

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

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

**Part D: Supplemental Information to
June 2014 Initial Study Report**

Prepared for

Alaska Energy Authority



SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

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1. INTRODUCTION

Section 1 (Part A) of the June 2014 ISR for the Landbird and Shorebird Migration, Breeding, and Habitat Use Study (Study Plan 10.16) details the development of this study from the Revised Study Plan (RSP) in 2012 through the end of the 2013 study season. Section 7 of the ISR (Part C), filed in June 2014, sets forth AEA's plan and schedule, at that time, for completing this study and meeting the objectives of the RSP.

As detailed in Section 2.2 of the ISR Part D Overview, various circumstances have required AEA to extend the original timeframe for completing the Commission-approved Study Plan. However, AEA has made meaningful progress with this Study 10.16 since the filing of the ISR in June 2014. As detailed below, AEA's recent activities for Study 10.16 have consisted of the following:

- In 2014, the study team conducted the second season of surveys for all field study tasks, except the colonially nesting swallow surveys (see Section 7.2 below).
- On October 21, 2014 AEA held an ISR meeting to update licensing participants on the status of the Landbird and Shorebird Study.
- The cumulative, error-corrected field data for this study for the two study years (2013 and 2014) have been uploaded to the Project server at the Geographic Information Network of Alaska.
- The study team prepared the 2014 Study Implementation Report for Study 10.16 in October 2015.

The primary purpose of this Part D Supplemental Information to the ISR is to report on the implementation of the Study Plan from the filing of the ISR in June 2014 through the filing of the Study Implementation Report and this ISR Part D. In light of this additional implementation, this Part D also identifies AEA's plans for completing Study 10.16 in a manner that meets the objectives of the Commission-approved Study Plan.

2. BACKGROUND

2.1. Purpose of Study

The goal of the study is to collect baseline data on the occurrence, distribution, abundance, and habitat use of breeding landbirds and shorebirds in the Project area to enable assessments of the direct, indirect, and cumulative impacts on these birds from construction and operation of the proposed Project. This study was designed to provide data on species of conservation concern, both landbirds and shorebirds, that are known or expected to occur in the Project area, as well as numerous other bird species that are protected under the federal Migratory Bird Treaty Act.

The study objectives are established in RSP Section 10.16.1:

- Collect data on the distribution and abundance of landbirds and shorebirds during the summer breeding season.
- Identify habitat associations for landbirds and shorebirds.
- Evaluate changes in distribution, abundance, and habitat use of landbirds and shorebirds through comparison with historical data.
- Characterize the timing, volume, direction, and altitude of landbirds and shorebirds migrating through the dam and camp facilities area (reported in the Study Completion Report for Study 10.15, Waterbird Migration, Breeding, and Habitat Use).
- Review the foraging habits and diet literature, and collect feather samples, if possible, for piscivorous and partly piscivorous landbird and shorebird species to inform Study 5.7, Mercury Assessment and Potential for Bioaccumulation.

2.2. Study Components

This study consists of the following components:

- Ground-based point-count surveys to collect data on the distribution, abundance, and habitat use of breeding landbirds and shorebirds in the study area.
- 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.
- Aerial survey and ground-based monitoring of colonially nesting swallows in riverine habitats within the inundation zone of the proposed Watana Reservoir.
- 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).
- 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.

3. STATUS, HIGHLIGHTED RESULTS, AND ACHIEVEMENTS

The following tasks were completed in 2013 and reported in Part A of the ISR for Study 10.16:

- The study team conducted ground-based point-count surveys in May and June 2013 to collect field data on the occurrence, distribution, and abundance of breeding landbirds and shorebirds in the study area during the summer breeding season.
- Also in May and June 2013, the study team conducted ground-based riverine- and lacustrine-focused surveys, targeting landbird and shorebird species typical of fluvial, riparian, and lacustrine habitats.

- In July 2013, the study team conducted an aerial survey of nesting swallows colonies, and made ground-based observations (at accessible colonies) to estimate activity levels, stage of breeding, and abundance.
- A study of migrant landbirds and shorebirds using a combination of daytime visual sampling and nocturnal radar and visual sampling was conducted during the spring and fall migration periods. This study component was conducted by researchers working on the Waterbird Study (Study 10.15).
- The study team prepared a literature review of piscivorous and partly piscivorous landbird and shorebird species and delivered it to the study team for the Mercury Study (Study 5.7).

The study team has completed the following activities for Study 10.16 since those reported in the June 2014 filing of the ISR:

- On March 7, 2014, a Technical Work Group (TWG) meeting was held to discuss possible tissue sampling of landbirds and shorebirds for mercury analysis.
- In May and June 2014, the study team conducted the second season of surveys for all field study tasks, except the colonially nesting swallow surveys (see Section 7.2 below).
- AEA held an ISR meeting on October 21, 2014 to discuss the results and status of the Landbird and Shorebird Study.
- In October 2015, the study team prepared the 2014 Study Implementation Report for Study 10.16, which summarizes the results of the field surveys conducted in 2014.

4. SUMMARY OF STUDY 10.16 DOCUMENTS

Since filing of the RSP in 2012, AEA and FERC have prepared several documents pertaining to this study. To aid review by FERC staff and licensing participants, each of these documents is listed below. Each of these documents is accessible on AEA's Project licensing website (<http://www.susitna-watanahydro.org/type/documents/>) by clicking on the entry in the "Link" column in the table. In addition, these documents are available on FERC's eLibrary system (<http://www.ferc.gov/docs-filing/elibrary.asp>), in Docket No. P-14241.

Title	Date	Description	Link
10.16. Landbird and Shorebird Migration, Breeding, and Habitat Use Study (Revised Study Plan)	12/14/2012	This document presents the plan for this study, including goals, objectives, the study area, and proposed study methods for landbirds and shorebirds.	RSP for Study 10.16
FERC Study Plan Determination for Study 10.16	2/1/2013	This document presents FERC approval of Study 10.16, which approved AEA's Revised Study Plan with no recommended changes.	FERC SPD for Study 10.16

Title	Date	Description	Link
Draft Initial Study Report for Study 10.16	2/3/2014	This draft of the ISR summarized the study methods and variances during the 2013 study season, and presented preliminary data collected for Study 10.16. This draft ISR was later republished as Part A of the final ISR.	Draft ISR for Study 10.16
Initial Study Report for Study 10.16	6/3/2014	This document is the Initial Study Report (Parts A, B and C) for Study 10.16. Part A republishes the Draft ISR. Part B identifies supplemental information and errata in Part A. Part C presents study modifications and plans for completing the study.	ISR Part A for Study 10.16 ISR Part B for Study 10.16 ISR Part C for Study 10.16
Initial Study Report Meetings, October 21, 2014	11/15/2014	Transcripts and AEA's agenda and Powerpoint presentations for the ISR meeting concerning the Project wildlife studies.	Transcripts from ISR Meeting Materials from ISR Meeting
Landbird and Shorebird Migration, Breeding, and Habitat Use Study (10.16) – 2014 Study Implementation Report	11/4/2015	2014 Study Implementation Report: a summary of field survey results in 2014.	2014 SIR for Study 10.16

5. NEW STUDY DOCUMENTATION SUPPLEMENTING THE ISR

The following table identifies and describes additional reports and other documents that update, refine, or otherwise supplement certain sections of the ISR pertaining to Study 10.16 during AEA's continued implementation of the Study Plan since the ISR was filed in June 2014.

ISR Reference	Description
Part A, Section 4	This Section is updated and supplemented by the Study Implementation Report for Study 10.16 (Section 4), which describes the study methods and variances implemented in 2014.
Part A, Section 5	This Section is supplemented by the Study Implementation Report for Study 10.16 (Section 5), which describes the field survey results for 2014.
Part A, Appendices A through F	These appendices are supplemented by those in the Study Implementation Report for Study 10.16 (Part A, Appendices A through F), which summarize the field survey results for 2014.

6. VARIANCES

6.1. 2013 Study Season

The following variances are reported in the June 2014 ISR:

- 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, is an improvement over the procedure described in the Study Plan and resulted in an unbiased determination of point-count plot locations. This plot-allocation procedure is sufficient to meet the study objectives.

- Because the allocation of point-count plots was based on the 1987 APA Project vegetation map, the study area in 2013 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 only occurred in 2013 because additional Project-specific vegetation mapping, from the Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin (Study 11.5), was used in 2014 to augment the 1987 APA Project vegetation map and support the point-count plot-allocation process (see the Study Implementation Report for Study 10.16, Section 4.1.1).
- The study area surveyed in 2013 was further restricted to 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 Corporation (ARRC) lands. This change reduced the size of the study area defined in the RSP (Section 10.16.3) by approximately 27 percent. The vast majority of that 27 percent represents CIRWG lands. Private lands and ARRC lands cover less than 0.4% of the study area, and to meet the study objectives it was not necessary to sample on the very small portions of the study area occurring on those lands. This variance only occurred in 2013 because access to CIRWG lands was subsequently authorized for the 2014 field season (see the Study Implementation Report for Study 10.16, Section 4.1.1).
- The colonially nesting swallow survey was changed in 2013 from a boat-based survey, as described in the RSP (Section 10.16.4.3), to a helicopter-based survey. This change resulted in a substantial increase in spatial coverage and survey efficiency.
- 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-mile 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.

6.2. 2014 Study Season

As noted in Section 4 of the Study Implementation Report for this study, the following variances occurred following the filing of the June 2014 ISR:

- As explained in Section 1.3 of the ISR Part D Overview and Section 3 of the Study Implementation Report for Study 10.16, in 2014 AEA included the Denali East Corridor Option as an additional alternative north-south corridor alignment for transmission and access from the dam site to the Denali Highway. For this study, in 2014 the corridor

addition included a 2-mile buffer surrounding the center lines of the new corridor and resulted in a change to the point-count plot-allocation sampling frame to allow the random allocation of study plots in the Denali East Corridor Option portion of the study area.

- Also in 2014, as explained in Section 1.3 of the ISR Part D Overview and Section 3 of the Study Implementation Report for Study 10.16, after the ISR was filed with FERC in June 2014, AEA finalized its plans to eliminate the Chulitna Corridor from further study. Accordingly, in 2014 the study team removed the Chulitna Corridor from the sampling frame for the allocation of point-count plots. No field surveys were conducted in Chulitna Corridor in the 2014 field season.
- In 2014, a more conservative approach to avoid sampling on private lands and Alaska Railroad Corporation (ARRC) lands was implemented (a 0.5-mile buffer surrounding all known private land parcels and all ARRC lands was used to avoid the allocation of point-count plots on those lands). This variance in the point-count plot-allocation methods was necessary to ensure that field crews would not conduct surveys or inadvertently stray onto private lands or ARRC lands during the field work.
- The point-count survey component of the riverine-focused surveys, as described in the RSP (Section 10.16.4.2), was eliminated in 2014 because the point-count survey data collected in 2013 in riverine habitats indicated that river noise frequently inhibited the acquisition of accurate data for breeding songbirds in vegetated riparian habitats.
- The metric representing bird abundance for the riverine-focused surveys (birds per unit time), as described in the RSP (Section 10.16.4.2), was changed in 2014 partly as a result of comments from the U.S. Fish and Wildlife Service. As described in the Study Implementation Report for Study 10.16, Section 4.2, the revised metric for bird abundance for the riverine-focused surveys has been changed to linear densities (birds per km of stream length).
- To augment the uncorrected counts of birds described for the riverine-focused surveys in the RSP (Section 10.16.4.2), in 2014 the study team improved the field methods and added line-transect distance-sampling techniques to the riverine-focused survey methods. The 2014 field data now can be analyzed with distance-sampling methods to correct for detection probability, and may allow for the estimation of a corrected number of birds that could be affected by the inundation of riverine habitats from the proposed Project. Line-transect distance-sampling methods were not possible in the vegetated riparian habitats surveyed adjacent to the sampled streams because of restrictions in visibility, so the numbers of birds recorded in those habitats will remain uncorrected for detection probability. This variance will not affect analyses involving the combined data from both study years or any comparisons in results between study years. For those analyses, the study team will use uncorrected, linear densities (see above), which can be calculated from the field data for both study years.

7. STUDY PLAN MODIFICATIONS

7.1. Modifications Identified in ISR

Section 7 of the ISR (Part C) details modifications for this study following the 2013 study season. These modifications are generally summarized as follows:

- As explained in the ISR (Part C, Section 7.1.2), in 2014 AEA included the Denali East Corridor Option as an additional alternative north-south corridor alignment for transmission and access from the dam site to the Denali Highway. For this study, the corridor addition included a 2-mile buffer surrounding the center lines of the new Denali East Corridor Option. This change was implemented as a variance in 2014 (see Section 6.2 above).
- 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. 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 Alaska Vegetation Classification Level-III vegetation types on the vegetation map prepared for the APA Project in 1987). This change was implemented as a variance in 2013 (see Section 6.1 above).
- The colonially nesting swallow survey was changed in 2013 from a boat-based survey, as described in the RSP (Section 10.16.4.3), to a helicopter-based survey. This change resulted in a substantial increase in spatial coverage and survey efficiency. This change was implemented as a variance in 2013 (see Section 6.1 above).
- 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-mile buffer around the proposed Watana Reservoir, Watana Dam site, and Watana Camp. This change was implemented as a variance in 2013 (see Section 6.1 above).
- The point-count survey component of the riverine-focused surveys, as described in the RSP (Section 10.16.4.2), was proposed to be eliminated in 2014 because the point-count survey data collected in 2013 in riverine habitats indicated that river noise frequently inhibited the acquisition of accurate data for breeding songbirds in vegetated riparian habitats. This change was implemented as a variance in 2014 (see Section 6.2 above).
- The metric representing bird abundance for the riverine-focused surveys (birds per unit time), as described in the RSP (Section 10.16.4.2), was proposed to be changed in 2014 partly as a result of comments from the U.S. Fish and Wildlife Service. The revised metric for bird abundance for the riverine-focused surveys has been changed to linear densities (birds per km of stream length). This change was implemented as a variance in 2014 (see Section 6.2 above). For lacustrine-focused surveys, the metric representing bird

abundance (birds per unit time), as described in the RSP (Section 10.16.4.2), was proposed to be changed in future study years. The new metric for bird abundance for the lacustrine-focused surveys will be the total number of birds recorded on lacustrine water bodies and in adjacent habitats. This change has not been fully implemented yet; it will be implemented during preparation of the Updated Study Report (USR).

- 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 after data from all years of this study are combined and summarized. This change will be implemented during preparation of the USR.
- As agreed to at the TWG meeting on March 7, 2014, the study task described in the RSP (Section 10.16.4.6) regarding the possible collection of feather samples for mercury analysis was formally transferred from Study 10.16 to the Mercury Study (Study 5.7).

7.2. Modifications Identified since the June 2014 ISR

As detailed in the 2014 Study Implementation Report for this study, AEA plans additional modifications to this study to complete the study in a manner that meets Study Plan objectives. These modifications are generally summarized as follows:

- The volume of point-count survey data collected in the two study years was well above (70 and 50 percent greater than) the annual sampling goal set forth in the RSP (Section 10.16.8), and all portions of the study area, including CIRWG lands, have now been surveyed. This study likely represents the most intensive and spatially extensive point-count study conducted in a single project area in Alaska, and sufficient point-count data are available to conduct the final habitat-use analyses and density calculations for landbirds and shorebirds in the study area. These data will enable quantitative determinations of the amount of breeding habitat for landbirds and shorebirds that could be lost and altered by development of the proposed Project, and will allow estimates of the number of landbirds and shorebirds that could be affected. Because of this, AEA has determined that a third year of point-count surveys, as described in the ISR (Study 10.16, Part C, Section 7), is not necessary to meet the study objectives.
- Similarly, sufficient data also were collected in the two study years during the riverine- and lacustrine-focused surveys to describe adequately and quantify the use of those habitats by landbirds and shorebirds in the study areas for those two surveys. Adequate data are available to provide minimum estimates of the numbers landbirds and shorebirds in riverine and lacustrine habitats that could be affected by development of the proposed Project. For the riverine and lacustrine surveys, AEA has determined that a third survey year, as described in the ISR (Study 10.16, Part C, Section 7), is not necessary to meet the study objectives.
- Lastly, a more efficient survey platform for colonially nesting swallows in the single survey year (2013) facilitated the survey of a larger study area than originally planned in

the RSP (10.16.3). The current data are sufficient to quantify the use of the study area by colonially nesting swallows, and will allow for a minimum estimate of the number of nesting swallows that could be affected by development of the proposed Project. For these reasons, AEA has determined that a second year of survey work, as described in the ISR (Study 10.16, Part C, Section 7) is not necessary to meet the study objectives for colonially nesting swallows.

8. STEPS TO COMPLETE THE STUDY

In light of the variances and modifications described above, the steps necessary for AEA to complete this study are summarized below. These steps have been updated from those listed in Part C, Section 7.1 of the ISR for this study. Because the second season of field surveys has been completed and the data collected are considered adequate to meet the Study Plan objectives (see Section 7.2 above), the remaining work for this study consists of the following data analysis tasks:

- The two years of point-count data will be combined and the uncorrected abundance measures for landbirds and shorebirds will be compared with other relatively recent studies conducted in interior Alaska and with the historical studies of breeding birds conducted for the APA Project in the 1980s (RSP Section 10.16.4.5).
- Similarly, the two years of riverine- and lacustrine-focused survey data will be combined and the uncorrected abundance metrics for each survey will be compared, when applicable, with the studies indicated above.
- The two years of point-count data 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). When possible, density estimates will be calculated separately for the proposed Watana Reservoir and Watana Dam site, and each of the alternative Project transmission line/access road corridors.
- The line-transect distance-sampling data for the riverine-focused surveys collected in 2014 will be analyzed with distance sampling methods in an attempt to calculate density estimates, corrected for detectability, for landbirds and shorebirds in the prominent riverine habitats in the area of the proposed Watana Reservoir and Watana Dam site.
- The riverine-focused survey data also will be used to calculate uncorrected linear densities (birds per km of stream length) for landbirds and shorebirds in both study years.
- 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 Vegetation and Wildlife Habitat Mapping Study (Study 11.5).