United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:

DEC 14 2009

Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: Kilarc-Cow Creek Project, FERC No. 606

Dear Ms. Bose:

This letter is in response to the Commission's November 16, 2009 letter to the U.S. Fish and Wildlife Service (Service) requesting information on data collected by the Service on Hooten Gulch. The Service has not collected data on Hooten Gulch. We are currently conducting an instream flow study on South Cow Creek, primarily focused on the portion of South Cow Creek from its confluence with Old Cow Creek to the confluence of South Cow Creek and Hooten Gulch. The only data that we have collected in South Cow Creek upstream of Hooten Gulch is habitat mapping data. The following describes the status of the data that we are collecting in our instream flow study on South Cow Creek.

Habitat Mapping

Juvenile fall-run Chinook salmon rearing

Mesohabitat mapping of South Cow Creek was conducted October 27-30, 2008, November 24-26, 2008, and April 16, 2009. There were three portions of the creek that were mesohabitat typed. These three sections were the Boero Reach, Valley Floor Reach, and the Tetrick Reach. The combined distance for these three reaches was 7.36 miles. Using habitat typing protocols developed by the California Department of Fish and Game, the mesohabitat mapping consisted of walking upstream or downstream and delineating the mesohabitat units. The location of the upstream and downstream boundaries of habitat units was recorded with a Real Time Kinematic (RTK) Global Positioning System (GPS) unit. The mesohabitat units were also delineated on aerial photos.

Following the completion of the mesohabitat mapping on April 16, 2009, the mesohabitat types and number of habitat units of each habitat type in each segment were enumerated, and shapefiles of the mesohabitat units were created in a Geographic Information System (GIS) using the GPS data and aerial photos flown on October 27, 2008. Since we were not able to get permission for access to the upper 1.54 miles of the Valley Floor Reach, identification of habitat types and shapefiles for this area was made solely using the October 27, 2008 aerial photos. The area of each mesohabitat unit was computed in a Geographic Information System from the above shapefiles. A total of 444 mesohabitat units were mapped for the three reaches. Table 1 summarizes the mesohabitat types, area totals and numbers of each type recorded during the habitat mapping process.

During the course of conducting the mesohabitat mapping, we also attempted to collect fall-run Chinook salmon spawning habitat suitability criteria (HSC). We were only able to locate a total of 20 redds, which were insufficient data for use in developing spawning HSC.

Field Reconnaissance and Study Site Selection

Juvenile fall-run Chinook salmon rearing

Field reconnaissance in April and May 2009 investigated potential study sites in the Boero and Valley Floor reaches. Based on the results of the mesohabitat mapping and field reconnaissance, a list of potential study sites was developed. Using the final list of potential study sites, we selected five habitat study sites that will represent the habitat types found in the Boero and Valley Floor reaches. We randomly selected the habitat study sites to ensure unbiased selection of the study sites. The following is the final list of the five study sites, listed in order from upstream to downstream: Jones, Poole, Farrell, Sabanovich and Boero.

Transect Placement (study site setup)

Juvenile fall-run Chinook salmon rearing

The Poole, Jones, Sabanovich, and Farrell study sites were established in April 2009, while the Boero study site was established in May 2009. For the sites selected for modeling, the landowners along both riverbanks were identified and temporary entry permits were sent, accompanied by a cover letter, to acquire permission for entry onto their property during the course of the study.

For each study site, a transect was placed at the up- and downstream ends of the site. The downstream transect will be modeled with the Physical Habitat Simulation System (PHABSIM) to provide water surface elevations as an input to the 2-D model. The upstream transect will be used in calibrating the 2-D model. The initial bed roughnesses used by River2D are based on the observed substrate sizes and cover types. A multiplier is applied to the resulting bed roughnesses, with the value of the multiplier adjusted so that the water surface elevation (WSEL) generated by River2D at the upstream end of the site match the WSEL predicted by the PHABSIM transect at the upstream end of the site. Transect pins (headpins and tailpins) were marked on each river bank above the 300 cfs water surface level using rebar driven into the ground and/or bolts placed in tree trunks. Survey flagging was used to mark the locations of each pin. We also installed horizontal bench marks that act as control points for the bed topography data collection when using a robotic total station. After installing the horizontal bench marks, data was collected to establish a precise set of location coordinates for each horizontal bench mark using survey-grade RTK GPS. Vertical benchmarks (lagbolts in trees or bedrock points) were established, and marked with paint and flagging.

Table 1
FY 2009 South Cow Creek Mesohabitat Mapping Results

Mesohabitat Type	South Cow Creek Units Area Totals (ft^2)	Number of Units
Side Channel Pool	51,292	32
Main Channel Pool	697,366	94
Side Channel Riffle	19,584	40
Main Channel Riffle	261,901	124
Side Channel Run	15,277	13
Main Channel Run	234,679	100
Side Channel Glide	1,156	2
Main Channel Glide	138,234	37
Cascade	493	2

Hydraulic and Structural Data Collection

Juvenile fall-run Chinook salmon rearing

Hydraulic and structural data collection for the Boero study site was completed in FY 2009. Low and medium flow water surface elevations were collected for all five sites. Velocity sets were collected for the transects at the Boero, Poole, Jones, and Farrell sites. Depth and velocity measurements were made by wading with a wading rod equipped with a Marsh-McBirney^R model 2000 or a Price AA velocity meter. A tape was used to measure stations along the transects. Substrate and cover (Tables 2 and 3) along the transects were determined visually. Dry bed elevations and substrate and cover data along the transects were collected and the vertical benchmarks were tied together for the Boero, Poole and Jones sites. Due to lack of sufficient funds and time constraints, we were unable to collect data on the Sabanovich study site and eliminated it from the study.

We collected the data between the inflow and outflow transects by obtaining the bed elevation and horizontal location of individual points with a total station or survey-grade RTK GPS, while the cover and substrate was visually assessed at each point. Bed topography data collection were completed for the Boero study site and a majority of the topographic data were collected for the Poole, Jones, and Farrell sites. Stage of zero flow at the outflow transect was surveyed for the Boero, Poole, and Jones sites. We anticipate collecting high flow water surface elevations during the winter of 2009-2010 on the four study sites. We will also complete the bed topography data collection on the Poole, Jones, and Farrell study sites in FY 2010.

Table 2
Substrate Descriptors and Codes

Code	Type	Particle Size (inches)
0.1	Sand/Silt	< 0.1
1	Small Gravel	0.1 – 1
1.2	Medium Gravel	1 – 2
1.3	Medium/Large Gravel	1 – 3
2.3	Large Gravel	2 – 3
2.4	Gravel/Cobble	2 – 4
3.4	Small Cobble	3 – 4
3.5	Small Cobble	3 – 5
4.6	Medium Cobble	4 – 6
6.8	Large Cobble	6 – 8
8	Large Cobble	8 – 10
9	Boulder/Bedrock	> 12
10	Large Cobble	10 – 12

To validate the velocities predicted by the 2-D model within the Boero, Poole, and Jones study sites, depth, velocities, substrate and cover measurements were collected in the site by wading with a wading rod equipped with a Marsh-McBirney model 2000 velocity meter. The horizontal locations and bed elevations were determined by taking a total station shot on a prism held at each point where depth and velocity were measured for these sites. A total of 50 representative points were measured throughout each site. We anticipate completing the hydraulic and structural data collection for the four rearing sites in FY 2010.

Hydraulic Model Construction and Calibration

Juvenile fall-run Chinook rearing

The topographic data for the 2-D model (contained in bed files) is first processed using the R2D_Bed software, where breaklines are added to produce a smooth bed topography. The resulting data set is then converted into a computational mesh using the R2D_Mesh software, with mesh elements sized to reduce the error in bed elevations resulting from the mesh-

Table 3
Cover Coding System

Cover Category	Cover Code
No cover	0
Cobble	1
Boulder	2
Fine woody vegetation (< 1" diameter)	3
Fine woody vegetation + overhead	3.7
Branches	4
Branches + overhead	4.7
Log (> 1' diameter)	5
Log + overhead	5.7
Overhead cover (> 2' above substrate)	7
Undercut bank	8
Aquatic vegetation	9
Aquatic vegetation + overhead	9.7
Rip-rap	10

generating process to 0.1 foot where possible, given the computational constraints on the number of nodes. The resulting mesh is used in River2D to simulate depths and velocities at the flows to be simulated.

The PHABSIM transect at the outflow end of each site is calibrated to provide the WSEL at the outflow end of the site used by River2D. The PHABSIM transect at the inflow end of the site is calibrated to provide the water surface elevations used to calibrate the River2D model. The initial bed roughnesses used by River2D are based on the observed substrate sizes and cover types. A multiplier is applied to the resulting bed roughnesses, with the value of the multiplier adjusted so that the WSEL generated by River2D at the inflow end of the site match the WSEL predicted by the PHABSIM transect at the inflow end of the site[1]. The River2D model is run at the flows at which the validation data set was collected, with the output used to determine the

[1] This is the primary technique used to calibrate the River2D model.

difference between simulated and measured velocities, depths, bed elevations, substrate and cover. The River2D model is also run at the simulation flows to use in computing habitat. All data for the four fall-run Chinook salmon rearing sites have been compiled and checked. PHABSIM calibration has been completed for two sites (Boero and Poole sites). Construction and calibration of the 2-D hydraulic model has been completed for the Boero site. Construction and calibration of the 2-D hydraulic models as described above for the three other study sites and running the production runs for the simulation flows for all four sites will be completed in FY 2010.

Habitat Suitability Criteria Development

Juvenile fall-run Chinook salmon rearing

We will be using habitat suitability criteria developed for the Lower Alluvial Segment of Clear Creek for fall-run fry and juvenile Chinook salmon rearing.

Habitat Simulation

Juvenile fall-run Chinook salmon rearing

Using the fall-run Chinook salmon fry and juvenile rearing HSC developed for the Lower Alluvial Segment of Clear Creek, fall-run Chinook salmon fry and juvenile rearing habitat will be computed over a range of discharges for the four rearing sites in South Cow Creek. Completion of this phase of the study will occur in FY 2010. We anticipate completing draft and final reports on the 2-D modeling of the fall-run Chinook salmon juvenile rearing in South Cow Creek in FY 2010.

The data from our instream flow study on South Cow Creek is available to the public and is available by contacting Mark Gard at mark_gard@fws.gov. The information should be referenced in the Commission's review for the project license surrender as personal communication from Mark Gard, U.S. Fish and Wildlife Service. If you have any questions regarding our instream flow study on South Cow Creek please contact Mark Gard at (916) 414-6600.

Sincerely,

(Acting)

for M. Kathleen Wood
Assistant Field Supervisor

cc:
Original and eight hardcopies filed with the Commission
Kilarc-Cow Creek Project, FERC #606 Service List

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

CERTIFICATE OF SERVICE

I hereby certify that Kilarc-Cow Creek Hydroelectric Project, FERC #606, California, U.S. Fish and Wildlife Service requesting information on data collected by the Service on Hooten Gulch has this day been electronically filed with the Federal Energy Regulatory Commission and served via deposit in U.S. mail, first-class postage paid, upon each other person designated on the service list for Project #606 compied by the Commission Secretary.

Dated at Sacramento, California, this 14th of December, 2009.

Name: Heeja Seto
Office Assistant
US Fish and Wildlife Service
2800 Cottage Way, Rm.W-2605
Sacramento, CA 95825
(916) 414-6600