Chelan River Biological and Water Quality Objectives Review
2019 Check In License Requirement
2016 to 2019 "To Do" List

November 6, 2015

The following Biological Objectives have yet to be achieved and water quality information collected for demonstrating water quality standard compliance as outlined in the Lake Chelan Settlement Agreement, Chapter 7, Table 7-10 and the 401 water quality certification. This document is intended to outline the methods and timeframe for collecting the remaining information in order to provide the Washington Department of Ecology (Ecology) all required data with which to initiate a process for determining water quality standards for the Chelan River.

Chinook salmon and steelhead Adult Production

These Objectives will not be able to be measured directly due to lack of methodology for marking fish. Discussions have been held within the Chelan River Fishery Forum (CRFF) to investigate potential methodologies for marking individual juveniles originating from the Chelan River to assess their return as adults. The CRFF could not recommend a viable method. Chelan PUD biological staff believe that adult production from the Chelan River is highly likely, particularly for Chinook salmon, and that, if questioned, the burden of proof of lack of adult production would be with the questioning party. Lack of adult production from the Chelan River would be virtually impossible to prove, hence low risk to the District.

Next Steps

None.

Steelhead Spawning Success

Steelhead spawning success has not been measured directly in the Reach 4 Habitat Channel, and would be challenging to do. Cylindrical egg tubes (CETs) were used for measuring Chinook salmon spawning success in Reach 4, which demonstrated high egg-to-fry survival. However, the same CET methodology implemented in the tailrace demonstrated high Chinook egg-to-fry mortality, to the point where this methodology was abandoned and redd excavation was used to determine Chinook spawning success in the tailrace. Chelan PUD staff have discussed the potential for reviewing the high spawning success CET data for Chinook salmon with the CRFF and requesting that these data be a sufficient surrogate for steelhead spawning. One complication of measuring steelhead spawning success is gathering test eggs would require coordination with Eastbank Hatchery staff to establish specific steelhead spawning timing and egg incubation. Steelhead broodstock and eggs are collected and incubated significantly earlier than steelhead spawning in the wild. Using test eggs with similar temperature units (similar stage of development) to naturally spawned eggs would be required to perform a valid test.

Next Steps

Discuss the following options at the next Chelan River Fishery Forum meeting, likely first quarter 2016:

Option 1: Use Chinook salmon CET data as surrogate for predicting steelhead egg-to-fry survival in the Habitat Channel; or

Option 2: Coordinate steelhead egg take and incubation with Eastbank Hatchery staff to "match up" hatchery egg temperature units with wild fish estimated temperature units, and perform a CET investigation in the Habitat Channel using the same methodology used for Chinook salmon. Conduct investigation in 2017 and 2018.

Steelhead Juvenile Rearing Success

Juvenile *O. mykiss* parr rearing success has been documented inhabiting the Chelan River Habitat Channel through conducting regular snorkel surveys. The term juvenile *O. mykiss* parr is used here instead of juvenile steelhead because it is impossible to distinguish between juvenile steelhead and rainbow trout at this life stage. Juvenile *O. mykiss* parr have been observed during spring and early summer months. However, in only one year, 2013, were juveniles observed during summer and early fall months. These observations indicate that juvenile *O. mykiss* parr rear in the Chelan River from emergence to between late July and early August, when water temperatures become acceptable, and then migrate downstream into the Columbia River seeking cooler water for rearing in August as Chelan River water temperatures increase to levels that appear to be unacceptable to juvenile *O. mykiss* parr.

Next Steps

Monthly snorkel surveys will be conducted in 2016 and 2018. These surveys will document steelhead juvenile ability to persist in the Chelan River.

Westslope cutthroat trout

Investigation continues into achieving the Biological Objective of the presence of 200 fish including various age classes. Westslope cutthroat trout (WCT) fry were stocked into the Chelan River in fall 2014. WCT juveniles, ranging in size from 4 to 6 inches, were stocked into the Chelan River during spring 2015. WCT fry were not observed during any snorkel surveys conducted after stocking. However, stocked juveniles have been observed during snorkel surveys, electrofishing, and hook-and-line sampling events through November 2015. Juveniles observed exhibited high condition factor and appeared to be have been able to thrive in spite of extremely high maximum daily Chelan River water temperatures documented in summer 2015. It may be difficult to determine whether the Biological Objective of 200 WCT is achieved through monitoring and evaluation efforts. However, the fact that WCT have been observed throughout 20125 under extreme conditions demonstrates that WCT can exist in the Chelan river, and that fact needs to be considered by Ecology at the 2019 10-year check-in when deciding the path forward for establishing water quality standards for the Chelan River.

Next Steps

Chelan PUD staff will recommend additional juvenile cutthroat stocking in fall 2015. Monthly snorkel surveys will be conducted in 2016 and 2018. These surveys will document WCT ability to persist in the Chelan River.

Temperature

Chelan River water temperature modeling is currently underway. A calibrated model has been constructed and is ready to use for modeling scenarios to investigate potential options, if any, for reducing Chelan River water temperatures. Additional SHADE model data are being acquired for input into the temperature model.

Next Steps

Chelan River temperature modeling "scenarios" will be run during late 2105 and early 2016 to determine potential effects that shade, channel morphology, and flow may have on Chelan River water temperatures. A report is due to FERC describing the Chelan River temperature modeling results on February 28, 2016.

Water Quality

Measurement of water quality parameters (dissolved oxygen [DO], pH, total dissolved gas [TDG], turbidity) in the Chelan River is required by the 401 water quality certification for the Lake Chelan Hydroelectric Project. Measurement of these water quality parameters is ongoing immediately below the dam, and in two locations (upper, lower) in the Chelan River Habitat Channel.

Next Steps

Water quality data will continue to be collected to demonstrate compliance with standards.

Benthic Macroinvertebrates

Sampling of macroinvertebrate drift and benthic macroinvertebrate community will be conducted, per Chapter 7: Chelan River Biological Evaluation and Implementation Plan of the Comprehensive Settlement Agreement, for assessing fish food sources within the Chelan River, and to compare general stream health between the restored, previously bypassed reach, of the Chelan River and the Chelan River reaches above the Lake Chelan Hydroelectric Project Dam (Lake Chelan Dam) and at the confluence with the Columbia River.

Next Steps

Chelan PUD is preparing a Request for Proposal for the Chelan River Benthic Investigation on behalf of the Chelan River Fishery Forum to issue to qualified consultants for conducting the investigation. Sampling will occur in 2016, 2017, and, potentially 2018.