Susitna-Watana Hydroelectric Project Document
ARLIS Uniform Cover Page

Title: Dall's sheep distribution and abundance study, Study plan Section 10.7 : Final study plan	**SuWa 200**
Author(s) – Personal:	
Author(s) – Corporate: Alaska Energy Authority	
AEA-identified category, if specified: Final study plan	
AEA-identified series, if specified:	
Series (ARLIS-assigned report number): Susitna-Watana Hydroelectric Project document number 200	**Existing numbers on document:**
Published by: [Anchorage : Alaska Energy Authority, 2013]	**Date published:** July 2013
Published for:	**Date or date range of report:**
Volume and/or Part numbers: Study plan Section 10.7	**Final or Draft status, as indicated:**
Document type:	**Pagination:** 7 p.
Related work(s):	**Pages added/changed by ARLIS:**
Notes:	

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Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Dall's Sheep Distribution and Abundance Study
Study Plan Section 10.7

Final Study Plan

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

July 2013

10.7. Dall's Sheep Distribution and Abundance

On December 14, 2012, Alaska Energy Authority (AEA) filed with the Federal Energy Regulatory Commission (FERC or Commission) its Revised Study Plan (RSP), which included 58 individual study plans (AEA 2012). Section 10.7 of the RSP described the Dall's sheep Distribution and Abundance Study. This study focuses on quantifying how many sheep inhabit the study area, assessing their distribution and habitat use, and evaluating the extent of use of two mineral licks in and near the proposed Project boundary. RSP 10.7 provided goals, objectives, and proposed methods for data collection regarding Dall's sheep.

On February 1, 2013, FERC staff issued its study plan determination (February 1 SPD) for 44 of the 58 studies, approving 31 studies as filed and 13 with modifications. RSP Section 10.7 was one of the 31studies approved with no modifications. As such, in finalizing and issuing Final Study Plan Section 10.7, AEA has made no modifications to this study from its Revised Study Plan.

10.7.1. General Description of the Proposed Study

The Dall's sheep study will be conducted over two years in 2013 and 2014. The study is designed to quantify how many sheep inhabit the study area, assess their distribution and habitat use, and evaluate the extent of use of two mineral licks in and near the proposed Project boundary.

Study Goal and Objectives

The goal of the study is to obtain sufficient information on the minimum population size, summer distribution, and current use of mineral licks by Dall's sheep—an important species of big game in the Project area—to use in evaluating potential Project-related effects and identifying measures to avoid, minimize, or otherwise mitigate those effects.

Four objectives have been identified for this study:

1) Estimate the current minimum population size of Dall's sheep in the study area.
2) Delineate the summer range of Dall's sheep in the study area.
3) Evaluate the current condition of mineral licks in and near the Project area.
4) Analyze and synthesize data from historical and current studies of Dall's sheep in the study area, as a continuation of the 2012 study (AEA 2012).

Data collected through aerial surveys and inspection of the mineral licks at Jay Creek and Watana Creek will document currently used areas for development of any necessary protection, mitigation, and enhancement measures.

10.7.2. Existing Information and Need for Additional Information

Dall's sheep were studied in the region during the early 1980s. Aerial surveys of the Watana Creek Hills counted 130–220 animals (Tankersley 1984). Later surveys of the Watana Hills counted 97 sheep in 1999, 50 sheep in 2003, and 63 sheep in 2007 (Peltier 2011). The sheep population in the larger management area has declined overall following a steep decline after the winter of 1999–2000 and additional declines during 2004–2007 (Peltier 2011). No sheep use of

areas on Mount Watana (directly south of the proposed Watana reservoir) or near the Denali Highway access corridor was documented in the 1980s (Tankersley 1984).

During the 1980s research, mineral licks were identified on lower Jay Creek and upper Watana Creek (Tankersley 1984). Sheep used those licks mainly between mid-May and mid-June and at least 31 percent of the sheep population observed in the Watana Creek Hills in 1983 traveled 5 miles (8 kilometers) or more to the Jay Creek lick. The Low Watana reservoir proposed in the 1980s would not have inundated the Jay Creek lick at a normal maximum operating level of 2,185 feet (135 feet higher than is planned for the currently proposed Project), but may have resulted in the loss of lower areas of the Jay Creek lick and associated resting areas due to accelerated erosion, and may have inhibited sheep travel along and across Jay Creek (Tankersley 1984).

The management objective for the Talkeetna Mountains and Chulitna–Watana Hills in Game Management Unit (GMU) Subunits 13A, 13E, 14A, and 14B is to maintain sheep populations that will sustain an annual harvest of 75 rams (Peltier 2011). This study only addresses sheep populations within portions of GMU 13E.

The proposed Project will result in wildlife habitat loss and alteration, blockage of movements of mammals, wildlife disturbance, and changes in human activity due to construction and operation.

New information is needed for a current enumeration of sheep abundance in the study area, especially in the Watana Creek Hills, and to evaluate the current extent of seasonal use of the Jay Creek and Watana Creek licks by sheep. The primary concerns for Dall's sheep are alteration of movement patterns, changes in the use of nearby mineral licks, disturbance, and changes in harvest patterns due to increased human access. Current data on distribution, population size, and use of the Jay Creek and Watana Creek licks will be important for assessing potential impacts on the local sheep population and for developing any protection, mitigation, and enhancement measures, if necessary.

10.7.3. Study Area

The study area consists of that portion of GMU Subunit 13E located east of the Parks Highway and south of the Denali Highway, encompassing the Project facilities, potential access and transmission line corridors, and the reservoir inundation zone (Figure 10.7-1). All suitable Dall's sheep habitat within the study area will be surveyed by airplane and the mineral licks at Jay Creek and Watana Creek will be visited on the ground.

10.7.4. Study Methods

The proposed study will consist of three components:

- Aerial surveys for summer distribution and minimum population estimation.
- Inspection of the Jay Creek and Watana Creek mineral licks to assess their current condition and general level of use.
- Analysis of historical (1980s) data and synthesis with current Alaska Department of Fish and Game (ADF&G) monitoring results.

An aerial survey will be conducted each year by an experienced ADF&G biologist to document sheep distribution and to develop a minimum population estimate. All suitable sheep habitat in

the study area will be covered by the survey, following ADF&G protocols for summer (July) surveys after lambing and before the sheep hunting season begins in early August.

The two site visits to the Jay Creek and Watana Creek mineral licks during May and June each year will provide a qualitative assessment of lick condition and levels of use. Alaska Energy Authority (AEA) contractors will perform these site visits rather than ADF&G personnel. Results will be compared with those from ground-based surveys of mineral licks conducted in the 1980s (Tankersley 1984). Conducting site visits in both 2013 and 2014 will provide information on annual variability, and the results of the 2013 visits will be used to modify the timing of the 2014 field visits, if necessary.

10.7.5. Consistency with Generally Accepted Scientific Practice

Aerial surveys will provide the best indication of the minimum population of sheep in the study area. These surveys are standard methods used by ADF&G for sheep in Alaska (see Harper 2011). Aerial surveys will be conducted by ADF&G personnel and pilots experienced in conducting surveys according to ADF&G protocols. Data will be analyzed in accordance with commonly accepted statistical techniques for wildlife studies.

10.7.6. Schedule

The timing of study surveys and reporting is depicted below (Table 10.7-1). Aerial surveys of all available sheep habitat within the study area will be conducted in July or early August in 2013 and 2014, and visits to mineral licks will be conducted in May and June each year. Data analysis and reporting will be conducted each year. Site visits to assess lick use will be conducted in May and June of 2013 and 2014 by an AEA contractor. Aerial surveys will be conducted over a period of about a week in July or early August of both years by ADF&G personnel. Data analysis and report preparation will be conducted from August to January. The Initial Study Report will be completed by February 2014 and the Updated Study Report will be done by February 2015. Project updates will be provided at Technical Workgroup meetings, which will be held quarterly in 2013 and 2014.

10.7.7. Relationships with Other Studies

As is depicted below (Figure 10.7-2), specific information will not be needed from other studies for the Dall's sheep study plan to proceed. Aerial surveys during summer and ground-based observations of mineral licks will provide data on the distribution and minimum population size in the study area and on the number of sheep using the mineral licks. That information will be used in the Evaluation of Wildlife Habitat Use (Section 10.19) for geospatial analyses to assess potential impacts on sheep habitat and to develop appropriate protection, mitigation, and enhancement (PM&E) measures to minimize impacts to Dall's sheep. The Large Carnivores Study (Section 10.8), Terrestrial Furbearers Study (Section 10.10), and Wildlife Harvest Analysis (Section 10.20) are expected to provide additional information that will aid in the impact assessment for sheep; however, the sheep study will not depend on information from those studies.

The potential impacts of construction and operation of the proposed Project on Dall's sheep may include the following:

- Direct loss and alteration of Dall's sheep habitats, including key habitat features such as mineral licks.
- Blockage or alteration of movements and changes in distribution due to reservoir water and ice conditions, access and transmission corridors, and new patterns of human activities.
- Mortality of Dall's sheep due to Project-related fluctuating water and ice conditions in the reservoir and downstream river reaches.
- Changes in mortality that may result from altered abundance and distribution of sheep predators due to increased human activities and habitat changes resulting from Project development.
- Mortality of Dall's sheep from increased subsistence and recreational harvest.

During the impact assessment that will be conducted for the FERC License Application in 2015, data on the distribution and abundance of Dall's sheep and their use of mineral licks in the study area will be used to assess Project impacts through geospatial analysis, evaluation of the responses of Dall's sheep to other similar projects (as documented in the scientific literature), and examination of the current physical characteristics of the Jay Creek and Watana Creek mineral licks. Direct habitat loss caused by the Project will be evaluated by overlaying the reservoir, access and transmission corridors, and related infrastructure (including any predicted changes around the two mineral licks) and the summer sheep ranges delineated from aerial surveys onto the Project wildlife habitat map. Similarly, zones of potential indirect effects will be delineated around the Project footprint, based on information from the literature. Population data will be incorporated into the geospatial analysis to estimate the number of sheep that may be affected. The GIS analysis will be combined with information from the literature to estimate the geographic extent, frequency, duration, and magnitude of Project effects on sheep.

Harvest data from ADF&G and population data from aerial surveys will provide a baseline with which to assess changes in mortality rates that may result from increased harvest, lake ice conditions, increased predation, or altered access to important habitats.

Information from other studies also will provide useful information to consider in the assessment of potential Project impacts on Dall's sheep, in particular the Large Carnivore Study (Section 10.8), Terrestrial Furbearer Study (Section 10.10), and the Wildlife Harvest Analysis (Section 10.20).

10.7.8. Level of Effort and Cost

Aerial surveys will require one observer and one pilot in a small tandem-seat fixed-wing airplane, flying daily for up to one week each summer to survey the sheep habitat in the study area. The ground visits to mineral licks will require 2–3 days per visit (twice annually), for a total of 8–10 days over both years. All suitable sheep habitat east of the Parks Highway and south of the Denali Highway within GMU 13E will be surveyed. The study cost is expected to be on the order of $50,000 per year in 2013 and 2014, for a total of approximately $100,000.

10.7.9. Literature Cited

AEA. 2012. W-S1: Big-game movement and habitat use study for the Susitna–Watana Hydroelectric Project, FERC Project No. 14241. Draft final version (March 21, 2012). Alaska Energy Authority, Anchorage.

Harper, P., editor. 2011. Dall sheep management report of survey–inventory activities. 1 July 2007–30 June 2010. Alaska Department of Fish and Game, Project 6.0. Juneau, Alaska.

Peltier, T. C. 2011. Units 13A, 13E, 14A (North) and 14B, Dall sheep management report. Pages 72–79 *in* P. Harper, editor. Dall sheep management report of survey–inventory activities, 1 July 2007–30 June 2010. Alaska Department of Fish and Game. Project 6.0. Juneau, Alaska.

Tankersley, N. 1984. Susitna Hydroelectric Project, Final report, Big game studies, Vol. VIII—Dall sheep. Report by Alaska Department of Fish and Game, Anchorage, for the Alaska Power Authority, Anchorage. 91 pp.

10.7.10. Tables

Table 10.7-1. Schedule for implementation of the Dall's sheep study.

Activity	2013				2014				2015
	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1Q
Site visits to assess mineral lick use		—				—			
Aerial surveys			—				—		
Data analysis				——				——	
Initial Study Report					—Δ				
Updated Study Report									—▲

Legend:

—— Planned Activity
Δ Initial Study Report
▲ Updated Study Report

10.7.11. Figures

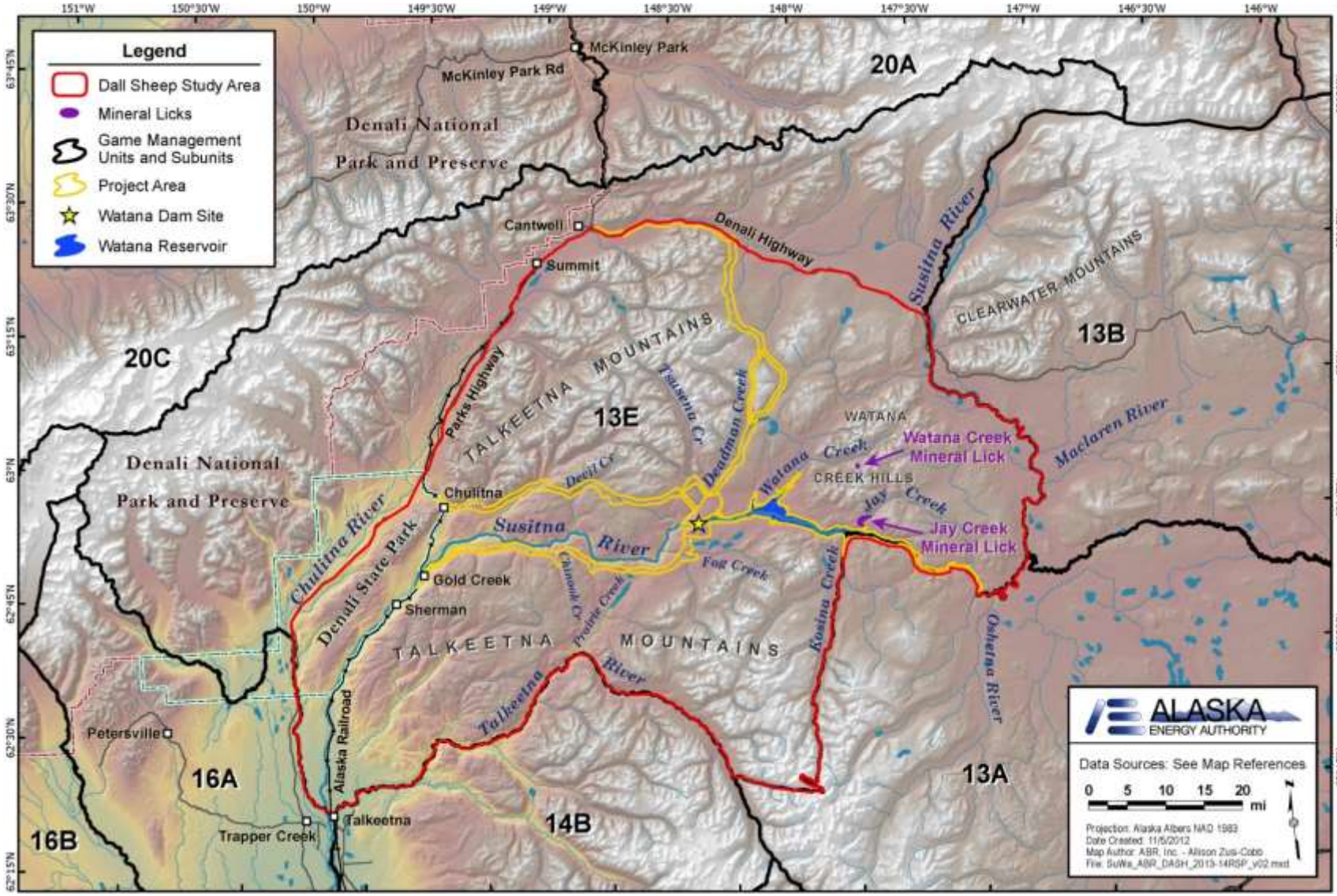

Figure 10.7-1. Dall's sheep study area.

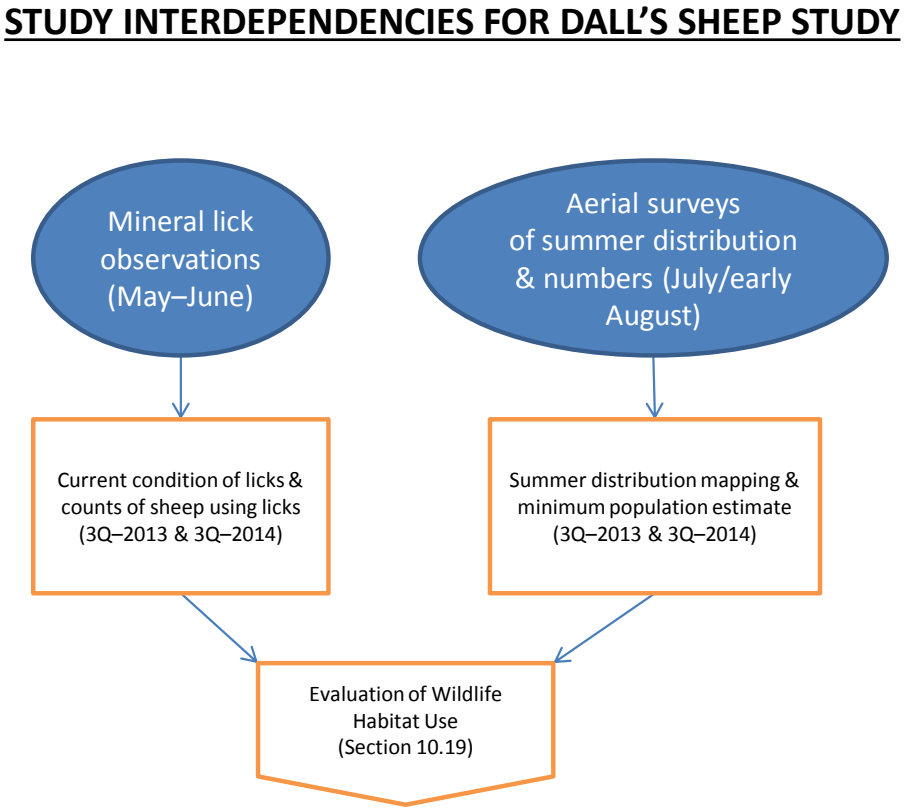

Figure 10.7-2. Study interdependencies for Dall's sheep study.