OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE - 18LWG09 MOC – Transition Flume Flow Testing
COORDINATION DATE - 24 July 18 – Follow-up Coordination 15 August 2018
PROJECT - Lower Granite Dam
RESPONSE DATE - 2 August 2018 - Follow-up Coordination 29 August 2018

Description of the problem - The configuration in the transition area of the transport flume just before entering the separator results in uneven flows over the porosity plate, an extensive hydraulic jump, and holding pools when operated under design recommendations. Operational changes have been made to eliminate fish holding and prevent the east side of the porosity unit from drying out. These changes include raising the primary dewaterer weirs to increase sweeping velocities in the flume and closing the porosity unit valves to prevent the porosity unit from drying out on the east side. These operations result in excess water through the separator exits and in the facility flumes. Facility dewatering and flush water adjustments improved PIT detection efficiency this season but are not capable of reducing the volume of water to the ideal flume levels. A long term solution that provides a uniform flow distribution in the transition area of the flume and over the porosity plate is needed. August 7 and 8 Lower Granite biological staff with a Walla Walla hydraulic engineer plan to perform hydraulic testing under various flow volumes in the transition area of the flume and over the porosity plate. Testing will require about eight brief instances of changing facility operation to primary bypass for installation and repositioning of a false wall in the transition flume. Primary dewaterer weirs will be raised and lowered to achieve the specified flows within the operating range during testing. No fish rescues are expected during the testing due to the availability of flush water in the flume and a sanctuary pool provided on the low point of the flume.

Type of outage required- N/A

Impact on facility operation (FPP deviations) – During short periods (less than 30-minutes per test) of primary bypass when all fish will be sent directly back to the river and not collected for transport.

Impact on unit priority - N/A

Impact on forebay/tailwater operation - N/A

Impact on spill- N/A

Dates of impacts/repairs- Testing is scheduled during regular business hours August 7 and 8. Follow up testing September 25 and 26.

Length of time for repairs- Testing will occur between 0800-1500 hours August 7 and 8. Follow-up testing will occur between 0800-1500 hours September 25 and 26.

Analysis of potential impacts to fish

1. 10-year average passage by run during the period of impact for adults and juvenile listed species, as appropriate for the proposed action and time of year; No impacts to adult passage are expected. Based on the ten year average collection and the ten year daily collection for August 7 and 8 about 0.2% of this year's total subyearling collection would be passing through the juvenile bypass system during the test and may be impacted. Based on the ten year average collection and the ten year daily collection for September 25 and 26 about 0.001% of this year's total subyearling collection would be passing through the juvenile bypass system during the follow-up testing and may be impacted.
2. Statement about the current year's run (e.g., higher or lower than 10-year average); Smolt index indicates the subyealing Chinook 10-year average is below average with about 81.8% of the ten year average having passed lower Granite as of July 25.
3. Estimated exposure to impact by species and age class (i.e., number or percentage of run exposed to an impact by the action); Testing will not impact fish passage through the adult facilities. The 10-year average daily juvenile fish collected for transport at Lower Granite August 7 and 8 totaled 998 smolts and total 368 for September 25 and 26. Species composition will primarily be subyearling Chinook salmon (98 to 99%). Based on the 10-year average collection and the 2018 subyearling Chinook salmon collection to date less than 0.2% for the August testing and less than 0.001% during the September testing would be returned to the river and not transported from Lower Granite due to this testing. The proportion is expected to be much less due to the short durations (less than 30 minutes per test) in primary bypass. Juvenile fish passage tends to increase at night and early morning which is outside of most of the timing when test would be occurring.

   An estimate of 1 to 5 (average of 3 fish) adult salmon and steelhead that would normally fall back through the juvenile separator and out the adult release flume would be bypassed directly to the river thought the outfall pipe via during primary bypass.
4. Type of impact by species and age class (increased delay, exposure to predation, exposure to a route of higher injury/mortality rate, exposure to higher TDG, etc.); Fish that are not collected and transported during testing may be exposed to higher predation rates and longer migration times because they would be returned to the tailrace at Lower Granite Dam rather than transported.

Summary statement - expected impacts on:

Downstream migrants: Minimal impacts are expected due to the relatively small numbers of smolts passing at the time of the outage and its short durations of primary bypass operation.

Upstream migrants (including Bull Trout): Minimal impacts are expected due to the relatively small numbers of adults that would be falling back through the bypass at time of the outage and its short duration.

Lamprey: Minimal impacts are expected due to the relatively small numbers of lamprey passing at the time of the outage and its short duration.

Comments from agencies:

-----Original Message-----
From: Hockersmith, Eric E CIV USARMY CENWW (US)
Sent: Wednesday, July 25, 2018 12:08 PM
To: 'Trevor Conder - NOAA Federal' <trevor.conder@noaa.gov>
Subject: RE: [Non-DoD Source] Re: 18 LWG 09 MOC - Transition Flume Test (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Trevor,

Plan at this time is Ryan Laughery will provide a write up and video of test findings at the August FPOM which he is planning to attend. The August FPOM meeting works better than the FFDRWG meeting as he will be out of the country during August FFDRWG.

Eric Hockersmith
Fishery Biologist
U.S. Army Corps of Engineers
Walla Walla District
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Walla Walla, WA 99362
Phone: 509-527-7122
Cell: 509-520-4350

-----Original Message-----
From: Trevor Conder - NOAA Federal [mailto:trevor.conder@noaa.gov]
Sent: Wednesday, July 25, 2018 10:28 AM
To: Hockersmith, Eric E CIV USARMY CENWW (US)
<Eric.E.Hockersmith@usace.army.mil>
Subject: [Non-DoD Source] Re: 18 LWG 09 MOC - Transition Flume Test (UNCLASSIFIED)

Eric,

We support this MOC, and request a brief write-up with photos on the results of the test.

-Trevor

Final coordination results:

After Action update August Test: The facility was placed in primary bypass twice for testing**.** Flume flow testing with the aggressive curve false wall was performed from 0920-1314 hours 7 August. Primary bypass occurred from 0920-1031 hours for false wall installation and from 1242-1314 hours for false wall removal.

Flume flow testing with the gradual curve false wall was performed from 1223-1445 hours 8 August. Primary bypass occurred from 1223-1300 hours for false wall installation and from 1418-1445 hours for false wall removal. Separator exits were closed to maintain a sanctuary pool while operation were changed to primary bypass and collection. No sampling occurred during these times.

Flow conditions in the transition area of the flume and over the separator with the two fabricated false walls tested were informative but didn't resolve unsatisfactory conditions. Additional testing with different false wall configurations is needed. Granite is requesting to perform additional testing with different false wall configuration in late September. Pushing the testing date out to late September will allow time Corps Hydraulic Engineer's to develop additional designs for testing and fabrication by Granite JFF maintenance staff.

The facility was placed in primary bypass twice for the second series of testing**.** Flume flow testing with the third curve false wall design was performed from 1010-1250 hours 25 September. Primary bypass occurred from 1010-1115 hours for installation and from 1220-1205 hours for removal.

Flume flow testing with the forth curve false wall design was performed from 0837-1003 hours 26 September. Primary bypass occurred from 0837-0922 hours for installation and from 1037-1103 hours for removal. Separator exits were closed to maintain a sanctuary pool while operation were changed to primary bypass and collection. No sampling occurred during changes in operations.

Flow conditions in transition flume area, over the porosity unit, and into the separator did not improve with any of the false wall designs. It was determined that the best fish transport flows through the flume, transitions area, and into separator are achieved with the PDW flume set point at 35-40 cfs. Operations were changed to these flows early May due to fish holding under the separator and swimming up the transition flume area to the secondary dewaterer. Changes in the porosity unit dewatering valves will be required to remove excess water from west side of the separator while not drying out the east side. These modifications are also needed to reduce the amount of water through the separator exits and raceway/bypass collection flumes. Options for modifications of the porosity control unit are being investigated.

Please email or call with questions or concern.

Thank you,

Elizabeth Holdren
Supervisory Fisheries Biologist Lower Granite Lock and Dam Ph. 1(509)843-2263
Elizabeth.a.holdren@usace.army.mil

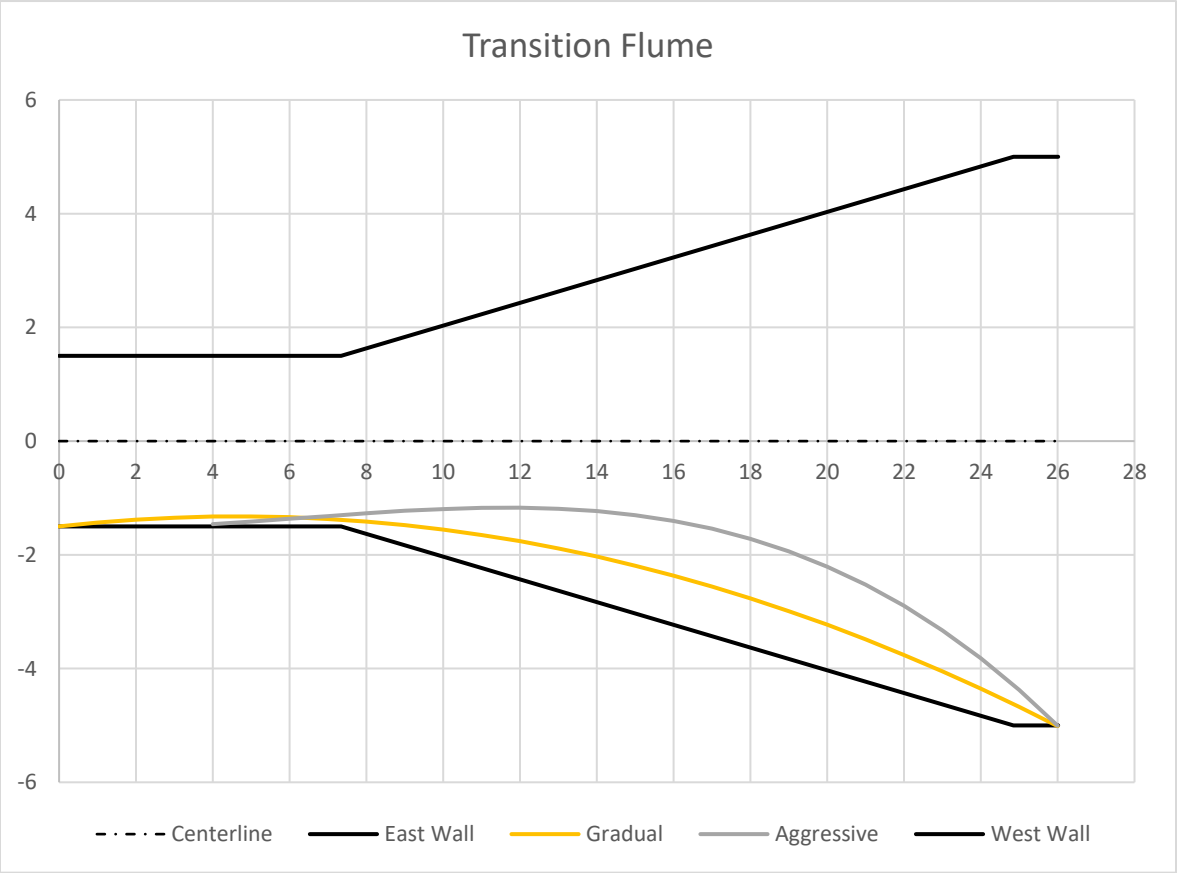
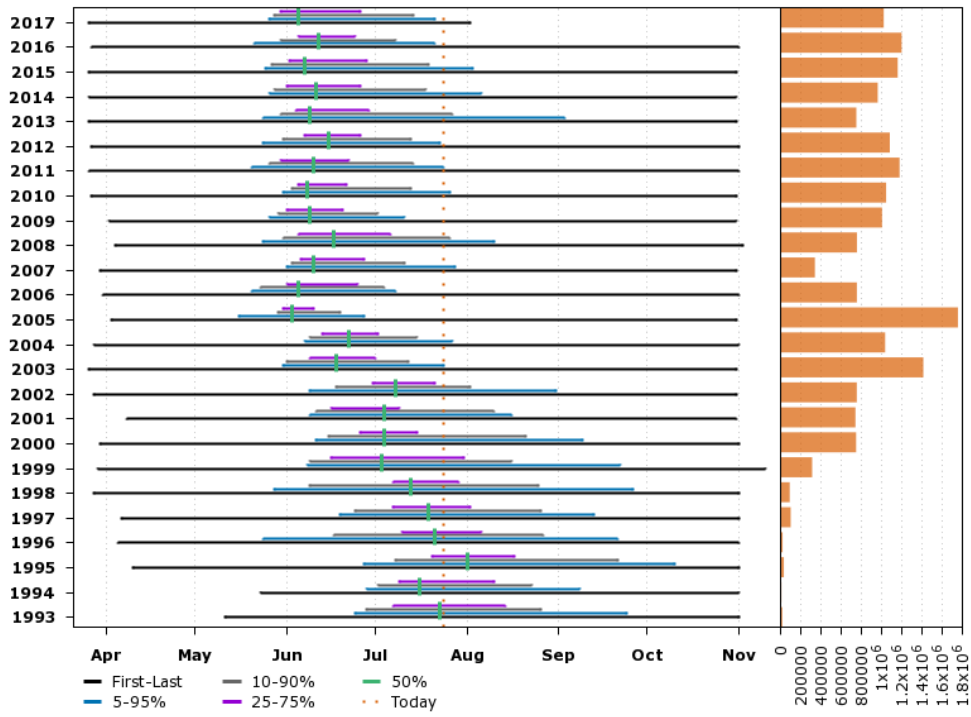


Figure 1. Diagram of transition flume false wall position for testing.

Historical Run Timing, 1993 - 2017
Smolt Index Subyearling Chinook
Lower Granite Dam, 1/1 - 12/31



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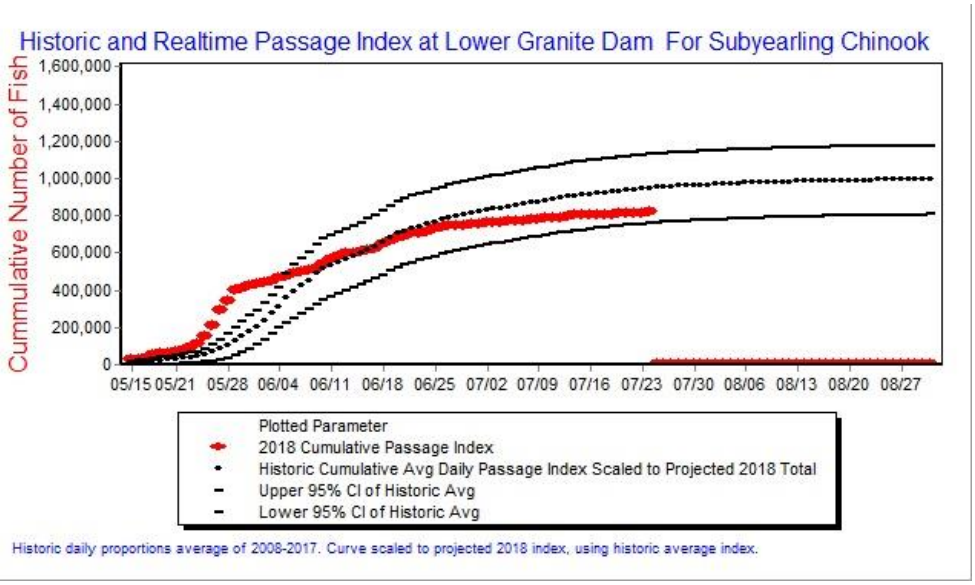
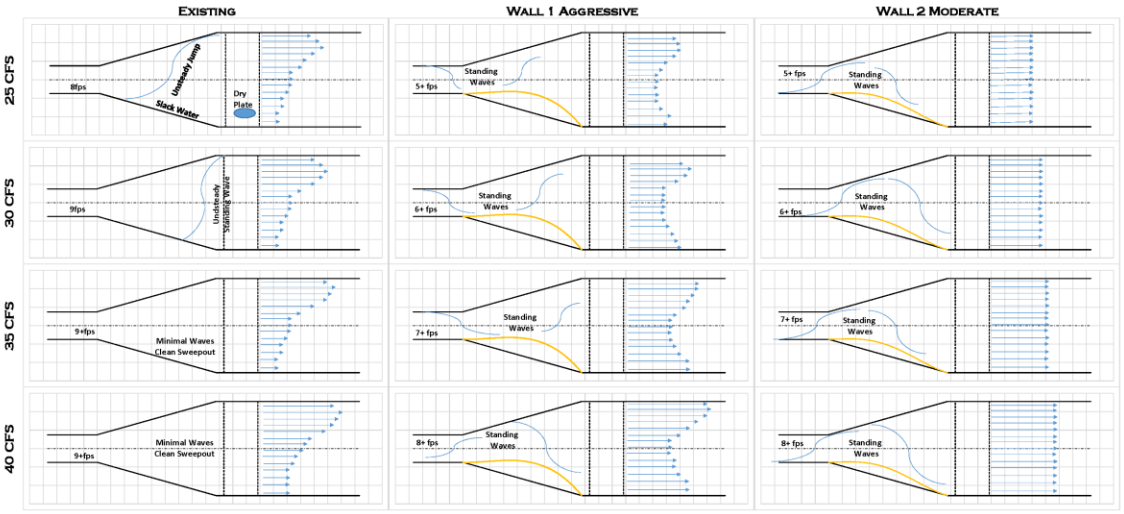
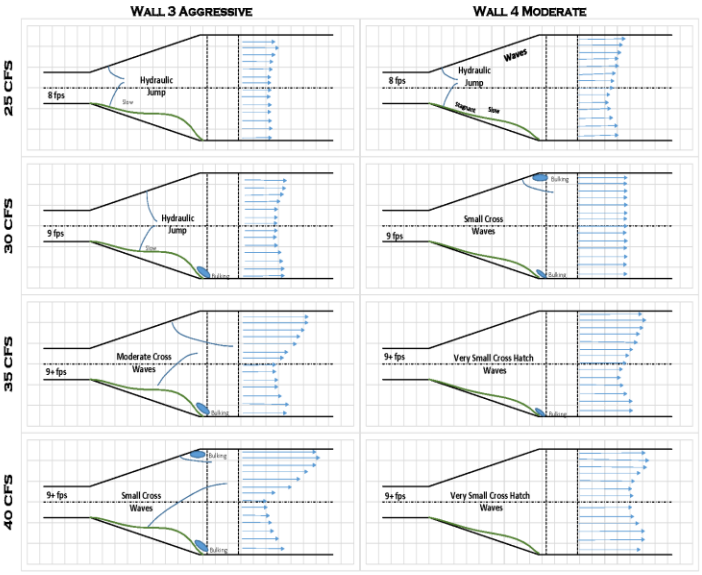


Historic daily proportions average of 2008-2017. Curve scaled to projected 2018 index, using historic average index.



Flow constricted entering transition area and slower than existing condition
Flow entering porosity plate improved over existing condition eliminating dry areas.
Flow entering separator unbalance but better than existing

Flow constricted entering transition area and slower than existing condition
Flow entering porosity plate fairly uniform eliminating dry areas.
Flow entering separator balanced



Flow not constricted entering transition area and maintains existing velocity condition
Flow entering porosity plate improved over existing condition eliminating dry areas.
Flow entering separator unbalance but better than existing

Flow not constricted entering transition area and maintains existing velcity condition
Flow entering porosity plate fairly uniform eliminating dry areas.
Flow entering separator close to balanced