

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

**Moose Distribution, Abundance, Movements,
Productivity, and Survival
Study Plan Section 10.5**

**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 Moose Distribution, Abundance, Movements, Productivity, and Survival (Study Plan 10.5) 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 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 Study 10.5 since the filing of the ISR in June 2014. As detailed below, AEA's activities for Study 10.5 have consisted of the following:

- On October 21, 2014, AEA held an ISR meeting for the Wildlife and Botanical studies.
- In 2014 and 2015, the study team conducted additional data collection, which involved tracking VHF radio-collared moose as described in RSP Section 10.5.4.2 and modified in ISR 10.5, Part C, Section 7.1.2.
- In 2015, the study team deployed 20 GPS collars on moose downstream of the proposed reservoir inundation zone and completed a late-winter population survey in the inundation zone and downstream area.
- The study team completed the 2014–2015 Study Implementation Report (SIR) 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 this ISR Part D. In light of this additional implementation, this Part D also identifies AEA's plans for completing Study 10.5 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 obtain sufficient population information and use of the study area to evaluate the potential effects of the Project on moose.

The study objectives are established in RSP Section 10.5.1:

- Analyze and synthesize data from historical and current studies of moose as a continuation of the 2012 big-game distribution and movements study.
- Document the moose population and composition in the study area.

- Assess the relative importance of the habitat in the inundation zone, proposed access/transmission corridors, and the riparian area below the Project.
- Document the productivity and calf survival of moose using the study area.
- Document the level of late winter use of adults and calves in the proposed inundation area.
- Document moose browse utilization in and adjacent to the inundation zone and the riparian area below the Project.
- Document the amount of potentially available habitat for improvement through crushing, prescribed burning, or other habitat enhancement.

2.2. Study Components

This study consists of the following components:

- Document moose distribution, movements, productivity, and survival through the use of VHF and GPS radio-collars.
- Population monitoring.
- Moose browse and habitat assessment.

3. STATUS, HIGHLIGHTED RESULTS, AND ACHIEVEMENTS

The following tasks were completed in 2013 and reported in Part A of the ISR for Study 10.5:

- To delineate moose movements in the Project area and to evaluate productivity and survival, the study team equipped cow and bull moose with Very High Frequency (VHF) and satellite-linked (Global Positioning System [GPS]) collars in October 2012 and March 2013. The study team conducted aerial radio-tracking (telemetry) surveys in fixed-wing aircraft monthly to document the distribution of radio-collared moose in the study area. During the spring calving and the fall season, the study team conducted aerial surveys weekly to document more frequently the distribution of moose in the study area. Additionally, to document productivity and associated calf loss accurately, the study team conducted twinning surveys daily during calving. Moose locations are regularly obtained from GPS collars via a satellite data link using the Argos Data Collection System.
- The study team evaluated moose populations using three survey techniques. To assess winter use of the proposed reservoir inundation zone, the study team surveyed the area in March 2012 and 2013. The study team conducted a GeoSpatial Population Estimator survey in November 2013 to estimate moose populations above and below the proposed dam site within the study area.
- The study team conducted the first season of field surveys in March–April 2013 to estimate the proportion of browse biomass removed by moose.

The study team has completed the following activities for Study 10.5 since the June 2014 filing of the ISR:

- The study team continued tracking radio-collared moose throughout 2014 and 2015, except during December, January, February, and April, as described in ISR 10.5, Part C, Section 7.1.2;
- The study team conducted a late-winter population survey of the proposed reservoir inundation zone, as well as in a newly designated extension of the study area downstream of the proposed Watana Dam site;
- The study team deployed and monitored 20 satellite-linked GPS collars on moose downstream of the proposed reservoir inundation zone.

4. SUMMARY OF STUDY 10.5 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
10.5. Moose Distribution, Abundance, Movements, Productivity, and Survival (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 moose.	RSP for Study 10.5
FERC Study Plan Determination for Study 10.5	2/1/2013	This document presents FERC approval of Study 10.5, which approved AEA's Revised Study Plan with additional recommendations.	FERC SPD for Study 10.5
Big Game Movement and Habitat Use Study (2012 Technical Memorandum)	3/26/2013	Technical memorandum summarizing existing information on movement and habitat use of big game, including moose.	Mar. 2013 TM for Study 10.5
Draft Initial Study Report for Study 10.5	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 10.5. This draft ISR was later republished as Part A of the final ISR.	Draft ISR for Study 10.5
Initial Study Report for Study 10.5	6/3/2014	This document is the Initial Study Report (Parts A, B and C) for Study 10.5. 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 10.5 ISR Part B for Study 10.5 ISR Part C for Study 10.5

Title	Date	Description	Link
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 filed by AEA.	Transcripts from ISR Meeting Materials from ISR Meeting
Moose Distribution, Abundance, Movements Productivity, and Survival Study (10.5) – 2014–2015 Study Implementation Report	11/5/2015	Study Implementation Report: a summary of field survey results in 2014 and 2015.	2014-2015 SIR for Study 10.5

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 10.5, 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 10.5 (Section 4), describing 2014 and 2015 study plan implementation.
Part A, Section 5	This section is supplemented by the Study Implementation Report for Study 10.5 (Section 5).

6. VARIANCES

6.1. 2013 Study Season

The following variance is reported in the June 2014 Study 10.5 ISR, Part A:

- The Study Plan (RSP Section 10.5.4.3) assumed that all portions of the study area would be equally available for sample allocation, but Cook Inlet Regional Working Group (CIRWG) lands were not available for sampling in 2013 due to the lack of a land-access agreement. Of the 96 randomly chosen high-stratum cells in the browse survey area, nine (9.4%) were located predominantly on CIRWG lands and thus were unavailable for sampling in 2013 (Table 4.3-1). Fourteen randomly chosen high-stratum cells were located partially on CIRWG lands, but had landing zones (LZs) on accessible lands that were potentially available for sampling. Ultimately, the sampling plan described above was flexible enough to accommodate the need to work around randomly chosen cells dominated by CIRWG lands (see Figure 5.1-4), just as randomly chosen cells that did not meet the sampling criteria (no LZ, no vegetation, or no browse species) were not sampled. Therefore, the study team was still able to accomplish the browse survey objective in 2013.

6.2. 2014–2015 Study Seasons

The following study plan modification is reported in the June 2014 Study 10.5 ISR, Part C, Section 7.1.2; the modification was implemented in the 2014 season, so is reported here as a variance:

- As described in Study 10.5 ISR, Part C, Section 7.1.2, AEA will forego monthly radio-tracking flights of VHF-collared moose (RSP Section 10.5.4.1) in the winter months of December, January, February, and April. Because little movement occurs during those months, monitoring during that period is unnecessary to meet the study objectives of obtaining sufficient information on the moose population and its use of the study area to evaluate the potential effects of the Project on moose.

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:

- The duration of the study (RSP Section 10.5.6) was extended through 2014 and into 2015 to continue collecting telemetry data from active VHF and satellite-linked GPS collars already deployed in the study area, thereby maximizing the amount of data obtained for use in addressing the study objectives.
- During the ISR meeting on October 21, 2014, licensing participants expressed concern about the study's ability to assess the relative importance of habitats downstream of the proposed Watana Dam site. The study team addressed this concern by deploying an additional 20 GPS collars in April 2015 on moose that were distributed along the Susitna River from the dam site to the southern end of Denali State Park.
- An additional late-winter reservoir inundation survey was conducted in March 2015 to supplement the 2012 and 2013 late-winter surveys in that area (RSP Section 10.5.4.2). During the ISR meeting on October 21, 2014, licensing participants expressed concern about the study's ability to assess the impact of potential future alteration of river flows and ice scouring on moose in that area. The study team addressed this concern by conducting a late-winter population survey in March 2015 along the Susitna River from the proposed Watana dam site to its confluence with the Chulitna and Talkeetna rivers to document the level of late winter use of adults and calves in this area.

7. STUDY PLAN MODIFICATIONS

7.1. Modifications Identified in ISR

Section 7.1.2 of Study 10.5 ISR (Part C) details a modification for this study following the 2013 study season. This modification is summarized as follows and matches the variance described above in the first paragraph under Section 6.2:

- AEA will forego monthly radio-tracking flights of VHF-collared moose (RSP Section 10.5.4.1) in the winter months of December, January, February, and April. Because little movement typically occurs during those months, monitoring during that period is

unnecessary to meet the study objectives of obtaining sufficient information on the moose population and use of the study area to evaluate the potential effects of the Project on moose.

7.2. Modifications Identified since the June 2014 ISR

As detailed in the 2014–2015 Study Implementation Report for this study, AEA plans modifications to complete this study in a manner that meets Study Plan objectives. These modifications are generally summarized as follows:

- RSP Section 10.5.6 indicated that telemetry surveys would continue through the life of the radio collars (approximately 2016). Radio collars were to be tracked every two weeks during May 10–June 15 in 2013 and 2014, including daily monitoring during calving (May 15–31) each year. Radio collars were also to be tracked weekly during September 1–20 in 2013 and 2014. The RSP indicated that any remaining GPS collars would be retrieved in March 2015. Telemetry surveys and monitoring of GPS-collared moose, including the additional 20 animals collared in the downstream portion of the study area in April 2015, are now planned to continue through March 2016 to continue to gather data to use in meeting the Study Plan objectives. The study team will continue to forego monthly radio-tracking flights of VHF-collared moose in the winter months of December, January, February, and April because little movement occurs during those months.
- Another late-winter population survey will be conducted in the downstream survey area in March 2016 to supplement the data obtained in the March 2015 survey described in Section 4.2 of the Study Implementation Report.

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. As necessary and appropriate, these steps have been updated from those appearing in Section 7 of the ISR (Part C), as described in the Study Implementation Report:

- Continue monitoring moose distribution, movements, productivity, and survival through VHF and satellite-linked GPS telemetry (RSP Section 10.5.4.1);
- Population monitoring (RSP Section 10.5.4.2);
- Moose browse survey and habitat assessment (RSP Section 10.5.4.3).