

**Susitna-Watana Hydroelectric Project
(FERC No. 14241)**

**Landbird and Shorebird Migration, Breeding,
and Habitat Use
Study Plan Section 10.16**

**Initial Study Report
Part C: Executive Summary and Section 7**

Prepared for

Alaska Energy Authority



SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

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EXECUTIVE SUMMARY

Landbird and Shorebird Migration, Breeding, and Habitat Use, Study 10.16	
Purpose	The primary objective of this study is to collect data on the distribution, abundance, and habitat use of breeding landbirds and shorebirds in the Project vicinity. The data will be used to enable assessments of the direct, indirect, and cumulative impacts on these birds from construction and operation of the proposed Project.
Status	In 2013, field data collection and analysis were completed as planned, with the necessary variances noted below. Two additional seasons of data collection and analysis will be needed to complete the study.
Study Components	<p>(1) Ground-based point-count surveys to collect data on the distribution, abundance, and habitat use of breeding landbirds and shorebirds in the study area.</p> <p>(2) Focused transect and point-count surveys in riverine habitats and transect surveys in lacustrine habitats, targeting piscivorous species and other species typical of fluvial, riparian, and lacustrine habitats.</p> <p>(3) Aerial survey and ground-based monitoring of colonially nesting swallows in riverine habitats within the inundation zone of the proposed Watana Reservoir.</p> <p>(4) Visual migration-watch surveys and radar sampling of migrant landbirds and shorebirds in the vicinity of the proposed Project dam site (reported separately in ISR Study 10.15, Waterbird Migration, Breeding, and Habitat Use).</p> <p>(5) Habitat-use analyses for landbirds and shorebirds to inform the Evaluation of Wildlife Habitat Use (Study 10.19), which will be the first step in quantifying the impacts to landbird and shorebird habitats from development of the proposed Project.</p>

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2013 Variances	<p>(1) The RSP (Section 10.16.4.1.1) describes a plot-allocation procedure based on aerial image-signatures. In 2013, high-resolution aerial imagery was not available for the full study area to use that method. Instead, field plots were allocated using a systematic/random procedure and stratifying by vegetation type (as mapped for the Alaska Power Authority Susitna Hydroelectric Project [APA Project] in 1987). This alternative plot-allocation procedure, which mirrors current accepted practice for the determination of point-count survey locations in Alaska, resulted in an unbiased determination of plot locations, and is sufficient to meet the study objectives.</p> <p>(2) Because the allocation of point-count plots was based on the 1987 APA Project vegetation map, the study area was limited to those areas mapped in 1987. Because of this, the study area was approximately 12 percent smaller than that defined in the RSP (Section 10.16.3). This variance will only occur in 2013 because additional Project-specific vegetation mapping, from ISR Study 11.5, will be used to augment the 1987 APA Project vegetation map and support the point-count plot-allocation process in future study years.</p> <p>(3) The study area surveyed in 2013 was further restricted to those state and federal lands within the study area because land-access permits were not available for Cook Inlet Region Working Group (CIRWG), private, or Alaska Railroad lands. This change reduced the size of the study area defined in the RSP (Section 10.16.3) by approximately 27 percent. This variance is only expected to occur in 2013 because access to CIRWG lands is expected to be authorized for the 2014 and 2015 field seasons.</p> <p>(4) The colonially nesting swallow survey was changed from a boat-based survey, as described in the RSP (Section 10.16.4.3), to a helicopter-based survey. This change resulted in an increase in spatial coverage and survey efficiency.</p> <p>(5) The 2013 field survey for colonially nesting swallows extended beyond the inundation area of the proposed Watana Reservoir, which was the study area described in the RSP (Section 10.16.4.3), to incorporate a 2-mi buffer around the proposed Watana Reservoir, Watana Dam, and Watana Camp. This allowed for the survey of all potential swallow nesting habitat that may be directly or indirectly affected by the creation of the proposed Watana Reservoir.</p>
Steps to Complete the Study	<p>The plans for completing this study include implementing the study components listed above and incorporating the modifications listed below. In 2014, all study components except the swallow survey will be implemented and sampling will occur throughout the entire study area. In 2015, all study components will be implemented. However, in 2015, the point-count surveys and the riverine- and lacustrine-focused surveys will occur only in those</p>

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portions of the study area that were not sampled in 2013 (CIRWG lands, portions of the Denali Corridor West Option, and the Denali Corridor East Option) so as to satisfy the Study Plan requirement of sampling randomly throughout the full study area in two years. The swallow survey in 2015 will be conducted the same study area as used in 2013.

In completing the FERC-approved Study Plan, AEA will implement eight modifications. Three of the eight modifications involved changes to the Study Plan field methods; those modifications, implemented in 2013, are described above under 2013 Variances and will be carried forward in 2014 and 2015. The remaining five modifications, described below, will be implemented in 2014 and 2015:

(1) The study area has changed from that described in the RSP (Section 10.16.3). AEA has added the Denali East Option road and transmission line alternative corridor to the study area. For this study, the corridor addition to the study area includes a 2-mi buffer surrounding the center lines of the road and transmission line alignments of the new Denali East Option.

(2) The point-count survey component of the riverine-focused surveys, as described in the RSP (Section 10.16.4.2), will be dropped in 2014 and 2015 because river noise inhibited the acquisition of accurate data for breeding songbirds in vegetated riparian habitats.

(3) The metric representing bird abundance for the riverine- and lacustrine-focused surveys (birds per unit time), as described in the RSP (Section 10.16.4.2), will be changed for the Updated Study Report (USR). The new metric for bird abundance for the riverine-focused surveys will be linear densities (birds per km of stream length). For the lacustrine-focused surveys, the total number of birds recorded on lacustrine water bodies and in adjacent habitats will be used as the abundance metric.

(4) Comparisons of the current and historical (1980s APA Project) data on landbirds and shorebirds were planned for inclusion in both the ISR and the USR (RSP Section 10.16.4.5). However, because annual fluctuations in the abundance of landbirds and shorebirds can be quite large, it could be misleading to make comparisons to historical data with only one year (2013) of current data. For these reasons, comparisons with the historical data will be presented only in the USR, after data from all years of this study are available.

(5) The objectives and methods in this study related to mercury analysis, including the literature review of food habits and diets of piscivorous landbirds and shorebirds and the collection of feather samples, have been consolidated in the Mercury Assessment and Potential for Bioaccumulation

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	<p>Study (Study 5.7).</p> <p>Because the eight study modifications serve to improve the sampling procedures, survey efficiency and coverage, the quantity and/or quality of the data collected, and the presentation of the study results, they all serve to enhance the achievement of the study objectives. No other modifications to the Study Plan are needed to achieve the study objectives.</p>
Highlighted Results and Achievements	<p>The landbird and shorebird study team conducted 1,364 point-count plots on 113 survey transects, 13 riverine-focused transect surveys, and 59 lacustrine-focused transect surveys between May 23 and June 20, 2013. Ninety-seven bird species were recorded during the surveys, 53 of which were landbirds and 11 of which were shorebirds. The most abundant landbird species were Fox Sparrow, White-crowned Sparrow, Common Redpoll, Yellow-rumped Warbler, Varied Thrush, Savannah Sparrow, Ruby-crowned Kinglet, and American Tree Sparrow. The most commonly recorded shorebird species were Wilson’s Snipe, American Golden-Plover, Lesser Yellowlegs, and Spotted Sandpiper, and Least Sandpiper.</p> <p>Preliminary density estimates for landbirds were calculated from the point-count survey data collected in 2013, and these estimates will be updated and expanded for additional species, as much as possible, after incorporation of the 2014 and 2015 survey data are collected. For the less common shorebirds, not enough observations were available to calculate densities with a single year of survey data.</p> <p>The swallow survey team identified 25 swallow nesting colonies, mostly on cliff and bluff faces along the Susitna River and the larger tributary streams in the study area in 2013. A minimum estimate of 438 pairs of nesting swallows in those 25 colonies was calculated from the survey data. Almost all were Bank Swallows, but two colonies of Violet-green Swallows also were recorded.</p>

7. COMPLETING THE STUDY

7.1. Proposed Methodologies and Modifications

To complete this study, the study team will implement the methods described in the Study Plan except as described in 7.1.2. These methods include:

- The same stratified systematic/random plot-allocation methods employed in 2013—modified from those described in the RSP (Section 10.16.4.1.1)—will continue to be used to determine the locations of point-count survey sites in an unbiased manner (see the description of these methods in Section 4.1.1 above and Section 7.1.2 below). These methods will facilitate point-count sampling in those portions of the study area that were not sampled in 2013, including CIRWG lands, areas in the northern and western portions of the Denali Corridor West Option, and in the Denali Corridor East Option.
- The point-count surveys for landbirds and shorebirds will be repeated following the same field methods used in 2013 (RSP Section 10.16.4.1.2). These surveys will be conducted within the revised study area boundaries (see the study area modification described below in Section 7.1.2).
- In 2015, the multiyear point-count data set will be analyzed with both removal and distance analyses to improve the accuracy of the detection functions and the density estimates for landbirds and shorebirds in the study area (RSP Section 10.16.4.1.3).
- Also in 2015, more detailed habitat-use analyses will be conducted for each landbird and shorebird species recorded in the study (RSP Section 10.16.7); these analyses will be based on the final wildlife habitat types mapped in the study area (see ISR Study 11.5).
- The riverine- and lacustrine-focused surveys will be repeated following the same survey methods used during the 2013 field season (RSP Section 10.16.4.2), except that the point-counts in riverine areas will be omitted (see Section 7.1.2 below).
- The second year of surveys for colonially nesting swallows will be conducted using the same field methods (RSP Section 10.16.4.3) and study area (see Section 4.1.3 above and Section 7.1.2 below) surveyed in 2013. Field efforts will be focused on re-examining colonies found in 2013, systematically searching for newly established colonies, and determining species composition, abundance, and breeding activity at accessible colonies.

7.1.1. Decisions Points from Study Plan

There were no decision points in the FERC-approved Study Plan to be evaluated for this study following the completion of 2013 work.

7.1.2. Modifications to Study Plan

Three of the eight modifications described below were implemented in 2013 as variances and will be carried forward in the 2014 and 2015 study seasons. The other five modifications will be implemented in 2014 and 2015 or in preparation for the USR.

(1) The study area has changed from that described in the RSP (Section 10.16.3). As described in the ISR Overview and depicted in Figure 1, AEA has added the Denali Corridor East Option road and transmission line corridor to the study area. For this study, the corridor addition to the study area includes a 2-mi buffer surrounding the center lines of the road and transmission line alignments of the new Denali Corridor East Option (Figure 7.1-1), which matches the 2-mi buffers used on the other potential road and transmission line corridors included in the study area.

(2) The RSP (Section 10.16.4.1.1) indicates that a pseudo-stratified random sampling procedure using high-resolution imagery signatures as the sampling strata would be used to determine the locations of point-count plots. This procedure had to be changed in 2013 because of the lack of suitable high-resolution imagery for the full study area to support the pseudo-stratified random sampling approach (see the variance describing this modification above in Section 4.1.1). Instead, a stratified systematic/random sampling procedure was used in 2013, which involved the random location of grids of point-count plots within habitat types (habitat types were represented by the AVC Level-III vegetation types on the vegetation map prepared for the APA Project by Kreig and Associates [1987]). More details on this sampling procedure can be found in Section 4.1.1 above and in Part B to this ISR. The alternative stratified systematic/random sampling procedure used in 2013 is less prone to bias in the determination of point-count plot locations than the pseudo-stratified random sampling procedure originally proposed in the RSP. Because of this, and to maintain consistency in the plot-allocation procedures across study years, the stratified systematic/random plot-allocation procedure used in 2013 will be used again in 2014 and 2015. To support the plot-allocation procedure in 2014 and 2015, new AVC Level-III vegetation mapping—prepared in the Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin (Study 11.5)—will be added to the 1987 Level-III vegetation map for those portions of the study area that were unmapped by Kreig and Associates (1987). The portions of the study area that were unmapped in 1987 include the northern and western portions of the Denali West Corridor and several other small areas on the Denali, Chulitna, and Gold Creek corridors. This modification in the plot-allocation procedure provides for an unbiased determination of point-count plot locations and will better serve to achieve the study objectives.

(3) In the RSP (Section 10.16.4.3), a boat survey platform is described for the survey of colonially nesting swallows. In 2013, the study team changed to a helicopter survey platform because it was clear after initial field work in the study area for the point-count surveys that a search for swallow colonies would be far more efficient (greater coverage in a shorter amount of time) using a helicopter as compared to a river boat. More details regarding this modification (discussed as a variance in this ISR) can be found in Section 4.3.1 above. To maintain consistency with the 2013 survey methods, a helicopter survey platform will be used again in completing this component of the study. This modification improves the survey efficiency and coverage.

(4) The RSP (Section 10.16.3) describes the study area for the colonially nesting swallow survey as encompassing the inundation zone of the proposed Watana Reservoir. This was changed in 2013, to incorporate a 2-mi buffer around the proposed Watana Reservoir, Watana Dam site, and Watana Camp. This expansion of the study area allowed the study team to survey all potential swallow nesting habitat in areas that could be directly or indirectly affected by the proposed

Project (i.e., with the inclusion of colonies very near to but not expected to be directly inundated by the proposed Watana Reservoir). More details regarding this modification can be found in Section 4.3.1 above. The study area expansion also was made more feasible given the greater efficiency in locating swallow colonies from a helicopter as opposed to a boat. This modification enhances the study objectives by widening the search area for potential swallow colonies.

(5) The RSP (Section 10.16.4.2) indicates that point counts and walking transect surveys would be conducted during the riverine-focused surveys, and during the field work in 2013 both survey efforts were implemented. The detections of breeding songbird species vocalizing in vegetated riparian habitats during the point-count surveys, however, were hindered in many cases because of river noise. Moving the point-count locations away from stream banks was only effective in some cases in reducing river noise. In situations with narrow riparian corridors, moving the point-count locations was not possible without the observers moving out of riparian habitats, which would have defeated the purpose of the survey. Because of these limitations and because the primary targets of the riverine-focused surveys are those landbird and shorebird species that use fluvial and riverine habitats and are typically under-sampled in standard point-counts (e.g., Belted Kingfisher, American Dipper, Semipalmated Plover, Solitary Sandpiper, Spotted Sandpiper, Wandering Tattler), not breeding songbirds in vegetated riparian habitats (RSP Section 10.16.4.2), the point-count component of the riverine-focused surveys will be dropped in 2014 and 2015. The 2013 data from the walking transect surveys in riverine habitats were compared to the point-count data, and it was clear that the same sets of riparian songbird species were recorded in both survey efforts, so there will be no loss of information on species occurrence in riparian habitats by removing the point-count survey component. As a result of this modification, the lengths of the stream segments on the walking transect surveys will be increased by eliminating the time spent conducting point counts. This greater survey coverage will result in more accurate linear density estimates for birds using riverine habitats (see below), and hence, will improve achievement of the study objectives.

(6) In the RSP (Section 10.16.4.2), the metric described to represent bird abundance for the riverine- and lacustrine-focused surveys is birds per unit time spent during the survey. This will be changed for the USR, partly in response to informal comments made by the USFWS on the draft version of this ISR. In the USR, the metric used to represent bird abundance for the riverine-focused surveys will be linear densities (birds per km of stream length). For the lacustrine-focused surveys, the total number of birds present on each lacustrine water body and in adjacent habitats will be reported. These changes will be made so that reviewers will be able to evaluate the total number of birds recorded as opposed to a relative measure of abundance such as birds per unit time, and hence, the revised metrics will better serve to achieve the study objectives. Additionally, representing the riverine-focused survey data as linear densities will allow for a rough calculation of the number of riverine-adapted birds that could be affected by the proposed Project.

(7) As described in the RSP (Section 10.16.4.5), comparisons of the current and historical (1980s APA Project) data on landbirds and shorebirds were planned to be made both in the ISR and the USR. This protocol was changed in 2013 for this ISR (see more details above in Section 4.5.1) because it is well known that annual fluctuations in the abundance of landbirds and shorebirds can be quite large; therefore, it could be misleading to make comparisons of the historical data with only one year (2013) of current data. For these reasons, comparisons with the historical data

will be presented only in the USR, after data from all years of this study are available. This modification will enhance the achievement of the study objectives by avoiding potentially contradictory and misleading information being presented in the ISR and the USR.

(8) RSP Sections 10.16.1, 10.16.4.2 and 10.11.4.6 provide objectives and methods for the study team to review available information on food habits and diets of piscivorous landbird and shorebird species as background for the Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7), and to opportunistically collect feathers for laboratory analysis of mercury levels. After further consideration of all mercury studies for the proposed Project, AEA has removed these objectives and methods related to mercury analysis of piscivorous landbirds and shorebirds (RSP Sections 10.16.1, 10.16.4.2 and 10.11.4.6) and consolidated this work under the Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7). Please see ISR Study 5.7.

7.2. Schedule

In general, the schedule for completing the FERC-approved Study Plan is dependent upon several factors, including Project funding levels authorized by the Alaska State Legislature, availability of required data inputs from one individual study to another, unexpected weather delays, the short duration of the summer field season in Alaska, and other events outside the reasonable control of AEA. For these reasons, the Study Plan implementation schedule is subject to change, although at this time AEA expects to complete the FERC-approved Study Plan through the filing of the Updated Study Report by February 1, 2016, in accordance with the ILP schedule issued by FERC on January 28, 2014.

With regard to this specific study, the study team expects to complete the field data collection during the 2014 and 2015 study seasons and to complete the reporting for this study in the USR. In 2014, the study team will conduct the following activities:

- The stratified systematic/random plot-allocation methods used in 2013—modified from those described in the RSP (Section 10.16.4.1.1) and above in Sections 4.1.1 and 7.1.2—will be used in 2014 to determine the locations of point-count survey sites. These methods will facilitate point-count and lacustrine-habitat-focused sampling in the full study area, including those portions of the study area that were not sampled in 2013 (CIRWG lands, areas in the northern and western portions of the Denali Corridor West Option, and in the Denali Corridor East Option).
- The point-count surveys for landbirds and shorebirds will be repeated in 2014 following the same field methods used in 2013 (RSP Section 10.16.4.1.2). These surveys will be conducted throughout the study area as was done in 2013, but will use the revised study area boundaries (see the study area modification described above in Section 7.1.2).
- The riverine- and lacustrine-focused surveys will be repeated in 2014 following the same survey methods used during the 2013 field season (RSP Section 10.16.4.2), except that the point-counts in riverine areas will be omitted (see Section 7.1.2 above). As in 2013, the lacustrine-focused surveys in 2014 will be conducted throughout the study area in conjunction with the point-count surveys, but the revised study area boundaries will be

used (see the study area modification described above in Section 7.1.2). The riverine-focused surveys in 2014 will be conducted in the inundation zone plus a 2-mi buffer, as was done in 2013, and will include CIRWG lands which were not surveyed in 2013.

In 2015, the study team will conduct the three activities described above for 2014 plus the additional field and reporting activities described below. In 2015, the point-count surveys and lacustrine-focused surveys will be conducted only in those areas that were not sampled in 2013 (CIRWG lands, the northern and western portions of the Denali Corridor West Option, and the Denali Corridor East Option) so as to satisfy the Study Plan requirement of sampling randomly throughout the full study area in two years. The riverine-focused surveys will be conducted only along those streams and rivers that were not sampled in 2013 (on CIRWG lands within the inundation zone plus a 2-mi buffer).

- The second year of surveys for colonially nesting swallows will be conducted in 2015 using the same field methods (RSP Section 10.16.4.3) and study area (see Sections 4.1.3 and 7.1.2 above) surveyed in 2013. Field efforts will be focused on re-examining colonies found in 2013 and systematically searching for newly established colonies.
- In 2015, the multiyear point-count data set will be analyzed with both removal and distance analyses to improve the accuracy of the detection functions and the density estimates for landbirds and shorebirds in the study area (RSP Section 10.16.4.1.3).
- Also in 2015, more detailed habitat-use analyses will be conducted for each landbird and shorebird species recorded in the study (RSP Section 10.16.7); these analyses will be based on the final wildlife habitat types mapped in the study area (see ISR Study 11.5).
- Final analyses of the data from all study years will be conducted in 2015 and the results of each component of this study will be reported in the USR.

7.3. Conclusion

The 2013 study effort, including the variances described in Section 4, resulted in far more data being collected than was expected. Combining those data with the work scheduled for 2014 and 2015, including the modifications described above in Section 7.1.2 and the use of the Project-specific wildlife habitat mapping data (see ISR Study 11.5)—to analyze habitat-use patterns and assist in the determination of abundance estimates—the planned landbird and shorebird study activities will achieve the study objectives.

The study team for the interrelated Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin (Study 11.5) has reduced the study area buffer size for wildlife habitat mapping to 2 mi instead of 4 mi. The study area for Study 11.5 also has been modified to incorporate the addition of the Denali Corridor East Option transmission line/road corridor as described above in Section 7.1.2. The modifications to Study 11.5 make the study area for wildlife habitat mapping exactly the same as the study area used in the landbird and shorebird study; hence the study area modifications for Study 11.5 are fully consistent with the objectives of the landbird and shorebird study. The reduction in the study area buffer size in Study 11.5 will allow that study team to meet study objectives and complete the wildlife habitat mapping in time to provide the required data to the landbird and shorebird study team.

7.4. Figures

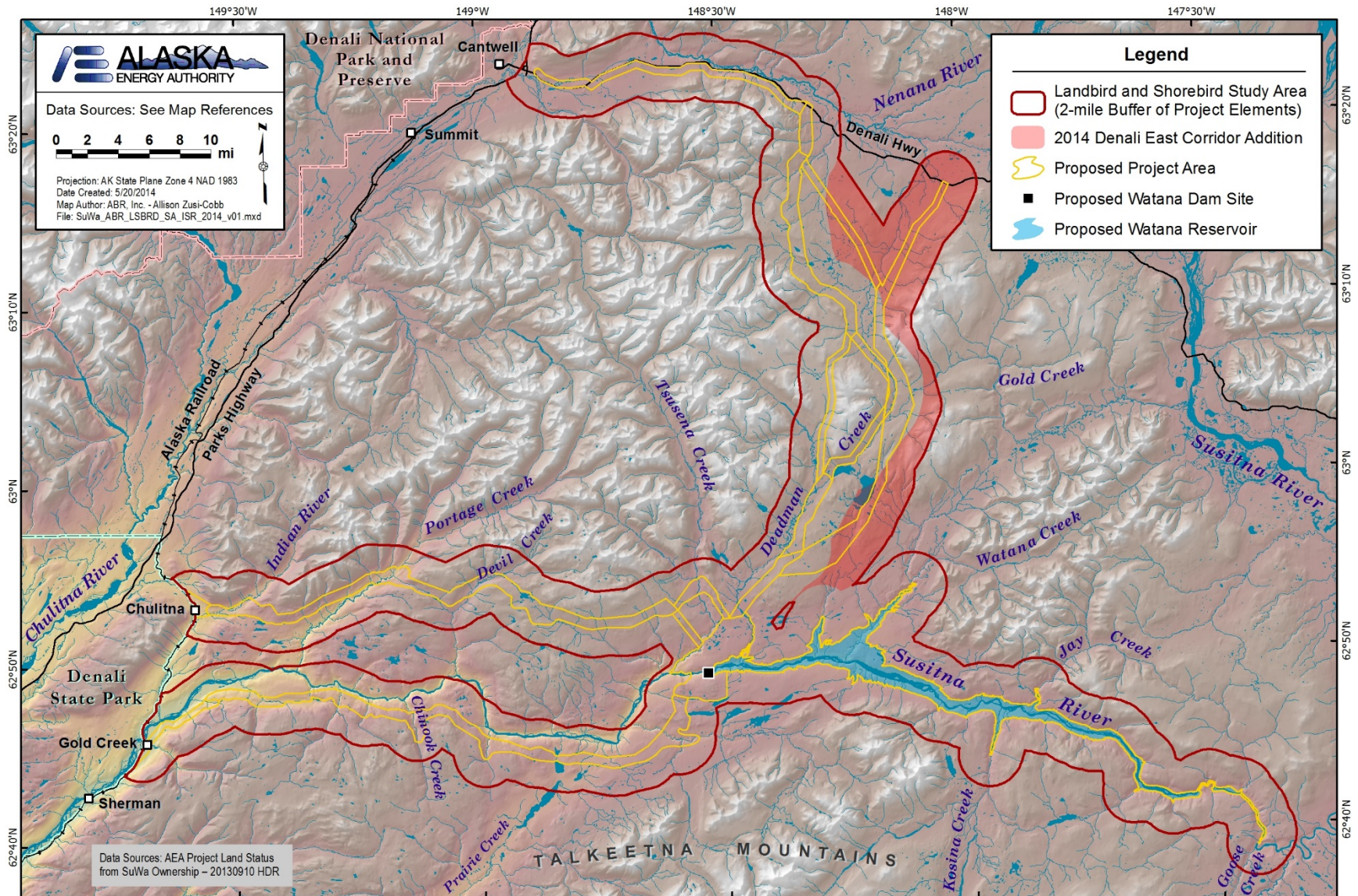


Figure 7.1-1. Revised study area for landbirds and shorebirds, showing Denali East Corridor Option added in 2014.