**MEETING MINUTES**
**Downstream Fish Passage Technical Working Group**

*Mission Statement: To develop an efficient fish passage design for the Baker River Project.*

**Project:** Baker River Project
FERC No. 2150

**Written By:** Dawn Schink

**Meeting Date:** February 5, 2002

**Location:** WestCoast SeaTac Hotel, Seattle

**Attendees:**

| | |
|---|---|
| Arnie Aspelund, PSE | Dawn Schink, PSE |
| Cary Feldmann, PSE | Gary Sprague, WDFW |
| Kim Lane, PSE | Jim Stow, USFWS |
| Mort McMillen, MWH | Nick Verretto, PSE |
| Ed Meyer, NMFS | |
| Wayne Porter, PSE | |
| Doug Bruland, PSE | |

**Purpose:** The purpose of the meeting was to continue development of conceptual design alternatives required for evaluation of downstream fish passage facilities in the course of relicensing the Baker River Hydroelectric Project.

Downstream Meeting - Tuesday 2/05/02

***Future meeting dates**:*
*March 5, Tuesday 9 a.m. - 3 p.m. - downstream design at Sea-Tac*
*March 6, Wednesday 9 a.m. - 3 p.m. - upstream design at Sea-Tac*
*April 2, Tuesday 9 a.m. - 3 p.m. - downstream design at Sea-Tac*
*April 3, Wednesday 9 a.m. - 3 p.m. - upstream design at Sea-Tac*
*May 6, Field Trip to Baker River to see studies*
*May 7, Tuesday 9 a.m. - 3 p.m. - downstream design at Sea-Tac*
*May 8, Wednesday 9 a.m. - 3 p.m. - upstream design at Sea-Tac*
*June 4, Tuesday 9 a.m. - 3 p.m. - downstream design at Sea-Tac*
*June 5, Wednesday 9 a.m. - 3 p.m. - upstream design at Sea-Tac*

**Completed Action item**
Charles Howard model should be ready mid-February.

| ITEM | DESCRIPTION | ACTION BY |
|---|---|---|
| **Review of Previously Presented Data** | Mort passed out Filter #1 Fatal Flaw Analysis Summary for Lower Baker and Upper Baker, and summarized information decided on last meetings.<br>A flow rat of 60% was decided as trade off point between gulper and MIS per conceptual review. See example FL.2. Mort is developing more detail for layout. More evaluations on the options are to follow esp, refinement of flow level, i.e. at 50% and 60% flows. Agencies are asked to review alternatives and provide comments.<br><br>Questions regarding upcoming biological testing and its relationship to design flow were discussed. Cary believes the tests designed for this year will answer these questions. These studies should answer the problem of collecting the fish, such as, are the fish coming into the gulper, but then turning back out, or are they just not coming into the gulper at all. Don wanted to know if new tagging and studies would be done when new screens or structures are put in. The tests have been done along, and adaptive management will continue.<br><br>Agencies were asked to be available for conference calls during the course of the studies in order to provide updates and discuss study progress. | |
| **Review of Conventional Screen Alternatives** | Hand out and Figures given on development of alternative F.1 – Conventional Screen – Full flow 0.4 fps. Reviewed criteria and approach velocities. Design includes two raceways based on comments from last meeting that would need redundant raceway for maintain purposes. Since velocity cannot drop where screens narrow, will need 500 cfs at max water level in narrow section and then pump back into flow line.<br>Adjustable crest to maintain flow over weir, with a side discharge weir to get fish into both raceways. This also provides a wider weir. This structure would be massive with 80" thick concrete walls at bottom<br><br>Primary reason to have so much flow is to keep transport velocities. Consider Ed suggested stepping screens down to load into the end. This can be considered, but would have difficult cleaning and maintaining any system this deep<br><br>Section View was reviewed. | |
| **Comments on Conventional Screens** | Primary concerns has to do with the size and depth of this structure. Doug raised the problem of the difficulty of crowding fish if they can't be seen? Without the ability of observation, assumptions cannot be made about the fish or the crowder. Doug wants to be able to view the fish if there are problems, instead of waiting until the fish are dead and float to the top. Another concern is with fish being caught between the brush seals or other screening. As designed, water would have to be lowered to crowd level, or pulled up. Ed suggested adding more screens, vertically, making it able to reduce the transport velocity, allowing a step down process, and lower pump action. Downside, it would complicate the cleaning process. Another idea is pumping in air, which "percolates" the fish with the bubbles. Pumping station either needs to float or it will not work below 398 feet. Pumps are designed to work two at a time, with one | |

| | | |
|---|---|---|
| | a backup. Dip baskets are another idea, making a couple dips to clean up debris first, before going for fish. This process is labor intensive. Maintenance would be very difficult, as personnel would need to get 60 feet down, which raises many safety concerns. | |
| **Comments on Conventional Screens (cont.)** | May have to adjust screen height in raceway as design progresses. Conceptual procedure is to raise telescoping weir, crowd fish, put fish in hopper and then transport or pipeline. Suggested that use crowder in vertical manner to crowd fish to top of raceway.<br><br>Since fish crowder is 60 feet deep, so would be difficult to see fish, this requires dewatering to see what is going on and to crowd fish. Ideally would want to be able to raise floor of crowding area as reservoir level changes.<br><br>Ed suggested that pump discharge point is lower in reservoir and then have an adjustable weir.<br><br>Major concern is assumption that flow must go around pumpback and secondary screens , then enter the penstock, this would create some very turbulent hydraulics.<br><br>Also pumps would be specialized and may require extra maintenance.<br><br>Also since generation would not be occurring 24 hours a day, so may not be able to take water going into penstock.<br><br>Another idea, which is being looked at, is the use of gravity creating flow through the screens. Right now, these configurations are being studied. Ed worries that getting 5000 cfs down and around the unit, as it is drawn up, will create turbulence and cause problems. Also likes the gravity creating flow, with a dedicated turbine. Will then need to look closely at secondary screens.<br><br>For the Lower Baker Screen, there is concern regarding the orientation of the screens, which may result in fish not entering the screens, or if fish run along the opposite shoreline, they would end up at intake tower. | |
| **Comments on Conventional Screens – Flow Issues (cont.)** | Mort reviewed a series of plotted curves that provided the velocities vs reservoir levels vs throat size for the screens. Note that Note that at Elevation 440 velocity varies from 1.25 to .5 fps. However if fish are in front of screens fish would have very low transport velocities. As start to change throat width from 56 feet to 34 feet velocities begin to increase to above 4.5 fps. The result is that at higher reservoir elevations and wider throat there would be very low flows in the front of the screen.<br>Figures 1.8 to 1.11 provides velocities for constant flow and varying throat widths. As Q become low have very low velocities, and if | |

| | | |
|---|---|---|
| | have a ramping unit at the end to the pentstock, as for the gravity proposal, flows would be extremely low. This is a concern since fish may not be attracted to the screens at these low velocities, biological performance of the screens are very questionable.<br><br>Using Charles Howard model, these variables will be able to be tested. Figures show how pool fluctuation and evaluation will effect pool velocity, which results in complex hydraulic problems. Since channel size will have to remain constant adjustable systems of this | |
| **Review of MIS Screen Alternatives** | Mort reviewed MIS Screen design with 2 handouts<br>One handout presented research done on Howard Hanson, Elwan Dam, Sullivan, Williamette Falls and Winchester (which is not operational). There are other facilities planned, such as Green Peter, which have not been constructed. EPRI has also performed good research where fish size, survival rate, etc were examined. The Elwa study looked at different velocities and different sizes of fish. Mort wants to consider biological issues first. Debris handling is concern. At PGE, when they get heavy debris flows, they back off unit to 5% every hour, which creates lots of cycling and flow fluctuation. When in cleaning position the screens are not screening fish, and this occurs very frequently during such events.<br><br>On Alternative F.5, the front flow would have to be moved to the side. Sweeping component velocities should be added to the Analysis Summary Table. No specific studies have been done on Kelts on Willamette Falls. Screens on the Columbia uses floor type screens to slide the Kelts across for evaluation.<br><br>On Alternative F2. It was suggested to angling spillway and placing bypass on end.<br><br>In conclusion Mort stated that he is reviewing differing constraints, such as fish damage, fish handling. etc, before proceeding with development of this alternative. | **1. Summarize research on data for next meeting - Mort**<br>**2. Summarize information in handout and write up for next meeting - Mort**<br>**3. Have Mort do the same level of detail on the main alternatives** |
| **Chinook Length Data** | Meeting resumed after lunch with a review of the Juvenile Trap and Haul Survey. This survey showed existing 7-year data on Chinook, coho and sockeye fry. Have 30 mm Sockeye Fry, which should be considered in screen design.<br>Gary cautioned to be aware of any fish that go through louvers of the gulper and into the pump. Doug does not believe that this occurs. Ed does not propose a study on this as louvers are not being proposed for any alternatives.<br><br>The data was viewed as useful by agencies (Gary). Increasing the number of days that sampling should occur is not validated by the data. This information could provide a higher level of comfort for MIS screens design<br><br>Chinook smolts leaving system is a bout 300-400, same as number of adults returning. Most of chinook adults returning are strays from other systems, such as Whidbey, etc. None have skagit tags. | |

| | | |
|---|---|---|
| | Expect 0-10 of returning adults based on calculations of ocean survival, but Chinook that arrive are from another system. Most to all of returned Chinook are returned to Skagit River, only hatchery outplace chinooks are place in Upper In Baker. | |
| **Meeting Summary** | In conclusion, at next meeting MWH will develop details of MIS and Gulper systems and incorporate comments on Conventional Screens that were made today. Hopefully alternatives that show a high degree of feasibility can be short-listed due to biological, operational and other concerns.<br><br>By April or May we will have alternatives refined to point where we can wait for results from biological studies, and then using this information start elimination of certain alternatives and refinement of remaining alternatives to select the preferred alternative. | |

## March 5th Meeting Agenda

1. Review Notes and Agenda
2. Discuss Meeting Facilitation
3. Action Items
4. Mort review detail on MIS Screens and Gulper
5. Look at Alternatives
6. Project Schedule
7. Review Assignments
8. Set next meeting agenda

## DRAFT Schedule of 2002 Down Stream Fish Passage Studies

| | | | | | | STORAGE | | | TRANSITION | EVACUATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Generation OFF | Generation ON | Generation OFF | | Generation ON | Generation OFF | Generation ON | | | | | |
| | | | | | | week 1 | week 2 | week 3 | week 4 | week 5 | week 6 | week 7 | | | | | |
| DATE | 11-Mar | 18-Mar | 25-Mar | 1-Apr | 8-Apr | 15-Apr | 22-Apr | 29-Apr | 6-May | 13-May | 20-May | 27-May | 3-Jun | 10-Jun | 17-Jun | July-Aug | Sept | Oct |
| **NEAR FIELD HYDROACOUSTICS** (DFP1) | Setup hydrophone array. [1] | Calibrate hydrophone array. PIT tag and release test smolts. | | Setup acoustic tagging station. | | | | | | | | | Disassemble, disinfect and inventory tagging station equipment. Disassemble hydrophone array and return equipment to HTI. Prepare Progress Report. [1] | | | Analyze data. | Submit Draft Report. | |
| **FAR FIELD RADIOTELEMETRY** (DFP2) | | | Setup radio antenna array. [2] | Calibrate radio antenna array. Setup radio tagging station. | | | | | | | | | Disassemble, disinfect and inventory tagging station equipment. Disassemble radio antenna array, return equipment to Lotek. Inventory PSE equipment. Prepare Progress Report. [2] | | | Analyze data. | Submit Draft Report. | |
| **FAR FIELD PIT TAG** (DFP3.1) | Setup PIT tag detector. | Setup PIT tagging station. | | | | | | | | | | | Disassemble, disinfect and inventory tagging station equipment. Prepare Progress Report. | | | Analyze data. | | Submit Draft Report. |
| **NEAR FIELD PIT TAG** (DFP3.2) | | | | | | | | | | | | | Prepare Progress Report. | | | Analyze data. | | Submit Draft Report. |
| **SURFACE COLLECTOR PIT TAG** (DFP3.3) | | | | | | | | | | | | | Prepare Progress Report. | | | Analyze data. | | Submit Draft Report. |
| **KELT RADIOTELEMETRY** (DFP4) | | | | | | | | | | | | | Disassemble and disinfect tagging station equipment. Prepare Progress Report. | | | Analyze data. Submit Draft Report. | | |

LEGEND

[1] Deployment and disassembly of hydrophone array requires coordination with operations personnel and professional divers

[2] Deployment and disassembly of radio antenna arrays may require coordination with operations personnel and professional divers.

STORAGE = outflow is less than or equal to 50% of inflow.

EVACUATION = outflow is greater than 150% of inflow.

GENERATION ON = greater than 2,100 cfs flowing through each turbine.

GENERATION OFF = turbines off.

◊ COLLECT AND TRANSPORT SMOLTS

✦ TAG SMOLTS

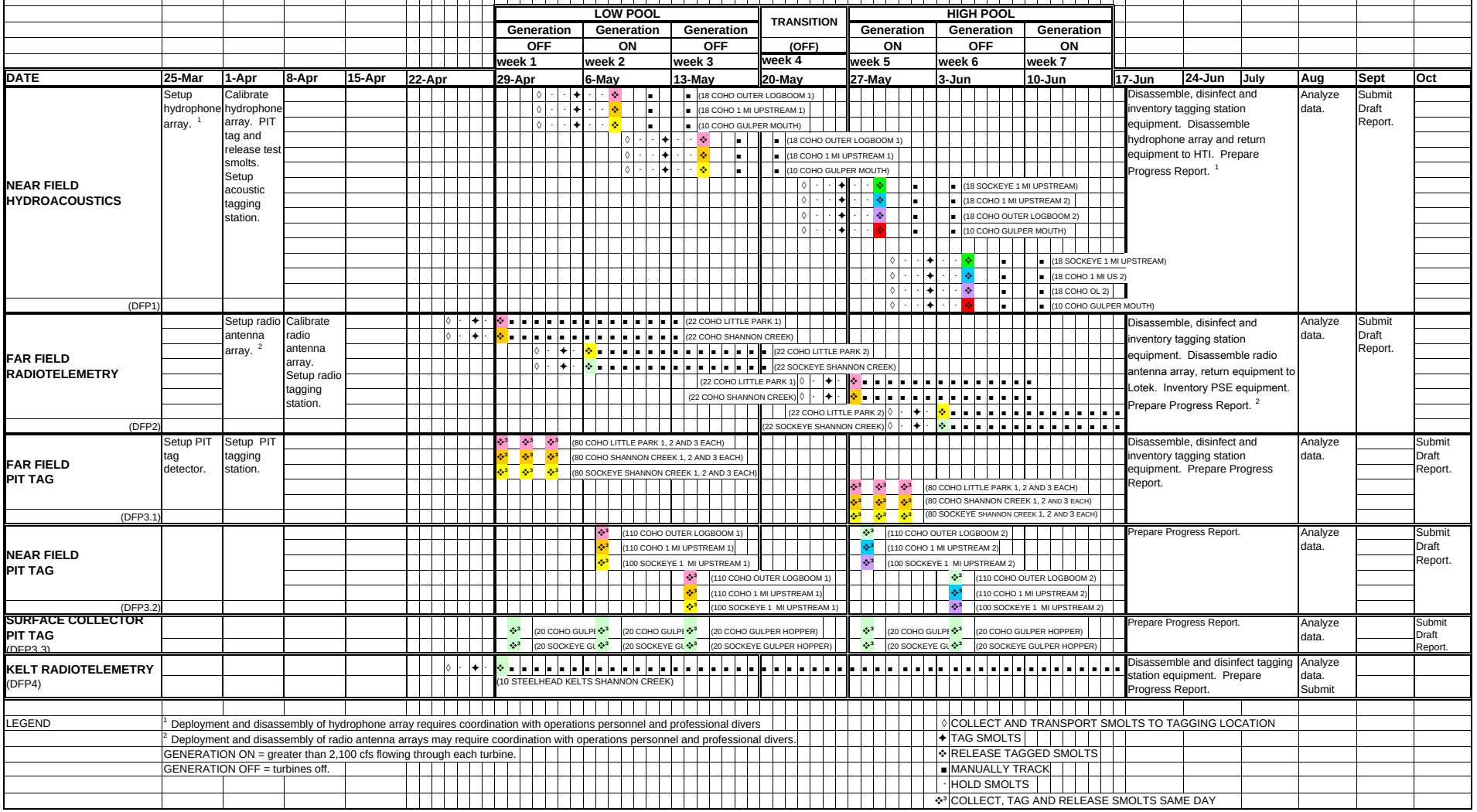
❖ RELEASE TAGGED SMOLTS

■ MANUALLY TRACK

· HOLD SMOLTS

❖³ COLLECT, TAG AND RELEASE SMOLTS SAME DAY

# DRAFT Schedule and Release Groups for 2002 Down Stream Fish Passage Studies at Upper Baker Project - Revised 2/14/02




LEGEND

[1] Deployment and disassembly of hydrophone array requires coordination with operations personnel and professional divers

[2] Deployment and disassembly of radio antenna arrays may require coordination with operations personnel and professional divers.

GENERATION ON = greater than 2,100 cfs flowing through each turbine.

GENERATION OFF = turbines off.

◊ COLLECT AND TRANSPORT SMOLTS TO TAGGING LOCATION

✦ TAG SMOLTS

❖ RELEASE TAGGED SMOLTS

■ MANUALLY TRACK

· HOLD SMOLTS

❖³ COLLECT, TAG AND RELEASE SMOLTS SAME DAY