

**OFFICIAL COORDINATION REQUEST FOR
NON-ROUTINE OPERATIONS AND MAINTENANCE**

COORDINATION TITLE – 18 IHR 04 Fish Release Pipe Install and Unit 2 Turbine Testing

COORDINATION DATE – 06/25/2018

PROJECT- Ice Harbor

RESPONSE DATE – 07/09/2018

Description of the problem: The installation of the new turbine runner in Unit 2 at Ice Harbor is scheduled for completion during the summer of 2018 with biological testing scheduled for September-October of 2018. A 2-day unit 2 outage will be required to install fish release pipes on the STS (Figures 1-2) before biological testing. If low flow precludes operating two units during the study period, a unit priority change to test unit 2 would be necessary as well. Release pipe removal will be in conjunction with STS removal.

Type of outage required:

- 1) 2-day unit 2 outage for fish release pipe installation on the STS in September.
- 2) Unit priority change from unit 1 to unit 2 if low flow precludes operating two units during the study period. The Project will coordinate outages and unit test operations with BPA/RCC.

Dates of impacts/repairs:

- 1) Fish release pipe install = Week of 24 September 2018
- 2) Fish release pipe removal = week of 16 December 2018 with STS removal
- 3) Unit 2 operating priority for testing = 24 September-31 October 2018.

Length of time for repairs: Total unit 2 outage time is estimated at 2 days each for fish release pipe install and removal. A unit priority change to operate and test unit 2 up to 30 days is requested. Additional days may be needed may be necessary depending on flow conditions and study progress.

Impact on fish facility operation: No impacts anticipated.

Analysis of potential impacts to fish:

1. Adult salmonid passage during the outage and study dates.

Approximately 27% of adult fall Chinook (Figure 3) and 53% of adult steelhead (Figure 4) will pass Ice Harbor Dam from September 20 to October 31, and a rare adult sockeye (Figure 5) may pass during this time period according to the 10-year average (DART 2018). Adult salmon and steelhead are generally upstream-focused during this migration period, but fallback may occur for fish that overshoot their natal tributary or mill around in the forebay.

Bull trout passage is unknown during the outage and study period. The study will

occur during the optimal bull trout spawning window which will reduce the likelihood of bull trout being in the vicinity of Ice Harbor Dam. The chances of a bull trout migrating downstream increase later in October as some adults migrate back into mainstem rivers to overwinter.

Approximately 9.4% of adult lamprey passing Ice Harbor may pass during the study period according to the 10-year average [Figure 6 (DART 2018)].

2. Juvenile salmonid passage during the outage and study dates.

Very few juvenile fish are expected to pass the project during this time period. The 10-year average at Lower Monumental and Little Goose dams suggests numbers in the low 100s or less across species per day would be passing the Ice Harbor during this time (Figure 7).

3. Type of impact for adults and/or juveniles, as appropriate, by species (increased delay, exposure to predation, exposure to a route of higher injury/mortality rate, exposure to higher TDG, etc.).

Negligible impacts are anticipated for adults and juveniles of all species. Trumbo et al. (2014) analyzed adult passage at the south shore fish way from 2005-2013 (adult count, passage percentages, and passage timing derived from radio telemetry data for Chinook salmon and steelhead) relative to turbine operations. Analysis results identified no difference of biological significance in adult passage at the Ice Harbor south fishway relative to turbine unit 1 or unit 3 operating singly (Figure 8), which suggests that any of units 1-3 operating singly would provide adequate attraction flow for the south fishway and would not delay adult passage during the 2-day unit 2 outage or during priority operation for testing. Adult bull trout and lamprey migrating upstream are expected to be affected similarly to adult salmon and steelhead.

Outmigrating juveniles passing Ice Harbor during the outage and study period would generally pass through the powerhouse bypass or turbine units. Therefore, operating an existing unit during the unit 2 install outage is no change from the baseline condition. Based on computational fluid dynamics and physical modeling efforts during the turbine design process, it can be assumed that unit 2 would provide safer turbine passage for outmigrating juveniles compared to the existing units during the study period. The draft tube ceiling has been lowered, effectively shifting the turbine boil downstream in the tailrace. This improves tailrace egress conditions for juveniles passing unit 2 as well.

The same logic of safer passage may apply to downstream migrating bull trout, lamprey, and adult salmon and steelhead fallbacks based on flow quality/reduced turbulence within the turbine water passageway compared to existing units.

Final judgement on scale of expected impacts (negligible, minor, significant) on:

- a. **Downstream migrants (including juveniles, adult bull trout, adult salmon and steelhead fallbacks):** Negligible. Downstream passage is not expected to degrade from the baseline and may be improved during turbine testing.

- b. Upstream migrants (including Bull Trout):** Negligible. No passage delays are anticipated from operating unit 2 rather than unit 1 during testing.

Comments from agencies

Final coordination results

After action update

Please email or call with questions or concerns.

Thank you,

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References:

Trumbo BA, MK Shuttles, JF Renholds, ML Ahmann and KE Crum. 2014. Ice Harbor Test Turbine Fixed Blade Runner Installation Considerations for Adult Salmonid Passage. Report of the US Army Corps of Engineers, Walla Walla District, Walla Walla, Washington.

DART (Data Acquisition in Real Time). 2018. Adult Passage Graphics & Text. Columbia Basin Research, University of Washington, Seattle, Washington. Available at: http://www.cbr.washington.edu/dart/query/adult_graph_text. 19 June 2018.

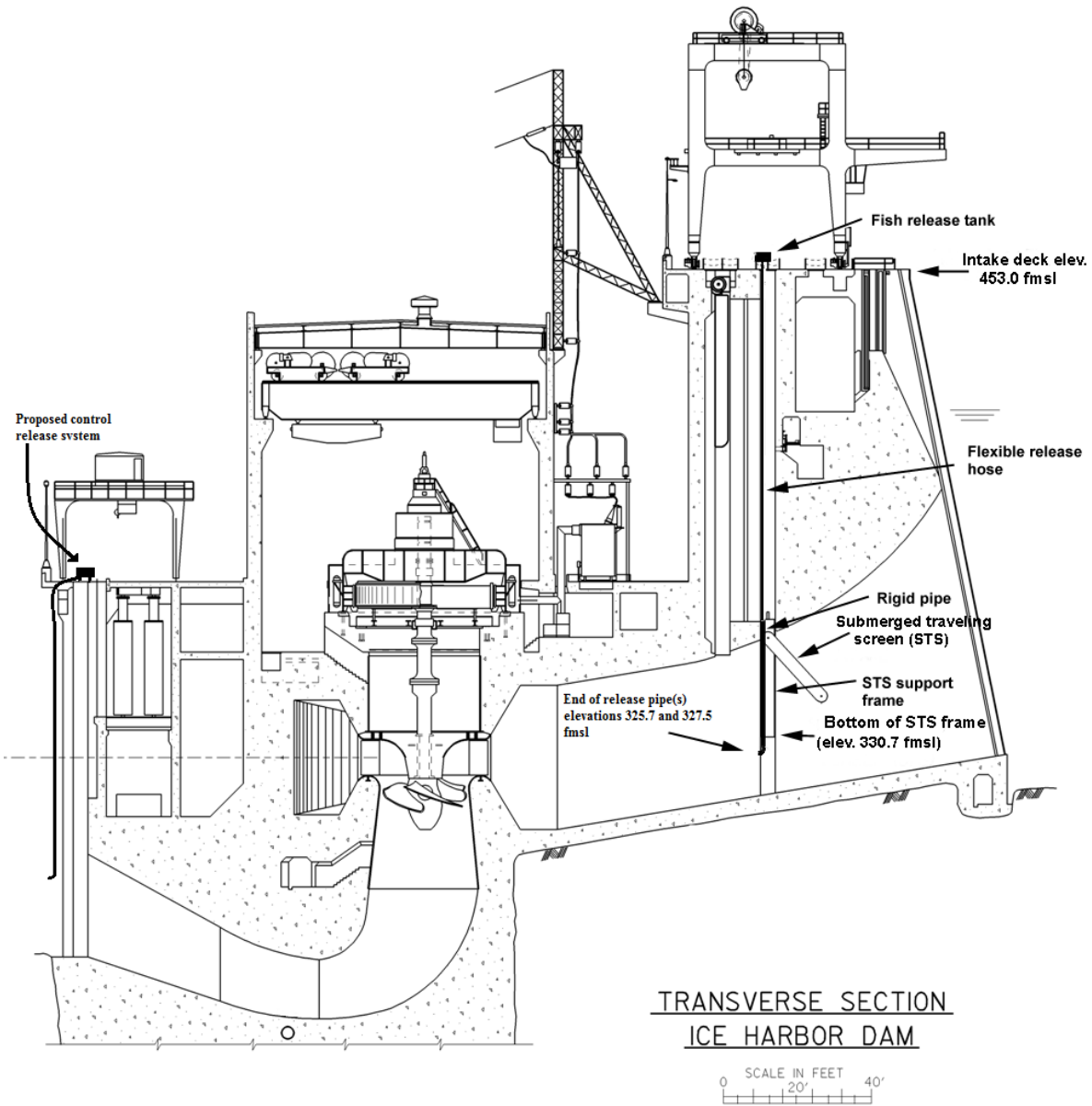
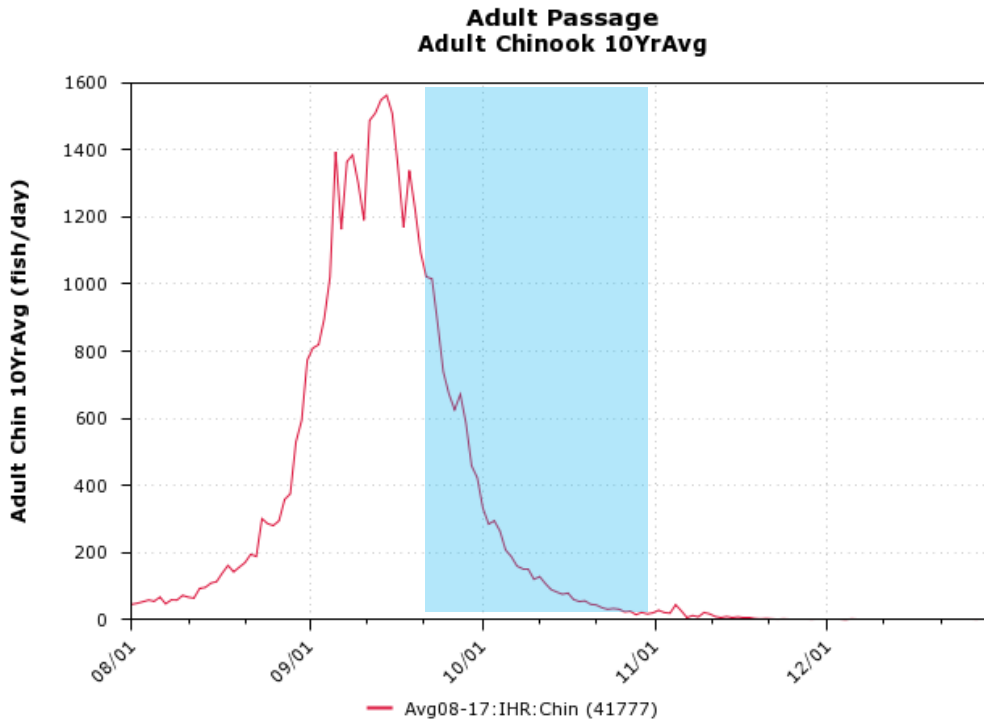


Figure 1: Cross-section of powerhouse and turbine showing the 2007 and proposed treatment release locations for juvenile Chinook salmon at Ice Harbor. Control fish will be released just downstream of the exit from the draft tube. Source U.S. Army Corps of Engineers.



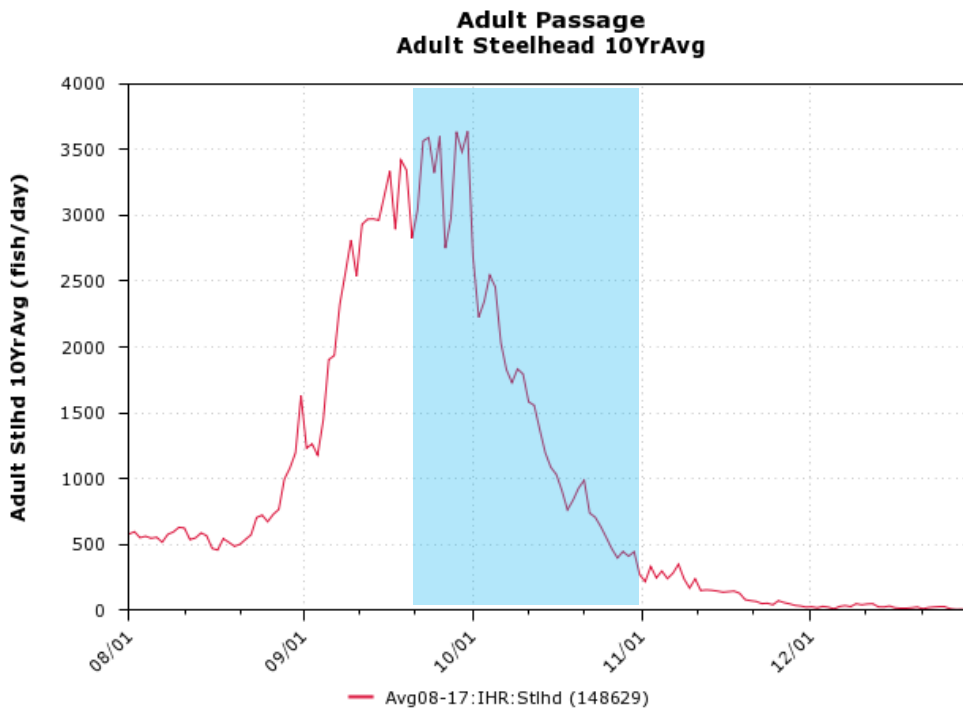
Figure 2: Planned fish release pipes design and method of attachment to traveling fish screen frame (top left photo) 30 inches off-center toward the north. Normandeau recommends that pipe design and installation (provided by Corp) follow that utilized previously in the 2007 study. The exit end of release pipes were curved (top right photo) and oriented in a downstream direction when installed. Normandeau will provide the same type of induction system and release hoses (bottom photo) used in 2007.



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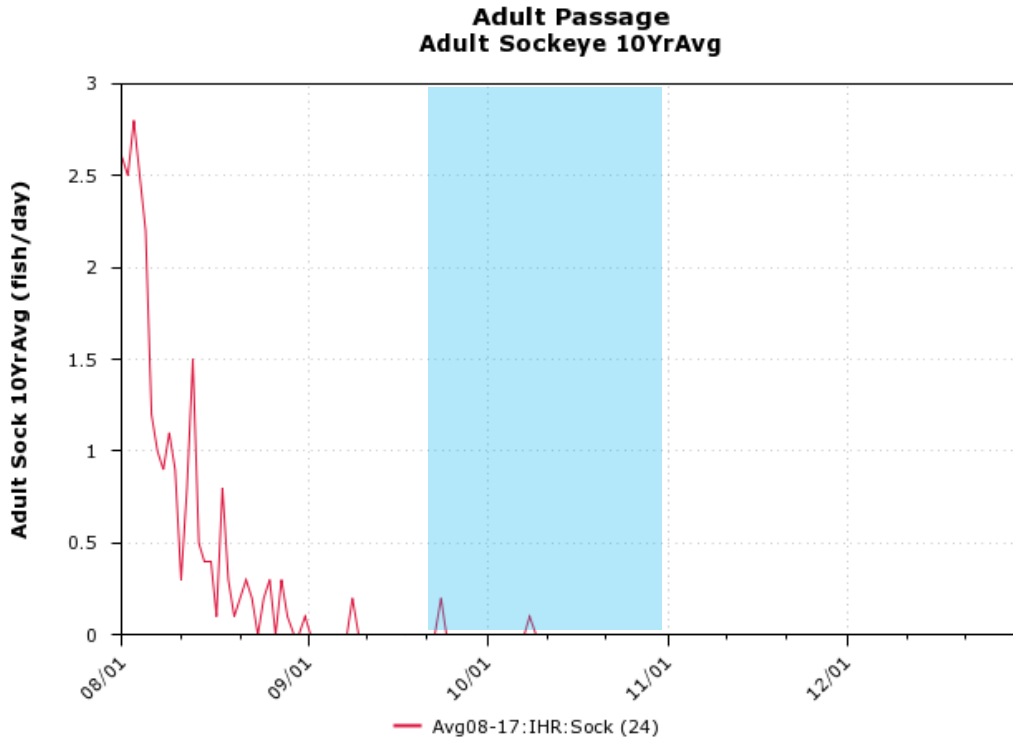
Figure 3. 10-year average adult fall Chinook passage at Ice Harbor Dam during the outage and study period (DART 2018). The blue shaded area is the approximate study window.



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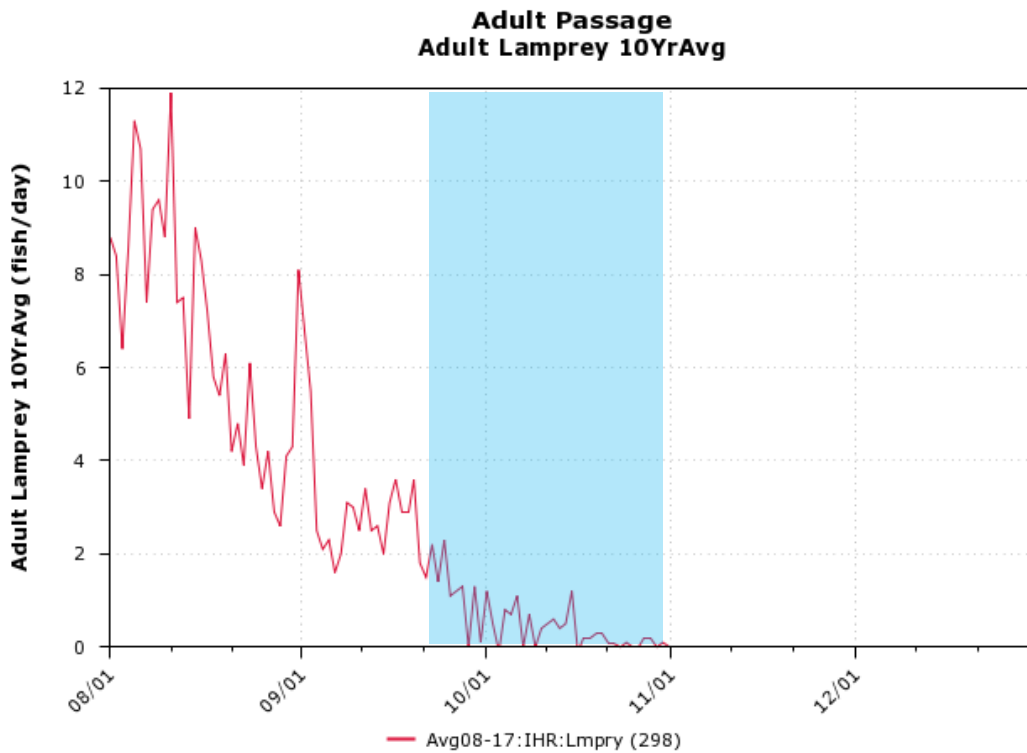
Figure 4. 10-year average adult steelhead passage at Ice Harbor Dam during the outage and study period (DART 2018). The blue shaded area is the approximate study window.



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Figure 5. 10-year average adult sockeye passage at Ice Harbor Dam during the outage and study period (DART 2018). The blue shaded area is the approximate study window.



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Figure 6. 10-year average adult lamprey passage at Ice Harbor Dam during the outage and study period (DART 2018). The blue shaded area is the approximate study window.

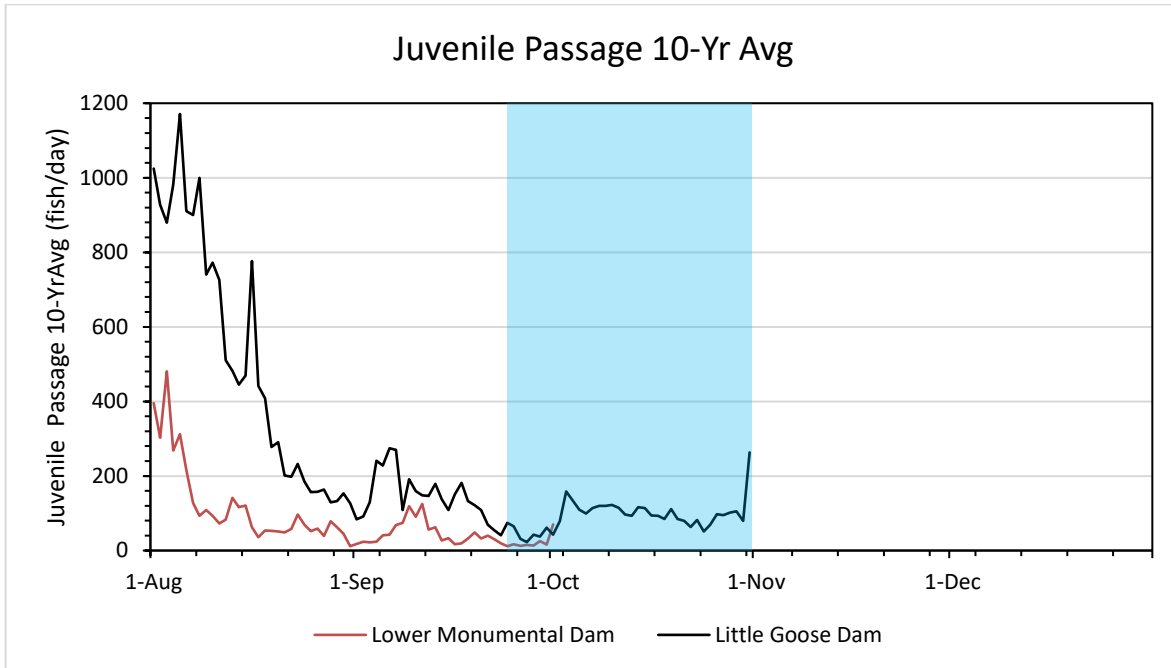


Figure 7. 10-year average juvenile passage at Lower Monumental and Little Goose dams during the outage and study period. Passage numbers are not estimated after October 1 at Lower Monumental Dam or after November 1 at Little Goose Dam. The blue shaded area is the approximate study window.

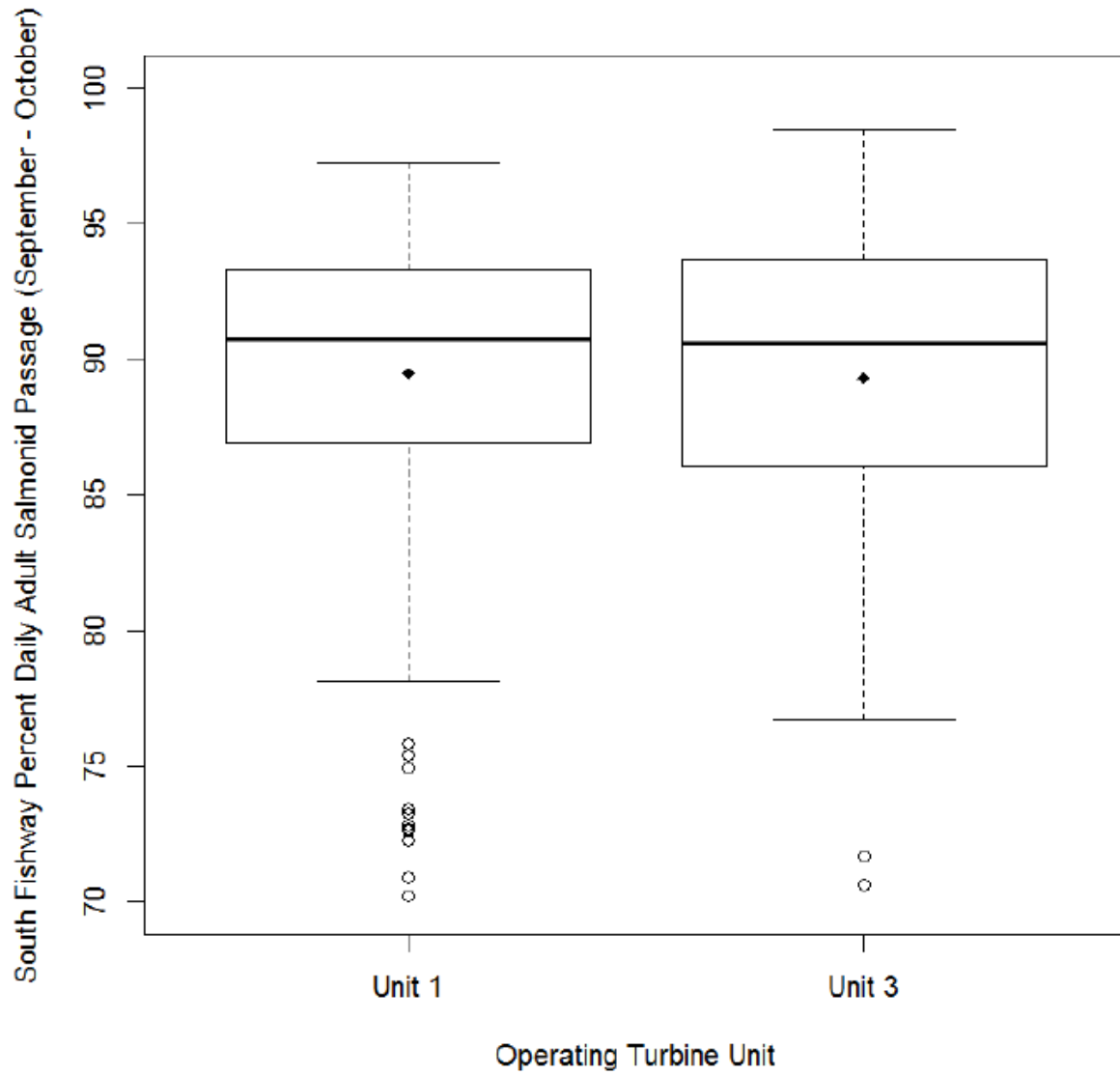


Figure 8: Ice Harbor Dam south fishway daily percent adult salmonid passage during the September – October no-spill period, 2005 – 2013.