BAKER RIVER PROJECT RELICENSE

Technical Working Group – Downstream Fish Passage

August 31, 2000

9:00 a.m. – 3:00 p.m.

West Coast Sea-Tac Hotel
18220 Pacific Hwy S.
Seattle, WA 98188

AGENDA

Review Agenda
Action Items
Brainstorm list of possible options for solutions
Other Issues?
Meeting evaluation
Set agenda for next meeting

BAKER RIVER PROJECT RELICENSE

Technical Working Group – Downstream Fish Passage

August 31, 2000

9:00 a.m. – 3:00 p.m.

West Coast Sea-Tac Hotel
18220 Pacific Hwy S.
Seattle, WA 98188

MEETING NOTES

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

Attendees: Ken Bates (WDFW), Gary Sprague (WDFW), Steve Fransen (NMFS), Stan Walsh (SSC), Arnie Aspelund (PSE), Nick Verretto (PSE), Kevin Brink (PSE), Cary Feldmann (PSE), Wayne Porter (PSE), Lyn Wiltse (facilitator)

*Note: Future meeting dates are: Sept. 28, October 19, November 16, 2000 from **9:00 to 3:00** at the SeaTac Airport West Coast Hotel.*

New Action Items

- Nick, Ken, Wayne, Cary, and possibly Mort will hold a conference call either Sept. 12th or 25th to develop further options/combinations of brainstormed passage concepts
- Everyone: Review list of potential action items and consider possible combinations, with following considerations/weighting factors:
  - Pros and cons
  - Availability of technology
  - Meets interests (good for fish, operation, for all life history stages, for other interests, economically viable)
  - Could it meet present criteria standards? (For information only)

"**Old" Action Items:**

- Fred will bring Skagit Chinook length-frequency data

- Fred will look at statistical variation from year to year in the gulper mark and recovery data (by September)
- A lengthy discussion of the need for collection of additional temperature data was prompted by Nick Verretto, who has not yet initiated vertical column data collection (using the Hydrolab) at the Lower Baker gulper. It was decided that temperature data would be collected once per week at both Upper and Lower Baker. Upper Baker data would consist of depth vs. temperature from the surface to 160' in 10' increments using the Hydrolab. Two data loggers will be deployed at 190' and 225' (depth from the surface). Lower Baker data would be collected in the same way to 100' depth using a portable temperature meter. Additional data loggers will be installed at depths of 150' and 200 feet
- Kevin Brink will analyze how fluctuation limits affect spill (# events, amounts, seasons, duration, flow-days by month), to facilitate discussions regarding limits to drawdown range and effects on screening designs. Kevin will report at the October 19th meeting
- Fred will look at statistical variation year-to-year in the gulper mark and recovery data (by September)
- Nick will bring rough analysis of gulper pump cycle test
- All members bring interests of your organizations
- All review the affinitized lists of data to be collected

Report on Completed Action Items:

- Nick distributed disks with:
  - Upper Baker spill frequency data
  - Lower Baker spill frequency data
  - Data from gulper pump cycle test
  - Length frequency-data
- Gary distributed information on reservoir productivity models. He reported that Dr. Mike Brett, Univ. of WA. (Center of Streamside Studies) is a possible contact. 206-616-3447 or 206-543-2549, mtbrett@u.washington.edu.

Brainstorm: What does successful downstream fish passage look like?

1. Works Well for Fish

- Every migrating fish successfully emigrates from the sub-basin minimal or no migration delay
- Minimal intervention
- Performance criteria goal is for at least 95% successful, with mitigation for less than 100% passage
- High % of fish emigrating from the basin
- Survival (fish health) would be better than wild migrants over the same distance
- Does not create an unnatural predation opportunity (concentrating fish in a way not found in nature, alternate release locations, minimal disorientation)
- Does not increase smolt mortality (over natural conditions)
- Accommodates all migratory species
- Needs to accommodate variable run sizes and timing
- Acceptable (functional) attraction/bypass flows
- Determine what target age classes we're after (all?)
- Minimize stress by handling and temperature
- At least maintains current numbers

- Doesn't affect their ability to return to spawning grounds
- Emigrates from sub-basin in good condition
- Healthy migrating fish populations that are not listed under ESA

2. Needs to be Economic (Cost-effective)

- Needs to be durable for the length of the license
- Can be installed quickly (less than 10 years)

3. **Works Well for the Operation**

- Safe from human operator and fish friendly perspective (low rates of injury/mortality)
- Efficient from human/fish perspective (transferring of fish)
- Reliable, foolproof methods of fish collection and transport
- Hydraulically efficient (minimum head loss, balance)
- Geographically accessible
- Readily modifiable
- Accommodates all migratory species
- Has to accommodate flood flows
- Needs facility and run size monitoring (real time, ongoing basis)
- Needs to adhere to the KISS principle (keep it simple, stupid)
- Should provide for evaluation
- Determine what target age classes we're after (all?)
- Accommodates reservoir operation, including drawdown and spill
- Needs to be durable for the length of the license
- Can be installed quickly (less than 10 years)
- Must be adaptable to changing technology
- Easily operated and maintained (accommodates trash, debris, ice, sediment)

4. **Works Well for All Life History Stages**

- Make sure we provide a homing path that considers entire life cycle (doesn't affect their ability to return to spawning grounds)
- Minimal residualization of anadromous fish
- Successful guidance of fish through the system

5. **Works Well for Other Interests**

- Should accommodate other interests (not at the expense of project existence, recreational opportunities, etc.)
- Supports water quality objectives (reservoir and river management)
- Provides for public education
- Has to accommodate flood flows
- Needs to function over a variety of operations
- Accommodates reservoir operation, including drawdown and spill

Brainstorm: List of Possible Downstream Options for Solution

1. **Reservoir Passage**
   - Behavioral guidance
   - Electric fields, bubble curtains, strobe lights, chemicals, sonics, turbulent flow
   - Reservoir management schedule for passage
   - Reservoir bypass (capture at Upper Baker, take to Lower Baker)
   - River screen and trap (upstream)
   - Temperature manipulation
   - Dam removal
   - Purse seine
   - Traveling gulper
   - Fremont Duck Thing
   - Fish vacuum
   - Multiple fixed-base traps with guide nets

2. **Attraction/Guidance**
   - Behavioral guidance
   - Split intake with deep a surface openings
   - A 10 ft. vee-screen with a fixed reservoir elevation that would be used during the peak of fish passage and a gulper that would operate at all other reservoir elevations
   - Two-station intake gives more control over attraction than surface collector (e.g., Lower Baker penstock/intake extension upstream
   - Conventional screen (up to full flow)
   - Electric fields, bubble curtains, strobe lights, chemicals, sonics, turbulent flow
   - Directional flow guidance
   - Gulper
   - Modified gulper plumbed into both pumps and penstock; replacing louvers with exclusionary screens, vee-shaped and ramped, adjustable for variable flow and velocity, uses guides
   - Reservoir management schedule for passage
   - Temperature manipulation
   - Surface collector/baffle combination (appropriate for Upper Baker)
   - Slotted spill -- notched spill gate
   - Turbine passage (fish-friendly)
   - Multiple slots oriented vertically (could be attached to a gulper conventional screen or gulper)
   - Spill for attraction flow
   - *Pied Piper* (something that attracts fish to a location so they can be more effectively collected)
   - Reservoir crowder (not only mechanical)
   - Traveling gulper
   - *Fremont Duck* Thing
   - Fish vacuum
   - MIS/Gulper hybrid
   - Baffle system upstream for spill; Collect fish behind it
   - Multiple fixed-base traps with guide nets

3. Exclusion

- Behavioral guidance
- A 10 ft. vee-screen with a fixed reservoir elevation that would be used during the peak of fish passage and a gulper that would operate at all other reservoir elevations
- MIS (Modular Incline Screen) is rectangular and can be anywhere fixed or variable elevation
- Vertically adjustable MIS
- Eicher (designed elliptically for penstock)
- Electric fields, bubble curtains, strobe lights, chemicals, sonics, turbulent flow
- Directional flow guidance
- Gulper
- Modified gulper plumbed into both pumps and penstock; replacing louvers with exclusionary screens, vee-shaped and ramped, adjust for variable flow and velocity, uses guides
- Barrier nets
- River screen and trap (upstream)
- Surface collector/baffle combination (appropriate for Upper Baker)
- Traveling screens (currently used on Columbia River) self-cleaning; a submerged traveling intake screen, in gate well slot
- Higher approach velocity than conventional
- Traveling gulper
- *Fremont Duck* Thing
- Fish vacuum
- MIS/Gulper hybrid
- Multiple fixed base traps with guide nets

4. Transport

- Fish locks
- Pipeline passage that utilizes penstock
- Dam removal
- Turbine passage (fish-friendly)
- Trap-and-haul
- *Fremont Duck* Thing

5. General

- Combination of behavioral guidance and conventional technology

Meeting Evaluation
Well-Dones:

- Like the 9:00 to 3:00 timeframe
- Good to get all the interests out
- Appreciate the candor
- Generated world's longest list of potential solutions
- Like working through lunch (like cold-cuts and salad, add pop)

Opportunities to Improve:

- Seemed a bit like Mom and Apple Pie
- Get agenda and final version of minutes out on e-mail/web prior to next meeting
- Tracking of purpose of some of the tasks

Parking Lot
Hydro-acoustic data – Arnie/Nick
Fish species run timing, emergent timing, length-frequency data - Nick
Design strategy process
Conceptual designs (as they relate to costs)
Sediment studies
Separate session for brainstorming options Sept 12th or 25th – Nick will coordinate

Tentative Agenda for next meeting – Sept 28, 2000
9:00 a.m. to 3:00 p.m. at West Coast Sea-Tac Hotel
1. Review Agenda
2. Action Items
3. Continue fleshing out brainstormed list of potential solutions
   Start with additional options/combinations developed by teamlet
4. Meeting evaluation
5. Set agenda for next meeting