BAKER RIVER PROJECT RELICENSE

Economics/Operations Working Group

March 14, 2001

1:30 – 4:30
Puget Sound Energy Mount Vernon Business Office
1700 E. College Way
Mount Vernon, WA 98273

AGENDA

Review/revise minutes and agenda	
Presentation on Baker/Skagit flows	Sue Madsen
Emergency Action Plan	Chris Drechsel
Fall/Winter Skagit River Flows	Lloyd Pernela/Cary Feldmann
Action items	
Set agenda for next meeting	
Evaluate meeting	

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)

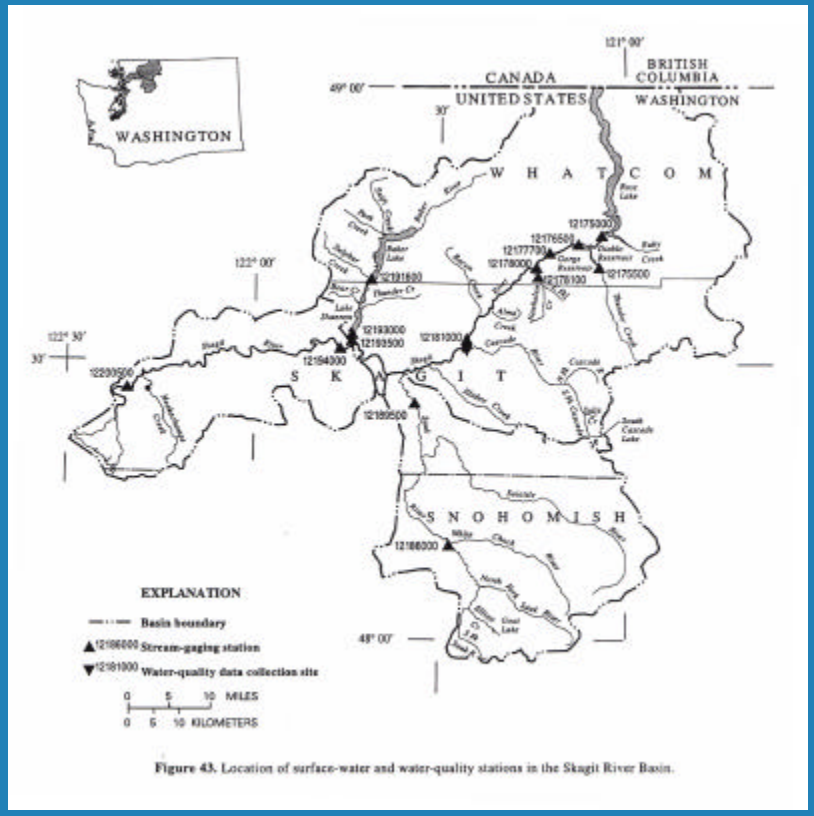


Figure 43. Location of surface-water and water-quality stations in the Skagit River Basin.

Overview

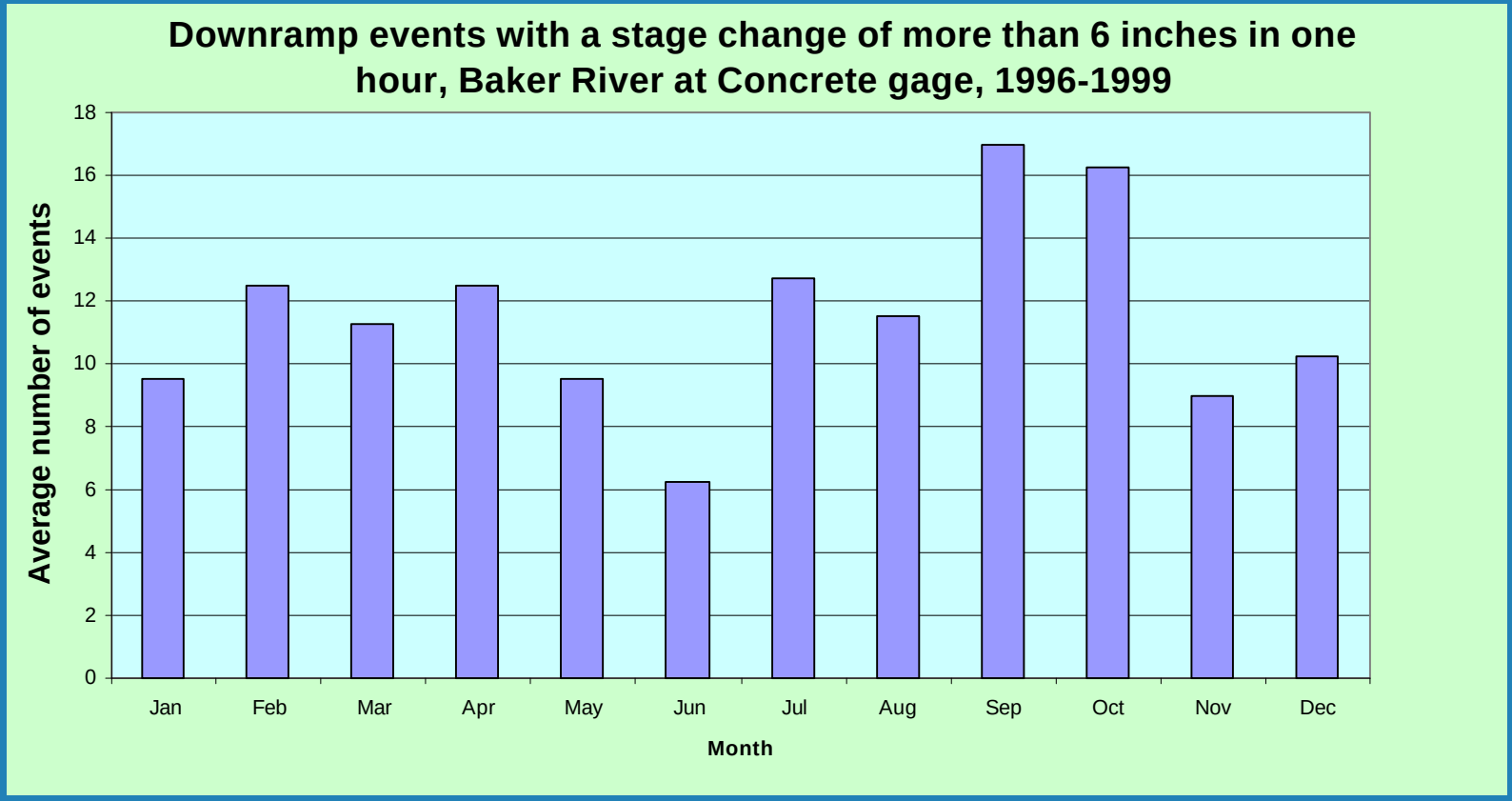
Gage	Location (River Mile)	Drainage Area (mi^2)	Mean Annual Discharge (cfs)
Skagit River at Newhalem	93.7	1,175	4,409
Skagit River at Marblemount	78.7	1,381	6,084
Sauk River at Sauk	5.4	714	4.356
Baker River at Concrete	0.7	297	2,657
Skagit River at Concrete	54.1	2,737	15,070
Skagit River at Mount Vernon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

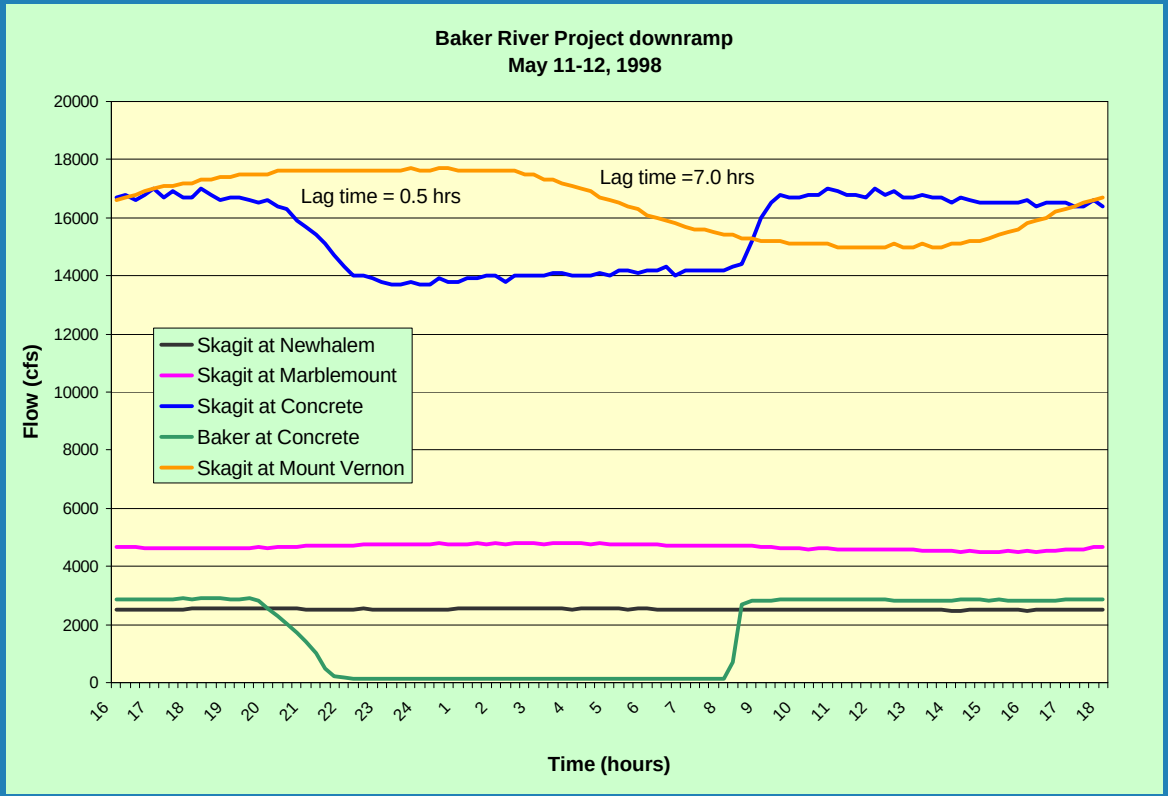
Frequency



Example of Baker River Project downramp

Timing

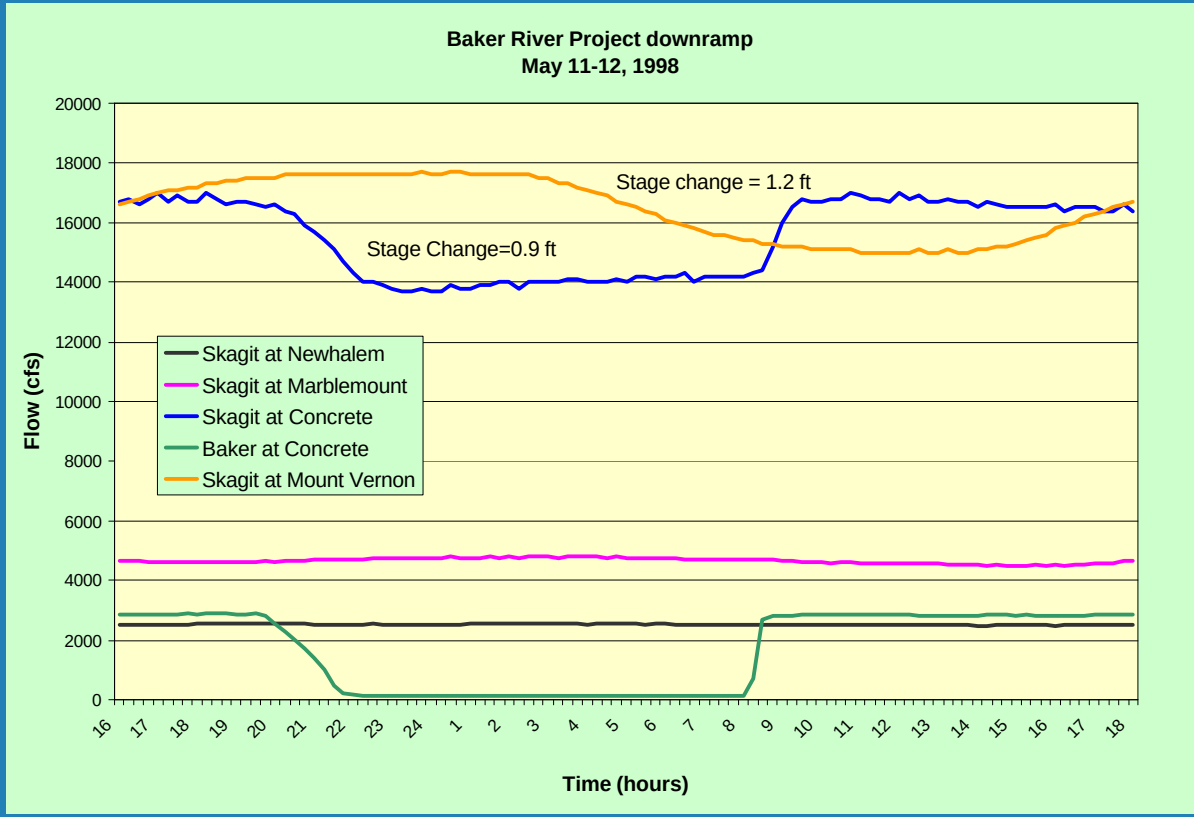
- Start time
- Lag time to Skagit River at Concrete gage
- Lag time to Skagit River at Mount Vernon gage



Example of Baker River Project downramp

Magnitude

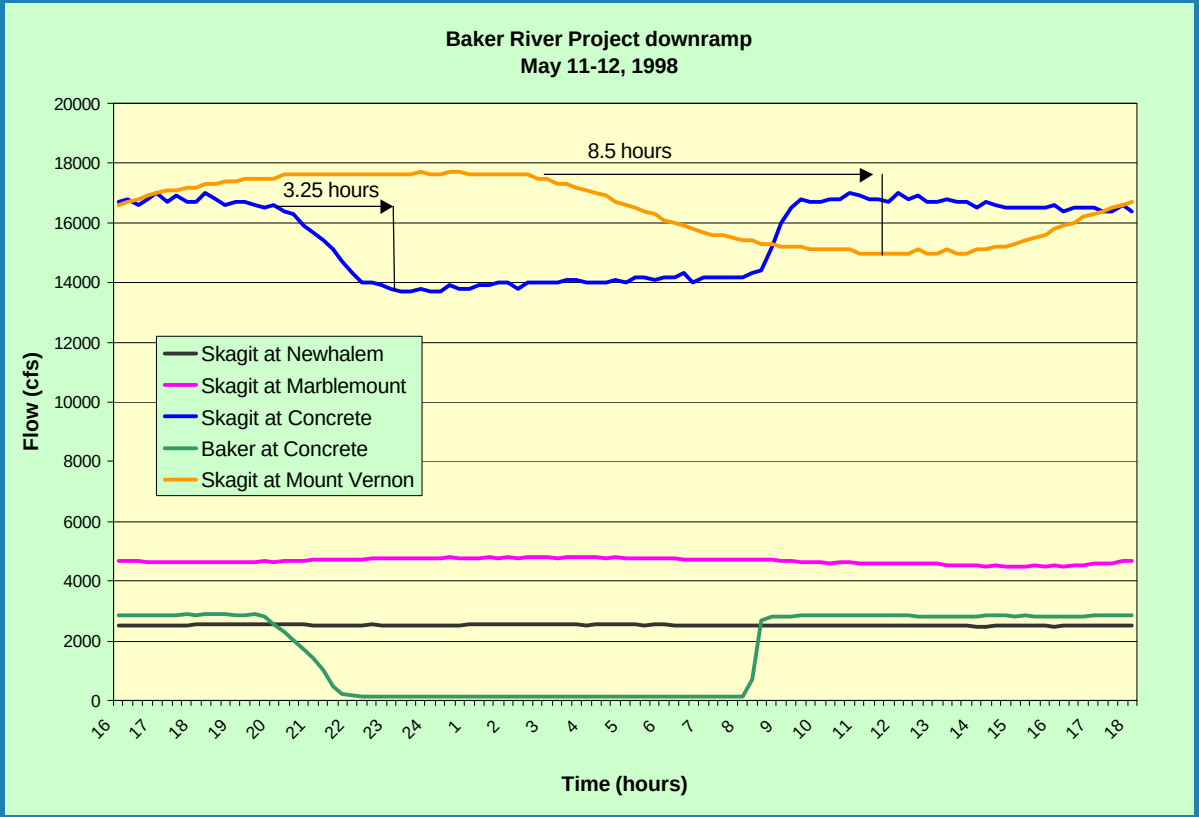
- Change in flow
- Baker at Concrete stage change/ramp rate
- Skagit River at Concrete stage change/ramp rate
- Skagit River at Mount Vernon stage change/ ramp rate



Example of Baker River Project downramp

Duration

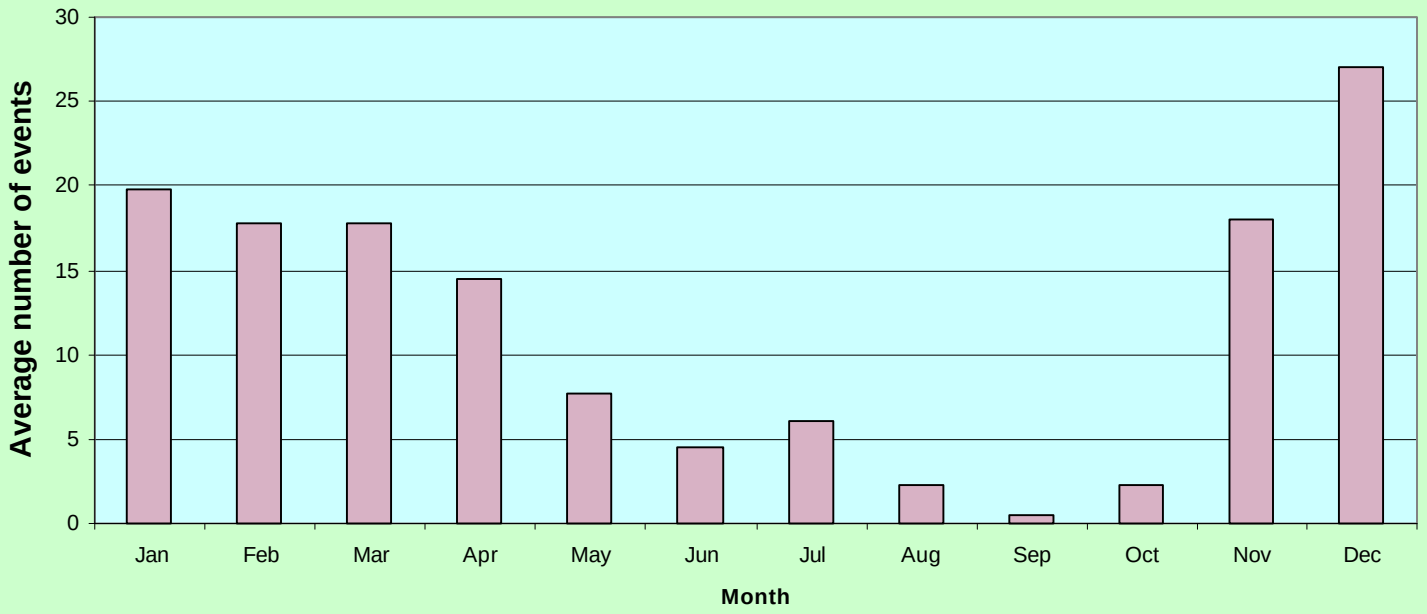
- Duration of downramp
- Initiation of upramp



Skagit River Project Operation

Frequency

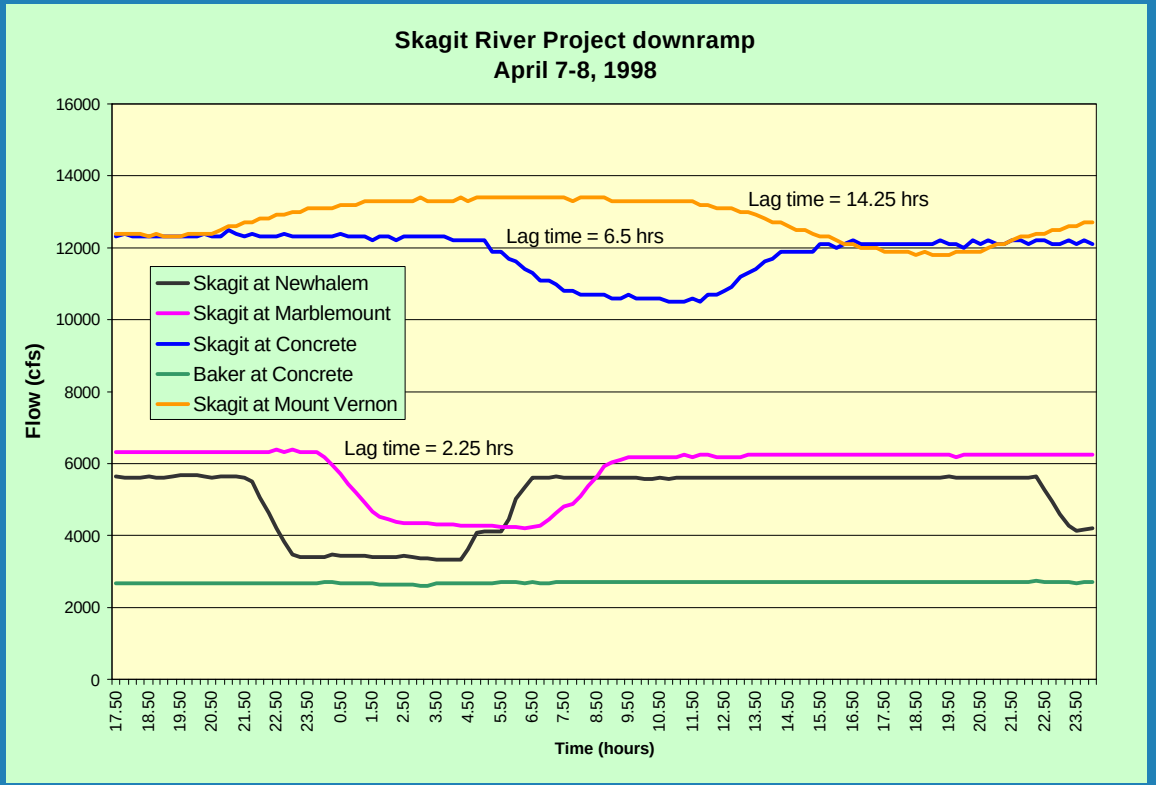
Downramp events with a stage change of more than 6 inches in one hour, Skagit River at Newhalem gage, 1996-1999



Example of Skagit River Project downramp

Timing

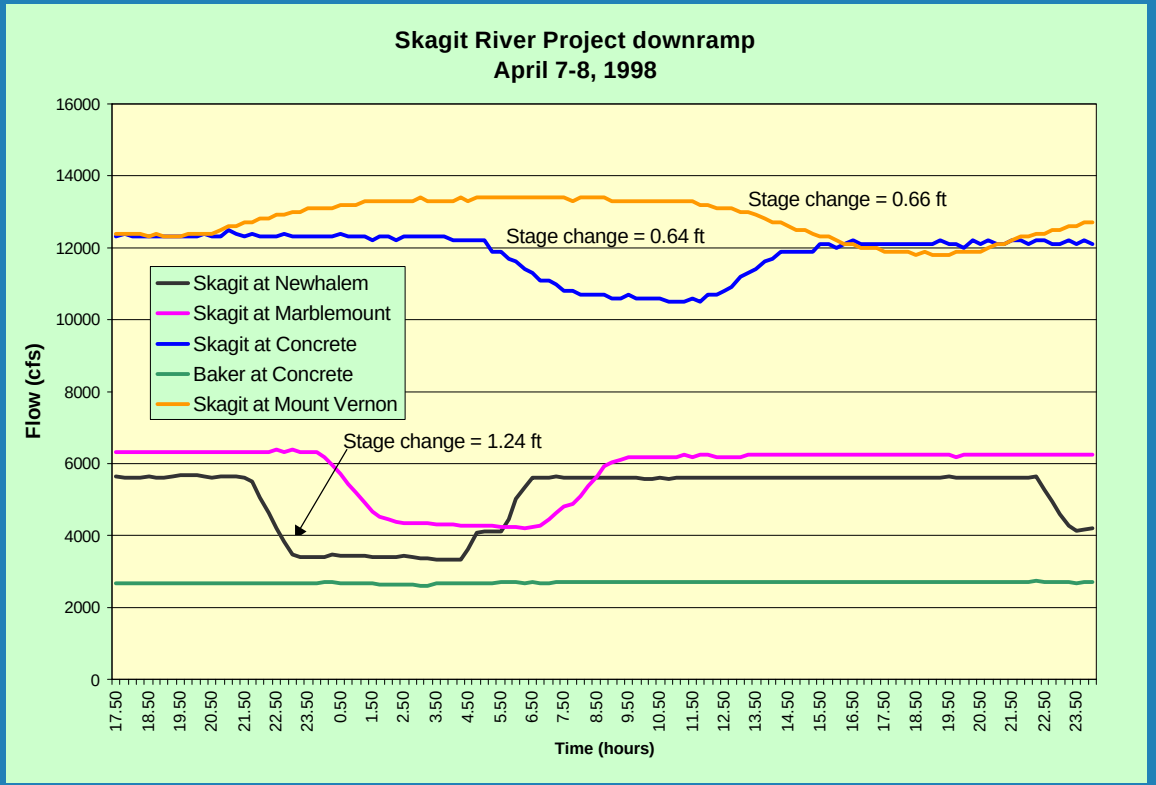
- Start time
- Lag time to Skagit River at Marblemount gage
- Lag time to Skagit River at Concrete gage
- Lag time to Skagit River at Mount Vernon gage



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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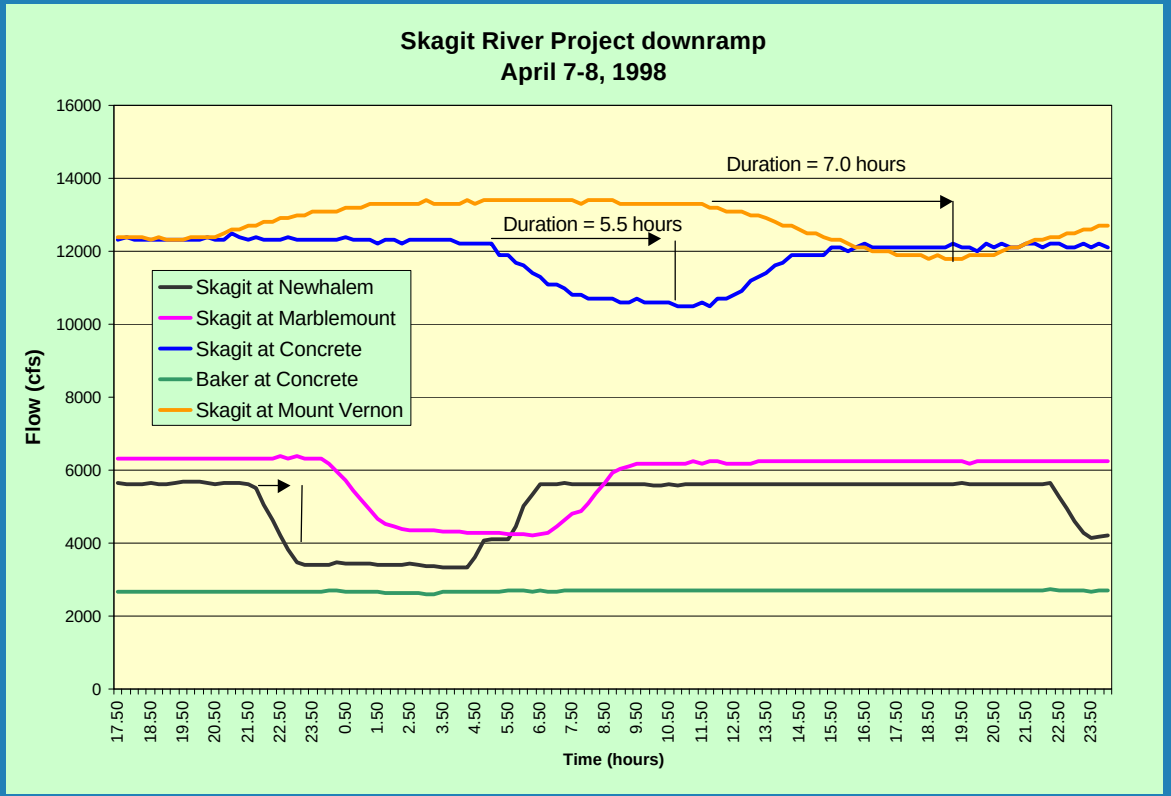
Example of Skagit River Project downramp

Duration

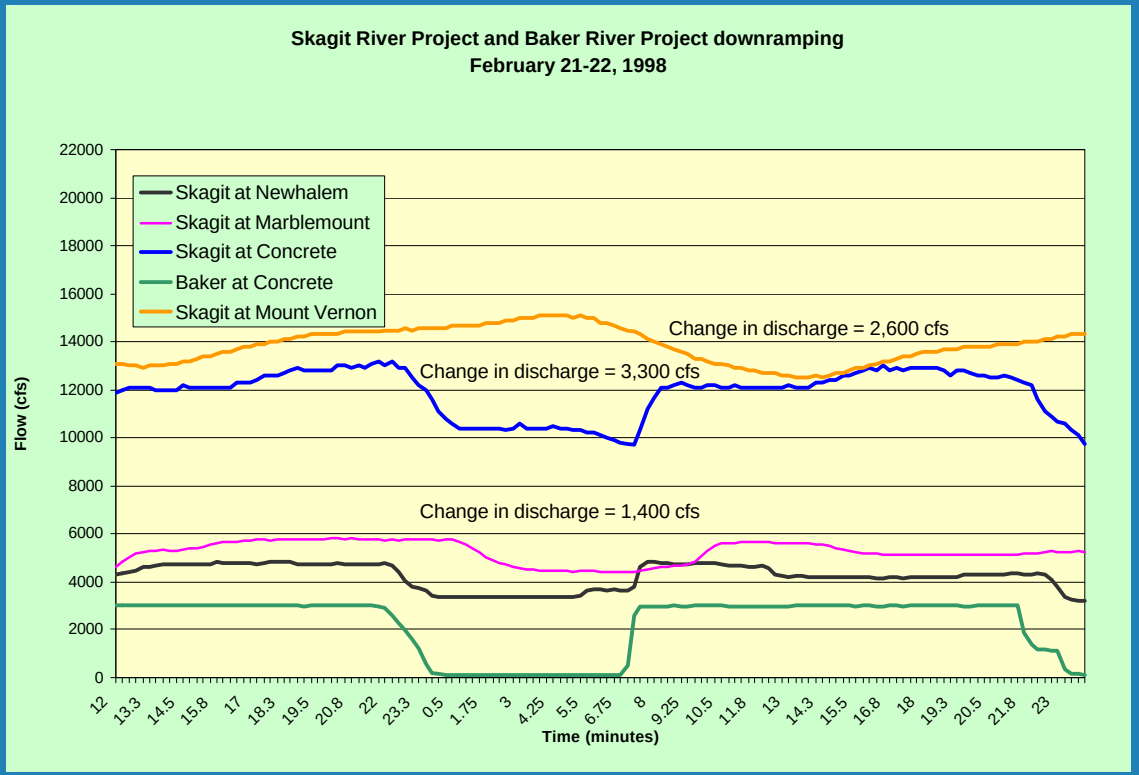
- Duration of downramp
- Initiation of upramp



Interactions

Concurrent BRP and SRP operation

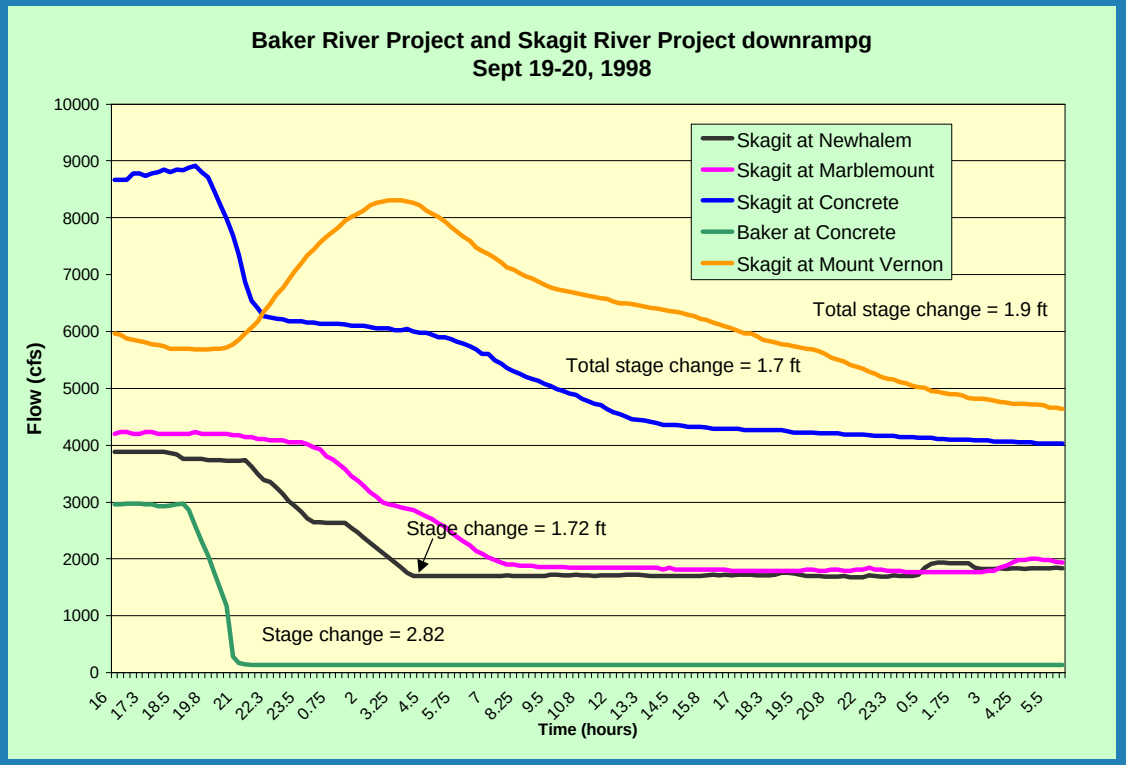
- Downramp events occurred concurrently
- Baker upramp truncated Skagit River Project downramp at Concrete gage
- Additive effects avoided



Interactions

No Baker Upramp

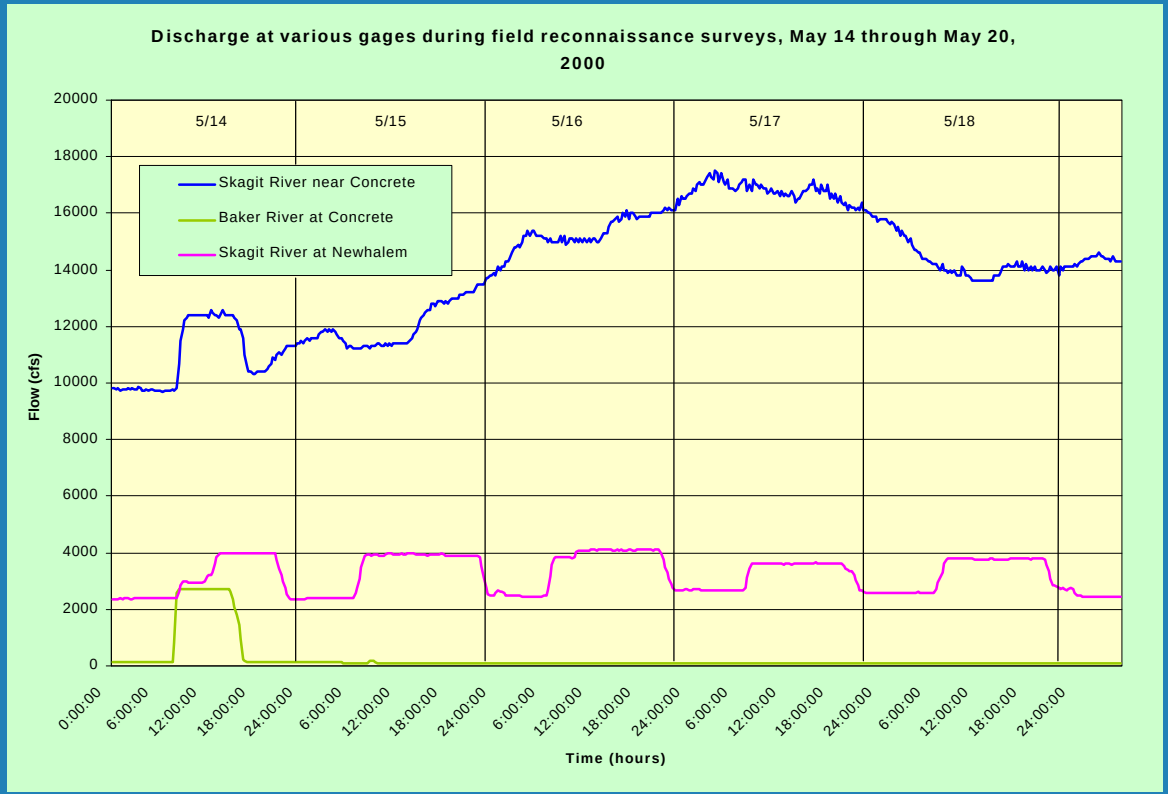
- Baker Project remained offline
- Rate of stage change
- Magnitude of stage change



Interactions

Tributary effects

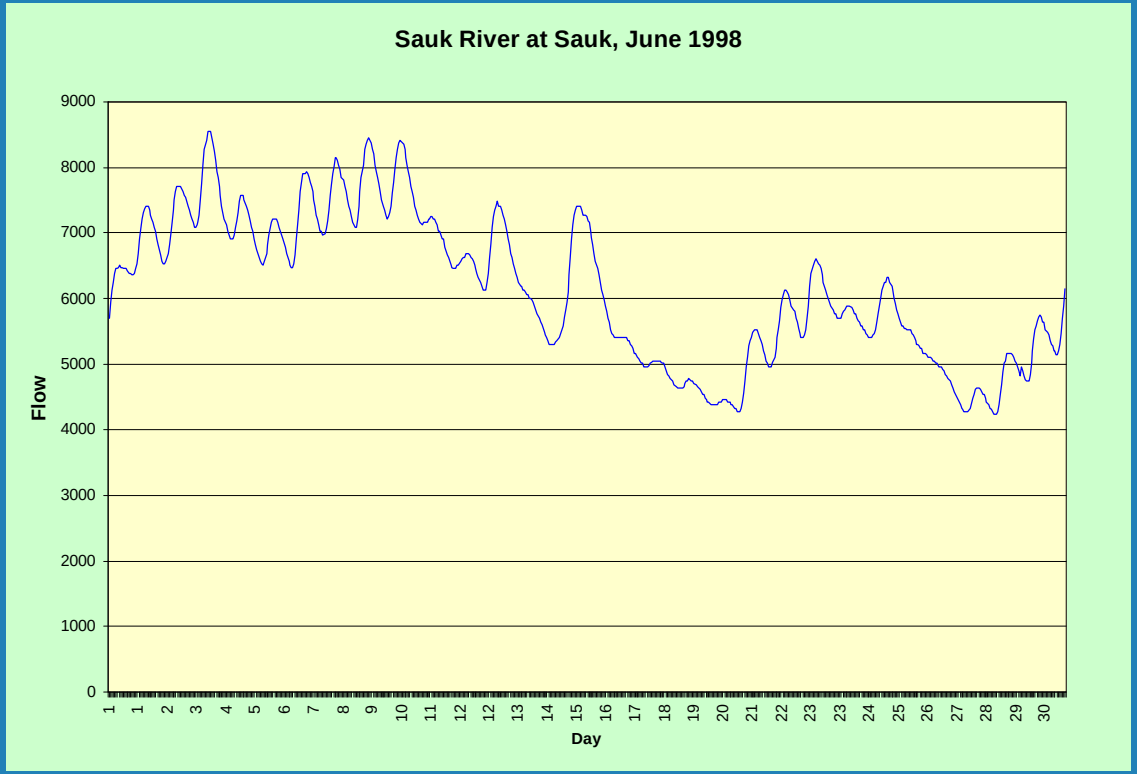
- Skagit River Project peaking
- Tributary inflow offsets impacts



Interactions

Tributary effects

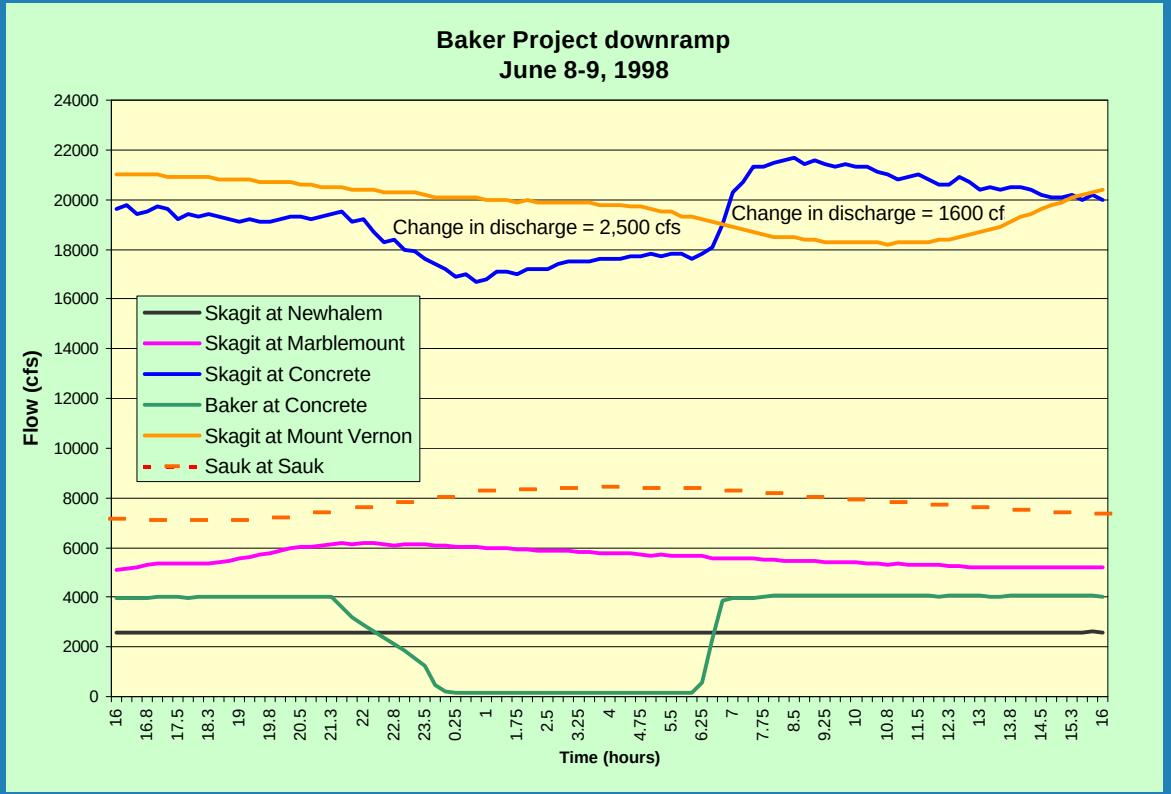
- Diurnal fluctuations as a result of spring snowmelt



Interactions

Tributary effects

- Tributary inflows partially offset Baker downramp



BAKER RIVER PROJECT RELICENSE

Economics/Operations Working Group

March 14, 2001

1:30 p.m. – 4:30 p.m.

PSE Office
Mount Vernon. WA

Team Leader: Lloyd Pernela (PSE), 425-462-3507; lperne@puget.com

PRESENT
Lloyd Pernela (PSE), Sue Madsen (R2 Resource Consultants), Stan Walsh (Skagit System Coop), Chris Drechsel (PSE), Bob Helton (Private Citizen), Jon Vanderheyden (U.S. Forest Service), Lyn Wiltse, facilitator (PDSA Consulting)

NEW/INCOMPLETE ACTION ITEMS
- Lloyd/Bob: Integrate hydrology group interests and issues with those of this group
- Lloyd: Get hard copies of Bob Barne's presentation to Bob Helton
- Chris: Reduce Emergency Action Plan map and give a copy to Lyn.
- Lloyd: Check FERC regulations of Emergency Action Plan as they pertain to this group
- Lyn: Check with Chris re: schedule

March 14, 2001 at PSE Office in Mt. Vernon, WA
1. Review/revise minutes and agenda
2. Emergency Action Plan (Chris Drechsel)
3. Presentation on Baker/Skagit flows (Sue Madsen of R2 Resource Consultants)
4. Fall/Winter Skagit River Flows (Lloyd Pernela)
5. Action items
6. List of discussion items (finish issues/interests)
7. Set agenda for April 11th meeting
6. Evaluate meeting

SKAGIT RIVER PSE and SCL RAMPING EFFECTS PRESENTATION

Sue Madsen of R2 Resource Consultants walked through a Power point presentation of the objectives, scope, and results of their investigation of hydropower operations in the lower Baker and Skagit rivers, Washington, 1996-1998. Hydrologic study investigated down ramp events on Skagit River: PSE Baker Project; interactions with Seattle City Lights operations; and effects of tributary inflows.

Sue Madsen reported on R2's investigation of three years Baker River and Skagit river gage data for six locations at 15-minute intervals. Focus was on downramp events [river stage decreased by more than 6-inches within one hour] and lag times [time difference between start of downramp event at upstream-most gage and the start of the downramp event at each downstream gage. Typical lag time from an event at Concrete to reach Mt Vernon gage was 7-8.5 hours. Typical lag time from an event at Newhalem to reach Concrete gage was 6.5 hours and to reach Mt. Vernon gage 14.2 hours. Other slides indicated event effects on magnitude, duration. Combinatorial effects of Skagit and Baker events with Tributary flows was also discussed.

A copy of the presentation will be available on Puget's Baker River relicensing website. Sue also distributed hard copies of the presentation.

PRESENTATION ON FALL/WINTER SKAGIT RIVER FLOWS

Lloyd Pernela distributed copies of newspaper articles from The Courier Times 3/7/2001; Seattle Post-Intelligencer 2/23/2001; and a Puget Sound Energy press release entitled Drought Threatens Puget Sound Energy's effort to Protect Skagit River Salmon. He presented graphs of cumulative precipitation from September thru January for the historical period 1966-2001 plotted against the 2000/1 season at Upper Baker Dam. It was only in mid-November that the region had the first indication that precipitation was not tracking with normal expectations. He walked the group through various scenarios of real time gage data from USGS gages on Skagit and Baker Rivers from Aug. 01 through Feb. 28th. He reviewed water levels for the Sauk, Skagit, and Baker Rivers, as well as Lake Shannon and Ross Reservoir. He also distributed the Lower Baker outage schedule. The outage at Baker began on March 8 and is scheduled to conclude mid July. He reported they expect to be at full pool by mid May.

Stan expressed appreciation for PSE's collaborative efforts in working to restore river levels since November. He also cautioned that there is a critical need for PSE to continue to work closely with tribes and agencies to reduce the likelihood that a de-watering event such as occurred in November is repeated in the future.

EMERGENCY ACTION PLAN (EAP)

Chris Drechsel presented an overview of Puget's current Emergency Action Plan for the Baker River Project. He distributed handouts to supplement his talk. The plan addresses requirements within the FERC Dam Safety Program and included periodic independent as well as FERC inspections and evaluations. The bulk of the plan deals with PSE's internal procedures in getting the word out to appropriate emergency response agencies when they uncover a problem. Another component of the plan is that it provides flood inundation maps. Chris posted the latest version of this map. The map assumes the worst case situation: a disintegration of Upper Baker Dam followed by a disintegration of Lower Baker Dam, at full pool, during a 100-year flood event. PSE is in the process of updating the maps and converting them into an electronic format.

Common EAP activities are: Annual review and update of the EAP; annual "telephone drill" involving all plan holders (local fire and police, county DEMs, FERC, Red Cross, PSE, etc.); annual training of Baker Project personnel; and "functional exercise" every 10 years.

ISSUES FOR THIS WORKING GROUP TO CONSIDER:

- ECONOMIC MODEL OF PROJECT OPERATIONS
- ECONOMICS OF STUDIES AS THEY RELATE TO ECONOMICS OF THE PROJECT
- ECONOMIC MODEL OF SUGGESTED SOLUTIONS OF WORKING GROUPS

PARKING LOT

- Forest Service Watershed Analysis
- Consider who will be the number cruncher for this team: PSE? Other?
- GANNT chart with due dates, etc.
- Presentations:
  - Wild and scenic river 101
  - Flood Plain Values 101
  - Fisheries/Hydraulics 102
  - Economic Model

EVALUATION OF THE MEETING:

Well-Dones:

- Sue Madsen's presentation
- Emergency Action Plan presentation
- Lloyd's update on Skagit River flows
- Good treats
- Getting better versed on the enormity of our issues
- Jon's presence

Need to Improve:

- Ran over
- New Team Leader was late

TENTATIVE AGENDA FOR NEXT MEETING

April 11, 2001 at PSE Office in Mt. Vernon, WA

1:30 to 4:30

1. Review/revise minutes and agenda
2. Action items
3. Overview of Charles Howard Model
4. Define scope of this Working Group
5. Set agenda for next meeting
6. Evaluate meeting