

FINAL - Meeting Summary Notes
Lewis River License Implementation
Engineering Subgroup
July 10, 2007
Fish Passage Meeting Notes

Subgroup Participants Present: (13)

Will Shallenberger, PacifiCorp
Sean Flak, PacifiCorp
Todd Olson, PacifiCorp
Arnold Adams, PacifiCorp
Erik Kinne, WDFW
Curt Leigh, WDFW (via phone)
Bryan Nordlund, NOAA Fisheries (NMFS)
Ken Bates, Kozmo
Dana Postlewait, R2 Resource Consultants
Peter Christensen, R2 Resource Consultants (afternoon portion only, via phone)
Suzanne Picard, R2 Resource Consultants
Monty Nigus, Black & Veatch
Brian Friesz, Black & Veatch

ADMINISTRATIVE

Welcome of attendees and review agenda. Todd Olson updated the group on status of issuance of the FERC licenses. The NOAA Biological Opinion is still being developed, and has not yet been submitted to FERC. The current planning date for issuance of license is November 1, 2007.

Sean Flak will be leaving PacifiCorp as of July 17, 2007. Arnold Adams will be taking over as PacifiCorp's project manager for the Merwin Project. Thanks to Sean for his hard work and best wishes in his new endeavors!

General Meeting Handouts:

Distributed via email on 7/10/2007 by Kim McCune:

- none

Distributed at meeting 7/10/2007 (paper copies):

- Meeting Agenda for 7/10/2007 meeting

FUTURE MEETING DATES

As a reminder, future meeting dates are shown in the following list based on new dates agreed to at the meeting. All meetings will be at the Merwin Hydro facility from 9:00 am – 4:00 pm unless otherwise noted.

- Friday, August 17th, 2007 (*moved from Wednesday, August 15th*)
- Thursday, September 27th, 2007 (*moved from Wednesday, September 26th*)
- Wednesday, November 7, 2007
- Wednesday, December 19, 2007

MERWIN TRAP PROJECT

Handouts

Distributed at meeting 7/10/2007 (paper copies):

- Merwin Trap Fish Loading Time Summary Discussion Draft
- Merwin Fish Trap Improvements Preliminary Hopper Design Drawings, 3 drawings

Presentations

- None.

Review of Previous Meetings' Merwin Action Items: See status summary table below.

No.	SUMMARY OF PENDING MERWIN ACTION ITEMS (remaining from previous Meetings)	STATUS
M32	BV/R2 (Nigus/Postlewait) Develop ways to reduce the shadow cast by the 8' water supply pipe over the entrance of the fish ladder.	Pending – to be developed with further trap and water supply options.
M35	BV/R2 (Nigus/Postlewait) Prepare a table showing loading cycle times for presentation at the next meeting.	Done. Today's agenda item.
M36	BV/R2 (Nigus/Postlewait) Develop more detail on how the hopper will unload into the flume and transition pipe. The sidewalls should be at least 5 feet high and the pipe should be covered with a net to prevent fish from jumping out.	Done. Today's agenda item.
M37	PacifiCorp (Flak) Revise and distribute a new milestone design schedule by the next subgroup meeting.	Pending
M39	PacifiCorp/R2 (Flak/Postlewait) Contact Grant County PUD to inquire about the disposition and potential sale of the 8' or 9' diameter fish bypass pipe that is being removed from Wanapum Dam	Done. The PUD had already scrapped the pipe.
M40	PacifiCorp/B&V/R2 (Flak, Nigus, Postlewait) Continue development of trap and water supply options.	Pending – ongoing.
M41	PacifiCorp (Olson/Shrier) Present Phased Implementation Proposal to the ACC	Done.
M42	PacifiCorp (Olson/Shrier) Develop tailrace fish behavior study plan outline and key metrics to support the Phased Implementation Proposal	Pending – ongoing.

M43	PacifiCorp/B&V/R2 (Flak/Nigus/Postlewait) Consider hydraulic model to assist with the trap design.	Pending – ongoing.
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Additional Comments on Last Meeting's Merwin Notes:

- Bryan Nordlund has drafted a memo outlining his comments on last meeting's notes. Bryan will send this memo to Kim McCune, who will either incorporate his comments or append them to the notes, as appropriate.
- Bryan also noted that Action Items M41 – M43 are related, and should be addressed together by the group.

MERWIN TRAP AGENDA TOPICS

Phase I Fish Behavior Study Update

- Many ideas are currently in discussion for possible future Fish Study plans and a rough outline has been developed. Frank Shrier is on vacation and has not yet reviewed the outline. Current ideas include installing a more elaborate sensor array in the Merwin Tailrace and/or doing an acoustic fish tracking study.
- The same is true for the Hydraulic Model Study. No firm plan has yet been finalized to the point that it is ready for review by the subgroup. Regarding the schedule, PacifiCorp would prefer that any input from a potential Hydraulic Model study would be available in time for the 60% design submittal.

Design Update (Working Session Forum)

- Trap – Routing attraction water to the fish entrances is currently posing a design challenge. At the last meeting, there was some concern about casting a shadow over the fish trap entrances. The shadow cast by an 8' diameter pipe, or a bifurcating pair of smaller diameter pipes, may discourage fish from entering the trap due to the light transition. Due to this concern, the team has spent time looking at ways to move the water supply piping to the interior of the dam.
 - At high tailwater elevations there is a headroom restriction inside the dam. Piping inside the dam appears to be feasible, but it may constrict the fish channel or obstruct the diffuser area. Each of these options appears to require some trade-offs on the original design flow or space goals. Additional design development will help to define how feasible these options are relative to the goals.
 - Locating the second fish entrance in Pump Bay 3 may alleviate some of these problems since the cableway inside the dam may have enough space at that location to hold the water supply pipe. At this time it is unknown if this would be the preferred location from a biological perspective, since the Fish Tracking Study showed that more fish were observed near Pump Bay 2 than Pump Bay 3.

Because there was no attraction flow in this area, it is unclear whether the results of the Fish Tracking Study are applicable to help with this location decision.

- How serious is the shadow / light transition issue? According to Ken Bates, an early Columbia River study showed that proper lighting could catch 90% of the fish with only 10% of the attraction flow, as opposed to tests with higher attraction flows and sharp light transitions. The focus, therefore, should be on creating a gradual, natural lighting transition into the fish conveyance channel. The group also noted, however, that the shadow cast by the 8' diameter water supply pipe may not be as important as was first thought since the site doesn't get very much direct sunlight per day.
- Trap Constructability – The group discussed constructability issues. Highlights of the discussion include:
 - Constructing the new primary entrance will require one or more dewatering bulkheads. This will likely interfere with the operation of the existing trap entrance. One or more trap outages will probably be necessary during construction, though all parties are interested in minimizing the length of outages.
 - Discussion indicated that any outages should occur during the months of July 1 through October 31, during the coho run, as outages during other periods may affect fish that are not as efficiently trapped at Merwin and the Lewis River Hatchery. This period should be reviewed by the Aquatic Coordination Committee.
 - Careful construction phasing will make use of portions of the existing capture facility during construction. A temporary trap will likely be required to reduce the total trap outage window.
 - Erik Kinne noted that a fish pump (i.e., a Can-O-Vac), may be worth considering as part of a temporary trap system. He reported that WDFW can successfully lift 40 lb Chinook about 20' with this type of fish pump.
 - The team will develop a construction sequence plan to address the above concerns.
- Crowder/Lift/Hopper – Dana presented working drawings of the latest hopper design concept. Highlights of the discussion include:
 - Due to interference with the Merwin powerhouse's gantry crane pick area, the flume leaving the hopper has been rotated 90° from the last layout. This will change the discharge gate from the east side to the south side of the hopper.
 - Fish enter the hopper through a gate along its side, are lifted up to the fish flume, and are slowly released into the fish flume through a gate in the front of the

hopper. The floor of the hopper is sloped to help move the last fish out of the hopper and into the flume.

- The cycle time for the current design is 15.22 minutes, which is slightly in excess of the maximum target cycle time of 15 minutes. The longest/slowest component of the cycle is lifting the hopper up to the flume. Additional research will be performed to confirm feasibility and identify high-speed hoists.
- A Riverwatcher fish counter may be considered to help count fish entering the ladder, or hopper.
- More thought needs to be given to preventing fish from holding at the hopper once the hopper is up at the fish flume. It would be desirable to have fish pointing nose-first for their trip down the fish flume. A false weir or other attractive device will be developed which would likely alleviate this issue.
- The current proposed water depth in the fish flume is 9". Some fish may be able to turn around in the flume and use this water depth to push their way back upstream, lengthening the time they spend in the flume. The group discussed the idea of providing a lesser flow to create more of a slide condition for the flume. Flexibility of water supply is desirable for this item. Flume/pipe dryers should also be considered.
- The electro-shocking baskets may be used to lift the fish for a short distance, which could help to reduce the height necessary for the fish hopper.

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M37	PacifiCorp (Flak) Revise and distribute a new milestone design schedule by the next subgroup meeting.	Pending
M40	PacifiCorp/B&V/R2 (Flak, Nigus, Postlewait) Continue development of trap and water supply options.	Pending
M42	PacifiCorp (Olson/Shrier) Develop tailrace fish behavior study plan outline and key metrics to support the Phased Implementation Proposal	Pending
M43	PacifiCorp/B&V/R2 (Flak/Nigus/Postlewait) Consider hydraulic model to assist with the trap design.	Pending
No.	SUMMARY OF NEW MERWIN ACTION ITEMS (from July 10, 2007 Meeting)	STATUS
M44	PacifiCorp (Olson) Confirm the July 1 – October 31 potential trap outage window with ACC at their next meeting, scheduled for the beginning of August.	Pending
M45	Black & Veatch/R2 (Nigus/Postlewait) Start work on a construction staging schedule and temporary trapping concepts and present findings to the group for discussion at next Subgroup meeting.	Pending
M46	WDFW (Kinne) Erik will collect information on fish-friendly Can-O-Vac pumps for discussion at the next meeting.	Pending
M47	Black & Veatch/R2 (Nigus/Postlewait) Contact vendors to find a faster hoist for the fish hopper.	Pending
M48	PacifiCorp (Adams) Identify how much clearance is needed under the fish flume/fish lift to allow for unencumbered use and maintenance of the existing 350 ton hoist .	Pending

SWIFT DOWNSTREAM PASSAGE PROJECT

Swift Downstream Passage Handouts

- Swift FSC Guide Net Arrangements
- FSC and Guide Net Layout Draft Plan Drawings
- (note: both of the above handouts were posted to PacifiCorp's web site on July 6th)

Presentations

- None.

No.	SUMMARY OF PENDING ACTION ITEMS FOR SWIFT (remaining from previous meetings)	STATUS
S32	WDFW/USF&WS/NMFS (Leigh, Kinne, Stow, Nordlund) Provide comments on the 30% Design Report to PacifiCorp within the 45-day review period ending June 15 th (note: this date was set following distribution of the report to the ACC after the subgroup meeting).	Done, will receive clarification on some of the comments from Bryan today. No comments were received by other agencies (USFWS or WDFW)
S33	PacifiCorp (Shallenberger). Direct design team to begin work on nets, and exclusionary net options.	Done, to be presented today.

Additional Comments on Last Meeting's Action Items List

- None. Notes can be made final.

SWIFT DOWNSTREAM AGENDA TOPICS

Possible Net/Curtain Layout Arrangements

- Will presented the team's preliminary net/curtain layout options with support from Peter on the phone. Both Will and Peter noted that these design concepts are the team's initial thoughts, and that presentation at this time is intended to be a working session to solicit input. Some of the concepts shown are based on input from the Baker FSC net design, and from Research Nets, in Redmond, WA. Highlights from the group discussion which followed include:

- Peter noted that a design goal from a structural perspective for nets is to keep the thru-velocity near 0.1 fps. Velocities of 0.15, or maybe even up to 0.2 fps may be considered, but lower velocities are more desirable.
- Peter also defined the nomenclature on the figures:
 - “N” denotes flow out of the north side of the FSC, with a velocity of about 2 fps (same number of gates on north side with higher flow).
 - “N-S” denotes flow out of the north and south sides of the FSC, with a velocity of about 1 fps.
 - “N-B” denotes flow out of the north and back (downstream) sides of the FSC, with a velocity of about 1 fps.
- The Red layouts were the first concept. The Yellow layouts represent team discussion and the next iteration of layout development.
- One design concept shows a guide net with a 15’ deep impermeable barrier along the top edge. This impermeable layer is intended to help guide fish and debris along the net. This design concept is not intended to function as an exclusionary net and therefore only extends through the top 40’ of reservoir depth. The 40’ net depth was chosen based on where the acoustic tag data showed fish were located and based on the experience of the design group.
- The second net design concept is an exclusionary net and as such, covers the full depth of the reservoir. This concept shows the same 15’ deep impermeable barrier along the top edge and a center net section (at about half-depth, called the “billowed net”), which is intended to drop down and overlap the lower portion of the vertical net to take up slack at the lower reservoir elevations. Submerged weight and float lines are shown on the section view (Figure NET-3) to illustrate how this net system would function.
- Lead nets were also shown for both of the above layouts, projecting into the reservoir from the FSC. The net concepts are shown with a 5’ deep impermeable barrier along the top edge, intended to help guide fish towards the FSC, and to prevent floating debris from becoming entangled in the net.
- Possible guide/lead net arrangements for both design concepts were overlaid onto the previously completed CFD model runs and evaluated using a qualitative rating system. It was assumed that a phased approach would be used to add nets, as indicated by the “Phase 2” net designations for the exclusion net leading from the FSC to the dam. Note that the CFD runs used for this evaluation do not include the net alignments, so flow patterns may change somewhat due to the net influence. The intent of this exercise and qualitative evaluation is to provide the group with a starting point for discussion.
- While the CFD model runs are useful tools for discussion, the actual performance of the nets will not be clear until after construction and testing. Therefore, the

flexibility to adjust the net alignments after construction and testing is of high importance. Exclusionary nets will not lend themselves as well to adjustments following construction. Guide nets (partial-depth) will be easier to adjust. The anchor system is a key feature of flexibility.

- Post-construction testing will be necessary to determine how net alignments should be adjusted. Possible testing ideas include:
 - Additional radio telemetry data
 - Acoustic telemetry to collect real-time data (equipment-intensive)
- Peter led a discussion regarding the kink in the early net alignments.
 - Unclear whether fish may stall at a kink in alignment
 - High net stresses/point loads at kink locations
 - Nets connected to piles at kinks using movable rings to manage net stresses.
- Peter reported on tests done on the guide net currently in place at the North Fork Dam on the Clackamas River in Oregon. The nets there are 30' deep with an impermeable portion near the surface. Algae growth in the summer completely occluded the top portion of the net. Consequently, it appears that the top area of the net will not be permeable during the summer regardless of how much open area the clean net has. This may not be as much of an issue at the Swift location, as the water is cooler.
- Will noted that discussions with operations and maintenance staff revealed that the wind at the reservoir tends to change direction in a fairly predictable way during the course of the average day. This change in wind direction is significant enough to move floating debris around the reservoir. The CFD model does not take this change in wind into account.
- A plan for deciding when to install Phase 2 nets has not yet been developed.
- It may be worthwhile to take a vertical section through the CFD model along a proposed net alignment to qualitatively evaluate the flow through the nets.
- The group felt the team was on the right track with the design development, and design will continue for the next meeting. All participants were requested to study the figures, and come to the next meeting prepared to discuss their observations and other ideas.

Clarification to NOAA Fisheries Comments on 30% Design

PacifiCorp distributed a list requesting clarification to NMFS's comments on the 30% design report. The team discussed these comments with Bryan Nordlund. Comments are summarized below:

- Fish representing populations to be passed should be species-specific (in other words, consider the design effects for each species).
- The 1 ft/s discharge guideline for the FSC pump discharges is based on preventing false adult attraction to the pumps. This is just a guideline, not a hard and fast rule. Bryan agrees that judging by the CFD model results, the north-only pump discharges look like good discharge options even though the discharge velocities exceed 1 ft/s. The pump discharge bays will have fine racks on them to prevent adults from migrating into the pumps. Work will continue on this topic.
- The location for releasing adults in the reservoir is still up for consideration. The ramp at Swift Camp is unusable below a reservoir elevation of 970'. More study is required to develop a year-round plan to be used under all conditions.
- The holding tank depth guideline of 5' is based on creating fish comfort. Shallower depths may cause stress. Fish comfort could further be enhanced through the use of sprinklers and cover, while a shallower depth would make it easier to net fish out of the tanks and observe their behavior. More freeboard would keep fish from jumping out of the tanks. Observation on how the 3' depth works at Cowlitz Falls project can be researched.
- Bryan noted that a water quality monitoring plan may be a good tool to help prevent fish stress or loss due to flow emergencies. Water quality parameters that could be monitored include water temperature, dissolved oxygen, and pH. Bryan is interested in a plan to avoid emergencies with the system.
- Sanctuary nets are nets with a solid bottom to hold water around the fish being netted. Sanctuary nets shall be specified for use on the FSC.
- A backwash spay-bar system would require dedicated high pressure pumps. The system could be installed between the backs of the screens and the baffling system. Unlike a brush system, there would be no devices on the fish side of the screens. Bryan envisioned this system in the higher velocity secondary screening area.

PENDING ACTION ITEMS FOR SWIFT

The following table provides a summary of all pending action items for the Swift Project.

No.	SUMMARY OF PENDING ACTION ITEMS FOR SWIFT (remaining from previous meetings)	STATUS
	None.	
No.	SUMMARY OF NEW ACTION ITEMS (from July 10th, 2007 meeting)	STATUS
S34	NMFS, WDFW, USFWS (Nordlund, Leigh/Klavas/Kinne, Stow) Provide feedback on the net/curtain arrangements presented	Pending

	today for discussion at the next meeting.	
S35	PacifiCorp (Shallenberger) Direct NHC to complete a CFD run using both a north-only discharge from the FSC while factoring in the effects of a constant average wind. This CFD run is not to include the effects of the nets at this time.	Pending
S36	R2 (Postlewait) Contact John Serl and Mike Kohn at Cowlitz Hatchery to get feedback on their experience with the depth of their holding tanks. Do they have problems with fish jumping out, or other concerns for the adult fish in 3' of water?	Pending
S37	PacifiCorp/R2 (Shallenberger/Christensen) Compile a matrix of comment responses for comments received on the 30% design.	Pending

Adjourned 3PM.