

MEMORANDUM FOR THE RECORD

Subject: Final notes for the 14 February 2017 Willamette Fish Facility Design Group meeting.

The meeting was held at the BPA conference room in Portland, Oregon. In attendance:

Last name	First Name	Agency	Email
Burchfield	Stephanie	NMFS	Stephanie.burchfield@noaa.gov
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Kovalchuk	Erin	NWP	Erin.H.Kovalchuk@usace.army.mil
Meyers	Jim	NOAA	
Piaskowski	Rich	NWP	Richard.M.Piaskowski@usace.army.mil
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On the phone: Garletts, Hall, Hudson, Meyers, Richards, Schwabe and Tarbox.

All documents may be found at http://www.nwd-wc.usace.army.mil/tmt/documents/FPOM/2010/Willamette_Coordination.

Meeting Purpose:

Review status of projects, discuss downstream fish passage design for Detroit Dam.

1. All additional comments to the January meeting minutes need to be in by February 17.
2. Review current project status
 - 2.1. General project schedule table –
 - 2.1.1. Cougar – The 30% review is scheduled for May 9th-23rd; the external agency review will be scheduled for four weeks as usual. Fielding needs to finish his comments on the EDR. Burchfield would like to review the PDT notes for Cougar to add biological input as decision are being made. The biologists between the COE and NOAA need to communicate more. Piaskowski will check to see if notes or summaries are available. NOAA would prefer real time decision making and

possibly being present at the PDT meetings. ACTION: COE will discuss this internally and get back to NOAA.

2.1.2. Foster - DDR and Plans and Specs are in review right now. Comments were requested by Feb 17th but will still be taken until next week. ACTION: Piaskowski will clarify with the PDT the IWW period and how many days the weir will be down.

2.1.3. Fall Creek – The web cam was down for a while but is now back up and running.

3. Detroit Downstream Passage [Powerpoint presentation]

3.1. Review baseline conditions (project configuration and fish passage) History – The EDR started with the 2008 BiOp to regulate temperatures. A selective withdrawal structure was selected. After an authority issue was resolved, the PDT moved to supporting the COP team with downstream passage. The team was struggling with making the temp control structure compatible with the not-yet designed fish collection systems. The current plan now integrates downstream passage and temperature control.

3.2. Power Point discussion- **Selective Withdrawal and downstream passage: Weir Box and Floating Screen Structure.** The alternatives were selected from the COP document. Passage performance criteria were not formally identified in the BiOp or COP, though the Corps and NMFS initiated discussions in 2016 to collaboratively develop criteria, similar to the process that was used to develop Cougar downstream passage objectives. NMFS voiced their interest in establishing passage performance criteria for Detroit before the design process gets too far down the road. The plan proposed by the Corps is to generally improve downstream passage efficiency and survival for juveniles and adults at Detroit Dam. The Detroit and Cougar PDTs held a meeting to discuss fish behavior findings and design issues from Cougar to come up with alternatives for Detroit. The PDT is using data from hydro-acoustic and J-Sats studies to figure out fish behavior around the dam. Using that data plus information from collectors around the region, the PDT focused using flows in the forebay in front of the entrance to attract fish. The goals for the Phase 2 FSS collection system: using surface flow in the forebay for fish attraction, shape the entrance to minimize rejection, have a hydraulic drop that allows for capture velocities, minimize competing flow and minimize handling. NMFS raised concern about the entrance configuration of the FSS proposal: As shown fish pass over the drop structure and then are exposed to dramatically decreased velocity in the channel leading up to the screen system, which is likely to cause fish holding (including predatory fish); This could reduce system survival; Good fish passage design is provided when velocity continually increases through the structure, including gradual acceleration that ultimately achieves capture velocity; There are risks that fish will reject or resist the drop structure as this approach is new and hasn't been tested in the field. Other factors in the design are debris

management, predation issues, O&M costs, and current project operations. There may be a barrier to exclude fish from certain areas. The PDT is designing the internal structure to meet NMFS criteria. The position of the entrance of the structure will be as close to the dam as possible. This design effort to date has focused on fish collection; transport alternatives are still to be determined to get fish below Big Cliff Dam. There are two main options Trap and Haul or by-pass system. **Detroit Specific Concerns:** There are several challenges of the FSS (collection system) design at Detroit: not blocking spillways, needs to be adaptable for the future, limited space, high level of penstock intakes, trash handling (debris), range of design inflow, proposed system require extra head (5 or 6 feet), and avoid disrupting peak power timing. The location of the FSS and SWS will be on the forebay side north of the spillway gates. Trashracks were not shown on the general plan view but will be in the final design. An artificial barrier is planned to exclude fish from getting behind the FSS from the intake to the dam and from the upstream side of the structure to the north shoreline. **Primary Components:** Schlenker read the list of components. The FSS intake weirs FWS and SWS will run independent of each other. Between the weir and the channel, the velocity will slow; fish holding and predators are possible problems. A list of predator fish in the Detroit reservoir is needed. The design needs to account for predator problems but if the flow is too high then more debris problems are likely. The system is gravity fed except for the fish collection box. The electrical needs have not been worked out yet. The 5 – 6 feet of loss head is the combined total of the loss from the forebay to the SWS. The floor may need to be shaped for velocities and to keep fish in the channel. Phase 1, **Selective Withdrawal Structure (SWS) with Weir Box:** The design of the system was shown. The weir box will be on the outside of the structure but the exact location is not set yet. The SWS will be made first with the weir box and tested to see how well it works. While the weir box is being tested, the FSS design will be completed. Lessoned learned from Cougar will be integrated into the plans before finalization. If it is determined that Phase 1 will not be adequate and to proceed with Phase 2, the FSS and floating wall will attach to the SWS screen area. The screened water from the FSS will then go into the SWS. The spill plan which was designed to control temperatures will change with this temp control tower. The turbines are run during the day and turned off at night for flood prevention and peak power. The turbine and spill operations will change. In the spring when the pool is being filled, this would be turned off. Turning off the flow could strand fish inside the FSS and SWS. There is flushing water capability but with low velocities. The interests of fish passage and generating power could line up and be a flow through system at all times. It would be ideal to capture as many fish at night when many are likely to attempt passage. An outlet from the SWS to the RO was built in as a safety net in case the powerhouse was

out of service. This could also be used as a back-up source or transition water supply.

Schedule: Currently in the EDR phase for Temp Control and DS passage. The PDT is finishing the internal review of the 90% EDR. Next it will go to BPA for review and then to outside agencies for 4 weeks. Exact dates are coming and will be posted. **Temp**

Control: The 30% DDR is due in March which is coming up soon and may need to be pushed back. The rest of the schedule is tentatively schedule as follows: 60%

November 2017, 90% June 2018, Final Draft 2018, Plans and Specs Oct 2018-April 2020

and Construction Oct 2020- June 2023. **Weir Box (Phase 1)** The schedule is as follows:

DDR April 2018- September 2018, P&S Oct 2018- April 2020, Construction April 2020-

June 2023, and testing June 2023-2024. The testing can and may go longer depending

on the success of the box. The weir box was in the COP paper. Burchfield is concerned that the PDT is keeping the weir box in the design, because NMFS understood that

upper management at NMFS, BPA, and the Corps agreed during 2015 ASA briefings to

not include the weir box in the final COP and 5-year plan. **Floating Screen Structure**

(Phase 2) The schedule is as follows: DDR April 2018- September 2018, DDR Final June

2021- Dec 2022, P&S Jan 2022- Jun 2024, and Construction Nov 2024- Aug 2027. All

three projects are running at the same time but there is a pause in the schedule to

integrate the lessons learned from Cougar. The fish liberation trucks and barge

considerations have been taken into account for the location. **Detroit Powerhouse**

Hourly Discharge exceedances. Based on 30 years of data, a chart was made to show

how often the turbines are running throughout the year. Temperature profiles are

different at Detroit than Cougar. Turbine water is cooler and surface water is warmer;

a lot of spill will make the water downstream too warm, and discharging too much from

turbines makes it too cool in summer. The regulating intake is about 60 feet lower so it

could have lower temperatures. The new temperature targets have to be

incorporated. With a lower intake pipe, there could be a false attraction for fish,

possible solved with a trash rack. Data on fish depth in the water column was looked

at. During the summer when this would be used, the fish are more surface oriented.

However, if this does provide false attraction, adaptive management will have to take

place. At this stage, a physical model isn't helpful but a 2-D digital model of fluvial

dynamics is being run. After the digital model, then a physical model will be looked at.

- 3.3. After PowerPoint Discussion: The weir box has not been designed and no drawings are available. The phased approach is meant to start with the temp control tower with fish collection via the weir box, using knowledge gained from Cougar to come up with a good system. The temp control tower will change the dynamics of the forebay but it is believed that the fish will respond to the flows. The COE has data already on fish behavior along the face of the dam and response to the penstock flows. The temperature stratification could be a concern for different times of the year. The

temperature expert needs to attend the next meeting to answer questions about how the forebay water temperature stratification may change with operation of the SWS. The COE feels that there is enough fish data for the design and implementation of this system. There are questions on how to improve guidance and collection efficiency with nets or structures, and how to reduce false attraction from other water outlets. After the system is in place, there will be studies to test the effectiveness of the system and weir box. There needs to be clear goals of fish collection and timeliness of decisions. The key will be to have the right studies in place to evaluate the weir box. NMFS is concerned that building and testing the weir box will cause further delay in completing fish passage at Detroit. The weir box testing occurs at the same time as Plans and Specs of the FSS. This approach is to verify the success or failure before construction. The Cougar tower is not as large. A couple issues with Cougar is that the trashrack in front is always piled with debris preventing the right flows from entering and sharp pointy temperature tower weirs. The elliptical shaped weirs are designed for this system for a more gradual acceleration. The FSS is not covered but occasional cross beams for support will be necessary. The structure needs to open. The structural supports may cause shadows. PGE uses a black boom to divert debris to the outside where it can be more easily removed. Jundt noted that PGE has an aggressive debris removal program and this helps ensure their projects operate as designed. Pacific Netting is the company that manufactures the black booms and may be useful in this situation. The less debris in the system the better.

3.4. Comments from this meeting will be added to the EDR. Summary of comments:

3.4.1. A major concern is what happens to the fish when the system is shut down.

Temperature in the structure as a result of shutting down needs to be looked at as well.

3.4.2. Trash rack location in relation to the weir could cause passage delays. The FSS needs a lot of space to keep the velocities at 12 fps over the weirs. If fish are congregating after the trash rack then predation could be a major issue.

3.4.3. False attraction into the lower portion of the SWS needs to be looked at but this depends on the actual flows in the collector. A trash rack on the low level intake might be necessary.

3.4.4. NMFS requested the Corps work with them to develop mutually agreeable performance standards for downstream fish passage at Detroit, similar to those at Cougar. NMFS does not think the weir box, as currently conceived, will adequately pass fish, and that spending extra dollars to build it and time to evaluate it will delay completion of a more effective fish passage structure.

- 3.4.5. Once the structure is in place, there is a major concern about the need to get the right studies in place to evaluate the weir box. NMFS will be requesting timeliness of this issue.
- 3.4.6. The FSS needs to have an open channel design. There may be supports causing shadows but this needs to be limited. The cross sectional velocity within the FSS should not have decreasing velocities as flow and fish progress downstream. Flow in the channel and screen must gradually accelerate from the most upstream end of the facility to the entrance where fish and flow enter the bypass, gradually increasing to capture velocity (meeting NMFS criteria).

Next meeting will be March 7th.