# Fish Passage Plan (FPP) Change Request Form

**Change Form # & Title**: 19LWG002 – Close Floating Orifice Gates

**Date Submitted**: December 20, 2018

**Project**: Lower Granite Dam

**Requester Name, Agency**: Elizabeth Holdren, USACE

**Final Action:** **APPROVED – 2/14/2019**

**FPP Section**: 2.4.2.6. Adult Facilities – Fish Passage Season (March 1 – Dec 31) – FOGs

**Justification for Change**: Maintaining Lower Granite fish ladder collection channel/tailrace head differential criteria along with depth over the weirs has been a challenge for many years. Operational changes over the last five years have reduced collection channel/tailrace head differential and depth over the weirs out of criteria readings. Lower Granite collection channel diffusers run the length of the powerhouse ending with diffuser 13 located between north powerhouse entrances and the spillway basin. Water provided from these diffusers maintains the additional 1-2 feet of channel depth required for attraction flow at the fish entrances. Reducing water loss through the powerhouse collection channel FOGs may improve channel/tailrace head differential. Closing FOGs is a simple operational change that will likely improve attraction flows at the entrances by increasing water flow over the weirs at the north powerhouse and north shore entrances.

Table 1 below shows that both north and south shore are less likely to meet head differential criteria and more likely to barely meet criteria with a head differential of 1.0 ft. Past evaluations of salmonid passage at Lower Granite show that FOG use as an entrance is relatively low.

**Proposed Change**: *(edits to existing FPP text in track changes)*

**2.4.2.6. Floating Orifice Gates (FOGs).** FOGs 1 and 10 will be operated (4 and 7 closed). Inspect fish fallout fence for debris buildup, holes, etc.

**Comments**:

 2/7/19 FPOM FPP Meeting: Conder asked whether just closing 4 and 7 (keeping 1 and 10 open), would be sufficient to maintain criteria. Looking at the graphs below indicates 1 and 10 see higher passage. Peery said that fish that pass through 1 and 10 would just shift over to the adjacent larger entrance at the spillway and powerhouse, respectively. Peery will inquire with Holdren on whether keeping 1 and 10 open would alleviate the concern with criteria. He will provide that information to FPOM for follow up at next week’s FPOM meeting on 2/14.

 2/8/19 Charles Morrill via email: “Ok…Continue to monitor this season to confirm.”

 2/8/19 Elizabeth Holdren, via email to Chris Peery: “Closing two FOGs would be fine considering the primary reason is to improve channel/tailwater is a great start. I will need to know so Joe can leave the bulkheads in place for FOGs 4 and 7.”

**Record of Final Action**: Approved as revised to keep FOGs 1 and 10 open.

Table 1. Number and percent of channel/tailrace head differential out of criteria readings and the number of reading with a 1.0 feet differential (2013-2017).

|  |
| --- |
| 2013 Channel/Tailrace Head Differential (Criteria 1-2') |
| N = 138 | # IN | % IN | = 1.0' | % = 1.0' | # OUT | % OUT |
| SSE | 138 | 100% | 4 | 3% | 0 | 0% |
| NPE | 134 | 97% | 37 | 27% | 4 | 3% |
| NSE | 118 | 86% | 40 | 29% | 20 | 14% |
|  |  |  |  |  |  |  |
| 2014 Channel/Tailrace Head Differential (Criteria 1-2') |
| N = 144 | # IN | % IN | = 1.0' | % = 1.0' | # OUT | % OUT |
| SSE | 143 | 99% | 2 | 1% | 1 | 1% |
| NPE | 129 | 90% | 45 | 31% | 15 | 10% |
| NSE | 51 | 35% | 37 | 26% | 93 | 65% |
|  |  |  |  |  |  |  |
| 2015 Channel/Tailrace Head Differential (Criteria 1-2') |
| N = 176 | # IN | % IN | = 1.0' | % = 1.0' | # OUT | % OUT |
| SSE | 162 | 92% | 44 | 25% | 14 | 8% |
| NPE | 150 | 85% | 54 | 31% | 26 | 15% |
| NSE | 84 | 48% | 59 | 34% | 92 | 52% |
|  |  |  |  |  |  |  |
| 2016 Channel/Tailrace Head Differential (Criteria 1-2') |
| N = 169 | # IN | % IN | = 1.0' | % = 1.0' | # OUT | % OUT |
| SSE | 168 | 99% | 11 | 7% | 1 | 1% |
| NPE | 169 | 100% | 10 | 6% | 0 | 0% |
| NSE | 163 | 96% | 22 | 13% | 6 | 4% |
|  |  |  |  |  |  |  |
| 2017 Channel/Tailrace Head Differential (Criteria 1-2') |
| N = 167 | # IN | % IN | = 1.0' | % = 1.0' | # OUT | % OUT |
| SSE | 161 | 96% | 15 | 9% | 6 | 4% |
| NPE | 156 | 93% | 24 | 14% | 11 | 7% |
| NSE | 150 | 90% | 25 | 15% | 17 | 10% |







Figures 1-3: From Stuehrenberg et al. 2005. Adult steelhead passage through fishways and transition pools at Bonneville, McNary, and Lower Granite Dam – 1996. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Report for U.S. Army Corps of Engineers, Portland and Walla Walla Districts, Portland, OR, Walla Walla, WA. Technical Report 2005-7.