Enclosure C
FWS-1
Sturgeon Study Plan
Submitted by the U. S. Fish and Wildlife Service
September 7, 2016

Introduction

The Service is requesting that the Licensee perform a sturgeon study on the lower Bear River from the non-Project diversion dam to the confluence with the Feather River.

Study Goals and Objectives

The goals of this study plan are to: 1) document the occurrence, temporal and spatial distribution, and movement of green and white sturgeon in the lower Bear River; 2) identify changes in the availability of habitat for holding and spawning adult sturgeon under different flow conditions; and 3) determine whether Project operations and maintenance activities adversely affect sturgeon in the lower Bear River.

Resource Agency Management Goals

The Service's goals for the sturgeon study plan are to provide data to:

- assist in the determination of which Habitat Suitability Curves (HSC) to utilize during data analysis; and
- determine which minimum instream flows are appropriate for Project operations for sturgeon species in the lower Bear River. This information also will be useful for other native fish species that use the lower Bear River.

Relevant Public Interest Considerations

The Service is a resource agency.

Existing Information and Need for Additional Information

Although both green and white sturgeon have been documented in the lower Bear River, little is known regarding the distribution, spawning, and rearing activities of sturgeon in the river. This information is needed to determine whether Project operations and maintenance activities adversely affect sturgeon in the lower Bear River.

Green sturgeon are listed as threatened under the ESA. Additionally, both green sturgeon and white sturgeon are California Species of Special Concern. It is also unclear to the Service which periods of green and white sturgeons' life histories are spent in the lower Bear River. Project operations and maintenance may have an adverse effect on sturgeon, specifically, the amount and timing of flow released from Camp Far West Dam may influence the distribution of sturgeon and impact stream conditions (i.e., temperature, velocity, etc.) for sturgeon migration, holding, spawning, and rearing. Without current information regarding the presence, distribution, and behavior of sturgeon, the Service cannot determine how Project operations and maintenance activities may affect sturgeon in the lower Bear River.

Project Nexus

The primary Project facilities include the: (1) Camp Far West Dam and spillway; (2) Camp Far West Reservoir (impoundment); (3) 6.8 MW capacity Camp Far West powerhouse; and (4) powerhouse afterbay.

The Project contributes to Direct, Indirect, and Cumulative effects on the lower Bear River. The Project directly impacts the community structure and habitat of the lower Bear River through operations and maintenance of the Project.

Description of Study Methods and Analysis

Study Area
The study area includes the Bear River between water diversion pool/Project afterbay and the confluence with the Feather River.

General Concepts
The following general concepts apply to this study:

- Personal safety is an important consideration of each fieldwork team. If Licensees determine the information cannot be collected in a safe manner, Licensees will notify FERC and USFWS as soon as possible via email to discuss alternative approaches to perform the study.

- Licensee will need to obtain permits from appropriate federal and/or state agencies to capture and handle green and white sturgeon.

- Licensee shall make a good faith effort to obtain permission to access private property where needed well in advance of performance of the study. If access is not granted or river access is not feasible or safe, Licensees will notify FERC and USFWS as soon as possible via email to determine if USFWS can assist in gaining access or to discuss alternative approaches to perform the study.

- Field crews may make minor modifications to the study proposal in the field to accommodate actual field conditions and unforeseen problems. If modifications are made, Licensees will provide a detailed description of the conditions that led to the decision to modify the study to FERC and USFWS as soon as possible via email.

- Licensees' performance of the study does not presume Licensees are responsible in whole or in part for resource management measures that may arise from the study.

- All special-status species observations will be submitted to the California Natural Diversity Database.

Study Methods
Methods necessary to complete this study involve data collection within the lower Bear River from the non-Project diversion dam to the Feather River. To increase the likelihood of detection of sturgeon during data collection, the study should be designed to occur within the known time periods of green and white sturgeon migration, spawning, holding, and rearing. Green sturgeon adults begin their upstream spawning migrations into freshwater during late February, spawn

between March and July, with peak spawning believed to occur between April and June (Adams et al. 2002). White sturgeon spawn between mid-February to late May, with peak activity during March and April.

The specific methods recommended by the Service for this study include:

- Conducting deep water surveys to document the occurrence of sturgeon in the lower Bear River downstream of the non-Project Diversion Dam;
- Collecting larval and juvenile sturgeon during early spring through summer utilizing rotary screw traps, artificial substrates, and larval nets deployed at multiple locations (Seesholtz 2003);
- Conducting snorkel surveys;
- Conducting surveys to identify potential spawning habitat; and
- Collecting and analyzing eDNA.

The Service would like to work collaboratively with the Licensee and other Project relicensing participants to develop a study plan with the appropriate methodologies to ensure sufficient data is collected to inform the study goals.

The Licensee will summarize and distribute results from this survey to the Service and other interested Project relicensing participants no later than 3 months from the end of the data collection. Licensee will discuss the results from the survey at a Relicensing Project meeting within one month of issuance of the study report.

Consistency of Methodology with Generally Accepted Scientific Practices

The methodologies recommended by the Service for this study are tailored to specifically evaluate the subject species of the study, green and white sturgeon, and the potential adverse effects on these species due to Project operations and maintenance activities. Study methodologies recommended by the Service in this study plan are consistent with methodologies in peer-reviewed literature.

The methodologies recommended by the Service for this study have been implemented in other FERC Project relicensing studies (see Study 7.9 – Green Sturgeon Downstream of Englebright Dam for the relicensing of the Yuba River Development Project, FERC Project No. 2246).

Considerations of Level of Effort

The specific information obtained during this study will provide information to the Service, Licensee, and other Project relicensing participants needed to understand the distribution and life stages of green and white sturgeon in the lower Bear River. This information will assist the Service, Licensee, and other Project relicensing participants in determining how Project operations and maintenance activities affect sturgeon in the lower Bear River. The results of this study and other Project relicensing studies (specifically Study 3.3 – Instream Flow Study) will assist the Service, Licensee, and other Project relicensing participants in the collaborative development of Project Mitigation & Enhancements for green and white sturgeon for the new FERC license.

References Cited

Adams, P.B., C.B. Grimes, J.E. Hightower, S.T. Lindley, and M.L. Moser. 2002. Status Review for the North American green sturgeon. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, CA.

Seesholtz, A. 2003. Final assessment of sturgeon distribution and habitat use SP-F3.2 Task 3a. Oroville Facilities Relicensing FERC Project No. 2100. California Department of Water Resources. http://orovillerelicensing.water.ca.gov/pdf_docs/12-17-03_env_att_11.pdf.