BAKER RIVER PROJECT RELICENSE

Aquatic Resources Working Group

February 8, 2001

9:30 a.m. – 2:30 p.m.

Puget Sound Energy's Everett Office
CFS Training Room
1122 75th St. S.W., Everett, WA

AGENDA

1. Review agenda and minutes
2. Review action items/parking lot
3. Update on Process Document
4. Update on Fish Passage Technical Working Group Meeting of January 30, 2001
5. Skagit Survey Review
6. Review study request submittals
7. Set agenda for next meeting (March 8)
8. Evaluate meeting

February 8, 2001

Investigation of hydropower operations in the lower Baker and Skagit rivers, Washington, 1996-1998

Prepared for Puget Sound Energy
Bellevue, Washington
by
R2 Resource Consultants

Study Objectives

- Evaluate the timing, magnitude, frequency and duration of downramp events at Puget Sound Energy's Baker River Project
- Investigate interactions with Seattle City Light Skagit River Project operations
- Investigate the effects of tributary inflows on the hydrologic effects of Baker Project operation

Overview

- Period of Record: Calendar year 1996-1999
- Data resolution: 15 minute unit interval stage and discharge
- Gage locations:
  - Skagit at Newhalem (12178100)
  - Skagit at Marblemount (12181000)
  - Sauk at Sauk (12189500)
  - Baker at Concrete (12193500)
  - Skagit at Concrete (12194000)
  - Skagit at Mount Vernon (12200500)

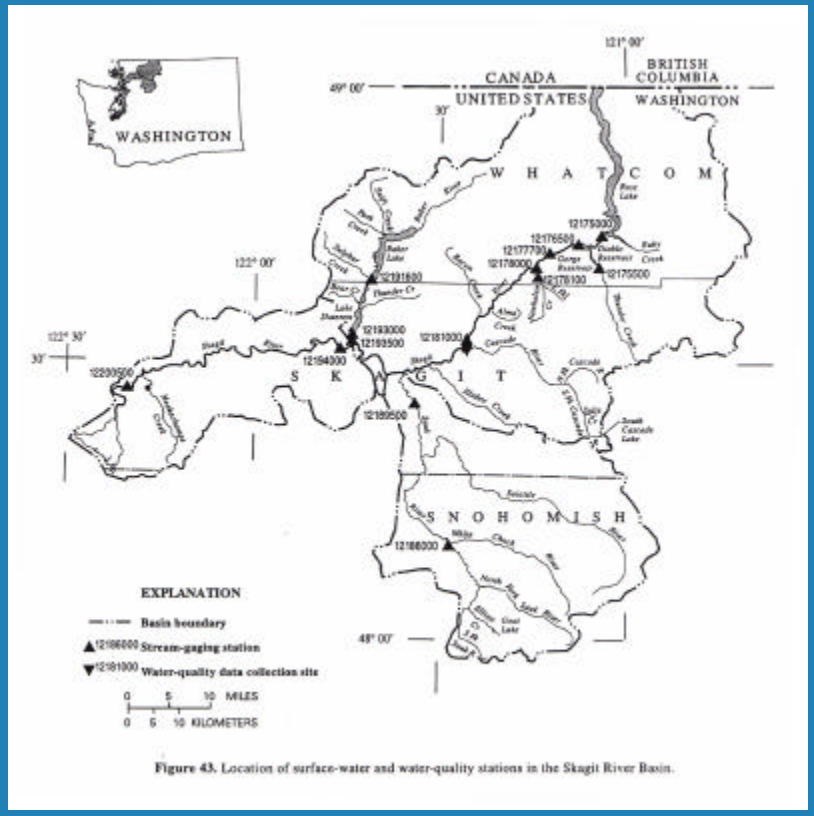


Figure 43. Location of surface-water and water-quality stations in the Skagit River Basin.

Overview

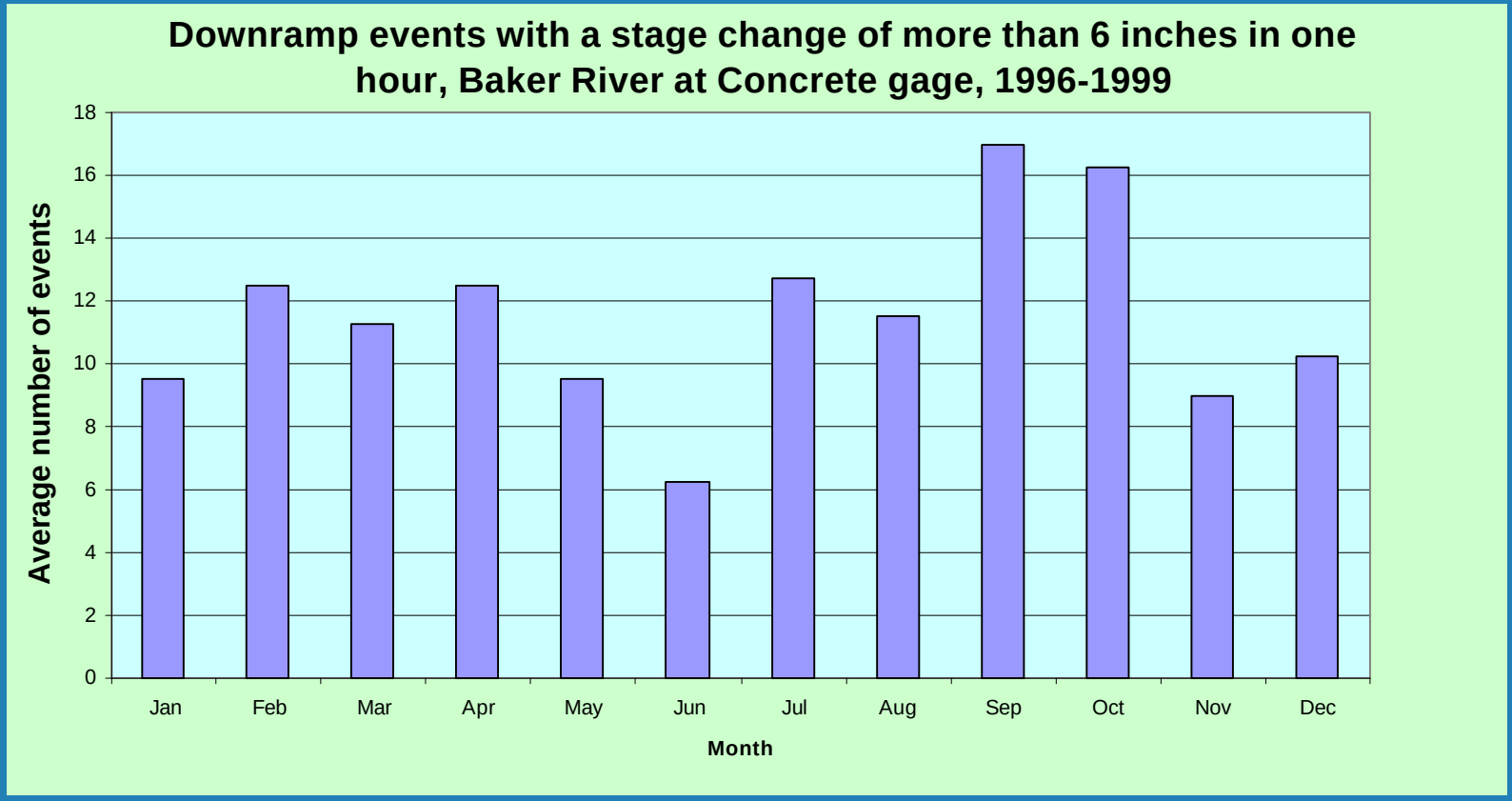
Gage	Location (River Mile)	Drainage Area (mi^2)	Mean Annual Discharge (cfs)
Skagit River at Newhalem	93.7	1,175	4,409
Skagit River at Marblemount	78.7	1,381	6,084
Sauk River at Sauk	5.4	714	4.356
Baker River at Concrete	0.7	297	2,657
Skagit River at Concrete	54.1	2,737	15,070
Skagit River at Mount Vernon	15.7	3,093	16,640

Definitions

- Downramp event: flow event during which the river stage decreased by more than 6 inches within one hour; event end defined by at least 3 consecutive 15-minute intervals where stage is stable or increases
- Lag time: time difference between the start of a downramp event at the upstream-most gage and the start of the downramp event at each downstream gage

Baker River Project Operation

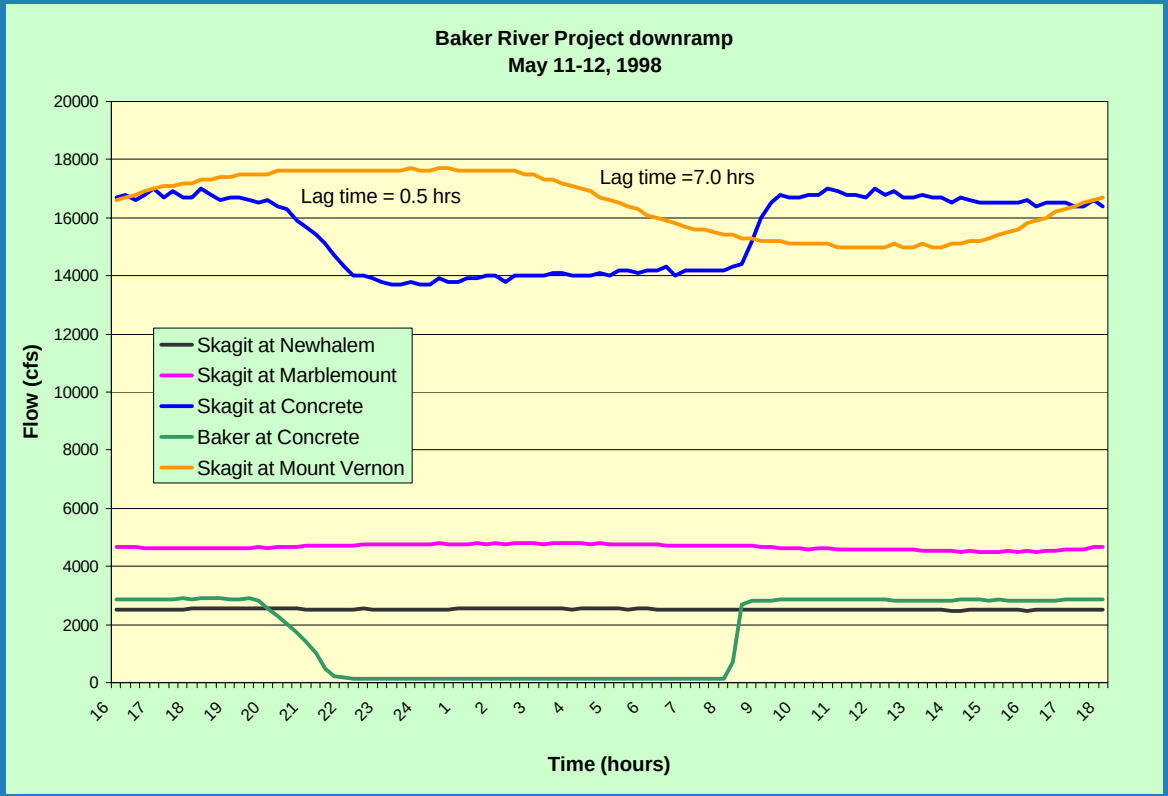
Frequency



Example of Baker River Project downramp

Timing

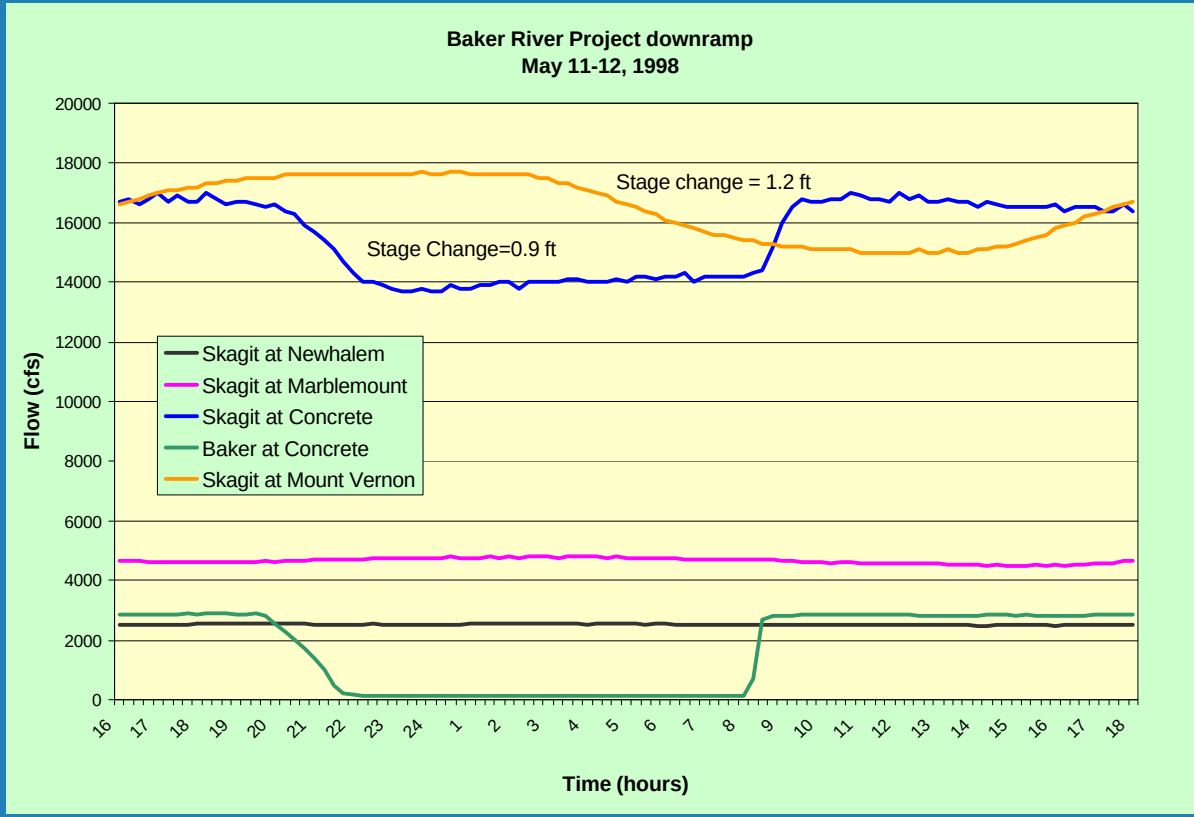
- Start time
- Lag time to Skagit River at Concrete gage
- Lag time to Skagit River at Mount Vernon gage



Example of Baker River Project downramp

Magnitude

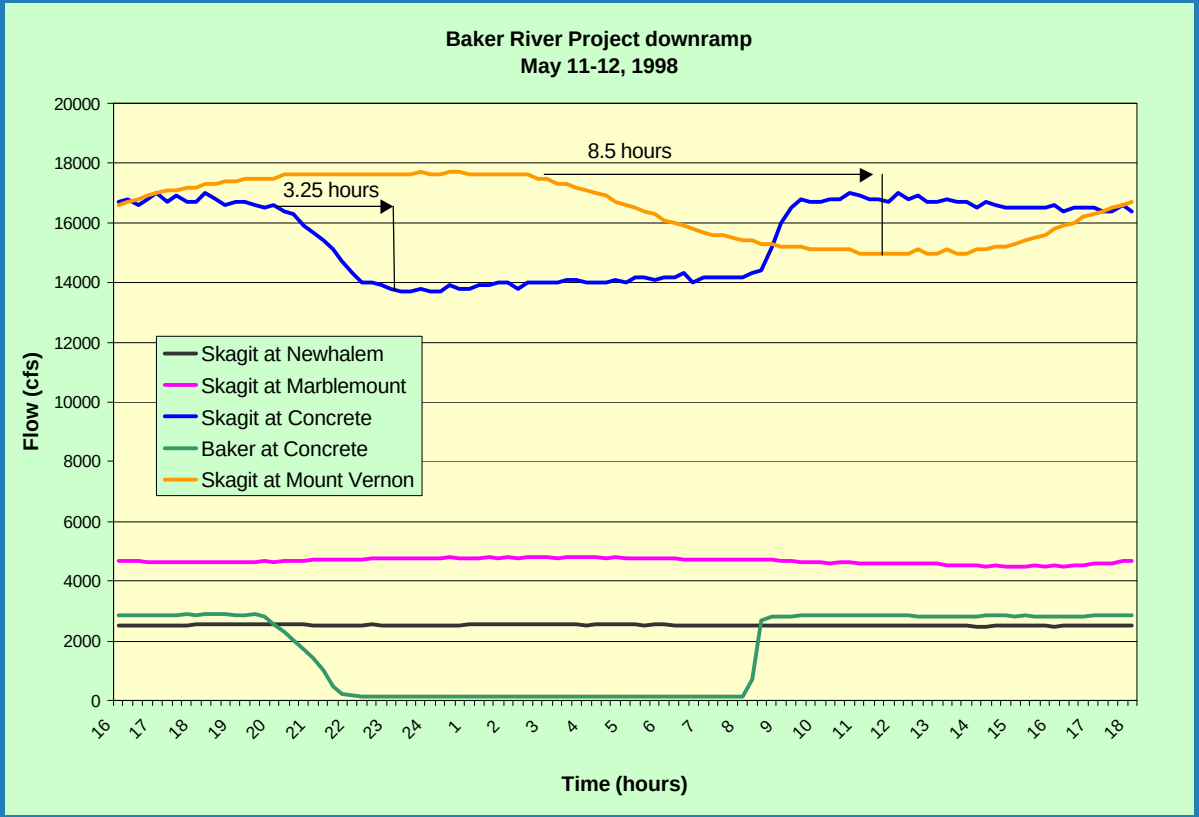
- Change in flow
- Baker at Concrete stage change/ramp rate
- Skagit River at Concrete stage change/ramp rate
- Skagit River at Mount Vernon stage change/ ramp rate



Example of Baker River Project downramp

Duration

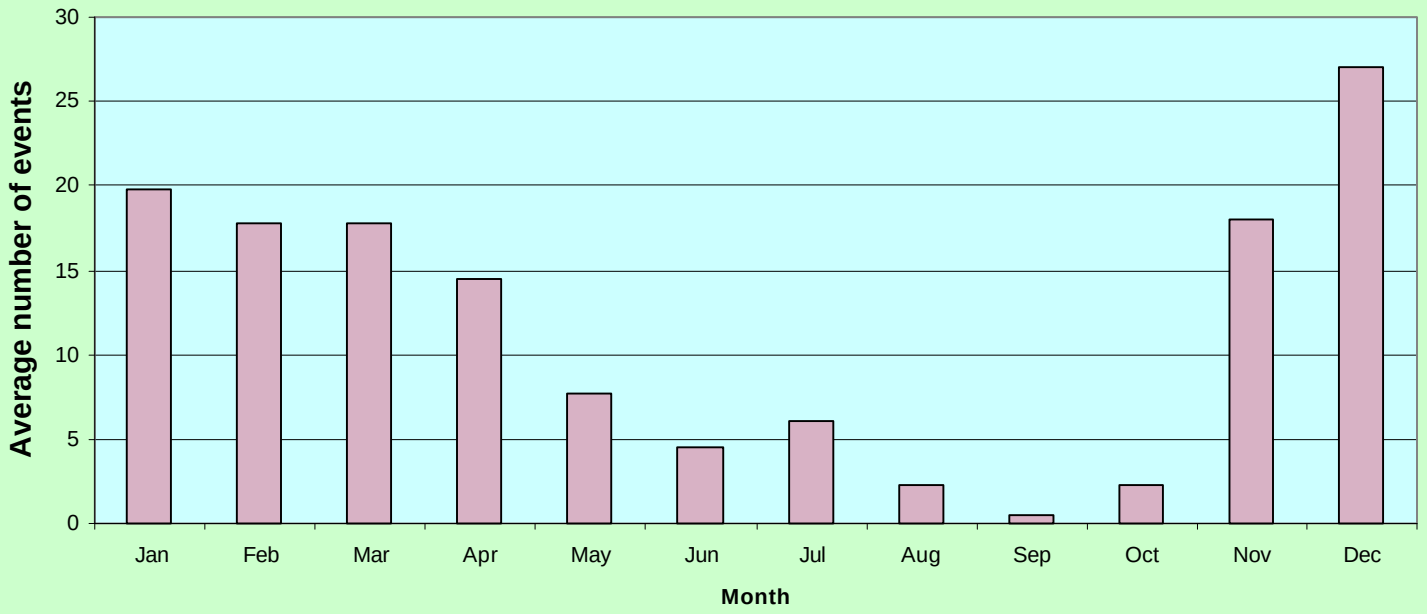
- Duration of downramp
- Initiation of upramp



Skagit River Project Operation

Frequency

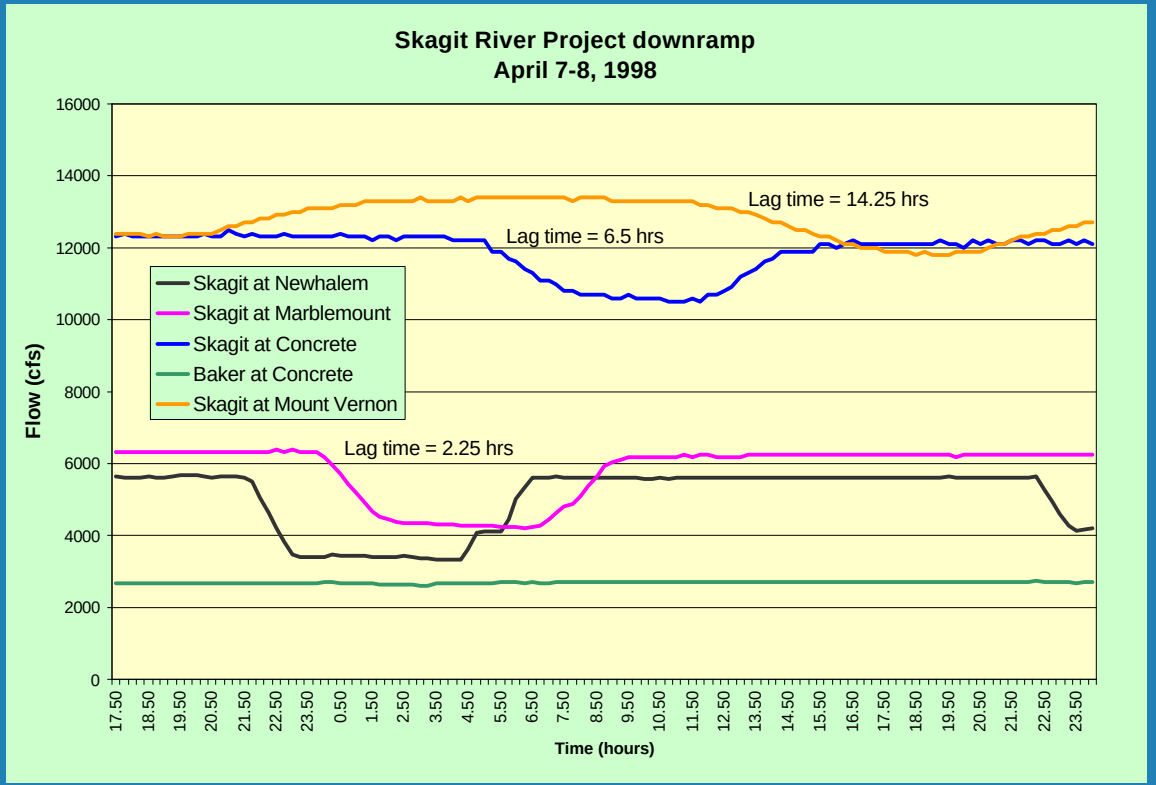
Downramp events with a stage change of more than 6 inches in one hour, Skagit River at Newhalem gage, 1996-1999



Example of Skagit River Project downramp

Timing

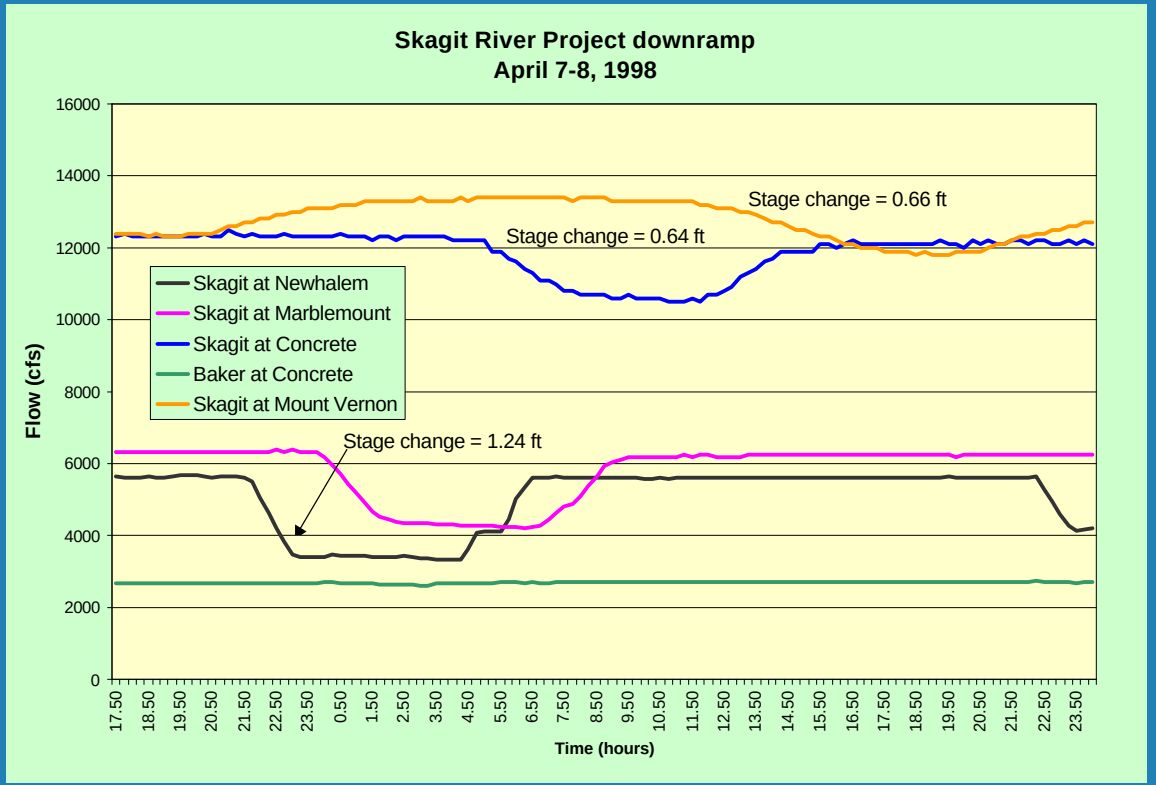
- Start time
- Lag time to Skagit River at Marblemount gage
- Lag time to Skagit River at Concrete gage
- Lag time to Skagit River at Mount Vernon gage



Example of Skagit River Project downramp

Magnitude

- Change in flow
- Skagit River at Newhalem stage change/ramp rate
- Skagit River at Concrete stage change/ramp rate
- Skagit River at Mount Vernon stage change/ ramp rate



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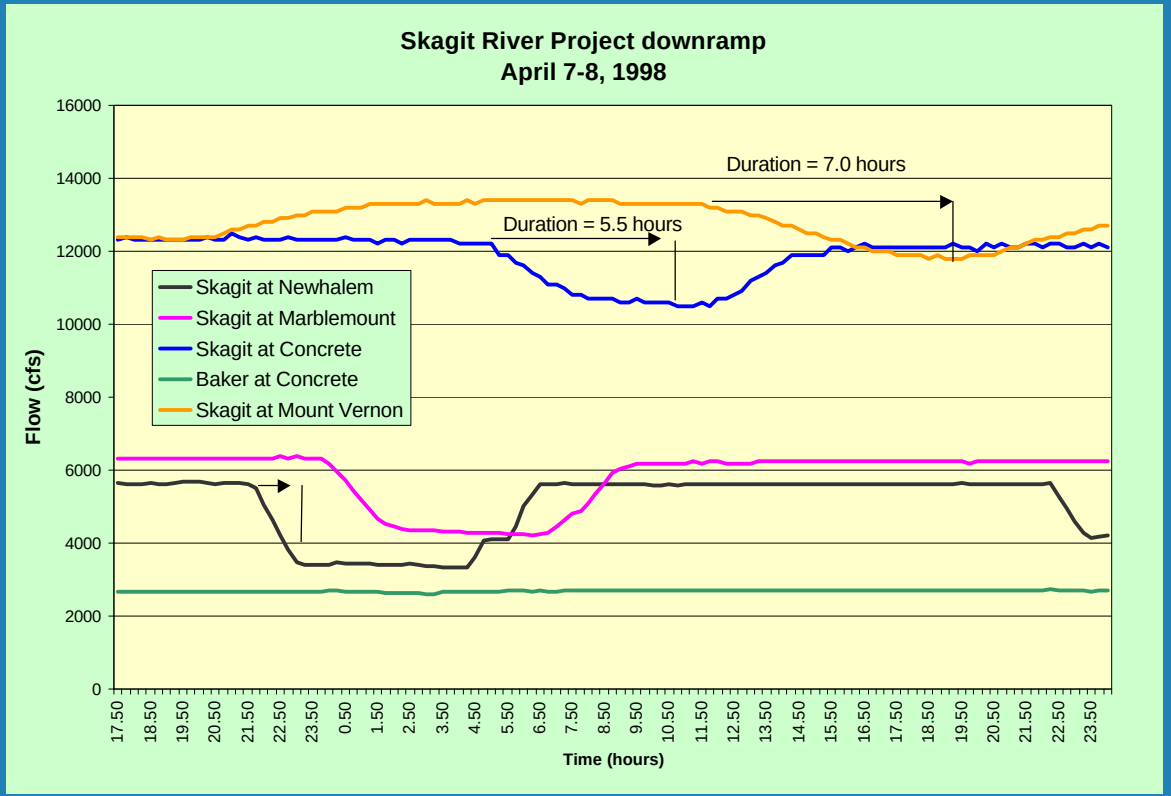
Example of Skagit River Project downramp

Duration

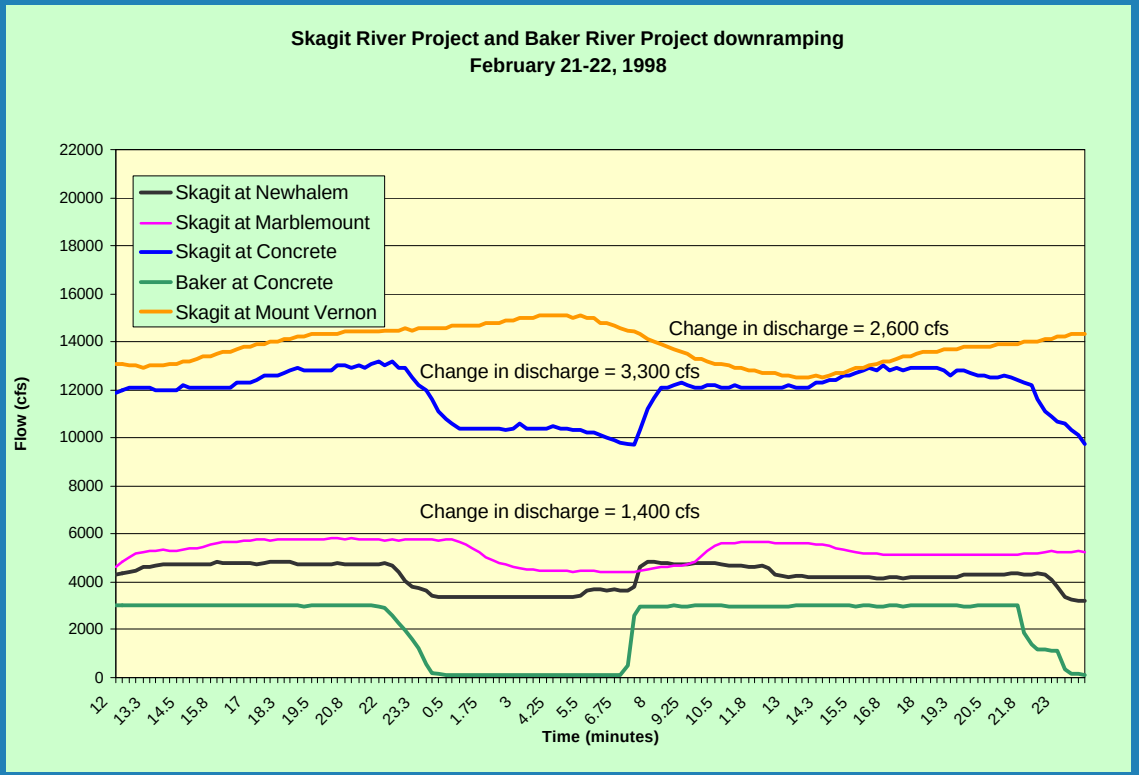
- Duration of downramp
- Initiation of upramp



Interactions

Concurrent BRP and SRP operation

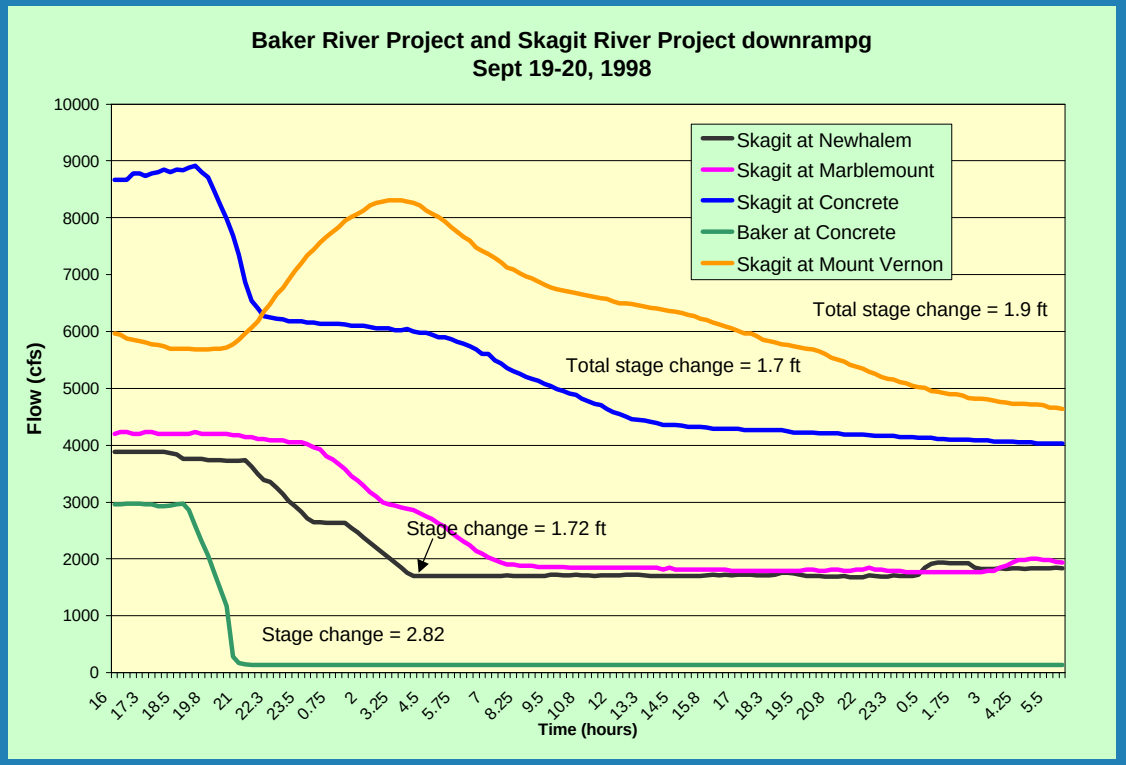
- Downramp events occurred concurrently
- Baker upramp truncated Skagit River Project downramp at Concrete gage
- Additive effects avoided



Interactions

No Baker Upramp

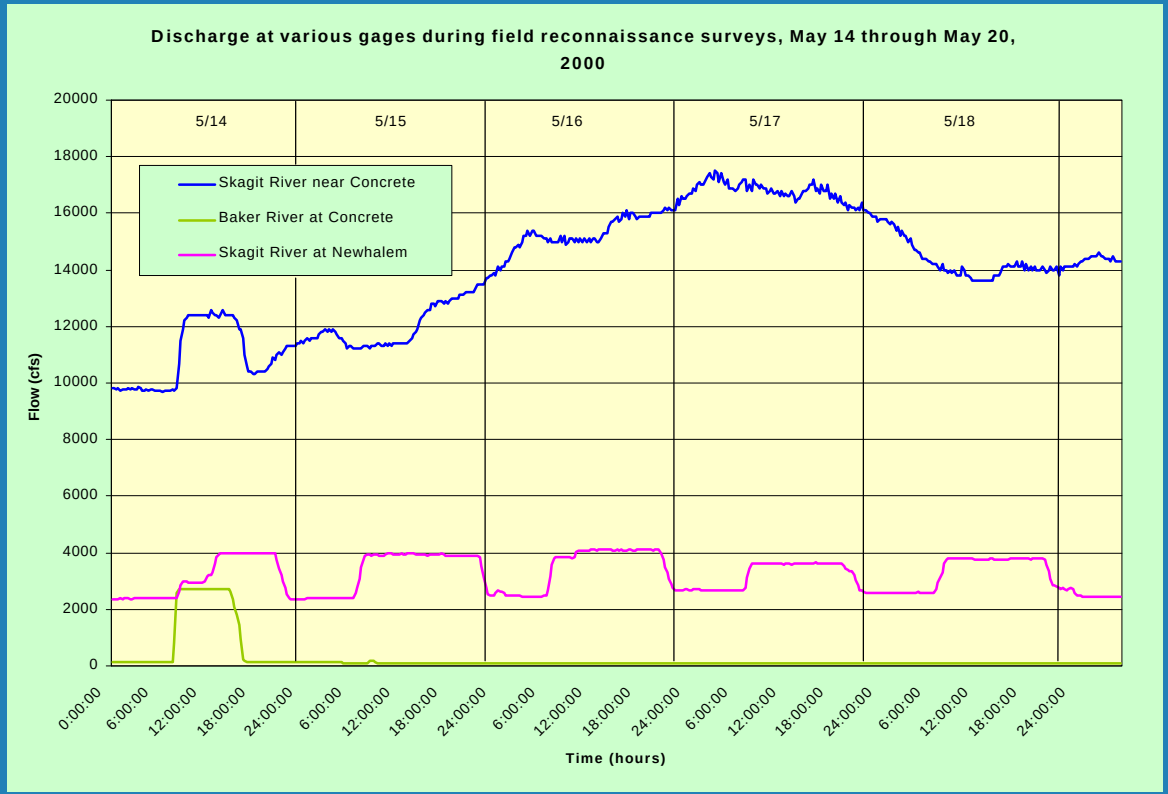
- Baker Project remained offline
- Rate of stage change
- Magnitude of stage change



Interactions

Tributary effects

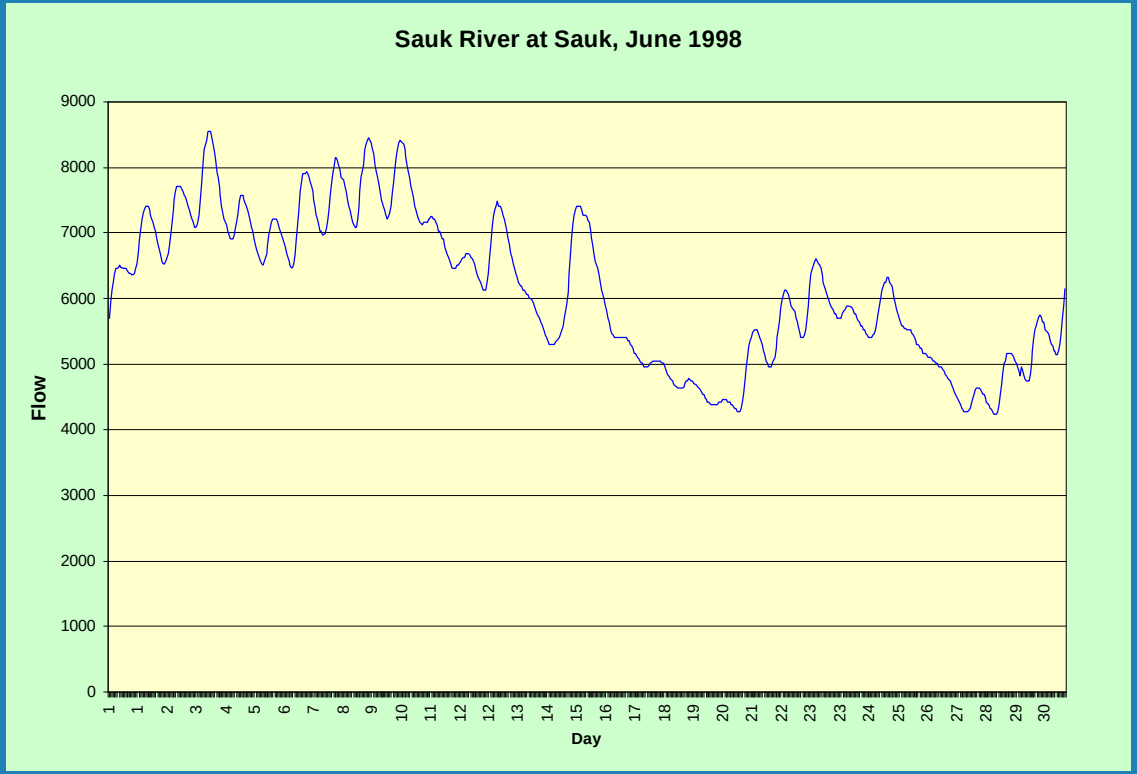
- Skagit River Project peaking
- Tributary inflow offsets impacts



Interactions

Tributary effects

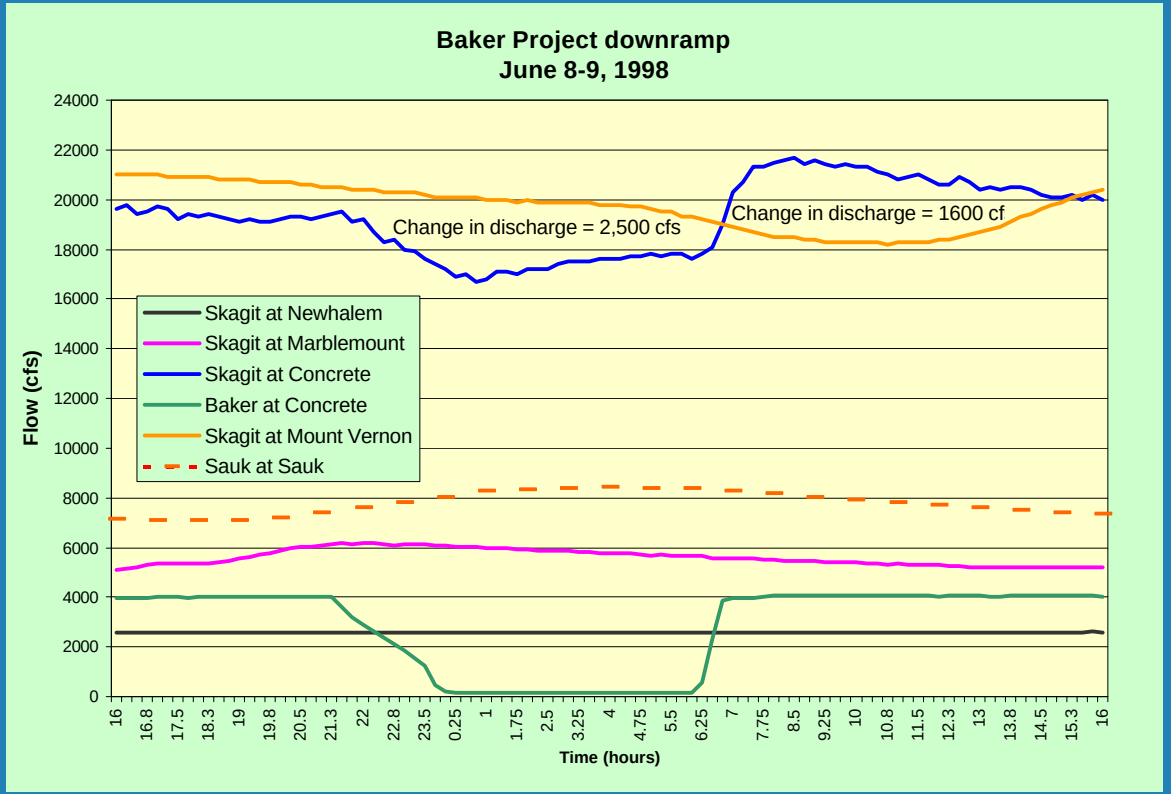
- Diurnal fluctuations as a result of spring snowmelt



Interactions

Tributary effects

- Tributary inflows partially offset Baker downramp



Reconnaissance-level investigation of habitat features in the lower Skagit River, Washington

Prepared for Puget Sound Energy
Bellevue, Washington
by
R2 Resource Consultants

Study Objectives

- Identify habitats potentially affected by Puget Sound Energy's Baker Project operations in the mainstem Skagit River downstream of the Baker River confluence
  - Side channel location and estimated inlet elevation
  - Location of gravel bars and estimated stage at which bars become fully inundated relative to survey WSE
  - Bar surface slope, substrate, and presence or absence of debris and depressions
  - Frequency, distribution and size of LWD within the active channel
  - Bank composition

Study Approach

- Phase I May 2000-December 2000
  - Conduct field reconnaissance survey to identify habitat features within the project reach
- Phase II February 2001-July 2001
  - Install and monitor staff gages in Study Reach

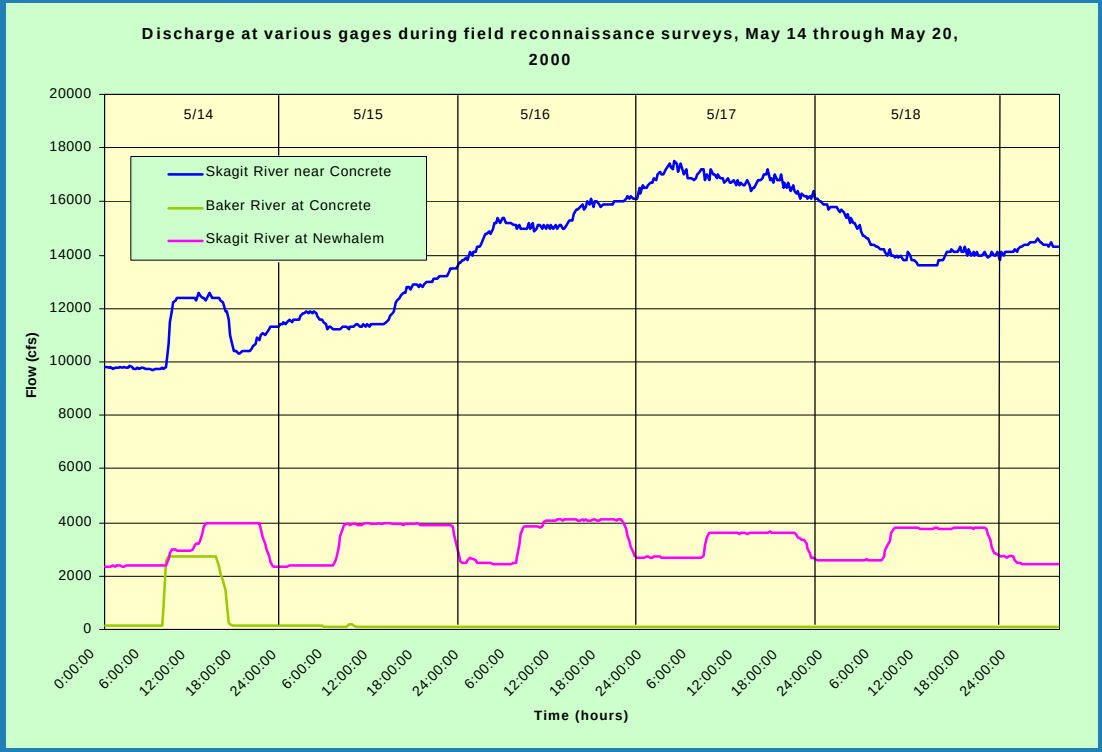
Field reconnaissance

- Conducted from May 16 through May 18 2000.
- Covered Skagit River from RM 64 (confluence with the Sauk) to RM 40 (Hamilton boat ramp)
- Two teams of 2-3 surveyors - one team for left bank and one team for right bank

Results of Field Reconnaissance

Flows

- Baker Project offline for duration of field survey
- Seattle City Light Project daily peaking
- Flows unstable due to a freshet event fed by tributary inflows



Results of Field Reconnaissance

Sandlines

Results of Field Reconnaissance

Varial Zone

Results of Field Reconnaissance

Gravel bars

- Approximate total area of gravel bars at 11,000 cfs =240 acres
- 65% of the bars examined during the survey are fully inundated at flows less than 25,000 cfs

Results of Field Reconnaissance

Gravel bars

Results of Field Reconnaissance

Gravel Bars

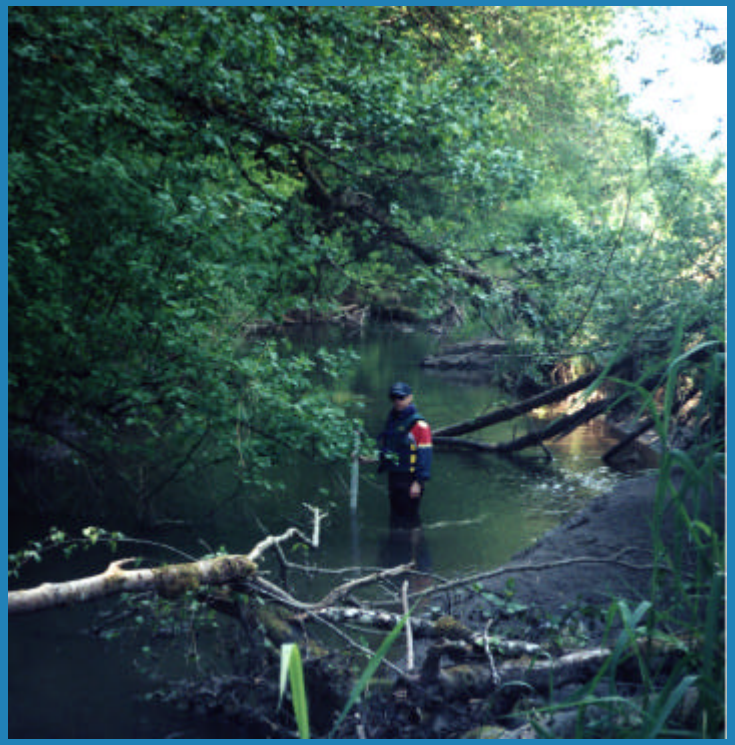
Results of Field Reconnaissance

Side Channels

- Three types of side channels: Bar top, Backbar and Secondary
- Identified 19 side channels with a total length of approximately 34,500 feet
- Side channels begin to become connected at flows greater than 7,000 cfs

Results of Field Reconnaissance

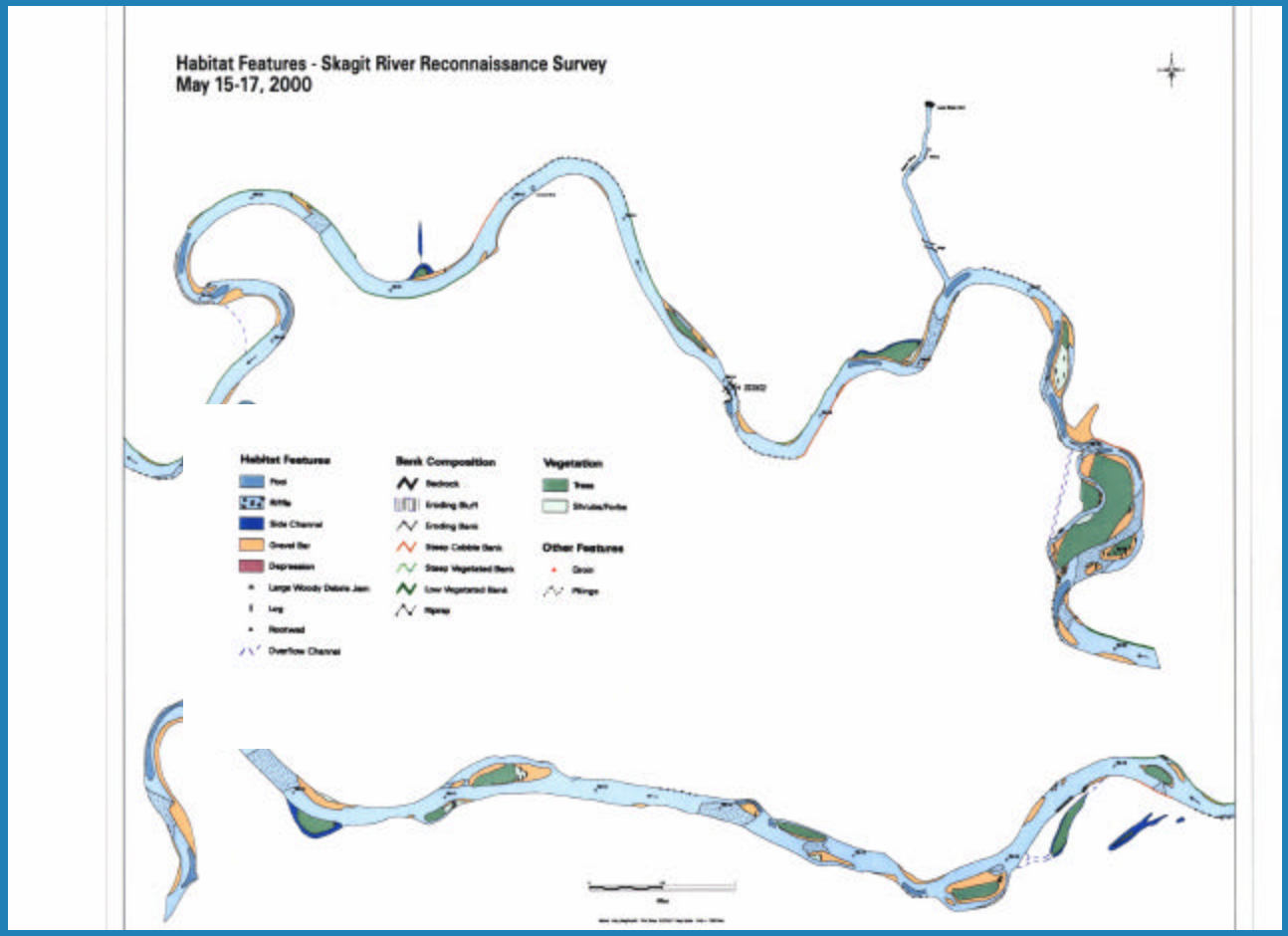
Side Channels



Results of Field Reconnaissance

Large Woody Debris

Results of Field Reconnaissance



BAKER RIVER PROJECT RELICENSE

Aquatic Resources Working Group

February 8, 2001

9:30 a.m. – 2:30 p.m.

PSE Office, Everett, WA

MEETING NOTES

Aquatics Working Group Mission: *"To identify issues and develop solutions and recommendations addressing fish and aquatic resource interests related to the Baker River Project and its operations, leading to a settlement agreement."*

Fish Team Leader: Arnie Aspelund, 425-462-3442, aaspel@puget.com

PRESENT:
Karen Kloempken (WA Dept. Fish & Wildlife), Stan Walsh (Skagit System Cooperative), Bill Reinard (Wildcat Steelhead Club), Dick Raisler (Fidalgo Flyfishers/WA Council-Federation of Fly Fishers), Arn Thoreen (Skagit Fisheries Enhancement Group), Steve Jennison (WA Dept. of Natural Resources), Don Schluter, (Trout Unlimited by phone), Rod Sakrison (WA Dept. of Ecology), Arnie Aspelund (PSE), Nick Verretto (PSE), Doug Bruland (PSE), Cary Feldmann (PSE), Chuck Ebel (Army Corps of Engineers), Phil Hilgert and Sue Madsen of R2 Resource Consultants, Lyn Wiltse (facilitator - PDSA Consulting)

Agenda Febuary 8, 2001
9:30 a.m. - 2:30 p.m.
PSE Office in Everett

1. Review notes/agenda
2. Action Items/Parking Lot
3. Skagit River Reconnaissance Level Survey Presentation (R2 Resource Consultants)
4. Update on Process Document
5. Update on Fish Passage Technical Working Group Meeting of Jan.30, 2001
6. Hydrologic Review Presentation (R2 Resource Consultants)
7. Review study request submittals
8. Set agenda for next meeting (March 8)

9. Evaluate meeting

FUTURE DATES
The team decided to continue to meet at the PSE Office in Everett on the second Thursday of each month, from 9:30 to 2:30 for 2001: Mar. 8, Apr. 12, May 10, June 14, July 12, Aug. 9, Sept., 13, Oct 11, etc.

NEW ACTION ITEMS
- ALL: Get study requests for 2001 field season to Arnie by February 18th.
- Arnie: Send hard copy of map lists of gage sites and today's handouts of the Fish Passage Technical Working Group to Don Schluter.
- Karen: Have Gary email spread-sheet to Don Schluter.

REPORT ON OLD ACTION ITEMS

- Nick and Arnie developed an index/bibliography of existing studies. Arnie distributed a handout of the initial draft of the Baker Project Alphabetical Reference List. We will continue to add to this list as we go.
- Nick: Checked with Bob Barnes re: What % does the Baker make up of Skagit River flow (regulated/unregulated/over all seasons). This information will be covered by the R2 Presentation on the Skagit River Reconnaissance Level Survey conducted in May of 2000.
- Arnie emailed study requests to all team members by February 2nd.

OLDER ACTION ITEMS
Gary: Bring hard copies of sockeye presentation

SKAGIT RIVER RECONNAISSANCE LEVEL SURVEY PRESENTATION
Sue Madsen and Phil Hilgert of R2 Resource Consultants walked through a Power point presentation of the objectives, scope, and results of their field reconnaissance.
During a planned Project shut down in May 2000, staff from PSE and R2 Resource Consultants conducted a three -day survey of Skagit River habitat features. Sue Madsen and Phil Hilgert of R2 presented the results of the reconnaissance level surveys describing the distribution and frequency of side channels, gravel bars, depressions and large woody debris. A copy of the presentation will be available on Puget's Baker River relicensing website. They also distributed hard copies of the presentation. Doug distributed copies of proposed Gage Site Locations for the Skagit River.

UPDATE ON PROCESS DOCUMENT
Arnie distributed copies of the latest draft of the Process Document for the relicensing of the Baker River Project. The group didn't spend any time on it because it is still very much a draft and won't even be reviewed by the Solution Team until March or possible April.

FISH PASSAGE TECHNICAL WORKING GROUP UPDATE
The Fish Passage Technical Working Group met on January 30, 2001. They are currently focusing on downstream fish passage (migration, attraction, collection and transport). They are

reviewing some conceptual design concepts. They feel like they don't have enough information yet to make a recommendation to go ahead with a design. They are initiating studies to provide answers so they can make recommendations to this group.

LOWER BAKER MAINTENANCE

With current basin flow levels at less than half what they normally are, it is possible that the Baker Project operations will run out of water by the first week in March. The agencies decided that the best use of that water is to keep water levels in the Skagit River at 7600cfs (for fish) as long as possible and hope for rain. PSE will take the maintenance outage at Baker River beginning in April (or sooner if it runs out of water) and lasting 16 weeks. The goal is to refill Lower Baker in time to reach spill crest height in time for the summer sockeye returns, June 25th.

HYDROLOGIC REVIEW PRESENTATION (R2 Resource Consultants)

Sue and Phil walked the team through the hydrologic review they conducted. They also distributed hard copies of the presentation. Sue Madsen of R2 Resource Consultants presented an evaluation of the timing, magnitude, frequency and duration of down ramp events at Puget Sound Energy's Baker River Project. The effect of Baker River Project, Skagit River Project and tributary inflow (e.g., Sauk River) on mainstream Skagit River stage fluctuations was examined using the 1996-1999 record of 15 minute stage intervals at six USGS gages.

STUDY REQUEST SUBMITTALS

The team reviewed the three new study requests that were distributed since our meeting last month. All team members were asked to submit study proposals to Arnie as soon as possible for the 2001 field season.

Chuck reviewed the Upper Baker River Delta request that he submitted and the Corps is funding. He did a bull trout spawning habitat assessment at 700 feet. He will do the same at 708 and at 720. He may use a combination of old fashioned observation and aerial photos. There may be an opportunity for him to do a sockeye assessment at the same time. The study results are needed by USFW by August, 2001. Phil suggested Chuck look at (1) slope of the delta; (2) extend the survey to complete range of reservoir fluctuations; (3) available habitat at different pool levels 707, 708-720 (incremental approach); (4) effect of reservoir levels on habitat conditions?; (5) evaluate enhancement opportunities. Chuck will get together with PSE and others to determine how the scope of this study can be expanded to fulfill other data needs of the group.

The group then reviewed the "Nutrient Addition to Baker and Shannon Lakes and Tributaries" submitted by the Wildcat Steelhead Club. Bill suggested we study the current levels of nutrients in the tributaries as well as the lakes to see if they are sufficient for optimal productivity. PSE said they are already facilitating nutrient supplementation with carcasses in the streams.

Rod walked the group through the Department of Ecology's proposed study: "Mainstem Skagit River Habitat Assessments and Flow/Habitat Relationships". He said some of the concerns in this study were covered by R2's presentation.

STUDY REQUEST TECHNICAL WORKING GROUP:

Stan, Nick, Arnie, Karen, Bill, Chuck, Rod, and Cary volunteered to form a technical working group to review study requests and make recommendations on which ones should be done in the 2001 field season. They will also be looking for opportunities to combine studies and or throw out studies in cases where they purport to collect data that are already available. They will be getting together on February 22 in one of the conference rooms at the PSE Office in Everett, starting at 9:00 a.m. to sift through all 2001 field season study requests and make recommendations to this group.

LIST OF MEETING HANDOUTS

- Survey Request: Native Char Potential Spawning Habitat Assessment on the Baker River Delta (Corps of Engineers)
- Survey Request: Nutrient Addition to Baker and Shannon Lakes and Tributaries (Wildcat Steelhead)
- Survey Request: Mainstem Skagit River Habitat Assessment and Flow/Habitat Relationships (State Dept. of Ecology)
- Upper Baker Baffle Modification for Flow Test (May, 2000)
- Modified Intake Baffle Screen; Option 1—Floating curtain Minimum Operating Reservoir Level Plan and Section (Figures 1 through 6)
- Scientific report, "Ecological Connectivity in Alluvial River Ecosystems and Its Disruption By Flow Regulation" (taken from Regulated Rivers Research Management, Vol.11, 105-119 (1995)
- Proposed Gage Site Locations for Skagit River
- R2 Presentation materials: Reconnaissance-Level Investigation of Habitat Features in the Lower Skagit River, Washington
- R2 Presentation materials: Investigation of Hydropower Operations in the Lower Baker and Skagit Rivers, Washington, 1996-1998

PARKING LOT

- Watershed Analysis- presentation by Brady Green at a later date
  We need a strategy to integrate this analysis into the process
- Feedback on "Salmon on the Baker River" document
  Different perspectives
  Discuss posting reviews on web
- Presentation on Northwest Forest Plan including Wild and Scenic Rivers Act (USFS) at a date to be defined later
- State agency presentation re: mandates: FS, Parks, Ecology, Fish and Wildlife, DNR, DOT, NMFS, USFWS

EVALUATION OF MEETING

Well-Dones

- R2 presentations
- Better coffee
- Great food

- We start at 9:30 and end at 2:30

Opportunities to Improve

- Make sure Don gets all materials ahead of time
- Not moving as fast as we'd like to
- Impact of limited Forest Service participation
- Concern re: last minute study requests
- We start at 9:30 and end at 2:30

Tentative Agenda for Next Meeting
March 8, 2001
9:30 a.m. - 2:30 p.m.
PSE Office in Everett

1. Review agenda and minutes
2. Review Action Items and Parking Lot
3. Discussion of article: Ecological Connectivity in Alluvial River Ecosystems
4. Study Request Submittals for 2001
5. Report form Study Request Technical Working Group
6. Set agenda for next meeting (April 12)
7. Evaluate meeting