OFFICIAL COORDINATION REQUEST FOR
NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 14 IHR 003 Ice Harbor Ogee & Deflector Modification – Revised
COORDINATION DATE- April 10, 2014 at FPOM meeting. Revised: April 28, 2014
PROJECT- Ice Harbor Dam
RESPONSE DATE- **May 1, 2014**

Description of the problem

A Removable Spillway Weir (RSW) was installed at Ice Harbor Dam (IHR) spillbay 2 in 2005. Juvenile salmonid passage and survival evaluations have included volitional passage and survival using radio telemetry (2005 to 2009), a direct injury and survival and sensor fish evaluation (2005), and a hydroacoustics vertical distribution (2005 and 2006). Up to 74% of the juvenile steelhead, 59% of the yearling Chinook salmon and 74% of the subyearling Chinook salmon typically pass IHR through the RSW. The direct injury and survival evaluation in 2005 identified high injury levels for fish passing close to the spillway ogee. The hydroacoustics vertical distribution evaluations indicated that at least 11% of spring migrants and 25% of summer migrants entered the RSW close to the ogee surface and may be passing through the high injury zone. Paired release radio telemetry survival estimates for juvenile steelhead and subyearling Chinook salmon passing through the RSW has been above the BiOp performance standard for dam passage. However, the majority (4 out of 5) of paired release radio telemetry survival estimates for yearling Chinook salmon have been below the BiOp performance standard. Comparisons between direct injury studies at other dams, as well as hydraulic analysis using Computational Fluid Dynamics (CFD) models, physical hydraulic models, and sensor fish data led to the conclusion that the slope of the spillway chute and the angle of the deflector were the likely causes of the high injury rates observed at the IHR RSW in 2005 and the low estimates of survival for yearling Chinook salmon. During the fall of 2014 and winter of 2014/2015 the ogee of IHR spillbay 2 is being modified to decrease the slope and increase the radius of the transition to the deflector. A contract for the construction was awarded during the spring 2014.

Construction activities associated with the IHR Spillbay 2 ogee and flow deflector modification will require extensive onsite efforts over the approximately 8-month long construction schedule. While some of the construction activities can occur during normal project operations, some activities will require alteration of normal project operations. Spillbay 2 will require extensive concrete drilling, cutting, demolition, etc. to provide sufficient anchor points for the new concrete as well as smooth transitions between existing and new concrete.

No disruption in spill for juvenile passage, called for in the USACE's Fish Passage Plan (2014), is anticipated. However, spillbays 1 through 3 are anticipated to be out of service for involuntary spill from 15 September 2014 through 1 March 2015 due to construction activities. To ensure completion of the ogee and deflector modification prior to the start of the 2015 spill for juvenile fish passage the COE proposes an earlier start of the in-water work window at IHR of 1 November 2014 and to begin concrete drilling, cutting, and demolition activities above the water on September 15, 2014.

The requested change in project operations and in-water work window is needed to provide sufficient time for the contractor to remove existing concrete, install new concrete, and allow the new concrete to cure prior to the start of the juvenile fish passage season which typically commences April 1.

Type of outage required

- Spill bays 1 through 3 out of service from 15 September 2014 through 1 March 2015 for construction activities associated with the modification of the Ice Harbor Dam spillbay 2 ogee and deflector.
- The IHR in-water work period changed from starting on 16 December 2014 to 1 November 2014.

Impact on facility operation

- Spill bays 1 through 3 out of service from 15 September 2014 through 1 March 2015.
- The IHR in-water work period start 1 November 2014.

Dates of impacts/repairs: 15 September 2014 through 1 March 2015

Length of time for repairs: 8 months

Expected impacts on fish passage

No impact to juvenile salmonid passage is anticipated provided the construction is completed on schedule in spring of 2015. Construction actives include concrete drilling, cutting, and demolition in spillway bay 2 and may generate excessive noise levels which could impact adult passage. Construction activity locations (in-water versus out of water work) and timing were chosen to minimize passage impacts to adult salmonids. The construction activity schedule was developed based on the previous 10-year run timing for fall Chinook salmon and adult steelhead at IHR (Table 1 and Figs. 1-2); fishway approach and entrance behavior for radio tagged adult fall Chinook salmon and adult steelhead from 2001-2005 and the diel fishway approach and entrance timing for radio tagged adult fall Chinook salmon and adult steelhead from 2001-2005 (Figs. 3-4).

The most likely location where construction activities could impact adult salmon and steelhead passage is the north powerhouse fishway entrance due to its proximity to spillbay 2. Approximately 26% (range 20-27%) of the adult fall Chinook salmon approach the north powerhouse entrance and 5% (5-15%) enter the fishway at this location (Table 2; Keefer and Caudill, 2014). Approximately 33% (range 26-36%) of the adult steelhead approach the north powerhouse entrance and 8% (4-13%) enter the fishway at this location (Table 3; Keefer and Caudill, 2014).

From 15 September 2014 through 12 October 2014 construction activities that could impact adult passage would be restricted to between the hours of ~~1600~~ 1800 and 0630 above elevation 347.20 in the spillway stilling basin which would be out of water work. From 13 October 2014 through 30 October 2014 construction activities that could impact adult passage would be restricted to between the hours of 1300 and 0630 above elevation 347.20 in the spillway stilling basin which would be out of water work. From 1 November 2014 through 28 February 2015 there would be no restrictions on the time of day or location (i.e., in-water versus out of water work) for construction activities.

Table 1. Percent of the run that had past Ice Harbor Dam on specific dates based on passage from August 1 through December 31 for adult fall Chinook salmon and adult steelhead over the previous 10-years (2004-2013).

	fall Chinook salmon	steelhead
15-Sep	39-65%	20-47%
12-Oct	94-99%	85-92%
1-Nov	100%	95-100%

Table 2. Distribution of fishway approaches and entries by radio-tagged fall Chinook salmon at Ice Harbor Dam (2000-2005). 'Unknown S Shore' refers to events that were likely at open but unmonitored orifice gates. Total unique fish = 301; annual range = 26-95 (Keefer and Caudill, 2014).

	Year						
Opening	2000	2001	2002	2003	2004	2005	**Total**
Fishway approach (n)	263	424	603	421	210	279	**2,200**
North	8%	10%	9%	10%	10%	6%	**9%**
N Powerhouse	27%	27%	20%	32%	25%	26%	**26%**
S Shore	51%	56%	55%	42%	45%	51%	**51%**
Unknown S Shore	13%	6%	16%	16%	21%	17%	**14%**
	126	245	312	203	113	116	**1,115**
Fishway entry (n)							
North	10%	10%	20%	16%	12%	10%	**14%**
N Powerhouse	9%	7%	5%	5%	15%	5%	**5%**
S Shore	53%	56%	45%	42%	30%	42%	**46%**
Unknown S Shore	28%	28%	30%	36%	43%	42%	**33%**

Table 3. Distribution of fishway approaches and entries by radio-tagged steelhead at Ice Harbor Dam (2000-2004). 'Unknown S Shore' refers to events that were likely at open but unmonitored orifice gates. Total unique fish = 1,653; annual range = 82-513 (Keefer and Caudill, 2014).

	Year					
Opening	2000	2001	2002	2003	2004	**Total**
Fishway approach (n)	1,842	1,737	2,644	1,057	327	**7,607**
North	9%	10%	10%	7%	9%	**9%**
N Powerhouse	36%	32%	32%	31%	26%	**33%**
S Shore	52%	50%	47%	47%	44%	**49%**
Unknown S Shore	4%	8%	11%	15%	21%	**10%**
	783	661	891	456	144	**2,935**
Fishway entry (n)						
North	8%	6%	11%	10%	10%	**9%**
N Powerhouse	13%	8%	4%	6%	9%	**8%**
S Shore	59%	65%	51%	49%	33%	**55%**
Unknown S Shore	21%	21%	34%	36%	48%	**28%**

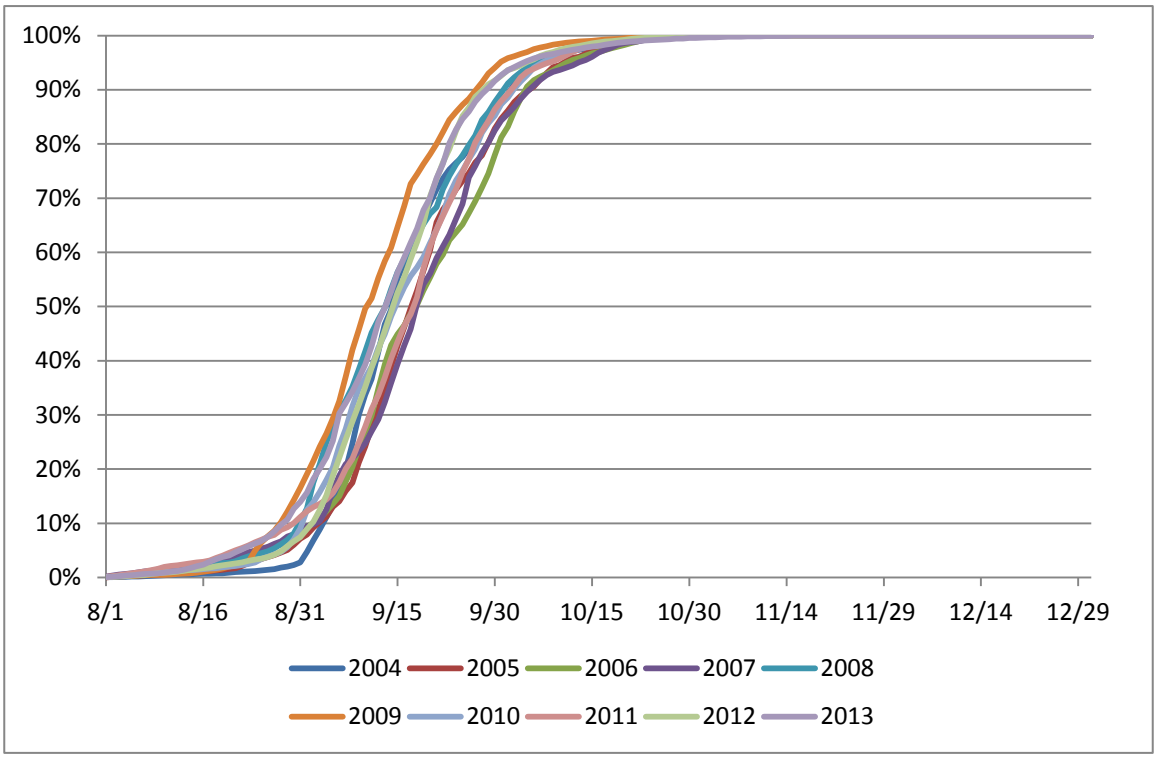

Figure 1. Passage distribution for adult fall Chinook salmon at Ice Harbor Dam for the previous ten years (2004-2013) from August 1 through December 31.

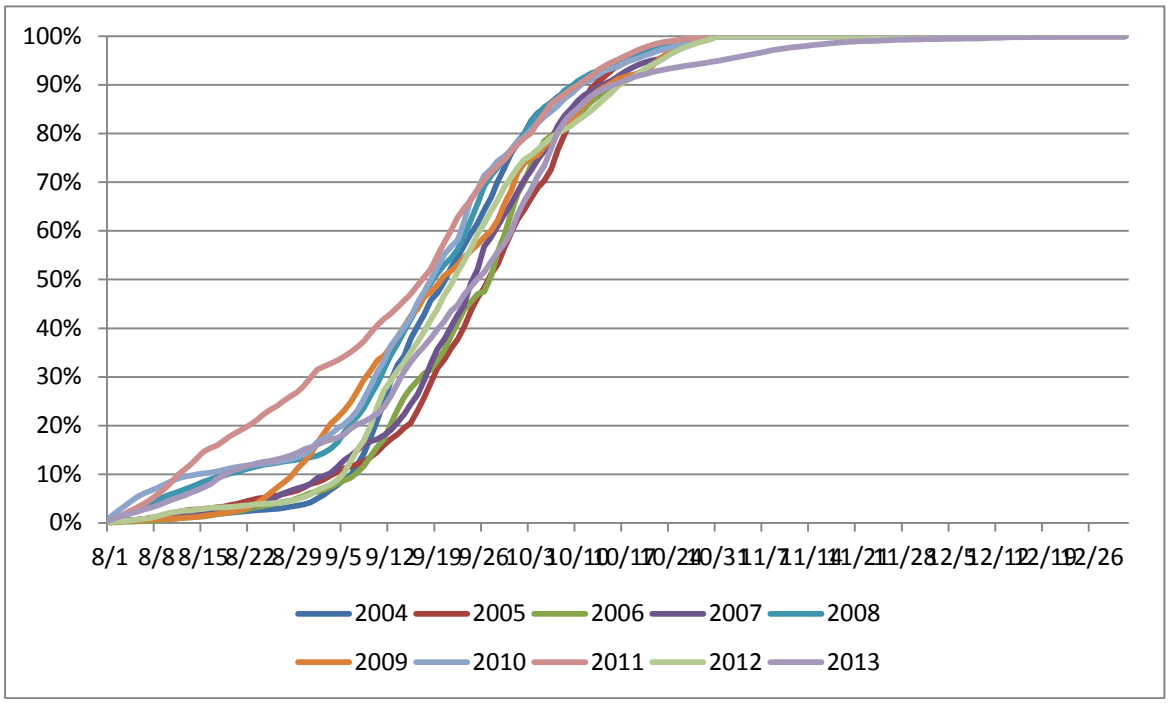

Figure 2. Passage distribution for adult steelhead at Ice Harbor Dam for the previous ten years (2004-2013) from August 1 through December 31.

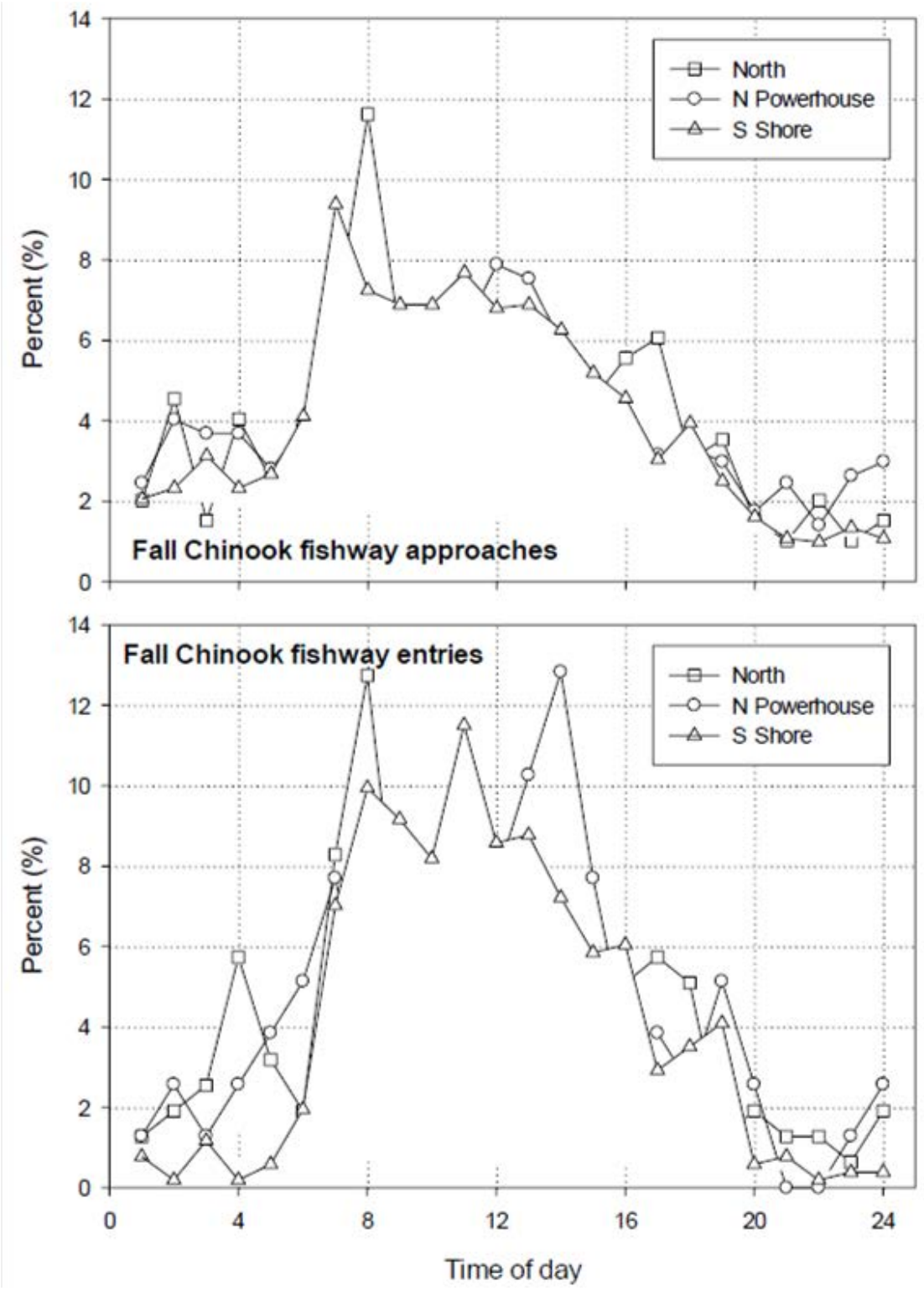

Figure 3. Hourly percent of fishway approaches (top) and fishway entries (bottom) by radiotagged fall Chinook salmon at Ice Harbor Dam (2000-2005). Data shown are percent of all events at each site separately. Total unique fish = 301; annual range = 26-95 (Keefer and Caudill, 2014).

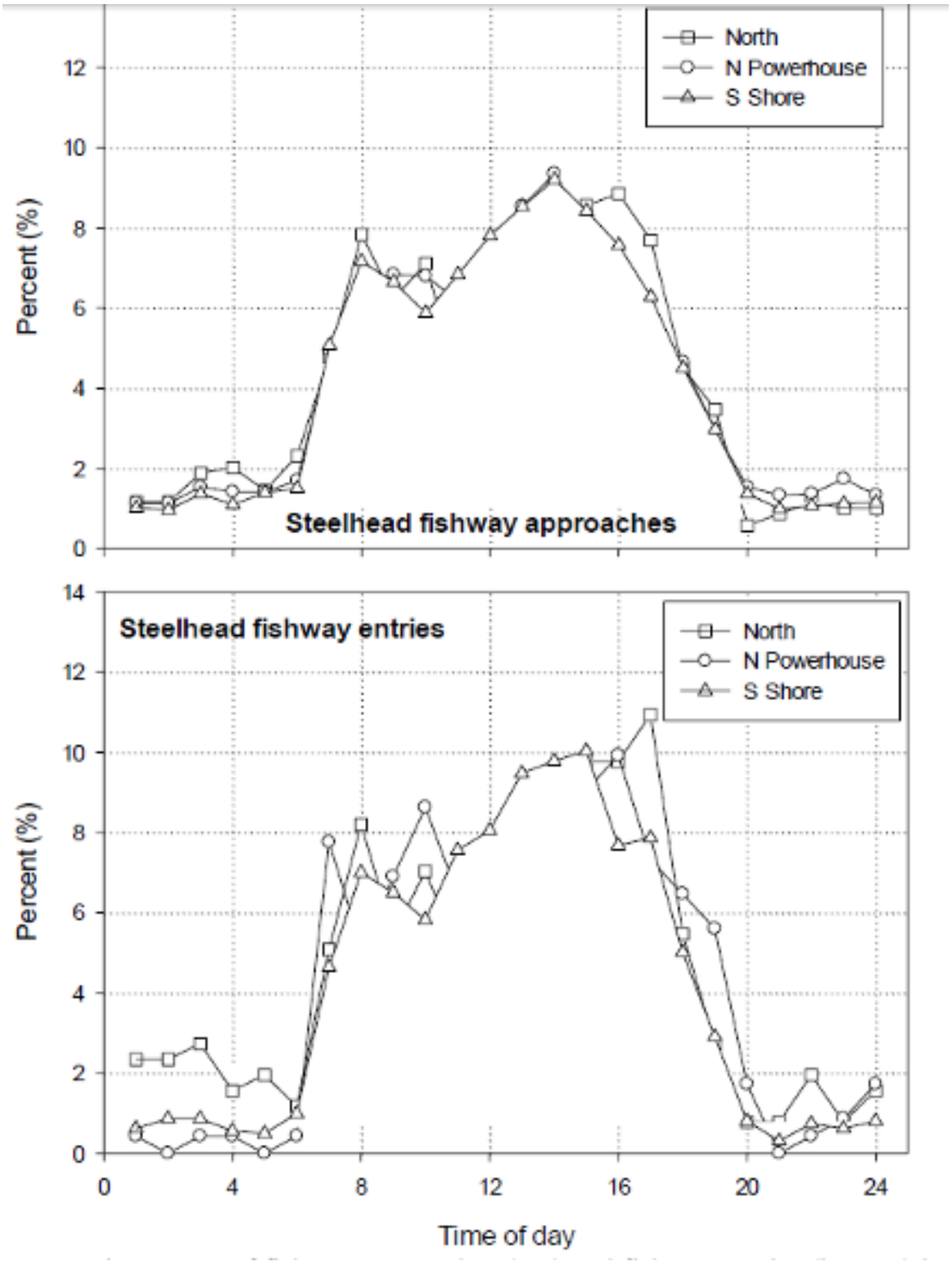

Figure 4. Hourly percent of fishway approaches (top) and fishway entries (bottom) by radiotagged adult steelhead at Ice Harbor Dam (2000-2004). Data shown are percent of all events at each site separately. Total unique fish = 1,653; annual range = 82-513 (Keefer and Caudill, 2014).

Work locations

The contractor is planning to begin construction at the upper end of the work area. The initial work area at its lowest point should be approximately 36 feet up the slope from the water in the tailrace. That work should be accomplished in the period 9/15-10/12. Activity in the lower work area (prior to in-water work) should begin the week of 10/13 and continue through the third week of November. That work area will extend from 3-5 feet off the water (depending on tailrace elevation) up to 36 feet off the water. See Figure 5 for the planned work locations.

Construction schedule:

Any work the contractor can do prior to 1 November will decrease the risk of adverse impact to completion date due to weather-related shutdowns through the winter season.

- 15 September through 30 October only work above elevation 347.20 in the spillway stilling basin which would be out of water work.
- 15 September through 12 October concrete drilling, cutting, demolition, etc. would be performed only between the hours of ~~1600~~ 1800 and 0630
- 13 October through 30 October concrete drilling, cutting, demolition, etc. would be performed only between the hours of 1300 and 0630
- In-water work 1 November through 28 February
- The contractor will proceed with the work furthest from the water during the period 15 September through 12 October. See Upper Work Area in Figure 5.
- The contractor does not plan to proceed with work near the water surface until the period 13 October through 1 November. See the Lower Work Area in Figure 5.

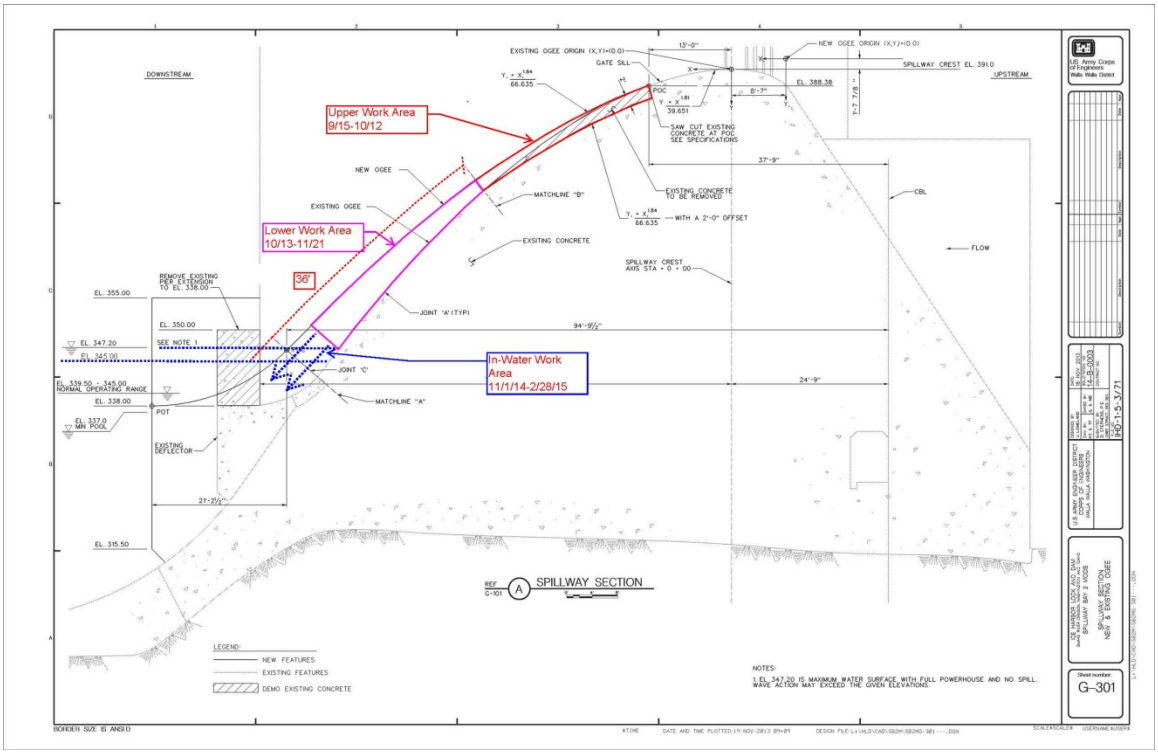

Figure 5. Planned work locations.

References

Keefer, M. and C. Caudill. 2014. Letter Report: Ice Harbor Dam: Distribution of Fall Chinook and steelhead at fishways, 31 March 2014. To USACE, Walla Walla District, Walla Walla, WA.

Comments from agencies:

From: Trevor Conder - NOAA Federal [mailto:trevor.conder@noaa.gov]
Sent: Monday, April 07, 2014 2:09 PM
To: Moody, Gregory P NWW
Cc: Sands, Jack D NWW; Gary Fredricks - NOAA Federal; Ritchie Graves - NOAA Federal; Bill Hevlin - NOAA Federal
Subject: [EXTERNAL] Re: 14 IHR 003 Ice Harbor Ogee Modification.docx (UNCLASSIFIED)

Greg,

You guys did a very thorough job constructing this MOC, and it is appreciated. We strongly support this work since it will likely provide survival benefits to Snake River ESU's over the long term, but we also want to minimize short term impacts without greatly compromising the completion schedule. Since the comment period was very short, we have provided a few initial questions/comments, but we would like to continue to work with the Corps on this issue. We appreciate the coordination and look forward to further discussion at this weeks FPOM.

-Trevor

1. From the MOC: ***The requested change in project operations and in-water work window is needed to provide sufficient time for the contractor to remove existing concrete, install new concrete, and allow the new concrete to cure prior to the start of the juvenile fish passage season which typically commences April 1.***

NOAA comment: The focus of this MOC should be to have this work completed by the start of the adult passage season on March 1 since the winter maintenance period ends on Feb 28th and the date of impacts listed in the MOC ranges from 15 Sept- 1 March. If that is not the plan, we will need to discuss impacts in March.

2. From the MOC: ***The most likely location where construction activities could impact adult salmon and steelhead passage is the north powerhouse entrance due to its proximity to spillbay 2 The contractor is planning to begin construction at the upper end of the work area. The initial work area at its lowest point should be approximately 36 feet up the slope from the water in the tailrace.***

NOAA comment: How close are these locations to the north powerhouse entrance? This should be discussed within the MOC since this distance correlates with the biological impacts of sound and vibration and likely has an impact on passage and behavior.

3. From the MOC: ***From 15 September 2014 through 12 October 2014 construction activities that could impact adult passage would be restricted to between the hours of 1600 and 0630 above elevation 347.20 in the spillway stilling basin which would be out of water work. From 13 October 2014 through 30 October 2014 construction activities that could impact adult passage would be restricted to between the hours of 1300 and 0630 above elevation 347.20 in the spillway stilling basin which would be out of water work.***

NOAA Comment: What was the biological justification for choosing these particular start and end times? From the diel pattern graphs (figures 3-4) it appears we still have a high proportion of adults approaching and entering the ladder during these suggested periods, the greatest proportion of steelhead entering the N powerhouse entered at 1600, the time of day when this MOC proposes to start heavy construction during late September which is also peak adult passage. Is it possible to delay these start times to when diel passage drops markedly and still remain on schedule? If possible, we suggest using the information to pick a time to begin heavy construction when adult approach and entrance is relatively low.

4. From the MOC: ***Table 1. Percent of the run that has passed Ice Harbor Dam on specific dates based on passage from August 1 through December 31 for adult fall Chinook salmon and adult steelhead over the previous 10-years (2004-2013).***

NOAA Comment: There is not a description of method used to determine the percent of the run that has passed by month in Table 1, (i.e. PIT, RT, or window count). If it is based on counts, this summary is dependent on viewing periods and is likely a misrepresentation of actual passage percentages. If based on RT, low sample size and tag life is likely a factor biasing the results in the later months. Based on PIT, we typically see that 100% of steelhead have not passed by Nov 1 as some adults delay or overwinter. A similar table using PIT data would likely be more useful in understanding the impacts.

From: Wills, David [mailto:david_wills@fws.gov]
Sent: Monday, April 07, 2014 12:52 PM
To: Moody, Gregory P NWW
Cc: Erin BrittonKuttel; Michelle Eames; Marci Koski; Don Anglin
Subject: [EXTERNAL] Fwd: 14 IHR 003 Ice Harbor Ogee Modification.docx (UNCLASSIFIED)

Greg,

Thank you for providing the Coordination Request for Non-Routine Operations and Maintenance, 14 IHR 003, dated April 4 for proposed ogee and deflector modifications at Ice Harbor Dam during the fall and winter of 2014-2015.

Based on work funded in part by the Corps to answer RPM 10.A.2 and RPM 10.A.3 from the 2000 USFWS BiOp, a body of data has been collected that establishes there are substantial numbers of sub-adult and adult bull trout using and likely overwintering in the mainstem Snake and Columbia rivers.

The following is taken directly from the coordination request. “Construction activities associated with the IHR Spillbay 2 ogee and flow deflector modification will require extensive onsite efforts over the approximately 8-month long construction schedule. While some of the construction activities can occur during normal project operations, some activities will require alteration of normal project operations. Spillbay 2 will require extensive concrete drilling, cutting, demolition, etc. to provide sufficient anchor points for the new concrete as well as smooth transitions between existing and new concrete. “

The extended eight month construction period and resultant change in usual operations deviates greatly, in my opinion, from the coverage extended in the 2000 USFWS Biological Opinion on the FCRPS. This alone causes me concern, however the recent 2010 designation of the mainstem Snake River as critical habitat for bull trout causes further concern since, to the best of my knowledge, the Corps has not consulted with the USFWS on FCRPS operations affecting this newly designated critical habitat.

Of specific concern, the following proposed construction schedule highlights from the coordination request all occur during the fall and winter periods coinciding with active bull trout use of the mainstem.

- 15 September through 30 October only work above elevation 347.20 in the spillway stilling basin which would be out of water work.

- 15 September through 12 October concrete drilling, cutting, demolition, etc. would be performed only between the hours of 1600 and 0630

- 13 October through 30 October concrete drilling, cutting, demolition, etc. would be performed only between the hours of 1300 and 0630

- In-water work 1 November through 28 February

- The contractor does not plan to proceed with work near the water surface until the period 13 October through 1 November.

While I technically agree with and support the proposed ogee and deflector modifications as a benefit to anadromous and resident fish passage survival, I recommend that the Corps contact the USFWS Eastern Washington Fish and Wildlife Office in Spokane, Washington to conduct informal consultation and determine if any further steps, such as formal consultation, is required on this impending work. I suggest you first contact Erin Britton-Kuttel (phone: 509-893-8029, email: erin_brittonkuttel@fws.gov) at the Spokane office.

Please contact me if I can be of any further help.
David

April 10 FPOM minutes:

Meeting Minutes FPOM April 10, 2014: FPOM said move the start time two hours later (start at 1800 instead of 1600) and prioritize the south units. Hevlin added another option of spilling and setting up the attraction flow. Lut stressed that the restrictions would be for September. Sands said the mod will cost NWW more money since this wasn't included in the original contract. Lorz suggested FPOM review should occur earlier for these projects.

Final results

Please email or call with questions or concerns.
Thank you,

Greg Moody
509-527-7124