Lower Columbia River Forebay and Fish Ladder Water Temperature Monitoring Scope of Work; Option 2

Purpose

There is regional interest in more rigorous monitoring of water temperatures in the forebays and within the fish ladders of the three Lower Columbia River (LCR) Dams - John Day, The Dalles and Bonneville. This stems from concerns regarding fish ladder water temperature differentials and subsequent delayed migration of adult salmonids. A water temperature data collection effort is currently being carried out by the Walla Walla District to monitor conditions at the lower four Snake River Dams and McNary Dam; efforts should be standardized across both Districts to the extent possible.

Current Water Temperature Monitoring

Water temperatures are currently monitored at the LCR dams mid-fish ladder as well as upstream and downstream of each dam at the Total Dissolved Gas (TDG) Fixed Monitoring Stations (FMS) (Table 1).

TABLE 1. CURRENT WATER TEMPERATURE MONITORING LOCATIONS, LCR DAMS

ID	Monitor Type	Location
JDAAN1	Hobo Temperature Monitor	North Exit Pool
JDAAN2	Hobo Temperature Monitor	North Entrance Pool
JDAAS1	Hobo Temperature Monitor	South Exit Pool
JDAAS2	Hobo Temperature Monitor	South Entrance Pool
JDY	TDG Temperature Monitor	Forebay Temperature
JHAW	TDG Temperature Monitor	Tailwater Temperature
TDAAN1	Hobo Temperature Monitor	North Ladder Count Station
TDAAE1 (TDA)	TDG Temperature Monitor	Forebay Temperature
TDDO	TDG Temperature Monitor	Tailwater Temperature
TDAAE2	Hobo Temperature Monitor	East Ladder Count Station
BONAB1	Temperature Monitor	Bradford Island Count Station
BONAN1	Temperature Monitor	Washington Shore Count Station
BONAN2	Temperature Monitor	Washington Shore Adult Fish Facility downstream return pool
BONAL1	Temperature Monitor	Bradford Island Lamprey Passage Structure, near exit
BONAL2	Temperature Monitor	Cascade Island Lamprey Passage Structure
BONAL3	Temperature Monitor	Washington Shore Auxiliary Water Supply Lamprey Passage Structure
BONAL4	Temperature Monitor	Washington Shore North Downstream Entrance Lamprey Flume/Passage System
BON	TDG Temperature Monitor	Forebay Temperature
CCIW	TDG Temperature Monitor	Tailwater Temperature
WRNO	TDG Temperature Monitor	Tailwater Temperature

Thermal profile data is not currently monitored in the LCR dam forebays. Past data indicates that there is a lack of reservoir thermal stratification, so instead, hourly point measurements collected by each FMS has been used to track forebay water temperature conditions at the dams.

Proposed Water Temperature Monitoring

There has been a resurgence in tracking forebay water temperatures, especially as they relate to potential water temperature problems within the fish ladders at the LCR dams. For that reason, additional water temperature probes will be added to the entrances and exits of each fish ladder located at Bonneville, The Dalles and John Day dams. These instruments will be deployed, maintained and downloaded by project staff. Data will be submitted to the Fish Passage Center (FPC) for upload onto their publically accessible website (http://www.fpc.org/river/Q_ladderwatertempgraph.php).

The forebay water temperature monitoring is expected to be more involved and will therefore be contracted out. Option 2 was chosen from three options of data collection methods for the Bonneville, The Dalles and John Day Dams. This is the most practical choice with the most flexibility for the location of the temperature profile strings. The contractor Mark Gunter provided a back of envelope estimate for Option 2. Mr. Gunter would work as a sub-contractor through an IDIQ, and a formal estimate will be provided through the contracting process. The quote is in-line with the IGE. The IGE does not include annual maintenance; however.

Option 2 – At Boat Restricted Zone (Real-time) Data Collection

Contractor shall install permanent water temperature monitoring equipment in the forebays of The Dalles and Bonneville dams using real-time water temperature equipment (NexSens® or similar), along with one set of back-up thermistors (Onset Hobos ® or similar) in case of templine failure. Water temperature instrumentation will be deployed on platform buoys built by the Contractor and may be deployed immediately upstream of boat restricted zone (BRZ) of the reservoirs or closer to the fish ladders if temperatures are more ideal (Figure).

To help determine the most suitable location of the temperature monitoring equipment platforms, the contractor shall first spend one day collecting up to four sample temperature depth profiles at each dam. Ideally, the platform location should be located where the coolest water resides and preferably closer to the fish ladder (South ladder at John Day Dam). If the contractor determines that temperatures do not vary laterally, the platform will be placed directly upstream of BRZ for Bonneville and The Dalles Dams, and either closer to the South fish ladder or upstream of BRZ at the John Day Dam. Cost shall increase if the platform is placed outside of the BRZ area.

FIGURE 1. PHOTOGRAPHS OF THE WATER QUALITY PLATFORMS LOCATED IN THE WILLAMETTE BASIN.

Water temperature data shall be monitored at 1 ft, 5 ft, 10, ft, 20 ft, 40 ft, 60 ft, and 80 ft from surface, on an hourly time interval. Data will be collected real-time and broadcasted via GOES satellite to the Portland District's Corps Water Management System (CWMS) database that is maintained by the Portland District Reservoir Regulation & Water Quality Section.

Data transmission equipment, including the DCP, GOES link, and antennae will be provided by Portland District, however, deployment, programming and ensured functionality will be the responsibility of the Contractor. Water temperature equipment shall be checked and calibrated at least twice during the year, preferably in the fall and again in the spring before the spill season begins. All services to the templines should be completed on site, as feasible, as these are permanent temperature monitoring locations. Thermistor strings will be downloaded manually by the Contractor at the same time the templines are being serviced.

Temperature data that is transmitted to the Portland District via GOES will be shared with the FPC for upload onto their publically accessible website; this is the District's responsibility. Any data manually downloaded by the Contractor should be emailed to both the FPC and the Portland District water quality staff for upload onto respective websites. All field notes and meta data such as site location, site name and latitude/longitude shall also be emailed as well.

All necessary equipment required for the deployment of water temperature equipment - including boats, trailers and deployment materials (stainless steel cables, cable clamps, buoys, etc.) - shall be supplied by the contractor.

All visits to reservoirs and thermistor deployment locations shall be coordinated with the respective project staff. All safety training and requirements shall be completed prior to deployment of equipment.

Option 2 Estimated Cost: $165,000 for three locations, including sampling water to determine best location of temperature platforms.