FINAL - Meeting Summary Notes
Lewis River License Implementation
Engineering Subgroup
August 17, 2007
Fish Passage Meeting Notes

Subgroup Participants Present: (13)

Will Shallenberger, PacifiCorp
Todd Olson, PacifiCorp
Arnold Adams, PacifiCorp
Frank Shrier, PacifiCorp
Erik Kinne, WDFW
Curt Leigh, WDFW (Via phone & Net Meeting)
Bryan Nordlund, NOAA Fisheries (NMFS)
Jim Stow, USF&W
Dana Postlewait, R2 Resource Consultants
Suzanne Picard, R2 Resource Consultants
Monty Nigus, Black & Veatch
Alex Bjelica, Black & Veatch (Via phone & Net Meeting)
Dennis Anderson, Black & Veatch (Via phone & Net Meeting)

ADMINISTRATIVE

Welcome of attendees and review agenda. Frank Shrier updated the group on the status of the FERC license. The NOAA Biological Opinion has not yet been submitted to FERC. It is anticipated that FERC will need 90-120 days for review once they receive it. The current planning date for issuance of the licenses is January 1st, 2008. Frank also noted that the actual issuance date has the potential of affecting the implementation schedule for both the fish passage and hatchery projects, as the original thinking during the settlement agreement discussions envisioned a March timeframe for license issuance. Because the actual construction and implementation schedules must accommodate the various fish windows (for facility outages, on-line dates, etc.), a more detailed implementation schedule will be developed once the license is issued to help address the staging of all of the implementation projects.

General Meeting Handouts:

Distributed via email on 8/13/2007 by Kim McCune:

- Meeting agenda for 8/17/2007 subgroup meeting
- Copies of the 7/10/07 subgroup meeting notes

Distributed at meeting 8/17/2007 (paper copies):

- Meeting Agenda for 8/17/2007 meeting
- Copies of the 7/10/07 subgroup meeting notes

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.

- Thursday, September 27th, 2007 *(moved previously from Wednesday, September 26th)*
- Wednesday, November 7, 2007 *(Note: Jim Stow cannot make this date. Kim McCune will look into moving this date to accommodate everyone)*
- Wednesday, December 19, 2007

MERWIN TRAP PROJECT

Handouts

Distributed at meeting 8/17/2007 (paper copies):

- Graph of Run Timing for Merwin Trap. 1 page.
- Tailrace Physical Hydraulic Model Draft Study Plan for Engineering Subgroup Review. 9 pages.

Presentations

- Presentation on Draft Fish Behavior Model Study by Frank Shrier.

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.	Presentation on impacts of shadow given at today's (8/17/07) meeting.
M37	PacifiCorp (Adams) Revise and distribute a new milestone design schedule by the next subgroup meeting.	Pending
M40	PacifiCorp/B&V/R2 (Adams, Nigus, Postlewait) Continue development of trap and water supply options.	Progress to presented today (8/17/07), completion still pending.
M42	PacifiCorp (Olson/Shrier) Develop tailrace fish behavior study plan outline and key metrics to support the Phased Implementation Proposal	Presented at today's (8/17/07) meeting.
M43	PacifiCorp/B&V/R2 (Adams/Nigus/Postlewait) Consider hydraulic model to assist with the trap design.	Progress to be presented today (8/17/07).
M44	PacifiCorp (Olson) Confirm the July 1 – December 31st potential trap outage window with the ACC at their next meeting, scheduled for the beginning of August.	Done, see note 1 below.

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.	Ongoing, action item to be updated.
M46	WDFW (Kinne) Erik will collect information on fish-friendly Can-O-Vac pumps for discussion at the next meeting.	Done.
M47	Black & Veatch/R2 (Nigus/Postlewait) Contact vendors to find a faster hoist for the fish hopper.	Done.
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.	Done. Have alternated means to access key equipment.

Note 1 – Todd discussed fish run timing at the Merwin Trap as it relates to the outage window with the Aquatic Coordination Committee (ACC) at their August 2007 meeting. The ACC generally agreed that the proposed outage window was acceptable, and that a temporary trap at Merwin would not be necessary during this outage as the Lewis River Hatchery ladder would meet all hatchery broodstock collection goals during this window. Frank suggested the group should also consider a "Plan B" outage window to address the possibility of delayed construction due to high winter flows, which would allow the trap outage to extend to February 28 as the chinook run doesn't typically start until March. He and Todd will discuss this extended outage period with the ACC. In addition to the trap outage window, the in-water work window is also significant. Minimizing the trap outage window is in everyone's best interest since (a) chinook are not easily collected at the Lewis River Hatchery and (b) it's important to minimize the number of hatchery adults spawning on natural spawning grounds. Todd noted that Pat Frazier (WDFW) will coordinate with Eric Kinne to confirm that the outage period is acceptable.

Additional Comments on Last Meeting's Merwin Notes:

- None. Notes are ready to be finalized.

MERWIN TRAP AGENDA TOPICS

Hydraulic Model Study Concepts.

Todd Olson provided an update on PacifiCorp's consideration of a hydraulic model to assist with the trap design and to support the phased trap implementation proposal as requested at the last meeting. PacifiCorp has had the design team research potential modeling goals, benefits, and develop a draft study plan for a modeling effort. No decision has yet been made by PacifiCorp on whether or not to proceed with modeling, but Todd is authorized to discuss utilization of a model with the subgroup to determine if the proposed model plan would help to confirm subgroup support of the phased trap implementation plan. Note that the model would complement the biological study plan (next topic) to gain subgroup support of the phased trap proposal.

Dana Postlewait presented a draft study plan for the group's consideration. This plan was developed with input from PacifiCorp, R2, Black & Veatch, and Northwest Hydraulic Consultants, who are currently supporting the downstream fish passage design for the Swift project. The following points were discussed by the group.

- The overriding goal with the model is to improve the initial chance of success with the Trap Design so that the reintroduction program will not be delayed.
- Highlights of the plan were discussed, including:
    - Hydraulic Model Goals:
        - Help evaluate and design the corner trap entrance geometry, including the possibility of an angled entrance weir and diverter wall options.
        - Help design the pump station intake, including rack layout and impacts from turbine flows.
        - Help evaluate possible secondary trap entrance locations.
    - Model Limitations were reviewed, and are outlined in the study plan, including:
        - Cannot evaluate entrained air effects.
        - Cannot evaluate the effects of trap entrance on turbine efficiency.
        - Will not evaluate internal hydraulics of fish entrance pool diffusers and ladder pool flow.
        - Cannot evaluate pump intake design relative to the suction bell and entrance channel/conduit.
        - The House Unit flow of approx 80 cfs will not be included. This small amount of flow is not likely to influence flow patterns.
    - Preliminary List of Model Tests:
        - The draft report includes a list of 19 distinct model runs, with an additional 10 unnamed runs as contingency to address preliminary results or issues discovered during the planned runs.
        - Discussion at the meeting of the 19 model runs yielded the conclusion that instead of committing to all 19 model runs, the plan should be prepared as a two-phased approach that could result in some efficiencies and potentially fewer documentation runs.
            - Phase 1 would be geared toward an initial, iterative design development effort focusing on runs 2 and 3, which would define the base geometry for the trap and pump station rack, and spot check several flow conditions.
            - Phase 1 would also identify the key flow conditions to be addressed in a Phase 2, which would focus on model documentation.
            - Phase 2 would provide documentation runs for the desired flows.
            - The team should also consider whether better results would be obtained using the "most efficient turbine flow" of ~2,700 cfs, rather than the maximum unit flow proposed. This will be considered during the study plan update.
        - Deliverables: Agency feedback will be necessary after the completion of Phase 1 to gain subgroup agreement for the model runs do be documented in Phase 2.

        - The model shall be set up so that the team can make adjustments based on the observations from phase 1.
    - The physical model may also help in developing an effective generation operations plan.
    - The physical model may also help determine what operational schemes will be of most interest for the biological assessment.
    - The physical modeling will be most useful if it is completed before the 60% design is done. The modeling shall be scheduled accordingly.
    - Anticipate a 1:24 scale model.
    - The boundaries of the model shall extend a short distance downstream of the bridge to the riffle which acts as the hydraulic control for the tailrace.

In order to meet the 60% design schedule, Dana asked the agencies if they could review and respond to the draft study plan within two weeks. At this point, Jim Stow and Bryan Nordlund caucused privately to review the plan, and reported back to the group that given the discussed revisions to a two-phase approach, they supported the plan and would not need the two week review period. The design team will make the suggested edits to the draft study plan, and will distribute to the subgroup via email ASAP.

Fish Behavior Model Study

Since the last meeting, Frank Shrier and Dr. MaryLouise Keefe have developed an outline, study plan framework, and key metrics for a more comprehensive trap biological evaluation to support approval of PacifiCorp's phased trap proposal. This study plan has also been reviewed by the design team and peer reviewed by Dr. Al Giorgi of the Swift M&E team.

Frank presented an overview of the study with a PowerPoint presentation titled "Merwin Trap Evaluation talking points" (note that PacifiCorp has distributed copies of this presentation to the subgroup via email on 8/20/07). The study plan is similar to a study completed in 2006, but on a much larger scale and takes into account "lessons learned" from the previous study. The study will begin during the first year of trap operation. Highlights of the study plan include:

- Expanding the previous study to include 25 antennas and 17 detection zones.
- Use 150 tags per fish species, as compared to 50 tags per species for the previous study.
- Fish will be tagged at the new trap facility and will be released at the Merwin boat ramp.
- There are 4 zones shown under the bridge. The array will be continuous so as to not miss any fish. The objective of this array is to detect 100% of the tagged fish moving into/out of the tailrace.
- The new electronics which will be used for this study are superior to the equipment used for the previous study. There will be less tag collusion (interference or loss of data due to multiple fish in the detection array at the same time).
- There will be 4 aerial antennas to monitor how many fish leave the system.
- The term "tailrace" will only refer to the area upstream of the bridge.
- Trap Efficiency Parameters to be measured:
    - Trap attraction

- Trap entry
- Trap passage time
- Number of trap entries resulting in capture
- Fallback rate
- Trap capture efficiency
- 5 release groups over the duration of each run curve

o Curt Leigh suggested adding a radiotag detection zone at "the point" just downstream of the bridge to evaluate that location as a possible alternate trap entrance location.
o Bryan would like to see "total time spent in tailrace" added as a measurement parameter to the study. This item was already proposed on the last slide.
o More thought needs to be given to how to define "regurgitated tags" and "dead fish". How long does a tag have to stay in one place before the study decides that the data is no longer valid?
o The tag life is 380 days. The duration of the study has not yet been decided on, though a longer study duration covering multiple years/seasons would be better than a shorter study.
o It is possible to add underwater video observation to the study to help refine conclusions.

Group discussion following Frank's presentation indicated general agreement with the concepts, study goals, and key metrics. Frank noted that the next step would be for PacifiCorp and R2 to finalize a draft study plan for distribution to the full ACC and the Engineering Subgroup.

Phased Trap Proposal

The agency representatives of the subgroup indicated that given 1) the implementation of a hydraulic model study and 2) incorporating the model results into the trap entrance design, and 3) agency approval of a biological study plan, that they support PacifiCorp's phased trap proposal. This recommended approval will be presented to the ACC; however, the group felt that the design team could begin moving forward towards the 30% design based on the phased trap implementation plan. Nordlund noted that the hydraulic model results must demonstrate that flow is sufficient to attract fish into the entrance over the range of project operations.

Trap Shadow Review

Black and Veatch prepared an electronic 3D sketch of the Merwin dam and powerhouse to present the impacts of potential shadows due to the water supply pipe over the trap entrance to the group. The sketch dynamically showed the movement of the shadow across the structures throughout regular daylight hours, and at different times of year. Monty Nigus presented several scenarios to the group, which clearly showed the shadow effects of the surrounding hillsides, the powerhouse building and dam features, and the preliminary layout of the proposed water supply pipe along the powerhouse face. The following points were demonstrated and observed:

o In winter, there may only be 1 ½ - 2 hours of actual shadow impact to the trap entrance.
o In summer, there are only 4-5 hours of shadow impact.

- For both of these extreme seasons, the hours of impact correspond to the middle part of the day, when movement of fish into the trap has been documented in the previous study to be at a minimum. That study showed that fish move mostly at dusk and dawn. Eric Kinne confirmed this observation based on WDFW's experience with the trap.
- Conclusion: The impacts of the shadow are less than was originally anticipated. The group discussed that the real issue isn't so much the shadow itself, than it is the transition from light to dark. This effect will be addressed through careful transitional lighting schemes inside the entrance. It was decided that a combination of natural light (skylights) and artificial lighting will be used to mitigate transitional lighting, with a bias towards natural light where possible.

River Return Piping Concepts

During the initial criteria development phase, the group indicated that non-target and non-transport fish are to be returned to the river following recovery from anesthesia in the sorting facility's recovery pond. The design team began working on conceptual design schemes to address this need. One design challenge is that the elevation difference between the recovery pond and the river is approximately 67 feet (more or less, depending on the tailrace water surface elevation). This is a substantial elevation to drop without injuring fish passing through a return pipe or flume.

Monty presented sketches of a flume configuration which would allow the fish to be routed directly to the river from the sorting area. Discussion points included the following:

- This is a unique facility, and the resulting structure would be very costly because of the large elevation difference.
- The design is difficult due to the lack of guidelines and similar existing projects. The closest facilities in existence would be the smolt return pipes on the Columbia River projects.
- The anticipated number of non-target and non-transport fish is relatively low. Currently, the trap only sees on the order of 100 such fish per year, including fall chinook, strays, sockeye, and chum.
- The key species of this group is fall chinook, which will not be passed upstream as the majority of their spawning area is downstream of the Merwin boat ramp.
- The group discussed the possibility of fish being released so close to the trap that they make multiple trips through the system, with no biological benefit and the stress of multiple handling.
- The group will investigate the possibility of trucking these fish back to the river instead of returning them to the river by flume. Trucking may turn out to be equally or more effective from a biological standpoint, and also less costly over the life of the project.
- The design team will provide more information on the species and numbers of fish likely to be transported, and Frank/Todd will discuss this option with the ACC at the next meeting.

Water Flow Diagram

- Monty presented a preliminary water supply schematic to the group for discussion. The diagram is preliminary and was developed to help assist with the hydraulic design of the system.
- The physical piping design and the schematic diagram will be developed interactively, and will be ready for further discussion at the next Subgroup Meeting.
- The group discussed the design needs of the preliminary attraction flow pump station, which will be developed in the unused turbine Unit 4 location. Currently, the team is examining the use of a 1-inch clear bar rack in front of the pumps.
- Bryan and Jim asked for additional quantification of smaller fish that may be in this area. Frank and Eric noted that there are sometimes small numbers of 2- to 6-inch fish observed in the trap.
- Additionally, Bryan and Jim asked for quantification of velocities at the various flows and design conditions that may be encountered in the tailrace upstream of the pump intakes and at the pump intake grating. This will be provided by the design team by the next meeting.

No.	**SUMMARY OF PENDING MERWIN ACTION ITEMS (remaining from previous Meetings)**	**STATUS**
M37	PacifiCorp (Adams) Revise and distribute a new milestone design schedule by the next subgroup meeting.	Pending. This item will be ongoing.
M40	PacifiCorp/B&V/R2 (Adams, Nigus, Postlewait) Continue development of trap and water supply options.	Pending, Ongoing
M45	Black & Veatch/R2 (Nigus/Postlewait) Start work on a construction staging schedule and present findings to the group for discussion at next Subgroup meeting.	Pending, Ongoing
No.	**SUMMARY OF NEW MERWIN ACTION ITEMS (from August 17, 2007 Meeting)**	**STATUS**
M49	PacifiCorp (Shrier) will finish preparing fish run timing graphs for the Merwin trap and Lewis River hatchery ladder for presentation at the next ACC and Subgroup Meetings to support the Plan A and Plan B trap construction outage windows.	Complete 8/29/07

M50	PacifiCorp/R2/B&V (Olson/Postlewait/Nigus) Update model study plan to indicate the phased approach, and email to the subgroup for review. Indicate PacifiCorp's desired action for use of the physical hydraulic model assuming the model will support agency approval of the phased trap proposal.	Pending
M51	PacifiCorp/R2 (Shrier/Keefe) Continue development of and publish a draft trap evaluation study plan for ACC and subgroup review.	Pending
M52	R2/PacifiCorp (Postlewait/Shrier) Confirm number and species of fish identified for the fish return tube, to help the team evaluate trucking fish to the boat ramp instead.	Pending
M53	NMFS (Nordlund) Discuss the feasibility of trucking non-target/non-transport fish downstream (instead of returning them to the river by flume) with Michelle Day.	Pending
M54	PacifiCorp (Olson/Shrier) Discuss trucking non-target fish downstream with the ACC.	Pending
M55	Black & Veatch (Nigus) Quantify velocities and flows at the pump station intake for various design conditions to help the subgroup discuss barrier rack criteria.	Pending

SWIFT DOWNSTREAM PASSAGE PROJECT

Swift Downstream Passage Handouts

- None.

Presentations

- None.

Project Updates

- The Swift Project was not on today's agenda, however, Will was able to provide the group with some project updates:
    - Geotechnical borings have been completed. The 12 borings have shown no fatal flaws for the FSC trestle. The rock at the dam area appears to be of sufficient hardness.
    - Assembling the FSC at Swift Camp appears feasible.

Adjourn 12:30 PM.