

OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 14BON01 BI lamprey wetted wall prototype

COORDINATION DATE- 23 January 2014

PROJECT- Bonneville Lock and Dam

RESPONSE DATE- 31 January 2014

Description of the problem- The Corps (Sean Tackley is POC) and NOAA Fisheries (Kinsey Frick) propose to install a prototype vertical “wetted wall” lamprey passage structure in the Bonneville Dam Bradford Island Ladder to provide a passage route for lamprey between the serpentine weir section and the auxiliary water supply (AWS) channel (**Figure 1**). The AWS channel leads to two entrances to an existing lamprey passage structure (LPS) shown to be efficient at successfully passing lamprey into the forebay.

The design would feature a lamprey refuge box (tested at Washington Shore Ladder) mounted to the fishway floor and situated directly under a vertical climbing wall supporting a skim of water supplied from the crest. Conduit tubing affixed to the fishway wall upstream of the climbing surface will direct lamprey to the climbing surface and provide a path for PIT antenna electrical supply. An external shroud fitted over the crest will shade the area and protect migrating lamprey from predation while providing visual access for video assessment and maintenance. The upper crest will pass lamprey to an open terminus for lamprey to exit into the AWS. The solid external surfaces of the refuge box located in the serpentine weir section would be beveled to minimize impacts on fishway hydraulics.

Key features of the prototype “wetted wall” structure (**Figure 2**):

1. The refuge box situated at the base of the waterfall will have access across the downstream face, fitted with vertical slats allowing no more than a 1.5” wide opening.
2. The upstream edge of the entrance box will be constructed of perforated plating to provide water flow through the box but will have no opening for passage. The box edges are 5” high and approximately 15” × 30” at their widest points with external 45° beveling on the solid edge.
3. The vertical climbing surface will be an exposed aluminum plate supplied with a sheet of water cascading over the crest of the structure. The wetted climbing plate will be 20” wide and mounted flush to the fishway wall.
4. The box will be anchored to the fishway floor and the fishway wall with 3/16” thick aluminum straps and 3/8” × 4” stainless concrete anchors spaced approximately 6” apart.
5. A length of 1.5” conduit attached to the fishway wall with stainless clamps along the upstream edge of the climbing plate will present a roadblock to lamprey moving along the wall to encourage them to find and use the climbing surface.
6. Behavior at the wall/water interface and the lower portion of the climbing wall by both lamprey and salmonids in response to the structure and its operation will be

monitored using a video system mounted to the shade hood at the crest of the wall. A half-duplex PIT antenna integrated into the crest rise will assess use by tagged lamprey. After the start of operations, daily visual observations will be made for impacts to salmon; operations will be adjusted as necessary to alleviate any noted negative effects.

7. River water will be supplied to an upwelling box on the internal crest of the vertical structure via a set of two continuously operating submerged 115V pumps (installed in the AWS directly below the outfall of the waterfall structure), each capable of providing 27 gal/min. Efforts will be made to dampen any sound or vibration from the small pumps to minimize any risk of impact on fish passage. Overflow from the pumps would provide a thin sheet of water on the climbing surface that could be adjusted in season or turned off in the event of observations of negative fish response to the operations (leaving only a smooth wall and a refuge box in the fishway). We will use a block design of low, medium, and high flow settings rotating daily; the high flow level will not exceed 1gal/s.

Type of outage required- N/A.

Impact on facility operation- None. The installation of this structure will require that a hole be cut in the fencing atop the fishway wall (see **Figure 1** photo); to accommodate the rounded flume and hood. This hole would need to be approximately 24 inches wide by 14 inches tall and would be cut through the fence grid without impacting the support structure or overall integrity of the fence itself. The hole will be patched and repaired if or when the structure is removed.

Length of time for repairs- Installation will occur during the current IWW period (01 December 2013 – 28 February 2014), while Bradford Island Ladder is dewatered. The structure would be operated and monitored from approximately June 1 through October 31. The structure will be removed when the ladder is next available if visual observations or radio-telemetry studies suggest that there may be a passage problem (likely winter 2014-15 or 2015-16).

Expected impacts on fish passage- No impacts on adult salmonid passage are expected as a result of these modifications, as the climbing plate, 1.5” conduit, and refuge box will have minimal to no effects on hydraulics. We do not anticipate that the amount of cascading water will attract salmonids to jump, and the flow rate will be adjusted in season if problems arise. The prototype structure is intended to benefit adult lamprey attempting to pass the Bradford Island Fish Ladder.

This structure would impact interpretation of adult lamprey counts, as it is upstream of the count station but downstream of the AWS channel LPS. Thus, waterfall structure count and PIT data must be used to estimate the % of lamprey that were counted both via the count slot and the LPS mechanical counter to avoid overestimating passage via the Bradford Island Ladder.

Comments from Bonneville Project

Comments from agencies-

CRITFC- -----Original Message-----

From: Tom Lorz [mailto:lorz@critfc.org]

Sent: Thursday, January 23, 2014 1:07 PM

To: Mackey, Tammy M NWP

Subject: [EXTERNAL] Re: FPOM: Official Coordination - 14BON01 BI lamprey wetted wall (UNCLASSIFIED)

this looks ok, but still have some questions, how much water are we talking about, do not want to cause a false attraction that increases jumping in that area. Also what if any structure will be needed over the fishway, does not look like any. Can give it a tentative of to move forward but a meeting to discuss would be wise. tom

NOAA Fisheries-

-----Original Message-----

From: Gary Fredricks - NOAA Federal [mailto:gary.fredricks@noaa.gov]

Sent: Monday, January 27, 2014 2:18 PM

To: Mackey, Tammy M NWP

Cc: Trevor Conder - NOAA Federal; Lorz, Tom; Wills, Dave; Zorich, Nathan A NWP; Tackley, Sean C NWP; Mary Moser - NOAA Federal; Kinsey Frick - NOAA Federal; Hausmann, Ben J NWP

Subject: [EXTERNAL] Re: FPOM: Official Coordination - 14BON01 BI lamprey wetted wall (UNCLASSIFIED)

Tammy, I've reviewed this updated MOC. Thanks to those working on this for considering our earlier comments. We support moving forward with this system as indicated. Either location in the ladder is ok, given the changes in the design. The researchers (and the project fisheries personnel) should notify our office if any jumping or unusual delay behavior of adult salmon is noted. I hope it works. Thanks, Gary

2014 February 13 FPOM meeting. 14BON01 Lamprey wetted wall. Hausmann reported on the MOC. BON concerns are related to the proposed rest box on the top of the ladder wall. Once the ladder is watered up, personnel cannot access the rest box to inspect for fish. Two circuits are needed but BON may be able to provide only one, which means there is the potential for pumps to fail, lamprey to be trapped in that rest box and no way for biologists to rescue them. FPOM asked more about the box since that wasn't in the original design. Hausmann said the box is constructed, not installed, but ready for installation. Wills and Fredricks shared Hausmann's concerns about the rest box. Hausmann said he received a verbal description from the fabricators but has not talked with Mary Moser. **ACTION: Hausmann will get more details about the rest box. He will send a photo later on 13 February if possible.** NOAA is ok with the wetted wall. Bettin asked if we are sure it is really a rest box or if that verbal description might be misleading. **Rejected.**

Hausmann was able to send additional photos of the wetted wall. FPOM wanted to know who said to go forward with the changes to the structure and why. Hausmann said NOAA was uncomfortable going forward without the rest box. Setter asked about the pumps and flows and how biologists will know the pump has gone out. Hausmann said this is supposed to be a test system that didn't require access since there wouldn't be a place for fish to hold or be trapped. FPOM noted the photos do not look like the MOC. Hausmann noted once the facility is in, it will need to stay in for two years. **CRITFC no longer supports this MOC. FPOM no longer supports this MOC.** Last minute changes were the primary cause and a lack of justification for the proposed changes.

Kinsey Frick called in to discuss the wetted wall. Frick explained the proposed changes. Van Dyke asked how adults will be kept from falling into the water supply. Frick explained that this

design has been successful in other locations and there will be no gaps. **FPOM approved the MOC.**

Final Action- Based on the discussion at FPOM, the wetted wall was installed. Upon further inspection, the wall was not installed in the same manner nor design as what was coordinated with FPOM. As of 24 February, due to the change in design and lack of FPOM coordination, the wetted wall was removed from Bradford Island. Further refinement of the design and coordination with FPOM will occur for next winter maintenance.

Please email or call with questions or concerns:
Sean C. Tackley or Nathan Zorich



Figure 1. Photo of the Bradford Island Fish Ladder showing proposed installation locations A (preferred) and B (if “A” is not acceptable). Lamprey would be guided to the adjacent AWS channel, where two LPS entrance ramps are located.

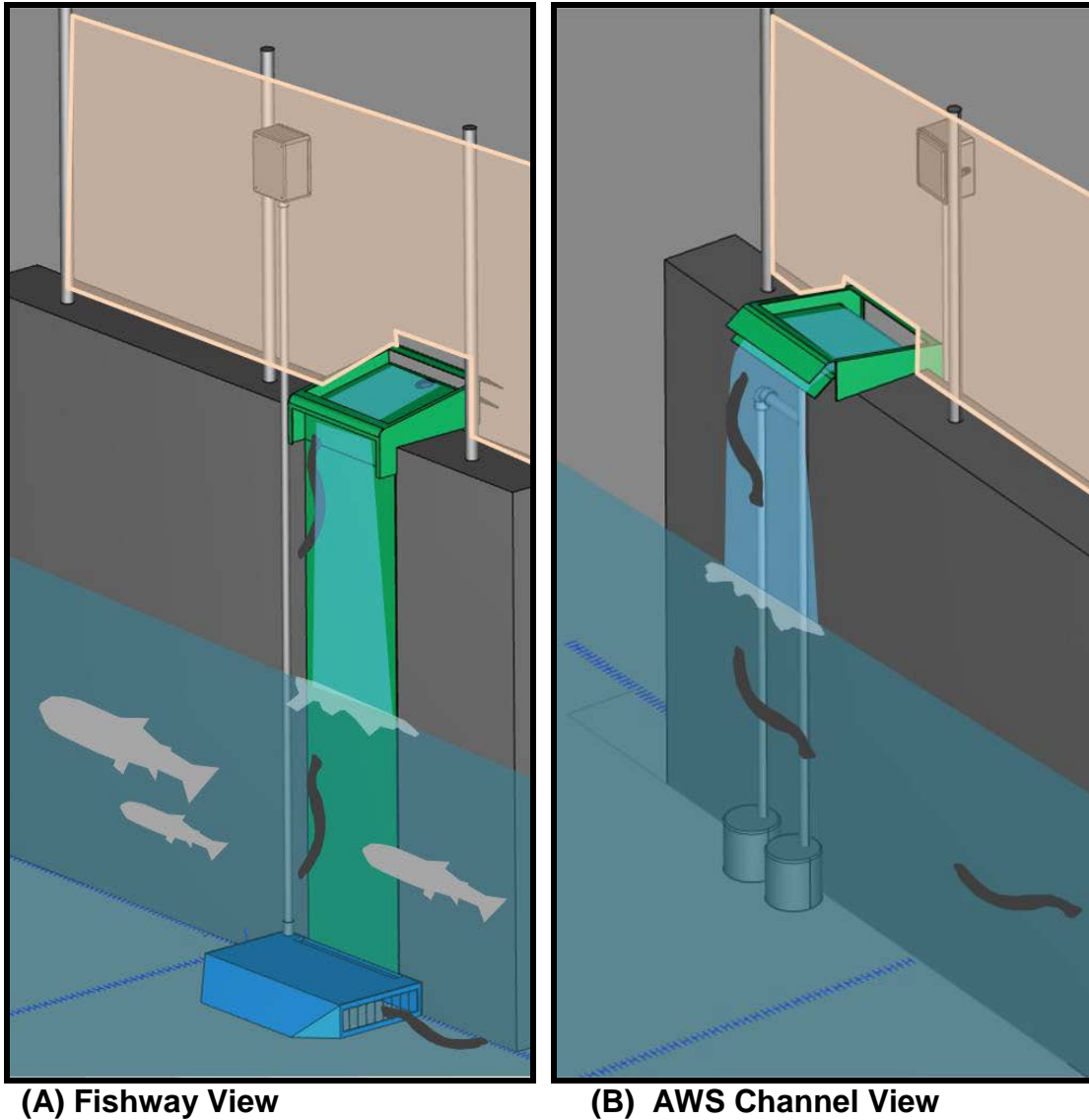


Figure 2. Isometric illustrations of the proposed wetted wall lamprey passage structure (lid on hood box at top of structure omitted in illustration). View (A) depicts the fishway side of the structure, including refuge box, climbing plate, and upstream 1.5" conduit. View (B) depicts the AWS channel side of the structure, including exit crest and two 115V submerged pumps. Water may be supplied via a nearby spigot instead (pending verification from Bonneville Project staff).