730" N	149° 30' 11.933" W	0.589	0.002	0	19020502004923	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	599	1755.790	63° 4' 36.749" N	149° 32' 47.373" W	2.748	0.011	0	19020502004918	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	599	2320.180	63° 4' 47.115" N	149° 32' 35.081" W	4.312	0.017	0	19020502004909	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	600	4404.892	63° 3' 44.405" N	149° 31' 29.018" W	0.448	0.002	0	19020502004960	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	600	3193.733	63° 3' 37.977" N	149° 31' 52.606" W	1.261	0.005	0	19020502004968	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	600	4609.373	63° 3' 35.444" N	149° 31' 16.761" W	6.138	0.025	0	19020502004964	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	600	3554.298	63° 3' 40.187" N	149° 31' 44.087" W	2.327	0.009	0	19020502004962	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	600	2888.458	63° 3' 27.397" N	149° 32' 2.238" W	0.560	0.002	0	19020502004981	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	601	5035.272	63° 2' 46.136" N	149° 32' 13.105" W	3.012	0.012	0	19020502005018	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	601	2564.117	63° 2' 23.903" N	149° 33' 54.058" W	3.368	0.014	0	19020502005042	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	601	1757.569	63° 2' 30.859" N	149° 34' 8.792" W	3.382	0.014	0	19020502005035	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	601	2967.425	63° 2' 46.531" N	149° 33' 0.399" W	1.309	0.005	0	19020502005020	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	602	3339.877	63° 2' 5.189" N	149° 34' 2.295" W	0.804	0.003	0	19020502005069	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	602	1316.294	63° 2' 17.495" N	149° 34' 37.220" W	4.612	0.019	0	19020502005052	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	602	684.018	63° 1' 59.152" N	149° 35' 31.226" W	16.941	0.069	0	19020502005067	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	602	2727.437	63° 2' 19.367" N	149° 34' 13.521" W	0.246	0.001	0	19020502005054	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	1205.681	63° 1' 21.285" N	149° 34' 55.353" W	0.988	0.004	0	19020502005131	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	1780.934	63° 1' 42.360" N	149° 35' 45.684" W	4.755	0.019	0	19020502005096	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	2862.100	63° 0' 59.740" N	149° 34' 48.422" W	0.319	0.001	0	19020502005158	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	3001.862	63° 1' 19.693" N	149° 36' 37.642" W	15.505	0.063	0	19020502005127	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	4163.894	63° 1' 33.294" N	149° 33' 53.465" W	0.304	0.001	0	19020502005113	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	1251.774	63° 1' 46.986" N	149° 34' 54.863" W	15.415	0.062	0	19020502005084	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	4666.957	63° 1' 45.552" N	149° 36' 53.835" W	0.312	0.001	0	19020502005099	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	4078.178	63° 1' 9.694" N	149° 36' 51.464" W	3.185	0.013	0	19020502005148	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	603	1220.412	63° 1' 14.433" N	149° 35' 3.346" W	1.115	0.005	0	19020502005139	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	604	1486.555	63° 0' 21.762" N	149° 35' 31.241" W	0.374	0.002	0	19020502005190	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	604	3883.204	62° 59' 55.664" N	149° 34' 39.387" W	25.011	0.101	0	19020502005197	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	605	5076.876	62° 59' 45.973" N	149° 38' 45.526" W	2.030	0.008	0	19020502004556	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	605	5070.556	62° 59' 50.494" N	149° 38' 41.731" W	0.625	0.003	0	19020502004555	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	605	3434.579	62° 59' 26.668" N	149° 35' 57.086" W	1.193	0.005	0	19020502004570	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	605	1325.446	62° 59' 57.067" N	149° 36' 19.756" W	0.246	0.001	0	19020502004548	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	3868.172	62° 59' 40.294" N	149° 38' 15.006" W	0.492	0.002	0	19020502004563	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	3152.194	62° 58' 49.029" N	149° 36' 29.057" W	2.983	0.012	0	19020502004588	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	2427.633	62° 59' 17.885" N	149° 38' 20.796" W	0.718	0.003	0	19020502004573	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	1929.892	62° 59' 11.838" N	149° 38' 16.199" W	2.060	0.008	0	19020502004574	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	3193.366	62° 58' 47.627" N	149° 38' 33.497" W	1.920	0.008	0	19020502004590	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	2056.389	62° 59' 19.880" N	149° 38' 8.215" W	0.488	0.002	0	19020502004571	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	606	3752.651	62° 58' 52.719" N	149° 38' 51.499" W	0.701	0.003	0	19020502004585	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	607	3125.323	62° 58' 40.218" N	149° 38' 41.985" W	1.706	0.007	0	19020502004599	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	607	5152.429	62° 58' 24.980" N	149° 39' 46.035" W	0.800	0.003	0	19020502004614	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	607	1830.323	62° 58' 4.205" N	149° 37' 16.172" W	4.639	0.019	0	19020502004631	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	607	3391.520	62° 58' 18.935" N	149° 39' 8.822" W	1.004	0.004	0	19020502004620	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	608	2691.169	62° 57' 59.464" N	149° 38' 45.984" W	1.561	0.006	0	19020502004635	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	608	2424.446	62° 57' 50.901" N	149° 39' 15.228" W	1.012	0.004	0	19020502004648	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	609	5098.698	62° 56' 34.358" N	149° 38' 19.790" W	0.322	0.001	0	19020502004705	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	611	5260.232	62° 55' 39.691" N	149° 43' 50.056" W	1.275	0.005	0	19020502004733	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	612	5219.672	62° 54' 16.685" N	149° 41' 3.858" W	3.779	0.015	0	19020502004806	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	612	1346.645	62° 54' 27.556" N	149° 42' 44.716" W	1.334	0.005	1319	19020502004796	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	5439.658	62° 53' 12.051" N	149° 43' 15.491" W	0.300	0.001	0	19020502004836	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	4628.283	62° 53' 52.163" N	149° 41' 52.528" W	57.486	0.233	0	19020502004817	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	4734.134	62° 53' 33.736" N	149° 42' 32.411" W	8.646	0.035	0	19020502004829	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	1246.739	62° 54' 4.376" N	149° 43' 14.641" W	28.266	0.114	0	19020502004807	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	4031.164	62° 53' 39.340" N	149° 42' 41.706" W	2.691	0.011	0	19020502004825	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	4723.132	62° 53' 42.718" N	149° 42' 27.427" W	1.378	0.006	0	19020502004823	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	613	3128.512	62° 54' 33.748" N	149° 44' 12.645" W	0.721	0.003	0	19020502004787	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	615	4473.921	62° 52' 27.482" N	149° 46' 10.172" W	16.416	0.066	0	19020502004858	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	616	3014.317	62° 53' 2.963" N	149° 49' 18.358" W	0.783	0.003	0	19020502004839	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	616	2772.799	62° 53' 5.190" N	149° 49' 3.452" W	2.131	0.009	0	19020502004834	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	2220.161	62° 52' 6.316" N	149° 50' 20.770" W	1.232	0.005	0	19020502004877	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	1455.178	62° 52' 16.680" N	149° 50' 2.951" W	0.201	0.001	0	19020502004865	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	1527.802	62° 52' 13.542" N	149° 50' 14.174" W	0.577	0.002	0	19020502004868	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	2707.228	62° 52' 57.200" N	149° 49' 54.446" W	1.488	0.006	0	19020502004842	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	2929.535	62° 52' 57.763" N	149° 49' 46.246" W	2.336	0.009	0	19020502004844	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	5740.831	62° 53' 29.275" N	149° 50' 1.696" W	4.437	0.018	0	19020502004827	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	617	1114.349	62° 52' 21.756" N	149° 49' 59.827" W	0.476	0.002	0	19020502004862	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	618	3344.370	62° 51' 55.877" N	149° 52' 56.283" W	1.941	0.008	0	19020502004885	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	618	4824.943	62° 51' 37.223" N	149° 50' 5.018" W	1.821	0.007	0	19020502004908	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	618	5352.472	62° 51' 15.999" N	149° 50' 28.898" W	0.896	0.004	0	19020502004935	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	618	4561.201	62° 51' 42.999" N	149° 50' 5.623" W	1.003	0.004	0	19020502004901	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	618	1846.858	62° 51' 51.852" N	149° 52' 22.073" W	1.461	0.006	0	19020502004893	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	895.938	62° 51' 19.190" N	149° 52' 59.934" W	0.997	0.004	0	19020502004926	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	5174.076	62° 50' 43.418" N	149° 51' 10.120" W	2.879	0.012	0	19020502004974	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1422.984	62° 51' 7.810" N	149° 52' 9.577" W	2.004	0.008	0	19020502004951	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	3778.304	62° 51' 53.774" N	149° 53' 6.119" W	0.930	0.004	0	19020502004890	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	2568.083	62° 51' 0.399" N	149° 53' 32.337" W	6.259	0.025	0	19020502004955	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	2003.944	62° 51' 33.859" N	149° 52' 9.753" W	0.711	0.003	0	19020502004910	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1603.699	62° 51' 10.499" N	149° 53' 14.107" W	1.597	0.006	0	19020502004939	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1629.342	62° 51' 13.522" N	149° 53' 16.898" W	1.410	0.006	0	19020502004931	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1398.554	62° 51' 13.647" N	149° 53' 9.124" W	1.489	0.006	0	19020502004929	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	2168.595	62° 50' 55.610" N	149° 52' 53.609" W	0.983	0.004	0	19020502004959	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1986.937	62° 51' 7.003" N	149° 53' 19.803" W	2.789	0.011	0	19020502004945	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	2275.324	62° 51' 6.561" N	149° 51' 51.169" W	1.117	0.005	0	19020502004953	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1291.124	62° 51' 29.879" N	149° 52' 19.589" W	2.548	0.010	0	19020502004914	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	619	1385.977	62° 51' 12.087" N	149° 52' 6.202" W	1.548	0.006	0	19020502004937	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	1935.481	62° 50' 11.236" N	149° 53' 48.758" W	3.833	0.016	0	19020502004988	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	2257.412	62° 50' 45.314" N	149° 53' 54.798" W	2.423	0.010	0	19020502004971	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	2227.766	62° 50' 46.935" N	149° 53' 50.483" W	1.666	0.007	0	19020502004967	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	2222.722	62° 50' 48.229" N	149° 53' 43.134" W	1.177	0.005	0	19020502004965	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	2177.154	62° 50' 46.032" N	149° 53' 45.011" W	0.585	0.002	0	19020502004972	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	4841.370	62° 50' 39.106" N	149° 51' 23.437" W	2.772	0.011	0	19020502004979	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	620	2611.389	62° 50' 54.826" N	149° 53' 28.848" W	0.635	0.003	0	19020502004961	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	621	2752.111	62° 49' 16.308" N	149° 54' 13.052" W	0.281	0.001	0	19020502005024	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1660.190	62° 48' 54.292" N	149° 55' 43.615" W	0.735	0.003	0	19020502005036	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	4273.826	62° 48' 28.763" N	149° 55' 10.761" W	2.374	0.010	0	19020502005049	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1685.855	62° 49' 19.087" N	149° 54' 39.003" W	28.794	0.117	0	19020502005016	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1627.747	62° 49' 25.730" N	149° 55' 13.164" W	1.868	0.008	0	19020502005013	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1376.025	62° 49' 22.793" N	149° 55' 54.609" W	0.426	0.002	0	19020502005021	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1914.603	62° 49' 4.940" N	149° 54' 52.219" W	2.616	0.011	0	19020502005027	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	622	1520.556	62° 49' 0.583" N	149° 55' 10.033" W	1.019	0.004	0	19020502005030	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	623	3533.632	62° 48' 5.715" N	149° 56' 29.838" W	0.957	0.004	0	19020502005055	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	623	304.394	62° 48' 42.364" N	149° 57' 8.457" W	1.022	0.004	0	19020502005041	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	624	2914.130	62° 48' 3.538" N	149° 57' 27.801" W	1.581	0.006	0	19020502005059	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	624	3468.685	62° 47' 34.213" N	149° 58' 17.595" W	0.894	0.004	0	19020502005078	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	2253.234	62° 47' 59.112" N	149° 59' 55.240" W	1.328	0.005	0	19020502005061	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	2614.880	62° 47' 30.301" N	149° 59' 1.822" W	8.055	0.033	0	19020502005076	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	1834.653	62° 47' 56.018" N	150° 0' 2.947" W	1.818	0.007	0	19020502005064	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	2556.066	62° 47' 30.411" N	150° 1' 2.360" W	4.819	0.020	0	19020502005367	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	4142.395	62° 48' 9.418" N	150° 0' 57.656" W	1.133	0.005	0	19020502005358	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	625	2241.027	62° 47' 52.374" N	150° 0' 38.214" W	1.321	0.005	0	19020502005362	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	626	1946.901	62° 47' 21.436" N	150° 1' 10.417" W	1.453	0.006	0	19020502005371	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	626	1926.833	62° 47' 20.966" N	150° 1' 6.024" W	1.492	0.006	0	19020502005370	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	626	846.211	62° 47' 10.969" N	150° 1' 20.623" W	0.650	0.003	0	19020502005372	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	2839.523	62° 46' 38.052" N	150° 3' 48.692" W	1.353	0.005	0	19020502005381	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	2957.712	62° 46' 51.576" N	150° 3' 25.704" W	2.105	0.009	0	19020502005378	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	1696.267	62° 46' 43.278" N	150° 2' 54.402" W	1.017	0.004	0	19020502005379	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	4386.884	62° 46' 14.326" N	150° 1' 17.351" W	1.182	0.005	0	19020502005383	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	4294.333	62° 45' 56.806" N	150° 1' 38.525" W	2.316	0.009	0	19020502005386	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	2765.699	62° 45' 58.666" N	150° 2' 28.030" W	4.183	0.017	0	19020502005387	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	3493.120	62° 45' 44.347" N	150° 2' 34.730" W	26.414	0.107	0	19020502005390	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	627	3272.889	62° 45' 51.171" N	150° 3' 2.167" W	3.743	0.015	853	19020502005391	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	627	2822.876	62° 46' 41.510" N	150° 3' 43.032" W	0.564	0.002	0	19020502005380	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	2172.562	62° 45' 39.459" N	150° 3' 49.880" W	0.907	0.004	0	19020502005396	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	3783.351	62° 45' 35.253" N	150° 3' 6.942" W	6.358	0.026	0	19020502005398	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	2317.242	62° 45' 31.872" N	150° 4' 9.954" W	1.405	0.006	0	19020502005399	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	4873.173	62° 45' 26.549" N	150° 2' 53.333" W	3.787	0.015	0	19020502005400	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	4372.296	62° 45' 12.245" N	150° 4' 3.436" W	1.367	0.006	0	19020502005407	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	844.390	62° 45' 46.521" N	150° 4' 31.927" W	0.861	0.003	0	19020502005395	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	628	2484.771	62° 45' 49.026" N	150° 3' 28.407" W	3.133	0.013	0	19020502005392	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	440.366	62° 45' 25.182" N	150° 5' 57.706" W	0.245	0.001	0	19020502005402	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	2580.255	62° 45' 8.588" N	150° 6' 34.319" W	0.433	0.002	0	19020502005411	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	523.704	62° 45' 25.477" N	150° 5' 51.112" W	0.935	0.004	0	19020502005401	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	1479.793	62° 45' 20.616" N	150° 5' 34.876" W	0.369	0.001	0	19020502005403	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	1854.373	62° 45' 19.970" N	150° 5' 26.418" W	0.284	0.001	0	19020502005404	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	1629.583	62° 45' 12.636" N	150° 6' 10.807" W	1.405	0.006	0	19020502005408	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	2169.251	62° 45' 20.172" N	150° 6' 45.039" W	0.253	0.001	0	19020502005406	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	629	2097.079	62° 45' 10.833" N	150° 6' 22.983" W	0.463	0.002	0	19020502005409	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	630	3189.750	62° 44' 56.214" N	150° 6' 15.507" W	2.073	0.008	0	19020502003548	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	630	1397.033	62° 45' 9.083" N	150° 7' 9.058" W	0.559	0.002	0	19020502005410	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	630	1973.389	62° 44' 13.081" N	150° 7' 0.000" W	350.819	1.420	816	19020502003357	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	630	3975.858	62° 44' 42.579" N	150° 6' 8.295" W	0.748	0.003	0	19020502003552	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	631	1279.316	62° 44' 14.514" N	150° 9' 17.013" W	1.367	0.006	0	19020502003555	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	631	2637.482	62° 43' 54.884" N	150° 8' 16.811" W	10.592	0.043	0	19020502003561	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	631	3345.326	62° 44' 12.679" N	150° 7' 35.896" W	1.000	0.004	0	19020502003558	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	631	1780.053	62° 44' 11.052" N	150° 9' 25.020" W	1.024	0.004	895	19020502003557	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	632	4930.766	62° 43' 7.938" N	150° 9' 11.920" W	0.343	0.001	0	19020502003590	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	632	2214.471	62° 43' 24.969" N	150° 10' 16.119" W	0.514	0.002	890	19020502003566	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	632	2266.251	62° 43' 39.189" N	150° 9' 29.489" W	0.388	0.002	0	19020502003562	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	633	3308.450	62° 42' 54.176" N	150° 10' 52.825" W	0.614	0.002	0	19020502003599	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	633	2789.226	62° 42' 50.813" N	150° 11' 14.224" W	2.038	0.008	0	19020502003600	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	633	294.306	62° 43' 22.126" N	150° 11' 51.731" W	7.023	0.028	0	19020502003565	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	634	1003.619	62░ 42' 26.958" N	150░ 12' 39.385" W	0.270	0.001	0	19020502003614	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	635	4991.212	62░ 41' 24.996" N	150░ 12' 34.064" W	1.299	0.005	0	19020502003640	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	635	3910.308	62░ 41' 31.613" N	150░ 12' 53.841" W	0.405	0.002	0	19020502003638	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	636	2124.451	62░ 40' 41.892" N	150░ 14' 54.162" W	7.003	0.028	0	19020502003665	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	636	4835.539	62░ 41' 4.220" N	150░ 12' 48.589" W	12.671	0.051	0	19020502003659	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	636	3968.413	62░ 41' 9.425" N	150░ 13' 8.246" W	4.134	0.017	0	19020502003654	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	636	1533.782	62░ 41' 7.477" N	150░ 15' 21.649" W	6.075	0.025	0	19020502003655	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	638	3959.214	62░ 39' 39.629" N	150░ 12' 9.408" W	0.445	0.002	0	19020502003691	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	639	619.476	62░ 38' 44.206" N	150░ 13' 31.183" W	1.184	0.005	0	19020502003716	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	641	4350.786	62░ 36' 49.536" N	150░ 11' 52.848" W	3.078	0.012	0	19020502003746	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	642	1868.111	62░ 36' 34.419" N	150░ 13' 48.526" W	4.672	0.019	0	19020502003751	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	643	1992.313	62░ 35' 37.564" N	150░ 13' 43.783" W	0.360	0.001	0	19020502003776	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	643	2095.030	62░ 35' 37.497" N	150░ 13' 38.213" W	0.727	0.003	0	19020502003775	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	644	5575.365	62░ 34' 14.117" N	150░ 16' 7.612" W	0.308	0.001	0	19020502003812	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	644	5287.517	62░ 34' 10.101" N	150░ 15' 58.711" W	0.867	0.004	0	19020502003815	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	644	5015.874	62° 34' 51.239" N	150° 12' 32.510" W	1.159	0.005	0	19020502003796	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	645	5208.313	62° 33' 31.389" N	150° 15' 57.912" W	0.282	0.001	0	19020502003851	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	645	5571.231	62° 33' 57.356" N	150° 16' 7.152" W	0.330	0.001	0	19020502003818	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	645	5288.882	62° 33' 50.924" N	150° 16' 3.391" W	0.256	0.001	0	19020502003819	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	645	5337.754	62° 33' 31.796" N	150° 16' 1.782" W	0.438	0.002	0	19020502003849	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	646	5679.729	62° 33' 18.025" N	150° 16' 29.935" W	5.428	0.022	776	19020502003869	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	1683.089	62° 31' 59.761" N	150° 14' 49.890" W	10.551	0.043	0	19020502003935	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	641.682	62° 32' 5.334" N	150° 14' 18.924" W	0.595	0.002	0	19020502003942	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	1773.849	62° 31' 52.229" N	150° 14' 24.676" W	3.688	0.015	0	19020502003969	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	3317.161	62° 32' 4.756" N	150° 12' 56.433" W	1.372	0.006	0	19020502003949	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	3630.053	62° 32' 10.122" N	150° 12' 50.622" W	0.933	0.004	0	19020502003933	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	3742.374	62° 32' 20.346" N	150° 12' 50.012" W	0.938	0.004	0	19020502003918	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	4201.560	62° 32' 32.223" N	150° 12' 51.359" W	0.218	0.001	0	19020502003907	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	647	2624.810	62° 31' 56.124" N	150° 15' 9.986" W	12.348	0.050	0	19020502003951	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	4656.426	62° 30' 50.276" N	150° 13' 8.848" W	1.971	0.008	0	19020502004049	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	4831.348	62° 31' 12.354" N	150° 12' 41.690" W	1.100	0.004	0	19020502004022	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	995.260	62° 31' 38.576" N	150° 14' 42.638" W	18.164	0.074	0	19020502003975	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	1917.514	62° 31' 26.034" N	150° 15' 8.118" W	0.954	0.004	0	19020502004004	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	1617.246	62° 31' 13.124" N	150° 15' 1.760" W	4.346	0.018	0	19020502004016	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	2487.664	62° 31' 7.651" N	150° 15' 14.624" W	2.420	0.010	0	19020502004021	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	4877.603	62° 31' 3.057" N	150° 12' 47.241" W	0.419	0.002	0	19020502004035	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	3763.553	62° 31' 49.237" N	150° 15' 31.512" W	11.495	0.047	0	19020502003960	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	648	5201.502	62° 31' 1.028" N	150° 12' 41.651" W	0.685	0.003	0	19020502004039	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	5037.004	62° 30' 49.330" N	150° 17' 22.447" W	16.876	0.068	0	19020502004033	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	2577.860	62° 31' 4.188" N	150° 15' 23.627" W	1.813	0.007	0	19020502004028	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	5087.417	62° 31' 25.838" N	150° 16' 34.874" W	57.517	0.233	0	19020502003983	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	2485.939	62° 30' 14.623" N	150° 14' 53.928" W	4.326	0.018	0	19020502004077	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	2583.539	62° 30' 22.803" N	150° 16' 14.619" W	0.697	0.003	0	19020502004072	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	2156.979	62° 31' 0.065" N	150° 15' 15.569" W	1.719	0.007	0	19020502004031	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	649	3550.868	62° 30' 43.571" N	150° 16' 41.118" W	0.393	0.002	0	19020502004055	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	3457.745	62° 30' 26.438" N	150° 16' 48.231" W	2.003	0.008	0	19020502004066	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	2695.702	62° 29' 41.352" N	150° 17' 16.714" W	1.263	0.005	0	19020502003392	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	2183.046	62° 30' 12.482" N	150° 16' 41.590" W	1.286	0.005	0	19020502004078	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	5045.308	62° 30' 2.956" N	150° 18' 8.350" W	0.773	0.003	0	19020502004086	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	650	3656.613	62° 29' 45.029" N	150° 17' 46.389" W	5.253	0.021	729	19020502003388	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	1823.041	62° 29' 56.743" N	150° 17' 0.310" W	0.586	0.002	0	19020502003383	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	5412.628	62° 30' 34.509" N	150° 17' 33.383" W	0.483	0.002	0	19020502004061	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	2761.602	62° 29' 45.140" N	150° 17' 19.365" W	0.350	0.001	0	19020502003390	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	4996.650	62° 30' 5.719" N	150° 18' 5.636" W	0.494	0.002	0	19020502004084	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	3215.954	62° 29' 54.507" N	150° 15' 12.025" W	0.387	0.002	0	19020502003386	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	4638.181	62° 30' 32.970" N	150° 17' 8.816" W	0.774	0.003	0	19020502004063	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	2524.049	62° 30' 17.115" N	150° 16' 9.424" W	0.497	0.002	0	19020502004076	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	1985.594	62° 30' 10.023" N	150° 16' 41.066" W	0.417	0.002	0	19020502004081	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	650	5140.441	62░ 30' 27.441" N	150░ 18' 15.124" W	77.159	0.312	730	19020502004056	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	1707.491	62░ 30' 9.674" N	150░ 16' 13.094" W	0.819	0.003	0	19020502004082	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	650	2664.484	62░ 29' 47.261" N	150░ 17' 18.555" W	0.231	0.001	0	19020502003389	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	4164.019	62░ 29' 25.498" N	150░ 17' 46.767" W	0.633	0.003	0	19020502003399	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	4455.550	62░ 28' 56.324" N	150░ 18' 10.253" W	0.325	0.001	0	19020502003404	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	3870.013	62░ 29' 15.034" N	150░ 17' 51.722" W	0.931	0.004	0	19020502003402	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	4452.929	62░ 29' 14.549" N	150░ 18' 7.640" W	3.224	0.013	0	19020502003401	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	4391.116	62░ 29' 29.228" N	150░ 17' 47.756" W	0.750	0.003	0	19020502003396	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	651	4165.885	62░ 29' 22.842" N	150░ 17' 49.857" W	0.486	0.002	0	19020502003400	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	652	5040.887	62░ 27' 51.579" N	150░ 17' 59.148" W	0.368	0.001	0	19020502003420	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	652	4348.330	62░ 27' 50.527" N	150░ 17' 41.817" W	0.383	0.002	0	19020502003421	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	652	5182.214	62░ 27' 49.456" N	150░ 18' 0.176" W	0.270	0.001	0	19020502003423	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	1579.951	62░ 27' 32.544" N	150░ 16' 38.927" W	0.901	0.004	0	19020502003433	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	2405.851	62░ 27' 7.001" N	150░ 15' 33.292" W	2.427	0.010	0	19020502003451	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4427.877	62° 27' 46.172" N	150° 17' 39.918" W	1.569	0.006	0	19020502003425	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4390.214	62° 27' 7.057" N	150° 17' 57.566" W	0.745	0.003	0	19020502003449	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	5383.292	62° 26' 54.963" N	150° 18' 11.384" W	0.906	0.004	0	19020502003459	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4863.000	62° 26' 45.372" N	150° 17' 44.504" W	1.215	0.005	0	19020502003467	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	2707.986	62° 26' 59.971" N	150° 15' 37.746" W	0.360	0.001	0	19020502003457	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	3901.217	62° 27' 3.507" N	150° 17' 44.208" W	0.343	0.001	0	19020502003454	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4379.721	62° 27' 37.828" N	150° 17' 47.900" W	0.477	0.002	0	19020502003430	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	1999.768	62° 27' 13.717" N	150° 17' 7.582" W	0.632	0.003	0	19020502003448	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	1795.451	62° 27' 6.980" N	150° 17' 2.409" W	1.241	0.005	0	19020502003450	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4733.701	62° 26' 50.278" N	150° 17' 47.971" W	0.509	0.002	0	19020502003464	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4636.865	62° 27' 38.755" N	150° 17' 53.048" W	0.401	0.002	0	19020502003429	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	4257.789	62° 27' 42.951" N	150° 17' 36.804" W	0.327	0.001	0	19020502003427	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	5174.962	62° 26' 56.878" N	150° 18' 6.420" W	0.322	0.001	0	19020502003456	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	653	3905.914	62° 27' 39.298" N	150° 17' 35.629" W	0.995	0.004	0	19020502003428	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	3056.159	62° 26' 30.716" N	150° 17' 6.610" W	1.498	0.006	0	19020502003474	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	2802.460	62° 26' 6.846" N	150° 16' 41.045" W	0.383	0.002	0	19020502003482	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	1135.003	62° 26' 26.806" N	150° 16' 23.682" W	0.498	0.002	0	19020502003477	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	2817.705	62° 26' 15.898" N	150° 16' 56.686" W	2.226	0.009	0	19020502003478	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	3927.369	62° 26' 2.270" N	150° 17' 6.416" W	0.854	0.003	0	19020502003486	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	654	4170.875	62° 26' 31.955" N	150° 17' 27.856" W	0.567	0.002	0	19020502003473	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	654	282.720	62° 26' 23.801" N	150° 15' 45.468" W	12.225	0.049	570	19020502003476	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	4327.555	62° 25' 15.839" N	150° 17' 18.509" W	0.237	0.001	0	19020502003516	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	3943.186	62° 25' 41.109" N	150° 17' 19.389" W	0.356	0.001	0	19020502003497	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	5280.886	62° 25' 25.030" N	150° 17' 50.412" W	1.664	0.007	0	19020502003511	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	1757.548	62° 25' 26.318" N	150° 16' 29.804" W	0.602	0.002	0	19020502003512	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	3282.773	62° 25' 56.747" N	150° 16' 51.248" W	6.580	0.027	0	19020502003489	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	3497.804	62° 25' 10.341" N	150° 17' 0.556" W	6.425	0.026	0	19020502003517	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	4492.453	62° 25' 40.573" N	150° 17' 31.637" W	0.365	0.001	0	19020502003498	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	2481.615	62° 25' 28.508" N	150° 16' 48.889" W	1.061	0.004	0	19020502003508	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	4290.943	62° 25' 39.235" N	150° 17' 26.432" W	0.379	0.002	0	19020502003499	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	1714.036	62° 25' 51.597" N	150° 16' 8.711" W	0.383	0.002	0	19020502003492	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	5152.641	62° 25' 43.511" N	150° 17' 47.110" W	1.293	0.005	0	19020502003495	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	4435.272	62° 25' 13.892" N	150° 17' 18.359" W	0.261	0.001	0	19020502003519	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	2324.955	62° 25' 15.710" N	150° 16' 23.799" W	0.354	0.001	0	19020502003518	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	5144.881	62° 25' 41.469" N	150° 17' 43.570" W	0.187	0.001	0	19020502003496	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	655	2408.575	62° 25' 22.143" N	150° 16' 39.178" W	0.261	0.001	0	19020502003514	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	656	4467.843	62° 24' 35.840" N	150° 17' 20.194" W	23.857	0.097	557	19020502003526	39009	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	656	3680.825	62° 24' 23.246" N	150° 16' 43.062" W	3.949	0.016	0	19020502003529	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	656	2120.732	62° 25' 4.153" N	150° 15' 51.608" W	0.345	0.001	0	19020502003521	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	656	3793.904	62° 25' 3.912" N	150° 16' 47.286" W	1.407	0.006	0	19020502003520	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	2381.760	62° 23' 38.302" N	150° 16' 27.443" W	0.239	0.001	0	19020502003537	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	2609.039	62° 23' 34.041" N	150° 16' 27.601" W	0.441	0.002	0	19020502003540	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	2314.136	62° 23' 39.765" N	150° 16' 27.645" W	0.240	0.001	0	19020502003536	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	4406.500	62° 23' 59.185" N	150° 17' 18.913" W	0.429	0.002	0	19020502005873	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	4488.030	62° 24' 10.317" N	150° 17' 13.718" W	0.446	0.002	0	19020502003532	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	3302.003	62° 23' 54.687" N	150° 16' 56.978" W	1.355	0.005	0	19020502003534	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	3275.713	62° 24' 9.847" N	150° 16' 45.199" W	0.260	0.001	0	19020502003533	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	3404.128	62° 24' 12.826" N	150° 16' 45.728" W	0.517	0.002	0	19020502003531	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	2530.664	62° 23' 36.139" N	150° 16' 27.631" W	0.172	0.001	0	19020502003538	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	2678.976	62° 23' 35.578" N	150° 16' 31.029" W	0.200	0.001	0	19020502003539	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	657	1297.761	62° 23' 56.417" N	150° 16' 12.640" W	0.207	0.001	0	19020502003535	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	659	897.613	62° 22' 21.770" N	150° 15' 41.770" W	2.011	0.008	0	19020502005874	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Chulitna River	Lake/Pond: Hydrographic Category = Perennial	659	1482.285	62° 22' 28.591" N	150° 15' 44.582" W	4.405	0.018	0	19020502003541	39004	Perennial	19020502	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	312	5019.616	66° 26' 11.259" N	150° 39' 42.415" W	1.428	0.006	0	19040604005623	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	312	2402.800	66° 26' 36.706" N	150° 36' 50.681" W	1.511	0.006	0	19040604005611	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	312	4243.020	66° 26' 25.129" N	150° 35' 51.586" W	0.654	0.003	0	19040604005616	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	312	3466.815	66° 26' 23.123" N	150° 36' 10.160" W	0.571	0.002	0	19040604005619	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	313	4331.215	66° 26' 7.629" N	150° 34' 51.498" W	2.119	0.009	0	19040604005622	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	314	4142.767	66° 25' 35.966" N	150° 33' 11.020" W	15.806	0.064	0	19040604005631	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	314	4252.363	66° 25' 42.989" N	150° 33' 44.993" W	10.308	0.042	0	19040604005630	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	314	3752.523	66° 25' 40.212" N	150° 34' 13.853" W	2.733	0.011	0	19040604005632	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	314	3467.760	66° 25' 33.461" N	150° 33' 52.076" W	3.456	0.014	0	19040604005635	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	314	4086.335	66° 25' 40.524" N	150° 33' 58.741" W	0.911	0.004	0	19040604005633	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	315	5024.489	66° 25' 18.012" N	150° 32' 19.129" W	21.512	0.087	0	19040604005638	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	315	5020.307	66° 25' 0.473" N	150° 31' 24.344" W	2.660	0.011	0	19040604005640	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	4608.856	66° 24' 8.484" N	150° 29' 32.382" W	2.651	0.011	0	19040604005590	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	4371.021	66° 24' 34.414" N	150° 30' 43.583" W	0.326	0.001	0	19040604005643	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	3843.376	66° 24' 21.631" N	150° 30' 18.013" W	0.417	0.002	0	19040604005644	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	4122.213	66° 23' 50.185" N	150° 29' 42.819" W	1.015	0.004	0	19040604005591	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	1647.138	66° 24' 10.668" N	150° 31' 9.375" W	1.637	0.007	0	19040604005648	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	2041.724	66° 24' 12.009" N	150° 30' 35.319" W	9.580	0.039	0	19040604005645	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	4596.775	66° 24' 13.140" N	150° 29' 39.919" W	1.205	0.005	0	19040604005589	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	3402.703	66° 24' 14.821" N	150° 30' 18.003" W	0.369	0.001	0	19040604005646	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	1833.535	66° 24' 10.384" N	150° 30' 57.156" W	2.252	0.009	0	19040604005647	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	3763.723	66° 23' 50.078" N	150° 29' 51.399" W	0.747	0.003	0	19040604005592	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	5360.587	66° 24' 45.683" N	150° 30' 33.309" W	3.772	0.015	0	19040604005641	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	316	4647.584	66° 24' 38.844" N	150° 30' 51.306" W	0.419	0.002	0	19040604005642	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kanuti River	Lake/Pond: Hydrographic Category = Perennial	317	4097.884	66° 23' 45.182" N	150° 29' 39.190" W	0.747	0.003	0	19040604005593	39004	Perennial	19040604	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3485.045	70° 19' 42.080" N	148° 30' 50.836" W	43.486	0.176	0	19060401010144	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	2994.214	70° 19' 10.865" N	148° 32' 10.438" W	6.823	0.028	0	19060401010184	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	2608.134	70° 19' 0.715" N	148° 32' 7.554" W	9.116	0.037	0	19060401010197	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3643.784	70° 19' 30.761" N	148° 31' 53.379" W	2.207	0.009	0	19060401010165	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3912.907	70° 19' 40.116" N	148° 31' 23.534" W	4.725	0.019	0	19060401010154	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	2135.194	70° 18' 47.807" N	148° 31' 38.611" W	2.721	0.011	0	19060401010217	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3402.343	70° 19' 31.332" N	148° 29' 31.104" W	19.928	0.081	0	19060401010162	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	1981.122	70° 18' 53.124" N	148° 31' 43.572" W	2.833	0.011	0	19060401010207	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	2932.640	70° 19' 16.332" N	148° 31' 58.449" W	2.282	0.009	0	19060401010181	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3148.224	70° 19' 25.262" N	148° 31' 45.225" W	2.260	0.009	0	19060401010170	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3299.308	70° 19' 3.308" N	148° 29' 2.980" W	1.931	0.008	0	19060401010198	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3421.347	70° 19' 37.444" N	148° 30' 11.135" W	4.342	0.018	0	19060401010157	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	0	3591.609	70° 19' 31.296" N	148° 31' 46.231" W	3.005	0.012	0	19060401010164	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	4322.259	70° 18' 46.443" N	148° 33' 33.106" W	1.570	0.006	0	19060401010218	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	2432.909	70° 17' 50.617" N	148° 30' 52.749" W	15.529	0.063	0	19060401010287	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	2844.129	70° 18' 3.000" N	148° 33' 57.638" W	105.040	0.425	0	19060401010256	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	3513.857	70° 18' 34.043" N	148° 33' 30.781" W	2.713	0.011	0	19060401010233	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	3256.832	70° 18' 48.763" N	148° 32' 41.420" W	3.881	0.016	0	19060401010213	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	3089.515	70° 18' 41.004" N	148° 33' 1.578" W	2.393	0.010	0	19060401010224	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	2353.281	70° 18' 7.932" N	148° 33' 7.374" W	2.603	0.011	0	19060401010269	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	1437.495	70° 18' 10.729" N	148° 32' 45.130" W	5.541	0.022	0	19060401010261	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	2051.496	70° 18' 14.037" N	148° 30' 50.541" W	2.048	0.008	0	19060401010260	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	1	3306.332	70° 18' 38.390" N	148° 33' 20.045" W	3.122	0.013	0	19060401010225	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	2972.191	70° 17' 7.445" N	148° 31' 51.423" W	2.325	0.009	0	19060401010359	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	539.202	70° 17' 35.008" N	148° 33' 9.012" W	4.537	0.018	0	19060401010318	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	2889.179	70° 17' 43.982" N	148° 34' 12.205" W	0.662	0.003	0	19060401010304	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3070.494	70° 17' 2.496" N	148° 32' 3.588" W	2.013	0.008	0	19060401010365	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	2184.503	70° 17' 25.569" N	148° 34' 13.674" W	8.789	0.036	0	19060401010331	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3724.513	70° 17' 41.819" N	148° 34' 46.519" W	2.760	0.011	0	19060401010301	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3020.124	70° 17' 59.224" N	148° 33' 19.651" W	3.293	0.013	0	19060401010282	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	5215.448	70° 16' 44.750" N	148° 31' 31.220" W	10.269	0.042	0	19060401010385	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	1447.003	70° 17' 25.969" N	148° 31' 28.335" W	65.754	0.266	0	19060401010326	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3877.356	70° 17' 39.101" N	148° 34' 52.820" W	3.297	0.013	0	19060401010307	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3729.374	70° 17' 45.672" N	148° 34' 40.971" W	2.430	0.010	0	19060401010298	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	2	3118.803	70° 17' 43.754" N	148° 34' 20.314" W	0.868	0.004	0	19060401010303	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	5931.598	70° 17' 5.424" N	148° 37' 55.799" W	12.660	0.051	0	19060401010355	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	2855.252	70° 16' 44.355" N	148° 33' 28.033" W	1.655	0.007	0	19060401010388	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	4999.014	70° 16' 56.786" N	148° 37' 42.089" W	32.294	0.131	0	19060401010363	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3292.313	70° 16' 48.063" N	148° 36' 45.851" W	9.085	0.037	0	19060401010377	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	1735.211	70° 16' 57.403" N	148° 36' 0.005" W	4.210	0.017	0	19060401010367	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3585.568	70° 17' 29.768" N	148° 35' 51.756" W	8.362	0.034	0	19060401010324	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3556.510	70° 17' 30.777" N	148° 35' 33.850" W	2.442	0.010	0	19060401010325	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	2168.211	70° 16' 36.059" N	148° 34' 18.884" W	1.642	0.007	0	19060401010404	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	5462.512	70° 17' 9.571" N	148° 37' 31.424" W	3.771	0.015	0	19060401010349	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	2270.318	70° 16' 36.762" N	148° 34' 1.531" W	6.511	0.026	0	19060401010394	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	4880.834	70° 17' 10.866" N	148° 37' 12.358" W	2.561	0.010	0	19060401010348	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3194.107	70° 16' 23.665" N	148° 34' 10.333" W	2.987	0.012	0	19060401010432	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	4191.797	70° 17' 39.481" N	148° 35' 3.576" W	1.907	0.008	0	19060401010308	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3718.105	70° 16' 22.419" N	148° 33' 43.083" W	4.079	0.017	0	19060401010433	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	1362.539	70° 16' 56.075" N	148° 34' 4.165" W	2.499	0.010	0	19060401010371	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	3694.558	70° 16' 43.576" N	148° 32' 46.594" W	41.253	0.167	0	19060401010380	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	3	4657.644	70° 17' 2.914" N	148° 37' 12.009" W	4.079	0.017	0	19060401010358	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	3687.226	70° 16' 13.977" N	148° 34' 6.191" W	1.802	0.007	0	19060401010457	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	1269.951	70° 16' 1.847" N	148° 35' 24.001" W	4.319	0.017	0	19060401010489	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	933.932	70° 16' 22.508" N	148° 35' 51.190" W	1.621	0.007	0	19060401010439	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	5148.347	70° 15' 32.781" N	148° 38' 34.500" W	17.501	0.071	0	19060401010518	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	1510.095	70° 16' 19.008" N	148° 34' 49.756" W	9.702	0.039	0	19060401010429	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	2280.273	70° 16' 38.899" N	148° 36' 13.144" W	4.020	0.016	0	19060401010392	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	5138.868	70° 16' 9.651" N	148° 33' 25.180" W	1.613	0.007	0	19060401010471	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	3810.804	70° 16' 10.624" N	148° 37' 54.564" W	1.764	0.007	0	19060401010462	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	1167.376	70° 16' 27.938" N	148° 35' 30.250" W	5.908	0.024	0	19060401010415	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	3200.740	70° 15' 59.286" N	148° 37' 28.413" W	1.603	0.006	0	19060401010492	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	2218.745	70° 15' 59.455" N	148° 35' 0.484" W	2.075	0.008	0	19060401010495	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	4	1276.774	70° 15' 57.701" N	148° 36' 2.634" W	5.210	0.021	0	19060401010499	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2145.853	70° 15' 16.224" N	148° 34' 3.121" W	1.312	0.005	0	19060401010556	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	4107.746	70° 15' 32.422" N	148° 32' 45.748" W	10.286	0.042	0	19060401010529	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2158.401	70° 15' 56.117" N	148° 33' 56.231" W	72.847	0.295	0	19060401010474	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	1872.824	70° 15' 49.579" N	148° 35' 9.081" W	14.058	0.057	0	19060401010512	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2628.891	70° 15' 9.465" N	148° 33' 42.671" W	6.113	0.025	0	19060401010561	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2583.175	70° 15' 29.976" N	148° 33' 43.192" W	2.168	0.009	0	19060401010534	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2922.191	70° 15' 15.449" N	148° 36' 25.223" W	2.111	0.009	0	19060401010555	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	3124.112	70° 15' 18.033" N	148° 36' 37.029" W	4.107	0.017	0	19060401010549	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	4043.534	70° 14' 55.677" N	148° 32' 45.556" W	98.696	0.399	0	19060401009289	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	4254.695	70° 15' 57.262" N	148° 33' 15.954" W	10.787	0.044	0	19060401010501	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2298.525	70° 15' 11.180" N	148° 34' 10.586" W	1.062	0.004	0	19060401010567	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2239.583	70° 15' 42.355" N	148° 35' 55.593" W	1.505	0.006	0	19060401010520	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	5	733.742	70° 15' 33.099" N	148° 35' 43.848" W	58.484	0.237	29	19060401010523	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2668.018	70° 15' 19.753" N	148° 33' 45.462" W	1.157	0.005	0	19060401010551	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2832.439	70° 15' 27.560" N	148° 36' 29.602" W	1.540	0.006	0	19060401010535	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	5	2891.738	70° 15' 19.102" N	148° 33' 0.477" W	58.388	0.236	0	19060401010536	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	2300.909	70° 14' 28.480" N	148° 35' 26.252" W	2.216	0.009	0	19060401009313	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	1559.429	70° 14' 41.747" N	148° 35' 36.233" W	2.222	0.009	0	19060401009306	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	2082.539	70° 14' 27.224" N	148° 35' 41.033" W	3.680	0.015	0	19060401009315	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	4711.090	70° 14' 14.587" N	148° 34' 32.951" W	2.076	0.008	0	19060401009331	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	4305.137	70° 14' 34.215" N	148° 33' 41.287" W	65.980	0.267	0	19060401009307	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	4130.866	70° 14' 8.545" N	148° 35' 13.320" W	2.351	0.010	0	19060401009339	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	5327.681	70° 15' 18.424" N	148° 38' 30.133" W	2.982	0.012	0	19060401010548	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	5088.403	70° 14' 11.891" N	148° 34' 15.572" W	7.442	0.030	0	19060401009327	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	2472.526	70° 15' 10.827" N	148° 36' 41.198" W	3.301	0.013	0	19060401010564	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	6	2769.536	70° 14' 26.943" N	148° 35' 14.148" W	1.639	0.007	0	19060401009317	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	5266.195	70° 13' 37.854" N	148° 40' 17.860" W	15.741	0.064	0	19060401009373	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	804.768	70° 14' 6.917" N	148° 37' 35.284" W	1.803	0.007	0	19060401009341	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	962.802	70° 13' 52.713" N	148° 36' 6.068" W	190.402	0.771	0	19060401009342	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	1422.383	70° 14' 1.553" N	148° 38' 15.140" W	1.956	0.008	0	19060401009346	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	3380.498	70° 14' 22.921" N	148° 38' 45.195" W	3.832	0.016	0	19060401009316	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	4679.587	70° 14' 18.191" N	148° 39' 40.524" W	4.002	0.016	0	19060401009319	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	4459.990	70° 14' 23.942" N	148° 39' 41.489" W	17.947	0.073	0	19060401009314	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	3015.196	70° 14' 15.880" N	148° 38' 43.703" W	1.752	0.007	0	19060401009322	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	3520.264	70° 13' 54.645" N	148° 39' 18.219" W	1.944	0.008	0	19060401009357	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	1176.585	70° 13' 41.556" N	148° 37' 18.888" W	8.968	0.036	0	19060401009374	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	524.641	70° 13' 51.501" N	148° 37' 59.162" W	22.452	0.091	0	19060401009355	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	7	1919.129	70° 14' 13.830" N	148° 36' 40.564" W	9.860	0.040	0	19060401009326	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	4802.898	70° 13' 10.317" N	148° 35' 12.510" W	2.029	0.008	0	19060401009418	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	2267.382	70° 12' 44.582" N	148° 37' 36.106" W	7.825	0.032	0	19060401009443	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	5132.527	70° 13' 3.459" N	148° 35' 3.933" W	1.533	0.006	0	19060401009424	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	5797.436	70° 13' 3.118" N	148° 40' 27.381" W	2.826	0.011	0	19060401009421	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	2793.202	70° 13' 15.475" N	148° 36' 15.029" W	2.163	0.009	0	19060401009408	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	4280.919	70° 13' 6.520" N	148° 35' 25.731" W	5.719	0.023	0	19060401009422	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	2267.551	70° 12' 39.594" N	148° 35' 57.117" W	346.895	1.404	0	19060401020847	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	809.810	70° 13' 21.611" N	148° 37' 40.913" W	4.652	0.019	0	19060401009394	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	8	347.602	70° 13' 12.493" N	148° 38' 46.293" W	417.710	1.691	45	19060401009376	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	8	3598.448	70° 13' 28.424" N	148° 35' 27.862" W	54.458	0.220	0	19060401020846	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	2987.663	70° 12' 16.913" N	148° 39' 34.953" W	2.163	0.009	0	19060401009468	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	1872.148	70° 11' 58.496" N	148° 37' 48.229" W	2.399	0.010	0	19060401009489	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	4455.336	70° 11' 54.063" N	148° 40' 5.424" W	3.944	0.016	0	19060401009491	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	3925.067	70° 11' 59.392" N	148° 39' 47.446" W	1.554	0.006	0	19060401009488	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	1639.538	70° 12' 33.911" N	148° 38' 29.309" W	1.486	0.006	0	19060401009451	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	3904.721	70° 12' 2.751" N	148° 39' 56.472" W	4.454	0.018	0	19060401009485	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	3119.765	70° 12' 9.831" N	148° 39' 39.839" W	4.491	0.018	0	19060401009476	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	5130.398	70° 12' 22.232" N	148° 40' 35.786" W	1.554	0.006	0	19060401009458	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	2191.162	70° 12' 16.999" N	148° 39' 10.639" W	2.927	0.012	0	19060401009467	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	1330.730	70° 12' 29.088" N	148° 38' 49.779" W	16.821	0.068	0	19060401009454	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	1206.971	70° 11' 59.548" N	148° 38' 17.405" W	24.907	0.101	0	19060401009483	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	908.403	70° 12' 18.897" N	148° 38' 32.904" W	1.590	0.006	0	19060401009466	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	2467.178	70° 12' 14.026" N	148° 39' 21.621" W	3.743	0.015	0	19060401009470	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	9	1601.756	70° 12' 9.759" N	148° 37' 16.652" W	3.751	0.015	0	19060401009479	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	2274.378	70° 11' 3.514" N	148° 37' 25.961" W	2.318	0.009	0	19060401009553	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage =	10	1344.936	70° 11' 42.189" N	148° 36' 41.522" W	266.880	1.080	46	19060401009486	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	3328.485	70° 11' 47.403" N	148° 39' 12.921" W	3.952	0.016	0	19060401009497	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	926.295	70° 11' 38.172" N	148° 37' 36.538" W	1.560	0.006	0	19060401009514	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	3683.065	70° 11' 25.257" N	148° 39' 34.557" W	1.583	0.006	0	19060401009523	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	408.931	70° 11' 28.113" N	148° 37' 27.678" W	9.472	0.038	0	19060401009519	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	2149.144	70° 11' 3.637" N	148° 37' 17.687" W	3.902	0.016	0	19060401009551	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	2828.099	70° 11' 48.370" N	148° 38' 47.371" W	1.698	0.007	0	19060401009499	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	1617.112	70° 11' 15.128" N	148° 37' 9.174" W	1.851	0.007	0	19060401009537	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	2224.384	70° 11' 37.315" N	148° 38' 50.811" W	2.520	0.010	0	19060401009513	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	954.033	70° 11' 26.469" N	148° 37' 12.975" W	2.463	0.010	0	19060401009526	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	4237.212	70° 11' 35.538" N	148° 35' 41.116" W	1.517	0.006	0	19060401009517	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	968.826	70° 11' 37.578" N	148° 37' 25.123" W	4.508	0.018	0	19060401009510	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	3780.300	70° 11' 46.158" N	148° 39' 31.290" W	6.096	0.025	0	19060401009498	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	1065.067	70° 11' 6.591" N	148° 38' 20.110" W	103.379	0.418	0	19060401009532	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	3841.053	70° 11' 12.397" N	148° 39' 31.917" W	1.874	0.008	0	19060401009539	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	4990.298	70° 11' 25.233" N	148° 40' 13.936" W	1.932	0.008	0	19060401009525	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	10	3235.792	70° 11' 17.322" N	148° 39' 23.015" W	5.522	0.022	0	19060401009534	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	5300.335	70° 10' 55.670" N	148° 40' 7.482" W	4.641	0.019	0	19060401009561	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	5538.933	70° 10' 46.688" N	148° 40' 19.989" W	3.405	0.014	0	19060401009568	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	1657.271	70° 10' 52.216" N	148° 37' 1.954" W	5.609	0.023	0	19060401009565	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	4627.314	70° 10' 39.984" N	148° 35' 8.054" W	11.421	0.046	0	19060401009576	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	2016.609	70° 10' 17.230" N	148° 37' 0.163" W	2.537	0.010	0	19060401009595	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	5117.145	70° 10' 56.153" N	148° 35' 12.857" W	3.191	0.013	0	19060401009564	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	1091.131	70° 10' 25.050" N	148° 37' 54.181" W	1.888	0.008	0	19060401009588	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	5179.901	70° 10' 38.414" N	148° 40' 11.163" W	5.405	0.022	0	19060401009573	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	5338.185	70° 10' 50.171" N	148° 40' 11.134" W	2.043	0.008	0	19060401009566	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	2284.639	70° 10' 11.921" N	148° 38' 3.059" W	7.778	0.031	0	19060401009602	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	2438.844	70° 10' 14.207" N	148° 38' 22.133" W	8.145	0.033	0	19060401009592	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	2167.087	70° 10' 11.151" N	148° 37' 48.646" W	4.086	0.017	0	19060401009604	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	1581.889	70° 10' 38.882" N	148° 36' 23.634" W	75.095	0.304	0	19060401009567	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	2370.443	70° 10' 10.221" N	148° 37' 33.651" W	1.938	0.008	0	19060401009606	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	4211.835	70° 10' 55.074" N	148° 39' 33.163" W	2.662	0.011	0	19060401009562	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	11	1107.715	70° 10' 21.077" N	148° 37' 41.033" W	3.548	0.014	0	19060401009590	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	2214.905	70° 9' 41.977" N	148° 38' 10.146" W	1.487	0.006	0	19060401009631	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	1105.926	70° 9' 38.171" N	148° 37' 36.916" W	4.694	0.019	0	19060401009635	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	12	4196.898	70° 9' 54.798" N	148° 34' 11.099" W	115.700	0.468	61	19060401009610	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	2172.700	70° 10' 2.448" N	148° 37' 48.580" W	2.294	0.009	0	19060401009616	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4068.325	70° 9' 27.356" N	148° 38' 54.366" W	3.248	0.013	0	19060401009645	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	2979.962	70° 9' 16.259" N	148° 37' 33.703" W	2.411	0.010	0	19060401009665	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	5300.451	70° 10' 10.107" N	148° 34' 42.600" W	1.556	0.006	0	19060401009609	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	659.841	70° 9' 36.451" N	148° 37' 7.087" W	3.034	0.012	0	19060401009637	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	2369.413	70° 10' 12.859" N	148° 35' 59.917" W	59.592	0.241	0	19060401009591	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	3504.273	70° 9' 25.599" N	148° 38' 31.787" W	2.100	0.008	0	19060401009648	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	886.690	70° 9' 38.820" N	148° 36' 36.608" W	2.475	0.010	0	19060401009633	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	1710.214	70° 9' 30.326" N	148° 37' 33.715" W	1.886	0.008	0	19060401009642	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	5150.475	70° 9' 27.287" N	148° 39' 24.713" W	2.970	0.012	0	19060401009643	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	1109.631	70° 9' 54.380" N	148° 36' 34.254" W	3.230	0.013	0	19060401009624	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	577.940	70° 9' 52.967" N	148° 37' 14.343" W	2.900	0.012	0	19060401009625	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	2721.159	70° 9' 26.530" N	148° 38' 3.685" W	1.496	0.006	0	19060401009647	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4888.471	70° 9' 16.361" N	148° 39' 5.042" W	3.529	0.014	0	19060401009659	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4532.001	70° 10' 2.970" N	148° 34' 55.008" W	2.547	0.010	0	19060401009617	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	3818.197	70° 9' 32.375" N	148° 35' 12.225" W	1.905	0.008	0	19060401009641	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	1874.268	70° 9' 23.349" N	148° 36' 40.327" W	9.798	0.040	0	19060401009652	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	1681.324	70° 9' 46.968" N	148° 36' 3.961" W	17.606	0.071	0	19060401009627	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4641.852	70° 9' 24.419" N	148° 39' 8.577" W	2.249	0.009	0	19060401009649	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	3326.202	70° 9' 52.651" N	148° 38' 42.050" W	1.619	0.007	0	19060401009626	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	12	3790.619	70° 10' 3.744" N	148° 40' 8.786" W	316.060	1.279	65	19060401009589	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4480.801	70° 10' 16.185" N	148° 35' 21.691" W	1.663	0.007	0	19060401009598	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	3876.448	70° 9' 32.645" N	148° 38' 52.236" W	1.757	0.007	0	19060401009640	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	4377.560	70° 9' 34.958" N	148° 39' 7.599" W	1.713	0.007	0	19060401009638	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	12	46.671	70° 9' 47.391" N	148° 37' 6.897" W	2.278	0.009	0	19060401009629	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	2682.926	70° 9' 17.187" N	148° 35' 10.572" W	3.535	0.014	0	19060401009664	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	3376.768	70° 9' 22.025" N	148° 34' 55.746" W	2.193	0.009	0	19060401009658	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	13	5659.223	70° 8' 52.274" N	148° 39' 47.671" W	251.415	1.018	65	19060401009673	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	2645.498	70° 9' 25.573" N	148° 35' 52.270" W	4.713	0.019	0	19060401009650	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	4821.372	70° 9' 1.799" N	148° 38' 36.638" W	6.121	0.025	0	19060401009676	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	3800.873	70° 9' 25.707" N	148° 34' 50.145" W	2.698	0.011	0	19060401009654	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	1631.811	70° 9' 15.512" N	148° 36' 13.600" W	1.574	0.006	0	19060401009670	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	1247.114	70° 8' 49.077" N	148° 36' 42.827" W	1.761	0.007	0	19060401009683	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	3063.969	70° 9' 25.362" N	148° 35' 20.098" W	4.572	0.019	0	19060401009651	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	2507.080	70° 9' 18.514" N	148° 35' 21.925" W	2.931	0.012	0	19060401009660	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	4829.862	70° 8' 42.828" N	148° 38' 29.503" W	1.673	0.007	0	19060401009685	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	13	2802.772	70° 9' 22.849" N	148° 35' 27.841" W	1.987	0.008	0	19060401009656	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	14	461.666	70° 7' 44.206" N	148° 35' 36.132" W	527.186	2.134	80	19060401009709	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	15	4993.511	70° 7' 24.819" N	148° 36' 38.719" W	1.680	0.007	0	19060401009735	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	28	3419.420	69° 57' 20.966" N	148° 46' 31.098" W	174.554	0.707	166	19060401021822	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	45	5469.312	69° 42' 54.542" N	148° 45' 35.090" W	70.120	0.284	0	19060401009148	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	46	4879.990	69° 42' 35.046" N	148° 45' 13.631" W	25.247	0.102	0	19060401009152	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	47	4789.866	69° 41' 54.654" N	148° 44' 44.904" W	3.688	0.015	0	19060401009156	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	47	5105.354	69° 41' 36.607" N	148° 45' 6.488" W	2.730	0.011	0	19060401009157	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	49	5472.493	69° 40' 1.327" N	148° 45' 21.739" W	60.926	0.247	392	19060401009166	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	51	2486.402	69° 37' 59.239" N	148° 41' 50.565" W	2.973	0.012	0	19060401009183	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	51	5067.961	69° 38' 3.852" N	148° 43' 10.635" W	1.770	0.007	0	19060401009182	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	51	2583.911	69° 38' 21.688" N	148° 42' 6.999" W	2.304	0.009	0	19060401009174	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	51	4587.722	69° 38' 7.475" N	148° 43' 1.564" W	3.736	0.015	0	19060401009179	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	52	3483.946	69° 37' 19.496" N	148° 41' 33.146" W	3.179	0.013	0	19060401009188	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	53	4549.134	69° 36' 12.192" N	148° 40' 51.794" W	4.941	0.020	0	19060401009212	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	53	5086.475	69° 36' 14.783" N	148° 41' 10.982" W	3.233	0.013	0	19060401009209	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	53	5600.451	69° 35' 50.574" N	148° 41' 37.132" W	135.359	0.548	0	19060401009214	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	54	1887.031	69° 35' 34.223" N	148° 39' 8.455" W	2.924	0.012	0	19060401009222	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	54	2746.282	69° 35' 20.479" N	148° 39' 0.571" W	1.640	0.007	0	19060401009226	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	54	3070.025	69° 35' 29.099" N	148° 39' 45.456" W	3.875	0.016	0	19060401009224	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	55	3350.775	69° 34' 43.080" N	148° 39' 30.323" W	3.885	0.016	0	19060401009231	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	55	3099.691	69° 35' 15.082" N	148° 39' 14.150" W	2.473	0.010	0	19060401009227	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	55	3651.249	69° 35' 9.922" N	148° 40' 43.925" W	249.951	1.012	470	19060401009225	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	55	139.520	69° 34' 50.321" N	148° 38' 15.595" W	86.107	0.349	0	19060401009229	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	56	3038.193	69° 34' 5.584" N	148° 38' 52.881" W	16.594	0.067	0	19060401009238	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	56	1287.783	69° 34' 6.709" N	148° 37' 54.803" W	2.589	0.010	0	19060401009240	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	57	1059.946	69° 33' 23.169" N	148° 36' 59.517" W	1.815	0.007	0	19060401009248	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	59	4174.734	69░ 31' 9.413" N	148░ 37' 2.406" W	2.847	0.012	0	19060401021823	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	59	4482.831	69░ 31' 28.831" N	148░ 37' 32.102" W	1.712	0.007	0	19060401009272	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	60	4956.685	69░ 30' 56.768" N	148░ 37' 11.090" W	1.692	0.007	0	19060401009279	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	61	5218.535	69░ 29' 43.706" N	148░ 37' 21.106" W	56.261	0.228	0	19060401021826	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	61	5708.786	69░ 30' 6.651" N	148░ 37' 0.179" W	2.597	0.011	0	19060401021829	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	63	2295.538	69░ 28' 40.256" N	148░ 34' 57.400" W	121.185	0.490	590	19060401021827	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	73	3053.635	69░ 20' 48.472" N	148░ 46' 45.064" W	15.534	0.063	0	19060401009133	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	126	2636.308	68░ 41' 13.261" N	149░ 9' 49.994" W	0.905	0.004	0	19060401010586	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	126	4191.164	68░ 41' 26.933" N	149░ 10' 16.084" W	0.846	0.003	0	19060401010583	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	127	2931.434	68░ 41' 11.779" N	149░ 11' 7.830" W	2.544	0.010	0	19060401010585	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	128	2891.650	68░ 40' 45.808" N	149░ 13' 47.628" W	9.869	0.040	0	19060401010587	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	128	3824.315	68░ 40' 45.757" N	149░ 14' 22.504" W	3.718	0.015	0	19060401010588	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	129	2082.939	68░ 39' 53.722" N	149░ 16' 0.009" W	1.025	0.004	0	19060401021831	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	129	1772.433	68░ 39' 49.426" N	149░ 15' 53.264" W	2.404	0.010	0	19060401021832	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	129	4939.724	68° 40' 37.450" N	149° 15' 52.215" W	1.642	0.007	0	19060401010589	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	129	2318.739	68° 40' 18.693" N	149° 14' 53.178" W	6.292	0.025	0	19060401010590	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	4457.061	68° 38' 3.638" N	149° 22' 59.391" W	0.849	0.003	0	19060401010600	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	1586.857	68° 38' 33.107" N	149° 23' 46.457" W	0.661	0.003	0	19060401010593	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	4216.721	68° 38' 6.784" N	149° 22' 53.158" W	0.258	0.001	0	19060401010599	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	4114.067	68° 38' 7.333" N	149° 22' 59.574" W	0.338	0.001	0	19060401010598	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	2012.406	68° 38' 29.661" N	149° 23' 53.934" W	0.972	0.004	0	19060401010594	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	4650.724	68° 38' 1.714" N	149° 23' 4.142" W	0.305	0.001	0	19060401010601	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	1892.040	68° 38' 44.967" N	149° 24' 17.179" W	0.337	0.001	0	19060401013044	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	2649.695	68° 38' 20.044" N	149° 23' 13.090" W	1.138	0.005	0	19060401010596	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	3717.714	68° 38' 10.743" N	149° 23' 7.336" W	0.375	0.002	0	19060401010597	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	4813.102	68° 37' 59.518" N	149° 23' 12.352" W	0.310	0.001	0	19060401010602	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	133	1947.657	68° 38' 29.043" N	149° 23' 45.667" W	0.383	0.002	0	19060401010595	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	4806.023	68° 39' 24.243" N	149° 25' 32.768" W	0.485	0.002	0	19060401013027	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	2535.863	68° 38' 12.788" N	149° 24' 52.607" W	1.723	0.007	0	19060401013052	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	4888.957	68° 37' 48.565" N	149° 24' 55.030" W	0.874	0.004	0	19060401013065	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	5409.442	68° 37' 42.957" N	149° 24' 47.838" W	2.571	0.010	0	19060401013068	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	3112.436	68° 39' 6.408" N	149° 25' 4.353" W	0.240	0.001	0	19060401013038	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	5625.012	68° 39' 32.195" N	149° 25' 33.742" W	0.301	0.001	0	19060401013024	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	5502.270	68° 39' 30.929" N	149° 25' 39.871" W	0.286	0.001	0	19060401013025	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	2653.442	68° 38' 59.721" N	149° 24' 51.953" W	0.262	0.001	0	19060401013041	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	1589.634	68° 38' 36.710" N	149° 26' 24.449" W	6.652	0.027	0	19060401013047	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	3060.759	68° 39' 6.687" N	149° 25' 14.901" W	0.350	0.001	0	19060401013037	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	3523.783	68° 37' 56.759" N	149° 25' 7.047" W	9.384	0.038	0	19060401013056	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	134	3327.792	68° 38' 50.004" N	149° 26' 59.244" W	1.394	0.006	0	19060401013042	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	135	1603.339	68° 38' 32.233" N	149° 27' 28.740" W	28.758	0.116	0	19060401013045	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	136	2053.985	68° 37' 10.724" N	149° 29' 32.566" W	8.397	0.034	0	19060401013078	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	136	2511.003	68° 37' 52.802" N	149° 30' 1.787" W	3.114	0.013	0	19060401013060	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	136	973.016	68° 37' 40.520" N	149° 29' 51.279" W	18.467	0.075	2942	19060401013064	39009	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	136	2163.302	68° 37' 25.904" N	149° 28' 10.028" W	5.519	0.022	0	19060401013073	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	137	4065.059	68° 37' 26.065" N	149° 31' 52.219" W	0.978	0.004	0	19060401013072	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	137	5076.506	68° 37' 22.426" N	149° 32' 35.724" W	0.762	0.003	0	19060401013074	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Kuparuk River	Lake/Pond: Hydrographic Category = Perennial	138	4606.161	68° 35' 53.019" N	149° 33' 54.787" W	1.813	0.007	0	19060401013092	39004	Perennial	19060401	Gas Conditioning Facility Mile 0 to Mile 540
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	5275.272	62° 23' 40.862" N	150° 17' 35.789" W	0.455	0.002	0	19020505005313	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	4828.101	62° 23' 52.970" N	150° 17' 29.218" W	0.447	0.002	0	19020505005296	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	4747.856	62° 23' 55.054" N	150° 17' 27.477" W	0.375	0.002	0	19020505005293	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	4880.815	62° 23' 49.503" N	150° 17' 30.004" W	0.322	0.001	0	19020505005306	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	4672.107	62° 23' 59.607" N	150° 17' 24.234" W	0.265	0.001	0	19020505005286	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	657	4762.366	62° 23' 56.652" N	150° 17' 27.346" W	0.211	0.001	0	19020505005292	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	5222.422	62° 23' 28.249" N	150° 17' 33.066" W	0.291	0.001	0	19020505005330	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	5295.986	62° 23' 31.645" N	150° 17' 33.218" W	1.018	0.004	0	19020505005323	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	3265.209	62° 22' 56.366" N	150° 17' 10.476" W	4.240	0.017	0	19020505005367	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	3224.679	62° 23' 3.744" N	150° 17' 7.596" W	0.507	0.002	0	19020505005362	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	3651.786	62° 23' 2.848" N	150° 17' 16.508" W	0.558	0.002	0	19020505005363	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	5722.674	62° 22' 40.790" N	150° 18' 2.733" W	13.042	0.053	0	19020505005380	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	658	4912.186	62° 23' 15.614" N	150° 17' 40.015" W	0.687	0.003	0	19020505005341	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	659	3667.865	62° 22' 16.065" N	150° 17' 4.345" W	0.222	0.001	0	19020505005429	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	659	3732.669	62° 22' 30.664" N	150° 16' 59.665" W	3.573	0.014	0	19020505005406	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	3247.640	62° 21' 10.907" N	150° 16' 23.032" W	0.716	0.003	0	19020505005500	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	3701.043	62° 21' 25.190" N	150° 16' 33.875" W	0.236	0.001	0	19020505005481	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	4807.140	62° 21' 7.184" N	150° 16' 55.161" W	1.388	0.006	0	19020505005504	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	3320.046	62° 21' 13.004" N	150° 16' 24.326" W	0.380	0.002	0	19020505005497	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	3705.390	62° 21' 33.665" N	150° 16' 30.352" W	0.503	0.002	0	19020505005471	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	5255.269	62° 20' 54.165" N	150° 16' 50.892" W	0.598	0.002	0	19020505005515	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	3653.842	62° 21' 29.610" N	150° 16' 32.503" W	1.036	0.004	0	19020505005475	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	5473.378	62° 20' 54.535" N	150° 16' 56.785" W	0.342	0.001	0	19020505005514	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	660	5062.048	62° 21' 27.474" N	150° 17' 5.781" W	2.617	0.011	0	19020505005477	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	661	1019.318	62° 20' 36.829" N	150° 14' 39.435" W	2.123	0.009	0	19020505005534	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	661	2026.256	62° 20' 40.602" N	150° 15' 45.501" W	1.389	0.006	0	19020505005531	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	661	1732.204	62° 20' 46.212" N	150° 14' 42.388" W	0.459	0.002	0	19020505005529	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	661	1547.082	62° 20' 45.970" N	150° 14' 53.488" W	0.319	0.001	0	19020505005528	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	661	911.809	62° 20' 31.168" N	150° 14' 37.269" W	2.259	0.009	0	19020505005546	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	662	4838.043	62° 19' 22.451" N	150° 16' 7.669" W	2.115	0.009	0	19020505005640	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	662	4364.050	62° 19' 32.776" N	150° 16' 3.335" W	5.139	0.021	0	19020505005621	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	662	2679.428	62° 20' 8.534" N	150° 14' 14.033" W	1.195	0.005	0	19020505005567	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	662	5342.276	62° 19' 25.239" N	150° 16' 16.992" W	0.226	0.001	0	19020505005636	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	664	3045.065	62° 18' 21.175" N	150° 13' 37.960" W	0.222	0.001	0	19020505005686	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	664	2422.801	62° 18' 14.320" N	150° 13' 39.110" W	3.243	0.013	315	19020505005693	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	664	1091.259	62° 17' 47.047" N	150° 14' 2.684" W	10.887	0.044	0	19020505005712	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	664	2021.200	62° 17' 36.420" N	150° 14' 48.298" W	7.914	0.032	0	19020505005735	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	665	4049.724	62° 17' 16.351" N	150° 16' 21.368" W	0.187	0.001	0	19020505005770	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	665	4010.443	62° 17' 10.302" N	150° 16' 20.793" W	0.220	0.001	0	19020505005794	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	665	3936.542	62° 17' 11.255" N	150° 16' 19.255" W	0.210	0.001	0	19020505005791	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	665	5414.054	62° 17' 4.978" N	150° 16' 51.774" W	0.757	0.003	0	19020505005800	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	665	3837.595	62° 17' 14.171" N	150° 16' 19.277" W	0.878	0.004	0	19020505005782	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	666	1348.746	62° 16' 9.689" N	150° 15' 4.734" W	0.332	0.001	0	19020505005877	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	666	1065.806	62° 16' 6.433" N	150° 14' 44.673" W	4.144	0.017	0	19020505005881	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	666	1572.038	62° 16' 2.668" N	150° 14' 44.625" W	1.329	0.005	0	19020505005891	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	666	811.937	62° 16' 9.357" N	150° 14' 48.458" W	2.563	0.010	0	19020505005876	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	4409.699	62° 15' 27.071" N	150° 16' 27.471" W	0.178	0.001	0	19020505005978	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	5542.525	62° 15' 19.662" N	150° 16' 50.349" W	0.426	0.002	0	19020505005999	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	5088.362	62° 15' 22.593" N	150° 16' 43.629" W	1.268	0.005	0	19020505005991	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	4598.530	62° 15' 27.664" N	150° 16' 31.647" W	0.186	0.001	0	19020505005975	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	4378.269	62° 15' 26.083" N	150° 16' 26.830" W	0.224	0.001	0	19020505005983	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	667	5556.271	62° 15' 22.340" N	150° 16' 52.772" W	1.102	0.004	0	19020505005990	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	669	4556.304	62° 13' 55.734" N	150° 12' 52.313" W	1.438	0.006	0	19020505008968	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	670	5131.702	62° 12' 40.968" N	150° 15' 33.910" W	11.364	0.046	0	19020505009013	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage =	672	2715.564	62° 11' 24.081" N	150° 13' 45.084" W	2.813	0.011	372	19020505009082	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	673	3134.349	62░ 11' 18.173" N	150░ 11' 12.692" W	7.433	0.030	367	19020505009089	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	673	4472.868	62░ 10' 4.490" N	150░ 12' 35.788" W	5.231	0.021	387	19020505009148	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	676	1600.158	62░ 10' 11.525" N	150░ 6' 23.363" W	7.968	0.032	0	19020505009149	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	676	2609.596	62░ 10' 17.346" N	150░ 6' 5.507" W	6.837	0.028	335	19020505009145	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	676	1209.014	62░ 10' 3.441" N	150░ 7' 16.416" W	11.172	0.045	0	19020505009154	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	676	1187.249	62░ 10' 8.611" N	150░ 6' 50.396" W	6.622	0.027	0	19020505009152	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	676	1615.179	62░ 10' 4.296" N	150░ 6' 18.807" W	0.450	0.002	0	19020505009155	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	677	1903.120	62░ 9' 31.522" N	150░ 5' 53.805" W	0.843	0.003	0	19020505009187	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	677	3059.436	62░ 9' 13.395" N	150░ 6' 51.324" W	2.540	0.010	0	19020505009194	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	677	4744.040	62░ 9' 46.755" N	150░ 4' 16.731" W	42.709	0.173	335	19020505009167	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	677	1571.054	62░ 8' 55.281" N	150░ 5' 46.972" W	1.294	0.005	305	19020505009212	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	516.964	62° 8' 35.022" N	150° 4' 24.902" W	4.052	0.016	0	19020505009223	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	3829.206	62° 9' 20.705" N	150° 4' 9.640" W	2.573	0.010	0	19020505009191	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	1285.016	62° 8' 27.991" N	150° 4' 28.993" W	2.721	0.011	0	19020505009233	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	1853.284	62° 8' 25.235" N	150° 3' 51.688" W	1.567	0.006	0	19020505009236	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	2662.888	62° 9' 7.485" N	150° 4' 41.612" W	4.808	0.019	0	19020505009203	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	2774.779	62° 8' 15.926" N	150° 4' 49.050" W	4.568	0.018	0	19020505009240	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	678	3865.999	62° 8' 13.383" N	150° 5' 16.396" W	1.249	0.005	0	19020505009248	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	679	2778.973	62° 8' 43.876" N	150° 3' 10.938" W	2.785	0.011	0	19020505009218	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	679	592.500	62° 8' 9.331" N	150° 3' 17.225" W	43.041	0.174	0	19020505009244	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	679	915.732	62° 8' 7.555" N	150° 2' 55.357" W	0.777	0.003	0	19020505009259	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	679	1064.672	62° 8' 34.673" N	150° 3' 2.439" W	74.080	0.300	335	19020505009221	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	680	1145.678	62° 7' 43.224" N	150° 2' 43.396" W	3.079	0.012	0	19020505009290	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	680	4248.912	62° 7' 32.265" N	150° 4' 11.181" W	4.052	0.016	0	19020505009303	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	680	2024.494	62° 7' 39.816" N	150° 3' 21.590" W	4.751	0.019	0	19020505009294	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	680	4274.709	62░ 7' 46.553" N	150░ 4' 16.560" W	43.315	0.175	320	19020505009275	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	681	2690.687	62░ 6' 41.073" N	150░ 2' 15.734" W	2.627	0.011	0	19020505009369	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	681	170.682	62░ 6' 47.361" N	150░ 3' 25.547" W	7.701	0.031	0	19020505009351	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	681	2965.867	62░ 7' 10.829" N	150░ 3' 31.986" W	0.796	0.003	0	19020505009328	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	682	4729.394	62░ 6' 2.797" N	150░ 2' 1.499" W	2.413	0.010	0	19020505009418	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	682	1490.609	62░ 5' 31.027" N	150░ 3' 32.608" W	7.431	0.030	0	19020505009437	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	683	1779.525	62░ 5' 18.206" N	150░ 3' 32.841" W	1.191	0.005	0	19020505009463	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	684	2714.313	62░ 4' 32.627" N	150░ 4' 8.064" W	2.656	0.011	0	19020505009519	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	685	4852.212	62░ 2' 56.674" N	150░ 2' 8.111" W	0.332	0.001	0	19020505009652	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	685	4764.940	62░ 2' 59.235" N	150░ 2' 7.542" W	0.624	0.003	0	19020505009648	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	685	2741.387	62░ 3' 35.508" N	150░ 2' 58.036" W	1.658	0.007	0	19020505009594	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	2627.243	62░ 2' 7.112" N	150░ 2' 51.254" W	2.399	0.010	0	19020505009717	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	1600.577	62░ 2' 41.708" N	150░ 3' 41.614" W	0.957	0.004	0	19020505009677	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	5650.167	62░ 2' 49.774" N	150░ 1' 51.683" W	0.719	0.003	0	19020505009662	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4724.243	62° 2' 41.869" N	150° 2' 7.061" W	0.297	0.001	0	19020505009678	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	3404.393	62° 2' 40.450" N	150° 2' 32.783" W	0.933	0.004	0	19020505009679	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	2719.875	62° 2' 10.091" N	150° 2' 50.138" W	0.634	0.003	0	19020505009712	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4030.800	62° 2' 32.126" N	150° 2' 14.907" W	1.850	0.007	0	19020505009686	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4818.861	62° 2' 44.284" N	150° 2' 6.459" W	0.607	0.002	0	19020505009676	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4268.196	62° 2' 35.778" N	150° 2' 12.779" W	0.347	0.001	0	19020505009684	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	5113.094	62° 2' 44.692" N	150° 1' 59.129" W	1.080	0.004	0	19020505009673	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4704.487	62° 2' 32.974" N	150° 1' 57.878" W	3.881	0.016	0	19020505009685	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	3230.899	62° 2' 26.698" N	150° 2' 31.236" W	0.417	0.002	0	19020505009692	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	2637.322	62° 2' 45.063" N	150° 3' 3.690" W	0.903	0.004	0	19020505009670	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	3902.646	62° 2' 35.054" N	150° 5' 3.157" W	0.927	0.004	0	19020505009681	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	686	4569.494	62° 2' 30.544" N	150° 2' 3.940" W	0.378	0.002	0	19020505009688	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	688	5363.981	62° 0' 47.219" N	150° 1' 45.588" W	21.855	0.088	0	19020505009778	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	696	4041.441	61° 53' 57.475" N	150° 2' 43.396" W	10.333	0.042	0	19020505008864	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	698	2204.303	61° 52' 26.332" N	150° 4' 44.081" W	0.804	0.003	0	19020505008876	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	698	3147.697	61° 52' 51.447" N	150° 4' 14.714" W	5.145	0.021	0	19020505008870	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	698	4204.933	61° 52' 34.349" N	150° 3' 52.256" W	1.082	0.004	0	19020505008874	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	699	989.075	61° 51' 59.292" N	150° 4' 49.949" W	17.336	0.070	0	19020505008879	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	699	2625.391	61° 52' 2.124" N	150° 4' 21.103" W	0.804	0.003	0	19020505008880	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	699	1992.032	61° 52' 6.571" N	150° 4' 45.076" W	2.077	0.008	0	19020505008878	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	699	1794.573	61° 51' 57.785" N	150° 4' 30.824" W	9.229	0.037	0	19020505008881	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	700	2509.529	61° 50' 39.294" N	150° 4' 8.313" W	0.671	0.003	0	19020505008890	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	701	237.382	61° 50' 1.542" N	150° 4' 48.475" W	151.812	0.614	184	19020505008898	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	701	3265.026	61° 50' 23.431" N	150° 2' 51.911" W	7.118	0.029	0	19020505008894	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	701	1229.877	61° 49' 54.750" N	150° 3' 54.007" W	8.134	0.033	0	19020505008900	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	701	2734.227	61° 50' 4.131" N	150° 3' 11.748" W	5.614	0.023	0	19020505008899	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	701	815.409	61° 50' 20.448" N	150° 4' 23.842" W	3.204	0.013	0	19020505008896	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	702	2674.986	61° 48' 51.213" N	150° 4' 32.494" W	3.045	0.012	0	19020505008905	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	707	4799.652	61° 45' 0.809" N	150° 2' 22.010" W	18.152	0.073	0	19020505008456	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	707	4568.989	61░ 44' 50.045" N	150░ 4' 39.380" W	1.377	0.006	0	19020505008457	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	707	3185.107	61░ 44' 39.031" N	150░ 3' 32.604" W	144.346	0.584	0	19020505008455	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	707	808.454	61░ 45' 17.820" N	150░ 4' 0.950" W	6.893	0.028	0	19020505008912	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	707	5152.082	61░ 45' 14.812" N	150░ 2' 0.515" W	5.515	0.022	0	19020505008914	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	708	5466.898	61░ 44' 33.112" N	150░ 4' 57.003" W	15.191	0.061	0	19020505008460	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	708	4676.798	61░ 44' 28.882" N	150░ 6' 12.512" W	118.230	0.479	0	19020505008458	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	708	613.000	61░ 45' 25.229" N	150░ 5' 35.043" W	2.941	0.012	0	19020505008910	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	710	1817.973	61░ 45' 8.256" N	150░ 7' 58.085" W	30.436	0.123	0	19020505008913	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	710	2499.721	61░ 45' 30.071" N	150░ 8' 32.799" W	6.837	0.028	0	19020505008909	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	710	2085.826	61░ 44' 53.332" N	150░ 8' 0.567" W	7.413	0.030	0	19020505008454	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	711	4675.382	61░ 43' 46.640" N	150░ 8' 7.808" W	2.013	0.008	0	19020505008473	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	711	2464.034	61░ 44' 2.059" N	150░ 8' 42.619" W	0.766	0.003	0	19020505008466	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	711	3550.928	61░ 43' 47.539" N	150░ 8' 39.378" W	0.789	0.003	0	19020505008472	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	711	2725.177	61░ 44' 4.228" N	150░ 8' 36.058" W	0.895	0.004	0	19020505008465	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	712	3554.285	61░ 43' 6.263" N	150░ 9' 4.681" W	7.902	0.032	0	19020505008485	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	713	3273.216	61° 42' 42.235" N	150° 8' 25.791" W	136.399	0.552	0	19020505008487	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	713	273.070	61° 42' 35.944" N	150° 10' 0.146" W	3.222	0.013	0	19020505008496	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	713	4335.455	61° 42' 27.214" N	150° 8' 37.183" W	2.888	0.012	0	19020505008502	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	713	4118.195	61° 42' 33.724" N	150° 8' 40.453" W	1.101	0.004	0	19020505008501	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	714	4931.685	61° 41' 54.285" N	150° 12' 0.646" W	29.738	0.120	157	19020505008511	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	714	5076.809	61° 41' 39.344" N	150° 8' 9.084" W	45.680	0.185	171	19020505008518	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	715	4162.286	61° 41' 4.354" N	150° 8' 30.366" W	13.175	0.053	0	19020505008538	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	715	1522.727	61° 41' 12.536" N	150° 9' 55.457" W	9.443	0.038	0	19020505008533	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	1420.945	61° 39' 49.815" N	150° 10' 33.255" W	1.964	0.008	0	19020505008572	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	3964.368	61° 39' 25.336" N	150° 9' 18.346" W	9.095	0.037	0	19020505008584	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	5046.427	61° 40' 24.334" N	150° 8' 32.007" W	3.997	0.016	0	19020505008557	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	716	1881.840	61° 40' 15.961" N	150° 9' 32.602" W	16.575	0.067	165	19020505008558	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	5691.128	61° 39' 14.893" N	150° 9' 3.807" W	0.583	0.002	0	19020505008595	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	5175.500	61° 40' 5.283" N	150° 7' 44.270" W	107.611	0.436	0	19020505008562	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	716	3054.378	61° 40' 18.926" N	150° 9' 15.527" W	1.688	0.007	0	19020505008560	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	717	5585.498	61° 39' 1.397" N	150° 9' 32.697" W	6.994	0.028	0	19020505008601	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	717	1559.022	61° 39' 12.916" N	150° 10' 58.132" W	0.338	0.001	0	19020505008594	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	718	1325.003	61° 39' 1.765" N	150° 12' 46.830" W	0.479	0.002	0	19020505008599	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	718	861.137	61° 38' 48.121" N	150° 12' 19.444" W	1.183	0.005	0	19020505008610	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	720	5029.346	61° 37' 19.978" N	150° 11' 46.497" W	1.744	0.007	0	19020505008642	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	721	2714.369	61° 36' 11.168" N	150° 13' 12.107" W	7.429	0.030	0	19020505008683	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	721	3604.988	61° 35' 58.574" N	150° 13' 10.615" W	3.183	0.013	210	19020505008689	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	721	3881.241	61° 36' 27.528" N	150° 15' 42.660" W	48.954	0.198	0	19020505008662	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	721	3724.614	61° 36' 14.522" N	150° 12' 42.723" W	32.089	0.130	0	19020505008674	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	722	1924.466	61° 35' 51.917" N	150° 15' 29.180" W	16.191	0.066	0	19020505008687	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	723	3742.848	61° 35' 11.615" N	150° 13' 39.602" W	3.411	0.014	0	19020505008703	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	724	1186.008	61° 33' 41.854" N	150° 14' 11.055" W	0.841	0.003	0	19020505008729	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	726	4066.107	61░ 32' 0.147" N	150░ 14' 41.987" W	0.951	0.004	0	19020505008760	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	727	3900.088	61░ 31' 8.680" N	150░ 14' 21.781" W	0.681	0.003	0	19020505008792	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	727	3688.727	61░ 31' 12.417" N	150░ 14' 18.991" W	0.443	0.002	0	19020505008789	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	727	3835.240	61░ 31' 27.469" N	150░ 11' 17.031" W	94.241	0.381	0	19020505008773	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	727	3961.993	61░ 30' 53.695" N	150░ 14' 3.206" W	0.579	0.002	0	19020505008797	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	3338.797	61░ 29' 19.180" N	150░ 12' 0.002" W	10.719	0.043	0	19020505008195	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	2775.237	61░ 29' 49.863" N	150░ 12' 33.577" W	3.432	0.014	0	19020505008175	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	4638.327	61░ 30' 38.675" N	150░ 10' 58.042" W	1.188	0.005	0	19020505008807	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	2582.777	61░ 29' 41.106" N	150░ 12' 29.224" W	12.556	0.051	0	19020505008178	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	3296.734	61░ 30' 1.982" N	150░ 10' 24.014" W	1.397	0.006	0	19020505008827	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	729	2957.296	61░ 29' 24.894" N	150░ 11' 51.029" W	2.374	0.010	0	19020505008193	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	1791.098	61░ 29' 23.604" N	150░ 10' 44.998" W	14.869	0.060	0	19020505008192	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	1812.787	61░ 29' 17.904" N	150░ 9' 25.718" W	1.422	0.006	0	19020505008204	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	4802.019	61░ 28' 42.813" N	150░ 10' 41.779" W	2.493	0.010	0	19020505008237	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	820.293	61░ 29' 17.984" N	150░ 9' 50.328" W	5.989	0.024	0	19020505008201	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	1702.505	61° 29' 38.514" N	150° 10' 30.415" W	2.204	0.009	0	19020505008183	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	2667.260	61° 30' 10.028" N	150° 9' 59.539" W	59.304	0.240	0	19020505008174	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	459.136	61° 29' 24.499" N	150° 9' 51.527" W	0.756	0.003	0	19020505008198	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	730	4439.343	61° 28' 42.734" N	150° 10' 10.958" W	4.020	0.016	0	19020505008239	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	692.109	61° 29' 10.071" N	150° 7' 46.637" W	25.234	0.102	0	19020505008210	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	4757.746	61° 29' 23.992" N	150° 6' 40.446" W	1.134	0.005	0	19020505008203	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	731	4174.207	61° 29' 9.826" N	150° 6' 40.630" W	16.798	0.068	105	19020505008213	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	4745.771	61° 29' 52.772" N	150° 7' 33.450" W	1.692	0.007	0	19020505008177	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	1888.054	61° 29' 28.827" N	150° 8' 1.921" W	1.705	0.007	0	19020505008197	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	4172.036	61° 29' 50.871" N	150° 7' 55.010" W	0.441	0.002	0	19020505008179	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	4030.985	61° 29' 22.549" N	150° 6' 55.982" W	2.757	0.011	0	19020505008202	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	3904.690	61° 28' 38.614" N	150° 9' 6.978" W	1.165	0.005	0	19020505008247	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	731	2940.659	61° 28' 59.746" N	150° 9' 24.295" W	2.038	0.008	0	19020505008221	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	4573.501	61° 28' 46.262" N	150° 6' 2.532" W	2.766	0.011	0	19020505008244	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	5780.982	61° 29' 12.750" N	150° 5' 59.349" W	36.369	0.147	0	19020505008206	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	3501.416	61° 28' 56.833" N	150° 6' 58.783" W	0.147	0.001	0	19020505008233	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	3403.881	61° 28' 34.056" N	150° 6' 19.843" W	6.134	0.025	0	19020505008254	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	4136.358	61° 28' 59.091" N	150° 6' 37.217" W	3.310	0.013	0	19020505008227	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	732	1175.170	61° 28' 33.412" N	150° 7' 1.203" W	18.668	0.076	85	19020505008250	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	5230.566	61° 28' 53.190" N	150° 5' 55.244" W	3.388	0.014	0	19020505008236	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	732	3269.462	61° 28' 56.699" N	150° 7' 6.096" W	1.038	0.004	0	19020505008231	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	733	4092.537	61° 27' 35.914" N	150° 6' 2.493" W	0.757	0.003	0	19020505008291	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	733	3138.885	61° 27' 2.018" N	150° 6' 26.610" W	72.636	0.294	85	19020505008301	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	733	2059.146	61° 27' 54.675" N	150° 7' 41.602" W	0.602	0.002	0	19020505008282	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	733	797.490	61° 27' 27.319" N	150° 7' 48.184" W	4.437	0.018	0	19020505008294	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	733	2376.038	61° 27' 13.758" N	150° 6' 59.342" W	0.931	0.004	0	19020505008302	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	733	2068.088	61° 27' 15.837" N	150° 7' 52.912" W	0.690	0.003	0	19020505008299	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category	734	300.951	61° 26' 44.572" N	150° 7' 36.670" W	1.932	0.008	0	19020505008312	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	= Perennial												737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	734	1734.636	61░ 27' 1.331" N	150░ 7' 44.170" W	1.254	0.005	0	19020505008305	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	734	893.616	61░ 26' 42.931" N	150░ 7' 17.273" W	27.091	0.110	85	19020505008308	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	734	1467.479	61░ 26' 53.450" N	150░ 8' 16.435" W	5.616	0.023	0	19020505008307	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	734	1928.470	61░ 26' 22.793" N	150░ 7' 53.913" W	1.298	0.005	0	19020505008316	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	735	1845.722	61░ 26' 10.207" N	150░ 6' 3.204" W	2.454	0.010	0	19020505008318	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	735	5541.633	61░ 25' 15.897" N	150░ 7' 49.596" W	16.857	0.068	0	19020505008330	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	736	937.772	61░ 25' 41.146" N	150░ 4' 23.270" W	7.410	0.030	140	19020505008327	39009	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	736	1136.894	61░ 25' 52.104" N	150░ 5' 8.997" W	36.447	0.148	0	19020505008321	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	736	4854.700	61░ 26' 29.080" N	150░ 4' 18.472" W	23.902	0.097	0	19020505008314	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	736	2188.952	61░ 25' 47.170" N	150░ 3' 59.891" W	6.831	0.028	0	19020505008326	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Susitna River	Lake/Pond: Hydrographic Category = Perennial	736	3964.771	61░ 26' 14.988" N	150░ 4' 41.972" W	0.491	0.002	0	19020505008317	39004	Perennial	19020505	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	470	4946.152	64░ 38' 38.275" N	149░ 2' 59.898" W	0.770	0.003	0	19040511006135	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	470	5218.535	64░ 38' 35.004" N	149░ 4' 17.061" W	6.253	0.025	0	19040511006133	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	471	2182.968	64° 37' 7.188" N	149° 4' 57.554" W	1.183	0.005	0	19040511006147	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	471	1624.845	64° 37' 15.344" N	149° 4' 37.929" W	0.637	0.003	0	19040511006146	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	473	839.005	64° 35' 58.782" N	149° 6' 59.183" W	3.499	0.014	0	19040511006155	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	473	763.109	64° 36' 4.336" N	149° 6' 50.901" W	3.080	0.012	0	19040511006152	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	473	1550.301	64° 35' 54.712" N	149° 7' 14.004" W	6.025	0.024	0	19040511006156	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	473	5502.043	64° 36' 37.345" N	149° 8' 10.177" W	6.390	0.026	0	19040511006149	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Lower Tanana River	Lake/Pond: Hydrographic Category = Perennial	473	1187.808	64° 35' 45.980" N	149° 6' 26.445" W	1.042	0.004	0	19040511006157	39004	Perennial	19040511	Gas Conditioning Facility Mile 0 to Mile 540
Middle Fork-North Fork Ch	Lake/Pond: Hydrographic Category = Perennial	177	2044.588	68° 6' 52.000" N	149° 32' 4.637" W	0.668	0.003	0	19040301011448	39004	Perennial	19040301	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	477	2313.647	64° 32' 16.689" N	149° 6' 17.851" W	8.058	0.033	0	19040508009025	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	478	2508.264	64° 32' 11.540" N	149° 6' 30.295" W	3.225	0.013	0	19040508009026	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	478	1667.741	64° 32' 7.123" N	149° 6' 24.443" W	18.828	0.076	0	19040508009027	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	481	4384.848	64° 29' 7.065" N	149° 3' 55.445" W	0.441	0.002	0	19040508008973	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	481	2627.230	64° 29' 6.753" N	149° 4' 25.187" W	9.713	0.039	0	19040508008972	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	483	4542.285	64° 27' 43.209" N	149° 2' 44.526" W	4.651	0.019	0	19040508008975	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	484	4624.781	64° 26' 52.588" N	149° 2' 26.134" W	1.567	0.006	0	19040508008976	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	484	3021.566	64° 26' 49.776" N	149° 3' 4.369" W	1.131	0.005	0	19040508008977	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	485	3879.905	64° 26' 7.871" N	149° 3' 6.514" W	2.778	0.011	0	19040508008978	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	495	123.828	64° 17' 57.642" N	149° 11' 57.528" W	8.077	0.033	0	19040508009003	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	495	3423.253	64° 17' 43.376" N	149° 10' 46.023" W	9.499	0.038	0	19040508009005	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	511	558.731	64° 5' 24.100" N	149° 13' 40.201" W	2.785	0.011	0	19040508008962	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	512	5282.040	64° 5' 15.275" N	149° 10' 41.334" W	3.754	0.015	0	19040508008963	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	516	984.017	64° 1' 45.960" N	149° 8' 44.260" W	1.686	0.007	0	19040508008965	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	517	4075.546	64° 1' 32.639" N	149° 7' 11.042" W	2.291	0.009	0	19040508008966	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	518	1932.216	64° 0' 16.965" N	149° 7' 28.431" W	0.586	0.002	0	19040508008967	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	519	1544.369	63° 59' 9.761" N	149° 7' 33.398" W	1.524	0.006	0	19040508008912	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	520	2150.461	63° 59' 4.830" N	149° 7' 17.988" W	1.473	0.006	0	19040508008913	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	525	3286.392	63° 54' 8.967" N	149° 5' 5.348" W	3.388	0.014	0	19040508008923	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	526	5268.761	63° 54' 50.121" N	149° 2' 28.938" W	4.540	0.018	0	19040508008918	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	527	5019.197	63° 54' 6.274" N	149° 1' 19.835" W	3.714	0.015	0	19040508008924	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	530	4546.818	63° 50' 48.480" N	148° 59' 4.030" W	4.534	0.018	0	19040508008715	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	531	2872.074	63° 50' 30.942" N	149° 2' 9.094" W	127.198	0.515	0	19040508008931	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	531	3314.908	63° 50' 26.716" N	149° 1' 44.127" W	0.670	0.003	0	19040508008932	39004	Perennial	19040508	Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	539	2361.029	63° 44' 28.581" N	148° 54' 39.396" W	5.686	0.023	0	19040508008518	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation, Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Reservoir: Reservoir Type = Water Storage; Construction Material = Nonearthen	540	2982.986	63° 43' 55.542" N	148° 53' 14.964" W	0.968	0.004	0	19040508009544	43613		19040508	Mile 540 to Mile 555, The Denali National Park Route Variation, Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Reservoir: Reservoir Type = Water Storage; Construction Material = Nonearthen	540	3272.776	63° 43' 53.869" N	148° 53' 20.353" W	0.973	0.004	0	19040508009545	43613		19040508	Mile 540 to Mile 555, The Denali National Park Route Variation, Gas Conditioning Facility Mile 0 to Mile 540
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	7950.174	63° 41' 41.418" N	148° 51' 56.960" W	15.101	0.061	0	19040508008546	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	2941.254	63° 43' 16.205" N	148° 49' 49.027" W	0.497	0.002	0	19040508008523	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	8097.830	63° 42' 3.217" N	148° 52' 41.057" W	2.068	0.008	0	19040508008538	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	7870.196	63° 41' 48.192" N	148° 52' 2.076" W	0.213	0.001	0	19040508008542	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	11084.809	63° 41' 2.568" N	148° 51' 37.416" W	6.826	0.028	0	19040508008559	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	8170.352	63° 41' 47.598" N	148° 52' 12.980" W	0.343	0.001	0	19040508008543	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	8870.923	63° 41' 27.749" N	148° 51' 38.964" W	5.336	0.022	0	19040508008553	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	10218.113	63° 41' 14.500" N	148° 51' 39.326" W	1.322	0.005	0	19040508008558	39004	Perennial	19040508	The Denali National Park Route Variation

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	1623.386	63░ 43' 4.634" N	148░ 50' 10.165" W	0.902	0.004	0	19040508008524	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	8945.611	63░ 41' 34.223" N	148░ 52' 1.149" W	0.614	0.002	0	19040508008551	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	542	2710.907	63░ 43' 15.966" N	148░ 50' 29.682" W	4.423	0.018	0	19040508008521	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	543	1850.463	63░ 42' 2.507" N	148░ 48' 14.523" W	2.745	0.011	0	19040508008539	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	543	10505.297	63░ 40' 58.768" N	148░ 50' 58.132" W	1.316	0.005	0	19040508008561	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	543	12242.347	63░ 40' 43.115" N	148░ 51' 12.643" W	0.476	0.002	0	19040508008563	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	11608.807	63░ 40' 42.436" N	148░ 50' 51.245" W	7.568	0.031	0	19040508008562	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	12199.891	63░ 40' 12.109" N	148░ 50' 37.825" W	0.635	0.003	0	19040508008572	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	12400.718	63░ 40' 8.066" N	148░ 50' 38.419" W	0.634	0.003	0	19040508008576	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	12293.945	63░ 40' 36.160" N	148░ 51' 0.190" W	4.072	0.016	0	19040508008564	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	9402.901	63░ 40' 33.496" N	148░ 49' 51.661" W	1.678	0.007	0	19040508008565	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	12140.363	63░ 40' 23.291" N	148░ 50' 46.774" W	2.016	0.008	0	19040508008567	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	545	9801.081	63░ 40' 16.398" N	148░ 49' 42.883" W	0.539	0.002	0	19040508008569	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	1570.372	63░ 40' 0.299" N	148░ 45' 28.348" W	0.622	0.003	0	19040508008583	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	2801.066	63░ 40' 17.062" N	148░ 44' 40.276" W	3.191	0.013	0	19040508008571	39004	Perennial	19040508	Mile 540 to Mile 555

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	7517.302	63° 39' 32.011" N	148° 48' 16.365" W	4.867	0.020	0	19040508008601	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	4615.949	63° 39' 39.873" N	148° 47' 4.876" W	1.999	0.008	0	19040508008596	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	12170.095	63° 39' 56.633" N	148° 50' 24.504" W	5.218	0.021	0	19040508008581	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	1018.499	63° 40' 5.016" N	148° 46' 12.067" W	1.933	0.008	0	19040508008579	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	3962.673	63° 39' 56.504" N	148° 47' 16.197" W	2.589	0.010	0	19040508008585	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	16611.321	63° 39' 11.062" N	148° 51' 37.276" W	5.994	0.024	0	19040508008611	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	3381.964	63° 40' 34.445" N	148° 44' 47.787" W	0.975	0.004	0	19040508008566	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	1849.541	63° 40' 2.062" N	148° 44' 54.819" W	38.612	0.156	0	19040508008577	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	3786.292	63° 40' 16.896" N	148° 44' 25.063" W	0.600	0.002	0	19040508008573	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	3226.186	63° 40' 24.463" N	148° 44' 20.528" W	15.508	0.063	0	19040508008568	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	683.816	63° 40' 3.806" N	148° 46' 1.166" W	5.994	0.024	0	19040508008580	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	17563.908	63° 39' 30.326" N	148° 52' 22.202" W	23.069	0.093	0	19040508008591	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	3307.254	63° 39' 43.161" N	148° 46' 25.966" W	0.860	0.003	0	19040508008594	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	1512.263	63° 39' 58.042" N	148° 46' 8.654" W	1.872	0.008	0	19040508008584	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	383.285	63° 40' 7.274" N	148° 45' 48.741" W	2.627	0.011	0	19040508008578	39004	Perennial	19040508	Mile 540 to Mile 555

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	546	2354.022	63░ 39' 45.220" N	148░ 45' 57.036" W	7.373	0.030	0	19040508008588	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	4740.395	63░ 39' 30.116" N	148░ 43' 24.200" W	0.339	0.001	0	19040508008605	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	4899.831	63░ 39' 7.808" N	148░ 46' 53.265" W	0.290	0.001	0	19040508008612	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	4189.473	63░ 39' 42.986" N	148░ 43' 39.643" W	6.001	0.024	0	19040508008595	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	5449.036	63░ 38' 52.874" N	148░ 46' 57.799" W	5.056	0.020	0	19040508008615	39004	Perennial	19040508	The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	4498.538	63░ 39' 48.213" N	148░ 43' 44.324" W	0.564	0.002	0	19040508008590	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	1744.637	63░ 39' 27.116" N	148░ 45' 50.989" W	1.511	0.006	0	19040508008606	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	2390.417	63░ 39' 33.703" N	148░ 46' 2.206" W	0.583	0.002	0	19040508008603	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	3512.320	63░ 39' 28.456" N	148░ 43' 50.437" W	0.426	0.002	0	19040508008608	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	2823.686	63░ 39' 34.274" N	148░ 46' 10.431" W	0.306	0.001	0	19040508008602	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	3764.862	63░ 39' 56.461" N	148░ 44' 15.400" W	3.094	0.013	0	19040508008586	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	547	2915.713	63░ 39' 33.279" N	148░ 44' 7.218" W	0.289	0.001	0	19040508008604	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	4289.846	63░ 38' 48.792" N	148░ 42' 57.244" W	0.365	0.001	0	19040508008617	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	2674.562	63░ 38' 36.043" N	148░ 45' 31.073" W	0.878	0.004	0	19040508008625	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	3892.880	63░ 38' 39.756" N	148░ 42' 58.436" W	1.766	0.007	0	19040508008623	39004	Perennial	19040508	Mile 540 to Mile 555

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	2585.718	63° 38' 42.281" N	148° 45' 29.900" W	1.882	0.008	0	19040508008622	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	3965.815	63° 38' 25.001" N	148° 42' 59.130" W	1.635	0.007	0	19040508008626	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	2340.434	63° 38' 48.127" N	148° 45' 15.056" W	0.605	0.002	0	19040508008616	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	4071.328	63° 38' 20.879" N	148° 43' 3.414" W	0.501	0.002	0	19040508008627	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	2620.009	63° 38' 59.858" N	148° 44' 0.884" W	1.594	0.006	0	19040508008614	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	4902.633	63° 38' 46.794" N	148° 42' 39.787" W	0.732	0.003	0	19040508008620	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	548	4555.283	63° 38' 48.767" N	148° 42' 50.039" W	0.520	0.002	0	19040508008618	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	5046.044	63° 37' 23.587" N	148° 42' 54.788" W	4.856	0.020	0	19040508008657	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	3231.948	63° 37' 22.954" N	148° 43' 44.489" W	10.138	0.041	0	19040508008655	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	3107.060	63° 37' 17.323" N	148° 44' 9.022" W	4.799	0.019	0	19040508008660	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	4353.242	63° 37' 33.829" N	148° 43' 5.323" W	0.480	0.002	0	19040508008649	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	4474.741	63° 37' 22.225" N	148° 43' 14.905" W	4.220	0.017	0	19040508008658	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	2724.751	63° 38' 8.606" N	148° 43' 56.379" W	0.483	0.002	0	19040508008631	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	4825.613	63° 37' 36.494" N	148° 42' 51.744" W	1.399	0.006	0	19040508008645	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	4555.365	63° 37' 10.582" N	148° 43' 37.599" W	2.447	0.010	0	19040508008664	39004	Perennial	19040508	Mile 540 to Mile 555

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	549	4544.549	63° 37' 32.673" N	148° 43' 2.088" W	0.848	0.003	0	19040508008650	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	550	3683.464	63° 36' 54.810" N	148° 44' 11.782" W	0.843	0.003	0	19040508008669	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	550	3408.403	63° 37' 1.207" N	148° 44' 16.334" W	0.865	0.003	0	19040508008666	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	550	4761.824	63° 36' 42.904" N	148° 43' 56.954" W	0.286	0.001	0	19040508008671	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	550	2917.067	63° 36' 58.688" N	148° 44' 27.703" W	1.233	0.005	0	19040508008667	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	551	2064.269	63° 36' 39.346" N	148° 46' 56.739" W	7.152	0.029	0	19040508008670	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	551	4935.050	63° 36' 17.357" N	148° 44' 35.754" W	2.555	0.010	0	19040508008676	39004	Perennial	19040508	Mile 540 to Mile 555
Nenana River	Lake/Pond: Hydrographic Category = Perennial	551	1933.873	63° 36' 33.033" N	148° 47' 5.654" W	5.489	0.022	0	19040508008672	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	551	1791.955	63° 36' 24.192" N	148° 47' 8.500" W	0.659	0.003	0	19040508008675	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	552	2130.936	63° 35' 53.622" N	148° 47' 34.556" W	1.467	0.006	0	19040508008681	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	553	1839.150	63° 34' 59.415" N	148° 48' 16.535" W	2.356	0.010	0	19040508008690	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	553	3871.573	63° 35' 6.868" N	148° 49' 0.293" W	0.235	0.001	0	19040508008687	39004	Perennial	19040508	Mile 540 to Mile 555, The Denali National Park Route Variation
Nenana River	Lake/Pond: Hydrographic Category = Perennial	559	2615.690	63° 29' 23.189" N	148° 49' 44.712" W	1.799	0.007	0	19040508008378	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	560	1219.726	63° 28' 38.140" N	148° 49' 23.194" W	3.523	0.014	0	19040508008386	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	562	2370.736	63° 26' 52.661" N	148° 48' 11.559" W	3.547	0.014	0	19040508008411	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	562	1824.593	63░ 26' 57.654" N	148░ 48' 24.032" W	4.419	0.018	0	19040508008408	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	563	533.689	63░ 26' 46.682" N	148░ 49' 37.448" W	3.411	0.014	0	19040508008415	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	563	322.209	63░ 26' 56.625" N	148░ 49' 55.803" W	5.088	0.021	0	19040508008409	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	563	170.407	63░ 26' 48.051" N	148░ 49' 59.091" W	0.649	0.003	0	19040508008413	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	563	558.809	63░ 26' 50.039" N	148░ 50' 18.163" W	5.219	0.021	0	19040508008412	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	564	2088.275	63░ 26' 3.341" N	148░ 52' 7.307" W	1.388	0.006	0	19040508008419	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	564	1972.088	63░ 26' 6.282" N	148░ 52' 9.620" W	2.109	0.009	0	19040508008418	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	565	3749.003	63░ 25' 33.914" N	148░ 51' 10.851" W	0.490	0.002	0	19040508008421	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	565	2690.217	63░ 25' 16.495" N	148░ 51' 43.282" W	7.576	0.031	0	19040508008423	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	568	991.530	63░ 23' 6.710" N	148░ 54' 2.268" W	1.408	0.006	0	19040508008443	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	568	1068.506	63░ 23' 0.373" N	148░ 54' 37.631" W	2.075	0.008	0	19040508008448	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	568	73.058	63░ 23' 9.074" N	148░ 54' 23.779" W	2.236	0.009	0	19040508008440	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	568	1232.087	63░ 23' 8.300" N	148░ 53' 52.720" W	2.441	0.010	0	19040508008441	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	5256.032	63░ 21' 49.822" N	148░ 56' 22.472" W	1.363	0.006	0	19040508008489	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	2752.529	63░ 22' 11.965" N	148░ 56' 55.063" W	0.716	0.003	0	19040508008476	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	2531.810	63░ 22' 5.804" N	148░ 57' 15.039" W	0.853	0.003	0	19040508008479	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	4472.071	63░ 21' 46.417" N	148░ 56' 59.873" W	2.660	0.011	0	19040508008491	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	3071.104	63░ 22' 11.926" N	148░ 56' 47.759" W	0.540	0.002	0	19040508008477	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	5267.956	63░ 21' 40.089" N	148░ 56' 54.322" W	0.301	0.001	0	19040508008499	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	570	5901.520	63░ 21' 44.772" N	148░ 56' 16.060" W	0.750	0.003	0	19040508008493	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	571	1026.271	63░ 22' 3.002" N	148░ 59' 24.123" W	1.917	0.008	0	19040508008480	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	571	620.947	63░ 22' 3.176" N	148░ 59' 41.794" W	5.363	0.022	0	19040508008478	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	572	787.592	63░ 21' 29.664" N	149░ 1' 10.412" W	23.723	0.096	0	19040508008755	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	572	1154.646	63░ 21' 56.571" N	149░ 0' 44.387" W	21.585	0.087	0	19040508008751	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	572	2363.043	63░ 21' 40.852" N	149░ 2' 5.908" W	3.013	0.012	0	19040508008752	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	572	2357.163	63░ 22' 3.180" N	149░ 0' 50.609" W	0.369	0.001	0	19040508008750	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	573	2316.792	63░ 20' 55.554" N	149░ 2' 15.174" W	55.485	0.225	0	19040508008757	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	573	2296.752	63░ 21' 37.560" N	149░ 2' 20.717" W	1.438	0.006	0	19040508008753	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	573	2686.567	63░ 21' 38.129" N	149░ 2' 11.720" W	0.410	0.002	0	19040508008754	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	574	4646.982	63░ 20' 14.196" N	149░ 2' 47.417" W	132.856	0.538	0	19040508008761	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	3825.890	63° 20' 51.470" N	149° 6' 54.970" W	1.838	0.007	0	19040508008758	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	2814.375	63° 19' 58.379" N	149° 5' 20.563" W	0.570	0.002	0	19040508008770	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	729.604	63° 20' 5.597" N	149° 6' 4.632" W	80.884	0.327	0	19040508008763	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	4073.591	63° 19' 55.980" N	149° 4' 46.495" W	1.659	0.007	0	19040508008773	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	2942.634	63° 20' 1.931" N	149° 5' 5.993" W	3.597	0.015	0	19040508008768	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	2729.825	63° 19' 53.848" N	149° 5' 38.970" W	4.466	0.018	0	19040508008771	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	345.149	63° 20' 15.411" N	149° 6' 44.110" W	29.861	0.121	0	19040508008762	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	575	3372.797	63° 20' 52.244" N	149° 6' 25.531" W	1.133	0.005	0	19040508008759	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	576	2945.302	63° 19' 36.299" N	149° 5' 58.600" W	108.870	0.441	2304	19040508008774	39009	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	576	1599.621	63° 19' 55.141" N	149° 8' 0.057" W	0.267	0.001	0	19040508008772	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	576	1652.501	63° 19' 39.756" N	149° 6' 52.928" W	0.791	0.003	0	19040508008778	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	576	2735.885	63° 20' 5.653" N	149° 8' 17.048" W	4.655	0.019	0	19040508008767	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	576	1990.367	63° 19' 22.542" N	149° 7' 38.752" W	4.169	0.017	0	19040508008781	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	576	5261.167	63° 19' 9.472" N	149° 5' 56.293" W	16.073	0.065	0	19040508008784	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	577	1930.081	63° 19' 25.300" N	149° 9' 19.615" W	3.991	0.016	0	19040508008780	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	578	1500.522	63° 18' 20.486" N	149° 9' 35.061" W	403.912	1.635	2329	19040508008786	39009	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	578	722.251	63° 18' 27.060" N	149° 10' 12.339" W	4.690	0.019	0	19040508008798	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	578	1080.362	63° 18' 50.943" N	149° 10' 9.593" W	5.616	0.023	0	19040508008789	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	769.433	63° 18' 11.800" N	149° 11' 46.331" W	1.237	0.005	0	19040508008804	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	2153.911	63° 17' 40.682" N	149° 11' 49.771" W	0.605	0.002	0	19040508008819	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	2031.070	63° 18' 16.706" N	149° 12' 11.206" W	21.761	0.088	0	19040508008792	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1189.166	63° 17' 57.513" N	149° 12' 14.201" W	2.325	0.009	0	19040508008809	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1005.945	63° 17' 54.588" N	149° 11' 27.159" W	1.092	0.004	0	19040508008811	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1199.819	63° 17' 50.262" N	149° 11' 35.668" W	0.415	0.002	0	19040508008815	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	2107.758	63° 17' 51.498" N	149° 12' 26.116" W	0.790	0.003	0	19040508008812	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1428.344	63° 17' 47.475" N	149° 11' 42.957" W	0.715	0.003	0	19040508008816	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	3719.046	63° 17' 33.929" N	149° 10' 50.956" W	0.332	0.001	0	19040508008821	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1135.764	63° 17' 51.874" N	149° 11' 32.691" W	0.267	0.001	0	19040508008814	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Nenana River	Lake/Pond: Hydrographic Category = Perennial	579	1648.293	63° 18' 6.618" N	149° 11' 0.245" W	3.128	0.013	0	19040508008806	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Nenana River	Lake/Pond: Hydrographic Category = Perennial	580	2239.335	63° 17' 31.767" N	149° 12' 3.484" W	0.329	0.001	0	19040508009899	39004	Perennial	19040508	Mile 555 to Cook Inlet NGLEP Facility (Mile 737)
Ramparts	Lake/Pond: Hydrographic Category = Perennial	338	4289.390	66° 7' 34.850" N	150° 8' 17.687" W	0.244	0.001	0	19040404003392	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	339	2061.100	66° 7' 3.995" N	150° 10' 7.138" W	1.494	0.006	0	19040404003394	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	340	2828.232	66° 5' 41.287" N	150° 10' 6.040" W	1.366	0.006	0	19040404003398	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	340	3398.797	66° 5' 43.980" N	150° 7' 34.796" W	9.461	0.038	0	19040404003397	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	341	1709.949	66° 5' 25.216" N	150° 10' 3.076" W	1.535	0.006	0	19040404003400	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	341	3440.757	66° 4' 44.093" N	150° 8' 43.313" W	1.302	0.005	0	19040404003403	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	341	1485.949	66° 5' 29.567" N	150° 10' 9.173" W	6.020	0.024	0	19040404003399	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	342	3634.179	66° 4' 26.903" N	150° 11' 21.239" W	1.039	0.004	0	19040404003406	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	342	3004.665	66° 4' 35.159" N	150° 8' 40.467" W	11.663	0.047	0	19040404003405	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	342	3894.589	66° 4' 21.184" N	150° 11' 33.230" W	2.393	0.010	0	19040404003408	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	344	2426.705	66° 2' 16.182" N	150° 9' 23.523" W	2.536	0.010	0	19040404003419	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	345	5340.584	66° 1' 27.857" N	150° 10' 8.635" W	2.951	0.012	0	19040404003424	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	345	5252.311	66° 0' 59.597" N	150° 8' 39.253" W	1.539	0.006	0	19040404003433	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Ramparts	Lake/Pond: Hydrographic Category = Perennial	345	4848.437	66° 1' 4.670" N	150° 8' 51.161" W	3.011	0.012	0	19040404003431	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	345	4783.385	66° 1' 30.831" N	150° 9' 46.043" W	1.912	0.008	0	19040404003425	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	346	5386.137	66° 0' 33.463" N	150° 7' 55.388" W	2.983	0.012	0	19040404003449	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	346	3071.922	66° 0' 48.788" N	150° 7' 14.854" W	2.613	0.011	0	19040404003440	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	346	5612.555	66° 0' 49.153" N	150° 8' 26.227" W	0.182	0.001	0	19040404003442	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	2835.235	66° 0' 12.336" N	150° 6' 5.462" W	1.537	0.006	0	19040404003459	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	2469.817	66° 0' 42.815" N	150° 6' 16.768" W	1.445	0.006	0	19040404003447	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	4045.949	65° 59' 59.281" N	150° 6' 19.811" W	6.942	0.028	0	19040404003329	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	2589.655	66° 0' 28.126" N	150° 6' 26.345" W	2.427	0.010	0	19040404003452	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	2565.673	66° 0' 49.654" N	150° 6' 11.811" W	0.272	0.001	0	19040404003445	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	5516.591	66° 0' 24.295" N	150° 7' 32.022" W	0.745	0.003	0	19040404003457	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	3505.761	65° 59' 58.729" N	150° 5' 31.255" W	4.259	0.017	0	19040404003330	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	1704.779	66° 0' 25.025" N	150° 6' 0.955" W	6.697	0.027	0	19040404003453	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	347	3106.234	66° 0' 4.462" N	150° 5' 43.291" W	2.903	0.012	0	19040404003460	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial; Stage =	348	2905.590	65° 59' 33.267" N	150° 4' 24.620" W	3.087	0.012	355	19040404003348	39009	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Ramparts	Lake/Pond: Hydrographic Category = Perennial	348	3838.541	65° 59' 22.678" N	150° 3' 25.486" W	1.718	0.007	0	19040404003349	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	348	1645.969	65° 59' 57.841" N	150° 4' 37.418" W	1.925	0.008	0	19040404003343	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	348	1367.557	65° 59' 55.324" N	150° 4' 25.662" W	1.202	0.005	0	19040404003346	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	349	5023.806	65° 59' 4.882" N	150° 3' 14.432" W	0.927	0.004	0	19040404003351	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	355	4344.325	65° 55' 58.038" N	149° 54' 19.269" W	3.037	0.012	0	19040404003192	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	358	2313.856	65° 54' 27.566" N	149° 48' 28.635" W	2.129	0.009	0	19040404003157	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	359	675.525	65° 54' 18.785" N	149° 46' 11.753" W	1.113	0.005	0	19040404003161	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	359	4042.162	65° 54' 0.168" N	149° 48' 1.380" W	0.480	0.002	0	19040404003166	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	359	4887.004	65° 53' 47.713" N	149° 48' 9.717" W	1.803	0.007	0	19040404003169	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	359	1800.454	65° 54' 17.809" N	149° 47' 41.657" W	61.431	0.249	0	19040404003208	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	359	1123.584	65° 54' 25.423" N	149° 46' 8.481" W	1.507	0.006	0	19040404003159	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	361	1217.508	65° 53' 2.582" N	149° 44' 2.767" W	23.921	0.097	0	19040404003176	39004	Perennial	19040404	Yukon River Bridge Option, Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	361	6928.444	65° 52' 36.202" N	149° 41' 45.749" W	1.576	0.006	0	19040404003234	39004	Perennial	19040404	Yukon River Bridge Option
Ramparts	Lake/Pond: Hydrographic Category = Perennial	361	2140.436	65° 53' 15.078" N	149° 44' 21.731" W	7.516	0.030	0	19040404003171	39004	Perennial	19040404	Yukon River Bridge Option, Gas Conditioning Facility Mile

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
													0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	364	5340.468	65° 50' 14.139" N	149° 43' 41.292" W	4.296	0.017	1160	19040404003235	39009	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	366	294.852	65° 50' 3.243" N	149° 37' 51.616" W	6.635	0.027	1160	19040404003236	39009	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	382	3413.512	65° 42' 34.268" N	149° 12' 32.697" W	0.417	0.002	0	19040404002968	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	386	4134.928	65° 40' 1.537" N	149° 5' 30.061" W	3.176	0.013	0	19040404003025	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	387	1289.827	65° 40' 10.527" N	149° 4' 6.006" W	1.618	0.007	0	19040404003023	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	387	1291.832	65° 40' 14.563" N	149° 3' 39.236" W	1.566	0.006	0	19040404003020	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	387	1506.163	65° 40' 11.515" N	149° 3' 4.264" W	2.266	0.009	0	19040404003022	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	388	5436.783	65° 40' 2.864" N	149° 0' 53.050" W	0.503	0.002	0	19040404003027	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial	388	4760.497	65° 40' 3.805" N	149° 1' 5.254" W	9.857	0.040	0	19040404003024	39004	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Ramparts	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	392	3900.201	65° 37' 21.915" N	148° 56' 18.511" W	11.992	0.049	735	19040404002917	39009	Perennial	19040404	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	3781.738	70° 8' 20.826" N	148° 32' 54.093" W	3.435	0.014	0	19060402015966	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	1777.893	70° 8' 13.152" N	148° 33' 43.996" W	6.802	0.028	0	19060402015977	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	3116.728	70° 8' 12.329" N	148° 33' 10.345" W	7.863	0.032	0	19060402015973	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	5115.306	70° 8' 4.219" N	148° 32' 12.984" W	14.990	0.061	0	19060402015981	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	1105.631	70° 8' 8.542" N	148° 34' 12.076" W	4.044	0.016	0	19060402017314	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	2391.628	70° 8' 0.600" N	148° 33' 39.636" W	4.538	0.018	0	19060402015991	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	4266.956	70° 8' 33.507" N	148° 32' 53.406" W	1.869	0.008	0	19060402015956	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	2712.930	70° 8' 14.099" N	148° 33' 24.314" W	5.051	0.020	0	19060402015974	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	1743.767	70° 7' 58.906" N	148° 34' 3.247" W	8.075	0.033	0	19060402017313	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	14	3378.353	70° 8' 15.401" N	148° 33' 1.265" W	6.317	0.026	0	19060402015970	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	15	2359.939	70° 7' 42.422" N	148° 32' 53.041" W	35.743	0.145	0	19060402016002	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	15	4251.950	70° 7' 56.231" N	148° 32' 39.741" W	6.478	0.026	0	19060402015997	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	15	5941.766	70° 8' 1.761" N	148° 31' 53.820" W	2.620	0.011	0	19060402015993	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	15	4960.054	70° 7' 6.950" N	148° 31' 47.000" W	4.310	0.017	0	19060402016036	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	2540.894	70° 6' 49.709" N	148° 32' 19.186" W	13.778	0.056	0	19060402016051	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	2903.792	70° 6' 18.790" N	148° 34' 59.851" W	2.119	0.009	0	19060402016072	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	2271.643	70° 6' 9.432" N	148° 33' 28.441" W	2.253	0.009	0	19060402016077	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	1834.877	70° 6' 53.114" N	148° 33' 8.240" W	19.983	0.081	0	19060402016048	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	358.136	70° 6' 22.549" N	148° 33' 17.710" W	17.952	0.073	0	19060402016068	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	3383.510	70° 6' 18.890" N	148° 35' 27.844" W	20.292	0.082	0	19060402016070	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	1426.771	70° 6' 46.959" N	148° 33' 20.513" W	2.540	0.010	0	19060402016057	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	16	3847.122	70° 6' 36.297" N	148° 35' 36.723" W	1.849	0.007	0	19060402016064	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	1220.736	70° 5' 56.994" N	148° 33' 12.362" W	1.922	0.008	0	19060402016088	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	1941.765	70° 6' 4.978" N	148° 32' 56.568" W	3.708	0.015	0	19060402016081	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	706.970	70° 5' 57.307" N	148° 34' 21.204" W	80.586	0.326	0	19060402016080	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	3265.012	70° 5' 36.901" N	148° 34' 52.361" W	2.160	0.009	0	19060402016098	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	1171.354	70° 5' 54.916" N	148° 33' 35.177" W	1.923	0.008	0	19060402016089	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	2601.153	70° 5' 42.065" N	148° 31' 36.657" W	37.450	0.152	0	19060402016093	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	3658.795	70° 6' 2.319" N	148° 31' 18.638" W	44.202	0.179	0	19060402016079	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	17	1816.937	70° 6' 1.880" N	148° 33' 33.794" W	2.389	0.010	0	19060402016084	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	1335.141	70° 5' 18.164" N	148° 34' 9.910" W	26.981	0.109	0	19060402016103	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	1368.459	70° 4' 42.779" N	148° 34' 0.560" W	42.234	0.171	0	19060402016117	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	3702.172	70░ 4' 55.739" N	148░ 36' 12.500" W	1.572	0.006	0	19060402016113	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	3554.893	70░ 5' 32.386" N	148░ 35' 6.537" W	3.745	0.015	0	19060402016099	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	1822.944	70░ 5' 14.345" N	148░ 35' 9.932" W	19.382	0.078	0	19060402016105	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	18	1825.047	70░ 5' 18.322" N	148░ 32' 50.442" W	133.558	0.541	80	19060402016100	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	2705.107	70░ 5' 26.336" N	148░ 34' 39.054" W	3.156	0.013	0	19060402016101	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	18	2877.939	70░ 5' 11.224" N	148░ 36' 6.949" W	107.078	0.433	83	19060402016104	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	18	5101.684	70░ 4' 53.810" N	148░ 36' 51.211" W	2.520	0.010	0	19060402016114	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	1512.914	70░ 3' 54.133" N	148░ 35' 1.042" W	3.281	0.013	0	19060402016131	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	3024.869	70░ 4' 15.395" N	148░ 36' 47.294" W	8.884	0.036	0	19060402016124	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	4220.330	70░ 4' 6.348" N	148░ 37' 30.877" W	8.655	0.035	0	19060402016126	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	2190.715	70░ 3' 46.422" N	148░ 35' 33.819" W	5.827	0.024	0	19060402016132	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	909.962	70░ 4' 8.742" N	148░ 34' 37.938" W	5.655	0.023	0	19060402016125	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	19	3707.148	70░ 4' 43.162" N	148░ 36' 28.234" W	7.962	0.032	0	19060402016116	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category	20	1484.802	70░ 3' 7.156" N	148░ 36' 15.498" W	5.700	0.023	0	19060402016142	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	= Perennial												
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	21	2160.826	70° 3' 1.705" N	148° 36' 46.284" W	8.319	0.034	0	19060402016144	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	22	3105.423	70° 2' 1.137" N	148° 40' 21.539" W	22.996	0.093	0	19060402016160	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	22	1727.242	70° 1' 50.007" N	148° 39' 29.547" W	7.782	0.031	0	19060402016162	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	22	1456.805	70° 2' 15.061" N	148° 38' 56.639" W	26.594	0.108	0	19060402016153	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	23	182.848	70° 0' 59.806" N	148° 39' 26.322" W	7.849	0.032	0	19060402016175	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	23	268.899	70° 1' 14.024" N	148° 38' 39.768" W	16.358	0.066	0	19060402016172	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	23	1063.971	70° 0' 53.876" N	148° 39' 14.013" W	5.509	0.022	0	19060402016177	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	23	1237.770	70° 1' 9.068" N	148° 38' 37.019" W	1.498	0.006	0	19060402016174	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	23	1807.859	70° 0' 47.760" N	148° 39' 47.503" W	4.400	0.018	0	19060402016178	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	24	245.478	70° 0' 27.249" N	148° 39' 51.880" W	9.574	0.039	0	19060402016185	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	24	2737.185	70° 0' 32.430" N	148° 41' 25.084" W	13.310	0.054	0	19060402016184	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	24	3740.877	70° 0' 39.554" N	148° 41' 33.479" W	3.356	0.014	0	19060402016182	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	24	2314.985	70° 0' 41.301" N	148° 40' 35.736" W	18.993	0.077	0	19060402016180	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	25	888.092	69° 59' 39.037" N	148° 41' 42.537" W	9.970	0.040	0	19060402015747	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	25	1919.761	69° 59' 25.737" N	148° 42' 26.334" W	19.213	0.078	0	19060402015748	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	25	2062.398	70° 0' 4.273" N	148° 41' 25.274" W	28.963	0.117	0	19060402015746	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	26	1074.578	69° 58' 58.369" N	148° 42' 39.087" W	21.374	0.087	0	19060402015750	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	26	3299.035	69° 58' 48.016" N	148° 44' 3.458" W	43.427	0.176	167	19060402015752	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	26	1888.507	69° 59' 1.275" N	148° 43' 6.932" W	10.978	0.044	0	19060402015751	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	27	915.791	69° 58' 13.401" N	148° 43' 43.026" W	2.076	0.008	0	19060402015755	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	27	4792.730	69° 58' 35.042" N	148° 45' 24.367" W	9.778	0.040	0	19060402015753	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	27	3738.938	69° 58' 25.148" N	148° 45' 6.188" W	5.945	0.024	0	19060402015754	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	27	1591.133	69° 58' 4.605" N	148° 44' 14.968" W	2.865	0.012	0	19060402015756	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	27	1413.009	69° 57' 47.944" N	148° 44' 3.431" W	32.282	0.131	0	19060402015757	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	28	1433.429	69° 57' 31.113" N	148° 44' 35.552" W	69.407	0.281	188	19060402015758	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	29	2235.115	69° 56' 39.362" N	148° 46' 12.100" W	9.908	0.040	0	19060402015763	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	29	3516.082	69° 56' 43.219" N	148° 46' 45.929" W	6.114	0.025	0	19060402015761	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category	29	655.056	69° 56' 18.410" N	148° 44' 49.075" W	20.568	0.083	0	19060402015765	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	= Perennial												
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	29	1328.796	69° 56' 22.749" N	148° 46' 12.074" W	34.610	0.140	0	19060402015764	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	29	2291.367	69° 56' 52.123" N	148° 46' 10.628" W	24.651	0.100	0	19060402015760	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	30	2526.084	69° 55' 23.895" N	148° 45' 7.881" W	7.123	0.029	0	19060402015768	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	30	1993.522	69° 55' 23.093" N	148° 46' 50.791" W	2.424	0.010	0	19060402015770	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	30	2912.899	69° 55' 50.000" N	148° 48' 1.926" W	17.588	0.071	0	19060402015766	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	30	2936.885	69° 55' 36.788" N	148° 44' 37.137" W	13.744	0.056	0	19060402015767	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	3990.311	69° 54' 38.825" N	148° 49' 8.755" W	13.434	0.054	0	19060402016816	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	4778.204	69° 55' 0.872" N	148° 49' 22.374" W	6.874	0.028	0	19060402016815	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	2187.162	69° 54' 46.075" N	148° 45' 49.395" W	10.017	0.041	0	19060402015771	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	4153.409	69° 54' 14.760" N	148° 45' 50.878" W	3.288	0.013	0	19060402015773	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	3222.689	69° 55' 18.248" N	148° 48' 27.049" W	62.847	0.254	0	19060402015769	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	31	4028.651	69° 54' 23.156" N	148° 45' 37.254" W	4.421	0.018	0	19060402015772	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	32	4053.152	69° 53' 52.373" N	148° 45' 58.915" W	11.806	0.048	0	19060402015775	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	32	1903.493	69° 54' 7.264" N	148° 46' 35.111" W	17.152	0.069	0	19060402015774	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	33	2075.725	69░ 52' 57.643" N	148░ 48' 21.673" W	6.617	0.027	0	19060402016817	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	33	2839.176	69░ 52' 44.960" N	148░ 48' 14.274" W	2.978	0.012	0	19060402016818	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	34	2096.958	69░ 52' 1.644" N	148░ 47' 1.067" W	2.781	0.011	0	19060402015778	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	34	2069.072	69░ 52' 5.238" N	148░ 47' 28.451" W	4.668	0.019	0	19060402015777	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	34	5110.916	69░ 52' 12.130" N	148░ 50' 22.800" W	186.311	0.754	0	19060402017322	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	34	2733.838	69░ 52' 22.437" N	148░ 48' 16.063" W	2.963	0.012	0	19060402016819	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	35	2311.948	69░ 51' 50.756" N	148░ 47' 4.695" W	7.733	0.031	0	19060402015779	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	35	2007.680	69░ 51' 31.714" N	148░ 47' 24.317" W	13.097	0.053	0	19060402015780	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	36	2123.137	69░ 50' 19.357" N	148░ 45' 44.067" W	1.651	0.007	0	19060402015782	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	36	1342.809	69░ 50' 38.795" N	148░ 46' 55.579" W	91.248	0.369	269	19060402015781	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	37	2718.600	69░ 50' 4.681" N	148░ 47' 6.761" W	48.225	0.195	0	19060402015783	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	37	1275.969	69░ 49' 46.610" N	148░ 46' 24.919" W	9.157	0.037	0	19060402015785	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	37	2499.448	69░ 49' 43.359" N	148░ 46' 52.248" W	1.290	0.005	0	19060402015787	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	37	3098.856	69░ 49' 44.215" N	148░ 47' 17.016" W	2.101	0.009	0	19060402015786	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	37	719.571	69° 49' 58.884" N	148° 45' 44.245" W	2.423	0.010	0	19060402015784	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	38	5428.544	69° 48' 23.543" N	148° 47' 41.639" W	1.811	0.007	0	19060402015788	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	39	2007.160	69° 47' 41.432" N	148° 45' 19.683" W	9.360	0.038	0	19060402015791	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	39	1805.494	69° 47' 56.280" N	148° 45' 32.419" W	3.305	0.013	0	19060402015790	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	39	1982.435	69° 48' 15.760" N	148° 45' 40.959" W	3.349	0.014	0	19060402015789	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	40	648.065	69° 47' 25.381" N	148° 43' 41.785" W	2.059	0.008	0	19060402015792	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	41	4192.021	69° 46' 22.620" N	148° 44' 53.777" W	7.611	0.031	0	19060402015796	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	41	3501.479	69° 46' 52.304" N	148° 44' 23.745" W	4.658	0.019	0	19060402015794	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	43	2684.663	69° 44' 49.754" N	148° 43' 8.054" W	3.917	0.016	0	19060402015649	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	43	3285.765	69° 44' 46.171" N	148° 43' 27.959" W	9.771	0.040	0	19060402015650	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	44	3178.507	69° 43' 49.840" N	148° 43' 12.652" W	1.986	0.008	0	19060402015655	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	44	1471.667	69° 44' 21.519" N	148° 41' 24.774" W	1.750	0.007	0	19060402015653	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	44	707.091	69° 44' 12.064" N	148° 41' 9.115" W	4.805	0.019	0	19060402015654	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	45	4739.204	69° 43' 47.379" N	148° 44' 24.774" W	1.510	0.006	0	19060402017328	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage =	45	2647.799	69° 43' 10.796" N	148° 44' 6.797" W	24.745	0.100	352	19060402017327	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	46	1211.546	69° 42' 40.169" N	148° 42' 58.206" W	4.358	0.018	0	19060402015659	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	46	767.028	69° 42' 29.516" N	148° 43' 10.528" W	4.299	0.017	0	19060402015661	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	46	1736.205	69° 42' 39.346" N	148° 43' 23.618" W	3.189	0.013	0	19060402015660	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	47	3769.598	69° 41' 55.250" N	148° 44' 16.078" W	4.443	0.018	0	19060402017329	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	47	3874.998	69° 41' 21.338" N	148° 40' 47.092" W	2.256	0.009	0	19060402015743	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	48	1830.471	69° 40' 35.665" N	148° 41' 27.399" W	2.937	0.012	0	19060402015669	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	48	2782.616	69° 40' 54.544" N	148° 41' 10.883" W	2.851	0.012	0	19060402015668	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	48	2433.259	69° 41' 2.963" N	148° 43' 29.958" W	5.682	0.023	0	19060402017330	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	48	2141.346	69° 41' 0.828" N	148° 43' 14.811" W	3.885	0.016	0	19060402017331	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	49	676.810	69° 39' 58.499" N	148° 42' 29.064" W	2.459	0.010	0	19060402017332	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	49	5395.405	69° 40' 10.170" N	148° 39' 35.663" W	4.961	0.020	0	19060402015670	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	49	2365.504	69° 40' 4.544" N	148° 41' 10.280" W	2.551	0.010	0	19060402015672	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	50	2270.739	69° 38' 57.244" N	148° 40' 32.527" W	1.911	0.008	0	19060402015678	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	50	1021.089	69° 39' 5.559" N	148° 41' 11.078" W	1.635	0.007	0	19060402015677	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	50	2348.342	69° 39' 24.694" N	148° 41' 5.141" W	5.249	0.021	0	19060402015676	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	51	2465.992	69° 38' 10.288" N	148° 39' 32.459" W	4.359	0.018	0	19060402015683	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	51	2451.935	69° 38' 20.313" N	148° 39' 35.060" W	3.495	0.014	0	19060402015680	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	57	414.195	69° 33' 8.825" N	148° 36' 35.748" W	5.279	0.021	0	19060402015711	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	1949.053	69° 32' 3.292" N	148° 36' 4.458" W	3.466	0.014	0	19060402015722	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	2498.821	69° 32' 28.954" N	148° 37' 10.227" W	1.776	0.007	0	19060402015716	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	2874.463	69° 32' 5.705" N	148° 37' 2.535" W	3.271	0.013	0	19060402015721	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	1880.495	69° 32' 8.544" N	148° 36' 35.749" W	2.946	0.012	0	19060402015720	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	2313.402	69° 32' 18.327" N	148° 34' 43.022" W	4.967	0.020	0	19060402015719	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	58	3686.227	69° 32' 16.039" N	148° 37' 42.321" W	1.488	0.006	0	19060402017333	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	59	2533.855	69° 31' 32.025" N	148° 36' 40.204" W	2.138	0.009	0	19060402015728	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	59	3106.783	69° 32' 1.192" N	148° 34' 30.271" W	3.451	0.014	0	19060402015723	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	59	2878.823	69° 32' 2.096" N	148° 34' 47.273" W	1.190	0.005	0	19060402015724	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	59	2805.246	69° 31' 28.303" N	148° 36' 46.308" W	2.326	0.009	0	19060402015731	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	59	336.151	69° 31' 35.263" N	148° 35' 37.350" W	2.371	0.010	0	19060402015727	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	60	3362.449	69° 30' 44.451" N	148° 33' 7.912" W	1.853	0.007	0	19060402015737	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	60	2809.605	69° 30' 54.188" N	148° 33' 32.050" W	3.978	0.016	0	19060402015735	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	60	4792.089	69° 30' 32.818" N	148° 32' 32.079" W	3.054	0.012	0	19060402015739	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	60	2885.471	69° 31' 8.870" N	148° 34' 4.046" W	2.097	0.008	0	19060402015733	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	75	2738.107	69° 19' 25.938" N	148° 42' 15.305" W	2.472	0.010	0	19060402015620	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	76	2650.621	69° 19' 3.974" N	148° 44' 32.193" W	2.908	0.012	0	19060402015622	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	78	2131.240	69° 17' 33.466" N	148° 46' 14.795" W	1.764	0.007	0	19060402015635	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	78	2203.232	69° 17' 22.091" N	148° 46' 30.331" W	1.266	0.005	0	19060402015636	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	79	2108.830	69° 16' 49.790" N	148° 46' 46.821" W	1.365	0.006	0	19060402015638	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	80	2884.527	69° 15' 37.299" N	148° 47' 29.102" W	1.315	0.005	840	19060402015647	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	80	3980.795	69° 15' 18.922" N	148° 47' 46.499" W	1.917	0.008	0	19060402015648	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	82	3094.729	69° 13' 38.472" N	148° 48' 15.332" W	35.417	0.143	0	19060402015419	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	82	954.690	69° 13' 54.965" N	148° 47' 20.191" W	2.652	0.011	0	19060402015417	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	83	1138.240	69° 13' 17.981" N	148° 47' 26.387" W	1.688	0.007	0	19060402015421	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	83	1106.984	69° 13' 16.400" N	148° 47' 34.117" W	1.388	0.006	0	19060402015423	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	85	1040.416	69° 11' 26.482" N	148° 48' 44.844" W	5.311	0.021	0	19060402016737	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	85	1053.911	69° 11' 23.154" N	148° 48' 56.934" W	1.884	0.008	0	19060402016738	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	86	2502.590	69° 10' 31.634" N	148° 51' 28.349" W	24.777	0.100	1046	19060402016740	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	87	3331.368	69° 9' 56.495" N	148° 51' 25.965" W	1.650	0.007	0	19060402016744	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	87	3650.380	69° 10' 3.335" N	148° 51' 38.204" W	5.145	0.021	0	19060402016742	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	91	4036.766	69° 6' 31.795" N	148° 53' 0.127" W	31.873	0.129	1030	19060402016753	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	91	2799.530	69° 6' 47.725" N	148° 52' 3.914" W	4.805	0.019	0	19060402016751	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	91	2978.518	69° 6' 25.793" N	148° 52' 16.588" W	2.422	0.010	0	19060402016754	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	91	1979.006	69° 6' 45.041" N	148° 51' 45.522" W	13.943	0.056	0	19060402016750	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	94	4506.855	69° 3' 37.337" N	148° 47' 25.012" W	1.781	0.007	0	19060402015469	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	95	4577.630	69° 3' 33.701" N	148° 47' 13.879" W	10.534	0.043	0	19060402015471	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	96	4822.766	69° 2' 10.743" N	148° 47' 34.750" W	3.503	0.014	0	19060402015486	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category	96	3948.911	69° 2' 44.672" N	148° 51' 30.382" W	2.050	0.008	0	19060402016778	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	= Perennial												
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	97	1816.654	69° 2' 9.212" N	148° 51' 6.653" W	67.999	0.275	1255	19060402016785	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	97	5396.855	69° 1' 29.340" N	148° 48' 6.223" W	11.207	0.045	0	19060402015489	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	98	2109.848	69° 0' 45.129" N	148° 49' 29.296" W	2.635	0.011	0	19060402016801	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	99	22.184	69° 0' 22.598" N	148° 49' 5.658" W	2.898	0.012	0	19060402016808	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	99	598.263	69° 0' 29.031" N	148° 49' 25.855" W	9.070	0.037	0	19060402016806	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	99	1037.746	69° 0' 10.792" N	148° 49' 20.479" W	3.326	0.013	0	19060402016809	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	100	1123.139	68° 59' 30.703" N	148° 48' 31.680" W	0.504	0.002	0	19060402016602	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	100	4574.663	68° 59' 13.698" N	148° 47' 2.912" W	1.799	0.007	0	19060402015098	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	100	1980.120	68° 59' 12.079" N	148° 49' 39.777" W	0.800	0.003	0	19060402016607	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	100	1984.627	68° 59' 52.083" N	148° 49' 10.923" W	1.838	0.007	0	19060402016595	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	101	1484.813	68° 58' 54.202" N	148° 49' 39.417" W	3.137	0.013	0	19060402016611	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	101	1755.608	68° 58' 48.997" N	148° 49' 28.814" W	1.208	0.005	1148	19060402016612	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	102	3314.325	68° 58' 9.646" N	148° 49' 43.486" W	0.572	0.002	0	19060402016624	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	102	2195.662	68° 57' 42.219" N	148° 50' 22.210" W	0.918	0.004	1178	19060402016630	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	104	3829.644	68° 56' 36.482" N	148° 54' 13.610" W	1.353	0.005	0	19060402016634	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	104	2511.879	68° 56' 38.799" N	148° 53' 37.296" W	10.487	0.042	1353	19060402016633	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	107	3294.791	68° 54' 8.811" N	148° 51' 21.412" W	0.231	0.001	0	19060402016659	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	107	3465.342	68° 53' 33.695" N	148° 50' 54.972" W	0.322	0.001	0	19060402016664	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	107	1618.653	68° 53' 39.801" N	148° 51' 29.635" W	7.755	0.031	0	19060402016663	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	107	1532.900	68° 53' 49.754" N	148° 51' 45.517" W	0.179	0.001	0	19060402016661	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	107	3278.136	68° 53' 31.521" N	148° 51' 2.816" W	0.342	0.001	0	19060402016665	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	108	230.240	68° 52' 52.976" N	148° 51' 59.078" W	7.830	0.032	0	19060402016670	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	109	3437.731	68° 51' 43.305" N	148° 52' 22.729" W	1.554	0.006	0	19060402016685	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	109	2487.211	68° 51' 41.041" N	148° 51' 54.027" W	5.346	0.022	0	19060402016684	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	109	4312.300	68° 51' 31.702" N	148° 53' 10.363" W	57.736	0.234	1443	19060402016686	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	109	2374.311	68° 51' 48.185" N	148° 51' 50.824" W	0.530	0.002	0	19060402016683	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	1332.586	68° 51' 37.444" N	148° 50' 4.541" W	1.480	0.006	0	19060402016687	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	2318.223	68° 51' 22.551" N	148° 51' 11.390" W	1.259	0.005	0	19060402016693	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	2475.798	68° 51' 0.177" N	148° 50' 42.932" W	0.885	0.004	0	19060402016700	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	452.519	68° 51' 25.366" N	148° 49' 51.360" W	1.393	0.006	0	19060402016692	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	929.633	68° 51' 31.884" N	148° 49' 59.678" W	0.972	0.004	0	19060402016690	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	2244.695	68° 51' 35.099" N	148° 50' 55.910" W	0.266	0.001	0	19060402016688	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	2538.419	68° 51' 31.434" N	148° 51' 12.123" W	1.678	0.007	0	19060402016689	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	2640.687	68° 51' 13.814" N	148° 51' 18.116" W	1.536	0.006	0	19060402016697	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	110	1769.319	68° 51' 26.845" N	148° 50' 53.155" W	0.314	0.001	0	19060402016691	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	111	74.920	68° 50' 29.924" N	148° 49' 29.985" W	1.609	0.007	0	19060402016708	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	113	1166.358	68° 48' 40.033" N	148° 50' 30.098" W	2.382	0.010	0	19060402016720	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	113	242.674	68° 48' 51.721" N	148° 50' 26.474" W	4.708	0.019	0	19060402016718	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	113	1194.841	68° 48' 41.655" N	148° 50' 16.493" W	2.796	0.011	0	19060402016719	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	113	4036.470	68° 49' 20.066" N	148° 52' 18.259" W	18.830	0.076	1455	19060402016716	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	114	3332.963	68° 47' 41.780" N	148° 49' 53.517" W	1.223	0.005	0	19060402016722	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	114	2100.447	68° 47' 43.048" N	148° 50' 35.883" W	2.574	0.010	0	19060402016721	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	116	1792.809	68° 46' 35.736" N	148° 51' 2.282" W	1.754	0.007	0	19060402016723	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	117	4130.877	68° 45' 39.963" N	148° 51' 8.772" W	1.262	0.005	0	19060402016731	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	117	856.799	68° 45' 33.911" N	148° 53' 23.846" W	1.967	0.008	0	19060402016733	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	117	4874.374	68° 46' 16.796" N	148° 54' 39.435" W	1.793	0.007	0	19060402016724	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	117	4694.469	68° 46' 12.804" N	148° 54' 41.811" W	1.128	0.005	0	19060402016725	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	117	5228.917	68° 45' 54.814" N	148° 55' 28.100" W	2.641	0.011	0	19060402016730	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	5146.909	68° 44' 40.330" N	148° 51' 41.219" W	55.121	0.223	0	19060402016361	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	541.800	68° 44' 54.314" N	148° 53' 59.333" W	2.576	0.010	0	19060402016359	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	3584.931	68° 44' 31.700" N	148° 53' 1.328" W	4.830	0.020	0	19060402016363	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	4195.236	68° 44' 21.559" N	148° 53' 7.186" W	7.348	0.030	0	19060402016366	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	3743.020	68° 44' 18.980" N	148° 53' 50.701" W	2.482	0.010	0	19060402016367	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	3000.944	68° 44' 55.544" N	148° 52' 55.513" W	1.798	0.007	0	19060402016357	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	118	3255.026	68° 44' 23.419" N	148° 53' 56.967" W	1.531	0.006	0	19060402016365	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	4603.561	68° 44' 52.988" N	148° 56' 47.391" W	0.405	0.002	0	19060402016358	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	1340.703	68° 43' 52.529" N	148° 55' 45.918" W	21.339	0.086	0	19060402016383	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	4760.715	68° 43' 34.235" N	148° 54' 27.959" W	0.929	0.004	0	19060402016391	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	3310.640	68° 44' 47.593" N	148° 55' 56.612" W	1.076	0.004	0	19060402016360	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	5302.070	68° 43' 55.776" N	148° 53' 16.263" W	11.109	0.045	0	19060402016385	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	3311.206	68° 43' 36.457" N	148° 55' 37.268" W	21.029	0.085	0	19060402016390	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	5019.482	68° 44' 8.230" N	148° 53' 21.267" W	2.245	0.009	0	19060402016375	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	3342.751	68° 44' 32.250" N	148° 56' 59.799" W	1.380	0.006	0	19060402016362	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	5177.184	68° 43' 28.155" N	148° 54' 24.637" W	2.205	0.009	0	19060402016394	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	119	4786.137	68° 44' 30.245" N	148° 57' 45.304" W	0.594	0.002	0	19060402016364	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	4736.303	68° 44' 11.818" N	148° 59' 1.407" W	0.877	0.004	0	19060402016368	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	3825.835	68° 44' 7.552" N	148° 58' 39.656" W	1.368	0.006	0	19060402016371	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	1757.424	68° 43' 40.553" N	148° 56' 32.272" W	1.188	0.005	0	19060402016389	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	1226.270	68° 43' 26.302" N	148° 57' 13.613" W	3.446	0.014	0	19060402016393	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	2475.541	68° 43' 15.987" N	148° 56' 55.093" W	1.405	0.006	0	19060402016396	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	3251.717	68° 43' 5.877" N	148° 57' 23.054" W	1.674	0.007	0	19060402016400	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	3852.370	68° 44' 3.252" N	148° 58' 53.832" W	3.097	0.013	0	19060402016379	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	120	4232.911	68° 44' 8.743" N	148° 58' 49.039" W	0.571	0.002	0	19060402016370	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	120	1064.502	68° 43' 49.762" N	148° 58' 0.177" W	18.512	0.075	1958	19060402016387	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	5541.540	68° 44' 10.222" N	148° 59' 51.830" W	1.137	0.005	0	19060402016369	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3827.938	68° 43' 52.247" N	149° 0' 7.667" W	1.431	0.006	0	19060402016386	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	2932.810	68° 43' 4.908" N	148° 58' 9.798" W	2.870	0.012	0	19060402016399	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4976.195	68° 42' 27.194" N	148° 58' 53.870" W	0.726	0.003	0	19060402016422	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4745.521	68° 44' 2.579" N	148° 59' 54.096" W	0.961	0.004	0	19060402016378	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3296.512	68° 43' 42.685" N	149° 0' 31.718" W	10.004	0.040	0	19060402016388	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4568.399	68° 44' 0.101" N	149° 0' 18.866" W	2.472	0.010	0	19060402016377	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3995.511	68° 42' 44.082" N	148° 58' 21.317" W	1.187	0.005	0	19060402016414	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	2362.355	68° 42' 57.961" N	148° 58' 42.897" W	1.839	0.007	0	19060402016403	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	5051.584	68° 42' 47.889" N	148° 57' 32.585" W	1.259	0.005	0	19060402016411	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	2335.093	68° 42' 51.758" N	148° 59' 13.619" W	2.185	0.009	0	19060402016408	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3176.630	68° 43' 29.691" N	149° 0' 50.632" W	0.743	0.003	0	19060402016392	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3108.843	68° 42' 44.615" N	148° 59' 9.629" W	0.649	0.003	0	19060402016412	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4564.663	68° 44' 1.086" N	148° 59' 19.765" W	0.698	0.003	0	19060402016380	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4215.197	68° 42' 53.536" N	148° 57' 49.497" W	0.860	0.003	0	19060402016407	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	3101.105	68° 42' 48.785" N	148° 58' 35.183" W	5.726	0.023	0	19060402016409	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	5381.521	68° 42' 23.504" N	148° 58' 50.730" W	0.386	0.002	0	19060402016425	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	2034.600	68° 42' 52.902" N	148° 59' 30.223" W	2.219	0.009	0	19060402016405	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	5019.512	68° 42' 41.864" N	148° 57' 36.917" W	6.435	0.026	0	19060402016413	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	121	4170.857	68° 42' 39.526" N	148° 58' 30.464" W	0.866	0.004	0	19060402016416	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	122	5201.477	68° 42' 19.190" N	148° 59' 29.828" W	2.107	0.009	0	19060402016429	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	122	4531.029	68° 42' 11.791" N	149° 0' 11.127" W	5.840	0.024	1996	19060402016433	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	122	2147.066	68° 42' 50.686" N	149° 2' 31.902" W	0.413	0.002	0	19060402016406	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	122	4061.817	68° 42' 30.037" N	148° 59' 47.403" W	2.280	0.009	0	19060402016419	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	122	5227.024	68° 42' 13.257" N	148° 59' 43.719" W	0.783	0.003	0	19060402016435	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	123	2668.243	68° 41' 41.461" N	149° 2' 38.791" W	7.298	0.030	0	19060402016444	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	123	5041.614	68° 41' 38.355" N	149° 1' 3.079" W	11.220	0.045	0	19060402016446	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	124	2349.889	68° 41' 1.333" N	149° 4' 54.504" W	7.966	0.032	0	19060402016457	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	124	3629.364	68° 40' 47.780" N	149° 4' 30.751" W	5.407	0.022	0	19060402016461	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	124	4362.531	68° 40' 42.652" N	149° 3' 52.564" W	2.536	0.010	0	19060402016463	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	125	3095.249	68° 40' 46.475" N	149° 5' 34.584" W	15.352	0.062	0	19060402016460	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	125	6098.071	68° 40' 22.427" N	149° 5' 16.549" W	9.650	0.039	0	19060402016465	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	128	2744.878	68° 40' 18.666" N	149° 14' 17.668" W	1.116	0.005	0	19060402017334	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	129	653.220	68° 39' 47.276" N	149° 14' 39.813" W	3.031	0.012	0	19060402016475	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	129	3702.331	68° 39' 29.561" N	149° 13' 28.929" W	4.204	0.017	0	19060402016478	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	129	5277.945	68° 39' 14.200" N	149° 13' 16.925" W	0.638	0.003	0	19060402016488	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	129	4019.723	68° 39' 17.379" N	149° 13' 57.507" W	1.367	0.006	0	19060402016485	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	130	4395.089	68° 38' 41.249" N	149° 16' 16.958" W	1.280	0.005	0	19060402016490	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage =	144	721.708	68° 31' 24.931" N	149° 28' 52.382" W	158.024	0.640	2892	19060402016871	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	146	4560.790	68° 29' 39.945" N	149° 29' 49.985" W	1.042	0.004	0	19060402016824	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	146	573.120	68° 29' 40.062" N	149° 28' 18.085" W	136.066	0.551	0	19060402016821	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	146	4918.318	68° 29' 39.730" N	149° 29' 57.335" W	0.328	0.001	0	19060402016825	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	146	3707.311	68° 29' 13.708" N	149° 29' 9.823" W	18.949	0.077	2660	19060402016827	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	146	4220.255	68° 29' 9.300" N	149° 28' 50.282" W	0.916	0.004	0	19060402016829	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	147	3329.513	68° 29' 3.606" N	149° 28' 8.620" W	7.097	0.029	0	19060402016830	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	147	2524.701	68° 29' 11.747" N	149° 27' 43.820" W	6.482	0.026	0	19060402016828	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	147	4995.991	68° 28' 42.844" N	149° 28' 36.745" W	1.952	0.008	0	19060402016836	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	147	4954.884	68° 28' 47.901" N	149° 28' 39.847" W	1.202	0.005	0	19060402016834	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	147	5282.049	68° 28' 52.936" N	149° 28' 54.936" W	5.308	0.021	0	19060402016832	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	148	1660.552	68° 27' 30.728" N	149° 25' 56.392" W	991.897	4.015	2622	19060402016835	39009	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	148	3990.284	68° 28' 1.151" N	149° 26' 31.425" W	4.474	0.018	0	19060402016837	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	149	742.359	68° 27' 48.539" N	149° 23' 34.640" W	0.312	0.001	0	19060402016266	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	149	316.643	68° 27' 42.472" N	149° 23' 32.008" W	13.988	0.057	0	19060402016267	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	149	2288.942	68° 27' 38.846" N	149° 24' 9.424" W	0.033	0.000	0	19060402016838	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	149	527.597	68° 27' 40.046" N	149° 23' 7.137" W	6.019	0.024	0	19060402016268	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	5896.524	68° 26' 37.593" N	149° 24' 3.681" W	0.394	0.002	0	19060402016843	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	4658.854	68° 26' 50.577" N	149° 23' 45.367" W	0.726	0.003	0	19060402016275	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	376.281	68° 27' 13.279" N	149° 21' 40.339" W	0.594	0.002	0	19060402016270	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	3131.687	68° 26' 51.072" N	149° 23' 2.193" W	2.131	0.009	0	19060402016273	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	5237.171	68° 26' 38.849" N	149° 23' 47.781" W	2.902	0.012	0	19060402016279	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	5028.947	68° 26' 50.082" N	149° 24' 1.082" W	7.191	0.029	0	19060402016274	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	3697.214	68° 27' 0.448" N	149° 23' 27.617" W	0.424	0.002	0	19060402016271	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	5851.601	68° 26' 35.297" N	149° 23' 57.629" W	0.733	0.003	0	19060402016283	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	3530.529	68° 26' 44.386" N	149° 22' 59.431" W	0.645	0.003	0	19060402016277	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	4605.878	68° 26' 46.587" N	149° 23' 37.343" W	0.583	0.002	0	19060402016276	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	150	1649.859	68° 26' 50.569" N	149° 22' 5.110" W	12.645	0.051	0	19060402016272	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	4700.428	68° 26' 28.972" N	149° 23' 32.343" W	16.756	0.068	0	19060402016282	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	4851.381	68° 26' 3.728" N	149° 23' 32.005" W	30.724	0.124	0	19060402016287	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	5177.304	68° 25' 55.552" N	149° 23' 14.357" W	0.478	0.002	0	19060402016291	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	2691.516	68° 26' 25.295" N	149° 22' 34.524" W	2.371	0.010	0	19060402016284	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	3717.298	68° 26' 12.844" N	149° 22' 54.812" W	1.512	0.006	0	19060402016286	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	3367.563	68° 26' 37.993" N	149° 22' 51.821" W	4.962	0.020	0	19060402016280	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	2289.806	68° 26' 43.549" N	149° 21' 57.789" W	0.376	0.002	0	19060402016278	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	2178.069	68° 26' 40.465" N	149° 22' 0.694" W	0.392	0.002	0	19060402016281	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	3942.991	68° 26' 7.388" N	149° 22' 55.944" W	2.189	0.009	0	19060402016288	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	6122.004	68° 26' 24.182" N	149° 24' 3.737" W	0.445	0.002	0	19060402016846	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	151	4080.268	68° 26' 13.685" N	149° 23' 20.817" W	31.720	0.128	0	19060402016285	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4277.459	68° 25' 1.512" N	149° 21' 57.157" W	1.714	0.007	0	19060402016311	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	2145.650	68° 25' 34.625" N	149° 22' 10.905" W	65.939	0.267	0	19060402016295	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4840.551	68° 25' 9.772" N	149° 22' 35.751" W	0.909	0.004	0	19060402016305	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	1351.405	68° 25' 20.694" N	149° 20' 47.236" W	0.376	0.002	0	19060402016299	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4166.125	68° 25' 12.965" N	149° 22' 21.384" W	1.192	0.005	0	19060402016303	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	5031.775	68° 25' 2.567" N	149° 22' 31.055" W	3.099	0.013	0	19060402016310	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	3750.030	68° 25' 47.297" N	149° 22' 19.649" W	0.574	0.002	0	19060402016293	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	3263.330	68° 25' 15.268" N	149° 21' 55.000" W	0.683	0.003	0	19060402016301	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	762.528	68° 25' 29.649" N	149° 20' 59.730" W	2.574	0.010	0	19060402016297	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4443.619	68° 25' 3.875" N	149° 22' 12.364" W	1.338	0.005	0	19060402016309	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4066.158	68° 25' 9.052" N	149° 22' 11.495" W	2.152	0.009	0	19060402016304	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	3592.859	68° 25' 14.454" N	149° 22' 3.568" W	0.440	0.002	0	19060402016302	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4578.502	68° 25' 16.998" N	149° 22' 40.532" W	1.486	0.006	0	19060402016300	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	152	4823.880	68° 25' 26.079" N	149° 22' 52.636" W	1.451	0.006	0	19060402016298	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	153	3851.777	68° 24' 38.772" N	149° 21' 45.351" W	20.987	0.085	0	19060402016315	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	153	2556.222	68° 25' 4.879" N	149° 20' 53.462" W	5.531	0.022	0	19060402016307	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	153	4425.321	68° 24' 50.403" N	149° 21' 57.225" W	0.948	0.004	0	19060402016314	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	154	2676.159	68° 23' 32.374" N	149° 19' 49.914" W	0.312	0.001	0	19060402016329	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	154	2765.821	68° 23' 55.406" N	149° 20' 37.056" W	0.470	0.002	0	19060402016323	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	154	3595.191	68° 23' 32.461" N	149° 20' 40.648" W	4.922	0.020	0	19060402016327	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	154	2354.430	68° 23' 35.843" N	149° 20' 8.062" W	18.983	0.077	0	19060402016326	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	154	3933.981	68° 24' 3.109" N	149° 21' 15.065" W	9.740	0.039	0	19060402016320	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	155	4563.656	68° 22' 49.766" N	149° 21' 7.353" W	0.416	0.002	0	19060402016341	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	155	4951.172	68° 22' 57.445" N	149° 21' 31.041" W	3.581	0.014	0	19060402016333	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	155	1669.085	68° 23' 12.486" N	149° 20' 1.178" W	9.309	0.038	0	19060402016331	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	155	2039.704	68° 22' 59.060" N	149° 20' 5.380" W	1.319	0.005	0	19060402016339	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	155	5010.975	68° 22' 45.476" N	149° 21' 23.530" W	10.967	0.044	0	19060402016340	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	156	4827.227	68° 22' 6.210" N	149° 21' 4.245" W	0.708	0.003	0	19060402016345	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	156	4631.583	68° 22' 1.333" N	149° 20' 54.456" W	1.135	0.005	0	19060402016346	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	156	2624.773	68° 22' 34.295" N	149° 19' 48.111" W	1.884	0.008	0	19060402016343	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	158	2193.721	68° 20' 46.666" N	149° 21' 24.627" W	1.315	0.005	0	19060402016349	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
Sagavanirktok River	Lake/Pond: Hydrographic Category = Perennial	171	570.761	68° 10' 17.101" N	149° 25' 55.034" W	1.608	0.007	0	19060402013648	39004	Perennial	19060402	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	263	2112.927	67° 3' 0.376" N	150° 20' 9.395" W	0.366	0.001	0	19040602005669	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	263	2287.427	67° 3' 1.768" N	150° 20' 13.820" W	0.480	0.002	0	19040602005667	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	265	1894.643	67° 1' 15.293" N	150° 17' 52.886" W	0.636	0.003	0	19040602005711	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	265	3301.683	67° 1' 11.266" N	150° 15' 53.408" W	0.912	0.004	0	19040602005713	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	270	1340.972	66° 57' 59.045" N	150° 22' 34.435" W	0.624	0.003	0	19040602005530	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	270	616.603	66° 58' 0.226" N	150° 22' 9.877" W	1.815	0.007	0	19040602005529	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	270	689.501	66° 57' 56.096" N	150° 22' 18.518" W	0.379	0.002	0	19040602005531	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	271	531.153	66° 57' 15.915" N	150° 23' 30.576" W	99.055	0.401	1295	19040602005534	39009	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	271	2303.968	66° 57' 2.670" N	150° 23' 32.423" W	2.157	0.009	0	19040602005536	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	271	2046.477	66° 57' 34.889" N	150° 22' 58.420" W	2.653	0.011	0	19040602005532	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	271	868.768	66° 57' 32.935" N	150° 23' 34.978" W	0.405	0.002	0	19040602005533	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	271	2191.904	66° 57' 22.588" N	150° 22' 52.877" W	0.531	0.002	0	19040602005535	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	272	852.346	66° 56' 44.484" N	150° 24' 34.806" W	1.221	0.005	0	19040602005537	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	274	2460.967	66° 55' 29.729" N	150° 26' 38.032" W	0.564	0.002	0	19040602005538	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	274	1801.270	66° 55' 21.044" N	150° 26' 45.407" W	0.655	0.003	0	19040602005540	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	274	1851.449	66° 55' 9.800" N	150° 27' 7.337" W	2.132	0.009	0	19040602005541	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	276	3415.043	66° 53' 11.209" N	150° 29' 8.378" W	0.554	0.002	0	19040602005543	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	277	582.174	66° 53' 7.588" N	150° 30' 24.799" W	9.337	0.038	0	19040602005822	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	277	4988.171	66° 53' 58.645" N	150° 31' 45.226" W	8.892	0.036	0	19040602005818	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	278	5430.193	66° 52' 39.819" N	150° 32' 56.140" W	2.780	0.011	0	19040602005836	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	278	2359.981	66° 52' 13.558" N	150° 29' 34.291" W	8.039	0.033	0	19040602005544	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	279	3875.693	66° 51' 42.369" N	150° 29' 56.675" W	3.123	0.013	0	19040602005545	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	279	3480.207	66° 51' 39.260" N	150° 30' 10.207" W	1.237	0.005	0	19040602005867	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	281	2290.198	66° 50' 22.499" N	150° 34' 56.415" W	0.684	0.003	0	19040602005876	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	283	5243.952	66° 49' 53.754" N	150° 38' 53.984" W	0.239	0.001	0	19040602005896	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	283	4667.951	66° 49' 50.317" N	150° 38' 42.054" W	0.143	0.001	0	19040602005898	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	283	4926.818	66° 49' 51.934" N	150° 38' 47.729" W	0.268	0.001	0	19040602005897	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	284	2823.723	66° 48' 59.810" N	150° 39' 2.602" W	2.721	0.011	0	19040602005909	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	284	6066.000	66° 49' 24.400" N	150° 39' 49.768" W	0.828	0.003	0	19040602005903	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	285	3518.518	66° 48' 17.164" N	150° 40' 19.506" W	4.745	0.019	0	19040602005923	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	285	4945.749	66° 48' 35.300" N	150° 40' 28.880" W	4.338	0.018	0	19040602005918	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	286	4614.533	66° 47' 58.545" N	150° 41' 14.266" W	4.557	0.018	0	19040602005929	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	286	3934.483	66° 47' 41.339" N	150° 41' 32.787" W	1.856	0.008	0	19040602005936	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	286	5098.506	66° 47' 54.663" N	150° 41' 37.064" W	11.423	0.046	0	19040602005930	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	287	3037.986	66° 46' 46.317" N	150° 40' 54.966" W	3.026	0.012	0	19040602005944	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	295	1549.996	66° 40' 5.111" N	150° 39' 24.343" W	4.921	0.020	0	19040602005642	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
South Fork Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	296	5593.223	66° 39' 21.457" N	150° 41' 35.302" W	2.020	0.008	0	19040602005707	39004	Perennial	19040602	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	405	2983.712	65° 28' 17.488" N	148° 40' 2.628" W	1.380	0.006	0	19040509004531	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	406	1962.134	65° 28' 0.773" N	148° 37' 49.670" W	1.411	0.006	0	19040509004532	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	408	3305.169	65° 26' 1.525" N	148° 38' 14.067" W	1.314	0.005	0	19040509004537	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	408	2105.776	65° 26' 10.157" N	148° 37' 35.662" W	0.513	0.002	0	19040509004536	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	409	1968.861	65° 26' 1.875" N	148° 37' 14.711" W	1.710	0.007	0	19040509004538	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	409	3719.829	65° 25' 33.268" N	148° 38' 36.230" W	1.016	0.004	0	19040509004541	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	409	1321.329	65° 25' 51.180" N	148° 37' 33.958" W	1.666	0.007	0	19040509004540	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	409	998.016	65° 25' 33.250" N	148° 37' 29.214" W	2.212	0.009	0	19040509004542	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	409	1658.821	65° 25' 47.770" N	148° 37' 58.861" W	6.763	0.027	0	19040509004539	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	1371.072	65° 24' 37.475" N	148° 37' 14.565" W	0.897	0.004	0	19040509004548	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	2151.981	65° 25' 4.317" N	148° 37' 39.090" W	0.968	0.004	0	19040509004545	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	3684.828	65° 25' 4.749" N	148° 38' 23.618" W	2.661	0.011	0	19040509004544	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	2603.721	65° 24' 28.150" N	148° 37' 32.842" W	1.172	0.005	0	19040509004551	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	2219.925	65° 24' 37.618" N	148° 37' 48.890" W	1.036	0.004	0	19040509004547	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	3221.219	65° 24' 42.571" N	148° 38' 15.927" W	1.491	0.006	0	19040509004546	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	3461.722	65° 25' 12.780" N	148° 38' 5.595" W	0.963	0.004	0	19040509004543	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	410	3837.312	65° 24' 35.624" N	148° 38' 24.797" W	1.913	0.008	0	19040509004549	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	411	2347.770	65° 24' 12.718" N	148° 38' 24.982" W	5.157	0.021	0	19040509004554	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	411	3503.689	65° 24' 24.949" N	148° 38' 28.463" W	4.562	0.018	0	19040509004550	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	411	2698.049	65° 23' 59.412" N	148° 38' 37.367" W	2.784	0.011	0	19040509004555	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	411	3431.649	65° 24' 15.723" N	148° 38' 40.925" W	1.377	0.006	0	19040509004553	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	4150.734	65° 23' 50.247" N	148° 39' 6.395" W	1.558	0.006	0	19040509004556	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	4090.995	65° 23' 37.259" N	148° 39' 35.623" W	0.904	0.004	0	19040509004560	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	4267.634	65° 23' 32.280" N	148° 39' 49.286" W	1.496	0.006	0	19040509004562	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	4644.339	65° 23' 30.245" N	148° 40' 6.050" W	3.370	0.014	0	19040509004563	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	4304.731	65° 23' 44.752" N	148° 39' 23.209" W	0.778	0.003	0	19040509004557	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	2227.100	65° 23' 31.409" N	148° 38' 52.176" W	1.643	0.007	0	19040509004564	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	412	2789.314	65° 23' 21.267" N	148° 39' 31.583" W	5.397	0.022	0	19040509004567	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	2189.021	65° 22' 47.866" N	148° 39' 32.732" W	2.899	0.012	0	19040509004573	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	1525.645	65° 22' 38.591" N	148° 39' 37.263" W	3.144	0.013	0	19040509004577	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	2534.657	65° 22' 32.246" N	148° 40' 6.269" W	0.349	0.001	0	19040509004579	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	1405.423	65° 22' 16.327" N	148° 39' 39.164" W	1.822	0.007	0	19040509004584	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	3726.864	65° 22' 57.539" N	148° 40' 0.884" W	1.495	0.006	0	19040509004571	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	1756.673	65° 22' 24.538" N	148° 39' 53.197" W	1.702	0.007	0	19040509004582	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	1996.945	65° 22' 28.311" N	148° 39' 58.415" W	0.877	0.004	0	19040509004581	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	4064.647	65° 22' 43.072" N	148° 40' 34.788" W	0.662	0.003	0	19040509004575	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	3697.436	65° 23' 3.354" N	148° 39' 52.199" W	5.124	0.021	0	19040509004569	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	413	3060.458	65° 22' 54.500" N	148° 39' 45.346" W	2.097	0.008	0	19040509004572	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	2655.623	65° 21' 35.505" N	148° 40' 35.747" W	1.242	0.005	0	19040509004596	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	5319.717	65° 21' 58.112" N	148° 41' 26.989" W	1.806	0.007	0	19040509004590	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	2522.010	65° 22' 0.570" N	148° 39' 43.776" W	1.441	0.006	0	19040509004589	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	4931.398	65° 21' 16.733" N	148° 41' 25.250" W	5.926	0.024	0	19040509004600	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	4520.205	65° 21' 23.464" N	148° 41' 17.350" W	1.141	0.005	0	19040509004599	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	414	2662.773	65° 21' 40.638" N	148° 40' 35.257" W	3.062	0.012	0	19040509004595	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	415	4744.571	65° 20' 32.526" N	148° 41' 33.182" W	8.707	0.035	0	19040509004603	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	415	2505.884	65° 20' 18.088" N	148° 39' 22.884" W	0.927	0.004	0	19040509004605	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	876.391	65° 19' 42.027" N	148° 40' 3.881" W	5.521	0.022	0	19040509004612	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	2554.644	65° 19' 49.998" N	148° 40' 55.572" W	12.367	0.050	0	19040509004608	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	1557.107	65° 19' 56.366" N	148° 40' 33.489" W	7.248	0.029	0	19040509004609	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	2799.321	65° 19' 40.026" N	148° 40' 52.653" W	1.581	0.006	0	19040509004613	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	3533.781	65° 19' 29.921" N	148° 41' 2.191" W	3.989	0.016	0	19040509004614	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	416	962.573	65° 19' 45.867" N	148° 40' 15.149" W	1.937	0.008	0	19040509004611	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	417	4915.330	65° 19' 10.347" N	148° 41' 55.655" W	4.230	0.017	0	19040509004615	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	418	4081.962	65° 17' 58.338" N	148° 41' 41.350" W	0.237	0.001	0	19040509004628	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	418	4275.958	65° 18' 1.020" N	148° 41' 50.475" W	3.341	0.014	0	19040509004624	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	2672.914	65° 17' 19.380" N	148° 41' 22.779" W	15.420	0.062	0	19040509004638	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	5359.854	65° 17' 6.696" N	148° 42' 15.302" W	0.212	0.001	0	19040509004646	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	3804.390	65° 17' 21.989" N	148° 41' 43.070" W	2.002	0.008	0	19040509004637	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	4111.431	65° 17' 40.272" N	148° 41' 33.367" W	2.272	0.009	0	19040509004633	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	5148.256	65° 17' 5.177" N	148° 42' 10.487" W	0.491	0.002	0	19040509004647	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	4883.800	65° 17' 30.446" N	148° 42' 33.526" W	73.825	0.299	0	19040509004632	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	419	3979.456	65° 17' 13.230" N	148° 41' 46.746" W	1.663	0.007	0	19040509004642	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	420	4019.491	65° 16' 20.395" N	148° 41' 59.297" W	3.129	0.013	0	19040509004659	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	421	2637.147	65° 15' 29.407" N	148° 42' 42.348" W	95.128	0.385	0	19040509004665	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	421	5079.393	65° 16' 11.246" N	148° 42' 53.199" W	2.757	0.011	0	19040509004661	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	5214.302	65° 14' 59.500" N	148° 43' 27.466" W	3.641	0.015	0	19040509004677	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	3886.675	65° 14' 26.099" N	148° 42' 39.430" W	0.359	0.001	0	19040509007450	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	3608.095	65° 14' 23.902" N	148° 42' 27.470" W	0.340	0.001	0	19040509007451	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	5225.287	65° 14' 51.980" N	148° 43' 27.167" W	2.543	0.010	0	19040509007426	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	5042.389	65° 14' 44.216" N	148° 43' 23.416" W	3.297	0.013	0	19040509007432	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	4139.355	65° 14' 24.602" N	148° 42' 51.557" W	7.913	0.032	0	19040509007447	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	4829.485	65° 14' 45.545" N	148° 43' 14.913" W	0.304	0.001	0	19040509007433	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	422	2890.001	65° 14' 37.212" N	148° 42' 32.735" W	13.556	0.055	0	19040509007435	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2419.404	65° 14' 9.693" N	148° 42' 4.875" W	0.620	0.003	0	19040509007460	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4075.505	65° 13' 33.009" N	148° 42' 42.439" W	1.099	0.004	0	19040509007487	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	1807.637	65° 13' 54.782" N	148° 42' 6.656" W	4.256	0.017	0	19040509007472	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3220.327	65° 13' 44.805" N	148° 42' 32.867" W	0.457	0.002	0	19040509007480	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4350.025	65° 13' 38.741" N	148° 42' 57.567" W	1.911	0.008	0	19040509007482	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2111.242	65° 14' 2.864" N	148° 42' 9.272" W	1.592	0.006	0	19040509007464	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3659.527	65° 14' 17.439" N	148° 42' 27.723" W	0.801	0.003	0	19040509007458	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4678.173	65° 13' 25.666" N	148° 43' 10.759" W	29.356	0.119	0	19040509007489	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3175.522	65° 14' 20.644" N	148° 42' 13.232" W	4.457	0.018	0	19040509007452	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3523.909	65° 13' 57.323" N	148° 42' 44.193" W	1.632	0.007	0	19040509007471	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2470.332	65° 14' 0.626" N	148° 42' 16.921" W	0.373	0.002	0	19040509007469	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3460.784	65° 14' 2.897" N	148° 42' 43.711" W	5.014	0.020	0	19040509007463	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3460.635	65° 13' 34.481" N	148° 42' 29.168" W	1.253	0.005	0	19040509007486	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2081.819	65° 13' 43.534" N	148° 42' 7.444" W	8.943	0.036	0	19040509007476	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2705.951	65° 14' 2.152" N	148° 42' 21.198" W	0.288	0.001	0	19040509007467	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4681.749	65° 13' 44.777" N	148° 44' 41.003" W	83.959	0.340	0	19040509007466	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4717.728	65° 13' 51.891" N	148° 43' 25.546" W	15.351	0.062	0	19040509007473	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2623.939	65° 13' 45.955" N	148° 42' 19.602" W	0.646	0.003	0	19040509007479	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	3970.247	65° 14' 18.717" N	148° 42' 33.522" W	0.209	0.001	0	19040509007457	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	2914.978	65° 13' 49.672" N	148° 42' 34.037" W	5.380	0.022	0	19040509007474	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	423	4214.717	65° 13' 47.719" N	148° 43' 1.552" W	3.830	0.015	0	19040509007477	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1815.078	65° 13' 3.990" N	148° 42' 2.967" W	0.363	0.001	0	19040509007515	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	5024.294	65° 13' 6.271" N	148° 43' 17.895" W	0.509	0.002	0	19040509007506	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	3008.723	65° 12' 47.066" N	148° 42' 22.012" W	1.050	0.004	0	19040509007546	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1554.566	65° 13' 4.781" N	148° 41' 57.362" W	0.491	0.002	0	19040509007512	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1009.402	65° 13' 12.849" N	148° 41' 58.989" W	82.265	0.333	0	19040509007490	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1602.060	65° 13' 2.788" N	148° 41' 58.019" W	0.645	0.003	0	19040509007520	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	3776.308	65° 12' 42.038" N	148° 42' 41.109" W	6.569	0.027	0	19040509007550	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1781.283	65° 13' 9.882" N	148° 42' 1.863" W	1.112	0.005	0	19040509007503	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	4844.478	65° 12' 53.641" N	148° 43' 13.847" W	1.700	0.007	0	19040509007529	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	4373.742	65° 12' 48.936" N	148° 43' 5.556" W	4.317	0.017	0	19040509007539	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	2586.105	65° 12' 52.555" N	148° 42' 20.275" W	2.034	0.008	0	19040509007535	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	3610.381	65° 13' 5.082" N	148° 42' 45.635" W	1.168	0.005	0	19040509007509	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	2686.425	65° 12' 42.167" N	148° 42' 1.043" W	0.514	0.002	0	19040509007555	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	1906.503	65° 13' 6.338" N	148° 42' 3.520" W	0.439	0.002	0	19040509007507	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	4445.361	65° 13' 3.070" N	148° 43' 4.820" W	0.537	0.002	0	19040509007516	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	3249.859	65° 12' 57.080" N	148° 42' 37.679" W	1.777	0.007	0	19040509007525	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	424	4722.395	65° 13' 11.481" N	148° 43' 11.484" W	3.163	0.013	0	19040509007500	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	3764.797	65° 12' 22.594" N	148° 43' 2.201" W	6.545	0.026	0	19040509007601	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	4638.044	65° 12' 38.771" N	148° 43' 8.728" W	10.040	0.041	0	19040509007557	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	3679.749	65° 12' 31.951" N	148° 42' 48.735" W	2.535	0.010	0	19040509007567	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	4913.557	65° 12' 4.076" N	148° 43' 34.935" W	8.420	0.034	0	19040509007648	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	1515.899	65° 12' 28.000" N	148° 41' 36.171" W	4.514	0.018	0	19040509007585	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	4761.726	65° 12' 21.900" N	148° 43' 21.898" W	1.077	0.004	0	19040509007607	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	1755.714	65° 12' 17.285" N	148° 42' 10.760" W	0.226	0.001	0	19040509007625	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	5188.286	65° 12' 28.053" N	148° 43' 31.713" W	2.253	0.009	0	19040509007574	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	425	2455.160	65° 12' 25.225" N	148° 42' 22.155" W	2.809	0.011	0	19040509007596	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4736.967	65° 11' 19.542" N	148° 44' 5.525" W	1.702	0.007	0	19040509007739	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4631.503	65° 11' 24.950" N	148° 44' 0.367" W	0.233	0.001	0	19040509007731	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4872.232	65° 11' 41.055" N	148° 43' 57.716" W	0.358	0.001	0	19040509007700	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4712.140	65° 11' 36.935" N	148° 43' 57.692" W	0.491	0.002	0	19040509007705	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	5601.526	65° 11' 58.231" N	148° 43' 50.853" W	0.308	0.001	0	19040509007669	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4513.744	65° 11' 32.264" N	148° 43' 59.697" W	3.585	0.015	0	19040509007712	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4180.796	65° 11' 41.427" N	148° 43' 40.775" W	1.308	0.005	0	19040509007696	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	5287.776	65° 11' 15.356" N	148° 44' 17.790" W	1.349	0.005	0	19040509007747	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	5090.785	65° 11' 36.781" N	148° 44' 15.441" W	13.354	0.054	0	19040509007699	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	5374.288	65° 11' 20.252" N	148° 44' 19.423" W	0.682	0.003	0	19040509007740	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	426	4830.489	65° 11' 55.531" N	148° 43' 39.766" W	6.090	0.025	0	19040509007670	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	427	5286.792	65° 11' 9.467" N	148° 44' 29.868" W	6.865	0.028	0	19040509007756	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	427	4059.913	65° 10' 32.949" N	148° 44' 28.468" W	0.445	0.002	0	19040509007835	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	428	2822.958	65° 9' 19.129" N	148° 42' 56.865" W	0.908	0.004	0	19040509007941	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	428	2588.900	65° 9' 19.357" N	148° 43' 9.930" W	0.385	0.002	0	19040509007942	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	4087.793	65° 7' 22.168" N	148° 45' 53.026" W	0.298	0.001	0	19040509008016	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	4035.726	65° 7' 20.108" N	148° 46' 10.491" W	34.895	0.141	0	19040509008013	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	1839.115	65° 7' 7.032" N	148° 45' 7.438" W	29.637	0.120	0	19040509008021	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	1876.326	65° 7' 7.283" N	148° 44' 57.681" W	0.473	0.002	0	19040509008029	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	2934.365	65° 7' 23.587" N	148° 45' 26.455" W	0.410	0.002	0	19040509008015	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	5312.282	65° 6' 42.981" N	148° 45' 59.258" W	5.441	0.022	0	19040509008040	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3270.925	65° 6' 43.374" N	148° 45' 2.590" W	10.007	0.041	0	19040509008042	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3224.580	65° 7' 24.351" N	148° 45' 32.741" W	0.339	0.001	0	19040509008014	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3264.347	65° 7' 19.685" N	148° 45' 35.344" W	0.305	0.001	0	19040509008022	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3754.925	65° 7' 20.526" N	148° 45' 47.118" W	0.518	0.002	0	19040509008019	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3214.103	65° 6' 50.048" N	148° 45' 5.802" W	1.221	0.005	0	19040509008037	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	5040.821	65° 6' 46.719" N	148° 45' 53.478" W	0.151	0.001	0	19040509008039	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3180.676	65° 7' 21.550" N	148° 45' 32.973" W	0.494	0.002	0	19040509008018	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3175.863	65° 6' 53.501" N	148° 45' 10.998" W	0.250	0.001	0	19040509008035	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	2952.048	65° 7' 17.034" N	148° 45' 31.199" W	1.836	0.007	0	19040509008023	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3785.252	65° 7' 17.769" N	148° 45' 48.101" W	0.458	0.002	0	19040509008024	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	5084.230	65° 6' 50.832" N	148° 46' 4.342" W	1.086	0.004	0	19040509008036	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	3483.436	65° 6' 43.898" N	148° 44' 49.981" W	0.359	0.001	0	19040509008044	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	431	4552.766	65° 6' 41.696" N	148° 45' 38.455" W	11.926	0.048	0	19040509008043	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	5461.741	65° 6' 28.627" N	148° 45' 33.366" W	0.296	0.001	0	19040509008057	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	3652.780	65° 6' 10.165" N	148° 44' 48.550" W	9.420	0.038	0	19040509008069	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	4441.705	65° 5' 59.346" N	148° 44' 50.560" W	5.745	0.023	0	19040509008083	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	367.488	65° 6' 29.542" N	148° 43' 41.482" W	9.110	0.037	0	19040509008055	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	1472.015	65° 6' 34.124" N	148° 44' 3.750" W	3.002	0.012	0	19040509008052	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	5082.302	65° 6' 31.052" N	148° 45' 30.599" W	3.096	0.013	0	19040509008056	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	5259.393	65° 6' 5.838" N	148° 45' 15.973" W	0.380	0.002	0	19040509008078	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	1878.818	65° 6' 22.044" N	148° 44' 19.684" W	19.453	0.079	0	19040509008061	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	4577.752	65° 6' 25.834" N	148° 45' 15.936" W	1.777	0.007	0	19040509008060	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	4974.783	65° 6' 2.756" N	148° 45' 5.922" W	0.500	0.002	0	19040509008082	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	4236.068	65° 6' 20.222" N	148° 45' 4.098" W	1.906	0.008	0	19040509008063	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	2229.786	65° 6' 5.114" N	148° 43' 25.616" W	2.435	0.010	0	19040509008080	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	432	3448.705	65° 6' 3.861" N	148° 44' 24.043" W	1.791	0.007	0	19040509008081	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	4114.667	65° 5' 53.746" N	148° 44' 33.617" W	0.314	0.001	0	19040509008091	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	5103.791	65° 5' 42.634" N	148° 45' 16.755" W	20.196	0.082	0	19040509008104	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	2427.047	65° 5' 30.929" N	148° 44' 2.374" W	3.396	0.014	0	19040509008124	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	1034.902	65° 5' 28.950" N	148° 42' 50.481" W	0.480	0.002	0	19040509008128	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	3443.047	65° 5' 59.838" N	148° 44' 11.489" W	1.651	0.007	0	19040509008085	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	2661.954	65° 5' 45.808" N	148° 44' 21.906" W	42.984	0.174	0	19040509008090	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	3584.404	65° 5' 32.540" N	148° 44' 27.283" W	0.486	0.002	0	19040509008122	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	433	4033.747	65° 5' 30.470" N	148° 44' 41.955" W	6.242	0.025	0	19040509008123	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	3621.929	65° 4' 47.695" N	148° 41' 11.272" W	0.337	0.001	0	19040509008187	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	5179.254	65° 4' 42.529" N	148° 44' 41.540" W	1.552	0.006	0	19040509008194	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	5101.274	65° 4' 44.677" N	148° 44' 41.318" W	0.465	0.002	0	19040509008190	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	1540.109	65° 4' 37.541" N	148° 42' 3.570" W	3.877	0.016	0	19040509008204	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	5564.332	65° 5' 22.738" N	148° 40' 52.787" W	0.631	0.003	0	19040509008140	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	4011.803	65° 4' 43.135" N	148° 41' 2.949" W	0.585	0.002	0	19040509008197	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	4960.559	65° 4' 42.204" N	148° 44' 34.352" W	0.418	0.002	0	19040509008195	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	5429.649	65° 5' 18.663" N	148° 40' 53.372" W	0.060	0.000	0	19040509008146	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	3834.302	65° 5' 18.447" N	148° 41' 41.732" W	0.528	0.002	0	19040509008143	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	434	2106.394	65° 4' 27.138" N	148° 43' 0.203" W	1.052	0.004	0	19040509008213	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	2810.786	65° 4' 0.381" N	148° 40' 41.885" W	0.791	0.003	0	19040509008246	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	1887.749	65° 3' 55.403" N	148° 42' 35.698" W	1.274	0.005	0	19040509008250	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	4883.493	65° 4' 15.987" N	148° 39' 54.396" W	1.883	0.008	0	19040509008230	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	2003.836	65° 3' 48.828" N	148° 41' 5.017" W	2.577	0.010	0	19040509008260	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	2081.950	65° 3' 39.133" N	148° 41' 35.117" W	1.535	0.006	0	19040509008276	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	2383.431	65° 3' 52.802" N	148° 42' 45.607" W	0.544	0.002	0	19040509008256	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	3591.390	65° 3' 33.516" N	148° 42' 51.372" W	1.559	0.006	0	19040509008284	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	1331.133	65° 3' 59.723" N	148° 41' 13.817" W	1.857	0.008	0	19040509008245	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	2246.994	65° 3' 55.061" N	148° 42' 43.182" W	0.140	0.001	0	19040509008254	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	435	3375.105	65° 3' 51.207" N	148° 40' 32.370" W	0.275	0.001	0	19040509008259	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	436	3414.014	65° 3' 24.552" N	148° 42' 15.737" W	0.568	0.002	0	19040509008301	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	436	4091.767	65° 2' 49.967" N	148° 42' 18.434" W	3.053	0.012	0	19040509008365	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	436	2652.260	65° 3' 2.489" N	148° 41' 53.824" W	1.552	0.006	0	19040509008342	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	436	5434.117	65° 3' 1.654" N	148° 43' 23.728" W	22.603	0.091	0	19040509008337	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	436	3354.037	65° 3' 20.722" N	148° 42' 17.414" W	1.176	0.005	0	19040509008308	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	437	4881.338	65° 2' 3.168" N	148° 38' 50.656" W	1.556	0.006	0	19040509008447	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	437	4860.693	65° 2' 9.324" N	148° 38' 47.550" W	0.642	0.003	0	19040509008442	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	437	1467.246	65° 2' 9.009" N	148° 41' 7.695" W	12.714	0.051	0	19040509008428	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	438	2368.454	65° 1' 22.776" N	148° 41' 18.413" W	0.968	0.004	0	19040509008493	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	438	3165.427	65° 1' 27.516" N	148° 41' 39.033" W	0.325	0.001	0	19040509008487	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	438	3047.370	65° 1' 25.385" N	148° 41' 35.316" W	0.411	0.002	0	19040509008489	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	438	3119.600	65° 1' 24.429" N	148° 41' 44.506" W	8.628	0.035	0	19040509008488	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	438	5234.823	65° 1' 7.268" N	148° 42' 15.796" W	0.457	0.002	0	19040509008516	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	2992.893	65° 0' 52.552" N	148° 41' 27.743" W	1.650	0.007	0	19040509008527	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	439	4127.239	65° 0' 35.199" N	148° 42' 25.261" W	92.674	0.375	330	19040509008540	39009	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	3759.509	65° 0' 30.093" N	148° 41' 44.491" W	0.472	0.002	0	19040509008555	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	3944.425	65° 0' 26.644" N	148° 41' 46.670" W	0.573	0.002	0	19040509008563	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	4148.601	65° 0' 24.836" N	148° 41' 49.893" W	0.362	0.001	0	19040509008569	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	2330.953	65° 0' 49.268" N	148° 39' 25.162" W	0.583	0.002	0	19040509008539	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	439	3554.792	65° 0' 53.314" N	148° 41' 36.250" W	0.323	0.001	0	19040509008528	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	440	4230.822	65° 0' 11.362" N	148° 42' 0.481" W	7.230	0.029	0	19040509008589	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	440	1610.756	64° 59' 40.958" N	148° 41' 0.796" W	2.025	0.008	0	19040509004729	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	440	3592.091	64° 59' 40.744" N	148° 42' 16.012" W	34.481	0.140	0	19040509004723	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	440	4189.711	65° 0' 6.887" N	148° 42' 13.088" W	9.474	0.038	0	19040509008600	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	441	2693.602	64° 58' 36.369" N	148° 39' 51.904" W	1.703	0.007	0	19040509004807	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	441	2226.990	64° 58' 34.430" N	148° 40' 12.823" W	1.658	0.007	0	19040509004811	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	441	2793.820	64° 59' 22.748" N	148° 41' 14.673" W	3.233	0.013	0	19040509004750	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	441	2201.857	64° 58' 55.771" N	148° 41' 32.718" W	1.959	0.008	0	19040509004782	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	441	4039.108	64° 59' 17.552" N	148° 42' 3.071" W	6.958	0.028	0	19040509004753	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	442	4897.174	64° 58' 38.323" N	148° 42' 57.076" W	16.740	0.068	0	19040509004797	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	442	493.510	64° 58' 11.089" N	148° 40' 34.632" W	4.735	0.019	0	19040509004842	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	938.251	64° 57' 25.572" N	148° 40' 32.775" W	5.478	0.022	0	19040509004890	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	88316.611	64° 55' 7.151" N	148° 7' 6.397" W	1.781	0.007	0	19040509009026	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	1982.058	64° 56' 53.211" N	148° 40' 48.609" W	6.391	0.026	0	19040509004923	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	112915.159	64° 55' 3.694" N	147° 57' 35.076" W	0.460	0.002	0	19040509009017	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	108302.743	64° 54' 36.556" N	147° 59' 31.004" W	0.925	0.004	0	19040509009010	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	121527.374	64° 53' 53.522" N	147° 54' 31.863" W	8.609	0.035	0	19040509009029	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	91127.819	64° 55' 18.237" N	148° 5' 56.320" W	1.514	0.006	0	19040509009028	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	117719.868	64° 54' 29.791" N	147° 55' 52.343" W	0.608	0.002	0	19040509009036	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	116515.398	64° 54' 9.555" N	147° 56' 28.853" W	0.699	0.003	0	19040509009031	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	85018.794	64° 54' 58.928" N	148° 8' 29.495" W	1.159	0.005	0	19040509009057	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	84651.300	64° 54' 56.440" N	148° 8' 38.382" W	2.188	0.009	0	19040509009056	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	108198.693	64° 54' 17.904" N	147° 59' 40.487" W	0.845	0.003	0	19040509009034	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	106822.174	64° 54' 53.066" N	147° 59' 52.980" W	10.725	0.043	0	19040509008978	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	116117.185	64° 54' 30.837" N	147° 56' 24.910" W	3.474	0.014	0	19040509009038	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	91960.183	64° 55' 15.761" N	148° 5' 38.178" W	1.150	0.005	0	19040509009027	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	114749.204	64° 54' 6.623" N	147° 57' 12.431" W	0.537	0.002	0	19040509009030	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	4202.299	64° 57' 43.137" N	148° 42' 21.307" W	1.775	0.007	0	19040509004878	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	443	2362.306	64° 57' 8.058" N	148° 41' 53.644" W	1.382	0.006	0	19040509004908	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	445	1401.384	64° 55' 25.812" N	148° 42' 10.891" W	5.851	0.024	0	19040509005039	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	447	3047.601	64° 54' 18.742" N	148° 46' 22.501" W	2400.029	9.714	308	19040509005027	39009	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	73123.549	64° 52' 34.105" N	148° 14' 15.120" W	1.322	0.005	0	19040509009049	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	76367.347	64° 52' 49.917" N	148° 12' 55.787" W	1.485	0.006	0	19040509009052	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	75590.615	64° 52' 50.403" N	148° 13' 13.433" W	1.406	0.006	0	19040509009053	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	75933.149	64° 52' 40.509" N	148° 13' 9.380" W	0.379	0.002	0	19040509009050	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	73257.235	64° 52' 24.964" N	148° 14' 15.366" W	0.362	0.001	0	19040509009047	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	74128.640	64° 52' 44.210" N	148° 13' 45.803" W	2.381	0.010	0	19040509009051	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	70017.623	64° 52' 0.325" N	148° 15' 40.071" W	0.958	0.004	0	19040509009046	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	447	73716.272	64° 52' 28.322" N	148° 14' 5.644" W	0.313	0.001	0	19040509009048	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	53241.821	64° 49' 34.282" N	148° 23' 44.593" W	6.396	0.026	0	19040509009082	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	59874.615	64° 48' 57.752" N	148° 21' 40.002" W	0.760	0.003	0	19040509008921	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	57878.062	64° 50' 20.677" N	148° 21' 12.663" W	0.997	0.004	0	19040509009062	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	72075.234	64° 51' 44.712" N	148° 14' 55.174" W	2.881	0.012	0	19040509009042	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	60009.277	64° 49' 50.899" N	148° 20' 45.868" W	0.255	0.001	0	19040509009086	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	68243.752	64° 51' 48.959" N	148° 16' 21.154" W	2.128	0.009	0	19040509009045	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	71963.705	64° 51' 48.361" N	148° 14' 59.158" W	0.891	0.004	0	19040509009044	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	68550.540	64° 51' 28.278" N	148° 16' 23.779" W	2.078	0.008	0	19040509009071	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	52087.207	64° 49' 33.340" N	148° 24' 17.219" W	2.572	0.010	0	19040509009081	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	59612.265	64° 48' 45.511" N	148° 21' 57.996" W	2.701	0.011	0	19040509009098	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	70896.147	64° 51' 39.043" N	148° 15' 26.962" W	1.369	0.006	0	19040509009073	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	50542.319	64° 49' 38.311" N	148° 24' 52.169" W	2.068	0.008	0	19040509009084	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	65532.428	64° 50' 1.898" N	148° 18' 22.043" W	1.073	0.004	0	19040509009087	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	63576.253	64° 50' 12.391" N	148° 19' 1.528" W	1.984	0.008	0	19040509009060	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	70489.273	64° 51' 44.994" N	148° 15' 25.932" W	9.352	0.038	0	19040509009043	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	65763.085	64° 50' 5.106" N	148° 18' 14.391" W	1.369	0.006	0	19040509009088	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	50286.085	64° 49' 36.307" N	148° 25' 1.057" W	0.534	0.002	0	19040509009083	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	2929.497	64° 52' 56.801" N	148° 43' 45.221" W	2.088	0.008	0	19040509005179	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	68288.647	64° 50' 45.924" N	148° 16' 47.600" W	2.122	0.009	0	19040509009067	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	60456.021	64° 48' 37.804" N	148° 21' 48.628" W	0.277	0.001	0	19040509009097	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	61159.643	64° 50' 34.099" N	148° 19' 40.758" W	5.331	0.022	0	19040509009065	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	67133.057	64° 51' 16.215" N	148° 17' 1.356" W	1.184	0.005	0	19040509009069	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	56775.924	64° 50' 37.258" N	148° 21' 29.931" W	0.559	0.002	0	19040509009066	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	61018.486	64° 50' 8.742" N	148° 20' 3.982" W	3.351	0.014	0	19040509009058	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	67419.325	64° 50' 24.726" N	148° 17' 21.804" W	1.629	0.007	0	19040509009063	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	54384.712	64° 49' 45.168" N	148° 23' 7.542" W	0.833	0.003	0	19040509009085	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	68014.365	64° 51' 26.619" N	148° 16' 37.653" W	1.642	0.007	0	19040509009070	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	448	68417.313	64° 51' 33.318" N	148° 16' 27.589" W	0.657	0.003	0	19040509009072	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	45265.489	64° 48' 27.769" N	148° 28' 30.815" W	2.412	0.010	0	19040509009096	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	44774.802	64° 48' 23.499" N	148° 28' 53.162" W	0.802	0.003	0	19040509009091	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	51053.462	64° 48' 7.490" N	148° 26' 21.336" W	3.471	0.014	0	19040509008938	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	2415.006	64° 52' 8.321" N	148° 44' 21.968" W	2.071	0.008	0	19040509005219	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	55936.825	64° 48' 27.659" N	148° 23' 54.479" W	0.710	0.003	0	19040509009093	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	43090.114	64° 48' 13.538" N	148° 29' 48.514" W	4.120	0.017	0	19040509008937	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	47972.550	64° 47' 58.289" N	148° 27' 50.926" W	11.187	0.045	0	19040509008939	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	45618.500	64° 48' 19.962" N	148° 28' 33.400" W	1.148	0.005	0	19040509009090	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	44649.881	64° 47' 57.275" N	148° 29' 36.022" W	2.449	0.010	0	19040509008941	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	52722.288	64° 47' 30.607" N	148° 26' 29.635" W	5.362	0.022	0	19040509008955	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	47669.902	64° 48' 16.531" N	148° 27' 37.967" W	2.090	0.008	0	19040509008935	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	54236.052	64° 47' 29.284" N	148° 25' 56.003" W	0.255	0.001	0	19040509008957	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	47386.692	64° 48' 48.234" N	148° 27' 1.368" W	3.830	0.016	0	19040509009100	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	46208.255	64° 48' 18.085" N	148° 28' 21.753" W	0.809	0.003	0	19040509008934	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	47062.465	64° 48' 54.178" N	148° 27' 12.446" W	0.333	0.001	0	19040509008922	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	46629.774	64° 47' 49.758" N	148° 28' 54.735" W	0.757	0.003	0	19040509008944	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	49724.152	64° 47' 37.221" N	148° 27' 47.232" W	0.943	0.004	0	19040509008953	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	2225.039	64° 52' 18.228" N	148° 44' 29.091" W	8.594	0.035	0	19040509005206	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	46315.266	64° 48' 26.138" N	148° 28' 8.765" W	0.518	0.002	0	19040509009095	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	52141.549	64° 48' 0.182" N	148° 26' 4.272" W	1.507	0.006	0	19040509008940	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	3198.028	64° 52' 49.956" N	148° 44' 10.379" W	1.835	0.007	0	19040509005189	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	46914.852	64° 48' 47.374" N	148° 27' 21.306" W	3.236	0.013	0	19040509009099	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	53960.263	64° 47' 45.784" N	148° 25' 36.925" W	1.113	0.005	0	19040509008948	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	52639.062	64° 48' 17.968" N	148° 25' 30.567" W	0.867	0.004	0	19040509008936	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	449	45440.955	64° 47' 44.349" N	148° 29' 37.042" W	2.539	0.010	0	19040509008946	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	451	1886.489	64° 50' 52.563" N	148° 46' 55.210" W	1.304	0.005	0	19040509005250	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	451	4952.019	64° 51' 48.716" N	148° 47' 15.951" W	1.177	0.005	0	19040509005229	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	451	1016.116	64° 51' 1.642" N	148° 46' 50.466" W	11.435	0.046	0	19040509005246	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	452	867.272	64° 50' 21.376" N	148° 47' 10.654" W	51.782	0.210	341	19040509005256	39009	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	452	5100.994	64° 50' 18.307" N	148° 48' 40.280" W	1.942	0.008	0	19040509005264	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	452	4277.785	64° 50' 0.913" N	148° 48' 18.482" W	3.120	0.013	0	19040509005272	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	452	3712.910	64° 50' 2.541" N	148° 48' 2.541" W	1.049	0.004	0	19040509005273	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	452	3624.400	64° 50' 9.398" N	148° 48' 10.799" W	8.464	0.034	0	19040509005267	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	453	2082.238	64° 49' 39.382" N	148° 48' 8.321" W	58.874	0.238	0	19040509005279	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	42502.060	64° 46' 34.803" N	148° 31' 22.904" W	0.262	0.001	0	19040509005359	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	43043.091	64° 46' 37.568" N	148° 31' 7.516" W	0.531	0.002	0	19040509005353	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	39099.788	64° 46' 40.243" N	148° 32' 41.306" W	0.419	0.002	0	19040509005352	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	37969.193	64° 46' 38.494" N	148° 33' 9.316" W	0.326	0.001	0	19040509005357	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	37570.498	64° 46' 36.752" N	148° 33' 18.789" W	0.963	0.004	0	19040509005361	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44325.430	64° 46' 57.948" N	148° 30' 23.358" W	0.578	0.002	0	19040509005340	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44209.888	64° 46' 43.243" N	148° 30' 36.329" W	0.982	0.004	0	19040509005344	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	35788.498	64° 46' 34.329" N	148° 34' 6.144" W	0.375	0.002	0	19040509005366	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44695.661	64° 46' 59.006" N	148° 30' 16.329" W	0.342	0.001	0	19040509005339	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	37978.919	64° 46' 36.199" N	148° 33' 11.167" W	0.394	0.002	0	19040509005362	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	43201.103	64° 46' 34.227" N	148° 31' 6.260" W	0.399	0.002	0	19040509005358	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	43205.567	64° 46' 45.414" N	148° 30' 55.864" W	1.901	0.008	0	19040509005343	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	46332.074	64° 47' 3.614" N	148° 29' 32.600" W	1.127	0.005	0	19040509008963	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	39473.995	64° 46' 37.158" N	148° 32' 30.217" W	1.100	0.004	0	19040509005354	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	40242.012	64° 46' 37.536" N	148° 32' 14.474" W	0.435	0.002	0	19040509005355	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44678.450	64° 47' 3.868" N	148° 30' 11.836" W	0.646	0.003	0	19040509005334	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	42179.447	64° 46' 42.594" N	148° 31' 24.859" W	0.451	0.002	0	19040509005348	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	45044.048	64° 47' 21.393" N	148° 29' 58.184" W	0.152	0.001	0	19040509008959	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	45380.706	64° 47' 19.199" N	148° 29' 44.710" W	3.683	0.015	0	19040509008960	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44988.049	64° 47' 25.414" N	148° 29' 55.140" W	1.011	0.004	0	19040509008958	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	43218.210	64° 47' 32.993" N	148° 30' 32.328" W	2.587	0.010	0	19040509005321	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	40657.388	64° 47' 27.898" N	148° 31' 37.998" W	0.541	0.002	0	19040509005325	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	49671.315	64° 47' 15.412" N	148° 28' 10.704" W	0.405	0.002	0	19040509008962	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	48746.337	64° 47' 17.025" N	148° 28' 32.552" W	0.573	0.002	0	19040509008961	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	44858.401	64° 46' 58.967" N	148° 30' 10.612" W	0.529	0.002	0	19040509005338	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	39702.492	64° 47' 36.031" N	148° 31' 51.969" W	4.379	0.018	0	19040509005320	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	4926.453	64° 48' 42.276" N	148° 49' 1.781" W	2.076	0.008	0	19040509005299	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	3127.275	64° 48' 54.026" N	148° 48' 14.189" W	18.109	0.073	0	19040509005291	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	43717.757	64° 46' 35.546" N	148° 30' 48.573" W	1.532	0.006	0	19040509005351	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	36917.175	64° 46' 37.329" N	148° 33' 35.248" W	0.721	0.003	0	19040509005360	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	454	42702.328	64° 47' 18.303" N	148° 30' 52.563" W	1.318	0.005	0	19040509005328	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	455	5313.027	64° 48' 25.117" N	148° 49' 17.028" W	0.849	0.003	0	19040509005311	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	455	1704.469	64° 47' 43.827" N	148° 47' 9.630" W	3.318	0.013	0	19040509005330	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	3269.052	64° 47' 2.754" N	148° 50' 24.250" W	3.676	0.015	0	19040509005364	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	580.685	64° 46' 57.652" N	148° 49' 20.764" W	2.193	0.009	0	19040509005368	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	2777.774	64° 47' 15.272" N	148° 50' 6.545" W	2.471	0.010	0	19040509005346	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	2284.636	64° 47' 12.473" N	148° 49' 51.939" W	1.924	0.008	0	19040509005350	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	1355.336	64° 46' 59.371" N	148° 49' 39.006" W	1.894	0.008	0	19040509005367	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	456	1061.996	64° 46' 47.959" N	148° 49' 8.714" W	4.903	0.020	0	19040509005375	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	471.177	64° 46' 7.788" N	148° 48' 11.043" W	11.941	0.048	0	19040509005411	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	2354.912	64° 46' 7.647" N	148° 49' 1.406" W	0.864	0.003	0	19040509005421	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	2951.709	64° 45' 47.052" N	148° 48' 37.041" W	1.425	0.006	0	19040509005442	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	2572.777	64° 46' 17.181" N	148° 49' 10.297" W	1.424	0.006	0	19040509005407	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	997.459	64° 46' 14.141" N	148° 48' 31.454" W	0.878	0.004	0	19040509005409	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	3545.595	64° 45' 56.790" N	148° 46' 56.119" W	0.786	0.003	0	19040509005428	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	2447.266	64° 46' 27.690" N	148° 49' 1.038" W	1.009	0.004	0	19040509005395	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	457	1275.057	64° 46' 6.500" N	148° 48' 32.332" W	0.554	0.002	0	19040509005420	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	28117.603	64° 45' 34.808" N	148° 36' 50.988" W	0.643	0.003	0	19040509005433	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	32650.025	64° 46' 9.506" N	148° 35' 12.840" W	0.512	0.002	0	19040509005390	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	22212.167	64° 45' 56.208" N	148° 39' 12.036" W	0.468	0.002	0	19040509005413	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	11509.372	64° 45' 45.534" N	148° 43' 17.244" W	0.473	0.002	0	19040509005435	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	20562.626	64° 45' 36.191" N	148° 39' 41.364" W	1.919	0.008	0	19040509005440	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	9551.041	64° 45' 47.406" N	148° 44' 0.677" W	2.487	0.010	0	19040509005431	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	22766.182	64° 46' 26.235" N	148° 39' 9.007" W	1.896	0.008	0	19040509005380	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	39763.746	64° 46' 24.463" N	148° 32' 28.674" W	5.417	0.022	0	19040509005371	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	41963.060	64° 46' 23.471" N	148° 31' 41.251" W	0.329	0.001	0	19040509005374	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	19037.737	64° 45' 49.927" N	148° 40' 23.279" W	1.002	0.004	0	19040509005423	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	17682.815	64° 45' 41.582" N	148° 40' 52.975" W	0.334	0.001	0	19040509005434	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	28006.242	64° 45' 32.307" N	148° 36' 53.578" W	0.601	0.002	0	19040509005439	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	12708.938	64° 45' 3.379" N	148° 42' 48.774" W	0.821	0.003	0	19040509005469	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	10658.440	64° 45' 22.519" N	148° 43' 29.634" W	4.030	0.016	0	19040509005457	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	25511.113	64° 46' 16.772" N	148° 37' 58.036" W	2.986	0.012	0	19040509005386	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	21868.629	64° 45' 37.288" N	148° 39' 13.985" W	0.747	0.003	0	19040509005436	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	8862.152	64° 45' 39.653" N	148° 44' 16.815" W	0.632	0.003	0	19040509005443	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	30762.494	64° 45' 38.610" N	148° 35' 45.224" W	3.020	0.012	0	19040509005426	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	49270.314	64° 46' 21.249" N	148° 28' 40.506" W	5.236	0.021	0	19040509008971	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	29378.409	64° 45' 59.132" N	148° 36' 25.784" W	0.380	0.002	0	19040509005404	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	12907.200	64° 45' 44.835" N	148° 42' 36.775" W	7.535	0.030	0	19040509005430	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	2241.543	64° 45' 38.685" N	148° 46' 48.793" W	2.683	0.011	0	19040509005448	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	18757.201	64° 45' 45.290" N	148° 40' 29.280" W	0.383	0.002	0	19040509005429	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	19685.506	64° 45' 36.712" N	148° 40' 3.216" W	2.755	0.011	0	19040509005438	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	24903.518	64° 45' 46.550" N	148° 38' 5.207" W	3.120	0.013	0	19040509005419	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	2813.213	64° 44' 56.587" N	148° 47' 43.864" W	0.550	0.002	0	19040509004711	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	28204.122	64° 46' 0.333" N	148° 36' 54.195" W	0.235	0.001	0	19040509005403	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	33679.105	64° 46' 13.927" N	148° 34' 48.666" W	1.375	0.006	0	19040509005383	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	28434.691	64° 46' 10.821" N	148° 36' 51.842" W	0.412	0.002	0	19040509005392	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	36723.763	64° 46' 28.473" N	148° 33' 44.355" W	0.548	0.002	0	19040509005372	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	27381.009	64° 46' 18.825" N	148° 37' 20.034" W	0.353	0.001	0	19040509005384	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	19929.857	64° 46' 16.804" N	148° 40' 15.033" W	1.130	0.005	0	19040509005391	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	1787.049	64° 45' 42.940" N	148° 48' 7.454" W	2.858	0.012	0	19040509005444	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	25715.466	64° 46' 24.244" N	148° 38' 2.287" W	0.314	0.001	0	19040509005381	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	22725.148	64° 45' 59.420" N	148° 38' 54.603" W	4.762	0.019	0	19040509005405	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	21219.772	64° 45' 57.732" N	148° 39' 35.444" W	0.356	0.001	0	19040509005412	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	29486.612	64° 46' 7.557" N	148° 36' 24.143" W	1.091	0.004	0	19040509005393	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	12454.095	64° 45' 46.856" N	148° 42' 55.881" W	0.592	0.002	0	19040509005432	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	35257.056	64° 45' 56.433" N	148° 34' 9.738" W	0.370	0.001	0	19040509005401	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	38432.017	64° 45' 52.845" N	148° 32' 52.531" W	2.969	0.012	0	19040509005400	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	23579.386	64° 46' 1.884" N	148° 38' 40.219" W	1.693	0.007	0	19040509005402	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	40527.195	64° 46' 18.540" N	148° 32' 13.284" W	0.364	0.001	0	19040509005376	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	2332.452	64° 45' 40.243" N	148° 46' 56.119" W	0.618	0.002	0	19040509005447	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	20550.117	64° 46' 28.164" N	148° 40' 5.742" W	1.933	0.008	0	19040509005378	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	23603.561	64° 46' 7.957" N	148° 38' 40.802" W	1.993	0.008	0	19040509005396	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	31303.075	64° 46' 1.712" N	148° 35' 41.406" W	0.729	0.003	0	19040509005397	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	30056.881	64° 45' 56.462" N	148° 36' 9.143" W	0.544	0.002	0	19040509005406	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	21104.581	64° 45' 48.333" N	148° 39' 34.992" W	0.883	0.004	0	19040509005424	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	36855.936	64° 45' 56.248" N	148° 33' 31.424" W	0.539	0.002	0	19040509005399	39004	Perennial	19040509	Fairbanks Lateral

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	31815.318	64° 45' 59.496" N	148° 35' 29.173" W	1.452	0.006	0	19040509005398	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	18704.145	64° 46' 25.039" N	148° 40' 46.813" W	2.508	0.010	0	19040509005382	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	36644.270	64° 45' 50.076" N	148° 33' 35.575" W	0.882	0.004	0	19040509005408	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	18209.656	64° 45' 51.304" N	148° 40' 43.160" W	0.722	0.003	0	19040509005422	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	4691.218	64° 45' 23.549" N	148° 45' 49.413" W	0.776	0.003	0	19040509005458	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	34711.158	64° 46' 26.514" N	148° 34' 25.525" W	3.910	0.016	0	19040509005373	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	458	17963.017	64° 45' 47.361" N	148° 40' 45.580" W	1.133	0.005	0	19040509005427	39004	Perennial	19040509	Fairbanks Lateral
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	459	2892.874	64° 44' 51.018" N	148° 47' 58.066" W	0.780	0.003	0	19040509004713	39004	Perennial	19040509	Fairbanks Lateral, Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	460	3383.408	64° 44' 4.275" N	148° 51' 29.606" W	0.595	0.002	0	19040509009488	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	460	4672.407	64° 44' 8.009" N	148° 52' 0.367" W	0.600	0.002	0	19040509009483	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	460	3898.330	64° 44' 8.663" N	148° 51' 45.055" W	2.308	0.009	0	19040509009486	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	460	3710.342	64° 44' 6.402" N	148° 51' 39.336" W	0.762	0.003	0	19040509009487	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	461	2179.883	64° 43' 29.702" N	148° 52' 2.651" W	0.687	0.003	0	19040509009479	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	461	2514.931	64° 43' 46.229" N	148° 52' 22.203" W	194.650	0.788	336	19040509009480	39009	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	461	3768.946	64° 43' 21.802" N	148° 52' 41.684" W	0.635	0.003	0	19040509009478	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	462	2700.749	64° 42' 59.561" N	148° 52' 54.492" W	0.334	0.001	0	19040509009475	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	462	2560.620	64° 42' 54.453" N	148° 53' 1.992" W	0.421	0.002	0	19040509009476	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	462	3162.582	64° 43' 5.026" N	148° 52' 53.572" W	0.287	0.001	0	19040509009474	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	462	1918.432	64° 42' 42.756" N	148° 53' 3.091" W	1.158	0.005	0	19040509009473	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	463	3663.735	64° 42' 7.092" N	148° 54' 55.703" W	0.949	0.004	0	19040509009456	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	463	1990.559	64° 41' 54.982" N	148° 54' 18.938" W	0.550	0.002	0	19040509009469	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	463	1648.481	64° 42' 14.611" N	148° 53' 21.944" W	0.702	0.003	0	19040509009470	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	463	5463.411	64° 42' 26.261" N	148° 55' 23.938" W	3.694	0.015	0	19040509009461	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	4452.528	64° 42' 3.579" N	148° 55' 30.921" W	0.229	0.001	0	19040509009459	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	3214.825	64° 41' 54.168" N	148° 54' 56.198" W	0.697	0.003	0	19040509009453	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	2137.245	64° 41' 42.640" N	148° 54' 41.668" W	0.973	0.004	0	19040509009455	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	2875.593	64° 41' 19.484" N	148° 56' 6.969" W	0.517	0.002	0	19040509009449	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	1858.884	64° 41' 15.036" N	148° 55' 40.972" W	0.552	0.002	0	19040509009450	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	3204.612	64° 41' 51.223" N	148° 55' 26.763" W	0.260	0.001	0	19040509009460	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	4287.242	64° 42' 1.761" N	148° 55' 30.686" W	0.173	0.001	0	19040509009458	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	1381.147	64° 41' 23.641" N	148° 55' 32.629" W	2.543	0.010	0	19040509009451	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	2693.173	64° 41' 48.812" N	148° 55' 6.410" W	0.650	0.003	0	19040509009454	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	2192.776	64° 41' 43.907" N	148° 55' 11.106" W	1.005	0.004	0	19040509009457	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	464	769.211	64° 41' 28.283" N	148° 55' 8.504" W	0.494	0.002	0	19040509009452	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	465	2329.305	64° 40' 49.420" N	148° 55' 30.245" W	0.781	0.003	0	19040509009445	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Tolovana River	Lake/Pond: Hydrographic Category = Perennial	469	4425.566	64° 38' 48.439" N	149° 2' 15.367" W	0.709	0.003	0	19040509009379	39004	Perennial	19040509	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	193	2609.375	67° 55' 46.223" N	149° 50' 38.349" W	0.464	0.002	0	19040601016019	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	193	2316.880	67° 55' 45.466" N	149° 50' 28.005" W	0.358	0.001	0	19040601016020	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	194	274.628	67° 54' 49.010" N	149° 49' 4.815" W	1.301	0.005	0	19040601016022	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	194	795.173	67° 54' 57.454" N	149° 48' 59.527" W	3.070	0.012	0	19040601016021	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	198	1529.326	67° 51' 35.787" N	149° 49' 53.479" W	4.072	0.016	0	19040601016023	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	205	1088.661	67° 45' 47.237" N	149° 46' 23.002" W	12.705	0.051	1545	19040601016024	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	205	568.569	67° 45' 32.385" N	149° 46' 8.780" W	14.680	0.059	0	19040601016025	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	206	624.656	67° 44' 52.801" N	149° 45' 49.181" W	2.891	0.012	0	19040601015434	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	209	3014.339	67° 42' 26.045" N	149° 45' 20.365" W	4.467	0.018	0	19040601015388	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	209	3622.276	67° 42' 34.795" N	149° 45' 27.175" W	0.733	0.003	0	19040601015387	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	209	857.444	67° 42' 20.222" N	149° 43' 32.836" W	7.623	0.031	1644	19040601015390	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	211	1613.733	67° 40' 27.840" N	149° 43' 53.979" W	2.951	0.012	0	19040601015444	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	211	1720.118	67° 40' 41.242" N	149° 44' 3.366" W	3.922	0.016	0	19040601015393	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	211	2486.991	67° 40' 44.361" N	149° 44' 23.502" W	3.712	0.015	0	19040601015443	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	212	448.717	67° 39' 58.711" N	149° 42' 57.761" W	13.985	0.057	1446	19040601015396	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	212	1909.748	67° 40' 0.129" N	149° 43' 33.169" W	0.587	0.002	0	19040601015398	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	530.951	67° 39' 7.450" N	149° 43' 28.097" W	2.462	0.010	0	19040601015400	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	1755.606	67° 38' 42.916" N	149° 43' 39.051" W	0.313	0.001	0	19040601015404	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	213	354.793	67° 38' 46.827" N	149° 43' 21.453" W	42.095	0.170	1415	19040601015402	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	3733.411	67° 38' 21.064" N	149° 43' 29.548" W	3.407	0.014	0	19040601015408	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	2507.505	67° 38' 35.081" N	149° 43' 44.007" W	0.780	0.003	0	19040601015406	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	1976.297	67° 38' 40.691" N	149° 43' 40.122" W	0.330	0.001	0	19040601015405	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	213	3165.311	67° 38' 28.007" N	149° 43' 37.329" W	1.003	0.004	0	19040601015407	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	214	4618.704	67° 37' 50.678" N	149° 44' 11.811" W	0.751	0.003	0	19040601015409	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	215	1049.980	67° 37' 48.309" N	149° 47' 6.340" W	1.036	0.004	0	19040601015410	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	216	1308.998	67° 36' 47.124" N	149° 47' 8.681" W	6.067	0.025	0	19040601015445	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	216	3070.074	67° 37' 9.852" N	149° 45' 40.151" W	0.544	0.002	0	19040601015418	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	218	1611.042	67° 35' 38.722" N	149° 47' 17.829" W	0.319	0.001	0	19040601015421	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	218	1994.139	67° 35' 39.174" N	149° 47' 50.423" W	0.579	0.002	0	19040601015420	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	218	1428.077	67° 35' 31.887" N	149° 47' 48.404" W	0.556	0.002	0	19040601015423	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	218	1687.559	67° 35' 34.470" N	149° 47' 50.602" W	0.319	0.001	0	19040601015422	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	219	1522.055	67° 34' 53.887" N	149° 48' 20.412" W	0.317	0.001	0	19040601015424	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	222	3363.859	67° 32' 20.447" N	149° 52' 51.875" W	1.387	0.006	0	19040601015428	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	222	4516.283	67° 32' 25.555" N	149° 53' 20.935" W	2.534	0.010	0	19040601015427	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	222	3944.817	67° 32' 20.176" N	149° 53' 3.554" W	0.276	0.001	0	19040601015430	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	225	2107.975	67░ 29' 29.012" N	149░ 52' 3.633" W	2.332	0.009	0	19040601015361	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	227	1038.967	67░ 28' 35.334" N	149░ 54' 26.646" W	0.357	0.001	0	19040601015362	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	227	1958.242	67░ 28' 20.245" N	149░ 55' 25.060" W	1.248	0.005	0	19040601015363	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	228	2243.127	67░ 27' 59.064" N	149░ 57' 41.074" W	3.673	0.015	0	19040601015364	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	229	2014.711	67░ 27' 49.938" N	149░ 58' 30.259" W	4.355	0.018	0	19040601015370	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	230	1062.862	67░ 28' 0.766" N	150░ 1' 6.300" W	4.868	0.020	0	19040601016327	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	2642.610	67░ 27' 28.765" N	150░ 4' 0.661" W	0.221	0.001	0	19040601016334	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	2258.071	67░ 27' 27.554" N	150░ 3' 54.161" W	2.455	0.010	0	19040601016332	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	596.169	67░ 27' 32.205" N	150░ 3' 5.350" W	0.833	0.003	0	19040601016331	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	2100.182	67░ 27' 14.192" N	150░ 3' 35.718" W	0.600	0.002	0	19040601016338	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	1281.277	67░ 27' 36.139" N	150░ 3' 19.113" W	0.813	0.003	0	19040601016330	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	231	1367.114	67░ 27' 26.700" N	150░ 3' 32.915" W	2.878	0.012	0	19040601016333	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	232	1834.928	67░ 27' 7.427" N	150░ 4' 0.516" W	2.020	0.008	0	19040601016340	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	232	2584.078	67░ 27' 14.354" N	150░ 4' 14.207" W	2.263	0.009	0	19040601016337	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	232	2428.729	67░ 27' 9.643" N	150░ 3' 42.078" W	1.106	0.004	0	19040601016339	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	232	1748.313	67° 27' 5.173" N	150° 4' 18.294" W	0.712	0.003	0	19040601016342	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	233	4595.145	67° 26' 13.327" N	150° 6' 24.881" W	0.833	0.003	0	19040601016350	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	234	3271.081	67° 24' 46.344" N	150° 3' 39.853" W	0.368	0.001	0	19040601016353	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	234	3393.554	67° 24' 42.004" N	150° 3' 50.025" W	0.228	0.001	0	19040601016355	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	235	1087.889	67° 24' 31.955" N	150° 5' 4.352" W	0.681	0.003	0	19040601016357	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	235	1875.594	67° 24' 42.029" N	150° 5' 19.793" W	4.566	0.018	0	19040601016354	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	235	1499.454	67° 24' 33.454" N	150° 4' 51.068" W	0.366	0.001	0	19040601016356	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	236	1659.686	67° 23' 48.092" N	150° 5' 38.962" W	0.533	0.002	0	19040601016358	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	240	301.024	67° 20' 14.933" N	150° 8' 29.545" W	3.685	0.015	0	19040601016359	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	241	3839.231	67° 19' 42.934" N	150° 11' 2.052" W	1.994	0.008	0	19040601016360	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	241	3207.468	67° 19' 30.219" N	150° 10' 52.293" W	0.867	0.004	0	19040601016362	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	241	3404.767	67° 19' 28.039" N	150° 10' 59.991" W	1.963	0.008	0	19040601016363	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	241	3028.407	67° 19' 32.918" N	150° 10' 47.570" W	1.808	0.007	0	19040601016361	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	243	2643.165	67° 17' 23.687" N	150° 10' 16.947" W	0.725	0.003	0	19040601016365	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage =	245	4078.645	67° 15' 44.334" N	150° 8' 52.924" W	6.441	0.026	1065	19040601016366	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	246	4129.909	67° 14' 46.440" N	150° 9' 26.806" W	1.786	0.007	0	19040601015452	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	246	1791.988	67° 14' 58.901" N	150° 10' 48.119" W	4.506	0.018	0	19040601015451	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	246	1774.463	67° 15' 1.138" N	150° 10' 42.039" W	0.071	0.001	0	19040601016368	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	246	2893.109	67° 15' 16.982" N	150° 9' 14.800" W	3.018	0.012	0	19040601016367	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	248	844.034	67° 13' 51.045" N	150° 13' 49.532" W	13.174	0.053	0	19040601015458	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	248	2187.571	67° 14' 13.086" N	150° 13' 59.178" W	0.600	0.002	0	19040601015457	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	248	1181.544	67° 14' 15.179" N	150° 13' 27.832" W	5.720	0.023	0	19040601015456	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	248	2183.994	67° 14' 24.651" N	150° 13' 20.557" W	3.256	0.013	0	19040601015455	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	248	3372.951	67° 13' 55.809" N	150° 14' 39.005" W	0.348	0.001	0	19040601015459	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	249	2610.505	67° 13' 39.492" N	150° 14' 39.508" W	0.550	0.002	0	19040601015460	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	250	988.850	67° 12' 53.215" N	150° 14' 57.021" W	45.859	0.186	1220	19040601015463	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	254	5315.900	67° 10' 40.540" N	150° 22' 10.192" W	0.438	0.002	0	19040601015497	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	255	4058.875	67° 8' 54.987" N	150° 22' 19.939" W	0.670	0.003	0	19040601015499	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk	Lake/Pond: Hydrographic Category	255	5093.533	67° 9' 10.229" N	150° 23' 9.389" W	0.618	0.003	0	19040601015498	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
River	= Perennial												
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	1167.468	67░ 8' 43.625" N	150░ 21' 4.685" W	8.711	0.035	0	19040601015500	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	962.559	67░ 8' 31.153" N	150░ 20' 5.637" W	15.489	0.063	0	19040601015502	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	2623.114	67░ 8' 8.959" N	150░ 19' 56.625" W	2.955	0.012	0	19040601015507	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	2104.884	67░ 8' 17.331" N	150░ 21' 34.571" W	9.066	0.037	0	19040601015503	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	1358.496	67░ 8' 14.945" N	150░ 20' 57.929" W	16.944	0.069	0	19040601015504	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	3453.276	67░ 8' 9.105" N	150░ 22' 6.563" W	25.234	0.102	0	19040601015506	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	256	5109.502	67░ 8' 8.771" N	150░ 22' 39.242" W	1.618	0.007	0	19040601015508	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	4239.832	67░ 7' 44.678" N	150░ 22' 31.658" W	12.349	0.050	0	19040601015518	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	4358.933	67░ 7' 35.673" N	150░ 18' 41.379" W	1.145	0.005	0	19040601015521	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	1852.066	67░ 7' 51.209" N	150░ 21' 22.604" W	5.769	0.023	0	19040601015514	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	4730.603	67░ 8' 2.489" N	150░ 22' 22.145" W	0.636	0.003	0	19040601015511	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	3189.139	67░ 7' 36.253" N	150░ 19' 11.782" W	0.714	0.003	0	19040601015522	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	4248.243	67░ 7' 28.903" N	150░ 18' 47.557" W	0.760	0.003	0	19040601015525	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	5761.028	67░ 7' 42.253" N	150░ 23' 14.979" W	14.781	0.060	0	19040601015519	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	764.877	67° 7' 33.712" N	150° 20' 4.530" W	17.296	0.070	0	19040601015520	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	257	579.709	67° 7' 45.580" N	150° 20' 23.084" W	3.880	0.016	0	19040601015517	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	990.232	67° 6' 59.760" N	150° 21' 21.628" W	13.834	0.056	0	19040601015533	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	2188.587	67° 6' 37.273" N	150° 19' 52.849" W	2.236	0.009	0	19040601015535	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	5070.698	67° 6' 33.929" N	150° 22' 47.085" W	6.391	0.026	0	19040601015537	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	1083.436	67° 6' 56.252" N	150° 20' 0.897" W	18.769	0.076	0	19040601015532	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	2946.350	67° 7' 6.675" N	150° 19' 19.973" W	7.038	0.028	0	19040601015530	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	258	2576.797	67° 6' 27.710" N	150° 20' 27.360" W	0.736	0.003	0	19040601015540	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	259	5160.651	67° 5' 57.428" N	150° 23' 5.787" W	1.321	0.005	0	19040601015557	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	259	4262.345	67° 6' 29.365" N	150° 22' 19.600" W	1.493	0.006	0	19040601015539	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	259	5045.487	67° 6' 2.291" N	150° 23' 5.726" W	2.226	0.009	0	19040601015555	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	259	2541.691	67° 6' 25.464" N	150° 20' 22.029" W	0.592	0.002	0	19040601015542	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	259	2547.093	67° 6' 17.789" N	150° 21' 53.412" W	5.122	0.021	0	19040601015544	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	260	1126.075	67° 5' 22.082" N	150° 20' 31.876" W	6.940	0.028	0	19040601015572	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage =	260	4765.430	67° 5' 13.274" N	150° 18' 35.562" W	30.256	0.122	1140	19040601015574	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

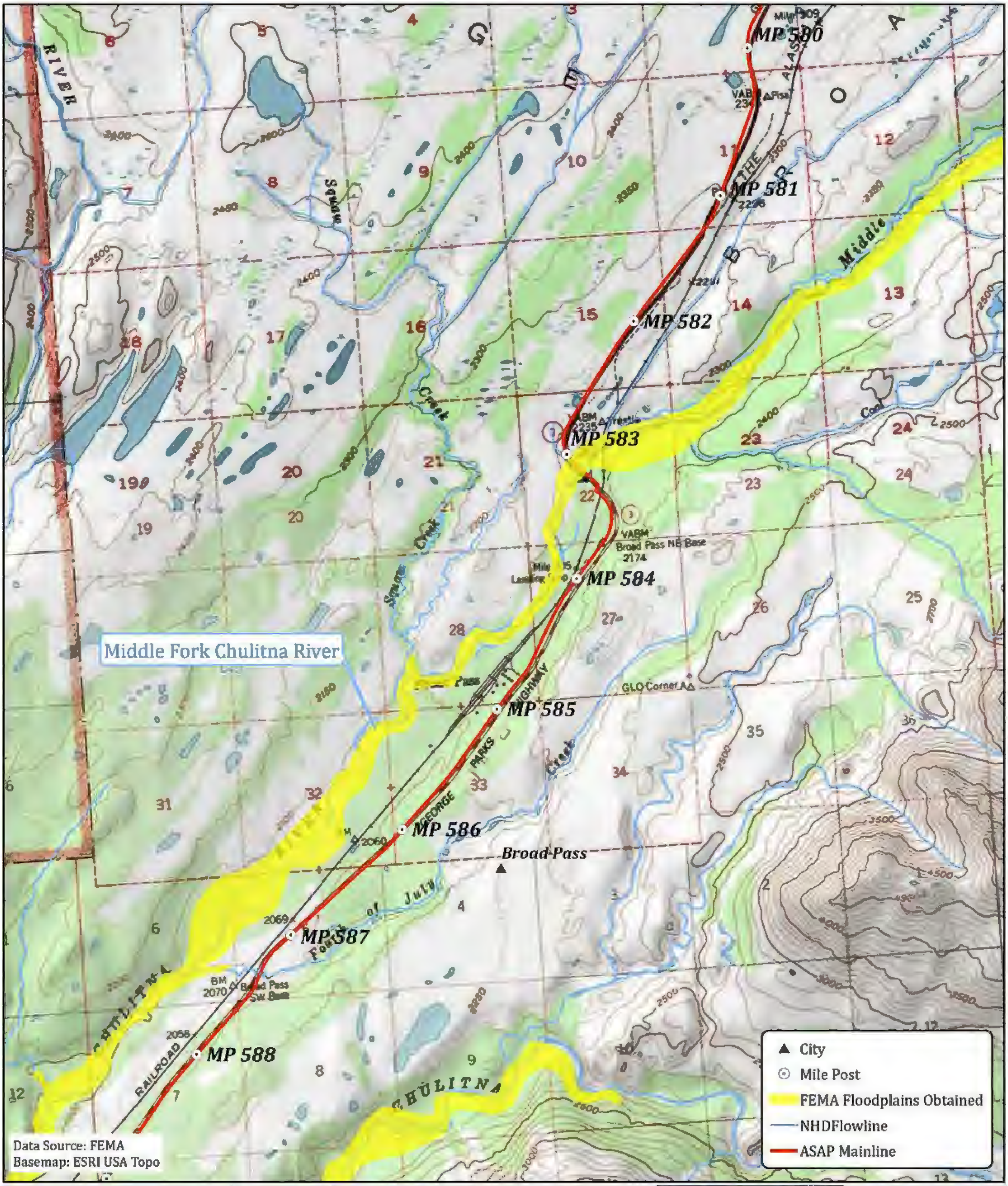
Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
	Average Water Elevation												
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	260	4285.992	67° 5' 17.937" N	150° 23' 30.320" W	154.958	0.627	1035	19040601015568	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	260	2715.070	67° 5' 14.137" N	150° 19' 48.801" W	0.670	0.003	0	19040601015576	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	261	3238.728	67° 4' 23.323" N	150° 22' 32.666" W	7.424	0.030	0	19040601015597	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	261	2376.217	67° 4' 41.206" N	150° 21' 43.541" W	7.695	0.031	0	19040601015583	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial; Stage = Average Water Elevation	261	1916.233	67° 4' 25.496" N	150° 19' 58.010" W	28.691	0.116	1155	19040601015586	39009	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	3471.516	67° 3' 28.886" N	150° 22' 13.697" W	0.828	0.003	0	19040601015608	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	1938.064	67° 3' 9.169" N	150° 20' 48.037" W	0.215	0.001	0	19040601015612	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	3739.490	67° 3' 54.791" N	150° 19' 27.355" W	2.327	0.009	0	19040601015599	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	2224.943	67° 3' 6.320" N	150° 20' 32.062" W	0.627	0.003	0	19040601015613	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	1505.259	67° 3' 42.460" N	150° 21' 6.636" W	1.747	0.007	0	19040601015606	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	2367.000	67° 3' 52.792" N	150° 20' 38.844" W	0.417	0.002	0	19040601015601	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	705.245	67° 3' 21.246" N	150° 20' 55.269" W	1.092	0.004	0	19040601015610	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	1967.580	67° 3' 49.325" N	150° 20' 52.810" W	1.289	0.005	0	19040601015602	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540

Appendix F - National Hydrologic Dataset – Waterbodies within 1 Mile of the Proposed Project

Watershed Name	Description of Waterbody	Closest Mile Post to Water-body	Distance to Closest Mile Post (feet)	Latitude	Longitude	Waterbody Acres (GIS)	Area (Sq Km)	Elevation	Reach Code	F Code	Hydro-graphic Category	HUCLINK	Segment
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	1918.131	67° 3' 45.744" N	150° 21' 12.607" W	2.563	0.010	0	19040601015604	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Upper Koyukuk River	Lake/Pond: Hydrographic Category = Perennial	262	4279.322	67° 3' 24.703" N	150° 22' 32.607" W	0.849	0.003	0	19040601015609	39004	Perennial	19040601	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	321	3916.541	66° 19' 53.704" N	150° 28' 20.356" W	11.503	0.047	0	19040403011129	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	326	3467.906	66° 16' 36.963" N	150° 19' 51.796" W	0.730	0.003	0	19040403011128	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	328	3582.636	66° 14' 32.055" N	150° 19' 47.363" W	0.148	0.001	0	19040403011881	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	328	4608.500	66° 14' 43.484" N	150° 20' 53.942" W	1.125	0.005	0	19040403011877	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	328	5137.035	66° 14' 36.927" N	150° 21' 1.009" W	1.833	0.007	0	19040403011878	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	3473.618	66° 14' 25.429" N	150° 19' 52.473" W	4.022	0.016	0	19040403011883	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	5014.485	66° 14' 23.244" N	150° 20' 32.174" W	1.677	0.007	0	19040403011884	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	4837.015	66° 14' 24.411" N	150° 20' 23.632" W	0.171	0.001	0	19040403011886	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	4897.736	66° 14' 9.557" N	150° 20' 28.583" W	3.212	0.013	0	19040403011888	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	3075.308	66° 14' 32.668" N	150° 19' 33.499" W	0.851	0.003	0	19040403011880	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540
Yukon Flats	Lake/Pond: Hydrographic Category = Perennial	329	3935.293	66° 14' 22.269" N	150° 20' 6.069" W	2.406	0.010	0	19040403011885	39004	Perennial	19040403	Gas Conditioning Facility Mile 0 to Mile 540

Appendix G

FEMA Floodplain Data Maps
Surface Water and Ground Water Monitoring Sites
USGS Surface Water Quality Sampling Sites



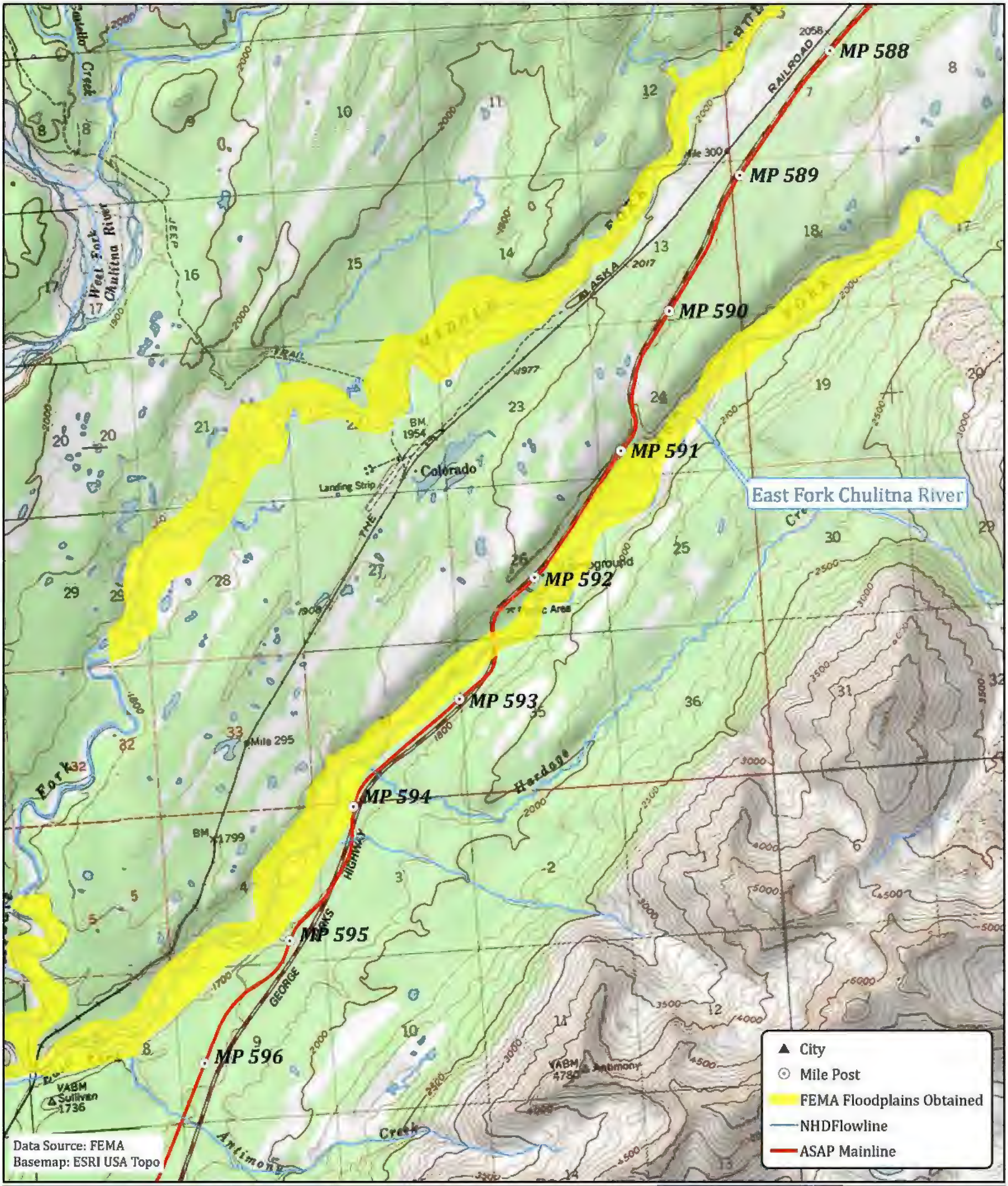
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

0 0.5 1 Miles

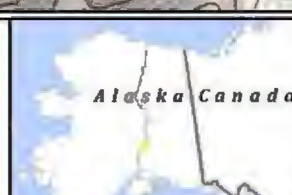
May 2012

NAD 1983 State Plane Alaska



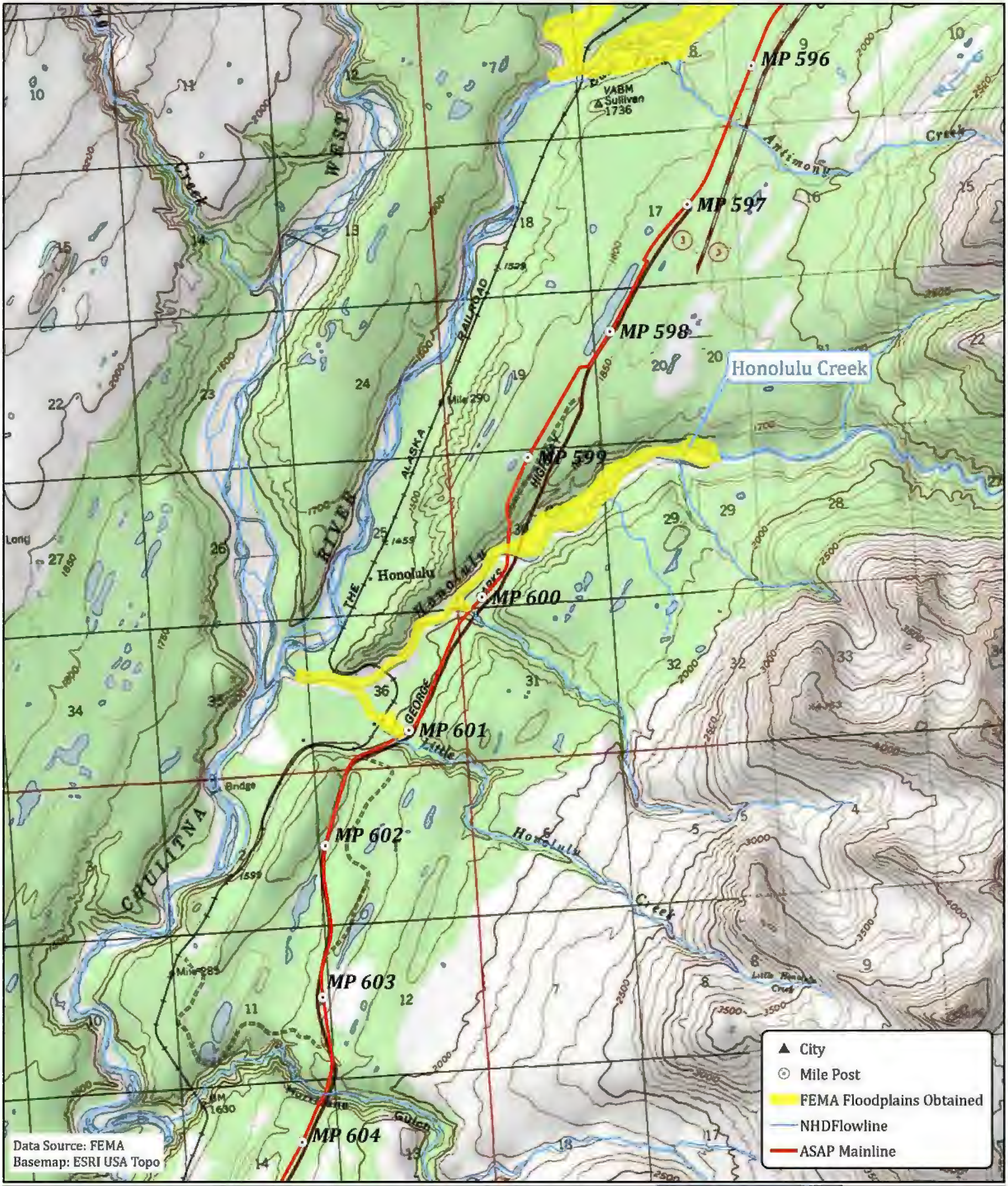
Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

0 0.5 1 Miles



May 2012

NAD 1983 State Plane Alaska

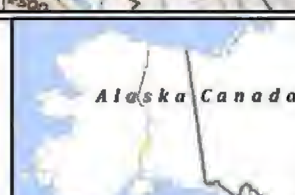


This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Page 3 of 6

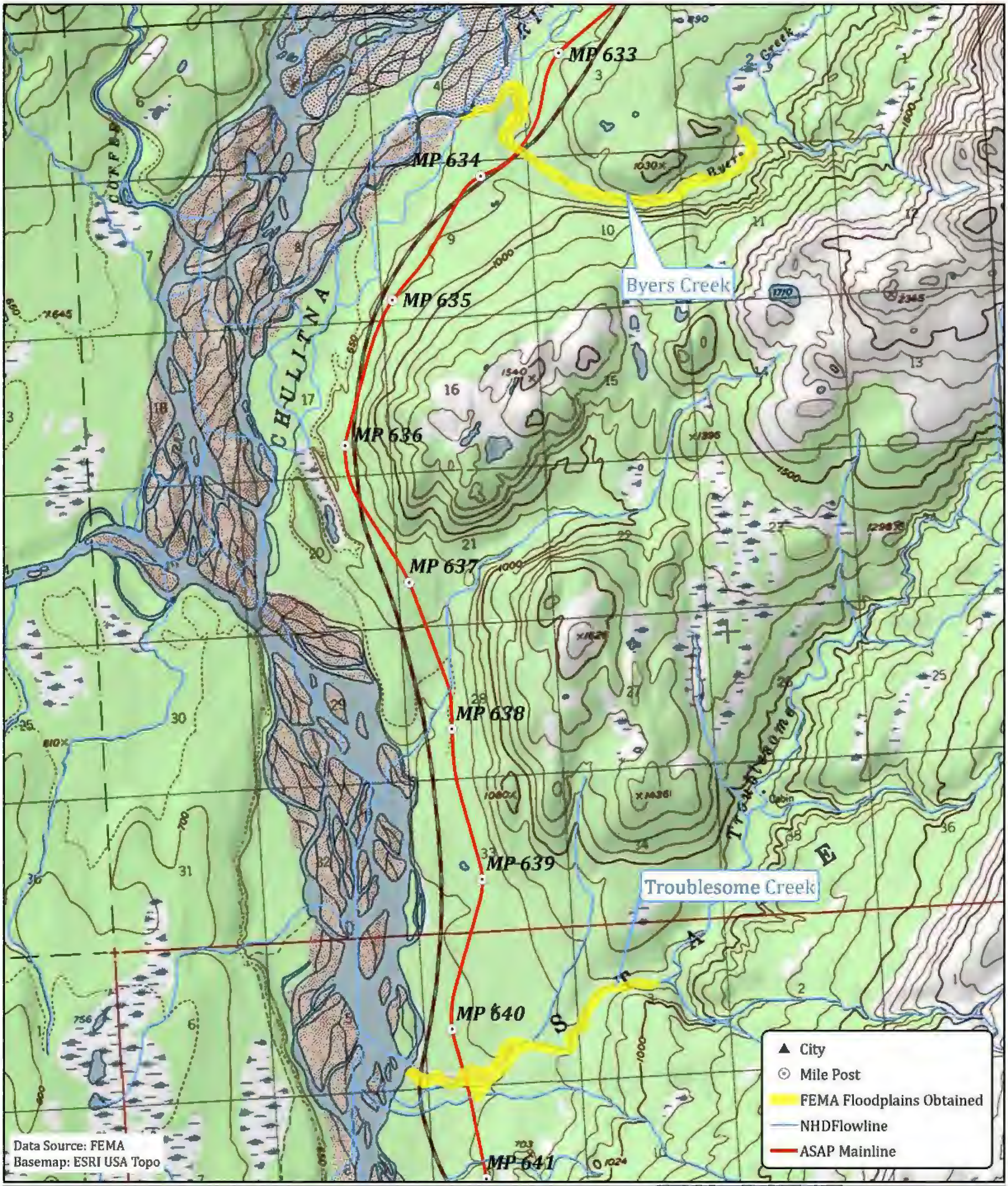
Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

0 0.5 1 Miles



May 2012

NAD 1983 State Plane Alaska

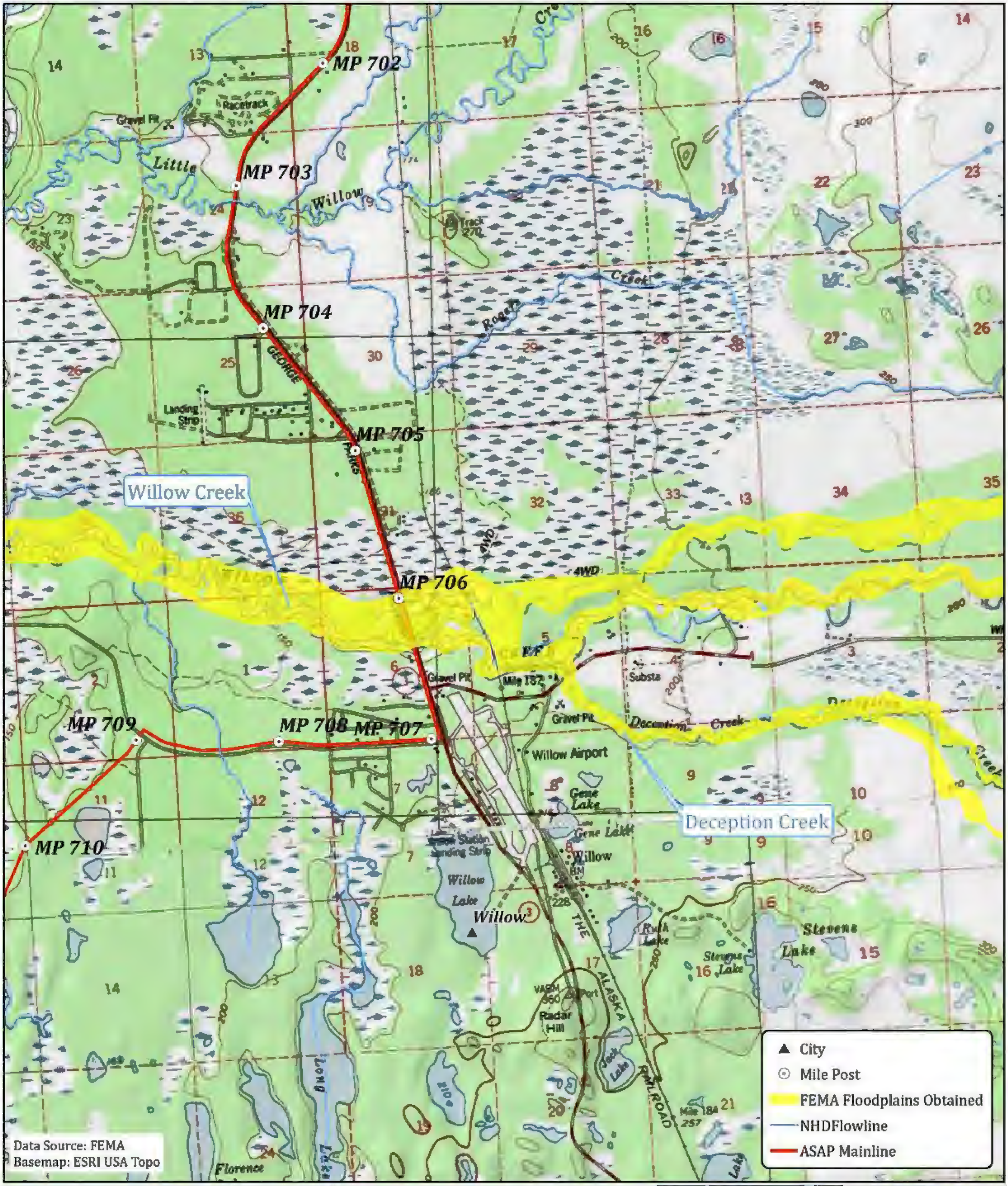


Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

0 0.5 1 Miles

May 2012

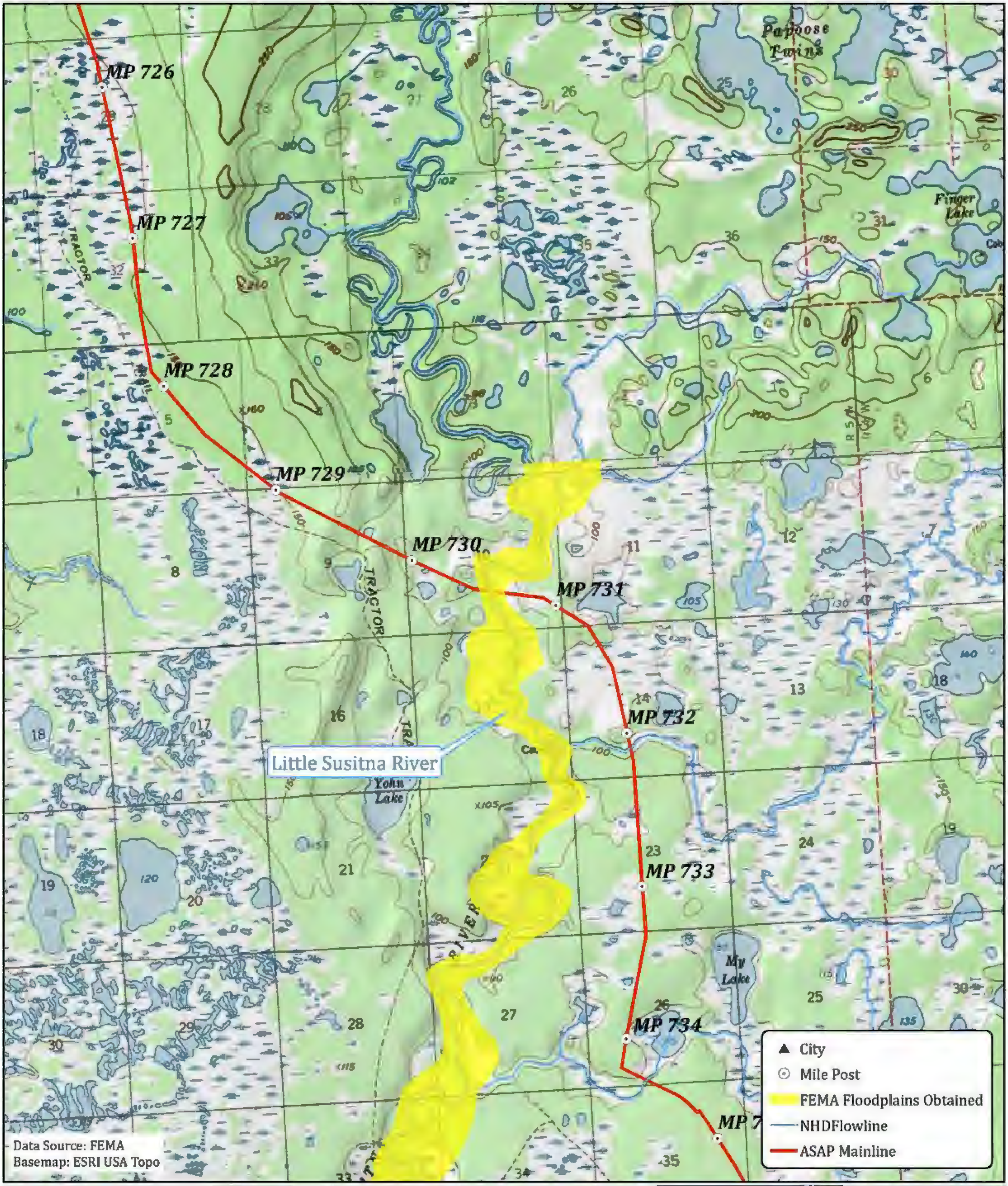
NAD 1983 State Plane Alaska



Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

May 2012

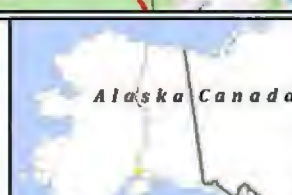
NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

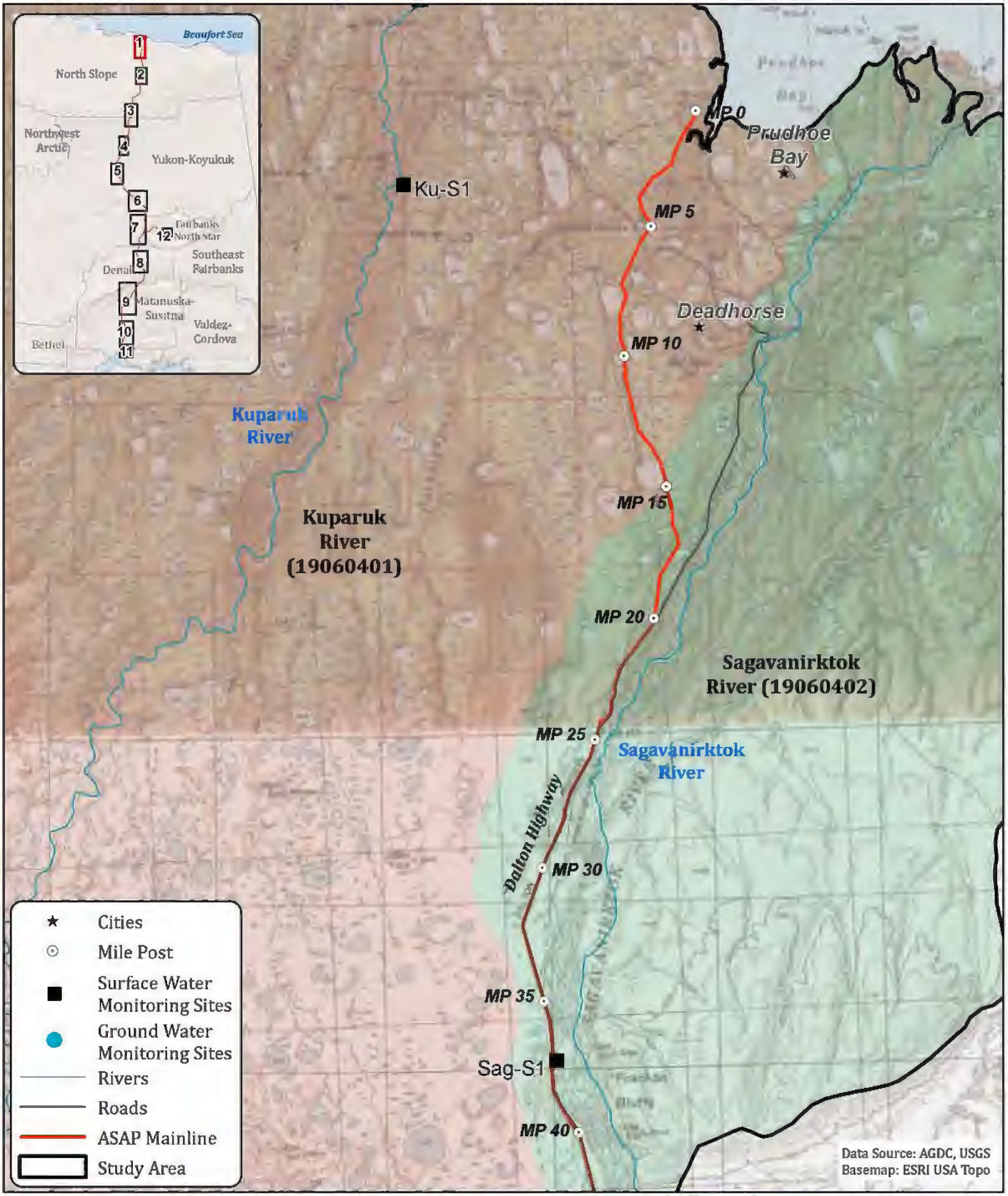
Alaska Stand Alone Gas Pipeline
FEMA Floodplain Data Available

0 0.5 1 Miles



May 2012

NAD 1983 State Plane Alaska



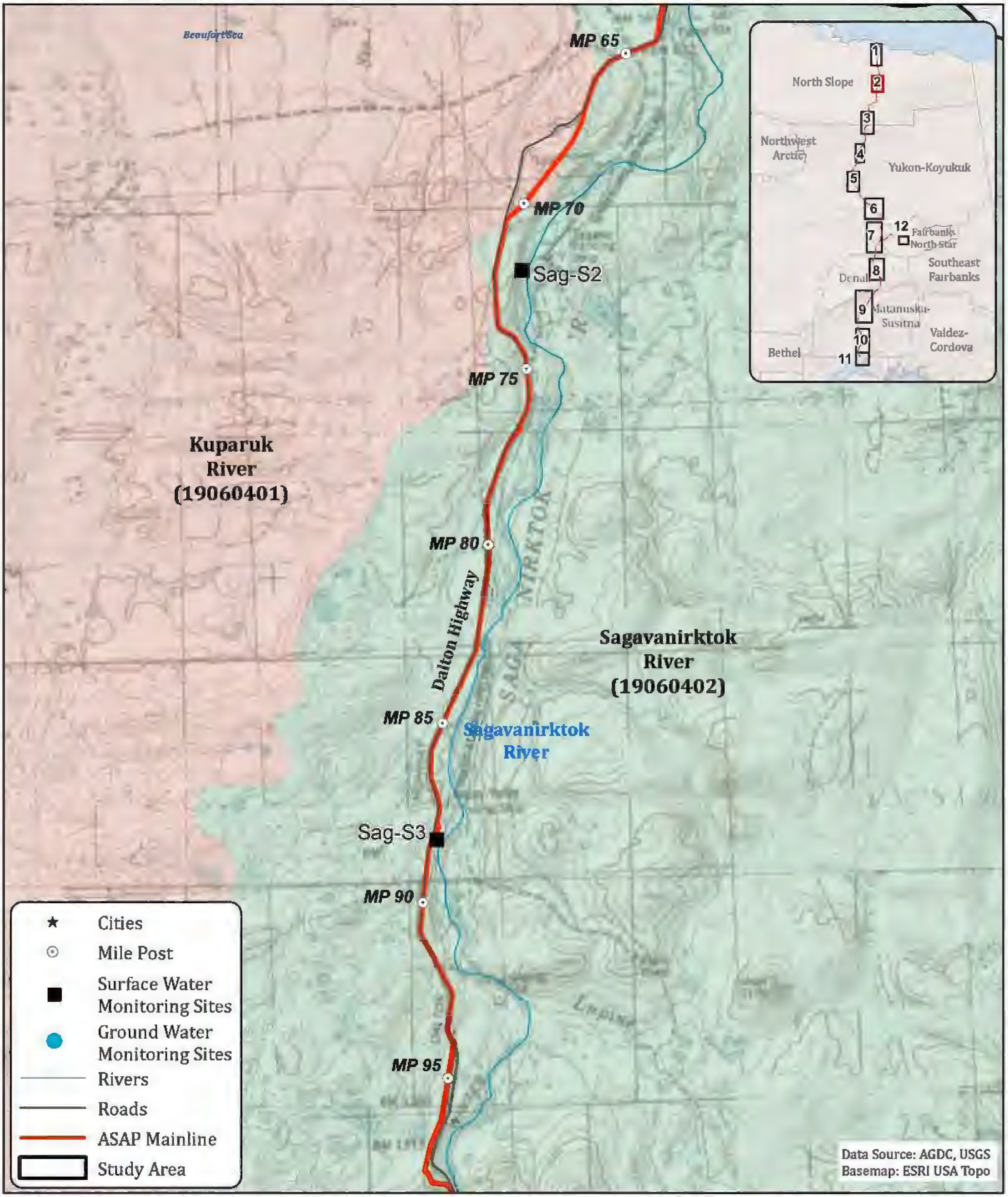
Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles

Alaska Canada

May 2012

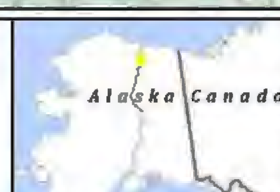
NAD 1983 State Plane Alaska



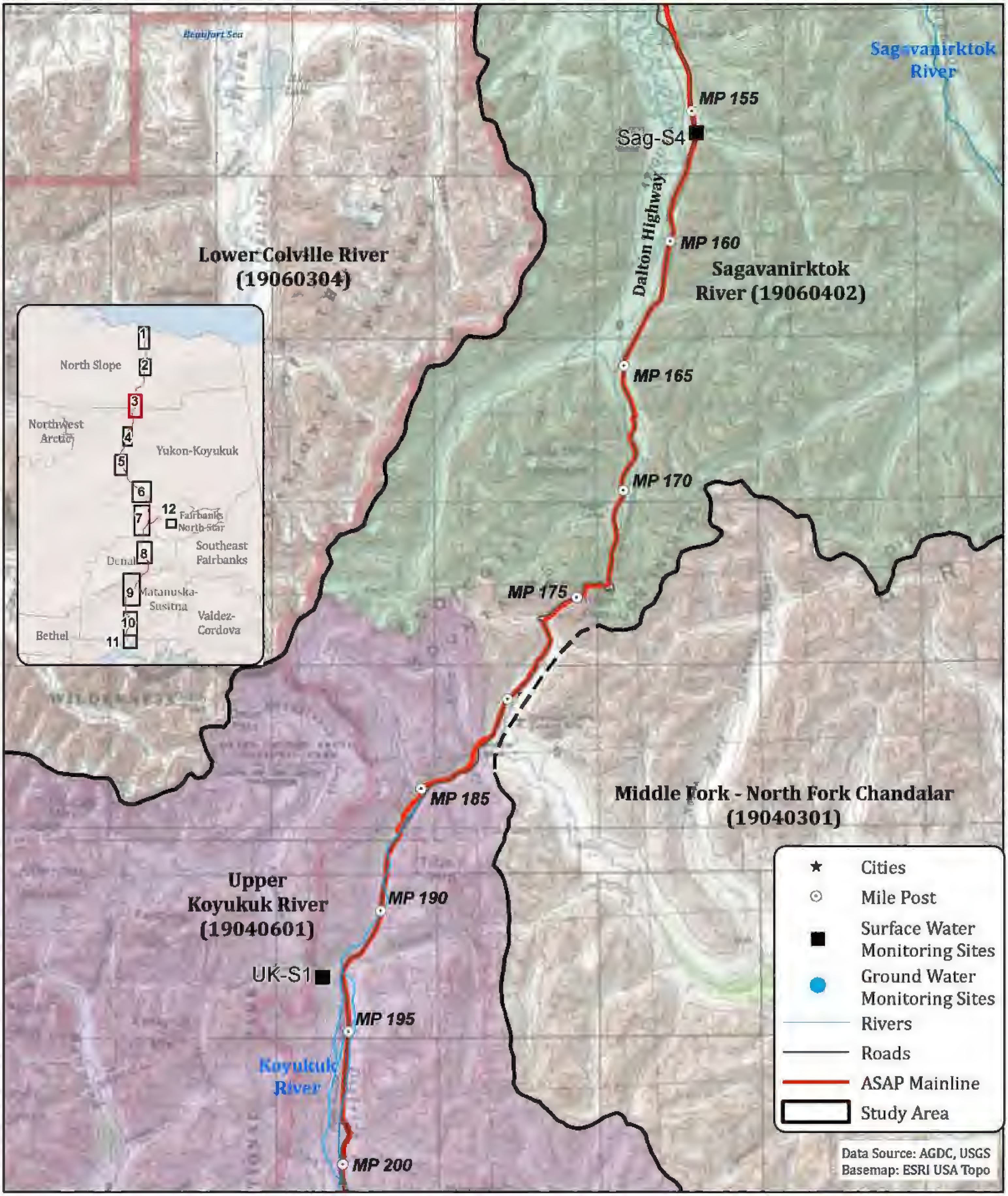
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Surface Water and Ground
Water Monitoring Sites

0 2.5 5 Miles



May 2012
NAD 1983 State Plane Alaska



Alaska Stand Alone Gas Pipeline
Surface Water and Ground
Water Monitoring Sites

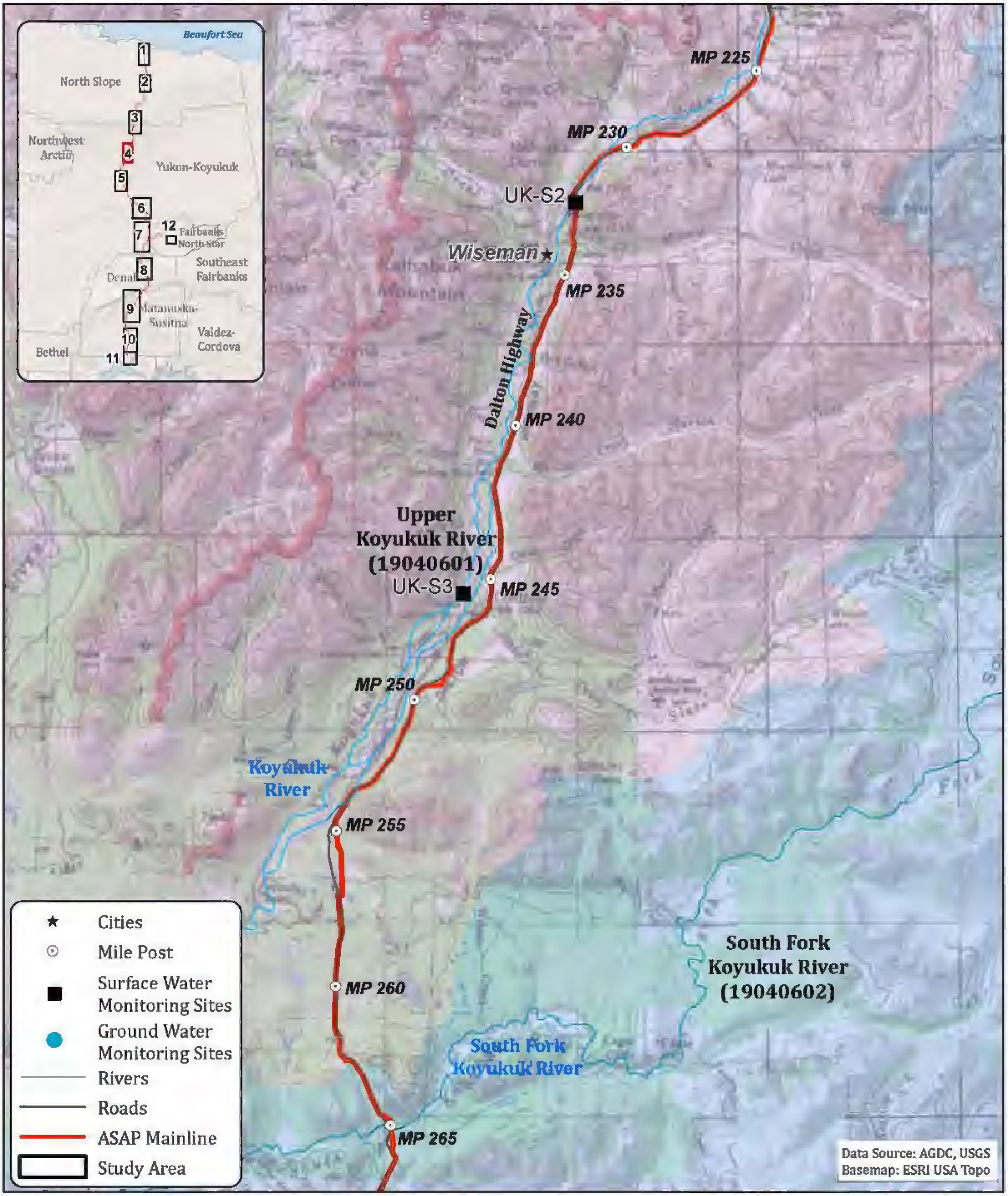
0 2.5 5 Miles

Alaska Canada

AK

May 2012

NAD 1983 State Plane Alaska



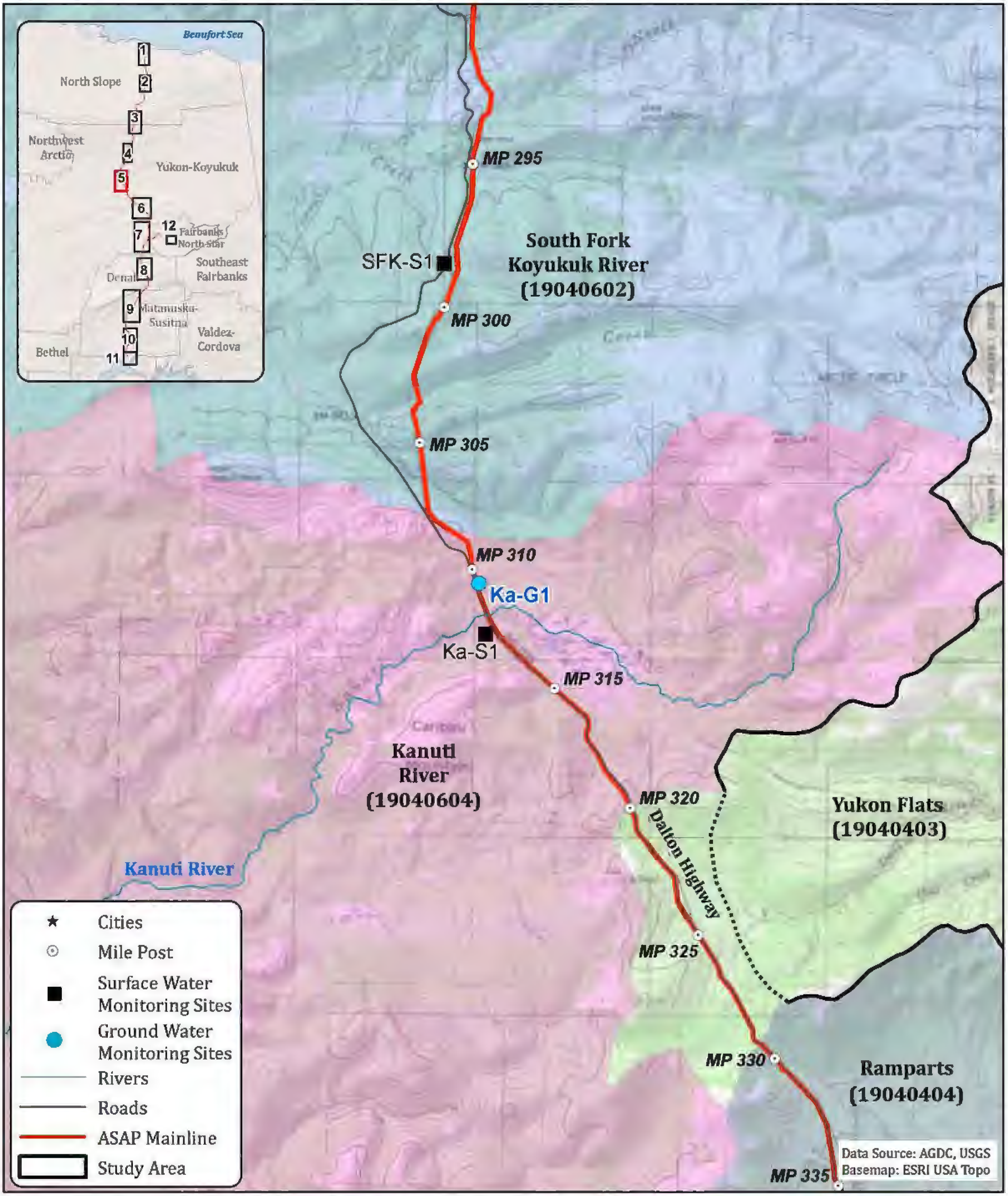
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2 4 Miles

May 2012

NAD 1983 State Plane Alaska



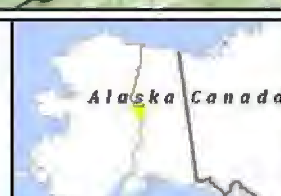
Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

May 2012
NAD 1983 State Plane Alaska

This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Surface Water and Ground
Water Monitoring Sites

0 2.5 5 Miles



May 2012

NAD 1983 State Plane Alaska

Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles

Alaska Canada

May 2012

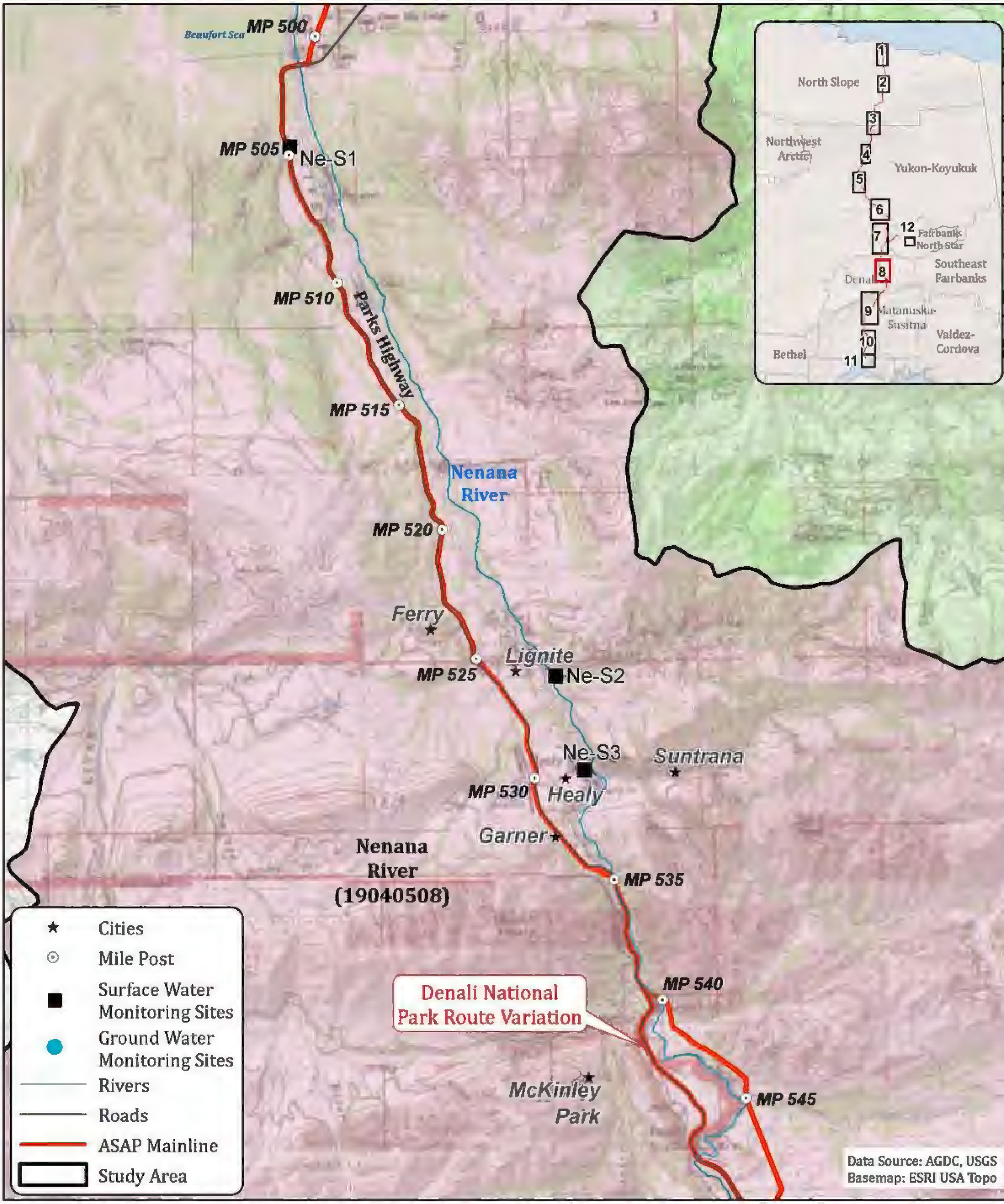
NAD 1983 State Plane Alaska

Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles

May 2012

NAD 1983 State Plane Alaska



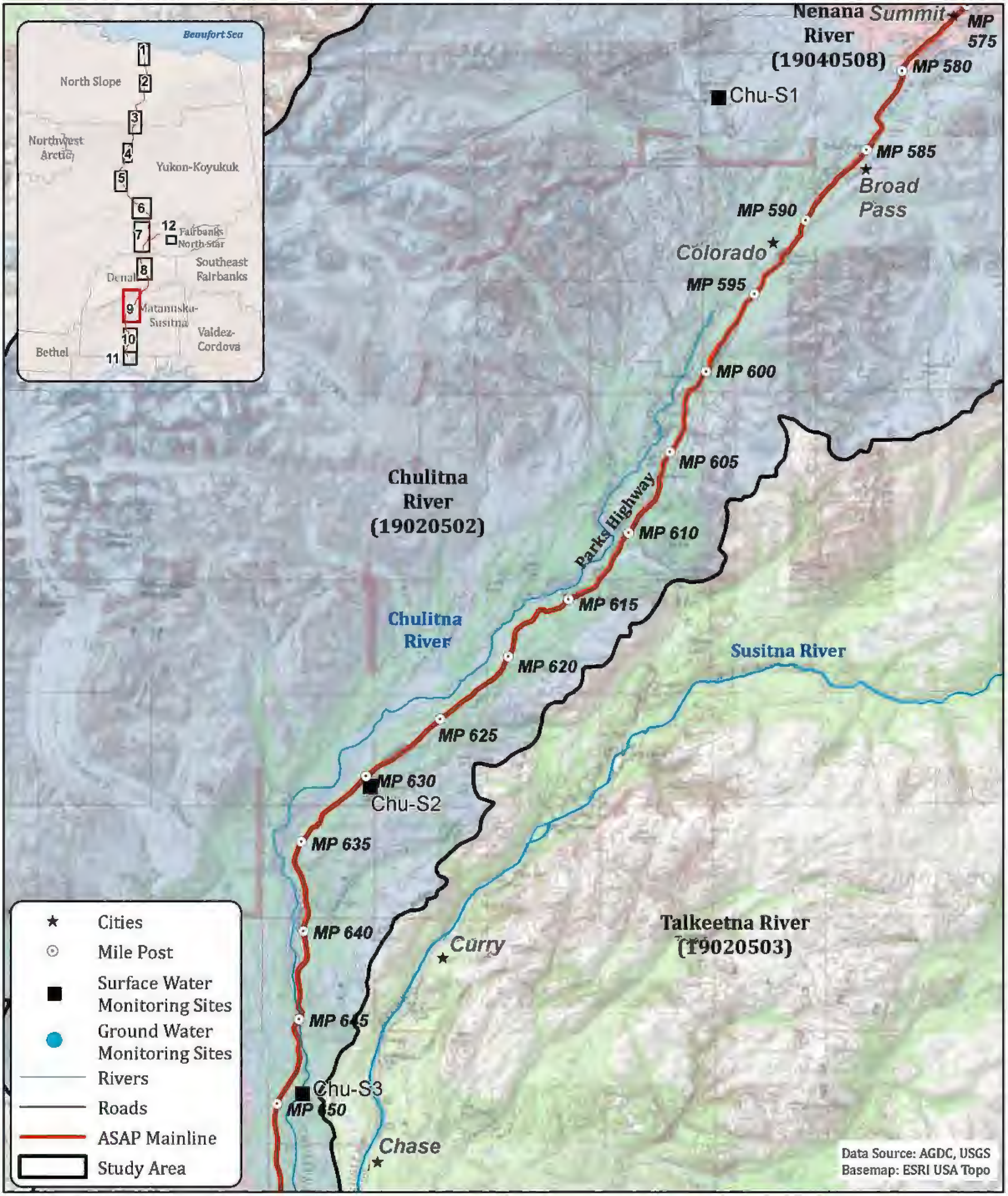
Alaska Stand Alone Gas Pipeline Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles

Alaska Canada

May 2012

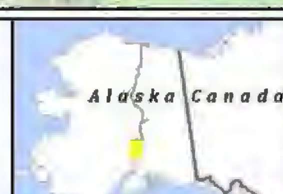
NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

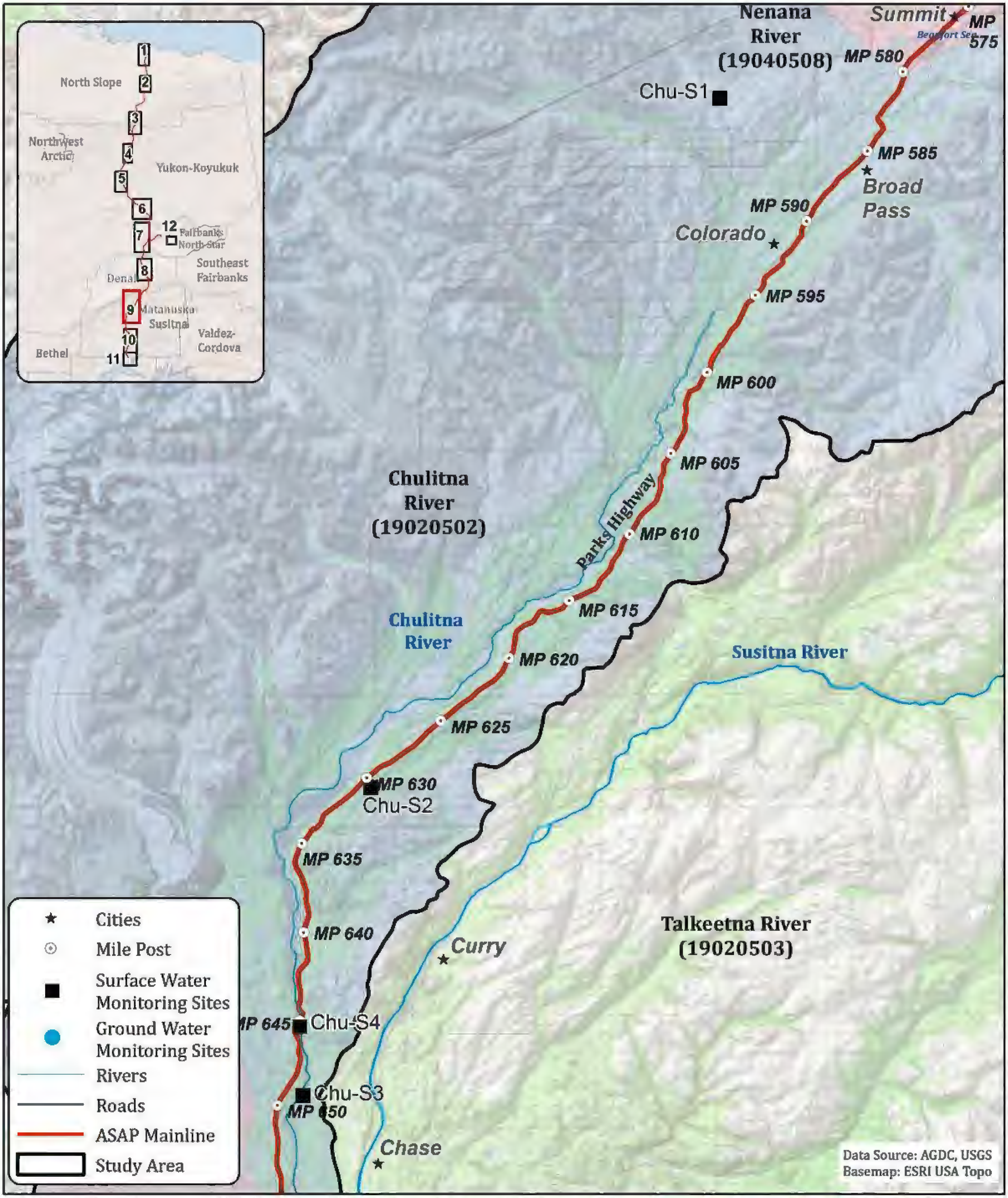
Alaska Stand Alone Gas Pipeline
Surface Water and Ground
Water Monitoring Sites

0 2.5 5 Miles



May 2012

NAD 1983 State Plane Alaska



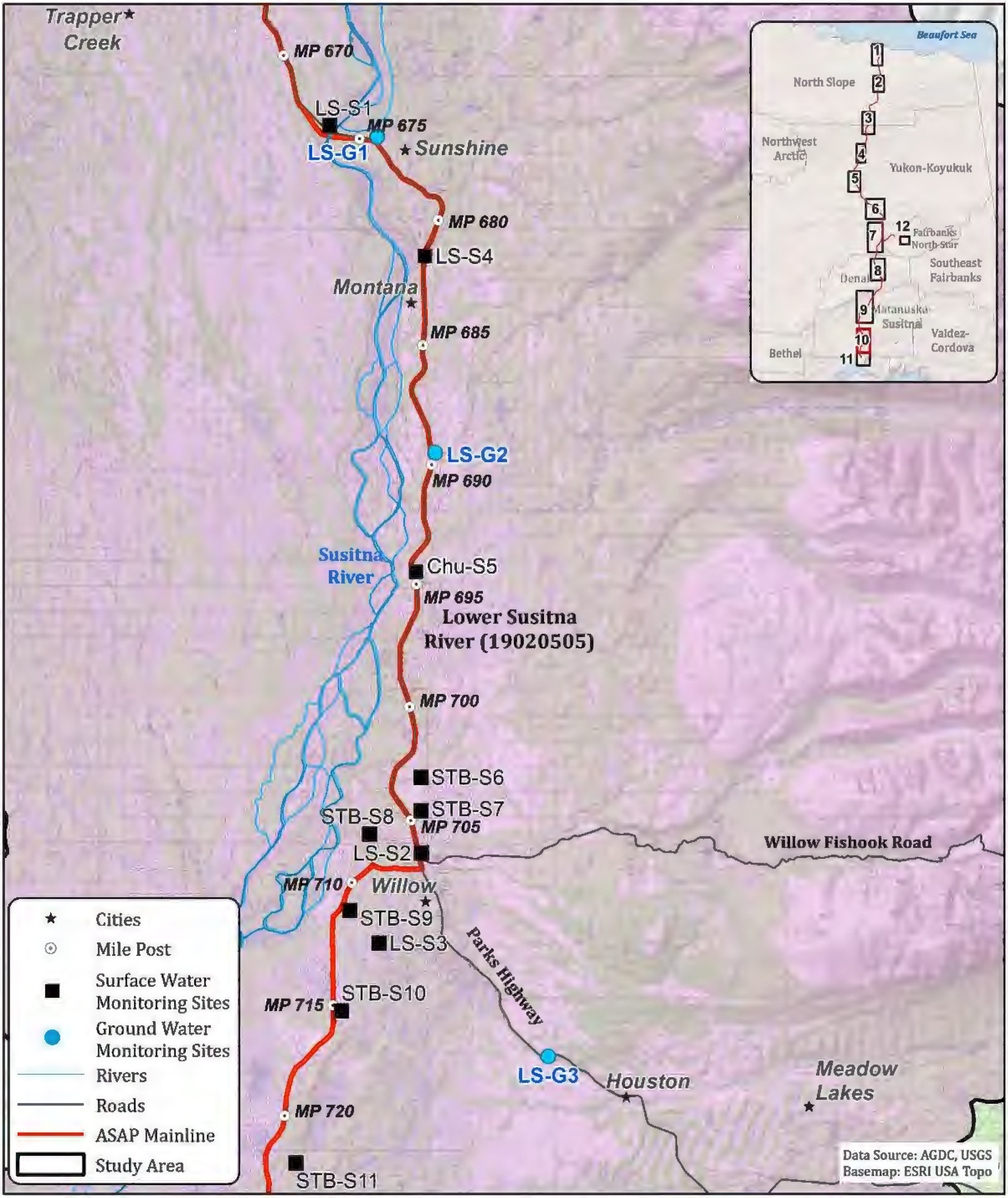
Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles

Alaska Canada

May 2012

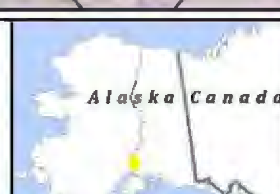
NAD 1983 State Plane Alaska



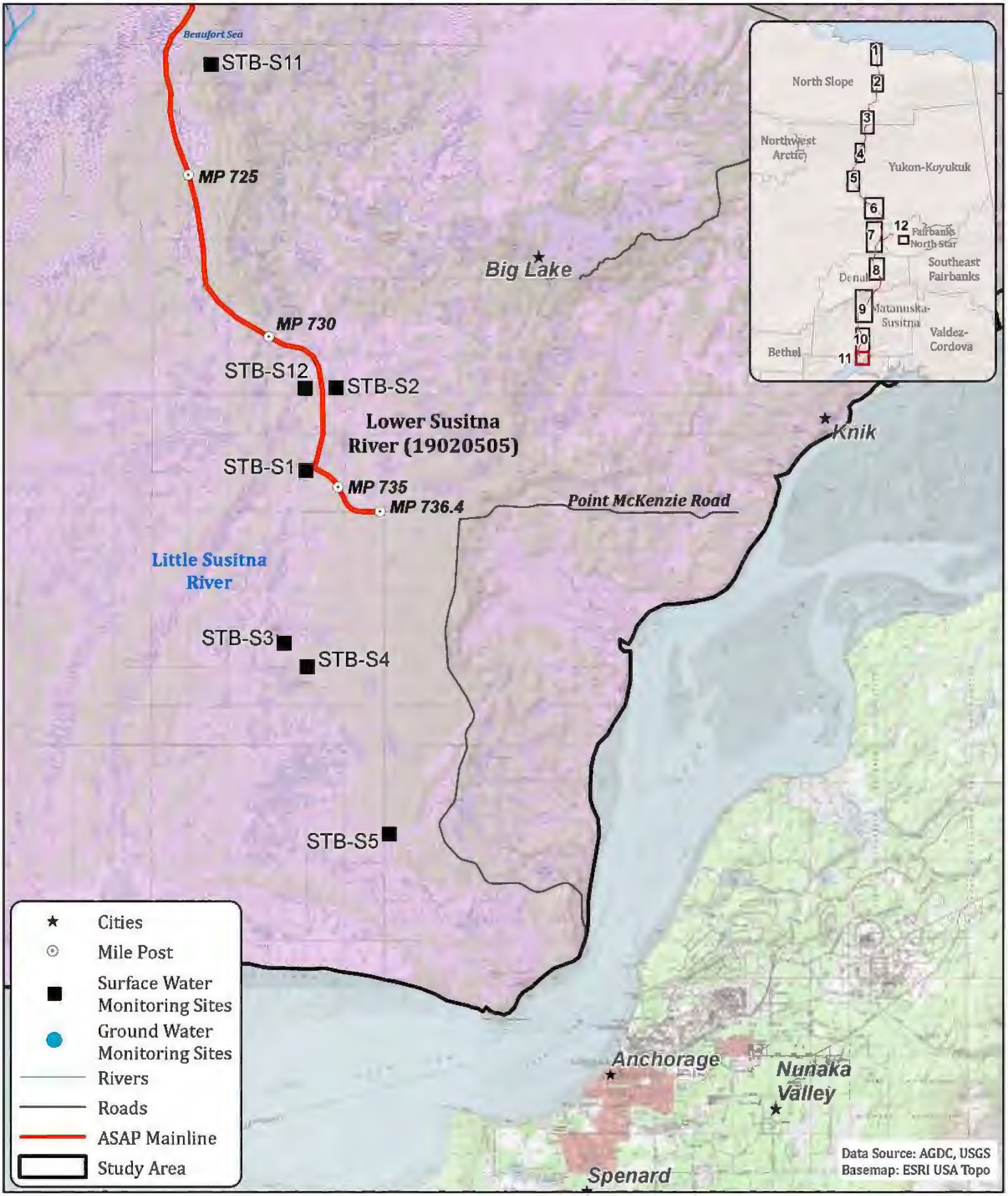
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Surface Water and Ground Water Monitoring Sites

0 2.5 5 Miles



May 2012
NAD 1983 State Plane Alaska



N

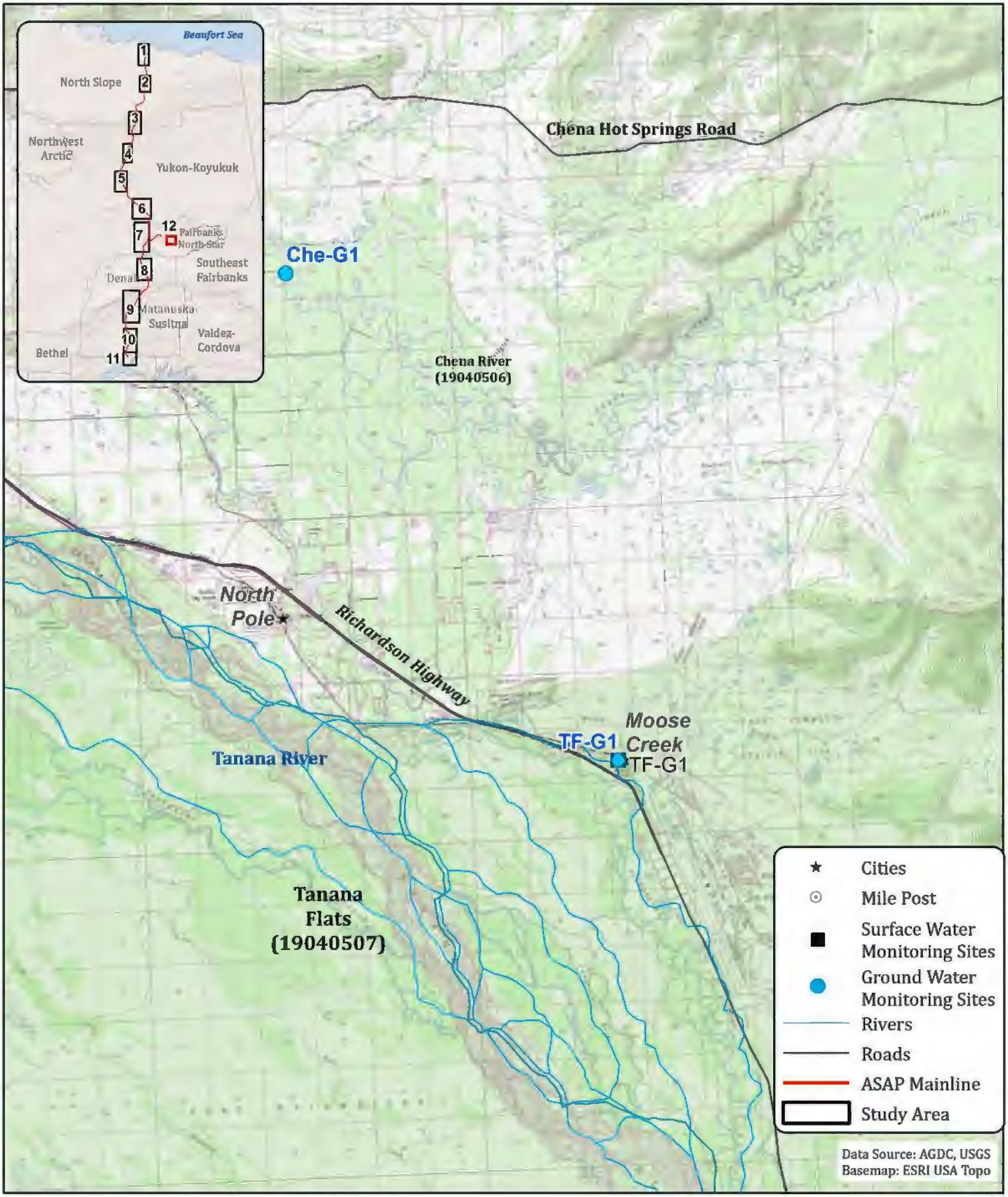
Alaska Stand Alone Gas Pipeline Surface Water and Ground Water Monitoring Sites

0 1.75 3.5 Miles

AK

May 2012

NAD 1983 State Plane Alaska



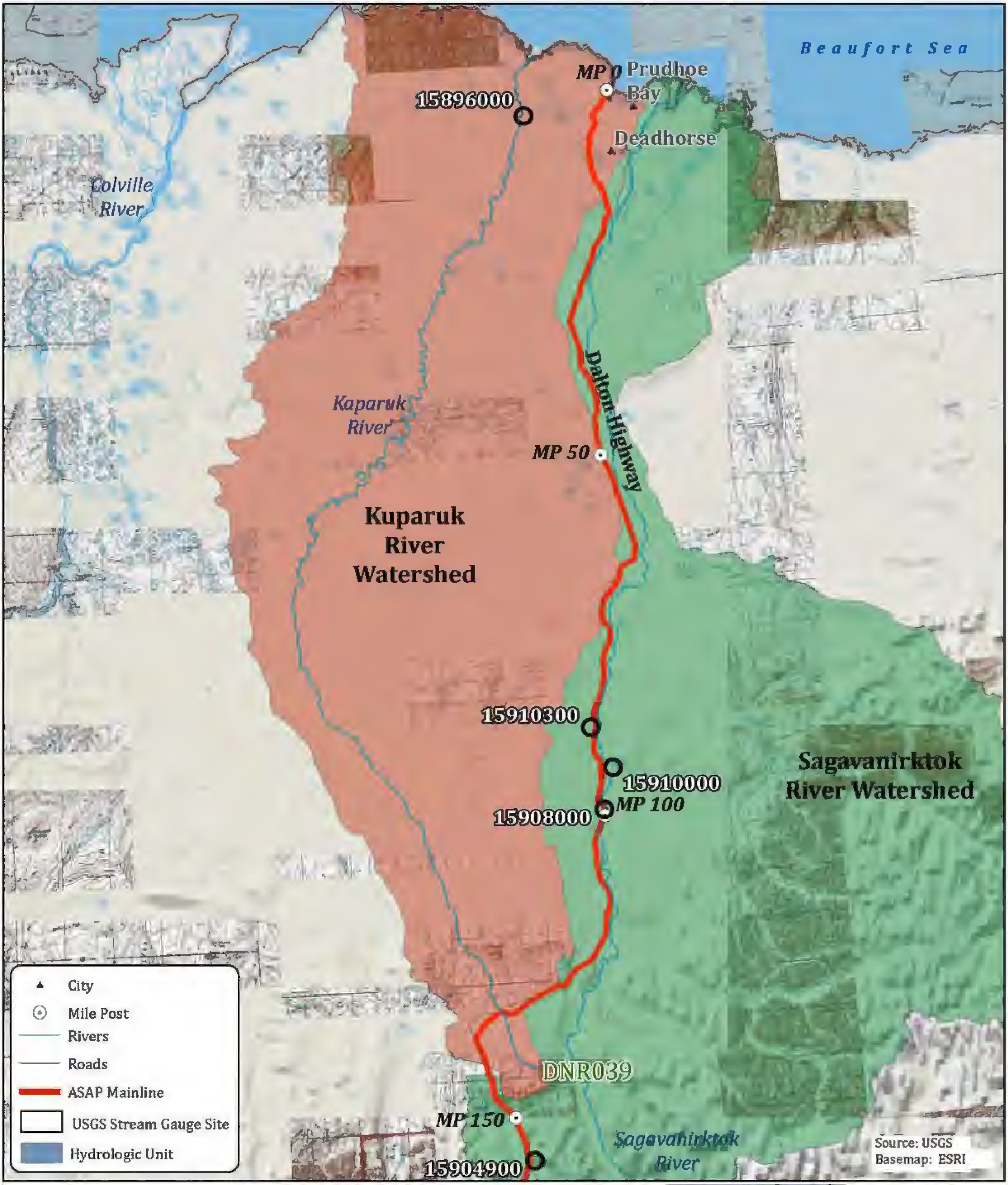
Alaska Stand Alone Gas Pipeline Surface Water and Ground Water Monitoring Sites

0 1.25 2.5 Miles

Alaska Canada

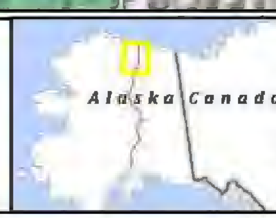
May 2012

NAD 1983 State Plane Alaska



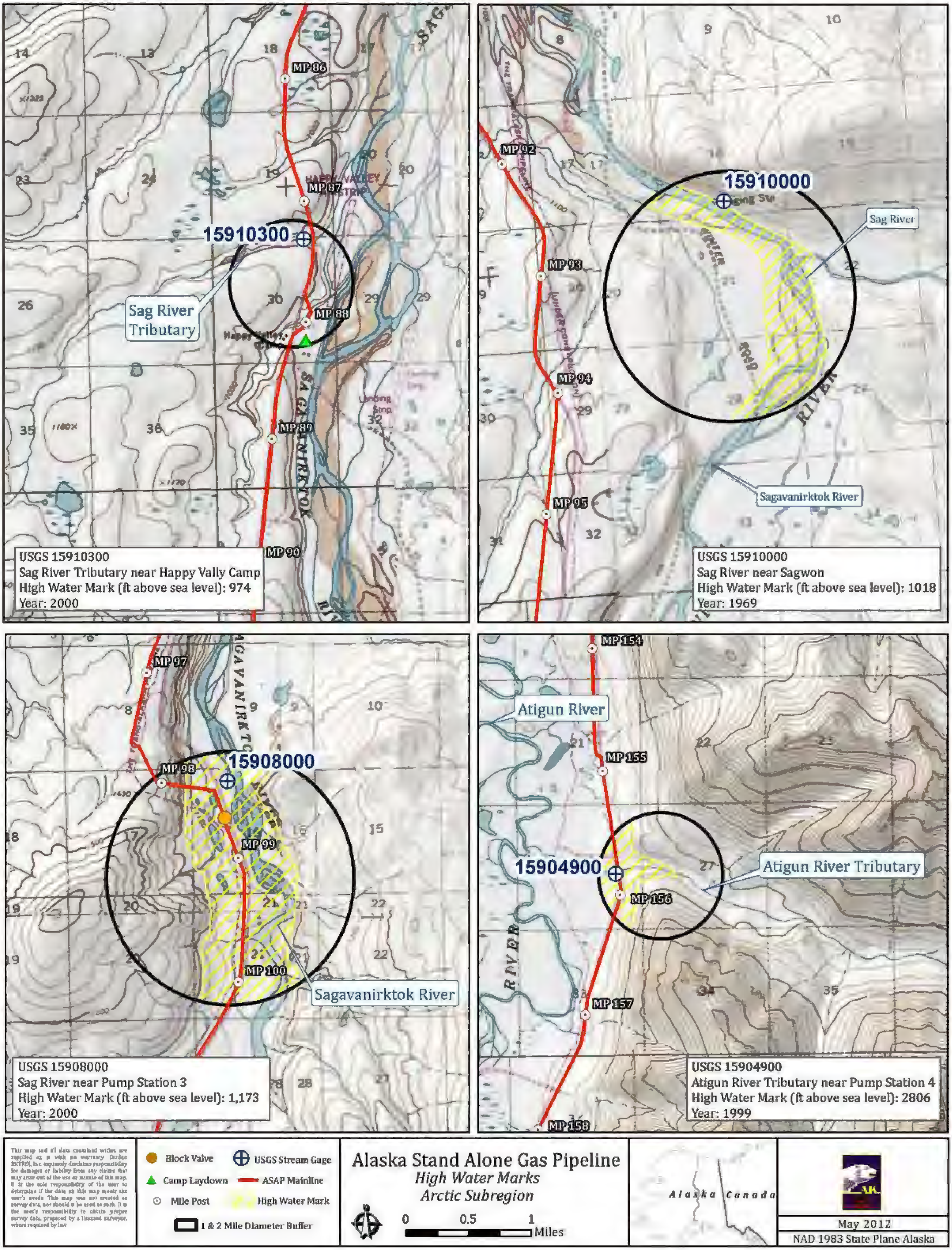
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
High Water Mark Index

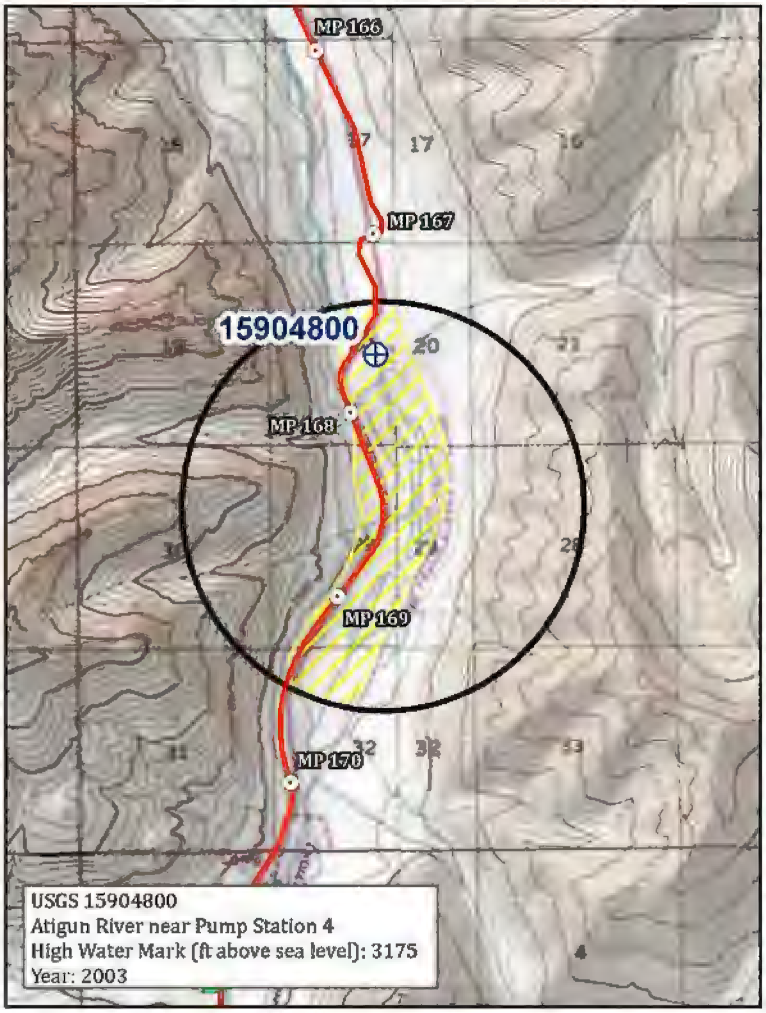


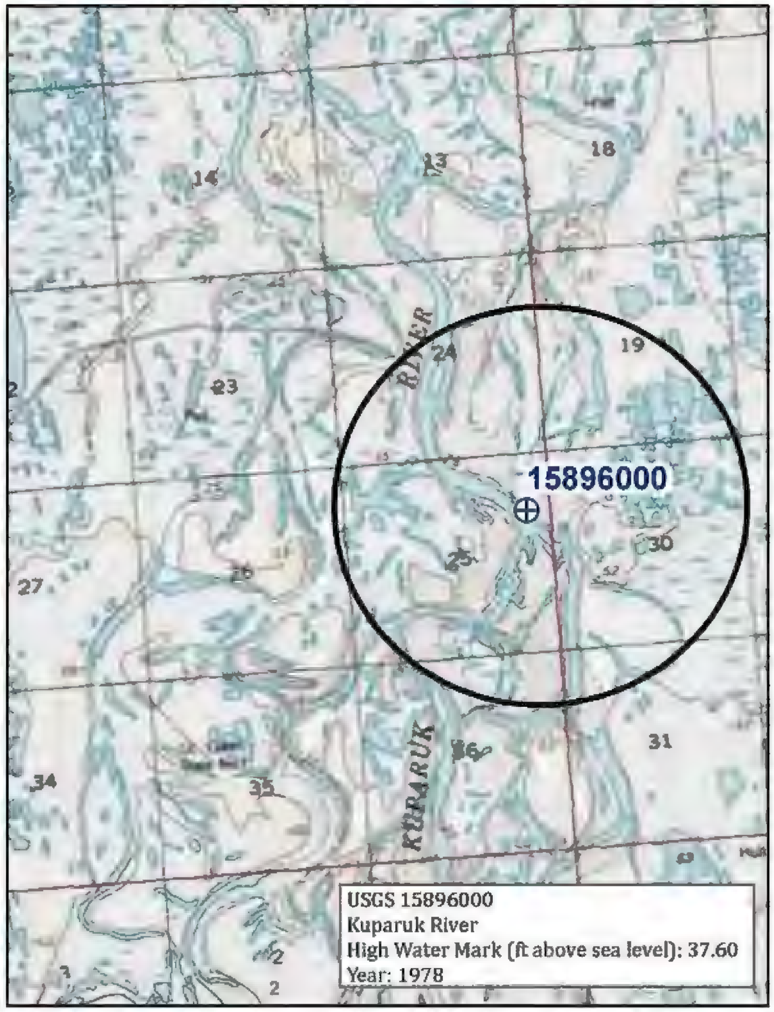
May 2012

NAD 1983 State Plane Alaska



15910300
Sag River Tributary
MP 86
MP 87
MP 88
MP 89
MP 90
HAPPY VALLEY AIRSTRIP
SAGAVANIRKTOK
USGS 15910300
Sag River Tributary near Happy Vally Camp
High Water Mark (ft above sea level): 974
Year: 2000
15910000
Sag River
Sagavanirktok River
RIVER
MP 92
MP 93
MP 94
MP 95
USGS 15910000
Sag River near Sagwon
High Water Mark (ft above sea level): 1018
Year: 1969
15908000
MP 97
MP 98
MP 99
MP 100
Sagavanirktok River
USGS 15908000
Sag River near Pump Station 3
High Water Mark (ft above sea level): 1,173
Year: 2000
Atigun River
15904900
Atigun River Tributary
MP 154
MP 155
MP 156
MP 157
MP 158
RIVER
USGS 15904900
Atigun River Tributary near Pump Station 4
High Water Mark (ft above sea level): 2806
Year: 1999
This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.
Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer
Alaska Stand Alone Gas Pipeline
High Water Marks
Arctic Subregion
0
0.5
1
Miles
Alaska
Canada
May 2012
NAD 1983 State Plane Alaska



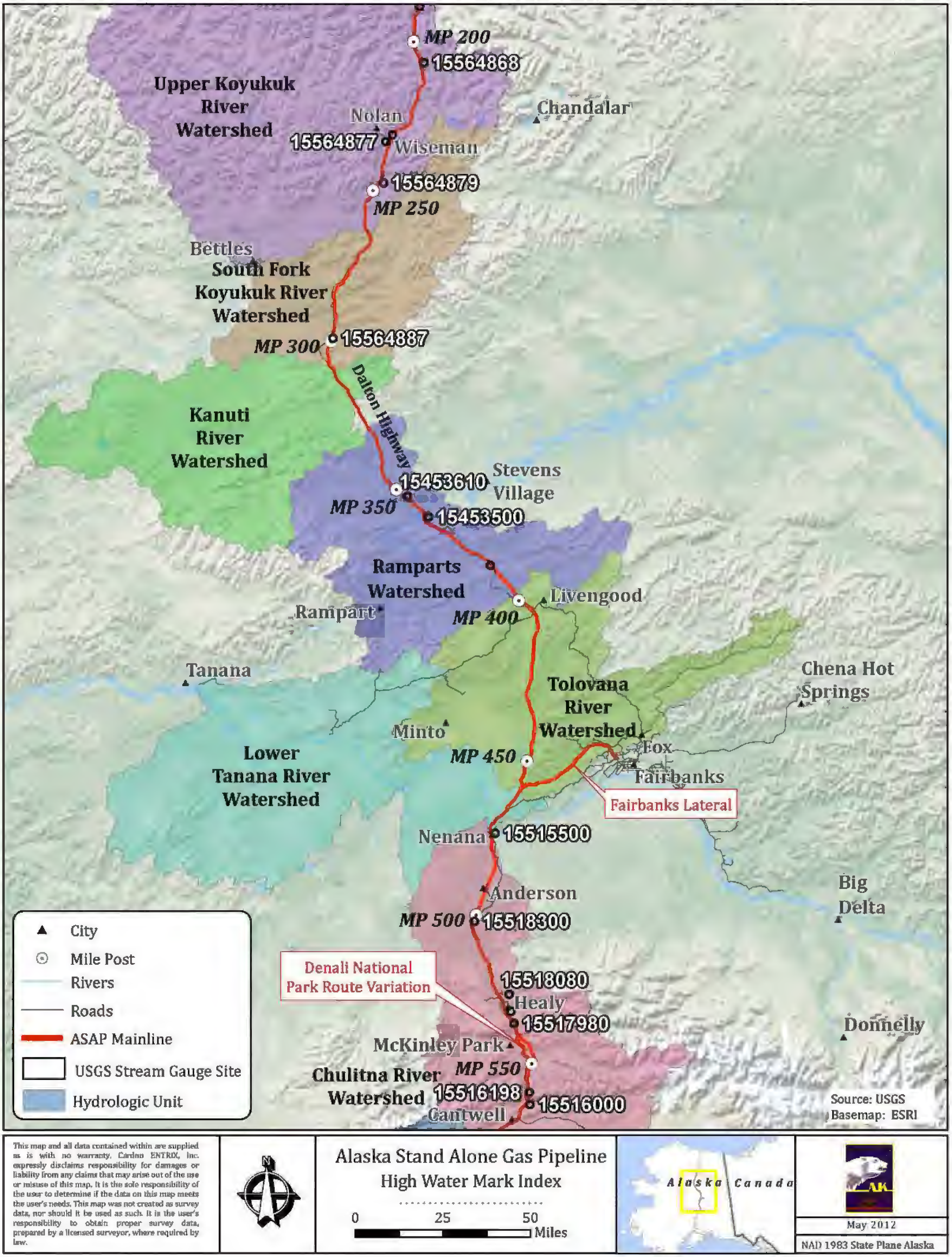


Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

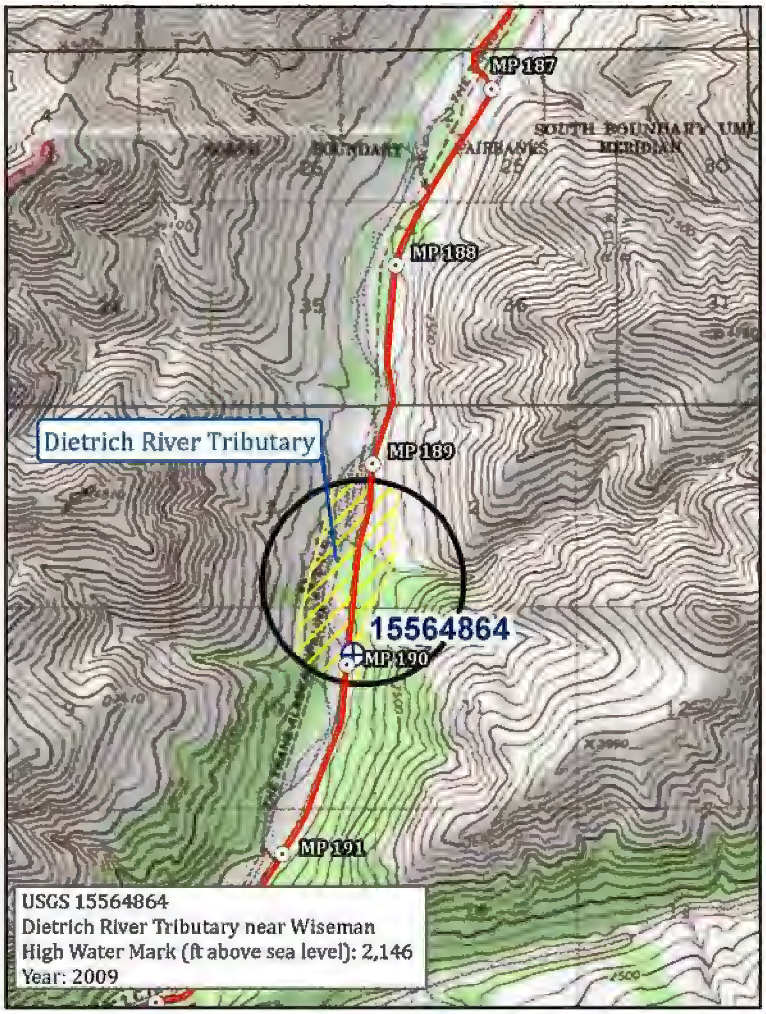
Alaska Stand Alone Gas Pipeline
High Water Marks
Arctic Subregion

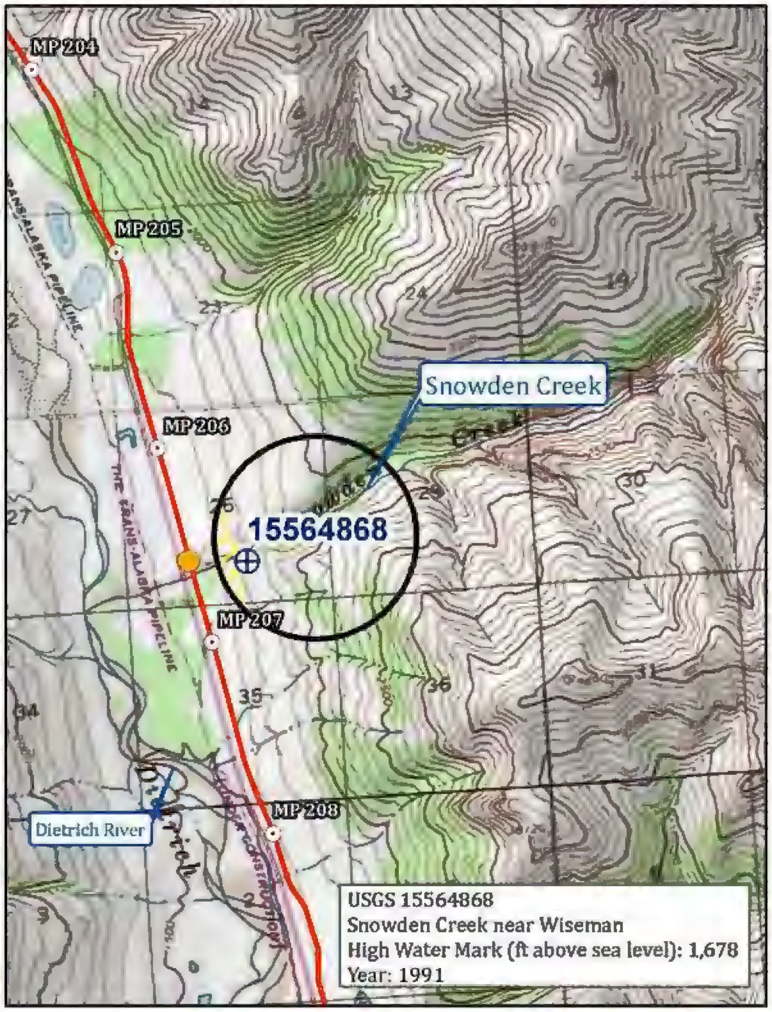
0 0.5 1 Miles

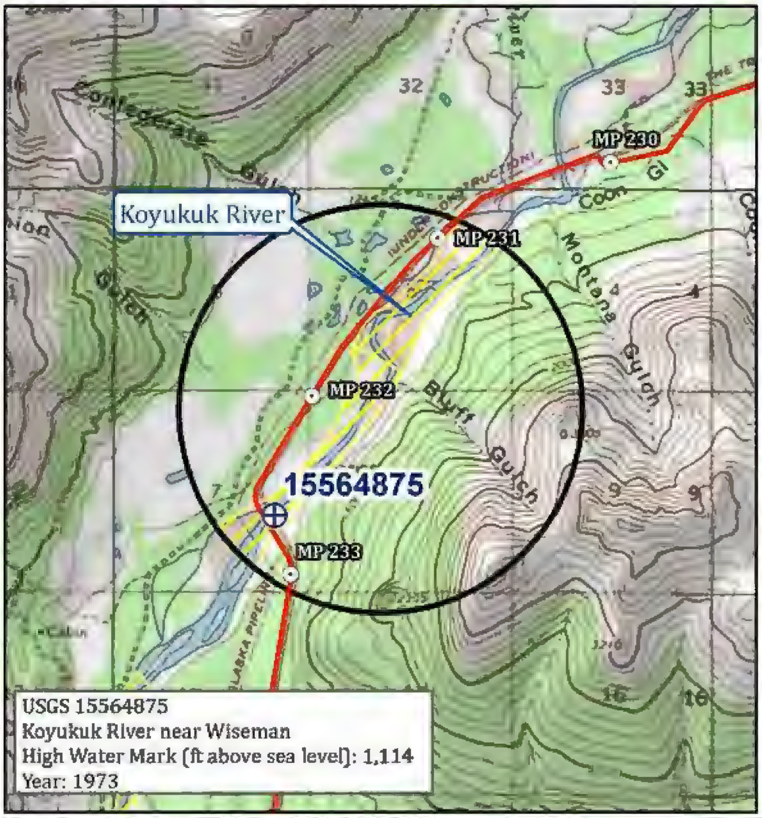
May 2012
NAD 1983 State Plane Alaska

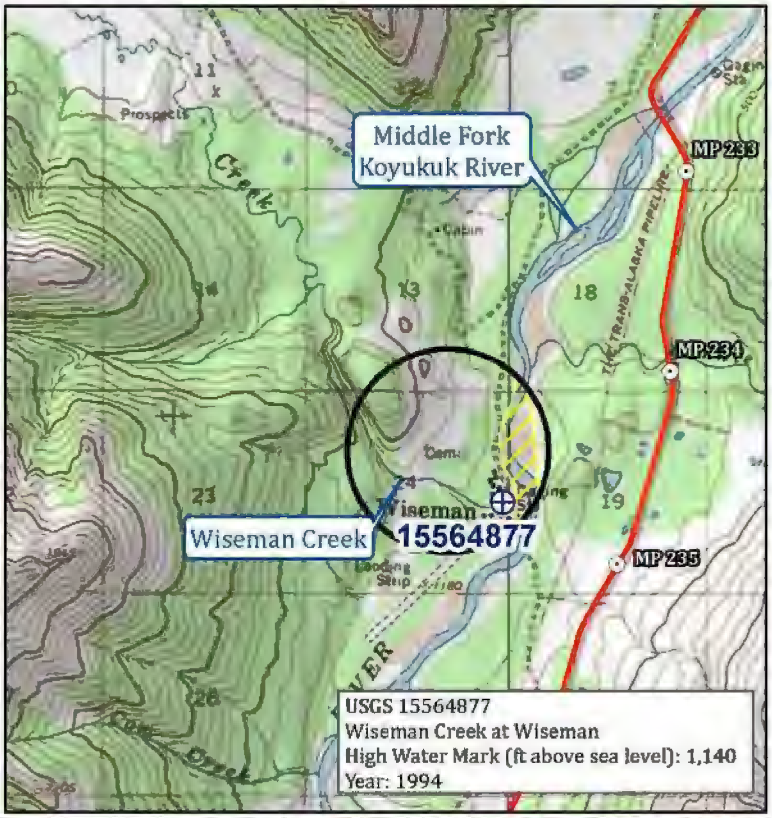


Alaska Stand Alone Gas Pipeline
High Water Mark Index









This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

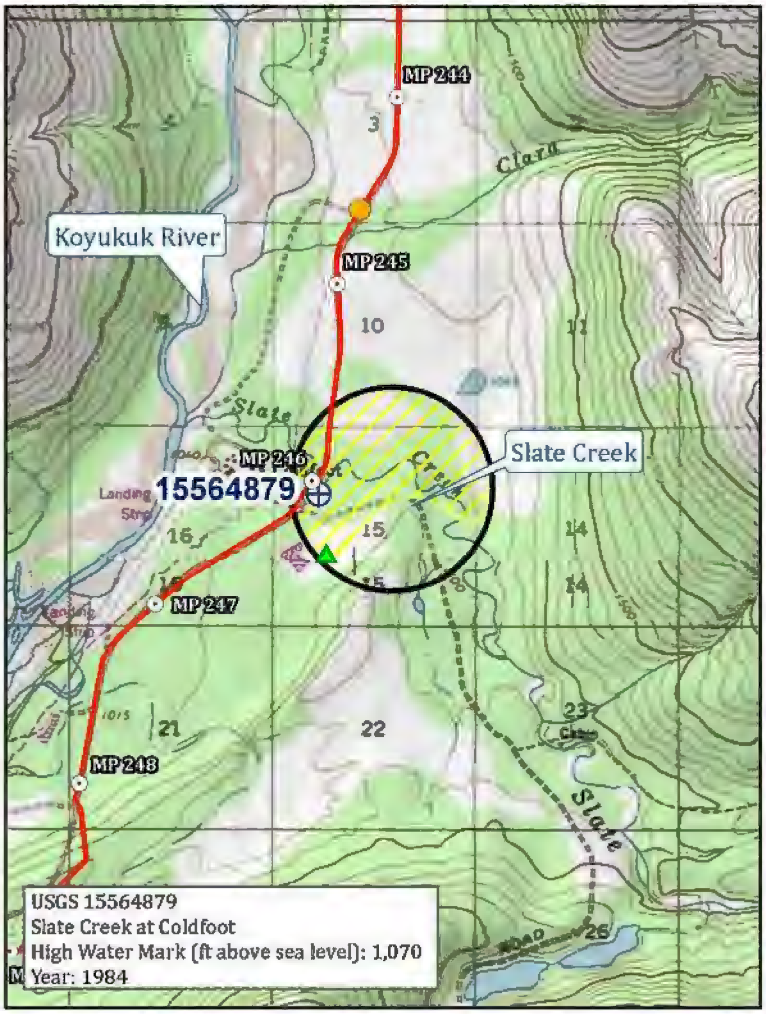
High Water Marks

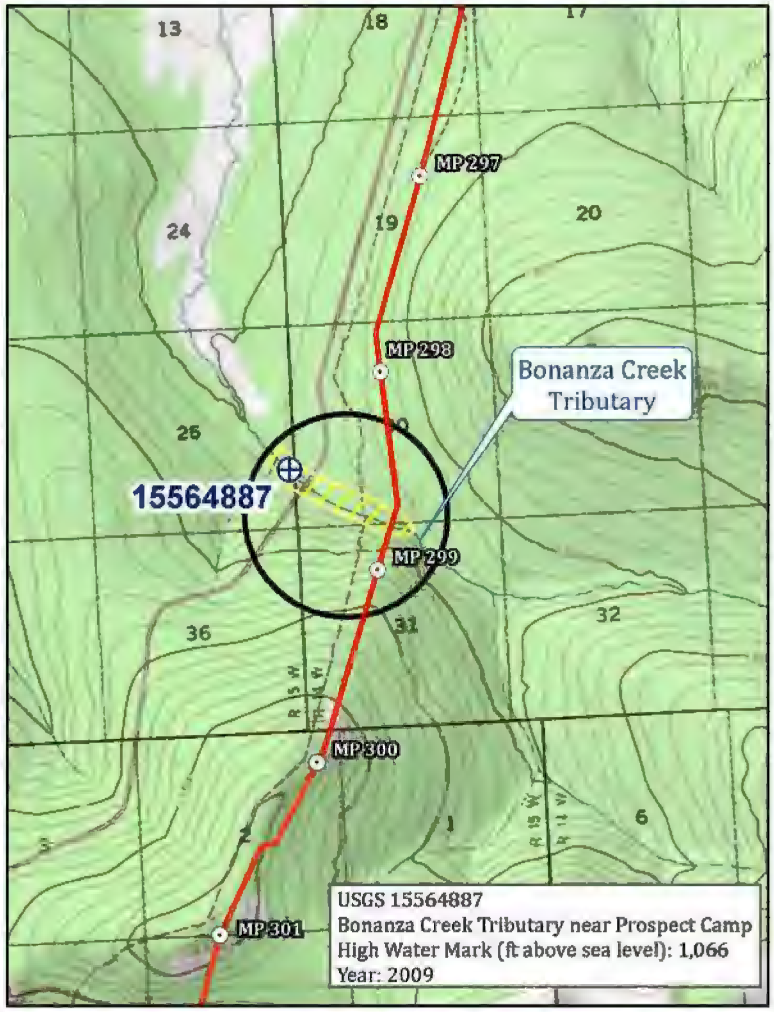
Interior Yukon Subregion

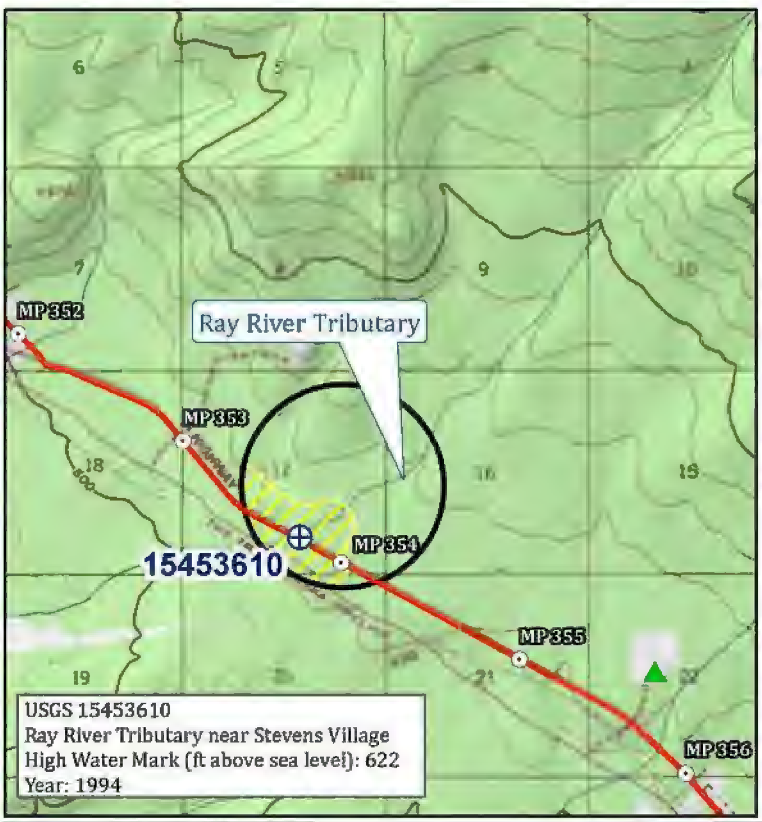
0 0.5 1 Miles

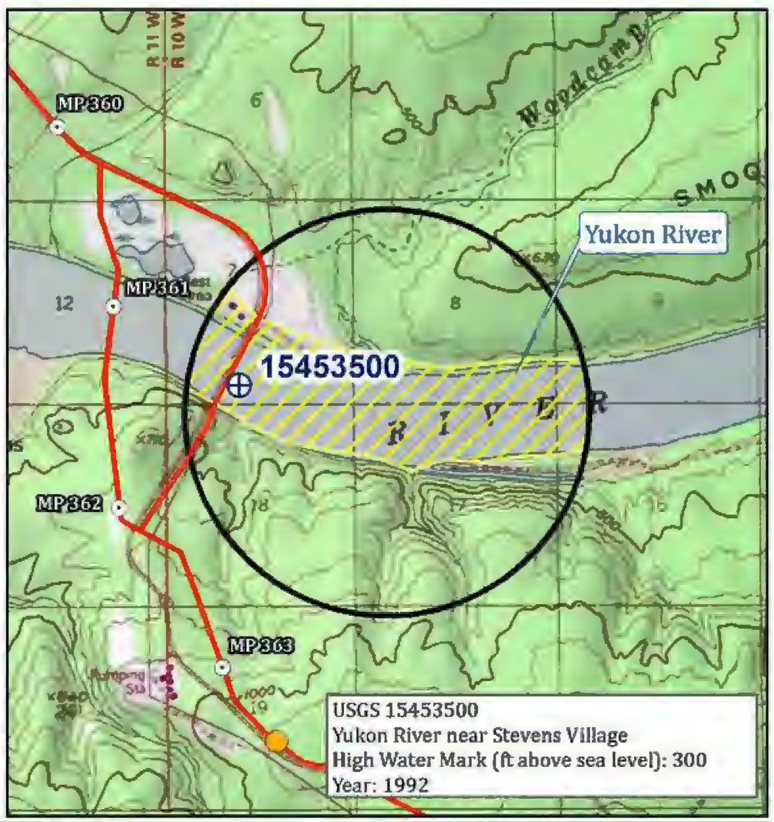
May 2012

NAD 1983 State Plane Alaska









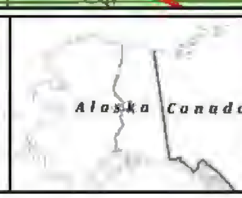
Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

High Water Marks

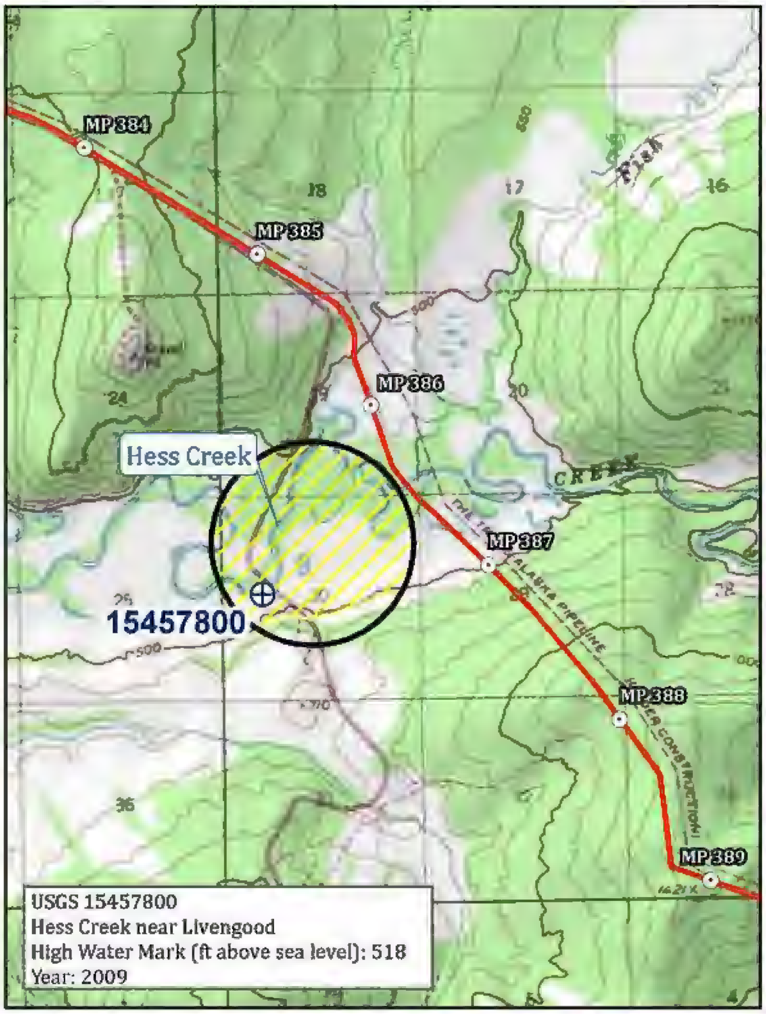
Interior Yukon Subregion

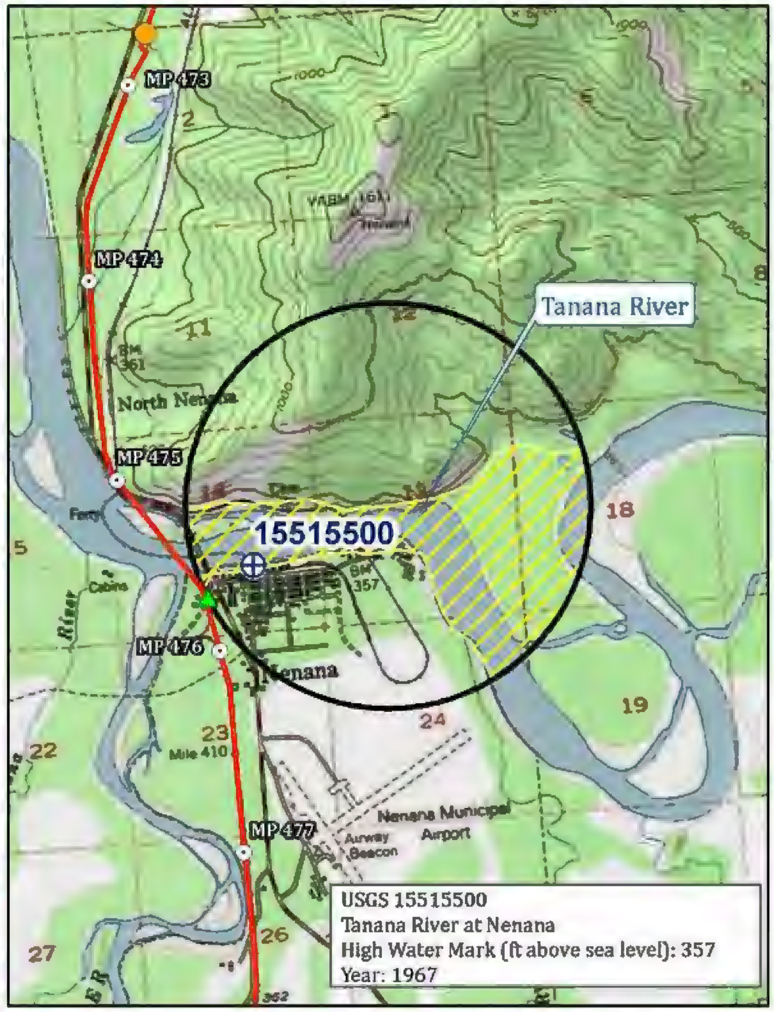
0 0.5 1 Miles

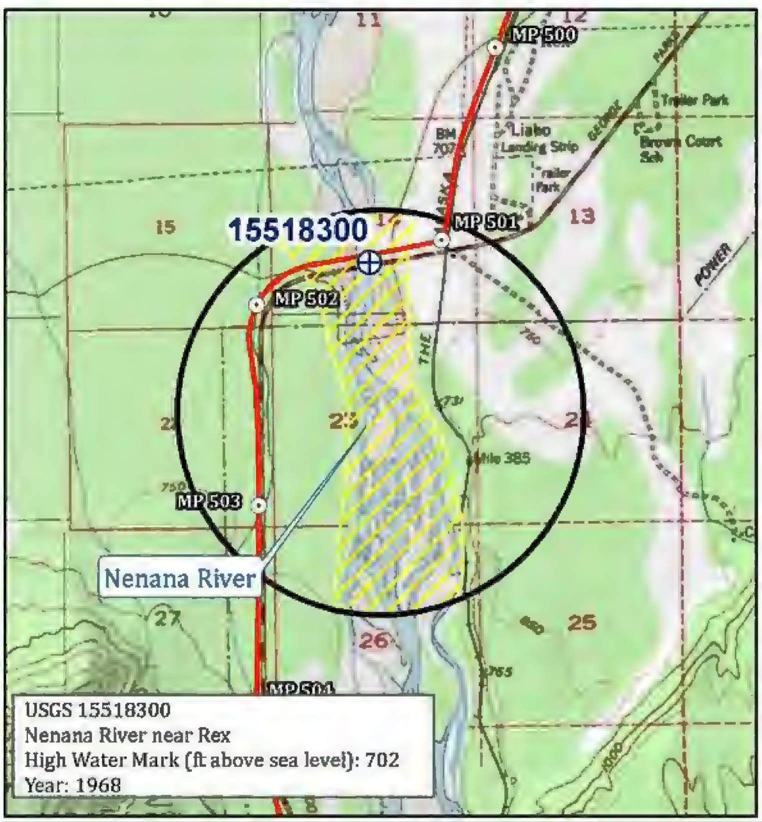


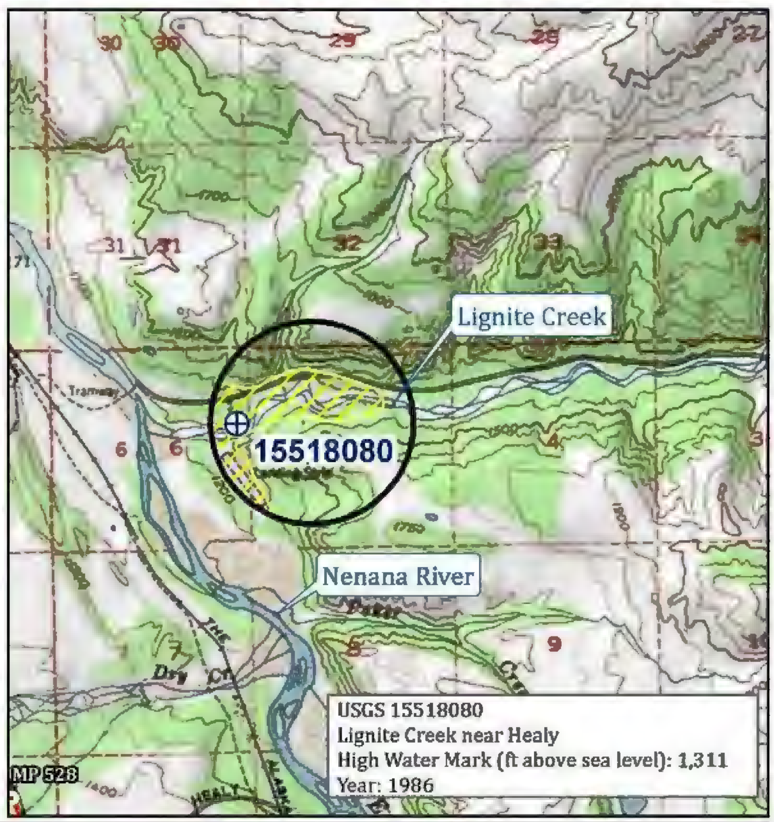
May 2012

NAD 1983 State Plane Alaska









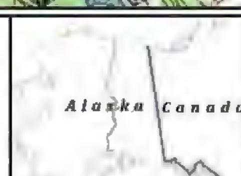
Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

High Water Marks

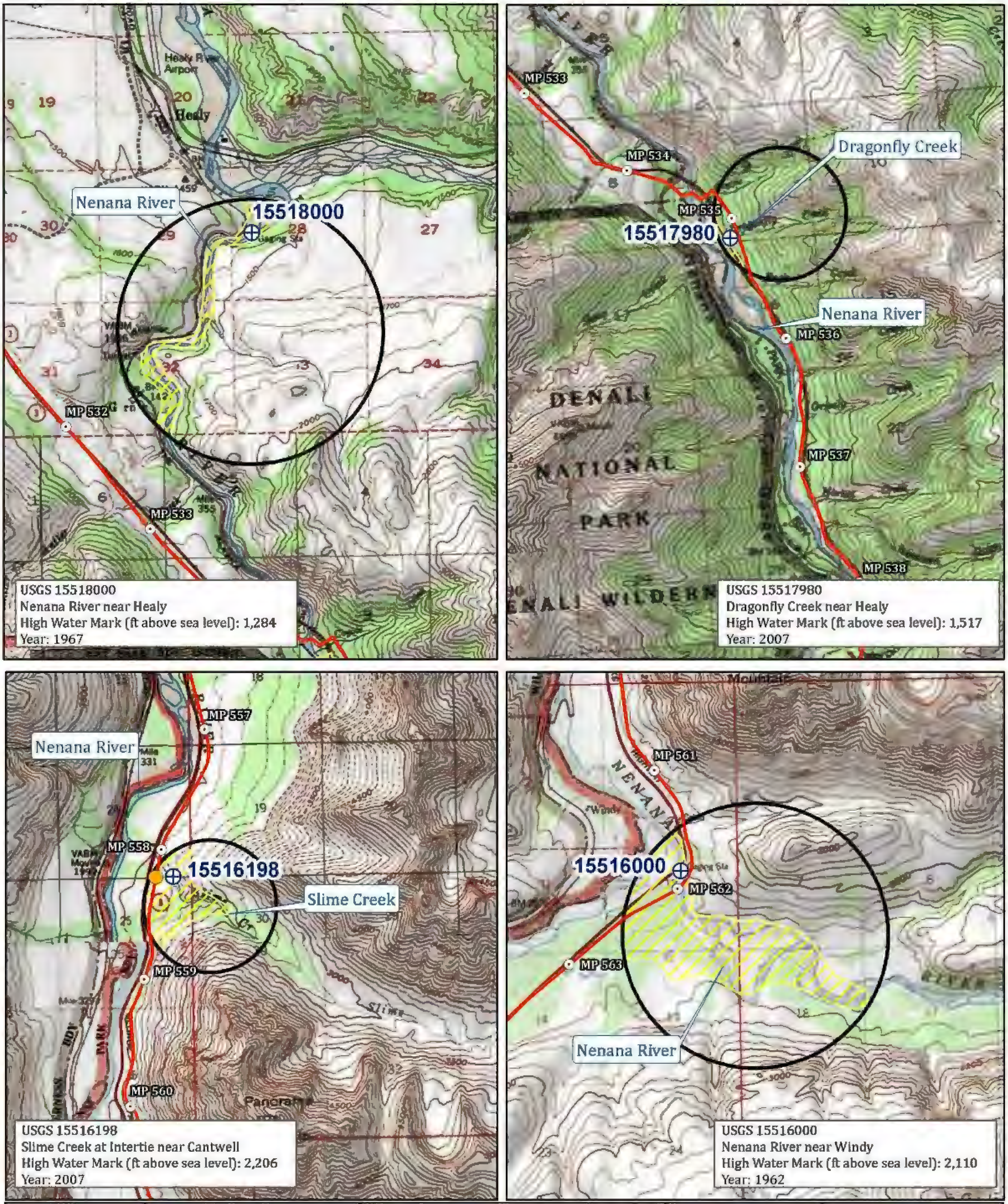
Interior Yukon Subregion

0 0.5 1 Miles



May 2012

NAD 1983 State Plane Alaska



Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

High Water Marks

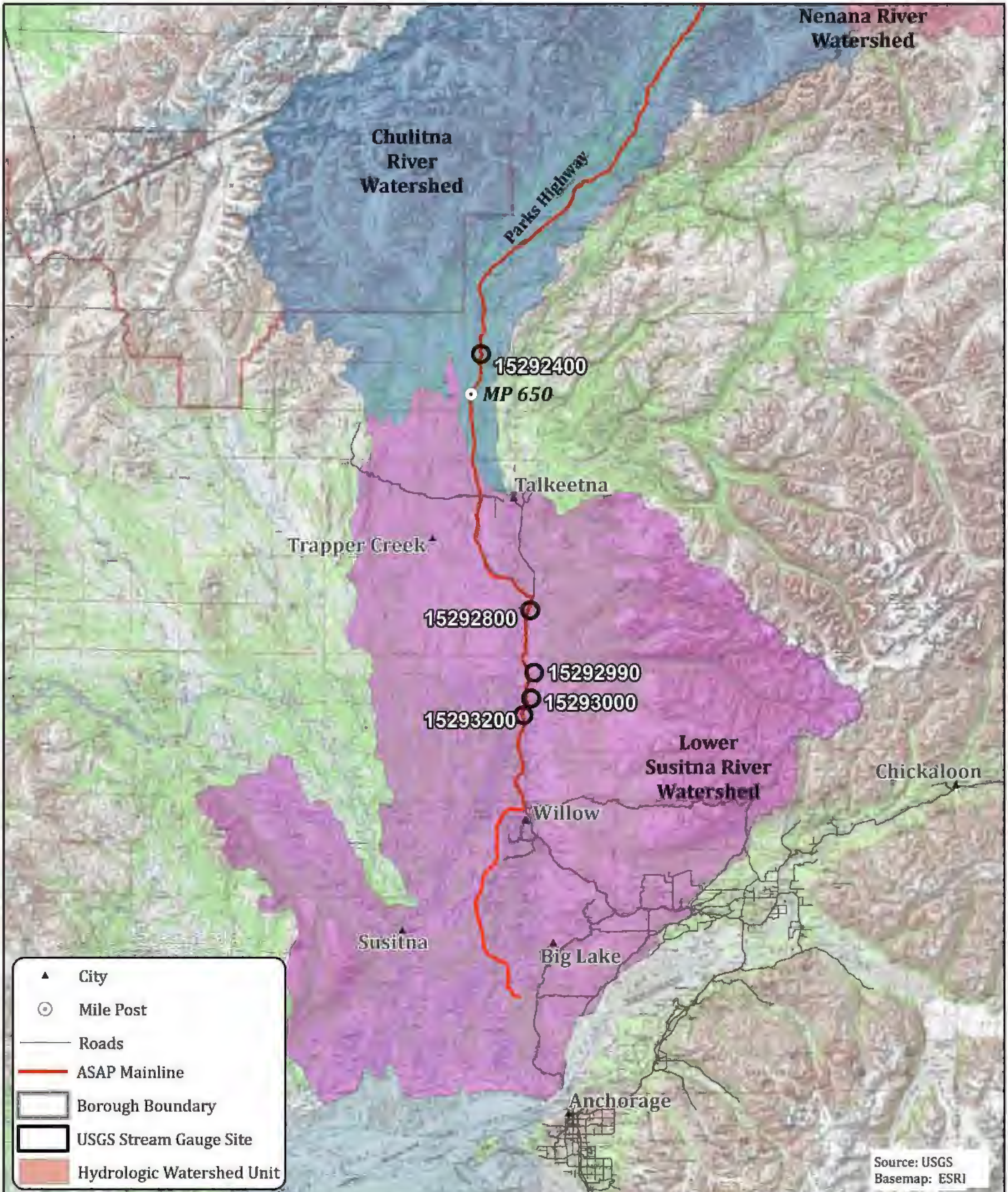
Interior Yukon Subregion

0 0.5 1 Miles

Alaska Canada

May 2012

NAD 1983 State Plane Alaska



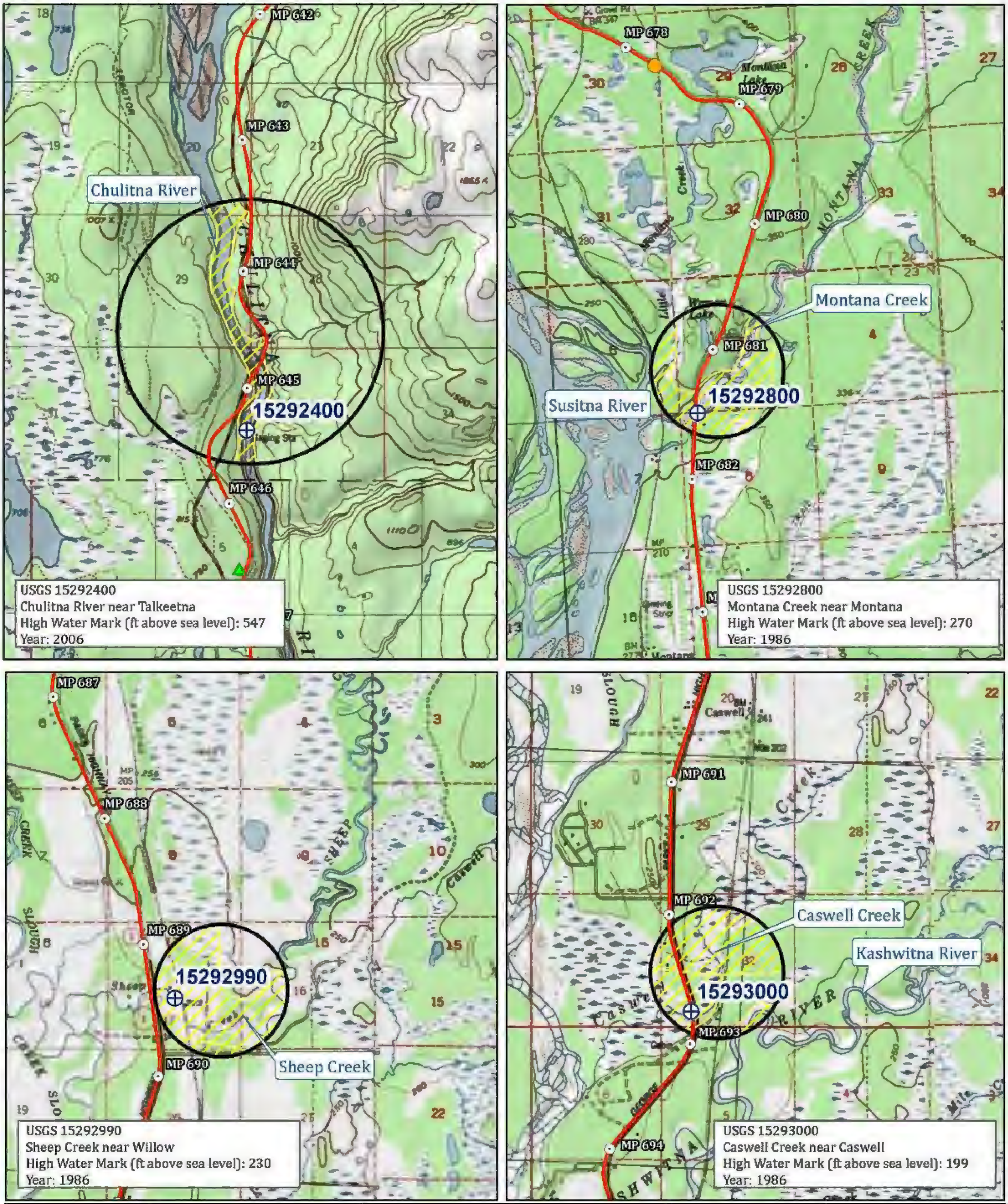
Alaska Stand Alone Gas Pipeline
High Water Mark Index

0 10 20 Miles

Alaska Canada

May 2012

NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX Inc expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

High Water Marks

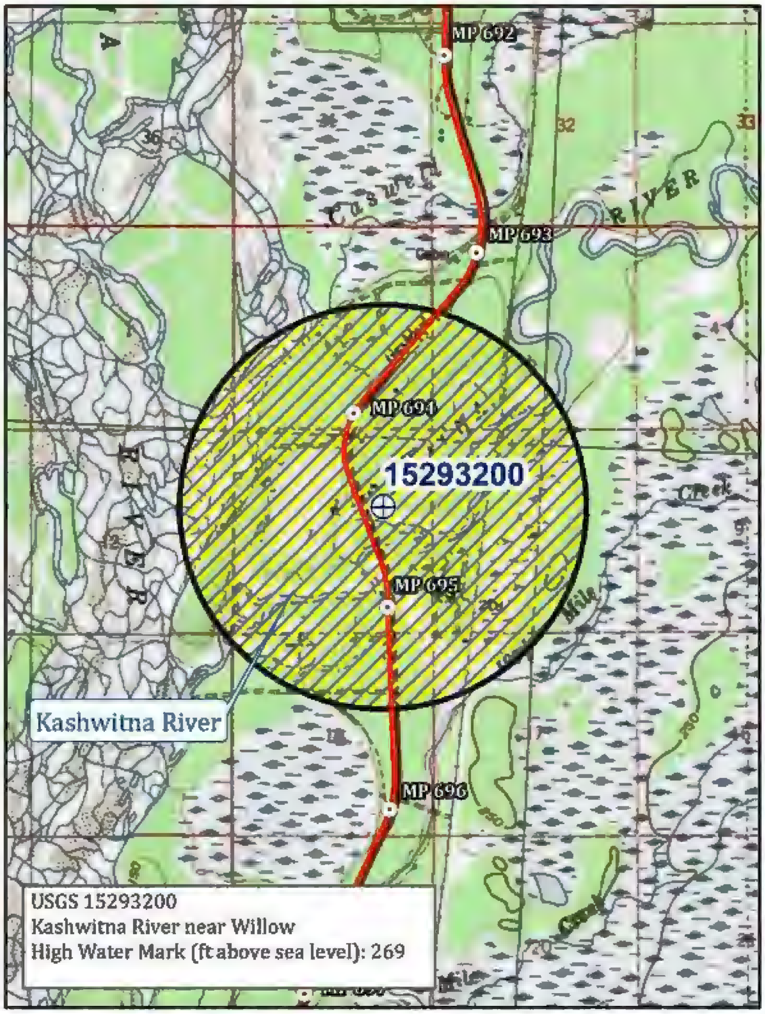
South Central Subregion

0 0.5 1 Miles

Alaska Canada

May 2012

NAD 1983 State Plane Alaska



Block Valve
USGS Stream Gage
Camp Laydown
ASAP Mainline
Mile Post
High Water Mark
1 & 2 Mile Diameter Buffer

Alaska Stand Alone Gas Pipeline

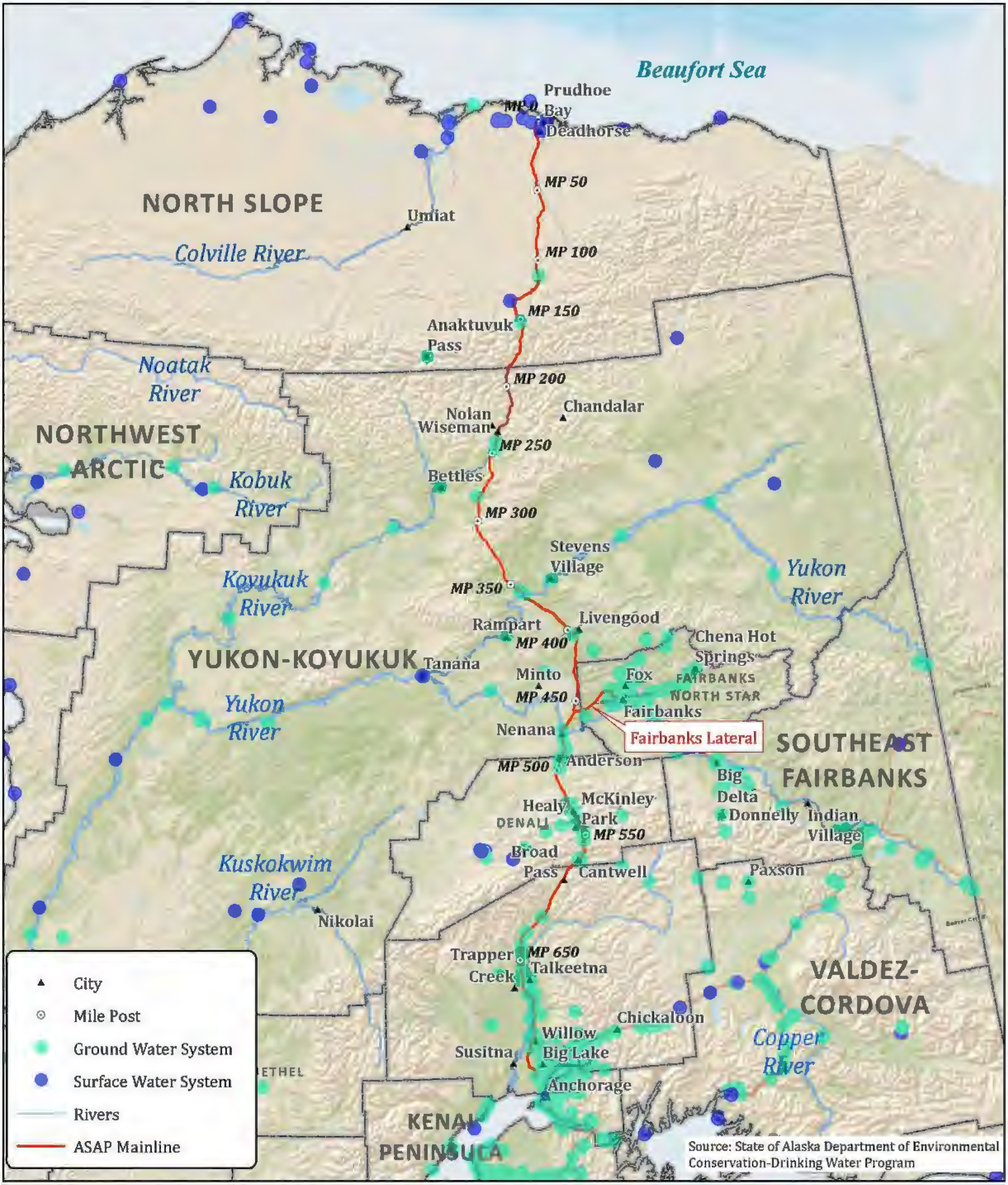
High Water Marks

South Central Subregion

0 0.5 1 Miles

May 2012

NAD 1983 State Plane Alaska



This map and all data contained within are supplied as is with no warranty. Cardno ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Alaska Stand Alone Gas Pipeline
Drinking Water Protection Areas

0 50 100 Miles

May 2012

NAD 1983 State Plane Alaska

Appendix H

Mitigation Measures

Applicant proposed mitigation measures are included in Section 5.23 of the Final EIS and can also be viewed on the Project website at www.asapeis.com

Appendix I

Affects Determination

Biological Assessment

Biological Opinion

Section 7 Letter of Concurrence

ALASKA STAND ALONE GAS PIPELINE/*ASAP*

Biological Assessment

May 2011

Alaska Gasline Development Corporation
P.O. Box 101020
Anchorage, AK 99510

NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PART OF AN APPLICATION FOR A PIPELINE EASEMENT. AGDC MAKES NO REPRESENTATION OR WARRANTY THAT THIS EASEMENT WILL BE GRANTED OR THAT ANY PIPELINE WILL BE AUTHORIZED. ANY ACTION TAKEN OR NOT TAKEN OR EXPENDITURE MADE BY ANY PERSON BASED ON THE INFORMATION INCLUDED HEREIN IS AT HIS OWN RISK AND RESPONSIBILITY AND NO LIABILITY SHALL ARISE AGAINST AGDC AS A CONSEQUENCE THEREOF.

Table of Contents

Tables

Figures

Appendices

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ACP	Arctic Coastal Plain
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities
AES	ASRC Energy Services Alaska, Inc.
AEWC	Alaska Eskimo Whaling Commission
AGDC	Alaska Gasline Development Corporation
AOOS	Alaska Ocean Observing System
ARRC	Alaska Railroad Corporation
ASAP	Alaska Stand Alone Gas Pipeline
ASME	American Society of Mechanical Engineers
BA	Biological Assessment
BACT	Best Available Control Technology
BLM	U.S. Department of Interior, Bureau of Land Management
BMP	best management practices
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOWFEST	Bowhead Whale Feeding Ecology Study
BP	British Petroleum
bscfd	billion standard cubic feet per day
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	carbon dioxide

CO_2 eq	CO_2 equivalent
CS	compressor station
Delta	Yukon-Kuskokwim Delta
DNP&P	Denali National Park and Preserve
DPS	distinct population segment
EDPS	Eastern distinct population segment
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FLIR	forward-looking infrared
FR	Federal Register
GCF	gas conditioning facility
GHG	greenhouse gas
GIS	geographic information systems
H_2S	hydrogen sulfide
HAPs	Hazardous Air Pollutants
HB	House Bill
HDD	horizontal directional drilling
Hz	hertz
IPCC	Intergovernmental Panel on Climate Change
ITR	incidental take regulations
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
LOA	letter of authorization
MLV	mainline valve

MMBtu	million British thermal units
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MMscfd	million standard cubic feet per day
MP	milepost
N/A	not applicable
N_2O	Nitrous Oxide
NEPA	National Environmental Policy Act
NGL	natural gas liquids
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	Criteria Pollutants
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NSB	North Slope Borough
NWT	Northwest Territories
O&M	operations and maintenance
OC	organochlorine
OCS	Outer Continental Shelf
PAH	poly-aromatic hydrocarbons
PCE	primary constituent elements
POD	Plan of Development, Rev. 1
POP	Persistent organic pollutants
ROW	right-of-way
SB	Southern Beaufort Population

SPCC	spill prevention control and countermeasure
SPCO	State Pipeline Coordinator Office
SWPPP	Storm Water Pollution Prevention Plan
TAPS	Trans-Alaska Pipeline System
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VSM	vertical support members
WDPS	Western distinct population segment

THIS PAGE INTENTIONALLY LEFT BLANK

1.0 EXECUTIVE SUMMARY

Pursuant to House Bill (HB) 369 passed by the Alaska Legislature in July 2010, the Alaska Gasline Development Corporation (AGDC) has initiated federal permitting processes for the Alaska Stand Alone Gas Pipeline/***ASAP*** (ASAP), including application for a Clean Water Act § 404 permit from the U.S. Army Corps of Engineers (USACE), and a federal grant and state lease for the respective federal and state portions of the associated ASAP right-of-way. By agreement among the stakeholder federal agencies, USACE has been designated the lead federal agency for the ASAP Environmental Impact Statement (EIS) process being undertaken pursuant to the National Environmental Policy Act (NEPA). The ASAP EIS cooperating agencies are the U.S. Environmental Protection Agency (EPA), the U.S. Department of Interior, Bureau of Land Management (BLM) and the National Park Service (NPS), and the Alaska Pipeline Coordinator's Office (SPCO). USACE has initiated consultation regarding the ASAP project under Section 7 of the Endangered Species Act (ESA) with both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (collectively, the Services). AGDC, acting through ASRC Energy Services Alaska, Inc. (AES) has been designated as the Non-Federal Representative, and has prepared this draft biological assessment (BA) for USACE's review.

As described in more detail in Section 2.0 of this BA and the applicant's Plan for Development, Rev. 1 (POD), the ASAP entails construction and operation of (i) a 737-mile, 24-inch-diameter mostly buried natural gas pipeline extending from Prudhoe Bay on the North Slope of Alaska to a connection point at milepost (MP) 39 of the existing ENSTAR Beluga Pipeline near Wasilla, Alaska, (ii) a 35-mile, 12-inch-diameter lateral pipeline spur from MP 458 of the ASAP to Fairbanks, and (iii) associated surface facilities. Construction activities include the transport of materials via barge through the Port of Seward and the Port of Anchorage to West Dock located on the North Slope. Accordingly, the action area addressed in this BA encompasses both the pipeline and surface facilities' construction and operations right-of-way, and port facilities and areas involved in transportation of construction materials.

The ASAP action area encompasses areas occupied by ESA-listed threatened and endangered species, designated critical habitat areas, and areas occupied by ESA candidate and proposed species. Table 1.0-1 provides a list of the species addressed in this BA, their ESA status and the action agency's initial effects determination.

TABLE 1.0-1 POTENTIALLY AFFECTED SPECIES AND CRITICAL HABITAT

Agency	Common Name	Scientific Name	Federal Status	Determination of Effect
USFWS	Spectacled Eider	*Somateria fischeri*	Threatened	Likely to adversely affect
	Steller's Eider	*Polysticta stelleri*	Threatened	Likely to adversely affect
	Polar Bear	*Ursus maritimus*	Threatened	Likely to adversely affect
	Polar Bear Critical Habitat	N/A	N/A	Likely to adversely affect
	Pacific Walrus	*Odobenus rosmarus divergens*	Warranted but Precluded	May affect, but not likely to adversely affect
NMFS	Bowhead Whale	*Balaena mysticetus*	Endangered	May affect, but not likely to adversely affect
	Fin Whale	*Balaenoptera physalus*	Endangered	May affect, but not likely to adversely affect
	Humpback Whale	*Megaptera novaengliea*	Endangered	May affect, but not likely to adversely affect
	Cook Inlet DPS Beluga Whale	*Delphinapterus leucas*	Endangered	May affect, but not likely to adversely affect
	Cook Inlet DPS Beluga Whale Critical Habitat	N/A	N/A	No effect
	Steller Sea Lion	*Umatopias jubatus*	Threatened	May affect, but not likely to adversely affect
	Ringed Seal	*Phoca hispida*	Proposed	May affect, but not likely to adversely affect
	Bearded Seal	*Erignathus barbatus*	Proposed	May affect, but not likely to adversely affect

In general, the vast majority of the proposed pipeline and associated surface facilities will not effect ESA-listed or ESA-proposed species and critical habitat. The potential for effects on species or critical habitat are limited to the polar bear and polar bear critical habitat, and to two eider species, and pertain to either port areas, through which ASAP construction materials will be transported, or to nearshore activities adjacent to the Beaufort Sea on the North Slope of Alaska.

2.0 PROJECT DESCRIPTION

The proposed project is a 24-inch-diameter natural gas pipeline with a natural gas flow rate of 500 million standard cubic feet per day (MMscfd) at peak capacity. The proposed pipeline will be buried except from MP 0 to 6, and at elevated-bridge stream crossings, compressor stations, possible fault crossings, pigging facilities, and off-take valve locations. The pipeline system will be designed to transport a highly-conditioned natural gas highly-enriched in non-methane hydrocarbons (i.e., natural gas liquids [NGLs]).

The purpose of the project is to provide a long-term, stable supply of up to 500 MMscfd of natural gas and NGLs from North Slope gas fields to markets in Fairbanks and Cook Inlet areas by 2016.

The routing of ASAP is from Prudhoe Bay following the Trans Alaska Pipeline System (TAPS) and Dalton Highway corridors, generally paralleling the highway corridor from the North Slope to near Livengood, northwest of Fairbanks. At Livengood, the pipeline route heads south, joining the Parks Highway corridor west of Fairbanks near Nenana. From there it continues south and terminates at MP 737. The ASAP will connect to ENSTAR's existing natural gas distribution system at MP 39 of the Beluga Pipeline near Wasilla. A lateral pipeline to Fairbanks (Fairbanks Lateral) will take off from the main pipeline just a few miles north of Nenana at Dunbar. The Fairbanks Lateral will travel northeast to Fairbanks, a distance of approximately 35 miles. Figure 2.0-1 provides the ASAP route overview.

2.1 *Primary Project Components*

The primary structures, facilities, and related project components are listed below.

Pipeline

- The 24-inch-diameter mainline is 737 miles in length.
- The 12-inch-diameter Fairbanks Lateral pipeline is 35 miles in length and will tie-in with the main pipeline at MP 458 of the ASAP.

Gas Conditioning Facility

- A 70-acre gas conditioning facility (GCF) will be located on the North Slope at Prudhoe Bay to provide conditioning necessary to remove carbon dioxide (CO_2), hydrogen sulfide (H_2S) and other impurities from the source gas stream.
- Natural gas will be obtained from the existing Central Gas Facility located approximately 1,000 feet north of the planned GCF.

Compressor Stations

- A maximum of two compressor stations will be required. Design optimization may allow construction using a single compressor station.
- Gas turbine-driven centrifugal compressors are proposed.
- Propane-cycle gas-chiller plants will be installed at compressor stations located north of Minto Flats.
- There will be two gas-turbine-driven electric-power generators per station.
- Each compressor station site will be on a gravel pad.
- Compressor station sites will be fenced.

Straddle and Off-Take Facility

- The Straddle and Off-Take Facility will be located at the Fairbanks Lateral Tie-In at MP 458 near Dunbar.
- The Straddle and Off-Take Facility will separate natural gas liquids (NGL[s]) from the gas stream to Fairbanks, providing 60 MMscfd of utility-grade gas to Fairbanks. NGLs extracted from the gas stream to Fairbanks will be re-injected into the main pipeline.
- A custody transfer gas metering station will be collocated with the Straddle and Off-Take Facility.

Cook Inlet NGL Extraction Facility and Terminus

- The Cook Inlet NGL Extraction Facility and Terminus will be located at MP 737. It will connect at MP 39 of the ENSTAR Beluga Pipeline.
- The Cook Inlet NGL Extraction Facility will separate NGLs from the gas stream and inject utility-grade gas into the ENSTAR Beluga pipeline. NGLs extracted from the gas stream will be sold separately.
- A custody transfer gas metering station will be collocated with the Cook Inlet NGL Extraction Facility and Terminus.

Other Permanent Facilities

- Mainline block valves will be set at a maximum of every 20 miles. It is expected that 30 mainline block valves and two valves along the Fairbanks Lateral will be required.
- A pig launcher will be located at the GCF. Pig launcher/receiver assemblies will be located at the compressor stations. A pig receiver will be located at the pipeline terminus. A pig launcher will be located at the tie-in for the Fairbanks Lateral and a receiver at the end of the alignment.
- Operation and maintenance (O&M) facilities will be located in Prudhoe Bay, Fairbanks, and Wasilla.

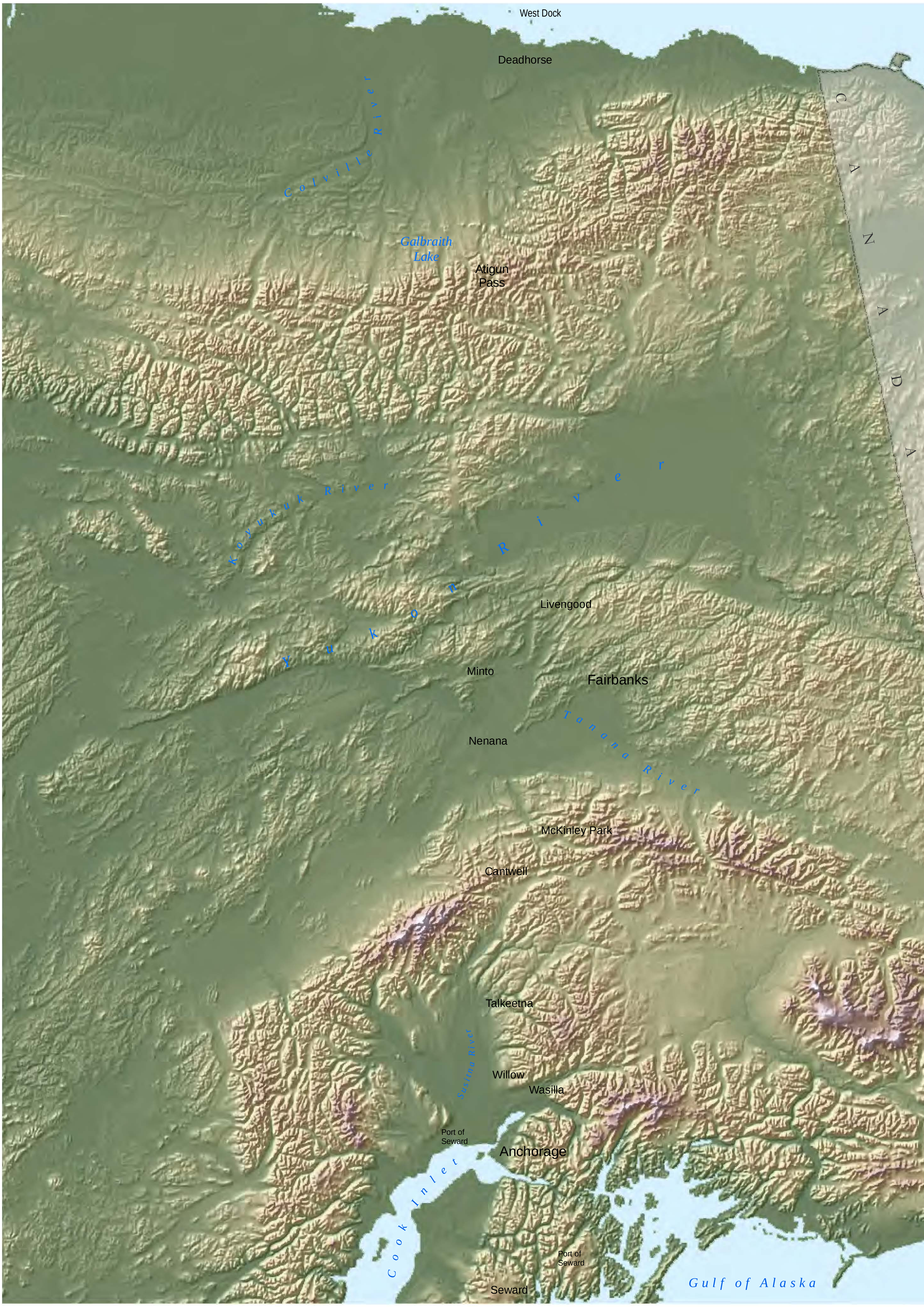
Material and Water Sources

- Material sites (gravel pits) will be distributed along the route to minimize hauling distances. Existing material sites will be used whenever possible.
- Water sources used for construction needs will be collected from surface water sources such as lakes and streams.

Construction Support Facilities

The facilities will include the following:

- Project Offices
- Logistics Support Sites
- Personnel Housing and Support
- Port Facilities
- Access Roads
- Construction Workpads (gravel, ice or snow, and grade)
- Laydown Yards and Storage Facilities
- Airports and Airstrips



Alaska Stand Alone Gas Pipeline Route

Fairbanks Lateral

Road

River

Town

PROJECT AREA OVERVIEW
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

SCALE: 0 30 60 120 Miles

FIGURE: 2.0-1

NAD83, Alaska Albers

AES-RTS: 11-001-001.mxd, 04/06/11, R00

A detailed description of the entire proposed project is provided in the POD published in March 2011, included here as Appendix B.

2.2 *Action Area and Scope of Biological Assessment*

The ASAP action area includes the complete 737-mile-long pipeline corridor and all associated facilities, existing port facilities in Alaska through which construction materials will be transported, and an area one-quarter-mile seaward from ship docking facilities at these port facilities. In order to focus efforts of this BA on the aspects of the proposed action that are likely to affect ESA species within the action area, the geographic areas evaluated focus on designated critical habitat or other portions of the action area where there is a likelihood of finding ESA-listed or ESA-proposed species. The northern portion of the action area is depicted in Figure 2.2-1. The southern portion of the action area for the Port of Anchorage is depicted in Figure 2.2-2 and the southern portion of the action area including the Port of Seward is depicted in Figure 2.2-3.

All of the ESA-protected species that may be affected by the ASAP are found exclusively in the marine environment or in nearshore areas. With the exception of the two eider species, all of these species are marine mammals (i.e., whales, walrus, seals, sea lions, and polar bear). Within the ASAP action area, the range for three species – Spectacled and Steller's eiders and the polar bear – includes both marine areas of the Beaufort Sea and terrestrial nearshore areas of the Arctic Coastal Plain (ACP) of Alaska's North Slope.

Critical habitat has been designated for the polar bear, Steller sea lions, spectacled and Steller's eiders, and Cook Inlet beluga whales. However, only portions of polar bear critical habitat and Cook Inlet beluga whale critical habitat are located within the ASAP action area.

Because of the concentration of ESA species and critical habitat within the ASAP action area on or adjacent to the ACP, a brief description of the proposed action occurring on the ACP and the adjacent Beaufort Sea is provided below.

2.2.1 Gas Conditioning Facility

The GCF will be located on the North Slope at Prudhoe Bay within an existing developed industrial area The GCF will remove CO_2, H_2S, and other impurities. NGLs (propane, butane, and pentanes) will be injected to enrich the gas, then compressed and cooled to maintain the existing thermal regime in permafrost soils, and injected into the proposed ASAP.

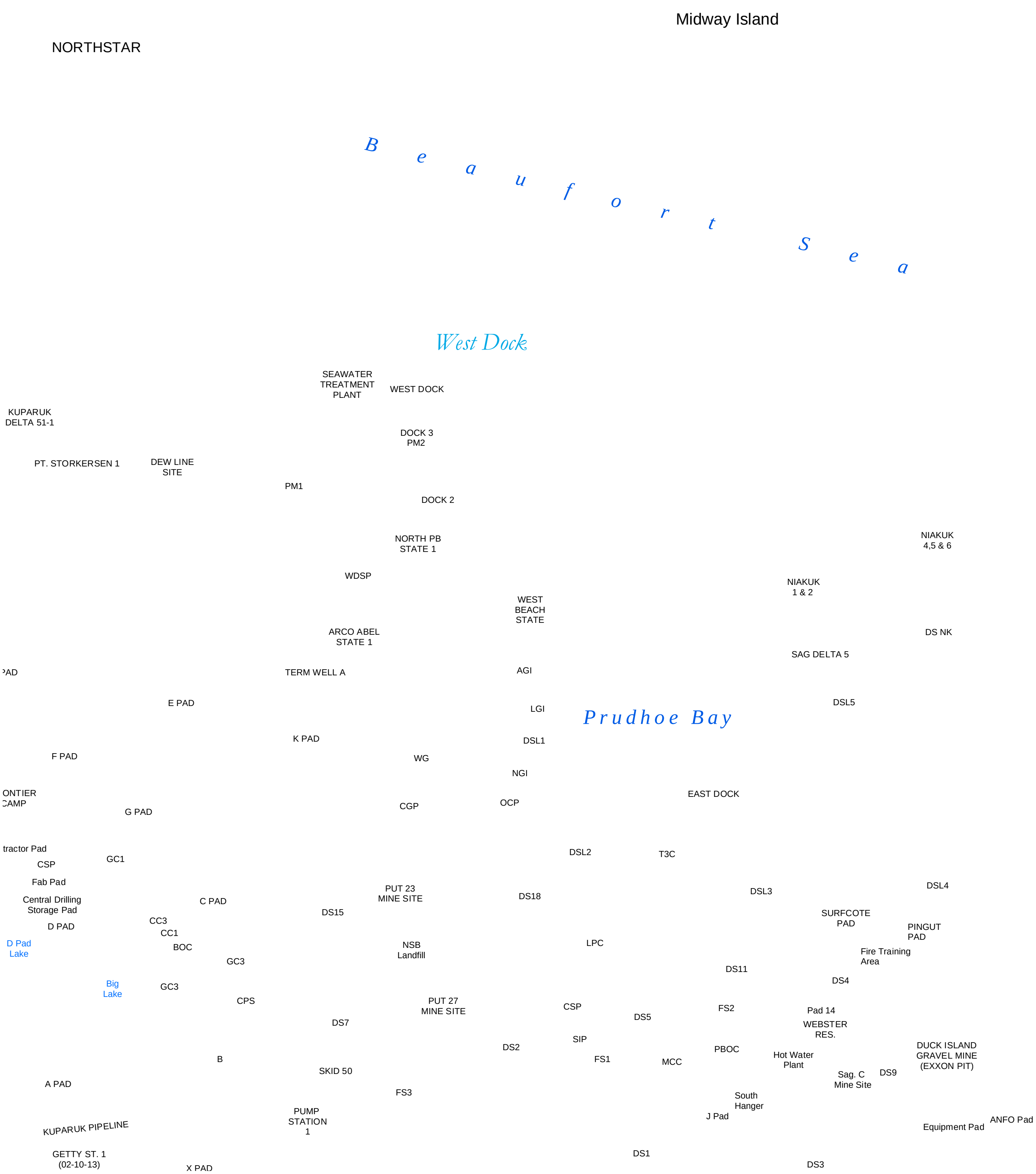
The GCF will be located on a 70-acre gravel pad and access to it will be via a permanent gravel road accessible from existing Prudhoe Bay roads. Module sections of the GCF will be transported to the facility site via barge to West Dock, then transported on existing roads and assembled on-site.

2.2.2 Aerial Pipeline Mode

The first six miles (MP 0–6) of the pipeline will be constructed aboveground on steel vertical support members (VSMs) spaced at approximately 20-foot increments at a minimum height of 7 feet above the tundra. This section of the pipeline is slated for winter construction. Once the necessary right-of-way (ROW) preparations have been made VSM locations will be surveyed, marked, and foundations drilled. Installation of VSMs will include standing and bracing the member, then backfilling around the VSM column with concrete slurry. Once VSMs have been installed, welded sections of pipe will be lifted and placed using sidebooms. Tie-ins will be accomplished in a manner similar to the remainder of the pipeline.

2.2.3 Buried Pipeline Mode

In general, the pipeline will be buried south of MP 6. The pipeline from MP 6 to the Atigun River Valley at MP 163 is slated for winter construction. The construction ROW will be cleared to remove vegetation and graded. Sections of pipe will be hauled from storage yards and distributed along the construction ROW, strung and placed into a trench, and the trench backfilled.



Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

NORTHERN PORTION OF THE ACTION AREA
WEST DOCK
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

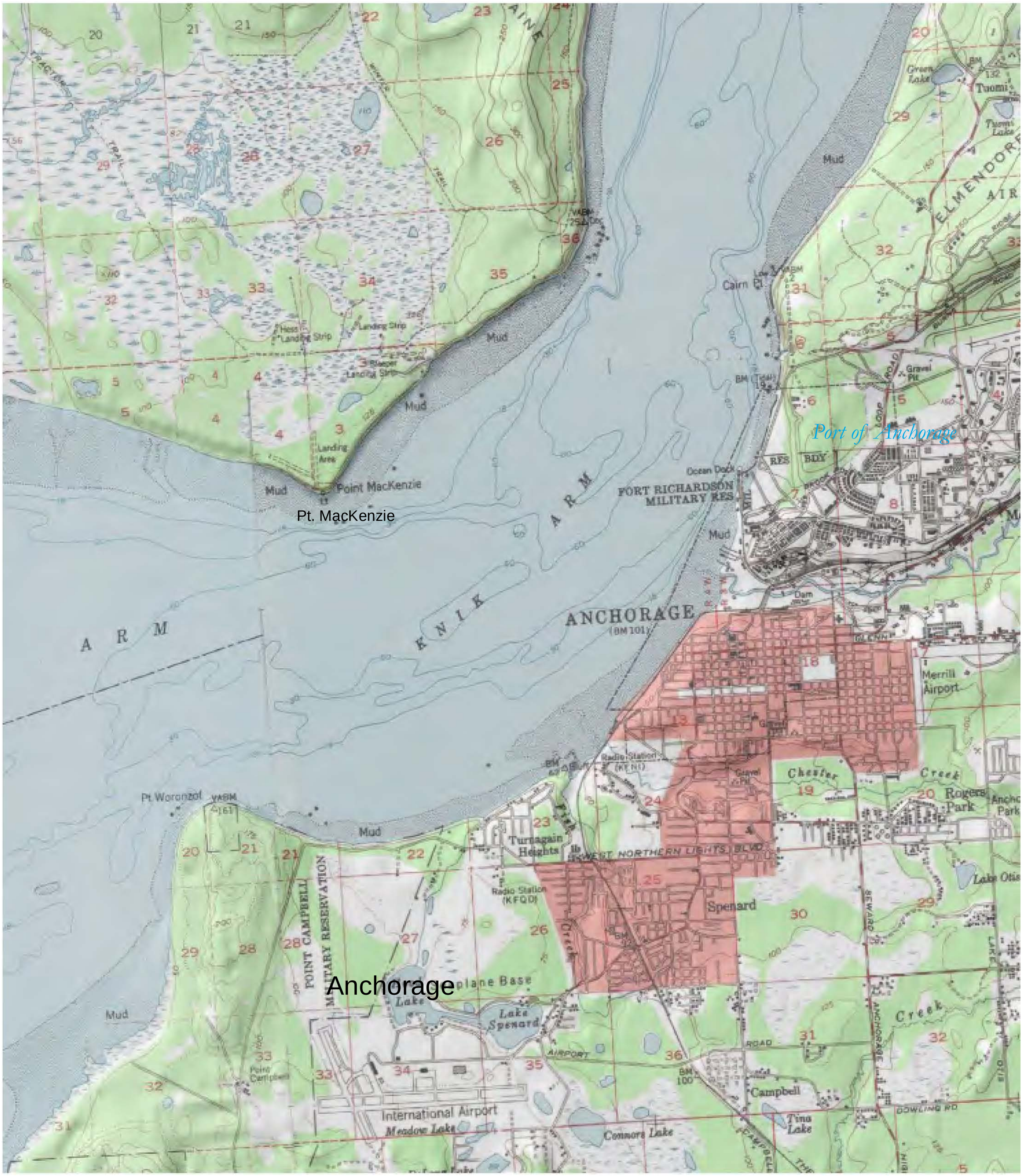
SCALE:
0 0.7 1.4 2.1 2.8
Miles

FIGURE:
2.2-1

NAD83, Alaska Albers

AES-RTS: 11-001-002.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK



Alaska Stand Alone Gas Pipeline Route

Port of Anchorage

NAD83, Alaska Albers

ALASKA GASLINE DEVELOPMENT CORP.
GAS FOR ALASKANS

SOUTHERN PORTION OF THE ACTION AREA
PORT OF ANCHORAGE
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

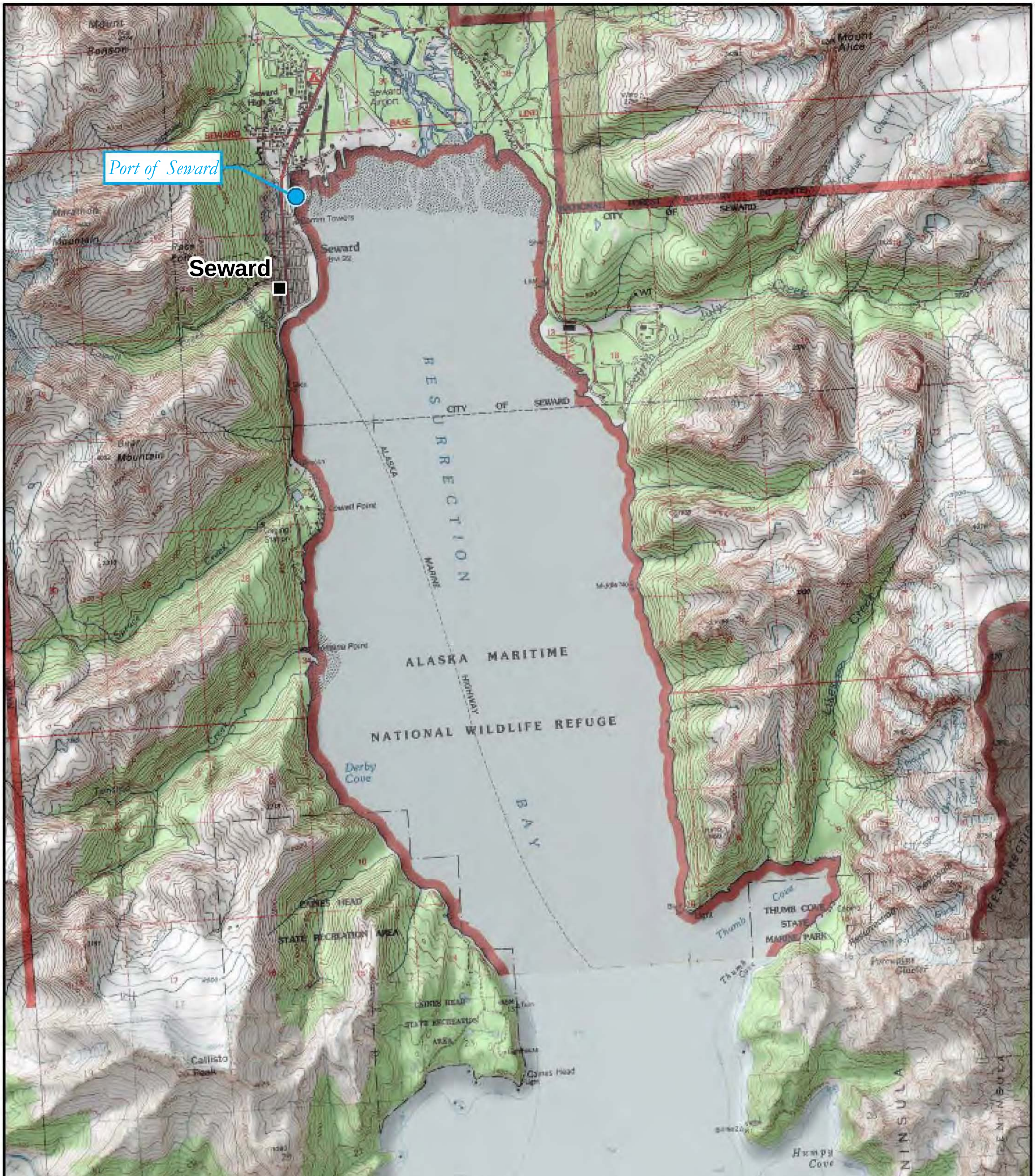
ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

SCALE: 0 0.5 1 1.5 Miles

FIGURE: 2.2-2

AES-RTS: 11-001-003.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK



Port of Seward

NAD83, Alaska Albers

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

ALASKA GASLINE DEVELOPMENT CORP.
GAS FOR ALASKANS

SOUTHERN PORTION OF THE ACTION AREA
PORT OF SEWARD
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

SCALE: 0 0.5 1 1.5 2 Miles

FIGURE: 2.2-3

AES-RTS: 11-001-014.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

3.0 DESCRIPTION OF THE SPECIES AND THEIR HABITATS

The species and critical habitats discussed in this BA are those identified as a result of a USACE-initiated consultation with USFWS and NMFS. On 2 November 2010, the USACE forwarded letters to USFWS and NMFS that described the ASAP project, including action area, and requested a list of threatened and endangered species and critical habitat that may be present.

The USFWS responded with a letter dated 17 December 2010, stating that the project is within the range of the spectacled eider (*Somateria fischeri*), Steller's eider (*Polysticta stelleri*), and polar bear (*Ursus maritimus*), and that critical habitat for the polar bear was designated on 7 December 2010, which includes sea ice habitat, denning habitat, terrestrial denning habitat, and barrier island habitat. Since the receipt of the USFWS's letter, on 8 February 2011, the Pacific walrus was designated a candidate species based on the USFWS's determination that the Pacific walrus warrants protection under the ESA, but that its listing is currently precluded by limited agency resources and higher priorities. Accordingly, this BA addresses Pacific walrus, which may seasonally occur in very small numbers in the ASAP action area.

The NMFS responded with a letter dated 10 December 2010, stating that bowhead whales may be found in or adjacent to the action area near West Dock and that their presence would be considered seasonal or occasional occurrences. NMFS further stated that Cook Inlet beluga whales (*Delphinapterus leucas*), fin whales (*Balaenoptera physalus*), humpback whales (*Megaptera novaengliae*), and Steller sea lions (*Eumetopias jubatus*) may be found in or adjacent to portions of the action area in Cook Inlet, near Anchorage, and that fin whales, humpback whales, and Steller sea lions may be present in or adjacent to the action area around the Port of Seward. Although not identified in NMFS's species letter, the agency has proposed listing as threatened species, distinct population segments (DPSs) of bearded seals (*Erignathus barbatus*) and ringed seals (*Phoca hispida*) that occur in the Alaskan Arctic and that may be present in or adjacent to the action area near West Dock. In addition, NMFS has designated critical habitat for the Cook Inlet beluga whale that encompasses that portion of the ASAP action area located adjacent to the Port of Anchorage. Accordingly, this BA addresses potential effects on the proposed bearded and ringed seal DPSs, and to the Cook Inlet beluga whale critical habitat.

Descriptions of these species and critical habitats are provided below.

3.1 *Threatened and Endangered Species*

3.1.1 Steller's Eider

Biological Populations and Listing Status

The Steller's eider is a small sea duck with a Holarctic distribution in Russia and Alaska. Three distinct breeding populations are recognized: the Alaska breeding population, the Russian-Atlantic breeding population, and the Russian-Pacific breeding population. These breeding populations mix in wintering areas such as the Bering Sea.

USFWS was petitioned in December 1990 to list the Steller's eider as endangered under the ESA, and they concluded after a status review that listing the Steller's eider was warranted but precluded by higher listing priorities. Status of the species was subsequently reconsidered and USFWS concluded in August 1993 that available information did not support listing the species range-wide, but did support listing the Alaska-breeding population. Listing the species across its entire range was considered to be unwarranted because counts in 1992 indicated that at least 138,000 Steller's eiders wintered in southwest Alaska, and because indications of decline were based upon imprecise population size estimates. Although population size estimates for the Alaska-breeding population were also imprecise, it was clear that Steller's eiders had essentially disappeared as a breeding species from the Yukon-Kuskokwim Delta (Delta), where they had historically occurred, possibly in significant numbers.

On June 11, 1997, the Alaska-breeding population of the Steller's eider was listed as threatened based on the observed contraction in the breeding range in Alaska and the resulting increased vulnerability of the remaining breeding population to extirpation (Federal Register [FR] 62:31748–31757). Causes for the decline were not identified when the listing occurred; potential causes referenced included hunting, ingestion of lead shot, predation, and changes in the marine environment that may be affecting eider food resources, Causes of the decline are still poorly understood (USFWS 2002a). The Alaska-breeding population is the only population listed under the ESA.

Population Status, Trends, and Abundance

The current world population of Steller's eiders is estimated to be about 150,000 to 200,000 birds, but is thought to have declined by as much as 50 percent in the 1960s, 1970s and 1980s (ADFG 2011). Currently, most of the world's Steller's eiders nest in Russia, with the Alaskan breeding population being much smaller than the Russia population. The species has undergone near extirpation in western Alaska. It still breeds on the ACP (Dau et al. 2000), but populations may number as low as 1,000 birds. Mallek et al. (2007), reporting the results of 21 consecutive years of aerial surveys, provided estimates of breeding Steller's eiders on the ACP that ranged from 0 to 2,543 with an average of 631. Based on these aerial surveys, Larned et al. (2010) reported a positive growth rate of 1.010 percent annually for the North Slope subpopulation of Steller's eiders from 1992–2009, and 1.056 percent annually for 2001–2010.

Range

Range of the Steller's eider in the Pacific is indicated below in Figure 3.1-1. The nesting distribution for the Alaska breeding population of Steller's eider includes much of the ACP in Alaska. A very small population also nests in the Delta. The majority of sightings of nesting Steller's eiders observed during annual aerial surveys of breeding pairs of waterfowl (e.g. Mallek et al. 2007) since 1986, and eider breeding population surveys (e.g. Larned et al. 2006) conducted across the ACP annually since 1992, have occurred east of Point Lay and west of Prudhoe Bay, and within about 50 miles of the coast (USFWS 2002a). The largest concentrations of breeding Steller's eiders in Alaska are found in the Barrow area, which is considered to be the core of the nesting area (USFWS 2002a), east to the Colville River Delta (USFWS 2005). Steller's eiders winter in coastal waters along the Aleutian Islands, Kodiak Island, and lower Cook Inlet.

Life History and Habitat Use

Breeding pairs are formed on wintering grounds. The birds congregate in large numbers in estuaries along the north side of the Alaska Peninsula in the spring, and then migrate north and east to the breeding grounds using coastal waters and offshore leads (Roseneau and Herter 1984, USFWS 2002a). Steller's eiders begin migrating into the ACP in late May or early June, when ponds and tundra begin to thaw. Steller's eiders that have arrived on the North Slope but have not begun to nest are often associated with deep to shallow Arctophila and Carex ponds (Rojek 2006, 2007, 2008).

Nesting in the Barrow area began 10 June – 1 July in 2005, 2006, and 2007 (Rojek 2006, 2007, 2008). Nest sites are chosen in open tundra or within shrub communities near ponds (Deygtyarev et al. 1999), often on slightly elevated areas near ponds (Murie 1924, Brandt 1943, Cramp et al. 1977). USFWS reported that most observed nests in the Barrow area have been found on the rims of low-centered polygons within partially-drained lake basins that contain a mosaic of shallow ponds with emergent sedges, and most are within 330 feet of permanent water (unpublished data summarized in FR 65:13262–13283).

Figure 3.1-1 Range of the Steller's Eider in the Pacific

Source: USFWS 2002

Steller's eiders hatch in late June and the female and brood move from the nest site to brood habitat in nearby ponds and wetlands, where they feed on aquatic insects and plants until they are capable of flight (Solovieva 1997). In the Barrow area, hatching was determined to occur 12 July – 2 August in 2005, 2006, and 2007 and the distance traveled from the nest to the brooding area was found to range from 328 feet to 2 miles (Rojek 2006, 2007, 2008). Steller's eiders and their broods forage on insect larvae and beetle species in emergent vegetation in shallow ponds.

Females and their broods move to coastal marine waters as the broods fledge. Rojek (2006, 2007, and 2008) reported that broods are fledged in the Barrow area anywhere from the second half of August to early September. Males and unsuccessful hens leave the tundra earlier, being found at small ponds on the tundra nesting ground until the middle or end of July, at which time they move to coastal waters (Rojek 2006, 2007, 2008). In successful years, males move to nearshore waters prior to molting body feathers and forage prior to fall migration. Unsuccessful females may congregate near incubating females until departure (Solovieva 1997). In unsuccessful years, all birds generally depart the breeding grounds sometime in July (Fredrickson 2001) or even mid-June (Rojek 2008).

The birds move to molting areas in Western Alaska, such as the Alaska Peninsula, Izembek Lagoon, Nelson Lagoon, Port Heiden, and the Seal Islands (Petersen 1981). As sea ice forms in the Arctic Ocean, flocks move south through open leads and eventually arrive at ice-free lagoons along the north and south side of the Alaska Peninsula, Cook Inlet, and the eastern Aleutian Islands (USFWS 2005). Winter habitat consists of waters typically less than 30 feet deep, so most birds are found within about 1,312 feet of the shore, except where shallows extend further (USFWS 2002a). In these areas they dive for mollusks, crustaceans, small fish, and other invertebrates (Petersen 1981). These prey items are often associated with eelgrass meadows, which provide a substrate for invertebrates (Metzner 1993).

Critical Habitat

Approximately 2,830 square miles of land and coastal waters in five units were designated as critical habitat for the Alaskan breeding population of Steller's eiders in 2001 (FR 66:8849). These areas include the historic breeding range on the Delta (Unit 1), and molting or wintering grounds at the Kuskokwim Shoals (Unit 2), Seal Islands (Unit 3), Nelson Lagoon (Unit 4), and Izembek Lagoon (Unit 5). All designated critical habitat for Steller's eiders is located more than 100 miles from the action area.

Steller's Eiders in the Action Area

From late May through early September, Steller's eiders may be found within or near portions of the action area located on the ACP, and in coastal waters near West Dock in the Beaufort Sea (See Figure 3.1-2). All other portions of the action area, including other terrestrial portions of the action area, and coastal waters adjacent to the Ports of Anchorage or Seward are not within the range of the species according to published maps, and the eiders would not be expected to occur in these areas.

The USFWS conducted annual aerial population surveys for breeding pairs of waterfowl on the entire ACP, including the Prudhoe Bay area, from 1986–2006 (Mallek et al. 2007), and conducted separate aerial surveys in the same area specifically for eiders from 1992 to 2006 (Larned et al. 2006). Since 2007, the two survey programs have been combined (Larned et al. 2010). The action area lies within areas documented by these survey programs as having low densities of nesting or breeding eiders. Since 1986 these surveys have resulted in observations of only four pairs of Steller's eiders in the Prudhoe Bay area. The USFWS survey data also indicate a mean positive annual population growth rate for Steller's eiders on the North Slope over the last 20 years of 1.010 percent annually, but the trend estimate is not considered to be meaningful because it is based on so few observations (Larned et al. 2010).

Site-specific surveys for Steller's eider's have not been conducted in the action area for the ASAP. However, Troy and Johnson (1987) reported the results of intensive avian surveys conducted for shorebirds and waterfowl in the lagoon waters on either side of West Dock and on the adjacent tundra in July–September 1981 that were part of a monitoring study for the Prudhoe Bay waterflood project. No Steller's eiders were observed along transects in the lagoon waters, but one Steller's eider was observed on the tundra. It was also reported in the FR 62:31750 (citing Troy personal communication) that a few pairs of Steller's eiders were observed on the tundra in the Prudhoe Bay oil fields each year from 1992 to 1994.

Extensive aerial surveys of the bird use of nearshore and offshore waters extended from Barrow to the Canadian border and from the shoreline offshore for distances of up to 62 miles in 1991, 2000, and 2001 (Fischer and Larned 2004). Only three Steller's eiders were observed, representing about 0.01 percent of all observed birds. The observed Steller's eiders were in Smith Bay more than 100 miles to the west of the action area.

West
Dock

Beaufort Sea

Prudhoe
Bay

Prudhoe Bay

SEAWATER
TREATMENT
PLANT
WEST DOCK
DOCK 3
PM2
PM1
DOCK 2
NORTH PB
STATE 1
NIAKUK
4,5 & 6
WDSP
NIAKUK
1 & 2
WEST
BEACH
STATE
ARCO ABEL
STATE 1
DS NK
SAG DELTA 5
TERM WELL A
AGI
DSL5
LGI
Prudhoe Bay
K PAD
DSL1
WG
NGI
EAST DOCK
CGP
OCP
DSL2
T3C

Steller's Eider Densities:

Low
Medium Low
Medium
Medium High
High

Alaska Stand Alone Gas Pipeline Route
Pipeline
Road

Bird Density data source: U.S. Fish and Wildlife Service, Arctic Coastal Plain Survey 1993-2005.

NAD83, Alaska Albers Equal Area.

ALASKA GASLINE DEVELOPMENT CORP.
GAS FOR ALASKANS

STELLER'S EIDER DENSITY
ON THE EASTERN NORTH SLOPE
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

SCALE:
0 3 6 9 12
Miles

FIGURE:
3.1-2

AES-RTS: 11-001-005.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Threats

Toxic Contamination of Habitat

Lead poisoning from the deposition of lead shot in nearshore habitats is a threat to spectacled and Steller's eiders. Lead poisoning of spectacled eiders has been documented on the North Slope of Alaska. Use of lead shot for hunting all birds on the North Slope is prohibited. Hunter outreach programs are being conducted to educate hunters and prevent the use of lead shot on the North Slope. Development of the proposed project will not increase hunting of spectacled or Steller's eiders or the use of lead shot in the action area.

Increased Predator Populations

Predator and scavenger populations may be increasing on the North Slope near industrial development and human infrastructure. Increased fox, gull, and raven populations (due to anthropogenic food sources and increased denning and nest sites) may have affected eider populations, although this has not been proven (USFWS 2009a).

Harvest

Hunting for spectacled and Steller‘s eiders was closed in 1991, however harvest data indicates that listed eiders continue to be hunted on the North Slope. Efforts are being conducted by BLM, North Slope Borough and USFWS to curtail this activity. Much of this activity has taken place near Barrow and other villages, not in the project action area. Intra-service consultations for the Migratory Bird Subsistence Hunting Regulations are conducted annually and the harvest of listed eiders is being monitored.

Impacts from Development

Alteration of North Slope nesting habitat of listed eiders has not been extensive to date. Some areas of breeding habitat have been altered by wetland fill and human infrastructure that may disturb individual birds, increase nesting or denning predators, or present collision obstacles. However, human activities on the ACP are not thought to have played a significant role in population declines of listed eiders, and, accordingly, Steller's eiders were not listed as a result of the impacts of development. Development and other activities that may adversely affect listed eiders undergo a Section 7 consultation, and the amount of impact is estimated in order to issue an Incidental Take Statement and a non-jeopardy conclusion (USFWS 2009a).

Climate Change

The North Slope of Alaska is especially sensitive to climate fluctuations. How this will likely affect individual organisms, species, or communities is difficult to assess, due to the large number of variables affecting and affected by climate change. Lakes and ponds used by eiders for forage and nesting are affected by warmer temperatures and longer growing seasons. Changes in precipitation patterns, air and soil temperature, and water chemistry are also affecting tundra communities (Hinzman et al. 2005). The comprehensive effects of global climate change that will impact both the habitats of spectacled and Steller's eiders are unknown at this time (USFWS 2009a).

3.1.2 Spectacled Eider

Biological Populations and Listing Status

The spectacled eider *(Somateria fischeri)* is a sea duck that inhabits the northern extent of the Pacific Ocean in the Chukchi and Bering Seas. Three primary breeding populations have been identified, the Russian arctic population, the ACP of Alaska population, and the Delta population in western Alaska.

The spectacled eider was listed as threatened throughout its range under the ESA in 1993 (FR 58:27474). It is believed that large declines in the populations were due to exposure to lead shot, increased predation, and changes in forage quality in wintering areas of the Bering Sea (USFWS 2002a).

Populations Status, Trends, and Abundance

The world-wide population of spectacled eiders was estimated by Larned and Tiplady (1999) to be about 330,000–390,000 birds. This estimate was based on survey counts of birds wintering in the Bering Sea, and therefore presumably includes many non-breeding birds. It has been estimated that about 4,000 pairs nest annually in the Delta, another 3,000–4,000 pairs nest on the ACP, and perhaps 40,000 or more pairs nest in arctic Russia (USFWS 2009a). Populations in the Delta declined by about 96 percent in the 1970s, 1980s, and 1990s, to the present 4,000 pairs. Due to the scarcity of historical data, it is unknown whether such declines ever occurred in Russia or on the ACP. Current survey data suggest that the spectacled eider population on the ACP is generally stable (Larned et al. 2006).

Range

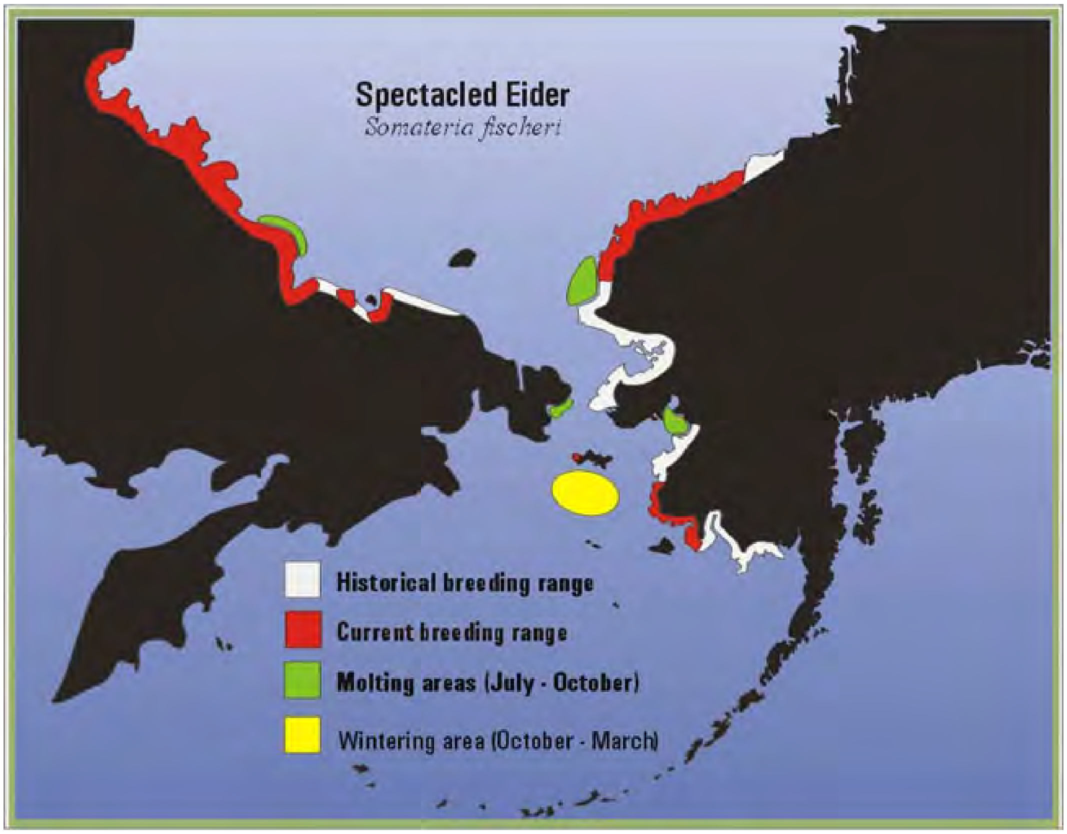
The range of the spectacled eider in the Pacific is indicated below in Figure 3.1-3. Although the historical nesting range was considerably larger, today spectacled eiders nest in three primary locations, the central coast of the Delta, the ACP of Alaska, and the eastern ACP of Russia (Petersen et al. 1999).

Nesting occurs on the ACP from about the Utukok River just south of Icy Cape, north and west to the Shaviovik River, and within this area most of the nesting takes place between Cape Simpson and the Sagavanirktok River (USFWS 2000), and primarily north of latitude of 70 degrees (USFWS 2000) or within about 50 miles of the coast (Larned and Balogh 1997).

Four principal molting areas have been identified: Ledyard Bay along the northeastern Chukchi Sea, Norton Sound in the northeastern Bering Sea, and Mechigmenskiy Bay and the Indigirka-Kolyma Delta in Russia. Most females from the North Slope molt in Ledyard Bay and Mechigmenskiy Bay, while the males molt in all three areas with about equal numbers molting at Ledyard Bay, Mechigmenskiy Bay, and the Indigirka-Kolyma Delta (Peterson et al. 1999).

The only known wintering area used by spectacled eiders is located in the Bering Sea south of Saint Lawrence Island, in water depths of 165–200 feet. Thousands of spectacled eiders are known to congregate in open areas in the pack ice in this area.

Figure 3.1-3 Range of the Spectacled Eider in the Pacific



Source: USFWS 2002

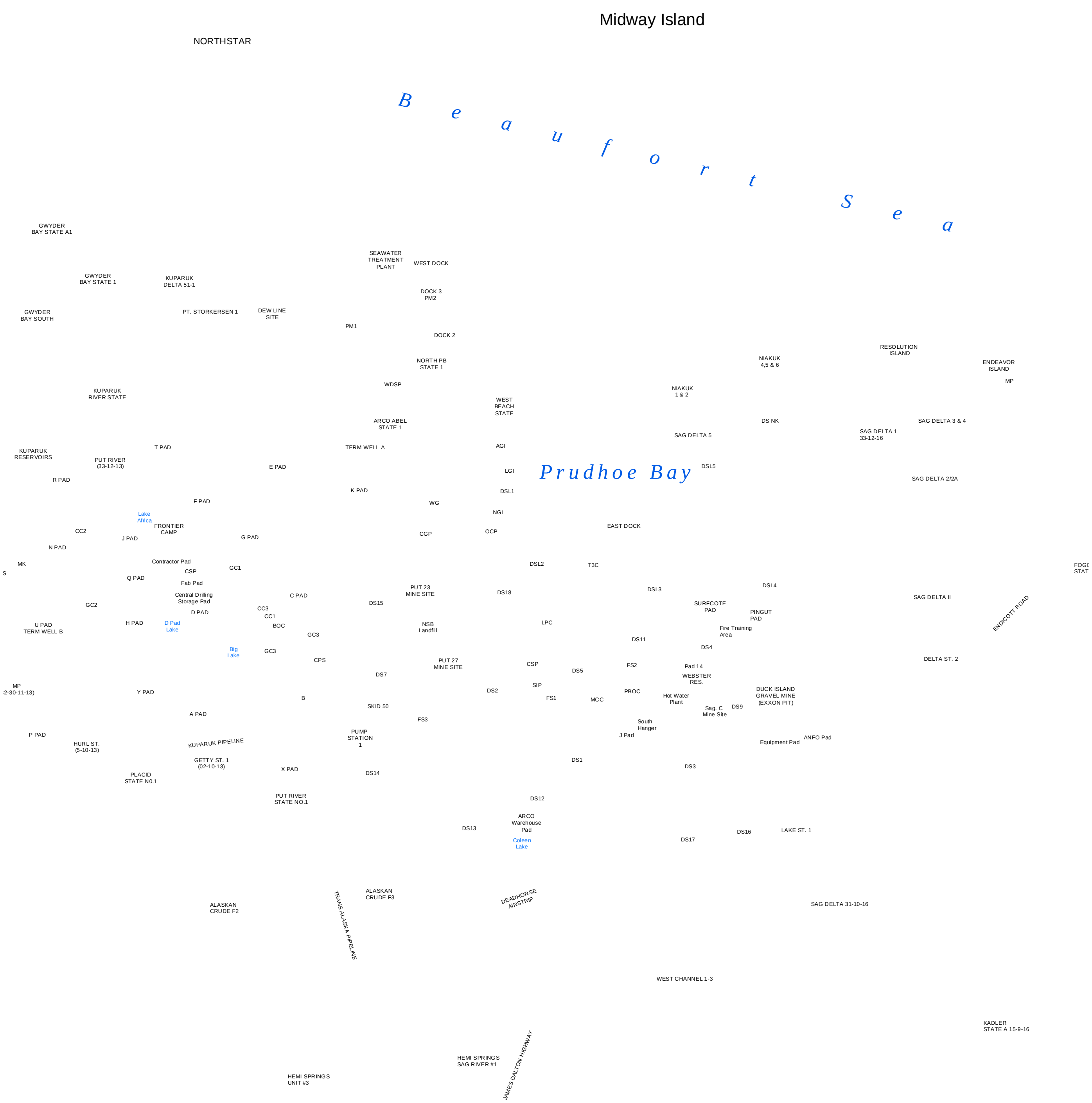
Life History and Habitat Use

Spectacled eiders spend most of their life in the marine environment where they dive to feed on bottom-dwelling prey such as mollusks, bivalves, and crustaceans (Petersen et al. 1998). These prey items are part of a benthic community that is highly variable, being influenced by seasonal and decadal weather systems in the North Pacific (Peterson and Douglas 2004; Grebmeier and Dunton 2000). This variability, coupled with the extreme energetic requirements of their habitats, may explain as much as 50 percent of winter mortality of female spectacled eiders (Flint et al. 2000).

Spectacled eiders return from wintering areas in the Bering Sea in late May or early June and nest in coastal wetlands near relatively shallow lakes and ponded areas dominated by emergent vegetation. Densities of spectacled eiders vary across the ACP, with larger densities west of the proposed action area (Figure 3.1-4). Surveys conducted since 1992 by the USFWS have recorded higher densities in recent years near Teshekpuk Lake. In the action area, the breeding population density of spectacled eiders is between 0.05 and 0.4 eiders per square mile (Larned et al. 2006).

Males depart the nesting grounds once females begin to incubate their clutch of eggs from mid- to late June. Depending upon breeding success, females will leave nesting areas between late June and early September (USFWS 2009a). As the annual sea ice forms, open water, or leads, provide molting and foraging habitat for spectacled eiders in northeast Russia and Ledyard Bay in the Chukchi Sea prior to winter migration (USFWS 2002a).

THIS PAGE INTENTIONALLY LEFT BLANK



Spectacled Eider Densities:

- Low
- Medium Low
- Medium
- Medium High
- High

Alaska Stand Alone Gas Pipeline Route
Pipeline
Road
Facility

Bird Density data source: U.S. Fish and Wildlife Service, Arctic Coastal Plain Survey 1993-2005.

NAD83, Alaska Albers Equal Area.

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

SPECTACLED EIDER DENSITY ON THE EASTERN NORTH SLOPE
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

SCALE: 0 1 2 3 4 Miles

FIGURE: 3.1-4

AES-RTS: 11-001-004.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

All three breeding populations congregate in a 3,000-square mile area south of St. Lawrence Island (Peterson and Douglas 2004; FR 66:9146).

Critical Habitat

Critical habitat for spectacled eiders was designated by the USFWS in 2001 (FR 66:9146) and comprises nesting habitat in the Delta, molting areas in Norton Sound and Ledyard Bay, and wintering habitat south of St. Lawrence Island (Figure 3.1-3). All designated critical habitat is located more than 400 miles from the action area.

Spectacled Eiders in the Action Area

Spectacled eiders may be present in or near the action area near the northern coast of Alaska and West Dock but are not expected near the action areas in Seward or Anchorage or along the pipeline corridor further than approximately 50 miles from the northern coast.

Surveys were conducted in offshore waters of the Beaufort Sea in order to determine the composition and distribution of birds in June, July, and August 1999–2001 (Fischer and Larned 2004). In 1999 and 2000 the area near West Dock at Prudhoe Bay was surveyed. Spectacled eider density was low throughout the entire survey area. In 2001, 15 spectacled eiders were seen between Prudhoe Bay and Barrow, and the density in the area encompassing West Dock was 0.0 (Fischer and Larned 2004).

Threats

Toxic Contamination of Habitat

Lead poisoning from the deposition of lead shot in nearshore habitats is a threat to spectacled and Steller's eiders. Lead poisoning of spectacled eiders has been documented on the North Slope of Alaska. Use of lead shot for hunting all birds on the North Slope is prohibited. Hunter outreach programs are being conducted to educate hunters and prevent the use of lead shot on the North Slope. Development of the proposed project will not increase hunting of spectacled or Steller's eiders or the use of lead shot in the action area.

Increased Predator Populations

Predator and scavenger populations may be increasing on the North Slope near industrial development and human infrastructure. Increased fox, gull, and raven populations (due to anthropogenic food sources and increased denning and nest sites) may have affected eider populations, although this has not been proven (USFWS 2009a).

Harvest

Hunting for spectacled and Steller's eiders was closed in 1991, however harvest data indicates that listed eiders continue to be hunted on the North Slope. Efforts are being conducted by BLM, North Slope Borough and USFWS to curtail this activity. Much of this activity has taken place near Barrow and other villages, not in the project action area. Intra-service consultations for the Migratory Bird Subsistence Hunting Regulations are conducted annually and the harvest of listed eiders is being monitored.

Impacts from Development

Alteration of North Slope nesting habitat of listed eiders has not been extensive to date Some areas of breeding habitat have been altered by wetland fill and human infrastructure that may disturb individual birds, increase nesting or denning predators, or present collision obstacles. However, human activities on the ACP are not thought to have played a significant role in population declines of listed eiders, and, accordingly, spectacled eiders were not listed as a result of the impacts of development. Development and other activities that may adversely affect listed eiders undergo a Section 7 consultation, and the amount of impact is estimated in order to issue an Incidental Take Statement and a non-jeopardy conclusion (USFWS 2009a).

Climate Change

The North Slope of Alaska is especially sensitive to climate fluctuations. How this will likely affect individual organisms, species, or communities is difficult to assess, due to the large number of variables affecting and affected by climate change. Lakes and ponds used by eiders for forage and nesting are affected by warmer temperatures and longer growing seasons. Changes in precipitation patterns, air and soil temperature, and water chemistry are also affecting tundra communities (Hinzman et al. 2005). The comprehensive effects of global climate change that will impact both the habitats of spectacled and Steller’s eiders are unknown at this time (USFWS 2009a).

3.1.3 Bowhead Whale

Biological Populations and Listing Status

Five stocks of bowhead whales are recognized worldwide (Angliss and Allen 2009b): the Western Arctic, Sea of Okhotsk, Spitsbergen, Davis Strait, and Hudson Bay stocks or populations. The Western Arctic stock of bowhead whales is the only stock found within U.S. waters. The bowhead whale is federally designated as endangered. The species was listed as an endangered species on 2 June 1970 (FR35:8495). It is also an Alaska Species of Special Concern. The Western Arctic stock is classified by NMFS as a strategic stock because the bowhead whale is listed as endangered under the ESA and therefore also designated as depleted under the Marine Mammal Protection Act (MMPA) (Angliss and Allen 2009b).

Populations Status, Trends, and Abundance

Small stocks occur in the Sea of Okhotsk and the offshore waters of Spitsbergen. These are composed of only tens to hundreds of individuals (Shelden and Rugh 1995, Zeh et al. 1993). Until recently, available evidence indicated that only a few hundred bowheads were in the Hudson Bay and Davis Strait stocks, but it now appears these should be considered one instead of two stocks based on genetics (Postma et al. 2006), aerial surveys (Cosens et al. 2006), and tagging data (Dueck et al. 2006; Heide-Jørgensen et al. 2006), and the abundance may be over a thousand (Heide-Jørgensen et al. 2007).

Based on the most recent abundance estimates, approximately 10,545 bowhead whales make up the Western Arctic stock (Angliss and Outlaw 2008). In the late 19th and early 20th century, this stock was overwhelmed by highly successful commercial whaling. The number of bowhead whales plummeted from an estimated population, in 1848, of 10,400–23,000 whales to a rough count of 1,000–3,000 individuals in the mid-20th century (Woodby and Botkin 1993). Commercial whaling of bowheads was outlawed in 1996 by a moratorium from the International Whaling Commission (IWC), although specific exemptions for certain countries exist and limited modern subsistence whaling continues with oversight and quotas regulated by the IWC.

Studies and surveys indicate the bowhead whale population has slowly increased at an annual rate of 3.4 percent between 1978 and 2001 to the current estimated number of 10,470 individuals (George et al. 2004), despite regulated harvests by subsistence hunters. The 1993 population was estimated at 8,200 (Zeh et al. 1995). Calf counts in 2001 were the highest on record, 121 individuals, confirming a growing population (George et al. 2004). Today, some reports suggest Western Arctic stock bowhead whales are approaching the carrying capacity of their habitat (Brandon and Wade 2004).

Range

Bowhead whales are distributed seasonally in ice-covered waters of the Arctic and near-Arctic, generally between 60 degrees and 75 degrees North latitude in the Western Arctic Basin (Moore and Reeves 1993). The majority of bowhead whales overwinter in the central and northwestern Bering Sea (November to March), migrate through the Chukchi Sea in the spring (March through June) following offshore ice leads around the coast of Alaska in continental shelf waters, and spend summers in the Canadian Beaufort Sea (mid-May through September) (Braham et al. 1980; Moore and Reeves 1993).

Life History and Habitat Use

Most bowheads of the Western Arctic population overwinter in the central and western Bering Sea, where they are associated with polynyas and the marginal ice zone. The amount of feeding that takes place in the Bering Sea is unknown (Richardson and Thomson 2002), however most mating is thought to occur there

(MMS and NMFS 2008). The whales congregate in polynyas before migrating in the spring (Moore and Reeves 1993), passing through the Bering Strait and into the Chukchi Sea from late March to mid-June (NMFS 2008a). Migration through the eastern Chukchi Sea takes place largely in open leads, some or most calving occurs at this time in the Chukchi Sea. Spring whaling takes place at this time by residents of Point Hope, Point Lay, Wainwright, and Barrow. Bowheads have been observed to pass Barrow, entering into the Beaufort Sea from early April to late May (IWC 2004). Migration through the Beaufort Sea occurs through lead systems offshore of the barrier islands. The whales arrive on their summering grounds in near Banks Island in Canada from Mid-May through June (IWC 2005). Bowheads move back out of the Canadian Beaufort and into the Alaska Beaufort Sea in August and September, with migration in the Central Beaufort and Prudhoe Bay area continuing from late August through late October (Moore and Reeves 1993).

Bowheads frequently interrupt their migration to feed (Ljungblad et al. 1986; Lowry 1993; Lowry et al. 2004) and their stops vary in duration from a few hours to a few weeks (MMS 2002). A commonly used feeding area is in and near Smith Bay, east of Barrow. Less consistently used feeding areas are in coastal and shelf waters near and east of Kaktovik. In 2007 and 2008, bowhead whales also used areas near Camden Bay to feed during their migration (Ireland et al. 2008, Funk et al. 2008). More research is being funded by the former Minerals Management Service (MMS) (now the Bureau of Ocean Energy Management, Regulation and Enforcement [BOEMRE]) Bowhead Whale Feeding Ecology Study (BOWFEST) to determine the extent to which bowheads might feed in the western Beaufort Sea.

During the fall migration (September–November) bowhead whales typically travel in continental shelf waters that are less than 164 feet deep on their way back to the Bering Sea. Ice cover influences the timing, duration, and path that the whales follow (Treacy 2002). In heavy ice conditions, bowhead whales divert north and migrate in deeper water further offshore (Moore et al. 2000).

Fall whaling for Kaktovik and Nuiqsut residents occurs from late August to mid-September. Traditional Knowledge gathered from local Iñupiat residents suggests that migration pods are segregated by sex and age (Braham et al. 1980). Bowhead whales typically reach the Barrow area in mid-September to late October during their westward migration from the feeding grounds in the Canadian Beaufort. Fall bowhead whaling near Barrow normally begins in mid-September, but may begin as early as August if whales are present and ice conditions are favorable (BLM 2005). Whaling near Barrow may continue into October, depending on the quota and conditions.

Fall surveys of bowhead whales in the Beaufort Sea have been conducted annually by MMS since 1979 (Ljungblad et al. 1986, 1987; Moore et al. 1989; Treacy 1988-1998, 2000, 2002a,b). Results of those surveys show that bowhead whales tend to migrate to deeper water (farther offshore) in the fall during years with higher-than-average ice coverage (Moore et al. 2000b). Most bowhead whales migrate west in water ranging from 50 to 650 feet deep (Miller and Davis 2002), though some individuals enter shallower water, particularly in light ice years. Ice cover influences the timing, duration, and path that the whales follow (Treacy 2002).

Bowhead whales feed primarily on copepods and euphausiids (Lowry 1993; Lowry and Sheffield 2002). To satisfy energy requirements, bowheads may need to find areas with above-average concentrations of zooplankton (Lowry 1993).

Bowhead whales are long-lived, slow-growing, late-maturing, and reproduce infrequently (Koski et al. 1993). Females and males become sexually mature around 25 years of age (George et al. 2007). Bowhead whales mate and calve during spring migration (Nerini et al. 1984), and calving occurs every three to four years (Koski et al. 1993). Gestation lasts between 12 and 16 months (Nerini et al. 1984). The majority of bowhead whale mating occurs in March and April (IWC 2004).

Critical Habitat

No critical habitat has been designated for the bowhead whale. The NMFS was petitioned by the Center for Biological Diversity and Marine Biodiversity Protection Center on 22 February 2000, to designate critical habitat for the Western Arctic bowhead stock. Petitioners asserted that the nearshore areas from the U.S.–Canada border to Barrow, Alaska should be considered critical habitat. Upon review, NMFS found the petition to have merit (FR 66:28141), but subsequently on 30 August 2002 (FR 67:55767), they announced the decision to not designate critical habitat for this population. In this decision, NMFS reported that they believed designation of critical habitat was not necessary because the population is known to be approaching its pre-commercial whaling population size, the population is increasing, there are no known habitat issues which are slowing the growth of the population, and activities that occur in the petitioned area are already managed to minimize impacts to the population (Angliss and Allen 2000b).

Bowhead Whales in the Action Area

Bowheads do not occur in Cook Inlet or the Gulf of Alaska and therefore would not be expected to occur in marine portions of the action area at Anchorage or Seward. Most of the bowhead whale population migrates through the Beaufort Sea offshore of West Dock during spring and fall (late August through late October) migrations to and from the summer feeding grounds. The migrations have been monitored by BOEMRE and NMFS since 1982 (Treacy et al. 2006, Clarke and Ferguson 2010) and industry (Blackwell et al. 2007, Ireland et al. 2009) over a number of years. A small number of bowhead whales have been seen or heard offshore near Prudhoe Bay in late August. (LGL and Greenridge 1996, Greene et al. 1999, Blackwell and Greene 2004, Blackwell et al. 2008, Goeta et al. 2008). Figure 3.1-5 shows bowhead whale sightings by the former MMS in the Beaufort Sea. However, these survey data indicate that the fall migration off northern Alaska occurs primarily over the continental shelf, mainly in waters 66–197 feet deep (Moore et al. 1989, Moore and Reeves 1993, Treacy 2002), e.g., generally 12–37 miles offshore (Treacy 2002, Monnett and Treacy 2005, Treacy et al. 2006).

Monitoring surveys have been conducted annually at the Northstar offshore oil and gas facility since 2001, and the survey area is just offshore of West Dock. Over 95 percent of the bowheads observed during these fall surveys occurred more than 13.9 miles offshore in 2001, 14.2 miles in 2002, 8.4 miles in 2003, and 10.1 miles in 2004 (Blackwell et al. 2007). West Dock extends out from the shoreline a total distance of 2.7 miles to water depths 7 feet. The occurrence of bowhead whales in the action area is therefore highly unlikely.

Threats

Known actions that have had an effect on bowhead whales in the past or are having an effect now in the proposed action area include historic commercial whaling, subsistence hunting, oil and gas-related activity, non-oil and gas industrial development, research activities, marine vessel traffic and commercial fishing, pollution and contaminants baseline, and climate change. Other than historic commercial whaling, no data is available to signify that any previous or current human activity has had population-level negative effects on bowhead whales or the recovery of the species (MMS and NMFS 2008).

The following documents have more detailed information regarding threats to bowhead whales and are incorporated here by reference:

Biological Opinion on Issuance of Annual Quotas Authorizing the Harvest of Bowhead Whales to the Alaska Eskimo Whaling Commission for the Period 2008 through 2012 (NMFS 2008a)

Final Environmental Assessment for Issuing Subsistence Quotas to the Alaska Eskimo Whaling Commission for a Subsistence Hunt on Bowhead Whales for the Years 2003 through 2007 (NMFS, 2003).

Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska, and Authorization of Small Takes under the Marine Mammal Protection Act (NMFS 2008c).

Historical Commercial Whaling

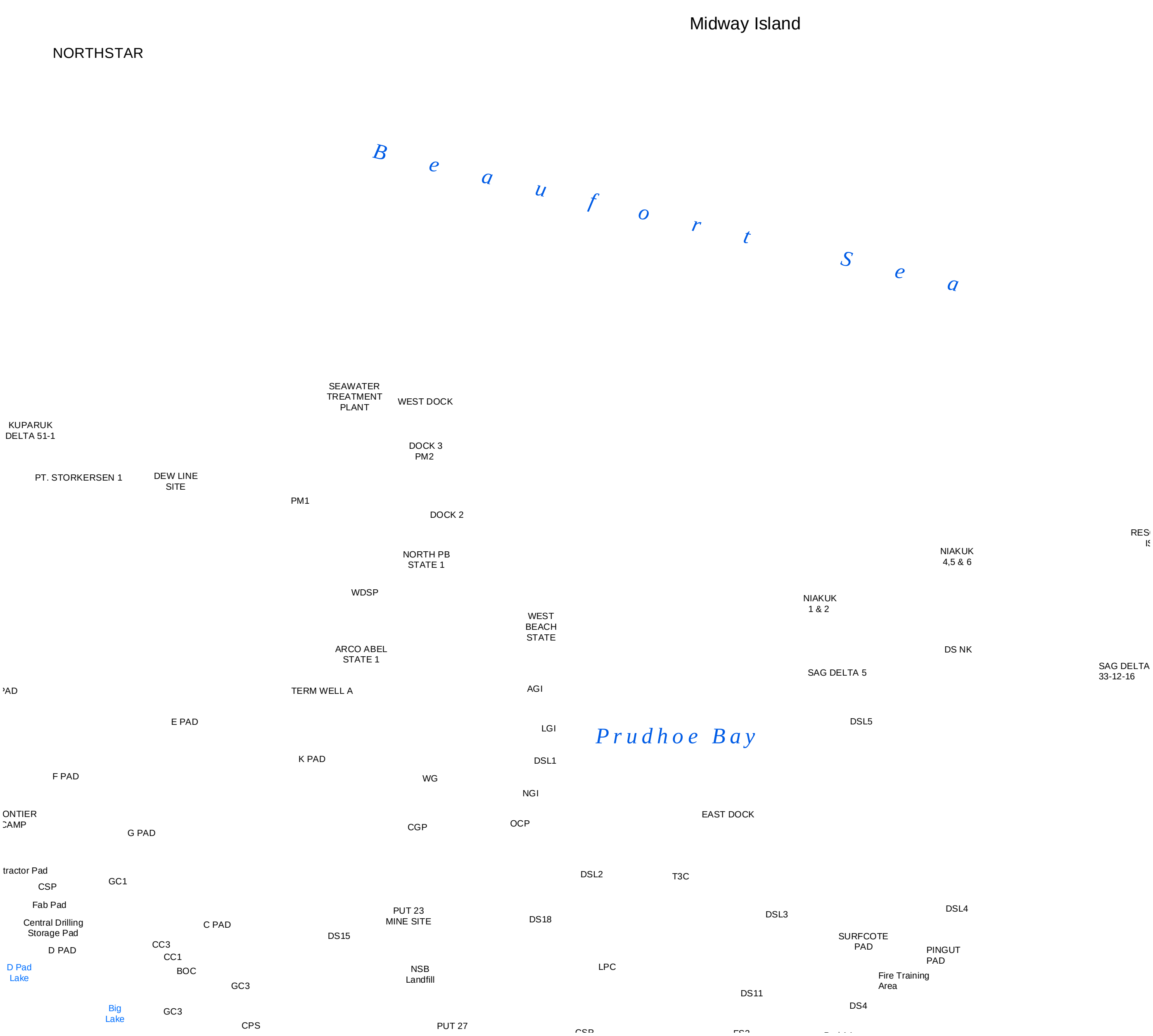
Current information suggests that bowhead whales in the Chukchi and Beaufort Sea planning areas are resilient at least to the level of human-caused mortality and disturbance that has existed after the cessation of commercial whaling (MMS and NMFS 2008).

Historic commercial whaling has had the greatest negative impact on bowhead whales of all past and present human industrial activities (NMFS 2008). Prior to the onset of commercial whaling activity in the late 1800s, it is estimated that the bowhead whale population was between 10,400 and 23,000 whales (Woodby and Botkin 1993). Near the end of commercial whaling, it is estimated that between 1,000 and 3,000 animals remained (Woodby and Botkin 1993). The Western Arctic population has increased in abundance significantly since the end of commercial whaling.

Subsistence Hunting

Alaska Native communities harvest bowhead whales for subsistence and cultural purposes as they have been doing for over 2,000 years (Stoker and Krupnik 1993). Currently, ten Alaskan villages participate in the bowhead whale hunt. There is no evidence that subsistence harvesting caused a significant negative impact on the Western Arctic population of bowhead whales prior to commercial whaling (MMS and NMFS 2008). However, as technological advances have been made, bowhead whales have become more accessible and easier to harvest, creating a possibility of over-harvest if unregulated (MMS and NMFS 2008).

Since 1977, the IWC has implemented a quota system to regulate the harvest of this population. There is currently a co-management agreement between the Alaska Eskimo Whaling Commission (AEWC), and the National Oceanic and Atmospheric Administration (NOAA). The IWC establishes strike limits for Russian and Alaskan communities. Over a period of five years 280 landings are currently allowed. Because the quota is dependent upon the population size of bowhead whales, it is unlikely that subsistence activities will cause a significant impact on the recovery of the Western Arctic population in the future.



Bowhead Whale Sighting

Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

ALASKA GASLINE DEVELOPMENT CORP.
GAS FOR ALASKANS

BOWHEAD WHALE SIGHTINGS IN THE BEAUFORT SEA 1979-2007
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

Sighting data obtained from Minerals Management Service Bowhead Whale Aerial Survey Project Historical Database, 1979-2007.

NAD83, Alaska Albers Equal Area.

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

SCALE:
0 1 2 3 4 Miles

FIGURE:
3.1-5

AES-RTS: 11-001-006.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Oil and Gas Activity

Offshore oil and gas activity, including seismic surveys, has occurred in the Chukchi and Beaufort Seas since the late 1960s (MMS and NMFS 2008). Two- and three-dimensional seismic programs have been conducted in both program areas. Twenty-three Geological and Geophysical permits were issued in the Beaufort Sea by the MMS in 1982 and 24 in 1983. There has been more seismic survey activity in the Beaufort Sea than in the Chukchi Sea. Between 1981 and 2002, 30 exploratory wells were drilled in the Beaufort Sea. Offshore oil and gas operations often require support operations that can also cause impacts to bowhead whales, such as ice-breaking, aircraft traffic, and vessel traffic.

More information on the history of oil and gas activity between 1979 and 1999 in the Beaufort Sea can be found in MMS Study 2002-071, *GIS Geospatial Data Base of Oil-Industry and Other Human Activity (1979-1999)* in the Alaskan Beaufort Sea (MMS 2002).

There is no indication that oil and gas activity in the Beaufort and Chukchi Seas have had any detectable long-term negative impacts on the health, status, or recovery of bowhead whale populations (MMS and NMFS 2008). The Western Arctic population has continued to increase over the period of time that oil and gas activities have been conducted offshore in the Alaskan Arctic.

The NMFS previously consulted with the MMS on the potential impacts of oil and gas leasing and exploration in the Beaufort and Chukchi Seas. NMFS issued seven Biological Opinions related to Outer Continental Shelf (OCS) lease sales. The Arctic Regional Biological Opinion was issued in 1988 on the potential effects of leasing and exploration activities in the Arctic Region and reinitiated in 1999. By 1999, oil and gas emphasis was placed on the Beaufort Sea. Therefore, the Biological Opinion issued in 1988 focused on the Beaufort Sea and presented newly available information on the potential effects of oil and gas-related noise on the bowhead whale. The Biological Opinion was revised in 2001 and concluded that oil and gas leasing and exploration in the Beaufort Sea was not likely to jeopardize the continued existence of bowhead whales.

With renewed industry interest in oil and gas exploration in the Chukchi Sea, the MMS reinitiated consultation with the NMFS in 2006 to include the Beaufort and Chukchi Seas. A revised opinion was issued in March 2006. After new information about the presence of humpback and fin whales in the Chukchi and Beaufort Seas, NMFS published a Biological Opinion of the potential impacts of oil and gas activities on those species along with the bowhead whale. They concluded that oil and gas activities in the Alaskan Beaufort and Chukchi Seas may affect but are not likely to jeopardize the continued existence of Western Arctic bowhead whales (MMS and NMFS 2008).

Vessel and Aircraft Traffic

Vessel traffic, in general, can impact bowhead whales due to disturbances by noise and vessel strikes. There are few documented records of vessel strikes of bowhead whales. There is speculation that vessel strikes could become more common in the future as vessel traffic is projected to increase due to receding ice levels (MMS and NMFS 2008). Noise disturbances could result in temporary changes in behavior, such as deflection or avoidance, of individual whales from a highly-localized area (MMS and NMFS 2008). Noises from vessels that could affect bowhead whales are generally associated with motors, seismic airguns, sonar, and ice-breaking (MMS and NMFS 2008). All disturbance effects on bowhead whales from marine vessels are expected to be short duration.

Low-flying aircraft could also produce noise that could temporarily disturb individual bowhead whales in a highly-localized area (MMS and NMFS 2008). Aircraft are generally flown at heights that do not cause harassment.

Fuel spills from either vessels or aircraft would introduce contaminants into the environment which could potentially impact bowhead whales if ingested, inhaled, or if physical contact occurred.

Commercial Fishing

Commercial fishing activities could impact whales via incidental take, entanglement in fishing gear, behavioral changes due to disturbances by associated activities, and vessel strikes. The association of bowhead whales with habitat associated with sea ice limits its exposure to commercial fishing activities (MMS and NMFS 2008). If commercial activity increases in the arctic and subarctic environments due to a reduction in sea ice, disturbances of bowhead whales by commercial fishing activities will increase. There have been no reports by marine mammal observers on commercial fishing vessels of bowhead whale mortalities due to commercial fish operations (Angliss and Lodge 2002). There have been few documented incidents of bowhead whales interacting with commercial crab pot gear, but, according to preliminary results of the examination of harvest records, there are slightly more incidents associated with ropes (Angliss and Outlaw 2008). The annual rate of bowhead entanglement in marine debris or gear between 2003 and 2008 is 0.4 percent annually (Angliss and Outlaw 2008.)

Climate Change

The current trend of warming in the arctic environment is attributed to the changes in sea ice extent, thickness, distribution, age, and melt duration (MMS and NMFS 2008). Sea ice extent is becoming less in both the summer and winter, although the reduction is more pronounced in the summer (Intergovernmental Panel on Climate Change [IPCC] 2001). Ice thickness is also decreasing, while the melt duration is increasing. It is uncertain whether non-ice-obligate arctic species, such as baleen whales, will be adversely influenced by diminishing sea ice (MMS and NMFS 2008). Moreover, the reduction in sea ice extent could beneficially increase the availability of prey for the Bering-Chukchi-Beaufort Sea Stock of bowhead whales (Moore and Laidre 2006). The reduction of sea ice over the past 20 years could be related to the recovery trend of bowhead whales (Walsh 2008), and the trend is expected to continue as the ice extent retreats further (Sheldon et al. 2003). Bowhead whales may alter routes used for migration and change feeding areas as the ice extent changes due to climate change (Moore and Huntington 2008).

3.1.4 Fin Whale

Biological Populations and Listing Status

Three individual ocean-basin populations have been identified: North Atlantic, North Pacific, and Southern Ocean. Individuals within each ocean-basin population rarely, if ever, mix. Additionally, within each ocean-basin population, geographical populations (stocks) also exist. In U.S. waters, three stocks are recognized: Alaska, California/Washington/Oregon, and Hawaii (Ohsumi and Wada 1974).

The fin whale was listed as endangered under the ESA in 1970 (FR 35:8495) and as depleted under the MMPA throughout their range. No critical habitat has been designated. Since 2007, fin whales have also been listed as endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

Populations Status, Trends, and Abundance

The worldwide population of fin whales is estimated to be 120,000 (MMS and NMFS 2008). The North Pacific population is estimated to include 15,000 individual fin whales (Angliss et al. 2001), down from their pre-commercial whaling population estimate of 42,000 to 45,000 (Ohsumi and Wada 1974). Currently, the population of fin whales in Alaskan waters west of Kodiak Island is estimated to be a minimum of 5,700 (Angliss and Outlaw 2009).

Range

Fin whales appear to be limited by tropical waters and sea ice. Fin whales prefer temperate or cool waters, and tend to avoid areas with very warm water (approximately 60 degrees Fahrenheit [°F] [15 degrees Celsius (°C)]), areas at the poles close to the ice pack, and small areas of water separated from the open ocean (NMFS 2006a; MMS and NMFS 2008). The North Pacific population distribution ranges from British Columbia, along the northern Pacific Rim, and to the far eastern Russian coast. The summer distribution of fin whales extends from Baja California to the northern Bering Sea or southern Chukchi Sea and over to Japan (MMS and NMFS 2008).

The Alaska stock of fin whales can be found in the deep waters of Prince William Sound, the Bering Sea, and the Gulf of Alaska. The highest densities of Alaska stock fin whales can be found in the northern part of the Gulf of Alaska and southeastern part of the Bering Sea during the summer (May through October) (MMS and NMFS 2008). The majority Alaska stock fin whales tend to aggregate along the mixing zones between coastal and oceanic waters that correspond roughly with the 656-feet isobaths, or shelf edge, in the northern North Pacific and Bering Sea (NMFS 2006a). Fin whales may be seen seasonally in the southwestern Chukchi Sea, although there is no indication that such occurrences are typical (MMS and NMFS 2008). There are no reports of fin whales in the Beaufort Sea (MMS and NMFS 2008), which is outside the published species range (Angliss and Outlaw 2009).

Life History and Habitat Use

The migratory status of the North Pacific fin whales is not well known; however, in the winter they have been seen off the southern coast of California and near the Hawaiian Islands (Angliss et al. 2001). Age, reproductive state, and stock affinity can all affect migration, as well as their movement inshore or offshore and north or south (NMFS 2006a).

Known fin whale feeding habitats extend through the Bering Sea into the southern Chukchi Sea, especially the southwestern Chukchi Sea near the Asian coast. Fin whales travel through the Aleutian Islands entering and exiting the Bering Sea to access their summer feeding grounds. They have also been known to travel from the northern Gulf of Alaska through the Shelikof Strait to reach the southeastern and northern Bering Sea (MMS and NMFS 2008). In recent years fin whales have been seen regularly around Pribilof Islands (NMFS 2006a).

Oceanographic changes may become favorable to the expansion of fin whale distribution into more northern waters if arctic warming continues. Availability of food sources will be the determining factor. The possibility of their distribution expanding into the Chukchi and Beaufort seas could result from long-term continued arctic warming (MMS and NMFS 2008).

Fin whales feed primarily on krill or euphausiids, as well as substantial quantities of fish (MMS and NMFS 2008). North Pacific fin whales favor *Euphausia pacifica, Thysanoessa longpipes, T. spinifera, and T. inermis* species of euphausiids. A significant portion of their diet also consists of large copepods, principally *Calanus cristatus*. A smaller portion of their diet is made up of herring, walleye pollock, and capelin (Nemoto 1970). In the northern Bering Sea, *Thyanoessa raschii* is the only species of euphausiid that the fin whale is known to feed on. In the Arctic and Subarctic, fin whales are thought to feed chiefly on capelin, Alaska pollock, herring, and saffron cod. Above 58 degrees North latitude in the Bering Sea, fish are the primary food source, consisting almost entirely of capelin, pollock, and herring (MMS and NMFS 2008).

The gestation period for fin whales is less than one year and calving intervals are estimated, based on whaling data, to be two years (NMFS 2006a). Calves are nursed for six to seven months, and mortality rates are estimated to be between 0.04 and 0.06 percent annually. Ice entrapment, attack by killer whales, disease, shark attacks on young and/or weak fin whales, and crassicaudiosis in the urinary tract are likely the principal causes of natural mortality among fin whales, though relatively little is actually known and most studies have been focused on the North Atlantic population (NMFS 2006a).

Low-frequency vocalizations from fin whales occur in the 10 to 200 hertz (Hz) band. The low-frequency sounds have potential to travel a great distance, allowing for the possibility of long-distance communication (Edds-Walton 1997). The most common vocalizations are in the 18 to 35 Hz band and are long, patterned sequences of short-duration infrasonic pulses (Patterson and Hamilton 1964). Bouts of long patterned sounds are common in temperate waters and can also occur to a lesser extent in high latitude feeding areas (Clark and Charif 1998). Fin whales in social groups tend to vocalize rapid pulses in short sequences in the 20 to 70 Hz range. While male reproductive displays typically are vocalized by a series of pulses in a regular repeating pattern that may last for more than a day (Tyack 1999).

While no studies have been done to directly measure fin whales' sound sensitivity, it is reasonable to assume that fin whales are similar to other large mysticetes and have acute infrasonic hearing (Ketten 1997).

Critical Habitat

No critical habitat has been designated for the fin whale.

Fin Whales in the Action Area

Fin whales are not known to occur in the Beaufort Sea. Fin whales are frequently observed in the northern Gulf of Alaska and southeastern Bering Sea from May to October, but do not commonly occur in Upper Cook Inlet or the Anchorage area, as they generally congregate near the 656-foot isobath which is approximately 190 miles from shore according to Alaska Ocean Observing System (AOOS) bathymetry data from 2010. Resurrection Bay is significantly deeper than the waters surrounding the Port of Anchorage, the 656 foot-isobath is only about seven miles from the Port of Seward, so fin whales may occur in closer proximity.

Threats

There are a number of actions that have effects on fin whales in the proposed action area. They include historic commercial whaling, subsistence hunting, oil and gas-related activity, non-oil and gas industrial development, research activities, marine vessel traffic and commercial fishing. Other than historic commercial whaling, no data is available to establish that any previous or current human activity has had negative effects on fin whale populations (MMS and NMFS 2008).

Historic Commercial Whaling

Throughout the 19th century, whalers on sailing vessels hunted fin whales in relatively small numbers (Mitchell and Reeves 1983). Steam-powered boats and harpoon guns in the latter part of the 19th century heightened the hunting success of fin whales. The eventual invention of deck-mounted cannons allowed commercial fin whale hunting and harvest to occur at much higher success, or mortality, rates (MMS and NMFS 2008). The first three-quarters of the 20th century saw a great deal of commercial fin whale hunting in all of the world's oceans. The estimated catch in the Southern Hemisphere from 1904 to 1979 is almost 750,000 individuals (IWC 1995:129B30). Commercial overharvesting from the 1940s through the 1960s led the Fin whale to be placed on the threatened and endangered species list, as well as listed as depleted and protected under the MMPA. In the 1950s and 1960s estimated numbers of 1,000 to 1,500 North Pacific fin were harvested annually, though not all Soviet catches were reported (MMS and NMFS 2008).

The 1946 International Convention for the Regulation of Whaling first began regulation of fin whale commercial hunting by enforcing a size limit on commercially hunted North Pacific fin whales; they had to be longer than 55 feet (Allen 1980). The IWC began management of commercial whaling of North Pacific fin whales in 1969, and later in 1976 for the North Atlantic fin whales. Full protection from hunting was granted by the IWC in 1976 for the North Pacific and Southern Ocean fin populations and in 1987 for the North Atlantic population.

Subsistence Hunting

In Alaska, subsistence hunters have not reported hunting or taking fin whales. Currently, Greenland is the only area in the Northern Hemisphere where fin whales are allowed to be hunted and taken for local nutritional subsistence. The IWC has granted approximately 20 takes per year as part of their aboriginal subsistence whaling scheme (Gambell 1993; Caulfield 1993). Japan has recently begun taking fin whales for research purposes in the Southern Ocean region; total catches have been minimal each year. They also import fin whale meat from an Icelandic company, Hvalur H/F, which takes approximately 125 fin whales each year (IWPO 2011).

Commercial Fishing

Each year North Atlantic fin whales are occasionally hurt or taken by inshore fishing gear, however prior to 1999 there were no observed or reported North Pacific fin whale takes incidental to commercial fishing operations (Read 1994; Angliss and Outlaw 2008). In 1999, one fin whale was reported killed incidental to the pollock trawl fishery in the Gulf of Alaska (Angliss and Outlaw 2008). Currently, fin whale fatalities incidental to commercial activity in Alaska are estimated at 0.6 individuals per year (Angliss et al. 2001).

Vessel Traffic

Marine vessel traffic also has the possibility to pose a threat to fin whales. In Alaska, there are 14 stranding records in the Alaska Region marine mammal stranding database between 1981 and 2009; two are a result of ship strikes. One of the ship strikes occurred in Uyak Bay near Kodiak in 2000, and the other occurred in Resurrection Bay near Seward in 2006. The cause of stranding for the majority could not be determined (MMSN 2010). Short term changes in dive behaviors have been documented when fin whales are disturbed by the presence of vessels. This may include reduced dive times, decreased dive and surface times, and a reduced number of blows per surface (Stone et al. 1992).

Fin whales that may occur near the Port of Seward are likely to have habituated to the vessel traffic in the area. There are a number of vessel-based activities that occur in the area, including whale-watching tours, recreational boating, cruises, and commercial shipping. Commercial vessel traffic has mitigation measures in place, as required by state and federal law, to prevent significant adverse effects on any marine mammal, including fin whales. The vessel traffic in Resurrection Bay, and specifically near the Port of Seward, does not pose a threat with population-level effects.

Oil and Gas-Related Activity

Oil and gas activities have had a minimal impact on fin whales. The oil and gas activity areas have relatively little overlap with fin whale habitat. Possible effects of oil and gas activity include interruption by loud ship noises, seismic testing, and sources of low-frequency communication, and possible courtship sounds from fin whales. Like the bowhead whale, the fin has a low-frequency hearing range, and effects are expected to be similar to that of the bowhead whale (MMS and NMFS 2008). Fin whales, in a study off Oregon, continued to produce normal sounds regardless of the presence of seismic air gun pulses (McDonald et al. 1993).

In Alaska, current human impacts that may result in serious injury or the fatality of fin whales are not known to be at a level that would incur population level effects (MMS and NMFS 2008).

Climate Change

It is uncertain whether non-ice-obligate arctic species, such as baleen whales, will be adversely influenced by diminishing sea ice resulting from climate change (MMS and NMFS 2008). The arctic range of fin whales may beneficially expand northward as their prey does. In the future, climate change may allow for increased vessel traffic, fishing, or other activities that could adversely affect fin whales in their existing or expanded range.

3.1.5 Humpback Whale

Biological Populations and Listing Status

Worldwide, approximately 13 different humpback whale stocks are recognized. Five stocks are found in U.S. waters: the Gulf of Maine, the Western North Pacific, the Central North Pacific, the California/Oregon/Washington, and the American Samoa. Three of these stocks occur within the North Pacific Stock: the Central North Pacific Stock, Western North Pacific Stock, and California/Oregon/Washington stocks. Stocks commonly return to traditional sites for reproduction, and there is very little interchange between stocks, though on rare occasion it does occur (NMFS 1991). Only the Central North Pacific and Western North Pacific stocks could be expected to occur near the action area.

The humpback whale is listed as endangered under the ESA, and as depleted under the MMPA. In 2008, the IUCN upgraded the status of the humpback whale from a vulnerable species to a species of least concern. A status review of humpback whales was initiated on 12 August 2009, seeking public comment on potential changes to their listing under the ESA.

Populations Status, Trends, and Abundance

Prior to exploitation, the worldwide population of humpback whales totaled around 125,000 and the North Pacific population was estimated to be 15,000. Post-exploitation, the status (both in numbers and range), was considerably reduced, primarily as a result of intensive commercial whaling (NMFS 1991).

There are an estimated 80,000 humpback whales worldwide currently. The North Pacific population is currently estimated to be 12,000 whales, up from an estimated low of 1,500 when commercial whaling was banned. The Western Pacific population was last estimated at 394 (Calambokidis et al. 1997); however, its thought this might be an underestimation in light of the low geographic coverage of sampling effort (Angliss and Allen 2009).

Range

Humpback whales are present in all of the world's oceans, though less so in arctic waters. Their winter range includes temperate and tropical waters in both hemispheres, generally between 10 degrees and 23 degrees North latitude, where they typically mate and calve. Their summer range is usually in areas with high biological diversity between higher latitudes of 35 degrees and 75 degrees North. This is where they do the majority of their feeding. Humpback whales prefer waters of continental shelves, along their edges, and near some oceanic islands (NMFS 1991). Humpback whales in the high latitudes of the North Pacific are seasonal migrants. In Alaska, humpback whales are found from southeastern Alaska, north and west through the Gulf of Alaska, Bering Sea, and into the southern Chukchi Sea. Most of the humpback whales that summer in Alaskan waters are thought to winter on the wintering grounds surrounding the Hawaiian Islands.

In the summer, the Western North Pacific stock occupies areas along the continental shelf off the Aleutian Islands and the Alaska Peninsula. Some individuals in this stock may still summer along the Asian coast, particularly around Kamchatka Peninsula and the Sea of Okhotsk (Tomlin 1967). This stock was once considered the center of the entire North Pacific population (Berzin and Rovnin 1966; Nishiwaki 1966). The northern range of this stock now extends throughout the Bering Sea, through the Bering Strait, and into the southern Chukchi Sea. Historically, sightings in the Western North Pacific stock's range have been most common south of Nunivak Island and east of the Pribilof Islands (MMS and NMFS 2008). They have not been documented in the Beaufort Sea. This migratory stock winters on the wintering grounds around the Hawaiian Islands or at the Asian wintering grounds from the Marshall Islands to the Philippines (Angliss and Allen 2009).

The Central North Pacific stock can be found throughout southeast Alaska in the summer, as well as in central and western portions of the Gulf of Alaska. This area includes Prince William Sound, around Kodiak Island, the Shelikof Strait, the Barren Islands, and the southern coastline of the Alaska Peninsula (MMS and NMFS 2008). Sightings in offshore waters of the Gulf of Alaska are generally attributed to migration into coastal waters, some feeding may also be occurring on offshore banks (Morris et al. 1983).

Life History and Habitat Use

The majority of humpback whales that summer in Alaska waters migrate to wintering grounds in the Hawaiian Islands. Six to 11 percent of the whales in the Hawaiian wintering grounds are calves (Herman et al. 1980). A smaller number of individuals may migrate to wintering grounds along the Pacific coast of Baja California and Mexico. Most that migrate to this area summer in southeast Alaska and migrate along the relatively shallow coastal waters rather than through deeper, offshore waters as is the case in migration to the Hawaiian Islands. The majority of animals that winter offshore of Baja California and the Pacific coast of California spend their summers off the central California coast. An even smaller number of individuals within the North Pacific population winter near Mariana, Bonin, and Ryukyu Islands and near Taiwan (Nishiwaki 1966; Ivashin and Rovnin 1967; Townsend 1935). The total number that winter in this area is expected to be in the low 100s, though at one point this area did support a shore-based whaling station near Ryukyu Island in the late 1950s and 1960s (NMFS 1991).

Humpback whales feed primarily on small schooling fish and large zooplankton, mainly krill. Species of humpback prey include: capelin, walleye pollock, atka mackerel, eulachon, sand lance, Pacific cod, saffron cod, arctic cod, salmon, pollock, haddock, rockfish, shrimps, euphausiids, mysids, and pelagic amphipods. In the Bering Strait and southern Chukchi Sea, the main source of prey are mysids (NMFS 1991). Physical oceanographic factors that contribute to productivity and local distribution of prey (and thus likely feeding areas), are upwelling, converging currents, continental shelves, offshore banks, and edges of continental shelves (NMFS 1991). Feeding occurs almost entirely on humpback whales' summer range. On average, humpback whales will dive 135–197 feet to catch their prey (Dolphin 1987a,b). While they may stay submerged for 21 minutes, the average dive time is 2.8 minutes for feeding whales, 3.0 minutes for non-feeding whales, and 4.3 minutes for resting whales (Dolphin 1987a,b). They also use the most diverse techniques to obtain their prey of any baleen whale.

Female humpback whales reach sexual maturity between four and six years of age, while male humpback whales reach sexual maturity between seven and 15 years of age. Conception is usually between December and March and the average gestation period is between 10 and 12 months. Birthing will occur during the same time frame the next year. Sexually mature females typically breed every two to three years. Females live to be an average of 61 years old, and males live to be an average of 57 years old. Females make up roughly one-quarter of the total population (NMFS 1991).

The primary causes of natural mortality among humpback whales are parasites, predation, red-tide toxins, and ice entrapment. Killer whales have been known to prey on humpbacks, usually on young or disabled individuals. However, the two species have also been known to peacefully coexist and feed in close proximity. Humpback whales have also been observed with shark bites. Ice entrapment is a concern in Newfoundland for the most part (NMFS 1991). Collisions with vessels and entanglement in fishing gear and collision with vessels are causes of injury and mortality worldwide.

Critical Habitat

No critical habitat has been designated for the humpback whale.

Humpback Whales in the Action Area

Humpback whales are not known to occur in the Beaufort Sea (Angliss and Allen 2009, MMS and NMFS 2008). Humpback whales are frequently observed in Lower Cook Inlet during May–September (MMS 1995), but do not commonly occur in Upper Cook Inlet or the Anchorage area. Humpback whales are also found in waters of the Gulf of Alaska and lower Resurrection Bay. Humpback whales are not expected to be found in near proximity to the Port of Anchorage, and while they do exist in Resurrection Bay, they have become habituated to vessel traffic in the area. They are not expected to be in direct proximity to the Port of Seward.

Threats

Known actions that have an effect on humpback whales in the proposed action area include historic commercial whaling, subsistence hunting, oil-and-gas-related activity, non-oil and gas industrial development, research activities, marine vessel traffic and commercial fishing. Other than historic commercial whaling, no data is available to establish that any previous or current human activity has had negative effects on humpback whale populations.

Historic Commercial Whaling

Historic commercial whaling decimated the humpback whale population to approximately 10 percent of its original population. At the time of the IWC moratorium on commercial whaling, humpback whales were feared to be in danger of extinction. Nearest to the project area, there was a whaling station at Port Hobron off of Kodiak Island and in Akutan on Akutan Island in the eastern Aleutians. Port Hobron operated from 1926 to 1937 and Akutan operated until 1939 (Brueggeman et al. 1986). Since the IWC's moratorium on commercial whaling in 1966, their numbers and distribution have risen and expanded, though the Soviets did continue hunting until the 1980s (Perry et al. 1999).

Subsistence Hunting

Worldwide, a limited amount of subsistence hunting for humpback whales occurs. The only areas where subsistence hunts for humpbacks whales are currently conducted are in Bequia (Grenadines) and Greenland. No subsistence hunt for humpbacks currently takes place in Alaska. Subsistence hunting of humpbacks has never been at a level known to cause population level effects.

Oil and Gas-Related Activity

The effects of oil-and-gas-related activity are relatively minimal. The primary concern attributed to oil-and-gas-related activity is the noise associated with seismic acquisition. Mitigation measures are in place to avoid negative interaction and harassment of humpback whales. Oil and gas activity is known to have no negative effects on population levels.

Vessel Traffic

The concern for vessel collisions with humpback whales is shared amongst oil and gas vessel traffic, non-oil and gas industry traffic, marine vessel traffic, research activities, and commercial fishing. Of all vessel traffic, commercial fishing is responsible for the largest number of collisions, as well as entanglements.

Worldwide, humpback whales are second only to fin whales in the number of ship strikes (Jensen and Silber 2003). Within Alaska, between the years of 1986 and 2007, there were 54 confirmed or suspected ship strikes listed in the NMFS Alaska Regional Stranding Database. The fate of the animals is not always known. The types of vessels that struck a humpback whale during this period include cruise ships, recreational cruisers, whale watching catamarans, fishing vessels, and skiffs. The lengths of these vessels have ranged from 20 feet to 250 feet (Jensen and Silber 2003). This shows that neither the type nor the length of the vessel makes it more or less likely to be party to humpback ship strike.

Cruise ships are of particular concern within the waters of southeast Alaska where humpback whales concentrate in shallower waters. Oil tankers generally transit further offshore in water where fewer concentrations of humpback whales can be found. Charter and private vessels run the same risks as cruise ships, as they operate in areas overlapping with nearshore distributions of humpback whales (NMFS 1991).

Commercial Fishing

In the Central North Pacific stock, humpback whales are killed incidental to federal groundfish and longline fisheries and state managed commercial salmon fisheries. The average annual mortality rate prior to 2004 was 1.5 individuals. Between the years of 2001 and 2005, incidental injuries and mortalities within the Central North Pacific stock were also attributed to sablefish pot fisheries (MMS and NMFS 2008). In the Western North Pacific stock, the annual mortality rate from fisheries is 0.20. Serious injuries and mortalities have occurred incidental to sablefish pot fisheries in the Bering Sea and Aleutian Islands (MMS and NMFS 2008).

Humpback whales can usually get out of entanglements in fishing gear (they are large enough to break through the netting), but sometimes they get entangled in the lead anchor which they cannot break (NMFS 1991). Between 1997 and 2007, Alaska reported 97 humpback entanglements. The majority of these involved southeast Alaska humpbacks (NMFS Alaska Regional Stranding Data). The gear involved in these reports was primarily from crab, ship, and unidentifiable pot gear.

Neither ship strikes nor entanglements are known to be at a level that would cause population-level negative effects on humpback whales. However, continued arctic warming and melting sea ice may allow industry to move north. Increased traffic and shipping, combined with an increased summer feeding-ground-range for humpback whales, may result in a greater possibility of interaction (NMFS 1991).

Climate Change

It is uncertain whether non-ice-obligate arctic species, such as baleen whales, will be adversely influenced by diminishing sea ice resulting from climate change (MMS and NMFS 2008). The range of humpback whales may beneficially expand northward as their prey does. In the future, climate change may allow for increased vessel traffic, fishing or other activities that could adversely affect humpback whales in their existing or expanded range.

3.1.6 Cook Inlet Beluga Whale

Biological Populations and Listing Status

Beluga whales are distributed throughout waters seasonally covered in ice in arctic and subarctic regions (Gurevich 1980) and are associated with leads and polynyas in the ice (Hazard 1988). Five recognized stocks of beluga whales occur in U.S. waters: the Beaufort Sea stock, Eastern Chukchi stock, Eastern Bering Sea stock, Bristol Bay stock, and the Cook Inlet stock. All of these stocks occur exclusively in Alaska. Only the Cook Inlet beluga whale has been listed under the ESA, and is discussed below. The NMFS listed the DPS of the beluga whale found in Cook Inlet, Alaska, as endangered under the ESA on 22 October 2008, effective 22 December 2008 (FR 73:62919–62930). The NMFS designated the Cook Inlet beluga as depleted under the MMPA on 31 May 2000 (FR 65:34590).

Population Status, Trends, and Abundance

Results from the most recent abundance survey by the NMFS indicated a population size of 375 in 2008, which was the same as the estimate derived from the 2007 survey (Hobbs and Shelden 2008). Most early surveys of belugas in Cook Inlet were incomplete in coverage of the area, and can therefore not be used to provide an estimate of the total population. Analysis of the most complete survey prior to 1994 resulted in a population estimate of 1,293 beluga in Cook Inlet in 1979 (Calkins 1989). The NMFS (2008a) now considers this estimate of approximately 1,300 beluga whales to be a good indicator of historical abundance, and therefore the carrying capacity of Cook Inlet. More complete surveys of the inlet were conducted by the NMFS beginning in 1993. According to the NMFS (Hobbs et al. 2000 in NMFS 2008b), these surveys, which included lower, middle, and upper Cook Inlet, documented a 47 percent decline in the population from between 1994 (653 belugas) and 1998 (347 belugas). The NMFS (73 FR 6219) has also reported that the population trend for the Cook Inlet beluga from 1999 to 2008 was a -1.45 percent per year (Table 3.1-2); they added that while this trend is not significantly different from zero, it is significantly less than the expected growth of an unharvested population of 2–4 percent.

TABLE 3.1-1 ESTIMATED POPULATION OF COOK INLET BELUGA WHALES 1999-2008 BASED ON AERIAL SURVEYS.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Beluga Whales[1]	367	435	386	313	357	366	278	302	375	375

[1] Hobbs et al. 2000; Rugh et al. 2003, 2004a, 2004b, 2005a, 2005b, 2005c, 2006, 2007; FR 73:62919).

A definitive cause of the sharp decline in beluga whale abundance in Cook Inlet has not been determined. Mortalities of belugas from subsistence, strandings, and predation have been indicated as contributing causes.

Local villages in the Cook Inlet region have been harvesting belugas for subsistence for decades, but there was a significant increase in the number of whales taken in the 1990s (NMFS 2008b). Following the relatively sharp decline in beluga whale abundance in the Cook Inlet, a conditional moratorium on the subsistence harvesting of beluga whales was implemented by the NMFS in 1999 and 2000 (Public Laws 106-31 and 106-553). Subsistence harvests of beluga whales are authorized only under co-management agreements between Native subsistence groups and the NMFS. Harvest levels are set in five-year increments based upon the average abundance estimate for the previous five-year period. Since the five-year abundance estimate for the period between 2003 and 2007 was below 350 belugas, no harvest of belugas will be authorized in Cook Inlet through 2012 (FR 73:60976; 15 October 2008).

Range

The range of the Cook Inlet beluga DPS is restricted to the Cook Inlet. Most, if not all, of the stock is thought to reside in Cook Inlet year-round and it does not seem to interbreed with other stocks of belugas outside of Cook Inlet (Hansen and Hubbard 1999, Rugh et al. 2000). There seems to have been some historical contraction of the summer range. In the 1970s, the summer distribution of Cook Inlet belugas included the upper, middle, and lower Cook Inlet (NMFS 2008b). Calkins (1989) reported that belugas were observed throughout Cook Inlet during a 1979 survey. Although the NMFS has received a few reports of belugas in the Lower Cook Inlet during summer, they have not been observed there during NMFS's annual summer surveys since 2001 (NMFS 2008b); However Belugas may still disperse throughout Cook Inlet during winter (NMFS 2008b). The contraction of the summer range is thought to be due to the reduced size of the population, with the more favorable habitats of the Upper Cook Inlet being able to accommodate the smaller population (NMFS 2008b).

Life History and Habitat Use

Within Cook Inlet, beluga whales typically inhabit shallow, coastal waters (Ridgway and Harrison 1981). Satellite tagging studies, aerial surveys, and boat- and land-based observations have shown that the beluga whales remain in the inlet year-round (Hobbs et al. 2005; Rugh et al. 1999, 2000, 2004a,b, 2005a,b,c, 2007; Cornick and Kendall 2008; McGuire et al 2008). Cook Inlet beluga whales frequent Knik Arm, Turnagain Arm, Chikaloon Bay, and the Susitna River delta area in upper Cook Inlet (NMFS 2008b). Data received from satellite transmitters attached to 14 beluga whales in Cook Inlet between 2000 and 2002 indicated that in the summer and fall they concentrated in upper Cook Inlet near rivers and bays (Hobbs et al. 2005), dispersing further south and offshore in the winter.

Seasonal use of Cook Inlet habitats by belugas appears to be strongly correlated with the movements and availability of prey. Within Cook Inlet, the distribution of beluga whales is closely tied to the distribution of prey and waterbody bathymetry (NMFS 2008b). Known feeding grounds in Cook Inlet include the Big and Little Susitna Rivers, Eagle Bay to Eklutna River, Ivan Slough, Theodore River, Lewis River, and

Chickaloon River and Bay (NMFS 2008b). The dramatic tidal influx and efflux in Cook Inlet are also major factors that dictate the whales distribution throughout the day (Hobbs et al. 2005; Huntington 2000; Funk et al. 2005).

In the spring and summer, observations of belugas frequently coincide with runs of eulachon and salmon. Beginning in late April and May they are associated with eulachon runs in the Susitna and Twenty Mile Rivers in Turnagain Arm. They arrive in the Knik Arm in May, where they tend to be concentrated near the Susitna River Delta feeding on various salmon runs (NMFS 2008b). Throughout the summer they frequent the Susitna and Little Susitna Rivers, as well as smaller streams along the west side of the Inlet south to Chinitna Bay (NMFS 2008b).

Belugas use waters of the Knik Arm intensively in the fall apparently preying on runs of coho salmon. They have been observed to congregate in Eagle Bay and elsewhere on the east side of Cook Inlet at this time, and sometimes in Goose Bay on the west side of Knik Arm. In the fall the whales start to disperse to locations further offshore including Trading, Tuxedni, and Chinitna Bays. In winter, the whales moved offshore and to the upper- and mid-inlet including Knik Arm and Turnagain Arm (Hobbs et al. 2005) but also Cook Inlet waters at least as far south as Redoubt Bay and Kalgin Island (NMFS 2008b). NMFS (2008a) concluded that they probably move throughout most of Cook Inlet during winter.

Calves are born in the summer and are grey in color that lightens with age. Beluga whales typically care for their calves for about two years. Beluga whales use echolocation to hunt for prey in the turbid waters of Cook Inlet. It is now thought that beluga whales may live more than 60 years (NMFS 2008b).

Cook Inlet beluga whales hunt both individually and cooperatively (NMFS 2008b). They are opportunistic feeders and prey upon a variety of fish depending on the species available during their seasonal movements. Analysis of the stomach contents of beluga whales in Cook Inlet has shown that belugas also feed on available marine invertebrates (Klinkhart 1966; Haley 1986; Perez 1990). The euchalon is an important prey species in early spring (NMFS 2008). In the summer, belugas rely primarily on salmon (NMFS 2008b). Little is known about the winter diet of Cook Inlet beluga whales (NMFS 2008b).

Critical Habitat

Critical habitat has been proposed for the Cook Inlet beluga and is discussed below in Section 3.2.1.

Cook Inlet Beluga Whales in the Action Area

Cook Inlet belugas commonly use waters in the action area at the Port of Anchorage. Waters around the Port of Anchorage area are used by prey species of beluga whales for migration, rearing, and foraging (Pentec 2005). During the late fall, when beluga whales concentrate at the mouth of Ship Creek, they are commonly seen within 300 feet of the docks at the Port of Anchorage (Great Land Trust 2000; Blackwell and Greene 2002; NMML 2004; Port of Anchorage et al. 2009). Markowitz and McGuire (2007) reported that belugas were commonly seen traveling and feeding within 5,000 feet of the Port, and beluga whales have been seen following the tidal influx and outflux close to the Port of Anchorage in October and November (Cornick and Kendall 2008). During pre-construction surveys at the Port of Anchorage between August and November 2005, scientists observed belugas adjacent to the port and within the footprint of the planned expansion of the port on a regular basis (Prevel Ramos et al. 2006). They were also seen swimming and feeding near the mouth of Ship Creek and off of Cairn Point (Prevel Ramos et al. 2006). Table 3.1-2 shows beluga whale observations recorded by Cornick and Saxon-Kendall (2009) in the action area from June to November in 2008.

TABLE 3.1-2 BELUGA WHALE OBSERVATIONS IN THE ACTION AREA FROM JUNE TO NOVEMBER 2008

Month	Total Sightings	Total Count of Beluga Whales
June	0	0
July	1	7
August	34	262
September	12	50
October	3	10
November	10	102
Cumulative Totals	**60**	**431**

(Source: Cornick and Saxon-Kendall 2009)

Threats

Subsistence Hunting

Limited Cook Inlet beluga whale subsistence hunting occurs today. Since 1999, zero to two whales have been allowed to be harvested each year, which is substantially different than the unsustainable levels seen in the 1980s and the majority of the 1990s (NMFS 2008b). Harvest levels prior to 1980 are unknown, but they are thought to have been significantly less than those between 1980 and 1999. The reported subsistence harvest numbers between 1994 and 1998 account for the estimated decline in Cook Inlet belugas during that period. In 1996, the takes from subsistence harvest totaled nearly 20 percent of the Cook Inlet beluga population, highlighting the significant impact that subsistence hunting was having on the stock (NMFS 2008b).

Between the years of 1995 and 1998, the annual subsistence harvest of Cook Inlet belugas was 77 individuals (NMFS 2008b). In 1999, there was a voluntary moratorium on beluga whale subsistence hunting, and from 2000 to 2010 only five beluga whales were harvested for subsistence purposes. Subsistence hunting is currently well-regulated and has minimal impact on the Cook Inlet beluga whale population.

Oil-and-Gas-Related Activity

The oil and gas industry in the Cook Inlet presents a number of potential dangers to the belugas in residence there. Threats include: seismic surveys; vessel operations; low-altitude aircraft operations; well drilling and logging; the marine discharge of drilling fluids; produced waters; gray waters; and sanitary wastes (NMFS 2008b). An oil spill represents the biggest danger, but is also least the likely to occur. Seismic activities require federal permits and mitigation measures. All discharges are regulated by the EPA, and NMFS reviews and comments on all oil and gas activities.

Vessel Traffic

Vessel traffic in the Cook Inlet occurs year round, but is most pronounced during the late spring, summer, and early fall months. The port facilities in Cook Inlet include Anchorage, Point MacKenzie, Tyonek, Drift River, Nikiski, Kenai, Anchor Point, and Homer. To date, there have been no confirmed mortalities incidental to vessel traffic in the Cook Inlet (NMFS 2008b).

Commercial vessel traffic and other large vessel traffic do not pose a significant threat to Cook Inlet beluga whales because of their slower speed and straight line movement. Smaller boats that travel at quicker speeds and less direct routes offer more of a threat. The likely response to vessels in general is avoidance behavior, but the smaller, faster boats may elicit a more pronounced response (NMFS 2008b).

Commercial Fishing

The MMPA requires all fisheries operators to maintain logbooks and participate in a reporting program which provides information concerning fishing effort, interactions with marine mammals, and if the interaction resulted in determent, entanglement, injury or mortality. Based on these reports, the mortality rate of Cook Inlet belugas incidental to commercial fisheries is zero (NMFS 2008b). Additionally, observations in the upper Cook Inlet in 1999 and 2000 showed evidence that neither set gillnet fisheries nor drift gillnet fisheries were responsible for any beluga whale injury or mortality. The current commercial fishing level in the Cook Inlet is such that it should not delay the recovery of Cook Inlet beluga whales (NMFS 2008b).

Climate Change

Climate change models expect effects to be most pronounced in the high northern latitudes, but effects to a lesser magnitude may also be seen in the Cook Inlet (NMFS 2008b). It is uncertain whether diminishing sea ice or other climate effects will result in adverse effects to non-ice-obligate species, such as the Cook Inlet beluga whale.

3.1.7 Steller Sea Lion

Biological Populations and Listing Status

Because of their decline, NMFS listed the Steller sea lion as threatened range-wide under the ESA in April 1990. Critical habitat has been defined for Steller sea lions as a 20-nautical-mile buffer around all major haul-outs and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (50 CFR 226.202 on Aug. 27, 1993).

Prior to 1997, only one population of Steller sea lions was recognized in Alaskan waters— the Eastern U.S. DPS. Based largely on differences in genetics, morphology, and population trends, this single population was split into two DPSs (Baker et al. 2005, Phillips et al. 2009, FR 62:30772). The Western DPS (WDPS) inhabits an area of Alaska from Prince William Sound westward to the end of the Aleutian Island chain and into Russian waters (NOAA 2010a). This segment occurs from 144 degrees W (Cape Suckling, east of Prince William Sound), westward to Russia and Japan. The Eastern DPS (EDPS) of Steller sea lions occurs from southeast Alaska southward to California (NMFS 2004; NMML 2010).

Because of a pattern of continued decline in the WDPS, it was listed as endangered on 5 May 1997 (FR 62:30772), while the EDPS remained under threatened status (NOAA 2010a). Population surveys suggest that a portion of the EDPS in the northern part of its range (Southeast Alaskan and British Columbia) is stable or increasing, while the remainder of the EDPS and all the WDPS is declining (NOAA 2010b).

Population Status, Trends, and Abundance

There are approximately 39,000–45,000 Steller sea lions in the Western U.S. and 44,500–48,000 in the Eastern U.S. The WDPS declined by 75 percent between 1976 and 1990, and decreased another 40 percent between 1991 and 2000 (the average annual decline during this period was 5.4 percent). Since the 1970s, the most significant drop in numbers occurred in the eastern Aleutian Islands and the western Gulf of Alaska (NOAA 2010b).

Based on non-pup counts of Steller sea lions on trend-sites throughout the Gulf of Alaska and Aleutian Islands, the overall WDPS population trend is stable and may be insignificantly increasing. The number of non-pups counted at trend-sites between 2000 and 2008 increased 12 percent. The increase in counts between 2004 and 2008 is 1 percent (NOAA 2010a).

Range

Steller sea lions range along the North Pacific Ocean rim from northern Japan to California (Loughlin et al. 1984), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands. The northernmost rookery in the Bering Sea is on Walrus Island near the Pribilof Islands. In the Gulf of Alaska the northernmost rookery is on Seal Rocks just outside of Prince William Sound (Kenyon and Rice 1961).

Steller sea lions are distributed across the North Pacific Ocean rim from northern Hokkaido, Japan, through the Kuril Islands, Okhotsk Sea, and Commander Islands in Russia, the Aleutian Islands, central Bering Sea, and southern coast of Alaska, and south to the Channel Islands off California (NMML 2010).

Life History and Habitat Use

Steller sea lions prefer the colder, temperate to sub-arctic waters of the North Pacific Ocean. Haul-outs and rookeries usually consist of beaches (gravel, rocky, or sand), ledges, and rocky reefs. In the Bering Sea and Okhotsk Sea, sea lions may also haul-out on sea ice, but this is considered atypical behavior (NOAA 2010b). During the May–July breeding season, Steller sea lions congregate at more than 40 rookeries, where adult males defend territories, pups are born, and mating takes place. Non-reproductive animals congregate to rest at more than 200 haul-out sites where little or no breeding takes place. Sea lions continue to gather at both rookeries and haul-out sites outside of the breeding season (NMML 2010).

Steller sea lions forage near shore and in pelagic waters. They are capable of traveling long distances in a season and can dive to approximately 1,300 feet in depth. Steller sea lions are opportunistic predators, foraging and feeding primarily at night on a wide variety of fishes (e.g., capelin, cod, herring, mackerel, pollock, rockfish, salmon, and sand lance), bivalves, cephalopods (e.g., squid and octopus) and gastropods. Prey varies geographically and seasonally. They may disperse and range far distances to find prey. Steller sea lions have been known to prey on harbor seal, fur seal, ringed seal, and possibly sea otter pups, but this would represent only a supplemental component to their diet (NMML 2010).

Critical Habitat

Critical habitat has been designated for Steller sea lions and is discussed below in Section 3.2.2.

Sea Lions in the Action Area

Sea lions do frequently occur in the action area of the Port of Seward, as well as the greater Resurrection Bay. Vessel traffic is common in the area and sea lions have become accustomed to the disturbances of this local traffic.

Threats

Subsistence Hunting

Under the ESA and the MMPA, Coastal Alaska Natives are allowed to harvest threatened and endangered species for subsistence purposes. The annual subsistence harvest has decreased substantially from approximately 550 sea lions in 1992 to annual takes of between 165 and 215 from 1997 to 2004 (Wolfe et al. 2005). The greatest numbers of sea lions harvested were in the Pribilof Islands and the Aleutian Islands (Wolfe et al. 2005). The surveys that produced these estimates covered all Alaskan communities that regularly hunt Steller sea lions. Males of all ages are the most vulnerable to subsistence harvests; however, the threat of hunting occurs at a medium frequency. Therefore, the relative impact on the recovery of the WDPS due to the Alaska Native subsistence harvest is considered low, with a high-feasibility of mitigation. The proposed action will not impact the annual harvest of Steller sea lions, which are not hunted in the action area.

Contaminants

Aside from the Exxon Valdez Oil Spill in 1989, which occurred well after the Steller sea lion decline was underway, no events have been recorded that support the theory of acute toxicity leading to Steller sea lion decline (Calkins et al. 1994). Steller sea lions have shown relatively low levels of toxic substances as well as heavy metals (Lee et al. 1996). However, there are no studies on the effects of toxic substances at the population level to determine their impact on vital rates and population trends. Sea lions exposed to oil spills may become contaminated with polycyclic aromatic hydrocarbons (PAHs) through inhalation, dermal contact and absorption, direct ingestion, or by ingestion of contaminated prey. Overall, there is still some concern that toxic substances may have indirect impacts on individual vital rates, however, relative impact on the recovery of the western DPS of Steller sea lion due to toxic substances is not considered high.

Climate Change

The potential impact of environmental change, through a reduction in quality and quantity of Steller sea lion prey species, has received substantial attention from the scientific community. Periodic shifts in oceanic and atmospheric conditions may have major effects on some prey fish populations. Precisely how the “regime shifts” alter fish populations and affect Steller sea lions, is poorly understood and has not been resolved.

The change in North Pacific fish community structure stemming from the regime shift in 1976–77 may have been substantial enough to alter the quality and availability of prey, such as pollock and other gadids for Steller sea lions, across the North Pacific Ocean (NMFS 2008). This may have resulted in part to nutritional stress of juvenile Steller sea lions. It is likely that, although oceanographic and atmospheric conditions have changed over the last several decades, those changes have not been outside the range of natural fluctuation previously experienced by Steller sea lions (NMFS 2008). Further, available evidence indicates that the current fish community structure is very similar to that just prior to the 1976–77 regime shift, and changes in Steller sea lion diets between regimes were unremarkable (NMFS 2008). Thus, the potential impact of environmental variability on recovery in the near term is minimal. A threat to recovery, nonetheless, will persist until the environment and associated fish distributions and populations change again to favor Steller sea lions, increasing their carrying capacity and subsequently Steller sea lion survivorship and birth rates.

Vessel Disturbance

The possible impacts of various types of disturbance on Steller sea lions have not been well studied, yet the response by sea lions to disturbance will likely depend on season and their stage in the reproductive cycle. Vessels that approach rookeries and haul-outs at slow speed, in a manner that allows sea lions to observe the approach, have less effect than vessels that appear suddenly and approach fast. Sea lions may become accustomed to repeated slow vessel approaches, resulting in minimal response. There are no rookeries in the action area. Routine vessel traffic into Seward is not known to have resulted in adverse effects on Steller sea lions.

Commercial Fishing

The potential impact of competition with fisheries, through a reduction in the biomass and quality of Steller sea lion prey species, is a highly debated topic among the scientific community. The effect of fisheries on the Steller sea lion prey field over time is largely unknown. As noted above, it is likely that no one factor accounts for the dramatic shifts in Steller sea lion abundance in the WDPS, and there are different theories as to the reasons for the period of steep decline (e.g., 1980s), slow decline (e.g., 1990s), and slow recovery (e.g., 2000s).

Fishing may have contributed to changes in the location, density, distribution, availability, quality, and energy value of the Steller sea lion prey field. While it seems reasonable to conclude that commercial fisheries for primary prey species of Steller sea lions have led to a reduction in the carrying capacity of the environment, it is much less clear how commercial fisheries are currently affecting the recovery of the WDPS. Nonetheless, regarding the indirect effects of commercial fisheries on the WDPS, it seems reasonable to conclude that such activities may be a continuing stressor.

Commercial fisheries can directly affect Steller sea lions in the Gulf of Alaska, by injuring and killing them in fishing gear or in vessel collision or being killed by fishermen. In general, the current level of direct impact to Steller sea lions is relatively small. However, it is likely that historical direct impacts influenced the rapid decline rate observed in the 1980s, but by the mid-1990s was no longer an important factor in the decline and lack of recovery (NMFS 2010). Commercial fishing regulations are in place to protect endangered Steller sea lions.

3.1.8 Polar Bear

Biological Populations and Listing Status

Evidence from telemetry surveys, tagging studies, and traditional knowledge has resulted in the recognition of 19 partially-discrete polar bear populations (IUCN 2006). Two recognized polar bear populations occur in Alaska: the Southern Beaufort Sea stock and the Chukchi/Bering Seas stock. Only the Southern Beaufort Sea Stock is found in or near the action area.

Because the principal habitat of polar bears is sea ice, it is considered a marine mammal, and included in the species protected under the MMPA. On 15 May 2008, the polar bear was listed as a threatened species range-wide under the ESA (FR 73:28212). This listing is based on the best available science showing that a loss of sea ice threatens polar bear habitat. The polar bear was listed as a threatened species which is defined as a species likely to become endangered in the foreseeable future.

The Southern Beaufort Sea (SB) population occurs between Icy Cape, Alaska on the western boundary and Pearce Point, Northwest Territory (NWT), Canada (Amstrup et al. 1986, Amstrup and DeMaster 1988, Stirling 1988). The size of the SB population was estimated to be approximately 1,800 animals in

1986 (Amstrup et al. 1986). A new population assessment derived from capture-recapture data collected during 2001 to 2006 estimated 1,526 (with a 95 percent confidence interval equal to 1,211–1,841) polar bears in the region in 2006 (Regehr et al. 2006). Because the precision of the earlier estimate was low, the two estimates cannot be statistically differentiated. The harvest of polar bears in the SB region is shared between Canada and the United States and since 1988 has been managed under the "Polar Bear Management Agreement for the Southern Beaufort Sea" by the Inuvialuit Game Council of Canada, and the North Slope Borough of Alaska. The harvest quota for the SB is 80 animals (40 for Alaska and 40 for NWT). In 2004/2005 the joint harvest was 46 bears (Schliebe et al. 2006, Branigan et al. 2006). The status of the SB population is designated as reduced (FR 73:28212, 15 May 2008; page 28217) and the predicted trend is declining (Aars et al. 2006).

Populations Status, Trends, and Abundance

The total number of polar bears worldwide is estimated to be about 20,000–25,000 bears (Schliebe et al. 2006). The most recent stock assessment estimated a population size of 1,526 bears (USFWS 2009a; USFWS 2010a). The SB population of polar bears was thought to be low and declining in the 1960s due to excessive harvest, and to have increased dramatically, (perhaps doubling) between the 1960s and the 1990s (Amstrup et al. 1998, Amstrup 2000,). The size of the SB population was estimated to be approximately 1,800 animals in 1986 (Amstrup et al. 1986, Amstrup 2000), and may have been as high as 2,500 in the late 1990s (Amstrup et al. 2001).

In 2006, results from an intensive five-year mark-recapture study indicated that the SB subpopulation included 1,526 polar bears (Regehr et al. 2006) suggesting a decline between the late 1990s and 2006, although low precision in the previous estimate of 1,800 precluded a statistical determination. Subsequent analyses of the 2001–2006 data indicates that the survival and breeding of polar bears during this period were affected by sea ice conditions. The population is currently considered to be declining.

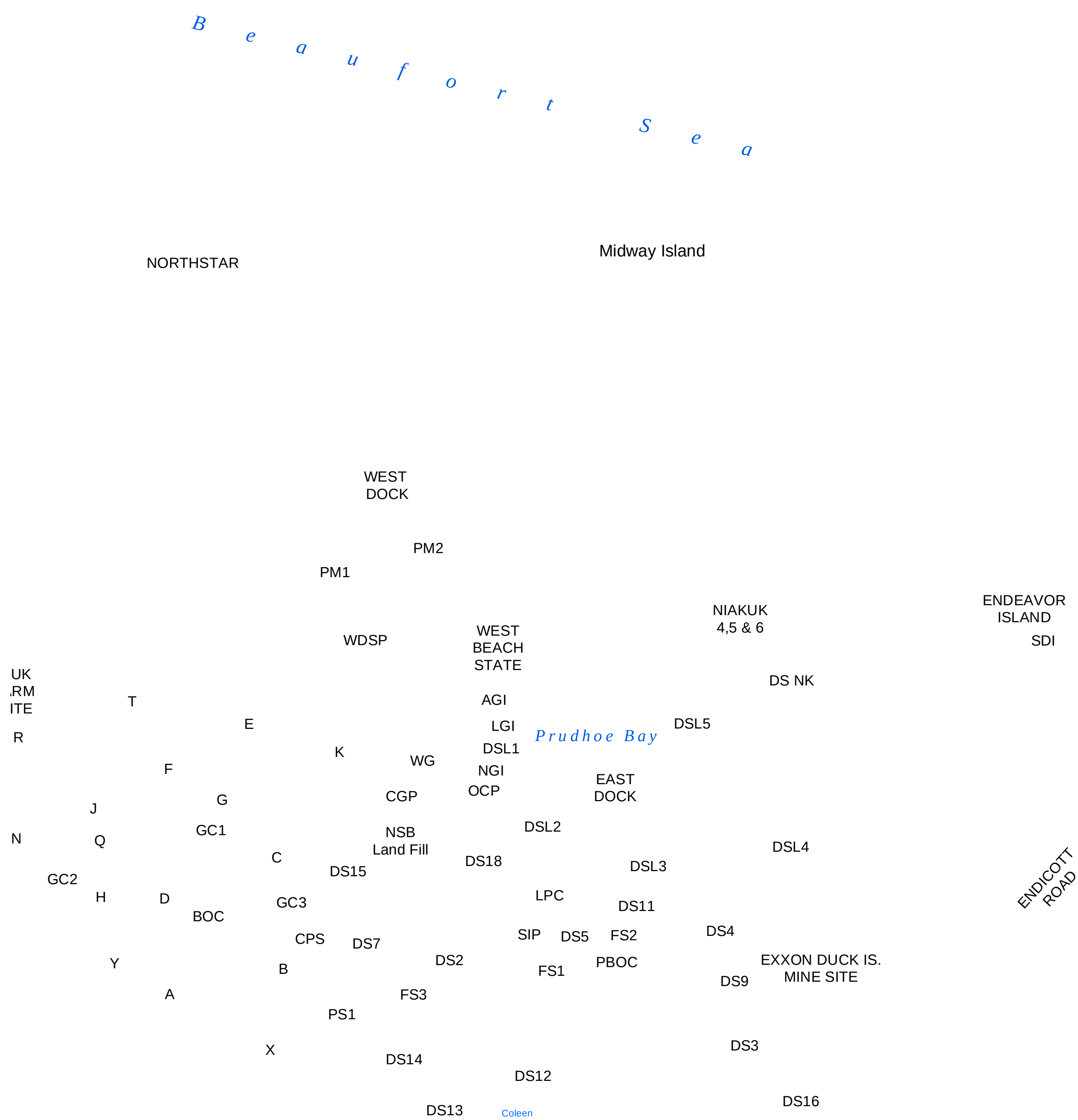
Range

Polar bears are the apical predators of the Arctic marine ecosystem (Amstrup 2003) and are distributed throughout regions of arctic and subarctic waters where the sea is ice-covered for large portions of the year. The SB population is found from Icy Cape, Alaska east to Pearce Point, NWT, Canada (Amstrup et al. 1986, Amstrup and DeMaster 1988, Stirling 1988).

Life History and Habitat Use

Polar bears are common in the Beaufort Sea and are known to occur in small, widely-distributed numbers in the proposed project area. Over most of their range, polar bears remain on the sea ice year round, as the sea ice is where their prey (mostly ringed seals [*Phoca hispida*]) is accessible. Polar bears visit land only for short periods, however, polar bear use of coastal areas during the fall open-water period has increased in recent years and is projected to continue to increase (Kochnev et al. 2003; Schliebe et al. 2005).

Female polar bears will come ashore to den and give birth to young. In the northern Alaska coastal areas, pregnant females enter maternity dens by late November and emerge as late as early April. Maternal dens typically are located in snow drifts in coastal areas, stable parts of the offshore pack ice, or on landfast ice (Amstrup and Gardner, 1994). Studies have shown that more bears are now denning nearshore rather than in far offshore regions (Fischbach et al. 2007). The highest density of land dens in Alaska occur along the coastal barrier islands of the eastern Beaufort Sea and within the Arctic National Wildlife Refuge (USFWS 2009a). See Figure 3.1-6.



Polar Bear Sighting

Polar Bear Critical Habitat

Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

Sighting data obtained from Minerals Management Service Bowhead Whale Aerial Survey Project Historical Database, 1979-2007.

NAD83, Alaska Albers Equal Area.

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

POLAR BEAR SIGHTINGS AND CRITICAL HABITAT IN THE BEAUFORT SEA

Alaska Stand Alone Gas Pipeline/***ASAP***

Biological Assessment

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

SCALE: 0 1 2 3 4 Miles

FIGURE: 3.1-6

AES-RTS: 11-001-013.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Only pregnant female polar bears den; other members of the population (males, solitary females, females with older cubs) remain active throughout winter. Pregnant females from the SB stock may den in the action area. Durner et al. (2006) found approximately 50 percent of pregnant females in the Beaufort Sea came ashore to construct maternity dens, while Amstrup and Gardner (1994) found 42 percent of females observed in the Alaskan Chukchi and Beaufort seas and Canadian Beaufort Sea from 1983–1991 denned on land. Fishbach et al. (2007) suggest 60 percent of females in these areas den on land, while the remaining females denned on shorefast ice, or drifting pack ice (USFWS 2009a).

Pregnant females come ashore to den in late October/early November depending upon ice movements and timing of freeze up (Lentfer and Hensel 1980). In Alaska, dens are sparsely distributed along a narrow coastal strip with sightings reported up to 30 miles inland (Lentfer and Hensel 1980) and 38 miles inland (Amstrup and Gardner 1994). Denning habitat includes areas such as coastal and river banks and bluffs where snow accumulates early.

Polar bears derive essentially all their sustenance from marine mammal prey obtained on sea ice habitat. The high fat intake from specializing on marine mammal prey allows polar bears to thrive in the harsh arctic environment (Stirling and Derocher 1990; Amstrup 2003; USFWS 2009a). Over much of their range, polar bears are dependent on ringed seals (Smith 1980) and where common, bearded seals (Derocher et al. 2002).

Polar Bears in the Action Area

Polar bears are expected to occur in the action area infrequently (Figure 3.1-6). As mentioned above, they spend the majority of time on sea ice, coming on land only occasionally. Some pregnant females from the SB stock come on land to enter dens in late fall. Maternal polar bear denning habitat exists in the action area, however there are few documented den sites found in that area (Figure 3.1-7).

Amstrup and Garner (1994) studied fidelity to denning locations and found that bears that denned once on pack ice were more likely to den on pack ice than on land in subsequent years. Bears were also found to be faithful to general areas. They are more likely to return to the eastern coastal area to den (if that is where they previously denned), earlier than to the western half of the Alaska coast. Annual variations in weather, ice conditions, prey availability, and the long-distance movements of polar bears (Amstrup et al. 1986, Garner et al. 1990) make recurrence of exact denning locations unlikely. If there are documented historical den sites found in the action area, there is no evidence indicating that a particular den site will be used again.

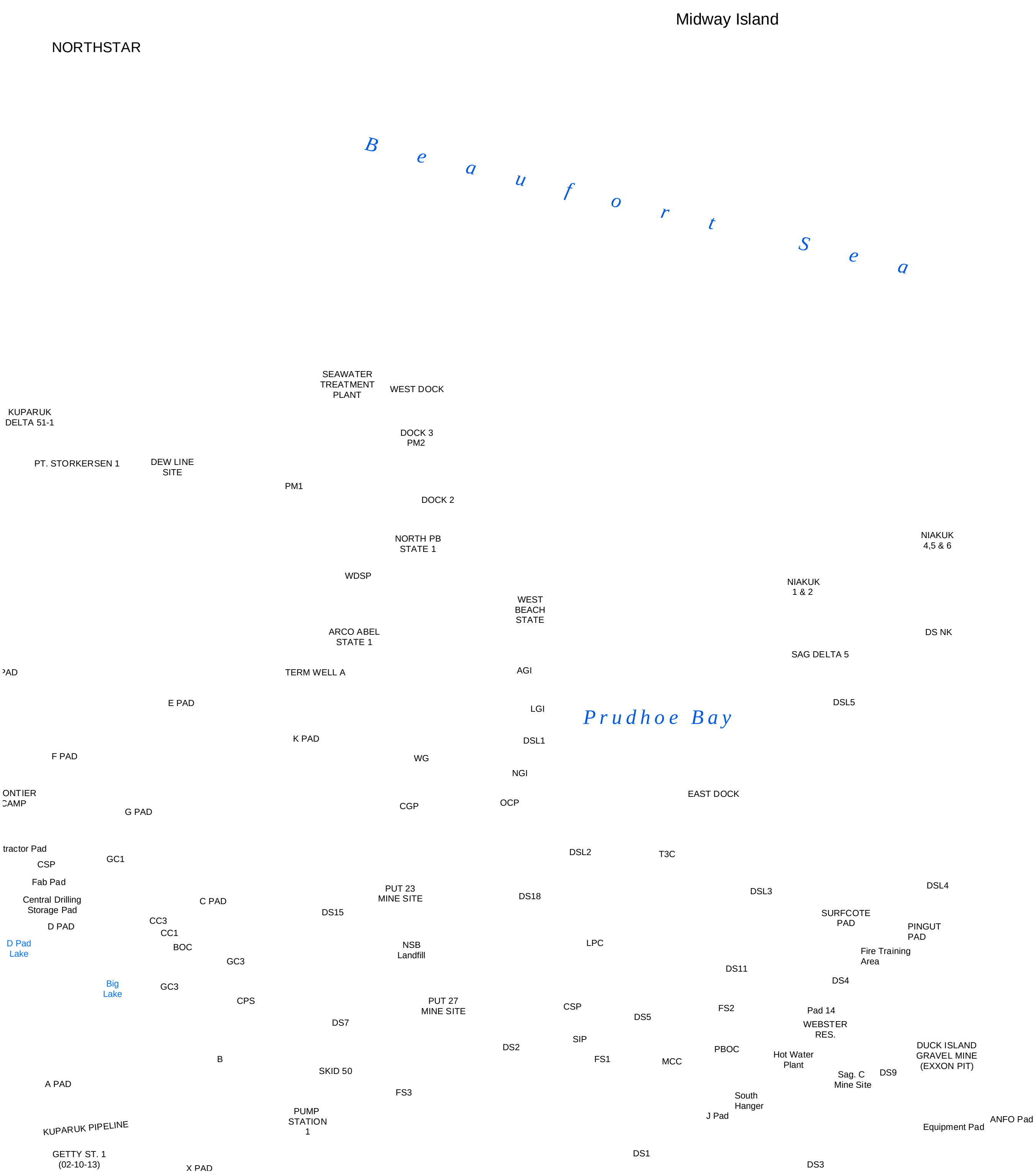
Threats

Historical and present potential threats effecting polar bears in the Beaufort Sea area include subsistence and sport hunting, environmental contaminants, climate change and development.

Hunting

Since passage of the MMPA, the sport hunting of polar bears in the United States has ceased. Alaska Natives that live on the North Slope of Alaska still harvest polar bears for subsistence purposes. There is a Native-to-Native agreement between the Iñupiat people of Alaska and the Inuvialuit people of Canada, developed in 1988, that establishes quotas and recommendations concerning hunting practices (USFWS 2009a). The current harvest levels, which have averaged 36 bears per year since 1980, are thought not to impact the rate of recovery of the species (USFWS 2006). Subsistence hunting for polar bears occurs near the villages of Barrow, Kaktovik, and Nuiqsut, the closest being Nuiqsut, located 59 miles from West Dock.

THIS PAGE INTENTIONALLY LEFT BLANK



Maternal Polar Bear Den Location

Maternal Bear Denning Habitat

Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

Maternal Polar Bear Den Location data obtained from:
USGS Catalogue of Polar Bear Maternal Den Locations in the Beaufort Sea and Neighboring Regions, Alaska 1910-2010 [Data Series 568].

NAD83, Alaska Albers Equal Area.

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
REGULATORY AND TECHNICAL SERVICES

MATERNAL POLAR BEAR DEN LOCATIONS/HABITAT IN THE BEAUFORT SEA

Alaska Stand Alone Gas Pipeline/***ASAP***

Biological Assessment

SCALE: 0 1 2 3 Miles

FIGURE: 3.1-7

AES-RTS: 11-001-008.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Environmental Contaminants

The types of contaminants with the greatest potential to be a threat threat to polar bears in the Arctic are petroleum hydrocarbons, persistent organic pollutants (POPs), and heavy metals. The Arctic ecosystem is particularly sensitive to environmental contamination due to the slower rate of breakdown of POPs, including organochlorine compounds (OCs) (Fisk et al. 2001; Lie et al. 2003). The highest concentrations of OCs have been found in species at the top of the marine food chains such as polar bears, which feed primarily on seals (Braune et al. 2005). The SB polar bear populations may also have concentrations of mercury close to the reported toxicological threshold levels of 60 micrograms wet weight for marine mammals (Arctic Monitoring and Assesment Program [AMAP] 2005).

Polar bear ranges overlap with many active oil and gas operations within 25 miles of the coast or offshore (Schliebe et al. 2006). Exposure of polar bears to petroleum hydrocarbons could potentially come from direct contact with oil spill products. To date, no major oil spills have occurred in the Alaska marine environment within the range of polar bears. Industrial development in polar bear habitat may also expose individuals to other hazardous substances through improper storage or spills.

The USFWS determined that contaminants are not a past, present, or future forseeable threat to the survival and recovery of polar bears throughout all or a portion of their range (FR 73:28,288).

Climate Change

The listing of polar bears as a threatened species under ESA is based largely on findings that continuing declines in arctic sea ice, linked to climate change, are likely to threaten the polar bear species within the foreseeable future (FR 73:28212, May 15, 2008). USFWS has determined that ongoing and projected loss of sea ice habitat is likely to result in nutritional stress and reduced productivity as already evidenced in the Western Hudson Bay and Southern Beaufort Sea populations (FR 73:28292). Eventually, at rates and magnitudes that will vary among populations, all polar bear populations are projected to suffer adverse effects, with some populations at risk of becoming extirpated if sea ice declines continue as projected through the end of the century.

Declining sea ice in the arctic marine environment may also lead to changes in polar bear use of their terrestrial environment. Sea ice must be stable for ice denning to be successful. Therefore, if the quality of sea ice decreases, more females may den on land (Durner et al. 2006). An estimate of greater than 60 percent of females from the SB stock currently den on land, while the remaining females den on drifting pack ice (Fischbach et al. 2007). In addition, if large areas of open water persist until late winter females may be unable to access land to den (Stirling and Andriashek 1992). Climate change may also affect the quality of denning habitat on coastal or island bluffs due to rapid erosion and slope failure due to melting permafrost (Durner et al. 2006). Changes in autumn and winter precipitation or wind patterns could significantly alter the availability and quality of denning habitat (Durner et al. 2003).

Polar bears' use of coastal habitats in the fall, during open-water and freeze-up conditions, has increased since 1992 (USFWS 2006). Since the late 1990s, the timing of ice formation in the fall has occurred later in the year (November or early December, as opposed to early or mid-October in the 1980s) resulting in an increased amount of time that the area was not accessible to polar bears. Consequently, bears spent a greater amount of time on land and not feeding. The later formation of nearshore ice increases the probability of bear–human interactions occurring in coastal villages (Schliebe et al. 2006). USGS created a website containing a compilation of new polar bear findings.

Human Development

The primary form of human development near the polar bear range that overlaps the action area has been oil and gas exploration and production-related facilities. Minimal effects have occurred to polar bears from the oil and gas industry in Alaska during the past 30 years. Since 1968 there have been only two known incidents of lethal takes of polar bears by industry in Alaska. Formal Section 7 Consultations have been conducted for the Chukchi Sea and Beaufort Sea Incidental Take Regulations (ITRs), which authorize the incidental taking of a small number of polar bears in these seas and the adjacent ACP during oil and gas activities in the Alaskan Arctic. No lethal take associated with the oil and gas industry has occurred during the period covered by ITRs (1991 until present) in either the Chukchi or Beaufort seas (USFWS 2009a).

Females and cubs denning on land can be vulnerable to disturbance from oil and gas activities; however, most females have been found to be relatively tolerant of human disturbance (Amstrup 1993). If disturbed, females appear more likely to abandon their dens in the fall before cubs are born and relocate, than in the spring when young cubs are less likely to survive if they leave the maternal den early (Lentfer and Hensel 1980, Amstrup 1993, Durner et al. 2006). Polar bears occur at or near most coastal and offshore facilities, and can occur in the project action area. The proposed project and associated activities will be subject to regulations under the MMPA, ITRs, and associated Letters of Authorization (LOAs), therefore minimizing human–bear incidents and interactions.

3.2 *Critical Habitat*

3.2.1 Cook Inlet Beluga Critical Habitat

Designation of Critical Habitat

On April 11, 2011, the NMFS published a final rule to designate 3,013 sq mi of critical habitat for the Cook Inlet beluga whale DPS, effective May 11, 2011 (76 FR 20180). Figure 3.2-1 shows an overview of the critical habitat in Cook Inlet. The NMFS excluded the Port of Anchorage from the final rule in consideration of national security interests. Portions of military lands were determined to be ineligible for designation of critical habitat.

Essential Features and Description of Critical Habitat

The NMFS has categorized Cook Inlet into three habitat types according to their importance to the conservation of the beluga whales. The most northern portion of the inlet is considered Type I habitat and the more southern portion is Type II habitat. Figure 3.2-1 shows the boundaries of the habitat types.

Type I habitat—The southern boundary of the Type I habitat area stretches from three miles southwest of the Beluga River across to Point Possession. It contains essential foraging and nursery habitat intensively used by beluga whales between the spring and fall. It is also the area of the inlet with the greatest potential of impacts from anthropogenic sources, such as industrial activities.

The northern portion of Cook Inlet, which has been designated as Type I habitat, consists of shallow tidal flats, and river mouths. The shallow tidal flats may also aid in molting or escaping predators (NMFS 2008b). The river mouths are important for eulachon and salmon and therefore attract feeding belugas. Following the coho salmon run, belugas spend more time in Type I habitat during the spring and fall (Funk et al. 2005). Type I habitat is the most valuable of the three habitat types.

Type II habitat—The Type II habitat area is primarily used during the fall and winter. However, there are a few isolated spring feeding areas within this habitat. Type II habitat includes the area south of the Type I area to a southern boundary line at 60.2500 N latitude (NMFS 2008b). Type II habitat also includes nearshore areas that extend down the west coast of the inlet following the tidal flats into Kamishak Bay to Douglass Reef, and a section of Kachemak Bay (NMFS 2008b). During the time beluga whales spend in Type II habitat, they tend to be in lower densities and deeper water (NMFS 2008b).

Critical Habitat Relative to the Proposed Action Area

The Port of Anchorage lies within the NMFS-determined Type I habitat (Figure 3.4-1), which is important to beluga whales for feeding and nursing calves. Belugas will likely be present in or near the action area during the construction period in the summer, when barges associated with the project will be arriving at the port.

3.2.2 Polar Bear Critical Habitat

Designation of Critical Habitat

On December 7, 2010, USFWS published a final rule designating critical habitat for the threatened polar bear (FR 75:76086–76137).

Primary Constituent Elements and Description of Critical Habitat

The Primary Constituent Elements of critical habitat for the polar bear in the United States in §17.95 Critical Habitat (FR 75:76137), include the following:

> (*i) Sea ice habitat used for feeding, breeding, denning, and movements, which is sea ice over waters 984 feet (300 m) or less in depth that occur over the continental shelf with adequate prey resources (primarily ringed and bearded seals) to support polar bears.*
>
> *(ii) Terrestrial denning habitat, which includes topographic features such as coastal bluffs and river banks, with the following suitable macrohabitat characteristics:*
>
>> *(A) Steep, stable slopes (range 15.5–50.0°), with heights ranging from 4.3 to 111.6 feet (1.3 to 34 m), and with water or relatively level ground below the slope and relatively flat terrain above the slope;*
>>
>> *(B) Unobstructed, undisturbed access between den sites and the coast;*
>>
>> *(C) Sea ice in proximity to terrestrial denning habitat prior to the onset of denning during the fall to provide access to terrestrial den sites; and*
>>
>> *(D) The absence of disturbance from humans and human activities that might attract other polar bears.*
>
> *(iii) Barrier island habitat used for denning, refuge from human disturbance, and movements along the coast to access maternal den and optimal feeding habitat. This includes all barrier islands along the Alaska coast and their associated spits, within the range of polar bears, in the United States, and the water, ice, and terrestrial habitat within 1 mile (1.6 km) of these islands (no-disturbance zone).*

Designated critical habitat encompasses three areas or units: Unit 1–sea ice, Unit 2–terrestrial denning habitat, and Unit 3–barrier island habitat. The total area designated covers 187,157 square miles, of which about 96 percent is sea ice habitat. The units are:

- *Sea ice habitat*: Extends from the Canadian border in the east to a point south of Hooper Bay, located over the continental shelf; including ice over water out to the 984 feet water depth contour or limits of the U.S. Exclusive Economic Zone;
- *Terrestrial denning habitat*: The lands within 20 miles of the northern coast of Alaska from the Canadian border west to the Kavik River, and the lands within 5 miles of the shoreline between the Kavik River and Barrow.
- *The Barrier Island habitat*: The offshore islands along Alaska's northern coast from the Canadian border west to Barrow, south to Point Hope, southwest to Wales, southeast to Nome, and ending at Hooper Bay, Alaska.

Certain areas were exempted from critical habitat according to the Final Rule designating the critical habitat, these are:

- Five U.S. Air Force (USAF) Radar Sites–located at Point Barrow, Point Lonely, Oliktok Point, Point Bullen, and Barter Island (measures to protect polar bears occurring in habitats within or adjacent to these facilities are included in the rule)
- Townsites at the Native communities of Barrow and Kaktovik
- All existing manmade structures, regardless of land ownership status (USFWS 2010a)

Critical Habitat in the Action Area

The action area of the proposed project includes approximately 1,112 acres located within designated Polar Bear Critical Habitat areas (As noted in Figure 3.1-6 above). This area consists mostly of terrestrial habitat, a small proportion of which may be suitable for, and could be used by, pregnant females for maternal denning in the winter months (As noted in Figure 3.1-7 above). Terrestrial dens provide pregnant polar bears with a safe environment away from predatory polar bears, human disturbance, and harsh weather, all of which threaten cub survival. In addition, Barrier Island habitat is used by polar bears for denning, as a corridor for traveling, a refuge from human disturbances, and for access to dens and feeding (USFWS 2010a). West Dock is located 1 mile from the nearest barrier island. West Dock is an existing facility and is exempted in the final critical habitat designation.

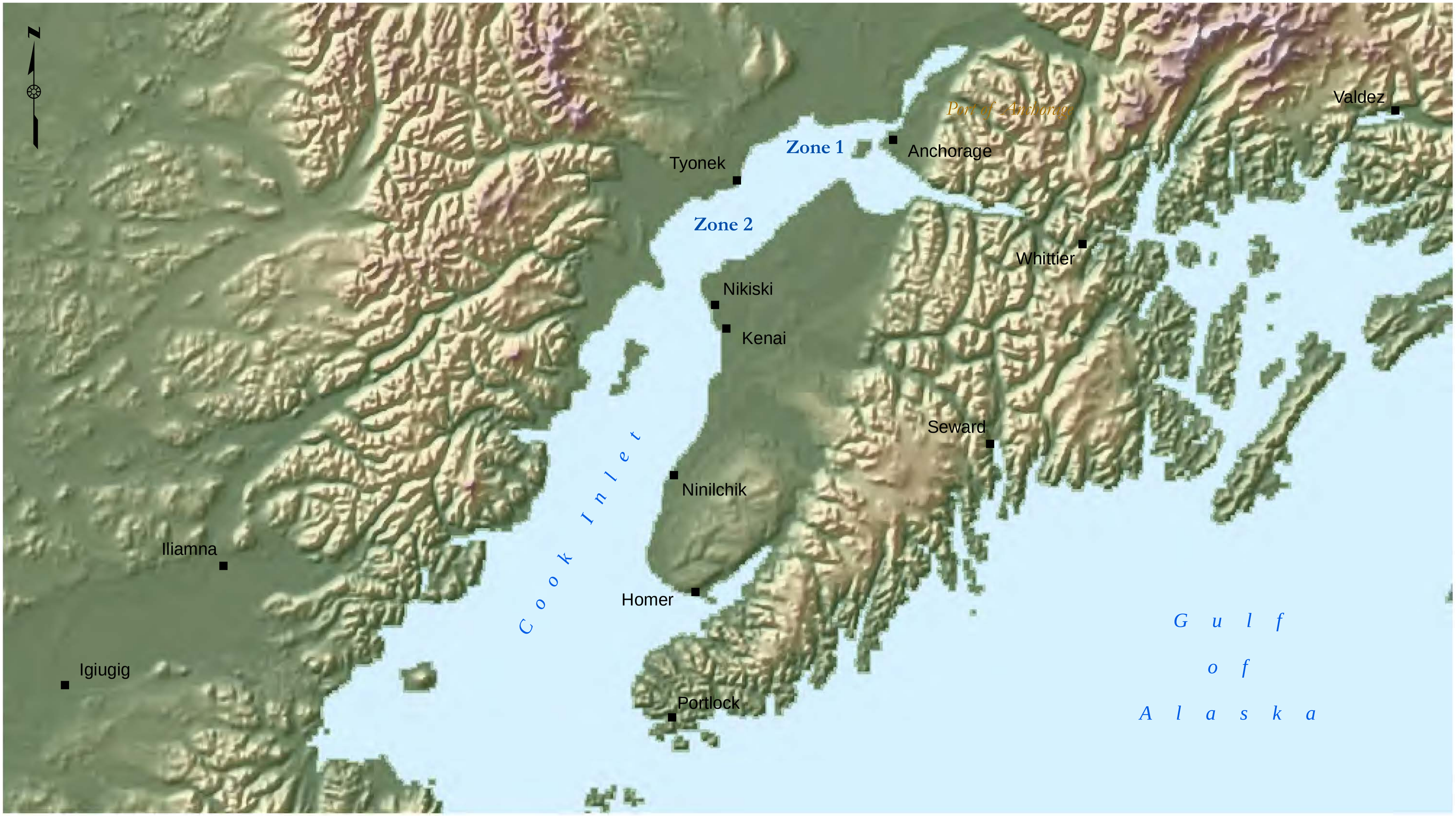
Sea ice habitat provides a platform for polar bears to hunt, breed, rest, move to terrestrial denning areas, and for long-distance travel. Polar bears require a stable ice platform from which to hunt seals, as this platform provides access to seals either at breathing holes, the ice edge, or near leads and polynyas. Sea ice habitat adjacent to open water areas over the shallower waters, where the highest densities of seals occur, is preferred polar bear habitat (USFWS 2010a).

3.2.3 Steller Sea Lion Critical Habitat

Designation of Critical Habitat

On 27 August 1993 NMFS published a final rule to designate critical habitat for the threatened and endangered populations of Steller sea lions (FR 58:45269).

However, there is no designated Steller sea lion critical habitat in the ASAP action areas, including action areas within Cook Inlet or Resurrection Bay (Figure 3.2-2). Critical habitat nearest to the Port of Seward is associated with the major haul-out at Outer Island and haul-outs at Gore Point located in Gulf of Alaska waters outside Resurrection Bay.



Beluga Whale Proposed Critical Habitat - Zone 1

Beluga Whale Proposed Critical Habitat - Zone 2

Alaska Stand Alone Gas Pipeline Route

Road

■ Town

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

BELUGA WHALE
CRITICAL HABITAT IN COOK INLET
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

SCALE:
0 12.5 25 50
Miles

FIGURE:
3.2-1

NAD83, Alaska Albers Equal Area

AES-RTS: 11-001-007.mxd, 04/21/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Stellar Sea Lion Critical Habitat

Alaska Stand Alone Gas Pipeline Route

Road

■ Town

NAD83, Alaska Albers Equal Area

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

STELLER SEA LION CRITICAL HABITAT NEAR THE ACTION AREA
Alaska Stand Alone Gas Pipeline/***ASAP***
Biological Assessment

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

SCALE: 0 12.5 25 50 Miles

FIGURE: 3.2-2

AES-RTS: 11-001-012.mxd, 04/21/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

3.3 *Candidate and Proposed Species*

3.3.1 Pacific Walrus

Biological Populations and Listing Status

On 8 September 2009, the USFWS announced a finding on a petition to list the Pacific walrus as threatened or endangered under the ESA and to designate critical habitat. The USFWS found that the petition presented scientific information indicating that listing a subspecies may be warranted. On February 8, 2011, the USFWS designated the Pacific walrus as a candidate for ESA protection. The 12-month finding indicated that, while the Pacific walrus warrants protection under the ESA, there are higher priority species that need to be addressed prior to the walrus. The walrus' status will be reviewed annually and a proposed rule to protect the species under the ESA will be developed in the future.

Populations Status, Trends, and Abundance

There is no reliable estimate for the size of the Pacific walrus population. Aerial surveys conducted by the U.S. and Russia between 1975 and 1990 produced population estimates ranging from 201,039 to 234,020 animals. However, these estimates are considered minimum values and are not suitable for detecting trends in population size (Gilbert, et al. 1992).

The number of Pacific walrus surveyed within a 122,860 square mile area was estimated at 129,000 with 95 percent confidence limits of 55,000 to 507,000 individuals in 2006. This estimate does not account for areas that were not surveyed, some of which are known to have had walruses present. Therefore the estimate was negatively biased to an unknown degree (Fay 1982; Burn, et al. 2009; USFWS 2010b) which provides assurance that walrus population size was greater than the estimate (NMFS 2005). Considering this, more surveys will be required to verify any trends in population size and to quantify such changes.

Range

The Pacific walrus is distributed in Russian and Alaskan waters over the continental shelves of the Chukchi and Bering seas, and ranges in the north from the eastern East Siberian Sea to the western Beaufort Sea. Migrations are directly related to the seasonal advance and retreat of the sea ice (Fay 1982, ADF&G 2009). Walruses are found in waters less than 656 feet deep along the pack ice margin where ice concentrations are less than 80 percent (Fay 1982). This ice-covered, shallow continental shelf is important for walruses, as they use this for rest and for calves incapable of deep or long-term diving (MMS 2007). Walruses use floating sea ice for birthing, nursing, resting, isolation from predators, and for passive transport to new feeding areas (USFWS 2009b). Reduced summer sea ice over the continental shelf in the Chukchi Sea in the past decade has resulted in increased use of land haul-outs by adult females and young during ice-free periods (Jay and Fischbach 2008).

Life History and Habitat Use

Walruses feed on benthic macroinvertebrates and prefer to forage in areas less than 262-feet-deep (Fay 1982). Walruses feed on a wide variety of organisms including worms, snails, clams, marine birds, and seals; but most frequently on clams, snails, and polychaete worms (Fay 1982; Sheffield and Grebmeier 2009).

Walruses in the Action Area

The Pacific walrus is found in low numbers in the Beaufort Sea (USFWS 2010b) (See Figure 3.3-1). Some walruses have hauled-out onshore near Kaktovik in the past, but this is not a frequent event.

The Beaufort Sea does not provide the optimal habitat for walruses. The probability of walruses occurring in or near the proposed action area offshore of Prudhoe Bay is very low, as is the probability of walruses hauled-out on the coast in the action area (Fischbach, personal comm. 2010).

Threats

Subsistence Hunting

Walruses have an intrinsically low rate of reproduction and are therefore limited in their capacity to respond to exploitation (Fay 1982). In the late 19th century, American whalers intensively harvested walruses in the northern Bering and southern Chukchi seas. The population was substantially depleted by the end of the century (Fay et al. 1989). Since 1930, the combined U.S. and Russia walrus harvests have ranged from 2,300–9,500 animals per year. These harvest levels were thought to be of sufficient scale to result in subsequent population declines (Fay et al. 1989; Fay et al. 1997). Since 1992, harvest levels have been limited; through the 1990s harvests ranged from approximately 2,400–4,700 animals per year. Current assessment of sustainable harvest rate is unknown (Garlich-Miller et al. 2006).

Climate Change

Pacific walrus is an ice-dependent species. Individuals use ice for many aspects of their life history throughout the year. Because of the projected loss of sea ice over the 21st century, USFWS has identified the loss of sea ice and associated effects to be a threat to the Pacific walrus population. Although USFWS anticipates that sufficient ice will remain, so that breeding behavior and calving will still occur in association with sea ice, the locations of these activities are expected to change in response to changing ice patterns. The greatest change in sea ice, walrus distribution, and behavioral responses is expected to occur in the summer (June–August) and fall (October–November), when sea ice loss is projected to be the greatest. USFWS has concluded that loss of sea ice, with its concomitant changes to walrus distribution and life-history patterns, will lead to a population decline, and is a threat to Pacific walrus in the foreseeable future because, over time, walruses will be forced to rely on terrestrial haul-outs to an increasingly greater extent.

Although USFWS determined that threats resulting from climate change warrant listing Pacific walrus under the ESA, the agency also determined that such a listing is precluded by limited resources and higher priority species. USFWS has assigned the Pacific walrus a priority listing of 9, on a scale of 1 to 12, with 1 representing the highest priority species for ESA listing and protection. USFWS assigned Pacific walrus a lower priority ranking because of its relatively high present abundance and its ability to rely on terrestrial haul-outs as sea ice diminishes.

NORTHSTAR

Midway Island

Beaufort Sea

WEST DOCK

PM2

PM1

ENDEAV ISLAN

NIAKUK 4,5 & 6

WDSP

WEST BEACH STATE

DS NK

T

AGI

E

LGI

DSL5

Prudhoe Bay

K

DSL1

WG

F

NGI

OCP

EAST DOCK

J

G

CGP

GC1

NSB Land Fill

DSL2

Q

DSL4

C

DS18

DSL3

GC2

DS15

H

D

GC3

LPC

Walrus Sighting

Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

Sighting data obtained from Minerals Management Service Bowhead Whale Aerial Survey Project Historical Database, 1979-2007.

NAD83, Alaska Albers Equal Area.

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

Alaska Gasline Development Corp.
Gas for Alaskans

WALRUS SIGHTINGS IN THE BEAUFORT SEA 1979-2007

Alaska Stand Alone Gas Pipeline/***ASAP***

Bilogical Assessment

SCALE: 0 1 2 3 4 Miles

FIGURE: 3.3-1

AES-RTS: 11-001-011.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Commercial Fishing and Marine Vessel Traffic

As walruses are normally closely associated with sea ice, their interaction with commercial fishing and marine vessel traffic in the Arctic is very limited.

Offshore Oil and Gas related activities

Oil-and-gas-related activities have been conducted in the Chukchi and Beaufort Seas since the late 1960s. Much of this activity has occurred in the Beaufort Sea OCS rather than the Chukchi Sea OCS.

Pacific walruses do not normally range into the Beaufort Sea (USFWS 2002b), though individuals and small groups are occasionally observed. During the history of the incidental take regulations in the Beaufort Sea interactions with walruses have been minimal. From 1994 to 2004, a total of nine sightings, involving 10 walruses were recorded by Industry during the open water seasons.

3.3.2 Ringed Seal

Biological Populations and Listing Status

The range of the ringed seal is circumpolar with five subspecies being recognized: the Arctic ringed seal (*Phoca hispida hispida*), the Baltic ringed seal (*Phoca hispida botnica*), the Okhotsk ringed seal (*Phoca hispida ochotensis*), the Ladoga ringed seal (*Phoca hispida ladogensis*), and the Saimaa ringed seal (*Phoca hispida saimensis*). On 10 December 2010, NMFS published a proposed rule to list the Arctic, Okhotsk, Baltic, and Ladoga subspecies as threatened and the Saimaa subspecies as endangered under the ESA (FR 75:77476). The only subspecies occurring in the action area, and addressed in this BA, is the Arctic subspecies. No critical habitat has been proposed for the ringed seal. A detailed comprehensive description of the distribution, life history, and abundance of ringed seals is included in the status review of the ringed seal recently published by the NMFS (NMFS 2010).

Populations Status, Trends, and Abundance

Specific estimates of the Arctic ringed seal population are not available but NMFS suggested that the population numbers are in the millions (FR 75:77492). Bengston et al. (2005) conducted ringed seal surveys in the Chukchi Sea in 1999 and 2000 and found densities higher at nearshore locations. They estimated the Chukchi population at 252,488 animals in 1999 and 208,857 in 2000. Frost et al. (2002) conducted surveys in the Beaufort Sea and estimated the density of ringed seals was 2.65 seals per square mile. Combining the estimated population sizes with the densities from previous surveys (Bengston et al. 2005, Frost et al. 2002), Angliss and Allen (2009a) estimated that there are at least 249,000 Arctic ringed seals in the Chukchi and Beaufort Seas (Angliss and Allen 2009a). This is considered to be a very conservative estimate given that some surveys did not correct the density for seals that were not visible during the survey because they were in the water, and because the survey did not include the entire range of the ringed seal habitat. Considering that these surveys were restricted to U.S. and Canadian waters, and did not include large areas of pack ice, Kelly et al. (2010) provided a reasonable estimate for the total population of Arctic ringed seals in the Chukchi and Beaufort Seas of 1,000,000 seals.

Reliable data on population abundance trends for the Arctic stock of ringed seals do not presently exist (Angliss and Allen 2009a). Frost et al. (2002) reported that trend analyses based on comparisons of observed seal densities in the central Beaufort Sea suggested a marginally significant but substantial decline of 31 percent from 1980–1987 to 1996–1999; however, Angliss and Allen (2009a) concluded that the apparent decline between the 1980s and the 1990s may have been due to a difference in the timing of surveys rather than an actual decline.

Range

In Alaska, the range of the ringed seal encompasses the Beaufort, Chukchi, and Bering Seas and can reach as far south as Bristol Bay in Alaska in years with extensive ice coverage. Throughout their range, ringed seals exhibit an affinity for ice-covered waters.

Life History and Habitat Use

The seals excavate subnivean lairs in the snow above some of the holes, in which they have their pups between March and April. The lair protects the pup against hypothermia and predation by Arctic foxes and polar bears (Smith et al. 1991). Once the pup is born, it is nursed there for five to eight weeks during which time the pup stays in the lair. There is a positive relationship between lack of maternal experience and increased predation by polar bear, which could account for poor reproductive success of less experienced females (Eley 1994). The primary food sources for ringed seals are arctic cod, saffron cod, shrimp, amphipods, and euphausiids (Reeves et al. 1992).

Ringed seals tend to prefer large floes (i.e., greater than 147 feet in diameter) and are often found in the interior ice pack where the sea ice coverage is greater than 90 percent (Simpkins et al. 2003). They remain in contact with ice most of the year and pup on the ice in late winter to early spring. During late April through June, ringed seals are distributed throughout their range from the southern ice edge northward (Burns and Harbo 1972, Burns et al. 1981, Braham et al. 1984). Ringed seals overwinter on pack and shorefast ice (Bengston et al. 2005). They create breathing holes in the newly formed ice and maintain them throughout the year by scraping the sides using the nails on their foreflippers (Smith and Hamill 1981).

The density of ringed seals is dependent upon the availability of food, ice conditions, and water depth. Frost et al. (2004) conducted aerial surveys over the Beaufort Sea coast between Barrow and Kaktovik to assess what variables such as water depth, distance from fast ice, and ice quality have on distribution. They determined that ringed seal density was greatest in intermediate water depths of 16.4–115 feet and in areas of smooth ice nearest to the edge of fast ice. Ringed seal densities were estimated from similar surveys flown in 1996–1999 in the Alaska Beaufort Sea from Barrow to Kaktovik. Observed seal densities in that region ranged from 0.81 to 1.17 per square kilometer (Frost et al. 2002, 2004). Results of surveys conducted by Frost and Lowry (1999) indicate that, in the Alaskan Beaufort Sea, the density of ringed seals in May–June is higher to the east than to the west of Flaxman Island. These surveys are conducted in the spring when seals are visible on ice, less is known of their distribution during summer months.

Ringed Seals in the Action Area

British Petroleum (BP) conducted seal surveys near the Northstar Unit located approximately 6 miles from West Dock offshore of Prudhoe Bay to determine baseline conditions prior to the construction of the satellite drilling island. Ringed seal densities close to the Northstar site ranged from 0.39 to 0.63 seals per square kilometer (Moulton et al. 2002.) These numbers did not indicate a decline in densities during 1997 to 1999 (Moulton et al. 2003).

Ringed seals are associated with sea ice and typically remain with the ice throughout the year (Angliss and Allen 2009a; Bengston et al. 2005), although in the summer, ringed seals are commonly seen alone or in small groups in open water (Harwood and Stirling 1992). Large concentrations of ringed seals are not expected near West Dock during activities associated with the proposed project, partly because they do not tend to travel in large groups and partly due to the normal industrial activity present at West Dock

(Figure 3.3-2). They are, however, the most frequently-encountered seal species in the Prudhoe Bay region (Simpkins et al. 2003).

Threats

Pollution and Contaminants

Contaminants accumulate in the Arctic and can adversely affect marine mammals. Contaminant loads have been studied in ringed seals, because they are the main prey for polar bears and they are an important subsistence species for Alaskan Natives (Dietz et al. 1995, Zhu et al. 1995, Muir et al. 1999, Fisk et al. 2001, Fisk et al. 2005, Kovacs et al. 2007, Dietz 2008).

Contaminant loads of pollutants such as organochlorine compounds and heavy metals in ringed seals that live in the Alaskan Arctic are lower than those found in ringed seals in Europe (Borga et al. 2005). High levels of mercury have been found in the liver and muscles of ringed seals in the Canadian Arctic, although no toxic effect of the metal was observed (Smith and Armstrong 1978). Mercury concentration becomes higher as seals age (Dehn et al. 2005). POP levels measured in ringed seals taken from Barrow were similar to those found in the Canadian Arctic and lower than those in Svalbard and the Kara Sea in the Russian Arctic (Nakata et al. 1998) (Kucklick et al. 2002). Levels of perfluorononanoic acid were higher and levels of perfluorooctane sulfonate were higher in ringed seals from the Bering and Chukchi Seas than in Canada and Greenland (Quakenbush and Citta 2008).

Section 4.2.5.1 in *The Status Review of the Ringed Seal (Phoca hispida)* contains more detailed information on contaminants in ringed seals and is incorporated in this document by reference (NMFS 2010).

Subsistence Hunting

Ringed seals are an important subsistence resource for Native Alaskans living in communities along the Beaufort Sea coast. Harvest levels decreased during the 1970s from 7,000–15,000 to 2,000–3,000 by 1979 (Frost 1985). In 2000, Alaska Department of Fish and Game (ADF&G) estimated that 9,500 ringed seals were being harvested per year, but there is no current estimate of the number of seals being harvested (Allen and Angliss 2010).

Oil and Gas Activities

Offshore oil and gas exploration, development, and production activities, have occurred in the Chukchi and Beaufort Seas since the late 1960s (MMS and NMFS 2008). Oil and gas activities may include artificial island construction, drilling operations, pipeline construction and operation, seismic surveys, and vessel and aircraft support operations. Among these activities, the effects of noise, physical disturbance and potential oil spills have the greatest potential to effect ringed seals. (FR 75:77487). However, long term research and monitoring results on ice seals, including ringed seals, in the Alaskan Arctic have shown no evidence of more than limited and transitory effects, resulting in no detectable injury to individual seals and seal lairs, and no more than a negligible impact on the affected Arctic subpopulation. As a result, NMFS has determined that oil and gas activities are not a foreseeable threat, individually or cumulatively, to the conservation status of the Arctic ringed seal. (FR 75:77489).

Climate Change

The proposed listing of ringed seals as a threatened species is primarily premised upon the potential adverse effects of modification of their sea ice habitat resulting from a warming climate projected out through the end of the century. (NMFS 2010). Although the Arctic ringed seal remains abundant and there have been no detected effects of climate change on ringed seals to date, NMFS has inferred that future ice and snow conditions threaten this subspecies with becoming endangered by 2100. The effects of climate change may be ameliorated if the Arctic ringed seal retracts northward with sea ice habitats; however, NMFS has projected that snow depths will be insufficient for lair formation and maintenance throughout most of the subspecies' range by the end of the century. (75 Fed. Reg. 77490). The timing for the onset of potential impacts from climate change on the Arctic ringed seal is uncertain.

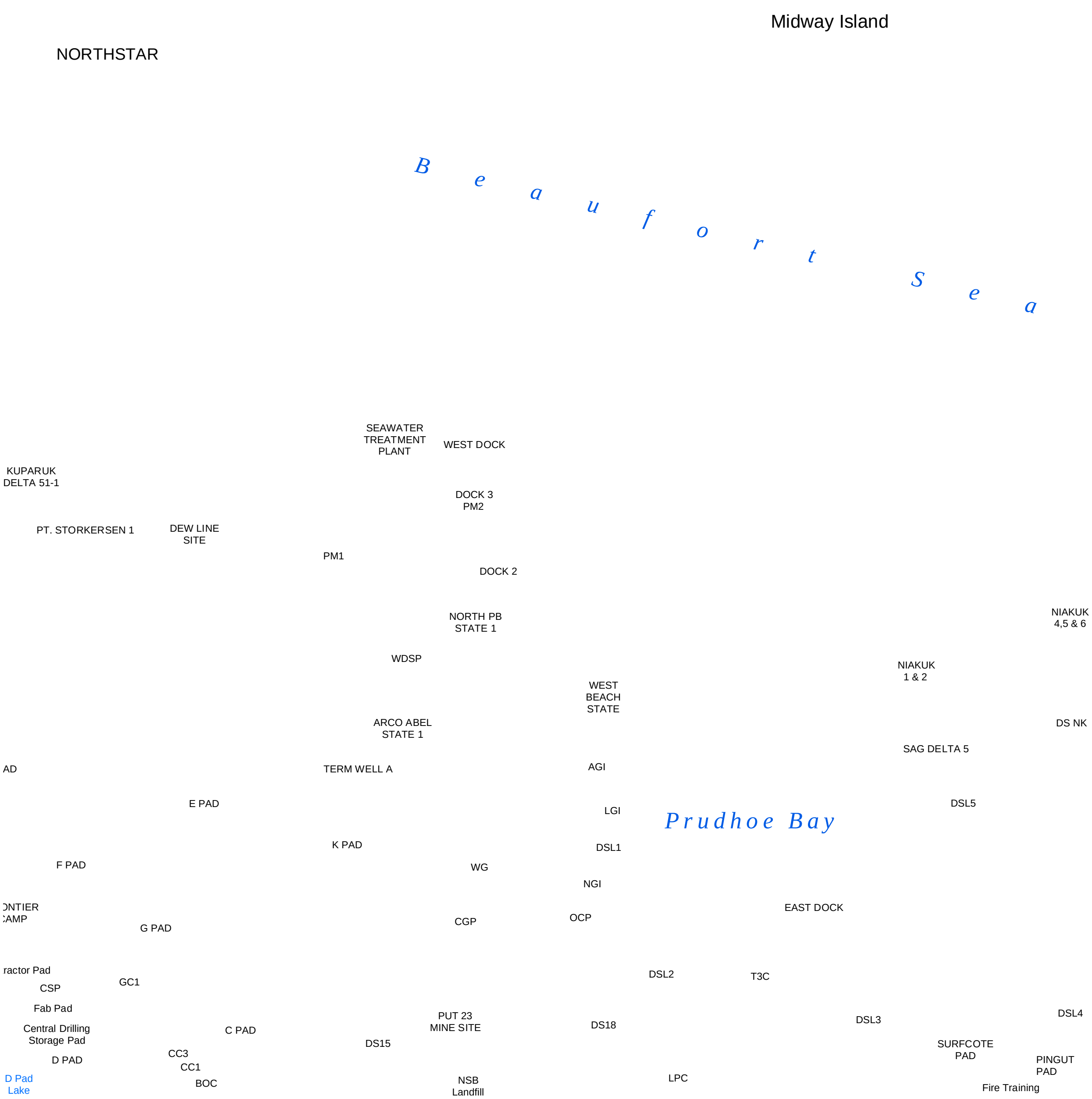
3.3.3 Bearded Seal

Biological Populations and Listing Status

The bearded seal is a circumpolar, ice-associated seal. There are two widely recognized subspecies of bearded seals, one (*Erignathus barbatus barbatus*) inhabiting the Atlantic sector of the species range, and the other (*Erignathus barbatus nauticus*) occupying the Pacific sector (Rice 1998). There is not a discrete geographical gap between the distributions of the two subspecies, but the general determination is that the Pacific sector subspecies is found to the west of longitude 112 degrees in the Canadian archipelago (NMFS 2010), and the only subspecies found in Alaska. In response to a petition, NMFS conducted a status review of the bearded sea, in which the Biological Review Team further delineated the subspecies found in the Pacific sector into an Okhotsk DPS and a Beringia DPS. The Okhotsk DPS is found in the Sea of Okhotsk and the Beringia DPS is found in the Bering, Chukchi, and Beaufort Seas, and is therefore, the DPS of interest described below. NMFS subsequently promulgated a proposed rule to list the Beringia DPS and the Okhotsk DPS of bearded seals as threatened throughout their ranges under the ESA on 10 December 2010 (FR 75:77496). Listing of the Atlantic sector subspecies was determined to be unwarranted. NMFS has not proposed to designate critical habitat for either the Beringia DPS or the Okhotsk DPS of bearded seals, because it is not currently determinable. A detailed comprehensive description of the distribution, life history, and abundance of bearded seals is included in the status review of the bearded seal recently published by NMFS (2010).

Populations Status, Trends, and Abundance

While no accurate estimates of the worldwide population of bearded seals exist, various authors have suggested populations of 500,000 to 1,000,000 (Bychkov 1971; Burns et al. 1981; Stirling and Archibald 1979; Blix 2005 in NMFS 2010b). Perhaps 450,000 of these are *Erignathus barbatus nauticus* in the Pacific sector (NMFS 2010b). Early estimates of the Beringian DPS in Alaska range from 250,000 to 300,000 (Popov, 1976; Burns J. 1981). There are no reliable estimates of the bearded seal population in the Beaufort Sea because correction factors to account for bearded seals not seen due to their submerged state in the water have not been developed (Angliss and Allen 2009). Uncorrected estimates of bearded seals in the eastern Beaufort Sea averaged 2,100 seals in 1974–1979 (Stirling et al. 1982 in NMFS 2010). These are considered to be substantial underestimates due to the lack of correction factors (NMFS 2010) and the limited area that was surveyed (Kelly 1988). There are also no reliable quantitative estimates of population trends due to the imprecision and incompleteness of the surveys (Taylor et al. 2007 in NMFS 2010)



Species

Bearded Seal

Ringed Seal

Alaska Stand Alone Gas Pipeline Route

Pipeline

Road

Facility

RINGED AND BEARDED SEAL SIGHTINGS IN THE BEAUFORT SEA 1979-2007

Alaska Stand Alone Gas Pipeline/***ASAP***

Biological Assessment

Sighting data obtained from Minerals Management Service Bowhead Whale Aerial Survey Project Historical Database, 1979-2007.

NAD83, Alaska Albers Equal Area.

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

ALASKA GASLINE DEVELOPMENT CORP.
GAS FOR ALASKANS

SCALE:

0 1 2 3 Miles

FIGURE:

3.3-2

AES-RTS: 11-001-010.mxd, 04/06/11, R00

THIS PAGE INTENTIONALLY LEFT BLANK

Range

Bearded seals, the largest of the ice seals, are associated with sea ice (Burns et al. 1981, Smith 1981, Kelly 1988, NMFS 2010b, Angliss and Allen 2009). In Alaska, their range extends from the Bering Sea north and east through the Chukchi and Beaufort Seas. Bearded seals are found in the Beaufort Sea year-round but in fewer numbers during the winter when habitat is limited to areas of open leads and active ice pack. Seasonal movements of bearded seals are related to the advance and retreat of sea ice (Kelly 1988). Ice platforms are needed for resting, reproduction, and molting (Fay 1974, Burns and Frost 1979, Burns 1981, Nelson et al. 1984, NMFS 2010.) They migrate throughout the year following the pack ice edge south into the Bering Sea in the winter and north into the Chukchi and Beaufort Seas in areas with high ice coverage in the summer (Burns et al. 1981; Simpkins et al. 2003; Bengston et al. 2000).

Life History and Habitat Use

Bearded seals primarily feed on benthic organisms on or in the sediments on the seafloor, including crabs, shrimp, and clams (Kelly 1988; Reeves et al. 1992; Finley and Evans 1983; Antonelis et al. 1994; NMFS 2010). They are therefore typically distributed in areas with sea ice cover over water less than 656 feet where they can effectively reach the seafloor to forage (Burns and Frost 1979; Fedoseev 2000; Kovacs 2002; NMFS 2010b), although they are also seen swimming in open water (Burns et al. 1981). Surveys in the Beaufort Sea indicated that bearded seals prefer areas with relatively open ice cover over water depths of less than 246 feet (Stirling 1977; Stirling et al. 1982). Preferred bearded seal habitat in the summer months in the Beaufort Sea is in water with fragmented multi-year ice over the continental shelf seaward of the scour zone (LGL 2007).

Bearded seals are the largest of the northern seals, weighing up to 750 pounds. They give birth to a single pup. Pupping occurs on drifting ice flows between late March through May (Kovacs et al. 1996). Pups are typically weaned when they are around 24 days old (Kovacs et al. 1996).

Bearded Seals in the Action Area

Aerial surveys indicated that bearded seals of the Beringia DPS are commonly found in Beaufort Sea waters offshore and, therefore, could approach the action area at West Dock (Refer to Figure 3.3-2). However, they would not be expected to occur there commonly due to the lack of ice, and the normal level of industrial activity. Bearded seals in the Beaufort Sea have been found to prefer areas close to the pack ice over water between 82 and 246 feet deep (Stirling 1977, Sterling et al. 1982). However, when the pack ice recedes north to areas over water depths greater than 656 feet, bearded seals tend to move further inshore to areas where they have access to the seafloor where they forage.

In the summer, the preferred habitat is in the central and northern Chukchi Sea. Habitat in the Beaufort Sea is more limited, because the edge of the pack ice is often over waters depths that are too deep for foraging (greater than 656 feet) (LGL 2007).

During spring seal surveys conducted in Prudhoe Bay, nine bearded seals were seen hauled-out on ice, only two of which were seen south of the barrier islands (Moulton et al. 2002). Several bearded seals were recorded during surveys in Prudhoe Bay between 1999 and 2001, but none were seen during surveys between 1997 and 1998 (Moulton et al. 2002). Although bearded, ringed, and spotted seals were observed during a marine mammal survey for an ocean bottom cable survey west of the Liberty Satellite Drilling Island (SDI) site and approximately 14 miles west of West Dock, only 7 percent of those seals were bearded seals. LGL estimated an average summer density of .0214 seals per square kilometer for bearded seals near Liberty (LGL 2002). Few bearded seals are expected to be near West Dock during vessel-related activities associated with the proposed project.

Threats

Pollution and Contaminants

There is little information available regarding contaminants in bearded seals. Contaminant loads of organochlorine compounds in bearded seals are lower in the U.S. and Canadian Arctic than in the European Arctic (Borga et al. 2005). High levels of mercury have been found in the liver and muscles of bearded seals, although no toxic effect of the metal was observed (Smith and Armstrong 1978). The rate of accumulation of heavy metals in bearded seals, appear to be higher than that seen in ringed seals (Smith and Armstrong 1978). Mercury concentration becomes higher as seals age (Dehn et al. 2005).

Oil and Gas Activities

Offshore oil and gas exploration, development, and production activities, have occurred in the Chukchi and Beaufort Seas since the late 1960s (MMS and NMFS 2008). Oil and gas activities may include artificial island construction, drilling operations, pipeline construction and operation, seismic surveys, and vessel and aircraft support operations. Among these activities, the effects of noise, physical disturbance and potential oil spills have the greatest potential to effect ringed seals (FR 75:77509). However, long-term research and monitoring results on ice seals, including ringed seals, in the Alaskan Arctic have shown no evidence of more than limited and transitory effects, resulting in no detectable injury to individual seals and seal lairs, and no more than a negligible impact on the affected subpopulation. As a result, NMFS has determined that oil and gas activities are not a foreseeable threat, individually or cumulatively, to the conservation status of the bearded seal (FR 75:77510).

Offshore oil and gas operations often require support operations, such as ice-breaking, aircraft traffic, and vessel traffic, which can also cause impacts to bearded seals.

More information on the history of oil and gas activity between 1979 to 1999 in the Beaufort Sea can be found in the MMS Study 2002-071 Geographic Information System (GIS) Geospatial Data Base of Oil-Industry and Other Human Activity (1979–1999) in the Alaskan Beaufort Sea (MMS 2002).

Climate Change

The proposed listing of bearded seals as a threatened species is primarily premised upon the potential adverse effects of modification of their sea ice habitat resulting from a warming climate projected out through the end of the century (NMFS 2010). Although the bearded ringed seal remains abundant and there have been no detected effects of climate change on bearded seals to date, NMFS has inferred that future ice and snow conditions threaten this subspecies with becoming endangered by 2100. The effects of climate change may be ameliorated if the bearded seal retracts northward with sea ice habitats; however, NMFS has projected that snow depths will be insufficient for lair formation and maintenance throughout most of the subspecies' range by the end of the century. The timing for the onset of potential impacts from climate change on the bearded seal is uncertain.

4.0 EFFECTS OF THE ACTION

The following sections provide an analysis of the potential effects of the proposed action on the threatened and endangered species, critical habitat, and proposed or candidate species identified in Section 3.0. The analyzed effects include direct, indirect, and cumulative effects. Direct and indirect effects are discussed in Section 4.1 and cumulative effects are analyzed in Section 4.2.

4.1 *Direct and Indirect Effects*

Direct effects are the immediate effects of the proposed project in the action area. Disturbance stemming from noise and habitat loss associated with construction, operation, and maintenance are considered direct effects. Indirect effects are reasonably foreseeable results from activities associated with the project that occur at a later time or at a distance removed from the immediate project area, such as effects on a prey species or changes in a pattern of land use.

4.1.1 Threatened and Endangered Species

4.1.1.1 Spectacled and Steller's Eiders

The proposed action would result in construction, maintenance, and operation of a pipeline with raised and buried sections through potential breeding habitat of spectacled and Steller's eiders.

Habitat Loss

Suitable breeding habitat for spectacled and Steller's eiders is found within the action area from the shoreline of Prudhoe Bay south for a distance of approximately 50 miles. Project facilities and appurtenances that would occur within this area during construction and operation are listed below in Table 4.1-1.

TABLE 4.1-1 PROJECT COMPONENTS WITHIN THE ACTION AREA

Project Phase	Facilities	Land Development/ Habitat Disturbance
Construction	Laydown Yards	6 acres
	Camp - 250 Persons	existing
	Fuel storage	existing
	Airport	existing
	West Dock	existing
	Right-of-way	5 acres (44 miles x 100 feet)
	Gas Conditioning Facility	70 acres
Operation	Right-of-way	158 acres (44 miles x 30 feet)
	Pipeline	2 acres buried, elevated
	Gas Conditioning Facility	70 acres

Construction of the ASAP and associated GCF may result in the disturbance of a maximum of 81 acres of potential eider breeding habitat within the action area. This is a conservative worst case estimate based on an assumption that all habitats within the right-of-way (ROW) would be disturbed. Construction in this area is expected to take place during a single winter; however, the effects on habitat would remain until any areas that are not to be maintained through operations would revegetate and recover sufficiently to provide breeding or nesting habitat for the birds.

Most (72 acres) of these habitat losses would be permanent as they consist of the footprint of the GCF and the buried and elevated portions of the pipeline, which would be operated for at least the lifetime of the project (possibly in excess of 50 years). Some of the remaining habitat losses would be regained over time as the permanent operations ROW is narrowed to approximately 30 feet or less, and disturbed areas outside of this ROW would be restored and become available to the birds as they are revegetated.

The habitat loss is not likely to adversely affect the spectacled eider or Steller's eider. There are scattered reports of Steller's eiders using habitats in the area in the past, but they have not been known to use the area for breeding or nesting in recent years. The only location on the North Slope where Steller's eider's are known to nest consistently is the Barrow area. The use of the Prudhoe Bay area by spectacled eiders has been documented in recent years; however, observed densities of breeding spectacled eiders in the area have been relatively low, with most observed breeding pairs being reported west of the Colville River. Suitable habitat is found across the North Slope so any eiders that are displaced could use habitats in the same area or elsewhere. The habitats that would be disturbed are within the Prudhoe Bay oilfield and the corridor of the TAPS and the Dalton Highway, and therefore have undergone some disturbance.

Construction will occur in the winter. Winter-time construction and the use of special methods for pipeline installation in wetlands will minimize the area of habitat that is affected.

Disturbance

Disturbance could potentially occur in the portion of the action area encompassed by coastal waters near West Dock in Prudhoe Bay, and in the portions of the action area that hold terrestrial breeding or nesting habitats.

Spectacled eiders are known to use the coastal waters of the Beaufort Sea for staging and migration. Males and non-breeding or unsuccessful females may be found in the waters from June to August; successful females and their broods may be found in these waters from August to early October. Construction of the ASAP would involve nine trips with barges through the Beaufort Sea to West Dock during these same open-water periods. Disturbance could result from the movement and noise associated with the barge traffic, and with the human and equipment activity at the dock; however, observed densities of spectacled eider's and Steller's eiders in these coastal waters are so low that disturbance from these barge trips is unlikely. Any disturbance that would occur is expected to consist of flushing and brief displacement from the path of the barge, and would not be expected to have deleterious effects on the birds.

Construction of the proposed pipeline and appurtenances in this portion of the action area would occur during a single winter. Spectacled and Steller's eiders are absent from the Beaufort Sea and North Slope breeding habitats (including the action area) from October through May. Therefore construction of the ASAP would not result in any disturbance effects on spectacled eiders or Steller's eiders.

Activities associated with the Operations and Maintenance (O&M) of ASAP could result in the disturbance and or displacement of spectacled or Steller's eiders from available breeding, nesting, or brooding habitat. However, research conducted at oil and gas facilities on the North Slope indicate that any such effects would be minimal. The distribution of spectacled eiders in the Kuparuk Oilfield has been investigated annually since 1993. Disturbance associated with noise, vehicle traffic on roads, and general human activity associated with O&M could result in discontinued use of some available habitats adjacent or near facilities, roads, or other sites where the activities occur.

Equipment contained within the GCF will generate continuous noise over the life of the proposed action. Birds, and particularly nesting birds, can be negatively impacted by noise emitted at continuous or irregular intervals during sensitive times of the year (Drewitt and Langston 2006; Burton et al. 2002). The impacts of noise from the BP Endicott oil production facilities on nearby birds have been minimal, likely due to individuals becoming habituated to the sound (Noel et al. 2003). The noise levels at the GCF are anticipated to be much lower, as equipment will be housed within the facility and fitted with sound baffles to minimize noise generation.

Collisions and Direct Mortality

Land-clearing and habitat disturbance associated with construction of the GCF and proposed pipeline in portions of the action area where there is potential spectacled and Steller’s eiders nesting habitat, would take place during a single winter. Neither species of eider occurs on the tundra during the months that construction or land clearing would take place. Therefore there is no opportunity for destruction of eider nests, eggs, broods, or nesting adults.

Eider mortalities due to potential collisions between the birds and vehicles, vessels, or structures may occur. The presence of the GCF will increase the potential for spectacled and Steller’s eiders to collide with a structure within their habitat over the life of the proposed action. Collisions are most likely to occur during migrations and periods of low visibility; however, collisions are expected to be rare events because of the very low densities of both these species in the project area.

Increased Predation

Increased human activity from the operation of the GCF may attract predators such as Arctic foxes and ravens. It has been hypothesized that increases in subsidized predators are due to availability of anthropogenic food subsidies (i.e., dumpsters and landfills) and also to increased availability of nesting and den sites (NAS 2003). Foxes and ravens are known to feed on the eggs or newborn chicks of sea ducks. Currently, facilities near the action area in Prudhoe Bay adhere to strict protocols to minimize waste that may attract predators and monitor areas that provide nesting habitat. The proposed GCF will operate under these protocols and workers will be trained to remain in compliance. These measures will ensure that O&M activities that increase human activity at the GCF and along the pipeline are not likely to adversely affect spectacled and Steller’s eiders. In recent years, the availability of food subsidies to nest predators have been curtailed by the oil industry and are probably not as large a problem as they were previously (Liebezeit 2010).

Spectacled and Steller’s eider nesting habitat may be disturbed by trenching that is required to bury the pipeline within the continuous permafrost of the ACP. Site clearance and trenching may alter permafrost present in the action area over time, which could lead to drying of wetland areas (Walker and Everett 1987). Significant drying of small ponds or lakes could lead to a loss of foraging habitat, which is important for breeding spectacled and Steller’s Eiders and their fledglings.

The effect of trenching in potential spectacled and Steller's eiders breeding habit will be minimal. As discussed above, spectacled eiders have not been observed south of TAPS MP 12, and the proposed buried section of pipeline begins approximately three miles north of this point. Combined with the low densities of both species in the action area, potential drying of small ponds and lakes from trenching is unlikely to have an adverse effect on Spectacled or Steller's eiders.

To mitigate the impact of permafrost thaw and subsequent wetland drying, the buried sections of pipeline are engineered with chilling units. This will ensure that the buried pipeline will remain very close to the ambient soil temperature and minimize any effects on the habitats of listed species.

4.1.1.2 Whales

The proposed action would result in vessel transit and noise associated with vessel traffic in known beluga, fin, humpback, and bowhead whale habitat. The potential direct and indirect effects of the proposed action on these listed species are discussed together in this section.

Vessel traffic during the two-year construction phase will be the primary cause of effect on whales in the action area. Because O&M will have no effect, construction is the only phase that will be discussed in this section.

In addition to the visual disturbance a transiting vessel may cause, low frequency sound energy from transiting vessels may result in avoidance behaviors from whales in the vicinity of the vessel. All disturbances as a result of vessel transit and associated noise are expected to be minor, temporary, and localized to the immediate area of the transiting vessel (MMS 2009a).

There are a number of factors that influence how a species hears a sound. The fate of sound resulting from vessel transit is site-, season-, and weather-specific (USDOC, NOAA, NMFS 2008). Oceanographic differences in bathymetry and seafloor characteristics play an enormous role in how a sound is carried. In addition, the frequency, intensity, and pressure of a sound will affect its propagation and resulting effects, meaning that the same sound could in fact differ greatly among different sites (USDOC, NOAA, NMFS 2008). These variables make it extremely difficult to estimate how vessel transit sound will be heard by and effect whales in the area. However, noise from a transiting vessel is relatively minimal and all data suggests that, in general, impacts will be limited to temporary deflection away from the transiting vessel (MMS 2009a).

Collisions with whales during vessel transit are also a concern. While increased vessel traffic in habitats occupied by endangered whales has the potential to increase vessel collisions, all available data indicates that vessel collisions are not an important source of injury or mortality (USDOC, NOAA, NMFS 2008). The proposed actions would not represent a significant increase in the volume of marine traffic.

Transiting vessels will take several proactive steps to mitigate any adverse effects and reduce the sound energy received by any marine mammal. Speed will be reduced when marine mammals come within a short distance of a transiting vessel, and in such a case the vessel will refrain from making multiple course changes in an attempt to avoid separating members of a group. Additionally, vessel speed will be reduced during inclement weather to avoid the chance of an accidental collision with a marine mammal. Transiting vessels will also never intentionally approach a marine mammal. Lastly, the transiting vessels will abide by all state and federal regulations regarding safety radii and maintaining a safe distance between the transiting vessel and any know marine mammals when operating under the scope of the proposed activities.

Fin, Humpback, and Bowhead Whale

Baleen whales are expected to have very similar reactions to transiting vessels and the associated noise, and as such fin, humpback, and bowhead whales will be discussed collectively. Bowhead reactions may be a bit more intense than fin or humpback because they are still hunted annually for subsistence. In addition, bowhead whales have been commercially hunted within some individuals' lifetimes. The typical reaction of a baleen whale to a vessel is to swim away, though a bowhead whale may begin swimming away at a further distance from the vessel than fin or humpback generally do. Bowhead avoidance of a vessel may begin at 0.6 to 2.5 miles, while fin and humpback avoidance of a vessel may begin at 1.2 to 2.5 miles away (MMS 2009b).

Endangered whales have been shown to react more strongly to vessels with outboard motors than those with diesel motors, as well as to vessels that approach quickly and directly rather than slower vessels moving in a direction other than toward the whale (MMS 2009a). Additionally, fin, humpback, and bowhead whales have fewer or less intense avoidance reactions when they are actively engaged in feeding or another activity (USDOC, NOAA, NMFS 2008).

In the event of fin, humpback, or bowhead whale disturbance, feeding or other behaviors resume relatively quickly after the disturbance event, usually within minutes or hours. Some individuals may return to the exact same location, though scattering may last a little longer, but displacement should also be short-term (MMS 2009a).

Data from past studies have indicated that behavioral effects on bowhead whales from oil and gas activities have been "primarily, but not exclusively avoidance." No such data have indicated that "such avoidance is long-lasting after cessation of the activity" (USDOC, NOAA, NMFS 2008). Bowhead whales in the vicinity of a transiting vessel are expected to slightly change their swimming speed and direction in an effort to avoid closely approaching the vessel or noise source (USDOC, NOAA, NMFS 2008).

Data from a study that Wartzok et al. (1989) did in the Canadian Beaufort showed that bowheads generally ignore small vessels at distances greater than 547 yards. In the bowheads tagged and studied, 180 whales voluntarily approached within 547 yards of small vessels. Little response was observed in these cases unless there was a sudden change in sound level resulting from a vessel accelerating. A separate Canadian study also found that data do not support the theory of decreased use of a zone due to oil and gas activities, including vessel transit (USDOC, NOAA, NMFS 2008).

Sound energy coming from transiting vessels does have the potential to mask whale sounds that would otherwise be heard. Masking may disrupt communication and detection of important resources. Due to the transient nature of the vessels in the area, this would be temporary and localized, and would thus not significantly effect the exposed whales (MMS 2009b).

No mortalities or injuries are likely as a result of ASAP activities. At most, vessel traffic associated with the proposed action may result in undetectable transitory avoidance behavior by very small numbers of whales with no biological consequence. Thus, the proposed actions are not likely to adversely affect fin, humpback, or bowhead whales.

Cook Inlet Beluga Whale

Disturbance

Noise from barging activities associated with ASAP could affect whale behavior by causing temporary avoidance. Startle responses were observed when vessels moved in areas with high concentrations of beluga whales (Fraker et al. 1978).

The extent of disturbance or harassment effects on the Cook Inlet beluga whale DPS by vessel traffic associated with the construction phase of the proposed project are likely to be temporary and localized. Noise from vessel traffic may affect, but is not likely to adversely affect, the Cook Inlet DPS of beluga whales.

Increased shipping could displace beluga whales from the Port of Anchorage area due to noise and disturbance. However, barges move slowly, and injuries to beluga whales from strikes by ships calling at the Port of Anchorage would be highly unlikely. Furthermore, barge traffic associated with the proposed project is temporary, and the relatively small increase in vessel traffic will span a two-year period. The number of vessel calls per year to the Port of Anchorage between 2002 and 2008 averaged 219 (USDOT 2009).

Noise from vessels at the Port of Anchorage could interfere with behavior and communications by masking natural sounds or calls from other beluga whales. However, vessel activity associated with the proposed project would be low and within the current scope of normal activities in the area.

Beluga whales may habituate to constant noises when the noise is not associated with hunting (Huntington et al. 1999). The additional noise from the relatively low number of barges expected to be added to existing vessel traffic in Cook Inlet will not likely cause more masking than what already may be occurring in the area.

Indirect Effects

Projects that cause changes in anadromous fish runs in streams that feed into Cook Inlet could also adversely affect beluga whales (NMFS 2008b). Anadromous streams are important to beluga whales, because they provide habitat that supports salmon species. Construction of the proposed pipeline could adversely affect anadromous streams if habitat or hydrology is altered, water quality is degraded, fish passage is impeded, or if fish are injured or killed.

All state and federal laws will be followed to mitigate potential negative effects from crossing anadromous streams. Therefore, no indirect effects from crossing anadromous streams are anticipated on beluga whales in Cook Inlet.

4.1.1.3 Polar Bears

Habitat Loss

Project facilities located within the terrestrial nearshore range of the polar bear within the ACP are identified above in Table 4.1-1. The proposed action would result in construction, maintenance, and operation of both the GCF and a segment of pipeline with raised and buried sections within the terrestrial range of the polar bear. Habitat losses within the footprint of the GCF and the buried and elevated portions of the pipeline would be permanent; however, suitable alternative terrestrial habitat is widespread across the North Slope and not a limiting factor for the species.

The location of the GCF and the proposed pipeline have not been surveyed to determine whether any areas contain the features necessary for polar bear denning. However, the proposed GCF facility location was selected within the existing Prudhoe Bay oilfield based upon its close proximity to existing oil and gas infrastructure and activity, and its relatively flat terrain, and the pipeline route closely follows the existing TAPS and Dalton Highway corridor. Accordingly, the area is unlikely to exhibit necessary macrohabitat characteristics for maternal denning, such as steep slopes (e.g., coastal bluffs and river banks), unobstructed access to the coast and the absence of disturbance from humans and human activities. No material dens are known to have been previously located within the proposed project footprint.

The habitat loss associated with the proposed ASAP project is not likely to adversely affect the polar bear species.

Disturbance

The construction and operation of the GCF and the proposed pipeline, and associated traffic, may cause temporary behavior changes in polar bears, due to loud noise and temporary or permanent physical obstruction. Disturbance from activities resulting from the proposed project could elicit several different responses in polar bears. Noise may act as a deterrent or attraction to bears. However, there is evidence that disturbance from stationary sources results in minor changes in behavior of polar bears. Observations to-date include numerous instances of polar bears who encounter facilities and then change their direction of movement and leave the area. Bears are frequently observed climbing over and crossing gravel roads and causeways in Prudhoe Bay oilfields, and appear to have little fear of manmade structures (USFWS 2009a). The proposed facilities in the action area may present a small-scale, local obstruction to some individual bears' movements but the effect on the species would be negligible.

Denning females are expected to avoid the construction and operations areas due to the lack of suitable habitat and human presence. Although denning females are not expected to occur in close proximity to ASAP project construction and operations activities, the potential to disturb a denning female exists.

The best available scientific information indicates that female polar bears entering dens, or females in dens with cubs, are more sensitive to noise than other age and sex groups (USFWS 2009a). According to Smith et al. (2007) noise from stationary activities may potentially deter females from denning nearby; however, polar bears have been known to den near industrial activities without any observed effect. On average, female polar bears den in the Beaufort Sea area in mid-November and emerge in early April (Amstrup and Gardner 1994); however, these dates can vary year-to-year depending upon sea ice, snow, and weather conditions. (Messier et al.

1994). The oil and gas industry, operating pursuant to MMPA authorizations, has successfully conducted annual den detection surveys and has implemented appropriate monitoring and protection measures, including maintenance of a one-mile radius buffer around maternal dens, such that effects on polar bears have been minimal. Similar measures will be implemented for the ASAP project activities through the MMPA authorization process and, accordingly, no more than a negligible effect is anticipated to occur.

Human-Bear Interactions

The proposed action may result in human-polar bear interactions that occur in the action area. Bears may be attracted or repelled by industry actions, depending on the circumstances. Industry activities are subject to the MMPA which prohibits the taking of polar bears without authorization. Mitigation measures required for all oil and gas projects include a site-specific plan of operation and human-bear interaction plan, to minimize impacts on both species.

There are several mechanisms through which the incidental takes of small numbers of polar bears can be authorized under the MMPA. The most commonly used is through the issuance of ITRs. Before USFWS can provide ITRs for polar bears under the ESA, take of marine mammals must first be authorized under the MMPA (MMS 2009a). For example, under this authorization the deterrence of bears from the facilities and structures is allowed, so that bear-human interactions are prevented. This type of deterrent or “harassment” may include using vehicles to make noise, using flashing lights, or firing cracker shells.

Under the MMPA, the oil and gas industry has received LOAs for development operations on the North Slope and the Beaufort Sea, regarding protection of polar bears. These LOAs have required mitigation measures, such as Polar Bear Interaction Plans, which include a range of measures such as:

- Use of detection systems, such as bear monitors
- Use of safety gates and fences
- Implementation of appropriate garbage, hazardous waste, and snow management plans
- Identifying the chain of command for responding to a polar bear sighting
- Employee training programs to educate field personnel regarding bear safety procedures

The above measures will be implemented prior to construction activities and followed during construction and operation activities to minimize human interactions with polar bears. As a result, small numbers of incidental interactions with polar bears, resulting in no mortality or injury, and causing only temporary deflection and minor changes in behavior, are likely to occur. The effects of these interactions, individually and cumulatively, is likely to be negligible.

Indirect effects to polar bears are not expected as a result of the proposed project during development or operation. Polar bears are expected to occur in the action area during the lifetime of the project and will not be adversely effected by project activities, except for temporary and minor disturbances to some individual bears, during construction.

4.1.2 Critical Habitat

4.1.2.1 Cook Inlet Beluga Whale

The NMFS has proposed but not yet designated critical habitat for the Cook Inlet DPS of beluga whales on April 11, 2011, effective May 11, 2011 (76FR 20180). The Port of Anchorage was excluded from the final rule in consideration of national security interests.

The proposed project activities in the action area in Cook Inlet will include vessel transit and docking at the Port of Anchorage. Several barge companies regularly use the Port of Anchorage for the transfer of products. The number of vessel calls per year to the Port of Anchorage between 2002 and 2008 averaged 219 annually (USDOT 2009). Transportation of ASAP materials via barge to the Port of Anchorage is within the scope and present volume of normal daily activities at this facility. Noise from transiting barges is not expected to cause beluga whales to abandon areas within the critical habitat.

The proposed project is not likely to have a detectable adverse effect on beluga whale critical habitat. Accordingly, beluga whale critical habitat will not be adversely modified or destroyed as a consequence of the proposed project.

4.1.2.2 Polar Bear Critical Habitat

Marine transportation activities associated with GCF and pipeline construction will occur during the summer open water season within the boundaries of Unit 1 (sea ice) of designated polar bear critical habitat, and in close proximity to the boundaries of Unit 3 (barrier island) critical habitat. However, polar bears are not expected to be present during open water conditions or in close proximity to West Dock facilities and activities during the summer, and no effects to these critical habitat units are anticipated.

As previously addressed above, the GCF and a portion of the pipeline will be located within the boundaries of Unit 2 (maternal denning) critical habitat. However, the areas directly affected by construction and operation are not known to have been used for maternal denning and are not likely to contain the essential macrohabitat elements for polar bear denning because of the flat terrain, prior disturbance, and ongoing human activity characteristics of these areas. Moreover, the availability of suitable denning habitat is widespread across the ACP and is not a limiting factor for polar bear recruitment and survival.

Although a small proportion of the Unit 2 area will be altered by construction and operations activities associated with the proposed project, such activities are not likely to adversely modify or destroy polar bear critical habitat.

No indirect effects are expected to occur to polar bear designated critical habitat, as a result of this project.

4.1.3 Candidate and Proposed Species - Pinnipeds

Vessel traffic during the two year construction phase is the only project activity that may effect pinnipeds in the action area. Because O&M will have no effect, construction is the only phase that will be discussed in this section.

4.1.3.1 Steller Sea Lion

The only project activity with the potential to effect Steller sea lions will be noise from the transit of a small number of vessels to and from the Port of Seward.

Calkins and Pitcher (1982) found that disturbance from aircraft and vessel traffic has variable effects on hauled-out Steller sea lions. Steller sea lion reaction to occasional disturbances ranges from no reaction at all to complete and immediate departure from the haul-out area. Low levels of occasional disturbance may have little long-term effect on sea lions. (Kenyon and Rice 1961).

Since Steller sea lions were afforded ESA protection in 1990, regulations have been in place to minimize disturbance of animals by humans. There are no sea lion haul-outs within, or in the immediate vicinity of, the action area at the Port of Seward. Moreover, vessel traffic associated with the Port of Seward is not known to have adverse effects on Steller sea lions. Due to limited vessel traffic associated with this project, and concurrent with the existence of vessel traffic already in the action area at the Port of Seward, the potential for adverse effects is discountable and, accordingly, proposed action is not likely to adversely affect Steller sea lions.

4.1.3.2 Pacific Walrus

Vessel noise associated with marine transportation of construction materials to West Dock has the potential to result in transient disturbance of very small numbers of Pacific walrus. However, the presence of Pacific walrus in the action area is rare, and no detectable effects are likely to occur.

Pacific walrus are known to use the central Beaufort Sea; however, their presence within the action area has been rare. Richardson et al. (1995) found that vessel noise does not seem to strongly affect pinnipeds (seals, sea lions, fur seals, and walruses) that are already in the water. Walruses may avoid moving vessels, with most reactions occurring within 0.29 miles (Richardson et al. 1995) or they may approach vessels out of curiosity. The impact of vessel traffic on marine mammals generally is expected to be transient and localized. Because of the low number of walrus expected to occur in the central Beaufort Sea, and the limited amount of vessel transit occurring in the proposed action area from project activities, the potential for effects from vessel traffic are discountable. Moreover, were there to be any effect, the consequences are expected to result in no detectable adverse impact on the Pacific walrus. Therefore, the ASAP may affect, but is not likely to adversely affect, the Pacific walrus.

There are no indirect effects on Pacific walrus anticipated as a result of the proposed project.

4.1.3.3 Ringed and Bearded Seals

Because the effects of vessel traffic are similar for all ice seals, effects on ringed and bearded seals will be addressed together in this section.

Direct effects on ringed and bearded seals could result from the presence of vessels at West Dock. However, no more than temporary and localized disturbance effects would occur. Disturbance effects exhibited by seals due to vessel traffic include moving away from the vessel or diving into the water if hauled-out on floating ice. Local effects would not change seal abundance or distribution near West Dock.

Vessels associated with the proposed project will only be at West Dock during summer months when water is typically ice-free in the action area. Seals prefer water near ice platforms on which they can haul-out. However, seals do also swim in areas of open water. Seals swimming in the water are not strongly affected by vessel noise (Richardson et al. 1995). Seals hauled-out respond more strongly to vessel noise and often respond by diving into the water (Richardson et al. 1995). It is not likely that there will be ice available for seals at West Dock during the summer when vessels associated with the project will be transiting. MMS has previously determined that increasing vessel traffic in the entire Beaufort Sea has no more than a negligible effect on ice seals (MMS 2008).

Although the potential for disturbance of very small numbers of ringed or bearded seals from vessel traffic exists, the effects, if any, are likely to be so negligible as to be undetectable individually or cumulatively. Vessel activity associated with the proposed project would be low and within the current scope of normal activities at West Dock. Accordingly, while the proposed project may affect ringed and bearded seals, it is not likely to adversely affect these species.

There are no likely indirect effects on seals anticipated as a result of the proposed action.

4.2 *Cumulative Effects*

Cumulative effects include the effects of future state, tribal, local or private actions, not involving federal activities, that are reasonably certain to occur in the action area for the proposed federal project (50 C.F.R. 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because such action will require separate consultation pursuant to Section 7 of the ESA.

All of the activities occurring within the action area are present actions that contribute to the existing environmental baseline and that are expected to continue into the future. These activities include oil and gas exploration and development on and adjacent to the North Slope; human habitation and development; vessel transportation into and use of the Port of Anchorage, the Port of Seward and West Dock; subsistence activities on the North Slope; and tourism. Oil and gas development activities are not subject to this cumulative effects analysis because they would be subject to federal permitting requirements and, thus, would require future Section 7 consultation. There are no data or information indicating that the extent or magnitude of the other identified state, tribal, local or private activities are likely to increase beyond their current levels. Accordingly, future state, tribal, local and private actions are likely to consist of a continuation of those currently contributing to the environmental baseline in the action area, and the effects are expected to remain stable and within the range of effects experienced in the past and present. Because there is no indication that the extent or magnitude of state, tribal, local or private actions will increase in the foreseeable future within the action area beyond their current levels, cumulative effects are not likely to adversely affect any of the listed or proposed for listing species, or any designated critical habitat occurring within the action area.

4.2.1 Climate Change

4.2.1.1 Global Climate Change

Global Climate Change, sometimes referred to as "Global Warming," refers to long-term fluctuations in temperature and other elements of the Earth's climate system. Natural processes such as solar-irradiance and volcanic activity can produce variations in climate. However, the IPCC has linked global climate change and the "greenhouse effect" to steep rises in atmospheric concentrations of CO_2, methane (CH_4), nitrous oxide (N_20), and synthetic halocarbons (chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, halons and sulphur hexafluoride) (IPCC 2007). Although scientific debate continues regarding the contributing factors to observed climate change and projections of trends and effects under various future scenarios, there is a current scientific consensus that increasing levels of carbon dioxide and other atmospheric greenhouse gases are a significant cause and ongoing contributing factor (IPCC 2007). At current rates of greenhouse gas release, average global surface temperatures could increase by 2.5 to 10 ºF (1.4 to 5.8 ºC) by the year 2100 (IPCC 2007).

General predictions of increasing climate change include, in addition to an increase in average surface temperatures, a rise in sea level, changes in oceanography (including changes in temperature, salinity, pH and sea ice), and increases in the severity of storms, floods, droughts, rainfall, heat waves and other weather anomalies. Some areas are expected to experience greater effects than other areas, however, prediction models are not sophisticated enough at the present time to make accurate regional predictions of such effects.

4.2.1.2 Arctic Climate Change

Although regional predictions of climate change based upon existing climate models are not considered reliable, there is a scientific consensus that the Arctic is already experiencing important climate changes and is expected to be one of the regions where climate change effects may be greatest. To date, many of the documented and most important effects have concerned reductions in sea ice extent and thickness in recent years. Analysis of long-term data sets indicates substantial reductions in both the extent and thickness of the arctic sea ice cover during the past 20-40 years, with record minimums in several recent years. Within the Artic, the Beaufort Sea has experienced some of the largest declines in ice extent during the summer. Other observed Arctic changes include decreased precipitation (particularly drier summers and falls), forest decline, permafrost degradation, increased storms and coastal erosion, and changes in ocean salinity, pH and temperature.

4.2.1.3 Potential Effects of the ASAP Project on Climate Change

In 2005, the U.S. emissions of CO_2 equivalent (CO_2 eq) totaled 7,147.2 million metric tons. Alaska currently emits approximately 53 million metric tons of CO_2 eq, and by the year 2020 is expected to emit 60 million metric tons (ADEC 2007).

There is no present scientific or policy (local, state, national or global) consensus regarding methodology, reliability, or relevance of estimating project-specific contributions to global climate change, or of attributing environmental impact significance to project-specific emissions of greenhouse gases. Accordingly, projected ASAP emissions cannot be quantified or causally linked in any scientifically accepted way to global climate change generally, or to climate change effects in the action area on listed species and critical habitat.

Qualitatively, probable effects of the ASAP project are likely to be indiscernible given projected emissions, the uniform distribution of greenhouse gas concentrations globally, and the absence of any meaningful nexus between the ASAP project and global oil and gas production and consumption rates. Moreover:

- The proposed project facilities would combust natural gas which is a lower emitter of carbon CO_2 with a rate of 117 lbs/(million British thermal units (MMBtu) versus 161 lbs/MMBtu for fuel oil combustion or 215 lbs/MMBtu for coal combustion (Energy Information Administration 2008).
- The proposed project would likely facilitate conversion from wood-, coal- and fuel-oil-based residential comfort heating in the Fairbanks North Star Borough, thus reducing overall greenhouse gas (GHG) emissions locally.

- The proposed project facilities will likely require air quality permits which incorporate emissions reduction control technology evaluations as part of the permitting process. EPA has currently promulgated Best Available Control Technology (BACT) requirements for GHG emissions for new sources (EPA 2010).
- Stricter EPA regulation of criteria pollutants (NOx) and certain hazardous air pollutants (HAP's) that also contribute to climate change would affect the proposed project facilities and require BACT.
- Newer technologies for emissions control of GHGs are being developed and may become available at the time the proposed project facilities are permitted and constructed.

There are no generally-applicable requirements, policies or guidance regarding appropriate mitigation measures for GHG emissions on a project-specific basis. In significant part, this is because there are no established Alaska or federal climate change or GHG emissions reduction or mitigation plans. Currently available information does not establish that solutions to these global problems may be effectively managed on an ad hoc, project-by-project, basis. Moreover, currently, there are no legal requirements or specific policies that impose restrictions on the ASAP project regarding GHG emissions, that limit or discourage production and consumption of domestic natural gas reserves, or that limit the production and consumption of natural gas from other domestic and foreign sources were the ASAP project not approved, for the purpose of limiting or mitigating global climate change effects.

Emissions from the proposed project are not expected to contribute in any discernable way to climate change, to climate change effects within the action area, or to effects upon listed species or critical habitat. Construction and operation of project facilities, and transiting vessel traffic in support of the proposed activities, is expected to contribute an extremely small amount of the overall GHG emissions into the planet's atmosphere and may, in some respects, ameliorate or reduce GHG emissions and climate effects that might otherwise result from the use of energy sources that produce larger amounts of GHGs than natural gas.

5.0 DETERMINATION OF EFFECT

5.1 *Steller's and Spectacled Eiders*

The construction and O&M of the ASAP are likely to adversely affect Steller's and spectacled eiders at the individual level of a very small number of takes as defined in the ESA, but with no detectable population level effects. Bird collisions with pipeline facilities, vehicles, and vessels are likely to occur in very small numbers during periods of migration and low visibility over the life of the project. Construction activities associated with the project are expected to produce very temporary and local disturbances to eiders and eider habitat, and are expected to occur primarily in winter outside of nesting season. During the operation and maintenance phase of the proposed project, strict protocols will be enforced that reduce waste and deter predators from facilities, thus minimizing disturbance to breeding and nesting eiders. No detectable effects to Steller's or spectacled eider populations are expected to occur from this proposed project.

5.2 *Whales*

5.2.1 Bowhead, Fin, and Humpback Whales

The construction and O&M of the proposed ASAP may affect but is not likely to adversely affect bowhead, fin, or humpback whales in the Beaufort Sea in the action area around West Dock. Vessel traffic associated with the proposed project will fall within the range of normal activity on the North Slope and at West Dock. Permit stipulations and mitigation measures will minimize any effects of disturbance from vessel traffic associated with the proposed project. Stipulations required by the NMFS as a result of the Section 7 consultation process will also be adhered to.

5.2.2 Cook Inlet Beluga Whale

Transportation activities associated with construction of the proposed ASAP may affect but are not likely to adversely affect the Cook Inlet beluga whale. Barging activities in and near the Port of Anchorage will be within the range of existing vessel traffic and are not likely to result in any detectable direct adverse effects. In addition, no indirect adverse effects through changes in prey access are likely as a result of anadromous stream crossings by the proposed pipeline. Permit stipulations will be adhered to and mitigation measures will be implemented to eliminate or reduce potential impacts to salmon runs in anadromous streams that will be crossed by the proposed pipeline.

5.2.3 Cook Inlet Beluga Whale Critical Habitat

The proposed project will not destroy or adversely modify critical habitat. Vessel traffic from the proposed project will occur within the range of existing vessel traffic. Although vessel traffic generates noise that has the potential to disturb marine mammals, vessel traffic at the Port of Anchorage is not expected to alter the suitability or use of the area by beluga whales. Because there will be no alteration or modification of habitat in Cook Inlet associated with the proposed project, there will be no effect on the beluga whale critical habitat.

5.3 *Pinnipeds*

5.3.1 Steller Sea Lion

Vessel traffic associated with transportation of construction materials for the proposed ASAP may affect, but is not likely to adversely affect Steller sea lions in or near the Port of Seward. Vessel traffic associated with the proposed project will fall within the range of normal activity near the Port of Seward and the action area does not encompass rookeries or other sensitive areas. Although noise from vessel traffic within the action area has the potential to transitorily disturb individual sea lions, not detectable adverse effects are known to occur in this area due to routine vessel traffic and none are likely as a result of the proposed project. The action area is not located within Steller sea lion designated critical habitat.

5.3.2 Pacific Walrus

As the Pacific walrus does not occur frequently in the Beaufort Sea, the construction and O&M activities associated with the proposed ASAP may affect but are not likely to affect walruses. Vessel traffic associated with the proposed project will fall within the range of normal activity in the action area around West Dock. The probability of a vessel within the action area interacting with an individual or group of walrus and/or adversely affecting the walrus is extremely low and, therefore, discountable. Mitigation practices will be followed to reduce any potential disturbance vessel traffic may have if interaction with walrus occurs, but no detectable adverse effects are anticipated.

5.3.3 Ringed and Bearded Seals

Marine vessel traffic associated with construction of the proposed ASAP may affect but is not likely to adversely affect ringed and bearded seals in the action area around West Dock. Small numbers of seals may be present in the area around West Dock and could be temporarily disturbed by noise associated with project vessel traffic. However, vessel traffic associated with the proposed project will fall within the range of normal activity near West Dock, and such activity is not known to have had adverse impacts on ringed and bearded seals. The NMFS will require certain stipulations be followed to reduce potential disturbance effects on ringed and bearded seals from vessel traffic associated with the proposed project. No detectable adverse effect to ringed or bearded seals is likely to occur.

5.4 *Polar Bears*

The proposed ASAP and the activities associated with the construction and O&M of this project are likely to adversely affect small numbers of individual polar bears at the level of a “take” by harassment as defined in the MMPA and the ESA. Over the life of the project, hazing of a small number of polar bears, resulting in a “take,” will likely occur for personnel safety purposes at some point during the lifetime of the ASAP project, however, the effects are likely to be limited to temporary changes in behavior, such as deflection. No injuries or mortality is likely. Polar bear mitigation measures will be adhered to throughout the lifetime of the project and, accordingly, no significant adverse effects on polar bears and polar bear habitat are likely.

5.4.1 Polar Bear Critical Habitat

Construction of the proposed ASAP is likely to adversely affect but not adversely modify or destroy polar bear critical habitat. The proposed project will not affect designated sea ice or barrier island critical habitat for the polar bear. However, construction activities and permanent project facilities will occupy a small proportion of the area designated as polar bear denning critical habitat (Unit 2). The areas affected by the proposed project are not likely to exhibit the essential habitat requirements for actual polar bear denning, and are not known to have been the location of maternal dens in the past. Moreover, maternal denning habitat is plentiful and widely distributed across the ACP.

6.0 REFERENCES

Aars, J., N.J. Lunn, and A.E. Derocher. eds. 2006. Polar bears: proceedings of the 14th working meeting of the IUCN/SSC Polar Bear Specialist Group, 20-24 June, Seattle, Washington, USA. IUCN, Gland, Switzerland. 189 pp.

ADEC (State of Alaska, Dept. of Environmental Conservation) 2007. Comments on Air Quality in the Northeast NPR-A Draft Supplemental Amended IAP/EIS submitted 11/6/2006. Juneau, AK: in MMS 2008A, MMS. 2008. Draft Environmental Impact Statement. Beaufort and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217, and 221, OCS EIS/EA MMS 2008-0055. Anchorage, AK: MMS 2008A, MMS, Alaska OCS Region.

ADFG 2011 www.adfg.alaska.gov/index.cfm?adfg=stellerseider.main

Alaska Department of Fish and Game (ADF&G). 2009. Wildlife Notebook Series. http://www.adfg.state.ak.us/pubs/notebook/marine/walrus.php (accessed 1/15/11)

Allen, B. M., and R. P. Angliss. 2010. Alaska Marine Mammal Stock Assessments, 2009. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-206. 276 p.

Allen, K.R. 1980. Conservation and management of whales. Univ, of Washington Press, Seattle.

Amstrup, S. C., I. Stirling, and J.W. Lentfer. 1986. Past and present status of polar bears in Alaska. Wildlife Society Bulletin 14: 241-254.

Amstrup, S.C. 1993. Human disturbances of denning polar bears in Alaska. Arctic 46:246–50.

Amstrup, S.C. 2003. Polar Bear (Ursus maritimus). Pages 587-610 in Feldhamer, B.C. Thompson, and J.A. Chapman, eds. Wild Mammals of North America - Biology, Management, and Conservation. John Hopkins University Press. Baltimore, Maryland.

Amstrup, S.C. and D.P. DeMaster. 1988. Polar Bear. In: Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations, J.W. Lentfer, ed. Washington, DC: Marine Mammal Commission, pp. 39-56.

Amstrup, S.C. T.L. McDonald, and I. Stirling. 2001. Polar bears in the Beaufort Sea: a 30-year mark-recapture case history. Journal of Agricultural, Biological, and Environmental Statistics 6(2):221-234.

Amstrup, S.C., 2000. Polar Bear. In: The Natural History of an Arctic Oil Field: Development and Biota, Chapter 7, J.C. Truett and S.R. Johnson, eds. San Diego, CA: Academic Press, pp. 133-157.

Amstrup, S.C., and C. Gardner. 1994. Polar bear maternity denning in the Beaufort Sea. Journal of Wildlife Management 58(1):1-10.

Amstrup, S.C., B.G. Marcot, and D.C. Douglas. 2007. Forecasting the range-wide status of polar bears at selected times in the 21st century. U.S. Geological Survey Administrative Report, Reston, Virginia.

126pp.

Angliss, R. and B. Allen. 2009. Bowhead whale (*Balaena mysticetus*) western Arctic stock. Pp 194-200 in Alaska marine mammal stock assessments 2008. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-193, 258 p.

Angliss, R. P., and K. L. Lodge. 2002. Alaska marine mammal stock assessments, 2002. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-133. 224 pp.

Angliss, R.P., and B.M. Allen. 2009. Alaska Marine Mammal Stock Assessments, 2008. U.S. Dep. Commer., NOAA Tech. Memo., NMFS-AFSC-206.

Angliss, R.P., and R. B. Outlaw. 2008. Alaska marine mammal stock assessments, 2007. U. S. Dep. Commer., NOAA Tech. Memo., NMFS-AFSC-180, 252 p.

Angliss, R.P., D.P. DeMaster, and A.L. Lopez. 2001, Alaska Marine Mammal Stock Assessments 2001, U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service, Alaska Fisheries Science Center, NOAA Technical Memorandum, NMFS-AFSC-124, Seattle, Wash., Dec.

Antonelis, G. A., S. R. Melin, and Y. A. Bukhtiyarov. 1994. Early spring feeding habits of bearded seals (*Erignathus barbatus*) in the Central Bering Sea, 1981. Arctic 47:74-79.

Arctic Monitoring and Assessment Program (AMAP). 2005. AMAP Assessment 2002: Persistent Organic Pollutants in the Arctic. Oslo, Norway. xvi + 310 pp.

Baker, A.R., T. R. Loughlin, V. Burkanov, C. W. Matson, R. G. Trujillo, D. G. Calkins, J. K. Wickliffe, and J. W. Bickham. 2005. Variation of Mitochondrial Control Region Sequences of Steller Sea Lions: The Three-Stock Hypothesis. Journal of Mammalogy, 86(6):1075-1084. 2005.

Bengston, J.L., P.L. Boveng. L.M. Hiruki-Raring, K. L. Laidre, C. Pungowiyi, and M. A. Simpkins. 2000. Abundance and distribution of ringed seals (Phoca hispida) in the coastal Chukchi Sea. Pp. 149-160 In A. L. Lopez and D.P. DeMaster. Marine Mammal Protection Act and Endangered Species Act Implementation Program 1999. AFSC Processed Rep. 2000-11, Alaska Fish. Sci. Cent., 7600 Sand Point Way NE Seattle, WA 98115.

Bengston, John, Lisa M. Hiruki-Raring, Michael A. Simpkins, Peter L. Boveng. "Ringed and bearded seal densities in the eastern Chukchi Sea, 1999-2000." *Polar Biology* 28 (2005): 833-845.

Berzin, A.A. and Rovnin, A.A. 1966. The distribution and migration of whales in the northeastern part of the Pacific Ocean and in the Bering Sea and the Sea of Chukotsk. Izvestia Tikhookeanskogo Nauchno-Issledovatel’skogo Institute Tybnogo Khozyaistva I Okeanografii 58: 179-207.

Blackwell, S.B. and C.R. Greene, Jr. 2002. Acoustic Measurements in Cook Inlet, Alaska, During 2001. Report from Greeneridge Sciences, Inc., Aptos, CA, for NMFS, Anchorage, AK.

Blackwell, S.B., C.R. Greene, T.L. McDonald, M.W. McLennan, C.S. Nations, R.G. Norman, and A. Thode. 2008. Beaufort Sea bowhead whale migration route study. (Chapter 8) *In*: *Preliminary Draft*: Joint Monitoring Program in the Chukchi and Beaufort seas, July-November 2007. LGL Alaska Report P971-1, Report from LGL Alaska Research Associates, Inc., LGL Ltd., JASCO Research, Ltd., and Greeneridge Sciences, Inc. for Shell Offshore, Inc. ConocoPhillips Alaska, Inc., and National Marine Fisheries Service, U.S. Fish and Wildlife Service. 445 p. plus Appendices.

Blackwell, S.B., W.J. Richardson, B. Streever, C.R. Greene. 2007. Bowhead Whale (*Balaena mysticetus*) Migration and Calling Behavior in the Alaskan Beaufort Sea, Autumn 2001-04: An Acoustic Localization Study. *Arctic*. Vol. 60, No. 3. September.

Blackwell, S.R. and C.R. Greene, Jr. 2004. Sounds from Northstar in the Open-Water Season: Characteristics and Contribution of Vessels. *In:* Monitoring of Industrial Sounds, Seals, and Bowhead Whales near BP's Northstar Oil Development, Alaskan Beaufort Sea, 1999-2003, W.J. Richardson and M.T. Williams, eds. LGL Report TA4002-4. Anchorage, AK: BPXA, Dept. of Health, Safety, & Environment.

Borgå, K., G. W. Gabrielsen, J. U. Skaare, L. Kleivane, R. J. Norstrom, and A. T. Fisk. 2005. Why do organochlorine differences between arctic regions vary among trophic levels? Environmental Science & Technology 39:4343-4352.

Braham, H. W., J. J. Burns, G. A. Fedoseev, and B. D. Krogman. 1984. Habitat partitioning by ice-associated pinnipeds: distribution and density of seals and walruses in the Bering Sea, April 1976 Pages 25-47 *in* F. H. Fay and G. A. Fedoseev, editors. Soviet-American Cooperative Research on Marine Mammals. Volume 1 - Pinnipeds. NOAA Technical Report NMFS 12. U.S. Department of Commerce, NOAA, Washington, D.C.

Braham, H.W., M.A. Fraker, and B.D. Krogman. 1980. Spring migration of the western Arctic population of bowhead whales. Mar. Fish. Rev. 42(9-10):36-46.

Brandon, J., and P.R. Wade. 2004. Assessment of the Bering-Chukchi-Beaufort Seas stock of bowhead whales. Unpubl. report submitted to the int. Whal. Comm. (SC/56/BRG20). 32pp.

Brandt, H. 1943. Alaska bird trails. Cleveland: Bird Research Foundation. 464 pp.

Branigan, M., T. Devine, T. Davison, L. Gordon and W. Wright. 2006. Summary of harvest data for species under quota in the Inuvialuit Settlement region, July 200-June 2005. GNWT-ENR Unpublished report, Northwest Territories, Canada. 36 pp.

Braune, B.M., P.M. Outridge, A.T. Fisk, D.C.G. Muir, P.A. Helm, K. Hobbs, P.F. Hoekstra, Z.A. Kuzyk, M. Kwan, R.J.Letcher, W.L. Lockhart, R.J. Norstrom, G.A. Stern, and I. Stirling. 2005. Persistent organic pollutants and mercury in marine biota of the Canadian Arctic: an overview of spatial and temporal trends. The Science of the Total Environment 351-352:4-56.

Brueggeman, J.J., T. Newby, and R.A. Grotefendent 1986. Catch Records of the Twenty North Pacific

Right Whales from Two Alaska Whaling Stations, 1917-1939. Arctic 39:1P43-46.

Burn, D.M., M.S. Udevitz, S.G. Speckman, R.B. Benter 2009. An improved procedure for detection and enumeration of walrus signatures in airborne thermal imagery. InternationalJournal of Applied earth Observation and Geoinformation 11 (2009) 324-333

Burns, J. J., and S. J. Harbo. 1972. An aerial census of ringed seals, northern coast of Alaska. Arctic 25:179-290.

Burns, J. J., L. H. Shapiro, and F. H. Fay. 1981. Ice as marine mammal habitat in the Bering Sea. Pages 781-797 *in* D. W. Hood and J. A. Calder, editors. The Eastern Bering Sea Shelf: Oceanography and Resources. Volume Two. U.S. Department of Commerce, NOAA, U.S. Department of Interior, Office of Marine Pollution Assessment, and Bureau of Land Management, Washington, D.C.

Burns, J., K. Frost. 1979. "The bearded seal, Erignuthus barbatus." In *Handbook of Marine Mammals*, by R.J., S.H. Ridgway Harrison. London: Academic Press, 1979.

Burton, N. H. K., M. M. Rehfisch and N. A. Clark. 2002. Impacts of disturbance from construction work on the densities and feeding behavior of waterbirds using the intertidal mudflats of Cardiff Bay, UK. Environmental Management 30:0865-0871.

Bychkov, V. A. 1971. Pinnipeds of the USSR. Pages 59-74 *in* Scientific principles of the conservation of nature (Nauchnye osnovy okhrany prirody). Ministry of Agriculture of the USSR, Moscow, Russia. (Translated from Russian by the Division of Foreign Fisheries,Washington, D.C., 14 p.).

Calambokidis J., Steiger G.H., Straley J.M., Quinn T., Herman L.M., Cerchio S., Salden D.r., Yamaguchi M., Sato F., Urban J.R., and others. 1007. Abundance and population structure of humpback whales in the North Pacific basin. Final Contract Report 50ABNF500113 to Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038. 72 pp.

Calkins, D. G., E. Becker, T. R. Spraker, and T. R. Loughlin. 1994. Impacts on Steller sea lions. Pages 119-139 *in*: T. R. Loughlin (ed.), Marine Mammals and the Exxon Valdez. Academic Press, N.Y

Calkins, D.G. 1989. Status of belukha whales in Cook Inlet. *In*: Gulf of Alaska, Cook Inlet, and North Aleutian Basin information update meeting. L.E. Jarvela and L.K. Thorsteinson (Eds). Anchorage, Ak., Feb. 7-8, 1989. Anchorage, Ak.: USDOC, NOAA, OCSEAP, p. 109-112.

Calkins, D.G., and K.W. Pitcher. 1982. Population Assessment, Ecology and Trophic Relationships of Steller Sea Lions in the Gulf of Alaska. U.S. Dep. of Commer., NOAA. OCSEAP Final Report 19 1983, pp. 445-546.

Cameron, M. F., J. L. Bengtson, P. L. Boveng, J. K. Jansen, B. P. Kelly, S. P. Dahle, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, And J. M. Wilder. 2010. Status review of the bearded seal (Erignathus barbatus). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-211, 246 p. (.pdf, 12.4 MB).

Caulfield, R.A. 1993. Aboriginal subsistence whaling in Greenland: the case of Qeqertarsuaq municipality in West Greenland. Arctic 46:144B155.

Clark C.W., and R. Charif. 1998. Monitoring the occurrence of large whales off North and West Scotland using passive acoustic arrays. Society of Petroleum Engineers (SPE). SPE/UKOOA European Environmental Conferences, Aberdeen, Scotland. April 1997.

Clarke, J.T. and M.C. Ferguason. 2010. Aerial Surveys for Bowhead Whales in the Alaskan Beaufort Sea: BWASP Update 2000-2009 with Comparisons to Historical Data. Science Applications International Corporation. Buckley, WA.

Cornick LA and Saxon-Kendall, L. 2009. Distribution, habitat use and behavior of Cook Inlet beluga whales and other marine mammals at the Port of Anchorage Marine Terminal Redevelopment Project, June – November, 2008. Alaska Pacific University, Anchorage, AK, for Integrated Concepts and Research Corporation, the Port of Anchorage, and the U.S. Department of Transportation Maritime Administration.

Cornick, L., and L. Kendall. 2008. Distribution, habitat use, and behavior of Cook Inlet beluga whales in Knik Arm, fall 2007. Final Annual Report for 2007 *prepared for* Integrated Concepts and Research Corporation, Anchorage, Alaska. 29p.

Cosens, S.E., H. Cleator, and P. Richard. 2006. Numbers of bowhead whales (Balaena mysticetus) in the Eastern Canadian Arctic, based on aerial surveys in August 2002, 2003, and 2004. Unpubl. paper submitted to the Scientific Committee of the Int. Whal. Comm. June 2006 (SC/58/BRG7). 19 pp.

Cramp, S., K. E. L. Simmons, I. J. Ferguson-Lees, R. Gilmor, P. A. D. Hollom, R. Hudson, E. M. Nicholson, M. A. Ogilvie, P. J. Olney, K. H. Voous, and J. Wattel, eds. 1977. Handbook of the birds of Europe, the Middle East, and North Africa. Vol. I. Oxford University Press, Oxford, United Kingdom. 722 pp.

Dau, C. P., P. L. Flint, and M. R. Petersen. 2000. Distribution of recoveries of Steller's Eiders banded on the lower Alaska Peninsula, Alaska. Journal of Field Ornithology 71:541-548.

Dehn, L.-A., G. G. Sheffield, E. H. Follmann, L. K. Duffy, D. L. Thomas, G. R. Bratton, R. J. Taylor, and T. M. O'Hara. 2005. Trace elements in tissues of phocid seals harvested in the Alaskan and Canadian Arctic: influence of age and feeding ecology. Canadian Journal of Zoology 83:726-746.

Derocher, A.E., O. Wiig, and M. Andersen. 2002. Diet composition of polar bears in Svalbard and the western Barents Sea. Polar Biology 25:448-452.

Deygtyarev, A. G., S. M. Sleptsov, S. P. Troev, J. M. Pearce, and M. R. Petersen. 1999. Status and biology of the Steller's Eider in Yakutia, Russia. Casarca 5:249-262.

Dietz, R. 2008. Contaminants in marine mammals in Greenland -- with linkages to trophic levels, effects, diseases and distribution. DSc Thesis. University of Aarhus, Denmark, Copenhagen, Denmark. 120 p.

Dietz, R., E. W. Born, C. T. Agger, and C. O. Nielsen. 1995. Zinc, cadmium, mercury and selenium in polar bears (Ursus maritimus) from Central East Greenland. Polar Biology 15:175-185.

Dolphin, W.F. 1987a. Dive behavior and foraging of humpback whales in southeast Alaska. Can. J. Zool. 65:354-362

Dolphin, W.F. 1987b. Prey densities and foraging of humpback whales, Megaptera novaeanglia. Experientia 43:468-471.

Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. Ibis 148:29-42.

Dueck, L.P., M.P. Hiede-Jorgensen, M.V. Jensen, and L.D. Postma. 2006. Update on investigations of bowhead whale (Balaena mysticetus) movements in the eastern Arctic, 2003-2005, based on satellite-linked telemetry. Unpubl. paper submitted to the Scientific committee of the int. Whal. Comm. June 2006 (SC-59/BRG5). 17pp.

Durner, G.M., S.C. Amstrup, and A.S. Fischbach. 2003. Habitat characteristics of polar bear terrestrial maternal den sites in northern Alaska. Arctic 56(1):55–62.

Durner, G.M., S.C. Amstrup, and K.J. Ambrosius. 2006. Polar bear maternal den habitat in the Arctic National Wildlife Refuge, Alaska. Arctic 59(1):31-36.

Edds-Walton PL. 1997. Acoustic communication signals of mysticete whales. Bioacoustics 8:47-60.

Eley, T.J. 1994. Wildlife Notebook Series: Ringed Seal, Alaska Department of Fish and Game.

Energy Information Administration. http://www.eia.doe.gov/oiaf/1605/coefficients.html. Retrieved March 15, 2011.

EPA 2010 http://www.epa.gov/nsr/ghgdocs/epa-hq-oar-2010-0841-0001.pdf. Accessed March 15, 2011.

Fay, F. H. 1974. The role of ice in the ecology of marine mammals of the Bering Sea. Pages 383-399 *in* D. W. Hood and E. J. Kelley, editors. Oceanography of the Bering Sea. Institute of Marine Science, Hakodate, Japan.

Fay, F.H. 1982. Ecology and Biology of the Pacific Walrus, *Odobenus rosmarus divergens* Illiger. *North American Fauna* 74:279.

Fay, F.H., B.P. Kelly, and J.L. Sease. 1989. Managing the exploitation of Pacific walruses: a tragedy of delayed response and poor communication. Marine Mammal Science 5:1-16.

Fay, F.H., L.L. Eberhardt, B.P. Kelly, J.J. Burns, and L.T. Quakenbush. 1997. Status of the Pacific walrus Population, 1950-1989. Marine Mammal Science 13(4):537-565.

Ferrero, R.C., D.P. DeMaster, P.S. Hill, M.M. Muto, and A.L. Lopez. 2000. Alaska marine mammal stock assessments, 2000. U. S. Dep. Commer., NOAA Tech. Memo., NMFS-AFSC-119.

Finley, K. J., and C. R. Evans. 1983. Summer diet of the bearded seal (*Erignathus barbatus*) in the

Fischbach, A.S., S.C. Amstrup, and D.C. Douglas. 2007. Landward and eastward shift of Alaskan polar bear denning associated with recent sea ice changes. Polar Biology 30:1395- 1405.

Fischbach, Anthony, USGS, 12/9/10 personal communication.

Fischer, J. B. and W. W. Larned. 2004. Summer distribution of marine birds in the western Beaufort Sea. Arctic 57:143-159.

Fisk, A. T., C. A. de Wit, M. Wayland, Z. Z. Kuzyk, N. Burgess, R. Robert, B. Braune, R. Norstrom, S. P. Blum, C. Sandau, E. Lie, H. J. S. Larsen, J. U. Skaare, and D. C. G. Muir. 2005. An assessment of the toxicological significance of anthropogenic contaminants in Canadian arctic wildlife. Science of the Total Environment 351:57-93.

Fisk, A.T., K.A. Hobson, and R.J. Norstrom. 2001. Influence of chemical and biological factorson trophic transfer of persistent pollutants in the Northwater Polynya marine food web.Environmental Science and Technology 35:732-738.

Flint, P. L., J. B. Grand, J. A. Morse, and T. F. Fondell. 2000. Late summer survival of adult female and juvenile Spectacled Eiders on the Yukon-Kuskokwim Delta, Alaska. Waterbirds 23:292–297.

Fraker, M., D. Sergeant, and W. Hoek. 1978. Bowhead and white whales in the southern Beaufort Sea. Sidney, British Columbia: Beaufort Sea Project, Department of Fisheries and the Environment.

Fredrickson, L. H. 2001. Steller's Eider (Polysticta stelleri). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Accessed from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/571> December 10, 2010.

Frost , K.J., and L.F. Lowry. 1999. Monitoring distribution and abundance of ringed seals in northern Alaska. Interim Rep. Cooperative Agreement Number 14-35-0001-30810 submitted to the U.S. Dep. Interior, Minerals Management Servife, Anchorage, AK. 37p + appendix.

Frost, K. J. 1985. The ringed seal (Phoca hispida). Pages 79-87 in J. J. Burns, K. J. Frost, and L. F. Lowry, editors. Marine Mammals Species Accounts. Alaska Department Fish and Game, Juneau, AK.

Frost, K. J., L. F. Lowry, G. Pendleton, and H. R. Nute. 2004. Factors affecting the observed densities of ringed seals, *Phoca hispida*, in the Alaskan Beaufort Sea, 1996-99. Arctic 57:115-128.

Frost, K.J., L.F. Lowry, G. Pendleton, and H.R. Nute. 2002. Monitoring distribution and abundance of ringed seals in northern Alaska. OCS Study MMS 2002-04. Final report from the Alaska Dep. Fish and Game, Juneau, AK, for U.S. Minerals Management Service, Anchorage, AK. 37p + Appendices.

Funk, D., D. Hannay, D. Ireland, R.Rodriguez, W. Koski (eds.). 2008. Marine mammal monitoring and mitigation during open water seismic exploration by Shell Offshore, Inc. in the Chukchi and Beaufort Seas, July- November 2007; 90 day report. LGL Rep. P969-1. rep. from LGL Alaska Research

Associated Inc., LGL Ltd., and JASCO Research Ltd. For Shell Offshore Inc., Nat. Mar. Fish. Serv., and U.S. Fish and Wildlife Serv. 218 p.

Funk, D.W., R.J. Rodrigues, and M.T. Williams (eds.) 2005. Baseline studies of beluga whale habitat use in Knik Arm, Upper Cook Inlet, Alaska. Rep. from LGL Alaska Research Associates, Inc., Anchorage, AK, for HDR Alaska, Inc., Anchorage, AK, and Knik Arm Bridge and Toll Authority, Anchorage, AK. 65 p. + appendices.

Gambell, R. 1993. International management of whales and whaling: an historical review of the regulation of commercial ad aboriginal subsistence whaling. Arctic 46:97B107.

Garlich-Miller, J.L., L.T. Quakenbush and J.F. Bromaghin. 2006. Trend in age structure and productivity of Pacific walruses harvested in the Bering Strait region of Alaska, 1952-2002. Marine Mammal Science 22:880-896.

Garner, G.W., S.T. Knick, and D.C. Douglas. 1990. Seasonal movements of adult female polar bears in the Bering and Chukchi Seas. International Conference on Bear Research and Management 8:219–26.

George, J.C., R. Zeh, R.P. Suydam, and C. Clark. 2004. Abundance and Population Trend (1978- 2001) of Western Arctic Bowhead Whales Surveyed near Barrow, Alaska. *Marine Mammal Science* 20(4):755-773.

George, J.C., S.E. Moore, and R. Suydam. 2007. Summary of stock structure research on the Bering-Chukchi-Beaufort Seas stock of bowhead whales 2003-2007. Unpubl. report submitted to Int. Whal. Comm. (SC/59/BRG3). 15pp.

Gilbert, J.R., G.A. Fedorseev, D. Seagars, E. Razlivalov, and A. LaChugin. 1992. Aerial census of Pacific Walrus, 1990. US Fish and Wildlife Service Marine Mammal Management, Anchorage Alaska.

Goeta, K., D. Rugh, and J. Mocklin. 2008. Bowhead whale feeding ecology study, aerial surveys, 2008 July, August, September. Quarterly report. Interagency agreement number MMS 4500000120, 8pp.

Great Land Trust 2000. Technical Report on Significant Natural Open Space in the Anchorage Bowl: A Survey of Biologically Important Habitat and Areas Identified as Important by the Anchorage Community. January.

Grebmeier, J. M., and K. H. Dunton. 2000. Benthic processes in the northern Bering/Chukchi seas: status and global change, p. 61–71. In Impacts of changes in sea ice and other environmental parameters in the Arctic. Report of the Marine Mammal Commission Workshop, 15–17 February 2000, Girdwood, Alaska. Marine Mammal Commission, Bethesda, MD.

Greene CR, Jr., Altman NS, Richardson WJ. 1999. Bowhead whale calls. p. 6-1 to 6-23 In: W.J. Richardson (ed.), Marine mammal and acoustical monitoring of Western Geophysical's open-water seismic program in the Alaskan Beaufort Sea, 1998. LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for Western Geophysical, Houston, TX, and U.S. Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD. Report nr LGL Rep. TA2230-3. 390 p.

Gurevich, V. S. 1980. Worldwide distribution and migration patterns of the white whale (beluga), Delphinapterus leucas. Rep. Int. Whal. Comm. 30:465-480.

Haley, D. 1986. Marine Mammals. Second edition. Seattle: Pacific Search Press.

Hansen, D.J. and J.D. Hubbard. 1999. Distribution of Cook Inlet beluga whales (Delphinapterus leucas) in winter. Final Report. OCS Study. MMS 99-0024. U.S. Dep. Int., Minerals Management Service, Alaska OCS Region, Anchorage, AK. 30p.

Harwood, L. A., and I. Stirling. 1992. Distribution of ringed seals in the southeastern Beaufort Sea during late summer. Canadian Journal of Zoology 70:891-900.

Hazard, K. 1988. Beluga whale, *Delphinapterus leucas*. Pp. 195-235 *In* J. W. Lentfer (ed.), Selected marine mammals of Alaska. Species accounts with research and management recommendations. Marine Mammal Commission, Washington, D.C.

Heide-Jørgensen, M.P., K. Laidre, D. Borchers, F. Samarra, and H. Stern. 2007. Increasing abundance of bowhead whales in West Greenland. Biol. Lett. 3:577-580.

Heide-Jørgensen, M.P., Laidre, Jensen, M.V., Dueck, L. & Postma, L.D. 2006. Dissolving stock discreteness with satellite tracking: Bowhead whales in Baffin Bay. *Marine Mammal Science*. **22**(1): 34-45.

Herman, L. M., Forestell, P. H. & Antinoja, R. C. 1980. Study of the 1976/77 migration of humpback whales into Hawaiian waters: Composite description. Final report to the U.S. Marine Mammal Commission. No. MMC-77/19. United States National Technical Information Services, Arlington, VA.

Hinzman, L., N. D. Bettez, W. R. Bolton, F. S. Chapin, M. B. Dyurgerov, C. L. Fastie, B. Griffith, R. D. Hollister, A. Hope, H. P. Huntington, A. M. Jensen, G. J. Jia, T. Jorgenson, D. L. Kane, D. R. Klein, G. Kofinas, A. H. Lynch, A. H. Lloyd, A. D. McGuire, F. E. Nelson, W. C. Oechel, T. E. Osterkamp, C. H. Racine, V. E. Romanovsky, R. S. Stone, D. A. Stow, M. Sturm, C. E. Tweedie, G. L. Vourlitis, M. D. Walker, D. A. Walker, P. J. Webber, J. Welker, K. S. Winker, and K. Yoshimkawa. 2005. Evidence and implications of recent climate change in northern Alaska and other Arctic regions. Climatic Change 72:251–98.

Hobbs, R. C., and K. E. W. Shelden. 2008. Supplemental status review and extinction assessment of Cook Inlet belugas (Delphinapterus leucas). AFSC Processed Rep. 2008-08, 76 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.

Hobbs, R.C., D. J. Rugh, and D. P. DeMaster. 2000. Abundance of belugas, Delphinapterus leucas, in Cook Inlet, Alaska, 1994-2000. Mar. Fish. Rev. 62(3):37-45.

Hobbs, R.C., K.L. Laidre, D.J. Vos, B.A. Mahoney, and M. Eagleton. 2005. Movements and Area Use by

Belugas, Delphinapterus leucas, in a Sub-Arctic Alaskan Estuary. Arctic, Vol 58, No. 4, 331-340.

Huntington, H.P. 2000. Traditional knowledge of the ecology of beluga whale, *Delphinapterus*

Huntington, H.P. and the Communities of Buckland, Elim, Koyuk, Point Lay, and Shaktoolik. 1999. Traditional knowledge of the ecology of beluga whales (*Delphinapterus leucas*) in the eastern Chukchi and northern Bering seas, Alaska. Arctic 52:49–61.

International Whale Protection Organization (IWPO) 2011. Retrieved from: http://www.internationalwhaleprotection.org/whalers.html on January 19, 2011.

International Whaling Commission (IWC). 1995. Report of the Scientific Committee. Rep. int. Whal. Commn 45:53B221.

International Whaling Commission (IWC). 2004b. Report of the Sub-Committee on Bowhead, Right and Gray Whales. Cambridge, UK: IWC, 27 pp.

International Whaling Commission (IWC). 2005a. Report of the Scientific Committee. Cambridge, UK: IWC.

Intergovernmental Panel on Climate Change (IPCC). 2001a. Summary for Policymakers. *In*: Climate Change 2001: Synthesis Report, Wembly, UK, Sept. 24-IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change., S. Solomon, D. Qin M. Manning Z. Chen M. Marquis K. B. Avery M. Tignor and H. L. Miller, eds. New York: Cambridge National Marine Fisheries Service. 2008. Conservation Plan for the Cook Inlet beluga whale (Delphinapterus leucas). National Marine Fisheries Service, Juneau, Alaska.

Ireland D. S., D. W. Funk, R. Rodrigues, and W. R. Koski (eds.). 2008. Joint Monitoring Program in the Chukchi and Beaufort Seas, July-November 2007. LGL Alaska Rep. P971-1. Rep. from LGL Alaska Research Associates Inc., Anchorage, AK, LGL Ltd., and JASCO Research Ltd. and Greeneridge Sciences, Inc. for Shell Offshore Inc, Houston, TX, ConocoPhillips Alaska Inc., Anchorage, AK and Nat. Mar. Fish. Serv., Silver Spring, MD. and U.S. Fish and Wildlife Service. 445 p. plus appendices.

Ireland, D.S., R. Rodrigues, D. Funk, W.R. Koski, D. Hannay. (eds.). 2009. Marine mammal monitoring and mitigation during open water seismic exploration by Shell Offshore Inc. In the Chukchi and Beaufort Seas, July–October 2008: 90-day report. LGL Rep. P1049-1. Rep from LGL Alaska Research Associates Inc., LGL Ltd., and JASCO Research Ltd. For Shell Offshore Inc., Nat. Mar. Fish. Serv., and U.S. Fish and Wild. Serv. 277 pp, plus appendices.

IUCN. 2006. Status of the polar bear. Pp 33-56 in J. Aars, N.J. Lunn, and A.E. Derocher (Eds.), Proceedings of the 14th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, Seattle, United

States. IUCN, Gland, Switzerland and Cambridge, UK.

Ivashin, M.V. and Rovnin, A.A. 1967. Some results of the Soviet whale marking in the waters of the North Pacific. Norsk Hvalfangst-Tid. 56(6): 123-135.

Jay CV, and Fischbach A.S. 2008. Pacific walrus response to Arctic sea ice losses. U.S. Geological Survey Fact Sheet 2008-3041:4

Jensen, A.S., and G.K. Silber. 2003. Large Whale Ship Strike Database. U.S. Dep. Commerce, NOAA Tech. Memo NMFS-F/OPR-25, 37 pp.

Kelly, B. P., J. L. Bengtson, P. L. Boveng, M. F. Cameron, S. P. Dahle, J. K. Jansen, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, And J. M. Wilder. 2010. Status review of the ringed seal (Phoca hispida). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-212, 250 p. (.pdf, 8.7 MB).

Kelly, B. P., O. H. Badajos, M. Kunnasranta, J. R. Moran, M. Martinez-Bakker, D. Wartzok, and P. Boveng. 2010. Seasonal home ranges and fidelity to breeding sites among ringed seals. Polar Biology 33:1095-1109.

Kelly, B.P. 1988. "Ringed Seal." In *Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations*, by J.W. Lentfer, 57-77. Washington DC: Marine Mammal Commission, 1988.

Kenyon, K.W., and Rice, D.W. (1961). Abundance and distribution of the Steller sea lion. Journal of Mammalogy, 42, pp.223-234.

Ketten, D.R.. 1997. Structure and function in whale ears. Bioacoustics 8:103-135.

Klinkhart, E.G. 1966. The beluga whale in Alaska. Alaska Dept. Fish and Game. Fed. Aid in Wildlife Restoration Proj. Rep. Vol. VII. 11p.

Kochnev, A.A., V.M. Etylin, I. Kavry, E.B. Siv-Siv, and V. Tanko. 2003. Traditional Knowledge of Chukotka Native Peoples Regarding Polar Bear Habitat Use. Final Report. Anchorage, AK: USDOI, National Park Service, 165 pp.

Koski, W.R., R.A. Davis, G.W. Miller, and D.E. Withrow., 1993. Reproduction. *In: The Bowhead Whale,* J.J. Burns, J.J. Montague and C.J. Cowles, eds. Special Publication of The Society for Marine Mammalogy, 2. Lawrence, KS: The Society for Marine Mammalogy, pp. 239-274.

Kovacs, K. M. 2002. Bearded seal *Erignathus barbatus*. Pages 84-87 *in* W. F. Perrin, B. Würsig, and J. G.M. Thewissen, editors. Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.

Kovacs, K. M., C. Lydersen, and I. Gjertz. 1996. Birth-site characteristics and prenatal molting in bearded seals (*Erignathus barbatus*). Journal of Mammalogy 77:1085-1091.

Kovacs, K.M., C. Lydersen, and I. Gjertz.. 2007. "Birth-Site Characteristics and Prenatal Molting in

Bearded Seals (Erignathus barbatus)." *Journal of Mammalogy* 774 (1996): 1085-1091.

Kucklick, J. R., W. D. J. Struntz, P. R. Becker, G. W. York, T. M. O'Hara, and J. E. Bohonowych. 2002. Persistent organochlorine pollutants in ringed seals and polar bears collected from northern Alaska. Science of the Total Environment 287:45-59.

Larned, W. and G. Balogh. 1997. Eider breeding population survey, Arctic Coastal Plain, Alaska 1992-1996. U.S> Fish and Wildlife Service, Migratory Bird Management, Anchorage, AK. 53 pp.

Larned, W. and T. Tiplady. 1999. Late wintering distribution of spectacled eiders (Somateria fischeri) in the Bering Sea 1998. Unpublished Report, U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, AK. 9 pp.

Larned, W. W., R. S. Stehn, and R. P. Platte. 2006. Eider breeding population survey, Arctic Coastal Plain, Alaska, 2006. U.S. Fish and Wildlife Service, Anchorage, Alaska.

Larned, W., R. Stehn, and R. Platte. 2010. Waterfowl breeding population survey Arctic Coastal Plain, Alaska 2009. U. S. Fish and Wildlife Service, Anchorage, Alaska.

Lee, J. S., S. Tanabe, H. Umino, R. Tatsukawa, T. R. Loughlin, and D. C. Calkins. 1996. Persistent organochlorines in Steller sea lion (*Eumetopias jubatus*) from the bulk of Alaska and the Bering Sea, 1976-1981. Mar. Pol. Bull. 32:535-544.

Lentfer, J.W. and R.J. Hensel. 1980. Alaskan polar bear denning. International Conference on Bear Research and Management 4:101–8.

LGL and Greenridge. 1996. *Northstar Marine Mammal Monitoring Program, 1995: Baseline surveys and retrospective analyses of marine mammal and ambient noise data from the Central Alaskan Beaufort Sea.* Report from LGL Ltd., King City, Ont., and Greenridge Sciences Inc., Santa Barbara, CA, for BP Exploration (Alaska) Inc., Anchorage, AK. 104 p.

LGL. 2007. *Joint Monitoring Program in the Chukchi and Beaufort Seas, July-November 2006.* Anchorage: LGL Alaska Research Associates Inc., 2007.

Lie, E., A. Bernhoft, F. Riget, S.E. Belikov, A.N. Boltunov, G.W. Garner, Ø Wiig, , and J.U. Skaare. 2003. Geographical distribution of organochlorine pesticides (OCPs) in polar bears (Ursus maritimus) in the Norwegian and Russian Arctic. The Science of the Total Environment 306:159-170.

Liebezeit. And S.W. Zack. 2010. Avian habitat and nesting use of tundra-nesting birds in the Prudhoe Bay Oilfield – Long-term monitoring**:** 2010 annual report. Prepared by the Wildlife Conservation Society for the Bureau of Land Management, Alaska Department of Fish and Game, BP exploration (Alaska), Inc., & other interested parties/stakeholders. 37 p.

Ljungblad, D. K., S. E. Moore, D. R. Van Schoik. 1986. Seasonal Patterns of Distribution, Abundance, Migration and Behavior of the Western Arctic Stock of Bowhead Whales (Balaena mysticetus) in Alaskan seas. Rep. Int. Whal. Comm. Special Issue 8:177-205.

Loughlin, T.R., D.J. Rugh, and C.H. Fiscus, (1984). Northern sea lion distribution and abundance: 1956–80." Journal of Wildlife Management, 48(3), pp.729-740.

Lowry, L.F. 1993. Foods and Feeding Ecology. *In: The Bowhead Whale*, J.J. Burns, J.J. Montague and C.J. Cowles, eds. Special Publication of The Society for Marine Mammalogy, 2. Lawrence, KS: The Society for Marine Mammalogy, pp. 201-238.

Lowry, L.F. and G. Sheffield. 2002. Stomach Contents of Bowhead Whales Harvested in the Alaskan Beaufort Sea. *In:* Bowhead Whale Feeding in the Eastern Alaskan Beaufort Sea: Update of Scientific and Traditional Information, LGL and Greeneridge, eds. LGL Report TA 2196-6. King City, Ont., Canada: LGL Ecological Research Associates, Inc., 28 pp.

Lowry, L.F., G. Sheffield, and J.C. George. 2004. Bowhead Whale Feeding in the Alaskan Beaufort Sea, Based on Stomach Contents Analyses. *J. Cetacean Res. Manage.* 6(3):223.

Mallek, E., R. Platte, and R. Stehn. 2007. Aerial breeding pair surveys of the Arctic Coastal Plain of Alaska 2006. U.S. Fish and Wildlife Service, Waterfowl Management, Fairbanks, AK 25 pp.

Marine Mammal Stranding Network (MMSN) 2010. National Marine Fisheries Service Alaska Regional Office. http://www.alaskafisheries.noaa.gov/protectedresources/strandings.htm. Visited on December 29, 2010.

Markowitz, T.M. and T.L. McGuire. 2007. Temporal-spatial distribution, movements and behavior of beluga whales near the Port of Anchorage, Alaska. LGL Alaska Research Associates, Inc., Anchorage, AK, for Integrated Concepts and Research Corporation, the Port of Anchorage, and the U.S. Department of Transportation Maritime Administration.

McDonald, M.A., J.A. Hildebrand, S. Webb, L. Dorman, and C.G. Fox, 1993. Vocalizations of blue and fin whales during a midocean ridge airgun experiment. J. Acoust. Soc. Am. 94 (3, pt.2):1849.

McGuire, T.L., C.C. Kaplna, M.K. Blees, and M.R. Link. 2008. Photo-identification of beluga whales in Upper Cook Inlet, Alaska. 2007 Annual Report. Report prepared by LGL Alaska Research Associates, Inc., Anchorage, AK, for Chevron, National Fish and Wildlife Foundation, and ConocoPhillips Alaska, Inc. 52p. + Appendices.

Messier, F., M.K. Taylor, and M.A. Ramsay. 1994. Denning ecology of polar bears in the Canadian Arctic Archipelago. Journal of Mammalogy 75:420–30.

Metzner, K. A. 1993. Ecological strategies of wintering Steller's Eiders on Izembek Lagoon and Cold Bay, Alaska. Master's Thesis. University of Missouri, Columbia.

Miller, G.W. and R.A. Davis. 2002. Marine Mammal and Acoustical Monitoring of Anderson Exploration Limited's Open-Water Seismic Program in the Southeastern Beaufort Sea, 2001. LGL Report TA 2618-1. King City, Ont. Canada: LGL Ecological Research Associates, Inc., 199 pp.

Minerals Management Service (MMS) and National Marine Fisheries Service (NMFS) 2008. Endangered

Species Act – Section 7 Consultation Biological Opinion. July 17, 2008.

Minerals Management Service (MMS). 1995. Cook Inlet Planning Area Oil and Gas Lease Sale 149. Final Environmental Impact Statement. OCS EIS/EA MMS 95-0066.

Minerals Management Service (MMS). 2002. GIS Geospatial Data Base of Oil-Industry and Other Human Activity (1979-1999) in the Alaskan Beaufort Sea. MMS OCS Study 2002-071.

Minerals Management Service (MMS). 2007. Final Environmental Impact Statement. Chukchi Sea Planning Area Oil and Gas Lease Sale 193 and Seismic Surveying Activities in the Chukchi Sea OCS EIS/EA MMS 2007-026 Minerals Management Service, Alaska OCS Region, Anchorage, AK.

Minerals Management Service (MMS). 2009a. Environmental Assessment, Shell Offshore Inc. 2010 Outer Continental Shelf Lease Exploration Plan Camden Bay, Alaska. Anchorage, Alaska. MMS 2009-052.

Minerals Management Service (MMS). 2009b. Environmental Assessment, Shell Offshore Inc. 2010 Exploration Drilling Program, Burger, Crackerjack, and SW Shoebill Prospects, Chukchi Sea Outer Continental Shelf, Alaska. Anchorage, Alaska. MMS 2009-061

Mitchell, E., and R.R. Reeves. 1983. Catch history, abundance and present status of northwest Atlantic humpback whales. Rep. int. Whal. Commn (Spec. Iss. 5):153B212

Monnett, C. and S.D. Treacy. 2005. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2002-2004. OCS Study, MMS 2005-037. Anchorage, AK: USDOI, MMS, Alaska OCS Region.

Moore, S.E. and R.R. Reeves., 1993. Distribution and Movement. *In: The Bowhead Whale*, J.J. Burns, J.J. Montague, and C.J. Cowles, eds. Special Publication of The Society for Marine Mammalogy, 2. Lawrence, KS: The Society for Marine Mammalogy, 313-386.

Moore, S.E., and H.P. Huntington. 2008. Arctic marine mammals and climate change: impacts and resilience. Ecological Applications 18(Suppl.):157–165.

Moore, S.E., D.P. DeMaster, and P.K. Dayton. 2000. Cetacean Habitat Selection in the Alaskan Arctic during Summer and Autumn. *Arctic* 53(4):432-447.

Moore, S.E., J.T. Clarke, and D.K. Ljungblad. 1989. Bowhead whale (*Balaena mysticetus*) spatial and temporal distribution in the central Beaufort Sea during late summer and early fall 1979 – 86. Report of the International Whaling Commission 39:283 – 290.

Moore, Sue E. and K.R. Laidre. 2006. Trends in sea ice cover within habitats used by bowhead whales in the western arctic. Ecol. Appl., 16 (3).12p.

Morris, B.F., Alton, M.S. and Braham, H.W. 1983. Living marine resources of the Gulf of Alaska, a resource assessment for the Gulf of Alaska/Cook Inlet proposed oil and gas Lease Sale 88. U.S. Dept.

Commerce, NOAA Tech. Memo. NMFS F/AKR-5. 232 pp.

Moulton, V. D., W. J. Richardson, T. L. McDonald, R. E. Elliott, and M. T. Williams. 2002. Factors influencing local abundance and haulout behaviour of ringed seals (*Phoca hispida*) on landfast ice of the Alaskan Beaufort Sea. Canadian Journal of Zoology 80:1900-1917.

Moulton, V.D., W.J. Richardson, M.T. Williams and S.B. Blackwell, 2003: Ringed seal densities and noise near and artificial island with construction and drilling. Acoustics Research Letters Online 4(4):112-117.

Muir, D., B. Braune, B. DeMarch, R. Norstrom, R. Wagemann, L. Lockhart, B. Hargrave, D. Bright, R. Addison, J. Payne, and K. Reimer. 1999. Spatial and temporal trends and effects of contaminants in the Canadian Arctic marine ecosystem: a review. Science of the Total Environment 230:83-144.

Murie, O. J. 1924. Report on investigations of birds and mammals of the Hooper Bay section of Alaska during the spring and summer of 1924. Unpublished report, U.S. Department of Agriculture, Biological Survey, Washington, D.C. Available at LGL Alaska Research Associates, Inc., 4175 Tudor Centre Drive, Suite 101, Anchorage, Alaska 99508.

Nakata, H., S. Tanabe, R. Tatsukawa, Y. Koyama, N. Miyazaki, S. Belikov, and A. Boltunov. 1998. Persistent organochlorine contaminants in ringed seals (Phoca hispida) from the Kara Sea, Russian Arctic. Environmental Toxicology and Chemistry 17:1745-1755.

NAS. 2003. Cumulative environmental effects of oil and gas activities on Alaska's North Slope. National Research Council of the National Academies. National Academies Press, Washington D.C.

NASA. 2005. Arctic Sea Ice Continues to Decline, Arctic Temperatures Continue to Rise In 2005.

National Marine Fisheries Service (NMFS). 1991. Final Recovery Plan for the Humpback Whale *Megaptera novaeangliae*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources. November 1991.

National Marine Fisheries Service (NMFS). 2000. Draft EIS. Federal Actions Associated with Management and Recovery of Cook Inlet Beluga Whales.

National Marine Fisheries Service (NMFS). 2001 Biological Opinion and ITS October 2001 Authorization of groundfish fisheries. Alaska Region Sustainable Fisheries Division October 2001

National Marine Fisheries Service (NMFS). 2003. Final Environmental Assessment for issuing Annual Quotas to the Alaska Eskimo Whaling Commission for a Subsistence Hunt on Bowhead Whales for the Years 2003 Through 2007. February 23, 2003.

National Marine Fisheries Service (NMFS). 2004. Alaska Groundfish Fisheries Final Programmatic Supplement Environmental Impact Statement (PSEIS). Alaska Regional Office, Juneau Alaska

National Marine Fisheries Service (NMFS). 2005. Revisions to Guidelines for Assessing Marine

Mammals Stocks. 24 pp. Available at: http://www.nmfs.noaa.gov/pr/pdfs/sars/gamms2005.pdf

National Marine Fisheries Service (NMFS). 2006. Draft Revised Recovery Plan for the Steller sea lion (Eumetopias jubatus). National Marine Fisheries Service, Silver Spring, MD. 285 pages.

National Marine Fisheries Service (NMFS). 2006a. Draft Recovery plan for the fin whale (Balaenoptera physalus). National Marine Fisheries Service, Office of Protected Resources, Silver Spring, Maryland.

National Marine Fisheries Service (NMFS). 2006b. Draft Revised Recovery Plan for the Steller sea lion (Eumetopias jubatus). National Marine Fisheries Service, Silver Spring, MD. 285 pages.

National Marine Fisheries Service (NMFS). 2008a. Final Environmental Impact Statement (EIS) for Issuing Annual Quotas to the Alaska Eskimo Whaling Commission for a Subsistence Hunt on Bowhead Whales for the Years 2008 through 2012. NOAA, National Marine Fisheries Service, Alaska Region, Juneau, Alaska.

National Marine Fisheries Service (NMFS). 2008b. *Conservation Plan for the Cook Inlet Beluga Whale (Delphinapterus leucas).* Juneau: National Marine Fisheries Service, 2008.

National Marine Fisheries Service (NMFS). 2008c. *Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska, and Authorization of Small Takes under the Marine Mammal Protection Act. 17 July, 2008.*

National Marine Fisheries Service (NMFS). 2008d. Recovery Plan for the Steller Sea Lion (*Eumetopias jubatus*). Revision. National Marine Fisheries Service

National Marine Fisheries Service (NMFS). 2010. Endangered Species Act-Section 7 Consultation, Biological Opinion Authorization of groundfish fisheries under the Fishery Management Plan for Groundfish of the Bering Sea and Aleution Islands Management Area. National Marine Fisheries Service, Alaska Region November 2010

National Marine Mammal Laboratory (NMML) 2004. Personal Communication from Christy Sims, Marine Mammal Data Specialist. Regarding Opportunistic Marine Mammal Sightings (1999-2002) and Beluga Aerial Survey Data (1993-2004). Seattle, Washington.

National Marine Mammal Laboratory (NMML). 2010. National Marine Mammal Laboratory Steller Sea Lions NMML Research-Biology. Alaska Fisheries Science Center website: http://www.afsc.noaa.gov/nmml/alaska/sslhome/biology.php accessed 1/28/11

National Oceanic and Atmospheric Administration (NOAA). 2010a. Revisions to the Steller Sea Lion Protection Measures for the Aleutian Islands Atka Mackerel and Pacific Cod Fisheries Council Review Draft Environmental Assessment/Regulatory Impact Review (EA/RIR). National Marine Fisheries Service, Alaska Region, Juneau, Alaska.

National Oceanic and Atmospheric Administration (NOAA). 2010b. Steller sea lion description http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/stellersealion.htm#description

Nelson, R. R., J. J. Burns, and K. J. Frost. 1984. The bearded seal (*Erignathus barbatus*). Pages 1-6 *in* J. J. Burns, editor. Marine Mammal Species Accounts, Wildlife Technical Bulletin No. 7. Alaska Department of Fish and Game, Juneau, AK.

Nemoto, T. 1970. Feeding pattern of baleen whales in the oceans. Pp. 241B252 in Marine food chains, ed. J.H. Steele. Univ. of California Press, Berkeley.

Nerini, M., H. Braham, W. Marquett, and D. Rugh. 1984. Life history of the bowhead whale, *Balaena mysticetus* (Mammalia: Cetacea). J. Zool. (Lond.)204(4).

Nishiwaki, M. 1966. Distribution and migration of the larger cetaceans in the North Pacific as shown by Japanese whaling results. pp. 171-191, In: Norris, K.S. (ed.) Whales, Dolphins and Porpoises. Berkeley University of California Press.

Noel, L. E., G. M. O'Doherty and S. R. Johnson. 2003. Atlas of activity areas for marine birds, waterfowl and human activity in the Barrier Island-Lagoon Systems between Spy Island and Brownlow Point, Alaska 1998-2002. Prepared for BP Exploration (Alaska) Inc. by LGL Alaska Research Associates, Inc. Anchorage, Alaska. 111 pp.

Ohsumi S, and Wada S. 1974. Status of Whale Stocks in the North Pacific, 1972. Report of the International Whaling Commission 24:114-126.

Patterson B., and G.R. Hamilton. 1964. Repetitive 20 cycle per second biological hydroacoustic signals at Bermuda. In:Tavolga WN, editor. Marine bioacoustics.

Pentec 2005. Marine Fish and Benthos Studies in Knik Arm, Anchorage, Alaska. Prepared for Knik Arm Bridge and Toll Authority and HDR Alaska, Inc. Report 12214-10/12214-12. Prepared by Pentec Environmental, Edmonds, Washington.

Perez, M.A. 1990. Review of marine mammal population and prey information for Bering Sea ecosystem studies. NOAA technical memorandum NMFS F/NWC-186.

Perham,Craig. 2011. Personal communication. January 26, 2011

Perry SL, DeMaster DP, Silber GK. 1999. The Great Whales: History and status of six species listed as endangered under the US endangered Species Act of 1973. Marine Fisheries Review 61(1):1-74

Petersen, M. R. 1981. Populations, feeding ecology, and molt of Steller's Eider. Condor 83:252-256.

Petersen, M. R. and D. Douglas. 2004. Winter ecology of spectacled eiders: environmental characteristics and population change. Condor 106:79-94.

Petersen, M. R., J. F. Piatt, and K. A. Trust. 1998. Foods of Spectacled Eiders (*Somateria fischeri*) in the Bering Sea, Alaska. Wildfowl 49:124–128.

Petersen, M. R., W. W. Larned, and D. C. Douglas. 1999. At-sea distribution of Spectacled Eiders: A 120-year-old mystery resolved. Auk 116:1009-1020.

Petersen, M., W. Larned, and D. Douglas. 1999. At-sea distribution of spectacled eiders: a 120-year-old mystery resolved. Auk 116(4):1009-1020.

Phillips, C.D., J.W. Bickham, J.C. Patton and T.S. Gelatt. 2009. Systematics of Steller Sea Lions (Eumetopias Jubatus): Subspecies Recognition Based on Concordance of Genetics and Morphometrics. Texas Tech University, Occasional Papers 283: 16 pages.

Popov, L. A. 1976. Status of main ice forms of seals inhabiting waters of the USSR and adjacent to the country marine areas. Pages 1-17 *in* Scientific Consultation on Marine Mammals, Bergen,Norway. Food and Agriculture Organization of the United Nations.

Port of Anchorage, USDOT-MA, and USACE. 2009. Biological Assessment of the Beluga Whale *Delphinapterus leucas* in Cook Inlet for Port of Anchorage Expansion Project and Associated Dredging at the Port of Anchorage, Alaska. Anchorage, AK.

Postma, L.D., Dueck, L.P., Heide-Jørgensen, M.P. and Cosens, S.E. 2006. Molecular genetic support of a single population of bowhead whales (*Balaena mysticetus*) in Eastern Canadian Arctic and Western Greenland waters. 15pp. International Whaling Commission SC/58/BRG4.

Prevel Ramos AP, TM Markowitz, DW Funk, MR Link. 2006. Monitoring beluga whales at the Port of Anchorage: Pre-expansion observations, August-November, 2005. Rep. from LGL Alaska Research Associates, Inc., Anchorage, AK, for Integrated Concepts and Research Corporation, the Port of Anchorage, and the U.S. Department of Transportation Maritime Administration.

Quakenbush, L. T., and J. J. Citta. 2008. Perfluorinated contaminants in ringed, bearded, spotted, and ribbon seals from the Alaskan Bering and Chukchi Seas. Marine Pollution Bulletin 56:1809-1814.

Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int. Whal. Commn. (Spec. Iss. 15):133B147

Reeves, R. R., B. S. Stewart, and S. Leatherwood. 1992. Bearded seal, *Erignathus barbatus* Erxleben, 1777. Pages 180-187 *in* The Sierra Club Handbook of Seals and Sirenians. Sierra Club Books, San Francisco, CA.

Regehr, E.V., S.C. Amstrup and I. Stirling. 2006. Polar bear population status in the Southern Beaufort Sea. Report Series 2006-1337, U.S. Department of the Interior, U.S. Geological Survey, Anchorage, Alaska. 20pp.

Rice, D. W. 1998. Marine mammals of the world: systematics and distribution. Society for Marine Mammalogy, Lawrence, KS. 231 p.

Richardson, W J, C R Greene, C I Malme, and D H Thomson.1995. *Marine Mammals and Noise.* San

Diego: Academic Press, Inc., 1995.

Richardson, W.J. and D.H. Thomson. 2002. Email dated Apr. 25, 2002, to S. Treacy, USDOI, MMS, Alaska OCS Region; subject: bowhead whale feeding study.

Ridgway, S. and Sir R. Harrison. 1981. Eds., Handbook of marine mammals. Volume 4. London: Academic Press.

Rojek, N. A. 2006. Breeding biology of Steller's Eiders nesting near Barrow, Alaska, 2005. U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Fairbanks, AK. Technical Report. 53 pp.

Rojek, N. A. 2007. Breeding biology of Steller's Eiders nesting near Barrow, Alaska, 2006. U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Fairbanks, AK. Technical Report. 53 pp.

Rojek, N. A. 2008. Breeding biology of Steller's Eiders nesting near Barrow, Alaska, 2007. U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Fairbanks, AK. Technical Report. 45 pp.

Roseneau. D. G. and D. R. Herter. 1984. Marine and coastal birds. Pp. 81-115 in Proceedings of a Synthesis Meeting: The Barrow Arch Environment and Possible Consequences of Planned Offshore Oil and Gas Development, J. C. Truett, ed. National Oceanic and Atmospheric Administration/Outer Continental Shelf Environmental Assessment Program, Anchorage, Alaska.

Rugh, D.J., B.A. Mahoney, and B.K. Smith. 2004a. Aerial Surveys of Beluga Whales in Cook Inlet, Alaska, Between June 2001 and June 2002. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-AFSC-145.

Rugh, D.J., B.A. Mahoney, C.L. Sims, B.K. Smith, and R.C. Hobbs. 2003. Aerial surveys of belugas in Cook Inlet, Alaska, June 2003. Unpublished document. Natl. Mar. Mammal Lab., NMFS, NOAA, 7600 Sand Pt Way, NE, Seattle, WA 98115. 13 p. NMML Annual Reports.

Rugh, D.J., K.E.W. Shelden, and B.A. Mahoney. 2000. Distribution of beluga whale, *Delphinapterus leucas*, in Cook Inlet, Alaska, during June/July 1993-2000. Mar. Fish. Rev. 63(3):6-21.

Rugh, D.J., K.E.W. Shelden, C.L. Sims, B.A. Mahoney, B.K. Smith, L.K. Litzky, and R.C. Hobbs. 2005c. Aerial surveys of Cook Inlet belugas in Alaska, June 2001, 2002, 2003, and 2004. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-AFSC-149, 71p.

Rugh, D.J., K.E.W. Shelden, C.L. Sims, B.A. Mahoney, B.K. Smith, and R.C. Hobbs. 2004b. Aerial surveys of Cook Inlet belugas in Alaska, June 2004. NMFS report. 16 pp.

Rugh, D.J., K.T. Goetz, B.A. Mahoney, B. K. Smith, T.A. Ruszkowski. 2005b. Aerial Surveys of belugas in Cook Inlet, Alaska, June 2005.

Rugh, D.J., K.T. Goetz, C.L. Sims. 2006. Aerial surveys of beluga in Cook Inlet, Alaska. May 2006. NMFS report. 8 pp.

Rugh, D.J., K.T. Goetz, J.A. Mocklin, B.A. Mahoney, and B.K. Smith. 2007. Aerial surveys of belugas in Cook Inlet, Alaska, June 2007. Unpubl. NMFS report. 16 pp.

Rugh, D.J., K.W. Shelden, B.A. Mahoney, L.K. Litzky, R.C. Hobbs, and K.L. Laidre. 1999. Aerial surveys of beluga whales in Cook Inlet, Alaska, June 1999.

Rugh, et al. 2005a. (Rugh, D.J., K.E.W. Shelden, C.L. Sims, B.A. Mahoney, B.K. Smith, L.K. (Litzky) Hoberecht, and R.C. Hobbs.) Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2001, 2002, 2003, and 2004. NOAA Technical Memorandum NMFS-AFSC-149. 71pp.

Schliebe, S., T.J. Evans, K. Johnson, M. Roy, S. Miller, C. Hamilton, R. Meehan, and S. Jahrsdoerfer. 2006. Status assessment in response to a petition to list polar bears as a threatened species under the U.S. Endangered Species Act. U.S. Fish and Wildlife Service, Marine Mammals Management, Anchorage, Alaska. 262pp.

Schliebe, S.L., T.J. Evans, S. Miller, C.J. Perham, J.M. Wilder, and L.J. Lierheimer. 2005. Polar Bear Management in Alaska, 2000-2004. Anchorage, AK: USDOI, FWS, 25 pp.

Sheffield G., and J.M. Grebmeier. 2009. Pacific walrus (Odobenus rosmarus divergens): Differential prey digestion and diet. Mar Mamm Sci 25:761-777. doi:DOI: 10.1111/j.1748-7692.2009.00316.x

Shelden, K. E. W., D. J. Rugh, D. P. Demaster, And L. R. Gerber. 2003. Evaluation of bowhead whale status: reply to Taylor. Conserv. Biol. 17(3):918-920.

Shelden, K.E.W. and D.J. Rugh. 1995. The bowhead whale *Balaena mysticetus* historic and current status. Mar. Fish. Rev. 57:1-20.

Simpkins, M. A., L. M. Hiruki-Raring, G. Sheffield, J. M. Grebmeier, and J. L. Bengtson. 2003. Habitat selection by ice-associated pinnipeds near St. Lawrence Island, Alaska in March 2001. Polar Biology 26:577-586.

Singh, H.B., 1995. Composition, Chemistry, and Climate of the Atmosphere. John Wiley and Sons, New York.

Smith, T. G. 1981. Notes on the bearded seal, *Erignathus barbatus*, in the Canadian Arctic. Department of Fisheries and Oceans, Arctic Biological Station, Canadian Technical Report of Fisheries and Aquatic Sciences No. 1042. 49 p.

Smith, T. G., and F. A. J. Armstrong. 1978. Mercury and selenium in ringed and bearded seal tissues from Arctic Canada. Arctic 31:75-84.

Smith, T. G., and M. O. Hammill. 1981. Ecology of the ringed seal, *Phoca hispida*, in its fast ice breeding habitat. Canadian Journal of Zoology 59:966-981.

Smith, T. G., M. O. Hammill, and G. Taugbøl. 1991. A review of the developmental, behavioural and physiological adaptations of the ringed seal, Phoca hispida, to life in the Arctic winter. Arctic 44:124-131.

Smith, T. S., S. T. Partridge, S. C. Amstrup, and S. S. Schliebe. 2007. Post-den emergence behavior of polar bears (Ursus maritimus) in northern Alaska. Arctic 60:187-194

Smith, T.G. 1980. Polar bear predation of ringed and bearded seals in the landfast sea ice habitat. Canadian Journal of Zoology 58:2201–9.

Solovieva, D. 1997. Timing habitat use and breeding biology of Steller's Eider in the Lena Delta, Russia. Pages 35-39 in Proceedings from Steller's Eider workshop. Wetlands Int. Seaduck Specialist Group Bull. no. 7.

Stirling, I. 1977. Adaptations of Weddell and ringed seals to exploit the polar fast ice habitat in the absence or presence of surface predators. Pages 741-748 *in* Adaptations within Antarctic Ecosystems. Proceedings of the 3rd SCAR Symposium on Antarctic Biology. Smithsonian Institute, Washington, D.C.

Stirling, I. 1988. Polar bears. University of Michigan Press, Ann Arbor, Michigan, USA. 220 pp.

Stirling, I. 1988. Polar bears. University of Michigan Press, Ann Arbor, Michigan, USA. 220 pp.

Stirling, I., and A.E. Derocher. 1990. Factors affecting the evolution and behavioral ecology of the modern bears. International Conference on Bear Research and Management 8:189-204.

Stirling, I., and D. Andriashek. 1992. Terrestrial maternity denning of polar bears in the Eastern Beaufort Sea area. Arctic 45(4):363-366.

Stirling, I., and R. Archibald. 1979. Bearded seal. Pages 83-85 *in* Mammals in the Seas. Food and Agriculture Organization of the United Nations, Rome, Italy.

Stirling, I., M. Kingsley, and W. Calvert. 1982. The distribution and abundance of seals in the eastern Beaufort Sea, 1974-79. Environment Canada, Canadian Wildlife Service, Edmonton, Canada. 25 p.

Stoker, S.W. and I.I. Krupnik., 1993. Subsistence Whaling. *In: The Bowhead Whale,* J.J. Burns, J.J. Montague, and C.J. Cowles, eds. Special Publications of the Society for Marine Mammalogy Publications, No. 2. Lawrence, KS: Society for Marine Mammalogy, pp. 579-629.

Stone, G.S., S.K. Katona, A. Mainwaring, J.M. Allen, and H.D. Corbett. 1992. Respiration and surfacing rates of fin whales (Balaenoptera physalus) observed from a lighthouse tower. Rep. int. Whal. Commn 42: 739-745.

Tomlin, A.G. 1967. Mammals of the USSR and adjacent countries. Vol. 9, Cetacea, Israel Program Sci. Transl. No. 1124, Natl. Tech. Inf. Serv. TT 65-50086. Springfield, VA. 717 pp. (Translation of Russian text published in 1957).

Townsend, C.H. 1935. The distribution of certain whales as shown by logbook records of American whaleships. Zoologica 19:1-50.

Treacy, S.D. 2002. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2001. OCS Study, MMS 2002- 061. Anchorage, AK: USDOI, MMS, Alaska OCS Region, 117 pp.

Treacy, S.D., Gleason, J.S and Cowles, C.J. 2006. Offshore distances of bowhead whales (*Balaena mysticetus*) observed during fall in the in the Beaufort Sea, 1982-2000: an alternative interpretation. *Arctic* 59(1): 83-90.

Troy, D. M., and Johnson, S. R. 1987. Marine birds. In: Truett, J. C., ed. Environmental characterization and biological utilization of the North Aleutian Shelf nearshore zone. Bryan, Texas: LGL Ecological Research Associates, Inc. 322-422.

Tyack P.L. 1999. Functional aspects of cetacean communication. In: Mann J, Conner RC, Tyack PL, Whitehead H, editors. Cetacean Societies: Field Studies of Dolphins and Whales. Chicago: University of Chicago Press.

U.S. Bureau of Land Management (BLM). 2002. Biological Evaluation of the Effects of Right-of-Way Renewal for the Trans-Alaska Pipeline System on Threatened and Endangered Species and Designated Critical Habitat. Anchorage, Alaska. June 2002.

U.S. Bureau of Land Management (BLM). 2005. U.S. Bureau of Land Management (BLM). 2005. Northeast national petroleum reserve–Alaska final amended integrated activity plan/environmental impact statement.

U.S. Department of Transportation (USDOT). 2009. Vessel Calls at U.S. Ports by Vessel Type. Maritime Administration. Online at: http://www.marad.dot.gov/documents/US_Port_Calls_by_Vessel_Type.xls (accessed February 21, 2011).

U.S. Fish and Wildlife Service (USFWS). 2000. Proposed Designation of Critical Habitat for the Spectacled Eider. 50 CFR Part 17. Federal Register. Vol. 65, No. 26. Tuesday, February 8, 2008.

U.S. Fish and Wildlife Service (USFWS). 2002a. Biological Opinion for Minerals Management Service‘s Proposed Beaufort Sea Natural Gas and Oil Lease Sale 186. October 22, 2002. 36pp.

U.S. Fish and Wildlife Service (USFWS). 2002b. Pacific Walrus (odobenus rosmarus divergens): Alaska Stock. MMPA Stock Assessment Report. 5pp.

U.S. Fish and Wildlife Service (USFWS). 2005. Alaska's Threatened and Endangered Species. Unpublished report, Anchorage Fish and Wildlife Field Office, Anchorage, Alaska.

U.S. Fish and Wildlife Service (USFWS). 2006. Environmental Assessment – Final Rule to Authorize Incidental Take of small numbers of polar bear (Ursus maritimus) and pacific walrus (Odobensus rosmarus divergens) during oil and gas activities in the Beaufort Sea and adjacent coastal Alaska. DOI – USF&WS, Anchorage, Alaska. June 2006. 69pp.

U.S. Fish and Wildlife Service (USFWS). 2007. Environmental Assessment: Proposed Rule to Authorize the Incidental Take of Small Numbers of Pacific Walruses and Polar Bears During the Oil and Gas

Industry Exploration Activities in the Chukchi Sea. U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service (USFWS). 2009a. Final Biological Opinion for Beaufort and Chukchi program area lease sales and associated seismic surveys and exploratory drilling. Consultation with the Minerals Management Service, Alaska OCS Region, Anchorage, Alaska. September 3, 2009. 168 pp.

U.S. Fish and Wildlife Service (USFWS). 2009b. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the Pacific Walrus as Threatened or Endangered; Notice of 90-day Petition Finding and Initiation of Status Review. Federal Register, FR 74:74 FR 46548–-46551, September 10, 2009.

U.S. Fish and Wildlife Service (USFWS). 2010a Final Rule to designate critical habitat for polar bear (Ursus maritimus) populations in the United States under the Endangered Species Act of 1973, as amended (Act). FWS 50 CFR Part 17, 150pp. http://www.regulations.gov and http://alaska.fws.gov/fisheries/mmm/polarbear/reports.htm.

U.S. Fish and Wildlife Service (USFWS). 2010b. (http://alaska.fws.gov/fisheries/mmm/walrus/pdf/walrus_q_a.pdf.

USDOC, NOAA, NMFS. 2008. Endangered Species Act, Section 7, Biological Opinion: Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska; and Authorization of Small Takes Under the Marine Mammal Protection Act. Seattle, WA: USCOC, NOAA 140pp.

Walker, D. A. and K. R. Everett. 1987. Road dust and its environmental impact on Alaskan taiga and tundra. Arctic and Alpine Research 19:479-489.

Walsh, J. E. (2008), Climate of the Arctic marine environment, *Ecological Applications*, *18*(sp2), S3-S22.

Wartzok, D., W.A. Watkins, and C. Malme. 1989. Movements and Behavior of Bowhead Whales in Response to Repeated Exposures to Noises Associated with Industrial Activities in the Beaufort Sea. Rep. by Purdue University, Fort Wayne, Indiana, for Amoco Production Company, Alaska. 228pp.

Wolfe, R. J., J. A. Fall, and R. T. Stanek. 2005. The subsistence harvest of harbor seals and sea lions by Alaska Natives in 2004. Alaska Department of Fish and Game, Juneau, AK, Subsistence Div. Tech. Paper No. 303.

Woodby, D.A. and D.B. Botkin., 1993. Stock Sizes Prior to Commercial Whaling. *In: The Bowhead Whale*, J.J. Burns, J.J. Montague, and C.J. Cowles, eds. Special Publication of The Society for Marine Mammalogy, 2. Lawrence, KS: The Society for Marine Mammalogy, pp. 387-407.

Zeh, J.E., A.E. Raftery, and A.A. Schaffner. 1995. Revised Estimates of Bowhead Population Size and Rate of Increase. Report of the International Whaling Commission 46. SC/47/AS10. Cambridge, UK: IWC, pp. 670-696.

Zeh, J.E., C.W. Clark, J.C. George, D. Withrow, G.M. Carroll, and W.R. Koski. 1993. Current Population Size and Dynamics. *In*: *The Bowhead Whale*, J.J. Burns, J.J. Montague, and C.J. Cowles, eds. Special

Publication of the Society for Marine Mammalogy 2. Lawrence, KS: The Society for Marine Mammalogy, pp. 409-489.

Zhu, J. P., R. J. Norstrom, D. C. G. Muir, L. A. Ferron, L. P. Weber, and E. Dewailly. 1995. Persistent chlorinated cyclodiene compounds in ringed seal blubber, polar bear fat, and human plasma from Northern Quebec, Canada - identification and concentrations of photoheptachlor. Environmental Science & Technology 29:267-271.

APPENDIX A

USFWS Correspondence - - Species List Letter dated 17 December 2010

NMFS Correspondence - - Species List Letter dated 10 December 2010

THIS PAGE INTENTIONALLY LEFT BLANK

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701

December 17, 2010

U.S. Army Corps of Engineers
Regulatory Division
Attn: Serena Sweet
~~P.O. Box 6898~~
Elmendorf AFB, AK 99506-0898

Re: Request for Endangered Species or Critical Habitat list for POA-2009-651 ASAP Project

Dear Ms. Sweet:

Thank you for your November 2, 2010 letter requesting information on endangered and threatened species, and designated critical habitats pursuant to Section 7 of the Endangered Species Act of 1973, as amended (Act).

Based on your letter, we understand the Alaska Gasline Development Corporation (AGDP) is proposing to construct a 24-inch diameter, high pressure natural gas pipeline from Alaska's North Slope to Cook Inlet. North Slope natural gas would be transported to in-state Alaska markets from take-off points in the Fairbanks area and other locations along the route. We also understand that you are preparing an Environmental Impact Statement (EIS) for the project.

This project is within the range of three species listed as threatened under the Act. Spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eider (*Polysticta stelleri*), and polar bears (*Ursus maritimus*) occur on the North Slope. Critical habitat for the polar bear was recently designated in the action area (December 7, 2010), and includes sea-ice habitat, terrestrial denning habitat, and barrier island habitat.

This list applies only to endangered and threatened species under the jurisdiction of the Alaska U.S. Fish and Wildlife Service. It does not preclude the need to comply with other environmental legislation or regulations such as the Clean Water Act. Please contact the National Oceanic and Atmospheric Administration to determine the status of listed and proposed species under their jurisdiction in the project area.

Thank you for your cooperation in meeting our joint responsibilities under the Act. If you need further assistance, please contact me at (907) 456-0324.

Sincerely,

Jewel Bennett
Branch Chief
Conservation Planning Assistance

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

December 10, 2010

Colonel Reinhard W. Koenig
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Re: POA- 2009-651
Alaska Stand Alone Pipeline (ASAP)
Project Request for Species List

Attn: Serena Sweet

Dear Colonel Koenig:

The National Marine Fisheries Service (NMFS) received your letter requesting information on threatened or endangered species and Essential Fish Habitat (EFH) associated with the Alaska Stand Alone Pipeline (ASAP) Proposed Project Area. The Corps of Engineers also provided NMFS with a CD of updated project documents which describe the proposed project in detail.

Background

NMFS provided scoping comments to the Corps for the ASAP project on March 8, 2010. After having recent discussions with the Corps and reviewing updated project descriptions, it is apparent that some aspects of the proposed project have changed and/or may still change somewhat.

The current proposed project involves construction of a 737 mile long, 24-inch diameter pipeline designed to transport natural gas consisting of either a highly conditioned natural gas highly enriched in non-methane hydrocarbons or conditioned natural gas containing mostly methane. The pipeline would start at Prudhoe Bay and follow the Trans-Alaska Pipeline System (TAPS) and Dalton Highway corridors, generally paralleling the highway corridor from the North Slope to near Livengood, northwest of Fairbanks. The pipeline would head south at Livengood and join the Parks Highway corridor west of Fairbanks near Nenana. From Nenana it would continue south to milepost 39 (near Wasilla) of the Beluga Pipeline (ENSTAR's distribution system) providing access to tidewater at Cook Inlet. There would also be a 12-inch diameter lateral pipeline to Fairbanks (Fairbanks Lateral) which would take off from the main pipeline just a few miles north of Nenana at Dunbar. The Fairbanks Lateral would travel approximately 35 miles northeast to Fairbanks.

The Corps has designated ASRC Energy Services, Inc. as the point of contact for the project EIS and biological assessment. In a recent phone conversation with ASRC Energy Services, they noted that marine interactions will be limited to transport. They also stated that existing facilities at West Dock and an existing port in Southcentral Alaska (possibly Anchorage or Seward) would be used for the transport (via barge).

The following information is based on the above project description and accounts for species that may be present in the marine areas off of Prudhoe Bay, Cook Inlet, Anchorage, and Seward.

Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. If a federal action agency determines that an action will not adversely affect EFH, no consultation is required, and the action agency is not required to contact NMFS about their determination.

EFH has been designated in waters used by anadromous salmon and various life stages of marine fish under NMFS' jurisdiction. Six fishery management plans exist for fisheries in Alaska. They cover groundfish in the Gulf of Alaska, groundfish in the Bering Sea and Aleutian Islands, crab in the Bering Sea and Aleutian Islands, salmon, scallops and federally managed species in the Arctic. Please visit our web site at http://www.fakr.noaa.gov/habitat/efh.htm and our National EFH Mapper at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html for additional information on habitat and EFH.

Threatened and Endangered Species

NMFS has management responsibility for all marine mammals in Alaska except sea otter, walrus, and polar bear and for sea turtles, anadromous fish, marine fish, marine plants, and corals. Section 7(a)(2) of the Endangered Species Act (ESA) directs federal interagency cooperation "to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species" or result in the destruction or adverse modification of critical habitat. Please visit our web site http://www.nmfs.noaa.gov/pr/species/esa/, for additional information regarding protected species and the ESA and critical habitat within Alaska.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 prohibits, with few exceptions, injury, harm or harassment of marine mammals. Under the 1994 Amendments to the MMPA, harassment is defined as any act of pursuit, torment, or annoyance which has the potential to injure or disturb a marine mammal causing disruption of behavioral patterns including migration, breathing, nursing, breeding, feeding or sheltering.

<u>Prudhoe Bay</u>

Endangered bowhead whales may be found in or adjacent to the proposed ASAP Project area and their presence would be considered seasonal or occasional occurrences.

NMFS is currently proposing to list a subspecies of ringed seals found in the Arctic and a distinct population segment of bearded seals in the Pacific Ocean (which may be found in this area) as

threatened under ESA. Please visit our web site at
http://alaskafisheries.noaa.gov/protectedresources/seals/ice.htm or 50 CFR Part 223 for further information.

Gray, beluga, and killer whales may also be present in the area and are protected under the MMPA.

Cook Inlet

Endangered Cook Inlet beluga whales, endangered fin whales, endangered humpback whales, and endangered Steller sea lions may be found within Cook Inlet.

Minke, gray, and killer whales, Pacific white-sided dolphins, dall's and harbor porpoises, and harbor seals may also be present in the area and are protected under the MMPA.

Anchorage

Endangered Cook Inlet beluga whales may be found in this area.

Harbor seals may also be present in the area and are protected under the MMPA.

Seward

Endangered fin whales, endangered humpback whales, and endangered Steller sea lions may be found in this area

Minke, gray, and killer whales, Pacific white-sided dolphins, dall's and harbor porpoises, and harbor seals may also be present in the area and are protected under the MMPA.

Critical Habitat

On December 1, 2009, NOAA proposed critical habitat for Cook Inlet beluga whales which may be located in or adjacent to possible project areas in waters near Anchorage or within Cook Inlet. A listing of these areas and further information may be found on our website at http://www.fakr.noaa.gov/protectedresources/whales/beluga.htm.

NMFS has designated rookeries, major haul outs, and marine foraging areas of the Steller sea lion in Alaska as critical habitat. A listing of these areas and further information may be found on our website at http://www.fakr.noaa.gov/protectedresources/stellers/habitat.htm, or in 50 CFR 226.202.

Critical habitat has also been proposed for the northern right whale in the Bering Sea and Gulf of Alaska, but appears to be outside the area associated with the subject plan.

Marine/Anadromous Fish

Several Pacific salmon stocks are also listed under the ESA and occur within Alaskan waters. These include the following Evolutionarily Significant Units (ESA): Lower Columbia River spring Chinook, Upper Columbia River spring Chinook, Lower Columbia River steelhead, Middle Columbia River steelhead, Upper Columbia River steelhead, Puget Sound Chinook, Snake River spring/summer Chinook, Snake River fall Chinook, Snake River basin steelhead, and Upper Willamette River steelhead. These stocks range throughout the North Pacific.

We hope this information is useful in fulfilling your requirements under section 7 of the ESA and section 305(b)(2) of the Magnuson-Stevens Act. Should you have any questions, please contact LT Amy Cox by email at amy.b.cox@noaa.gov, or by telephone at (907) 271-6620.

Sincerely,

FOR James W. Balsiger, Ph.D
Administrator, Alaska Region

cc: brad.smith@noaa.gov
Jeanne.hanson@noaa.gov
cristi.reid@noaa.gov
louise_smith@fws.gov
serena.e.sweet@usace.army.mil
rockwell.theodore@epa.gov
stacey.aughe@asrcenergy.com
michelle.turner@asrcenergy.com

APPENDIX B

AGDC Plan of Development, Rev. 1

The AGDC Plan of Development (POD) appended to the Biological Assessment has not been reproduced here. The POD may be viewed at www.asapeis.com.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C

Mitigation Measures

THIS PAGE INTENTIONALLY LEFT BLANK

The USACE will consult with NMFS and USFWS to determine additional mitigation measures that may be required to ensure that the ASAP is not likely to jeopardize the continued existence of any ESA-listed species or result in the destruction or adverse modification of critical habitat. Mitigation will include application for an LOA and/or IHA for polar bears and walruses, and mitigation measures will be specified in such approvals.

Typical mitigation measures that will likely be required of ASAP vessel operators and construction crews by the USFWS and the NMFS.

Mitigation Measures	Species
Avoid concentrations of groups of whales by all vessels.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Maintain the maximum practicable distance from concentrations of marine mammals.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Not approach Pacific walruses or polar bears on ice or land closer than 805 m (.5 mi).	Pacific Walrus, polar bear
Reduce vessel speed to below 10 knots when within 300 yards (274 m) of whales and those vessels capable of steering around such groups should do so.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale
Vessels may not be operated in such a way as to separate members of a group of marine mammals from other members of the group.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Avoid multiple changes in direction and speed when within 300 yards (274 m) of whales. In addition, operators should check the waters immediately adjacent to a vessel to ensure that no whales will be injured.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale
Reduce vessel speed when weather conditions require, such as when visibility drops, to avoid the likelihood of injury to marine mammals.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Implement a 24-hour monitoring plan to record and observe polar bears in the area to minimize polar bear and human interactions, thereby reducing the potential for take.	polar bear

Mitigation Measures	Species
Reduce/eliminate polar bear attractants.	polar bear
Store food waste and other associated waste in containers until transferred for disposal at an approved disposal site.	Polar bear
Transfer sanitary waste from bathrooms, sewage sludge, and kitchen-associated garbage on a regular basis to ensure control of attractants.	Polar bear
Identify kitchen grease for treatment as spoilable waste.	Polar bear
Transport hazardous wastes off vessel for disposal at an approved facility.	Polar bear
Strictly prohibit employees from directly feeding animals, throwing food to animals, or improperly disposing of food wastes.	Polar bear
Ensure bear has escape route(s) prior to conducting harassment activity.	Polar bear
Choose the method that will have the least effect on the bear and increase the intensity of the method or use additional methods of harassment only if necessary.	Polar bear
Shout at the bear as a method of harassment before using a projectile.	Polar bear
Monitor bear movement after harassment	Polar bear
Designate a qualified individual or individuals to observe, record, and report on the effects of their activities on polar bears and Pacific walruses.	Pacific Walrus, polar bear
Have an approved polar bear and/or walrus interaction plan on file with the USFWS and onsite.	Pacific Walrus, polar bear
Train operation and construction crews regarding polar bear awareness.	Polar bear
Provide USFWS and NMFS with a Plan of Cooperation that ensures that activities will not interfere with subsistence hunting and that adverse effects on the availability of marine mammals are minimized.	Bowhead whale, ringed seal, bearded seal, polar bear, Pacific walrus
Contact affected subsistence communities to discuss potential conflicts caused by location, timing, and methods of proposed operations.	Bowhead whale, ringed seal, bearded seal, polar bear, Pacific walrus
Make efforts to locate occupied polar bear dens within and near proposed areas of operation, utilizing appropriate tools, such as, forward looking infrared (FLIR) imagery and/or polar bear scent-trained dogs and report polar bear dens to the USFWS prior to the initiation of activities.	Polar bear
Observe a 1-mile operational exclusion zone around all known polar bear dens during the denning season (November-April) or until the female and cubs leave the areas.	Polar bear

Mitigation Measures	Species
Cease work in the immediate area of previously unknown occupied polar bear dens and contact the USFWS for guidance.	Polar bear
Restrict the timing of activity to limit disturbance around polar bear dens.	Polar bear
Consult with potentially affected communities and appropriate subsistence user organizations to discuss potential conflicts with subsistence marine mammal hunting caused by the location, timing, and methods of proposed operations and support activities.	Bowhead whale, ringed seal, bearded seal, polar bear, Pacific walrus
Develop and implement a site-specific, USFWS- and NMFS-approved, marine mammal monitoring and mitigation plan to monitor and evaluate the effects of authorized activities on marine mammals and the subsistence use of these resources.	Pacific Walrus, polar bear
Maintain trained Marine Mammal Observers aboard vessels to alert crew of the presence of marine mammals and initiate adaptive mitigation responses and to carry out specified monitoring activities identified in the marine mammal monitoring and mitigation plan necessary to evaluate the impact of authorized activities on marine mammals and the subsistence use of these resources.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Cooperate with the USFWS, NMFS, and other designated Federal, State, and local agencies to monitor the impacts of oil and gas activities in the Beaufort Sea on marine mammals.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Report the results of specified monitoring activities to the USFWS and NMFS.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear
Report all observations of polar bears during any Industry operation.	Polar bear
Report any incidental lethal take or injury of a marine mammal immediately to USFWS or NMFS, depending upon the species injured or killed.	Cook Inlet beluga whale, bowhead whale, fin whale, humpback whale, ringed seal, bearded seal, Steller sea lion, Pacific walrus, polar bear

THIS PAGE INTENTIONALLY LEFT BLANK

BIOLOGICAL OPINION

for the

ALASKA STAND ALONE GAS PIPELINE

Consultation with the
U.S. Army Corps of Engineers
Anchorage, Alaska

Prepared by:
Fairbanks Fish and Wildlife Field Office
U. S. Fish and Wildlife Service
101 12th Ave, Room 110
Fairbanks, AK 99701

July 10, 2012

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) on a proposal by the Alaska Gasline Development Corporation (AGDC) to construct the Alaska Stand Alone Gas Pipeline (ASAP), a 24-inch diameter, high pressure natural gas pipeline from Alaska's North Slope to Cook Inlet, and associated infrastructure. Because the project will impact waters of the United States, the AGDC has requested a section 404 permit from the U.S. Army Corps of Engineers (USACE). The USACE is the lead Federal agency preparing an Environmental Impact Statement (EIS) for the ASAP project pursuant to the National Environmental Policy Act (NEPA). Cooperating Federal agencies are the U.S. Environmental Protection Agency, the Bureau of Land Management, the National Park Service, and the Alaska Pipeline Coordinator's Office. On June 7, 2011, the USACE submitted a Biological Assessment for the ASAP EIS (BA; AGDC 2011) to the Service.

This BO describes the effects of the proposed action on Alaska-breeding Steller's eiders (*Polysticta stelleri*), spectacled eiders (*Somateria fischeri*), polar bears (*Ursus maritimus*), and polar bear critical habitat pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). A brief conference report on Pacific walrus (*Odobenus rosmarus divergens*), a candidate species, is also included in the document. We used information provided in the project BA; project-specific communications with the USFWS Alaska Region Marine Mammal Management (USFWS MMM) office; other Service documents; and published and unpublished literature to develop this BO.

Section 7(a)(2) of the Act states that Federal agencies must ensure that their activities are not likely to:

- Jeopardize the continued existence of any listed species, or
- Result in the destruction or adverse modification of designated critical habitat.

The Service has determined the proposed action may affect but is *not likely to adversely affect* Steller's eiders and *may adversely affect* spectacled eiders, polar bears, and polar bear critical habitat. We have also determined the proposed action is *not likely to jeopardize the continued existence* of the Pacific walrus.

Following review of the status and environmental baseline of spectacled eiders, polar bears, and polar bear critical habitat, and analysis of the potential effects of the proposed Action to these listed entities, the Service has concluded the proposed action, as described, is *not likely to jeopardize the continued existence* of spectacled eiders or polar bears, and is *not likely to destroy or adversely modify* polar bear critical habitat.

Re-initiation may be required if subsequent modifications of the proposed action would change the effects analysis presented in this BO. Examples include the addition of overhead transmission lines or communication towers and changes in the size or location of affected tundra habitat. If there are changes to the proposed project, we recommend that you contact the Fairbanks Fish and Wildlife Field Office to determine whether additional consultation may be appropriate. Conditions under which re-imitation may be required are described further in section 14.

If you have comments or concerns regarding this BO, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office at (907) 456-0441.

2. DESCRIPTION OF THE PROPOSED ACTION

Project Overview

The purpose of the project is to provide a long-term, stable supply of up to 500 million standard cubic feet per day (MMscfd) of conditioned natural gas and natural gas liquids from North Slope gas fields to markets in Fairbanks and Cook Inlet areas by 2016. The proposed pipeline would originate in Prudhoe Bay and follow the Trans Alaska Pipeline System (TAPS) and Dalton Highway corridors, generally paralleling the highway corridor from the North Slope to near Livengood, northwest of Fairbanks. At Livengood, the pipeline route turns south, joining the Parks Highway corridor west of Fairbanks near Nenana. From there it continues south and terminates at pipeline mile post (MP) 737. The ASAP then connects to ENSTAR Natural Gas Company's existing natural gas distribution system at MP 39 of the Beluga Pipeline near Wasilla. The Fairbanks Lateral, a 35-mile lateral pipeline spur from MP 458 to Fairbanks, would provide 60 MMscfd of utility-grade gas to Fairbanks.

The proposed main pipeline is 24 inches in diameter with a natural gas flow rate of 500 MMscfd at peak capacity. A gas conditioning facility (GCF) would also be constructed at Prudhoe Bay, AK. The proposed pipeline would be aboveground from MP 0 to 6. For the remainder of the route, the pipeline would be buried, except at elevated-bridge stream crossings, compressor stations, possible fault crossings, pigging facilities, and off-take valve locations.

Construction is planned for a 2.5-year period. Pre-construction activities such as ROW development and construction of access roads, laydown yards, and camps would begin in the summer prior to the first season of pipeline construction. Pipeline construction is planned to begin in late 2014 and be completed in late September 2016. A detailed project description is provided in the AGDC's Plan for Development, dated March 2011.

Action Area

The action area is the area in which direct and indirect effects of the action to listed species and designated critical habitat may occur. The area directly affected by the proposed project is the total footprint of the GCF, the pipeline, access roads, and associated permanent and construction support facilities up to 25 miles[1] inland from the Beaufort Sea coast. The area indirectly affected by the proposed project is delineated by a zone of influence surrounding new infrastructure within which listed species may be

[1] The assumed inland extent of the polar bear range for consultation purposes. The inland extent of breeding spectacled eiders and polar bear critical habitat are also encompassed in this range.

affected by disturbance resulting from construction activities and project operations. This zone of influence is assumed to be 200 m (656 ft) for spectacled eiders and 1.6 km (1 mi) for polar bears. Potential effects to spectacled eiders and polar bears within these zones are discussed further in Section 7, *Effects of the Action*.

Project Components within the Action Area

Listed eiders, polar bears, and polar bear critical habitat occur in the portion of the project area north of the Brooks Range in Alaska. The southern extent of the Action Area is 25 miles inland from the coast at Prudhoe Bay or approximately MP 28 of the pipeline. The primary structures, facilities, and related project components that are located within this area are summarized below. Note that the proposed Action, as described in the BA, does not include overhead transmission lines or communication towers.

Gas conditioning facility

The GCF will be constructed on a 70-acre gravel pad within an existing industrial area at Prudhoe Bay. Access will be via a permanent gravel road accessible from existing Prudhoe Bay roads. Module sections of the GCF will be transported to the facility site via barge to West Dock, then transported on existing roads and assembled on-site.

The GCF will provide conditioning necessary to remove carbon dioxide (CO_2), hydrogen sulfide (H_2S), and other impurities from the source gas stream. Natural gas will be piped from the existing Central Gas Facility located approximately 1,000 (305 m) feet north of the planned GCF. Natural gas liquids (propane, butane, and pentanes) will be injected to enrich the gas. The enriched gas will then be compressed and cooled to maintain the existing thermal regime in permafrost soils, and injected into the ASAP. The applicant's Plan of Development indicates two mixing towers will be used for the gas conditioning process

Aerial pipeline mode

The first six miles of the 24-inch-diameter pipeline will be constructed aboveground on steel vertical support members (VSMs) spaced at ~20-foot increments supporting the pipe ≥7 feet above the tundra. This section of the pipeline is slated for winter construction. Once the necessary right-of-way (ROW) preparations have been made VSM locations will be surveyed, marked, and foundations drilled. Installation of VSMs will include standing and bracing the member, then backfilling around the VSM column with concrete slurry. Once VSMs have been installed, welded sections of pipe will be lifted and placed using sidebooms.

Buried pipeline mode

Most of the pipeline south of MP 6 will be buried. The pipeline from MP 6 to the Atigun River Valley at MP 163 (approximately 100 miles south of the range of listed species) is slated for winter construction. The construction ROW will be cleared to remove vegetation and graded. Sections of pipe will be hauled from storage yards and distributed along the construction ROW, strung and placed into a trench before the trench is backfilled.

Material and water sources
Material sites (gravel pits) will be distributed along the route to minimize hauling distances. Existing material sites will be used whenever possible. Attachment 6 in the AGDC's Plan of Development identified five existing material sites along the pipeline route between Prudhoe Bay and MP 25.

Water used for construction needs will be collected from surface water sources.

Other permanent facilities
Operations and maintenance facilities will be located in Prudhoe Bay. A pig launcher will be located at the GCF. A separate gravel pad with camp and administrative facilities is located ~600m west of the GCF (see Attachment 1 of the Plan of Development). Permanent access roads will be constructed at MP 5.5 (length = 0.46 mile) and MP 20 (length = 0.1 mile; see Attachment 5 in the AGDC's Plan for Development,).

Construction support facilities
Construction support facilities include project offices; logistics support sites; personnel housing and support; port facilities (West Dock); access roads and construction workpads (gravel and ice/snow); laydown yards and storage facilities; and airports and airstrips.

A single 6-acre laydown yard is planned within the action area at MP 4 (see Plan for Development).

Materials and equipment needed for construction of the GCF will be shipped via marine transport to West Dock at Prudhoe Bay. The existing West Dock facilities are thought to be sufficient to receive materials without additional construction or dredging activities beyond the currently permitted maintenance. The applicant estimates that approximately 9 shipments will be required to complete material delivery to West Dock.

Mitigation measures
Section 11.0 (Wildlife Resources) of the Draft Environmental Impact Statement for the ASAP project[2] identifies several mitigation measures that will be implemented to address wildlife resources. Measures that are likely to reduce adverse effects to spectacled eiders and polar bears include:

- Avoid locating pipeline facilities in sensitive wildlife habitats to the maximum extent practicable.
- Schedule construction activities to avoid effects during sensitive periods in the life cycle of wildlife to the extent practicable.
- Ensure construction camp operations and pipeline facility construction activities comply with measures that avoid attracting wildlife.
- Adopt motor vehicle and aircraft procedures that minimize disturbances to wildlife.
- Avoid or minimize construction and operational activities during sensitive periods in life cycles of wildlife, including nesting migratory birds.

[2] Released for public comment on January 20, 2012

- Developing a Wildlife Interaction and Habitat Protection Plan and Bear Avoidance and Human Encounter/Interaction Plan to be followed during construction and operations to minimize human interactions with wildlife.
- Developing Comprehensive Waste Management Plan to assure the appropriate handling and disposal of wastes, minimize human/carnivore interaction, and discourage wildlife presence and feeding opportunities the following plans will be developed.

3. EFFECT DETERMINATION FOR STELLER'S EIDER

In Alaska, Steller's eiders breed almost exclusively on the Arctic Coastal Plain (ACP), migrating to the breeding grounds in late spring and remaining in the region as late as mid-October. However, nesting is concentrated in tundra wetlands near Barrow, AK and Steller's eiders occur at very low densities elsewhere on the ACP (Larned et al. 2010). USFWS aerial surveys for breeding eiders conducted on the ACP from 1992–2010 detected only 5 Steller's eiders east of the Colville River, with the most recent observation in 1998 (USFWS Alaska Region Migratory Bird Management, unpublished data). Because available data indicate Steller's eiders are unlikely to nest near or migrate through the project area, we conclude that adverse effects to the species will be discountable and that the proposed action is *not likely to adversely affect* Steller's eiders.

4. CONFERENCE REPORT ON PACIFIC WALRUS

The Pacific walrus was listed as a candidate species under the Act with the publication of the 12-month petition finding on February 10, 2011 (USFWS 2011a). Pacific walruses occur in the Beaufort Sea in extremely low numbers because the continental shelf is relatively narrow along the Beaufort Sea and its deeper, less productive waters provide limited food resources. In years of low ice concentrations in the Chukchi Sea, some animals range east of Point Barrow into the Beaufort Sea (Fay 1982). However, from 1994 to 2004, oil industry monitoring programs recorded only 10 animals in the Beaufort Sea (USFWS 2011a). The U.S. Geological Survey also reported that only a few tagged walruses entered the extreme western portion of the Beaufort Sea near Barrow during studies of Pacific walrus movement in 2007–2009 (USGS 2011).

A conference on a candidate species results in a determination of whether the proposed action is likely to jeopardize the continued existence of the species. Because walruses are rarely observed in the Beaufort Sea, we conclude that effects from the proposed action will be discountable and the proposed action is *not likely to jeopardize the continued existence* of Pacific walruses.

5. STATUS OF THE SPECIES AND CRITICAL HABITAT

This section presents biological and ecological information relevant to formation of the BO. Appropriate information on the species' life history, habitat and distribution, and other factors necessary for their survival is included for analysis in later sections.

Spectacled Eider

Spectacled eiders (Figure 3.1A) were listed as threatened throughout their range on May 10, 1993 (USFWS 1993) based on indications of steep declines in the two Alaska-breeding populations. There are three primary spectacled eider populations, each corresponding to breeding grounds on Alaska's North Slope, the Yukon–Kuskokwim Delta (YKD), and northern Russia. The YKD population declined 96% between the early 1970s and 1992 (Stehn et al. 1993). Data from the Prudhoe Bay oil fields (Warnock and Troy 1992) and information from Native elders at Wainwright, AK (R. Suydam, pers. comm.in USFWS 1996) suggested concurrent localized declines on the North Slope, although data for the entire North Slope breeding population were not available. Spectacled eiders molt in several discrete areas (Figure 3.1B) during late summer and fall, with birds from the different populations and genders apparently favoring different molting areas (Petersen et al. 1999). All three spectacled eider populations overwinter in openings in pack-ice of the central Bering Sea, south and southwest of St. Lawrence Island (Petersen et al. 1999; Figure 3.2), where they remain until March–April (Lovvorn et al. 2003).

Life History

Breeding – In Alaska, spectacled eiders breed primarily on the North Slope (ACP) and the YKD. On the ACP, spectacled eiders breed north of a line connecting the mouth of the Utukok River to a point on the Shaviovik River about 24 km (15 miles) inland from its mouth. Breeding density varies across the ACP (Figure 3.2). Although spectacled eiders historically occurred throughout the coastal zone of the YKD, they currently breed primarily in the central coast zone within about 15 km (~9 miles) of the coast from Kigigak Island north to Kokechik Bay (USFWS 1996). However, a number of sightings on the YKD have also occurred both north and south of this area during the breeding season (R. Platte, USFWS, pers. comm. 1997).

Spectacled eiders arrive on the ACP breeding grounds in late May to early June. Numbers of breeding pairs peak in mid-June and decline 4–5 days later when males begin to depart from the breeding grounds (Smith et al. 1994, Anderson and Cooper 1994, Anderson et al. 1995, Bart and Earnst 2005). Mean clutch size reported from studies on the Colville River Delta was 4.3 (Bart and Earnst 2005). Spectacled eider clutch size near Barrow has averaged 3.2–4.1, with clutches of up to eight eggs reported (Quakenbush et al. 1995, Safine 2011). Incubation lasts 20–25 days (Kondratev and Zadorina 1992, Harwood and Moran 1993, Moran and Harwood 1994, Moran 1995), and hatching occurs from mid- to late July (Warnock and Troy 1992).

Nest initiation on Kigigak Island on the YKD occurs from mid-May to mid-June (Lake 2007). Incubation lasts approximately 24 days (Dau 1974). Mean spectacled eider clutch size is higher on the YKD compared to the ACP. Mean annual clutch size ranged from 3.8–5.4 in coastal areas of the YKD (1985–2011; Fischer at al. 2011), and 4.0–5.5 on Kigigak Island (1992–2011; Gabrielson and Graff 2011), with clutches of up to eight eggs reported (Lake 2007).

On the breeding grounds, spectacled eiders feed on mollusks, insect larvae (craneflies, caddisflies, and midges), small freshwater crustaceans, and plants and seeds (Kondratev and Zadorina 1992) in shallow freshwater or brackish ponds, or on flooded tundra. Ducklings fledge approximately 50 days after hatch, and then females with broods move directly from freshwater to marine habitat to stage prior to fall migration.

Survivorship – Nest success is highly variable and thought to be influenced by predators, including gulls (*Larus* spp.), jaegers (*Stercorarius* spp.), and red (*Vulpes vulpes*) and arctic (*Alopex lagopus*) foxes. In arctic Russia, apparent nest success was calculated as <2% in 1994 and 27% in 1995; low nest success was attributed to predation (Pearce et al. 1998). Apparent nest success in 1991 and 1993–1995 in the Kuparuk and Prudhoe Bay oil fields on the ACP was also low, varying from 25–40% (Warnock and Troy 1992, Anderson et al. 1998). On Kigigak Island in the YKD, nest survival probability ranged from 0.06–0.92 from 1992–2007 (Lake 2007); nest success tended to be higher in years with low fox numbers or activity (i.e., no denning) or when foxes were eliminated from the island prior to the nesting season. Bowman et al. (2002) also reported high variation in nesting success (20–95%) of spectacled eiders on the YKD, depending on the year and location.

Available data indicates egg hatchability is high for spectacled eiders nesting on the ACP, in arctic Russia, and at inland sites on the YKD, but considerably lower in the coastal region of the YKD. Spectacled eider eggs that are addled or that do not hatch are very rare in the Prudhoe Bay area (Declan Troy, TERA, pers. comm. 1997), and Esler et al. (1995) found very few addled eggs on the Indigirka River Delta in Arctic Russia. Additionally, from 1969 to 1973 at an inland site on the Yukon Delta National Wildlife Refuge, only 0.8% of spectacled eider eggs were addled or infertile (Dau 1974). In contrast, 24% of all nests monitored in a coastal region of the YKD during the early to mid-1990s contained inviable eggs and ~10% of eggs in successful nests did not hatch due to either embryonic mortality or infertility (Grand and Flint 1997). This relatively high occurrence of inviable eggs near the coast of the YKD may have been related to exposure to contaminants (Grand and Flint 1997). It is unknown whether hatchability of eggs in this region has improved with decreased use of lead shot in the region and natural attenuation of existing lead pellets (Flint and Schamber 2010) in coastal YKD wetlands.

Recruitment rate (the percentage of young eiders that hatch, fledge, and survive to sexual-maturity) of spectacled eiders is poorly known (USFWS 1999) because there is limited data on juvenile survival. In a coastal region of the YKD, duckling survival to 30 days averaged 34%, with 74% of this mortality occurring in the first 10 days, while survival of adult females during the first 30 days post hatch was 93% (Flint and Grand 1997).

(A)

(B)

Figure 3.1. (A) Male and female spectacled eiders in breeding plumage. (B) Distribution of spectacled eiders. Molting areas (green) are used July –October. Wintering areas (yellow) are used October –April. The full extent of molting and wintering areas is not yet known and may extend beyond the boundaries shown.

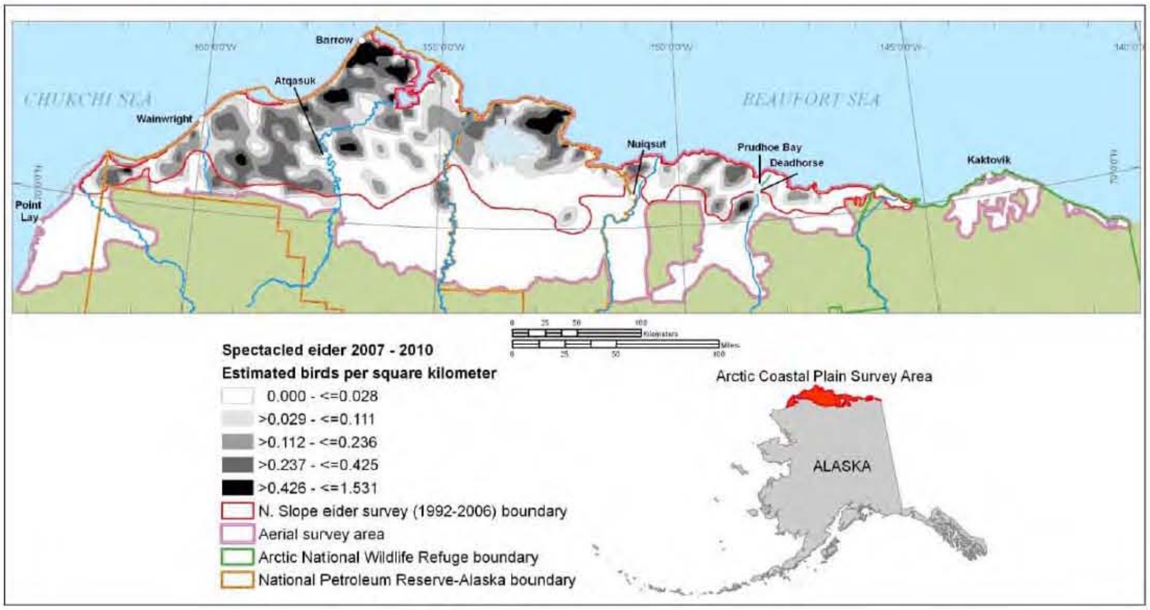


Figure 3.2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km^2 of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010. From Larned et al. 2011.

Fall migration and molting – As with many other sea ducks, spectacled eiders spend the 8–10 month non-breeding season at sea, but until recently much about the species' life in the marine environment was unknown. Satellite telemetry and aerial surveys led to the discovery of spectacled eider migrating, molting, and wintering areas. These studies are summarized in Petersen et al. (1995), Larned et al. (1995), and Petersen at al. (1999). Results of recent satellite telemetry research (2008–2011) are consistent with earlier studies (Matt Sexson, USGS, pers. comm.). Phenology spring migration and breeding, including arrival, nest initiation, hatch, and fledging, is 3–4 weeks earlier in western Alaska (YKD) compared to northern Alaska (ACP); however, phenology of fall migration is similar between areas. Individuals depart breeding areas July–September, depending on their breeding status and molt in September–October. (Matt Sexson, USGS, pers. comm.).

Males generally depart breeding areas on the North Slope (ACP) when the females begin incubation in late June (Anderson and Cooper 1994, Bart and Earnst 2005). Use of the Beaufort Sea by departing males is variable. Some appear to move directly to the Chukchi Sea over land, while the majority moved rapidly (average travel of 1.75 days), over near shore waters from breeding grounds to the Chukchi Sea (TERA 2002). Of 14 males implanted with satellite transmitters, only four spent an extended period of time (11–30 days), in the Beaufort Sea (TERA 2002). Preferred areas for males appeared to be near large river Deltas such as the Colville River where open water is more prevalent in early summer when much of the Beaufort Sea is still frozen. Most adult males marked in northern and western Alaska in a recent satellite telemetry study migrated to northern Russia to molt (USGS, unpublished data). Results from this study also suggest that male eiders are likely follow coast lines but also migrate straight across the northern Bering and Chukchi seas in route to northern Russia (Matt Sexson, USGS, pers. comm.).

Females generally depart the breeding grounds later, when much more of the Beaufort Sea is ice-free, allowing for more extensive use of the area. Females spent an average of two weeks in the Beaufort Sea (range 6-30 days) with the western Beaufort Sea the most heavily used (TERA 2002). Females also appeared to migrate through the Beaufort Sea an average of 10 km further offshore than the males (Petersen et al. 1999). The greater use of the Beaufort Sea and offshore areas by females was attributed to the greater availability of open water when females depart the area (Petersen et al. 1999, TERA 2002). Recent telemetry data indicates that molt migration of failed/non-breeding females from the Colville River Delta through the Beaufort Sea is relatively rapid, 2–weeks, compared to 2–3 months spent in the Chukchi Sea (Matt Sexson, USGS, pers. comm.).

Spectacled eiders use specific molting areas from July to late October/early November. Larned et al. (1995) and Petersen et al. (1999) discussed spectacled eiders' apparently strong preference for specific molting locations, and concluded that all spectacled eiders molt in four discrete areas (Table 3.1). Females generally used molting areas nearest their breeding grounds. All marked females from the YKD molted in nearby Norton Sound, while females from the North Slope molted in Ledyard Bay, along the Russian coast, and near St. Lawrence Island. Males did not show strong molting site fidelity; males from all three breeding areas molted in Ledyard Bay, Mechigmenskiy Bay, and the Indigirka/Kolyma River Delta. Males reached molting areas first, beginning in late June, and remained through mid-October. Non-breeding females, and those that nested but failed, arrived at molting areas in late July, while successfully-breeding females and young of the year reached molting areas in late August through late September and remained through October. Fledged juveniles marked on the Colville River Delta usually staged in the Beaufort Sea near the delta for 2–3 weeks before migrating to the Chukchi Sea.

Avian molt is energetically demanding, especially for species such as spectacled eiders that complete molt in a few weeks. Molting birds must have ample food resources, and the rich benthic community of Ledyard Bay (Feder et al. 1989, 1994a, 1994b) likely provides these for spectacled eiders. Large concentrations of spectacled eiders molt in Ledyard Bay to use this food resource; aerial surveys on 4 days in different years counted 200 to 33,192 molting spectacled eiders in Ledyard Bay (Petersen et al. 1999; Larned et al. 1995).

Wintering – Spectacled eiders generally depart all molting sites in late October/early November (Matt Sexson, USGS, pers. comm.), migrating offshore in the Chukchi and Bering Seas to a single wintering area in openings in pack-ice of the central Bering Sea south/southwest of St. Lawrence Island (Figure 3.1). In this relatively shallow area, > 300,000 spectacled eiders (Petersen et al. 1999) rest and feed, diving up to 70 m to eat bivalves, other mollusks, and crustaceans (Cottam 1939, Petersen et al. 1998, Lovvorn et al. 2003, Petersen and Douglas 2004).

Table 3.1 Important staging and molting areas for female and male spectacled eiders from each breeding population.

Population and Sex	Known Major Staging/Molting Areas
Arctic Russia Males	Northwest of Medvezhni (Bear) Island group
	Mechigmenskiy Bay
	Ledyard Bay
Arctic Russia Females	unknown
North Slope Males	Ledyard Bay
	Northwest of Medvezhni (Bear) Island group
	Mechigmenskiy Bay
North Slope Females	Ledyard Bay
	Mechigmenskiy Bay
	West of St. Lawrence Island
YKD Males	Mechigmenskiy Bay Northeastern Norton Sound
YKD Females	Northeastern Norton Sound

Spring migration – Recent information about spectacled and other eiders indicates they probably make extensive use of the eastern Chukchi spring lead system between departure from the wintering area in March and April and arrival on the North Slope in mid-May or early June. Limited spring aerial observations in the eastern Chukchi have documented dozens to several hundred common eiders (*Somateria mollissima)* and spectacled eiders in spring leads and several miles offshore in relatively small openings in rotting sea-ice (W. Larned, USFWS; J. Lovvorn, University of Wyoming, pers. comm.). Woodby and Divoky (1982) documented large numbers of king eiders (*Somateria spectabilis*) and common eiders using the eastern Chukchi lead system, advancing in pulses during days of favorable following winds, and concluded that an open lead is probably requisite for the spring eider passage in this region. Preliminary results from an ongoing satellite telemetry study conducted by the USGS Alaska Science Center (Figure 3.3; USGS, unpublished data) suggest that spectacled eiders also use the lead system during spring migration.

Adequate foraging opportunities and nutrition during spring migration are critical to spectacled eider productivity. Like most sea ducks, female spectacled eiders do not feed substantially on the breeding grounds, but produce and incubate their eggs while living primarily off body reserves (Korschgen 1977, Drent and Daan 1980, Parker and Holm 1990). Clutch size, a measure of reproductive potential, was positively correlated with body condition and reserves obtained prior to arrival at breeding areas (Coulson 1984, Raveling 1979, Parker and Holm 1990). Body reserves must be maintained from winter or acquired during the 4-8 weeks (Lovvorn et al. 2003) of spring staging, and Petersen and Flint (2002) suggest common eider productivity on the western Beaufort Sea coast is influenced by conditions encountered in May to early June during their spring migration through the Chukchi Sea (including Ledyard Bay). Common eider female body mass increased 20% during the 4-6 weeks prior to egg laying (Gorman and Milne 1971, Milne 1976, Korschgen 1977, Parker and Holm 1990). For spectacled eiders, average female body weight in late March in the Bering Sea was 1,550 ± 35 g (n = 12), and slightly (but not significantly) more upon arrival at breeding sites (1,623 ± 46 g, n = 11; Lovvorn et al. 2003), indicating that spectacled eiders must maintain or enhance their physiological condition during spring staging.

Abundance and trends

The most recent rangewide estimate of the total number of spectacled eiders was 363,000 (333,526–392,532 95% CI), obtained by aerial surveys of the known wintering area in the Bering Sea in late winter 1996–1997 (Petersen et al. 1999). Winter/spring aerial surveys were repeated in 2009 and 2010. Preliminary results from 2009 indicate an estimate of 301,812 spectacled eiders, but this value will be updated when surveys from both years are analyzed (Larned et al. 2009).

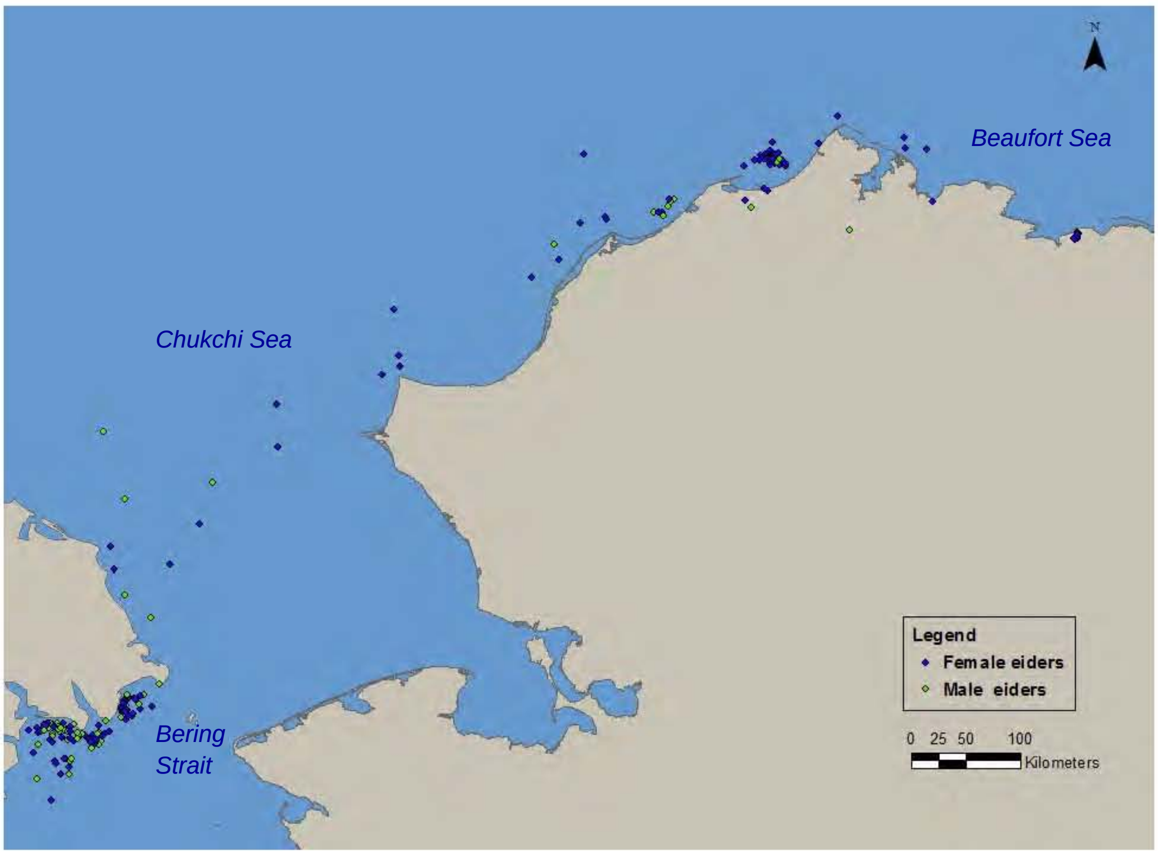


Figure 3.3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown. Eiders were tagged on the North Slope during the 2009 and 2010 breeding seasons. Data provided by Matt Sexson, USGS Alaska Science Center (USGS, unpublished).

Population indices for North Slope-breeding spectacled eiders are unavailable prior to 1992. However, Warnock and Troy (1992) documented an 80% decline in spectacled eider abundance from 1981 to 1991 in the Prudhoe Bay area. Since 1992, the Service has conducted annual aerial surveys for breeding spectacled eiders on the ACP. The 2010 population index based on these aerial surveys was 6,286 birds (95% CI, 4,877–7,695; unadjusted for detection probability), which is 4% lower than the 18-year mean (Larned et al 2011). In 2010, the index growth rate was significantly negative for both the long-term (0.987; 95% CI, 0.974–0.999) and most recent 10 years (0.974; 95% CI, 0.950–0.999; Larned et al. 2011). Stehn et al. (2006) developed a North Slope-breeding population estimate of 12,916 based on the 2002–2006 ACP aerial index for spectacled eiders and relationships between ground and aerial surveys on the YKD. If the same methods are applied to the 2007–2010 ACP aerial index reported in Larned et al (2011), the resulting population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI).

The YKD spectacled eider population was thought to be about 4% of historic levels in 1992 (Stehn et al. 1993). Evidence of the dramatic decline in spectacled eider nesting on the YKD was corroborated by Ely et al. (1994). They documented a 79% decline in eider nesting between 1969 and 1992 for areas near the Kashunuk River. Aerial and ground survey data indicated that spectacled eiders were undergoing a decline of 9–14% per year from 1985–1992 (Stehn et al. 1993). Further, from the early 1970s to the early 1990s, the number of pairs on the YKD declined from 48,000 to 2,000, apparently stabilizing at that low level (Stehn et al. 1993). Before 1972, an estimated 47,700–70,000 pairs of spectacled eiders nested on the YKD in average to good years (Dau and Kistchinski 1977).

Fischer et al. (2011) used combined annual ground-based and aerial survey data to estimate the number of nests and eggs of spectacled eiders on the coastal area of the YKD in 2011 and evaluate long-term trends in the YKD breeding population from 1985 to 2011. The estimated total number of nests measures the minimum number of breeding pairs in the population in a given year and does not include potential breeders that did not establish nests that year or nests that were destroyed or abandoned at an early stage (Fischer et al. 2011). The total number of nests in 2011 was estimated at 3,608 (SE 448) spectacled eiders nests on the YKD, the second lowest estimate over the past 10 years. The average population growth rate based on these surveys was 1.049 (90% CI = 0.994–1.105) in 2002–2011 and 1.003 (90% CI = 0.991–1.015) in 1985–2011 (Fischer et al. 2011). Log-linear regression based solely on the long-term YKD aerial survey data indicate positive population growth rates of 1.073 (90% CI = 1.046–1.100) in 2001–2010 and 1.070 (90% CI = 1.058–1.081) in 1988–2010 (Platte and Stehn 2011).

Spectacled eider recovery criteria

The Spectacled Eider Recovery Plan (USFWS 1996) presents research and management priorities with the objective of recovery and delisting so that protection under the Act is no longer required. Although the cause or causes of the spectacled eider population decline is not known, factors that affect adult survival are likely to be the most influential on population growth rate. These include lead poisoning from ingested spent shotgun pellets, which may have contributed to the rapid decline observed in the YKD (Franson et al. 1995, Grand et al. 1998), and other factors such as habitat loss, increased nest predation, over harvest, and disturbance and collisions caused by human infrastructure. Under the Recovery Plan, the species will be considered recovered when each of the three recognized populations (YKD, North Slope of Alaska, and Arctic Russia): 1) is stable or increasing over 10 or more years and the minimum estimated population size is at least 6,000 breeding pairs, or 2) number at least 10,000 breeding pairs over 3 or more years, or 3) number at least 25,000 breeding pairs in one year. Spectacled eiders do not currently meet these recovery criteria.

Polar Bear

The Service listed the polar bear (*Ursus maritimus*) as threatened throughout its range on May 15, 2008 (USFWS 2008a). Sea-ice provides a platform for hunting and feeding, for seeking mates and breeding, for denning, for resting, and for long-distance movement. Polar bears primarily hunt ringed seals, which also depend on sea-ice for their survival, but they also consume other marine mammals (USFWS 2008a). Because the principal habitat of polar bears is sea-ice, it is considered a marine mammal, and is therefore protected under the Marine Mammal Protection Act of 1972 (MMPA).

Distribution and status

Polar bears are distributed throughout regions of arctic and subarctic waters where the sea is ice covered for large portions of the year. The total number of polar bears worldwide is estimated to be 20,000–25,000 bears (Schliebe et al. 2006). Although movements of individual polar bears overlap extensively, telemetry studies have demonstrated spatial segregation among groups or stocks of polar bear in different regions of their circumpolar range (Schweinsburg and Lee 1982, Amstrup 2000, Garner et al. 1990 and 1994, Messier et al. 1992, Amstrup and Gardner 1994, Ferguson et al. 1999, Carmack and Chapman 2003). Patterns in spatial segregation suggested by telemetry data, along with information from surveys, marking studies, and traditional knowledge, resulted in recognition of 19 partially discrete polar bear groups by the International Union for the Conservation of Nature (IUCN) Polar Bear Specialist Group (PBSG). These 19 groups have been described as management subpopulations (or stocks) in the scientific literature and regulatory actions (IUCN 2006).

Two stocks of polar bears occur in Alaska: the Chukchi/Bering seas (CBS) and Southern Beaufort Sea (SBS) stocks (Figure 3.4). Unlike polar bears in eastern Canada, the Alaskan stocks do not currently spend extended periods of time on land (Garner et al. 1990), with the exception of females that choose to den on land rather than pack-ice.

Movement patterns

Telemetry studies indicate polar bear movements are not random, nor do they passively follow ocean currents on the ice as previously thought (Mauritzen et al. 2003) Movement data come almost exclusively from adult female polar bears because male anatomy (their neck is larger than their skull) will not accommodate radio collars. The movements of seven male polar bears surgically implanted with transmitters in 1996 and 1997 were compared to movements of 104 females between 1985 and 1995 (Amstrup et al. 2001). The data indicated males and females had similar activity areas on a monthly basis, but males traveled farther each month (Amstrup et al. 2000). Activity areas have not been determined for many populations, and available information reflects movement data collected prior to recent changes wrought by retreating ice conditions. In the Beaufort Sea, annual activity areas for individually monitored female bears averaged 149,000 km^2 (range 13,000–597,000 km^2, Amstrup et al. 2000). Total annual movements by female bears in the Beaufort Sea averaged 3,415 km and ranged up to 6,200 km, with a movement rate of > 4 km/ hr sometimes sustained for long periods, and movements of > 50 km/day observed (Amstrup et al. 2000). Mean activity area in the Chukchi Sea, which is characterized by highly dynamic ice conditions, was 244,463 km^2 (Garner et al. 1990). Average annual distance moved by CBS female bears was 5,542 km.

Radio-collared females indicate some individuals occupy home ranges (multi-annual activity areas), which they seldom leave (Amstrup 2003). The size of a polar bear's home range is determined, in part, by the annual pattern of freeze-up and break-up of sea-ice, and therefore by the distance a bear must travel to access prey (Stirling 1988, Durner et al. 2004). A bear with consistent access to ice, leads, and seals may have a relatively small home range, while bears in areas such as the Barents, Greenland, Chukchi, Bering or Baffin seas may have to move many hundreds of kilometers each year to remain in contact with sea-ice from which to hunt (Born et al. 1997, Mauritzen et al. 2001, Ferguson et al. 2001, Amstrup 2003, Wiig et al. 2003).

The CBS population is widely distributed on the pack-ice of the northern Bering, Chukchi, and eastern portions of the Eastern Siberian seas (Garner et al. 1990, Garner et al. 1994, Garner et al. 1995). Polar Bears are seasonably abundant in the Chukchi Sea and their distribution is influenced by the movement of seasonal pack-ice. Polar bears in the Chukchi and Bering seas move south with advancing ice during fall and winter, and move north in advance of receding ice in late spring and early summer (Garner et al. 1990). Polar bears are dependent upon sea-ice for foraging and the most productive areas are near ice edges, leads, or polynyas where ocean depth is minimal (Durner et al. 2004). Polar bears can be present along the Alaskan shoreline as they opportunistically scavenge on marine mammal carcasses.

The SBS population occurs between Icy Cape, Alaska on the western boundary and Pearce Point, NWT (Amstrup et al. 1986, Amstrup and DeMaster 1988, Stirling et al. 1988). It is thought that nearly all bears in the central coastal region of the Beaufort Sea are from the SBS population, and that proportional representation of SBS bears decreases to both the west and east. For example, only 50% of polar bears occurring in Barrow, Alaska and Tuktoyaktuk, NWT are SBS bears, with the remainder being from the CBS and Northern Beaufort Sea populations.

Feeding
Polar bears derive essentially all their sustenance from marine mammal prey and have evolved a strategy that utilizes the high fat content of marine mammals (Best 1985, Amstrup et al. 2007). Over half the caloric content of a seal carcass occurs in the layer of fat between the skin and underlying muscle (Stirling and McEwan 1975) and polar bears quickly remove the fat layer from beneath the skin after they catch a seal. High fat intake

from specializing on marine mammal prey allows polar bears to thrive in the harsh Arctic environment (Stirling and Derocher 1990, Amstrup 2003).

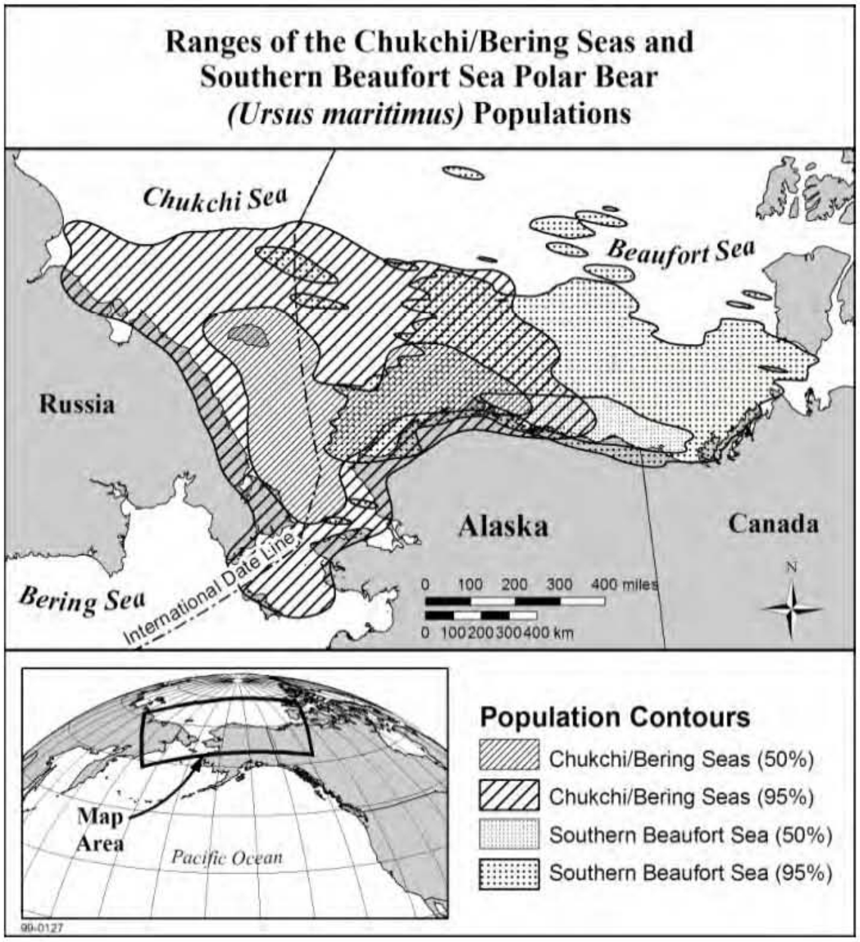


Figure 3.4. Ranges of polar bear stocks in Alaska (USFWS 2009)

Over much of their range, polar bears are dependent on one species of seal, the ringed seal (*Phoca hispida*) (Smith and Stirling 1975, Smith 1980). The relationship between ringed seals and polar bears is so close that the abundance of ringed seals in some areas appears to regulate the density of polar bears, while polar bear predation in turn regulates density and reproductive success of ringed seals (Hammill and Smith 1991, Stirling and Øritsland 1995). Polar bears occasionally catch belugas (*Delphinapterus leucas*), narwhals (*Monodon monoceros*), walrus (*Odobenus rosmarus divirgens*), and harbor seals (*P. vitulina*) (Smith 1985, Calvert and Stirling 1990, Smith and Sjare 1990, Stirling and Øritsland 1995, Derocher et al. 2002). Where common, bearded seals (*Erignathus barbatus*) can be a large part of polar bear diets, and are probably the second most common prey item (Derocher et al. 2002), and walrus can be seasonally important in some parts of the polar bear's range (Ovsyanikov 1996).

Polar bears rarely catch seals on land or in open water (Furnell and Oolooyuc 1980); rather they catch seals and other marine mammals at the air-ice-water interface, where aquatic mammals come to breathe (Amstrup et al. 2007). Although there are local exceptions (e.g. Bentzen et al. 2007, Schliebe et al. 2008), it appears that polar bears gain little overall benefit from alternate foods (Amstrup et al. 2007). Therefore, maintenance of polar bear populations is dependent upon marine prey, largely seals, and polar bears are tied to the surface of the ice for effective access to that prey (Amstrup et al. 2007).

Reproduction

Polar bears have an intrinsically low reproductive rate characterized by late age of sexual maturity, small litter sizes, and extended maternal investment in raising young. Female polar bears enter a prolonged estrus between March and June, when breeding occurs. Ovulation is thought to be induced by mating (Wimsatt 1963, Ramsay and Dunbrack 1986, Derocher and Stirling 1992). Implantation is delayed until autumn, and gestation is 195–265 days (Uspenski 1977), with active development of the fetus suspended for most of that time. The timing of implantation, and hence birth, is likely dependent upon body condition of the female, which in turn is dependent upon a variety of environmental factors (Schliebe et al. 2006).

Throughout their range, most pregnant female polar bears excavate dens in snow located on land during September–November after drifts large enough to excavate a snow cave have formed (Harington 1968, Lentfer and Hensel 1980, Ramsay and Stirling 1990, Amstrup and Gardner 1994). In the southern Beaufort Sea a portion of the population dens in snow caves located on pack and shorefast-ice. Successful denning by polar bears requires an accumulation of sufficient snow combined with winds to cause snow accumulation leeward of topographic features that create denning habitat (Harington 1968). The common characteristic of all denning habitat is topographic features that catch snow in the autumn and early winter (Durner et al. 2003). Polar bear denning habitat in Alaska includes areas of low relief topography characterized by tundra with riverine banks within approximately 50 km of the coast (Amstrup 1993, Amstrup and Gardner 1994, Durner et al. 2001, 2003), and offshore pack-ice pressure ridge habitat. Although the northern Alaskan coast gets minimal snow fall, because the landscape is flat the snow is blown continuously throughout the winter creating drifts in areas of relief.

Fidelity to denning habitat was investigated by Amstrup and Gardner (1994), who located 27 females at up to four successive maternity dens. Bears that denned once on pack-ice were more likely to den on pack-ice than on land in subsequent years. Similarly, bears were faithful to general geographic areas – those that denned once in the eastern half of the Alaska coast were more likely to den there than to the west in subsequent years. Annual variations in weather, ice conditions, prey availability, and the long-distance movements of polar bears (Amstrup et al. 1986, Garner et al. 1990) make recurrence of exact denning locations unlikely.

Satellite telemetry studies determined mean dates of den entry in the Beaufort Sea were 11 and 22 November for land (n = 20) and pack-ice (n = 16), respectively; however, many pregnant females did not enter dens until late November or early December

(Amstrup and Gardner 1994). Female bears foraged until den entry. Mean date of emergence was 26 March for pack-ice dens (n = 10) and 5 April for land dens (n = 18). Messier et al. (1994) reported mean date of den entry and exit varied among years depending upon sea-ice, snow and weather conditions. For bears denning on sea-ice or moving from sea-ice to land denning habitat, time of sea-ice consolidation can alter the onset of denning. Sea-ice dens must be in ice stable enough to stay intact for up to 164 days while possibly moving hundreds of kilometers by currents (Amstrup 2003, Wiig 1998).

Data suggests that an increasing number of SBS females are denning on land. Sixty percent of radio-collared females denned on land from 1996–2006, compared to forty percent in the previous 15 years (Fishbach et al. 2007). The geographic distribution of terrestrial dens also appears to have shifted to the west (USFWS 2006).

Insufficient data exist to accurately quantify polar bear denning locations along the Alaskan Chukchi Sea coast; however, dens in the area are less concentrated than for other areas in the Arctic. The majority of denning of Chukchi Sea polar bears occurs on Wrangel Island, Herald Island, and other locations on the northern Chukotka coast of Russia.

Polar bears give birth in the dens during mid-winter (Harington 1968, Ramsay and Dunbrack 1986). Survival and growth of the cubs depends on the warmth and stable environment within the maternal den (Blix and Lentfer 1979). Family groups emerge from dens in March and April when cubs are about three months old and able to survive outside weather conditions (Blix and Lentfer 1979, Amstrup 1995).

Newborn polar bears are very small, weighing approximately 0.6 kg (Blix and Lentfer 1979), and nurse from their hibernating mothers. Cubs grow quickly and may weigh 10-12 kg by the time they emerge from the den about three months later. Young bears stay with their mothers until weaned, which occurs most commonly in early spring when the cubs are 2.3 years of age. Female polar bears are available to breed again after cubs are weaned. Therefore, in most areas, the minimum successful reproductive interval for polar bears is 3 years (Schliebe et al. 2006).

Age of maturation of mammals is often associated with a threshold body mass (Sadleir 1969), and in polar bear populations it appears to be largely dependent on numbers and productivity of ringed seals. In the Beaufort Sea, ringed seal densities are lower in some areas of the Canadian High Arctic and Hudson Bay. As a possible consequence, female polar bears in the Beaufort Sea usually do not breed for the first time until they are 5 years of age (Lentfer and Hensel 1980), giving birth for the first time at 6 years of age.

Litter size and reproduction rates vary by geographic area and may change in response to hunting pressure, environmental factors, and other population perturbations. Litters of two cubs are common (Schliebe et al. 2006), with litters of three cubs occurring sporadically across the Arctic and most commonly reported in the Hudson Bay region (Stirling et al. 1977, Ramsay and Stirling 1988, Derocher and Stirling 1992). Average litter size across the species' range varied from 1.4 to 1.8 cubs (Schliebe et al. 2006), and several studies have linked reproduction to availability of seal prey, especially in the northern portion of their range. Body weights of mother polar bears and their cubs decreased markedly in the mid-1970s in the Beaufort Sea following a decline in ringed and bearded seal pup production (Stirling et al. 1976, 1977, Kingsley 1979, DeMaster et al. 1980, Stirling et al. 1982, Amstrup et al. 1986). Declines in reproductive parameters varied by region and year with ice conditions and the corresponding reduction in numbers and productivity of seals (Amstrup et al. 1986). In the Beaufort Sea, female polar bears produce a litter of cubs at an annual rate of 0.25 litters per adult female (Amstrup 1995).

Polar bear reproduction lends itself to early termination without extensive energetic investment by the female (Ramsay and Dunbrack 1986, Derocher and Stirling 1992). Female polar bears may defer reproduction in favor of survival when foraging conditions are difficult (Derocher et al. 1992). Repeated deferral of reproduction could cause a decline in populations with an intrinsically low rate of growth (Schliebe et al. 2006).

Life span and survivorship

Polar bears are long-lived animals; the oldest known female polar bear in the wild was 32 years and the oldest known male was 28, although few bears in the wild live beyond 20 years (Stirling 1990). Taylor and colleagues (unpublished data) described survival rates that generally increased by age class up to approximately 20 years of age (cubs-of-the-year, 35–75%; subadults 1–4 years, 63–98%; adults 5–20 years, 95–99%; and adults > 20 years 72–99%).

Survival of cubs is dependent upon their weight when they exit maternity dens (Derocher and Stirling 1992), and most cub mortality occurred early in the period immediately following emergence from the den (Amstrup and Durner 1995, Derocher and Stirling 1996), with early mortality generally associated with starvation (Derocher and Stirling 1996). Survival of cubs to the weaning stage (generally 27–28 months) is estimated to range from 15% to 56% of births (Schliebe et al. 2006). Subadult survival rates are poorly understood because telemetry collars cannot be used on rapidly growing individuals. Population age structure indicates subadults 2–5 years survive at lower rates than adults (Amstrup 1995), probably because their hunting and survival skills are not fully developed (Stirling and Latour 1978).

Eberhardt (1985) hypothesized adult survival rates must be in the upper 90% range to sustain polar bear populations. Studies using telemetry monitoring of individual animals (Amstrup and Durner 1995) estimated adult female survival in prime age groups may exceed 96%, and survival estimates are a reflection of the characteristics and qualities of an ecosystem to maintain the health of individual bears (Schliebe et al. 2006).

Abundance and Trends – Alaska Stocks

A reliable population estimate for the CBS stock currently does not exist (USFWS 2010a); however, the best available information at this time suggests a minimum population estimate of 2,000 (USFWS 2010a), based on extrapolation from multiple years of denning data for Wrangel Island in Russia and an assumed population denning rate (IUCN 2006 in USFWS 2010a). Reliable estimates of population size based upon mark and recapture studies are not available for this region. The combined Alaska–Chukotka polar bear harvest is currently believed to exceed sustainable levels, and the status of the CBS polar bear population is considered uncertain or declining (Schliebe et al. 2006).

Estimates of the population size of the SBS were 1,778 from 1972 to 1983 (Amstrup et al. 1986), 1,480 in 1992 (Amstrup 1995), and 2,272 in 2001 (Amstrup, USGS unpublished data). Most recently, Regehr et al. (2006) estimated the SBS to be 1,526 (95% CI = 1,211–1,841), the most current and valid estimate of the SBS population (USFWS 2010c). Declining survival, recruitment, and body size (Regehr et al. 2006, 2007), low growth rates during years of reduced summer and fall sea-ice (2004 and 2005), and an overall declining growth rate of 3% per year from 2001–2005 (Hunter et al. 2007), indicate the SBS stock population is declining (USFWS 2010c).

Declines in sea-ice have occurred in optimal polar bear habitat in the southern Beaufort and Chukchi seas between 1985 to 1995 and 1996 to 2006, and the greatest declines in 21st century optimal polar bear habitat are predicted to occur in these areas (Durner et al. 2009). These stocks are vulnerable to large-scale dramatic seasonal fluctuations in ice movements which result in decreased abundance and access to prey, and increased energetic costs of hunting. The CBS and the SBS stocks are currently experiencing the initial effects of changes in sea-ice conditions (Rode et al. 2010, Regehr et al. 2010, and Hunter et al. 2007). Regehr et al. (2010) found that the vital rates of polar bear survival, breeding rates, and cub survival declined with an increasing number of ice-free days/year over the continental shelf, and suggested that declining sea-ice affects these vital rates via increased nutritional stress.

Polar bear critical habitat
The Service designated polar bear critical habitat on December 7, 2010 (USFWS 2010a). The Primary Constituent Elements (PCEs) of critical habitat for the polar bear are:

1) Sea-ice habitat used for feeding, breeding, denning, and movement, which is further defined as sea-ice over waters 300 m (984.2 ft) or less in depth that occurs over the continental shelf with adequate prey resources (primarily ringed and bearded seals) to support polar bears.

2) Terrestrial denning habitat, which includes topographic features, such as coastal bluffs and river banks, with suitable macrohabitat characteristics. Suitable macrohabitat characteristics are:

    a) Steep, stable slopes (range 15.5–50.0°), with heights ranging from 1.3 to 34 m (4.3 to 111.6 ft), and with water or relatively level ground below the slope and relatively flat terrain above the slope;

    b) Unobstructed, undisturbed access between den sites and the coast;

    c) Sea-ice in proximity to terrestrial denning habitat prior to the onset of denning during the fall to provide access to terrestrial den sites; and

d) The absence of disturbance from humans and human activities that might attract other polar bears.

3) Barrier island habitat used for denning, refuge from human disturbance, and movements along the coast to access maternal den and optimal feeding habitat, including all barrier islands along the Alaska coast and their associated spits, within the range of the polar bear in the United States, and the water, ice, and terrestrial habitat within 1.6 km (1 mi) of these islands.

The Service designated three polar bear critical habitat units, which correspond to each of the three PCEs described above. The Sea Ice Unit covers approximately 179,508 mi^2 of primarily marine habitat extending from the mean high tide line of the Alaska coast seaward to the 300 m depth contour, and spans west to the international date line, north to the Exclusive Economic Zone, east to the US–Canada border, and south to the known distribution of the CBS polar bear population. Sea-ice is used by polar bears for the majority of their life cycle for activities such as hunting seals, breeding, denning, and traveling (USFWS 2010a).

The Terrestrial Denning Unit covers approximately 5,657 mi^2 of land along the northern coast of Alaska from near Point Barrow east to the Canadian border. It encompasses approximately 95% of the known historical terrestrial den sites from the Southern Beaufort Sea (SBS) population (Durner et al. 2009). The inland extent of denning distinctly varies between two longitudinal zones, with 95% of the dens between the Kavik River and the Canadian border occurring within 20 miles of the mainland coast, and 95% of the dens between the Kavik River and Barrow occurring within 5 miles of the mainland coast.

The Barrier Island Unit covers approximately 4,083 mi^2 of barrier islands and the associated complex of spits, water, ice, and terrestrial habitats within one mile of barrier islands. There is significant overlap between this unit and both the terrestrial denning and sea-ice units. The Barrier Island Unit follows a similar coastal extent as the Sea Ice Unit, from near Hooper's Bay in southwestern Alaska to near the Canadian Border.

Critical habitat does not include manmade structures (e.g., houses, gravel roads, generator plants, sewage treatment plants, hotels, docks, seawalls, pipelines) and the land on which they are located existing within the boundaries of designated critical habitat on the effective date of the rule.

Sea-ice, including ice designated as critical habitat, is rapidly diminishing. Terrestrial denning locations in Alaska do not appear to be a limiting factor. However, rain-on-snow events may decrease den quality, and later onset of freeze-up in the fall may limit sea-ice in proximity and therefore access to terrestrial denning habitat (USFWS 2008a). Erosion of barrier islands and the Arctic shoreline, presumably caused by climate change (Mars and Houseknecht 2007), may be changing terrestrial denning habitat by creating or destroying bluffs.

Human activities such as ground-based vehicular traffic and low-flying aircraft occur in polar bear critical habitat. These activities may temporarily create disturbance between den sites and the coast (e.g., disturbance from ice roads), and may temporarily degrade the ability of barrier island habitat from being a refuge from human disturbance. For example, vessels may need to use barrier islands to weather out a storm, and this may interfere with a polar bear's ability to use barrier islands for the same purpose. However, these activities are usually infrequent and have short-term effects.

6. ENVIRONMENTAL BASELINE

This section provides an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or critical habitat within the action area.

Spectacled eiders

Status of spectacled eiders within the Action Area

Although the majority of North Slope-breeding spectacled eiders nest in tundra wetlands west of the proposed pipeline, the Prudhoe/Kuparuk area is one of the primary breeding areas along the Beaufort Coast (Figure 4.1; Larned et al. 2011). Spectacled eiders are present in the Action Area from late May through late October. The factors that have potentially contributed to the current status of spectacled eiders in the Action Area are discussed below and include environmental contaminants, increased predation, collisions with structures, and long-term habitat loss through development and disturbance.

Environmental contaminants

The deposition of lead shot in tundra or nearshore habitats used for foraging is considered a threat to spectacled eiders. Lead poisoning of spectacled eiders has been documented on the YKD (Franson et al. 1995, Grand et al. 1998) and Steller's eiders on the ACP (Trust et al. 1997; Service unpublished data). Female Steller's eiders nesting at Barrow in 1999 had blood lead concentrations that reflected exposure to lead (>0.2 ppm lead), and six of the seven tested had blood lead concentrations that indicated poisoning (>0.6 ppm lead) (Pattee and Pain 2003). Additional lead isotope tests confirmed the lead in the Steller's eider blood was of lead shot origin, rather than natural sources such as sediments (Matz, USFWS, unpublished data). Use of lead shot for hunting waterfowl is prohibited statewide, and for hunting all birds on the North Slope, and the Service reports good compliance in most areas with the lead shot prohibitions. Further, we expect the availability of lead shot in spectacled eider foraging habitat near Prudhoe Bay to be substantially lower than areas of the North Slope used more frequently for waterfowl hunting.

Other contaminants, including petroleum hydrocarbons from local sources and globally distributed heavy metals, may also affect spectacled eiders. For example, Trust et al. (2000) reported high concentrations of metals and subtle biochemical changes in spectacled eiders wintering near St. Lawrence Island. Spectacled eiders breeding in the Prudhoe Bay area may have experienced varying levels of exposure to petroleum hydrocarbons, heavy metals, and other contaminants; however, it is difficult to assess the impacts of this exposure to eiders.

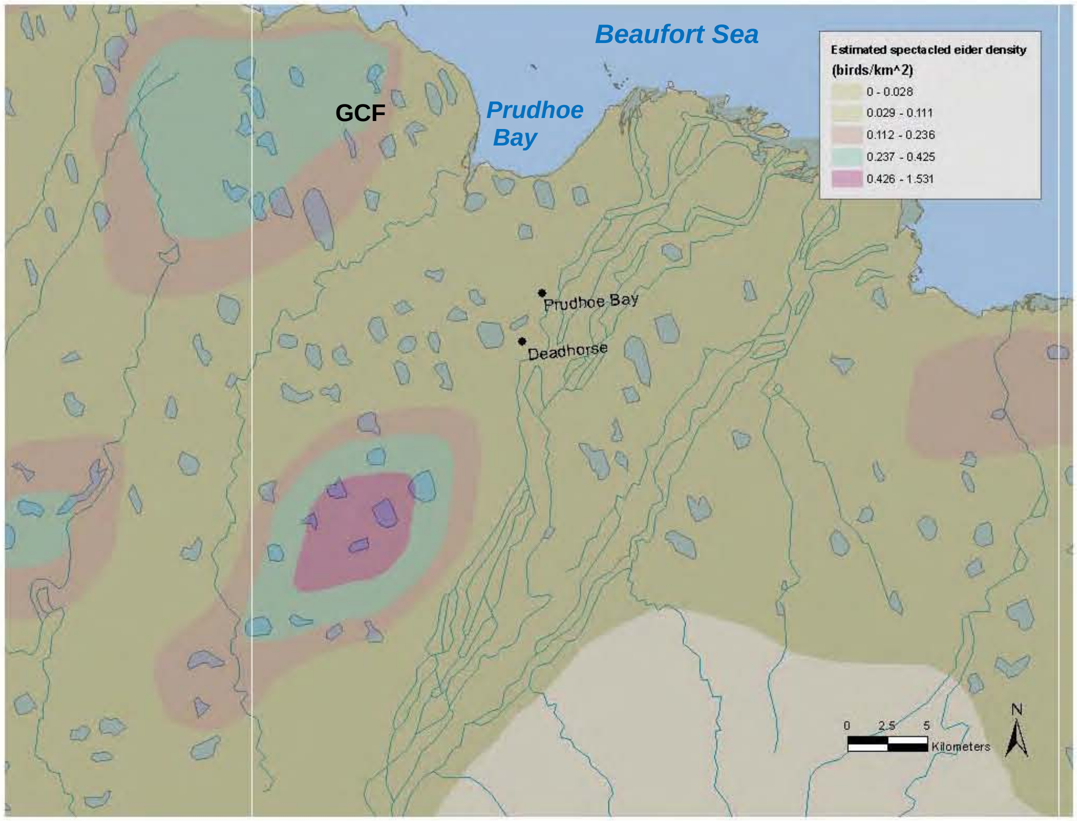


Figure 4.1. Estimated spectacled eider density in the northern portion of the Alaska Stand Alone Gas Pipeline project area. Density polygons are based on data collected during the 2007–2010 Arctic Coastal Plain aerial surveys (USFWS Migratory Bird Management, unpublished data). GCF indicates the proposed location of the Gas Conditioning Facility at milepost 0 of the ASAP.

Increased predator populations

There is some evidence that predator and scavenger populations have increased on the ACP near villages and industrial infrastructure (Eberhardt et al. 1983; Day 1998; Powell and Bakensto 2009). Researchers have proposed that reduced fox trapping, anthropogenic food sources in villages and oil fields, and nesting/denning sites on human-built structures have resulted in increased fox, gull, and raven numbers (R. Suydam and D. Troy, pers. comm. in USFWS 2010, Day 1998). Although we expect corresponding increases in predation rates have also occurred, studies to substantiate the influence of increased predation on spectacled eiders are lacking. However, studies of Steller’s eiders near Barrow have suggested a relationship between predation rates and breeding success (Quakenbush et al. 1995, Obritschkewitsch et al. 2001, Rojek 2008, Safine 2011).

Extensive oil and gas development within the East and West Operating Areas of the Prudhoe Bay Unit since the 1970s may have influenced predator populations in the Action Area. Although efforts by industry to manage food waste and discourage nesting on infrastructure have mitigated increases in predator population to an extent, it is likely that spectacled eiders have experienced increased predation rates associated with development in the Prudhoe Bay area.

Habitat loss through development and disturbance

Existing oil and gas industry developments in the Prudhoe Bay Unit and construction of the Trans Alaska Pipeline System (TAPS) have resulted in long-term loss of spectacled eider breeding habitat in the Action Area directly through gravel fill and indirectly through disturbance from oilfield activities. Given the extent of development in the Prudhoe Bay area, it is likely that eiders have experienced loss of production resulting from direct and indirect habitat loss. However, the degree to which spectacled eiders can reproduce in disturbed areas or move to other less disturbed areas to reproduce, and the potential population level consequences of previous development in the Action Area, are unknown.

Climate change

Arctic landscapes are dominated by lakes and ponds (Quinlan et al. 2005), such as those used by spectacled eiders for feeding and brood rearing on Alaska's North Slope. Arctic regions are thought to be especially sensitive to the effects of climate change (Quinlan et al. 2005, Schindler and Smol 2006, and Smol et al. 2005). Productivity of some lakes and ponds appears to have increased as a result of nutrient inputs from thawing soil and increased annual degree days (Quinlan et al. 2005, Smol et al. 2005, Hinzman et al. 2005, and Chapin et al. 1995). Changes in water chemistry and temperature regimes have also altered the algal and invertebrate communities that form the basis of the food web in these systems (Smol et al. 2005, Quinlan et al. 2005) and may have resulted in mismatched timing between migration and the availability of food in Arctic ponds (Callaghan et al. 2004).

Regional activities requiring formal section 7 consultation

Activities on the eastern ACP that required formal section 7 consultations, and the estimated incidental take of listed eiders, is presented in Table 4.1. The table illustrates the number and diversity of actions that required consultation in the region. We believe these estimates have overestimated, possibly significantly, actual take. Actual take is likely reduced by the implementation of terms and conditions in each biological opinion, is spread over the life-span of a project (often 50 years), and is dominated by the potential loss of eggs/ducklings, which we expect to have substantially lower population-level effects compared to adult mortality for this species (see further discussion in the conclusion).

Table 4.1 - Activities on the eastern Arctic Coastal Plain that required formal section 7 consultations and the amount of incidental take provided. Listed activities include those where effects to listed eiders may occur in the Colville River Delta east to the Sagavanirktok River.

Project Name	Impact Type	Estimated Incidental Take
Beaufort Sea Planning Area Lease Sale 186, 195, & 202 (2002)	Collisions	5 adult spectacled eiders 1 adult Steller's eider
Intra-Service, Issuance of Section 10 permits for spectacled eider (2000)	Disturbance Collection	10 spectacled eiders 10 spectacled eider eggs 25 spectacled eiders
Alpine Development Project (2004)	Habitat loss Collisions	4 spectacled eider eggs/ducklings 3 adult spectacled eiders
ABR Avian Research/USFWS Intra-Service Consultation (2005)	Disturbance	5 spectacled eider eggs/ducklings
Pioneer's Oooguruk Project (2006)	Habitat loss Collisions	3 spectacled eider eggs/ducklings 3 adult spectacled eiders
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2006)	Disturbance	7 spectacled eider eggs/ducklings
KMG Nikaitchuq Project (2006)	Habitat loss Collisions	2 spectacled eiders/year 7 adult spectacled eiders
BP 69kV powerline between Z-Pad and GC 2 (2006)	Collisions	10 adult spectacled eiders
BP Liberty Project (2007)	Habitat loss Collisions	2 spectacled eider eggs/ducklings 1 adult spectacled eider
Intra-service on Subsistence Hunting Regulations (2007)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2007)	Disturbance	21 spectacled eider eggs/ducklings
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2007)	Disturbance	6 spectacled eider eggs/ducklings
Intra-service on Subsistence Hunting Regulations (2008)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2008)	Disturbance	56 spectacled eider eggs/ducklings
BLM Northern Planning Areas of NPR-A (2008)	Disturbance Collision	87 spectacled eider eggs/ducklings/year 12 Steller's eider eggs/ducklings/year < 7 adult spectacled eiders < 1 adult Steller's eider
MBM/USFWS Intra-Service, Shorebird studies and white-fronted goose banding in NPR-A (2008)	Disturbance	21 spectacled eider eggs/ducklings
BP Alaska's Northstar Project (2009)	Collisions	≤ 2 adult spectacled eiders/year ≤ 1 adult Steller's eider/year
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2009; North Slope field sites)	Loss of Production Capture/surgery	130 spectacled eider eggs/ducklings 4 adult spectacled eiders
Intra-service on Subsistence Hunting Regulations (2009)	No estimate of incidental take provided	

BLM Programmatic on Summer Activities in NPR-A (2009)	Disturbance	49 spectacled eider eggs/ducklings
Minerals Management Service Beaufort and Chukchi Sea Program Area Lease Sales (2009)	Collision	12 adult spectacled eiders <1 adult Steller's eider
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2010)	No estimate of incidental take provided	
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2010; North Slope field sites)	Loss of Production Capture/handling/ surgery	130 spectacled eider eggs/ducklings 7 adult/juvenile spectacled eiders (lethal take) 108 adult/juvenile spectacled eiders (non-lethal take)
BLM Programmatic on Summer Activities in NPR-A (2010)	Disturbance	32 Spectacled eider eggs
Intra-Service, USFWS Migratory Bird Management goose banding on the North Slope of Alaska (2010)	Disturbance	4 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2010)	Disturbance	35 spectacled eider eggs/ducklings
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2011)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2011)	Disturbance	20 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2011; Colville River Delta field site)	Capture/handling/ surgery	65 juvenile + 13 adult spectacled eiders (non-lethal take) 7 adult/juvenile spectacled eiders (lethal take)
ConocoPhillips Alaska, Inc's CD-5 Project (Alpine reinitiation; 2011)	Habitat loss	59 spectacled eider eggs/ducklings

Polar bear

Status of polar bears in the action area

Polar bears spend the majority of their time on ice in waters over the productive continental shelf. Polar bears are generally widely and sparsely distributed across the Beaufort Sea. The SBS is distributed across the northern coasts of Alaska, Yukon, and Northwest territories of Canada. Declining survival, recruitment, and body size (Regehr et al. 2006, Regehr et al. 2010, Rode et al. 2010), and low population growth rates during years of reduced sea-ice (2004 and 2005), and an overall declining population growth rate of 3% per year from 2001 to 2005 (Hunter et al. 2007) suggest that the SBS is now declining. The status of this stock is listed as 'reduced' by the IUCN (Obbard et al. 2010) and 'depleted' under the MMPA.

Only pregnant female polar bears den; other members of the population (males, solitary females, and females with older cubs) remain active throughout winter. Unlike polar bears in eastern Canada, the Alaskan stocks do not currently spend extended periods of time on land (Garner et al. 1990), except land-denning females. However, non-denning bears are known to travel through the Action Area, particularly along the coast of

Prudhoe Bay. No maternal dens have been reported from the Action Area. The closest reported den was located approximately 13 km (8 mi) west of the proposed GCF site on the Sagavanirktok River delta.

Oil and gas development, environmental contaminants and climate change are the primary factors that have contributed to the environmental baseline for polar bears in the Action Area. These factors are discussed further below.

Oil and gas development

Extensive oil and gas development in the Prudhoe Bay area over the past several decades has likely altered the use of the area by polar bears. Assessing the magnitude of these effects is difficult. It is reasonable to assume that some bears have been excluded from habitat that they may have otherwise used for movements along the coast and denning. However, documented impacts on polar bears by the oil and gas industry in Alaska during the past 30 years have been minimal. Polar bears have been encountered at or near most coastal and offshore production facilities, or along roads and causeways that link these facilities to the mainland. Interactions have been minimized by implementation of Incidental Take Regulations (ITRs) for the Beaufort Sea (USFWS 2006, 2011) and Chukchi Sea (USFWS 2008b) and the associated Letters of Authorization (LOAs) issued under the MMPA. The ITRs only authorize non-lethal incidental take. As part of the LOAs issued pursuant to these regulations, the oil and gas industry is required to report the number of polar bears observed, their response, and if deterrence activities were required (see below). Recent data from the region regulated under the Beaufort Sea ITRs indicate an average of 306 polar bears were observed annually by the oil and gas industry (range 170–420; 2006–2009). About 81% of these bears showed no change in their behavior, 4% altered their behavior by moving away from (or towards) the industrial activity, while the remaining 15% were intentionally harassed (hazed) to actively deter the bears.

Lethal take associated with the oil and gas industry has occurred on only one occasion during the periods covered by the Chukchi Sea (1991–1996 and 2008–present) and Beaufort Sea (1993–present) ITRs, when a polar bear was accidentally killed in August 2011 due to the misuse of a firecracker round. Prior to issuance of these regulations, lethal takes of adults by industry in Alaska were also rare with two known occurrences since 1968.

Formal section 7 consultations have been conducted for the Chukchi Sea and Beaufort Sea ITRs, which authorize the incidental, unintentional taking of a small number of polar bears in these seas and the adjacent western and northern coasts of Alaska during oil and gas activities in arctic Alaska. These consultations and their conclusions were considered in the jeopardy analysis of this BO.

Environmental contaminants

Three main types of contaminants in the Arctic are thought to present the greatest potential threat to polar bears and other marine mammals: petroleum hydrocarbons, persistent organic pollutants (POPs), and heavy metals.

Potential exposure of polar bears to petroleum hydrocarbons comes from direct contact and ingestion of crude oil and refined products from acute and chronic oil spills. Polar bear range overlaps with many active and planned oil and gas operations within 40 km (25 mi) of the coast or offshore (Schliebe et al. 2006). Polar bears occurring in the Action Area may have been exposed to petroleum hydrocarbons associated with oil and gas industry operations in the Prudhoe Bay area.

Contamination of the Arctic and sub-Arctic regions through long-range transport of pollutants has been recognized for over 30 years (Bowes and Jonkel 1975, Proshutinsky and Johnson 2001, Lie et al. 2003). The Arctic ecosystem is particularly sensitive to environmental contamination due to the slower rate of breakdown of POPs, including organochlorine compounds (OCs), relatively simple food chains, and the presence of long-lived organisms with low rates of reproduction and high lipid levels. The persistence and lipophilic nature of organochlorines increase the potential for bioaccumulation and biomagnification at higher trophic levels (Fisk et al. 2001). The highest concentrations of OCs have been found in species at the top of the marine food chains such as glaucous gulls, which scavenge on marine mammals, and polar bears, which feed primarily on seals (Braune et al. 2005). Consistent patterns between OC and mercury contamination and trophic status have been documented in Arctic marine food webs (Braune et al. 2005).

Climate change

Warming-induced habitat degradation and loss are negatively affecting some polar bear stocks, and unabated global warming will ultimately reduce the worldwide polar bear population (Obbard et al. 2010). Loss of sea-ice habitat due to climate change is identified as the primary threat to polar bears (Schliebe et al. 2006, USFWS 2008a, Obbard et al. 2010). Patterns of increased temperatures, earlier spring thaw, later fall freeze-up, increased rain-on-snow events (which can cause dens to collapse), and potential reductions in snowfall are also occurring. In addition, positive feedback systems (i.e., sea-ice albedo) and naturally occurring events, such as warm water intrusion into the Arctic and changing atmospheric wind patterns, can amplify the effects of these phenomena. As a result, there is fragmentation of sea-ice, reduction in the extent and area of sea ice in all seasons, retraction of sea-ice away from productive continental shelf areas throughout the polar basin, reduction of the amount of heavier and more stable multi-year ice, and declining thickness and quality of shorefast-ice (Parkinson et al. 1999, Rothrock et al. 1999, Comiso 2003, Fowler et al. 2004, Lindsay and Zhang 2005, Holland et al. 2006, Comiso 2006, Serreze et al. 2007, Stroeve et al. 2008). These climatic phenomena may also affect seal abundances, the polar bear's main food source (Kingsley 1979, DeMaster et al. 1980, Amstrup et al. 1986, Stirling 2002). However, threats to polar bears will likely occur at different rates and times across their range, and uncertainty regarding their prediction makes management difficult (Obbard et al. 2010).

In 2007, a USGS science team released 9 reports[3] to the Service that included (1) new observational data on polar bears, including updated information on the current status of

[3] Reports are available at: http://www.usgs.gov/newsroom/special/polar_bears/.

3 of the world's 19 subpopulations of polar bears, and (2) projections of the future distribution and abundance of polar bears in the rest of the 21st century, given changes expected in future sea-ice conditions. The overall conclusion of the USGS research effort was that if projected changes in future sea-ice conditions are realized, approximately two-thirds of the world's current polar bear population will be lost by the mid-21st century. Because the observed trajectory of Arctic sea-ice decline appears to be underestimated by currently available models, this assessment of future polar bear status may be conservative (Amstrup et al. 2007).

While climate change will have the largest impact on polar bears in the marine environment, it may also lead to changes in use and vulnerability of polar bears in the terrestrial environment. An estimated > 60% of females from the SBS stock den on land, with the remaining bears denning on drifting pack-ice (Fischbach et al. 2007). Durner et al. (2006) noted that ice must be stable for ice-denning females to be successful. As climate change continues, the quality of sea-ice may decrease, forcing more females to den on land (Durner et al. 2006). However, if large areas of open water persist until late winter due to a decrease in the extent of the pack-ice, females may be unable to access land to den (Stirling and Andriashek 1992).

Climate change may affect the availability and quality of denning habitat on land. Durner et al. (2006) found that 65% of terrestrial dens found in Alaska between 1981 and 2005 were on coastal or island bluffs. These areas are suffering rapid erosion and slope failure as permafrost melts and wave action increases in duration and magnitude. In all areas, dens are constructed in autumn snowdrifts (Durner et al. 2003). Changes in autumn and winter precipitation or wind patterns (Hinzman et al. 2005) could significantly alter the availability and quality of denning habitat.

Polar bears' use of coastal habitats in the fall during open-water and freeze-up conditions has increased since 1992 (USFWS 2006). This may increase the number of human – polar bear interactions if bears occur close to human settlements or development. Amstrup (2000) observed that direct interactions between people and bears in Alaska have increased markedly in recent years. The number of bears taken for safety reasons, based on three-year running averages, increased steadily from about 3-per-year in 1993, to about 12 in 1998, and has averaged about 10 in recent years. There are several plausible explanations for this increase. It could be an artifact of increased reporting, or of increased polar bear abundance and corresponding probability of interactions with humans. Alternatively, or in combination, polar bears from the SBS population typically move from the pack-ice to the near shore environment in the fall to take advantage of the higher productivity of ice seals over the continental shelf. In the 1980s and early 1990s, the near shore environment would have been frozen by early or mid-October, allowing polar bears to effectively access seals in the area. Since the late 1990s, the timing of ice formation in the fall has occurred later in November or early December, resulting in an increased amount of time that the area was not accessible to polar bears. Consequently, bears spent a greater amount of time on land and not feeding. The later formation of near-shore ice increases the probability of bear-human interactions occurring in coastal villages (Schliebe et al. 2006). Some experts predict the number of polar bear–human interactions will increase as climate change continues (Derocher et al. 2004).

Summary
Primary threats to polar bears in the Action Area relate to increased use of coastal habitats by non-denning bears and increased use of maternal denning habitat on land resulting from climate change, which exposes polar bears to the effects of human activities in these areas with greater frequency. While other stressors exist and are managed, they are not currently thought to be significant threats to polar bear populations; however, each of these factors could become more significant in combination with future effects of climate change and the resultant loss of sea-ice.

Polar bear critical habitat
Within the Action Area, habitat within 5 miles of the Beaufort Sea coast is within the Terrestrial Denning Unit (Figure 4.2). The GCF, pipeline, and associated structures up to approximately one mile of the proposed pipeline is within the Barrier Island Unit, which is delineated by a 1 mile (1.6 km) zone of influence surrounding barrier islands (Figure 4.2).

Habitat loss and disturbance from oil and gas development
Most of polar bear critical habitat has not been subject to oil and gas development; however, the Action Area has experienced extensive development in recent decades. Manmade structures existing on the effective date of the final critical habitat rule, January 6, 2011, and the land on which they are located are excluded from critical habitat. However, human activities (e.g., noise produced by equipment and visual stimuli) at these facilities may interfere with the capability of critical habitat adjacent to facilities to provide their intended function. For example, polar bears may alter travel routes to avoid contact with these facilities, and avoid denning, hunting, and resting near existing structures. Interactions and adverse effects to polar bears from these existing oil and gas activities have been minimized by implementation of the Beaufort Sea ITRs (USFWS 2006, 2011) promulgated under the MMPA. We expect that measures implemented to minimize incidental take of polar bears have also minimized effects to the conservation role of polar bear critical habitat in the Action Area.

Environmental contaminants
Exposure to environmental contaminants may affect polar bear survival or reproduction. Thus, the presence of contaminants within polar bear critical habitat could affect the conservation value of the habitat. Three main types of contaminants in the Arctic are thought to pose the greatest potential threat to polar bears: petroleum hydrocarbons, persistent organic pollutants (POPs), and heavy metals.

Petroleum hydrocarbon contamination from oil and gas development has had a limited effect on the environmental baseline of polar bear critical habitat. A single large spill has been reported for the Chukchi and Beaufort seas. In August 1988, 68,000 gallons (1,619 barrels) of heating fuel were spilled 3–6 miles north of the barrier islands off Brownlow Point by a barge tanker enroute to Kaktovik. No large oil spills from oil and gas activities have occurred in arctic Alaska. Small spills have occurred in terrestrial areas, but have affected a limited area, and unlikely to have compromised the conservation function of the Terrestrial Denning Unit.

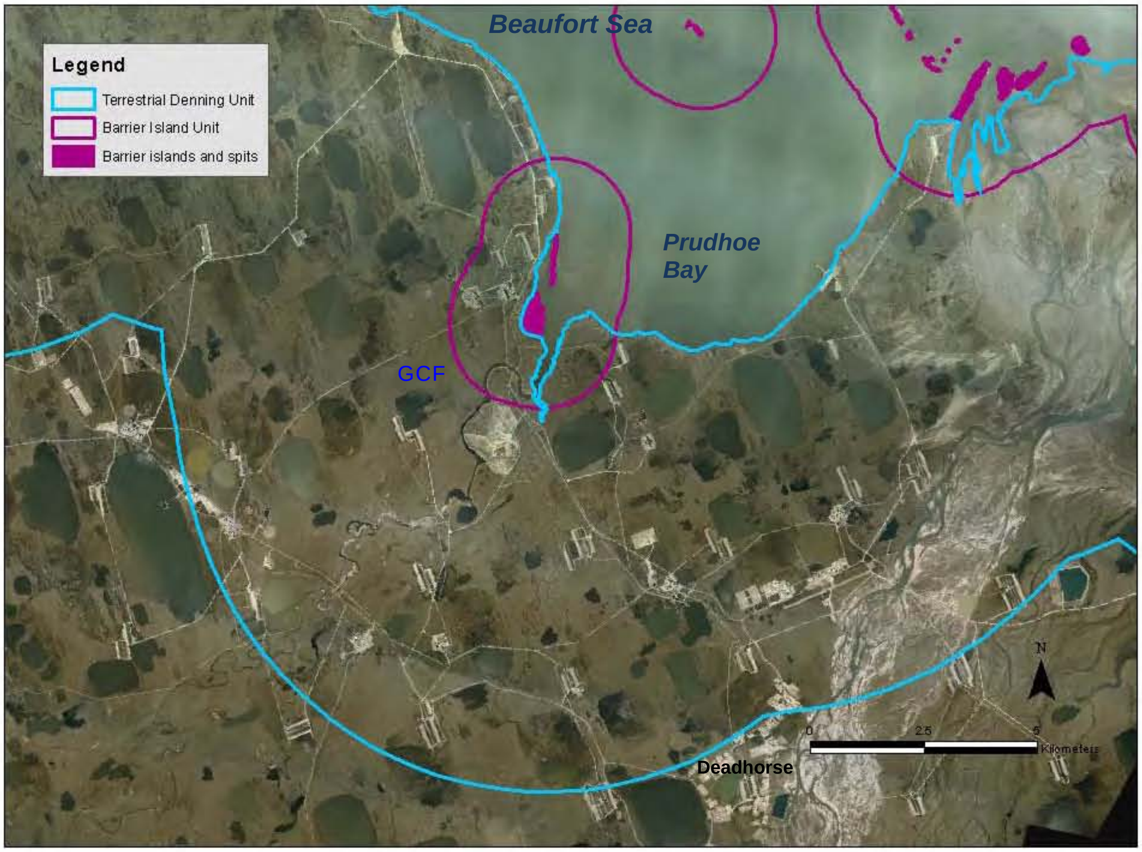


Figure 4.2. Designated polar bear critical habitat in the vicinity of Prudhoe Bay. The Terrestrial Denning Unit, as delineated in the Prudhoe Bay area, includes terrestrial habitat within 8 km (5 mi) inland from the Beaufort Sea coast. The Barrier Island Unit includes barrier islands, spits, and a 1.6 km zone of adjacent aquatic and terrestrial habitats. The Sea Ice Unit is not shown. GCF indicates the approximate location of the proposed Gas Conditioning Facility at milepost 0 of the ASAP.

Contamination of the Arctic and sub-Arctic regions through long-range transport of pollutants has been recognized for over 30 years (Bowes and Jonkel 1975, Proshutinsky and Johnson 2001, Lie et al. 2003). Arctic ecosystems are particularly sensitive to environmental contamination due to the slower rate of breakdown of POPs, including organochlorine compounds (OCs), relatively simple food chains, and the presence of long-lived organisms with low rates of reproduction and high lipid levels that favor bioaccumulation and biomagnification. Consistent patterns between OC and mercury contamination and trophic status have been documented in Arctic marine food webs (Braune et al. 2005). Presumably, these characteristics have affected the capacity of polar bear critical habitat to support polar bears, although is difficult to estimate the extent of impairment.

Climate change
Climate change is contributing to the rapid decline of sea-ice throughout the arctic, and some of the largest declines are predicted to occur in the Chukchi and southern Beaufort Seas (Durner et al. 2009 *in* USFWS 2009). This directly affects the sea-ice PCE, which provides feeding, breeding, denning, and traveling habitat for polar bears. The decrease in the quality and quantity of sea ice may increase the importance of barrier island and terrestrial habitat for foraging, denning, and resting. For example, Schliebe et al. (2006) demonstrated an increasing trend in the number of observed polar bears using terrestrial habitats in the fall. Additionally, Fischbach et al. (2007) hypothesized that reduced availability of older, more stable sea-ice is contributing to the observed decrease in the proportion of female polar bears denning on sea-ice in northern Alaska.

Climate change may also affect the availability and quality of denning habitat on land. Durner et al. (2006) found that 65% of terrestrial dens found in Alaska between 1981 and 2005 were on coastal or island bluffs. These areas are suffering rapid erosion and slope failure as permafrost melts and wave action increases in duration and magnitude. In all areas, dens are constructed in autumn snowdrifts (Durner et al. 2003). Changes in autumn and winter precipitation or wind patterns (Hinzman et al. 2005) could significantly alter the availability and quality of snow drifts for denning.

Summary of the status of polar bear critical habitat in the Action Area
Localized effects to critical habitat in the Action Area (Figure 4.2) have been small in scale, including potential disturbance from existing oil and gas infrastructure in the Prudhoe Bay area and the effects of small oil spills. At a larger spatial scale, globally distributed pollutants and climate change have diminished the quality of polar bear critical habitat; however, estimating the magnitude of these effects within the Action Area is difficult.

7. EFFECTS OF THE ACTION ON LISTED SPECIES

This section of the BO provides an analysis of the effects of the action on listed species and, where appropriate, critical habitat. Both direct effects (effects immediately attributable to the action) and indirect effects (effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur) are considered. Interrelated and interdependent effects of the action are also discussed.

Effects to spectacled eiders
Adverse effects to spectacled eiders could occur through collisions with structures, long-term habitat loss, and increased predator populations; each of these factors is evaluated below.

Collisions with structures
Migratory birds suffer considerable mortality from collisions with man-made structures (Manville 2004). Birds are particularly at risk of collision when visibility is impaired by darkness or inclement weather (Weir 1976). There is also evidence that lights on structures increase collision risk (Reed et al., 1995; Russell, 2005; numerous authors cited by Manville 2000). Anderson & Murphy (1988) monitored bird behavior and strikes to a 12.5km power line in the Lisburne area (the southern portion of the Prudhoe Bay oil fields) during 1986 and 1987. They observed 25 different species of birds including spectacled eiders. Results indicated that strike rate was related to flight behavior, in particular the height of flight. Johnson and Richardson (1982) in their study of migratory behavior along the Beaufort Sea coast reported that 88% of eiders flew below an estimated altitude of 10 m (32 ft) and well over half flew below 5 m (16 ft). This tendency to fly low puts eiders at risk of striking objects in their path. A literature review by Day et al. (2005) also suggested that eider species maybe particularly susceptible to collisions with offshore structures as they fly low and at relatively high speed (~ 45 mph).

Eiders migrating east during spring and west during summer/fall migration periods would be at risk of colliding with ASAP structures. However, we expect most eiders to remain offshore during spring migration because they are thought to follow open water leads in the pack ice during their spring migration to the breeding grounds (Woodby and Divoky 1982; Johnson and Richardson 1982, Oppel et al. 2009, M. Sexson, USGS, pers. comm.). During post-breeding migration in summer and fall, we anticipate that male eiders would have the greatest collision risk in the Action Area. Satellite telemetry data from the eastern ACP, including Prudhoe Bay, indicated that male spectacled eiders departed early in the summer and generally remained close to shore, sometimes crossing overland, during westward migration (TERA 2002; see also Petersen et al. 1999). However, we anticipate that the collision risk for spectacled eiders migrating through the Action Area in early summer would be greatly reduced by the improved visibility of structures during the 24 hours of daylight in the Prudhoe Bay area from mid-May through late July. When females and juveniles migrate during late summer/fall, decreasing daylight and more frequent exposure to foggy weather conditions could increase collision risk. Longer nights increase the time that eiders are vulnerable to collision with unseen structures, and may increase susceptibility to disorientation from lights. However, we anticipate that these birds are also more likely to migrate over open water in the Beaufort Sea (Petersen et al. 1999, TERA 2002), avoiding the Action Area. Thus we anticipate there is a very low risk of spectacled eider mortality from collisions with project infrastructure.

Overhead transmission lines and communication towers would increase collision risk to migrating and breeding spectacled eiders in the Action Area because these structures are more difficult for eiders to detect and avoid; however, overhead transmission lines and communication towers are not included in the current proposed Action.

In summary, we anticipate the likelihood of collisions of spectacled eiders with proposed structures would be very low given 1) improved visibility of structures in late-spring and early summer; 2) the tendency of migrating eiders to fly further offshore in late summer and fall, when eiders would be more vulnerable to collisions; and 3) overhead transmission lines and communication towers are not included in the proposed action.

Increased predator populations
There is some evidence that predator and scavenger populations have increased near villages and industrial infrastructure on the ACP (Eberhardt et al. 1983; Day 1998; Powell and Bakensto 2009). Researchers have proposed that reduced fox trapping, anthropogenic food sources in villages and oil fields, and nesting/denning sites on human-built structures have resulted in increased numbers of arctic foxes (*Vulpes lagopus*), common ravens (*Corvus corax*), and glaucous gulls (*Larus hyperboreus*) in developed areas of the ACP (R. Suydam and D. Troy, pers. comm. in USFWS 2010, Day 1998). Foxes are important predators of ground-nesting birds in the Prudhoe Bay Oilfield (Liebezeit and Zack 2008, 2010) and appear to occur at higher densities in the Prudhoe Bay region compared to adjacent areas outside of the oil fields (see review in Burgess 2000). Ravens appear to have expanded their breeding range on the North Slope by utilizing buildings and other manmade structures for nest sites (Day 1998). Day (1998) interviewed a number of biologists who work on the North Slope and many felt that ravens may be highly efficient egg predators. Ravens were observed depredating 5 Steller's eider nests near Barrow during 5 nesting years[4] between 1992 and 1999 (Quakenbush et al. 2004). In 2010, Liebezeit and Zack (2010) observed the highest number of ravens since their long-term studies of tundra-nesting birds in the Prudhoe Bay Oilfield began in 2003.

Estimating the effects of predators on spectacled eider production in the Action Area is extremely difficult; however, we anticipate that structures associated with the ASAP would increase the number of potential nesting and perching sites for ravens in the Prudhoe Bay area and may increase the availability of food for ravens and foxes, potentially increasing predator productivity and depredation of spectacled eider nests. The BA indicates that ASAP project operations will follow protocols to minimize waste that may attract predators and monitor areas that provide nesting habitat. These protocols would be consistent with those used at other facilities in Prudhoe Bay to limit anthropogenic food resources and the availability of nest sites. If these measures are implemented, we anticipate adverse effects to spectacled eiders from increased predator populations would be minimal.

Long-term habitat loss
Direct habitat loss will result from placement of gravel to construct the GCF (70 acres), the camp and administrative facilities pad (~11.3 acres), the laydown yard at MP 4 (6 acres), and the access road at MP 5.5 (~3.2 acres). This area of gravel fill would be rendered permanently unavailable as breeding habitat for eiders. Additionally, activities within the construction right of way (242.4 acres based on 100-foot width along MP 0–20) may permanently alter spectacled eider breeding habitat. We also anticipate that indirect habitat loss will occur within a 200-m (656.17-ft) zone of influence surrounding new development through disturbance from on pad activities and pipeline maintenance.

[4] Steller's eiders have highly variable nesting effort among years and nests are not detected near Barrow in about 50% of years.

The two principal mechanisms through which disturbance can adversely affect eiders on their breeding grounds are:

1. Displacing adults and/or broods from preferred habitats during pre-nesting, nesting, brood rearing, and migration; and
2. Displacing females from nests, exposing eggs or young to inclement weather or predators.

In the discussion below, we provide an assessment of potential loss of production resulting from the proposed ASAP project. This assessment uses updated estimates of spectacled eider density in the Action Area based on recent waterfowl breeding population survey data from the region (Larned et al. 2011). These estimates were developed at a coarse, regional scale and are not site-specific; however, they reflect the best available data on the density of the Action Area by breeding spectacled eiders. Distributions on a local scale may vary based on the availability of preferred habitats.

Direct loss of habitat would occur by placement of gravel onto approximately 333 acres (1.35 km^2) of tundra wetlands during construction of the pads and access road. We expect indirect habitat loss will occur through displacement of eiders within a 200-m zone of influence surrounding gravel pads and along each side of the access road and the pipeline. The area encompassed by the zone of influence, the area of total habitat loss, is estimated to be 3,511 acres (14.21 km^2). Although we expect the zones of influence associated with the access road and the pipeline to overlap considerably, we do not have enough information to accurately assess the extent of overlap and included both areas in our calculation of total habitat loss to ensure we have not underestimated potential effects to spectacled eiders. Additional details on estimation of total habitat loss are presented in Appendix A.

Spectacled eider density polygons constructed from data collected during the 2007–2010 waterfowl breeding population survey of the ACP (Larned et al. 2011; Figure 4.1) provide our best estimate of spectacled eider nesting effort in the Action Area because comparable site-specific data are not available from the Action Area. These surveys were conducted at a broad spatial scale relative to the Action Area. Eider counts were not corrected for visibility. Predicted spectacled eider density in the Action Area ranged from 0 to 0.425 birds/km^2 (Figure 4.1). We multiplied the median predicted density in the Action Area (0.2125 birds/km^2) by the estimated affected area (14.21 km^2) to estimate the potential number of spectacled eider pairs displaced by the proposed Action per year. We assume the estimated number of pairs displaced is equivalent to the number of nests or young broods that may be affected. We also assume that spectacled eiders will be present and attempt to nest annually in the Action Area. The potential loss of production in terms of numbers of eggs or ducklings lost was based on an average clutch size of 3.9 for spectacled eiders in northern Alaska (Petersen et al. 2000, Bart and Earnst 2005, Johnson et al. 2008).

Loss of production of up to two nests or 8 eggs/ducklings per year was estimated as follows:

0.2125 birds/km^2 × 0.5 nests/pair × 14.21 km^2 = 1.51 nests per year

2 nests × 3.9 eggs per nest = 7.8 eggs per year

Loss of production of 80 nests or 316 eggs over an assumed 50-year project life[5] was estimated as follows:

0.2125 birds/km^2 × 0.5 nests/pair × 14.21 km^2 × 50 years = 75.52 nests over 50 years

76 nests × 3.9 eggs or ducklings per nest = 296.4 eggs over 50 years

To summarize, we estimate that the proposed action will result in the loss of 8 spectacled eider eggs or ducklings per year or 297 eggs or ducklings over an assumed 50-year project life through direct loss of breeding habitat and disturbance within a 200-m zone of influence surrounding the project infrastructure within the Action Area. These estimates are based on a series of inclusive assumptions and represent the maximum potential impact to spectacled eiders.

Polar Bears

Adverse effects polar bears could result from the proposed Action primarily through disturbance, increased polar bear–human interactions, and habitat loss.

Denning polar bears

Durner et al. (2006) found approximately 50% of pregnant females in the Beaufort Sea came ashore to construct maternity dens, while Amstrup and Gardner (1994) found 42% of females observed in the Alaskan Chukchi and Beaufort seas and Canadian Beaufort Sea from 1983–1991 denned on land. The most recent data (Fishbach et al. 2007) suggests 60% of females in these areas den on land. In Alaska, dens are sparsely distributed along a narrow coastal strip with sightings reported up to 48 km inland (Lentfer and Hensel 1980) and 61 km inland (Amstrup and Gardner 1994).

Female polar bears entering dens, or females in dens with cubs, are more sensitive than other age and sex groups to noises (USFWS 2011c). Females appear more likely to abandon their dens in the fall before cubs are born and relocate if disturbed (Lentfer and Hensel 1980, Amstrup 1993), than in the spring when young cubs are less likely to survive if they leave the maternal den early (Amstrup 1993). Industrial noise and activities that commence after the female has denned may cause a female to abandon the den site prematurely, before the altricial cubs have developed enough to survive outside the den. Post-emergence, females and cubs spend an average of 8 days in the area before the den site is abandoned (USGS data cited by USFWS 2006). These family groups may be particularly susceptible to disturbance.

[5] The project BA (page 80) states the lifetime of the project is “possibly in excess of 50 years”.

Behavioral responses of individual denning females and family groups to disturbance is variable. While observations of den abandonment associated with industry activities have been reported from northern Alaska (see review in USFWS 2011c), available data indicates such events have been infrequent and isolated (USFWS 2011c) and some studies have reported individual denning polar bears to be tolerant of human disturbance (e.g., Amstrup 1993, Smith et al. 2007). Additionally, USFWS (2011c) reported three examples (2006, 2009, and 2010) of pregnant female bears establishing dens prior to the onset of oil industry activity within 400 m (1,312 ft) of the den site and remaining in the den through the normal denning cycle.

Polar bears are not known to den in the Action Area; however, suitable denning habitat is available in the area and there is a possibility female polar bears would attempt to den in the area. We anticipate that the level disturbance associated with ongoing oil and gas industry activities in the area would allow a denning polar bear to either become habituated to or relocate to a less disturbed area, significantly reducing the likelihood of potential effects.

Disturbance to non-denning bears

Operations at the GCF and along the pipeline may disturb and displace individual polar bears from the immediate area. There is, however, some evidence that polar bears exposed to routine industrial noises may acclimate to those noises and show less vigilance than bears not exposed to such stimuli (e.g., Smith et al. 2007). Polar bears regularly travel along the coast of Prudhoe Bay north of the proposed location for the GCF (C Perham, pers. comm.); however, the proposed site is adjacent to existing processing facilities and we do not anticipate the new facility to further alter movement patterns of polar bears in the area.

The Service expects that potential adverse effects to polar bears will be reduced further by the applicant's compliance with existing and future authorization issued under the MMPA, such as LOAs issued under the Beaufort Sea ITRs. Disturbance that disrupts behavioral patterns of polar bears is classified as take under the MMPA. The MMPA prohibits incidental take of marine mammals unless specific ITRs have been promulgated under section 101(a)(5) of the MMPA and a subsequent LOA has been issued. Under the MMPA, incidental take is only permitted provided the total of such taking will have no more than a negligible impact[6] on the marine mammal species (or stock in the case of the Beaufort Sea ITRs), and does not have an unmitigable adverse impact[7] on the availability

[6] Negligible impact - an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

[7] Unmitigable adverse impact - is an impact resulting from the specified activity (1) that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by (i) causing the marine mammals to abandon or avoid hunting areas, (ii) directly displacing subsistence users, or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

of these species for subsistence uses. Additional information on measures implemented under these regulations to reduce effects to polar bears from oil and gas industry activities can be found in the BO for the 2011 Beaufort Sea ITRs (USFWS 2011).

Routine aircraft traffic is not anticipated to adversely affect polar bears in the Action Area. Amstrup (1993) studied the response of denning bears to research aircraft and found no detectable motion among collared bears in their dens when flights took place. Reactions of non-denning polar bears appear limited to short-term changes in behavior. Hence, no long-term adverse impacts to individuals from aircraft activities are anticipated.

Increased polar bear–human interactions

Polar bear–human encounters can be dangerous for both the polar bear and human. For the bear, a human encounter may result in the bear being hazed away from the area or, in the worst case, being killed in defense of life and property. While loud noises may deter bears from entering an area of operation, polar bears are curious and commonly approach noise sources, such as industrial sites (Stirling 1988).

Polar bear deterrence activities associated with oil and gas and other activities occur regularly in the Action Area. From August 2006 through July 2010, the oil and gas industry working in the Beaufort Sea or its adjacent coast reported the sightings of 1,414 polar bears, of which 209 (15%) were intentionally harassed, or deterred (C. Perham, pers. comm.). Annually, the percent of total bears sighted that were deterred ranged from ranged from 9% in 2010 to 43% in 2006, with an average of 15%.

Authorization to harass (haze) polar bears may be requested under section 112(c), and/or 101(a)(4)(A) of the MMPA, which allows the Service to set up cooperative agreements with industry or other publics, and under sections 109(h) which states that a person may take a marine mammal in a humane manner if such taking is for: (a) protection or welfare of the mammal; (b) protection of public health and welfare; or (c) non-lethal removal of nuisance animals. This type of action is considered Level B Harassment[8]. Although hazing may have some short term adverse effects by displacing a bear, the safe removal of a bear to non-industrial areas may prevent more serious impacts to the bear possibly including lethal take in defense of life and property. Since the implementation of ITRs, LOAs, and authorization of intentional take, only two polar bears are known to have been killed due to encounters with industry on the North Slope of Alaska. In contrast, 33 polar bears were killed in the Canadian Northwest Territories from 1976 to 1986 during encounters with industry (Stenhouse et al. 1988).

The Service also consulted previously on a Final Rule regarding passive and preventative deterrence measures that any person can use (e.g., acoustical and vehicular deterrence) when working in polar bear habitat (USFWS 2010d). The Service concluded that these

[8] Level B Harassment - has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

methods are likely to cause, at most, only short-term changes in behavior, such as bears running away from the disturbance (USFWS 2010d).

Habitat Loss
The pipeline, gravel pads, access road, and other components of the Action would impact approximately 333 acres (1.35 km^2) of tundra habitat within the Action Area. Polar bears use coastal areas for denning, hunting, and travel corridors, and we suspect with changing ice patterns more polar bears will be encountered on land in the future. Oil infrastructure in the Prudhoe Bay area is not though to significantly interfere with movements of non-denning bears.

Terrestrial dens in Alaska are sparsely distributed along a narrow coastal strip, with observations up to 61 km (37.9 mi) inland (Amstrup and Gardner 1994). Denning habitat includes coastal bluffs, along river banks, and bluffs where snow accumulates early (Durner et al. 2003). It is possible a small amount of potential denning habitat may be destroyed or altered by project activities; however, denning habitat is not limiting population size, and adverse effects from habitat loss are not anticipated (C. Perham, pers. comm. in USFWS 2008).

Polar Bear Critical Habitat
In our effects analysis, we analyzed how the PCEs are likely to be affected and how that is likely to influence the function and conservation role of each PCE at the unit scale. We assumed if the function of any one PCE at the individual critical habitat unit scale was not likely to be appreciably reduced, then it follows that adverse modification for the total polar bear critical habitat would not likely occur.

Effects on sea ice habitat
Activities will primarily occur on land within and south of the Prudhoe Bay oil fields. Accordingly, we do not expect adverse effects to the Sea Ice Unit.

Effects on terrestrial denning habitat
The proposed Action may alter the physical features of terrestrial denning habitat through the construction of ~7 miles of pipeline, ~87 acres of gravel pads, ~5.5 miles of gravel road within the Terrestrial Denning Unit (Figure 4.2). Temporary effects to terrestrial denning habitat could result from construction of ice/snow roads and pads in support of construction and operations. Additionally, activities that may occur in the Action area could be a source for disturbances that may affect the conservation role of terrestrial denning habitat.

Topographic features – The terrestrial denning PCE is characterized by steep, stable slopes that accumulate snow. Certain areas such as barrier island, river banks, and coastal bluffs that occur at the interface of mainland and marine habitat receive proportionally greater use for denning (Durner et al. 2004, 2006), with coastal bluffs providing the most preferred topographic relief. For example, of 35 terrestrial dens found on the ACP in 2001, >80% were along coastal bluffs (Durner et al. 2003).

The proposed Action could result in modifications of some slopes and limit their capability to catch snow. We expect that alteration of slopes during construction is likely to be minimal, and, in fact, largely avoided because construction and use of steep terrain is more difficult than flat areas. Therefore, we expect only a small area containing suitable topographic features for denning would be affected.

Features related to polar bear movement and absence of disturbance – A disturbance may affect critical habitat if it persists and affects the critical habitat's conservation role. Features of the terrestrial denning habitat PCE that relate to disturbance include: 1) unobstructed, undisturbed access between den sites and the coast; and 2) the absence of disturbance from humans and human activities that might attract other polar bears (i.e., non-denning polar bears which may kill females and cubs in dens).

Given the limited extent of development anticipated in polar bear critical habitat, it is unlikely the proposed Action will significantly hinder movement between den sites and the coast through physical obstructions or disturbance.

Human activity could also reduce the quality of terrestrial denning habitat by providing attractants (such as food and scents) that could attract adult male bears, which may kill females and cubs, to nearby dens. Disturbance and attractants resulting from the Action would be most likely to occur where human presence is concentrated or prolonged, such as camp facilities and the GCF. However, we expect that these effects will be reduced by following protocols to minimize waste that may attract predators, as stated in the BA, and the applicant's compliance with existing and future authorizations issued under the MMPA (see *Polar Bears* section, page 36), which include terms and conditions to minimize effects to denning bears and manage human food waste. Thus, both the level of human activity within preferred denning habitat and the presence of attractants to non-denning polar bears will be limited.

Summary of potential effects to the Terrestrial Denning Unit –Adverse effects of the Action are not expected to substantially impact the conservation role of the Terrestrial Denning Unit because: 1) we expect development in areas where topographic relief produces optimal denning habitat, such as river and coastal bluffs to be limited; 2) terms and conditions associated with authorizations under the MMPA would minimize the level of persistent disturbance that may result from the Action; and 3) the scale of the potentially affected area would be small relative to the extent of the Terrestrial Denning Unit such that the function of the unit as a whole would not be compromised.

Effects on barrier island habitat

The proposed GCF and associated facilities and approximately one mile of gas pipeline will occur within the Barrier Island Unit. This area is within the 1.6-km zone surrounding the designated barrier island near the mouth of the Putuligayuk River in Prudhoe Bay (Figure 4.2). Approximately 93 acres of habitat will be rendered unavailable for denning, refuge from human disturbance, and movements along the coast to access maternal den and optimal feeding habitat.

As discussed above, disturbance may affect critical habitat if it persists and affects the critical habitat's conservation role. The Service has identified refuge from human disturbance as a feature of the barrier island habitat PCE essential to the conservation of polar bears. Because human activities are expected to routinely occur within the footprint of the project during and after construction, we anticipate that the proposed action would result in persistent human disturbance that is likely to adversely affect the intended conservation role of the Barrier Island Unit. However, we anticipate that adverse effects related to disturbance would be minor because the affected area does not include optimal denning habitat, the area is already subject to disturbances from existing oil and gas infrastructure and the spatial scale of the project is not large enough to substantially interfere with polar bear movements along the coast to access maternal den and optimal feeding habitat.

Summary of effects to the Barrier Island Unit – The proposed Action will permanently affect ~93 acres of the Barrier Island Unit through long-term habitat loss along the southwest coast of Prudhoe Bay and persistent human disturbance associated with construction and operation the GCF and other proposed facilities. Adverse effects of the Action are not expected to substantially impact the conservation role of the Barrier Island Unit because adverse effects are expected to be minor and the scale of the potentially affected area would be small relative to the extent of the Barrier Island Unit such that the function of the unit as a whole would not be compromised.

Interdependent and Interrelated Effects

An interrelated action depends on the proposed action for its justification; an interdependent action has no independent utility apart from the action under consultation. Implementation of the proposed Action may facilitate the additional development related to gas extraction on the North Slope by providing infrastructure needed to transport natural gas to potential markets; however, the Service has not identified specific actions that are interdependent on or interrelated to the proposed action.

8. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the Action Area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. When analyzing cumulative effects of a proposed action, it is important to define both the spatial (geographic), and temporal (time) boundaries. Within these boundaries, the types of actions that are reasonably foreseeable are considered.

Future development by the State of Alaska or the North Slope Borough may occur in the area through developments like improved roads, transportation facilities, utilities or other infrastructure. However, the entire Action Area, and the undeveloped lands surrounding are wetlands, and are therefore subject to Section 404 permitting requirements by the

U.S. Army Corps of Engineers. This permitting process would serve as a federal nexus, and hence trigger a review of any major state or borough construction project in the area.

9. CONCLUSION

Regulations (51 CFR 19958) that implement section 7(a)(2) of the ESA define "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete our analysis with respect to critical habitat.

Spectacled eiders

In evaluating the impacts of the proposed project to spectacled eiders, the Service identified direct and indirect adverse effects that could result from habitat loss and disturbance. Using methods and logic explained in the *Effects of the Action* section, the Service estimates that 76 nests would be lost resulting from long-term habitat loss over an assumed 50-year project life. Loss of production over the life of the project is estimated at 297 spectacled eider eggs, based on these 76 nests. However, we expect this loss of production will not have a significant effect at the population level because only a small proportion of spectacled eider eggs or ducklings on the North Slope would eventually survive to recruit into the breeding populations. Thus, the loss of eggs or ducklings is of much lower significance for survival and recovery of spectacled eiders than the death of an adult bird. For example, spectacled eider nest success recorded on the YKD ranged from 18-73% (Grand and Flint 1997). From the nests that survived to hatch, spectacled eider duckling survival to 30-days ranged from 25-47% on the YKD (Flint et al. 2000). Over-winter survival of one-year old spectacled eiders was estimated at 25% (P. Flint pers. comm.), with annual adult survival of 2-year old birds (that may enter the breeding population) of 80% (Grand et al. 1998). Using these data (in a very simplistic scenario) we estimate that 0.9–6.6% of eggs/ducklings would be expected to survive and recruit into the breeding population.

If we also apply these rates to the estimated loss of production for the ASAP project, we would expect the project to preclude 3–21 adults (or 1.5–10.5 breeding pairs) from entering the North Slope population over a 50-year project life. The population of North Slope-breeding spectacled eiders was last estimated at 12,916 (10,942–14,890, 95% CI; Stehn et al. 2006) for the period of 2002– 2006. Applying the methods of Stehn et al. (2006) to more recent aerial survey data from the North Slope results in an estimate of 11,254 (8,338–14,167, 95% CI) for the period of 2007– 2010. Given the potential loss of recruitment of ≤21 eiders is a small percentage of the estimated population size and this loss would be distributed across ~50 years, we believe the population-level effects of loss of production from the ASAP project will not significantly affect the likelihood of survival and recovery of spectacled eiders. Accordingly, it is the Services' biological opinion that the proposed action is *not likely to jeopardize the continued existence* of the spectacled eider.

Polar bears

We have assessed potential impacts to polar bears to ensure activities that may result from the action do not jeopardize the continued existence of the species as required under section 7(a)(2) of the ESA. As described in the *Effects of the Action*, activities that may result from the action could adversely affect polar bears through disturbance, an increase in polar bear-human interactions, and habitat loss. A small numbers of polar bears may be adversely affected through disturbance or polar bear-human interactions which may include intentional take. These adverse effects are expected to impact only the Southern Beaufort Sea polar bear stock and population level impacts to the species are not anticipated. Therefore, the Service concludes that the proposed action is *not likely to jeopardize the continued existence* of the polar bear.

Polar Bear Critical Habitat

After considering the status of polar bear critical habitat, the environmental baseline, cumulative effects, and effects of the proposed Action on each PCE, we conclude the proposed Action may adversely affect but *is not likely to destroy or adversely modify polar bear critical habitat*. This conclusion was based on the following factors:

Activities will primarily occur on land within and south of the Prudhoe Bay oil fields. Accordingly, we do not expect adverse effects to the Sea Ice Unit. Adverse effects of the Action are not expected to substantially impact the conservation role of the Terrestrial Denning Unit because: 1) we expect development in areas where topographic relief produces optimal denning habitat, such as river and coastal bluffs to be limited; 2) terms and conditions associated with authorizations under the MMPA would minimize the level of persistent disturbance that may result from the Action; and 3) the scale of the potentially affected area would be small relative to the extent of the Terrestrial Denning Unit such that the function of the unit as a whole would not be compromised.
Adverse effects of the action are not expected to substantially impact the conservation role of the Barrier Island Unit because these effects are expected to be minor and the scale of the potentially affected area would be small relative to the extent of the Barrier Island Unit such that the function of the unit as a whole would not be compromised.

Future Consultation

This BO's determination of non-jeopardy is based on the assumption that the USACE and their agents will consult with the Service on future activities related to the ASAP project that are not evaluated in this document.

In addition to listed eiders and polar bears, the area affected by the ASAP project may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered. The Service, through future consultation may recommend alternatives to future developments within the project area to prevent activity that will contribute to a need to list such a species or their habitat. The Service may require alternatives to proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of designated or proposed critical habitat. The Federal action agencies should not authorize any activity that may affect such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended (16 U.S.C. 1531 et seq.), including completion of any required procedure for conference or consultation.

10. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

Spectacled Eiders

As described in Section 7, *Effects of the Action*, the activities described and assessed in this BO may adversely affect spectacled eiders through direct and indirect long-term habitat loss. Long-term habitat loss would occur directly from placement of gravel fill and indirectly through disturbance associated with facility operations and pipeline maintenance. Methods used to estimate loss of spectacled eider production resulting from long-term habitat loss are described in the *Effects of the Action* section. Based on these estimates of loss of spectacled eider production, the Service anticipates that *297 spectacled eider eggs* are likely to be taken as a result of the proposed Action through long-term direct and indirect habitat loss (harm).

While the incidental take statement provided in this consultation satisfies the requirements of the ESA, it does not constitute an exemption from the prohibitions of take of listed migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act. However, the Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703–712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668–668d), if such take is in compliance with the terms and conditions specified herein.

Polar Bears
The Service cannot provide incidental take authorization for polar bears for those activities that may occur as a result of an action where incidental take of marine mammals has not been authorized under section 101(a)(5) of the MMPA. We anticipate authorizing incidental take of polar bears through consultation on the issuance of ITRs and LOAs under the MMPA. Similarly, this document cannot issue incidental take for activities that may result in intentional take of polar bears as defined under sections 101(a)(4)(A), 109(h), and 112(c) of the MMPA. Authorization of intentional harassment will be subject to subsequent review under the ESA.

USACE has a continuing duty to regulate the activity covered by this Incidental Take Statement (ITS). If USACE (1) fail to assume and implement the terms and conditions or (2) fail to require any applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse.

11. REASONABLE AND PRUDENT MEASURES

These reasonable and prudent measures (RPMs) and their implementing terms and conditions (T&Cs) aim to minimize the incidental take anticipated from activities described in this BO.

We have not identified RPMs or terms and conditions for polar bears. However, the Service anticipates that AGDC would obtain and comply with the terms and conditions of a LOA under the Beaufort Sea ITRs, pursuant to the MMPA.

As described in *Section 8 – Incidental Take Statement*, activities conducted by the USACE and their agents are anticipated to lead to incidental take of spectacled eiders through long-term habitat loss and disturbance of nesting females during the life of the project.

RPM 1 – Breeding spectacled eiders may remain on tundra in the action area through late August, but are considered to be most vulnerable to the effects of disturbance through the early brood-rearing stage. Accordingly, off-pad activities and pipeline maintenance within the action area should not be scheduled between June 1 and July 31 to the extent practicable.

12. TERMS AND CONDITIONS

To be exempt from the prohibitions of Section 9 of the Act, MBM Office must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

T&C 1 – The AGDC has scheduled all construction activities outside of the eider breeding window. Changes to this schedule that affect the timing of proposed activities relative to spectacled eider nesting and brood-rearing periods should be reported to USFWS so that potential effects to eiders can be evaluated.

13. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend the following actions be implemented:

1. Ravens are known to depredate eider nests near Barrow, AK (Quakenbush et al. 2004, Rojek 2008) and are potentially significant predators of spectacled eider eggs elsewhere on the North Slope, including oil fields. The Service recommends that AGDC remove any nest materials from accessible raven nest locations prior to egg laying, in addition to developing and implementing techniques designed to render their structures unattractive to breeding ravens.

2. While no collisions between spectacled eiders and project structures are anticipated, the Service recommends reporting all sea duck collisions to the Endangered Species Branch, Fairbanks Fish and Wildlife Field Office to improve our understanding of potential collision risks to eiders in the Prudhoe Bay area. Please contact Ted Swem at 907-456-0441.

14. RE-INITIATION NOTICE

This concludes formal consultation for the Alaska Stand Alone Pipeline project. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded;
2. New information reveals effects of the action agency that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
3. The agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat not considered in this opinion; or
4. A new species is listed or critical habitat is designated that may be affected by the action.

15. LITERATURE CITED

Alaska Gasline Development Corporation (AGDC). 2011. Biological Assessment for the ASAP EIS (BA; AGDC 2011) prepared by ASRC Energy Services, Inc. on behalf of AGDC.

Amstrup, S.C. 1993. Human disturbances of denning polar bears in Alaska. Arctic 46:246–50.

Amstrup, S.C. 1995. Movements, distribution, and population dynamics of polar bears in the Beaufort Sea. Ph.D. Dissertation, University of Alaska, Fairbanks, Alaska. 299 pp.

Amstrup, S.C. 2000. Polar bear. pp. 133–157 *in* J.J. Truett and S.R. Johnson, *eds.* The natural history of an Arctic oilfield: development and the biota. Academic Press, Inc. New York.

Amstrup, S.C. 2003. Polar Bear (*Ursus maritimus*). Pages 587–610 *in* Feldhamer, B.C. Thompson, and J.A. Chapman, *eds.* Wild Mammals of North America – Biology, Management, and Conservation. John Hopkins University Press. Baltimore, Maryland.

Amstrup, S.C., and G.M. Durner. 1995. Survival rates of radio-collared female polar bears and their dependent young. Canadian Journal of Zoology 73:1312–22.

Amstrup, S.C., G.M. Durner, I. Stirling, N.J. Lunn, and F. Messier. 2000. Movements and distribution of polar bears in the Beaufort Sea. Canadian Journal of Zoology 78:948–66.

Amstrup, S.C., and C. Gardner. 1994. Polar bear maternity denning in the Beaufort Sea. Journal of Wildlife Management 58(1):1–10.

Amstrup, S.C., B.G. Marcot, and D.C. Douglas. 2007. Forecasting the range-wide status of polar bears at selected times in the 21st century. U.S. Geological Survey Administrative Report, Reston, Virginia. 126 pp.

Amstrup, S.C. T.L. McDonald, and I. Stirling. 2001. Polar bears in the Beaufort Sea: a 30-year mark–recapture case history. Journal of Agricultural, Biological, and Environmental Statistics 6(2):221–234.

Amstrup, S. C., I. Stirling, and J.W. Lentfer. 1986. Past and present status of polar bears in Alaska. Wildlife Society Bulletin 14: 241–254.

Anderson, B. and B. Cooper. 1994. Distribution and abundance of spectacled eiders in the Kuparuk and Milne Point oilfields, Alaska, 1993. Unpublished report prepared for ARCO Alaska, Inc., and the Kuparuk River Unit, Anchorage, Alaska by ABR, Inc., Fairbanks, Alaska, and BBN Systems and Technologies Corp., Canoga Park, CA. 71 pp.

Anderson B.A. and S.M. Murphy 1988. Lisburn terrestrial monitoring program 1986 and 1987: The effects of the Lisburn powerline on birds. Final report by ABR Inc. for ARCO Alaska. 60pp.

Anderson, B., R. Ritchie, A. Stickney, and A. Wildman. 1998. Avian studies in the Kuparuk oilfield, Alaska, 1998. Unpublished report for ARCO Alaska, Inc. and the Kuparuk River Unit, Anchorage, Alaska. 28 pp.

Anderson B., A.A. Stickney, R.J. Ritchie, and B.A. Cooper. 1995. Avian studies in the Kuparuk Oilfield, Alaska, 1994. Unpublished report for ARCO Alaska, Inc. and the Kuparuk River Unit, Anchorage, Alaska.

Bart, J. and S.L. Earnst. 2005. Breeding ecology of spectacled eiders *Somateria fischeri* in Northern Alaska. Wildfowl 55:85–100.

Bentzen T.W., E.H. Follman, S.C. Amstrup, G.S .York, M.J.Wooler, and T.M. O'Hara. 2007. Variation in winter diet of Southern Beaufort Sea polar bears inferred from stable isotope analysis. Canadian Journal of Zoology 85:596–608.

Best, R.C. 1985. Digestibility of ringed seals by the polar bear. Canadian Journal of Zoology 63:1033–1036.

Blix, A.S. and J.W. Lentfer. 1979. Modes of thermal protection in polar bear cubs: at birth and on emergence from the den. American Journal of Physiology 236:67–74.

Born, E.W., Ø. Wiig, and J. Thomassen. 1997. Seasonal and annual movements of radio collared polar bears (*Ursus maritimus*) in NE Greenland. Journal of Marine Systems 10:67–77.

Bowes, G.W. and C.J. Jonkel. 1975. Presence and distribution of polychlorinated biphenyls (PCB) in arctic and subarctic marine food chains. Journal of the Fisheries Research Board of Canada. 32:2111–2123.

Braune, B.M., P.M. Outridge, A.T. Fisk, D.C.G. Muir, P.A. Helm, K. Hobbs, P.F. Hoekstra, Z.A. Kuzyk, M. Kwan, R.J.Letcher, W.L. Lockhart, R.J. Norstrom, G.A. Stern, and I. Stirling. 2005. Persistent organic pollutants and mercury in marine biota of the Canadian Arctic: an overview of spatial and temporal trends. The Science of the Total Environment 351–352:4–56.

Burgess, R.M. 2000. Arctic Fox. Pages 159–178 *in* J.C. Truett and S.R. Johnson (eds.). The natural history of an Arctic oil field development and biota.

Callaghan, T.V., L.O. Björn, Y. Chernov, T. Chapain, T.R. Christensen, B. Huntley, R.A. Ims, M. Johansson, D. Jolly, S. Jonasson, N. Matveyeva, N. Panikov, W. Oechel, G. Shaver, J. Elster, H. Henttonen, K. Laine, K. Taulavuori, E. Taulavuori, and C. Zöckler. 2004. Biodiversity, distributions and adaptations of Arctic species in the context of environmental change. Ambio 33:404–417.

Calvert, W. and I. Stirling. 1990. Interactions between polar bears and over-wintering walruses in the central Canadian High Arctic. International Conference on Bear Research and Management 8:351–56.

Carmack, E., and D.C. Chapman. 2003. Wind driven shelf/basin exchange on an Arctic shelf: the joint roles of ice cover extent and shelf-break bathymetry. Geophysical Research Letters 30:1778.

Chapin, F.S, G.R. Shaver, A.E. Giblin, K.J. Nadelhoffer, and J.A. Laundre. 1995. Responses of Arctic tundra to experimental and observed changes in climate. Ecology 76:694–711.

Comiso, J.C. 2003. Warming trends in the Arctic from clear sky satellite observations. Journal of Climate 16:3498–3510.

Comiso, J. C. 2006. Abrupt decline in the Arctic winter sea ice cover. Geophysical Research Letters 33:18504.

Cottam, C. 1939. Food habits of North American diving ducks. USDA Technical Bulletin 643, Washington, D.C.

Coulson, J.C. 1984. The population dynamics of the Eider Duck *Somateria mollissima* and evidence of extensive non-breeding by adult ducks. Ibis 126:525–543.

Dau, C.P. 1974. Nesting biology of the spectacled eider, *Somateria fischeri* (Brandt), on the Yukon–Kuskokwim Delta, Alaska. University of Alaska, Fairbanks, Alaska. M.S. thesis. 72 pp.

Dau, C.P., and S.A. Kistchinski. 1977. Seasonal movements and distribution of the spectacled eider. Wildfowl. 28:65–75.

Day, R.H. 1998. Predator populations and predation intensity on tundra-nesting birds in relation to human development. Report prepared by ABR Inc., for Northern Alaska Ecological Services, U.S. Fish and Wildlife Service, Fairbanks, Alaska. 106 pp.

DeMaster, D.P., M.C.S. Kingsley, and I. Stirling. 1980. A multiple mark and recapture estimate applied to polar bears. Canadian Journal of Zoology 58:633–638.

Derocher, A.E., N.J. Lunn, and I. Stirling. 2004. Polar bears in a warming climate. Integrative and Comparative Biology 44:163–176.

Derocher, A.E. and I. Stirling. 1992. The population dynamics of polar bears in Western Hudson Bay. Pages 1150–59 *in* McCullough, D.R. and R.H. Barrett, *eds*. Wildlife 2001: Populations. Elsevier Applied Science, London.

Derocher, A. E., and I. Stirling. 1996. Aspects of survival in juvenile polar bears. Canadian Journal of Zoology 74:1246–1252.

Derocher, A.E., I. Stirling, and D. Andriashek. 1992. Pregnancy rates and serum progesterone levels of polar bears in Western Hudson Bay. Canadian Journal of Zoology 70:561–66.

Derocher, A.E. and Ø. Wiig. 1999. Infanticide and cannibalism of juvenile polar bears (*Ursus maritimus*) in Svalbard. Arctic 52:307–310.

Derocher, A.E., O. Wiig, and M. Andersen. 2002. Diet composition of polar bears in Svalbard and the western Barents Sea. Polar Biology 25:448–452.

Drent, R. and S. Daan. 1980. The prudent parent: energetic adjustments in breeding biology. Ardea 68:225–252.

Durner, G.M., S.C. Amstrup, and K.J. Ambrosius. 2001. Remote identification of polar bear maternal den habitat in northern Alaska. Arctic 54:115–21.

Durner, G.M., S.C. Amstrup, and K.J. Ambrosius. 2006. Polar bear maternal den habitat in the Arctic National Wildlife Refuge, Alaska. Arctic 59(1):31–36.

Durner, G. M., S. C. Amstrup, and A. S. Fischbach. 2003. Habitat characteristics of polar bear terrestrial maternal den sites in Northern Alaska. Arctic 56:55–62.

Durner, G.M., S.C. Amstrup, R. Nielson, T. McDonald. 2004. Using discrete choice modeling to generate resource selection functions for female polar bears in the Beaufort Sea. Pages 107–120 *in* S. Huzurbazar (Editor). Resource Selection Methods and Applications: Proceedings of the 1st International Conference on Resource Selection, 13–15 January 2003, Laramie, Wyoming.

Durner, G.M., D.C. Douglas, R.M. Nielson, S.C. Amstrup, , T.L. McDonald, I. Stirling, Mauritzen, M., E.W. Born, O. Wiig, E. DeWeaver, M.C. Serreze, S. Belikov, M. Holland, J.A. Maslanik, J. Aars, D.A. Bailey, and A.E. Derocher, 2009. Predicting 21st-century polar bear habitat distribution from global climate models. Ecological Monographs 79: 25–58.

Eberhardt, L.E. 1985. Assessing the dynamics of wild populations. Journal of Wildlife Management 49:997–1012.

Eberhardt, L.E., R.A. Garrott, and W.C. Hanson. 1983. Winter movements of Arctic foxes, *Alopex lagopus*, in a Petroleum Development Area. The Canadian Field-Naturalist 97:66–70.

Ely, C.R., C.P. Dau, and C.A. Babcock. 1994. Decline in population of Spectacled Eiders nesting on the Yukon–Kuskokwim Delta, Alaska. Northwestern Naturalist 75:81–87.

Esler D., J.M. Pearce, J. Hodges, and M.R. Petersen. 1995. Distribution, abundance and nesting ecology of spectacled eiders on the Indigirka River Delta, Russia. Unpublished progress report. National Biological Survey, Alaska Science Center. 12 pp.

Fay, F. H. 1982. Ecology and biology of the Pacific walrus, *Odobenus rosmarus divergens* Illiger. North American Fauna 72, U.S. Fish and Wildlife Service, Washington, D. C. 279 pp.

Feder, H.M., N.R. Foster, S.C. Jewett, T.J. Weingartner, and R. Baxter. 1994a. Mollusks in the Northeastern Chukchi Sea. Arctic 47(2): 145–163.

Feder, H.M., A.S. Naidu, J.M. Hameedi, S.C. Jewett, and W.R. Johnson. 1989. The Chukchi Sea Continental Shelf: Benthos–Environmental Interactions. Final Report. NOAA–Ocean Assessment Division, Anchorage, Alaska. 294 pp.

Feder, H.M., A.S. Naidu, S.C. Jewett, J.M. Hameedi, W.R. Johnson, and T.E. Whitledge. 1994b. The northeastern Chukchi Sea: benthos–environmental interactions. Marine Ecology Progress Series 111:171–190.

Ferguson, S.H., M.K. Taylor, E.W. Born, A. Rosing-Asvid, and F. Messier. 1999. Determinants of home range size for polar bears (*Ursus maritimus*). Ecology Letters 2:311–18.

Ferguson, S.H., M.K. Taylor, E.W. Born, A. Rosing-Asvid, and F. Messier. 2001. Activity and movement patterns of polar bears inhabiting consolidated versus active pack ice. Arctic 54:49–54.

Fischbach, A.S., S.C. Amstrup, D.C. Douglas. 2007. Landward and eastward shift of Alaskan polar bear denning associated with recent sea ice changes. Polar Biology 30:1395–1405.

Fischer, J.B., R.A. Stehn, and G. Walters. 2011. Nest population size and potential production of geese and spectacled eiders on the Yukon–Kuskokwim Delta, Alaska, 1985–2011. Unpublished Report. U.S. Fish and Wildlife. Service, Anchorage, Alaska. 43 pp.

Fisk, A.T., K.A. Hobson, and R.J. Norstrom. 2001. Influence of chemical and biological factors on trophic transfer of persistent pollutants in the Northwater Polynya marine food web. Environmental Science and Technology 35:732–738.

Flint, P.L and J.B. Grand. 1997. Survival of spectacled eider adult females and ducklings during brood rearing. Journal of Wildlife Management 61:217–221.

Flint, P.L., J.B. Grand, J.A. Morse, and T.F. Fondell. 2000. Late summer survival of adult female and juvenile spectacled eiders on the Yukon–Kuskokwim Delta, Alaska. Waterbirds 23:292–297.

Flint, P.L and J.L. Schamber. 2010. Long-term persistence of spent lead shot in tundra wetlands. Journal of Wildlife Management 74:148–151.

Fowler, C., W.J. Emery, and J. Maslanik. 2004. Satellite-derived evolution of Arctic sea ice age: October 1978 to March 2003. Geoscience and Remote Sensing Letters:, 1:71–74.

Franson, J., M.R. Petersen, C. Meteyer, and M. Smith. 1995. Lead poisoning of spectacled eiders (*Somateria fischeri*) and of a common eider (*Somateria mollissima*) in Alaska. Journal of Wildlife Diseases 31:268–271.

Furnell, D.J. and D. Oolooyuk. 1980. Polar bear predation on ringed seals in ice-free water. Canadian Field-Naturalist 94: 88–89.

Gabrielson, M. and N. Graff. 2011 Monitoring of Nesting Spectacled Eiders on Kigigak Island, Yukon Delta NWR, 2011. Unpublished report. U.S. Fish and Wildlife Service, Yukon Delta National Wildlife Refuge, Bethel, Alaska 99559. 16 pp.

Garner, G.W., S.C. Amstrup, I. Stirling, and S.E. Belikov. 1994. Habitat considerations for polar bears in the North Pacific Rim. Transactions of the North American Wildlife and Natural Resources Conference 59:111–20.

Garner, G.W., S.E. Belikov, M.S. Stishov, and S.M. Arthur. 1995. Research on polar bears in western Alaska and eastern Russia 1988–92. Pages 155–164 *in* Wiig, O., E.W. Born, and G.W. Garner, *eds*. Polar bears: proceedings of the eleventh working meeting of the IUCN/SSC Polar Bear Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.

Garner, G.W., S.T. Knick, and D.C. Douglas. 1990. Seasonal movements of adult female polar bears in the Bering and Chukchi Seas. International Conference on Bear Research and Management 8:219–26.

Gorman, M.L. and H. Milne. 1971. Seasonal changes in adrenal steroid tissue of the common eider *Somateria mollissima* and its relation to organic metabolism in normal and oil polluted birds. Ibis 133:218–228.

Grand, J.B. and P.L. Flint. 1997. Productivity of nesting spectacled eiders on the Lower Kashunuk River, Alaska. The Condor 99:926–932.

Grand, J.B., P.L. Flint, and M.R. Petersen. 1998. Effect of lead poisoning on spectacled eiders survival rates. Journal of Wildlife Management 62:1103–1109.

Hammill, M.O. and T.G. Smith. 1991. The role of predation in the ecology of the ringed seal in the Barrow Strait, Northwest Territories, Canada. Marine Mammal Science 7:123–135.

Harington, C.R. 1968. Denning habits of the polar bear (*Ursus maritimus* Phipps). Report Series 5, Canadian Wildlife Service, Ottawa, Canada.

Harwood, C. and T. Moran. 1993. Productivity, brood survival, and mortality factors for spectacled eiders on Kigigak Island, Yukon Delta NWR, Alaska, 1992. Unpublished report prepared for U.S. Fish and Wildlife Service, Bethel, Alaska. 11pp + Appendix.

Hinzman, L.D., N.D. Bettez, W.R. Bolton, F.S. Chpin, M.B. Dyurgerov, C.L. Fastie, B. Griffith, R.D. Hollister, A. Hope, H.P. Huntington, A.M. Jensen, G.J. Jia, T. Jorgenson, D.L. Kane, D.R. Klien, G. Kofinas, A.H. Lynch, A.H. Lloyd, A.D. McGuire, F.E. Nelson, W.C. Oechel, T.E. Osterkamp, C.H. Racine, V.E. Romanovsky, R.S. Stone, D.A. Stow, M. Strum, C.E. Tweedie, G.L. Vourlitis, M.D. Walker, D.A. Walker, P.J. Webber, J.M. Welker, K.S. Winklet, K. Yoshikawa. 2005. Evidence and implications of recent climate change in northern Alaska and other arctic regions. Climatic Change 72: 251–298.

Holland, M., C.M. Bitz, and B. Tremblay. 2006. Future abrupt reductions in summer Arctic sea ice. Geophysical Research Letters 33:L23503. 5 pp.

Hunter, C.M., H. Caswell, M.C. Runge, E.V. Regehr, S.C. Amstrup, and I. Stirling. 2007. Polar bears in the southern Beaufort Sea II: demographic and population growth in relation to sea ice conditions. U.S. Dept. of the Interior, U.S. Geological Survey Administrative Report. 46 pp.

IUCN. 2006. Status of the polar bear. Pages 33–56 in J. Aars, N.J. Lunn, and A.E. Derocher (Eds.), Proceedings of the 14th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, Seattle, United States. IUCN, Gland, Switzerland and Cambridge, UK.

Johnson, C.B, J.P. Parrett, and P.E. Seiser. 2008. Spectacled eider monitoring at the CD–3 development, 2007. Annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, Alaska. 51 pp.

Johnson, R. and W. Richardson. 1982. Waterbird migration near the Yukon and Alaska coast of the Beaufort Sea: II. Molt migration of seaducks in summer. Arctic 35: 291–301.

Kingsley, M.C.S. 1979. Fitting the von Bertalanffy growth equation to polar bear age–weight data. Canadian Journal of Zoology 57:1020–25.

Kondratev, A. and L. Zadorina. 1992. Comparative ecology of the king eider *Somateria spectabilis* and spectacled eider *Somateria fischeri* on the Chaun tundra. Zool. Zhur. 71:99–108. (in Russian; translation by J. Pearce, National Biological Survey, Anchorage, Alaska).

Korschgen, C.E. 1977. Breeding stress of female eiders in Maine. Journal of Wildlife Management 41:360–373.

Lake, B. C. 2007. Nesting Ecology of Spectacled and Common Eiders on Kigigak Island, Yukon Delta NWR, Alaska, 2007. Unpublished report. U.S. Fish and Wildlife Service, Yukon Delta National Wildlife Refuge, Bethel, Alaska 99559. 18 pp.

Larned, W., G.R. Balogh, and M.R. Petersen. 1995. Distribution and abundance of spectacled eiders (*Somateria fischeri*) in Ledyard Bay, Alaska, September 1995. Unpublished progress report, U.S. Fish and Wildlife Service, Anchorage, Alaska. 11 pp.

Larned, W.W., R. Platte and R. Stehn. 2009. Waterfowl breeding population survey, Arctic Coastal Plain, Alaska, 2008. Unpublished report, U.S. Fish and Wildlife Service, Anchorage, Alaska. 42 pp.

Larned, W., R. Stehn, and R. Platte. 2010. Waterfowl breeding population survey Arctic Coastal Plain, Alaska 2009. Unpublished report. U.S. Fish and Wildlife Service, Anchorage, AK. 42 pp.

Larned, W., R. Stehn, and R. Platte. 2011. Waterfowl breeding population survey Arctic Coastal Plain, Alaska 2010. Unpublished report. U.S. Fish and Wildlife Service, Anchorage, AK. 52 pp.

Lentfer, J.W. and R.J. Hensel. 1980. Alaskan polar bear denning. International Conference on Bear Research and Management 4:101–8.

Lie, E., A. Bernhoft, F. Riget, S.E. Belikov, A.N. Boltunov, G.W. Garner, Ø Wiig, and J.U. Skaare. 2003. Geographical distribution of organochlorine pesticides (OCPs) in polar bears (*Ursus maritimus*) in the Norwegian and Russian Arctic. The Science of the Total Environment 306:159–170.

Liebezeit, J.R.. and S. Zack. 2008. Point counts underestimate the importance of arctic foxes as avian nest predators: evidence from remote video cameras in Arctic Alaskan oil fields. Arctic 61:153–161.

Liebezeit, J.R., and S. Zack. 2010. Avian habitat and nesting use of tundra-nesting birds in the Prudhoe Bay oilfield – long-term monitoring: 2010 annual report. Interim report prepared by the Wildlife Conservation Society in fulfillment of U.S. Bureau of Land Management grant L10AS0005737. 37 pp. Accessed 19 January 2012 through http://www.wcsnorthamerica.org/AboutUs/Publications/tabid/3437/Default.aspx.

Lindsay, R.W., and J. Zhang. 2005. The thinning of the Arctic sea ice, 1988-2003: have we passed a tipping point? Journal of Climate 18: 4879–4894.

Lovvorn, J.R., S.E. Richman, J.M. Grebmeier, and L.W. Cooper. 2003. Diet and body condition of spectacled eiders wintering in the pack ice of the Bering Sea. Polar Biology 26:259–267.

Manville, A.M., II. 2000. The ABCs of avoiding bird collisions at communication towers: the next steps. Proceedings of the Avian Interactions Workshop, December 2, 1999, Charleston, SC. Electric Power Research Institute. 15pp.

Manville, A.M., II. 2004. Bird Strikes and electrocutions at power lines, communication towers, and wind turbines; State of the art and state of the science – next steps towards mitigation. Proceedings 3rd International Partners in Flight Conference, March 20–24, 2002, Asilomar Conference Grounds, CA. USDA Forest Service General Technical Report PSW-GTR-191. 25pp.

Mars, J.C. and D.W. Houseknecht. 2007. Quantitative remote sensing study indicates doubling of coastal erosion rate in the past 50 yr along a segment of the Arctic coast of Alaska. Geology 35:583–586.

Mauritzen, M., A.E. Derocher, O. Pavlova., and Ø. Wiig. 2003. Female polar bears, *Ursus maritimus*, on the Barents Sea drift ice: walking the treadmill. Animal Behavior 66: 107–113.

Mauritzen, M., A.E. Derocher, and Ø Wiig. 2001. Space-use strategies of female polar bears in a dynamic sea ice habitat. Canadian Journal of Zoology 79:1704–1713.

Messier, F., M.K. Taylor, and M.A. Ramsay. 1992. Seasonal activity patterns of female polar bears (*Ursus maritimus*) in the Canadian Arctic as revealed by satellite telemetry. Journal of Zoology (London) 226:219–29.

Messier, F., M.K. Taylor, and M.A. Ramsay. 1994. Denning ecology of polar bears in the Canadian Arctic Archipelago. Journal of Mammalogy 75:420–30.

Milne, H. 1976. Body weights and carcass composition of the common eider. Wildfowl 27:115–122.

Moran, T. 1995. Nesting ecology of spectacled eiders on Kigigak Island, Yukon Delta NWR, Alaska, 1994. Unpublished report prepared for U.S. Fish and Wildlife Service, Bethel, Alaska. 8pp + appendix.

Moran, T. and C. Harwood. 1994. Nesting ecology, brood survival, and movements of spectacled eiders on Kigigak Island, Yukon Delta NWR, Alaska, 1993. Unpublished report prepared for U.S. Fish and Wildlife Service, Bethel, Alaska. 33 pp + appendix.

Obbard, M.E., G.W. Thiemann, E. Peacock, and T.D. DeBruyn, eds. 2010. Polar Bears: Proceedings of the 15th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, Copenhagen, Denmark, 29 June–3 July 2009. Gland, Switzerland and Cambridge, UK: IUCN. vii + 235 pp.

Obritschkewitsch, T., P. Martin, and R. Suydam. 2001. Breeding biology of Steller's eiders nesting near Barrow, Alaska, 1999–2000. Northern Ecological Services, U.S. Fish and Wildlife Service, Technical Report NAES-TR-01-04, Fairbanks, Alaska 113 pp.

Oppel, S., D.L. Dickson, and A.N. Powell. 2009. International importance of the eastern Chukchi Sea as a staging area for migrating king eiders. Polar Biology 32:775–783.

Ovsyanikov, N. 1996. Polar Bears. Living with the White Bear. Voyager Press, Stilwater, Minnesota. 144 pp.

Parker, H. and H. Holm. 1990. Pattern of nutrient and energy expenditure in female Common eiders nesting in the high arctic. Auk 107:660–668.

Parkinson, C.L., D.J. Cavalieri, P. Gloersen, H.J. Zwally, and J.C. Comiso. 1999. Arctic sea ice extents, areas, and trends, 1978–1996. Journal of Geophysical Research 104(C9):20837–20856.

Pattee, O.H., Pain, D.J., 2003. Lead in the environment. Pages 373–408 *in* Hoffman, D.J., Rattner, B.A., Burton, G.A., Jr., Cairns, J., Jr. (Eds.), Handbook of Ecotoxicology. CRC Press Inc., Boca Raton.

Pearce, J.M., D. Esler and A.G. Degtyarev. 1998. Birds of the Indigirka River Delta, Russia: historical and biogeographic comparisons. Arctic 51:361–370.

Petersen, M.R. and D. Douglas. 2004. Winter ecology of spectacled eiders: environmental characteristics and population change. Condor 106:79–94.

Petersen, M., D. Douglas, and D. Mulcahy. 1995. Use of implanted satellite transmitters to locate spectacled eiders at sea. Condor 97: 276–278.

Petersen, M.R. and P.L. Flint. 2002. Population structure of pacific common eiders breeding in Alaska. Condor 104:780–787.

Petersen, M.R., J.B. Grand, and C.P. Dau. 2000. Spectacled Eider (*Somateria fischeri*). *In* A. Poole and F. Gill, editors. The Birds of North America, No. 547. The Birds of North America, Inc., Philadelphia, PA.

Petersen, M.R., W.W. Larned, and D.C. Douglas. 1999. At-sea distribution of spectacled eiders: a 120-year-old mystery resolved. The Auk 116(4):1009–1020.

Petersen, M.R., J.F. Piatt, and K.A. Trust. 1998. Foods of Spectacled Eiders *Somateria fischeri* in the Bering Sea, Alaska. Wildfowl 49:124–128.

Platte, R.M. and R.A. Stehn. 2011. Abundance and trend of waterbirds on Alaska's Yukon–Kuskokwim Delta coast based on 1988 to 2010 aerial surveys. Unpublished report, U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, Alaska. April 29, 2011. 43 pp.

Powell, A.N. and S. Backensto. 2009. Common ravens (Corvus corax) nesting on Alaska's North Slope Oil Fields. Final Report to CMI, Minerals Management Service OCS Study 2009-007, Alaska. 41 pp.

Proshutinsky, A.Y. and M. Johnson. 2001. Two regimes of Arctic's circulation from ocean models with ice and contaminants. Marine Pollution Bulletin 43:61–70.

Quakenbush, L.T., R.S. Suydam, K.M. Fluetsch, & C.L. Donaldson. 1995. Breeding biology of Steller's eiders nesting near Barrow, Alaska, 1991–1994. Ecological

Services Fairbanks, AK, U.S. Fish & Wildlife Service, Technical Report NAES-TR-95-03. 53 pp.

Quakenbush , L., R. Suydam, T. Obritschkewitsch, and M. Deering. 2004. Breeding biology of Steller‘s eiders (*Polysticta stelleri*) near Barrow, Alaska, 1991–1999. Arctic 57:166–182.

Quinlan, R., M.V. Douglas, and J.P. Smol. 2005. Food web changes in arctic ecosystems related to climate warming. Global Change Biology 11:1381–1386.

Ramsay, M.A. and R.L. Dunbrack. 1986. Physiological constraints on life history phenomena: the example of small bear cubs at birth. American Naturalist 127:735–43.

Ramsay, M.A. and I. Stirling. 1988. Reproductive biology and ecology of female polar bears (*Ursus maritimus*). Journal of Zoology (London) 214:601–34.

Ramsay, M.A. and I. Stirling. 1990. Fidelity of female polar bears to winter den sites. Journal of Mammalogy 71:233–36.

Raveling, D.G. 1979. The annual cycle of body composition of Canada Geese with special reference to control of reproduction. Auk 96:234–252.

Reed, J.R., J.L. Sincock, and J.P. Hailman. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation. Auk 102: 377–383.

Regehr, E.V., S.C. Amstrup and I. Stirling. 2006. Polar bear population status in the Southern Beaufort Sea. Report Series 2006-1337, U.S. Department of the Interior, U.S. Geological Survey, Anchorage, Alaska. 20 pp.

Regehr, E.V., C.M. Hunter, H. Caswell, S.C. Amstrup, and I. Stirling. 2007. Polar bears in the southern Beaufort Sea I: survival and breeding in relation to sea ice conditions, 2001–2006. U.S. Dept. of the Interior, U.S. Geological Survey Administrative Report, Reston, Virginia. 45 pp.

Regehr, E.V., C.M. Hunter, H. Caswell, S.C. Amstrup, and I. Stirling. 2010. Survival and breeding of polar bears in the southern Beaufort Sea in relation to sea ice. Journal of Animal Ecology 79:117–127.

Rode, K.D., S.C. Amstrup, and E.V. Reghr. 2010. Reduced body size and cub recruitment in polar bears associated with sea ice decline. Ecological Applications. 20: 798–782.

Rojek, N.A. 2008. Breeding biology of Steller‘s eiders nesting near Barrow, Alaska, 2007. U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Fairbanks, Alaska. Technical Report. 44 pp.

Rothrock, D.A., Y. Yu, and G.A. Maykut. 1999. Thinning of the Arctic sea-ice cover, Geophysical Research Letters 26: 3469–3472.

Sadleir, R.M.F.S. 1969. The ecology of reproduction in wild and domestic mammals. Methuen, London.

Safine, D.E. 2011. Breeding ecology of Steller's and spectacled eiders nesting near Barrow, Alaska, 2008–2010. U. S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Fairbanks, Alaska. Technical Report. 66 pp.

Schindler, D.W., and J.P. Smol. 2006. Cumulative effects of climate warming and other human activities on freshwaters of arctic and subarctic North America. Ambio 35:160–168.

Schliebe, S., T.J. Evans, K. Johnson, M. Roy, S. Miller, C. Hamilton, R. Meehan, and S. Jahrsdoerfer. 2006. Status assessment in response to a petition to list polar bears as a threatened species under the U.S. Endangered Species Act. U.S. Fish and Wildlife Service, Marine Mammals Management, Anchorage, Alaska. 262 pp.

Schliebe S., K.D. Rode, J.S. Gleason, J. Wilder, K. Proffitt, T.J. Evans, and S. Miller. 2008. Effects of sea ice extent and food availability on spatial and temporal distribution of polar bears during the fall open-water period in the Southern Beaufort Sea. Polar Biology 31: 999–1010.

Schweinsburg, R.E. and L.J. Lee. 1982. Movement of four satellite-monitored polar bears in Lancaster Sound, Northwest Territories. Arctic 35:504–11.

Serreze, M. C., M. M. Holland, and J. Stroeve. 2007. Perspective on the Arctic's shrinking sea-ice cover. Science. 315:1533–1536.

Smith, L., L. Byrne, C. Johnson, and A. Stickney. 1994. Wildlife studies on the Colville River Delta, Alaska, 1993. Unpublished report prepared for ARCO Alaska, Inc., Anchorage, Alaska. 58 pp.

Smith, T.G. 1980. Polar bear predation of ringed and bearded seals in the landfast sea ice habitat. Canadian Journal of Zoology 58:2201–9.

Smith, T.G. 1985. Polar bears, *Ursus maritimus*, as predators of belugas, *Delphinapterus leucas*. Canadian Field-Naturalist 99:71–75.

Smith, T.G. and B. Sjare. 1990. Predation of belugas and narwhals by polar bears in nearshore areas of the Canadian High Arctic. Arctic 43: 99–102.

Smith, T.G. and I. Stirling. 1975. The breeding habitat of the ringed seal (*Phoca hispida*): the birth lair and associated structures. Canadian Journal of Zoology 53:1297–1305.

Smol, J.P., A.P. Wolfe, H.J.B. Birks, M.S.V. Douglas, V.J. Jones, A. Korhola, R. Pienitzi, K. Rühland, S. Sorvari, D. Antoniades, S.J. Brooks, M.A. Fallu, M. Hughes, B.E. Keatley, T.E. Laing, N. Michelutti, L. Nazarova, M. Nyman, A.M. Patterson, B. Perren, R. Quinlan, M. Rautio, E. Saulier-Talbot, S. Siitonen, N. Solovieva, and J. Weckström. 2005. Climate-driven regime shifts in the biological communities of arctic lakes. Proceedings of the National Academy of Science 102:4397–4402.

Stehn, R., C. Dau, B. Conant, and W. Butler. 1993. Decline of spectacled eiders nesting in western Alaska. Arctic 46: 264–277.

Stehn, R., W. Larned, R. Platte, J. Fischer, and T. Bowman. 2006. Spectacled eider status and trend in Alaska. U.S. Fish and Wildlife Service, Anchorage, Alaska. Unpublished Report. 17 pp.

Stenhouse, G.B., L.J. Lee, and K.G. Poole. 1988. Some characteristics of polar bears killed during conflicts with humans in the Northwest Territories, 1976–1986. Arctic 41:275–278.

Stirling, I. 1988. Polar bears. University of Michigan Press, Ann Arbor, Michigan, USA. 220 pp.

Stirling, I. 1990. Polar bears and oil: ecological perspectives. Pages 223–34 *in* Geraci, J.R. and D.J. St. Aubin, *eds*. Sea Mammals and Oil: Confronting the Risks. Academic Press, Inc. New York, New York.

Stirling, I. 2002. Polar bears and seals in the eastern Beaufort Sea and Amundsen Gulf: a synthesis of population trends and ecological relationships over three decades. Arctic 55:59–76.

Stirling, I., and D. Andriashek. 1992. Terrestrial maternity denning of polar bears in the Eastern Beaufort Sea area. Arctic 45(4):363–366.

Stirling, I., D. Andriashek, C. Spencer, C. Derocher, and A.E. Derocher. 1988. Assessment of the polar bear population in the eastern Beaufort Sea. Final report to the Northern Oil and Gas Assessment Program. Canadian Wildlife Service, Edmonton, Alberta, Canada. 81 pp.

Stirling, I., and A.E. Derocher. 1990. Factors affecting the evolution and behavioral ecology of the modern bears. International Conference on Bear Research and Management 8:189–204.

Stirling, I., C. Jonkel, P. Smith, R. Robertson, and D. Cross. 1977. The ecology of the polar bear (*Ursus maritimus*) along the western coast of Hudson Bay. Occasional Paper No. 33. Canadian Wildlife Service, Ottawa, Canada. 64 pp.

Stirling, I., M. Kingsley, and W. Calvert. 1982. The distribution and abundance of seals in the eastern Beaufort Sea, 1974–79. Canadian Wildlife Service Occasional Paper No. 47, Ottawa, Canada.

Stirling, I. and P.B. Latour. 1978. Comparative hunting abilities of polar bear cubs of different ages. Canadian Journal of Zoology 56:1768–72.

Stirling, I. and M. McEwan. 1975. The caloric value of whole ringed seals (Phoca hispida) in relation to polar bear (*Ursus maritimus*) ecology and hunting behavior. Canadian Journal of Zoology 53:1021–1027.

Stirling, I. and N.A.Øritsland. 1995. Relationships between estimates of ringed seal (Phoca hispida) and polar bear (*Ursus maritimus*) populations in the Canadian Arctic. Canadian Journal of Fisheries and Aquatic Sciences 52:2594–2612.

Stirling, I., A.M. Pearson, and F.L. Bunnell. 1976. Population ecology studies of polar and grizzly bears in northern Canada. Transactions of the North American Wildlife and Natural Resources Conference 41:421–30.

Stroeve, J., M. Serreze, S. Drobot, S. Gearheard, M. Holland, J. Maslanik, W. Meier, and T. Scambos. 2008. Arctic Sea Ice Extent Plummets in 2007. EOS, Transactions, American Geophysical Union 89(2):13–14.

TERA (Troy Ecological Research Associates). 2002. Spectacled eider movements in the Beaufort Sea: Distribution and timing of use. Report for BP Alaska Inc., Anchorage, Alaska and Bureau of Land Management, Fairbanks, Alaska. 17 pp.

Trust, K.A., J.F. Cochrane, and J.H. Stout. 1997. Environmental contaminants in three eider species from Alaska and Arctic Russia. Technical Report WAES-TR-97-03. U.S. Fish and Wildlife Service, Anchorage, Alaska. 44 pp.

Trust, K., K.T. Rummel, A.M. Scheuhammer, I.L. Brisbin, Jr., MG Hooper. 2000. Contaminant exposure and biomarker responses in spectacled eiders (Somateria fischeri) from St. Lawrence Island, Alaska. Arch. Environ. Contam. Toxicol. 38:107-113.

USFWS. 1993. Final rule to list the Spectacled Eider as threatened. Published 10 May 1993 by the U.S. Fish and Wildlife Service. Federal Register 58(88):27474–27480.

USFWS. 1996. Spectacled Eider Recovery Plan.. Prepared for Region 7, U.S. Fish and Wildlife Service, Anchorage, Alaska. 100 pp + Appendices.

USFWS. 1999. Population status and trends of sea ducks in Alaska. Migratory Bird Management, Anchorage, Alaska.

USFWS. 2006. Marine mammals; incidental take during specified activities. Final rule [to authorize the nonlethal, incidental, unintentional take of small numbers of polar bears and Pacific walruses during year-round oil and gas industry exploration, development, and production and operations in the Beaufort Sea and adjacent northern coast of Alaska]. U.S. Fish and Wildlife Service, Anchorage, Alaska. Federal Register 71:43926–43953.

USFWS. 2008a. Determination of threatened status for the polar bear (*Ursus maritimus*) throughout its range; final rule. U.S. Fish and Wildlife Service. Federal Register 73:28212–28303.

USFWS. 2008b. Marine mammals; incidental take during specified activities. Final rule [to authorize the nonlethal, incidental, unintentional take of small numbers of polar bears and Pacific walruses during year-round oil and gas industry exploration, development, and production and operations in the Chukchi Sea and adjacent western coast of Alaska]. U.S. Fish and Wildlife Service, Anchorage, Alaska. Federal Register 73:33212–33255.

USFWS. 2009. Designation of critical habitat for the polar bear (*Ursus maritimus*) in the United States. proposed rule. U.S. Fish and Wildlife Service. Federal Register 74:56058–56086.

USFWS. 2010a. Polar Bear (*Ursus maritimus*): Chukchi/Bering Seas Stock. Stock Assessment Report. Marine Mammals Management Office, Anchorage, AK. 9 pp.

USFWS. 2010b. Polar Bear (*Ursus maritimus*): Southern Beaufort Sea Stock. Stock Assessment Report. Marine Mammals Management Office, Anchorage, AK. 9 pp.

USFWS. 2010c. Designation of critical habitat for the polar bear (*Ursus maritimus*) in the United States; final rule. U.S. Fish and Wildlife Service. Federal Register 75:76086–76137.

USFWS. 2010d. Marine Mammal Protection Act; Deterrence guidelines; final rule. U.S. Fish and Wildlife Service. Federal Register 75:61631–61638.

USFWS. 2011a. Endangered and threatened wildlife and plants; 12-month finding on a petition to list the Pacific walrus as endangered or threatened; proposed rule. Published 10 February 2011 by the U.S. Fish and Wildlife Service. Federal Register 76:7634–7679.

USFWS. 2011b. Programmatic biological opinion for polar bears (*Ursus maritimus*), polar bear critical habitat, and conference opinion for the Pacific walrus (*Odobenus rosmarus divergens*) on the Beaufort Sea incidental take regulations. U.S. Fish and Wildlife Service, Fairbanks, Alaska. 92 pp.

USFWS. 2011c. Marine mammals; incidental take during specified activities. Final rule [to authorize the nonlethal, incidental, unintentional take of small numbers of polar bears and Pacific walruses during year-round oil and gas industry exploration, development, and production and operations in the Beaufort Sea and adjacent northern coast of Alaska]. U.S. Fish and Wildlife Service, Anchorage, Alaska. Federal Register 76:47010–47054.

USGS. 2006. Biological response to ecological change along the Arctic Coastal Plain. Progress Report, August 2006, Alaska Science Center, Anchorage, United States Geological Survey. 10 pp.

Uspenski, S M., ed. 1977. The polar bear and its conservation in the Soviet Arctic. A collection of scientific papers. Central Laboratory of Nature Conservation, Moscow, Russia.

Warnock, N. and D. Troy. 1992. Distribution and abundance of spectacled eiders at Prudhoe Bay, Alaska: 1991. Unpublished report prepared for BP Exploration (Alaska) Inc., Environmental and Regulatory Affairs Department, Anchorage, Alaska, by Troy Ecological Research Associates (TERA), Anchorage, Alaska. 20 pp.

Weir, R. 1976. Annotated bibliography of bird kills at man-made obstacles: a review of the state of the art and solutions. Unpublished report prepared for Department of Fisheries & Environment, Canadian Wildlife Service-Ontario Region.

Wiig Ø. 1998. Survival and reproductive rates for polar bears at Svalbard. *Ursus*. 10:25–32.

Wiig Ø., E.W. Born, and L.T. Pedersen. 2003. Movements of female polar bears (*Ursus maritimus*)in the East Greenland pack ice. Polar Biology 26:509–516.

Wimsatt, W.A. 1963. Delayed implantation in the Ursidae, with particular reference to the black bear (*Ursus americanus pallas*). Pages 49–76 in A.C. Enders, ed. Delayed implantation. University of Chicago Press, Chicago.

Woodby, D.A. and G.J. Divoky. 1982. Spring migration of eiders and other waterbirds at Point Barrow, Alaska. Arctic 35: 403–410.

United States Department of Commerce
National Oceanic and Atmospheric Administration

Section 7 Letter of Concurrence

for

Alaska Stand Alone Gas Pipeline

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

January 11, 2012

Colonel Reinhard W. Koenig
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Attn: Serena Sweet

Dear Colonel Koenig:

The National Marine Fisheries Service (NMFS) received your letter dated 7 June 2011 requesting consultation under Section 7 of the Endangered Species Act of 1973 for project reference POA- 2009-651. The Corps of Engineers (USACE) also provided NMFS with two CD's of updated project documents and a Biological Assessment. NMFS concurs with the USACE determination of Not Likely to Adversely Affect, and that formal consultation is not necessary for the Alaska Stand Alone Pipeline given the details provided in the Biological Assessment (BA) and Project Description.

NMFS staff have reviewed updated project descriptions online at www.asapeis.com and www.gasline.us.com and the BA provided by the USACE to complete this letter of concurrence for the endangered western distinct population segment (DPS) of Steller sea lion *Eumetopias jubatus;* endangered bowhead whales *Balaena mysticetus;* endangered Cook Inlet DPS beluga whale *Delphinapterus leucas;* proposed ringed seal *Phoca hispida;* endangered fin whale *Balaenoptera physalus;* endangered humpback whale *Megaptera novaengliae; and* proposed bearded seal *Erignathus barbatus.* This letter of concurrence also includes an analysis of any direct and indirect effects on designated critical habitat.

Background

NMFS provided scoping comments on March 8, 2010 and a threatened and endangered species list on December 10, 2010, to the USACE for the Alaska Stand Alone Gas Pipeline (ASAP) project.

The current proposed project involves construction and operation of a 737-mile long, 24-inch diameter pipeline designed to transport natural gas consisting of either a highly conditioned natural gas highly enriched in non-methane hydrocarbons or conditioned natural gas containing mostly methane. The pipeline would start at Prudhoe Bay and follow the Trans-Alaska Pipeline System (TAPS) and Dalton Highway corridors, generally paralleling the highway corridor from the North Slope to near Livengood, northwest of Fairbanks. The pipeline would head south at Livengood and join the Parks Highway corridor west of Fairbanks near Nenana. From Nenana it would continue south to milepost 39 (near Wasilla) of the Beluga Pipeline (ENSTAR's distribution system) providing access to tidewater at Cook Inlet. There would also be a 12-inch diameter lateral pipeline to Fairbanks (Fairbanks Lateral) which would take off from the main pipeline just a few miles north of Nenana at Dunbar. The Fairbanks Lateral would travel approximately 35 miles northeast to Fairbanks. The operation of the proposed terrestrial pipeline will have no effects on marine mammal stocks listed as endangered or threatened, or proposed to be listed stocks.

The most relevant portion of the action for NMFS species relates to port and transiting vessel operations during construction. ASAP estimates approximately 35 vessel shipments to deliver pipe into Alaska via either the port of Anchorage or the port of Seward and 9 vessel shipments to deliver materials to West Dock at Prudhoe Bay during the 2-year construction season. In addition, the biological assessment describes concerns due to noise and the development and implementation of a Noise Abatement Program as mitigation of potential effects on the environment. ASAP describes in their biological assessment several proactive vessel operational steps that will be taken to mitigate sound energy exposure and the probability of vessel collisions with marine mammals. The noise mitigation measures described by ASAP include speed reductions, minimization of multiple course changes, and no approach when marine mammals are observed by vessel crew (i.e., known to be present). We assume these measures are part of the proposed action, and believe they would be practical, effective, realistic, and appropriate to include in the proposed action as part of the Noise Abatement Program.

Action Area

The Action Area for this project consists of a 737-mile north-south and 35-mile west-east terrestrial pipeline corridor and the ports of Anchorage and Seward and West Dock in Prudhoe Bay plus a ¼ mile seaward extension. The ¼ mile seaward extension from the ports of Anchorage, Seward and West Dock in Prudhoe Bay represent the only area of potential direct and indirect effects on proposed, threatened, or endangered species under NMFS jurisdiction.

Effects of the Action

The ESA section 7 implementing regulations (50 CFR 402.02) define "effects of the action" as:

"the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02)."

There are three possible determinations of effects under the ESA. The determinations and their definitions are:

No Effect – The proposed action or interrelated or interdependent actions will not affect (positively or negatively) listed species or their habitat.

May affect, not likely to adversely affect – The proposed action or interrelated or interdependent actions may affect listed species or their habitat, but the effects are expected to be insignificant, discountable, or entirely beneficial. *Insignificant effects* relate to the size of the impact and should never reach the scale where a take will occur. *Discountable effects* are those that are extremely unlikely to occur. Based on best judgment, one would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur. *Beneficial effects* are contemporaneous positive effects with no adverse effects to listed species.

May affect, likely to adversely affect – The proposed action or interrelated or interdependent actions may have measurable or significant adverse effects on listed species or their habitat. Such a determination requires formal ESA section 7 consultation.

Determinations are also required of the effects of a federal action on any designated critical habitat for listed species.

Determination of Effect

Direct Effects

The USACE has concluded that the ASAP project may affect, but is not likely to adversely affect any of the endangered, threatened or marine mammals proposed for listing under NMFS jurisdiction within the Action Area. NMFS has analyzed the project description and biological assessment and determined the majority of the effects of the action will occur in the terrestrial environment. Western DPS Steller sea lions, endangered Cook Inlet DPS beluga whales, and proposed to be listed ringed seals are most frequently observed in shallow nearshore waters and most likely to experience the direct effects of vessel traffic and the associated underwater noise. Bowhead, fin, and humpback whales as well as proposed to be listed bearded seals are all commonly found in deeper offshore waters not near the ports or docks identified in the Action Area (Bengtson et al. 2005; Calambokidis et al. 2008; Moore et al. 2006; Moore and Reeves 1993; Simpkins et al. 2003) and therefore we do not consider them likely to be exposed to direct effects from the action.

Marine mammals may hear underwater sounds above background sound levels from transiting barge and vessel traffic. Underwater sounds from vessels can travel long distances and may be heard by a distant marine mammal some time after the vessel has passed; however their received levels at longer distances are often so low they are difficult to detect and attribute to a singular source. Underwater sound levels attenuate with distance and therefore the potential for marine mammals to detect sounds and respond behaviorally to a particular sound is reduced.

Bowhead whales, fin whales, bearded seals and humpback whales are found more frequently in offshore waters (see references above) and subject to noise exposure from transiting vessels in the offshore marine waters. Bowheads migrate offshore north of this project at West Dock

(Bockstoce et al. 2007). Most transiting vessels would be closer to shore or approaching West Dock and passing bowhead whales would be unlikely to receive noise within the migratory corridor or the received levels of such noise would be so low it would not be expected to cause a significant change in whale behavior (Moulton et al. 2003). Bowhead whales, fin whales, bearded seals and humpback whales may hear noise from ship traffic associated with the proposed action and might move further offshore or away from the source, but continue their behavior (Richardson et al. 1995a). Monitoring studies of the Northstar Island oil and gas production facility in the Beaufort Sea (Richardson and Williams 2003) found that offshore displacement of bowhead whales occurred at times of loudest noise (which was predominately due to vessel activity near Northstar Island ~6 miles north of West Dock) during its construction in 2001. However, no significant displacement was observed in subsequent years when vessel traffic noise was reduced (Richardson et al. in press). Bowhead whales are known to avoid small boats at distances up to 4 km, but most reactions have been observed at ranges of less than 1.9 km (Richardson et al. 1985; 1995b). Richardson et al. (1985; 1995b) postulated a whale's response was more closely related to sudden changes in vessel direction and whale's exposure to and experience with small vessels. Whales tend to show little response to larger vessels that move slowly and are not heading towards them (Richardson et al. 1995a). NMFS believes any effects on humpback, fin or bowhead whales due to vessel noises delivering materials and equipment through the Gulf of Alaska, Bering, Chukchi and Beaufort seas associated with construction of this project would be insignificant.

Cook Inlet belugas, ringed seals and Steller sea lions could all be exposed to low level transiting vessel noise within and outside the action area. Beluga whales, ringed seals, or Steller sea lions are the only species likely to be directly affected by vessel sound exposure from the proposed action in the Action Areas. These three species may hear and respond to underwater sound associated with barge departures and arrivals in the ports identified in the Action Area. However, few beluga whales, ringed seals, or Steller sea lions would be expected within the action area, and these species are not known to consistently respond in predictable ways to vessel traffic or underwater sounds associated with large vessels or barges that would reach the scale where direct effects would be observed or "taking" occurs (Richardson et al. 1995a; Moulton et al. 2003). There are no records of beluga whales, ringed seals or Steller sea lions being struck by large vessels, and vessels arriving or departing from ports or docks are moving slowly and vessel speed is the most important predictor of vessels striking and killing large whales (Laist et al. 2001; Silber et al. 2010).

Given the action area consists of shallow nearshore marine waters associated with each of two ports and West Dock, there is little likelihood that a bowhead, fin, humpback whale, or bearded seal will be present in these areas (Bengtson et al. 2005; Calambokidis et al. 2008; Moore et al. 2006; Moore and Reeves 1993; Simpkins et al. 2003) and subject to direct effects of the proposed action (Moulton et al. 2003).

The ASAP project includes several proactive vessel operational steps that will be taken to mitigate sound energy exposure and the probability of vessel collisions with marine mammals. ASAP vessels and barges will implement speed reductions, minimize multiple course changes, and not approach marine mammals when they are observed by vessel crew. Vessel speed reductions and minimization of multiple course changes in the presence of marine mammals will reduce underwater sound levels emanating into the marine environment. The reduction in underwater sound levels will further reduce the probability that sound exposure levels will exceed behavioral response thresholds of the nearest marine mammals. The implementation of the ASAP Noise Abatement Program will ensure that any potential direct effects from at sea vessel traffic are insignificant.

The ports of Anchorage and Seward and West Dock are all active marine traffic hubs with near continuous summer vessel traffic. No effects that would be considered "taking" under the ESA on listed species are anticipated from the current or anticipated inconsequential changes in marine traffic levels due to the ASAP project. Cook Inlet beluga whales, ringed seals and Steller sea lions may at most experience insignificant direct effects (Moulton et al. 2003; Prevel Ramos et al. 2006), whereas the remaining listed species will not experience direct effects.

Effects from Interdependent and Interrelated Actions:

Interdependent actions are defined as actions with no independent use apart from the proposed action. Interrelated actions include those that are part of a larger action and depend on the larger action for justification. We did not identify any interdependent/interrelated actions associated with the ASAP construction or operation.

Indirect Effects

Indirect effects of the ASAP project are those which occur later in time and may affect marine mammals. During the construction of the ASAP project only minor increases in vessel and barge traffic will occur and the resulting underwater sounds will not persist in the marine environment to result in indirect effects. There are no proposed marine activities during operation of the terrestrial pipeline and therefore no indirect effects are anticipated from operation of the ASAP. There does not appear to be any potential indirect effects from the ASAP project.

Critical Habitat

Critical habitat for Cook Inlet beluga whales was designated on April 11, 2011 (see 76 FR 20180). The Port of Anchorage was excluded from the Cook Inlet beluga critical habitat designation. Further information may be found on our website at http://www.alaskafisheries.noaa.gov/protectedresources/whales/beluga.htm, or in 50 CFR 226.220. We did not identify any direct or indirect effects to this critical habitat due to the proposed project.

NMFS has designated rookeries, major haul outs, and marine foraging areas of the Steller sea lion in Alaska as critical habitat. A listing of these areas, the associated three-mile no entry marine zones and further information may be found on our website at http://www.alaskafisheries.noaa.gov/protectedresources/stellers/habitat.htm, or in 50 CFR 226.202. We did not identify any direct or indirect effects to this critical habitat due to the proposed project.

No CH has been designated in Alaska for bowhead, fin, or humpback whales.

Conclusion

Under section 7(a)(2) of the Endangered Species Act of 1973, as amended, NMFS concurs with the Army Corps of Engineers determination that this work is not likely to adversely affect the endangered western DPS of Steller sea lion *Eumatopias jubatus;* endangered bowhead whales *Balaena mysticetus;* endangered Cook Inlet DPS beluga whale *Delphinapterus leucas;* proposed ringed seal *Phoca hispida;* endangered fin whale *Balaenoptera physalus;* endangered humpback whale *Megaptera novaengliea; or* proposed bearded seal *Erignathus barbatus* nor any designated critical habitat. Because ringed and bearded seals have not been designated under the ESA, this document will serve as conference under the provisions of section 7. Upon issuance of a determination regarding listing these stocks, NMFS will issue a letter confirming this conference as the section 7 consultation for this action. Under section 7(a)(2) of the Endangered Species Act of 1973, as amended, NMFS has further determined that formal consultation is not necessary due to its concurrence with the USACE determination of not likely to adversely affect.

Reinitiating consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) take of a listed species occurs, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered, or (4) a new species is listed or critical habitat designated that may be affected by the action.

We hope this information is useful in fulfilling your requirements under section 7 of the ESA. Should you have any questions, please contact Michael Williams by email at michael.williams@noaa.gov, or by telephone at (907) 271-5117.

Sincerely,

James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: brad.smith@noaa.gov
cristi.reid@noaa.gov
louise_smith@fws.gov
serena.e.sweet@usace.army.mil
rockwell.theodore@epa.gov
stacey.aughe@asrcenergy.com
michelle.turner@asrcenergy.com

References

Bengtson, J.L., L.M. Hiruki-Raring, M.A. Simpkins, and P.L. Boveng. 2005. Ringed and bearded seal densities in the eastern Chukchi Sea, 1999-2000. **Polar Biology.** 28: 833-845.

Blackwell, S.B., W.J. Richardson, C.R. Greene Jr., and B. Streever. 2007. Bowhead whale (*Balaena mysticetus*) migration and calling behaviour in the Alaskan Beaufort Sea, Autumn 2001-04: an acoustic localization study. **Arctic** 60(3):255-270.

Bockstoce, J.R., D.B. Botkin, A. Philp, B.W. Collins, and J.C. George. 2007. The geographic distribution of bowhead whales (*Balaena mysticetus*) in the Bering, Chukchi, and Beaufort Seas: Evidence from whaleship records, 1849-1914. **Marine Fisheries Review**. 67(3): 1-43.

Calambokidis, J.E.A. Falcone, T.J. Quinn, A.M. Burdin, P.J. Clapham, J.K.B. Ford, C.M. Gabriele, R. LeDuc, D. Mattila, L. Rojas-Bracho, J.M. Straley, B.L. Taylor, J. Urbán R., D. Weller, B.H. Witteveen, M. Yamaguchi, A. Bendlin, D. Camacho, K. Flynn, A. Havron, J. Huggins, and N. Maloney. 2008. SPLASH: Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific. Final report for Contract AB133F-03-RP-00078 U.S. Dept of Commerce Western Administrative Center, Seattle, Washington. (available at http://www.cascadiaresearch.org/SPLASH/SPLASH-contract-Report-May08.pdf)

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, and M. Podesta. 2001. Collisions between ships and whales. **Marine Mammal Science.** 17(1):35-75.

Moore, S.E., K.M. Stafford, D.K. Mellinger, C.G. Hildebrand. 2006. Listening for large whales in the offshore waters of Alaska. **BioScience**. 56(1):49-55.

Moore, S.E., and R.R. Reeves. 1993. Distribution and movement. Pp. 313-386 *In* J.J. Burns, J.J. Montague, and C.J. Cowles (eds.), **The bowhead whale**. Society for Marine Mammalology, Special Publication. No. 2.

Moulton, V.D., M.T. Williams, W.J. Richardson and T.L. McDonald. 2003. *Estimated numbers of seals and whales potentially affected by Northstar activities, Nov. 2001 – Oct. 2002.* p. 11-1 to 11-31. *In:* W.J. Richardson and M.T. Williams (eds.). 2003. Monitoring of industrial sounds, seals, and bowhead whales near BP's Northstar Oil Development, Alaskan Beaufort Sea, 1999–2002. Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for BP Explor. (Alaska) Inc., Anchorage, AK, and Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD.

Prevel Ramos, A., T.M. Markowitz, Funk, D.W., and M.R. Link. 2006. Monitoring beluga whales at the Port of Anchorage: Pre-expansion observations, August-November, 2005. Rep. from LGL Alaska Research Associates, Inc., Anchorage, AK, for Integrated Concepts and Research Corporation, the Port of Anchorage, and the U.S. Department of Transportation Maritime Administration.

Richardson, W.J. and M.T. Williams (eds.). 2003. Monitoring of industrial sounds, seals, and bowhead whales near BP's Northstar Oil Development, Alaskan Beaufort Sea, 1999–2002. Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for BP Explor. (Alaska) Inc., Anchorage, AK, and Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD.

Richardson, W.J., M.A. Fraker, B. Würsig and R.S. Wells. 1985. Behaviour of bowhead whales, *Balaena mysticetus*, summering in the Beaufort Sea: reactions to industrial activities. **Biological Conservation.** 32(3):185-230.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme and D.H. Thomson. 1995a. **Marine mammals and noise**. Academic Press, San Diego, CA. 576 p.

Richardson, W.J., K.J. Finley, G.W. Miller, R.A. Davis and W.R. Koski. 1995b. Feeding, social and migration behavior of bowhead whales, *Balaena mysticetus*, in Baffin Bay vs. the Beaufort Sea--regions with different amounts of human activity. **Marine Mammal Science.** 11(1):1-45.

Richardson, W.J., T.L. McDonald, C.R. Greene Jr., S.B. Blackwell and B. Streever. in press. Distribution of bowhead whale calls near an oil production island with fluctuating underwater sound. In: A.N. Popper and A. Hawkins (eds.), Effects of noise on aquatic life. Springer, New York.

Silber, G.K., J. Slutsky, S. Bettridge. 2010. Hydrodynamics of a ship/whale collision. **Journal of Experimental Marine Biology and Ecology.** 391:10-19.

Simpkins, M. A., L. M. Hiruki-Raring, G. Sheffield, J. M. Grebmeier, and J. L. Bengtson. 2003. Habitat selection by ice-associated pinnipeds near St. Lawrence Island, Alaska in March 2001. **Polar Biology**. 26:577-586.

Zerbini, A. N., J. M. Waite, J. L. Laake and P. R. Wade. 2006. Abundance, trends and distribution of baleen whales off western Alaska and the central Aleutian Islands. **Deep-Sea Research. Part I**:1772-1790.