

MEMORANDUM FOR THE RECORD

Subject: Final minutes for the 05 March 2019 Willamette Fish Facility Design Work Group meeting.

The meeting was held in the Lobby Conference Room, Suite 140, NOAA Fisheries Building in Portland, OR (NWP). In attendance:

Last name	First Name	Agency	Email
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On the phone: Griffith, Janes, Myers, Murauskas, Pierce, Reis, Richards, Schwabe, Tarbox, Walker and Weiland.

Meeting Purpose:

Finalize previous meeting notes. Provide an update on status of active design projects and presentations and discussions of the Foster Fish Weir design improvements and AFF ladder improvements.

1. Final decisions or recommendations

1.1. February meeting minutes were approved.

2. Review Schedule

Document	Review Dates
Cougar DDR and EA	Closed
Cougar Draft EA	Closed
Cougar DSP 30% Plans and Specs	April
Cougar physical model site visit	Week of 26 March
High Head By-pass Report 75%	Closed
Detroit revised SWS 60% DDR	Closed
Detroit SWS DDR90%	April
Detroit FSS DDR 90%	Closed
Detroit FSS DDR 95% new tower location	May
Detroit EIS	April
Foster Ladder Draft Assessment Report	end of June

3. Updates on active design/construction projects –

3.1. **Fall Creek AFF** – The pipe lining contractor had equipment failures and they were unable to finish the work. The contractor will come back in October and it will require special operations. Richards is waiting for a proposal back for the dewatering flume. Once the team has the proposal, the pipe lining can be fabricated and in October, the old one will be swapped out for the new.

3.2. **Detroit Temp and DSP PDT** - SWS 90% DDR should come out in April timeframe. 95% DDR for the FSS should be out to group in May timeframe. The team has started the P&S for the SWS and will be using the early contractor involvement as the contracting mechanism for FSS. The team will take the DDR and move that into a PS package that contractors will build on. The draft EIS will be available for agency review in April with public release in late May. Public meetings will be in the June timeframe (3 meetings likely). The team will present the 90% DDR at the April WFFDWG.

3.3. **Cougar DSP** - 30% plans and specs will be out in early April for FFDWG review. Tarbox will check to see if she can present at April. Khan pointed out the snow storm that occurred over the last couple of days would limit access to the FSS and this should be considered when designing.

3.3.1. Dates for the WFFDWG to visit Cougar physical model: week of March 26. A small COE team went to visit the model on February 20-21 and saw it run under different flows. The model has to have some modifications made and the contract has to be amended. The mods will be made before the agency visit on 27 March. **ACTION: Khan will send out photos of the model with the meeting minutes** (Done).

3.4. **High Head Bypass** – The team has received comments from ODFW and NOAA requested an extension. A contract for the HHB EDR has not been awarded yet. Until there is a contractor in place, the workshops meetings are not scheduled. The funding is available for Cougar but Detroit is still an option on the contract. Philips is the technical lead for Cougar and Ryan for Detroit.

4. Foster DSP and AFF ladder –

4.1. **Presentation and discussion with the Fish Weir PDT on alternatives for improving passage at the new weir.** The new weir was installed in March 2018. Post construction testing started immediately with balloon tag, sensor and radio tagged fish. All the data will be presented at the Science Review. Preliminary data showed a high rate of injury and mortality. The sensor fish showed that the injuries were occurring when a fish strikes the spillway bay in a kind of bald spot without a water cushion and secondary injuries sliding down the spillway with bruises and scrapes. The new weir is 14' wide with 4' of head. When the water falls over the weir, it spreads out and creates a bald spot of concrete. The PDT reconvened to come up with alternatives to remedy the two problem areas. The new weir has much better collection efficiency. The team looked at many alternatives. 1. A modification to the shape was rejected. Modifying the weir would be difficult because the fit of the weir is very tight; there is only about 3" on either side. 2. Concrete retaining piers running down the spillway was a good idea to channel water but dam safety said no because these spillways have to be returned to original operation for 100 year flood conditions. 3. A pipe from the fish weir to an outlet on the spillway surface but this was too complicated – how many pipes, how to remove, debris and angles. 4. Inflatable C-shaped water catch – an inflatable tube that creates an angle of 45° then the water will go down the spillway. The location of the tube would have a tainter gate seal on top of it. Dam safety does not allow anything between the concrete and the tainter gate seal. 5. Non-movable angles stream catch on spillway- this solid angle object would be a large 15' x 45' and removing it would be difficult and sealing would be difficult. Reis asked how this option would improve passage. The idea is to change the water flow and the water couldn't back up behind the weir. It is not clear if it would significantly help. Dam safety said that the time limit is 24 hours to remove the weir and return the spillway to original condition. 6. Moveable shell shaped stream catch – the idea was to put the shell on wheels to move it out of the way with cables a pulley system. This option is expensive and complicated. Any option is a long term fix and OM has to be considered in the decision. 7. Inflated flume mounted to the weir – an inflatable tube that would be cut loose in an emergency and fished out later. The load would be very high for an inflatable object and constructability would be challenging. 8. Landing pool– static removable slide gate. This option would create a landing or plunge pool for the fish with a tiny dam. One section would extend across the spillway pier nose to pier nose with holes drilled into the spillway to hold up the gate. The slides gates would be craned out for an emergency; the holes could be filled. The tainter gate could be closed due to the downstream location of the slide gate but it would still need to be craned out. 8b. pneumatically controlled hinge gate – same landing pool creation but using moving hinges. Obermeyer Hydro Company out of Colorado sells a pneumatically controlled hinge gate that could be used to create the pool but with remote control ability. There would be five individually activated sections and it would give flexibility to operate only the needed sections at a time. This option looks promising but waiting on hydraulic calculations first. The location would be approximately 15' downstream of the fish weir which won't inhibit the flow. Kelly asked how easy it will be to repair the hinges. Khan said it would require upkeep but the gates have had good maintenance records. Lebanon Dam already has these gates in place. The design would have the water flowing over a metal plate which can handle more use than the pneumatically inflated bag. Jundt was familiar with the product and said they had a good track record. Kelley asked if this option would help the second problem (sliding down the dam surface) as well as the bald spot problem. The team is considering temporary log booms running

down the sides of the flow to help make the water deeper similar to the first concrete beams. This option has not been looked at too much because they need to fix the first problem before the second. Hudson asked about TDG buildup and concerns about fish holding up in the newly made pool. Khan said that the remote gates could help in figuring out how high to keep the pool and adjust remotely if fish are holding. One of the hydraulic calculations is to keep the depth of the pool at a certain level to help alleviate the TDG concerns. Dishman asked if the gates could be placed in the vertical position. Obermeyer would have to answer since it is not the common usage but there would be concern about the gates being damaged with the flow. The old weir had high rate of injury and a low rate of collection; the new weir has much better collection efficiency. The water flow over the spillway was not the problem on the old weir. Having five individual Obermeyer gates to create the plunge pool on the spillway would give flexibility to the weir operations. The secondary injuries were mostly abrasion. Coating the spillway concrete was suggested as an option to alleviate the abrasions. Ament asked if the tainter gate could be closed to the minimum opening to funnel the water flow. Khan said the team looked into this but the opening would be too small for adult fish and cause a very violent water path. There would also be dam safety concerns with water hitting the skin plate of the tainter gate and vibration issues. Kelly asked what the current injury rate is but Khan doesn't have the data on hand and preferred to wait until the researchers have data to present. The RME team decide that the weir should be taken out of service and instead, a special spill operation with spill from a regular spill bay (#3) was evaluated with internal Water Management and others and with BPA. BPA approved the special spill operation for the spring while design improvements are made to the weir. Spill will occur out of bay 3 during the night (7PM-7AM) with only station service power generation and the turbines would be operated during the day for power (no spill during the day). This operation started 01 March until the weir is fixed. The team will update the group on the status next month.

- 4.2. **Presentation and discussion with the Fish AFF Ladder PDT on alternatives for improving collection at the ladder** – The team is focusing on improvements to temperature and olfactory cues. Both structural and operational changes are being proposed. Schlenker gave an overview of the set up at Foster. The intakes that feed the ladder are very deep with cooler water. The entrance area source of water is the AWS which is drawn from the tailrace and is for attraction flow. Griff said that modeling showed the AWS water is mostly recirculated water which comes from either the ladder or the turbines (both cold). UofI did a radio tag study from 2011-14 of fish throughout the system and found that fish moved quickly through the Willamette and S. Sanitam until they hit the Foster tailrace area. Griff said that fish holding in the tailrace was observed before the modifications to the ladder where made as well. The old PDT thought the problem was the ladder being out of criteria but the modifications did not fix the problem. Hydraulics were looked at again but was not considered the major factor. The main concern is that the intakes are located so deep that when the Foster reservoir stratifies in the summer only cold water is put into the ladder. Ament asked if the spillway attracts fish since it is warmer water. Royer said that earlier in the spring fish are attracted to the spillway but then the water gets too warm and they hold beneath the colder fish ladder. Khan said that sometimes fish will start up the ladder but then back out. There is a hatchery intake pipe used to mix the water temperatures for the hatchery that could have potential for warming the ladder. Since 2012, the forebay pool is held at low pool elevation until April for weir ops instead of refill in February and is quickly

refilled by 01 May. The old curve is no longer followed; this operation supports the fish weir use. The temperature targets used will influence the design so the PDT has to be sure to use the current operational strategies. Several members concurred with using the temperature targets for the S. Santiam instead of the McKenzie. The alternatives include operational changes, structural changes like a piping water, using a shallow well, the hatchery intake, heating up water or partition the head box to have warm water sent to one part of the box and ancillary options like ladder diffusers or building a juvenile holding pond water for scent. The ladder diffusers were not in the ladder upgrade from a few years ago and should still be looked at. Buccola discussed operational changes with different blocks of spill using the USGS model for Green Peter. The PDT is using the modeling results to see if it is possible to warm up the water column at the ladder intakes with this method and will then look at the problems that arise from changing the water temperature upstream of Foster. The operations could have additional benefits of warming up the water enough for fish to spawn in the middle fork. Royer looked into dam safety restrictions of using the spillway at GP and there are no current restrictions. Possible problems are warming up the intakes too much or changing the hatchery water temperatures. The Foster stratification is much smaller than the stratification of Green Peter. In a dry year, the spillway option would not be available for very long. Kelley said that 56° is when fish start to move and Dishman added that the pattern should match the S. Santiam targets. The final alternative could be a mix of operational and structural changes. Schlenker next went over the structural alternatives. Looking at monthly temps for the past 8 years at different depths shows there is surface water that could be used as a potential source for warm water and the warmer the water the smaller the pipe needed. The current intakes would remain and this warmer water would be added as needed. Potential intake sources are available in the upper section. Most fish ladders have at least two sections of diffusers to help attraction water and several diffusers would allow for incremental temperature changes. If a juvenile holding pond for scent attraction is determined by the PDT as a necessary addition for adult fish attraction, it would be too complicated to use an existing pond. The PDT is looking at a portable pond option to test this theory inexpensively. The concept of a chamber to mix of all the gravity fed water sources (warm, cold and juvenile scented water) to the right temperature and the possible schematic was shown. The schedule is to develop and screen alternatives by 31 March. A draft assessment report will go out for review at the end of June and a final report by the end of September. The selected alternative would go to the DDR phase next. This alternative may be a combination of operational and structural changes. Schlenker said they need to test what the operational changes would do to the tributaries near Green Peter and wants to avoid any Bi Op issues. Khan said he didn't think it would be a Bi Op issue and there is lots of good habitat that goes unused due to the very cold temperatures. **Khan suggested bringing in the environmental section immediately to make sure there aren't any potential problems.** Griff suggested running the model at a low pool throughout the summer even though it is not the authorized purpose just to see what happens. With the power peaking, the discharge is highly variable with 50cfs being the minimum. BPA would not support eliminating peaking. Recreation and storage for fall releases are the two big uses for the dam. Ament suggested testing some of the ideas before designing and building. If the PDT requires specific data, then they can propose a special RME testing but at this time, no test has been asked for. Lowering the pool would affect the habitat but currently the spawning is upstream. Recreational use will be a major factor in the operations. In low pool, most docks

would be high and dry. Dishman brought up that having multiple diffusers might help dilute the stress signal coming the presort pool. Pierce asked about comparing 2015 data to the data from before the repairs to the system. Weir operations are much later and there is advanced run timing through the system.

5. Next Steps

- 5.1. Next WFFDWG meeting currently scheduled for April 2
- 5.2. Upcoming reviews
- 5.3. Willamette Fisheries Science Review March 12-14.