Susitna-Watana Hydroelectric Project (FERC No. 14241)

Overview of Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report

Prepared by

Alaska Energy Authority



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1. INTRODUCTION TO ISR PART D

This document provides the Alaska Energy Authority's (AEA) Part D Supplemental Information to the Initial Study Report (ISR) for the original licensing of the proposed Susitna-Watana Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC or Commission) Project No. 14241. This Part D is provided in furtherance of the Commission's Integrated Licensing Process (ILP) regulations, 18 C.F.R. § 5.15(c), which require an applicant to "describ[e] 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." Under the Commission's ILP regulations, the ISR also is to "include any modifications to ongoing studies proposed by the potential applicant."

AEA filed its ISR for the Project in June 2014. This ISR Part D provides a "roadmap" of updates to the ISR—covering the period June 2014 when the ISR was filed, through the filing of this ISR Part D.¹ As directed by Commission staff in its October 27, 2015 letter, this ISR Part D "tie[s]-together the record of information" generated in AEA's implementation of the Study Plan.² Recognizing that Commission staff, federal and state resource agencies, Alaska Native entities, and other licensing participants have had access to the ISR for approximately 17 months now, this ISR Part D seeks to tie the record together efficiently and without requiring a duplication of effort. For this reason, ISR Part D is a high-level cumulative report of ISR elements (e.g., variances and modifications), provides crosswalk tables to relevant documents for each study, and identifies any supplemental or updated sections of the previously filed Parts A, B and C of the ISR.

Moreover, the "study implementation reports" and "study completion reports," described in Section 1.5 below, are intended to be complementary to the information presented in this ISR Part D. AEA began posting these implementation and completion reports to the Project licensing website in October 2015, and will continue to do so as these reports are finalized. In addition, AEA began filing these reports with the Commission once it lifted the abeyance in its October 27 letter.

Consistent with AEA's longstanding practice in this licensing process, data collected during the Study Plan implementation, to the extent they have been verified through AEA's quality assurance and quality control procedures and are publicly available, can be accessed at <u>http://gis.suhydro.org/reports/</u>.

1.1. Background of ISR Part D Development

The ISR, including this Part D Supplement, is the product of nearly four years of intense work and consultation among AEA, federal and state resource agencies, Alaska Native entities, and

¹ While most work completed since the June 2014 ISR occurred during calendar year 2014, in a number of instances data collection and other work extended into 2015. Any work completed during 2015 is noted in the individual ISR Part D reports.

² Letter from Ann Miles, Federal Energy Regulatory Commission, to Wayne Dyok, Alaska Energy Authority, at 2, Project No. 14241-000 (issued Oct. 27, 2015).

other licensing participants. Since the filing of AEA's Notice of Intent and Pre-Application Document in December 2011, AEA and licensing participants have consulted closely in the development and implementation of the Study Plan.

These efforts, from the early stages in 2011 through the June 2014 filing of the ISR, are summarized in the introductory Section 1.1 of the ISR. Since June 2014 to the present time, these efforts are summarized as follows:

- *Continued Data Collection:* Although AEA had limited funding available for fieldwork in 2014, during preparation of the June 2014 ISR it recognized that a targeted, continuing study effort could greatly assist Commission Staff, AEA, resource agencies, Alaska Native entities, and other licensing participants in advancing the Project's remaining licensing study program. In particular, at that time AEA had recently obtained a land access permit from the Cook Inlet Region Working Group (CIRWG)—lands that were not accessible to AEA during the 2013 study season. For these reasons, the ISR (Section 1.3 and Table 3) detailed AEA's plans for continued data collection.
- **Release of 2014 Technical Memoranda:** In preparation for ISR meetings scheduled for October 2014, AEA filed over 20 technical memoranda with the Commission on September 17, 29, and 30, 2014. These technical memoranda reported on: (1) results of studies conducted during 2013 and 2014 that were not available at the time AEA filed the ISR in June 2014; and (2) studies that AEA completed during the 2014 field season—to take advantage of the newly acquired access to CIRWG lands, maintain continuity of certain ongoing study efforts, and economically utilize existing field support infrastructure by completing additional field work for other studies.
- 2014 ISR and Technical Workgroup Meetings: Following AEA's filing of the ISR in June 2014, it continued to hold technical workgroup meetings on ongoing study efforts. In September 2014, for example, it held a three-day fish passage feasibility workshop. In October 2014, AEA convened a total of six, one-day ISR meetings to review progress on each of the 58 individual studies. In December 2014, AEA held technical workgroup meetings for aquatics, fish passage, geomorphology, and groundwater studies. The agenda, meeting notes, presentations, and other information for each meeting (including transcripts for the October 2014 ISR meetings) are all accessible at AEA's website for the Project, http://www.susitna-watanahydro.org/meetings/.
- Abeyance of ILP: On December 26, 2014, the Governor of the State of Alaska issued an Administrative Order to suspend discretionary spending on a number of capital projects, including the Project, due to a large state budget deficit. Accordingly, on December 31, 2014, AEA suspended additional ISR meetings scheduled for January 2015 and requested the Commission to hold the ILP in abeyance. The Commission granted this request by letter order dated January 8, 2015.
- *Lifting of Abeyance:* On July 6, 2015, the Governor's office clarified that the Governor's prior Administrative Order regarding discretionary spending authorized AEA to proceed with efforts to reach the Commission's issuance of its Study Plan Determination (SPD) for the Project. Accordingly, on August 26, AEA requested the Commission to lift the

abeyance and adopt a modified ILP schedule to issue its SPD. AEA's proposed schedule included significantly more time for Commission staff, AEA, and licensing participants to review reports related to the Study Plan and fulfill their obligations in study plan development. To assist in this effort, AEA reported that it would be preparing study reports that detail its implementation (or, as appropriate, completion) of the Commission-approved Study Plan to date. These reports are described in more detail in Section 1.5, below. On October 27, 2015, the Commission lifted the abeyance but deferred a decision on AEA's proposed schedule until reviewing this ISR Part D.

• *Release of Study Implementation and Completion Reports:* Beginning in October 2015, AEA began its release of reports for 38 of the 58 studies included in the Commission-approved Study Plan. For most of these studies, AEA prepared a "study implementation report"—a progress report on implementing the study since the June 2014 ISR. AEA has completed all required elements of the study and fulfilled all Study Plan objectives for 11 of the 38 reports. For these studies, AEA prepared a comprehensive "study completion report." These reports are described in more detail in Section 1.5, below. To distribute these studies to resource agencies, Alaska Native entities, and other licensing participants as quickly as possible, AEA posted these reports on its licensing website for the Project (http://www.susitna-watanahydro.org/type/documents/) as they were completed. Once the Commission lifted the ILP abeyance on October 27, 2015, AEA filed the previously posted reports with the Commission on its eLibrary system. The remaining reports will be filed with the Commission and placed on the Project website as they are finalized.

1.2. Structure of ISR Part D

AEA filed the ISR for the Project on June 3, 2014. As described in greater detail in Section 1.2 of the June 2014 ISR, this filing consisted of three separate segments for each of the 58 individual studies included in the Study Plan, as follows:

- *Part A:* Part A of the ISR reproduces the draft ISR filed with the Commission on February 3, 2014. For each individual study, Part A reports on the methodologies employed and the results achieved through the 2013 study season. Part A also identifies any variances in methodologies from the Study Plan during the 2013 study season, and discusses how AEA had proposed, as of February 2014, to meet Study Plan objectives in light of such variances. In many instances, Part A evaluates how the data collected through the 2013 study season compare to historical scientific data in the Project area.
- *Part B:* Part B of the ISR contains any new supplemental information or errata with respect to Part A that occurred between the time of the draft ISR (in February 2014) until the filing of the ISR in June 2014. The information in Part B was derived from either comments received during technical meetings following AEA's distribution of the draft ISR, or AEA's internal review of the document following its February 3 submittal.
- *Part C:* Part C of the ISR includes material that was not included in the February 3 draft ISR, as well as an updated executive summary for each individual study. Part C details AEA's plans—as of June 2014 when the ISR was filed—for completing the Study Plan,

including modifications. It also includes AEA's specific proposal for 2014 and 2015 work and explains how the modifications will meet Study Plan objectives.

This filing supplements the ISR by adding a new *Part D* for each of the individual studies in the Study Plan. This Part D Supplement to the ISR is intended primarily to be a high-level cumulative report of the following information, from the initiation of the Project study program in 2012 and the Commission's SPD in 2013, through the filing of this ISR Part D:

- *Status, Highlighted Results, and Achievements:* Each individual study reported in Part D contains a summary of the important accomplishments achieved in implementing the study. For each individual study, this section summarizes information presented in ISR Part A, Sections 5 and 6 (presenting information collected through the end of the 2013 study season), as well as in the complementary study implementation and completion reports (presenting information collected after the 2013 study season) discussed in Section 1.5 below.
- Summary of Study Documents: Throughout the study program, AEA has released scores of technical memoranda and other documents reporting on study progress and reports. An important component of this Part D is to identify and describe each of these documents, for each individual study included in this supplement to the ISR. AEA believes that this summary will assist Commission staff and licensing participants in identifying and organizing all pertinent information for each individual study, on a going-forward basis.
- *New Study Documentation Supplementing the ISR:* In preparing this Part D Supplement to the ISR, AEA reviewed Parts A, B and C of the ISR, to determine whether any sections of the ISR required updating, refinement, or clarification based on work completed since the ISR was prepared in June 2014.
- *Variances:* Per the Commission's ILP regulations, Part D includes a comprehensive identification of all variances to the FERC-approved Study Plan since AEA commenced its implementation in 2013. The information on variances presented in this Part D is intended to be a high-level summary, with more detailed information on variances presented in ISR Part A, Section 4 (for variances through the end of the 2013 study season), as well as in the complementary study implementation and completion reports (for variances since the 2013 study season) discussed in Section 1.5 below.
- *Modifications:* Per the Commission's ILP regulations, Part D includes a comprehensive identification of all modifications to the FERC-approved Study Plan since AEA commenced its implementation in 2013. Consistent with its approach to reporting variances, the information on Study Plan modifications presented in this Part D is intended to be a high-level summary, with more detailed information presented in ISR Part C, Section 7 (for modifications identified in the ISR following the 2013 study season), as well as in the complementary study implementation reports (for modifications on a going-forward basis) discussed in Section 1.5 below.

• *Steps to Completing the Study:* As explained in more detail in Section 2.2 below, Part D for each individual study identifies steps needed for AEA to complete the Study Plan.

Because this Part D Supplement to the ISR is comprehensive and cumulative in nature identifying and summarizing work performed by AEA under the Study Plan since the ISR was filed in June 2014—there are no information gaps in the Commission's review of all work performed to date. This approach supports a thorough SPD by the Commission in 2016 that will identify, for each individual study, all remaining work needed to support AEA's license application for the Project.

1.3. Changes to Transmission and Access Corridors

When AEA filed the ISR in June 2014, it explained in Section 1.4 of the ISR two major changes to the transmission and access corridors under review for the Project. First, AEA explained that it was adding an additional alternative north-south corridor alignment for transmission and access from the dam site to the Denali Highway. AEA explained that this new alignment—referred to as the "Denali East Option"—could have advantages over other alternatives, as it would encumber only State-owned lands and traverse generally lower-elevation areas (and possibly avoid some of the icing problems typically encountered at higher elevations) than the original north-south alignment. For clarification, AEA noted that the original north-south alignment, which was previously referred to simply as the "Denali Corridor," would be referred to the "Denali West Option" on a going-forward basis (although the two Denali options are co-terminus near the dam site at the south end for both transmission and access and along Denali Highway to the north for transmission).

In addition, AEA in Section 1.4 of the ISR explained that it was considering the possibility of eliminating the Chulitna Corridor from further study. At that time, AEA reported that it was reviewing initial study results and consulting with federal and state resource agencies, Alaska Native entities, and other licensing participants on this matter. Following this review and consultation, AEA in September 2014 filed a formal proposal with the Commission to change the Study Plan by eliminating the Chulitna Corridor from further study. AEA explained that using this corridor would entail the crossing of Indian River and Portage Creek, and it would parallel Portage Creek for about 8 miles. Both of these waterways contain important anadromous salmon spawning and rearing habitat. In addition, using the Chulitna Corridor would require the road and transmission line routes to be located at higher elevations along more avalanche-prone slopes than the other corridors, and thus would not provide as reliable access and transmission operations as the other corridors.

These changes affect the study areas for many of the individual 58 studies in the Study Plan, including the following: Study 4.5 (Geology and Soils Characterization Study); Study 6.5 (Geomorphology Study); Study 9.13 (Aquatic Resources Study within the Access Alignment, Transmission Alignment, and Construction Area); Study 10.10 (Terrestrial Furbearer Abundance and Habitat Use); Study 10.11 (Aquatic Furbearer Abundance and Habitat Use); Study 10.12 (Small Mammal Species Composition and Habitat Use); Study 10.14 (Surveys of Eagles and Other Raptors); Study 10.15 (Waterbird Migration, Breeding, and Habitat Use); Study 10.18 (Wood Frog Occupancy and Habitat Use); Study 10.19 (Evaluation of Wildlife Habitat Use); Study 11.5

(Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin); Study 11.7 (Wetland Mapping Study in the Upper and Middle Susitna Basin); Study 11.8 (Rare Plant Study); Study 11.9 (Invasive Plant Study); Study 12.5 (Recreation Resources Study); Study 12.6 (Aesthetic Resources Study); Study 13.5 (Cultural Resources Study); and Study 13.6 (Paleontological Resources Study).

Although a general depiction of these changes to the study areas of these studies appears in Figure 1, the specific changes are noted in the individual study Sections of this ISR Part D.

1.4. Completed Studies

While most of the 58 individual studies in the FERC-approved Study Plan remain a work-inprogress at this time, AEA has completed all required fieldwork, investigation, study, analysis, and reporting of the following studies:

- Study 5.5, Baseline Water Quality Study
- Study 7.7, Glacier and Runoff Changes Study
- Study 9.7, Salmon Escapement Study
- Study 9.9, Characterization and Mapping of Aquatic Habitats Study
- Study 10.7, Dall's Sheep Distribution and Abundance Study
- Study 10.9, Wolverine Distribution, Abundance and Habitat Occupancy Study
- Study 10.10, Terrestrial Furbearer Abundance and Habitat Use Study
- Study 10.13, Bat Distribution and Habitat Use Study
- Study 10.15, Waterbird Migration, Breeding, and Habitat Use Study
- Study 10.18, Wood Frog Occupancy and Habitat Use Study
- Study 15.9, Air Quality Study
- Study 16.5, Probable Maximum Flood Study
- Study 16.6, Site Specific Seismic Hazard Study

Because AEA believes that each of these studies is now complete in terms of meeting the requirements of the approved study plan, AEA's final, completed report and analysis for these studies appear in individual study completion reports.³ In addition, to assist Commission staff and licensing participants determine the completeness of these studies, AEA has included each study as part of this ISR Part D.

1.5. Study Implementation and Completion Reports

In its August 26, 2015 request for the Commission to lift the abeyance of this ILP process, AEA indicated that it would be filing study reports to ensure a complete and up-to-date record of all progress made in implementing the FERC-approved Study Plan. Although the ISR contains an accurate reporting of work completed through the 2013 study season, since that time AEA has made additional progress on many of the 58 individual studies—either through additional fieldwork, data collection, or data analysis. For the 38 studies in which AEA has made

³ The only exceptions are Study 7.7 and Study 16.5, in which the final report appears in Part A of the ISR, filed in June 2014.

substantial progress since the June 2014 ISR, AEA has prepared a "study implementation report" (for studies that remain a work-in-progress) or a "study completion report" (for studies that AEA has completed since the June 2014 ISR).

In general, these implementation and completion reports contain detailed treatment of: (1) methods and variances in implementing the study since 2013; (2) study results through calendar year 2014; (3) discussion and analysis of study results; and (4) identification, as applicable, of modifications to the Study Plan on a going-forward basis.

AEA has not prepared an implementation report for 20 studies. Two of these studies were fully completed and reported in the June 2014 ISR. The remaining 18 studies have either been deferred, or have not advanced to the point where a study report is needed. For these 20 studies, the ISR itself contains the most up-to-date information related to AEA's progress. To ensure that this ISR Part D presents a complete record for Commission staff and licensing participants of all reports for each of the 58 individual studies, Table 1 contains a listing of each individual study component. (Table 1 below updates and supersedes the Table 1 included in Section 1.6 of the ISR filed in June 2014.)

2. CONCLUSION AND NEXT STEPS

2.1. Study Plan Determination

The Commission's ILP regulations provide an opportunity for the license applicant, resource agencies, Alaska Native entities, and other licensing participants to review interim study results and progress, and to evaluate whether new studies or study modifications are needed to support the license application. While this interim review typically occurs shortly after the first study season, the circumstances of this Project are unique—given the large volume of studies, fluctuations in Project appropriations, and on-the-ground challenges of implementing an extensive study program in a remote, isolated location of South-Central Alaska. AEA appreciates the flexibility of Commission staff and all licensing participants in customizing the ILP process to the needs of this Project.

When the Commission lifted the abeyance for the ILP process on October 27, 2015, it did not establish a schedule for the ISR meetings, meeting summary, comment opportunities, and other activities leading to its SPD. Instead, once Commission staff has an opportunity to review this ISR Part D "roadmap," it will decide on the schedule going forward.

Once Commission staff decides on the schedule, AEA will establish the dates for the ISR meetings. AEA will notify licensing participants of these meeting dates through its email notification system, and the meeting dates will be filed with the Commission and posted on the Project's website.

2.2. Completing the Study Plan

AEA began implementing the Study Plan in the 2013 study season, shortly after Commission staff approved the December 2012 Revised Study Plan in separate determinations issued in

February and April 2013. Since the Commission's Study Plan approval, AEA in 2013 completed one full year of study work, followed by a more targeted study program since that time.

While AEA hopes to reinitiate the study program assuming additional appropriations of the Alaska State Legislature in 2017, future efforts necessarily must conform to the level of such appropriations and other factors.

For these reasons, this ISR Part D purposefully excludes a schedule for completing the Study Plan—and any prior anticipated schedule for completing the Study Plan set forth in Parts A, B or C of the ISR (or any other AEA document) is no longer valid. Instead, AEA is now focusing on the scope of work and sequence of activities for each study that are required to meet the objectives and requirements of the Study Plan—fully recognizing and anticipating that any individual study element may be delayed due to circumstances beyond AEA's control.

This approach will allow for the Commission to issue a SPD identifying all studies and information needed to support AEA's licensing application, while providing the needed schedule flexibility to adapt to unforeseen circumstances that could arise during Study Plan implementation.

3. FIGURES AND TABLES

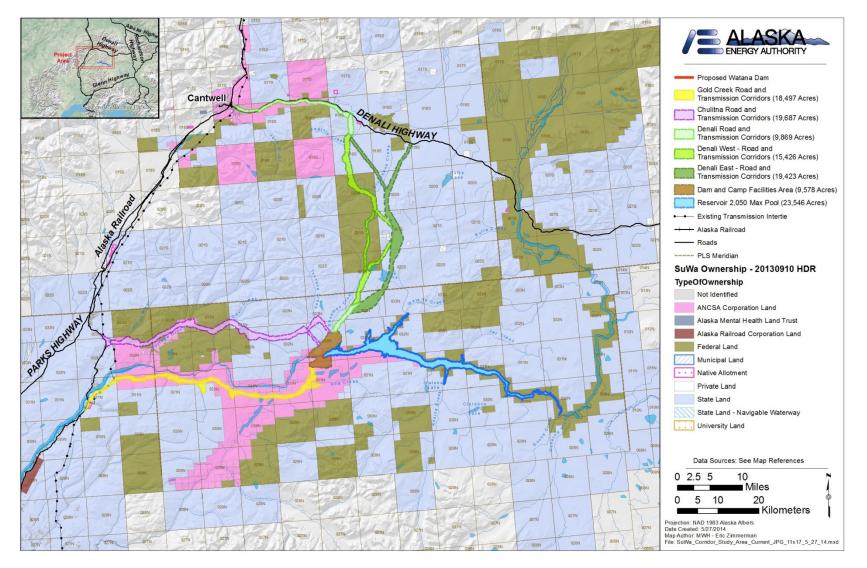


Figure 1. Updated Susitna-Watana Project Area

Table 1. Complete List of ISR Components

| Document Title | Document Link |
|--|-----------------------------------|
| 4 GEOLOGY AND SOILS | |
| 4.5 Geology and Soils Characterization Study | |
| Geology and Soils Characterization Study Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information | ISR Part A for Study 4.5 |
| and Errata to Part A), and Part C (Executive Summary and | ISR Part B for Study 4.5 |
| Section 7) | ISR Part C for Study 4.5 |
| Geology and Soils Characterization Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 4.5 |
| Geology and Soils Characterization Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 4.5 |
| 5 WATER QUALITY | |
| 5.5 Baseline Water Quality Study | |
| Baseline Water Quality Study Initial Study Report Part A | ISR Part A for Study 5.5 (File 1) |
| (Sections 1-6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section | ISR Part A for Study 5.5 (File 2) |
| 7) | ISR Part A for Study 5.5 (File 3) |
| | ISR Part A for Study 5.5 (File 4) |
| | ISR Part A for Study 5.5 (File 5) |
| | ISR Part A for Study 5.5 (File 6) |
| | ISR Part B for Study 5.5 |
| | ISR Part C for Study 5.5 |
| Baseline Water Quality Study (Study 5.5) and Water Quality Modeling Study (Study 5.6), Water Quality and Lower River Modeling | Sept. 2014 TM for Study 5.5 |
| Baseline Water Quality Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 5.5 |
| Baseline Water Quality Study Completion Report | SCR for Study 5.5 (File 1) |

| Document Title | Document Link |
|---|--------------------------------------|
| | SCR for Study 5.5 (File 2) |
| 5.6 Water Quality Modeling Study | |
| Water Quality Modeling Study Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and | ISR Part A for Study 5.6 |
| Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part B for Study 5.6 |
| | ISR Part C for Study 5.6 |
| Baseline Water Quality Study (Study 5.5) and Water Quality Modeling Study (Study 5.6), Water Quality and Lower River Modeling Technical Memorandum | Sept. 2014 TM for Study 5.6 |
| Water Quality Modeling Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 5.6 |
| Water Quality Modeling Study 2014-2015 Study Implementation Report | 2014 SIR for Study 5.6 (File 1) |
| | 2014 SIR for Study 5.6 (File 2) |
| 5.7 Mercury Assessment and Potential for Bioaccumulation | Study |
| Mercury Assessment and Potential for Bioaccumulation Study Initial Study Report Part A (Sections 1-6, 8-9), Part B | ISR Part A for Study 5.7 |
| (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part B for Study 5.7 |
| | ISR Part C for Study 5.7 |
| Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7), Evaluation of Continued Mercury Monitoring Beyond 2014 Technical Memorandum | Sept. 2014 TM for Study 5.7 |
| Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7) Errata to Evaluation of Continued Mercury Monitoring Beyond 2014 Technical Memorandum(September 30, 2014) | Nov. 2014 TM for Study 5.7 |
| Mercury Assessment and Potential for Bioaccumulation Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 5.7 |
| Mercury Assessment and Potential for Bioaccumulation Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 5.7 (File 1) |
| | 2014-2015 SIR for Study 5.7 (File 2) |

| 6 GEOMORPHOLOGY | |
|--|--|
| 6.5 Geomorphology Study | |
| Geomorphic Reach Delineation and Characterization, Upper, Middle and Lower Susitna River Segments Technical Memorandum | May 2014 TM for Study 6.5 |
| Geomorphology Study Initial Study Report Part A (Sections 1- 6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part A for Study 6.5 (File 1) ISR Part A for Study 6.5 (File 2) |
| | ISR Part A for Study 6.5 (File 3) ISR Part B for Study 6.5 ISR Part C for Study 6.5 |
| Susitna River Historical Cross Section Comparison Technical Memorandum | Sept. 2014 TM for Study 6.5 |
| Update of Sediment Transport Relationships and a Revised Sediment Balance for the Middle and Lower Susitna River Segments Technical Memorandum | Sept. 2014 TM for Study 6.5 |
| Mapping of Geomorphic Features and Turnover within the Middle and Lower Susitna River Segments from 1950s, 1980s, and Current Aerials | Sept. 2014 TM for Study 6.5 (File 1) Sept. 2014 TM for Study 6.5 (File 2) |
| | <u>Sept. 2014 TM for Study 6.5 (File 3)</u> <u>Sept. 2014 TM for Study 6.5 (File 4)</u> |
| | <u>Sept. 2014 TM for Study 6.5 (File 5)</u> <u>Sept. 2014 TM for Study 6.5 (File 6)</u> |
| | <u>Sept. 2014 TM for Study 6.5 (File 7)</u> Sept. 2014 TM for Study 6.5 (File 8) |
| | Sept. 2014 TM for Study 6.5 (File 9) |
| | <u>Sept. 2014 TM for Study 6.5 (File 10)</u> <u>Sept. 2014 TM for Study 6.5 (File 11)</u> |
| | <u>Sept. 2014 TM for Study 6.5 (File 12)</u> Sept. 2014 TM for Study 6.5 (File 13) |
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| | Sept. 2014 TM for Study 6.5 (File 14) |
|---|---------------------------------------|
| | Sept. 2014 TM for Study 6.5 (File 15) |
| | Sept. 2014 TM for Study 6.5 (File 16) |
| Geomorphology Study (Study 6.5) - Updated Mapping of Aquatic Macrohabitat Types in the Middle Susitna River | Sept. 2014 TM for Study 6.5 (File 1) |
| Segment from 1980s and Current Aerials Technical | Sept. 2014 TM for Study 6.5 (File 2) |
| Memorandum | Sept. 2014 TM for Study 6.5 (File 3) |
| | Sept. 2014 TM for Study 6.5 (File 4) |
| | Sept. 2014 TM for Study 6.5 (File 5) |
| Geomorphology Study (Study 6.5) - Mapping of Geomorphic Features and Turnover within the Middle and Lower Susitna | Sept. 2014 TM for Study 6.5 (File 1) |
| River Segments from 1950s, 1980s, and Current Aerials Technical Memorandum | Sept. 2014 TM for Study 6.5 (File 2) |
| | Sept. 2014 TM for Study 6.5 (File 3) |
| | Sept. 2014 TM for Study 6.5 (File 4) |
| | Sept. 2014 TM for Study 6.5 (File 5) |
| | Sept. 2014 TM for Study 6.5 (File 6) |
| | Sept. 2014 TM for Study 6.5 (File 7) |
| | Sept. 2014 TM for Study 6.5 (File 8) |
| | Sept. 2014 TM for Study 6.5 (File 9) |
| | Sept. 2014 TM for Study 6.5 (File 10) |
| | Sept. 2014 TM for Study 6.5 (File 11) |
| | Sept. 2014 TM for Study 6.5 (File 12) |
| | Sept. 2014 TM for Study 6.5 (File 13) |
| | Sept. 2014 TM for Study 6.5 (File 14) |
| | Sept. 2014 TM for Study 6.5 (File 15) |
| | Sept. 2014 TM for Study 6.5 (File 16) |
| Geomorphology Study (Study 6.5) - Susitna River Historical Cross Section Comparison (1980s to Current) Technical Memorandum | Sept. 2014 TM for Study 6.5 |

| Geomorphology Study (Study 6.5) - 2014 Update of Sediment-Transport Relationships and a Revised Sediment Balance for the Middle and Lower Susitna River Segments Technical Memorandum | Sept. 2014 TM for Study 6.5 |
|--|--|
| Glacier and Runoff Changes (Study 7.7) and Fluvial Geomorphology (Study 6.5) Assessment of the Potential for Changes in Sediment Delivery to Watana Reservoir Due to Glacial Surges Technical Memorandum | Nov. 2014 TM for Study 6.5 |
| Geomorphology Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 6.5 |
| Geomorphology Study Initial Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 6.5 (File 1) 2014-2015 SIR for Study 6.5 (File 2) |
| | 2014-2015 SIR for Study 6.5 (File 3) |
| 6.6 Fluvial Geomorphology Modeling Below Watana Dam S | tudy |
| Fluvial Geomorphology Modeling Below Watana Dam Study Initial Study Report Part A (Sections 1-6, 8-9), Part B | ISR Part A for Study 6.6 (File 1) |
| (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part A for Study 6.6 (File 2) |
| | ISR Part A for Study 6.6 (File 3) |
| | ISR Part B for Study 6.6 |
| | ISR Part C for Study 6.6 |
| Fluvial Geomorphology Modeling below Watana Dam Study (Study 6.6) Decision Point on Fluvial Geomorphology Modeling of the Susitna River below PRM 29.9 Technical Memorandum | Sept. 2014 TM for Study 6.6 |
| Fluvial Geomorphology Modeling Below Watana Dam (Study 6.6) Winter Sampling of Main Channel Bed Material Technical Memorandum | Sept. 2014 TM for Study 6.6 |
| Riparian Instream Flow (Study 8.6) and Fluvial Geomorphology (Study 6.6) Dam Effects on Downstream Channel and Floodplain Geomorphology and Riparian Plant Communities and Ecosystems–Literature Review Technical Memorandum | Nov. 2014 TM for Study 6.6 |
| Fluvial Geomorphology Modeling Below Watana Dam Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 6.6 |

| Fluvial Geomorphology Modeling Below Watana Dam Study Initial Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 6.6 (File 1) 2014-2015 SIR for Study 6.6 (File 2) 2014-2015 SIR for Study 6.6 (File 3) |
|--|--|
| | 2014-2015 SIR for Study 6.6 (File 4) |
| 7 HYDROLOGY RESOURCES | |
| 7.5 Groundwater Study | |
| Groundwater Study Initial Study Report Part A (Sections 1-6, | ISR Part A for Study 7.5 (File 1) |
| 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) and Appendices | ISR Part A for Study 7.5 (File 2) |
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| Groundwater Study (Study 7.5), Preliminary Groundwater and Surface-Water Relationships in Lateral Aquatic Habitats within Focus Areas FA-128 (Slough 8A) and FA-138 (Gold Creek) in the Middle Susitna River Technical Memorandum | Sept. 2014 TM for Study 7.5 |
| Groundwater Study (Study 7.5), Groundwater and Surface- Water Relationships in Support of Riparian Vegetation Modeling Technical Memorandum | Sept. 2014 TM for Study 7.5 |
| Groundwater Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 7.5 |
| Groundwater Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 7.5 (File 1) |
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| 7.6 Ice Processes | | |
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| Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part A for Study 7.6 (File 2) | |
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| Ice Processes in the Susitna River Study (Study 7.6), Detailed Ice Observations October 2013 – May 2014 Technical Memorandum | Sept. 2014 TM for Study 7.6 | |
| Ice Processes Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 7.6 | |
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| 7.7 Glacial and Runoff Changes Study | | |
| Ice Processes Initial Study Report Part A (Sections 1-6, 8-9), | ISR Part A for Study 7.7 | |
| and Part B (Supplemental Information and Errata to Part A) | ISR Part B for Study 7.7 | |
| Glacier and Runoff Changes (Study 7.7) and Fluvial Geomorphology (Study 6.5) Assessment of the Potential for Changes in Sediment Delivery to Watana Reservoir Due to Glacial Surges Technical Memorandum | Nov. 2014 TM for Study 7.7 | |
| Ice Processes Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 7.7 | |
| 8 INSTREAM FLOW STUDY: FISH, AQUATICS, AND RIPARIAN | | |
| 8.5 Fish and Aquatics Instream Flow Study | | |
| Fish and Aquatics Instream Flow Study Initial Study Report | ISR Part A for Study 8.5 (File 1) | |
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| Fish and Aquatics Instream Flow Study (Study 8.5) 2013-2014 Instream Flow Winter Studies Technical Memorandum | Sept.2014 TM for Study 8.5 |
| Fish and Aquatics Instream Flow Study (Study 8.5) Evaluation of Relationships between Fish Abundance and Specific Microhabitat Variables Technical Memorandum | Sept.2014 TM for Study 8.5 |
| Fish and Aquatics Instream Flow Study (Study 8.5) 2013-2014 Instream Flow Winter Studies Technical Memorandum Addendum | Dec. 2014 TM for Study 8.5 |
| Fish and Aquatics Instream Flow Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 8.5 |
| Fish and Aquatics Instream Flow Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 8.5 (File 1) |
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| 8.6 Riparian Instream Flow Study | |
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| Riparian Instream Flow (Study 8.6) and Fluvial | Nov. 2014 TM for Study 8.6 |
| Geomorphology (Study 6.6) Dam Effects on Downstream | 1101. 2017 111 101 Study 0.0 |
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| Channel and Floodplain Geomorphology and Riparian Plant Communities and Ecosystems-Literature Review Technical Memorandum | |
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| Riparian Instream Flow Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 8.6 |
| Riparian Instream Flow Study 2014-2015 Study Implementation Report | 2014-2015 SIR for Study 8.6 (File 1) |
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| Study of Fish Distribution and Abundance in the Upper Susitna River Initial Study Report Part A (Sections 1-6, 8-9), | ISR Part A for Study 9.5 (File 1) |
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| Final Susitna River Fish Distribution and Abundance Implementation Plan | Final IP for Study 9.5 |
| Study of Fish Distribution and Abundance in the Upper Susitna River Study 9.5 Proposed 2015 Modifications to Fish Distribution and Abundance Study Plan Implementation Technical Memorandum | Sept. 2014 TM for Study 9.5 |
| Susitna River Fish Distribution and Abundance Implementation Plan: Appendix 3. Protocol for Site-Specific Gear Type Selection; Version 5 | Nov. 2014 TM for Study 9.5 |
| Fish Distribution and Abundance in the Upper and Middle/Lower Susitna River (Studies 9.5 and 9.6): Draft Chinook and Coho Salmon Identification Protocol | Nov. 2014 TM for Study 9.5 |
| Study of Fish Distribution and Abundance in the Upper Susitna River (Study 9.5) Evaluation of 2014 Study Modifications in the Black River Technical Memorandum | Dec. 2014 TM for Study 9.5 |
| Study of Fish Distribution and Abundance in the Upper Susitna River Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.5 |
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| 9.6 Study of Fish Distribution and Abundance in the Middle and Lower Susitna River | | |
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| Lower Susitna River Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part A for study 9.6 (File 2) | |
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| Study of Fish Distribution and Abundance in the Middle and Lower Susitna River Study 9.6 2013-2014 Winter Fish Study Technical Memorandum | Sept. 2014 TM for Study 9.6 | |
| Susitna River Fish Distribution and Abundance Implementation Plan: Appendix 3. Protocol for Site-Specific Gear Type Selection; Version 5 | Nov. 2014 TM for Study 9.6 | |
| Fish Distribution and Abundance in the Upper and Middle/Lower Susitna River (Studies 9.5 and 9.6): Draft Chinook and Coho Salmon Identification Protocol | Nov. 2014 TM for Study 9.6 | |
| Study of Fish Distribution and Abundance in the Middle and Lower Susitna River Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.6 | |
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| 9.7 Salmon Escapement Study | | |
| Salmon Escapement Study Initial Study Report Part A (Sections 1.6, 8.9) Part B (Supplemental Information and | ISR Part A for Study 9.7 | |
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| Salmon Escapement (Study 9.7) 2014 Implementation and Preliminary Results Technical Memorandum | Sept. 2014 TM for Study 9.7 |
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| Salmon Escapement Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.7 |
| Salmon Escapement Study - Study Completion Report | SCR for Study 9.7 |
| 9.8 River Productivity Study | |
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| A), and Part C (Executive Summary and Section 7) | ISR Part A for Study 9.8 (File 2) |
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| River Productivity Study (Study 9.8) - 2013 Initial River Productivity Results Technical Memorandum | Sept. 2014 TM for Study 9.8 |
| River Productivity Study (Study 9.8) - 2014 Field Season River Productivity Progress Report Technical Memorandum | Sept. 2014 TM for Study 9.8 |
| Errata to ISR Appendix A | Nov. 2014 TM for Study 9.8 |
| River Productivity Study (Study 9.8) - Fish Diet Sample Size Sufficiency Analysis Technical Memorandum | Dec. 2014 TM for Study 9.8 |
| River Productivity Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.8 |
| River Productivity Study 2014-2015 Study Implementation Report | 2014 SIR for Study 9.8 (File 1) |
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| 9.9 Characterization and Mapping of Aquatic Habitats Stud | y |
| Characterization and Mapping of Aquatic Habitats Study Initial Study Report Part A (Sections 1-6, 8-9), Part B | ISR Part A for Study 9.9 (File 1) |
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| Characterization and Mapping of Aquatic Habitats (Study 9.9), | Sept. 2014 TM for Study 9.9 |
| 2013 and 2014 Aquatic Habitat Mapping Field Season | |
| Completion Progress Technical Memorandum | |
| Characterization and Mapping of Aquatic Habitats (9.9) Errata | Nov. 2014 TM for Study 9.9 |
| to Initial Study Report Part A - Appendix A, Remote Line | |
| Mapping, 2012 | |
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| Characterization and Mapping of Aquatic Habitats Study (9.9) | <u>Nov. 2014 TM for Study 9.9</u> |
| Revised Map Book for 2012 Remote Line Mapping | |
| Characterization and Mapping of Aquatic Habitats Study | ISR Part D for Study 9.9 |
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| Characterization and Mapping of Aquatic Habitats Study - | SCR for Study 9.9 (File 1) |
| Study Completion Report | <u>SCR for Study 9.9 (File 1)</u> |
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| 9.10 The Future Watana Reservoir Fish Community and Ris | k of Entrainment Study |
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| The Future Watana Reservoir Fish Community and Risk of | ISR Part D for Study 9.10 |
| Entrainment Study Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | |
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| 9.11 Study of Fish Passage Feasibility at Watana Dam | |
| Study of Fish Passage Feasibility at Watana Dam Initial Study | ISR Part A for Study 9.11 (File 1) |
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| 9.12 Study of Fish Passage Barriers in the Middle and Upper Tributaries | r Susitna River and Susitna | |
| Study of Fish Passage Barriers in the Middle and Upper | ISR Part A for Study 9.12 (File 1) | |
| Susitna River and Susitna Tributaries Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section | ISR Part A for Study 9.12 (File 2) | |
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| Study of Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries Study 9.12 Fish Passage Criteria Technical Memorandum | Nov. 2014 TM for Study 9.12 | |
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| 9.13 Aquatic Resources Study Within the Access Alignment, Transmission Alignment, and Construction Area | | |
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| 9.14 Genetic Baseline Study for Selected Fish Species | | |
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| Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part B for Study 9.14 | |
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| Final 2014 Implementation Plan for the Genetic Baseline Study for Selected Fish Species in the Susitna River, Alaska (2014 Regional Operational Plan) | June 2014 TM for Study 9.14 | |
| Genetic Baseline Study for Selected Fish Species Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.14 | |
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| 9.15 Analysis of Fish Harvest in and Downstream of the Sust Area | itna-Watana Hydroelectric Project | |
| Analysis of Fish Harvest in and Downstream of the Susitna- Watana Hydroelectric Project Area Initial Study Report Part D: Supplemental Information to June 2014 Initial Study Report | ISR Part D for Study 9.15 | |
| Analysis of Fish Harvest in and Downstream of the Susitna- Watana Hydroelectric Project Area Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and | ISR Part A for Study 9.15 ISR Part B for Study 9.15 | |
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| 9.16 Eulachon Run Timing, Distribution, and Spawning in the Susitna River | | |
| Eulachon Run Timing, Distribution, and Spawning in the Susitna River Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part A for Study 9.16 ISR Part B for Study 9.16 ISR Part C for Study 9.16 | |
| Eulachon Run Timing, Distribution, and Spawning in the Susitna River (Study 9.16), 2015 Proposed Eulachon Spawning Habitat Study Modifications Technical Memorandum | Sept. 2014 TM for Study 9.16 | |
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| 9.17 Cook Inlet Beluga Whale Study | | |
| Cook Inlet Beluga Whale Study Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section | ISR Part A for Study 9.17 (File 1) | |

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| 10.8 Distribution, Abundance, and Habitat Use by Large Ca | rnivores Study |
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| 10.9 Wolverine Distribution and Abundance Study | |
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| 10.10 Study of Terrestrial Furbearer Abundance and Habitat Use | |
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| 10.11 Aquatic Furbearer Abundance and Habitat Use Study | |
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| 10.13 Bat Distribution and Habitat Use Study | |
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| 10.14 Surveys of Eagles and Other Raptors Study | |
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| Surveys of Eagles and Other Raptors Study Initial Study Report Part A (Sections 1-6, 8-9), Part B (Supplemental | ISR Part A for Study 10.14 |
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| 10.15 Water bir u Migration, Diccuing, and Habitat Study | |
| Waterbird Migration, Breeding, and Habitat Study Initial | ISR Part D for Study 10.15 |
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| 10.17 Population Ecology of Willow Ptarmigan in Game Ma | nagement Unit 13 | |
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| 6, 8-9), Part B (Supplemental Information and Errata to Part A), and Part C (Executive Summary and Section 7) | ISR Part B for Study 10.17 | |
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| 10.19 Evaluation of Wildlife Habitat Use | | |
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