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Susitna-Watana Hydroelectric Project (FERC No. 14241)

Eulachon Run Timing, Distribution, and Spawning in the Susitna River Study Plan Section 9.16

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

LGL Alaska Research Associates, Inc.

June 2014

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EXECUTIVE SUMMARY

Eulachon Run Timing, Distribution and Spawning in the Susitna River 9.16	
Purpose	The goal of this study is to collect baseline information regarding eulachon (*Thaleicthys pacificus*) run timing, distribution, and habitat use in the Susitna River. Eulachon are an important prey species for the endangered Cook Inlet beluga whale (CIBW; *Delphinapterus leucas*); this study has been designed to support the Cook Inlet Beluga Whale Study (Study 9.17).
Status	The first year of data collection is complete. A second year of data collection will resume in 2015.
Study Components	Acoustic sampling was used at a fixed site in the Lower River to assess the timing and duration of the spawning migration and assess the relative abundance of eulachon. Radio telemetry and mobile acoustic surveys were used jointly to identify the distribution of spawning locations in the study area and evaluate fish behavior on spawning sites. Active capture methods were used to confirm eulachon spawning concentrations, collect information on eulachon population characteristics, and document incidental observations of marine fish species. Physical habitat characteristics were measured at confirmed spawning sites.
2013 Variances	AEA implemented the methods as described in the Study Plan, with the exception of the following variances: • RSP Section 9.16.4.1.1: The blocking weir was removed due to flood conditions and because turbulence from the weir impeded sonar data collection. • RSP Section 9.16.4.1.3: Water velocity data were not collected at the sonar station because the data were not needed to estimate eulachon run timing. • RSP Section 9.16.4.1.2: Fish sampling was conducted at other locations along the river, in addition to the sonar site, to more effectively estimate catch per unit effort (CPUE) and run timing. • RSP Section 9.16.4.1.1: Sonar data collection ended on June 15 when fewer than 2 fish per minute were observed. • RSP Section 9.16.4.2.2: Visual surveys were also used to identify spawning sites. • RSP Section 9.16.4.3.2: Visual surveys were the primary method to characterize substrate. • RSP Section 9.16.4.3.3: A grid sampling design was not used to collect

Eulachon Run Timing, Distribution and Spawning in the Susitna River 9.16	
	water quality information; instead, a randomized approach was used.
Steps to Complete the Study	2015 will include activities that fully achieve the four objectives of the Study Plan by using the methods presented in the Study Plan (RSP Section 9.16.4) with the following modifications: • No blocking weir will be used around the sonar transducer (RSP Section 9.16.4.1.1). • Sonar data will be collected until at least June 10 and until less than 2 fish per minute are observed (RSP Section 9.16.4.1.1). • Run timing and population characteristics data will be collected at up to five sites (RSP Section 9.16.4.1.2). • No water velocity data will be collected at the sonar site (RSP Section 9.16.4.1.3). • Visual observation will be used to collect data on substrate composition (RSP Section 9.16.4.3.2). • Three randomized locations at each site will be measured for water velocity (RSP Section 9.16.4.3.3).
Highlighted Results and Achievements	Despite the late break-up of ice, this study was able to document the eulachon run in 2013. Information from fixed-station sonar and dip netting indicated that the bulk of the eulachon run in the Susitna River occurred between May 28 and June 16, 2013. In addition, 28 spawning sites were documented between Project River Miles (PRMs) 10.5 and 50.3. This distribution was similar to that observed in the 1980s. No spawning sites were detected upstream of Willow Creek and the majority of spawning sites observed were downstream of the Yentna River confluence. Radio telemetry was effective for studying eulachon movement to spawning sites. Over half of the radio-tagged eulachon traveled 500 m (1,640 feet) or more upstream from their tagging location; many tagged fish travelled as much as 20 km (12 mi).

7. COMPLETING THE STUDY

7.1. Proposed Methodologies and Modifications

To complete this study, AEA will implement the methods in the Study Plan (RSP Section 9.16.4), except as described in Sections 7.1.1 and 7.1.2. These activities include:

- Sonar and active sampling will be used to evaluate Eulachon run timing and duration as described in RSP Section 9.16.4.1 with the exception of the modifications as explained below (Section 7.1.2.1).
- AEA will implement the methods for the identification and mapping of potential eulachon spawning sites as described in RSP Section 9.16.4.2 with the exception of modifications as explained below (Section 7.1.2.2). This portion of the study includes radio telemetry, sonar, and active sampling to confirm spawning locations.
- Eulachon spawning habitat characteristics will be described according to RSP Section 9.16.4.3 with the exception of modifications (Section 7.1.2.2) and decision point (Section 7.1.1) as explained below. Substrate composition and physical characteristics including water quality, depth and velocity will be recorded.
- AEA will describe eulachon population characteristics including length, weight, age and sex ratios as described in RSP Section 9.16.4.4 with no modifications. Baseline genetic data and incidental observations of other marine fish species will also be collected.

7.1.1. Decision Points from Study Plan

RSP Section 9.16.4.3 of the Study Plan provided that AEA would determine the feasibility of using acoustics to identify substrate composition at eulachon spawning sites based on results in 2013. Although sonar was deemed feasible, AEA is not planning on using sonar as the primary method for characterizing spawning substrate. This modification is described further in Section 7.1.2.2. Based on the similarity in classifications between visual surveys and side scan sonar in 2013, visual surveys will be the primary method for characterizing substrate at spawning sites in 2015. Visual surveys are the simplest effective method for characterizing substrate; however, side scan sonar and grab samples may be used if any spawning sites are found at depths too great to be surveyed visually.

7.1.2. Modifications to Study Plan

7.1.2.1. Eulachon Run Timing and Duration

RSP Section 9.16.4.1.1 provided that AEA would use a blocking weir around the sonar unit to exclude fish from the 70-100 centimeter range. In 2013, the weir was removed due to debris accumulation during high flows and interference to the sonar from turbulence. AEA plans to eliminate the blocking weir in 2015 to avoid similar problems. The absence of a blocking weir will enhance AEA's ability to accurately characterize eulachon run timing and duration.

RSP Section 9.16.4.1.1 provided that AEA would collect sonar data until no eulachon were detected for five consecutive days after June 10. In 2013, sonar data collection was terminated

on June 15 when active fish sampling at PRM 17.5 had yielded less that fewer than 2 fish per minute for five consecutive days. Given the peak estimates of passage from sonar (>100,000 fish per day) and active sampling (875 fish per minute of dip netting), sampling for five consecutive days with zero catch would have been costly and uninformative. The criterion for halting sonar surveys that was implemented in 2013 will be repeated in 2015 to evaluate run timing and duration.

RSP Section 9.16.4.1.2 provided that AEA would conduct standard sampling with dip nets and/or gillnets to assess representativeness of results from the fixed sonar site. In 2013, fish sampling was conducted at additional locations to target actively migrating fish (in contrast to spawning fish which were observed milling at the fixed sonar site). AEA plans, as a modification to the Study Plan, to increase the number of sites sampled by dip netting in the lower Susitna River to collect information on run timing and population characteristics to approximately five. In addition, sites will be selected that have habitat characteristics more similar to the sampling site at PRM 19.2 than those at PRM 17.5 and PRM 17.7, both of which were used for spawning. Sampling additional locations will increase the likelihood of obtaining daily information from at least one site without spawning activity throughout the eulachon migration. Sampling at locations without spawning activity will better support assessment of the sonar data and determination of run timing and duration. All sites will be selected no later than two days after sampling begins.

RSP Section 9.16.4.1.3 provided that AEA would use water velocity at the sonar site to expand cross-sectional densities to an index of fish passage. In 2013, water velocity data were not collected because the data were not needed to estimate run timing. Therefore, this variance will be carried forward as a modification to the Study Plan in 2015. Elimination of this data collection will not impact AEA's ability to evaluate run timing and duration.

7.1.2.2. Eulachon Spawning Habitat Characteristics

RSP Section 9.16.4.3.2 provided that AEA would expand acoustic substrate classifications in 2014 if the feasibility testing was successful in 2013, but also provided that AEA would use only physical grab samples and visual surveys if side scan sonar did not accurately distinguish substrate composition. Although side scan sonar provided good images of substrate, visual surveys and side scan sonar output files produced similar substrate classifications for all sites. AEA will therefore use visual surveys as the primary method to classify substrate in 2015. Visual surveys are the simplest effective method for characterizing substrate; however, side scan sonar and grab samples may be used if any spawning sites are found at depths too great to be surveyed visually.

RSP Section 9.16.4.3.3 provided that AEA may use a grid sampling design for the collection of water depth and velocity. In 2013, a randomized approach (three samples at each site) was adopted because river conditions were not conducive to wading or anchoring a boat to collect data at grid locations. Random habitat sampling was able to characterize spawning habitat effectively and will be used again in 2015.

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 State of Alaska 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.

AEA is not proposing any efforts under this study in 2014. AEA plans to complete all remaining data collection and analysis for this study in 2015.

7.3. Conclusion

AEA expects to fully achieve the objectives of the Eulachon Study. Despite variances to the Study Plan in 2013 (as described in Section 4), all study objectives were successfully completed. The modifications for 2015 (Section 7.1.2) are such that they will improve data collection, data analysis, and allow for the successful on-schedule completion of the study.