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SUSITNA-WATANA HYDRO

Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Aquatic Furbearer Abundance and Habitat Use
Study Plan Section 10.11

Initial Study Report
Part A: Sections 1-6, 8-10

Prepared for

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

ABR, Inc.—Environmental Research & Services

Fairbanks, Alaska

June 2014

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LIST OF ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

Abbreviation	Definition
ADF&G	Alaska Department of Fish and Game
AEA	Alaska Energy Authority
APA	Alaska Power Authority
FERC	Federal Energy Regulatory Commission
ILP	Integrated Licensing Process
ISR	Initial Study Report
Project	Susitna-Watana Hydroelectric Project
RSP	Revised Study Plan
USR	Updated Study Report

1. INTRODUCTION

On December 14, 2012, Alaska Energy Authority (AEA) filed with the Federal Energy Regulatory Commission (FERC or Commission) its Revised Study Plan (RSP) for the Susitna-Watana Hydroelectric Project No. 14241 (Project), which included 58 individual study plans (AEA 2012). RSP Section 10.11 described the Aquatic Furbearer Abundance and Habitat Use Study (Aquatic Furbearer Study). This study was designed to assess the distribution of aquatic furbearers among habitats, to estimate population size for beavers (*Castor canadensis*), and to assess the relative abundance of other aquatic furbearers (muskrat, *Ondatra zibethicus*; river otter, *Lontra canadensis*; mink, *Neovison vison*). Additional work is being done to provide information on the food habits and diets of piscivorous furbearers (river otter and mink) to inform the Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7). RSP Section 10.11 described the goal, objectives, and proposed methods for data collection regarding aquatic furbearers.

On February 1, 2013, FERC staff issued its study determination (February 1 SPD) for 44 of the 58 studies, approving 31 studies as filed and 13 with modifications. RSP Section 10.11 was one of the 31 studies approved with no modifications.

Following the first study season, FERC's regulations for the Integrated Licensing Process (ILP) require AEA to "prepare and file with the Commission an initial study report describing its overall progress in implementing the study plan and schedule and the data collected, including an explanation of any variance from the study plan and schedule" (18 CFR 5.15(c)(1)). This Initial Study Report (ISR) on the Aquatic Furbearer Study has been prepared in accordance with FERC's ILP regulations and describes AEA's progress in implementing the study, as set forth in the FERC-approved RSP (referred to herein as the "Study Plan").

2. STUDY OBJECTIVES

The goal of the Aquatic Furbearer Study is to collect baseline data on aquatic furbearers in the study area to enable assessment of potential Project-related impacts. This information will be used to develop appropriate mitigation measures.

Five specific objectives were established in RSP Section 10.11.1:

1) Delineate the distribution and estimate the current population size of beavers.

2) Describe the distribution and relative abundance of river otters, mink, and muskrats.

3) Describe habitat associations of aquatic furbearers.

4) Review available information on food habits and diets of piscivorous furbearers (river otter and mink) as background for the Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7).

5) Collect hair samples from river otters and mink to characterize baseline tissue levels of mercury for the Mercury Assessment and Potential for Bioaccumulation Study.

3. STUDY AREA

As established by RSP Section 10.11.3, the study area for aquatic furbearers varies according to the species being surveyed. Beavers were surveyed in the riparian study area from the reservoir inundation zone downstream to the confluence of the Susitna and Chulitna rivers, as well as in other portions of the Project area. Muskrat surveys are restricted to water bodies and wetland areas in the Project area, including the reservoir inundation zone. In addition to covering all portions of the Project area, winter track and transect surveys for river otters and mink focus on the stream survey area, consisting of the mainstem Susitna River above the dam site and on tributary streams draining into the reservoir inundation zone, as well as on similar river and tributary stretches immediately downstream from the dam site. Stream surveys extend upstream along tributaries at least 3 miles (Figure 3-1) to provide comparative data on the extent of use of those drainages in comparison with the Susitna mainstem.

4. METHODS AND VARIANCES IN 2013

The methods implemented for each of the Aquatic Furbearer Study components in 2013 are described in this section, along with explanations of variances from the Study Plan, where necessary.

4.1. Beaver and Muskrat Surveys

AEA implemented the methods described in the Study Plan (RSP Section 10.11.4.1), with the exception of the variances explained below (Section 4.1.1).

The study team flew an aerial survey to assess the distribution and abundance of beaver colonies in the Middle Susitna River Segment below the proposed dam site and in the Project area (reservoir inundation zone, dam and camp facilities area, and access road and transmission line corridors). The survey of the beaver study area was conducted in a small piston-engine helicopter (Robinson R-44) in October 2013, after deciduous trees had shed leaves but before most water bodies froze. Active beaver colonies were indicated by lodges with fresh food caches nearby, consisting of small-diameter trees and saplings, typically with leaves still attached, that had been cut and stored underwater (Hay 1958, Payne 1981). Inactive colonies were noted as well, as indicated by the lack of fresh caches near lodges or by the proximity of old caches lacking fresh cuttings from the current season. The survey was conducted in two phases to account for elevational and latitudinal differences in the timing of leaf fall and ice formation. The portions of the study area at higher elevations (Denali corridor and part of the Chulitna corridor) were surveyed on October 1–2 and the remainder of the study area was surveyed on October 9–10. The locations of beaver lodges were recorded and mapped using a handheld Global Positioning System (GPS) receiver.

Although the planned aerial survey of muskrat "pushups" (feeding structures consisting of small, seasonally temporary domes of vegetation debris and mud pushed up through holes or cracks in the ice cover of water bodies; Erb and Perry 2003) was not conducted in spring 2013 (see Section 4.1.1 below), the presence of muskrats and muskrat pushups was recorded and mapped by researchers conducting aerial surveys for other Project studies (Study 10.14, Surveys of Eagles and Other Raptors; Study 10.15, Waterbird Migration, Breeding, and Habitat Use; Study 10.16, Landbird and Shorebird Migration, Breeding, and Habitat Use).

4.1.1. Variances

The downstream beaver survey area in the Middle Susitna River Segment that was sampled in October 2013 was somewhat wider in the lower end than was proposed in RSP Section 10.11.3 (as depicted in RSP Figure 10.11-1). The reason for this expansion was that the survey area was aligned with the riverine physiography area, which was delineated for Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam (Study 11.6), after preparation of the Study Plan. As a result of using this refined survey area, more potential beaver habitat was covered than was originally included in the Study Plan, providing a greater volume of data to use in addressing the study objectives.

The unusually late spring, persistent deep snow cover, and delayed melt of snow and ice in 2013 led the study team to postpone and then cancel the aerial survey of muskrat pushups, which had been planned for April (RSP Sections 10.11.4.1 and 10.11.6) for consistency with similar surveys conducted in late winter 1980 for the Alaska Power Authority's Susitna Hydroelectric Project (APA Project) (Gipson et al. 1982). The intent of RSP Section 10.11.4.1 was to conduct the muskrat survey before aerial surveys began for other wildlife studies. The same water bodies that would have been surveyed for this study were covered by researchers conducting aerial surveys for other Project studies (primarily spring migration surveys of waterbirds, but also nest occupancy surveys of raptor nests). Hence, the presence of muskrat pushups in 2013 was instead recorded during spring surveys of waterbirds and raptors, which were conducted in the appropriate time frame (spring melt) for identifying muskrat pushups. Several incidental sightings of muskrats also were provided by researchers conducting point-count surveys of landbirds and shorebirds. The incidental sightings in 2013 provided useful information on the distribution and relative abundance of muskrats in and near the study area, which, when combined with data to be collected on subsequent surveys in the next year of study, are expected to enable the study team to achieve the study objective for this species.

4.2. River Otter and Mink Surveys

AEA did not implement the survey methods proposed in the Study Plan for river otters and mink in 2013 (RSP Section 10.11.4.2), as explained below in Section 4.2.1.

Although the planned aerial surveys of river otters and mink were not conducted in 2013, sightings of river otters and the locations of river otter and mink tracks were recorded and mapped during three aerial transect surveys conducted in February, March, and April 2013 for the study of Terrestrial Furbearer Abundance and Habitat Use (see ISR Study 10.10). In addition, researchers conducting surveys for other Project studies in 2013 (Study 9.5, Fish Distribution and Abundance in the Upper Susitna River; Study 9.6, Fish Distribution and Abundance in the

Middle and Lower Susitna River; Study 9.7, Salmon Escapement; Study 10.14, Surveys of Eagles and Other Raptors; 10.15, Waterbird Migration, Breeding, and Habitat Use) also provided data from incidental observations of river otters.

4.2.1. Variances

Aerial surveys of river otter and mink tracks were not conducted as planned in late winter 2013 (two or three surveys following fresh snowfall in February–early April; RSP Section 10.11.4.2) because of an unanticipated delay in contract approval and study initiation. The survey planned for early winter (November/December) 2013 was not conducted due to logistical difficulties encountered in trying to match a suitable weather window (within three days of fresh snowfall) with pilot and aircraft availability. Despite the lack of dedicated surveys in 2013, the study team was able to compile incidental observations of river otters, river otter tracks, and mink tracks in and near the study area recorded by researchers conducting surveys for the other Project studies described above (Section 4.2). The combination of these incidental data with the results of aquatic furbearer surveys to be conducted in the next study season will enable the study team to meet the study objectives.

4.3. Information for Mercury Assessment

AEA implemented the methods described in the Study Plan, with the exception of the variance explained below (Section 4.3.1).

The intent of RSP Section 10.11.4.3 is to obtain hair samples from river otters and mink for laboratory analysis to characterize preconstruction levels of mercury for the study of Mercury Assessment and Potential for Bioaccumulation (Study 5.7). Because the Alaska Department of Fish and Game (ADF&G) requires that the pelts of river otters be sealed by an authorized ADF&G representative, the study team planned to collect hair samples from river otters that were harvested in the study area and presented to ADF&G for sealing. No river otter carcasses were presented for sealing from the study area in 2013, however, so no hair samples could be collected for that species. Similarly, no trappers were known to have harvested mink in the study area in 2013, so no hair samples could be obtained for that species either. Another potential source of mink hair was incidental capture in hair-snag traps set for marten as part of Study 10.10, Terrestrial Furbearer Abundance and Habitat Use, but the marten trapping component of that study had to be postponed in 2013 (see ISR Study 10.10).

The study team reviewed scientific literature in 2013 to locate and synthesize information on the food habits and diets of river otters and mink in freshwater aquatic systems to support the pathways analysis being conducted for Study 5.7, Mercury Assessment and Potential for Bioaccumulation. The results of that review, which is still in progress, will be incorporated in the USR after the next study season.

4.3.1. Variances

The Study Plan anticipated the possibility that hair samples from river otters and mink might not be obtained from trapper-harvested animals. In that event, then the Study Plan proposed that hair-snag traps (e.g., DePue and Ben-David 2007, Pauli et al. 2008) would be deployed in late

winter during track surveys at locations in the stream survey area where river otter and mink sign was recorded. Because the track surveys were not conducted in 2013 (see Section 4.2.1 above), however, no hair-snag traps were deployed in 2013. The study team will meet Study Plan objectives by deploying hair-snag traps during future track surveys in the next study season.

5. RESULTS

Data developed in support of the Aquatic Furbearer Study are available for download in the following files at http://gis.suhydro.org/reports/isr:

- ISR_10_11_AFUR_Data_2013.accdb.

5.1. Beaver and Muskrat

The study team began the aerial survey of beaver colonies on October 1–2 and completed it on October 9–10, 2013. The survey was conducted in two phases to sample areas at higher and lower elevations under similar conditions (after leaf fall and before ice formation, which occurred earlier at higher elevations). During the first part of the survey, the study team surveyed the Denali corridor between the Denali Highway and the dam and camp facility area, along with the Chulitna corridor between Portage Creek and the dam and camp facility area. Some shallow water bodies had begun to freeze by the time the survey was conducted. The remainder of the study area at lower elevations was surveyed on the second part of the survey.

A total of 186 beaver colonies were recorded and mapped in the study area (Table 5.1-1; Figure 5.1-1), 69 (37.1%) of which were judged to be active, based on the proximity of a fresh food cache consisting of fresh-cut stems of forage plants (typically with leaves still attached) stored in water bodies as an overwinter food supply. Lodges built into banks were common in riverine areas with seasonal or permanently flowing streams, whereas more typical mound-shaped lodges were generally found in "beaver ponds" away from flowing streams. A greater proportion of the lodges located in the downstream survey area (Middle Susitna River Segment) were active than in other parts of the study area (Table 5.1-1); it is possible, however, that the difference is related to lower detectability of inactive bank lodges without caches nearby. Fresh food caches tended to be more visible than were beaver lodges built in river banks, which are more likely to occur in riverine areas.

Twelve observations of muskrats or muskrat pushups were recorded incidentally during aerial surveys of water bodies in the study area for waterbirds and raptors in 2013. Six of those water bodies were located in the Fog Lakes area (Figure 5.1-2). Muskrats or muskrat pushups were recorded on four lakes during waterbird surveys in May, with the number of pushups ranging from 3 to 50 per lake, and muskrat pushups were recorded on six water bodies during Bald Eagle surveys in May. All of the incidental sightings from waterbird and raptor surveys in May were recorded during May 21–24. Two muskrats were observed during landbird/shorebird point-count surveys in late May and early June and a muskrat was observed in a lake between Indian River and Portage Creek during a waterbird brood survey in July 2013.

5.2. River Otter and Mink

The study team compiled a list of 60 incidental observations of river otters and river otter tracks that were recorded incidentally during surveys for other Project studies in 2012 and 2013, but only one observation of mink tracks was recorded during those surveys (Figure 5.2-1). Fourteen sets of river otter tracks and one set of mink tracks were recorded on seven of the 14 transects sampled during aerial surveys of winter tracks for Study 10.10, the Terrestrial Furbearer Study: three sets of river otter tracks on February 26; seven sets of river otter tracks, a river otter, and one set of mink tracks on March 27; and four sets of river otter tracks on April 19. A total of 17 river otters in 12 groups were observed during aerial surveys of waterbirds (Study 10.15, Waterbird Migration, Breeding, and Habitat Use) between early June and mid-October 2013. Two river otters and 23 sets of tracks were recorded in 25 sightings during raptor surveys (Study 10.14, Surveys of Eagles and Other Raptors) in May and October–December 2013. One river otter and four sets of tracks were recorded in five sightings during raptor surveys in July and October–December 2012. One of the river otters seen during a Bald Eagle survey on May 24, 2013, was eating a muskrat at the time of the sighting. Incidental sightings from aerial surveys of radio-tagged fish in December 2013 (S. Crawford, LGL Alaska, pers. comm.) included two groups of four river otters each in the Middle Susitna River Segment, one at the mouth of Portage Creek and the other near Slough 21, plus one set of otter tracks between Jay Creek and Kosina Creek in the Upper Susitna River Segment.

5.3. Information for Mercury Assessment

To date, the review of literature on the food habits, diets, and mercury exposure of river otters and mink has encompassed 30 references from scientific journals, reports, and books. The review, which is still continuing, focuses primarily on documenting the proportion of the diet composed of fish, the types and size classes of fishes eaten, and the amounts consumed. This review will provide important input data for the pathways analysis of Study 5.7, Mercury Assessment and Potential for Bioaccumulation, to be completed in the next study season.

6. DISCUSSION

6.1. Beaver and Muskrat

The beaver survey completed in October 2013 provided current information on the number, distribution, and activity status of beaver lodges in the study area (Project area and downstream survey area). Beavers were distributed throughout most of the Project area and the downstream survey area, but the proportion of active colonies was lower in the access/transmission corridors and dam and camp facility area than in the riverine survey area downstream. Beaver lodges built in riverbanks were more challenging to detect than were lodges in ponds and lakes, and fresh caches had higher detectability; hence, the study team may have located a higher proportion of active colonies in the downstream survey area. APA Project researchers in the 1980s noted that beavers became more numerous with increasing distance downstream from Devils Canyon in the Middle and Lower Segments of the Susitna River, and that beavers were more abundant on side channels and sloughs with silty banks (Gipson et al. 1982, 1984). In contrast, no signs of beaver activity were found in the active floodplain of the Susitna River between the Tyone River (above

the upstream end of the proposed Watana reservoir inundation zone) and Devils Canyon (Gipson et al. 1982, 1984), similar to the 2013 survey results, which found very little beaver sign in the reservoir inundation zone.

The fall survey planned for the next year of this study will provide more data to assess potential differences in the distribution of active colonies. Surveys for the APA Project revealed substantial differences in the number of active colonies among years (e.g., twice as many in 1983 as in 1982), possibly related to the detectability of colonies among years but also to differences in survival as a result of high water events and damage during breakup (Gipson et al. 1984).

Another beaver survey is planned for spring in the next study season to assess overwinter survival of the colonies that were active in fall 2013 and to quantify the presence and activity status of beaver colonies on another fall survey in the next year of study. A similar survey in late April 1984 found that 23 colonies (85 percent) had survived the winter, out of 27 colonies that had been classified as active in October 1983 (Gipson et al. 1984).

Furbearer surveys for the APA Project were primarily restricted to areas within 3 mi of the Susitna River, so information on beavers or muskrats in the potential access corridors for that project are scant. An aerial survey of muskrats and beavers in the upper Susitna basin also was flown in July 1981, but specific results were not reported (Gipson et al. 1982), other than a general statement that most sign of these species was found in water bodies on plateaus above the river at elevations of 2,000–2,400 ft. Sixteen beaver dams were found along the potential road access corridor for the APA Project between Gold Creek and Devil Canyon, and 12 dams and 8 lodges were found along Deadman Creek (Gipson et al. 1984), but it is not possible to compare numbers directly between the APA Project surveys and those for the current study.

The study team compiled 14 incidental observations of muskrats and muskrat pushups in and near the study area in 2013, with most pushups being observed in the Fog Lakes area and at Watana and Clarence lakes. The late spring and delayed breakup in 2013 did not provide good conditions for the muskrat survey, but the incidental observations from surveys conducted for other Project studies generally corroborate the findings of the APA Project studies. Muskrat surveys were flown for the APA Project studies in 1980 on March 10, April 24, and May 9, but the snow cover was too deep to distinguish most pushups until the May survey, when 97 water bodies were surveyed within 3 mi of the Susitna River from the Oshetna River at the upper end of the Watana reservoir zone downstream to Gold Creek (Gipson et al. 1982). Pushups were found on 27 (26 percent) of the 103 lakes surveyed in 1980 (including several lakes from the earlier surveys), ranging from one to 32 pushups per water body. The range observed in this study was three to 50 pushups on individual lakes. The spring survey planned for the next year of study, combined with additional incidental observations, will provide more data on the distribution and relative abundance of muskrats in the study area.

6.2. River Otter and Mink

Incidental observations of river otters and river otter tracks in 2013 indicated that the species is distributed in low numbers along the Susitna River mainstem, tributary streams, and adjacent lakes and ponds in the study area, as was indicated by the only survey of this species that was conducted for the APA Project in the 1980s (Gipson et al. 1982). Surveys of river otter and mink

tracks and sign were conducted once for the APA Project during November 10–12, 1980, using both aerial and ground observations. Fourteen aerial survey transects were flown, extending 3 mi perpendicularly from each side of the Susitna River mainstem from just below Portage Creek upstream to just below the Tyone River mouth. Tracks of each species were recorded on 11 (79 percent) of the 14 transects sampled on that survey (Gipson et al. 1982). Similar aerial surveys of tracks in 2013 conducted for Terrestrial Furbearer Abundance and Habitat Use (Study 10.10) found sign of river otters on a total of seven of the same 14 transects, suggesting that fewer river otters may have been present in 2013 (although direct comparisons are difficult because of the small number of surveys).

During the same survey period in November 1980, ground checks at 37 sampling points (spaced approximately 1–2 mi apart) along the Susitna River from below Portage Creek to Vee Canyon recorded river otter tracks at 17 (46 percent) and mink tracks at 22 (59 percent) of the points sampled (Gipson et al. 1982). River otters were dispersed in low numbers along the length of the river sampled, whereas mink were more numerous in the upper portion of the study area (Gipson et al. 1982). The incidental sightings compiled for the current study in 2013 included only one occurrence of mink tracks, on lower Watana Creek, on an aerial survey of tracks in late March 2013. It is possible that the presence of more mink may have been masked by the similarity between their tracks and those of marten, which are more numerous in the study area than are mink (Gipson et al. 1982). The results of additional track surveys are needed to better assess the relative abundance of mink in the study area.

The researchers who conducted the track surveys in November 1980 considered the number of river otter tracks they encountered on Susitna River shelf ice in the two impoundment zones proposed for that project to be unusually high (43 tracks at 17 locations), and speculated that the high incidence of tracks may have resulted either from otters moving upstream or downstream before freeze-up or from otters feeding on grayling that were moving out of tributaries to overwinter in the river mainstem (Gipson et al. 1982). No such concentrations of tracks have been reported thus far in this study, although the planned survey in November/December 2013 could not be conducted. Nevertheless, the Bald Eagle roosting and foraging surveys (Study 10.14, Surveys of Eagles and Other Raptors) flown periodically during October–early December 2012 and 2013 did not produce any indications of unusual concentrations of river otter tracks.

6.3. Information for Mercury Assessment

River otters and mink are piscivorous carnivores that have been reported to be susceptible to the accumulation of mercury in their body tissues (e.g., Wobeser and Swift 1976, Yates et al. 2005, Sleeman et al. 2010). Hence, obtaining tissue samples from these species in the study area is an important objective of the current study, which will be addressed in the next study season. That information, combined with the results of the literature review, will provide crucial input data for the pathways analysis to be conducted for Study 5.7, Mercury Assessment and Potential for Bioaccumulation, in the next study season.

7. COMPLETING THE STUDY

[Section 7 appears in the Part C section of this ISR.]

8. LITERATURE CITED

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9. TABLES

Table 5.1- 1. Number and Percentage of Beaver Colonies, by General Location and Activity Level, October 2013.

General Location	Active Colonies	Inactive Colonies	Total
Chulitna Corridor	16 (41.0%)	23 (59.0%)	39
Dam and Camp Facility Area	2 (18.2%)	9 (81.8%)	11
Denali Corridor	10 (17.5%)	47 (82.5%)	57
Gold Creek Corridor	6 (35.3%)	11 (64.7%)	17
Middle River	35 (57.4%)	26 (42.6%)	61
Watana Reservoir	0 (0%)	1 (100%)	1
Total	69 (37.1%)	117 (62.9%)	186

10. FIGURES

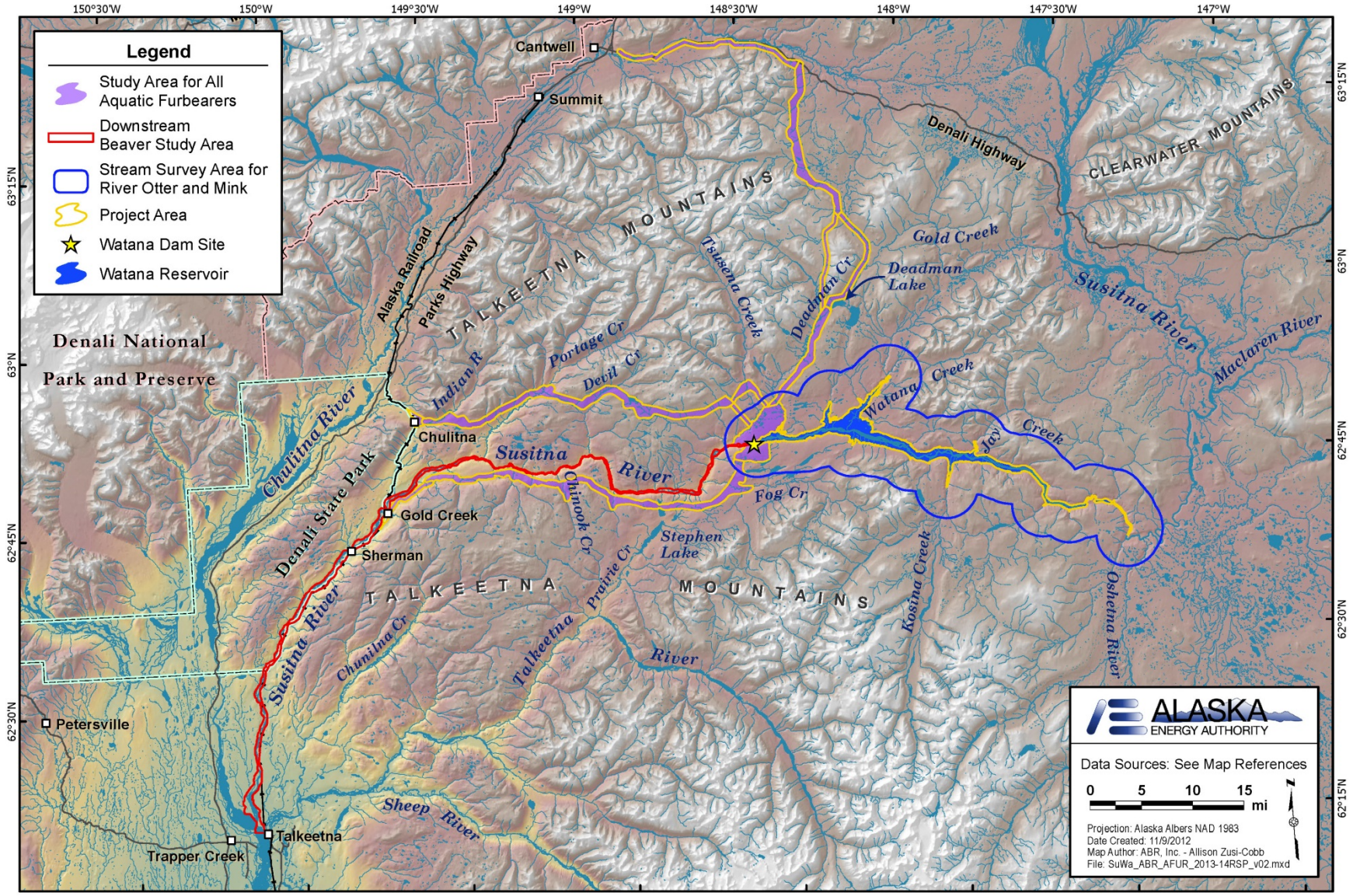

Figure 3- 1. Aquatic Furbearer Study Area.

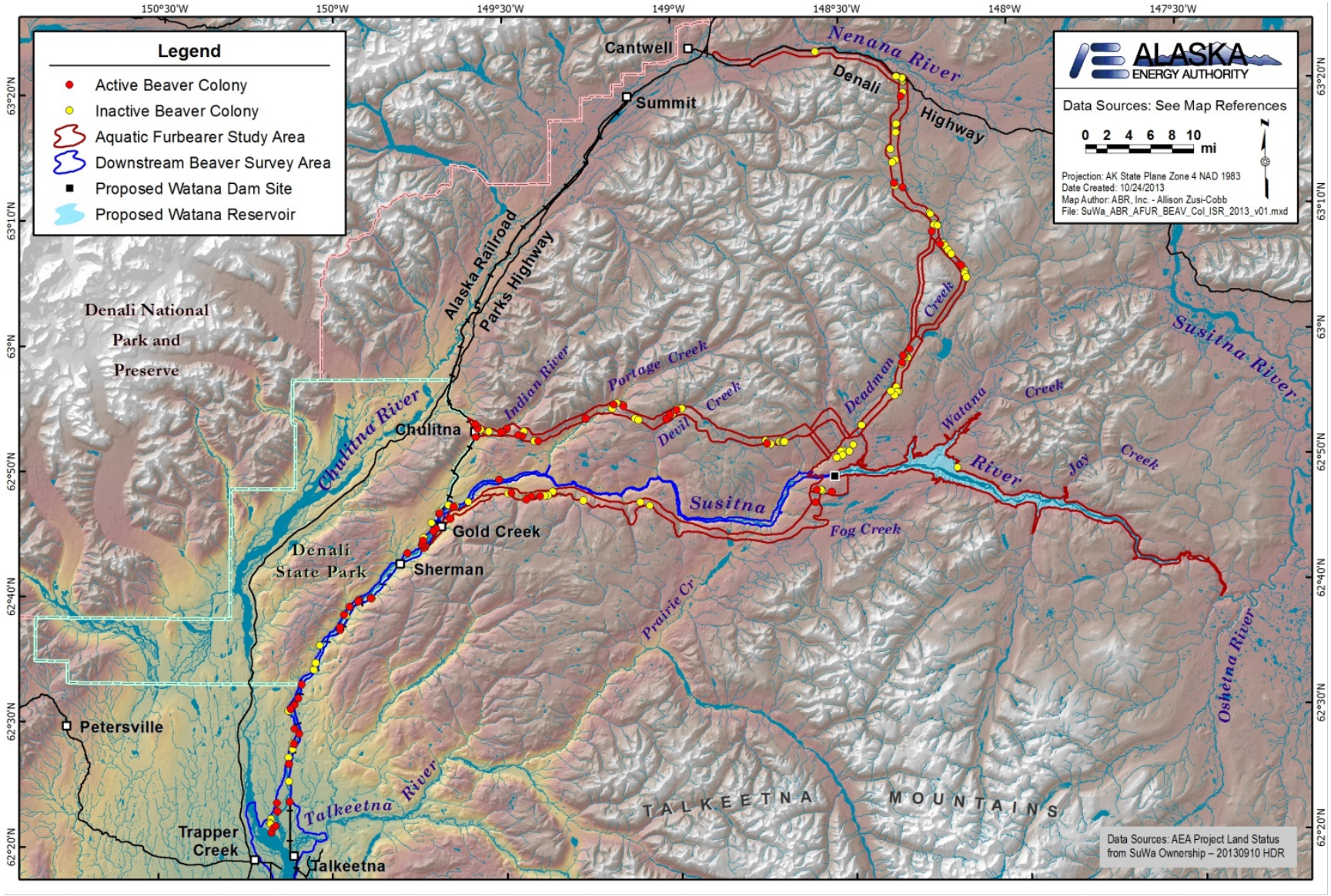

Figure 5.1- 1. Beaver Colony Locations, October 2013.

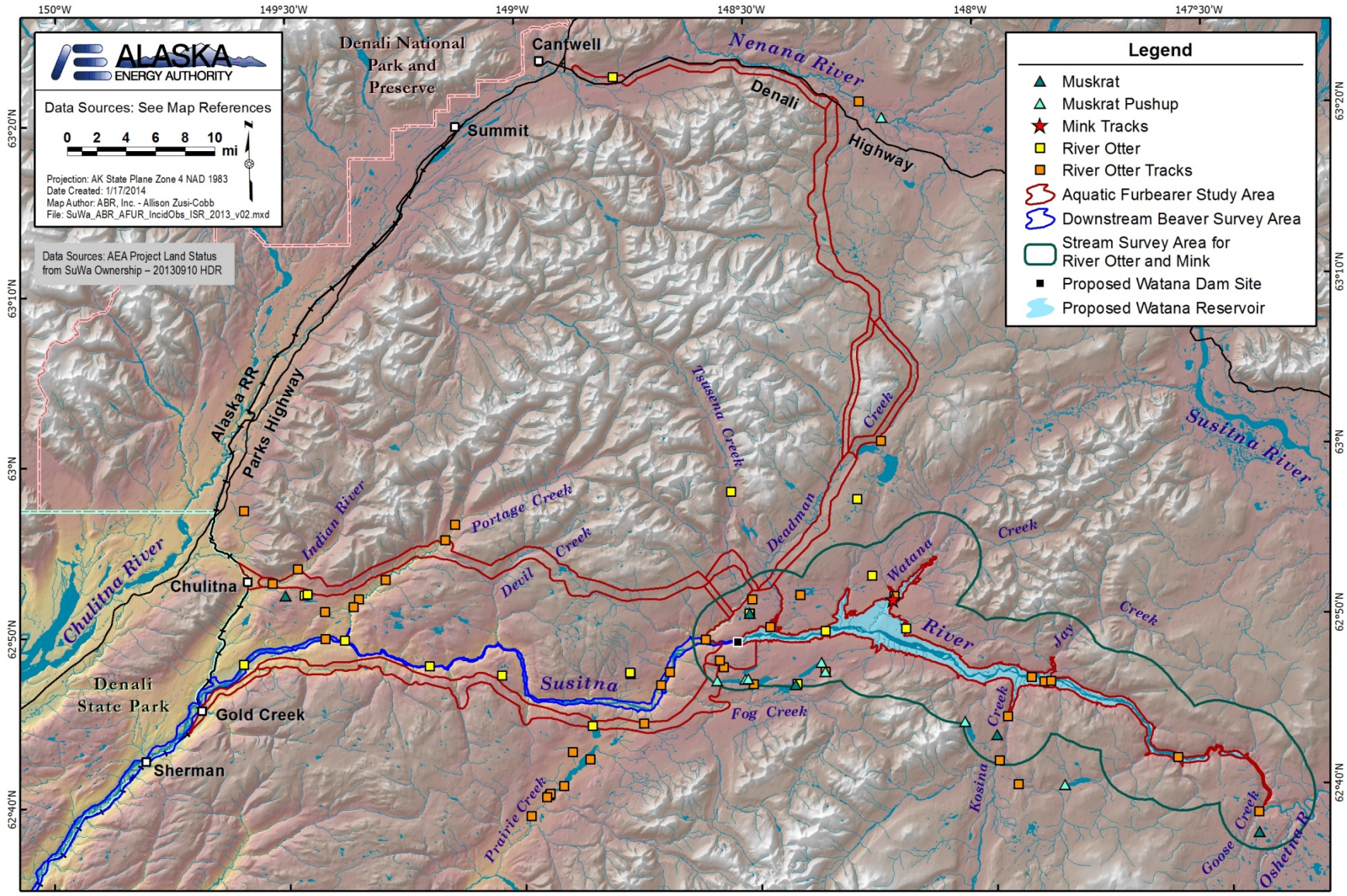

Figure 5.1- 2. Locations of Muskrats, River Otters, and Mink Observed Incidentally during Other Project Surveys in 2013.