TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday July 07, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Dworshak summer operations.
   i. [Dworshak Outflows and Lower Granite Tailwater Temperatures in June-July (as of 7 July 2004 @ 0900 hrs)] (Corps)
   ii. [Clearwater River at Peck (1979, 1991, 1994 weather) and Lower Granite Dam (1979, 1991, 1994 weather)] (Kyle Martin)
   iii. Summer Dworshak Operations [SOR #2004-17]
   iv. [Dworshak Information] (Kyle Martin)
3. Zone 6 Treaty fishery.
4. Lower Granite Powerhouse outage August 16 - 19 daily 0700 - 1700 hours.
5. Montana SOR
   i. Libby & Hungry Horse Operations for July through September [SOR #2004-MT-2]
   ii. LIBBY (BiOp versus Montana Plan) - KOOTENAY LAKE (BiOp versus Montana Plan) - GRAND COULEE (BiOp versus Montana Plan) - PRIEST RAPIDS AND MCNARY (BiOp versus Montana Plan) - [Charts]
6. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality
      a. Spill Information
         i. [Average Daily Spill - June 21 - July 04, 2004]
         ii. [Exceedance Type - June 21 - July 04, 2004]
      b. Average percent TDG for 12 highest hours - [June 2004] [July 2004]
7. Other
   a. Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

AVERAGE DAILY SPILL

June 21 - July 4, 2004

		Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB-W	McNary FB-O	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	CCIW	WRNO TW	Camas FB
DATE		12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE	12 HR AVE
6/21/04	Avg Spill							37.8	37.8	72.2	72.2	72.2	78.2	78.2	81.8	81.8	99.2	99.2	99.2	99.2
6/21/04	% TDG							106.2	112.9	**116.4**	**117.2**	118.9	113.2	118.6	**116.8**	117.5	**116.3**	113.7	117.3	**117.3**
6/22/04	Avg Spill							44.6	44.6	67.2	67.2	67.2	58.5	58.5	72.8	72.8	68.7	68.7	68.7	68.7
6/22/04	% TDG							106.8	117.5	**117.5**	**115.8**	118.6	114.2	117.8	114.5	117.7	114.3	110.2	116.2	113.6
6/23/04	Avg Spill							42.9	42.9	31.9	31.9	31.9	62.0	62.0	72.9	72.9	50.7	50.7	50.7	50.7
6/23/04	% TDG							106.8	117.1	**115.1**	**117.9**	117.0	113.5	117.3	111.1	114.8	109.6	109.2	110.0	109.8
6/24/04	Avg Spill							45.1	45.1	0.0	0.0	0.0	49.6	49.6	53.7	53.7	50.3	50.3	50.3	50.3
6/24/04	% TDG							106.7	114.3	**116.4**	**121.3**	114.8	112.8	115.8	109.4	114.2	107.0	108.5	108.7	107.7
6/25/04	Avg Spill							41.2	41.2	0.0	0.0	0.0	51.5	51.5	65.8	65.8	50.4	50.4	50.4	50.4
6/25/04	% TDG							107.4	113.4	**spill stops**	**spill stops**	**spill stops**	110.9	115.8	107.9	113.3	105.4	108.7	108.3	108.3
6/26/04	Avg Spill							39.5	39.5				51.2	51.2	70.6	70.6	77.5	77.5	77.5	77.5
6/26/04	% TDG							106.8	116.4				109.0	115.5	107.5	113.1	105.7	112.7	110.1	108.1
6/27/04	Avg Spill							37.9	37.9				52.2	52.2	68.5	68.5	94.9	94.9	94.9	94.9
6/27/04	% TDG							106.4	115.7				107.2	115.8	107.4	112.9	106.6	114.0	113.6	110.8
6/28/04	Avg Spill							39.1	39.1				53.7	53.7	72.0	72.0	67.9	67.9	67.9	67.9
6/28/04	% TDG							107.6	114.3				107.0	116.1	108.9	113.7	107.9	111.5	114.7	112.5
6/29/04	Avg Spill							23.2	23.2				50.4	50.4	66.6	66.6	50.9	50.9	50.9	50.9
6/29/04	% TDG							109.0	112.3				107.3	116.0	108.8	113.6	108.3	109.0	109.3	109.0
6/30/04	Avg Spill							33.9	33.9				60.8	60.8	78.2	78.2	77.6	77.6	77.6	77.6
6/30/04	% TDG							108.2	115.7				106.9	117.3	108.2	114.6	107.6	112.6	109.9	108.5
7/1/04	Avg Spill							29.9	29.9				51.7	51.7	70.3	70.3	94.1	94.1	94.1	94.1
7/1/04	% TDG							107.9	116.6				106.6	116.7	107.7	114.6	107.5	114.3	114.2	111.6
7/2/04	Avg Spill							34.3	34.3				52.4	52.4	69.4	69.4	70.0	70.0	70.0	70.0
7/2/04	% TDG							106.4	113.7				106.0	115.1	106.8	113.5	107.0	112.1	112.9	111.4
7/3/04	Avg Spill							39.3	39.3				39.0	39.0	51.9	51.9	50.9	50.9	50.9	50.9
7/3/04	% TDG							106.4	113.0				105.6	114.8	106.3	113.1	106.7	108.9	110.5	108.0
7/4/04	Avg Spill							32.6	32.6				44.9	44.9	59.5	59.5	76.6	76.6	76.6	76.6
7/4/04	% TDG							105.2	115.4				104.5	115.1	105.1	112.4	105.5	112.9	110.8	108.4
Avg Spill		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**107.0**	**114.9**	**116.4**	**118.1**	**117.3**	**108.9**	**116.3**	**109.0**	**114.2**	**108.2**	**111.3**	**111.9**	**110.4**

EXCEEDANCE TYPES
June 21 – July 4, 2004

According to the Washington Department of Ecology TDG variance for 2004 spill season, the Corps is required to provided the following information on exceedances of the 120% TDG in tailwater and 115% TDG in forebay water quality standards:

1. Date and times of exceedance
2. Amount of exceedance in percent saturation
3. Explain reason for exceedance
4. Discuss steps taken to fix the problem.

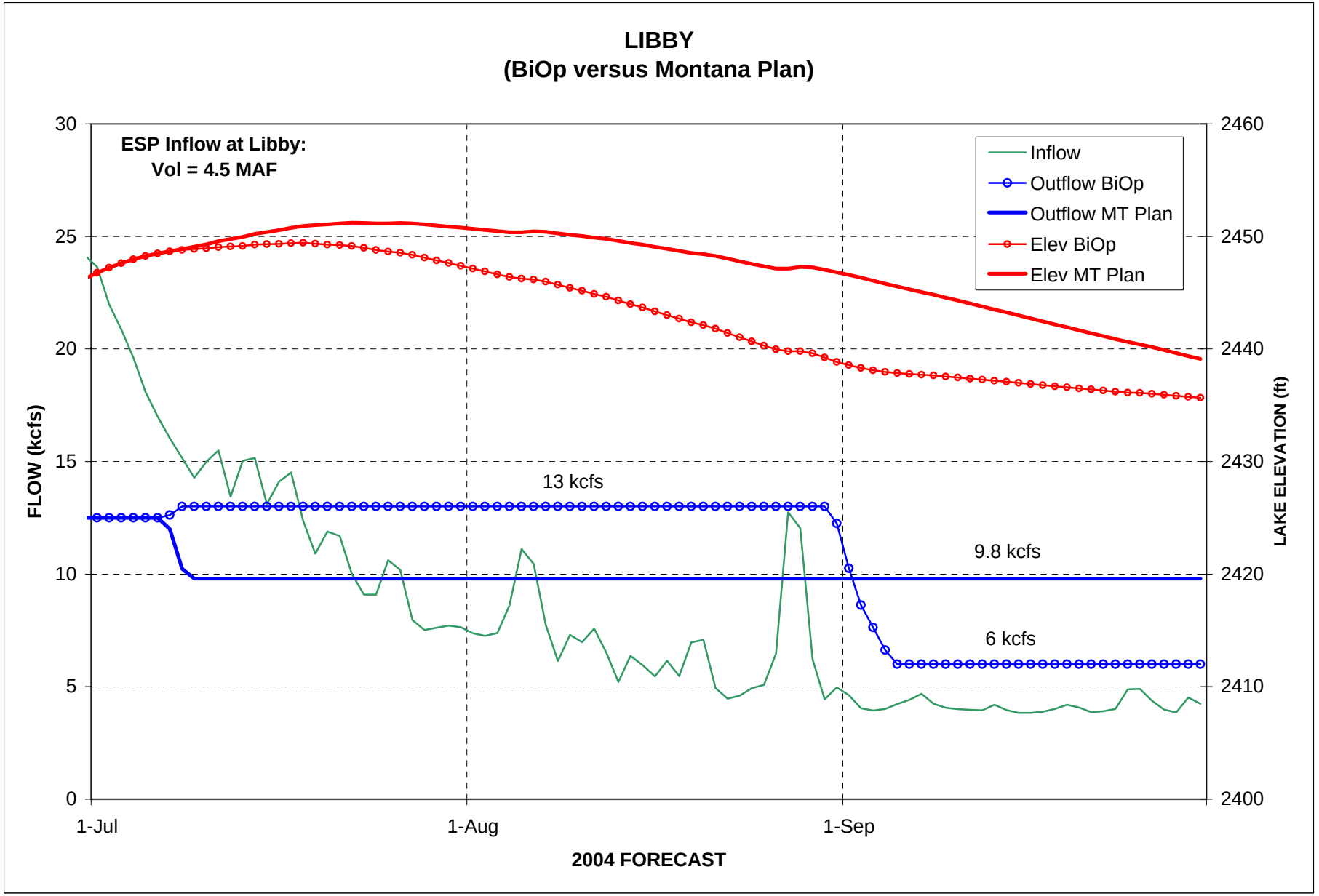
In order to provide the above information, the Corps has developed the following draft list of reasons that exceedances occur.

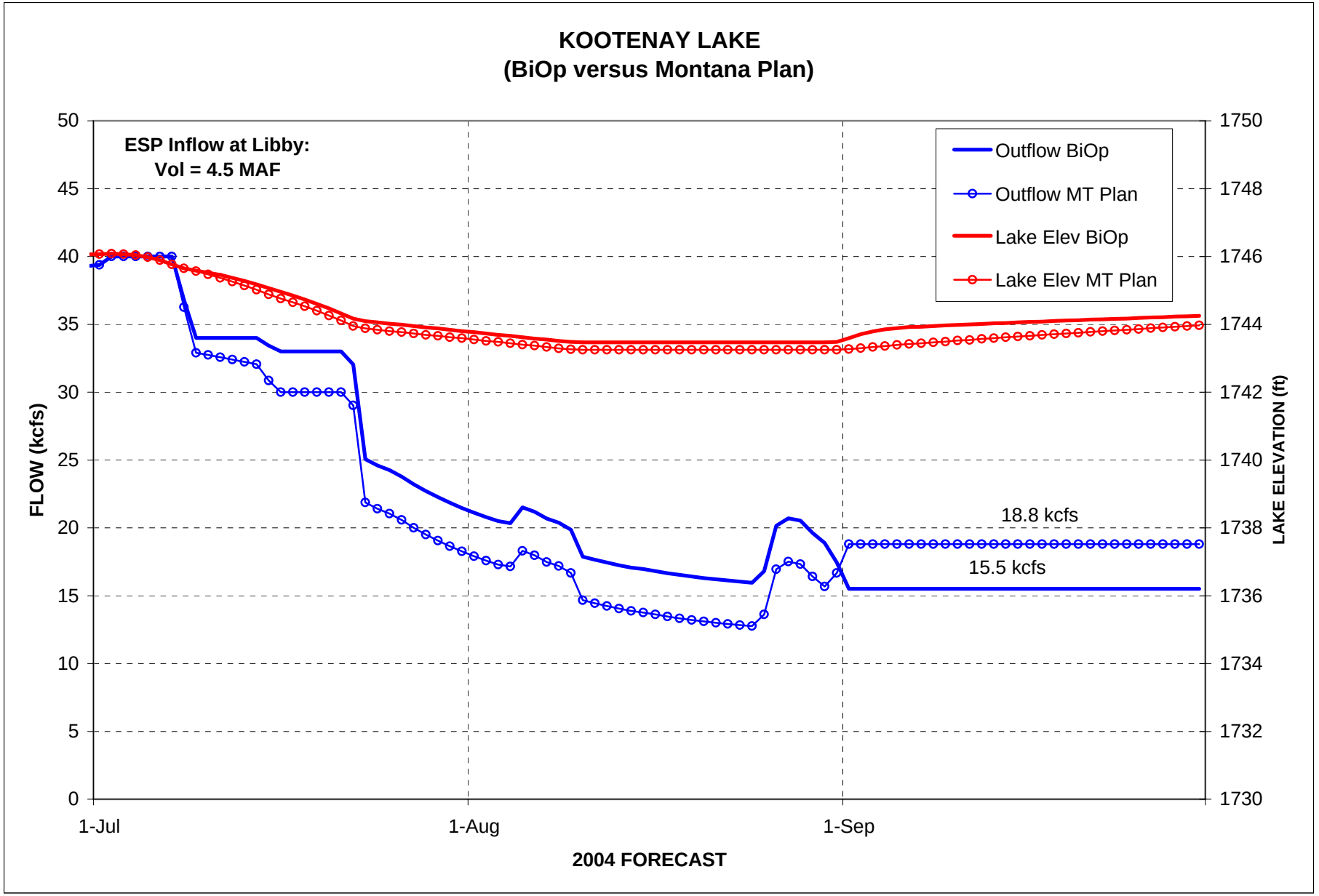
TDG EXCEEDANCE TRACKING
Types of Exceedances:
1. Exceedance due to high runoff flows and flood control efforts
2. Exceedance due to Intertie line outages
3. Exceedance due to unit outages during repair or maintenance
4. Exceedance due to BPA is unable to handle load so they had to spill
5. Exceedance due to a break down in communication. (e.g. Teletype transmission failure or project operator misinterpreted teletype)
6. Exceedance due to uncertainties when using best professional judgment to apply the spill guidance criteria (travel time; degassing; water temperature effects; spill patterns)
7. Exceedance due to high TDG levels coming from the Mid-Columbia Projects (see Pasco FMS readings).
8. Exceedance due to high TDG levels coming from the Snake Projects (See Ice Harbor Dam tailwater FMS readings)
9. Exceedance due to a load rejection, the powerhouse was not working and the river was spilled.
10. Exceedance due to failure of FMS gages, database outage, and satellite failures, etc
11. Exceedance due to other unanticipated mechanical problems/maintenance operations (gate was stuck open, passing debris etc.)
12. Exceedance due to sharp rise in water temperature (a 3 to 5 degree F. change in a day).
13. Exceedance due to bulk spill pattern being used which generated more TDG than expected.

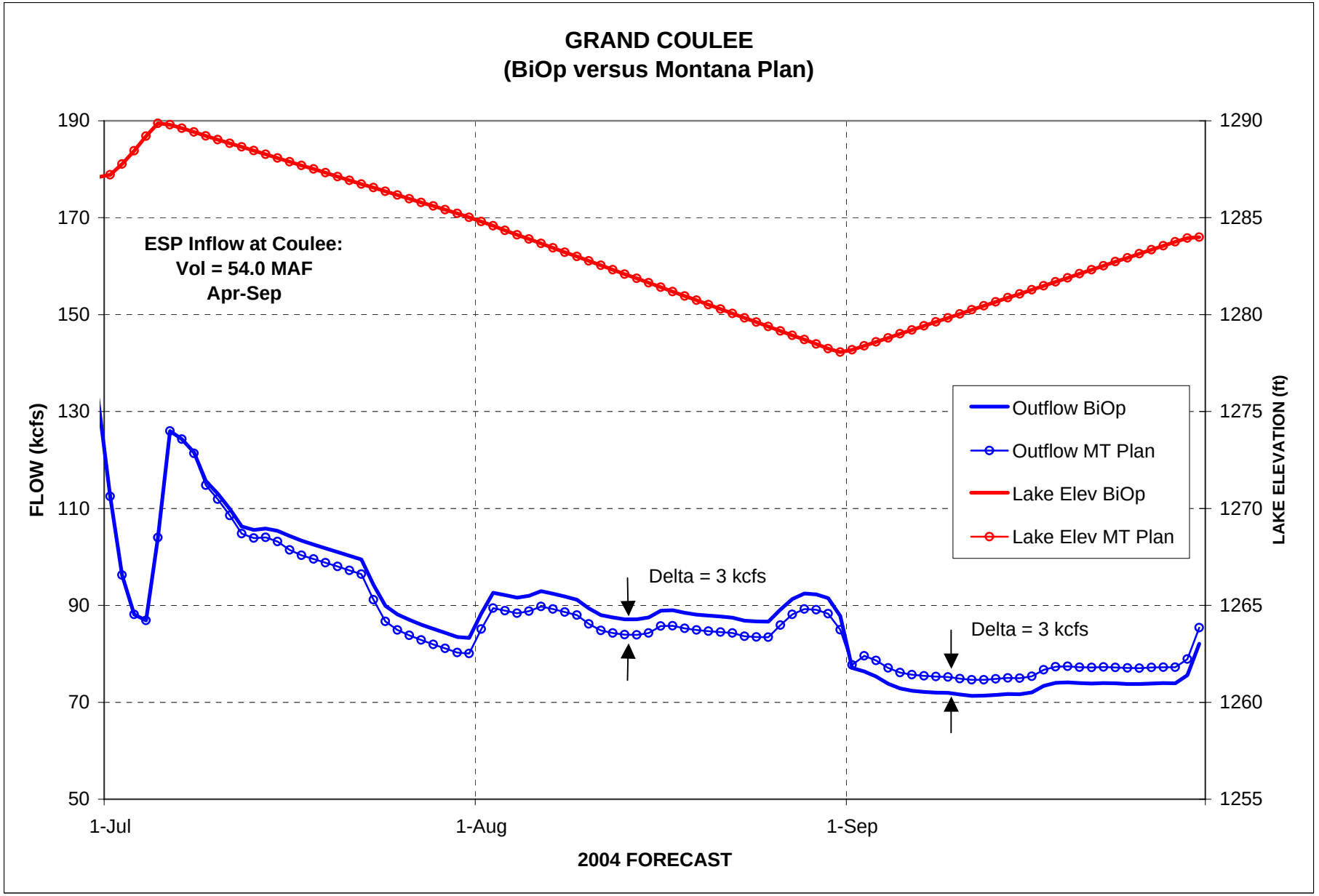
Exceedances are being tracked and the following table is the results for the 2004 spill season from June 21 to July 4, 2004.

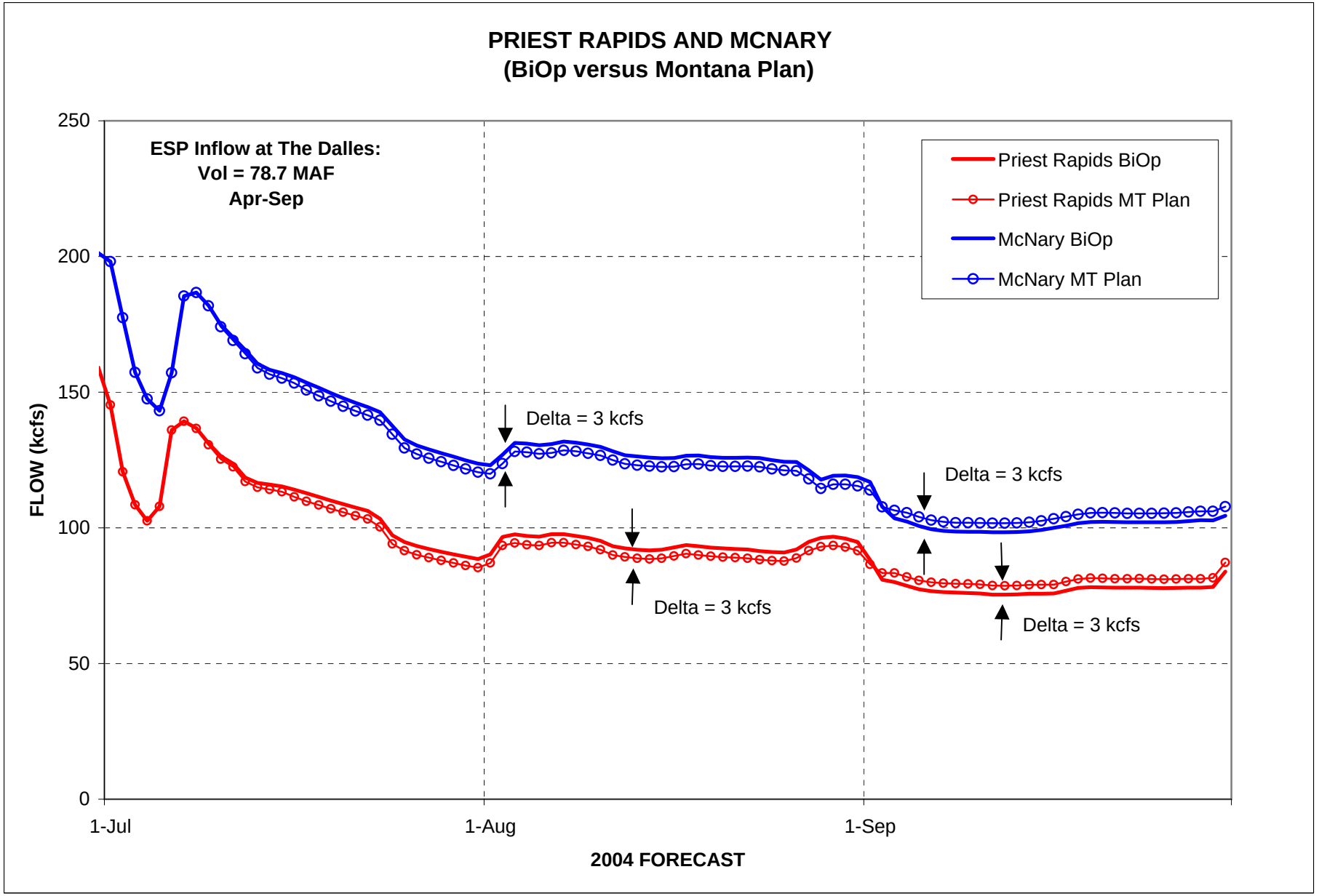
TYPES OF EXCEEDANCES FOR AVERAGE % TDG FOR 12 HIGHEST HOURS
June 21 - July 4, 2004

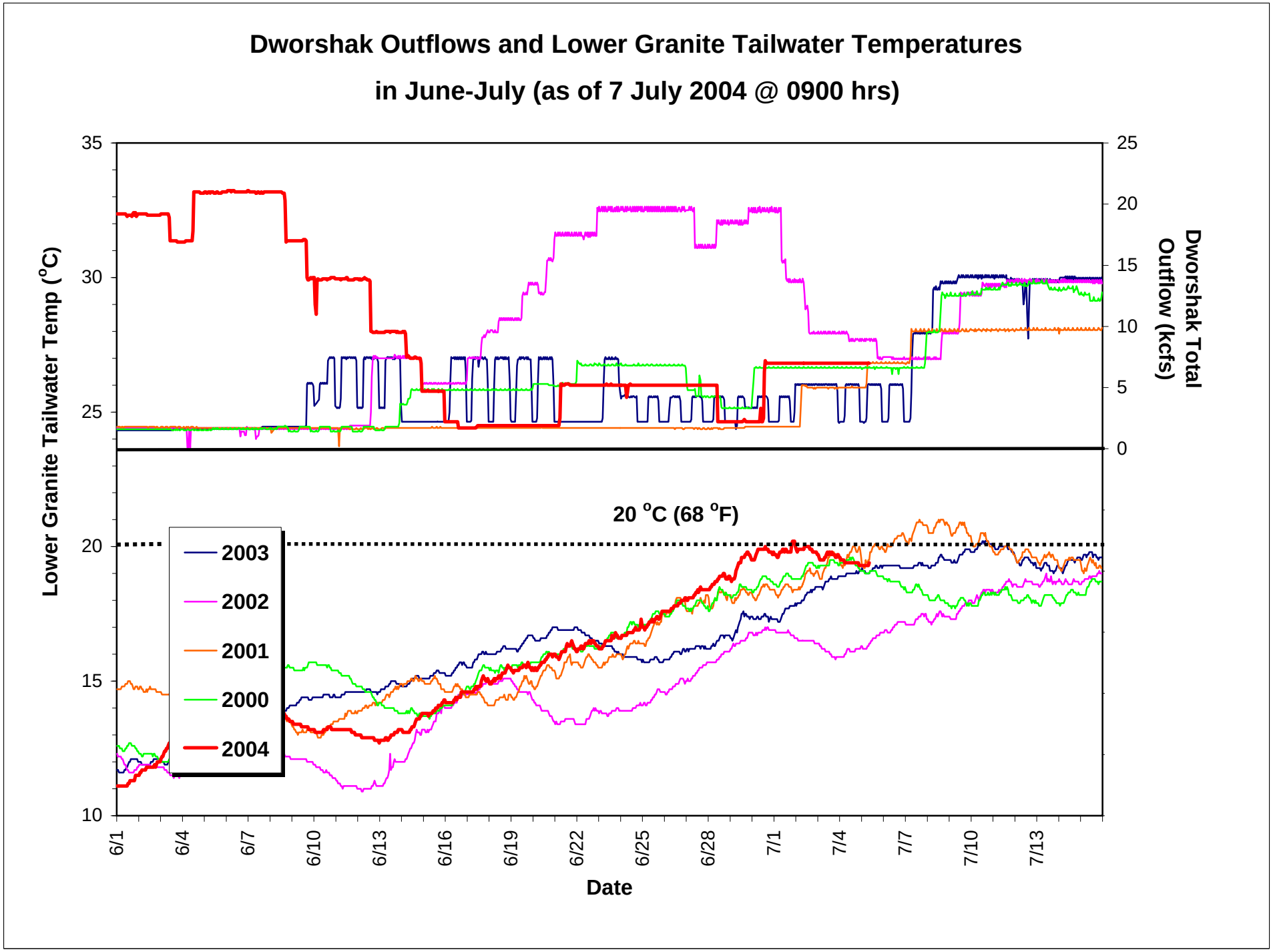
	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB-W	McNary FB-O	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	CCIW	WRNO TW	Camas FB
DATE	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type
6/21/04							---	---	**12**	**12**	---	---	---	**6**	---	**6**	---	---	**12**
6/22/04							---	---	**12**	**12**	---	---	---	---	---	---	---	---	---
6/23/04							---	---	**12**	**12**	---	---	---	---	---	---	---	---	---
6/24/04							---	---	**12/7**	**12**	---	---	---	---	---	---	---	---	---
6/25/04							---	---			---	---	---	---	---	---	---	---	---
6/26/04							---	---			---	---	---	---	---	---	---	---	---
6/27/04							---	---			---	---	---	---	---	---	---	---	---
6/28/04							---	---			---	---	---	---	---	---	---	---	---
6/29/04							---	---			---	---	---	---	---	---	---	---	---
6/30/04							---	---			---	---	---	---	---	---	---	---	---
7/1/04							---	---			---	---	---	---	---	---	---	---	---
7/2/04							---	---			---	---	---	---	---	---	---	---	---
7/3/04							---	---			---	---	---	---	---	---	---	---	---
7/4/04							---	---			---	---	---	---	---	---	---	---	---
Total Exceed	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**1**

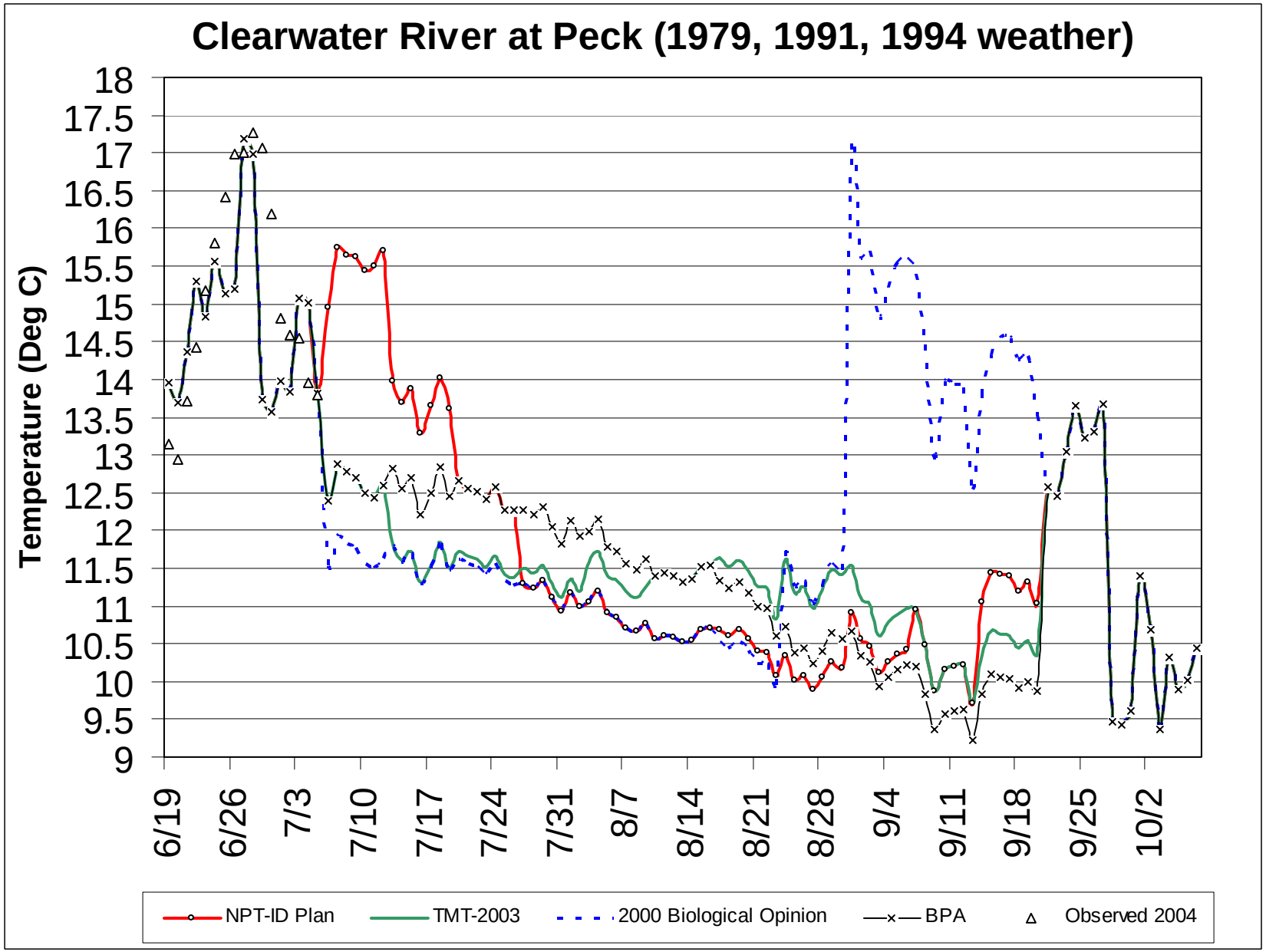

LIBBY
(BiOp versus Montana Plan)
ESP Inflow at Libby:
Vol = 4.5 MAF
Inflow
Outflow BiOp
Outflow MT Plan
Elev BiOp
Elev MT Plan
13 kcfs
9.8 kcfs
6 kcfs
FLOW (kcfs)
LAKE ELEVATION (ft)
30
25
20
15
10
5
0
2460
2450
2440
2430
2420
2410
2400
1-Jul
1-Aug
1-Sep
2004 FORECAST

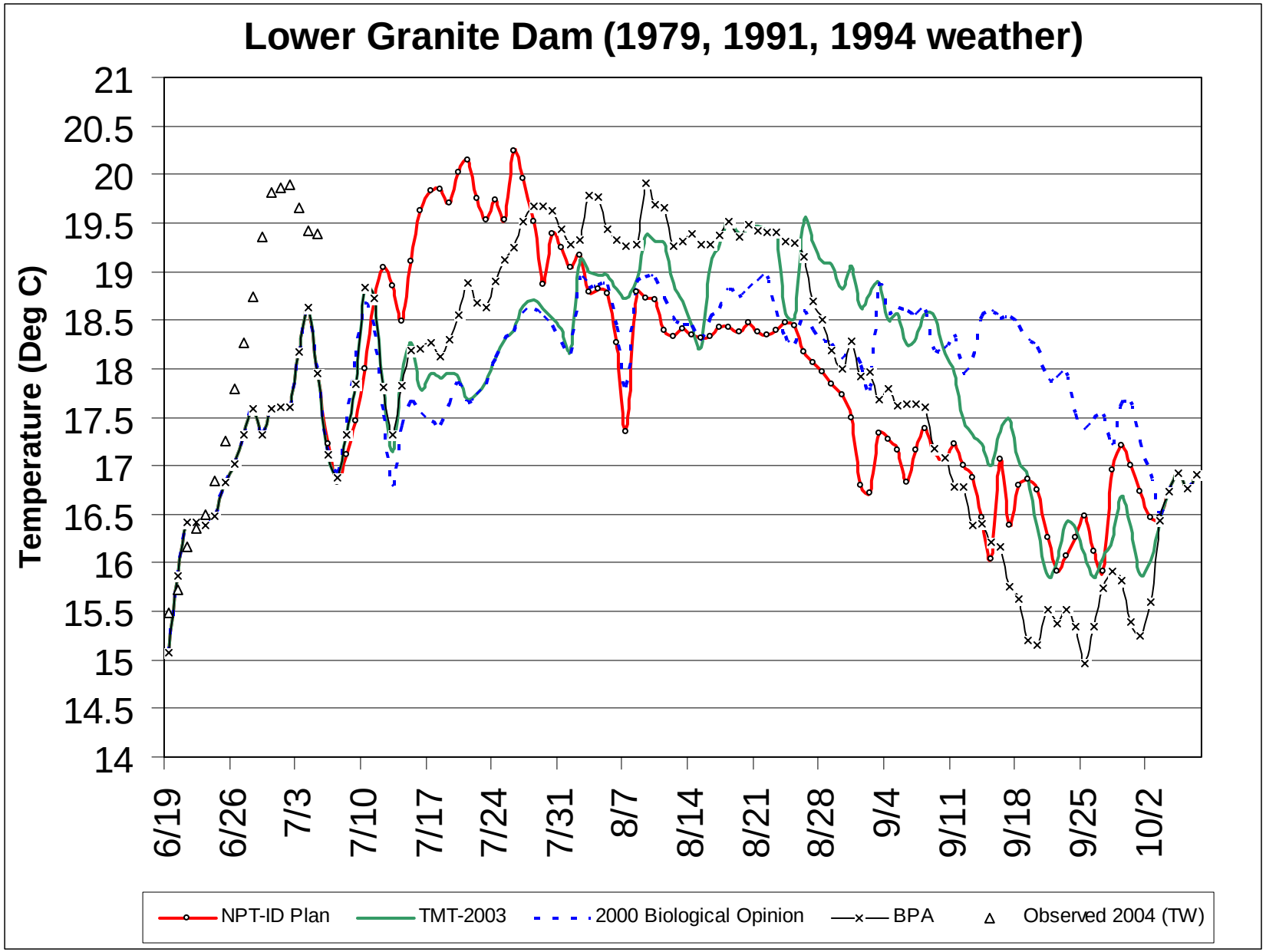

KOOTENAY LAKE
(BiOp versus Montana Plan)
ESP Inflow at Libby:
Vol = 4.5 MAF
Outflow BiOp
Outflow MT Plan
Lake Elev BiOp
Lake Elev MT Plan
18.8 kcfs
15.5 kcfs
FLOW (kcfs)
LAKE ELEVATION (ft)
50
45
40
35
30
25
20
15
10
5
0
1750
1748
1746
1744
1742
1740
1738
1736
1734
1732
1730
1-Jul
1-Aug
1-Sep
2004 FORECAST


GRAND COULEE
(BiOp versus Montana Plan)
ESP Inflow at Coulee:
Vol = 54.0 MAF
Apr-Sep
Outflow BiOp
Outflow MT Plan
Lake Elev BiOp
Lake Elev MT Plan
Delta = 3 kcfs
Delta = 3 kcfs
FLOW (kcfs)
LAKE ELEVATION (ft)
190
170
150
130
110
90
70
50
1290
1285
1280
1275
1270
1265
1260
1255
1-Jul
1-Aug
1-Sep
2004 FORECAST


PRIEST RAPIDS AND MCNARY
(BiOp versus Montana Plan)
ESP Inflow at The Dalles:
Vol = 78.7 MAF
Apr-Sep
Priest Rapids BiOp
Priest Rapids MT Plan
McNary BiOp
McNary MT Plan
Delta = 3 kcfs
Delta = 3 kcfs
Delta = 3 kcfs
Delta = 3 kcfs
FLOW (kcfs)
250
200
150
100
50
0
1-Jul
1-Aug
1-Sep
2004 FORECAST


Dworshak Outflows and Lower Granite Tailwater Temperatures
in June-July (as of 7 July 2004 @ 0900 hrs)
Lower Granite Tailwater Temp (°C)
Dworshak Total Outflow (kcfs)
35
30
25
20
15
10
25
20
15
10
5
0
20 °C (68 °F)
2003
2002
2001
2000
2004
6/1
6/4
6/7
6/10
6/13
6/16
6/19
6/22
6/25
6/28
7/1
7/4
7/7
7/10
7/13
Date


Clearwater River at Peck (1979, 1991, 1994 weather)
Temperature (Deg C)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
NPT-ID Plan
TMT-2003
2000 Biological Opinion
BPA
Observed 2004

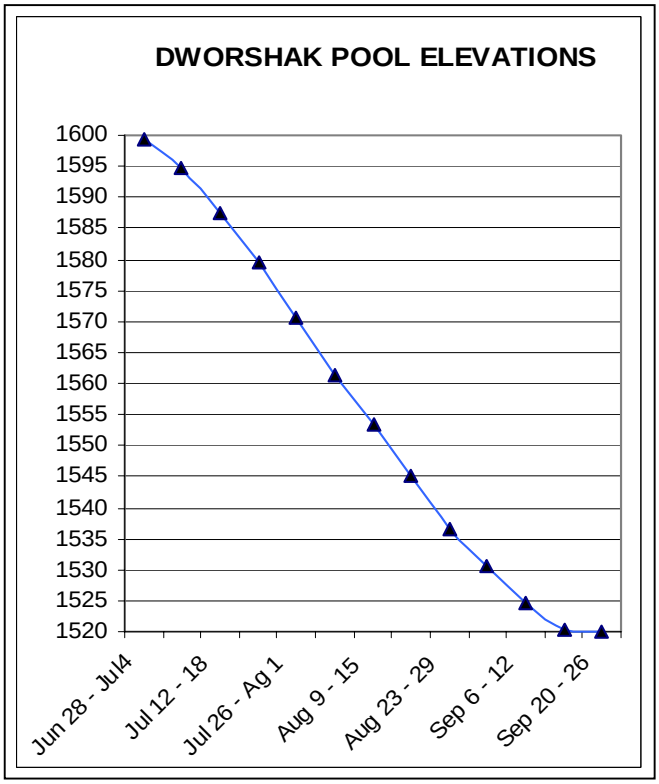

Lower Granite Dam (1979, 1991, 1994 weather)
Temperature (Deg C)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
15.5
15
14.5
14
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
NPT-ID Plan
TMT-2003
2000 Biological Opinion
BPA
Observed 2004 (TW)

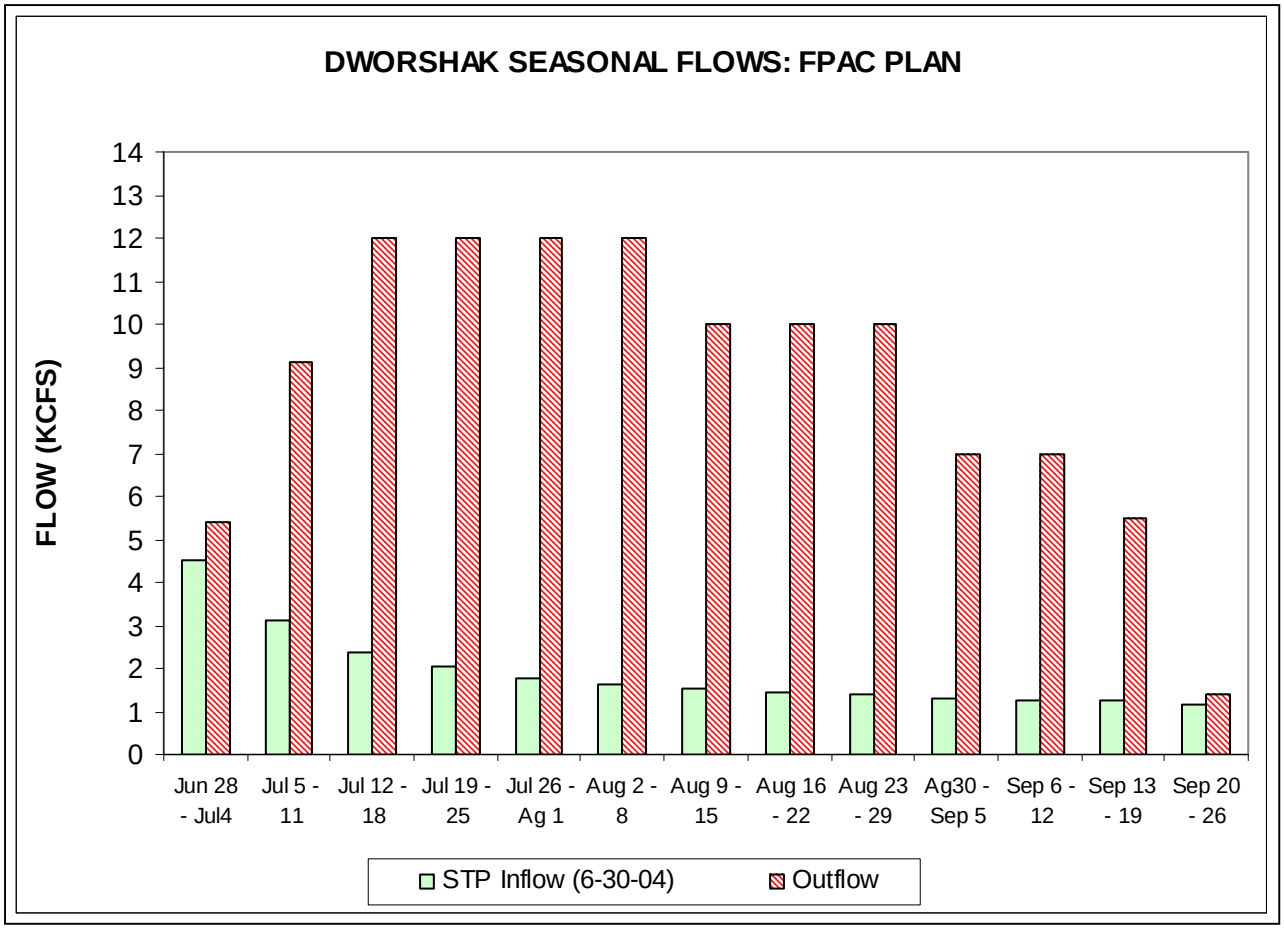
N.F. Clearwater at Dworshak (DWR)

06-Jul-04 **WY 2004 SUMMER**	Outflow (FPAC) (kcfs)	STP Inflow (6-30-04) (NWRFC) (kcfs)	Storage (KaF)	DWR Pool Elevation (feet) end-of week:
Jun 27th		Forecast:		1600.0
Jun 28 - Jul4	5.4	4.5	2003	1599.3
Jul 5 - 11	9.1	3.1	1919	1594.8
Jul 12 - 18	12.0	2.4	1786	1587.4
Jul 19 - 25	12.0	2.0	1648	1579.4
Jul 26 - Ag 1	12.0	1.8	1506	1570.7
Aug 2 - 8	12.0	1.6	1362	1561.3
Aug 9 - 15	10.0	1.5	1244	1553.3
Aug 16 - 22	10.0	1.5	1126	1545.0
Aug 23 - 29	10.0	1.4	1006	1536.4
Ag30 -Sep 5	7.0	1.3	927	1530.6
Sep 6 - 12	7.0	1.3	848	1524.7
Sep 13 - 19	5.5	1.2	789	1520.2
Sep 20 - 26	1.4	1.2	786	1520.0
Total (KaF):	1,574	345		

CRITFC Hydro Program

FPAC Plan





TECHNICAL MANAGEMENT TEAM
MEETING NOTES
July 7, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Robin Harkless

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Dworshak Operations:
SOR 2004-17: The salmon managers met yesterday to discuss summer operations while looking at existing information, models, etc. There was a consensus between the states, tribes, NOAA, and USFWS to recommend the following operation: Maintain current flows until July 12th. Then ramp up to 12 kcfs through August 8th; on August 9th ramp down to 10 kcfs through August 31st. Target an elevation of 1535' at the end of August and 230 kaf remaining water for September. Maintain no greater than 68° in the tailwater – the salmon managers want to maintain this temperature so support adjusting flows as necessary.

The COE provided information as attachments to the agenda. Flows increased slightly over the weekend which decreased the temperature at Dworshak. CRITFC also provided graphs to show what the requested operation might look like.

The salmon managers clarified their overall objective: to use the specified flows to meet desired temperatures and reach elevation 1535' by the end of August. (Flows may need to be adjusted to accommodate temperature needs.) It was also clarified that the requested 10 kcfs is full powerhouse, which is slightly below 10 kcfs at the project.

The COE congratulated everyone that signed on to the SOR for reaching a consensus on their recommendation. The COE will begin to ramp up flows to 12 kcfs on July 12th and target 45° -- no lower than 45°. They will continue to monitor the pool elevation. If conditions warrant a change to the recommended operations, the COE will send an email notification to TMT. TMT will check in on Dworshak operations at their next meeting.

Zone 6 Treaty Fishery:
Kyle Martin, CRITFC, reported that the tribes are expecting to gather information with fish counts later this week. If need be, Kyle will coordinate with Cindy Henriksen about a treaty fishery for this week, and Cindy will forward the information to TMT. TMT will check in on this issue at the next TMT meeting.

Lower Granite Powerhouse Outage:
Cindy Henriksen reminded the group that there will be a powerhouse outage at Lower Granite August 16th-19th for doble testing. One unit will be operated at speed/ no load; spill will occur over the spillway to meet powerhouse minimums during the daytime only. Cindy asked TMT to

consider: If the total river flow is greater than 40 kcfs in the Snake River, should the COE operate outside MOP? And, should the COE use the RSW for spill if necessary? TMT will consider these two questions and discuss them further at a future TMT meeting. The issue will remain on the agenda as a placeholder for discussion and decision prior to the outage.

Montana SOR 2004-MT-2:
Jim Litchfield, Montana, described the objective of SOR-MT-2, regarding Hungry Horse and Libby summer operations: to improve the aquatic environment in Montana through stable flows. This operation was first recommended by the Northwest Power and Conservation Council (NPCC) in 2003.

The specifications for operations under the Montana recommendation are as follows:

- Provide stable flows at Libby to reach elevation 2439' by the end of September. (The priority is elevation). Based on models, flows would be a weekly average of 10 kcfs.
- Due to maintenance this year, draft Hungry Horse more aggressively in July and August, and reach elevation 3545' by the end of August, which equals about 4.4 kcfs weekly average flows for the month. Reach elevation 3540' by the end of September, which equals September weekly average flows of about 2.3 kcfs. Provide stable flows at Hungry Horse.
- Maintain minimum flows for bull trout.
- COE and BPA should continue to pursue and reach agreement with Canada for a flow swap.
- Limit Grand Coulee elevation to 1284' (plus/minus 1') by the end of September.

Other information/comments:

- Montana noted that they are trying to balance river impacts with reservoir impacts given this year's conditions.
- Graphs were provided to show the Montana recommendation and the BiOp base case for summer water usage. The graphs show about a 3 kcfs difference between the two operations.
- Jim Litchfield reiterated that a swap must occur in July to provide a benefit to Canada, so the issue is timely.
- **ACTION**: CRITFC requested that Montana provide references relative to the information provided in the SOR.
- How would Montana monitor the changed operation to show effects on survival? Brian Marotz, Montana Fish, Wildlife and Parks, offered that a plan for doing this has been presented and given a favorable review from the ISRP, with some suggestions to improve the study. Montana believes this study could provide useful information.
- **ACTION**: Paul Wagner, NOAA, commented that some quotes in the SOR from the ISAB report are taken out of context. Jim Litchfield will check on this.
- **ACTION**: Paul Wagner will forward new data from the NOAA Science Center (which will be included in a final tech memo on effects of the FCRPS on survival) relative to the SOR.
- Oregon expressed concern for the loss of flow in July and August and shifting water into September. It will be a challenge to meet the needs of resident fish and to maintain flows, and Oregon suggested that TMT look for offsets and be creative in looking for alternative water sources.

After a break, TMT members offered a response to Montana's proposed operation:

USFWS: Cannot sign on to a 3-year study design at this point without knowing what type of information will come out; right now on track to meet current BiOp. If the COE is willing to implement SOR 2004-MT-2, the USFWS is prepared to object and raise the issue to IT.
NOAA: The salmon are at a critical point and in steady decline. Flow objectives are critical to salmon survival. This SOR goes against flow objectives specified in the BiOp. The benefits to downstream stocks vs. risks to upstream stocks are unknown without a study, which will be difficult to conduct. Until a policy decision is made on this issue, NOAA supports maintaining the current program for summer operations at Libby and Hungry Horse.
Oregon: Supports Montana's objectives but has concerns with the impacts on salmon – without a viable alternative to offset lower flows, Oregon cannot support this SOR. Oregon recommends that the region continue to explore alternative water sources.
Idaho: Shares concerns with the USFWS on a multi-year experiment – has not seen the modified study plan so it is difficult to support or not support. Also, funding has not yet been approved. Supports BiOp objectives and doing the evaluation but at this point, does not have the technical basis for supporting Montana's SOR.
BOR: Open to any suggestions for changes. At this point, supports the NOAA and USFWS recommendation – adhere to the BiOp target of 3540' by the end of August.
BPA: Neutral on this position and will support the TMT recommendation.
COE: Because there is no consensus by the TMT for operations, the COE does not have an operation to implement.

NOAA expressed appreciation for Montana's effort in the SOR to strike a balance for all needs. TMT, with no consensus, elevated the issue to IT. The USFWS agreed to raise the issue, and TMT members developed the following policy questions for the IT to consider:

"Shall the action agencies begin implementation of the Council's Mainstem Recommendations for Libby and Hungry Horse, as requested in Montana's SOR 2004 MT-2? Montana has proposed reducing lower Columbia River flows by approximately 4 Kcfs during the months of July and August, moving a portion of the Libby and Hungry Horse flow augmentation volumes designated by the BiOp for use during the summer season into September. Should this operation be implemented under the adaptive management provisions of the BiOp, and do the proposed research and resident fish benefits balance the potential risks (and benefits) to salmon in the lower river? Are there alternative sources of water that could offset the proposed reduction in lower river flow, given 2004 environmental and flow conditions?"

UPDATE: The IT met on Thursday, July 8th to discuss the policy questions elevated from TMT. The IT was unable to reach consensus on the issue, so a Regional Executives call was scheduled for Monday, July 12th at 10:00 am.

Status of Operations:
Reservoirs: Libby is at elevation 2448' and filling. Outflows are at 12.5 kcfs. Hungry Horse is at elevation 3559.2' and slowly drafting. Grand Coulee is at elevation 1288.8', and is also drafting. Brownlee is about 1' from full. Dworshak outflows were at 7 kcfs last week. The project is now operating at full powerhouse out, 3' from full, and drafting about half a foot/day. Priest Rapids seasonal flows were 126 kcfs, and 202 kcfs at McNary.

Fish status: Subyearlings are still migrating. Numbers have decreased at McNary to about 170,000 per day. Adult numbers are progressing at Bonneville; high numbers are expected this year. Ron Boyce, Oregon, reported on observed fish at Bonneville: 71,000 summer chinook; 113,000 sockeye; 27,500 steelhead, and record numbers of chad. Oregon will provide adult numbers on the TMT web page.

Next Meeting, Wednesday, July 21st, 9am-noon:
Agenda Items:

- Dworshak Summer Operations
- Zone 6 Treaty Fishery Update
- Lower Granite Powerhouse Outage
- Libby/Hungry Horse Operations

1. Greeting and Introductions

The July 7 Technical Management Team meeting was chaired by Cindy Henriksen of the Corps and facilitated by Robin Harkless. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Henriksen at 503/808-3945.

2. Dworshak Summer Operations.

On July 6, the action agencies received SOR 2004-17. This SOR, supported by USFWS, IDFG, ODFW, WDFW, NOAA Fisheries, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC, requests the following specific operations:

- Maintain outflows at Dworshak of 10 Kcfs (or near powerhouse flows) through July 11. On July 12, increase outflows to 12 Kcfs and maintain through August 8. On August 9, decrease flows to 10 Kcfs and maintain through August 31. Draft to elevation 1535 by August 31 and maintain approximately 200 kaf of Dworshak storage water for early September flow and temperature augmentation. All recommended outflows should target 45 degrees F and are contingent upon maintaining temperature below 68 degrees F in the Lower Granite tailwater.

David Wills provided an overview of the SOR, the full text of which is available via hotlink from today's agenda on the TMT homepage. He noted that all of the salmon managers were able to reach consensus on this operation.

Henriksen distributed a graph showing Dworshak outflows and Lower Granite tailwater temperatures through July 6; she noted that Dworshak outflow was increased to 7 Kcfs and temperature reduced to 45 degrees through the weekend, and water temperatures in the Lower Granite tailwater have decreased somewhat in response. In response to a question from Henriksen, Wills said the overall target of this SOR is to use the available water to keep Lower Granite tailwater temperatures below 68 degrees F while ending August at elevation 1535. If we get into very hot weather, and water temperatures begin to exceed that threshold, we will come back to TMT with further recommendations, said Wills.

Would it be OK to end August at, say, elevation 1537, if temperatures are somewhat lower than expected? asked Scott Bettin. If we miss 1535 by a foot or two either way, that would not be unreasonable, replied Dave Statler – again, we will likely adjust this operation through the season based on actual water supply and temperature conditions. Bettin said BPA would prefer to run full powerhouse capacity and avoid spill at Dworshak for as long as possible, with the understanding that elevation 1535 might be achieved a few days later than August 31. We want to make sure we have enough flow from Dworshak to keep Lower Granite tailwater temperatures below 68 degrees, Will replied - again, we'll look at the model runs and monitor the temperature situation, and will adjust the operation through August.

The Corps applauds the salmon managers' efforts to achieve consensus on this operation, said Henriksen; Dworshak is already releasing full powerhouse capacity. On July 12, we will increase Dworshak outflow to 12 Kcfs, and will continue to monitor both the Dworshak pool elevation and temperatures in the Lower Granite tailwater. If we see any significant departures from the expected inflows at Dworshak, we'll notify the TMT, said Henriksen.

If air temperatures continue to be moderate, do you still want to increase Dworshak outflow to 12 Kcfs on July 12? Jim Litchfield asked. My forecast shows moderate temperatures over the short term, but a warming trend as we head deeper into July, said Kyle Martin. The objective is to stay ahead of the curve, added Paul Wagner. Bettin thanked the salmon managers for bringing this SOR together in a timely fashion. It was agreed to revisit this topic at the next TMT meeting.

3. Zone 6 Treaty Fishery.

Martin said the tribes are still gathering their harvest data, and should know by later today whether or not another treaty fishery will take place on 2004. Once they review that operation, they will make a decision as to whether or not another fishery will be possible, said Martin. He said he will let the Corps know what CRITFC decides; Henriksen said she will then forward that information to TMT.

4. Lower Granite Powerhouse Outage.

Henriksen said that, from August 16-19, the Lower Granite powerhouse will be out of service for Doble testing from 7 a.m. to 5 p.m. One unit will run at speed-no-load and an additional 6 Kcfs will be spilled to achieve the minimum flow of 11.5 Kcfs through the Lower Snake. If total river flow is greater than 40 Kcfs, we may need to fill Lower Granite pool above MOP +1, and generate that water out by night, she said. Generally flow is low enough during August that this is not a problem, but it's just a heads-up. Bettin asked whether the salmon managers want to use the RSW during this test. Wagner said he doesn't see a lot of downside to RSW operation; he said FPAC and TMT will discuss that option and will make a recommendation to the action agencies.

In response to a request from Boyce, Rudd Turner said he will forward some written information to the TMT membership showing the coordination that had taken place previously in the year on this operation. And again, said Henriksen, the two questions for TMT to consider are, should the Corps pond above MOP +1 if total river flow is greater than 40 Kcfs, and should the 6 Kcfs of spill go through the RSW or the spillway. It was agreed to revisit this topic at the next TMT meeting.

5. Montana SOR.

On July 7, the action agencies submitted SOR 2004 MT-2. This SOR, supported by Montana Fish, Wildlife and Parks, requests the following specific operations:

- Implement the Northwest power Planning Council's Mainstem Recommendations for operation of Libby and Hungry Horse dams and evaluate the resulting physical and biological changes in water quality and the effects on the aquatic environment in Montana and in the Lower Columbia River from McNary to below Bonneville Dam. Because this water year falls into the lowest 20th percentile, the Council recommends drafting both Libby and Hungry Horse to an elevation that is 20 feet from full by the end of September using a flat weekly flow adjusted as actual inflows change. The following specific operations are recommended:
- Establish a stable flow objective for Libby Dam that is expected to draft the reservoir to elevation 2439 by the end of September.
- Based on the latest COE models this flow objective is approximately 10 Kcfs.
- Adjust Libby's weekly flow objectives as necessary so that Libby drafts to elevation 2439 by the end of September. It is preferred that weekly average outflows are held as flat as possible, or, if necessary, are reduced gradually from July through September.
- Establish a stable weekly average outflow objective at Hungry Horse dam that

will result in drafting Hungry Horse to elevation 3545 by August 31. This elevation is the maximum allowable elevation necessary to permit scheduled maintenance to proceed in September. The expected outflow is approximately 4.4 Kcfs which will be adjusted on a weekly basis to achieve 3545 at the end of August. This operation is contrary to the long-term strategy recommended by the Council for Hungry Horse however, it is recommended this year to allow the planned maintenance.

- Draft the remaining 5 feet of storage from Hungry Horse in September. This is expected to provide approximately 2.3 Kcfs of stable weekly outflows with the reservoir ending September at elevation 3540.
- As with Libby, it is preferred that weekly average outflows are held flat or are gradually reduced from July through September and all changes in outflows will follow the ramp rates in the bull trout BiOp.
- Maintain flows out of Libby and Hungry Horse that are at least the minimum flows for bull trout. Minimum bull trout flows are a higher priority than the recommended ending reservoirs at the end of September. The minimum bull trout flow during September is expected to be 6 Kcfs.
- The Corps and BPA will pursue concluding an agreement with Canada that will assure that the increased flow from Libby in September will result in increased inflows to Lake Roosevelt during September.
- Refill of Grand Coulee in September will be limited to elevation 1284, plus or minus one foot. This is consistent with past refill volumes and will assure that the increased flows in September out of Libby and Horse are passed downstream to the Lower Columbia.
- Continue to implement bull trout and other aquatic research to measure changes in fish survival and productivity.

Wagner, Litchfield and Brian Marotz discussed the differences between the requested operation and a true “normative” river operation; Wagner observed that what this SOR requests is actually a highly regulated operation, rather than a normative river operation. Under a normative operation, flows would peak in July and gradually decline, Wagner observed. That’s true, Litchfield replied; what we’re attempting to provide is a stable flow through the end of August, followed by gradually declining flows through September. Henriksen observed that Wagner may be confusing “normative” with “natural;” under a natural hydrograph, we would simply be passing inflow during July and August, she said. Good point, Wagner replied.

The group devoted a few minutes of discussion to the impacts of the Montana proposal on Grand Coulee and Lower Columbia operations in August and September. Litchfield noted that the goal of this proposed operation is to ensure that Grand Coulee is no better or worse off than it would have been under a normal BiOp operation, in terms of outflow and elevation. We’re also trying to accommodate resident fish and cultural issues in Lake Roosevelt, he said. He noted that the change in outflow volume under Montana’s proposed operation – 3 Kcfs – is negligible. Wagner replied that it is probably not appropriate to trivialize this difference, given the fact that the action agencies argued that the additional 2.5 Kcfs to be provided from Brownlee was considered a significant biological offset for the reduced summer spill program. Bettin replied that the Brownlee

flow applies to the Lower Snake, where total river flow is much smaller than in the Lower Columbia.

In response to a question from Martin, Brian Merotz said Montana Fish, Wildlife and Parks is conducting the radio-tracking experiments in the Flathead and Kootenai. Litchfield said the bottom line is that Montana would really like to find a way to implement this SOR on an experimental basis in 2004. Wagner asked about Montana's ability to monitor the biological impacts of the Montana proposal in 2004; Merotz described MFWP's monitoring plans, which are designed to tease out what is happening as a result of dam operations at a population level, including survival mechanisms once the fish leave their natal tributaries. He noted that Montana's monitoring proposal has been favorably reviewed by the ISRP. The species in question are bull, westslope cutthroat and rainbow/cutthroat hybrid trout. About 60% of these fish leave their natal tributaries at Age 3, primarily during the month of June. So that emigration takes place outside the time-frame of Montana's requested operation? Wagner asked. The fish are then subjected to river operations for several years once they leave their natal streams, Marotz replied. The Montana proposal is also expected to improve conditions for native species within Libby and Hungry Horse reservoirs, in comparison to normal BiOp operations, he added.

The group discussed the ISAB's comments on the Montana proposal; Wagner noted that the reference to these comments in the justification fro the Montana SOR was taken somewhat out of context, because they applied mainly to spring operations. Litchfield said he will check on that comment.

After a few minutes of further discussion, Boyce said his concern is the loss in lower river flow during July and August when the majority of the ESA-listed stocks are migrating, and shifting that volume into September, when fewer listed fish are migrating. From Oregon's perspective, he said, if this SOR is to be implemented, we will need to look creatively at alternative sources of water to offset that reduction in lower river flow. Boyce said that he had thought TMT had identified an operation that would have provided somewhat higher flows in July and August, while still filling in flows in September via re-shaping of flood control releases. My understanding was that Montana had signed on to that SOR, he said – has that changed? Our objective was to implement the Council's recommendations, Litchfield replied; drafting Libby to 2439 by the end of August is not consistent with those recommendations. There was also some question about the feasibility of the flood control shift on the part of the action agencies, Litchfield added. That's correct, said Henriksen – the concern was that any water released from Libby during September would be trapped in Kootenay Lake.

Again, the goal of this SOR was to balance reservoir impacts with river impacts, said Litchfield. Wagner observed that the Council's recommendations included a very intensive biological evaluation of the effects of this change in operation to the reservoir, to the river below Libby, and to downstream salmon stocks – that's a very tall order. Brian has laid out what we propose, in terms of a monitoring program that will give us useful information within Montana, one that should show us whether this operation provides positive or negative effects, Litchfield replied; there are other monitoring programs ongoing in the lower river that should give us information about the impacts on

salmon species there. Again, said Boyce, I think it would make more sense to agree that the biological impacts downstream would be significant, and attempt to replace that water from other sources.

Following a caucus break, Wills said the salmon managers had discussed the Montana proposal; however, it was not possible to reach consensus. He said the Fish and Wildlife Service cannot sign off on a three-year study design without further information. Even when we talked about a one-season operation, he said, we still couldn't come to a consensus. We're on track to met the current BiOp objectives, he said; the Fish and Wildlife Service is unwilling to agree to this SOR, and if the action agencies are planning to implement it, we would have to object and elevate the issue to IT. Wagner quoted from a recent National Academy of Sciences report which concluded that listed salmon are most vulnerable during the late summer period. He said NOAA Fisheries is unwilling to support this SOR because it goes against the operations specified in the BiOp, and would prefer to stick with the current program.

Boyce said ODFW supports what Montana is trying to do for their fisheries and aquatic resources, but echoes the concern about the impacts to lower river salmon from this proposal. Without a viable alternative to offset that reduction in flow, Oregon can't support this operation, but would like to continue to explore alternatives to replace that reduction in flow. Pete Hassemer said Idaho would prefer not to state an opinion on the Montana SOR at this point; until we have a chance to evaluate the modified study plan, he said, on a technical basis, it is difficult to say whether or not we would support the Montana plan. We support the biological objectives Montana is trying to achieve, and the studies needed to evaluate this change in operation. However, at this point, we don't have a technical basis on which to agree or disagree with the Montana proposal, said Hassemer.

John Roache said Reclamation is always open to proposed changes in operation that would improve conditions for anadromous and resident fish; however, at this point, Reclamation concurs with the NOAA Fisheries and USFWS position, and supports adhering to elevation 3540 at the end of August. Bettin said BPA is neutral on this proposal, and is willing to implement either the Montana proposal or the BiOp operation. Henriksen said that, from the Corps perspective, she has heard that there is a general ideological support among the salmon managers for the biological and research objectives in the Montana SOR, although there are some technical and funding concerns about the proposal. Wills clarified by saying that USFWS opposes the Montana SOR, and will elevate this issue to IT if necessary. I understand that the salmon managers do not support the Montana SOR, she said. Wagner observed that the Montana SOR does deserve policy-level debate; he said NOAA Fisheries appreciates the thorough work Montana put into this proposal. It would be helpful if a Libby/Arrow swap could be negotiated in 2004, he added; that would allow everyone to get what they want. Henriksen said such a swap is unlikely this year.

Henriksen said that, at this point, the Corps does not have a consensus operation for the Montana projects, but is willing to implement the Montana SOR if there are no objections. We have an operation in place, which everyone supported at the time the last Libby SOR was put on the table, said Wills. If the Corps wants to implement the current

Montana SOR instead, said Wills, then the Fish and Wildlife Service will object. After a few minutes of additional discussion, it was agreed that, because the Corps is prepared to implement the Montana SOR, the Fish and Wildlife Service will elevate it to the IT.

After a brief discussion, the question for IT was framed as follows:

> Shall the action agencies begin implementation of the Council's Mainstem Recommendations for Libby and Hungry Horse, as requested in Montana's SOR 2004 MT-2? Montana has proposed reducing lower Columbia River flows by approximately 4 Kcfs during the months of July and August, moving a portion of the Libby and Hungry Horse flow augmentation volumes designated by the BiOp for use during the summer season into September. Should this operation be implemented under the adaptive management provisions of the BiOp, and do the proposed research and resident fish benefits balance the potential risks (and benefits) to salmon in the lower river? Are there alternative sources of water that could offset the proposed reduction in lower river flow, given 2004 environmental and flow conditions?

It was agreed that Henriksen will attempt to coordinate an IT conference call to discuss this issue at 11 a.m. tomorrow morning, and will notify the TMT via email.

6. Status of Operation.

Henriksen said Libby is at elevation 2448, filling slightly, with 12.5 Kcfs outflow. Roache said Hungry Horse is at elevation 3559.2 feet and drafting slowly at 5.2 Kcfs outflow. Grand Coulee is at elevation 1288.8 feet and drafting slightly. Henriksen said Brownlee is within 0.6 feet of full and passing inflow. Dworshak outflow was increased to 7 Kcfs last week, and subsequently increased again to 9.5 Kcfs (full powerhouse capacity); the project is at elevation 1597 and drafting 0.5 feet per day. The spring seasonal average flow at Priest Rapids was 126 Kcfs; at McNary, 202 Kcfs. Wagner said subyearling chinook continue to outmigrate from the Snake River at a rate of about 15,000 fish per day; indices at McNary have dropped from 450,000+ over the past week to 170,000 yesterday. Boyce said adult summer chinook counts are in the top four of the past 10 years – 71,000 to date, one of the highest observed. The adult sockeye is at 113,000 to date; steelhead, 27,552; and over 5 million shad, the all-time record.

Bettin said occasional lightening is the only problem to report for the power system; Jim Adams said there are no major water quality problems to report at this time.

7. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, July 21. Meeting ended at 12:30 summary prepared by Jeff Kuechle.

TMT Participant List

July 7, 2004

Name	Affiliation
Robin Harkless	Facilitation Team
Cindy Henriksen	COE
David Wills	USFWS
Paul Wagner	NOAAF
Jim Litchfield	Montana
Tina Lundell	COE
Mike O'Bryant	CBB
Kyle Martin	CRITFC
Dave Ryan	PPM
Tim Heizenrater	PPM
Michele DeHart	FPC
Ron Boyce	ODFW
Pete Hassemer	IDFG
John Roache	Reclamation
Dave Statler	NPT
Brian Marotz	MFWP
Tom Haymaker	PNGC
Russ George	WMCI
Cathy Hlebechuk	COE
Ruth Burris	PGE
Scott Boyd	COE
Mary Karen Scullion	COE
Lee Corum	PNUCC
Dave Benner	FPC
Scott Bettin	BPA
Nic Lane	BPA
Steve Kerns	BPA
Martin Hatscher	SCL
Bruce MacKay	Consultant

Lance Elias	PPL
Steve Haeseker	USFWS

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Thursday **08 July, 2004 1100 - 1300 hours**

Custom House Room 118

Portland, Oregon

Conference call line: 503-808-5190

NOTE: NEW DAY and PHONE BRIDGE

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

Issue Elevated from TMT to IT

July 08, 2004

1. Welcome and introductions.
2. Issue Elevated from TMT to IT
   [Columbia River Regional Form Implementation Team]
3. TMT developed the above policy question on July 7, 2004. There will be an IT meeting on July 8th from 11:00 a.m. to 1:00 p.m. in Room 118 of the Custom House (Corps of Engineers, NPD Heaquarters) located at 220 NW 8th, Portland, OR. Phone bridge is (503) 808-5190. The lines are limited to 24.
4. In Season Update on Wild Chinook Salmon Subyearlings in the Snake river
   [Charts - 3 pgs]
5. Other
   - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

COLUMBIA RIVER REGIONAL FORUM
Implementation Team

******NOTE CHANGE IN IT MEETING LOCATION BELOW******

Issue Elevated from TMT to IT

Issue: Shall the action agencies begin implementation of the Council's Mainstem Recommendations for Libby and Hungry Horse, as requested in Montana's SOR 2004 MT-2? Montana has proposed reducing lower Columbia River flows by approximately 4 Kcfs during the months of July and August, moving a portion of the Libby and Hungry Horse flow augmentation volumes designated by the BiOp for use during the summer season into September. Should this operation be implemented under the adaptive management provisions of the BiOp, and do the proposed research and resident fish benefits balance the potential risks (and benefits) to salmon in the lower river? Are there alternative sources of water that could offset the proposed reduction in lower river flow, given 2004 environmental and flow conditions?

TMT developed the above policy question on July 7, 2004. There will be an IT meeting on July 8th from 11:00 a.m. to 1:00 p.m. in Room 118 of the Custom House (Corps of Engineers, NPD Heaquarters) located at 220 NW 8th, Portland, OR. Phone bridge is (503) 808-5190. The lines are limited to 24.

Cindy Henriksen
Reservoir Control Center
(503) 808-3945

In Season Update on Wild Chinook Salmon Subyearlings in the Snake river

2 July, 2004

William P.Conner

Synopsis

Wild subyearling Chinook salmon in the Snake River emerged early, grew rapidly, completed shoreline rearing early, and are passing Lower Granite Dam early. Empirical data combined with modeling results indicate that passage at Lower Granite Dam of wild Chinook salmon subyearlings from the Snake River was 72—99% complete as of 2-July, 2004.

Table 1. Percent of total Snake Origin Wild Subyearling Chinook PIT-tag detections at McNary Dam July to September.

Year	July	August	September
1998	70.6%	19.4%	0.4%
1999	38.7%	42.2%	1.5%
2000	54.0%	8.9%	0.8%
2001	61.1%	33.3%	5.6%
2002	85.2%	12.7%	0.0%
2003	42.8%	12.6%	1.6%
Average	58.7%	21.5%	1.6%

Table 2. Monthly average flow projections for July, August, and September at McNary Dam for 2004.

July	August	September
151 kcfs	135 kcfs	98 kcfs

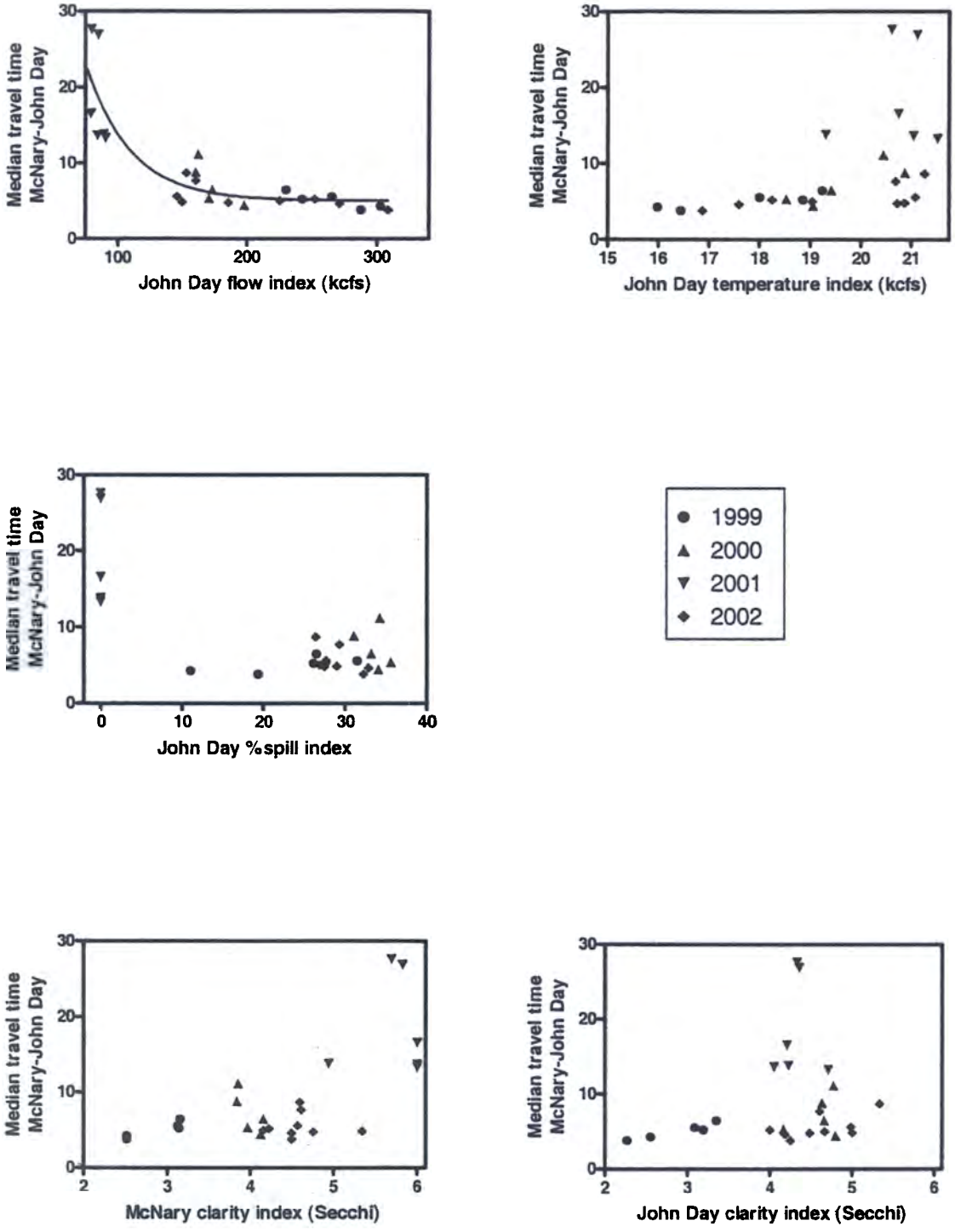


Figure 48. Median travel time between McNary and John Day Dams plotted against various river condition indices for run-of-river subyearling chinook salmon released in the tailrace of McNary Dam, 1999-2002. Flow index panel illustrates exponential-decay curve fit to data.

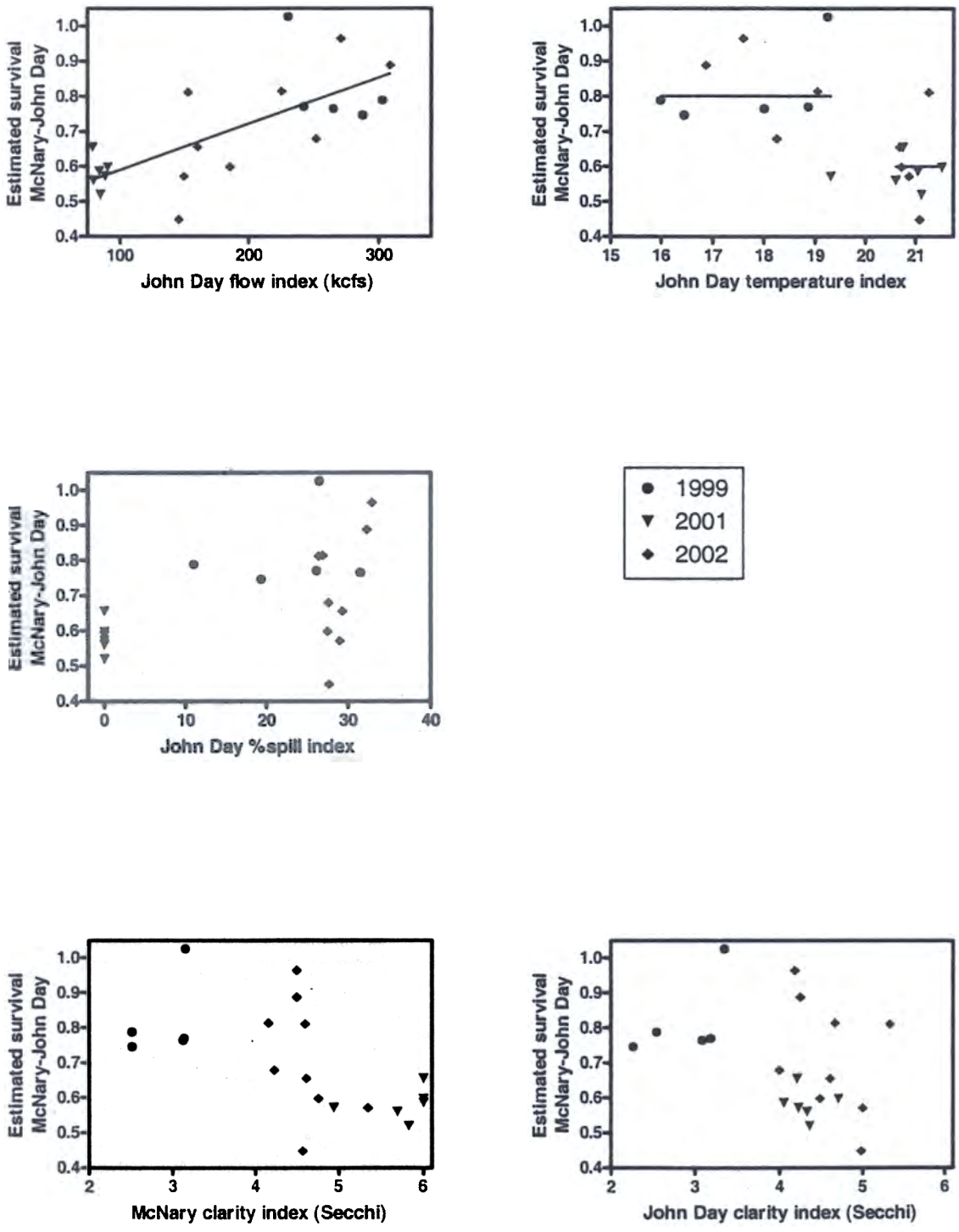


Figure 49. Estimated survival between McNary Dam tailrace and John Day Dam tailrace plotted against various river condition indices for run-of-river subyearling chinook salmon released in tailrace of McNary Dam, 1999, 2001, and 2002. Flow index panel illustrates simple linear regression line without year effects. Temperature index panel illustrates constant mean survival above and below 20 °C.

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday 21 July, 2004 0900 - 1200 hours

Custom House Room 118

Portland, Oregon

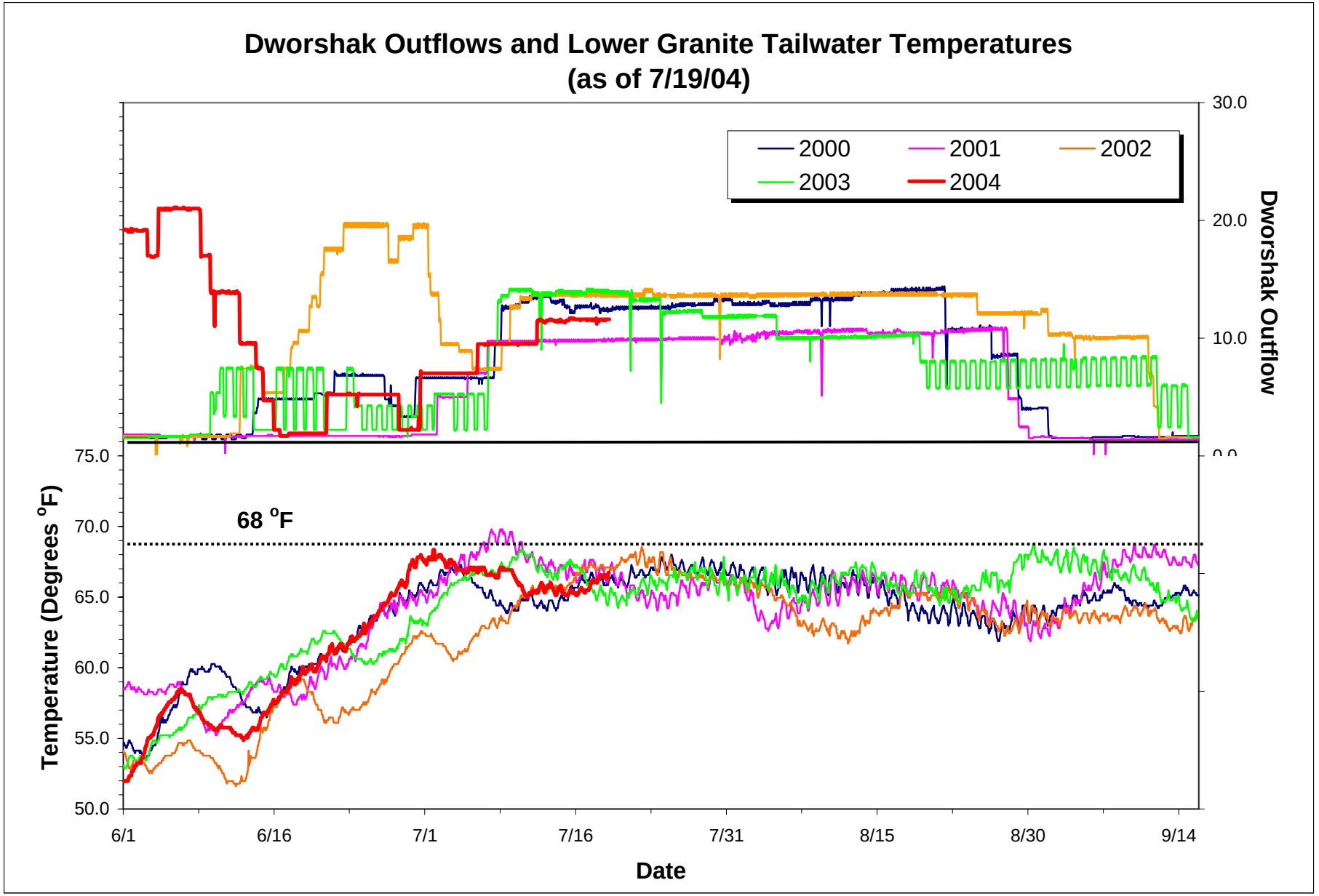
Conference call line: 503-808-5190

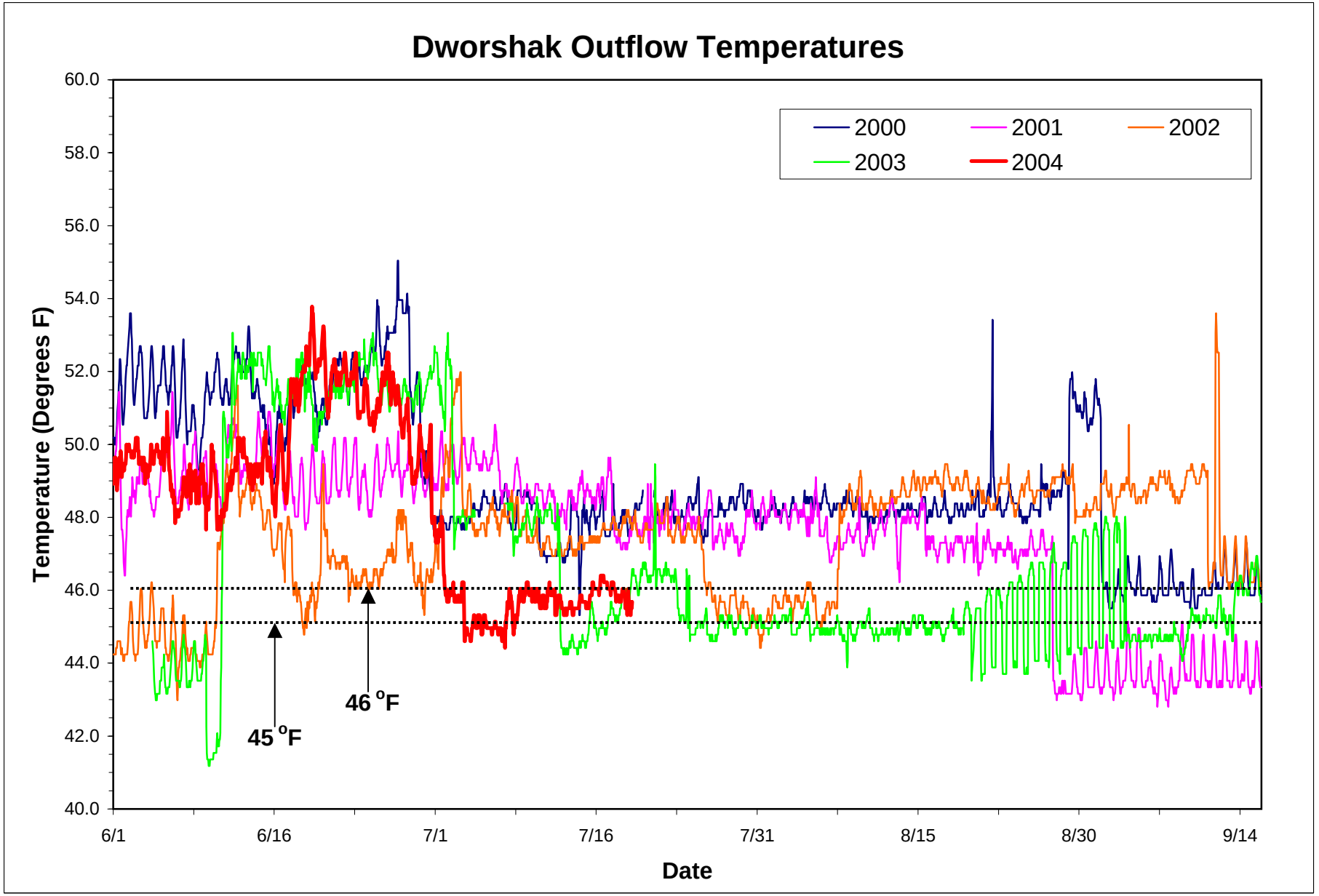
All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

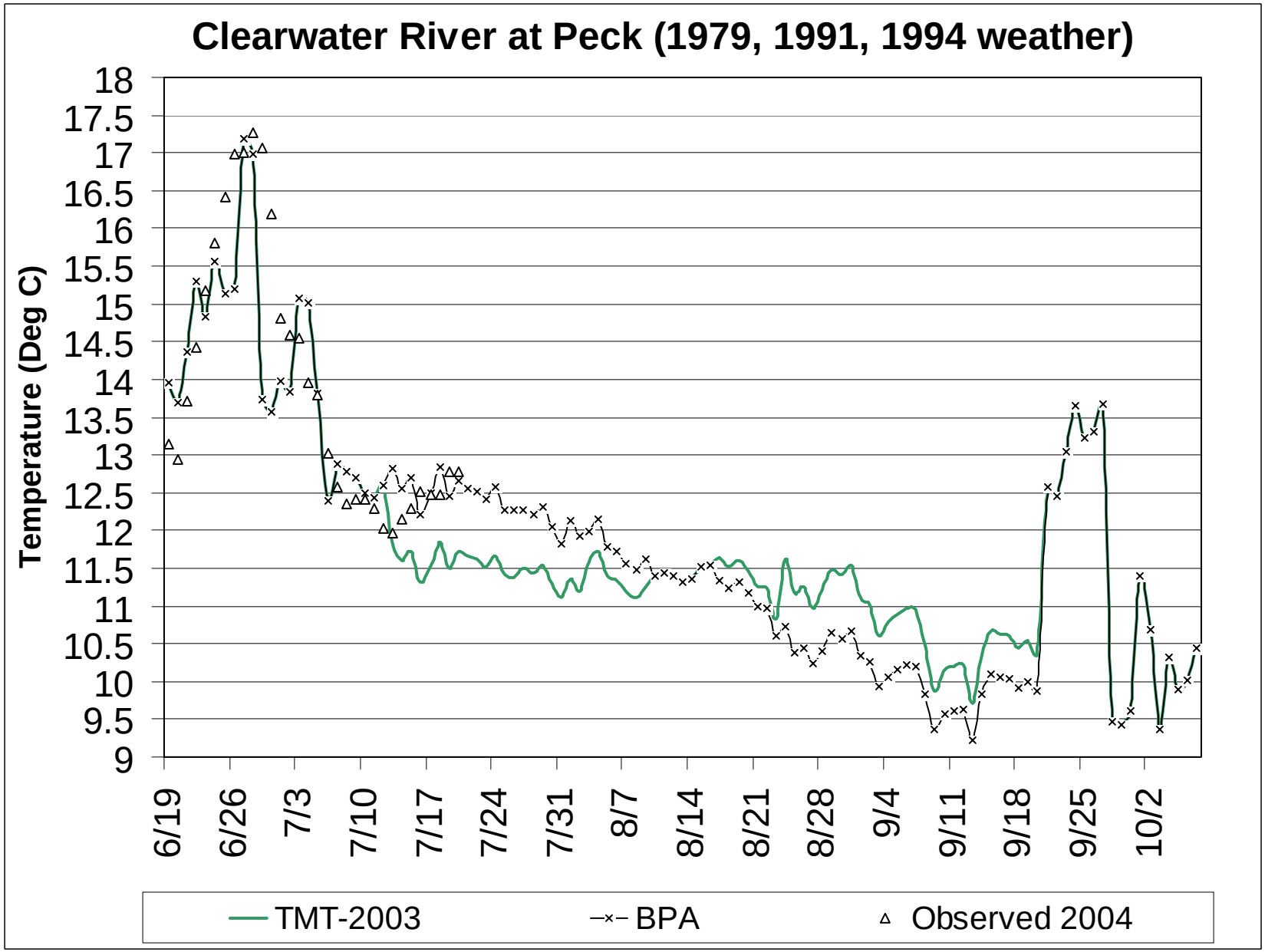
AGENDA

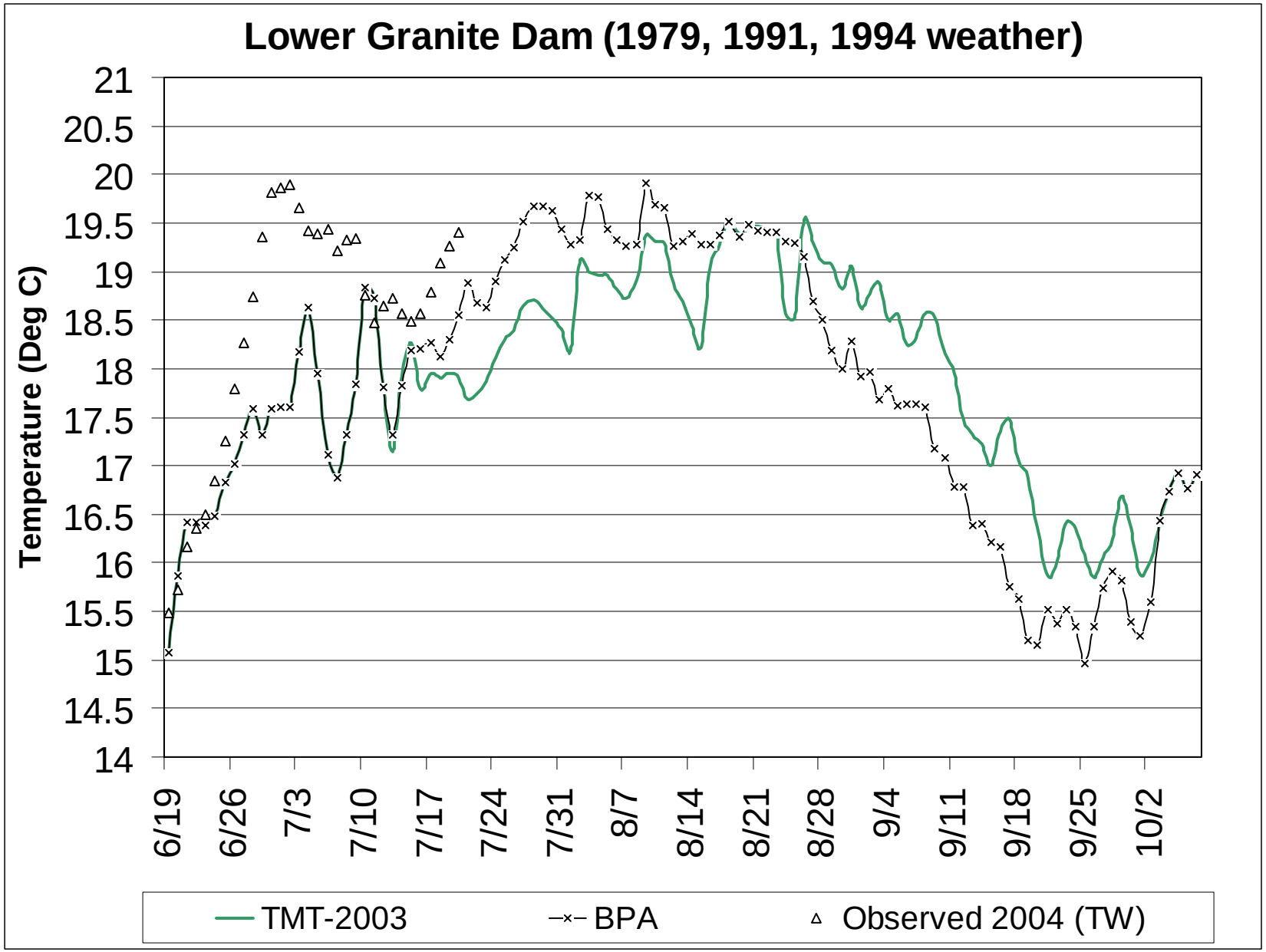
1. Welcome and introductions.
2. Dworshak summer operations. [DWR Summer Ops] [EPA Model Comparison]
3. Zone 6 Treaty fishery. [SOR 2004-C7] [SOR 2004-C8]
4. Lower Granite Powerhouse outage August 16 - 19 daily 0700 - 1700 hours.
5. Update of Libby / Hungry Horse Operations. [NOAA Response to SOR 2004-MT-2]
6. Spring / Summer Update: Summer Spill appendix (AAs).
7. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality [Average Daily Spill] [Exceedance Types]
   e. Spill Information
8. Other
   - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942


Dworshak Outflows and Lower Granite Tailwater Temperatures
(as of 7/19/04)
2000
2001
2002
2003
2004
30.0
20.0
10.0
0.0
Dworshak Outflow
75.0
70.0
65.0
60.0
55.0
50.0
68 °F
Temperature (Degrees °F)
6/1
6/16
7/1
7/16
7/31
8/15
8/30
9/14
Date


Dworshak Outflow Temperatures
60.0
58.0
56.0
54.0
52.0
50.0
48.0
46.0
44.0
42.0
40.0
Temperature (Degrees F)
2000
2001
2002
2003
2004
46 °F
45 °F
6/1
6/16
7/1
7/16
7/31
8/15
8/30
9/14
Date


Clearwater River at Peck (1979, 1991, 1994 weather)
Temperature (Deg C)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004


Lower Granite Dam (1979, 1991, 1994 weather)
Temperature (Deg C)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
15.5
15
14.5
14
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004 (TW)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

July 19,2004

Ms. Judi Danielson
Chair, Northwest Power and Conservation Council
851 SW Sixth Avenue, Suite 1100
Portland, OR 97204-1348

Dear Judi:

Thank you for your letter of July 14,2004, clarifying the Council's intentions regarding proposed operational changes at Libby and Hungry Horse Dams. The letter was a helpful part of our consideration of the recent System Operations Request filed by the State of Montana (2004-MT-2).

The Council's Fish and Wildlife Program, as a result of the recent Mainstem Amendments, proposes as a hypothesis that certain modifications to current operations at Libby and Hungry Horse Dams would significantly benefit resident fish without discernible adverse effects on the survival of juvenile and adult anadromous fish. These modifications in operations would have the effect of slightly slowing and stabilizing the rate of summer reservoir withdrawals for salmon flow augmentation and potentially could increase the productivity of the aquatic community in those reservoirs and the river reaches immediately below them.

Your letter indicates that the Council also finds that the Montana System Operations Request "is not inconsistent" with this provision of the Program, but asks that NOAA Fisheries provide written assurance that this operation "is not expected to have a discernible adverse effect on listed salmon and steelhead and that adequate monitoring is in place."

I support the Council's efforts to assure that measures taken to protect listed and non-listed stocks of salmon do not unnecessarily compromise other ecosystems, especially those in areas beyond the usual range of salmon and steelhead. I also agree that this is a matter that merits further examination and deserves careful application of the best available science.

As I understand these provisions, the Council's program anticipates that this hypothesis will be tested in an experimental manner, by taking an action and measuring its effects. Therein lies the problem. Although Montana is prepared to conduct research to measure the extent of the anticipated changes in productivity in the Kootenai and Flathead **Rivers,** there is not now in place a research program adequate to measure the kinds of changes in

juvenile salmon survival in the Lower Columbia River that might be expected to result from the proposed operation, especially if such changes have a small or even negligible effect.

While a major survival failure ---- for example, loss of 50% of the migrants ---- should be detectable with the monitoring now in place, a more subtle change --- for example, a 1% decrease in survival ---- would likely not be observed by the monitoring systems in place for this year's juvenile Fall Chinook migration. Further, given the small changes in flow relative to the total lower Columbia River flow that are proposed in this experiment, it may prove difficult if not impossible to design a future research program that will provide statistically significant measurements of the resulting changes in juvenile salmon survival in the lower Columbia River.

For this reason, I cannot give the assurance the Council has requested prior to the implementation of this experiment, that "adequate monitoring" is in place. For similar reasons, NOAA Fisheries is unable at this time to support full implementation this year of Montana's System Operations Request 2004-MT-2.

However, I also note that it would still be useful and appropriate for the State of Montana to conduct baseline studies of productivity under this year's conditions. In particular, the current outflow of 12.5kcfs in the Kootenai River below Libby Dam offers an opportunity to measure productivity at a river level within the bounds of historic flows. Based on current forecasts, NOAA Fisheries will support maintaining this outflow at a constant level for the remainder of this operational season. In the event that subsequent forecasts show decreased runoff, NOAA will work with Montana in the regional forum process to adjust flows so that the expected reservoir drawdown limit is not exceeded.

Finally, in the event that the current outflows do not cause the reservoir to reach its anticipated 20 foot draft limit as expected by the end of August, we would support continuing those flows or a somewhat lesser flow into September on an experimental basis to provide some data on resident fish benefits from increased flows in September. The information gained from this experimental operation could be very helpful in determining whether Montana's proposal for such extended flows is operationally practicable.

For Hungry Horse dam, I recommend that the current level of flow also be maintained for as long as possible this summer, consistent with drawdown limits. As with Libby, in the event that subsequent forecasts show decreased runoff, NOAA Fisheries will work with Montana in the regional forum process to adjust flows so that the expected reservoir drawdown limit is not exceeded. This operation should provide the drawdown space needed for planned maintenance by the Bureau in early September but NOAA will work with Montana and the Bureau within the in-season management process if unanticipated water conditions occur.

I want to provide the Council and the State of Montana with assurance that I understand the importance of the biological objectives that you are trying to achieve in the reservoirs and rivers above and below Libby and Hungry Horse dams. I believe that the steps we are describing here are an important part of the implementation of the Council's Mainstem Amendments.

We will continue to work with you and others who are interested in finding better ways to operate the hydropower system and in understanding the impacts and benefits on both resident and anadromous fish from reservoir drafting strategies during July, August and September.

With that goal in mind, I would propose that we work together to identify the present bounds of the science regarding flows and survival and to determine how we can help advance that science and our application of it.

The body of scientific information on the nature and extent of the relationship between flow and the survival of migrating juvenile salmon continues to grow. Here are a few recent examples, among many: In 2003, the Independent Scientific Advisory Board, which is jointly appointed by the Council, the Columbia River Intertribal Fish Commission, and NOAA Fisheries, issued a report, which called into question the benefits of flow augmentation in some instances. Earlier this year, as part of Washington's Columbia River Initiative program, the National Research Council of the National Academy of Sciences prepared a report which included consideration of the affects on juvenile salmon of flows in the lower Columbia River. In preparation for the next biological opinion on the operations of the FCRPS, our Northwest Fisheries Science Center has recently compiled additional information and analysis on flow and survival. **US** Fish and Wildlife Service researcher William Conner has developed an important model for the Lower Snake River that predicts the relative impacts of flow and temperature on the survival of migrating juvenile Fall Chinook.

I would therefore propose that the Council and NOAA Fisheries, together with those Columbia River tribes or tribal organizations that might be interested in participating, sponsor a one or two day scientific symposium or similar workshop to address the following points regarding the relationship between flows and juvenile survival:

1. What is the "state of the science"? What information is available and applicable to this question? On which points is there consensus, and on which is there widespread disagreement?

2. Which of the attributes that are currently unknown or in general dispute are most important to decision making about hydro operations? What kinds of further research would be needed to resolve them?

3. Is there an experimental design practical and feasible for implementation in the next water year that would allow meaningful testing of the Council's hypothesis? If so, how would the experiment best be structured?

4. In modeling projected effects of flow operations on listed and non-listed fish --- especially in instances where empirical measurements are not available or not practical or feasible --- what are the relative strengths and weaknesses of the available models? Is there credible scientific information indicating that certain models (and modeling assumptions) are likely to be more reliable than others?

Answering these four questions will allow us to determine whether the Council's hypothesis can be tested by running an actual experiment, or, whether it is better to analyze the effects by using a model.

The Council or other participants may have additional points to be addressed, and I certainly do not intend that the above list be exhaustive. However, it would be our desire to keep the symposium sharply focused on identifying what is known, what is not known, which unknowns are most important, and how we might best resolve the uncertainty. It is not our intent that the symposium attempt to resolve issues where there is not an adequate scientific foundation to support that resolution.

I would suggest that the symposium be held as soon as practicable. While I know that organizing and preparing for a thorough and orderly discussion of these questions requires more than a few weeks of lead time, I am hopeful, with the Council's support, that it might be completed no later than this fall.

The scheduling is important not only to further resolution of the Montana SOR and related requests involving other upstream operations, but also to the revisions to the FCRPS biological opinion now underway. While the symposium is not likely to be completed soon enough to impact the draft biological opinion promised at the end of August, our intention would be incorporate adaptive management provisions that will allow these results to be considered in making operational management decisions under the biological opinion.

My thanks again to the Council for its willingness to take up this difficult but important issue, for your determination to resolve these issues using scientific methods, and for your interest in fashioning a solution that carries broad regional support.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: Governor Dirk Kempthorne, ID
Governor Judy Martz, MT
Governor Ted Kulongoski, OR
Governor Gary Locke, WA

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
July 21, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Dworshak Operations:
Cindy Henriksen, COE, reported that TMT had settled on a strategy for Dworshak and the COE has been releasing 11.6 kcfs/day out to maintain tailwater temperatures at or below 68°. Current outflow temperatures (available as an attachment to today's agenda) show that temperatures have remained below 68° at the Lower Granite tailrace, so the COE will continue with the current operation and plan to do so through the end of August. Kyle Martin, CRITFC, provided additional handouts showing observed and modeled temperatures to date at Lower Granite and Peck.

ACTION: The salmon managers will continue to monitor temperatures in the tailwater and, if need be, call an emergency TMT meeting to discuss a change in operation to accommodate the temperature needs.

Zone 6 Treaty Fishery:
Kyle Martin, CRITFC, presented SOR 2004-C7 and 2004-C8 with requests for tribal summer fisheries for July 14-17, July 21-24, and July 26-31. The request was to operate the John Day, Bonneville and The Dalles pools at a steady elevation, within 1' from full. The July 1 net survey observed 171 nets, and the fishers seem to prefer the John Day pool for summer fisheries.

The COE and BPA expressed that lead time on the request has been an issue this time, and would prefer 24 hours' notice in order to try to meet the request. Kyle acknowledged this. He will report to his tribal Council members that for the July 26-31 request, which starts on a Monday, the COE will likely start with a lower pool due to expected power needs from the forecasted heat wave. The COE will then slowly fill to attempt to implement the tribes' request. Cindy LeFleur, WDFW, noted that there will be opportunity to give more heads up to operators for the Fall tribal fishery, which is likely to begin the week after August 20. A suggestion was made for Kyle to begin talking to field staff in order to develop the Fall fishery request.

Lower Granite Powerhouse Outage:

Cindy Henriksen reminded the group that there will be a powerhouse outage at Lower Granite August 16th-19th for doble testing. One unit will be operated at speed/ no load; spill will occur over the spillway to meet powerhouse minimums during the daytime only. Cindy asked TMT to consider: If the total river flow is greater than 40 kcfs in the Snake River, should the COE operate outside MOP? And, should the COE use the RSW for spill if necessary?

The salmon managers met and discussed the questions, and prefer not to operate outside MOP+2, but to pass inflow through the RSW in the unlikely event that river flows are greater than 40 kcfs.

Libby/Hungry Horse Operations:
Paul Wagner, NOAA, recapped that the request for Libby and Hungry Horse operations presented by Montana last week was elevated to IT and then the Regional Executives. An official decision was made on Monday, July 19 by NOAA Fisheries to hold the discharge at Libby at 12.5 kcfs and Hungry Horse at 5.1 kcfs. This will provide some water into the system in September and meet some of Montana's expressed interests. Tony Norris, BOR, reported that the BOR had increased Hungry Horse to 5.7 and will ramp down to 5.1 sometime today.

A question was raised about whether NOAA had considered that the extra water would potentially be 'trapped' in Canada in September. The COE responded that it is likely that the water will be trapped in Kootenay Lake and there will not be a swap agreement with Canada this year. Paul Wagner said NOAA had considered this. An estimated 113 kaf will come out of Libby in September with this new operation, based on yesterday's STP runs. The total expected decrease from this operation is an 1800 cfs reduction in flows.

NOAA recognized that there is not a consensus in the region on Libby and Hungry Horse operations, so proposed a symposium to discuss the science around the issue – including NOAA's "Effects" memo, The National Academy of Sciences report, ISAB information, and others. This will provide an opportunity for a broader airing of the issue and greater policy review. NOAA's Science Center will take the lead in coordinating the workshop. This will not influence operations for this year.

Spring/Summer Update:
In response to the COE's decision to stop spill in August, the summer spill appendix draft update was handed out and posted on the TMT web page. It updates information about the end of summer spill at the Lower Columbia projects in August and notes the hydro offsets. This is an update to the Water Management Plan.

Status of Operations:
Reservoirs: Libby is at elevation 2450' and filling. Outflows are at 12.5 kcfs. Hungry Horse is at elevation 3556.4' with outflows at 5.7 kcfs – the BOR will ramp down to 5.1 kcfs per NOAA's decision on the Montana proposal (see above). Grand Coulee is at elevation 1287.6' with ~ 70 kcfs inflows. The BOR provided a summary of Snake River flow augmentation, and will provide a general accounting of volume in/volume out analysis in August when summer operations are complete. Oregon will review past post-

season reviews and notify the BOR if there is additional data that would be helpful this year in the review. Brownlee is at elevation 2068' and releasing ~33 kaf/week. Dworshak is at elevation 1584', 16' from full. Temperatures at Dworshak are 45° and water temperatures are being monitored to not exceed 68° at the Lower Granite tailrace.

Fish status: Subyearling chinook at Lower Granite reached their peak and are on the decline. About 4,000/day are passing the project at this point. Numbers at McNary are lower than predicted, due to a number of factors. Tagged fall chinook in the Snake River appeared in late May and peaked around June 27 – 121 fish were observed that day. The adult summer chinook run is nearly over; about 70,000-100,000 fish were observed this year. Sockeye numbers were 100,000-120,000. Steelhead numbers look good so far. August 1st starts the fall season. The forecast for fall chinook is ~635,000.

ACTION: Cindy LeFleur, WDFW, will provide information on fisheries, fish runs by species, and other information to TMT via handouts and the TMT web page. Dave Wills, USFWS, will provide information on sturgeon at the next TMT meeting.

Power System: Loads are expected to come up with increases in temperatures forecasted for the near future.

Water quality: There were some TDG exceedances in the McNary forebay on the Oregon side due to TDG coming from upstream and increased temperatures. An instrumental error at Camas/Washougal caused a couple exceedances.

A graph was provided with average spill per day for the last two weeks.

Next Meeting, Wednesday, August 4th, 9am-noon:
Agenda Items:

- Fall Fisheries, Fish Run Finals – WDFW
- Sturgeon Update – USFWS
- Dworshak Temperatures, Operations Update
- Tribal Summer Fishery Review – CRITFC
- Libby/Hungry Horse Operations Update
- Status of Spill
- System Operations Status

1. Greeting and Introductions

The July 21 Technical Management Team meeting was chaired by Cindy Henriksen of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Henriksen at 503/808-3945.

2. Dworshak Summer Operations.

Henriksen said the summer operational strategy at Dworshak was set last meeting; the project continues to release 11.6 Kcfs, in an effort to keep Lower Granite tailwater temperatures at or below 68 degrees F. She noted that the most recent temperature readings from the Lower Granite tailwater fixed monitoring station are hot-linked to today's agenda on the TMT homepage; so far, water temperatures remain below 68 degrees. Dworshak will continue to release 11.6 Kcfs until early August, at which point outflow will be reduced to just under 10 Kcfs, full powerhouse capacity. David Wills noted that water temperatures are creeping upward at the Lower Granite tailwater station, and a conference call may be needed to adjust the Dworshak operation if they continue to do so. That was our understanding when we agreed to this operation, said Henriksen. Kyle Martin noted that air temperatures in the Lewiston area are expected to be about 10 degrees (F) cooler in the coming week than they were last week, which may help moderate water temperatures at Lower Granite somewhat. It was agreed that a conference call may be needed this Friday.

3. Zone 6 Treaty Fishery.

On July 13 and July 20, the Corps received CRITFC SORs covering lower river operations during the summer treaty fishery. The SORs covered three periods of fishing: 6 a.m. July 14 through 6 p.m. July 17, 6 a.m. July 21 through 6 p.m. July 24, and 6 a.m. July 26 through 6 p.m. July 31. As always, the CRITFC tribal treaty fishery SORs requested that Bonneville, The Dalles (Celilo) and John Day pools be operated within one foot of full pool.

Martin said he is sure this will be the last summer tribal treaty fishery SOR for 2004. He noted that, during a July 1 aerial survey, CRITFC personnel counted 271 nets -- 31% in Bonneville pool, 24% in The Dalles pool, and 45% in John Day pool. During the July 15 aerial survey, a total of 161 nets were seen, 31% in Bonneville pool, 29% in The Dalles pool and 40% in John Day pool.

Henriksen said the Corps has been having some problems with lead time on some of the CRITFC SORs; when the request is received too late in the day, she said, it can be difficult to accommodate these requests. She added that next week's fishery is for the entire week; on Monday, July 26, we may be starting the day with Bonneville pool on the low side, and filling over the day – that's normal after weekend operation, she said. That's fine, as long as it's a gradual fill, Martin replied. The Corps will do its best to honor the tribes' request, Henriksen said. Again, a bit more lead time will really help us to implement your SORs, said John Wellschlager – giving us less than 24 hours' notice is essentially setting us up for failure, in terms of being able to implement your requests. I understand, said Martin, adding that the reason for the late notice is generally the fact that tribal treaty fisheries must be negotiated among four tribal entities.

Have you analyzed the ESA impacts of the tribal treaty fishery? Jim Litchfield asked. The tribes are allowed a 7% incidental take on listed species, said Cindy LeFleur – at this time, the only listed adult species in-river are Snake River sockeye and steelhead. On the chinook side, the only fish currently in the river are Upper Columbia summer chinook, which are not listed, LeFleur said. She asked for as much notice as possible regarding any potential fall tribal fisheries, which could begin as soon as the week of

August 20. That would help everyone to meet your requests, said Wellschlager. I will communicate that to our tribal people, Martin replied.

Henriksen said a teletype has gone out specifying 75-76.5 feet as a hard constraint at Bonneville pool. At the other projects the operating ranges have been elevation 262.5-264 at John Day pool and the normal 3-foot operating range at The Dalles pool, where fluctuation is often only 2-feet.

4. Lower Granite Powerhouse Outage August 16-19.

Henriksen reminded the group that, at the last TMT meeting, the salmon managers were asked to discuss the various operational options for the period of August 16-19, when the Lower Granite powerhouse will be offline from 7 a.m. to 5 p.m. for doble testing. She said that, during the test period, Lower Granite will pass the Snake River minimum flow of 11 Kcfs during daylight hours (5 Kcfs speed-no-load, 6 Kcfs spill). We wanted some guidance as to how to pass that flow, she said; were the salmon managers able to reach a consensus on the type of operation you would like to see?

Our preference is to pass the 6 Kcfs of spill through the RSW during the day, replied Dave Wills; we would prefer not to pond, to the greatest extent possible. We're anticipating that, as long as total river flow is below 40 Kcfs, Lower Granite pool will fill about one foot, from MOP +1 to MOP +2, during the day; we would need to pass that water out at night, Henriksen said. Wills added that, in the unlikely event that total river flow exceeds 40 Kcfs during the testing period, the salmon managers would prefer that the Corps not pond above MOP +2, but instead pass the excess flow during the day, via spill. Ron Boyce said ODFW concurs with that suggested operation. How much volume is there in one foot of Lower Granite storage? Boyce asked. It's about 5 ksfd, Henriksen replied, adding that the Corps is willing to implement the salmon managers' requested operation.

5. Update on Libby/Hungry Horse Operations.

Henriksen said that, on July 19, the Corps issued a letter of response on Montana's SOR 2004 MT-2, covering requested summer operations at Libby and Hungry Horse dams this summer. The full text of this letter is hot-linked to today's agenda on the TMT homepage. Paul Wagner reminded the group that this issue was elevated from TMT to IT; the IT was unable to resolve it, so it was elevated last week to the Regional Executives. The issue was not resolved by the end of the Regional Executives call, he said, but they did promise a decision as soon as possible. We now have that decision, he said; it is to hold Libby's current discharge of 12.5 Kcfs as long as possible, until elevation 2439 is achieved. It now appears that this will occur in the first week of September. The same decision was made at Hungry Horse, said Wagner; the current discharge of 5.7 Kcfs will be reduced to 5.1 Kcfs and held until elevation 3540 is achieved.

This may result in some water being trapped in Kootenay Lake and in Lake Roosevelt, said Wagner; discussions have been ongoing to see that this does not happen. It would be nice to know how those negotiations are proceeding, he said. So NOAA

Fisheries recognizes the fact that flows will be lower, as a result of this decision, at McNary during July and August? Henriksen asked. Yes, Wagner replied. There will be no agreement with Canada, she said, because we're just planning to hold 12.5 Kcfs during July and August – there is no incentive for Canada to sign such an agreement. Most, if not all, of the additional water released during September will be trapped in the Canadian portion of the system, said Wellschlager – I just wanted to be sure you understand that. We understand that, Wagner replied, adding that he would like to verify that the trapping does occur, when we get to September.

Wills said that, based on his calculations, a total of 113 kaf of Libby storage will be released in September, under this operation. In other words, he said, that is the volume by which lower river flows will be reduced prior to August 31. Wagner said the operation is expected to result in a 1.8 Kcfs reduction in lower river flows during July and August. Norris said Hungry Horse discharge will be ramped down to 5.1 Kcfs as soon as possible; he said Reclamation estimates that there will be about a foot of Hungry Horse storage remaining above 3540 on August 31.

Wagner said NOAA Fisheries recognizes that there is still some disagreement, around the region, on the state of the science on this issue. NOAA has therefore proposed a one- or two-day workshop or symposium on this issue, at which the science will be presented and the validity of this operation will be debated. This symposium would include representatives from NOAA, the Council, the states and tribes, and will be convened as soon as practicable. The symposium will not impact 2004 operations at Libby and Hungry Horse? Henriksen asked. No – the 2004 operation has already been determined, Wagner replied.

6. Spring/Summer Update.

Henriksen said the action agencies have issued a draft revision of the 2004 Water Management Plan, called the spill appendix, which summarizes the action agencies' decision to curtail summer spill at the Lower Columbia projects, as well as the hydrologic offset measures that will be implemented. She asked the TMT to review the revised update and provide any comments they may have to her as soon as possible.

7. Status of Operation.

Henriksen said Libby continues to release 12.5 Kcfs; the current elevation at the project is just over 2450, nine feet from full. Inflows have been slightly higher than expected. Hungry Horse is currently at elevation 3556.4, said Tony Norris; the project is releasing 5.7 Kcfs, which will be ramped down to 5.1 Kcfs later today or tomorrow. Grand Coulee is at elevation 1287, releasing 70 Kcfs, with 87 Kcfs inflow. Norris also distributed a summary of 2004 and previous years' Upper Snake flow augmentation volumes; he noted that a total of 335 kaf is expected to be available for summer flow augmentation this year. In response to a question from Boyce, Norris said the data on Brownlee inflows and outflows during the Upper Snake flow augmentation period is publicly available via the Reclamation website. Norris said he will provide such a Brownlee volume in/volume out analysis once the 2004 Upper Snake flow augmentation operation is completed in August. And will all of the Upper Snake water be passed

through Brownlee in 2004? Boyce asked. Yes, except for the volume that was released in June, Norris replied.

Henriksen noted that one of the water management offsets for the 2004 summer spill reduction was an agreement between Bonneville and Idaho Power to release an additional 100 kaf from Brownlee in July. The agreement is that the volume is to be released, at a rate of 33 kaf per week, between July 7 and July 28. Brownlee is releasing 14-15 Kcfs, currently, Henriksen said. Wellschlager noted that what the agreement actually bought was assurance that the 100 kaf will be released, not necessarily that additional water would be released.

The current Dworshak elevation is 1584 feet, 16 feet from full and drafting, 45 degrees outflow temperature, releasing about 11.5 Kcfs, 2 Kcfs of which is spill, said Henriksen.

On the fish front, Wagner said the peak of the subyearling chinook run has now passed at Lower Granite; indices at that project are now down to 4,100-fish-per-day range. Subyearlings continue to arrive at the lower river projects, with an index of 25,000+ yesterday at McNary. Moving on, Wagner touched on Billy Connor's PIT-tagged wild Snake River subyearling chinook research; according to Connor's data, the peak of this outmigration occurred on June 27, somewhat earlier than normal. The 95% passage point in the 2004 wild subyearling outmigration is forecast to occur on August 7. Overall, the timing of the subyearling outmigration appears to have moved somewhat earlier in the season since 1993, Wagner observed. Cumulative subyearling chinook passage at Lower Granite is now approaching 1 million fish for 2004; at McNary, about 7 million fish. Wagner noted that the latter figure is significantly below the pre-season projections for McNary.

With respect to 2004 adult passage, LeFleur said the summer chinook run is now almost over, and will total 95,000-100,000. The sockeye run is about 120,000 fish, another very good run. The adult steelhead run also looks significantly better than average in 2004, said LeFleur. She noted that the Compact will be meeting soon to establish harvest levels for the fall season; she said she will update the TMT on adult count and fisheries data as more information becomes available. The adult fall chinook run is forecast to exceed 635,000 fish in 2004, down slightly from last year's record run of 880,000 adult fall chinook, but still a very good run; the 2004 coho run is forecast to be about 250,000 fish. In response to a request from Litchfield, Wills said he will provide an update on 2004 sturgeon activities at the next TMT meeting.

Wellschlager said there are no power system issues to report at this time; the weather continues to be hot, and loads high. On the water quality front, Jim Adams said the Corps recorded a few TDG and water temperature exceedences in the past two weeks, including water temperatures of 75 degrees at the McNary forebay monitoring station on July 18. Laura Hamilton said the Corps has recorded up to a 9-degrees F jump in McNary water temperatures over a 24-hour period, which also results in elevated TDG levels. In response to a question, Rudd Turner said project personnel have observed no fish quality problems at McNary as a result of these warm temperatures. Hamilton also provided a chart showing average daily spill volumes for the period July 5-18:

Ice Harbor: 31.5 Kcfs
John Day: 45.2 Kcfs
The Dalles: 59.6 Kcfs
Bonneville: 74.4 Kcfs

8. Next TMT Meeting Date.

The next Technical management Team meeting was set for Wednesday, August 4. Meeting summary prepared by Jeff Kuechle.

TMT Attendance List

July 21, 2004

Name	**Affiliation**
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
Cindy Henriksen	COE
Kyle Martin	CRITFC
Tina Lundell	COE
Tim Heizenrater	PPL
Rudd Turner	COE
Laura Hamilton	COE
David Wills	USFWS
Scott Boyd	COE
Mary Karen Scullion	COE
Ron Boyce	ODFW
Jim Litchfield	Montana
Lee Corum	PNUCC
Tony Norris	USBR
John Wellschlager	BPA
Tom Haymaker	PNGC
Paul Wagner	NOAAF
Cindy LeFleur	WDFW
Jim Adams	COE

Mike O’Bryant	CBB
David Benner	FPC
Kevin Nordt	PGE
Russ George	WMCI
Bruce MacKay	Consultant
Mike Buchko	Powerex
Lance Elias	PPL
Richelle Beck	D. Rohr & Associates
Todd Perry	CPS

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT CONFERENCE CALL

Friday July 23, 2004 1300 - 1400 hours

Custom House Room 118

Portland, Oregon

Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Dworshak summer operations.

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
July 23, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

1. Greeting and Introductions

The July 23 Technical Management Team meeting was chaired by Cindy Henriksen of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Turner at 503/808-3945.

2. Dworshak Operation.

Henriksen said the purpose of today's conference call was to discuss the current air and water temperature situation at Lower Granite, and whether or not to change the current Dworshak operation to reduce water temperatures in the Clearwater and Lower Snake rivers. Dave Statler said it is very hot in Lewiston, currently; the forecast is calling for temperatures of 100 degrees+ over the next few days. Henriksen said that, according to the National Weather Service forecast, air temperatures are expected to moderate somewhat by Monday. She added that the tailrace temperature at Lower Granite reached 67.5 degrees yesterday.

Total river flow at Lower Granite is currently 33 Kcfs-35 Kcfs, Henriksen continued; the temperature of the Brownlee releases, measured at Oxbow, was 68 degrees yesterday. On Wednesday, we discussed the potential need for a TMT conference call if water temperatures were on the rise and the forecast was for continued hot weather; that is the reason for today's call. Do we want to increase the flow of cold water from Dworshak for a few days?

Statler said the Nez Perce Tribe would consider that a prudent action at this time. Sharon Kiefer said Idaho agrees. Paul Wagner said FPAC will discuss the water temperature situation further at a Monday conference call, and attempt to reach consensus on how long the increased Dworshak flow should continue.

One concern is that the cold water from Dworshak won't reach Lower Granite for two or three days, said Henriksen – the question is whether or not this change in operation will have the desired effect. She said she has been talking to the biologists at Lower Granite, who told her that fish health is not currently a concern at the project – mortality has been low. Yesterday mortality spiked to nearly 2%, but that was because it was a transport day, and there were more fish to be seen in the raceways. An increase in mortality on transport days is typical. Still, cumulative stress could be a problem down the road, said Kiefer – at this point, we just don't know. Turner said that, under the Fish Passage Plan, a daily mortality rate of 6% or higher for three consecutive days would trigger additional action. Wagner replied that the purpose of the proposed change in Dworshak operations is to stay ahead of the curve, to avoid a fish health

problem.

The group discussed the possibility of keeping the Dworshak outflow at its current level of 9.5 Kcfs, but reducing the release temperature of the water. It was agreed that more information is needed from the Fish and Wildlife Service about the effects of a lower Dworshak outflow on juveniles in the Lower Clearwater.

John Wellschlager said that, given the cost of this operation – 2 Kcfs of spill costs ratepayers about $100,000 per day at Dworshak – BPA would prefer to spill for as short a duration as possible. It was agreed to reconvene via conference call at 11 a.m. Monday to revisit this operation.

Henriksen summarized the change in Dworshak operations by saying that the Corps will increase Dworshak outflow to 11.5 Kcfs as soon as possible. The Corps will monitor the dissolved gas situation below Dworshak closely. The TMT will revisit the operation on Monday morning, and will likely reduce Dworshak outflow to full powerhouse capacity later that day. With that, today's conference call was adjourned.

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT CONFERENCE CALL

Monday 26 July, 2004 1100 - 1200 hours

Custom House Room 118

Portland, Oregon

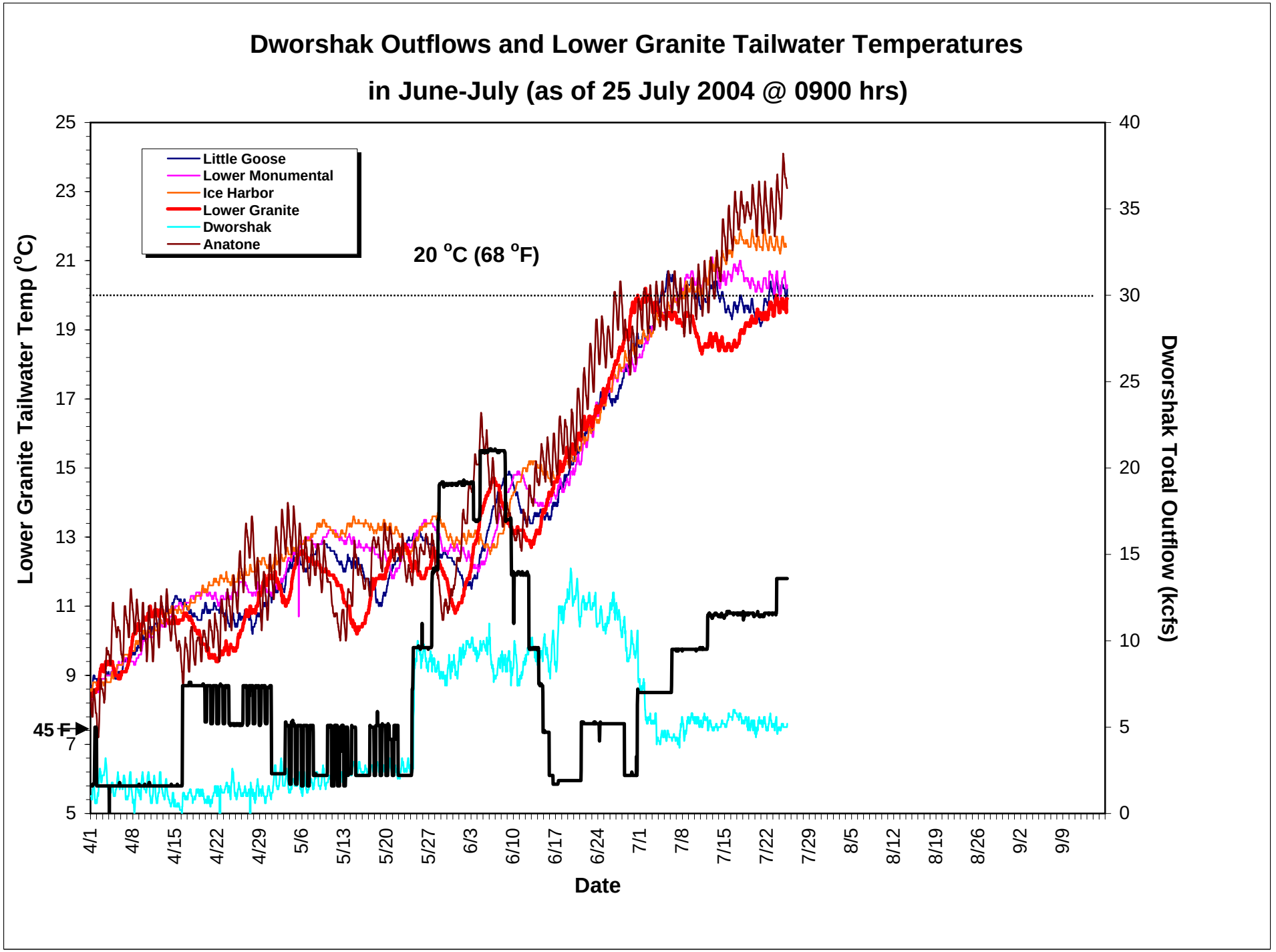
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

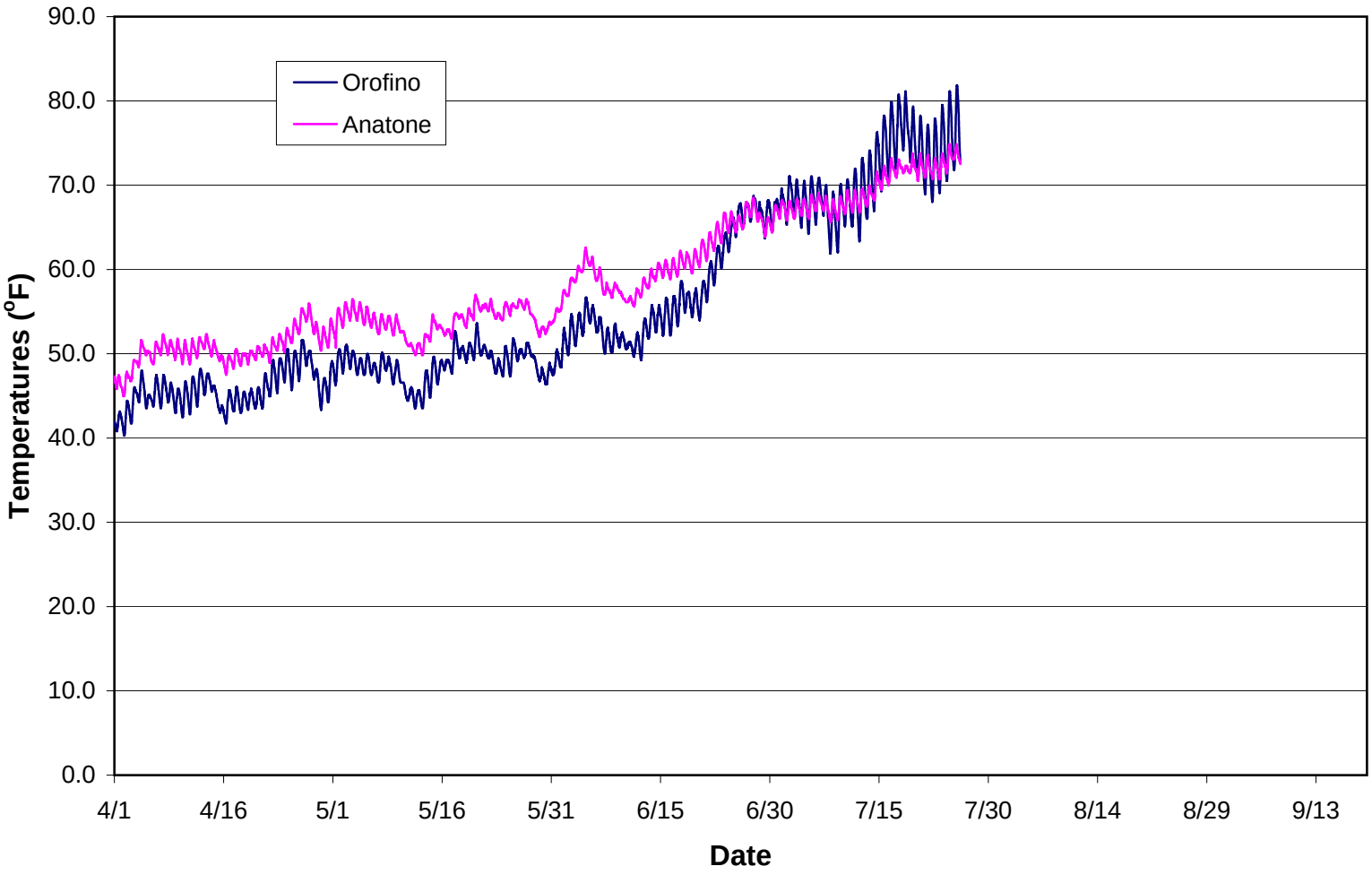
AGENDA

1. Dworshak summer operations. [Lower Snake Temperatures]

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942


Dworshak Outflows and Lower Granite Tailwater Temperatures
in June-July (as of 25 July 2004 @ 0900 hrs)
Little Goose
Lower Monumental
Ice Harbor
Lower Granite
Dworshak
Anatone
20 °C (68 °F)
45 F
Lower Granite Tailwater Temp (°C)
Dworshak Total Outflow (kcfs)
Date
25
23
21
19
17
15
13
11
9
7
5
40
35
30
25
20
15
10
5
0
4/1
4/8
4/15
4/22
4/29
5/6
5/13
5/20
5/27
6/3
6/10
6/17
6/24
7/1
7/8
7/15
7/22
7/29
8/5
8/12
8/19
8/26
9/2
9/9

Middle Snake & Tributaries Temperatures



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 26, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Dworshak Operations:

A TMT conference call was held on Friday, July 23, to discuss a request from the salmon managers to increase Dworshak flows to 14 kcfs to get ahead of forecasted high temperatures by using Dworshak to reduce the tailwater temperature at Lower Granite. Cool water was the primary objective of the requested emergency operation. At the COE's suggestion, Paul Wagner, NOAA, checked with the USFWS hatchery downstream of Dworshak to discuss the possibility of decreasing Dworshak releases to 43°water, rather than increasing flows to meet cooler water objectives. TMT members agreed that saving water in the reservoir would be beneficial for everyone. The hatchery responded that cooler water was not acceptable over the weekend due to last minute scheduling issues at the hatchery, but that it would be acceptable the following (this) week.

Ron Boyce, Oregon, reported on an FPAC call today (July 26), at which the salmon managers discussed Dworshak releases and current conditions. Lower Granite tailwater temperatures have moderated and air temperatures are expected to do the same, so the salmon managers requested that Dworshak discharges be decreased from the current 13.7 kcfs to 11.2-11.5 kcfs as soon as possible, and to decrease Dworshak releases to 43° water. The USFWS hatchery, as noted above, agreed to this lower temperature operation for this week and requested that the COE notify them if/when this change will occur.

ACTION: TMT members agreed to the salmon managers' requested operation. The COE will reduce outflows at Dworshak immediately. The temperature decrease will take about 8 hours. The COE will coordinate with the hatchery regarding the decreased temperature, and Cindy Henriksen will send an email to TMT members after the coordination, notifying them if there will be a temperature change or not after this week. The salmon managers will continue to monitor conditions.

It was noted that the operation change on Friday was indeed beneficial for the fish, and NOAA and other salmon managers expressed appreciation to the action agencies for a timely response to the request. Ron Boyce, Oregon, noted that McNary temperatures have been quite high recently and suggested that this project also continue to be closely monitored.

Next Meeting, Wednesday, August 4th, 9am-noon:

Agenda Items:

- Fall Fisheries, Fish Run Finals – WDFW
- Sturgeon Update – USFWS
- Dworshak Temperatures, Operations Update
- Tribal Summer Fishery Review – CRITFC
- Libby/Hungry Horse Operations Update
- Status of Spill
- System Operations Status

**Participants on today's conference call*: Jim Adams, Dave Benner, Scott Bettin, Ron Boyce, Scott Boyd, Robin Harkless, Cindy Henriksen, Cathy Hlebechuk, Russ Kiefer, Kyle Martin, Donna Silverberg, Dave Statler, Paul Wagner, John Wellschlager

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
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COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday August 04, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed.
Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Fall Fisheries, Fish Run Finals
    i. [Columbia River Fish Runs and Fisheries - Power Point] - (Cindy LeFleur - WDFW August 2004)
3. Sturgeon Update - USFWS
4. Dworshak temperatures, operations updates.
    i. [Clearwater River at Peck (1979, 1991, 1994 weather) and Lower Granite Dam (1979, 1991, 1994 weather)]
5. Zone 6 Tribal Summer Fishery Review - CRITFC
    i. [Impact of Pool Fluctuations on the 2004 Summer Treaty Fishery]
6. Lower Granite Powerhouse outage update August 16 - 19 daily 0700 - 1700 hours.
7. Update of Libby/Hungry Horse Operations
8. Bonneville Spillway Flow.
    i. [BONNEVILLE SPILL FLOW 7/30/2004]
    ii. [Bonneville Spillway Flow Discrepancy - Power Point] - (Laurie Ebner- NWP)
9. Status of Spill
10. Status of Operation
    a. Reservoirs
    b. Fish
    c. Power System
    d. Water Quality
        1. Temp
            i. [McNary Water Temperatures]
            ii. [Dworshak Outflows and Lower Granite Tailwater Temperatures]
            iii. [2004 - CHANGES IN WATER TEMPERATURE OVER TIME DWORSHAK RESERVOIR 2003 - CHANGES IN WATER TEMPERATURE OVER TIME DWORSHAK RESERVOIR]
        2. Spill

i. [AVERAGE DAILY SPILL July 19 - August 2, 2004]
ii. [EXCEEDANCE TYPES Ju1y 18 – August 2, 2004]

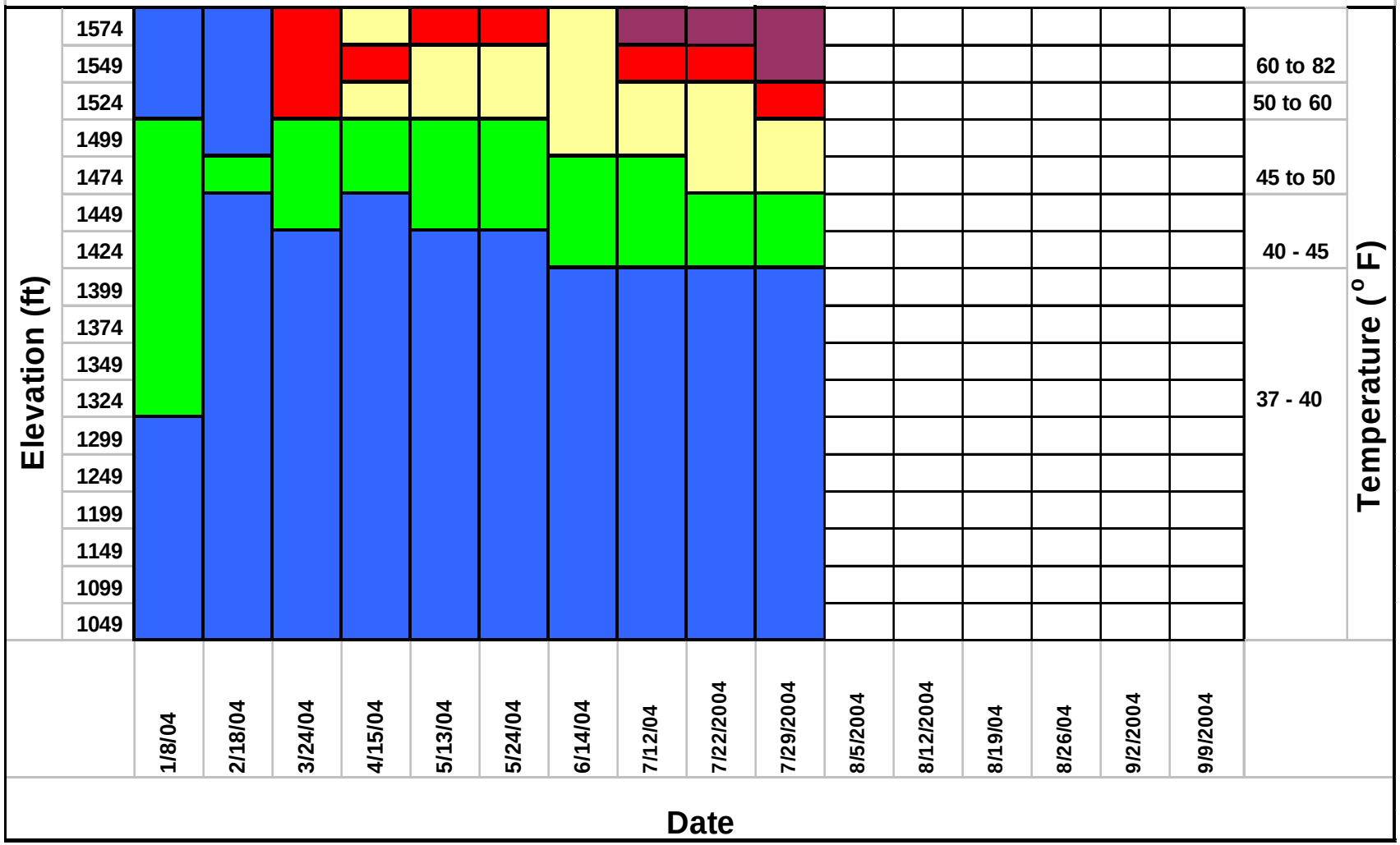
3. TDG
   i. [Average percent TDG for 12 highest hours - July 2004]
   ii. [Average percent TDG for 12 highest hours - August 2004]

e. Other
- Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

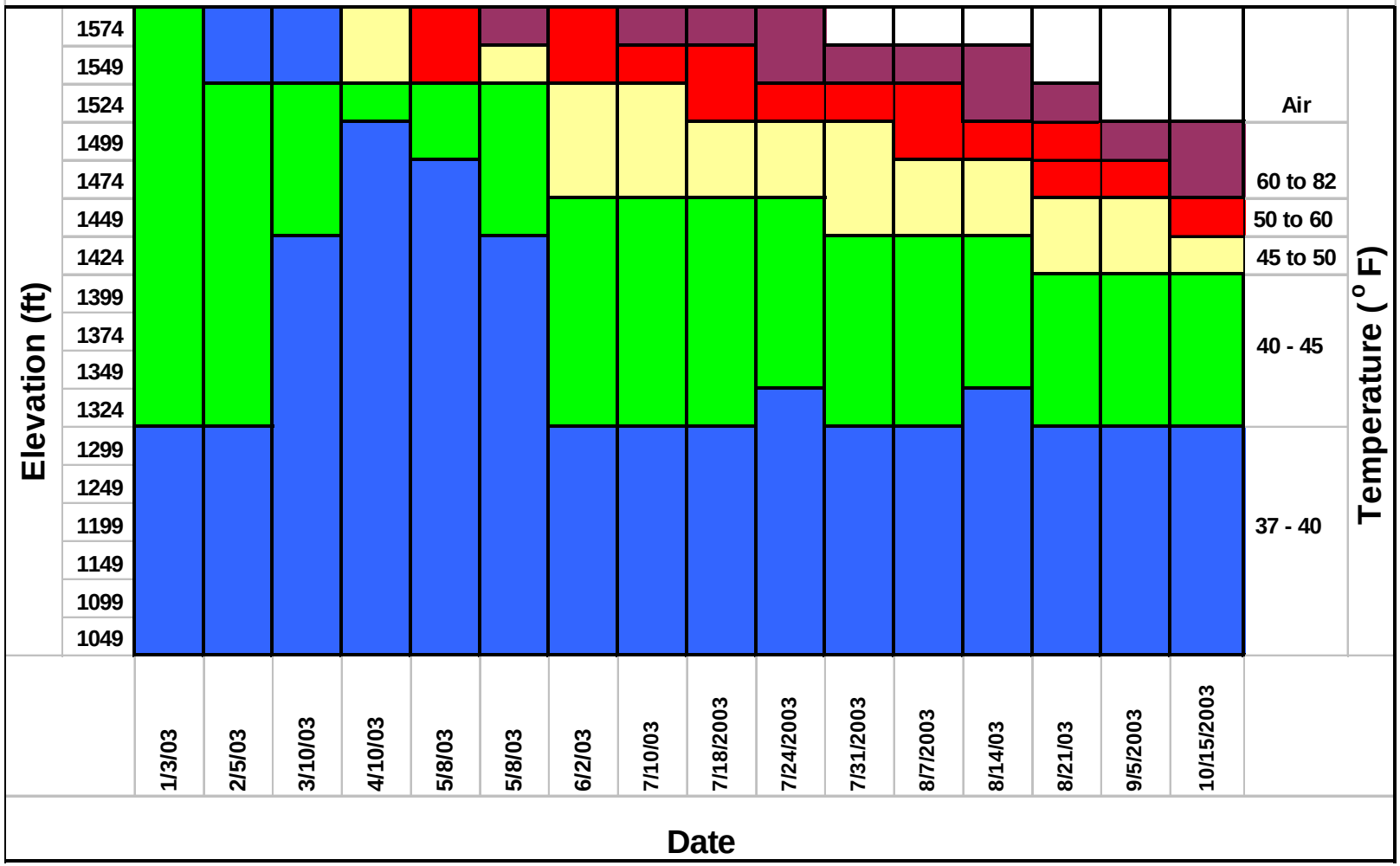
2004 - CHANGES IN WATER TEMPERATURE OVER TIME

DWORSHAK RESERVOIR



2003 - CHANGES IN WATER TEMPERATURE OVER TIME

DWORSHAK RESERVOIR



BONNEVILLE SPILLWAY FLOW

Testing and measured evidence suggests the painted dog markings on the walls of the gate wells at Bonneville Dam are inappropriately placed. These markings are used to calibrate the instruments that the project uses to measure gate openings. Those instruments then populate the control system that is used to control the spill flow.

Because the dog markings are misplaced, the spill quantity being reported at Bonneville Dam may not represent the actual quantity being spilled. The discrepancy may date back to the early 1970s, but may have become apparent in 2002 when the spill pattern was changed from having the majority of flow at the end bays of the spillway, which required the affected gates to be open more, to spreading the spill out equally across all 18 spill bays. This is more noticeable when the gates are at low openings of .5 ft –1.0 ft. The difference between the reported flow and actual flow for each gate is a greater percentage of the flow through that gate and, since more gates are at .5 ft- 1.0 ft open at lower spill quantities, the total difference becomes more apparent.

All dams have some level of inaccuracy in the flow and spill being monitored and reported. The table below shows the potential variation the Corps is evaluating at Bonneville Dam.

SPILL FLOW QUANTITIES BASED ON CURRENT DOG MARKINGS			
REPORTED SPILL FLOW	POTENTIAL SPILL FLOW	DIFFERENCE	PERCENT DIFFERENCE
50Kcfs	35Kcfs	-15Kcfs	29.8%
75Kcfs	64Kcfs	-11Kcfs	14.5%
100Kcfs	90Kcfs	-10Kcfs	9.6%
125Kcfs	118Kcfs	-7Kcfs	5.6%
150Kcfs	143Kcfs	-7Kcfs	4.1%

NEXT STEPS

To respond to the discrepancy in spill, the Corps will change the spill gate settings at Bonneville Dam. The Corps is completing a research operation where the outflow had been 50 kcfs around the clock. The last treatment of the test is to operate with daytime spill of 75 kcfs and nighttime spill up to the gas cap. The last test block is to continue through August 1 at 0500 with this operation.

Beginning August 1 at 0500, Bonneville Dam outflow will be increased during daytime hours to assure an actual 75 kcfs spill volume. As a result, the reported spill during daytime hours on Sunday, August 1 will be about 85 kcfs or 86 kcfs. The spill pattern will be that shown in the 2004 Fish Passage Plan for a volume of 75 kcfs. with each gate opened an additional 0.3 feet. Nighttime spill will be up to the gas cap as measured at downstream fixed monitoring stations. The Corps' Hydraulics Section is examining the spillway and is preparing a proposal to verify the rating tables at Bonneville and other Corps Dams. When this is finished, the appropriate permanent adjustments will be made at Bonneville Dam.

This issue will be discussed in more detail at the TMT meeting Wednesday, August 4. If you have other questions in the meantime, please call Cindy Henriksen at (503) 808-3945.

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Portland District

Bonneville Spillway Flow Discrepancy

TMT – August 4th 2004

Laurie Ebner
Hydraulic Engineering – Portland District
US Army Corps of Engineers

US Army Corps of Engineers ®
Portland District

Flow Discrepancy

- Flow discrepancy between Bonneville and The Dalles reported in 2003
- Project discharge at Bonneville should be higher than The Dalles (additional inflow)
- Discrepancy appeared to correspond to new spill patterns instituted at Bonneville in 2002
- Initially uncertain if discrepancy at Bonneville or The Dalles.
  - Web data for The Dalles is verified by comparing to the USGS gauge data at The Dalles (just downstream of the project) – "http://waterdata.usgs.gov/nwis/uv?14105700"

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Bonneville Spillway Gate History

- Originally two gate types
  - 50 foot high gates (Bays 4-15)
  - 60 foot high gates (Bays 1-3, 16-18)
- Bonneville Rating Curve updated in 1967
- In 1972 all gates were modified to 60 foot high gates and all of the gate bottom edges were modified from a flat bottom plate to one with a 45 degree angle to reduce vibration.
  - The modified gate edges may have changed the flow characteristics and thus the discharge coefficient.

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Bonneville Spillway Gate History

- Discrepancy between actual gate opening and reported gate opening (gate is approximately 4 inches lower than being reported) for openings of 0-2 feet.
- Additional measurements need to be taken to determine over what range this error applies.

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Planned Actions

- Develop plan for calibration of each spillway gate – available for review 8/11/2004
- Calibrate/verify the gate opening for each spillway gate
- Verify rating curve (especially for small gate openings)
- Verify that changes implemented take care of the historical discrepancy in total river flow between The Dalles and Bonneville
- Develop strategy to communicate discrepancy so previous published work can be properly interpreted

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Portland District

Additional Facts

- Large 50 foot vertical lift spillway gates are not typically designed for fine regulation of flow. The uncertainty or range of error at small gates openings defined as less than about 10% of the gate height (5 feet for Bonneville) is large.
- There is always inherent uncertainty when regulating a river system. Sources of discharge error at a large project like Bonneville Dam include:
  - Tributary contributions
  - Ladder and other miscellaneous flows
  - At best, a 5% difference between actual and computed discharge at a project would be considered good agreement.

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Additional Facts

- The calibration errors would be significant only when the project was trying to meet a target discharges such as the 75K daytime spill (set for adult fallback purposes) or some other target. Typically, the project discharges through the spillway at the gas cap discharge – at which time the gas concentration in the river downstream determines the spill volume that can be passed.
- When total river flows exceed the powerhouse capacity, the flow is discharged through the spillway, increasing the 75K daytime spill. Reducing the error in discharge measurements since the largest error occurs at low spillway discharges.

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Spill Discrepancy Estimates

Data will be updated after completion of spillway gate calibration

Spill Requested	Old Spill Pattern			New Spill Pattern (2002)		
	Desired	Actual	Error	Desired	Actual	Error
50	51	48	0.06	50	35	0.30
75	79	74	0.06	75	64	0.15
125	125	118	0.06	125	118	0.06

Assumes a Bonneville Forebay of 74 feet

Desired is using actual gate opening requested and coefficient as determined in 1967 model work.

Actual is subtracting 0.3 feet from gate opening and using the same coefficients as desired but modified based on gate opening.

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Recommendations

- Modify the measurement system at Bonneville such that the reported flow from Bonneville is closer to the actual flow.
- Develop and Coordinate plan to calibrate each spillway gate.
- Perform spillway gate calibration.
- Verify that corrections for each spillway gate opening account for discrepancy in total river flow between The Dalles and Bonneville.
- Develop communication plan for the region

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Portland District

Bonneville Gate Openings in Dogs and Feet

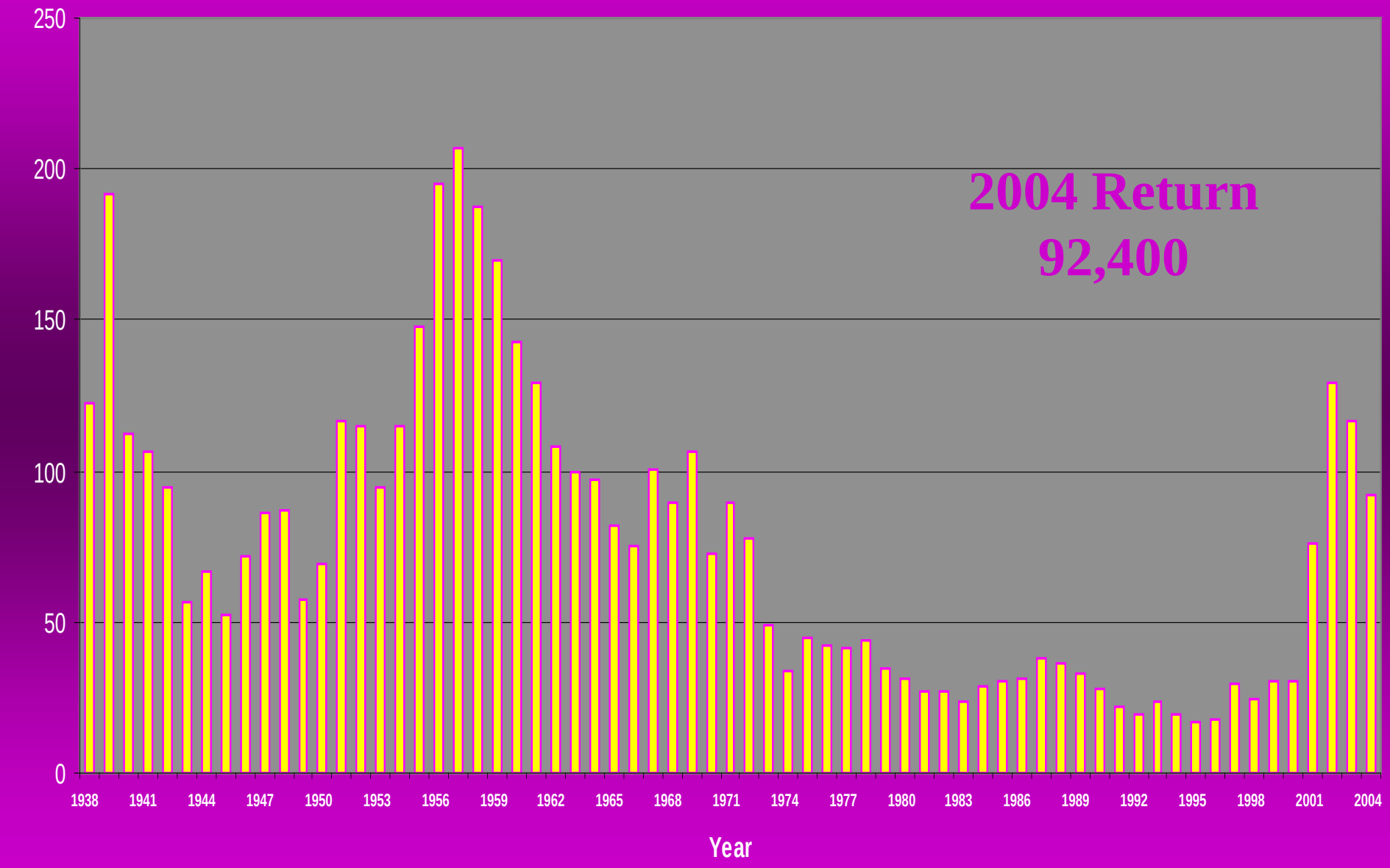
Bonneville Spillway Gates		
Opening	50 ft gate	60 ft gate
Dogs	feet	feet
1	0.73	1.06
2	2.65	2.98
3	4.56	4.89
4	6.48	6.81
5	8.4	8.73
6	10.32	10.64
7	12.23	12.56
8	14.15	14.48
9	16.07	16.4
10	17.98	18.31

Source of information is 1967 rating curve analysis.

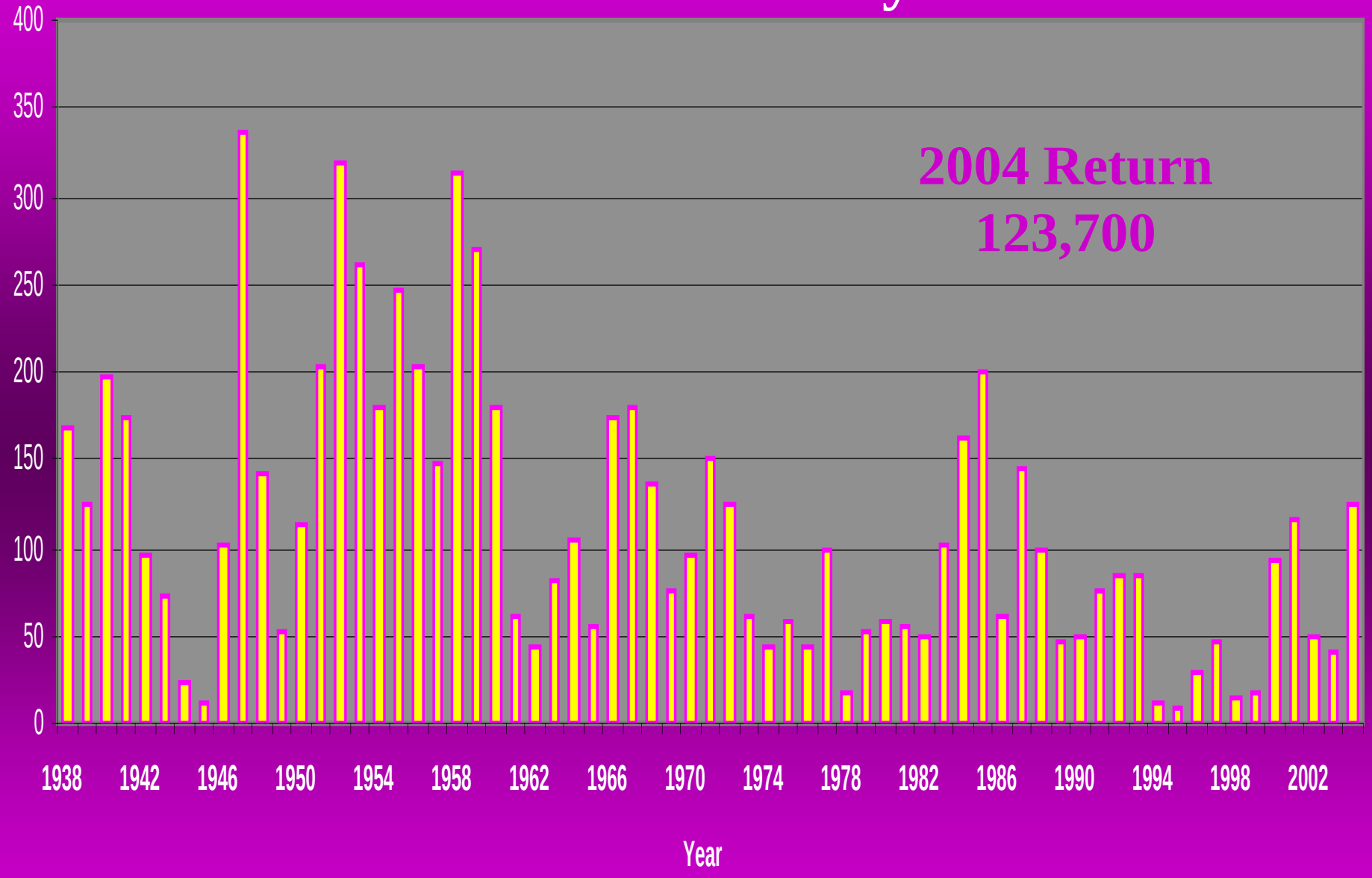
Columbia River
Fish Runs and Fisheries

Cindy LeFleur
WDFW
August 2004

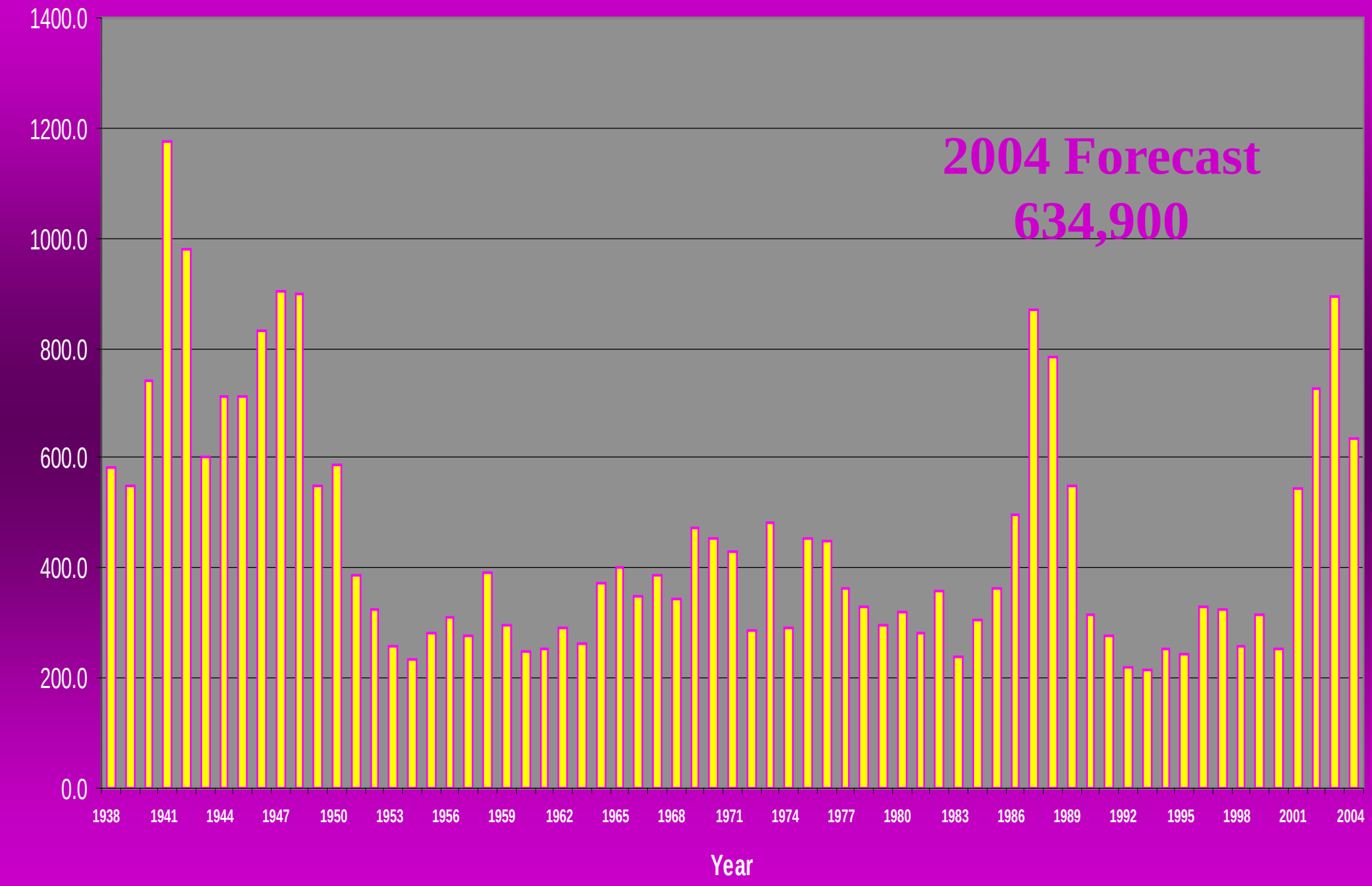
Columbia River Summer Chinook Returns



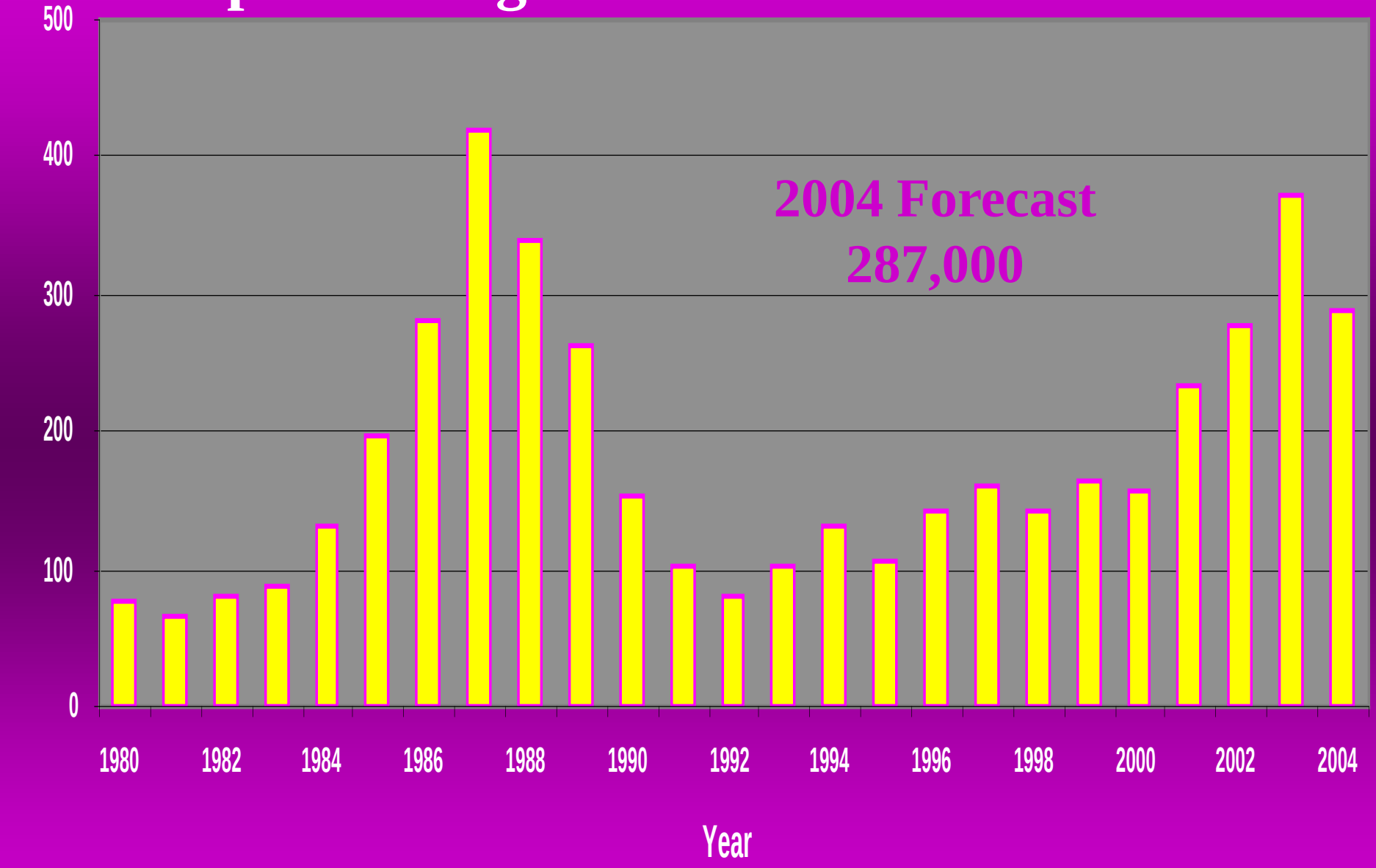
Columbia River Sockeye Returns



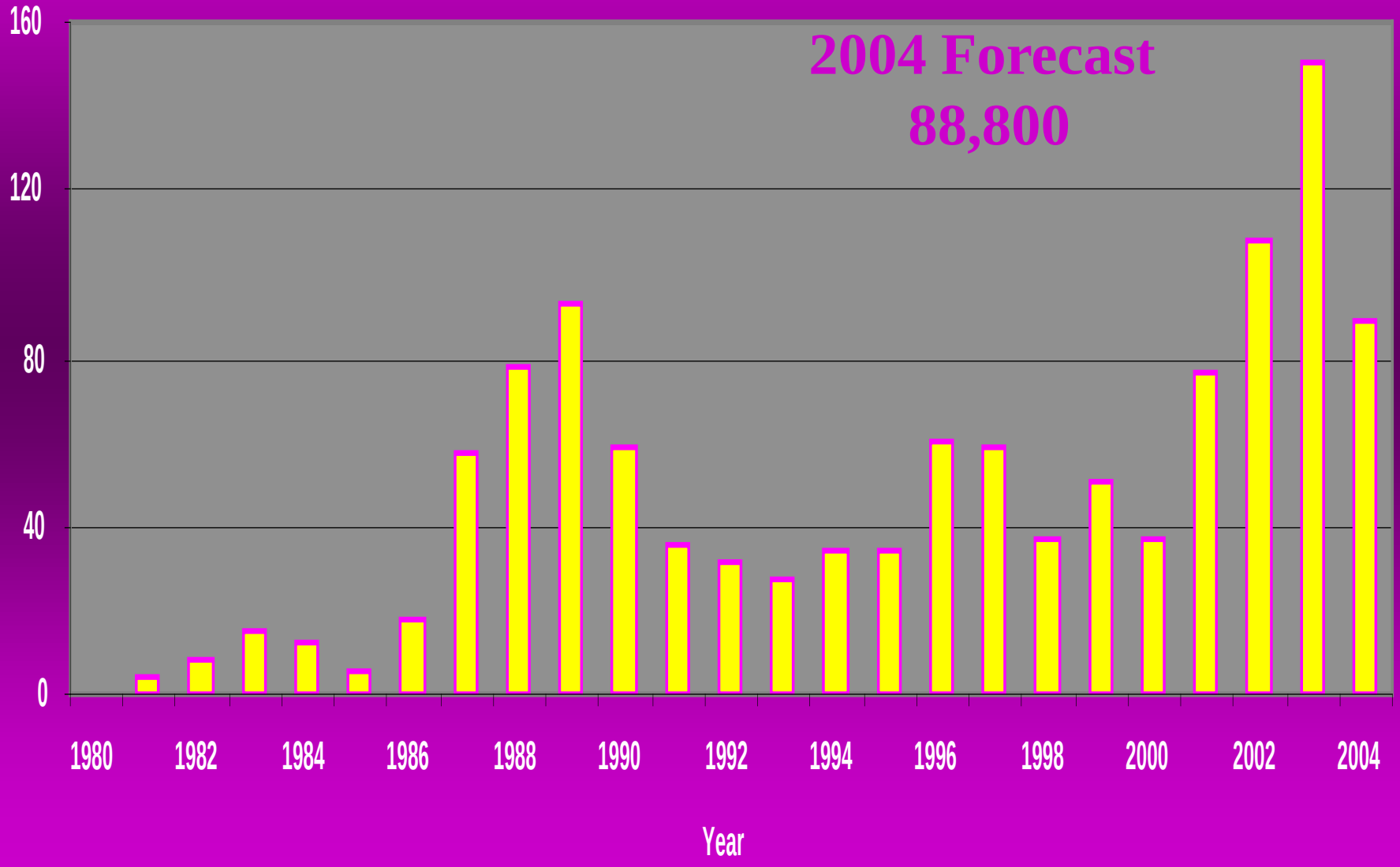
Columbia River Fall Chinook Returns



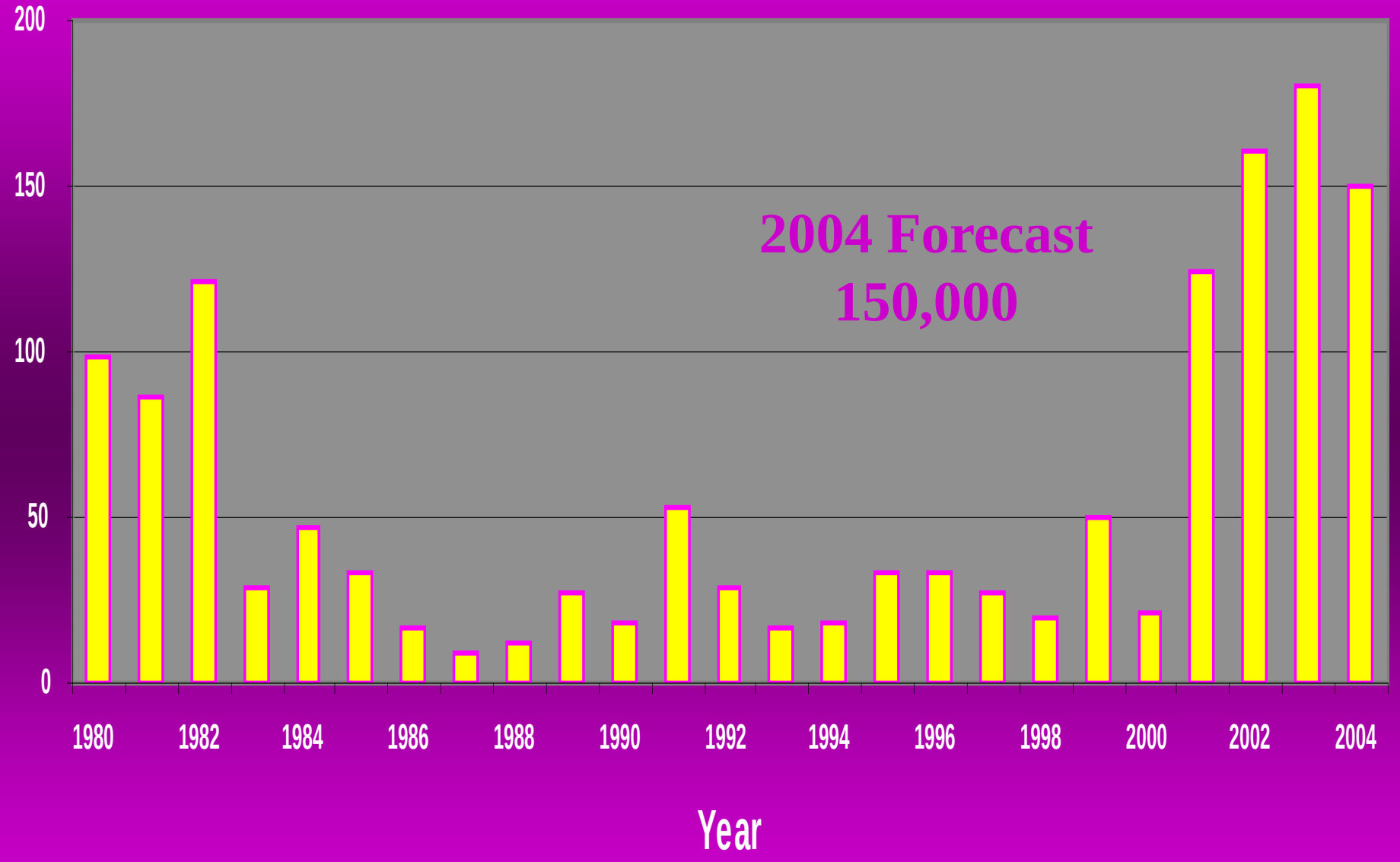
Upriver Bright Fall Chinook Returns



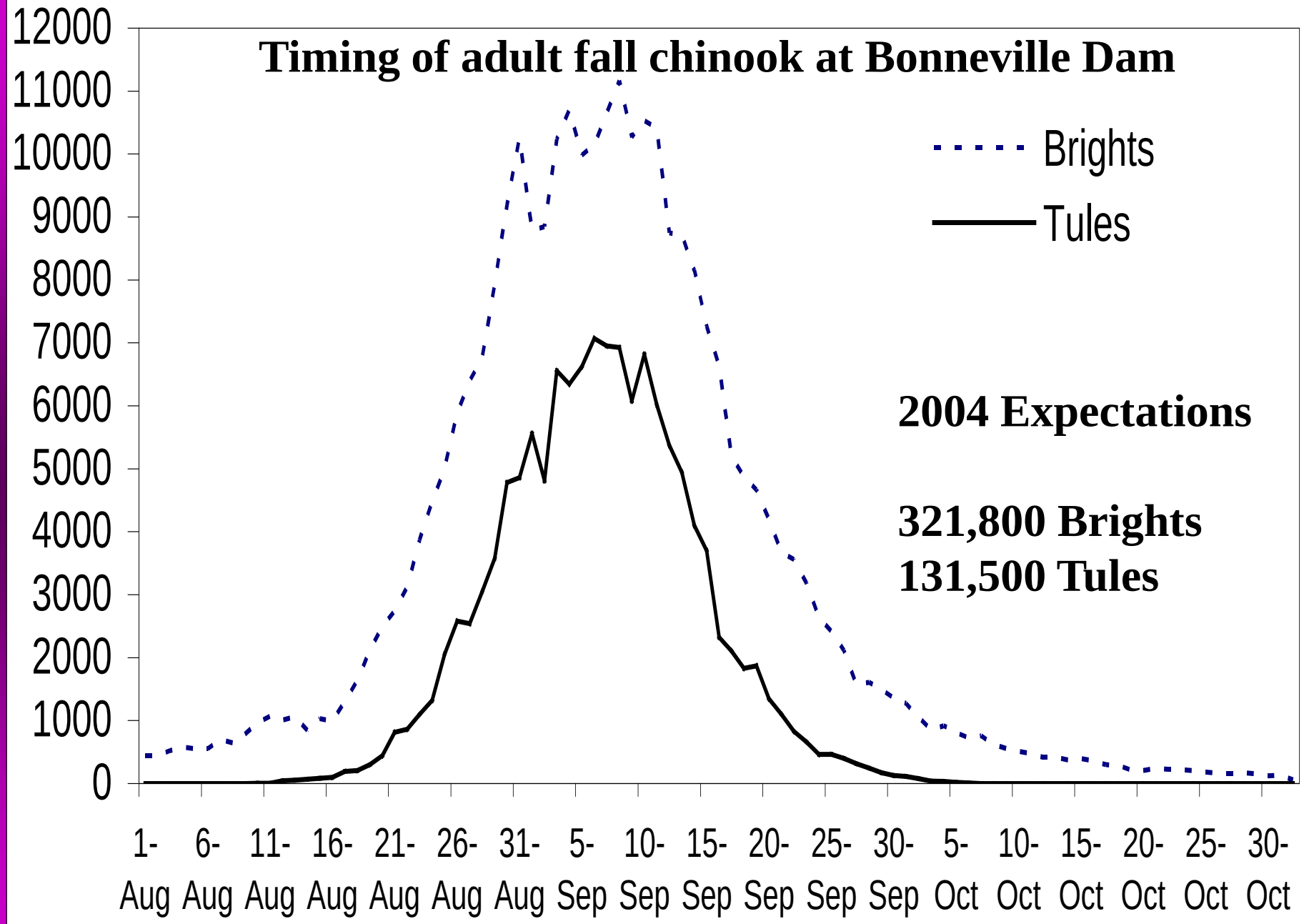
Mid-Columbia Bright Fall Chinook Returns



Bonneville Pool Hatchery Fall Chinook Returns

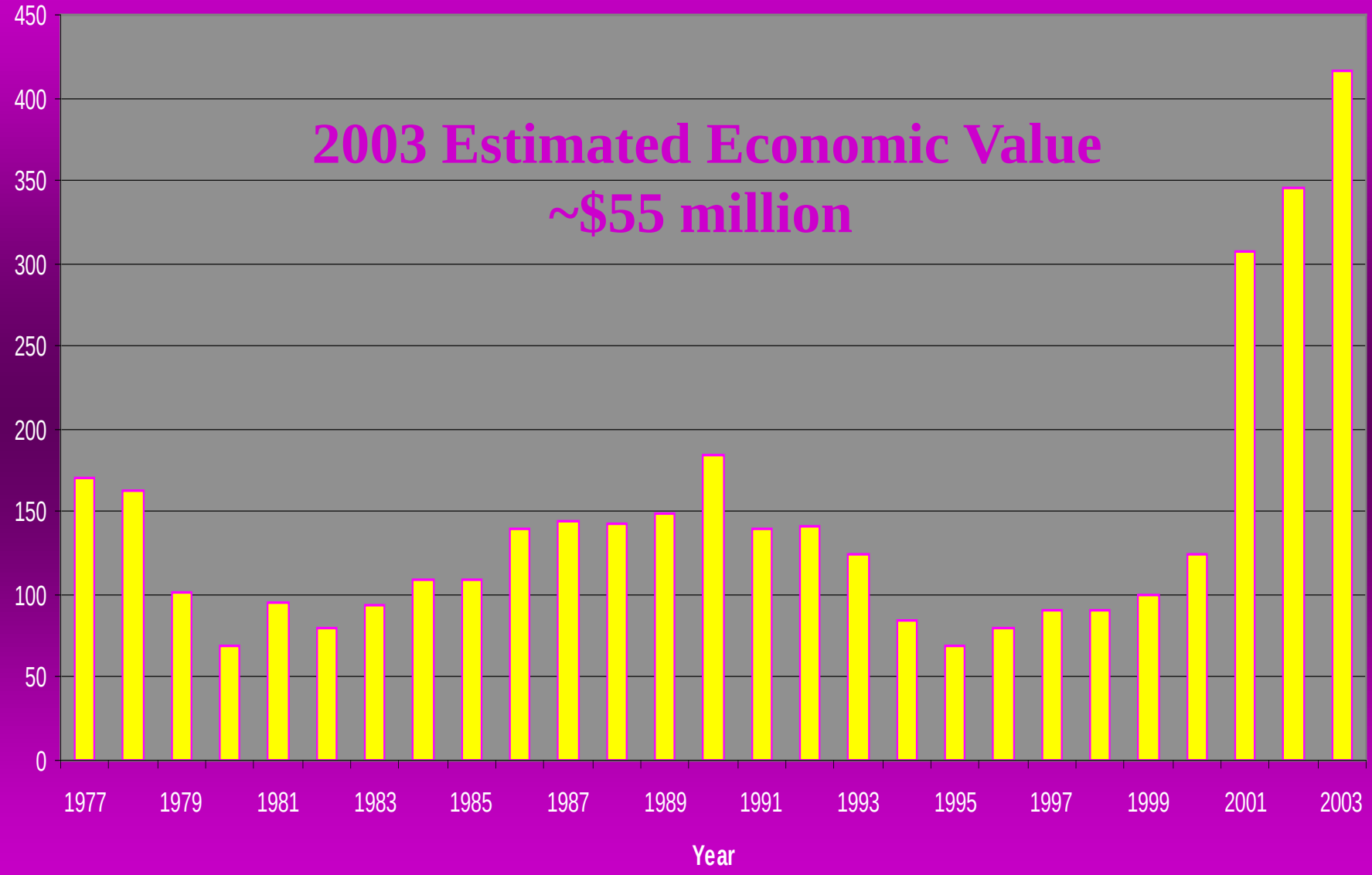


Bonneville Dam Observation


Timing of adult fall chinook at Bonneville Dam
Brights
Tules
2004 Expectations
321,800 Brights
131,500 Tules
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Aug
6-Aug
11-Aug
16-Aug
21-Aug
26-Aug
31-Aug
5-Sep
10-Sep
15-Sep
20-Sep
25-Sep
30-Sep
5-Oct
10-Oct
15-Oct
20-Oct
25-Oct
30-Oct

Columbia River Recreational Fisheries

Salmonid Angler Trips Below Bonneville Dam



Columbia River Commercial Fisheries

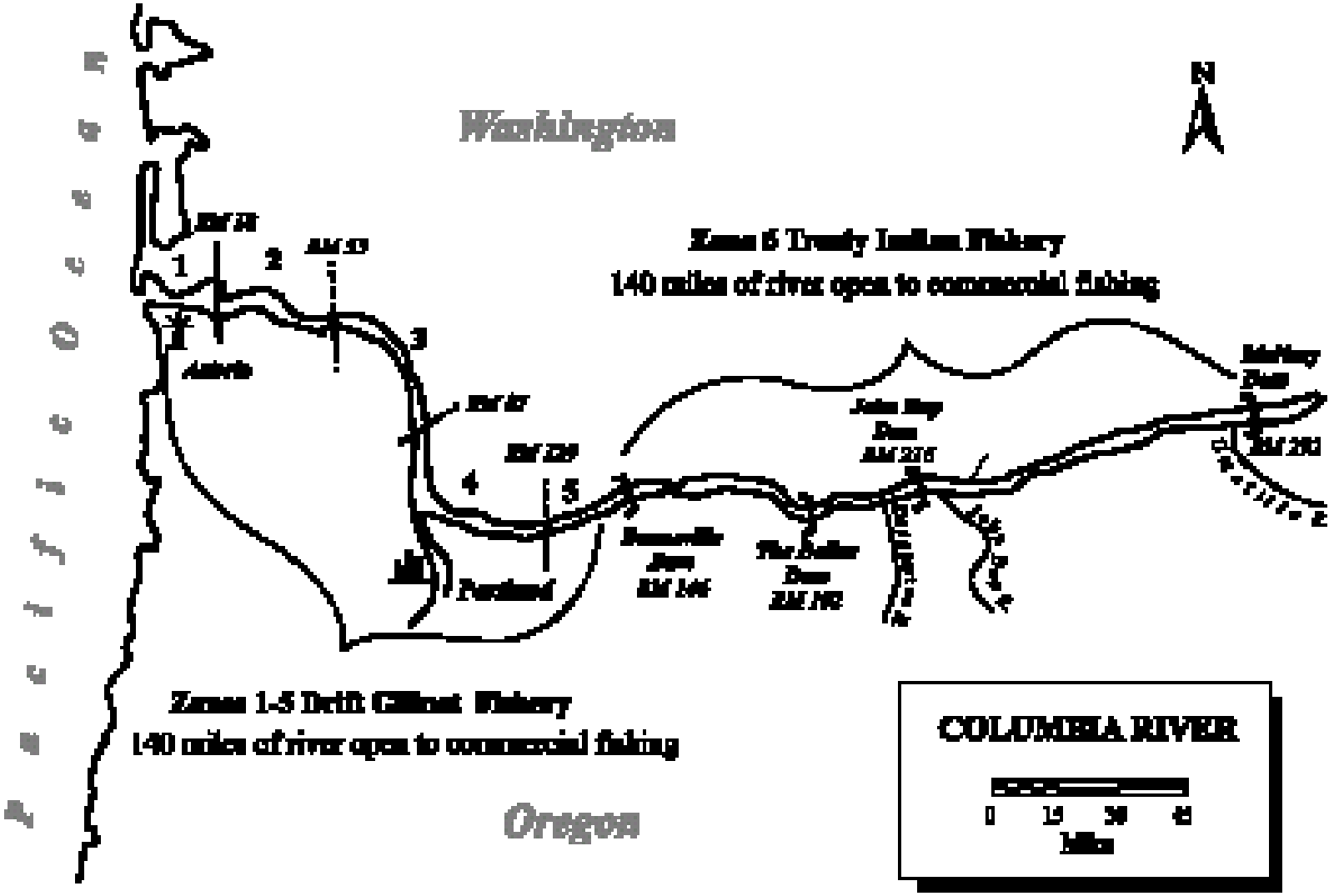
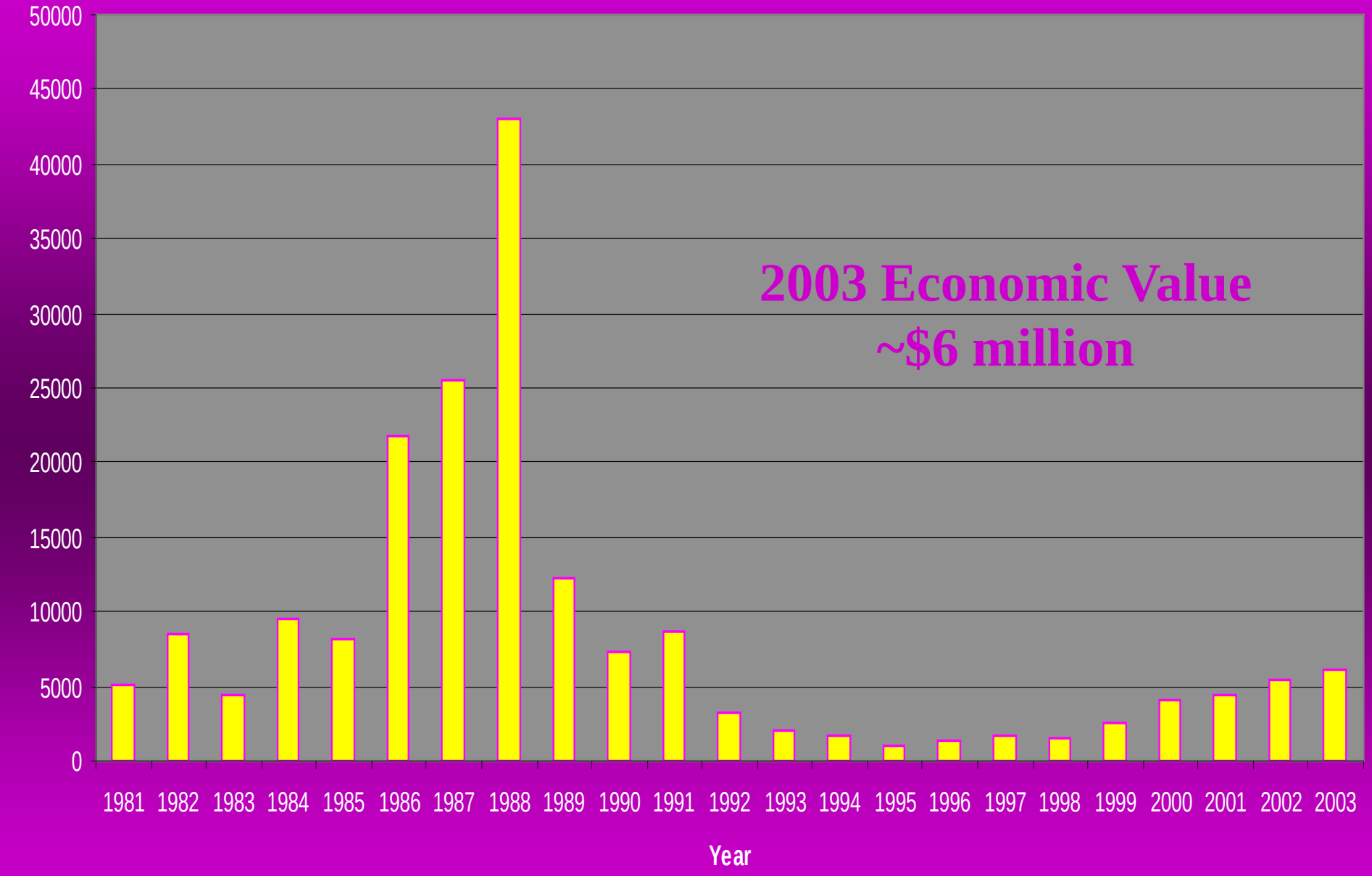


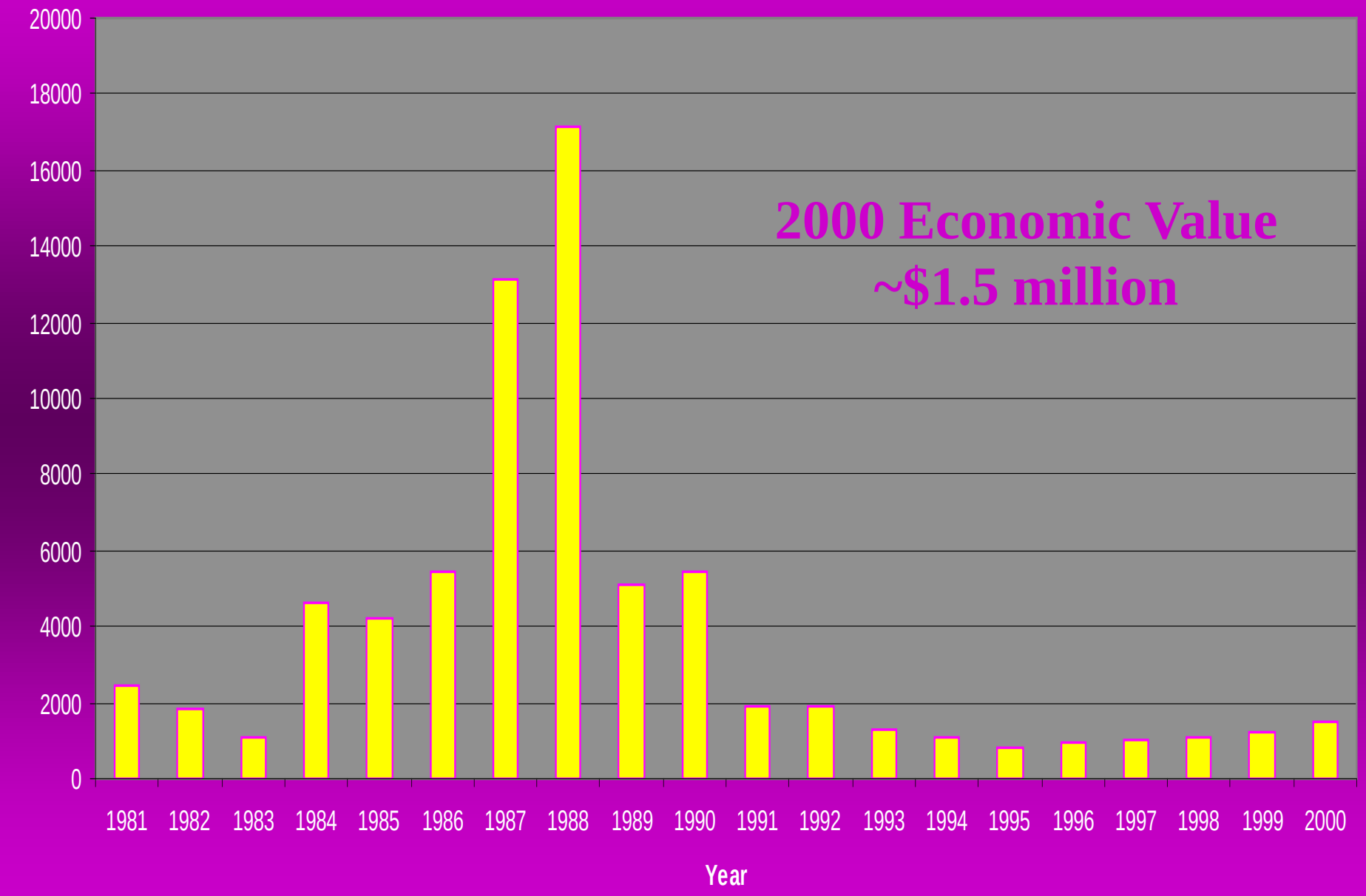
Figure 2. Map of the Columbia River Below McNary Dam Showing Areas Open to Commercial Fishing.

Economic Value of Non-Indian Commercial Fisheries



Columbia River Treaty Indian Fisheries

Economic Value of Treaty Indian Commercial Fisheries



Management Guidelines

ESA – Endangered Species Act

Snake River Fall Chinook
Lower Columbia Chinook
Steelhead (4 ESUs)
Lower Columbia Chum

Oregon State ESA –

Lower Columbia Wild Coho

Management Guidelines

31.29% URB harvest rate

- 8.25% non-Indian
- 23.04% treaty Indian

17% impact rate on wild Group B steelhead

- 2% non-Indian
- 15% treaty Indian

WDFW Web Site

http://www.wdfw.wa.gov/fish/crc/crcindex.htm

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Columbia River Compact

Joint Staff Reports
Joint State Action Notices
Fact Sheets

ODFW Web Site

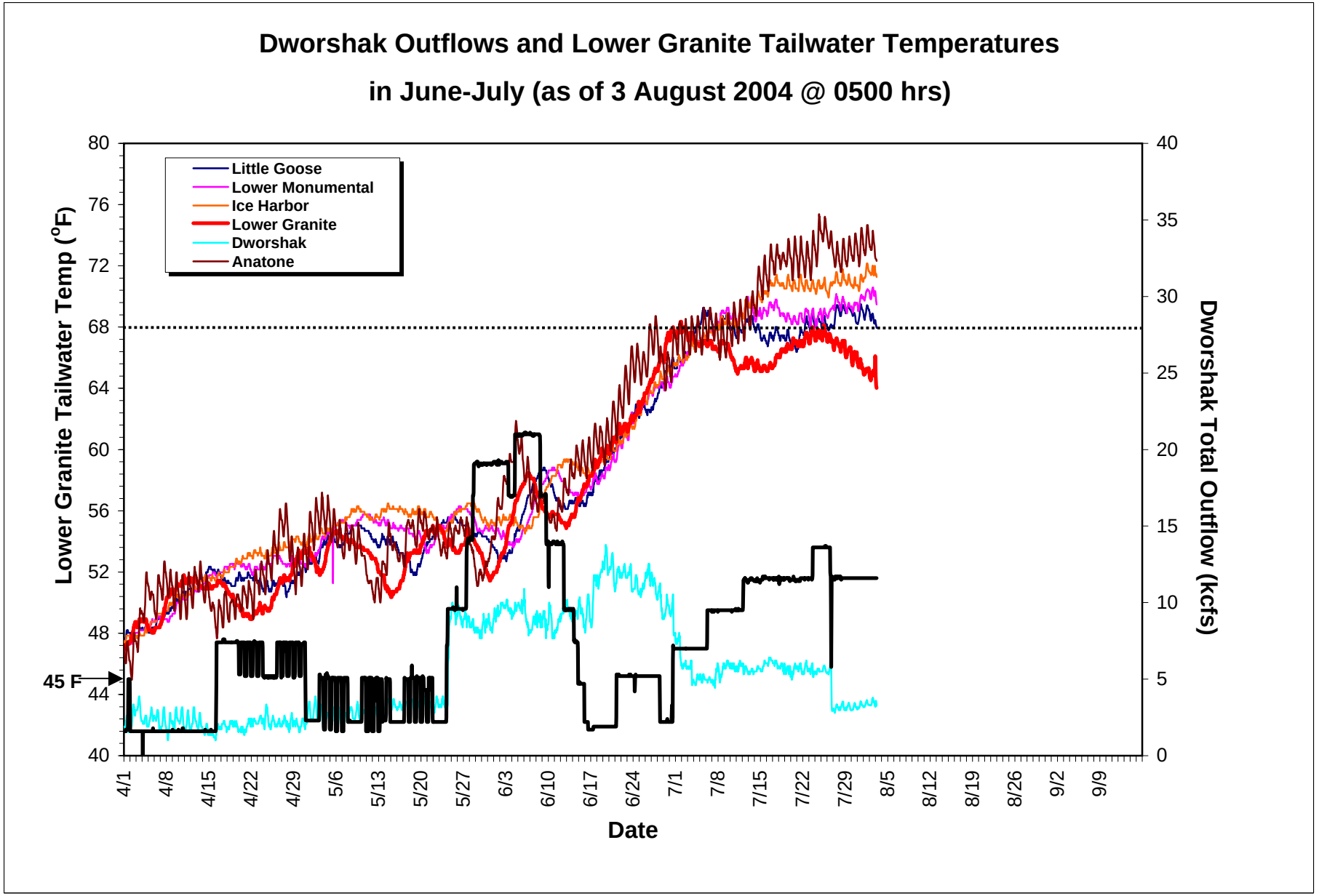
http://www.dfw.state.or.us/ODFWhtml/InfoCntrFish/InterFish/crm.html#LastAction

Columbia River Fisheries and Management
In-Season Information Page

Joint Staff Reports

Joint State Action Notices

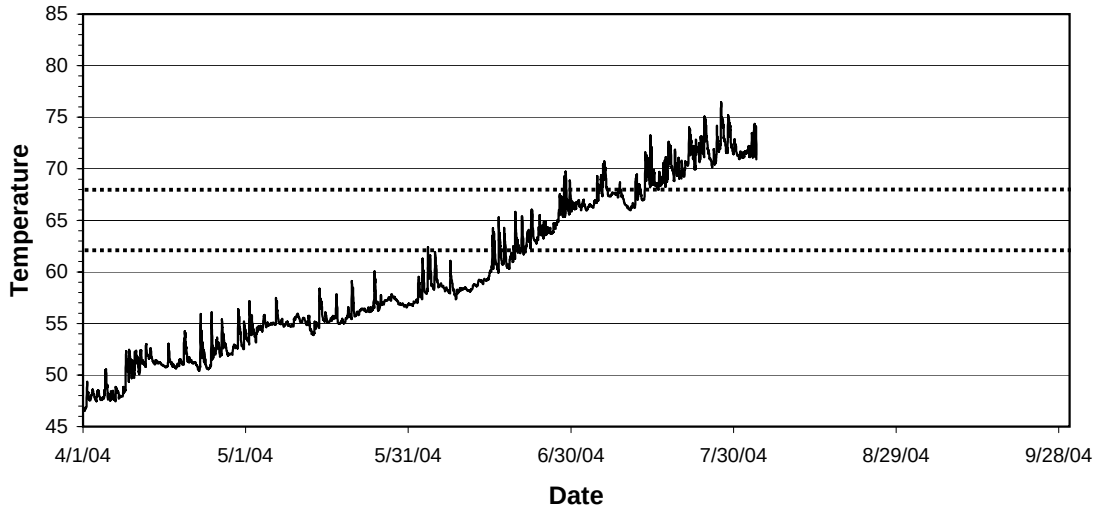
Fact Sheets


Dworshak Outflows and Lower Granite Tailwater Temperatures
in June-July (as of 3 August 2004 @ 0500 hrs)
Little Goose
Lower Monumental
Ice Harbor
Lower Granite
Dworshak
Anatone
45 F
Lower Granite Tailwater Temp (°F)
Dworshak Total Outflow (kcfs)
Date
80
76
72
68
64
60
56
52
48
44
40
40
35
30
25
20
15
10
5
0
4/1
4/8
4/15
4/22
4/29
5/6
5/13
5/20
5/27
6/3
6/10
6/17
6/24
7/1
7/8
7/15
7/22
7/29
8/5
8/12
8/19
8/26
9/2
9/9

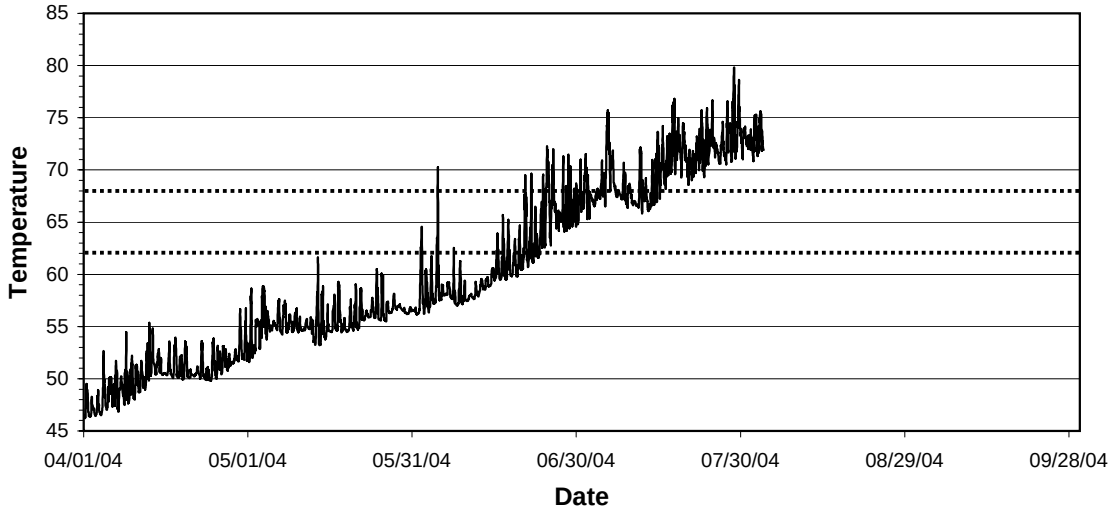
McNary Water Temperatures

(As of 3 August 2004 @ 0500 hrs)

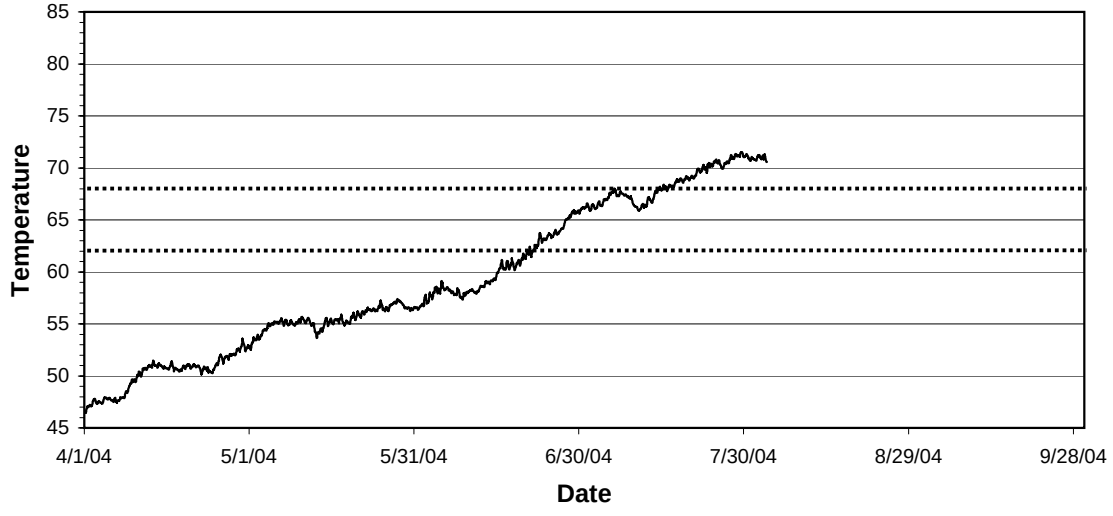
McNary Forebay (Washington Side)

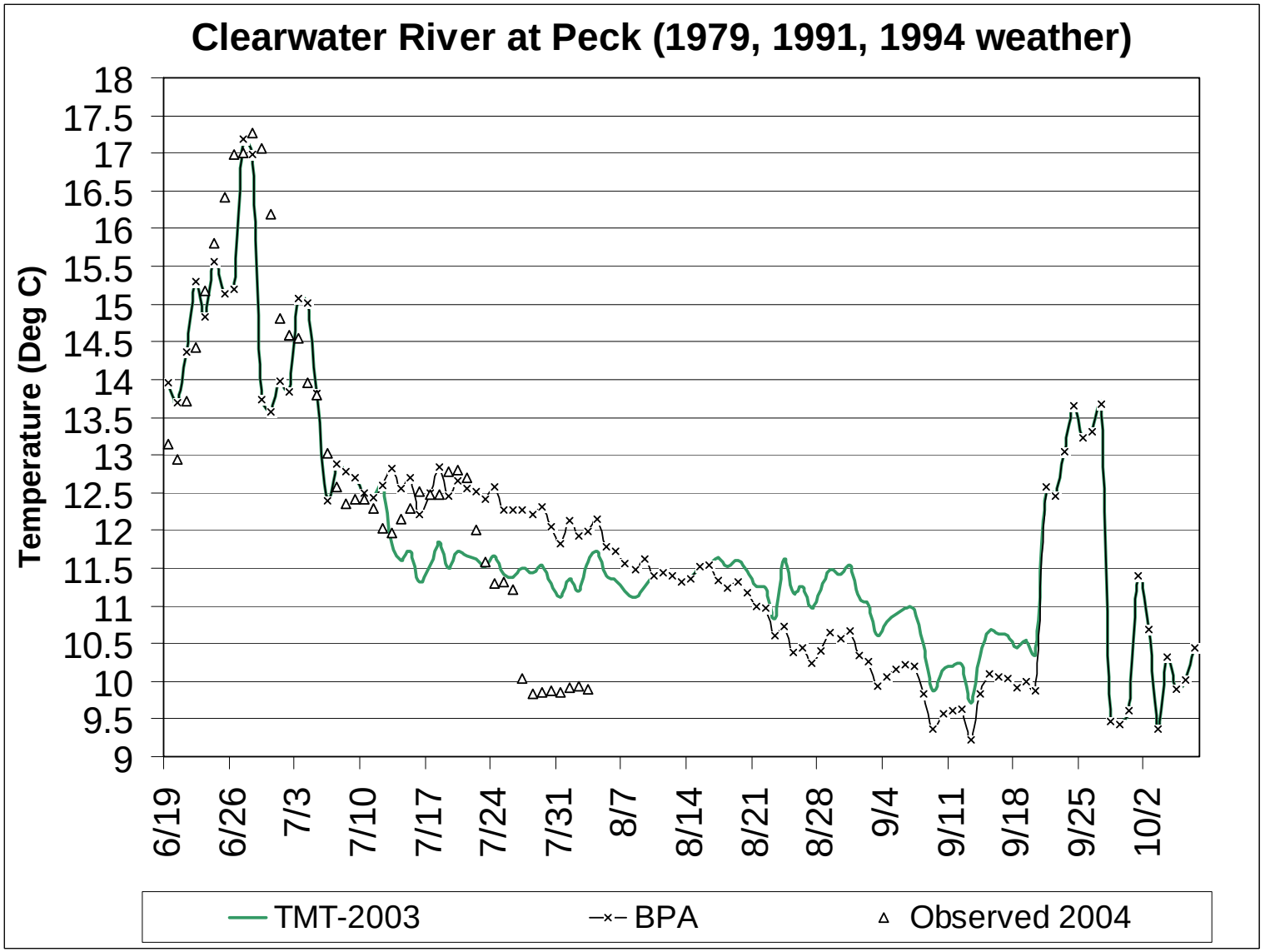


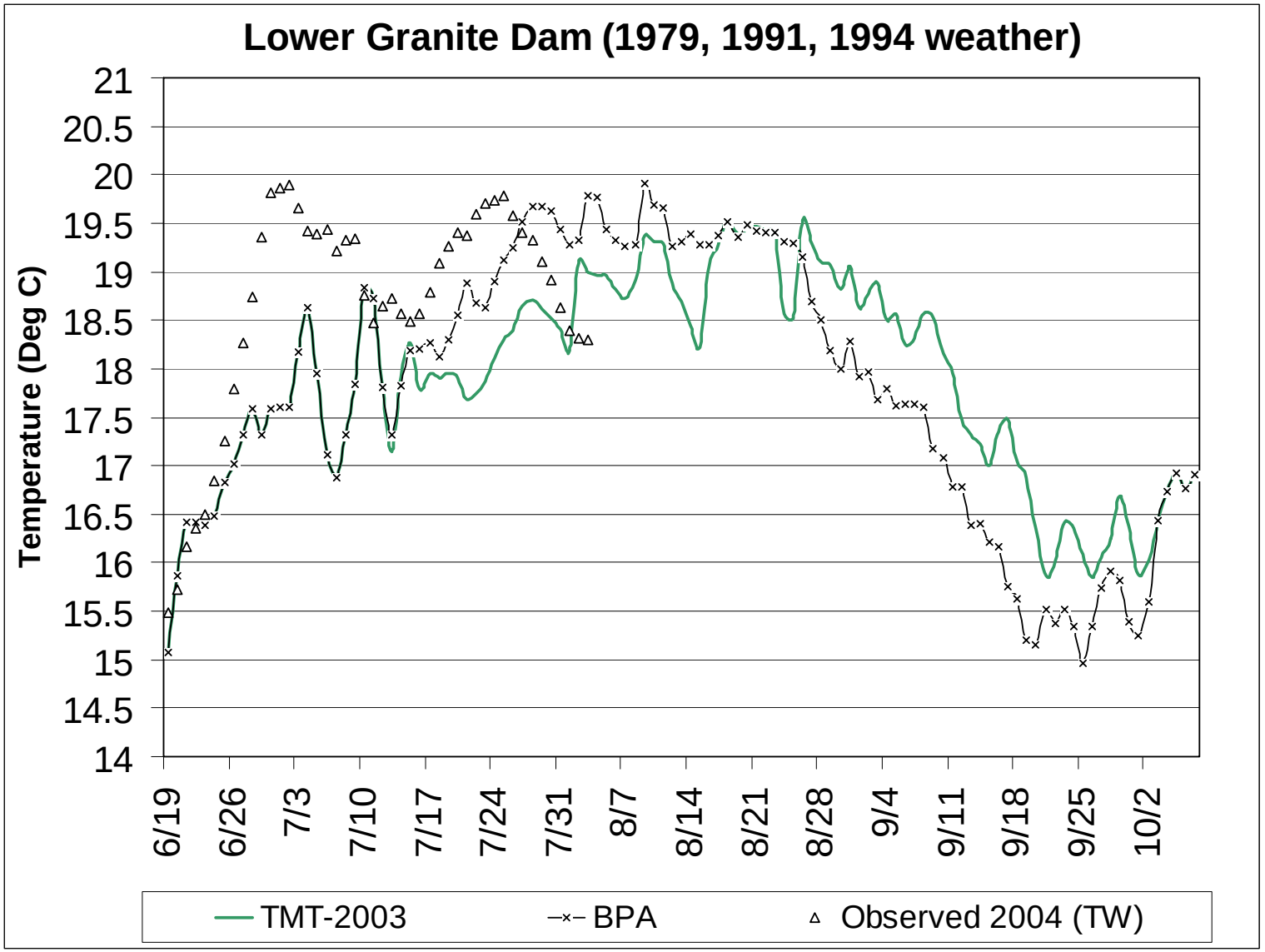
McNary Forebay (Oregon Side)



McNary Tailwater




Clearwater River at Peck (1979, 1991, 1994 weather)
Temperature (Deg C)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004


Lower Granite Dam (1979, 1991, 1994 weather)
Temperature (Deg C)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
15.5
15
14.5
14
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004 (TW)

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232 Telephone (503) 238-0667
Fax (503) 235-4228
www.critfc.org

TO: Technical Management Team (TMT)
FROM: Kyle Martin, *Senior Hydrologist*, CRITFC Hydro Program
DATE: August 4, 2004

SUBJECT: Impact of Pool Fluctuations on the 2004 Summer Treaty Fishery

CRITFC submitted four System Operation Requests (2004-C5 through 2004-C8) via the NMFS' TMT forum to support spring treaty fishing. The CRITFC requests asked for (1) specific elevations and (2) stable pool elevations during each week of treaty fishing.

Criterion #1 asked to operate the pools as a hard constraint within a one-foot specified elevation range. The Corps replied with a commitment as a hard constraint to a 1.5-foot range, or 1-foot as a soft constraint, as they have done so since 1996.

The table shows the hourly compliance of CRITFC's elevation range criteria, as well as the Corps' criteria, during the treaty fishery. Averages from the two-week 2003 summer season are also shown.

2004	Bonneville Pool	The Dalles Pool	John Day pool
1 foot range (**CRITFC**):	75.5 - 76.5 ft	158.5 -159.5 ft	263.5 - 264.5 ft
JUNE 23 - 25	98%	28%	18%
JUNE 30 - JULY 2	87%	28%	25%
JULY 14 - JULY 17	0%	85%	0%
JULY 21 - JULY 24	91%	82%	27%
JULY 26 - JULY 31	79%	68%	14%
average:	**71%**	**58%**	**17%**
2003 average:	82%	54%	18%
1.5 foot range (COE):	75 - 76.5 ft	158 -159.5 ft	263 - 264.5 ft
JUNE 23 - 25	100%	51%	84%
JUNE 30 - JULY 2	100%	75%	82%
JULY 14 - JULY 17	39%	100%	66%
JULY 21 - JULY 24	100%	99%	98%
JULY 26 - JULY 31	100%	93%	95%
average:	**88%**	**84%**	**85%**
2003 average:	100%	95%	84%

Pool elevation data is a good objective measure as to the absolute pool fluctuations (Criterion #2) as shown in Figures 1 through 15. Bonneville pool saw 0.3 – 0.7/1.3 foot swings (compared to 0.8 - 1.0 foot swings in summer 2003). The Dalles pool saw 0.5 – 1.5/2.0 foot swings (compared to 0.8 – 1.8 foot swings in summer 2003). John Day pool saw 0.4 – 0.6/0.8 foot swings (compared to 0.5 - 1.0 foot swings in summer 2003).

cc: CRITFC Hydro Program (Heinith, Lorz) and Fish Management Division (Ellis, Matylewich)

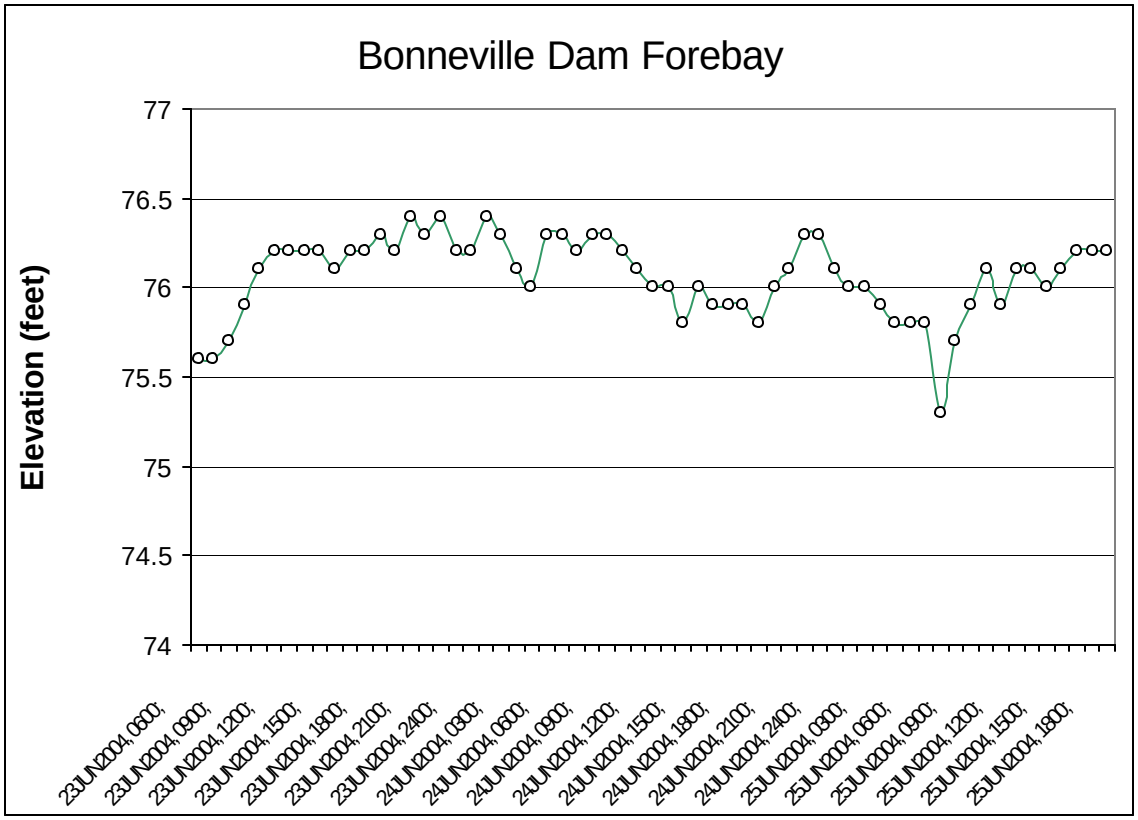


Figure 1. Observed BON pool elevations during June 23-25, 2004 summer treaty fishing.

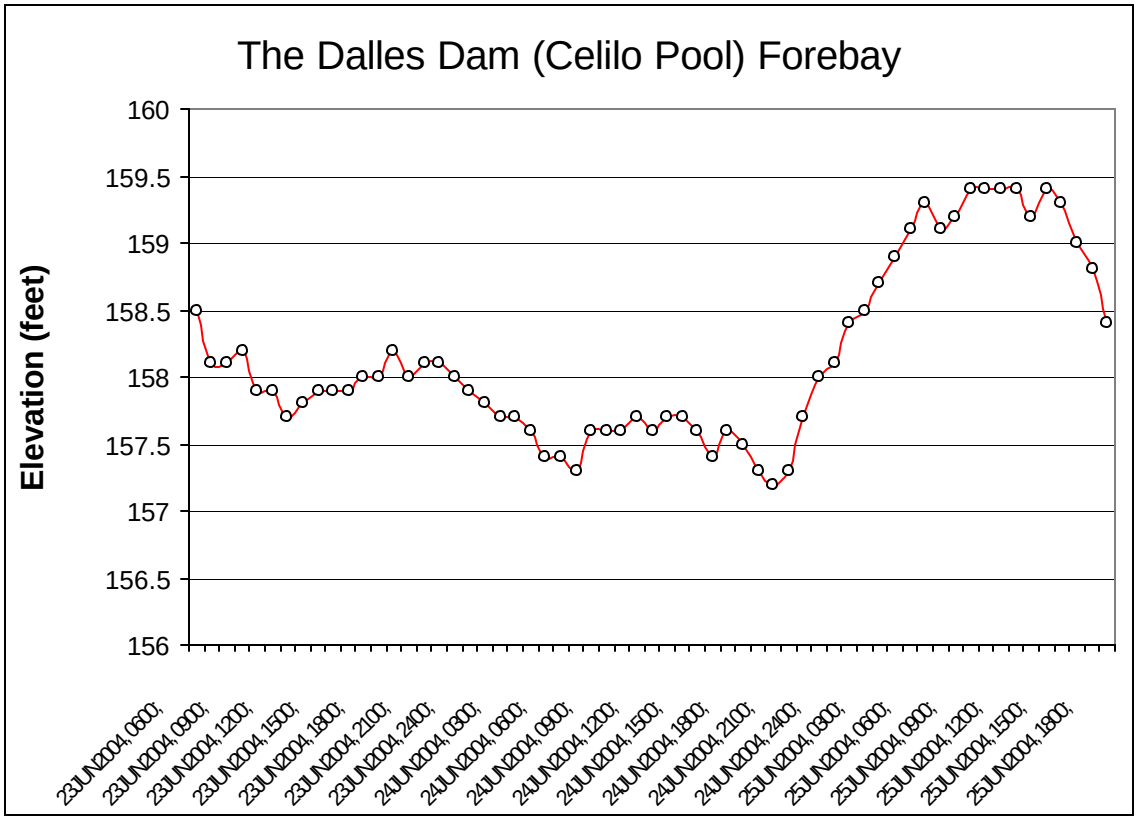


Figure 2. Observed TDA pool elevations during June 23-25, 2004 summer treaty fishing.

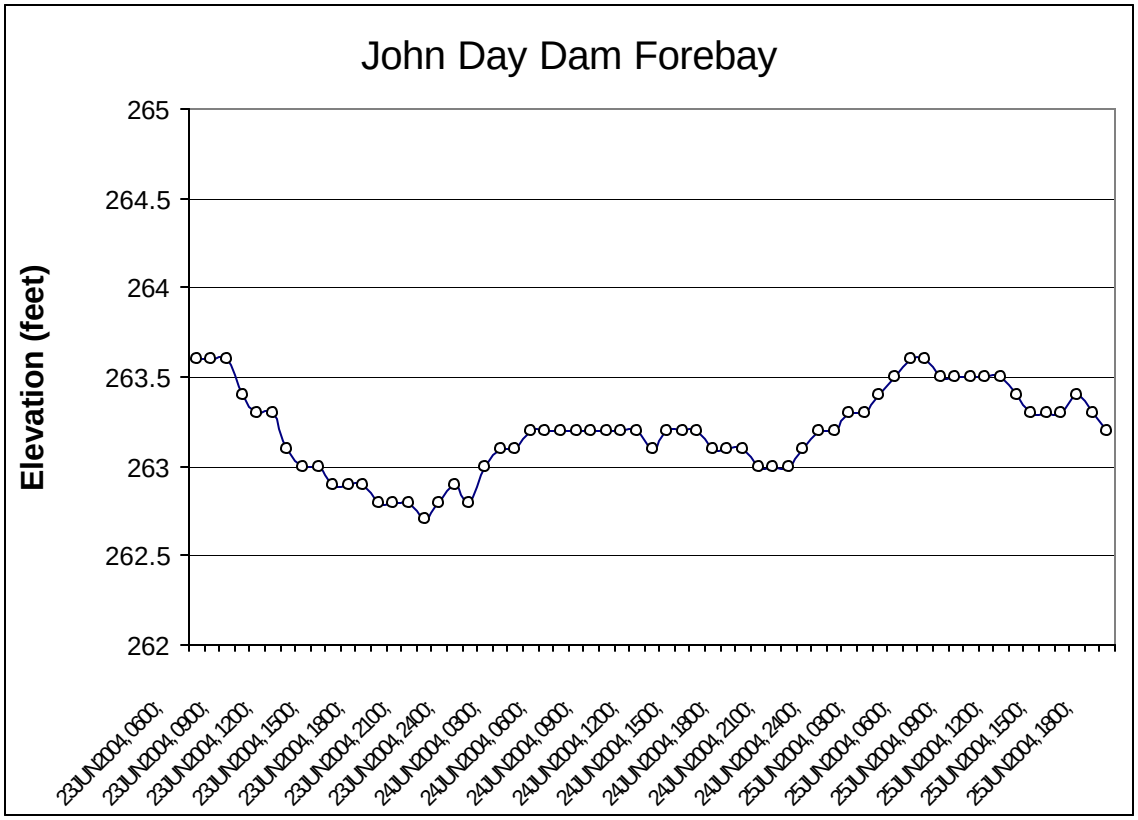


Figure 3. Observed JDA pool elevations during June 23-25, 2004 summer treaty fishing.

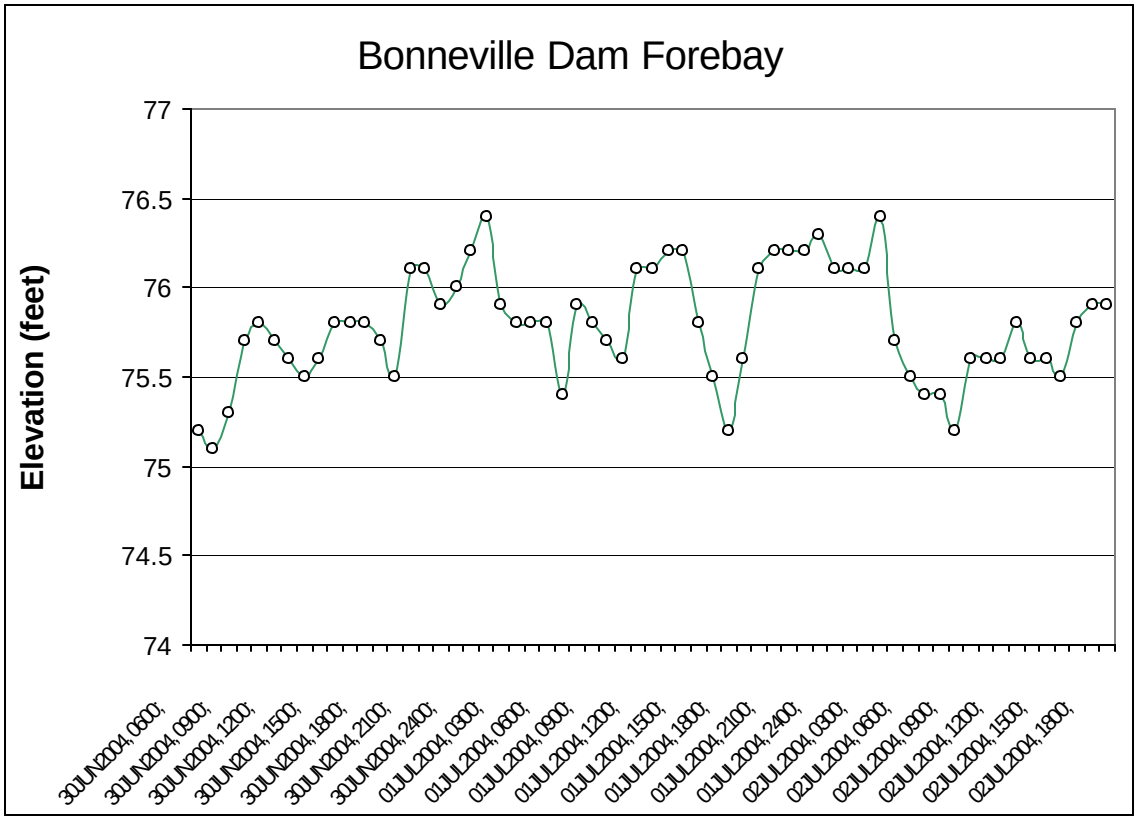


Figure 4. Observed BON pool elevations during June 30 - July 2, 2004 spring treaty fishing.

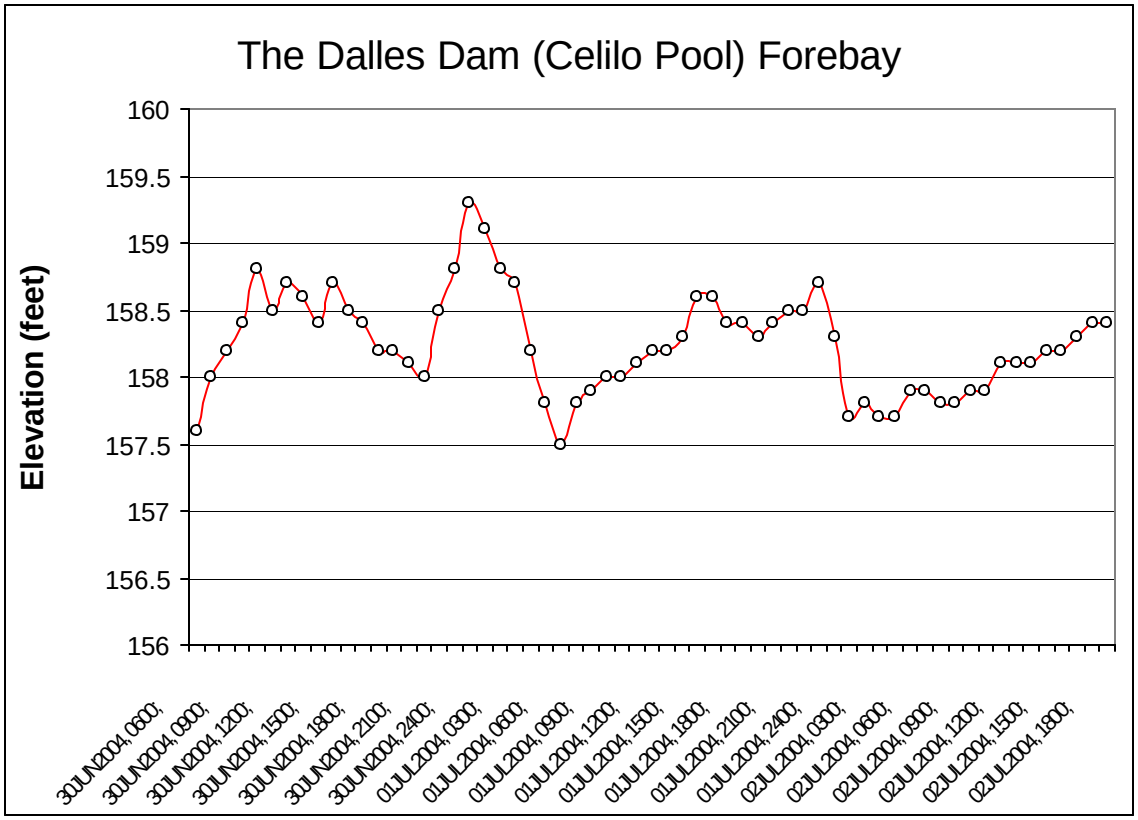


Figure 5. Observed TDA pool elevations during June 30 - July 2, 2004 spring treaty fishing.

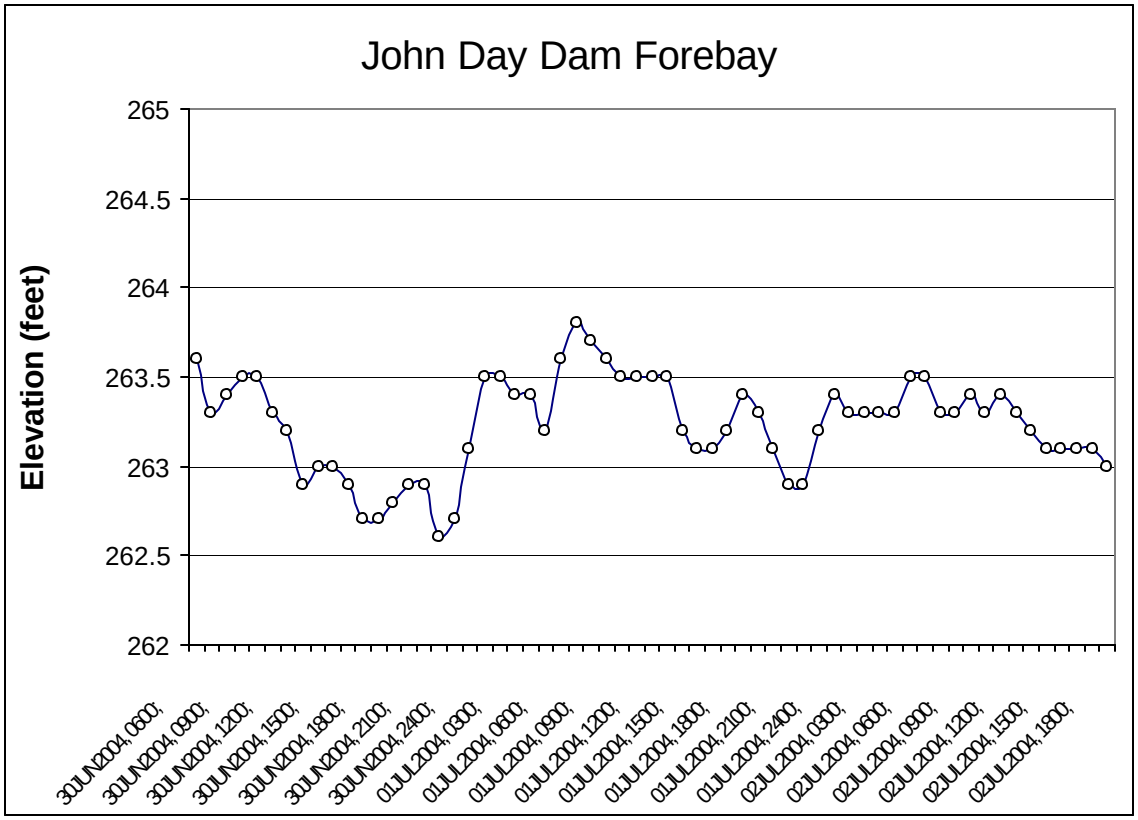


Figure 6. Observed JDA pool elevations during June 30 - July 2, 2004 summer treaty fishing.

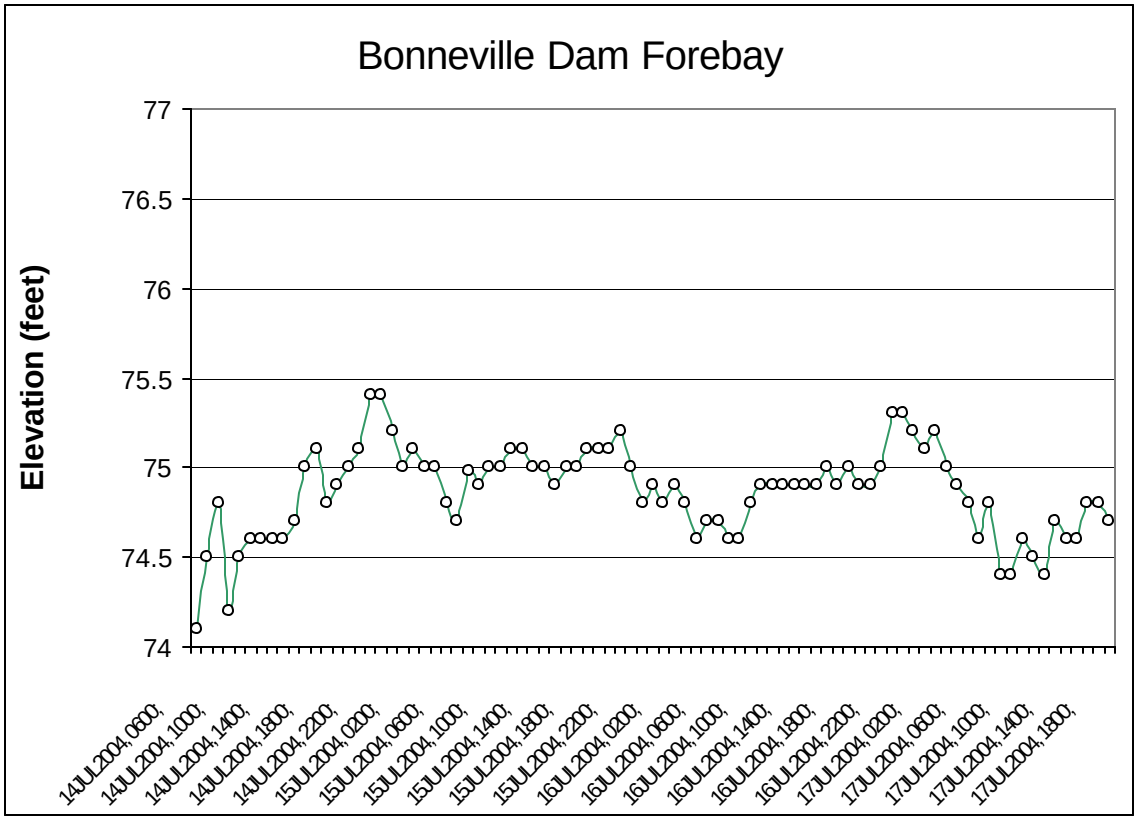


Figure 7. Observed BON pool elevations during July 14-17, 2004 summer treaty fishing.

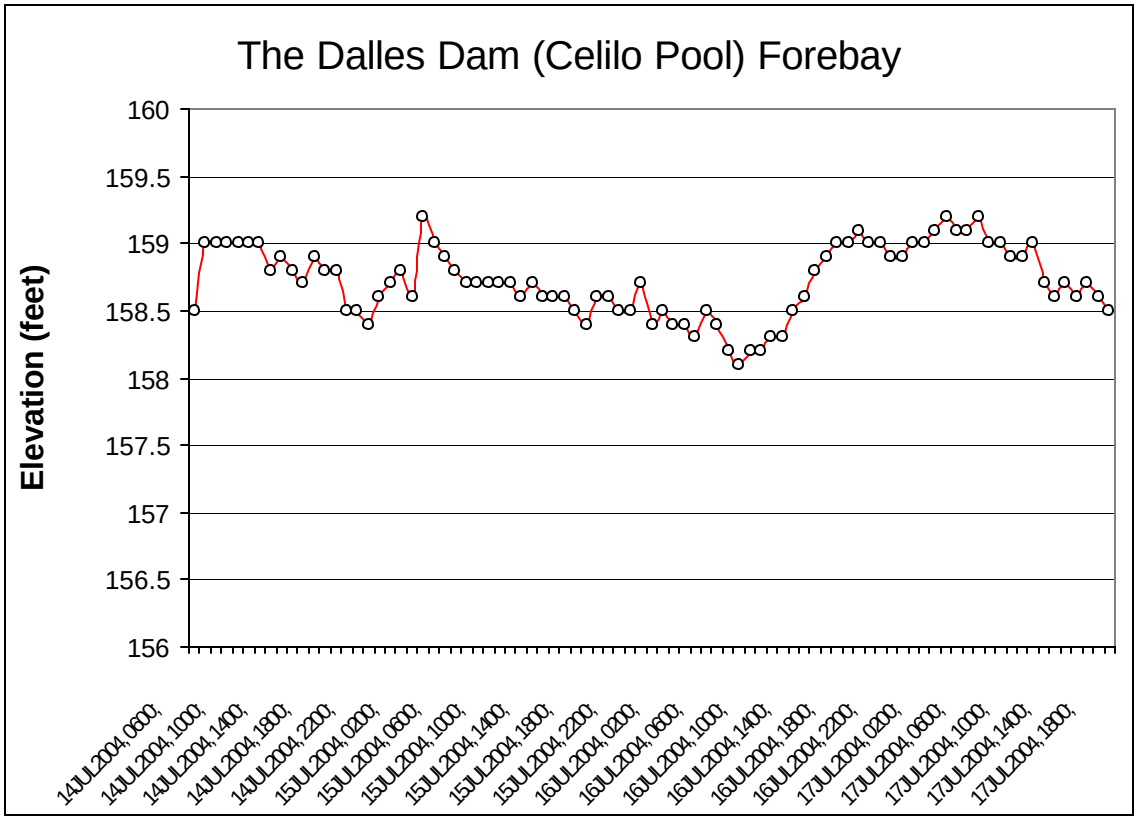


Figure 8. Observed TDA pool elevations during July 14-17, 2004 summer treaty fishing.

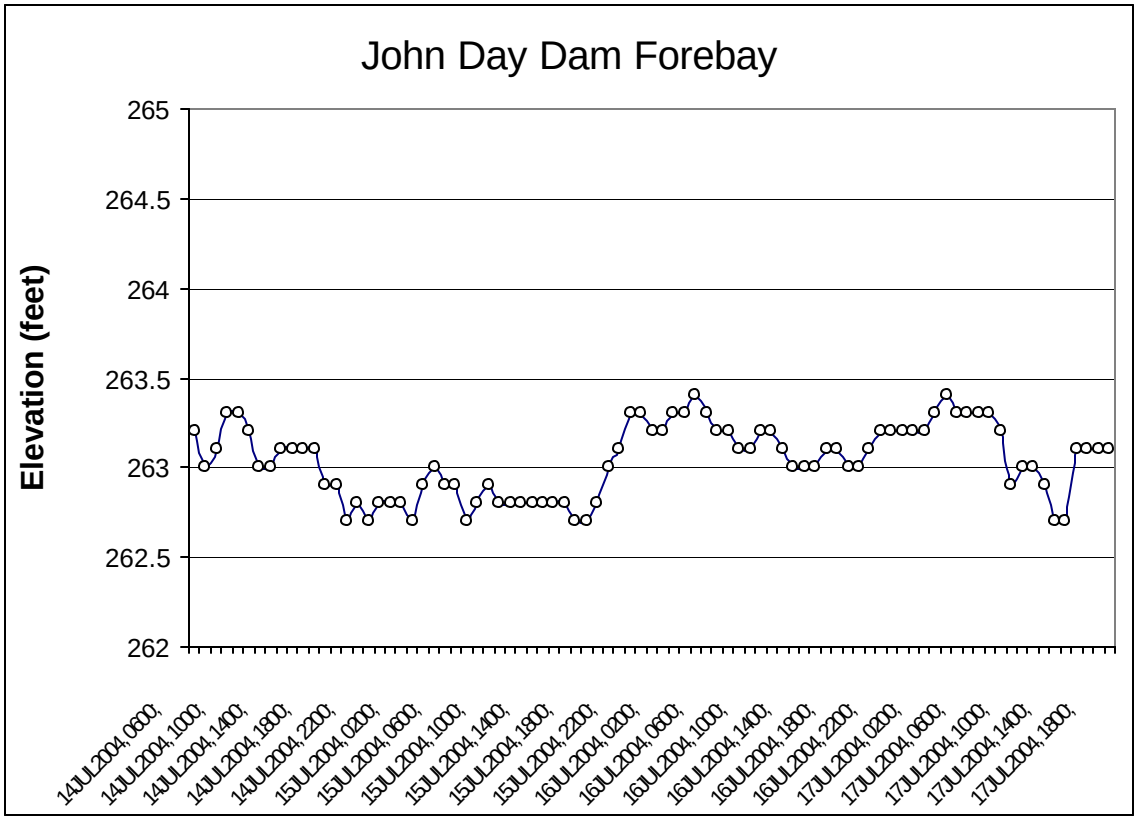


Figure 9. Observed JDA pool elevations during July 14-17, 2004 summer treaty fishing.

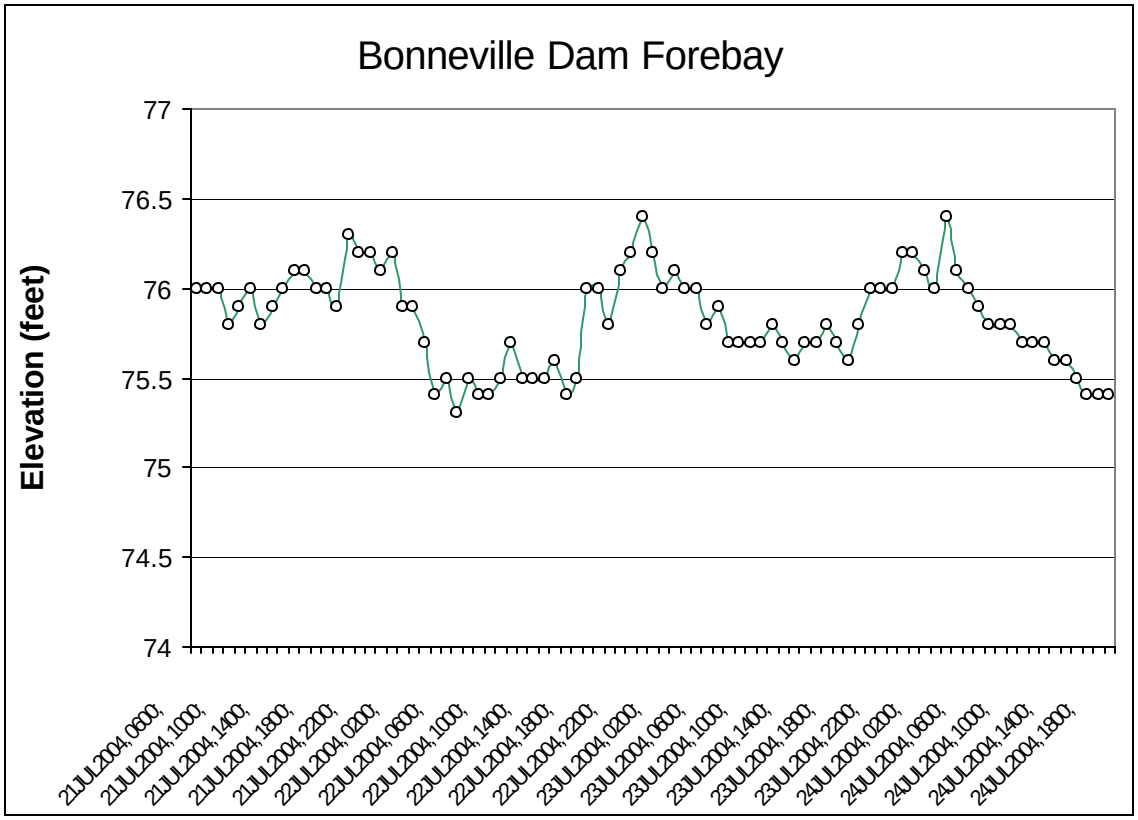


Figure 10. Observed BON pool elevations during July 21-24, 2004 summer treaty fishing.

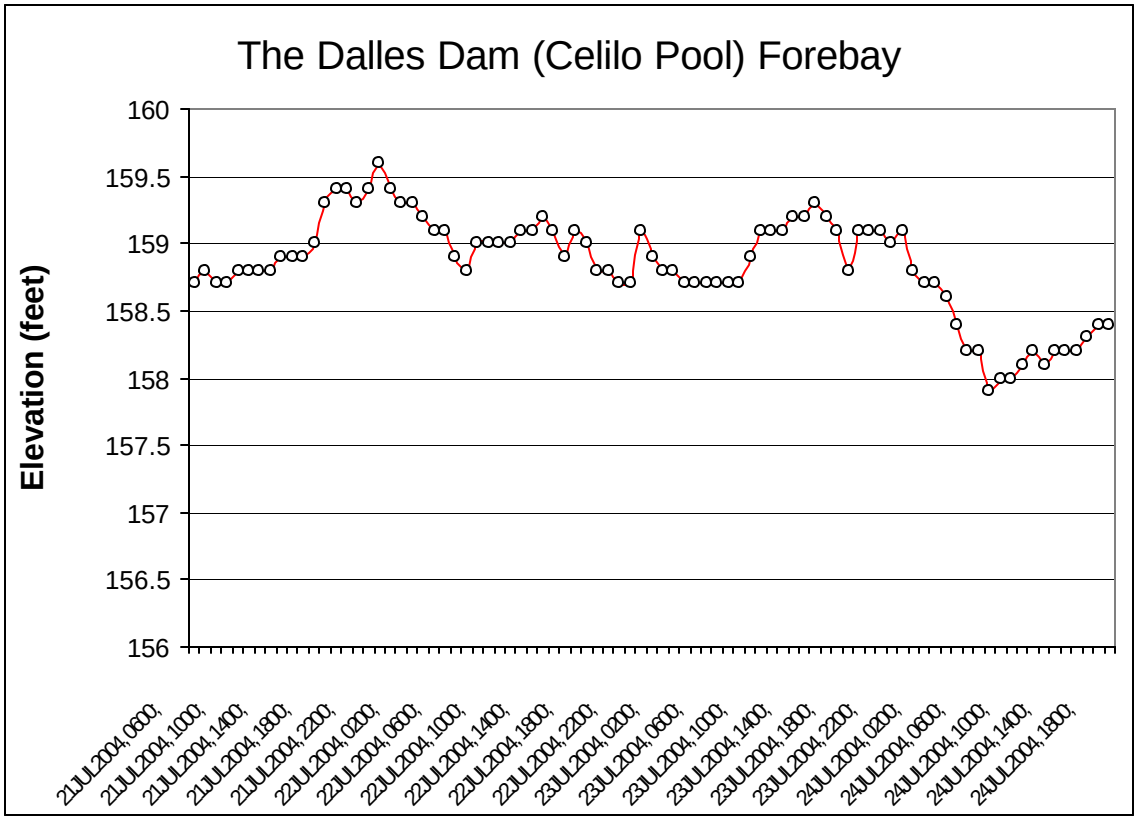


Figure 11. Observed TDA pool elevations during July 21-24, 2004 summer treaty fishing.

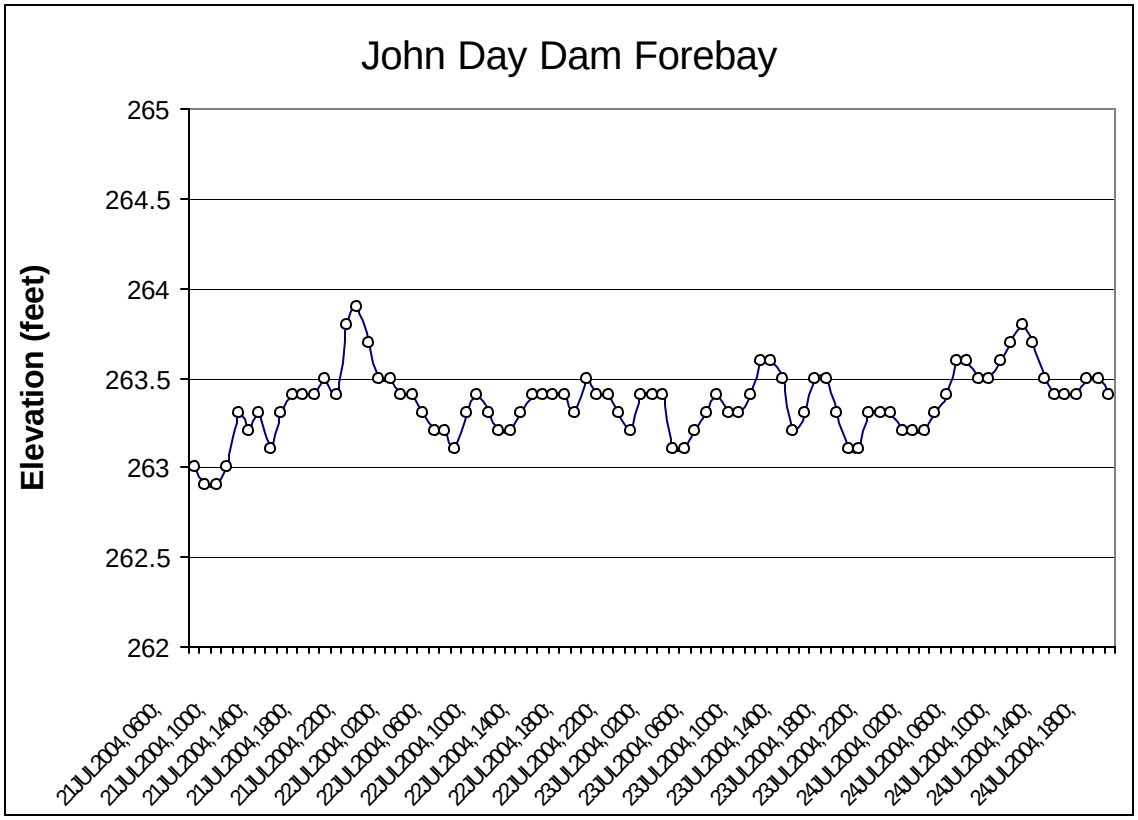


Figure 12. Observed JDA pool elevations during July 21-24, 2004 summer treaty fishing.

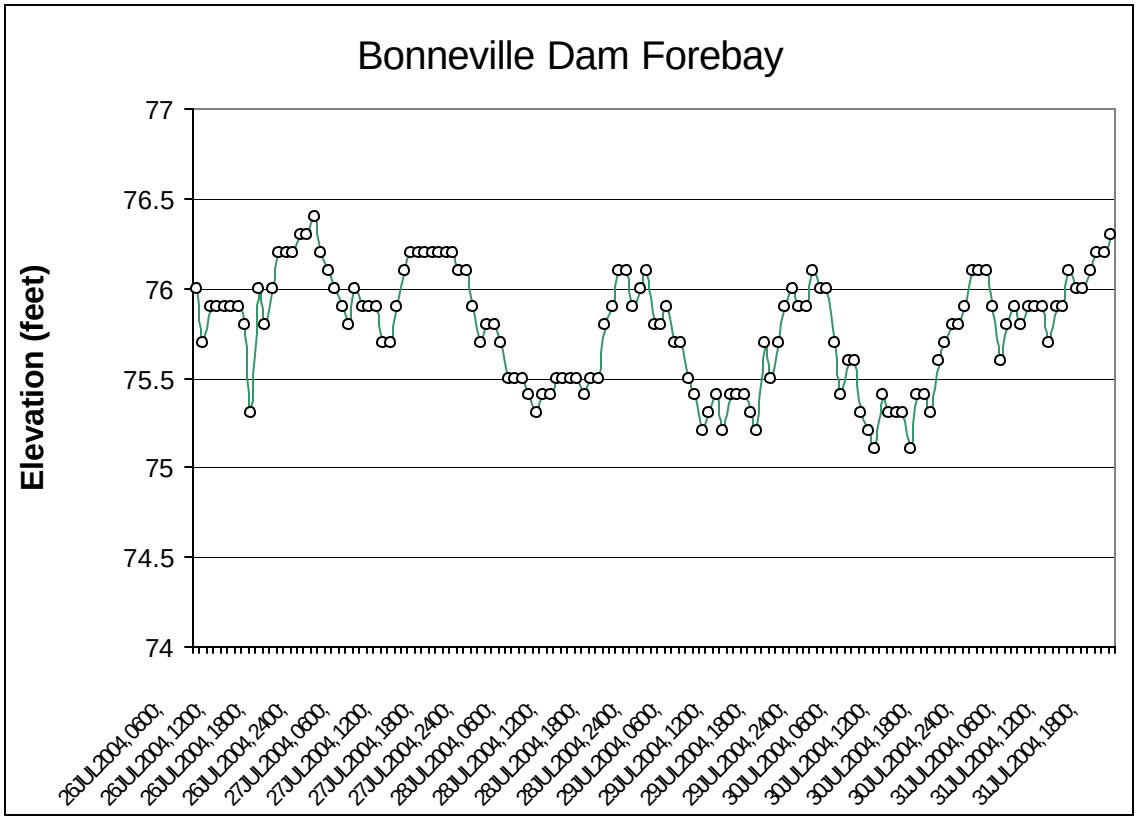


Figure 13. Observed BON pool elevations during July 26-31, 2004 summer treaty fishing.

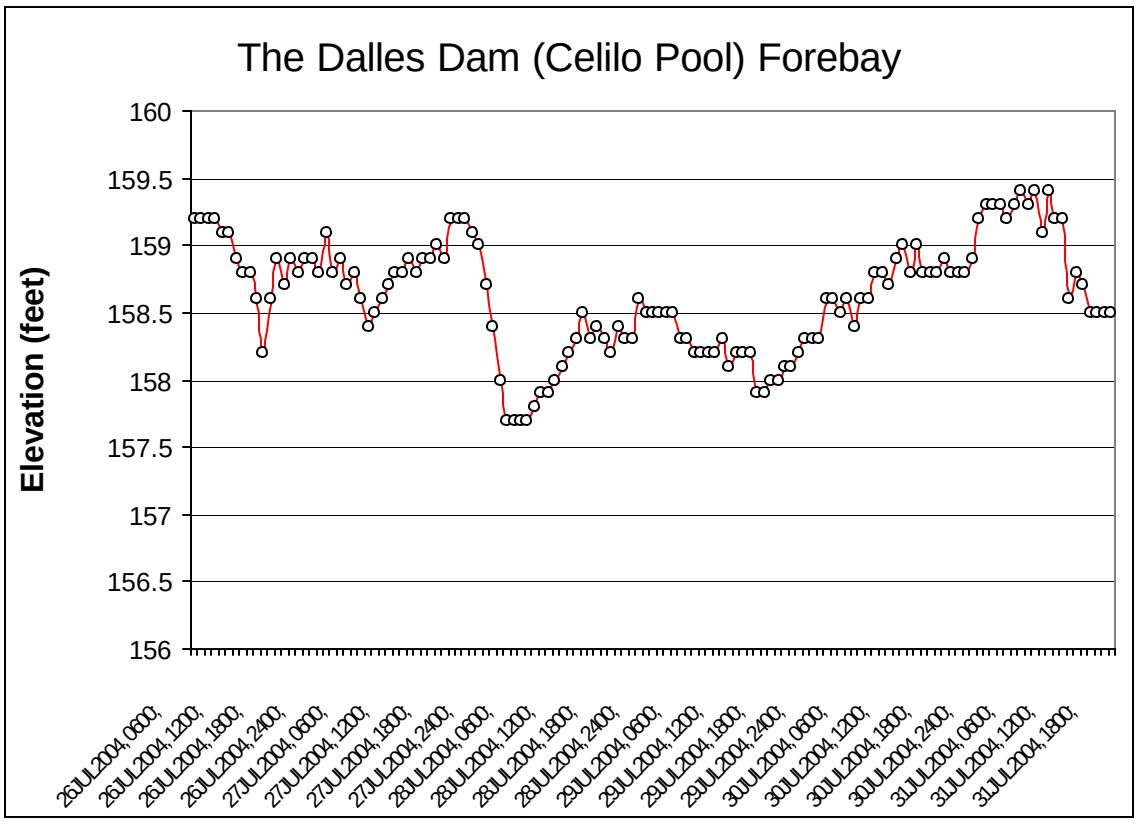


Figure 14. Observed TDA pool elevations during July 26-31, 2004 summer treaty fishing.

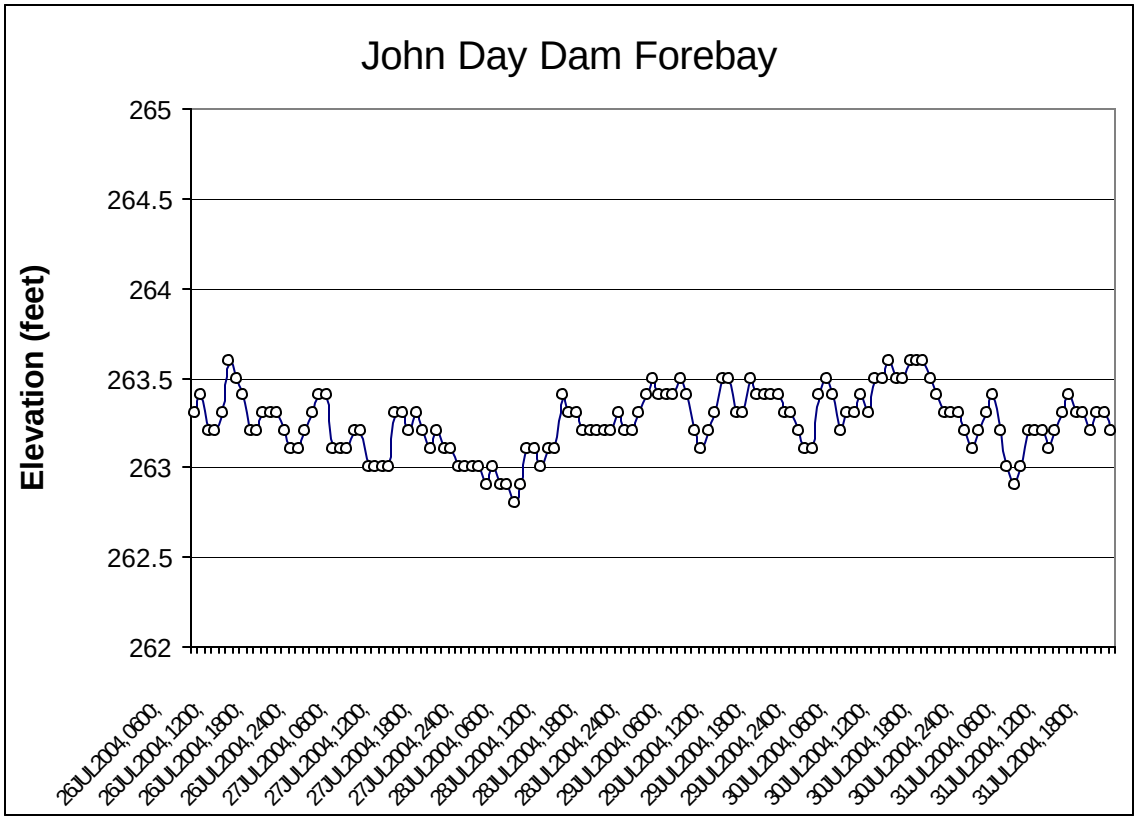


Figure 15. Observed JDA pool elevations during July 26-31, 2004 summer treaty fishing.

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
August 4, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON
FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Fall Fisheries/Fish Run Finals:
Cindy LeFleur, WDFW, presented power point slides (also attached to the TMT agenda) on adult return forecasts, fisheries economics and management constraints. Preliminary results for summer chinook returns to the Columbia River mouth were 92,400; and 123,700 for sockeye. The following bullets summarize the forecasted return numbers for 2004:

- 634,900 Fall chinook
    - 287,000 Upriver Bright Fall chinook
    - 6,100 Snake River wild Fall chinook
    - 88,800 Mid-Columbia Brights
    - 150,000 Bonneville pool hatchery Fall chinook

The 2003 recreational fishery economic value was estimated at $55 million for below Bonneville on the Washington and Oregon sides. The commercial fishery economic value was estimated at $6 million, and the Treaty Indian fishery for 2000 was estimated at $1.5 million. For additional information, visit the WDFW website at: www.wdfw.wa.gov/fish/crc/crcindex.htm. The ODFW website also lists information on fish runs: www.dfw.or.state.us.gov. "Joint" staff reports (Oregon, Washington, Idaho, four Columbia River treaty tribes, NOAA, and USFWS) describe historical attributes of the fisheries. Joint fact sheets give in-season management and fish numbers. There will be regular updates on fall fisheries and adult fish runs at future TMT meetings.

Dworshak Temperatures/Operation Update:
Cindy Henriksen, COE, reported on the current status of Dworshak. Outflows are 11.6 kcfs; temperature releases are down to 43°, per TMT discussions on July 26th. The Lower Granite tailrace is down to 64°. The COE informed TMT that, compared to last year, there is less volume of water at which 40-45° can be maintained. When the Dworshak operation ends and the powerhouse goes down to one unit, which will necessitate going into overshot or undershot mode, the disparity between the temperatures will likely be much greater if the project continues to release 43° now. Overshot would likely provided water too warm to aid in river temperature control and undershot would be too cold. The COE suggested that the temperatures be raised to 45° to 46° now to ensure a smaller

disparity of temperatures later when there is only one unit in use (around September 15th.)

Dave Wills, USFWS, reported that the downstream hatcheries prefer slightly warmer temperatures now, and prefer to maintain stable temperatures. The COE's proposed operation was acceptable to the hatchery and other salmon managers.

ACTION: The COE will raise temperature releases to 45° today (8/4) and reduce flows to full powerhouse after midnight on Sunday, August 8th. The COE and the salmon managers will monitor temperatures to provide the full benefit of cooler water temperatures.

Sturgeon Update:
Bob Hallock, USFWS, reported that they spawned 8 female sturgeon in the hatchery. 16 were transported for in-river spawning. There were two potential female spawners over gravel this year, which would make them #5 and #6 and the first in 13 years! A similar process of doing an intervention of in-river fish and moving them upstream may be pursued again next year. Discussions are underway on this. The USFWS does not expect habitat changes next year.

Zone 6 Tribal Summer Fishery Review:
Kyle Martin, CRITFC, reported on the 2004 summer tribal fishery – his handouts are linked to today's agenda. Kyle did not hear of any net problems as a result of pool fluctuations thus far. Overall lessons learned include: John Day is the preferred pool for summer fisheries so next year, continued improvements at this project will be helpful. Also, the COE has improved in maintaining flat flows at each of the pools, which is one of the objectives of the tribal fishery requests. Finally, the COE prefers a reasonable amount of notice so they and BPA operators are able to implement the request. Total catch numbers were: 8,703 summer chinook; 5,464 steelhead; and 4,310 sockeye.

ACTION: Kyle will check on the number of lost nets this year, and report back to interested TMT members.

Lower Granite Powerhouse Outage:
The COE had planned to do doble testing on August 16-19 which would require the project to go offline. New developments have resulted in the COE asking the project to delay the outage to September 20th, when all required work at the project can be completed. This will require a total 20 kcfs spill during the time of the outage (6 days expected). The salmon managers were asked to consider spill options including time of day, whether to use the RSW, and whether to operate outside of MOP at that time. The salmon managers will discuss this at FPAC and give feedback at the next TMT meeting.

Libby/Hungry Horse Operations:
Libby is at elevation 2448' with outflows at 12.5 kcfs. The project should reach elevation 2439' during the first week in September. Hungry Horse is at 3552', drafting .5' today. Outflows are 5.1-5.2 kcfs.

Bonneville Spillway Flow Discrepancy:
The COE found a discrepancy in the actual and reported amount of spill from Bonneville. Laurie Ebner, COE Portland District-Hydro, presented information that there was a discrepancy in spill between Bonneville and The Dalles. The COE discovered that the problem is at Bonneville. After determining the problem, they developed a list of planned actions:

- Develop plan for calibration of each spillway gate – available for review 8/11
- Calibrate/verify the gate opening for each spillway gate
- Verify rating curve
- Verify that changes implemented take care of the historical discrepancy in total river flow between The Dalles and Bonneville
- Develop strategy to communicate discrepancy so previous published work can be properly interpreted

COE recommendations include:

- Modify the measurement system at Bonneville such that the reported flow from Bonneville is closer to the actual flow.
- Develop and coordinate a plan to calibrate each spillway gate.
- Perform spillway gate calibration.
- Verify that corrections for each spillway gate opening account for the discrepancy in total river flow between The Dalles and Bonneville.
- Develop a communication plan for the region.

ACTIONS: The COE plans to begin reworking the gate lifts as of tomorrow. They may see unusual data for the next period while trying to re-calibrate. There will be an update on longer term actions at the next TMT meeting.

Status of Spill:
Based on Judge Redden's ruling last week, BiOp spill will continue at Bonneville and The Dalles through August. The COE removed the amended WMP to stop spill. At least one party to the case had filed an appeal to the ruling, as of today.

System Status:
Reservoir operations: Grand Coulee is at elevation 1283.6', with 80 kcfs inflows.

Fish status: Subyearling numbers at Lower Granite are dropping, now below 1,000. Numbers at McNary are down to ~30,000. Adult fall chinook numbers are similar to, thus far, previous years.

Power system: The system is operating to meet load. A CGS tripped off on Friday; project operators are working to get it back on-line.

Water quality: TDG exceedances in the McNary forebay occurred, due to increased temperatures. The COE provided graphs of McNary temperatures from April 1st to date. This and additional data are available as links to today's agenda.'

Next Meeting, Wednesday, August 25th, 9am-noon:

Agenda Items:

- Bonneville Spillway Discrepancy
- Lower Granite Powerhouse Outage
    - Salmon managers preferred operation
- Status of Dworshak Temperatures
- Autumn Treaty Fishery
- Begin Discussion: End of MOP in Lower 3 Pools
- Systems Status

1. Greeting and Introductions

The August 4 Technical Management Team conference call was chaired by Cindy Henriksen of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Henriksen at 503/808-3945.

2. Fall Fisheries.

Cindy LeFleur provided a presentation on the status of the summer and fall fisheries in the Lower Columbia. She began with a preliminary count of adult summer chinook returns in 2004 (92,000), noting that all counts are to the mouth of the Columbia, and that recent summer chinook runs have been among the best on record. LeFleur provided the following additional preliminary run counts and estimates:sockeye, 123,000, fall chinook, 635,000, the fifth-largest estimate since 1948. There are five basic management groups within that total, she noted. For upriver bright, the forecast is 287,000, a really good return. These are primarily wild fish; this includes the Hanford stock. Snake River wild, the listed component, the forecast is 6,100, down from 6,900 in 2003. Mid-Columbia brights: these are hatchery fish returning to Bonneville hatchery and hatcheries above Bonneville dam; the forecast for 2004 is 88,800. Tule fall chinook, primarily from Spring Creek Hatchery: 150,000, a very good return.

One thing we do in the fall, as a management tool, is Bonneville Dam Observation, where we sit in the counting station and count the number of tule and bright chinook, LeFleur continued; we divide the run by looking at the skin color of those fish. LeFleur explained that the bright fish, as their name implies, are bright silver in color, because they migrate farther and spawn later; the tules have darker skins because they're closer to spawning. She put up a graph showing the forecasts for these two stocks: 453,000, total, at Bonneville Dam.

LeFleur put up a map showing the zones of the non-Indian commercial fisheries and the treaty fisheries. The economic value of the non-Indian commercial harvest was about $6 million in 2003, down sharply in recent years (from $40 million in 1988), due to falling prices and the influence of the ESA on harvest rates. The prices have begun to turn around slightly in recent years, she noted. LeFleur added that the breakdown between the fall commercial and sport fishery is approximately 50-50, in terms of fish numbers allotted. LeFleur also touched on the management constraints guiding the

spring, summer and fall fisheries. She added that more complete information on the fisheries is available from the Columbia River Compact and ODFW websites. LeFleur said she will provide further updates as the fisheries progress.

3. Sturgeon Update.

Bob Hallock said a total of eight female sturgeon were spawned in the hatchery this year. He noted that the releases requested from Libby in 2004 were modest, by recent standards; 13-16 Kcfs. A total of 16 fish – 6 females – were transported upstream in 2004; two of those females stuck around on the spawning grounds this year, before abruptly migrating downstream some 15 miles overnight, generally a characteristic behavior of just-spawned females. These are the only females we believe to have spawned in the river in the last 13 years, which is cause for optimism, he added. In 2005, no significant changes are expected, Hallolck said; we may simply take females into the hatchery, fertilizing their eggs and placing the fertilized eggs on the substrate in the river. If so, it is likely that a similar flow request will be submitted, he said.

4. Dworshak Temperatures, Operations Updates.

The Corps provided a variety of graphs showing the current water temperature situation in the Snake and Clearwater rivers. Henriksen said Dworshak is currently releasing 11.6 Kcfs; the release temperature has been reduced to 43 degrees F. At Lower Granite's tailrace gauge, we're seeing temperatures in the 64-66-degree range, currently, said Henriksen. What we wanted to talk about today is the quantity of water available within Dworshak reservoir at various temperatures, she said. Jim Adams said that, in 2004, the quantity of colder water in the 40-45-degree range is significantly less than it was in 2003, primarily due to the way the thermocline set up this year. Have you re-assessed your statement, a few weeks ago, that there was adequate cold water available in 2004? Ron Boyce asked. Yes, Adams replied – it now looks as though we have enough 40-45-degree water to last only until the end of August. After that, we will either have to release much colder or much warmer water, through undershot or overshot mode. Can you mix the two? Boyce asked. Only if you have more than one unit running, Adams replied.

Our concern is that, once we get out toward the end of September, we'll have to choose between 41-degree water or 62-degree water, Henriksen said – it may make sense to go to a slightly warmer release temperature now, to save some of the mid-temperature water for later in the season. We could operate one unit in undershot mode and one in overshot mode, Adams explained. In other words, right now we have the ability to mix flows using over-and-undershot mode, whereas later in the season, we won't have that ability. The Corps anticipates that this will result in a Dworshak release temperature of 45-46 degrees, rather than the current 43 degrees. Such an operation could be set up within a few hours, he added.

Essentially, we're trying to plan for post-drafting operations, because very cold or very warm water won't be good for the hatchery, said Adams. In response to a question,

Adams said the Corps anticipates that it will reach elevation 1520 and drop to a one-unit operation at Dworshak some time around September 15.

Kyle Martin noted that a cooling trend is on the way for the Lewiston area, with temperatures forecast in the mid-80s through the weekend. In other words, he said, this is probably a good time to implement this operation. In response to a question, David Wills said personnel at Dworshak National Fish Hatchery would prefer to see the 45-46 degree temperature now, for optimal steelhead growth. They would prefer to go to 45-46 degrees no later than mid-August, he said. Martin added that there are no major heat waves on the immediate horizon for Lewiston.

After a brief discussion, no TMT objections were raised to the proposed operation; Henriksen said the Corps will increase Dworshak's outflow temperature to 45-46 degrees this afternoon. In response to a question, Henriksen said the current flow at Lower Granite is about 27 Kcfs; it is expected to fall to 23-24 Kcfs by next week. Dworshak outflow will be reduced to full powerhouse capacity (9.5 Kcfs) at midnight Sunday, August 9.

5. Zone 6 Tribal Summer Fishery Review.

Martin provided a review of the four summer treaty fisheries in 2004, specifically, how well the Corps was able to meet the specific elevations requested in the tribal SORs. The requested elevation range was met 71% of the time in Bonneville pool, 58% of the time in The Dalles pool, and 15% of the time in John Day pool. The Corps was in compliance with the elevation ranges it agreed to maintain during the summer treaty fisheries 88% of the time in Bonneville pool, 84% of the time in The Dalles pool and 85% of the time in John Day pool. Martin noted that the summer tribal fishery is somewhat unique, because the majority of the nets are set in John Day, rather than Bonneville, pool.

He said that, according to tribal law enforcement personnel, no major safety incidents were reported. According to WDFW, 8,703 summer chinook, 5,464 steelhead and 4,310 sockeye were harvested by summer tribal treaty fishers in 2004. If we have a summer treaty fishery in 2005, he said, CRITFC would ask the Corps to focus on John Day pool, in terms of maintaining the requested elevation range. In response to a question from Scott Bettin, Martin said he has no information, at this time, on the number of nets lost during the summer treaty fishery. In response to another question, Martin said he should know the date of the first fall treaty fishery within the next couple of weeks.

Henriksen reminded Martin that the week of July 14 – 17 had been previously discussed at TMT. That week, the Corps received CRITFC's request for a high pool operation late in the day July 13, and the Corps had previously agreed to a low pool operation at Bonneville for work on a boat ramp. Henriksen reminded Martin that RCC staff had asked him how he wished to have the operation handled. Martin had chosen the lower elevations shown. At John Day, Henriksen said, the Corps operates between elevations 262.5 feet and 264.0 feet per the NOAA BiOp. The elevations CRITFC

requests for John Day are above that range and outside the BiOp. Given the discrepancy, Henriksen said, the Corps would operate to the BiOp range.

6. Lower Granite Powerhouse Outage (August 16-19) Update.

Henriksen reminded the TMT that it had already discussed the planned 7 a.m.-5 p.m. doble testing outage at Lower Granite; since then, the Corps has learned that it would be necessary to have a much longer outage -- up to six days. The outage has therefore been postponed until September 20. We expect the flow to be about 20 Kcfs at Lower Granite by that time; we will be spilling the entire river once the outage begins, with the exception of 5 Kcfs, which will run through a single unit at speed-no-load to provide station service, Henriksen said. The question for the TMT is, do you want the 15 Kcfs of spill to go through the RSW, or over the spillway? It was agreed to revisit this topic at the next TMT meeting.

7. Libby/Hungry Horse Operations Update.

Henriksen said Libby continues to release 12.5 Kcfs; 2448 is the current elevation. The project is expected to reach elevation 2439 some time in the first week in September, perhaps as late as September 11. Tony Norris reported that Hungry Horse is at elevation 3552, drafting half a foot per day, with outflows of 5.2 Kcfs. The draft rate will increase as inflows continue to decline.

8. Bonneville Spillway Flow.

Henriksen noted that she had sent out a memo describing the recently-discovered discrepancy in spillway volumes at Bonneville Dam. I wanted to let people know that the discrepancy existed, she said, and that we would be talking about it at today's meeting. Lori Ebner of the Corps' Portland District provided an overview of the problem, noting that the discrepancy in flow between Bonneville and The Dalles was first noted in December 2003; it appears to have its origin in the new spill pattern and flow deflectors that came online at Bonneville in 2002.

Ebner provided the historical background for this problem, noting that there have historically been two types of gates at Bonneville: 50-foot-high gates and 60-foot-high gates. The last time the Bonneville rating curves were recalibrated was 1967. There is some question whether the discharge coefficients are exactly right for the smaller gate openings, Ebner said.

In measuring the gates, we found that there is a 4-inch discrepancy between what is being reported and what is actually being delivered, said Ebner. We did that measurement last week, she added. Ebner then provided an overview of the gate control structures.

The plan of action now is to recalibrate each spillway gate, said Ebner; that plan will be made available for regional review. We will also review the rating curves, especially for small gate openings. We want to verify that the changes implemented

account for the discrepancy, Ebner said. We will then develop a strategy for communicating any discrepancies. She noted that these 50-foot gates are not really designed for fine flow control. There is always uncertainty when you're measuring discharge, she said; there is inherent error in the calibration calculations.

Ebner provided some preliminary, worst-case estimates of the spill discrepancies the Corps believes has occurred, in the form of a table (Ebner's entire presentation is available via hot-link from today's agenda on the TMT homepage; please refer to this document for full details). Over the next few days, Bonneville project personnel plan to re-measure the gate openings, to provide a reported flow that is closer to the actual flow. We will also develop and coordinate a plan to re-calibrate each gate, and verify that the re-calibration accounts for any discrepancy. How quickly that occurs will depend on how quickly we can get regional agreement on the plan, Ebner added.

The bottom line is that we do plan to have the project, tomorrow, start re-working the way they're doing the gate lifts, Henriksen said, so that when we report that we're spilling 75 Kcfs at Bonneville, we are actually spilling 75 Kcfs at Bonneville. That may mean that we see some unusual data tomorrow and Friday as they conduct that recalibration work, she said. Second, in the longer term, the Corps will be developing a more rigorous testing and recalibration plan for discussion at FPAC and TMT.

How long has this discrepancy been going on? Wills added. Possibly since 1972, when the gates were modified at Bonneville, although the most serious discrepancies have most likely occurred since 2002, when the flow deflectors were installed and the flow pattern was modified, Ebner replied. Boyce pointed out that, given this information, it appears that the region has been shorted between 5 Kcfs and 10 Kcfs in BiOp spill at Bonneville. Henriksen disagreed, noting that the calculation is not that simple; the Corps has been acting in good faith, and operating Bonneville according to the best information available. Still, there has been a large discrepancy since 2002, Boyce said; while I'm not trying to point fingers, it would have been nice to get to the bottom of that discrepancy before now. The bottom line is that the Corps is now taking the necessary steps to ensure that 75 Kcfs of daytime spill is actually being delivered, he said.

Ebner noted that, once the recalibration occurs, it is likely that the Corps will discover that a number of the gates are reporting correctly, and will be able to recalibrate those that are reporting incorrectly. As of Saturday, what will be reported will likely be very close to what is actually being delivered, she said. We would like to get all of this taken care of as soon as possible, she said; we are committed to having a permanent fix in place by March 2005. We'll revisit this topic at the next TMT meeting, said Silverberg.

[Editor's note: The Corps has decided not to make an interim fix on August 5 – 6 to spill quantities being reported. The spill quantities being reported will continue to be about 85 kcfs during daylight hours until a final calibration methodology can be completed.]

9. Status of Spill.

Henriksen said spill is continuing at Bonneville and The Dalles; spill is scheduled to continue at these projects through August 31. And the Water Management Plan will be modified to reflect that? Boyce asked. Yes, was the reply, that appendix to the Water Management plan has been removed from the web. This is a result of Judge Redden's ruling last week? Silverberg asked. Correct, Henriksen replied. In response to another question, Boyce said he is aware of one pending appeal to that ruling.

10. Status of Operations.

Norris said Grand Coulee is at elevation 1286.3, with inflows of 80 Kcfs and outflows of 80-100 Kcfs depending on the day of the week. The project is expected to reach elevation 1280 by August 31. With respect to the status of the migration, Wagner said the subyearling index at Lower Granite and the other Lower Snake projects is declining. At McNary, the index has been running in the 30,000 fish-per-day range. In terms of run timing, 2004 appears to be slightly ahead of the curve, Wagner said; at Lower Granite, the subyearling run is now falling off rather precipitously. The pattern is similar at McNary. Moving on to PIT-tag data, Wagner said Snake River fall chinook, including wild stocks, are still passing Lower Granite Dam in small numbers. These are typically late-migrating fish, which is why we're still just seeing a handful passing the dam, Boyce observed.

With respect to the power system, Wellschlager said the CGS nuclear plant in Richland tripped offline earlier this week; the operators are working to get that facility back on-line. Other than that, the power system is operating to meet load.

Adams provided an overview of the current water quality status of the system, noting several TDG and water temperature exceedences in recent weeks, particularly at McNary. He noted that a variety of water quality-related documents are attached to today's agenda on the TMT homepage.

11. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, August 25. Meeting summary prepared by Jeff Kuechle.

TMT Participant List

August 4, 2004

Name	**Affiliation**
Cindy Henriksen	COE
Tony Norris	USBR
Ron Boyce	ODFW
Russ Kiefer	IDFG

David Wills	USFWS
John Wellschlager	BPA
Cindy LeFleur	WDFW
Lee Corum	PNUCC
Russ George	WMCI
Scott Bettin	BPA
Nic Lane	BPA
Scott Boyd	COE
Jim Adams	COE
Laura Hamilton	COE
Steve Haeseker	USFWS
Kyle Martin	CRITFC
Mike O'Bryant	CBB
Margaret Filardo	FPC
Bruce MacKay	Consultant
Martin Hatscher	SCL
Bill Rudolph	NWFL
Paul Wagner	NOAAF
Donna SIlverberg	Facilitation Team

TECHNICAL MANAGEMENT TEAM					
BOR: *Tony Norris / John Roache*			**BPA:** *Scott Bettin / John Wellschlager*		
NMFS: *Paul Wagner / Chris Ross*			**USFWS:** *David Wills / Steve Haeseker*		
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*		**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*	
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*					

TMT MEETING

Wednesday August 18, 2004 0900 - 1200 hours

Custom House Room 118

Portland, Oregon

Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. August flow (Salmon Managers).

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday August 25, 2004 0900 - 1200 hours

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AGENDA

1. Welcome and introductions.
2. Bonneville Spillway Discrepancy -
   [Proposed Process to improve accuracy of Bonneville Spillway Discharge - DRAFT August 13, 2004]
3. Lower Granite Powerhouse outage, September 20-26: Salmon managers; recommended spill operation
4. Status of Dworshak/Lower Granite Tailrace Temperature
   i. [Dworshak Outflows and Lower Granite Tailwater Temperatures in 2004]
   ii. [2004 - CHANGES IN WATER TEMPERATURE OVER TIME DWORSHAK RESERVOIR]
   iii. [Clearwater River at Peck (1979, 1991, 1994 weather) and Lower Granite Dam (1979, 1991, 1994 weather)]
   iv. [SOR #2004-18]
5. Autumn Treaty Fishery [SOR 2004-C9]
6. End of MOP Operation in Lower Snake River
7. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality
      1. Temp [McNary Tailwater Temperatures] [Dworshak Water Temperatures]
      2. Spill : [2002] [2003] [2004]
         [Aug 3-23 Average Daily Spill]
         [Aug 3-23 Exceedance Types]
      3. TDG : [August 2004]
      4. Gas Caps : [2002] [2003] [2004]
8. Other
   - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy

Hlebechuk at (503) 808-3942

AVERAGE DAILY SPILL

August 03, 2004 - August 23, 2004

DATE		Low Gran FB 12 HR AVE	Low Gran TW 12 HR AVE	Little Goose FB 12 HR AVE	Little Goose TW 12 HR AVE	Low Monu. FB 12 HR AVE	Low Monu. TW 12 HR AVE	Ice Harb FB 12 HR AVE	Ice Harb TW 12 HR AVE	McNary FB-W 12 HR AVE	McNary FB-O 12 HR AVE	McNary TW 12 HR AVE	John Day FB 12 HR AVE	John Day TW 12 HR AVE	The Dalles FB 12 HR AVE	The Dalles TW 12 HR AVE	BON FB 12 HR AVE	CCIW 12 HR AVE	WRNO TW 12 HR AVE	Camas FB 12 HR AVE
8-03-04	Avg Spill							20.5	20.5				35.3	35.3	47.2	47.2	89.7	89.7	89.7	89.7
8-03-04	% TDG							102.0	113.8				102.0	114.7	103.6	111.1	102.0	114.2	113.7	110.8
8-04-04	Avg Spill							15.4	15.4				36.1	36.1	49.1	49.1	92.8	92.8	92.8	92.8
8-04-04	% TDG							105.4	112.3				102.1	115.1	104.9	111.7	103.2	114.7	114.3	111.5
8-05-04	Avg Spill		0.2					20.7	20.7				35.7	35.7	47.8	47.8	89.3	89.3	89.3	89.3
8-05-04	% TDG		106.1					102.1	113.4				101.5	114.7	105.1	111.8	103.4	114.7	114.2	110.7
8-06-04	Avg Spill							15.7	15.7				29.5	29.5	38.5	38.5	87.8	87.8	87.8	87.8
8-06-04	% TDG							101.7	111.2				101.0	113.8	104.8	111.9	104.4	114.0	114.6	110.8
8-07-04	Avg Spill							18.4	18.4				30.3	30.3	40.6	40.6	84.7	84.7	84.7	84.7
8-07-04	% TDG							99.5	112.0				100.2	114.2	104.4	111.7	103.9	112.8	114.4	125.2
8-08-04	Avg Spill							17.5	17.5				22.9	22.9	27.5	27.5	82.1	82.1	82.1	82.1
8-08-04	% TDG							102.6	112.0				102.6	112.8	105.9	111.6	104.6	113.3	112.5	125.2
8-09-04	Avg Spill							17.0	17.0				32.7	32.7	34.8	34.8	81.2	81.2	81.2	81.2
8-09-04	% TDG							101.3	111.3				102.0	114.7	107.1	111.5	105.0	113.5	113.2	125.6
8-10-04	Avg Spill							21.0	21.0				37.9	37.9	44.5	44.5	87.2	87.2	87.2	87.2
8-10-04	% TDG							100.4	113.0				102.0	114.7	108.5	113.0	108.3	113.6	114.5	125.2
8-11-04	Avg Spill							16.0	16.0				45.7	45.7	61.8	61.8	97.6	97.6	97.6	97.6
8-11-04	% TDG							102.1	113.1				103.1	115.5	108.0	113.6	108.3	115.0	115.8	114.6
8-12-04	Avg Spill							18.0	18.0				41.9	41.9	54.5	54.5	95.2	95.2	95.2	95.2
8-12-04	% TDG							104.7	112.1				104.9	115.2	107.7	114.3	109.1	115.1	116.6	113.4
8-13-04	Avg Spill							14.5	14.5				37.7	37.7	49.5	49.5	90.1	90.1	90.1	90.1
8-13-04	% TDG							105.4	112.1				105.2	115.0	107.6	113.9	108.7	114.3	115.4	112.9
8-14-04	Avg Spill							14.6	14.6				28.9	28.9	34.4	34.4	87.3	87.3	87.3	87.3
8-14-04	% TDG							103.3	112.2				105.5	114.1	106.8	113.3	107.2	112.3	116.3	112.8
8-15-04	Avg Spill							15.1	15.1				30.0	30.0	38.3	38.3	84.9	84.9	84.9	84.9
8-15-04	% TDG							101.0	111.1				103.8	114.0	105.5	112.6	105.8	112.1	114.4	113.1
8-16-04	Avg Spill							19.8	19.8				41.6	41.6	49.0	49.0	94.8	94.8	94.8	94.8
8-16-04	% TDG							101.7	113.6				103.3	115.5	105.2	111.6	104.5	114.3	114.2	112.9
8-17-04	Avg Spill							17.1	17.1				38.1	38.1	50.2	50.2	96.2	96.2	96.2	96.2
8-17-04	% TDG							100.6	112.2				103.0	114.6	104.4	111.6	102.9	114.7	115.3	112.3
8-18-04	Avg Spill							17.8	17.8				43.2	43.2	55.6	55.6	103.4	103.4	103.4	103.4
8-18-04	% TDG							102.0	112.5				103.1	115.9	104.8	112.1	103.4	114.9	114.7	111.9
8-19-04	Avg Spill							17.5	17.5				41.6	41.6	54.4	54.4	101.1	101.1	101.1	101.1
8-19-04	% TDG							102.6	111.3				103.7	115.3	106.9	113.3	104.6	115.2	115.8	112.9
8-20-04	Avg Spill							16.9	16.9				41.0	41.0	53.7	53.7	99.1	99.1	99.1	99.1
8-20-04	% TDG							102.3	112.7				103.8	114.8	106.5	113.1	104.7	115.1	115.1	112.2
8-21-04	Avg Spill							18.1	18.1				41.0	41.0	55.2	55.2	100.6	100.6	100.6	100.6
8-21-04	% TDG							100.9	113.2				103.7	114.9	105.4	112.7	104.7	115.5	115.5	111.7
8-22-04	Avg Spill							16.2	16.2				28.1	28.1	35.6	35.6	88.8	88.8	88.8	88.8
8-22-04	% TDG							100.3	111.0				103.3	113.6	105.4	111.6	104.9	113.4	115.6	109.5
8-23-04	Avg Spill																			
8-23-04	% TDG																			
Avg Spill		0.0	0.2	0.0	0.0	0.0	0.0	17.4	17.4	0.0	0.0	0.0	36.0	36.0	46.1	46.1	91.7	91.7	91.7	91.7

Proposed Process to improve accuracy of Bonneville Spillway Discharge

Background: Since additional flow deflectors were installed at Bonneville Dam Spillway in 2002, a discrepancy between the computed inflow (The Dalles Outflow + tributary inflow) and outflow from the Bonneville Dam was identified. The discrepancy varied but was on the order of 10 to 20 Kcfs. At first it was not known if there was a problem at The Dalles or Bonneville. Analysis pinpointed the problem was at Bonneville. GDACS spill related tables were revised in March 2004 but the problem still persisted. During July 2004, it was discovered that the spillway gates at Bonneville had been miscalibrated and actual gate openings were up to 0.3 ft. less than was reported. The greatest impact on discharge was at smaller gate openings. As the gate openings increased, the discrepancy in the reported gate opening had less influence on the actual discharge through the spillway.

Goal: Verify, quantify and correct inaccuracies in gate openings and rating curve at Bonneville Spillway and document differences between actual and reported spill volumes prior to spring 2005 spill season.

Proposed Procedure:

1. **Document and quantify flow imbalances between The Dalles and Bonneville Dams with the old (prior to 2002) and new (after 2002) spill patterns for spill volumes of 50k, 75k, 100k and 125k cfs.** At least two flow periods for each spill volume will be used to ensure repeatability of results. A minimum of 16 flow balances will be performed (8 with old pattern and 8 with new pattern). Time periods with relatively stable Dalles outflow, Bonneville outflow and Bonneville pool elevation will be selected to minimize errors. NWD Reservoir Control Center (RCC)will perform this function.

2. **Recalibrate gates and document old vs. new gate opening readouts.** Each of the 18 gates will be re-calibrated by measuring the vertical gate opening and calibrating the gate dial readout to the actual gate opening. The pre-calibration gate opening readout will be recorded for gate openings of .5, 1.0, 2.0, 3.0, 4.0 and 5.0 feet to allow back calculation of actual vs. reported gate openings and associated spill volumes. This will be needed for interpretation of existing and future biological research results. It is estimated that each gate will required 15 minutes to record and calibrate to the actual gate opening. Bonneville Project (project) will accomplish this task..

3**. Update the spillway rating curve/table for small gate openings (up to 5 feet).** Existing model study results and current design guidance will be consulted to update the discharge coefficients for small gate openings to reflect the changes in gate lip geometry installed in the 1970's to reduce vibration problems on the gates. The greatest differences

will be found at small gate openings up to about 2 feet. NWP Hydraulic Design (HD) will accomplish this task.

4. **Compute actual versus reported discharges for the four spill scenarios in item one and the corrections determined in items 2 and 3 above.** Using the revised computed discharges, the four spill scenarios from step one will be checked to see if the changes account for the flow imbalances between The Dalles and Bonneville Dam. The goal will be to match within ± 5% of the actual computed flows. If the comparisons don't check out within a reasonable tolerance (assumed to be 5% at this time), additional evaluation of the rating curve coefficients will be conducted (the gate opening calibration is independent of the rating curve). Joint effort between RCC and HD.

5. **Reprogram GDACS with updated rating curve and document findings.** If the changes in steps 2, 3 and 4 above account for flow imbalances, a new spillway rating table will be provided by HD and input into GDACS by Hydroelectric Design Center (HDC). The results of the gate calibration, the rating curve modification and quantification of the flow imbalances will be documented in a report. This will be a joint effort between the project, RCC and HD. The changes and report will be provided prior to the 2005 spring spill season - February 2005.

6. **Verification that flow imbalance problem is corrected.** Once spill begins in spring of 2005, RCC will perform random flow balance checks between The Dalles and Bonneville projects to verify the changes have corrected the historical flow balance problem. This information will be shared with the region through TMT.

SCHEDULE:

The overall goal is to complete the above effort prior to the start of the next spill season. An interim solution to the gate calibration problem was implemented on 1 August 2004. The interim solution is to manually raise the gates an additional 0.3 feet when spilling at the 75k cfs or below. It is proposed to continue this interim solution for the rest of the spill season (end of August 2004).

It is estimated that the calibration process will take 2 days total. The actual time that each gate is open will be minimized. Spill volumes of up to 10 Kcfs for 15 minutes will be required for each gate calibration. It must be noted that the initial calibrations will be performed at low gate openings and only a check at the 5 ft. opening will be required. It is estimated that an average of 5 Kcfs for the total 15 minutes per gate will be required. Due to project workload and scheduled outages for Bank and Unit maintenance it would be almost impossible to complete this task before the end of August. It is the project's intention to have all calibrations completed no later than Dec. 2004.

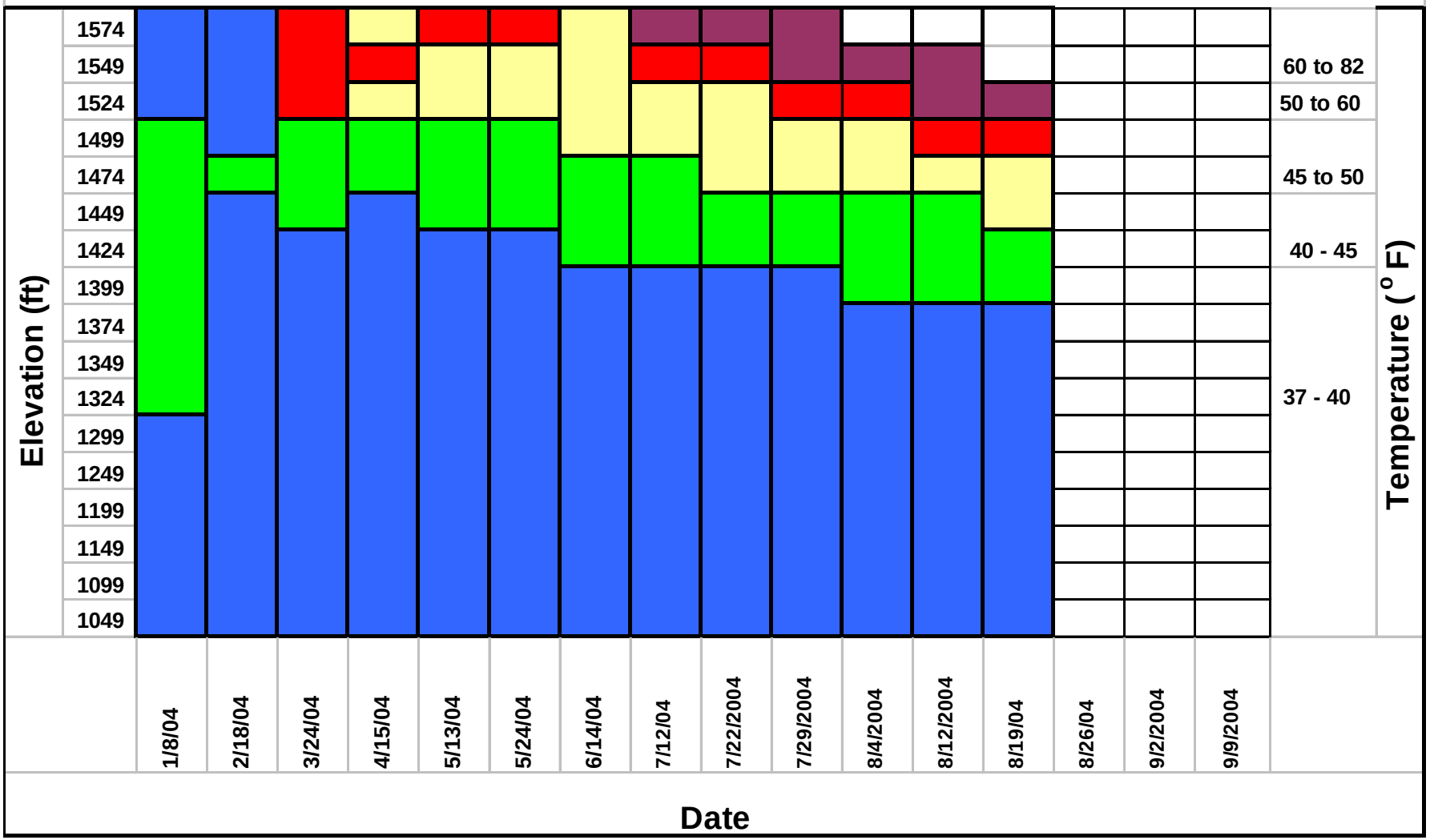
The other steps above can be conducted at any time but it will be timed to coincide with recalibration of the gates. It is estimated it will require about one month to complete all the above steps and document the results. Assuming funding is provided in November,

the effort could be completed and coordinated with the Region by the end of January 2005 at the latest.

POC for this work is Bob Buchholz, CENWP-EC-HD; 503-808-4877.

2004 - CHANGES IN WATER TEMPERATURE OVER TIME

DWORSHAK RESERVOIR



EXCEEDANCE TYPES
August 3 – August 23, 2004

According to the Washington Department of Ecology TDG variance for 2004 spill season, the Corps is required to provided the following information on exceedances of the 120% TDG in tailwater and 115% TDG in forebay water quality standards:

1. Date and times of exceedance
2. Amount of exceedance in percent saturation
3. Explain reason for exceedance
4. Discuss steps taken to fix the problem.

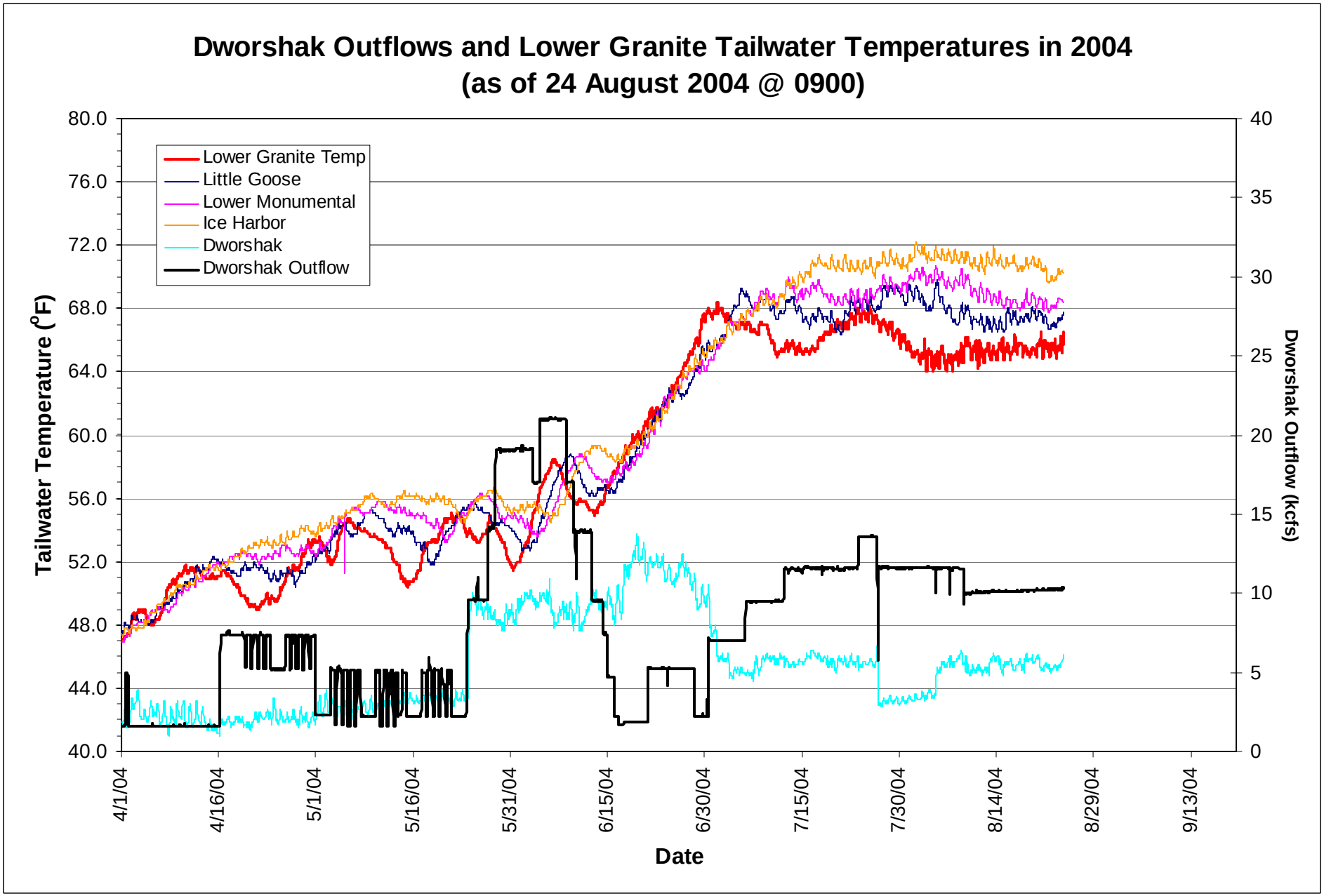
In order to provide the above information, the Corps has developed the following draft list of reasons that exceedances occur.

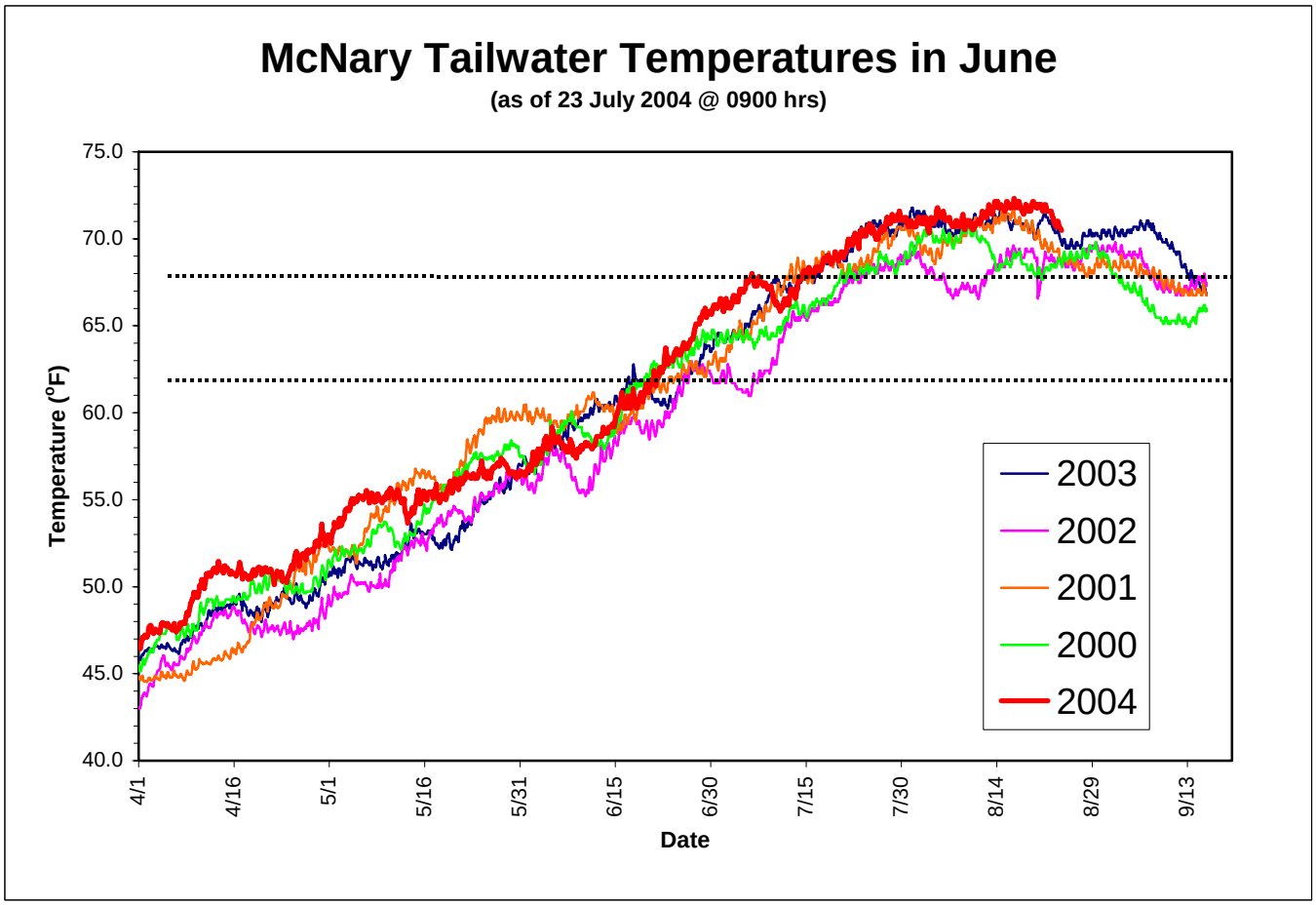
TDG EXCEEDANCE TRACKING
Types of Exceedances:
1. Exceedance due to high runoff flows and flood control efforts
2. Exceedance due to Intertie line outages
3. Exceedance due to unit outages during repair or maintenance
4. Exceedance due to BPA is unable to handle load so they had to spill
5. Exceedance due to a break down in communication. (e.g. Teletype transmission failure or project operator misinterpreted teletype)
6. Exceedance due to uncertainties when using best professional judgment to apply the spill guidance criteria (travel time; degassing; water temperature effects; spill patterns)
7. Exceedance due to high TDG levels coming from the Mid-Columbia Projects (see Pasco FMS readings).
8. Exceedance due to high TDG levels coming from the Snake Projects (See Ice Harbor Dam tailwater FMS readings)
9. Exceedance due to a load rejection, the powerhouse was not working and the river was spilled.
10. Exceedance due to failure of FMS gages, database outage, and satellite failures, etc
11. Exceedance due to other unanticipated mechanical problems/maintenance operations (gate was stuck open, passing debris etc.)
12. Exceedance due to sharp rise in water temperature (a 3 to 5 degree F. change in a day).
13. Exceedance due to bulk spill pattern being used which generated more TDG than expected.

Exceedances are being tracked and the following table is the results for the 2004 spill season from July 5 to July 18, 2004.

EXCEEDANCE TYPES
August 3 – August 23, 2004

	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB-W	McNary FB-O	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	CCIW	WRNO TW	Camas FB
DATE	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type	Exceedance Type
8/3/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/4/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/5/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/6/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/7/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10
8/8/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10
8/9/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10
8/10/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10
8/11/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/12/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/13/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/14/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/15/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/16/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/17/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/18/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/19/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/20/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/21/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/22/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/23/04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Exceed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4


Dworshak Outflows and Lower Granite Tailwater Temperatures in 2004
(as of 24 August 2004 @ 0900)
Lower Granite Temp
Little Goose
Lower Monumental
Ice Harbor
Dworshak
Dworshak Outflow
Tailwater Temperature (°F)
Dworshak Outflow (kcfs)
80.0
76.0
72.0
68.0
64.0
60.0
56.0
52.0
48.0
44.0
40.0
40
35
30
25
20
15
10
5
0
4/1/04
4/16/04
5/1/04
5/16/04
5/31/04
6/15/04
6/30/04
7/15/04
7/30/04
8/14/04
8/29/04
9/13/04
Date



Exceedance Comparison
(in Degrees Fahrenheit)

Year	Hours of Exceedance	Index of Exceedance
2004	951	2626.8
2003	1399	3318.0
2002	817	716.2
2001	1259	1871.8
2000	911	1063.4
1999	454	303.1
1998	1532	4708.8
1997	887	757.1
1996	766	574.6
1995	1421	2833.1

10-yr Statistics

Hours of Exceedance

Range:
High: 1532 hrs (1998)
Low:454 hrs (1999)

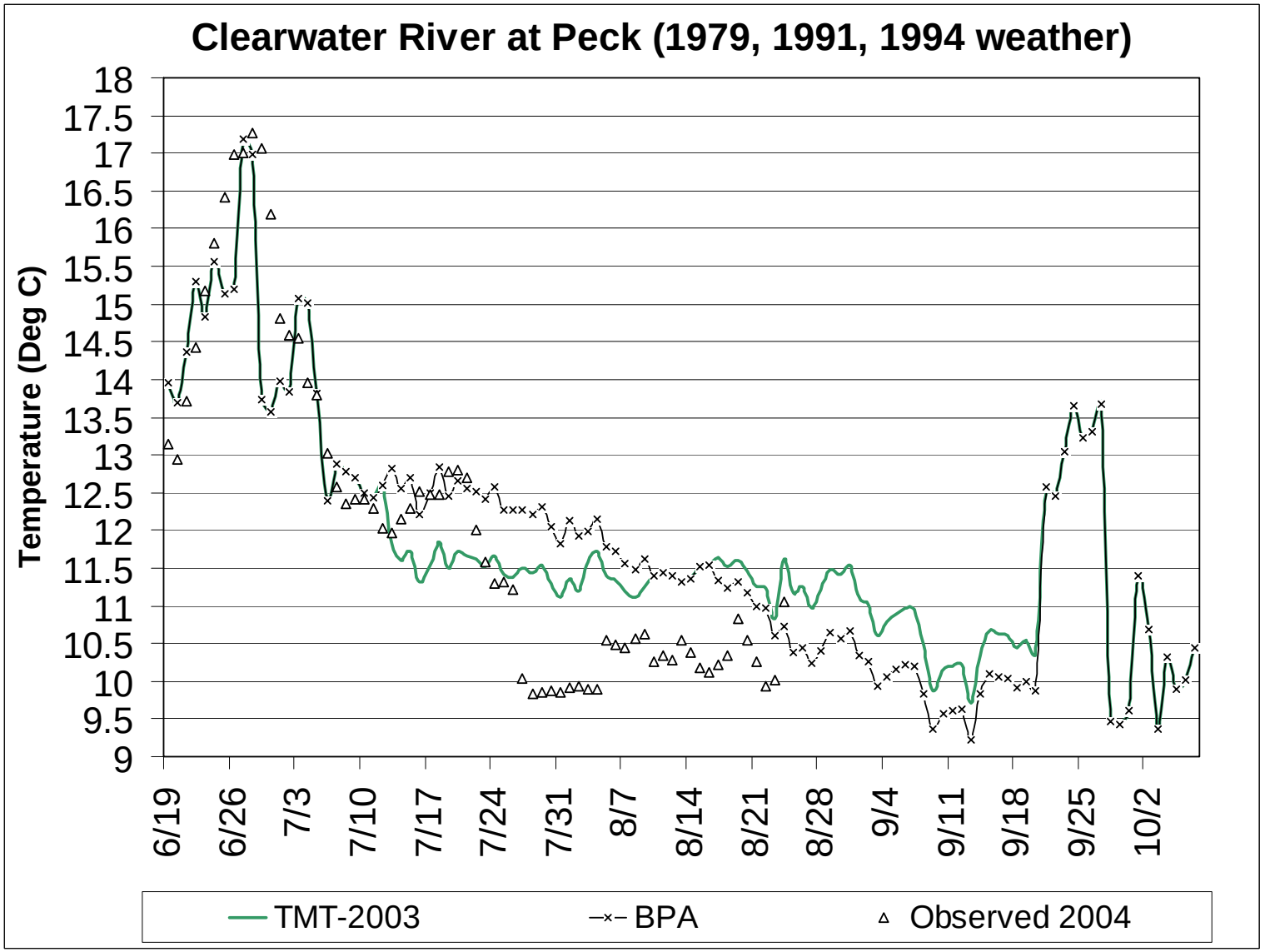
Average: 1039.7 hrs

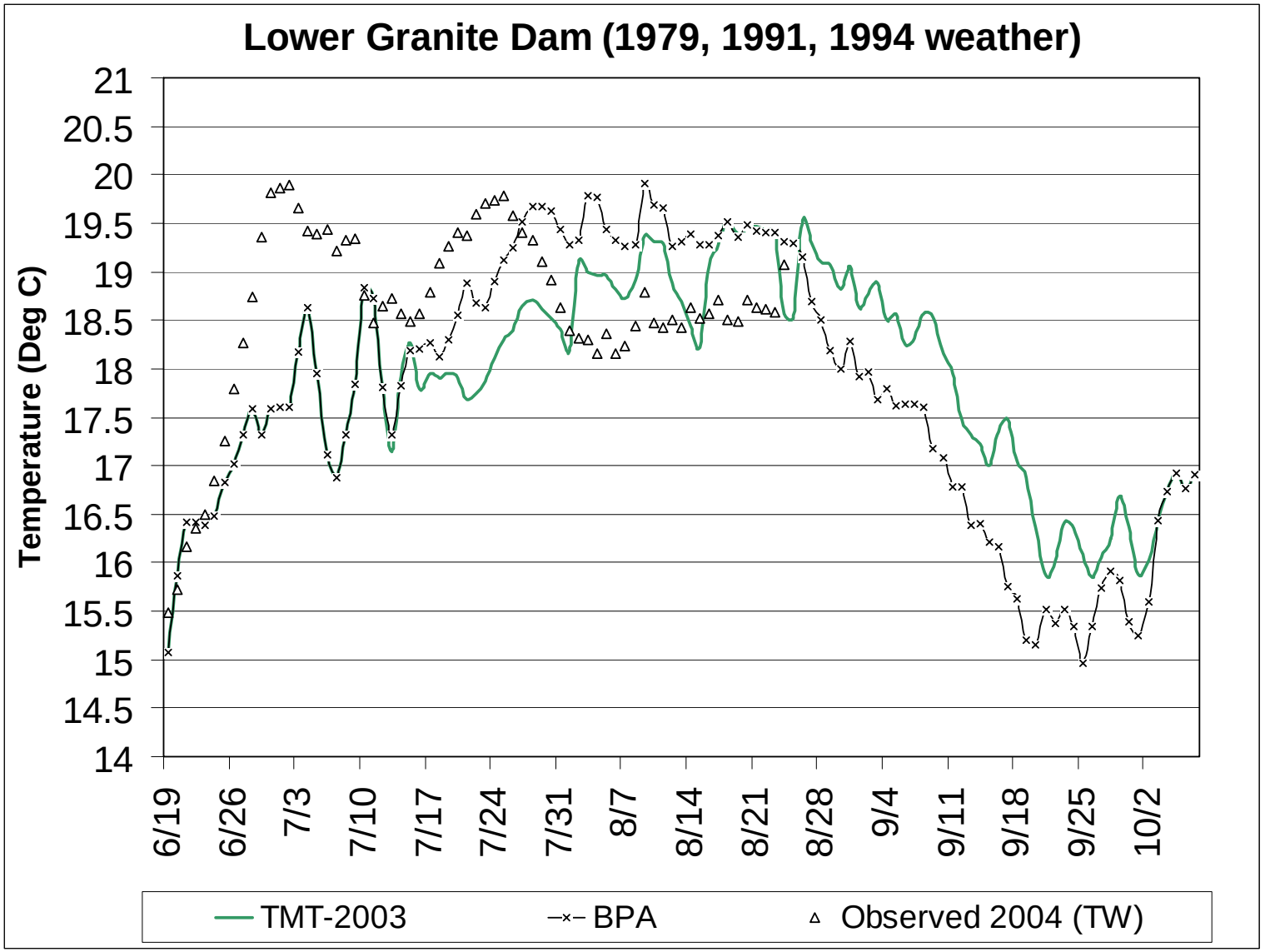
Index of Exceedance

Range:
High: 4708.8 degree-hrs (1998)
Low: 303.1 degree-hrs (1999)

Average: 1877.303 degree-hrs

Number of Hours Remaining in August = 187
Number of Hours Remaining Until 15 September = 547


Clearwater River at Peck (1979, 1991, 1994 weather)
Temperature (Deg C)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004


Lower Granite Dam (1979, 1991, 1994 weather)
Temperature (Deg C)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
15.5
15
14.5
14
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
10/2
TMT-2003
BPA
Observed 2004 (TW)

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
August 25, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Bonneville Spillway Discrepancy:
Laurie Ebner, COE, explained the Corps proposal for fixing calibration on the gates at BON. This proposal was sent in advance to TMT members and is on the TMT website. Its goal is to "verify, quantify and correct inaccuracies in gate openings and rating curve at Bonneville Spillway and document differences between actual and reported spill volumes prior to Spring 2005 spill season". The team working to correct the calibration is also working to provide a means for interpreting old data versus new data to assist with data analysis and comparison for both future studies and operations. Laurie noted that the Corps will require 2-3 days to re-calibrate all the gates, although the schedule for this work is not yet known. TMT will be among those with whom the Corps will coordinate in setting the date for the work.

> **ACTION**: COE will provide TMT with date and timing options for the recalibration work as soon as they are developed.

Lower Granite Powerhouse Outage, Salmon Managers' Response:
After reviewing the information related to the September powerhouse outage at LGR, the salmon managers made the following recommendation for spill operations during that time: Spill as needed to operate the RSW, plus any additional available water, and continue MOP + 1.

Russ Kiefer, ID, noted that had the doble testing been scheduled sooner and in better coordination with the salmon managers a mutually beneficial test could have occurred. The salmon managers were eager to gather data related to the RSW at LGR earlier in the summer. Had they been aware of this testing, perhaps the outage could have been used to gain biological data at a time when there were fish and salmon study tools in the river.

> **ACTION**: Since doble testing occurs at each project every three years, in advance of next season, TMT will discuss future doble testing schedules and the possibility of combining study times and resources to get mutual benefit out of needed operations. *(Facilitator's Note: this issue was first discussed at TMT's July 7th meeting)*

Status of Dworshak/Lower Granite Tailrace Temperature

Jim Adams used graphics (see agenda links) to describe the status of water temperature issues at DWR and the LGR tailrace. He noted that the volume of 40-45 degree water from DWR is diminishing quite quickly. The COE is be drafting the reservoir to elevation 1520'. Once it reaches this elevation, they have very little control of the temperature, regardless of the rate of discharge, simply due to the construction specifications of the project. They will either be able to use overshot or undershot modes, but no mixing will be possible.

> **FOLLOW-UP**: The management of temperature at DWR will be included as an agenda item for this year's TMT Year End Review so the group can learn as much as possible from this year's operation.

SOR 2004-18: Late Summer Dworshak Operations

Request: Steve Haeseker, USFWS, delivered this SOR on behalf of the salmon managers to modify SOR 2004-17. They request that the Action Agencies target 1533' by August 31 and maintain 10 kcfs discharge for as long as possible. He noted that the group is aware the agencies may have to drop to 7 kcfs to hit the requested elevation. The salmon managers also request that a temperature of 45-47 degrees be maintained, if possible.

Response: The COE noted that DWR is currently at 1540'. They will hold the project between 10.2-10.3 through August 30/31 and expect to hit 1533' on August 31, as requested. On Sept. 1 they will drop to 7 kcfs. When the discharge is 7 kcfs, they anticipate the temperature will be close to 47 degrees, but it may vary up or down depending on ambient weather conditions.

> **FOLLOW-UP ACTION**: ID, the Nez Perce tribe and the salmon managers will discuss and bring back to TMT a recommendation for the ramp down rates after the project hits 1520' and drops from 7 kcfs to 1.4 kcfs.

ZONE 6 FALL TREATY FISHERY: SOR 2004-C9

Request: On behalf of CRITFC's four member Tribes, Kyle Martin presented this operation request to support four tribal fishery sessions beginning today, August 25. (For specifics of the four fisheries, please see the SOR). Kyle noted that the tribes will share net flight data gathered on a daily basis with the COE and BPA to assist with the operations.

Response: Cindy Henriksen, COE, noted that the operation was underway for this week and she will send teletypes out to the projects one week at a time to allow for any future contingencies or emergencies. COE is planning to meet the SOR within their normal operating ranges. Cindy will coordinate with CRITFC if any emergencies or changes arise.

End of MOP Operation in Lower Snake River:

Cindy Henriksen (COE) reminded the group that there will be a powerhouse outage at Lower Monumental from Monday August 30 - Friday Sept 3 next week for planned doble testing. This test was coordinated with salmon managers and included in this year's Fish Passage Plan. The COE proposed to hold LoMo steady at 23 kcfs out (5 kcfs speed no load, 18 kcfs over the spillway). To accommodate needs for the outage, LGS

would fill above MOP Monday and Tuesday and LoMo would fill above MOP Tues/Wed. ICH would remain at MOP until 9/3 and fill over the Labor Day weekend.

In response, the salmon managers recommended that the COE fill the pools of LGS and LoMo at a rate consistent with TDG standards of 120% on 8/30-31 and 110% after 9/1, but delay end of Mop and refill completion until 9/15. They explained that this suggestion is consistent with the request for DWR operations in that it would allow the water from DWR to move through the Lower Snake system, helping with the Clearwater systems' juvenile fish migration as well as adult salmon migration needs.

After much discussion and attempt to reach a common ground, it was determined that the action agencies would like time to consider the salmon managers' recommendation. Their current plan is to implement the operation as originally proposed by Cindy. However, the action agencies offered a follow-up discussion on Thursday, 8/26 (tomorrow) at 2 pm which will allow them time to review the data and reflect on the options.

> **ACTION**: Conference call at 2 pm on 8/26 for further consideration of the issue. The dial in number is 503-808-5190

STATUS OF OPERATION:

Reservoirs: For detail of reservoir elevations, please see the minutes of the meeting. Cindy Henriksen (COE) noted that, due to planned study activity in the Kootenai River, flows out of Libby may stay higher for longer than expected in September.

> **ACTION:** A TMT subgroup of MT, USFWS, NOAA, COE and BPA will work to further understand and coordinate the details of this operation.

Power: Nic Lane, BPA, noted that CGS is back on-line.

Water Quality: Jim Adams, COE, told TMT that new features have been added to the water quality reporting pages ion TMT's website. More details on gas cap and spill can be found there. He also noted that the tailwater temperature at McNary is looking like this season may be the second warmest on record.

Other:

The **Lake Roosevelt Forum** will be holding a conference this November in Spokane and have requested that members of TMT be on a panel Monday November 15th.

> **ACTION:** TMT members are asked to say whether they are willing and able to be on the panel and whether they would also like to hold a meeting that same day. **Respond to Cindy by Monday, August 30.**

TMT Year End Review

> **ACTION:** Members were asked to consider possible dates and agenda items, as well as presentations they might be willing to make, for this year's TMT Year End Review. This will be discussed at TMT's Sept. 15th meeting.

NOTE!!!!! Next Meeting, Conference Call 8/26 at 2 pm

Next Face-to-Face Meeting: September 15th: Agenda will be posted one week prior.

- BON spillway discrepancy update/potential dates for work
- TMT year end review agenda and schedule
- Update of Libby operations/subgroup findings

- Status of Tribal Autumn Fishery
- Other TBA

1. Greeting and Introductions

The August 25 Technical Management Team meeting was chaired by Cindy Henriksen of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Henriksen at 503/808-3945.

2. Bonneville Spillway Discrepancy.

Lori Ebner said the Corps has implemented a temporary fix for the Bonneville spillway discrepancy; meanwhile, the proposal for fixing the calibration of the spill gates has been distributed via email. We have been having GDACS set spill at the requested spill level; the operators are then manually raising the gates by 4 inches. There is still a discrepancy between actual spill and what is being recorded in CROHMS; however, we are closer now, Ebner said.

Ebner said the new gate calibration will be accomplished as soon as possible, although the exact date for that work is not yet known. The project thinks it will take two days – a maximum of three – to electronically recalibrate all of the gates at Bonneville. We will then look at the rating curve to make sure it reflects the new calibration, and will verify it a couple of times during the coming months to ensure that we've fixed the discrepancy. The biggest effort right now is spending the 2-3 days on the project, doing the physical calibration, she said.

Will you be able to extrapolate at spill levels above 125 Kcfs? Ron Boyce asked. The plan is to take all gate openings incrementally up to 5 feet, she said; it should be possible to extrapolate to a higher flow, although it is rare for the gate openings at Bonneville to exceed 5 feet. The action, then, at this point, is that Bonneville will let the TMT know when they have some options available for them to consider, in terms of the timing of the recalibration operation? Silverberg asked. That's correct, Ebner replied.

3. Lower Granite Powerhouse Outage, September 20-26.

Paul Wagner said the salmon managers had discussed this proposed operation; the idea that was floated was to use this outage to fill into MOP. Our feeling is that MOP +1 operation should continue at Lower Granite, with a unit at speed-no-load and a quantity of training spill through the RSW, he said. Why was September 20-26 selected? asked Russ Kiefer. The outage, for doble testing, was originally planned for August, said Henriksen; however, there were staffing and safety issues within the powerhouse that arose and needed to be addressed, so the outage was moved into September. Another reason was that Bonneville's Transmission Business Line was planning a separate outage in September, so this test was scheduled to coincide with that outage. The Lower Granite

test doble was coordinated through the Fish Passage Plan, said Henriksen, although the timing is vague.

Kiefer noted that, in June, the salmon managers requested a test of the RSW, to see how summer-migrating fall chinook would respond. That would have been a good opportunity to combine those operations, he said; now spill will occur at a time when few juvenile migrants are passing and we have no monitoring equipment is in place at the RSW. It's a lesson learned, in other words, he said; it seems to me that BPA got together with the Corps and determined what was most advantageous to the power system, not what would be most biologically beneficial. Henriksen noted that much of what drove the scheduling was the availability of the crews needed to conduct the work. Again, she said, we scheduled the doble testing in such a way as to avoid two outages.

Don Faulkner of the Corps described the purpose of doble testing, which is a required power system maintenance activity every three years. It is typically scheduled toward the end of summer. The request I've heard from the salmon managers is that, three years from now, the federal operators better coordinate the timing of this testing, said Silverberg, although it does sound as though you made an effort to accommodate biological needs into the timing of the outage. Henriksen noted that doble testing will be required at other projects in the Snake and Lower Columbia Rivers in the next few years, so the Corps will bear that request in mind.

4. Status of Dworshak/Lower Granite Tailrace Temperature.

Jim Adams provided an overview of Lower Granite tailrace temperatures to date in 2004; he noted that, in general, Dworshak operations and the weather have combined to keep the temperature at the Lower Granite tailrace fixed monitoring station below 68 degrees F. Dworshak is releasing 10.6 Kcfs at 45-46 degrees F, currently. Adams also touched on the current water temperature profile within Dworshak Reservoir, noting that we are reaching the point in the season when fine temperature control is becoming more difficult, and water temperatures are expected to creep upward toward 50 degrees F. by mid-September. We'll revisit this topic at our end-of-year review, Henriksen said, and will take a look at how our operations at Dworshak this summer may have influenced the quantity of water available in the optimal 40-45 degree range. In response to a question, Kyle Martin said that the recent rain events appear to have lowered the temperature in the Clearwater at Peck by about 1 degree C.

On August 24, the action agencies received SOR 2004-18. This SOR, supported by USFWS, NOAA Fisheries, ODFW, WDFW, IDFG, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC, requests the following specific operations:

- Target elevation 1533 feet at Dworshak Dam by August 31. Maintain outflows of 10 Kcfs at Dworshak until it becomes necessary to reduce flows to 7 Kcfs in order to achieve the end-of-August elevation of 1533 feet. Maintain a 45-47-degree release temperature from Dworshak. Maintain outflow of 7 Kcfs through September 15, or until elevation 1520 is reached.

Steve Haeseker went briefly through the contents of SOR 2004-18, the full text of which is available via hot-link from today's agenda on the TMT homepage. Henriksen noted that, given current and forecast rain events in the Clearwater basin, it appears that it will be possible to hold the current 10.5 Kcfs outflow through August 29 or 30, at which point Dworshak outflow will be reduced to 7 Kcfs, most likely on Tuesday, August 31. We think the outflow temperature will be around 47 degrees F by that time, she added. In response to a question from Cathy Hlebechuk, Kiefer said the salmon managers will discuss whether an abrupt reduction or a gradual rampdown from 7 Kcfs to the Dworshak minimum outflow of 1.3 Kcfs is desired, and will report back to the Corps.

5. Autumn Treaty Fishery (SOR 2004 C-9).

On August 20, the action agencies received SOR 2004 C-9, covering operations during the upcoming fall treaty fishery. The SOR covers four separate periods:

- 6 a.m. August 25 through 6 p.m. August 27
- 6 a.m. August 31 through 6 p.m. September 3
- 6 a.m. September 7 through 6 p.m. September 10
- 6 a.m. September 13 through 6 p.m. September 17

As always, CRITFC requests that the action agencies hold Bonneville, The Dalles and John Day pools within 1 foot from their respective full pool elevations. Martin noted that CRITFC plans to conduct aerial surveillance of net placement each week.

Henriksen noted that the first tribal fishery started this morning, and the Corps issued a teletype specifying a hard constraint of 75-76.5 feet at Bonneville. John Day is operating between 262.5-264 feet, its normal BiOp operating range, she said. The current operating range at John Day will be in effect through September 30. She added that the normal operation at The Dalles is two feet at this time of year. The plan is to meet our normal operating range, she said; if there are any bumps in the road, we'll get the word out. Martin thanked the action agencies for their efforts to work with the tribes on this issue; he noted that the dates shown in the SOR are firm. Martin asked that, if the pool elevations are low at the start of the final week of treaty fishing, which begins on a Monday, the Corps fill the pools as quickly as possible (by noon on September 13). Nic Lane said BPA has no objections to Corps' planned operation, and thanked CRITFC for its advance coordination

6. End of MOP Operation in Lower Snake River.

Wagner noted that we are now approaching the time of year when adult passage begins to supercede juvenile passage, and the pools at the Lower Snake projects are typically refilled, to ensure that the adult ladders are in criteria.

Lower Monumental has a scheduled powerhouse outage next week, said Henriksen, beginning Monday at 7 a.m. and ending Friday, whenever they're done with the work. Lower Monumental will be spilling next week, in other words; the action agencies have been discussing how best to meet the multi-purpose needs of the system. We have heard that the salmon managers would prefer not to see a large reduction in

Lower Snake flows across the week, as a result of refilling the Lower Snake pools to MOP; we're expecting flows in the 23-24 Kcfs range in the Lower Snake next week, she said.

She noted that Dworshak outflow will be reduced by 3 Kcfs next week; we could, use the scheduled outage at Lower Monumental to, as we usually do, refill the Lower Snake pools sequentially, beginning Monday at Little Goose, and still leave 23-24 Kcfs in the river. Lower Monumental would release 5 Kcfs speed-no-load and 18 Kcfs over the spillway across the week; it is a much smaller pool and would fill quickly on Wednesday. If we don't fill above MOP this week, we will have more spill at Lower Monumental, which will likely produce TDG in excess of 110%, she said. If we wait until the end of the week to fill the projects, we will see greatly reduced flows in the Lower Snake during refill, she said. In response to a question from Boyce, Henriksen said the Lower Monumental outage was coordinated through the Fish Passage Plan; it is a planned maintenance outage with various purposes.

Steve Haeseker noted that it makes little sense, to him, to use the tortuously-negotiated Dworshak September storage to refill the Lower Snake pools, rather than to benefit migrating juveniles in the Clearwater. Henriksen noted that Lower Granite and Ice Harbor will remain at MOP. It makes more sense to me that we would maintain MOP at least through the end of the 7 Kcfs outflow from Dworshak, on about September 15; and preferably through September 30, Haeseker said.

At Henriksen's request, Wagner provided a brief overview of the current status of the juvenile outmigration. He noted that there are competing views about how the migration should be managed at this time of year; NOAA Fisheries' view is that there are two fall chinook life-histories expressed by this species: yearlings and subyearlings. To not recognize the later-migrating subyearling component allows water temperatures in Lower Granite pool to increase, putting later migrants at risk – hence our support for continued flow augmentation from Dworshak through September 15. The emphasis isn't necessarily to move them quickly through the Lower Snake, he added; it is to maintain desirable environmental conditions for these fish until they outmigrate, some at a much later date than September.

Wagner said the subyearling passage indices have increased significantly at Lower Granite in recent days, probably in response to the recent rain events, to more than 1,300 fish per day on August 23. Given the expected outmigration across the season of more than 1 million fish, however, subyearling passage is really just starting to take off in the Lower Snake, Wagner said. Wagner also touched on recent PIT-tag detection data for Clearwater juveniles at the Lower Snake projects; the group discussed the relevance of this information; in particular, what components of the Clearwater run are PIT-tagged: primarily larger, earlier-migrating fish. It is likely that the PIT-tagged fish migrate earlier than the Clearwater population as a whole, said Kiefer, so we need to be careful how we use the DART PIT-tag information for fall chinook. Just because DART says 99% of the PIT-tagged fish have passed, it doesn't mean 99% of the total Clearwater run has passed, Kiefer said.

The other factor to be considered is adult passage, said Wagner, and the need to maintain a high enough elevation to provide good passage conditions at the Lower Snake adult ladder entrances. If juvenile passage was the only consideration, said Wagner, then obviously, we would stay at MOP.

Haeseker said that, in his view, the primary reason the Fish and Wildlife Service, and all of the other salmon managers with the exception of NOAA, supported the extension of the Dworshak releases into September, is to benefit the migrating Clearwater subyearlings. Boyce said ODFW would prefer that the planned maintenance operation be deferred until October. Again, the outage was coordinated through the Fish Passage Plan, said Rudd Turner, down to the specific dates – you've had eight months to make that comment. It has been coordinated; we have a limited number of crews to do this kind of work, and they have to be out there next week to do this work – we don't have a choice, Henriksen added.

Michele DeHart noted that, in her understanding, adult passage isn't expected to be a problem at the Lower Snake projects, at least for the next few weeks, given expected river flows and elevations.

What exactly would the salmon managers like to see happen? Henriksen asked. How about a proposal that the Corps do what it needs to do to stay within water quality criteria during the outage, but maintain MOP at the Lower Snake projects through October 1? said Haeseker. We would have to ask NOAA Fisheries about the advisability of maintaining MOP past August 30, said Henriksen, given our obligation to implement the BiOp. I would also want to consult with the Nez Perce Tribe about the impacts of such an operation on adult passage. Martin replied that, according to the 2004 Tribal River Operations Plan, supported by CRITFC and the Nez Perce Tribe, MOP should be maintained at Lower Granite through October 31, but the tribes are flexible as to MOP operations at the other Lower Snake projects.

Following a brief caucus break, Wagner said the view he had expressed earlier regarding the purpose of the Dworshak September releases is not widely-held among the other salmon managers. The proposal has been put forward to gradually refill the pools, at such a rate that will not exceed the 110% post-August 31 TDG cap, he said. In other words, said Haeseker, let the pools refill to whatever extent is necessary to avoid TDG exceedences during the outage, but do not refill the pools further once the outage is complete, until Dworshak goes to minimum outflow. So in effect, you're saying keep the projects at MOP through September 15? Henriksen asked. If that is the effect, Haeseker replied.

Henriksen said that is somewhat surprising, given the language in the BiOp, which specifies that the pools should be refilled early in September to bring the adult ladders into criteria. However, it was never my understanding that the Dworshak September releases would be used to refill the Lower Snake pools, she said. The recommendation we have on the table was to use the rainfall event to provide a smooth transition, and to keep Lower Snake flows higher while the pools refill, she said. Again, we would prefer to see the Dworshak flow augmentation water used for flow augmentation during what has been a low-flow year, Haeseker replied; if natural rain

events provide some additional flow, so much the better. The decision was made to provide some additional protection for the later-migrating Clearwater juveniles, because that is a valuable component of the run, added Kiefer. We believe that is the best use of this resource for anadromous fish.

Henriksen replied that the action the Corps is proposing is consistent with the direction in the BiOp; she noted that, if the action agencies wait until the post-September 15 period to refill the Lower Snake pools, that will result in a far greater impact on flows through the Lower Snake. Again, she said, the Corps looks at the FCRPS as a multi-purpose system; we would prefer to minimize TDG production, rather than going right up to the standard. We would also prefer to refill the Lower Snake pools sooner, rather than later, in order to maximize flexibility and power production, another purpose of the system. I'm a little disappointed that you're proposing that we defer refill and compromise those other uses, she said.

Kiefer replied that it is the salmon managers' belief that their proposed operation is the best one, from a biological standpoint. He noted that the salmon managers' proposal includes a provision that would allow refill to avoid any exceedence of the 110% TDG standard. What is the negative impact you're so concerned about, in terms of delaying refill until after September 15? he asked.

Maintaining the pools at MOP is a restriction to the operational flexibility of the power system, which is detrimental to the region, Henriksen replied. We have operated the system in this way for many years, apparently without detrimental impacts. In response to a question, Henriksen said that, without the action agencies' proposed operation, flows in the Lower Snake would be about 29 Kcfs on Monday, August 30, declining to about 23 Kcfs by Friday; we would keep flows at a steady 23 Kcfs across the week, she said. Haeseker noted that the salmon managers' proposal represents something of a compromise; again, he said, any refill that is needed to avoid TDG exceedences can stay in the pool. Henriksen replied that, given the fact that the 110% state TDG standard would likely not be exceeded unless total spill in the Lower Snake exceeds 20 Kcfs, and 5 Kcfs would be passed via speed-no-load at Lower Monumental, it is unlikely that any refill would be necessary to avoid TDG exceedence. She expressed surprise at the salmon managers' request, because traditionally, the action agencies have begun to refill from MOP once the biological management period ends on August 31. Again, the salmon managers' concern is that, if we begin to refill out of MOP, we will receive less biological benefit from the September Dworshak releases than we would have if we had released all of the Dworshak water prior to August 31, added Kiefer. In response to a question, Wagner said NOAA Fisheries has incorporated the salmon managers' position into its recommendation on this issue.

Following another caucus, Lane said the action agencies would like a bit more time to consider the salmon managers' proposal. In the interim, we will plan to implement the operation we proposed next week, with the caveat that we schedule another TMT meeting on Thursday afternoon to discuss it, if needed, he said. The planned operation would be that, during the scheduled outage at Lower Monumental, we will hold the flow at Lower Monumental at 23 Kcfs through the week, said Henriksen. Inflow to Little Goose upstream will be greater than 23 Kcfs; we would use that

additional flow to fill Little Goose above MOP on Monday and Tuesday. Then, on Tuesday and Wednesday, we would use the additional flow to fill Lower Monumental above MOP. Ice Harbor would remain at MOP through September 3, then refill above MOP over Labor Day weekend. Kiefer noted that the target date in the BiOp is August 31; under this proposal, refill would begin at Little Goose on August 30. Turner noted that the BiOp does not specify a start date for refill above MOP; rather, it is tied to various biological criteria.

After a few minutes of discussion, it was agreed to convene a TMT conference call at 2 p.m. tomorrow, September 26.

7. Status of Operation.

Henriksen said Libby continues to release 12.5 Kcfs; its current elevation is just below 2444 and generally drafting, though it filled slightly yesterday, and is expected to continue to fill slightly over the next few days. Libby is expected to reach 2439 by September 7 or 8; at that time, we plan to reduce Libby outflow, in part to accommodate a USGS survey crew. They plan to start that work by September 10; they have requested 12.5 Kcfs for four days, beginning September 10, followed by five days at 8 Kcfs. Kiefer observed that an additional four days at 12.5 Kcfs to accommodate a contractor is a problem, to him; if it wasn't for that, we would be dropping Libby outflow sooner. Cathy Hlebechuk replied that the contractor has been awaiting funding; she noted that these dates are not carved in stone.

Norris said Grand Coulee is at elevation 1280, should hit 1278 by August 31. Hungry Horse is at 3548, currently, and drafting half a foot per day toward elevation 3540 as soon after August 31 as possible. Dworshak is at 1540 and drafting toward 1533 by August 31, at which point outflow will be reduced to 7 Kcfs.

On the power system front, Lane said the CGS nuclear plant is back on-line.

Adams went briefly through the new features on the Corps' water quality website, including daily gas cap, average daily spill and water quality exceedence information, for 2002, 2003 and 2004. Adams noted that 2004 is headed toward being the second-warmest water year in the last 10 years at the McNary tailwater gauge.

8. Other.

A. Request From Lake Roosevelt Forum for Nov. 15 Panel Discussion. Henriksen said she has received a request from the Lake Roosevelt Forum for the TMT to join a panel discussion at the LRF conference in Spokane on November 15. She asked the TMT members to consider whether or not they would like to participate. If the TMT would like to meet in Spokane during the conference, a room will be made available, she said.

B. TMT End-of-Year Review. Henriksen asked the TMT participants to think about agenda items for the annual end-of-year review meeting, as well as a date for this meeting.

9. Next TMT Meeting Date.

The next face-to-face Technical Management Team meeting was scheduled for Wednesday, September 15, though a conference call may be needed to discuss Libby operations in September prior to that date. A conference call to discuss refill above MOP at the Lower Snake projects was set for tomorrow at 2 p.m. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List

August 25, 2004

Name	**Affiliation**
Russ Kiefer	IDFG
Donna Silverberg	Facilitation Team
Paul Wagner	NOAAF
Jim Litchfield	Montana
Nic Lane	BPA
Tony Norris	USBR
Kyle Martin	CRITFC
Ron Mason	COE
Bob Couch	COE
Rudd Turner	COE
Tom Haymaker	PNGC
Lori Ebner	COE
Jim Adams	COE
Tim Heizenrater	PPM
Laura Hamilton	COE
Ruth Burris	PGE
Russ George	WMCI
Michele DeHart	FPC
Mike O'Bryant	CBB
Scott Boyd	COE
Mike Buchko	Powerex

David Benner	FPC
Margaret Filardo	FPC
Richele Beck	D. Rohr & Associates
Martin Hatscher	SCL
Ron Boyce	ODFW
Cathy Hlebechuk	COE
Lance Elias	PPM
Bruce MacKay	Consultant
Lee Corum	PNUCC
Steve Haeseker	USFWS

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT CONFERENCE CALL

Thursday August 26, 2004 1400 - 1500 hours

Custom House Room 118

Portland, Oregon

Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. End of MOP Operation in Lower Snake River.

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 26, 2004 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

The following notes are a summary of issues discussed on today's conference call. These notes are not intended to be the "record" of the call, only a reminder for TMT members. See the Meeting Minutes for more details of the discussion and considerations.

End of MOP Operation in Lower Snake River:

At yesterday's TMT meeting, Cindy Henriksen, COE put forth a proposal from the action agencies for operations of Lower Snake projects during a planned outage at Lower Monumental. The COE proposed to hold LoMo steady at 23 kcfs out (5 kcfs speed no load, 18 kcfs over the spillway). To accommodate needs for the outage, LGS would fill above MOP Monday and Tuesday and LoMo would fill above MOP Tues/Wed. ICH would remain at MOP until 9/3 and fill over the Labor Day weekend.

In response, the salmon managers recommended that the COE fill the pools of LGS and LoMo at a rate consistent with TDG standards of 120% on 8/30-31 and 110% after 9/1, but delay end of MOP and refill completion until 9/15.

The action agencies agreed to review the data and a conference call was set for today to follow-up with a possible new plan.

Nic Lane, BPA, explained that the action agencies had discussed the issue internally with their biologists and they had reviewed the BiOp and Water Management Plans for further guidance. BPAs biologist reported a low number of fish in the system and expects no change to occur in the environmental conditions until the fish had passed LGR—where they will be transported, instead of staying in-river. Based on this, Nic presented a revised plan, consistent with past operations at this time of year, that was also supported by COE:

> Hold the projects within MOP on Monday and Tuesday. Beginning September 1, lift the MOP restrictions and fill some into LGS and LoMo during the planned outage. This will likely result in 3' being stored at LGS and 2' at LoMo.

While NOAA's Paul Wagner expressed a willingness to support this changed operation as a positive movement on behalf of the interests stated at yesterday's TMT meeting, Steve Haeseker, on behalf of USFWS, OR and ID did not. He noted that this was not as much movement towards the mid-September goal as he and others had hoped for, a time during which the DWR water was anticipated for use to protect migrating juveniles and adults via both temperature and flow augmentation. While Steve said he and the others are not supportive of the proposal, they did not choose to elevate the issue to IT.

The Nez Perce tribe also was not supportive of the proposal as they believe only 9% of the Clearwater system's migrating juveniles have passed LGR. Dave Statler and Greg Haller explained that those fish are very important to the tribe and will require additional cool water and flow to assist with their passage. To address these concerns directly, Greg Haller, on behalf of the Tribe, requested that formal consultation between the COE's General and the Tribal Chair, Anthony Johnson occur as soon as possible on this issue.

1. MOP Operation on the Lower Snake River

Silverberg said the purpose of today's conference call was to discuss the timing of the end of the minimum operating pool restrictions at Little Goose, Lower Monumental and Ice Harbor Dams. She reminded the group that, at yesterday's TMT meeting, the Corps had proposed to refill Little Goose and Lower Monumental pools during next week's scheduled powerhouse outage at Lower Monumental; Ice Harbor would then be refilled over Labor Day weekend. Flow through the Lower Snake would be held to a constant 23 Kcfs through the week. The salmon managers said they would prefer that the pools not be refilled above MOP, except for that volume necessary to avoid exceeding the state gas cap, until after the Dworshak flow augmentation volume is exhausted on September 15. The action agencies agreed to further discuss that proposal, hence today's call.

Our proposal, after discussing the salmon managers' proposal internally, is much the same as yesterday's, said Nic Lane. He discussed the biological criteria laid out in the BiOp. We would propose holding the pools at MOP until August 31, and lift the MOP restriction beginning September 1. Bob Heinith said CRITFC has been trying to find out where, in the Fish Passage Plan, the Lower Monumental outage is covered; Appendix A, Henriksen replied.

Which agencies are in favor of BPA's proposed operation? asked Dave Statler. The Corps can certainly support BPA's recommendation, Henriksen replied, although we presented a somewhat different proposal at yesterday's TMT meeting. So it's an action agency proposal? Statler asked. Correct, Silverberg replied.

Wagner said NOAA Fisheries is OK with BPA's proposed operation. The concern raised by salmon managers at yesterday's meeting was that water from Dworshak would be used to refill the Lower Snake pools; NOAA Fisheries did not fully share that concern, he said, but went along with it yesterday. The BiOp isn't completely clear on this issue, he said, and what BPA is now proposing represents a more satisfactory compromise. There is no real specificity, in terms of actual dates, in the BiOp, Wagner said.

Steve Haeseker said he doesn't see this proposal as much of a compromise; it only delays the start of refill for two days, and does little to address the salmon managers' concerns -- Dworshak water would still be used to fill the pools. I guess we appreciate your consideration of our propoosal, he said.

There are still Clearwater River subyearling chinook moving through the system, according to Billy Connor, said Greg Haller. Also, said Statler, there is still a water

temperature concern; although we have received some relief in recent days, the Hells Canyon outflow temperature at Oxbow is still 71 degrees. Once the weather warms up again, he said, temperature will once again be a concern in the Lower Snake, and if the pools are filled above MOP, that will reduce the effectiveness of the cold water from Dworshak, the volume of which is already going to be reduced beginning September 1. I don't believe it would be a prudent action until ambient natural cooling begins, he said.

In response to a question from Silverberg, Pam Kingsbury of BPA said the expectation is that refill of both Little Goose and Lower Monumental pools would likely begin on Tuesday; how quickly they fill will depend on inflows. She added that Little Goose pool will be filled by three feet, Lower Monumental pool by two, a total volume of about 20 ksfd.

Our feeling is that there are very low numbers of fish in the river, although we recognize that these are important fish, said Lane; also, the conditions these fish face would not change until they reach Lower Granite. We also have adults present, he added. Statler replied that less than 9% of the Clearwater fall chinook outmigrants have passed Lower Granite at this date; these fish are, as you state, very important to the Nez Perce Tribe.

The recent NOAA Fisheries findings letter on summer spill shows juvenile survival running at a deficit, observed Bob Heinith – how will the operation to which you're agreeing help juveniles? My read is that augmentation from Dworshak has two seasons of operation, replied Wagner – during the first season, it provides flow augmentation to decrease juvenile travel time, provide better in-river conditions and increase survival. That season is coming to an end; the spill season is also coming to an end, and the water that is now coming out of Dworshak is primarily beneficial from the standpoint of maintaining environmental conditions in the reservoirs, not to reduce travel time. Without the whole package of spill and flow augmentation, NOAA doesn't share the other salmon managers' view that the flow augmentation facet will make a significant difference to survival at this point in the season. Its environmental control benefit is important to both juvenile and adult migrants, he added.

Wouldn't you agree that decreasing travel time through the Lower Snake would be beneficial to juvenile migrants? Heinith asked. Possibly in terms of reducing predation, Wagner replied. Even if it's a small benefit, would you agree that it is still a benefit? Heinith asked. I'm not sure, Wagner replied – the data on larger outmigrants, which spend more time in the river system, isn't clear on whether or not speeding their outmigration provides a benefit at this time of year. He added that, according to the data from the Anatone gauge, water temperatures have cooled from 73 degrees to 67.5 degrees in recent days, so cooling is already occurring. The likelihood of temperatures significantly rebounding, given the shorter days from here on out, is low.

Statler said that question is open to debate. He added that he has consistently argued that the fish do not pay attention to an artificial cutoff date for flow augmentation and spill of August 31. And we have accepted your argument, Wagner replied; fish are clearly still present in the system, which is why NOAA Fisheries agreed to move a portion of the Dworshak volume into September.

Is there anything the action agencies have heard today that would change what you've proposed to do? Silverberg asked. The operation we're proposing is similar to what we've done in past years, Lane replied; at this time, we're not really amenable to doing anything different than what we've proposed. The discussion then turned to the elevations needed to ensure adequate conditions at the adult ladders; Heinith noted that Bjorn's data shows little difference, in adult passage success, when the ladders are in compliance and when they're up to two feet out of compliance.

What I'm hearing, then, is that most of the salmon managers, with the exception of NOAA Fisheries, are concerned about the proposed Lower Snake operation, said Silverberg; I've also heard that the tribes are very concerned about the 91% of the Clearwater fall chinook run that has yet to pass Lower Granite. We have also heard that NOAA does not oppose the operation, and the action agencies intend to implement it. Does anyone wish to elevate this issue for IT consideration? she asked.

After a brief caucus break, Haller asked whether the action agencies feel this decision is consistent with Judge Redden's decision. Yes, Lane replied. We don't agree, said Haller, while we're not going to elevate it to IT at this time, the Nez Perce Tribe is requesting formal consultation on this issue between the Corps General and the Tribal Executive Committee here in Lapwai. Haeseker said the Fish and Wildlife Service also disagrees with the action agencies' planned operation, as do ODFW, WDFW and IDFG; however, he said he did not want not elevate this issue to IT. Statler suggested that Silverberg call Ron Boyce and Russ Kiefer to see whether or not they wish to elevate this issue; she agreed to do so.

What is the Corps' response to our request for formal consultation? Haller asked. I will pass the message forward through our chain of command, Henriksen said. Haller said the General or his staff can call him, Dave Statler, or Nez Perce Tribal Chair Anthony Johnson directly. With that, the August 26 TMT conference call was adjourned. Meeting summary prepared by Jeff Kuechle.

List of TMT Participants

August 26, 2004

Name	**Affiliation**
Cindy Henriksen	COE
Donna Silverberg	Facilitation Team
Mike O'Bryant	CBB
Nic Lane	BPA
Kyle Martin	CRITFC
Bob Heinith	CRITFC

Steve Haeseker	USFWS
Margaret Filardo	FPC
Paul Wagner	NOAAF

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
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OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday September 15, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Bonneville spillway calibration update, work dates.
3. Libby operations update, subgroup report.
   [Sep 8 sub-group minutes]
4. Albeni Falls fall/winter operation
5. Lower Granite powerhouse outage, MOP operation
6. Autumn Treaty fishery update.
7. TMT year-end review, agenda and schedule.
8. Draft 2005 Water Management Plan.
   [Water Management Plan Draft 9-15-04]
9. Status of Operation
   a. Reservoirs
   b. Fish - Adult Fall Chinook 2004
      i. [Brights over Bonneville 2004]
      ii. [Tules over Bonneville 2004]
   c. Power System
   d. Water Quality
      1. Temp
         i. [Dworshak Outflows and Lower Granite Tailwater Temperatures in 2004 (as of 13 September 2004 @ 0900 hrs)]
         ii. [2004 - CHANGES IN WATER TEMPERATURE OVER TIME DWORSHAK RESERVOIR]
10. Other
    - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

2005~~4~~ Water Management Plan

Draft ~~Final~~ – September 15, 2004~~October 22, 2003~~

TABLE OF CONTENTS

1.0 Introduction

1.1 Draft BiOp and Updated Proposed Action

On September 9, 2004 NOAA Fisheries released "State/Tribal Review Draft Biological Opinion Operation of the Federal Columbia River Power System including the 19 Bureau of Reclamation Projects in the Columbia Basin (Revised and reissued pursuant to court order, NWF v. NMFS, Civ. No. CV 01-640-RE (D. Oregon))" (Draft BiOp). The Draft BiOp can be found at http://www.salmonrecovery.gov/R_biop.shtml. Also on September 9, 2004 the Action Agencies released "FINAL Draft Updated Proposed Action for the FCRPS Biological Opinion Remand" (Draft Proposed Action) The Draft Updated Proposed Action can be found at http://www.salmonrecovery.gov/implementation.shtml.

The Draft Updated Proposed Action states, "To a large extent, this Updated Proposed Action continues the implementation of many of the actions contained in the 2000 BiOp"[1] and "The Action Agencies are currently implementing the RPA of the 2000 BiOp. Under this Updated Proposed Action, we would implement the majority of measures in the 2000 RPA without modification and refine some of the more general offsite measures described in the 2000 RPA."[2]

In addition the action agencies are engaged in Endangered Species Act (ESA) Section 7 consultation with the U.S. Fish and Wildlife Service on the operation of Libby Dam as part of the Federal Columbia River Power System as part of their 2000 BiOp titled "Effects to Listed Species from Operations of the Federal Columbia River Power System".

Based on the above information this first draft of the 2005 Water Management Plan assumes that Action Agencies will be implementing the 2000 NMFS and USFWS BiOps' -water management actions unless indicated elsewhere. Changes adopted through action agency ESA consultations will be incorporated into this Water Management Plan.

~~1.1~~1.2 Preparation of Plans

This Water Management Plan for 200~~4~~5 has been prepared as part of the implementation planning process outlined in the 2000 National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) Biological Opinions (BiOps) concerning operation of Federal Columbia River Power System (FCRPS) dams. This plan describes how the FCRPS dams and reservoirs will be operated for the 200~~4~~5 water year (October 1, 200~~3~~4, through September 30, 200~~4~~5) to implement the BiOps' water management measures in a manner consistent with the actions called for in both BiOps and progress toward the performance standards specified in the NMFS 2000 BiOp, and non-BiOp related, requirements and purposes, such as flood control, hydropower, irrigation and recreation. The FCRPS hydrosystem performance standards are presented in section 12.

Per the BiOps, the action agencies will annually prepare a 1-year Water Management Plan that covers FCRPS hydro operations in the upcoming water year. These plans will generally be

[1] Draft Updated Proposed Action Page 1
[2] Draft Updated Proposed Action Page 13

drafted in July and completed by the end of September. The plan will cover the upcoming water year, which begins on October 1 and ends on September 30 the following year. This 1-year plan will be written when very little information is known about the future year's water supply. Therefore, the annual Water Management Plan will generically describe how the FCRPS will be operated during the year. It will also include any special operations (such as any special tests, flood control procedures planned for the year, etc.) that are known at the time the plan is developed.

This plan contains several uncertainties that previous plans did not address. Firstly, the NMFS FCRPS BiOp is in remand per U.S. Federal District Courts ruling by Judge Redden. The ~~assumption is the~~ current provisions of the 2000 BiOp will remain in place until a new BiOp is developed. Another ~~second~~ uncertainty is how the Northwest Power and Conservation ~~Planning~~ Council's recommendations will be addressed. Many of their proposals called for studies. The extent these studies will impact operations are uncertain at this time. In addition, there are a number of project operations that may be revised based on research results that are not available at this time.

The action agencies will also develop more detailed in-season action plans to describe how the FCRPS projects will be operated under actual conditions with current water supply forecasts. The first action plan will be prepared in the fall to address the fall/winter operation of the FCRPS projects. A spring update will be drafted in January and finalized in the March/April time period to address the spring and summer operation of the FCRPS projects. These action plans will take into account changes in the BiOp adopted by NOAA in this time frame.

~~This year a 5-year Water Management Plan will also be developed. The 5-year Water Management Plan will mainly look at planned and expected fisheries research resulting in possible changes to FCRPS operations.~~

~~1.2~~1.3 BiOp Strategies

This Water Management Plan addresses strategies to enhance juvenile and adult fish survival through a coordinated set of hydro project management actions to achieve performance standards, and to provide benefits to resident fish. The plan is structured to address water management actions associated with the following strategies and substrategies, as defined in the Endangered Species Act 2005~~4~~/2005~~4~~-2009~~8~~ Implementation Plan for the Federal Columbia River Power System. These strategies generally remain the same in the Draft Updated Proposed Action except where noted below.

~~1.2.1~~1.3.1 Hydro Strategies and Substrategies for Listed Species of Anadromous Fish

Hydro Strategy 2 – Manage water to improve juvenile and adult fish survival

Substrategy 2.1 – Reservoir operations to enhance fish survival: Actions under this substrategy are project operations that benefit fish at or near the project or its reservoir.

Substrategy 2.2 – System flow management to enhance fish survival: This substrategy includes coordinated system operations for mainstem flow management and redd protection.

Substrategy 2.3 – Spill operations for project passage: This substrategy includes spill operations at individual projects to provide a better project passage for juvenile fish while avoiding high dissolved gas levels or adult fallback problems.

Substrategy 2.5 – This has been changed in the Draft Updated Proposed Action to Operate to Achieve Maximum Fish Benefits in a Cost Effective Manner[3]

Substrategy? Other actions to enhance water management: This substrategy includes water management related actions that are being done to improve fish survival, such as studies, water quality actions, and water conservation improvements.

Hydro Strategy 3 – Operate and maintain fish passage facilities to improve fish survival

Substrategy 3.3~~4~~ (Number is changed in Draft Updated Proposed Action[4] – Juvenile fish transport actions to enhance fish survival. This substrategy includes the transportation of juvenile fish around FCRPS dams.

~~1.2.2~~1.3.2 Strategy and Substrategies for Listed Species of Resident Fish

Strategy 1 – Promote the reproduction and recruitment of Kootenai River white sturgeon (KRWS).

Substrategy 1.1 – Create conditions below Libby Dam that facilitate KRWS natural reproduction and juvenile survival. This substrategy includes operations at and below Libby Dam that aid in Kootenai River white sturgeon recovery.

Strategy 2 – Determine the impacts of the FCRPS on bull trout and mitigate for those impacts.

Substrategy 2.2 – Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats. This substrategy includes actions to improve conditions for bull trout.

[3] Draft Updated Proposed Action page 17
[4] Draft Updated Proposed Action page 18

~~1.3~~1.4 Non-BiOp Operations

Each year the action agencies implement water management actions that are not required by the BiOps, but are aimed at meeting other project requirements and purposes such as flood control, power generation, irrigation, navigation, recreation, and fish and wildlife not listed under the ESA. The table below includes some of the fish and wildlife related non-BiOp water management actions that may be implemented and the time of year such actions typically occur. These actions are further described in section 12.

Action	**Time of Year**
Keenlyside Dam (Arrow) - mountain whitefish actions	December - January
Keenlyside Dam (Arrow) - rainbow trout actions	April - June
Libby - burbot actions	December - February
Dworshak – flow increase for hatchery release	March
Grand Coulee – kokanee	September - October
Hanford Reach Protection Flows	March - June
Vernita Bar Protection Flows	November - April
McNary - waterfowl nesting	March - May
McNary - waterfowl hunting enhancement	October - January
John Day - goose nesting	March - May
John Day - waterfowl hunting enhancement	October - January
Bonneville - Tribal fishing	April - September
Bonneville - Spring Creek Hatchery release	March

~~1.4~~1.5 Changes From Last Year's Plan

This is the fourth~~third~~ annual water management plan developed under the NMFS and USFWS 2000 BiOps.

~~The NMFS 2000 FCRPS BiOp calls for a 5-Year Water Management Plan to be developed, which will outline operational considerations out to the 5-year horizon. The 5-Year Plan is a separate document that identifies potential operational changes that may occur in future years. Developments such as the Bonneville corner collector, changes in spill operations, and consideration of the NWPCC Mainstem Amendments. Some of these changes may be implemented as early as 2004 after coordination in the regional forums and through the Action Agencies.~~

~~Another change is the addition of two new appendixes, number 5, Chum Spawning Considerations and number 6, Criteria to consider for providing spill or terminating spill at Lower Snake River below average runoff volume years.~~

2.0 Hydro System Operation

2.1 Priorities

The NMFS and USFWS BiOps list the following strategies for flow management:

- Limit the winter/spring drawdown of storage reservoirs to increase spring flows and the probability of reservoir refill.
- Draft from storage reservoirs in the summer to increase summer flows.
- Provide minimum flows in the fall and winter to support mainstem spawning and incubation flow below Bonneville Dam.

The Action Agencies have reviewed these strategies and other actions called for in the BiOps and developed the following priorities (in order) for flow management and individual reservoir operations:

1. Operate storage reservoirs (Hungry Horse, Libby, and Albeni Falls) to meet minimum flow and ramp rate criteria for resident fish.
2. Refill the storage projects by June 30 to provide summer flow augmentation. A late snowmelt runoff may delay refill in order to avoid excessive spill.
3. Operate storage projects to be at their April 10 flood control elevations to increase available flows for spring flow management.
4. Provide fall and winter flows for chum salmon spawning and incubation.

The Action Agencies implement several independent FCRPS project operations to benefit fish at or near each project or its reservoir. Reservoirs are to be operated to meet project minimum outflows, to reduce outflow fluctuations to avoid stranding resident fish and degrading fish habitat and productivity, to reduce cross sectional area to speed juvenile passage, and to make specific temperature releases to improve water temperatures for fish. These operations are generally the highest priority and not likely to change.

In an operating year that begins on October 1, the flow needs are not encountered in the same order as the BiOp priorities (e. g. the first decision to be made is for chum spawning flows which ultimately have a lower priority than summer flows), so chronologically, the Action Agencies will attempt to operate during the year as follows.

The initial objective is to operate the storage reservoirs (Dworshak, Hungry Horse, Libby, Albeni Falls, and Grand Coulee) to be at flood control levels by early April. This level varies by runoff forecast. Reaching early April flood control levels will be affected by how much water was released for flood control, power generation, and fishery flows to support both lower Columbia chum and Hanford reach fall Chinook spawning, and to meet Columbia Falls minimum flow requirements.

The next objective is to attempt to refill the storage reservoirs by about June 30 without causing excessive spill, to maximize available storage of water for the benefit of summer migrants. The June 30 refill in general has priority over spring flow (April, May, June) objectives, while attempting to meet the spring flow objectives and other fish needs.

The final objective is the management of available storage to augment summer (July and August) flows to achieve flow objectives and for water temperature moderation. The storage reservoirs will be drafted to their specified August 31 draft limits to augment summer flows and/or moderate river temperatures. Draft limits are a higher priority than the summer flow objectives in order to meet other project uses and reserve water in storage for the following year.

These objectives are intended as general guidelines in overall system operations. The BiOps also embrace the concept of adaptive management. Adaptive management is the concept that the operation of the system should be adjusted based on acquired knowledge about current conditions in the system and effects of our management actions on it, as opposed to following a rigid set of rules. Some items to be considered are current information on fish migration, stock status, biological requirements, biological effectiveness, and hydrologic and environmental conditions. System managers recognize that there is often insufficient water to meet all the actions specified in the BiOps and meet other system uses such as flood protection, power system reliability, irrigation, recreation, and navigation needs. The use of water for any one fish species or project purpose will most likely affect the amount of water available for other fish species or project purposes. Therefore, the Action Agencies, in coordination with regional parties through the TMT, endeavor to consider the multiple uses of the system, while providing, as a high priority, the measures to benefit listed species.

2.2 Conflicts

As stated above, there often is not enough water available in the Columbia River basin to meet every action item stated in the BiOps and provide for other project purposes. Below are some of the main conflicts that may occur.

2.2.1 Flood control draft versus project refill

One way to maximize flood control is to provide abundant storage space in the event a large flood occurs. Conversely, the BiOps require that the storage projects be as full as possible to increase the likelihood of refill and provide flows for spring flow management and summer flow augmentation.

Flood control procedures specify the amount of storage needed to provide flood protection. The space is provided to reduce the risk of forecast and runoff uncertainty. In an effort to reduce forecast error and to better anticipate the runoff timing or water supply for a given year, the BiOps call for the action agencies to study system flood control requirements and forecast procedures to determine if they can be improved.

2.2.2 The provision of spring flows versus project refill and summer flow augmentation

Again, because water supply and runoff forecasts are not 100 percent accurate, it is difficult to estimate how much water is available for spring flows and still assure refill at the storage projects by June 30. If too much water is allowed to flow through the storage reservoirs in the spring, there is an increased risk of not refilling the projects. This will reduce the water supply available for summer flow augmentation. On the other hand, if the reservoirs fill too early in the spring, late season rain or snowmelt may cause flood damage downstream, or cause excessive spill and produce higher dissolved gas levels.

2.2.3 Chum tailwater elevations versus refill/spring flows

Setting the Bonneville tailwater elevation level for chum spawning and incubation in recognition of the spring refill priority is one of the decisions that the Action Agencies, in consultation with the interagency Technical Management Team (TMT), have to make with the least amount of reliable information. Decisions about the tailwater elevation level for chum spawning and incubation are made in the October/November time period, long before the action agencies have reliable information on the coming year's expected water supply. The early season Southern Oscillation Index (SOI) provides an indication of the upcoming year's water supply. If the tailwater elevation level selected is too high (causing higher flows), there is a risk of refill failure. Choosing to refill runs the risk of reducing the tailwater elevation that can be supported through the spawning season and dewatering chum redds. A chum salvage plan will be in place for 2005~~4~~ that will provide a reasonable level of assurance some level of chum salmon production will occur in the event chum flows cannot be provided. The area below Bonneville Dam is also utilized by fall chinook and coho spawning when water is provided to the spawning grounds.

2.2.4 Sturgeon pulse versus summer flow augmentation

Water released from Libby Dam for spring sturgeon flows (pulse) during April -through July may reduce the water available for summer flow augmentation from Libby, although VARQ has been implemented to minimize that possibility. If the pulsed water cannot be stored in Grand Coulee, spring flows will be provided, potentially at the expense of summer flows.

2.2.5 Fish operations versus other project uses

In addition to flood control operation, there are other project purposes that may conflict with operations carried out for the purpose of enhancing fish survival. For example, keeping the flow steady below a project for resident and anadromous fish needs conflicts with the ability to use a project to follow electrical load changes; spilling water for juvenile fish passage reduces the amount of power that can be generated to meet demand; and augmenting flows during fish migration periods may conflict with the shape of power demand. Additionally, irrigation

demands and recreation elevations at headwater reservoirs may impact the amount of water available for spring flows. The development of the Biological Opinion for the FCRPS included consultation with the federal operating agencies on the operations of the Hydrosystem, and the impact on listed stocks. These negotiations included consideration of the multiple uses of the Hydrosystem. These negotiations and the multiple uses of the Hydrosystem are part of the foundation of the Biological Opinion.

2.2.6 Conflicts and priorities

The conflicts described above pose many challenges to the Action Agencies in meeting the multiple uses of the Federal hydro system. Given these challenges, the priorities for flow management and individual reservoir operations outlined in section 2.1 will guide the Action Agencies in their operational decision-making when conflicts arise. Discussion of conflicts between operational requirements and alternatives for addressing such conflicts will occur in TMT with disputes taken to IT and at times to the Federal Executives.

2.3 Emergencies

The 2000 BiOps acknowledge that emergencies and other unexpected events occur and may cause deviations from fish operations. Such deviations may be short in duration, such as a deviation to respond to an unexpected unit outage or power line failure, or longer in duration, such as experienced in 2001 in response to the low water conditions and unprecedented power market conditions. The TMT has developed Emergency Protocols to be followed to respond to short-term emergencies. (See Appendix 1 or see TMT homepage at http://www.nwd-wc.usace.army.mil/TMT for current version of protocols.)

2.4 Research

Research studies sometimes require special operations that differ from routine operations otherwise described in the Biological Opinions. These studies are generally developed through technical workgroups of the Regional Forum (e.g., System Configuration Team (SCT) and the USACE's Anadromous Fish Evaluation Program Fish Facilities Design Review Work Group (FFDRWG) and Studies Review Work Group (SRWG) and further described in 1- and 5-Year Implementation Plans. In most cases, operations associated with research entail relatively minor changes from routine operations and are coordinated in technical forums (e.g., TMT, FPOM). In some cases, the nature or magnitude of operational changes for research may require further coordination and review in policy forums (e.g., Implementation team (IT)). Generally, research planning and coordination occurs throughout the late fall and winter, with final research plans established by late winter/early spring. In extraordinary events such as extreme low runoff conditions or an emergency, planned research may be modified prior to spring to accommodate anticipated unique circumstances and/or to reallocate resources to obtain the greatest value given the circumstances. The Council's recommended changes in mainstem hydro operations will require the development of specific experimental designs that may be implemented next spring and summer. These experiments are under development and may be incorporated into the experimental protocols for next year as soon as they become available.

3.0 Decision Points and Water Supply Forecasts

3.1 Decision Points

Table 1 below lists the key water management decisions/actions and when they need to be made. Some decision points, such as setting flow objectives, are clearly articulated in the BiOps. Other decision points, such as setting weekly flow augmentation levels, require much discussion and coordination. Some of the decision points given below are spelled out in the BiOps and some are based on experience. These decisions are made by the action agencies in consideration of actions called for in the BiOps and input received through the Regional Forum (TMT, IT, Regional Executives).

Table 1. Water Management Decision Points/Actions

	Early October	November	Winter (December – March)	Early April	Early May	June	Early July
Operations	• Assess potential of providing tailwater elevations/flows for chinook populations below Bonneville Dam *(Non-BiOp Action)* • Assess potential tailwater elevations / flow levels to support chum spawning below Bonneville Dam • Preliminary discussions of flood control/ project refill strategy • Albeni Falls fall/winter drawdown strategy discussion	• Early season forecast using SOI • Evaluate VARQ rule curves • Evaluate likely tier for sturgeon water volume • Consider Kootenai burbot operations	• Determine winter/spring chum flow levels below Bonneville Dam • Determine flood control and refill strategies, including any available flood control shifts • Minimum flows from Hungry Horse Dam and minimum Columbia Falls flows are set by April-August forecast • Begin discussing spring operations • Spring Creek Hatchery release –March *(Non-BiOp Action)* • Begin spring transport discussions • Hanford Reach Operations Discussed *(Non-BiOp Action)* • Outlook for meeting flow objectives prepared	• Spring flow objectives are set by the April final volume forecasts • Determine spring flow management strategy including priority for refill • Determine start dates and levels by project for spring spill • Determine start date for MOP at Lower Snake River projects • Determine John Day forebay elevations	• Use May final forecast to calculate the appropriate volume of the sturgeon tiered flow release from Libby using new, coordinated formula • Determine required outflow from Libby for bull trout.	• Summer flow objective at Lower Granite determined by June final volume forecast • Determine summer flow augmentation strategy (early June) • Complete Dworshak temperature modeling and determine release strategy • Decision on McNary juvenile fish transportation (late June) • Switch to 30% spill 24 hours a day at John Day.	• Grand Coulee summer reservoir draft limit determined by July F~~f~~inal April – August volume forecast

	Early October	November	Winter (December – March)	Early April	Early May	June	Early July
	• Hanford Reach /Vernita Bar flows set *(Non-BiOp Action)*						
Plans	Develop fall/winter update to the annual water management plan		Preliminary work on spring/summer update to the annual water management plan	Start operational plans for Libby and Hungry Horse Dams	Libby and Hungry Horse operational plans due		
Forecasts			January, February, and March volume forecasts released by the RFC	April final forecast released by RFC	May final forecast released by RFC	June final forecast released by RFC	

3.2 *Water Supply Forecasts*

Water supply forecasts serve as a guide to how much water is available for fish and other operations.

During the flow management season (April 3 - August 31) weekly flow projections are provided to the TMT.

The National Weather Service's Northwest River Forecast Center, USACE Northwest Division Hydrologic Engineering Branch, Reclamation, and others prepare water supply forecasts to manage the Columbia River. Table 2 below lists the forecasts that are referenced by the NMFS 2000 BiOp and the USFWS 2000 BiOp.

Table 2. Water Supply Forecasts Used to Determine BiOp Actions

Forecast Point	Forecast period	Forecast	What does it control	BiOp reference	RPA Action Item
Lower Granite	April – July	April Final	Spring flow objective at Lower Granite	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
Lower Granite	April – July	June Final	Summer flow objective at Lower Granite	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
The Dalles	April – August	April Final	Spring flow objective at McNary Dam	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
Hungry Horse	April – August	March Final provided by Reclamation	Hungry Horse minimum flows	NMFS BiOp at Section 9.6.1.2.3 Page 9-63 USFWS BiOp at Section 3.A.1 Page 6	NMFS Action 19
Hungry Horse	April – August	March Final provided by Reclamation	Columbia Falls minimum flow	NMFS BiOp at Section 9.6.1.2.3 Page 9-63 USFWS BiOp at Section 3.A.1 Page 7	NMFS Action 19
The Dalles	April – August	July F~~f~~inal	Grand Coulee summer draft limit	NMFS BiOp at Section 9.6.1.2.3 Page 9-64	NMFS Action 19
Libby	April – August	Not Specified~~May Final~~	Volume of water for sturgeon flow at Bonners Ferry and minimum bull trout flows between sturgeon and salmon flows	USFWS BiOp at Section 8.1 Page 74 and USFWS BiOp at Section 3.A.2 Page 15	USFWS Action 8.1.c NMFS Action 19

Table 3 summarizes the major fish-related reservoir and flow operations by project. More detailed descriptions of each of these operations follow.

Table 3. Major Fish-Related Reservoir and Flow Operations

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Libby	Winter: Operate to VARQ flood control rule curve and achieve appropriate elevation by April 10 Spring: Refill by June 30 and operate to meet flow objectives	April – July Augment flows at Bonners Ferry for sturgeon pulse	Year Round: Operate to minimum flows and project ramping rates to minimize adverse affects of flow fluctuations	Operate to meet flow objectives and June 30 refill if possible without excessive spill	July/August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 2,439 feet	Fall/winter storage may be used to support chum flows
Hungry Horse	Winter: Operate to VARQ flood control by April 10 Spring: Refill by June 30 if possible without excessive spill and operate to meet flow objectives		Year Round: Operate to Columbia Falls minimum flows and project ramping rates to minimize adverse affects of flow fluctuations		July/August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 3,540 feet	Fall/winter storage may be used to support chum flows
Albeni Falls	Winter: Operate to flood control rule curve by April 10 Spring: Refill by June 30 and operate to meet flow objectives		Fall/Winter: Maintain the recommended elevation until kokanee fry emergence (approximately end of April) The USFWS recommended elevation is expected to be provided by September			Fall/winter storage may be used to support chum flows

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Grand Coulee	Winter: Operate to 85% confidence of meeting April 10 flood control elevation Spring: Refill by June 30 and operate to meet flow objectives				July-August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 1,280 feet (>/= 92 maf forecast at The Dalles) or 1,278 feet (< 92 maf forecast at The Dalles)	Fall/winter storage may be used to support chum flows
Grand Coulee (continued)					July/August: Operate Banks Lake at elevation 5 feet less than full to provide more water for summer flow augmentation	
Dworshak	Winter: Operate to flood control rule curve by April 10 Spring: Refill by June 30 and operate to meet flow objectives				Draft for summer flow augmentation and water temperature reduction, not to exceed reservoir draft limit of 1,520 feet	Fall/winter storage may be used to support chum flows
Lower Granite				Flow objective of 85-100 kcfs Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	Flow objective of 50-55 kcfs Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Little Goose				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	
Lower Monumental				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	
Ice Harbor				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Nov 30~~ Operate to 1% peak efficiency	
McNary				Flow objective of 220-260 kcfs Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	Flow objective of 200 kcfs Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
John Day				Apr 10-Sep 30 Operate within 1.5 feet of minimum level that provides irrigation pumping ~~MIP~~ to reduce juvenile travel time Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency Operate within 1.5 feet of level that will allow irrigation to reduce juvenile travel time	
The Dalles				Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	
Bonneville				Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	Apr 1 – Oct 31~~Mar 15-Oct 31~~ Operate to 1% peak efficiency	If hydrologic conditions indicate system can likely maintain minimum flow below BON of 125 kcfs Nov 1 - April, implement mainstem chum flows. If not, provide flows below BON to enable access to creeks for spawning.

4.0 Sub-Strategies: Hydrosystem Substrategy 2.1: Reservoir operations to improve fish survival

4.1 Lower Snake Projects (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor)

4.1.1 Reservoir Passage

All Lower Snake projects will operate within 1 foot of Minimum Operating Pool (MOP) from approximately April 3 until small numbers of juvenile migrants are present. This normally occurs in late August.[5] Going out of MOP operations when small numbers of juvenile migrants are present provides for better adult passage. Lower Granite Dam shall not return to normal operating pool until enough natural cooling has occurred in the fall, generally after October 1. The purpose of this action is to provide a smaller reservoir cross section to reduce juvenile salmon travel time and reduce flow fluctuations. Elevations may be modified to maintain the minimum navigation channel requirements.

4.1.2 Juvenile Fish Survival

To enhance juvenile passage survival, turbines at all Lower Snake projects will be operated within 1% of peak efficiency during the juvenile and adult migration seasons (April 1~~March 15~~ through October 31~~November 30~~).[6]

4.2 Lower Columbia Projects (McNary, John Day, The Dalles, Bonneville)

To enhance juvenile passage survival, turbines at all the Lower Columbia projects will be operated within 1% of peak efficiency during the juvenile and adult migration seasons (April 1 ~~March 15~~ through October 31).[7] A test of operating above the 1% peak operating efficiency is scheduled to be conducted at McNary Dam during the 2005~~4~~ juvenile migration.

4.2.1 John Day

4.2.1.1 Pool level

John Day pool shall operate within a 1½-foot range of the minimum level that provides irrigation pumping from April 10 to September 30.[8] The purpose of this action is to provide a smaller reservoir cross section to reduce juvenile salmon travel time.

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[5] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 20 Note page numbers for the NMFS BiOp refers to the PDF version.
[6] NMFS BiOp at Section 9.6.1.4.4 Page 9-93, Action 58
[7] NMFS BiOp at Section 9.6.1.4.4 Page 9-93, Action 58
[8] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 20

5.0 Hydrosystem Substrategy 2.2: System flow management to improve fish survival

5.1 Flow Objectives

The purpose of the flow objectives is to aid in achieving the hydro system biological performance standards by providing better instream flow to aid in juvenile salmon and steelhead migration and enhance water quality. However, as recognized in the BiOps, it is not possible to achieve the flow objectives in many water years because there is limited water and reservoir storage. This Water Management Plan strives to achieve the best possible mainstem passage conditions, recognizing the priorities established in this document and the need to balance the limited water and storage resources available in the region.

Weekend flows are often lower than weekday flows due to less electrical demand in the region. During the spring and summer migration period (April through August), the action agencies strive to maintain flows during the weekend at a level which is at least 80% of the previous weekday average.

5.1.1 Lower Granite

5.1.1.1 Spring anadromous fish

The April final runoff volume forecast at Lower Granite Dam for April to July determines the spring flow objective at Lower Granite Dam.[9] When the forecast is less than 16 million acre-feet (maf) the flow objective will be 85 kcfs. If the forecast is between 16 maf and 20 maf the flow objective will be linearly interpolated between 85 kcfs and 100 kcfs. If the forecast is greater than 20 maf the flow objective will be 100 kcfs. The planning dates for the flow objective are from April 3 to June 20.

5.1.1.2 Summer anadromous fish

The June final runoff volume forecast at Lower Granite Dam for April to July determines the summer flow objective at Lower Granite Dam.[10] When the forecast is less than 16 maf the flow objective will be 50 kcfs. If the forecast is between 16 maf and 28 maf the flow objective will be linearly interpolated between 50 kcfs and 55 kcfs. If the forecast is greater than 28 maf the flow objective will be 55 kcfs. The planning dates for the flow objective will be from June 21 to August 31.

5.1.2 Priest Rapids—Spring anadromous fish

The spring flow objective at Priest Rapids dam is 135 kcfs.[11] The planning dates are from April 10 to June 30.

[9] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[10] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[11] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14

5.1.3 McNary

5.1.3.1 Spring anadromous fish

The spring flow objective at McNary Dam is set according to the April final runoff volume forecast at The Dalles Dam for April to August.[12] When the forecast is less than 80 maf the flow objective will be 220 kcfs. If the forecast is between 80 maf and 92 maf the flow objective will be linearly interpolated between 220 kcfs and 260 kcfs. If the forecast is greater than 92 maf the flow objective will be 260 kcfs. The planning dates for the flow objective will be from April 10 to June 30.

5.1.3.2 Summer anadromous fish

The summer flow objective at McNary Dam is 200 kcfs.[13] The planning dates for the flow objective will be from July 1 to August 31.

5.2 All Storage Projects

The purpose of the following actions is to refill FCRPS storage projects as much as possible for spring flows, summer flow augmentation and to cool water temperatures.

The FCRPS dams will be operated during the winter season in order to achieve a high probability of water surface elevations within 0.5 foot of the flood control rule curve by April 10, and to refill by June 30, except as specifically provided by the TMT.[14] The Action Agencies, in consideration of recommendations of the Technical Management Team, will determine the availability and amount of any additional FCRPS storage draft beyond the flood control rule curve for the purpose of flow augmentation, consistent with refill by June 30 for summer flow augmentation.

During the spring, the Action Agencies shall operate the FCRPS to meet the flow objectives and refill the storage reservoirs (Albeni Falls, Dworshak, Grand Coulee, Hungry Horse, and Libby) by approximately June 30.[15] (See Grand Coulee Section 5.9 for special operations this year) If both these objectives cannot be achieved, the TMT will make an in-season recommendation, weighing considerations unique to each particular year. Because research results indicate that increased flows have more direct survival benefits for summer migrants than for spring migrants, modest reductions in spring flows to facilitate reservoir refill would generally be preferable to refill failure.

During the summer, the Action Agencies draft mainstem storage reservoirs (Libby, Hungry Horse, Dworshak, Grand Coulee, Banks Lake) within the NMFS BiOp's specified draft limits, based on flow recommendations provided by TMT. TMT considers a number of factors when developing its flow recommendations, such as: the status of the migration, attainment of flow objectives, water quality, and the effects that reservoir operations will have on other listed and resident fish populations.

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[12] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[13] NMFS BiOp at Section 9.6.1.2.1 Page 9-58, Action 14
[14] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[15] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18

5.3 Libby

5.3.1 Flood Control

The Corps plans to use the new SOI forecast procedure in November and December to determine the December 31 flood control elevation. In below average water years the end of December draft elevation may be higher than 2411 feet.

Libby will be operated during the winter season in order to achieve a high probability of water surface elevations within 0.5 foot of the VARQ flood control elevation by April 10 and to refill by June 30 and avoid the risk of filling too quickly and having to spill, except as specifically provided by the TMT.[16]

During the spring, the Action Agencies shall operate Libby to refill by approximately June 30 while contributing to meeting the flow objectives and the pulse for sturgeon. [17]

5.3.2 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Libby to help meet the flow objectives for juvenile salmon out-migration in the lower Columbia. Retention of July/August water in Lake Koocanusa is possible under a Libby-Canadian storage water exchange, but is not guaranteed. This exchange agreement also reduces the second flow peak created by July/August salmon flow through Kootenay Lake July and August. The purpose of this action is to reduce or eliminate the second peak in the Kootenai River, thus protecting bull trout and sturgeon. Additionally, the exchange agreement reduces the draft of Lake Koocanusa and increases upstream benefits (Note: This type of exchange is allowed under the current Libby Coordination Agreement, which was signed February 16, 2000. Because the operation must have mutual benefit and the magnitude of the water year is not known earlier, the operation, if any, for a given water year is not finalized until June or July of that year.)

The summer reservoir draft limit is 2,439 feet,[18] which determines the maximum draft available for summer flow augmentation from Libby. The Northwest Power Planning and Conservation Council mainstem amendments call for an evaluation of the relative risks posed to resident fish versus the benefits provided to anadromous fish by drafting the reservoir to 2439' by ~~August~~September 30 in the lowest 20% of volume runoff years and to elevation 2449' by September 30 in all other years.

5.4 Hungry Horse

5.4.1 Flood Control

Hungry Horse began operating using VARQ starting January 1, 2001.[19] The purpose of this action is to provide more water for flow augmentation.

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[16] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[17] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[18] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19
[19] NMFS BiOp at Section 9.6.1.2.3 Page 9-62 Action 19

Hungry Horse will be operated during the winter season to achieve a high probability[20] of water surface elevations within 0.5 foot of the flood control rule curve by April 10 and to refill by June 30, except as specifically provided by the TMT.[21]

5.4.2 Refill

During the spring, the Action Agencies shall operate Hungry Horse to contribute to meeting the flow objectives and refill by approximately June 30.[22]

5.4.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Hungry Horse to help meet the flow objectives. The summer reservoir draft limit is 3,540 feet.[23] This limit determines the maximum draft available for summer flow augmentation from Hungry Horse. The Northwest Power Planning and Conservation Council mainstem amendments call for an evaluation of the relative risks posed to downstream resident fish versus the benefits provided to anadromous fish by drafting the reservoir to 3,540 feet by September 30~~August 31~~ in the lowest 20% of volume runoff years and to elevation 2449' by September 30 in all other years.

5.5 Albeni Falls

5.5.1 Flood Control

Albeni Falls will be operated during the winter season in order to achieve a high probability[24] of water surface elevations within 0.5 foot of the flood control rule curve by April 10 and to refill by June 30, except as specifically provided by the TMT.[25]

5.5.2 Refill

During the spring, the Action Agencies shall operate Albeni Falls to meet the flow objectives and refill by approximately June 30.[26]

5.6 Upper Snake River Reservoir Operation for Flow Augmentation

The purpose of this action is to provide water from the upper Snake Reservoirs for flow augmentation.

Reclamation will attempt to provide 427 kaf of flow augmentation from the Reclamation projects in the upper Snake River basin consistent with the NMFS 2002 Supplemental Biological Opinion and Idaho state law.[27]

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[20] No specific probability of refill is specified in the BiOps. According to the BiOps (NMFS 9-62) the probability of being at April 10 flood control is 60% when operating using VARQ.
[21] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[22] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[23] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19
[24] No specific probability of refill is specified in the BiOps
[25] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[26] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[27] NMFS BiOp at Section 9.6.1.2.6 Page 9-70, Action 32

5.7 Brownlee, Dworshak, and Grand Coulee Flood Control

Opportunities to shift flood control requirements from Brownlee and Dworshak to Grand Coulee shall be considered.[28] These shifts may be implemented after coordination with TMT. The purpose of this action is to provide more water for flow augmentation in the lower Snake River. This will occur when the shifts will not compromise flood control and they have been coordinated.

5.8 Dworshak

5.8.1 Flood Control

Dworshak will be operated during the winter season in order to achieve a high probability[29] of water surface elevations within 0.5 foot of the flood control rule curve by April 10 and to refill by June 30, except as specifically provided by the TMT.[30]

5.8.2 Refill

During the spring, the Action Agencies shall operate Dworshak to meet the flow objectives and refill by approximately June 30.[31]

After summer fish operations, flows from Dworshak shall be limited to minimum one turbine operation (approximately 1,500 cfs) unless higher flows are required for flood control.[32] The purpose of this action is to assist in the filling of Dworshak reservoir.

5.8.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Dworshak to help meet the flow objectives. The summer reservoir draft limit is 1,520 feet.[33] This limit determines the maximum draft available for summer flow augmentation from Dworshak. As was the case in 2002 and 2003, water may be held above 1,520 feet and discharged in early September in some water years.

5.8.4 Water quality

During the summer, releases shall be made from Dworshak to attempt to maintain water temperatures at the Lower Granite tailrace ~~forebay~~ fixed monitoring site at or below 68 F.[34] Although the NOAA 2000 FCRPS BiOp stated the goal was to maintain the forebay at this temperature, modeling and experience have demonstrated that the tailrace temperature is more representative of river conditions and temperature exposure of migrating salmonids. The purpose of this action is to improve water quality (by lowering water temperature) in the Lower Snake River. This fishery action also assists in cooling the downstream lower Snake River closer to the state water temperature standards.

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[28] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 21
[29] No specific probability of refill is specified in the BiOps
[30] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[31] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[32] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 19
[33] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 19
[34] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 19

5.9 Grand Coulee

5.9.1 Flood Control

Grand Coulee will be operated during the winter season in order to achieve an 85% probability of water surface elevations within 0.5 foot of the flood control rule curve by April 10. ~~It will be operated to refill by July 4 if summer flow objectives are being met.~~ The TMT may provide other specific operations.[35] Grand Coulee Dam will be held below elevation 1255 feet for a minimum of 6 weeks during April and May to accomplish required maintenance on the spillway drum gates. The maintenance on the drum gates has been delayed the past three water years due to low water conditions. This year the maintenance is mandatory.

5.9.2 Refill

During the spring, the Action Agencies shall operate Grand Coulee to ~~meet the flow objectives and~~ refill by approximately July 4.[36] The ability to meet flow objectives in May and June may be affected by drum gate maintenance.

5.9.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Grand Coulee to help meet the flow objectives for juvenile salmon out migration. The July F~~f~~inal forecast produced by RFC ~~in July~~ determines the summer reservoir draft limit. The draft limit is 1,280 feet in years when the April through August forecast for The Dalles is equal to or exceeds 92 maf. If the forecast is less than 92 maf the draft limit will be 1,278 feet.[37] This limit determines the maximum draft available for summer flow augmentation from Grand Coulee.

5.10 Banks Lake Summer Draft

Banks Lake will be drafted to elevation 1,565 feet by the end of August.[38] The purpose of this action is to provide more water for summer flow augmentation.

5.11 Bonneville Dam Chum Tailwater Elevations

The purpose of the following actions is to provide spawning areas and protect redds of chum salmon.

Tailwater elevations will be regulated below Bonneville Dam to support spawning of chum salmon if the best hydrologic data available by early October indicate that precipitation, runoff, and reservoir storage are likely to support the operation from the start of spawning (late October or early November) until the end of emergence (generally through the start of the spring flow management season in April). The SOI has been given consideration in previous years as a method to get a relative gage as to what the coming year's precipitation may be. The chum spawning operation cannot adversely affect implementation of NMFS's 2000 FCRPS higher

[35] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[36] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[37] NMFS BiOp at Section 9.6.1.2.3 Page 9-64, Action 19
[38] NMFS BiOp at Section 9.6.1.2.4 Page 9-67, Action 23

priority RPA actions (see section 2.1) or the parties' ability to comply with the Vernita Bar agreement. If these conditions cannot be met, the Action Agencies will work with NOAA Fisheries ~~NMFS~~ and the regional salmon managers to identify operations that would benefit salmon while maintaining these other fish protection measures. Such operations may include intentionally managing flows below what is necessary for mainstem spawning to discourage redds from being established in the area or shaping flows in a manner that would discourage redd development (reverse load factoring). In the BiOp, the chum spawning operation calls for the FCRPS projects to provide a minimum flow below Bonneville Dam of 125 kcfs (or more as coordinated) from when chum salmon are found in the area around Ives and Pierce islands (but no later than November 1) through December 31. The NMFS BiOp recommends flows from Bonneville Dam be maintained within 5 kcfs of the established minimum.[39] However, in recent years, operating to the Bonneville tailwater gage during daylight hours was found to be an effective management tool. During nighttime hours, discharges more the 5 kcfs over the daytime discharge level may occur. Operations with discharges more than 75 kcfs over the daytime discharge level have occurred without impacting where chum redds were placed. The tailwater gage better reflects the effects of tides, tributary inflow, and groundwater influence below Bonneville Dam. The Action Agencies intend to operate to a minimum Bonneville tailwater elevation of approximately 11.4 feet in operating year 2004.

If water supply conditions indicate that it is not possible to maintain this minimum tailwater elevation at Bonneville Dam, flow will be provided at times during the chum-spawning season to allow access to Hamilton and Hardy Creeks if the creeks are flowing. Details will be set through coordination in TMT.[40]

From January 1 to the start of spring flows April 10, if the chum operation is possible, the minimum tailwater elevation at Bonneville Dam will be the daily minimum water surface elevation established by coordination in the TMT.[41]

Chum salmon will be captured and used as broodstock to initiate/bolster a spawning population in the recently restored habitat of Duncan Creek. The NPPC Duncan Creek project outlines the logistics for a brood movement and fry-rearing program. The salvage operation would expand the numbers of fish captured and reared in this newly established brood collection program to make up for the lack of tributary or mainstem spawning

The Implementation Team sought criteria that NOAA Fisheries uses to make decisions regarding the provision of water for chum spawning. A memo responding to this request is attached in Appendix 5.

[39] NMFS BiOp at Section 9.6.1.2.1 Page 9-58, Action 15
[40] NMFS BiOp at Section 9.6.1.2.1 Page 9-60, Action 16
[41] NMFS BiOp at Section 9.6.1.2.1 Page 9-59, Action 15

6.0 Hydrosystem Substrategy 2.3: Spill operations for project passage

This substrategy addresses spill at certain FCRPS projects to provide improved survival and better project passage for juvenile fish while avoiding adult fallback problems and creating greater than 120% saturation levels of total dissolved gas in the tail race and 115 % at the designated downstream monitoring stations at the forebay of the next dam downstream.

The planning dates for spring spill for juvenile fish migration are April 3 to June 20 in the Snake River, and April 10 to June 30 in the lower Columbia River.[42] Spill levels and times are indicated below.[43] The NMFS 2000 FCRPS BiOp stated that n~~N~~o spill for juvenile fish passage at the three Snake River collector projects shall occur when seasonal average flows are projected to be below 85 kcfs.[44] The specificity of the 85 kcfs criteria was debated in TMT and IT during the 2003 and 2004 flow season. NOAA F~~f~~isheries provided criteria regarding the provision of spill when flows are forecasted to be close to the 85 kcfs threshold. These criteria are attached in Appendix 6.

Planning dates for summer spill for juvenile fish migration are June 21 to August 31 in the Snake River, and July 1 to August 31 in the lower Columbia River.[45] There will be no summer spill at the four collector projects (Lower Granite, Little Goose, Lower Monumental, and McNary).[46]

~~The concept of how to apply planning dates to spill decisions is being considered by the IT. Any guidance they may provide on this issue will be included in the spring/summer update of the 2004 WMP.~~

Spill for the various projects are shown in the table below:

~~Changes in spill levels or spill operations are being considered for the following projects in 2004: Bonneville Dam, John Day, Ice Harbor, and Lower Granite. These changes will be informed by the results of research results that are not currently available.~~

In regard to summer spill the Draft Updated Proposed Action states "The Corps, BPA and NOAA Fisheries will be exploring further definition of and subsequent exercise of the annual hydrosystem performance measure approach outlined in Section II (Adaptive Management Framework) and/or a revision to the Updated Proposed Action to address summer spill issues in the context of achieving appropriate biological performance.[47]

[42] NMFS BiOp at Section 9.6.1.4.3 Page 9-88, Action 54
[43] NMFS BiOp at Section 9.6.1.4.4 Page 9-88, Action 54 and NMFS BiOp at Section 9.6.1.3.4 Page 9-76, Action 41
[44] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 40
[45] NMFS BiOp at Section 9.6.1.4.3 Page 9-88, Action 54
[46] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 42
[47] Draft Updated Proposed Action Page 2

Table 4. Spill at run-of-river projects to aid out migration of juvenile anadromous fish.

Project	Planning Dates	Time	Spring Spill	Summer Spill	Amount	Minimum Generation Requirements kcfs
Lower Granite	April 3– June 20	24 hours a day ~~1800-0600~~	Yes	No	19 kcfs (RSW with training) ~~120/115 gas cap~~	11.5[a]
Little Goose	April 3– June 20	1800-0600	Yes	No	120/115 gas cap	11.5[a]
Lower Monumental	April 3– June 20	24 hours a day	Yes	No	45% or 50% of outflow	11.5[a]
Ice Harbor	April 3– August 31	24 hours a day [d]	Yes	Yes	120/115 gas cap 1800-0500 45 Kcfs 0500-1800	7.5 – 9.5[a]
McNary	April 10– June 30[b]	1800-0600	Yes	No	120/115 gas cap	50
John Day	April 10– August 31	1800-0600 1900-0600 May 15– July 20~~31~~ June 21 24 hours a day	Yes	Yes	60% of outflow until June 20 Min spill 30% Starting June 21 30% of outflow	50
The Dalles	April 10– August 31	24 hours a day	Yes	Yes	40% of outflow	50
Bonneville	April 10– August 31	24 hours a day	Yes	Yes	120/115 gas cap nighttime 75 kcfs daytime [c] 50 min flow	30

a – Minimum generation requirements at the Lower Snake River Projects may not be needed all the time.

b – Collection of subyearling fall chinook for transportation at McNary Dam shall not be initiated until in-river migratory conditions are deteriorating (i.e., no longer spring-like).[48] In general, the switch from spring to summer operation will occur on or about June 20. Spring-like is defined as favorable flow and water temperature conditions; i.e., river flows are at or above the spring flow target (220 to 260 kcfs) at McNary Dam, and ambient water temperatures are below 62°F (17°C). Actual dates shall be set by TMT coordination.

c – Day and nighttime vary during the spill season and are set in the Fish Passage Plan.

[48] NMFS BiOp at Section 9.6.1.3.4 Page 9-77, Action 43

d- An RSW is planned for installation this winter at Ice Harbor.

Note: Spill for juvenile fish passage may be reduced or turned off for short periods of time because of navigation problems at the projects or to allow for juvenile fish barges to dock and undock. Also research at projects that spill may change the details of spill at the project.

7.0 Hydrosystem Substrategy ?~~2.5~~: Other actions to enhance water management

This substrategy includes water management related actions that are being done to improve fish survival, such as studies, water quality actions, and water conservation improvements.

7.1 Libby

7.1.1 TDG and Water temperature monitoring

Water temperature profiles in the south end (near-dam, or forebay area) of Lake Koocanusa during May and June will be monitored to provide information necessary for timing of sturgeon spawning/rearing flow augmentation.[49] Also, water temperature profiles in the forebay are used to determine whether warmer temperatures may be provided to assist sturgeon spawning

During the summer of 2003, the Seattle District installed a TDG monitoring sensor at a fixed monitoring station below Libby Dam on the spillway side of the river (left bank, looking downstream) directly across the river from the USGS stage gage.

7.1.2 Libby VARQ

The purpose of VARQ is to better ensure reservoir refill and to provide more (and more reliable) water for spring flows and summer flow augmentation without reducing flood control protection.

An Environmental Impact Statement (called the Upper Columbia Alternative Flood Control and Fish Operations EIS) is being prepared and additional public and Canadian (including Columbia River Treaty) coordination will be conducted before VARQ can be implemented at Libby, Hungry Horse, and Grand Coulee for the long term. VARQ will continue to be implemented on an interim basis until a final decision is made regarding long-term implementation. This decision will be made in 2005 upon completion of the EIS.[50]

7.1.3 Libby Storage Reservation Diagram and Runoff Volume Forecast Procedure

The purpose of the Libby storage reservation diagram study and investigation of a new forecast procedure and the investigation into a variable 31 December draft point is to see if more water can be made available for spring flows without reducing flood control protection.

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[49] USFWS BiOp at Section 8.3.h Page 82 Note page numbers in USFWS BiOp may vary depending on how it is printed.

[50] NMFS BiOp Section 9.6.1.2.3 Page 63, Action 19; NMFS BiOp Section 9.6.1.2.3 Page 9-66, Action 22; and USFWS BiOp Section 8.1.b page 73

The investigation of the forecast procedure has been completed. Forecasts will be done in water year 2005~~4~~ using the new method. ~~Work on a new Libby storage reservation diagram and 31 December draft point will be completed in December 2003. A decision has not been made concerning implementation of a variable 31 December draft point.~~ [51]

7.1.4 Coordination

An annual operational schedule to be supplemented on a monthly basis will be provided to the USFWS annually on or about May 1 but not later than May 10. The annual schedule shall include month-end estimates of water surface elevation at Koocanusa Reservoir and estimates of monthly discharge from Libby Dam. The monthly supplement shall include a report of actual operations over the previous month and shall include daily water surface elevation at Koocanusa Reservoir and hourly spill and releases at Libby Dam.[52] The purpose of this action is to provide for better coordination. The Action agencies plan to do this required coordination at TMT meetings.

~~7.1.5Increased Flow Capacity at Libby~~

~~The purpose of the following actions is to provide for a higher flow during the sturgeon pulse.~~

~~The USACE has initiated evaluation of channel capacity in the Libby/Troy area below Libby Dam for purposes of determining possible impacts and limitations of increasing flow capacity from Libby Dam.[53] . This study is expected to be completed by the end of calendar year 2003 and will be used in the Upper Columbia Alternative Flood Control (VARQ) and Fish Operations EIS.. Pending funding approval, the USACE will begin an evaluation of flood control levels and public safety concerns along the banks of the Kootenai River below Libby Dam in the Bonners Ferry area, and the feasibility of increasing releases above any identified channel capacity constraints through structural or non-structural means.[54] NEPA documentation will be required for this action and will be addressed for the flows themselves (but not the means by which additional capacity would be achieved) through the Upper Columbia Alternative Flood Control (VARQ) and Fish Operations EIS.~~

~~Limited flow over the Libby spillway is being considered starting in 2004 to enhance sturgeon flow capability. Maximum spill levels will be based in part on final analysis of data from the spill test and spill for flood control that took place in June-July 2002 at Libby. Preliminary information indicates maximum spill may be 2,000 cfs or less in order to not exceed the state standard of 110% TDG assuming a measurement point at the cross-section of the USGS gage below the dam. However, no method other than voluntary spill is available to achieve the required 5,000 cfs additional capacity from Libby Dam by 2004.[55] Therefore, the allowable dissolved gas limit and the exact location for measuring it are being developed in coordination with the state of Montana Departments of Environmental Quality, and Fish, Wildlife, and Parks. Further NEPA documentation requirements for use of voluntary spill are being determined.~~

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[51] NMFS BiOp Section 9.6.1.2.6 Page 33, Action 36; USFWS BiOp at Section 8.1.h Page 76; and USFWS BiOp at Section 8.1.i Page 76

[52] USFWS BiOp at Section 11.A.1.1.c Page 93

[53] ~~USFWS BiOp at Section 8.2a.5 Page 79 and Section, 8.2a.2 Page 78~~

[54] ~~USFWS BiOp at Section 8.3.a Page 80~~

[55] ~~USFWS BiOp at Section 8.2a.5 Page 79~~

~~7.1.6Kootenai River Groundwater Investigation~~

~~The purpose of the following action is to provide for a higher flow level during the sturgeon pulse.~~

~~Groundwater seepage investigations[56] are being conducted as part of the Upper Columbia Alternative Flood Control (VARQ) and Fish Operations EIS. These will allow better quantification of the relationship between river stage/duration and groundwater saturation in agricultural lands from the Bonners Ferry area downstream to the Canadian border. Further field investigations, modeling, and a report will be completed in 2003.[57]~~

7.2 Hungry Horse Coordination

Reclamation will fulfill the USFWS recommendation for annual and monthly reporting by contributing to the annual water management plan and presenting weekly and biweekly reports of Hungry Horse operations through the TMT process.[58]

Reclamation will also fulfill the USFWS recommendation for reporting actual operations by making available pertinent historic elevations and flows as related to Hungry Horse Dam through its current website at http://mac1.pn.usbr.gov/pn6200/esatea.html. These actions are described in accordance with the US Bureau of Reclamation, Pacific Northwest Region Findings and Commitments Implementing December 2000 Biological Opinions for the Federal Columbia River Power System and Other Related Actions, Section III, B, 2, paragraph 23.

Reclamation began operating under VARQ at Hungry Horse in 2001. The VARQ EIS is scheduled to be completed in the spring of 2005.

7.3 Water Quality Actions

7.3.1 Water Quality Plans

One- and five-year water quality plans are to improve fish passage and survival through water quality improvement measures. The intent of the water quality plans is to recommend FCRPS facility and operational improvements related to water quality, total dissolved gas (TDG) and water temperature monitoring, and related studies. The BiOp also includes RPAs 130 to 143, which are water quality actions.[59]

Operationally oriented water quality RPAs 131 and 132 are addressed in the annual Water Management Plan. RPA 143 has long-term water management planning goals and is also addressed in the Water Management Plan. The other capital investment water quality RPAs related to facility improvements will be addressed in the 1-year and the 5-year Research, Monitoring, and Evaluation Plans.

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[56] USFWS BiOp at Section 8.3.c Page 81
[57] USFWS BiOp at Section 8.3.c Page 81
[58] USFWS BiOp at Section 11.A.1.2.A Page 93
[59] NMFS BiOp Section 9.4.2.4 Page 9-29, Action 5

7.3.2 Total Dissolved Gas Monitoring

Exposure to high levels of TDG over long periods of time can be harmful or lethal to fish. Environmental monitoring at the dams is necessary where voluntary spill is employed for juvenile fish passage to ensure that gas levels do not exceed TDG thresholds established in the NMFS (now called NOAA Fisheries) BiOp, and variance levels established by the state water quality agencies. According to RPA 131 of the BiOp, the physical monitoring program is to include QA/QC components; redundant and backup monitors at as many locations as the Water Quality Team determines necessary; calibration of monitoring equipment at least every 2 weeks; adequate funds for spot-checking monitoring equipment, error checking, correcting, and recording functions for CROHMS data; and daily reporting.

There are two purposes for the Corps to monitor total dissolved gas (TDG) and water temperature at 10 Columbia River Basin dams: 1) to monitor project performance in relation to water quality standards, and 2) to provide water quality data for anadromous fish passage at Columbia/Snake mainstem dams. The monitoring program is considered an integral part of the Corps' Reservoir Control Center water management activities.

TDG is the primary water quality parameter monitored. High saturation level TDG can cause physiological damage to fish. Water temperature is also measured because it affects TDG saturation levels, and because it influences the health of fish and other aquatic organisms. Both TDG and water temperature are closely linked to project water management operations (e.g., water released over the spillways, releases through the powerhouses and other facilities, and forebay and tailwater water surface elevations).

One component of the NMFS 2000 BiOp water quality strategy was for the Corps to take the actions necessary to implement the spill program at the dams called for in the BiOp, including obtaining variances from appropriate State water quality agencies. The Corps took the necessary actions to prepare for the 2002 and 2003 spill seasons. The Corps will follow a similar process prior to the 2004 season. The variance provides for a revision of the total dissolved gas standard from 110% to a revised standard of 115% in the forebays and 120% in the tailwaters of McNary, John Day, The Dalles, and Bonneville dams, and the Camas location, from April 1, 2003, to August 31, 2003. The 115% and 120% caps are based on the 12 highest hourly measurements per calendar day. Also, a cap of total dissolved gas of 125%, based on the two highest hours, is in effect.

In 1999, the State of Washington had issued a modified TDG water quality standard, which is in effect through the 2003 water year. Additional actions with the State of Washington were not required for the 2002 water year. The Corps will be meeting with the Washington Department of Ecology in late 2003 to discuss the possibility and process for developing a multiple year TDG rule modification starting in the 2004 spill season.

The State of Idaho was not approached in 2002 concerning a variance to water quality standards. The State, in conjunction with the Tribes, provided a set of conditions in 2001 to be met as part of the variance process. The Corps did not pursue obtaining a variance from the State of Idaho for 2002 or 2003 and does not plan to do so in 2004.

The Reservoir Control Center is responsible for monitoring the TDG and water temperature conditions in the forebays and the tailwaters of the lower Columbia River/lower Snake River dams, and selected river sites. The operational water management guidelines in Oregon are to change spill levels and, subsequently, spill patterns at the dams (daily if necessary) so that the forebays are as close to, but do not exceed, daily (12 highest hours) average of 115% TDG, and the tailwater levels are close to, but do not exceed, daily (12 highest hours) average of 120% TDG. Also, a cap of total dissolved gas of 125%, based on the two highest hours, is in effect.

The Corps prepares a Total Dissolved Gas Management Plan each year (see Appendix 4). It is a supporting document for the Water Management Plan. The Plan summarizes the roles and responsibilities of the Corps as they relate to dissolved gas monitoring. The Plan stipulates what to measure, how, where, and when to take the measurements, and how to analyze and interpret the resulting data. The Plan also provides for periodic review and alteration or redirection of efforts when monitoring results and/or new information from other sources justifies a change. The Plan identifies channels of communication with other cooperating agencies and interested parties.

The Corps will be monitoring similarly to what occurred since 2000.

See: http://www.nwd-wc.usace.army.mil/TMT/

The 2004 Plan of Action can be found listed under the TDG category of the Reservoir Control Center Water Quality Team page on the following web site:

http://www.nwd-wc.usace.army.mil/TMT/wqwebpage/mainpage.htm

7.3.3 Other Water Quality Actions

The following water quality topics are covered in Appendix 4: Total Dissolved Gas Model, Temperature Model and Temperature Monitoring Needs, Water Quality Database.

7.4 Canadian Storage for Flow Augmentation

The purpose of the actions below is to see if more water from Canadian storage projects can be obtained for flow augmentation.

One (1) maf of Treaty storage shall be requested and negotiated when available with BC Hydro to be provided and released during the migration season.[60]

[60] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 24

BPA shall continue to request and negotiate with BC Hydro for storage of water in non-Treaty storage space during the spring, for subsequent release in July and August, for flow enhancement as long as operations forecasts indicate that water stored in the spring can be released in July and August.[61]

A study regarding the shaping and release of water behind Canadian Treaty storage projects in July and August was completed in 2001. [62]

7.5 Albeni Falls Coordination

The action agencies, the USFWS, and Idaho Department of Fish & Game shall meet annually to evaluate Lake Pend Oreille kokanee monitoring results and make necessary adjustments through subsequent in-season management.[63] The purpose of this action is to review IDFG monitoring results and to ensure winter lake operation protocol is addressing the needs of kokanee spawning and hence, threatened bull trout, which feed on kokanee.

7.6 Public Coordination

The purpose of the following actions is to provide for better regional coordination.

Actions in the Water Management Plan will be coordinated with NOAA Fisheries~~NMFS~~, USFWS, and the states and tribes in preseason planning and in-season management of flow and spill operations. This coordination shall occur in the Technical Management Team process.[64]

At all appropriate decision points, the action agencies shall routinely seek timely input and concurrence from the USFWS on all matters affecting USFWS listed fish through the Columbia River Treaty, International Joint Commission Orders, and all other decision making processes involving transboundary waters in the Columbia River basin. This shall include notification of all meetings and decision points and provision of opportunities to advise the action agencies during meetings and in writing, as appropriate.[65]

~~*7.7System Flood Control Study*~~

~~The purpose of the various flood control studies is to see if more water can be available for spring flow management without reducing flood control protection.~~

~~The plans for the Columbia River Fish Mitigation System Flood Control Review for 2004 include the completion of the planning reconnaissance phase. This includes completing for the 905(b) Analysis and the Project Management Plan.~~[66]

[61] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 25
[62] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 26
[63] USFWS BiOp at Section 11.A.1.4.d Page 94
[64] NMFS BiOp at Section 9.4.2.2 Page 9-27, Action 3 and NMFS BiOp at Section 9.4.2.2 Page 9-60, Action 17
[65] USFWS BiOp at Section 8.1.g Page 76
[66] ~~NMFS BiOp Section 9.6.1.2.6 Page 72, Action 35~~

~~Banks Lake Flow Augmentation~~

~~The purpose of the proposed operation at Banks Lake is to enhance and attempt to help flow objectives in the Columbia River during the juvenile out-migration of ESA-listed salmonid stocks. This would be accomplished by altering the August draft limit of Banks Lake from elevation 1,565 feet down to 1,560 feet.~~[67]

~~Reclamation is preparing an analysis to determine if this action will be implemented.~~

~~7.9~~7.7 Dworshak Draft to 1,500 Feet Adult Evaluation

The NMFS BiOp calls for drafting Dworshak to 1,500 feet in order to evaluate whether releasing approximately 200 kaf of water during September provides a benefit to adult migrants.[68] The ongoing temperature monitoring and field evaluations will continue in 2005?~~4~~ to provide data for the study.

Water conditions at the end of 2002 *and a TMT decision in 2003* allowed approximately 200 KAF of storage from Dworshak to be released in September for the purpose of this study. The preliminary data from the 2002 test was presented to TMT in the fall of 2002. A final report on the 2002 operation is anticipated in 2004.

~~7.10~~7.8 Other Reclamation Water Management Actions

The following actions from the NMFS BiOp are intended to provide additional benefits to listed fish.

Reclamation will consult with NMFS before committing any of its uncontracted storage space or entering into new contracts. No contracts are scheduled for review in 2004.[69]

Reclamation shall pursue water conservation improvements at its projects. Reclamation annually receives numerous proposals for conservation projects from its irrigation districts and others. FY 2002 project selection criteria have been developed with a new ESA emphasis and will be applied to proposals considered for Reclamation projects.[70]

Reclamation provided NOAA Fisheries with a report on unauthorized use of Reclamation project water in March 2003. [71]

Reclamation shall complete ESA consultations on its tributary projects below Chief Joseph Dam. Consultations are in progress for the Crooked River, Deschutes, Arnold, Umatilla, Yakima, Upper Snake and Tualatin Projects.[72]

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[67] NMFS BiOp at Section 9.6.1.2.6 Page 9-70, Action 31
[68] NMFS BiOp at Section 9.6.1.2.6 Page 9-71, Action 34
[69] NMFS BiOp Section 9.6.1.2.6 Page 68, Action 27
[70] NMFS BiOp Section 9.6.1.2.6 Page 68, Action 28
[71] NMFS BiOp Section 9.6.1.2.6 Page 69, Action 29
[72] NMFS BiOp Section 9.6.1.2.6 Page 69, Action 30

The Action Agencies shall acquire water for in-stream use from Reclamation's Upper Snake River Projects. Reclamation, NMFS, and others are participating in settlement discussions under the Snake River Basin Adjudication. Implementation of flow augmentation in 2004 will involve a settlement, another ESA consultation on the Upper Snake projects, and authorizing legislation from Idaho.[73]

The study of salmon attraction problems in the wasteways and drains is complete. Water quality monitoring and evaluation of return flows has been initiated and will be ongoing in 2004.[74]

8.0 Hydrosystem Substrategy 3.3: Juvenile fish transport actions to improve fish survival

This substrategy addresses actions to collect juvenile fish at some FCRPS projects while providing a balance between transported and in-river juvenile fish migration.

The Draft Updated Proposed Action states "The Action Agencies will continue to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. However, rather than beginning transport in accordance with the 2000 BiOp and the associated NOAA Fisheries Section 10 permit, we would not initiate transportation in the lower Snake River until temperatures, as measured at the Lower Granite forebay TDG monitor, exceeded 9°C for 2 consecutive days or April 15, whichever would come first. In lieu of transport, fish would be bypassed back to the river through what is believed to be the least intrusive PIT tag detection routes and allowing for some level of smolt monitoring. Results of McNary transportation studies with upper Columbia Chinook and steelhead may result in proposed modifications to spring transport at that facility.[75]

8.1 Snake River Collector Projects

All non-research juvenile salmonids collected at the Snake River collector projects will be transported (Lower Granite, Little Goose, and Lower Monumental dams).[76] A review of the information relative to when spring transport should be initiated will occur during the winter of 200~~4~~3/200~~5~~4. Current research information should be available to help inform this decision consistent with NOAA Fisheries' BiOp action 51.

8.2 McNary

Juvenile spring migrants collected at McNary Dam shall be bypassed.[77]

Collection of subyearling fall chinook for transportation at McNary Dam shall not be initiated until in-river migratory conditions are deteriorating (i.e., no longer spring-like).[78] In general, the switch from spring to summer operation will occur on or about June 20. Spring-like is defined as favorable flow and water temperature conditions; i.e., river flows are at or above the spring flow

[73] NMFS BiOp at Section 9.6.1.2.6 Page 9-70, Action 32
[74] NMFS BiOp Section 9.6.1.2.7, Page 74-75, Actions 37, 38, 39
[75] Draft Updated Proposed Action page 36.
[76] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 40
[77] NMFS BiOp at Section 9.6.1.3.4 Page 9-76, Action 41
[78] NMFS BiOp at Section 9.6.1.3.4 Page 9-77, Action 43

target (220 to 260 kcfs) at McNary Dam, and ambient water temperatures are below 62°F (17°C). Actual dates shall be set through coordination with TMT.

9.0 Resident Fish Substrategy 1.1: Create conditions below Libby Dam that facilitate Kootenai River white sturgeon (KRWS) natural reproduction and juvenile survival

9.1 Libby

9.1.1 Sturgeon

The purpose of the actions below is to provide water for sturgeon spawning.

Water shall be stored in Libby reservoir and supply, at a minimum, water volume during May and June, based upon water availability or the "tiered" approach as defined through coordinated reevaluation that took place in March 2002 among USACE, USFWS, and MDFWP, and summarized in the table below. This water shall be in addition to storage needs for listed bull trout, salmon, and the 4,000 cfs minimum releases from Libby Dam. Accounting on these total tiered volumes shall begin when the USFWS determines benefits to conservation of sturgeon are most likely to occur. This may include releases timed to enhance survival of eggs, yolk sac larvae, or larvae reared under the preservation stocking program and released into the Kootenai River. Releases may be timed to serve both wild fish and hatchery eggs/fish. Sturgeon flows will generally be initiated between mid-May and the end of June to augment lower basin runoff entering the Kootenai River below Libby Dam.[79]

[79] USFWS BiOp at Section 8.1.c Page 73,

Table 5. "Tiered" volumes of water for sturgeon flow enhancement to be released from Libby Dam according to the April - August volume runoff forecast at Libby. Actual flow releases would be shaped according to seasonal requests from the USFWS and in-season management of water actually available.[80]

Forecast runoff Volume (maf*) at Libby	Sturgeon flow volume (maf) from Libby Dam
0.00 < forecast < 4.80	Sturgeon flows not requested
4.8	0.8
5.4	0.8
6.35	1.12
7.4	1.2
8.5	1.2
8.9	1.6
Forecast > 8.9	1.6

Note: For forecasts between 4.8 and 8.9 maf interpolate from the values shown in the table above.

The purpose of the actions below is to provide for the annual sturgeon pulse.

Libby outflow will fulfill the operational guidelines provided by the USFWS annually prior to and during the sturgeon spawning/incubation period. During 2004, operational guidelines will include a request to deliver a high flow of water for 4 or 5 days at a time when both Kootenay Lake-Kootenai River stages are low and local runoff is high, to evaluate the potential of increased stream energy to scour sand from buried gravel within designated critical habitat. However, this would be done within established flood control criteria. Specific release recommendations will be developed in consultation with action agencies and submitted annually through the TMT or similar regional process.[81]

Efforts will be coordinated to attempt to limit sturgeon-spawning flows so they do not exceed a river stage elevation of 1,764 feet at Bonners Ferry. (Note: This may not always be possible during periods of unusual local runoff that may be beyond the control of Libby Dam.)[82]

[80] Letter from Michael White (USACE) to Anne Badgley (USFWS) dated August 23 2002
[81] USFWS BiOp at Section 8.2.c Page 80
[82] USFWS BiOp at Section 8.3.b Page 80

During sturgeon recruitment flow periods, local inflow will be allowed to supplement Libby Dam releases to the maximum extent feasible, while assuring public safety by monitoring water levels throughout relevant areas of the Kootenai River basin.

For 2004 there is a proposal to provide 2-5 days of scouring flows from Libby during April, May, or June. This volume would be incorporated in the tiered sturgeon flow enhancement volume.

9.1.2 Coordination

Libby Dam flows shall be regulated consistent with existing treaties, Libby Project authorization for public safety, other laws, and the 1938 International Joint Commission order to achieve water volumes, water velocities, water depths, and water temperature at a time to maximize the probability of allowing significant sturgeon recruitment.[83]

10.0 Resident Fish Substrategy 2.2: Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats

10.1 Libby

The following minimum flows to protect bull trout between the sturgeon and salmon flows will be provided based on the April to August volume runoff forecast at Libby.

If Koocanusa Reservoir elevations are below salmon guidelines (2439 ft) on July 1, and salmon augmentation will not occur for that year, the action agencies shall provide 6,000 cfs for the bull trout minimum flow during July and August (lowest water years). If additional water is available, increases in minimum flows may be determined through the TMT process.[84]

[83] USFWS BiOp at Section 8.1.a Page 73
[84] USFWS BiOp at Section 11.A.1.1.b Page 93

Table 6. Minimum bull trout releases in July from Libby Dam.

Forecast runoff Volume (maf*) at Libby	Min bull trout flows between sturgeon and salmon flows
0.00 < forecast < 4.80	6 kcfs
4.80 < forecast < 6.00	7 kcfs
6.00 < forecast < 6.70	8 kcfs
6.70 < forecast < 8.10	9 kcfs
8.10 < forecast < 8.90	9 kcfs
8.90 < forecast	9 kcfs

(USFWS BiOp at Section 3.A.2 Page 13)

**maf = million acre-feet*[85]

10.1.1 Ramp Rates

The purpose of the following actions is to provide better conditions for resident fish by limiting the flow fluctuations and setting minimum flow levels.

Operational constraints will be implemented at Libby Dam intended to minimize adverse effects of rapid and severe river flow fluctuations on bull trout, including year-round minimum flows and ramping rates, seasonal water management, conducting studies to monitor the adequacy of the constraints, and providing for modification of the operational constraints depending on study results.[86] Exact operational constraints are shown in paragraphs below.

The following ramp rates will guide project operations to meet various purposes, including power production.

[85] USFWS BiOp at Section 8.3.g Page 81
[86] USFWS BiOp at Section 10.A.1 Page 87

Table 7. Prescribed ramp rates to protect resident fish and their food organisms, and to minimize levee erosion, in the Kootenai River.

Daily and Hourly Maximum Ramp Up Rates for Libby Dam (as measured by daily flows, not daily averages, restricted by hourly rates)			
Flow Range	**Ramp Up Unit (Daily max)**	**Ramp Up (Hourly max) 1 Oct – 30 Apr**	**Ramp Up (Hourly max) 1 May – 30 Sep**
4,000 - 6,000 cfs	Limit ramp up to one unit per day (approx. 5,000 cfs per day)	2,000 cfs/hr	1,000 cfs/hr
6,000 - 9,000 cfs	Limit ramp up to one unit per day (approx. 5,000 cfs per day)	2,000 cfs/hr	1,000 cfs/hr
> 9,000 - 17,000 cfs	Limit ramp up to two units per day (approx. 10,000 cfs per day)	3,500 cfs/hr	2,000 cfs/hr
> 17,000 cfs	No limit	7,000 cfs/hr	3,500 cfs/hr

(USFWS BiOp at Section 3.A.2 Page 13)

Daily and Hourly Maximum Ramp Down Rates for Libby Dam (as measured by daily flows, not daily averages, restricted by hourly rates)			
Flow Range	**Ramp Down Unit (Daily Max)**	**Ramp Down(Hourly max) 1 Oct – 30 Apr**	**Ramp Down (Hourly max) 1 May – 30 Sep**
4,000 - 6,000 cfs	Limit ramp down to 500 cfs per day	500 cfs/hr	500 cfs/hr
> 6,000 - 9,000 cfs	Limit ramp down to 1,000 cfs per day	500 cfs/hr	500 cfs/hr
> 9,000 - 17,000 cfs	Limit ramp down to 2,000 cfs per day	1,000 cfs/hr	1,000 cfs/hr
> 17,000 cfs	Limit ramp down to one unit per day (approx. 5,000 cfs per day)	5,000 cfs/hr	3,500 cfs/hr

(USFWS BiOp at Section 3.A.2 Page 14)

Daily and hourly ramping rates may be exceeded during flood emergencies to protect health and public safety and in association with power or transmission emergencies.[87]

Variances to ramping rates during years where runoff forecasting or shortage shortfalls occur, or variances are necessary to provide augmentation water for other listed species, will be negotiated through the TMT process. This is expected in only the lowest 20th percentile water years.[88]

[87] USFWS BiOp at Section 3.A.2 Page 14
[88] USFWS BiOp at Section 3.A.2 Page 14

Note: The ramp rates will be followed except when they would cause a unit(s) to operate in the rough zone, a zone of chaotic flow in which all parts of a unit are subject to increased vibration and cavitation that could result in premature wear or failure of the units. In this case the project will utilize a ramp rate, which allows all units to operate outside the rough zone. The action agencies will provide additional information to the USFWS describing operations outside the "rough zone."[89]

10.2 Hungry Horse

10.2.1 Ramp Rates

The purpose of the following actions is to provide better conditions for resident fish by limiting the flow fluctuations and setting minimum flow levels.

Operational measures will be implemented at Hungry Horse Dam to minimize adverse effects of rapid and severe river flow fluctuations on bull trout, including year-round minimum flows and ramping rates, and seasonal water management; conduct studies to monitor the adequacy of the constraints; and provide for modification of the operational constraints depending on study results.[90] Exact operational measures are shown in paragraphs below.

The following ramp rates will guide project operations to meet various purposes, including power production.

[89] USFWS BiOp at Section 3.A.2 Page 13
[90] USFWS BiOp at Section 10.A.1.2 Page 88

Table 8. Ramp rates prescribed for Hungry Horse Dam releases to protect resident fish and their food organisms in the Flathead River.

Daily and Hourly Maximum Ramp Up Rates for Hungry Horse Dam (as measured by daily flows, not daily averages, restricted by hourly rates).		
Flow Range (measured at Columbia Falls)	**Ramp Up Unit (Daily Max)**	**Ramp Up Unit (Hourly max)**
3,200 - 6,000 cfs	Limit ramp up 1,800 cfs per day	1,000 cfs/hour
> 6,000 - 8,000 cfs	Limit ramp up 1,800 cfs per day	1,000 cfs/hour
> 8,000 - 10,000 cfs	Limit ramp up 3,600 cfs per day	1,800 cfs/hour
> 10,000 cfs	No limit	1,800 cfs/hour

(USFWS BiOp at Section 3.A.1 Page 8)

Daily and Hourly Maximum Ramp Down Rates for Hungry Horse Dam (as measured by daily flows, not daily averages, restricted by hourly rates)		
Flow Range (measured at Columbia Falls)	**Ramp Down Unit (Daily max)**	**Ramp Down Unit (Hourly max)**
3,200 - 6,000 cfs	Limit ramp down to 600 cfs per day	600 cfs/hour
> 6,000 - 8,000 cfs	Limit ramp down to 1,000 cfs per day	600 cfs/hour
> 8,000 - 12,000 cfs	Limit ramp down to 2,000 cfs per day	1,000 cfs/hour
> 12,000 cfs	Limit ramp down to 5,000 cfs per day	1,800 cfs/hour

(USFWS BiOp at Section 3.A.1 Page 8)

Daily and hourly ramping rates may be exceeded during flood emergencies to protect health and public safety and in association with power or transmission emergencies.[91]

Variances to ramping rates during years where runoff forecasting or storage shortfalls occur, or variances are necessary to provide augmentation water for other listed species, will be coordinated through the TMT process. This is expected in only the lowest 20th percentile water years.[92]

Note: The ramp rates will be followed except when they would cause a unit(s) to operate in a zone that could result in premature wear or failure of the units. In this case the project will utilize a ramp rate, which allows all units to operate outside the rough zone. The action agencies will provide additional information to the USFWS describing operations outside the "rough zone."[93]

[91] USFWS BiOp at Section 3.A.1 Page 8
[92] USFWS BiOp at Section 3.A.1 Page 8
[93] USFWS BiOp at Section 3.A.1 Page 7

The minimum outflow for Hungry Horse Dam will be determined monthly starting with the January forecast, with final flows based on the March final runoff forecast for Hungry Horse Reservoir for the period April 1 to August 31. These forecasts will be provided by Reclamation to the TMT. If the April to August forecast is greater than 1,790 kaf, the minimum flow shall be 900 cfs. If the forecast is less than 1,190 kaf, the minimum flow shall be 400 cfs. If the forecast is between 1,190 and 1,790 kaf, the minimum flow will be linearly interpolated between 400 and 900 cfs.[94] The minimum flow from Hungry Horse can be lowered to 145 cfs when the river at Columbia Falls reaches flood level (13 feet).

The minimum flow at Columbia Falls will be determined monthly starting with the January forecast, with the final flows based on the March final runoff forecast for Hungry Horse Reservoir for the period of April 1 to August 31. If the April to August forecast is greater than 1,790 kaf, the minimum flow shall be 3,500 cfs. If the forecast is less than 1,190 kaf, the minimum flow shall be 3,200 cfs. If the forecast is between 1,190 and 1,790 kaf, the minimum flow will be linearly interpolated between 3,200 and 3,500 cfs.[95]

10.3 Albeni Falls

10.3.1 Lake winter elevation

A proposal has been made to operate~~draw down~~ Lake Pend Oreille in the fall/winter to an elevation of 2,055~~1~~ feet during the 2004/2005 season.

[94] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19 and USFWS BiOp at Section 3.A.1 Page 6
[95] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19 and USFWS BiOp at Section 3.A.1 Page 7

11.0 FCRPS Hydrosystem Performance Standards

Table 9. FCRPS hydrosystem survival performance rates (%) for affected life stages.

ESU	Adult Survival Rate		Juvenile Survival Rate		
	FCRPS System	Per FCRPS Project 1	FCRPS In-river Only		FCRPS Combined [2] (Transport + In-river + Differential Mortality of Transported Fish)
			System	Per Project [1]	
Chinook Salmon					
SR spring/summer	85.5	98.1	49.6	91.6	57.6
SR fall	74.0	96.3	14.3	78.4	12.7
UCR spring	92.2	98.1	66.4	90.3	66.4
UWR	N/A	N/A	N/A	N/A	N/A
LCR	98.1	98.1	90.7	90.7	90.7
Steelhead					
SR	80.3	97.3	51.6	92.1	50.8
UCR	89.3	97.3	67.7	90.7	67.7
MCR	89.3	97.3	67.7	90.7	67.7
UWR	N/A	N/A	N/A	N/A	N/A
LCR	97.3	97.3	90.8	90.8	90.8
CR chum salmon	N/A	N/A	N/A	N/A	N/A
SR sockeye salmon	88.7	98.5	N/A	N/A	N/A

(NMFS BiOp Section 9.2.2.2.1, Page 9-12, Table 9.2-3)

Source: Adult standards taken from Table 9.7-2. Juvenile standards taken from Table 9.7-1.

[1] Per-project in-river survival rate calculated as the xth root of the system in-river survival rate (where x = number of FCRPS projects encountered). They are provided for illustrative purposes only. They are *NOT* intended to be interpreted as project-specific standards, or to be used in any way to support curtailment of survival improvement measures at an individual project.

[2] Values represent averages over the water years and D values in Table 9.7-1.

12.0 Fish and Wildlife Related Non-BiOp Actions

The following non-BiOp actions are typically options available to be addressed by TMT during the water management year.

12.1 Keenlyside Dam (Arrow)

12.1.1 Mountain Whitefish

Spawning flow levels are set the third week in December between 45 and 55 kcfs. Spawning continues through mid-January. Egg protection flows are set 5 to 15 kcfs lower than the spawning flow through the end of March.

12.1.2 Rainbow Trout

Rainbow trout spawning begins in April. Protection levels begin somewhere between 15 and 25 kcfs. The goal is to have stable flows or ever-increasing flows through June.

12.2 Libby

12.2.1 Burbot

Providing low flows from Libby Dam to aid upstream migration of burbot to spawning areas above Kootenay Lake on the Kootenai River in Idaho is considered each winter. These low flows may occur over several periods of time or may last for an extended period from December through February. The details of this operation for 20054 are being developed and may be included in the fall/winter update. Negotiations on a Conservation agreement are underway for this species. Use of VARQ may aid this operation in years with medium runoff forecasts, and a variable December draft may help as well if and when it is implemented.

12.3 Dworshak

12.3.1 Flow increase for Dworshak National Fish Hatchery release.

Release 4 – 6 kcfs from Dworshak in order to move juvenile fish into the mainstem Clearwater River during the spring hatchery release.

12.4 Grand Coulee

12.4.1 Kokanee

Fill Grand Coulee to 1,283 feet by October 1. Maintain elevation 1,283 to 1,285 feet or greater through October for brood stock collection and access to tributaries.

12.5 Hanford Reach Protection Flows

Grant County PUD limits outflow from Priest Rapids Dam to minimize juvenile fish stranding.

12.6 Vernita Bar Protection Flows

Flow management occurs from Priest Rapids Dam in the fall to ensure that fall chinook salmon establish redds (spawn) at an elevation that enables the redds to have a high likelihood of not being dewatered prior to emergence of fry. Daytime flows are regulated to a range between 50 and 70 kcfs during October and November when redds are being established. Flow fluctuations are limited from the time of fish emergence in early April through early June. (Note: This is included pursuant to the Vernita Bar Settlement Agreement and the annual Hanford reach stranding agreement.)

12.7 McNary

12.7.1 Waterfowl nesting

To improve waterfowl nesting conditions in the McNary pool between March and May each year, we operate the pool in the top 1 foot of the pool range for several hours every 4 days.

12.7.2 Waterfowl hunting enhancement

In order to enhance Waterfowl hunting, we hold the McNary pool constant several times a week from October to January.

12.8 John Day

12.8.1 Goose nesting

To encourage geese to nest in areas that are not typically inundated by frequent fluctuations in the John Day pool between March and May each year, we operate the pool in the top 1 foot of the pool range for several hours every 4 days.

12.8.2 Waterfowl hunting enhancement

In order to enhance Waterfowl hunting, we hold the John Day pool constant several times a week from October to January.

12.9 Bonneville

12.9.1 Tribal Fishing

To support tribal fishing, the Bonneville pool is normally held between elevation 75 and 76.5 feet during tribal fishing seasons.

12.9.2 Spring Creek Hatchery Release

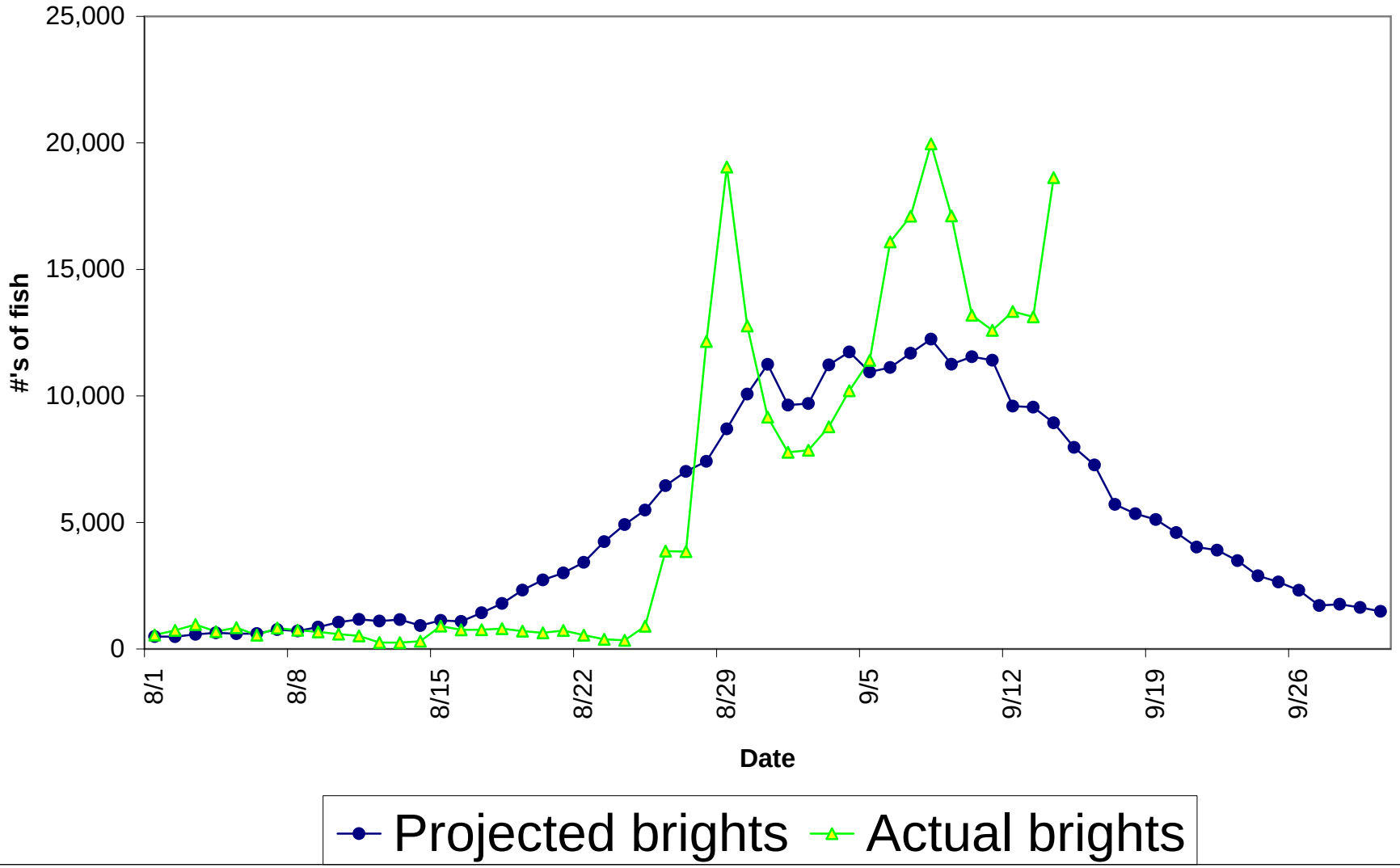
~~Special operations for Spring Creek hatchery release may include powerhouse 2 priority operation, bypass system in operation, screens installed, and water may be spilled, to aid the March release from Spring Creek hatchery.~~ The U.S. Fish and Wildlife Service typically releases

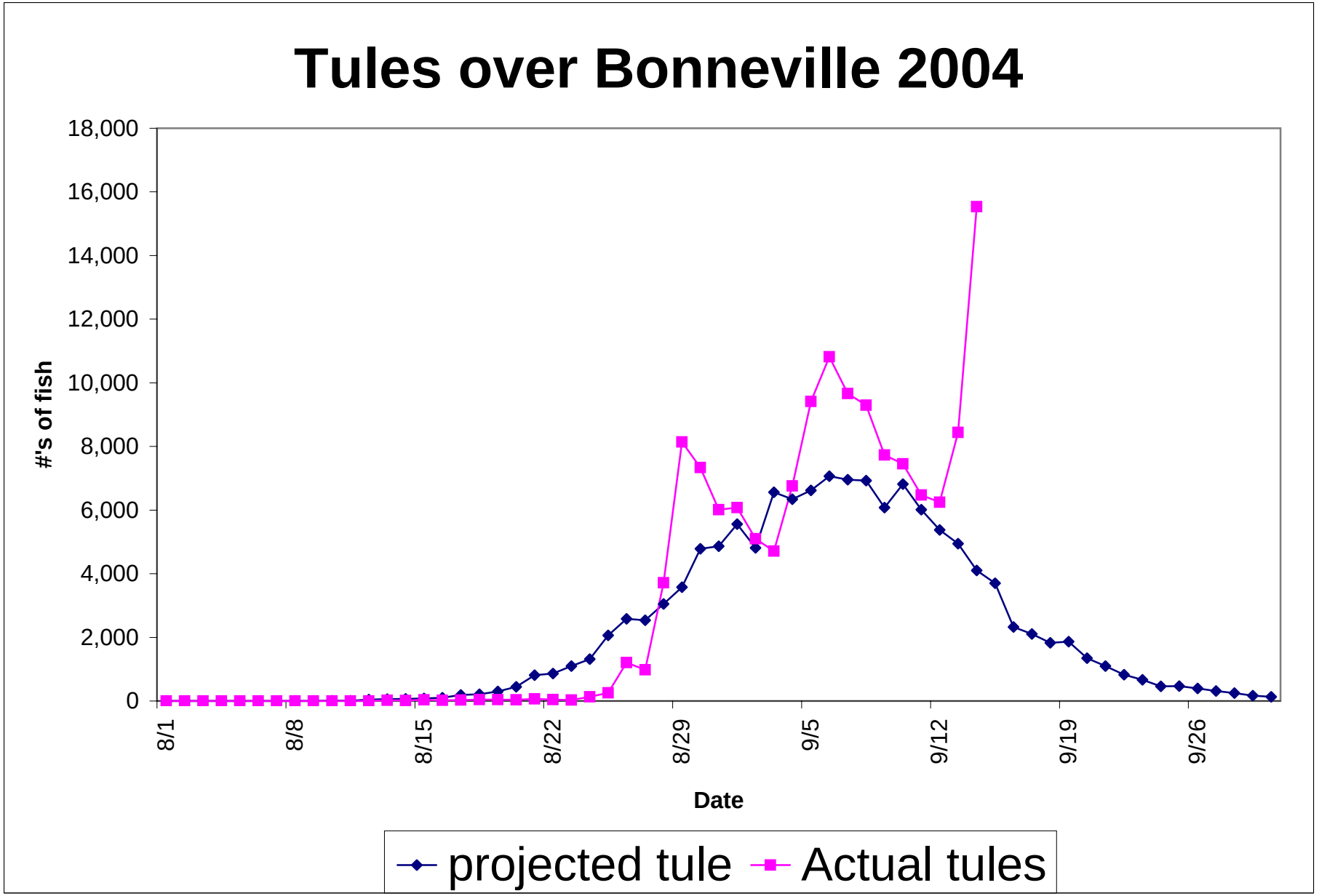
between 7 and 8 million tule fall chinook fry from the Spring Creek National Fish Hatchery upstream of Bonneville Dam in March. In 2005 the action agencies plan to operate Bonneville Dam with a powerhouse 2 priority, to operate all units with fish screens, and to operate the bypass facility in order to provide project passage for this hatchery release. The B2 Corner Collector will be operated for a period of days (to be determined) during the March 2005 release. The Fish and Wildlife Service, Corps of Engineers and Bonneville Power Administration reached mutual agreement on an operation at Bonneville Dam for the March 2004 release of sub-yearling chinook from Spring Creek Hatchery in support of a two-treatment evaluation in which the effectiveness of spill as compared to operation of the new B2 corner collector will be evaluated. The agreement was reached in exchange for a commitment to no spill for March Spring Creek releases in 2005 and 2006 (unless we see significant problems with the new B2 corner collector, in which case we will revisit 2005 and 2006 operations for the March hatchery release).

13.0 Conclusion

This draft 2005~~4~~ Water Management Plan will be coordinated with the Technical Management Team. Seasonal action plans will be developed as described in the introduction to this plan. Additionally, operations may be adjusted in-season based on recommendations from the TMT.

Brights over Bonneville 2004




Tules over Bonneville 2004
18,000
16,000
14,000
12,000
10,000
8,000
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9/12
9/19
9/26
Date
projected tule
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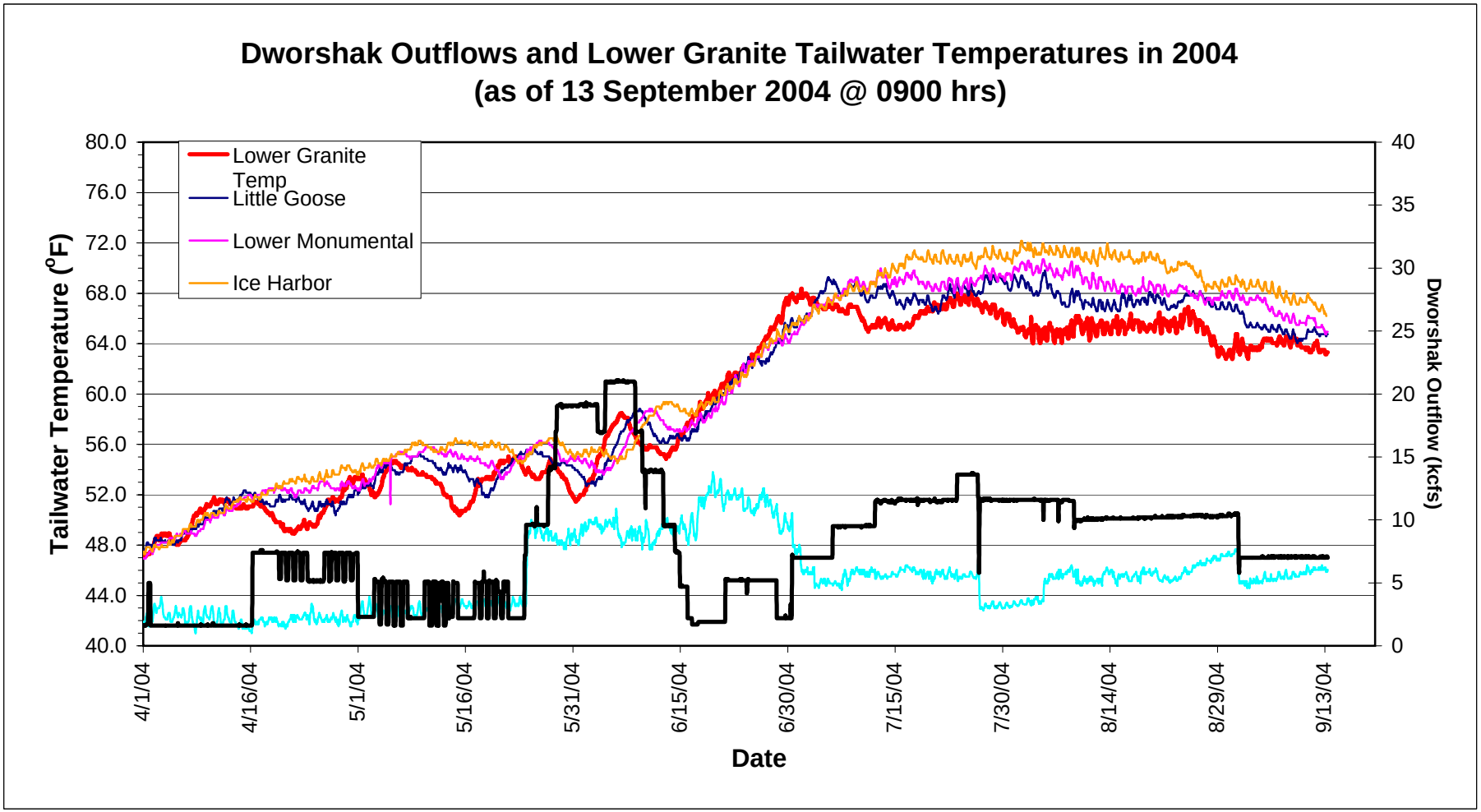
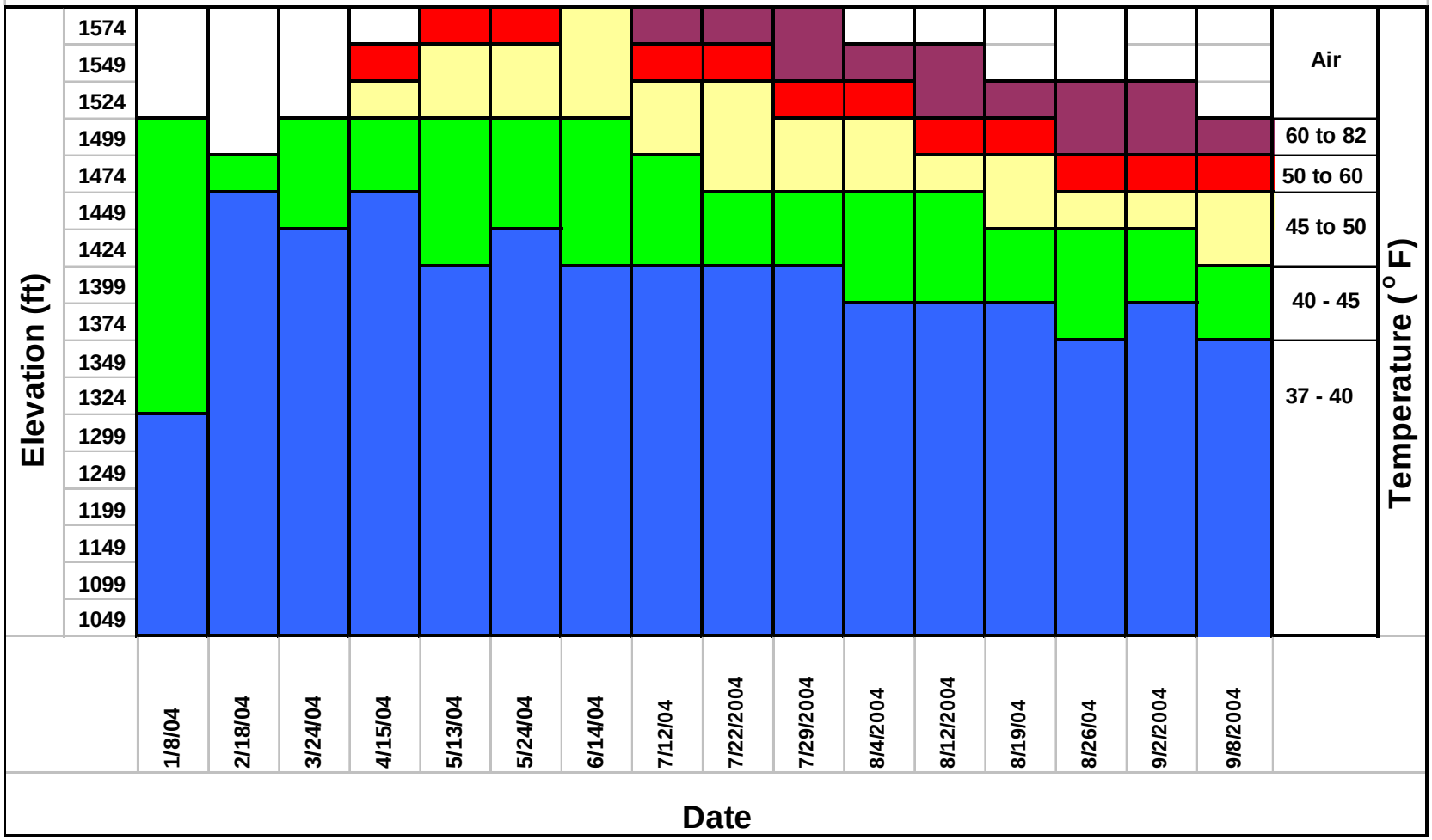

Dworshak Outflows and Lower Granite Tailwater Temperatures in 2004
(as of 13 September 2004 @ 0900 hrs)
Lower Granite Temp
Little Goose
Lower Monumental
Ice Harbor
Tailwater Temperature (°F)
Dworshak Outflow (kcfs)
80.0
76.0
72.0
68.0
64.0
60.0
56.0
52.0
48.0
44.0
40.0
40
35
30
25
20
15
10
5
0
4/1/04
4/16/04
5/1/04
5/16/04
5/31/04
6/15/04
6/30/04
7/15/04
7/30/04
8/14/04
8/29/04
9/13/04
Date

2004 - CHANGES IN WATER TEMPERATURE OVER TIME

DWORSHAK RESERVOIR



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
September 15, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

TMT Internet Homepage: http://www.nwd-wc.usace.army.mil/TMT/index.html

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Bonneville Spillway Calibration Update:
Rudd Turner, COE, updated TMT members that the COE is still in the planning stage of doing a calibration study, based on a draft that was presented at the August 25th TMT meeting. The COE is looking at the last 2 weeks of October to implement the work, due to funding, timing of fish runs, and weather. The COE may be operating under a continuing resolution from Congress for funding. Bonneville is spilling during the day for adult fish attraction. The spill gates were opened and measured at 6" so current calibration data should be accurate. The COE will update TMT as plans progress.

Libby Operations/Subgroup Report:
A sub-group of TMT met on September 8th to discuss Libby operations through September. Notes from that discussion, courtesy of Jeff Kuechle, were provided as an attachment to today's TMT agenda. Rudd Turner re-capped that discussion, saying that the group agreed to a weekly load shaping schedule through the end of September (starting this week): 14 kcfs during the week, Friday ramp down to 12.5 kcfs, then ramp down again to 10 kcfs over the weekend, and back up to 14 kcfs on Monday.

Since that discussion, inflows have been above average and are forecasted to remain above average through the month. If the current operating plan continues, the COE projects that Libby will end up at an elevation above 2439' by the end of September. The COE asked TMT members to share their preference, for 12.5 kcfs weekly average, or 2439' end of September elevation?

Some TMT members expressed interest in maintaining a weekly average of not greater than 12.5 kcfs over meeting 2439' at the end of this month. There was also an expressed interest in saving the extra water for lower Columbia chum spawning later in the fall. The COE would like to avoid filling at the project in October, and BPA, noting that this operation is not a BiOp

requirement, would like to maintain some flexibility for power needs. There was also an interest in doing a gradual ramp-down and avoiding hard constraint minimums in October.

Idaho expressed the desire that any change to the Libby operation should not impact the studies that were planned to come out of operating Libby outside the BiOp this year. While there has been some basic modeling and baseline information from this year's unique operation, funding was not put in place in enough time to hire contractors to do the more extensive study design put forth by Brian Marotz of the Montana Fish, Wildlife and Parks Dept. TMT members expressed disappointment that these studies did not occur. Idaho was interested in understanding how the funding failure occurred even in the face of the change to BiOp operations. It was noted that more lead time is needed to put funding for studies in place.

After a full discussion, TMT agreed to recommend (and the COE agreed to implement) the following operation for Libby: 9 kcfs minimum outflow and do not release more than 12.5 kcfs as a weekly average.

Albeni Falls:
Based on an SOR from USFWS (in coordination with NOAA and Idaho) last year, the COE plans to draft Lake Pend Oreille to elevation 2055' by late November. The COE plans to operate to reach elevation 2060-2061' by the end of September to meet the November target. The current elevation is 2062.3'. The USFWS requested that the COE consider shifting the draft until later and use this water also to support chum. Idaho needs to check to see if a shift would work with kokanee spawning. Idaho and USFWS will coordinate on this and update TMT at the September 29th TMT meeting.

Lower Granite Powerhouse Outage/MOP Operations:
Rudd Turner reported that, rather than a 24-hour outage, the Lower Granite powerhouse will require a daytime outage, from 7am to 5pm from September 20-25th, for doble testing and transformer repair at the project. Half of the work has been deferred to next year, resulting in shorter outage hours than originally planned. So, the COE plans to fill during the day and release water (30 kcfs) out at night. During the outage the project will operate 1 unit at speed-no-load and spill to meet the 11.5 kcfs minimum discharge. BPA requested that the MOP operating range be increased by 0.5' to ensure a smoother operation and moderate TDG levels. The goal is to keep TDG levels at or close to 110%. Oregon requested that the COE consider spilling at night also, to support remaining migrating juveniles.

The COE will operate Lower Granite, from September 20-25th, as such: fill as needed, up to 0.5' above the MOP+1 range, while operating 1 unit at speed-no-load plus spill from 7am-5pm. At 5 pm, draft water out to MOP +1.

Autumn Treaty Fishery Update:
Kyle Martin, CRITFC, reported that the Autumn Treaty fishery is likely to continue through next week. The highest priority on forebay operation is for the John Day pool (50-68% of the total nets are there) with lowest priority for Bonneville for this fishery. Additional fisheries requests are yet to be determined.

TMT Year End Review 2004:
The 2004 TMT year end review was scheduled for Wednesday, November 10th, from 10am-3pm at the Water Resources Education Center in Vancouver. Cindy LeFleur, WDFW, will work with the facilitation team to reserve the space. A draft agenda for the 2004 Year End Review was handed out, based on topics that were discussed during last year's review. TMT members offered suggestions for changes and additional items for this year. The facilitation team will work with individual members to coordinate on presentations (who and what). An updated agenda will be sent to TMT members prior to the November 10th review meeting. The facilitation services evaluation form will be distributed at the review, and there will be time for discussion (as desired) on this and overall process at the meeting. This year, folks have the option of filling the form out and sending it to Jacque Abel, or doing a phone interview with Jacque. The facilitation team has an interest in hearing from as many Regional Forum participants as possible.

2005 Water Management Plan DRAFT:
The COE provided the full draft 2005 WMP as an attachment to today's TMT agenda, and provided a handout with a section of the draft. The Action Agencies are not yet requesting formal comments on the draft, as there are ongoing consultations with NOAA on the remand of its BiOp, as well as the USFWS on the Libby operations portion of its BiOp.

TMT members discussed the process for incorporating comments and requesting changes to the WMP. It was suggested that longer term issues be raised and planned for via IT. A suggestion was also made that the WMP go back to being a TMT document, not an action agencies document, to re-initiate more give and take amongst TMT members in integrating comments to the WMP.

ACTION: There will be more discussion of the WMP at the September 29th TMT meeting. At that meeting TMT members can look at past comments and raise issues that need more discussion, and flag those major changes that will occur (e.g. LGR doble testing).

Status of Operations:
Reservoirs: Bonneville is at 104 kcfs day average flows. McNary is at 96.6 kcfs. Lower Granite is operating at 38 kcfs out. Dworshak is at elevation 1521.6', with 3.4 kcfs in and 4.8 kcfs out. Dworshak will ramp down to minimum outflows in the next few days. Libby is at 2444.7'. Albeni Falls is at 2062.3', with 11.7 kcfs out and 13.6 kcfs in. Hungry Horse is at 3540' and holding. Grand Coulee is at 1282' and filling.

Fish status: Cindy LeFleur, WDFW, provided graphs depicting adult fall chinook brights over Bonneville and tules over Bonneville for 2004. Both show late migration patterns and above average numbers – 264,000 brights have passed Bonneville to date, and 142,000 tules have passed. There has been very good sport fishing below Bonneville over the last two weeks. In August, the commercial fishery caught 212,000 fish. The fishery will start again next week and go through October.

Juveniles are at the end of migration; numbers on the Snake are down to the 100's. Total migration numbers met their high number projections this year. A question was raised about winter pit-tagging and whether screens should be pulled to avoid ice damage.

ACTION: Russ Kiefer, IDFG, will take this issue to FPOM.

Water quality: Temperatures have been below 68° as of last week. When Dworshak ramped down to 4.8 kcfs out, overshot mode resulted in temperatures of 53°, as projected.

USGS Chum Study:
Ken Tiffin, USGS, provided a proposal to the COE and BPA for a chum study involving 10 trials at 10 kcfs/hour over a 9-hour period in early November through early December. The COE would like input from TMT on this. The COE has some concerns about spawning/dewatering.

ACTION: Ken will present information to TMT on the proposed chum study at the September 29th meeting. Rudd Turner will get the proposal up on the web in advance.

Next Meeting, Wednesday, September 29th, 9am-noon:
Agenda Items:

- Libby Operations
- Albeni Falls Operations
- WMP Comments
- USGS Chum Study
- System Status

Meeting Minutes

1. Greeting and Introductions

The September 15, 2004 Technical Management Team meeting was chaired by Rudd Turner of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Turner at 503/808-3935.

2. Bonneville Spillway Calibration Update.

Turner said the Corps is in planning mode on the calibration issue; we put a draft study plan on the table last meeting, and that remains the current plan. We're looking at the last two weeks in October to do the actual calibration, in part because of funding – that will be the new fiscal year – and it is also better for fish – after fall chinook, and before chum. The weather is a factor as well; we would prefer to conduct this operation before November. Funding could potentially be an issue; Congress has not yet passed the appropriation, and we expect to be working under a continuing resolution. The study won't cost a lot – $5,000 to $7,000 – but O&M funding is very tight within the Corps at this time. Hourly and daily data are still reflecting any errors that might be there; until we do the calibration work, we don't know what the errors are, so that data has not been scrubbed. Bonneville is spilling through Bays 1 and 18 during the day for adult fish attraction, said Turner; those bays have been physically measured, so that data should be accurate.

3. Libby Operations Update.

Turner said the Libby operations subgroup, set up at the last TMT meeting, met via conference call last Wednesday. At that call, Libby operations through the end of September were discussed. The notes from that meeting are available via hot-link from today's agenda on the TMT homepage. The group decided to develop a weekly load-following schedule while continuing to release a weekly average outflow of 12.5 Kcfs, in order to achieve elevation 2439 at Libby by September 30. We went to 14 Kcfs outflow on Monday, and will hold that through tomorrow. On Friday, Libby outflow will be reduced to 12 Kcfs, and to 10 Kcfs over the weekend – this operation will result in a weekly average of 12.5 Kcfs through September 30.

Turner said Libby inflows continue to be above average for this time of year, with inflows 120-170% of normal actual and expected through September 30. The project has been sitting at 2444.7' since last week, he said, essentially passing inflow. The Corps now believes that, if we continue to release 12.5 Kcfs, the project could end up 2-3 feet, or more, above elevation 2439' on September 30. The bottom line is that it doesn't look as though we can achieve elevation 2439' by September 30 unless Libby outflow is increased.

Jim Litchfield said holding 12.5 Kcfs outflow, and letting Libby elevation fall where it may on September 30, makes sense to him. Russ Kiefer said IDFG would also support such an operation, because it may provide some additional water for use in the upcoming chum operation. Paul Wagner said such an operation is consistent with the guidance in the Bob Lohn letter on Libby operations, which specified either elevation 2439 by September 30 or continuing to release 12.5 Kcfs through the operating season. We have talked internally at NOAA Fisheries about saving some water for chum, Wagner said, and believe this would be a worthwhile action to take.

Litchfield said Brain Marotz (Montana Fish, Wildlife, and Parks Dept.) would prefer to see a gradual rampdown in Libby outflow during September – a softer landing – to avoid reducing Libby outflow to absolute minimum before increasing outflow again for chum and power production. Ron Boyce observed that the inflow forecast has changed since Lohn wrote his letter; he asked what Montana's preferred operation would be, given the new circumstances. Litchfield replied that a rampdown to 9 Kcfs as soon as possible, then to 8 Kcfs through the end of the month, then no lower than 6 Kcfs until winter load comes up, would be Montana's preferred operation. Turner replied that the Corps would prefer to go through October without filling into Libby –we would prefer to hold steady or draft slightly during October, he said, because of the desire for a smooth operation given the need to draft by the end of December. According to the modeling the Corps did yesterday, we would need to release 7-8 Kcfs through October in order to hold the end-of-September operation at Libby.

Scott Bettin reminded the group that this isn't a time of year in which Biological Opinion measures guide operations. We're willing to take biological needs into account, of course, but BPA would also like to keep its options open, in terms of operations for power, he said. If we give you a recommended operation, not a hard constraint, would that be a problem? Litchfield asked. No, it would not, Bettin replied. In that case, said Litchfield, Montana would prefer to see

the gradual rampdown to 9 Kcfs, then 8 Kcfs, then to whatever flow is needed to hold Libby's September 30 elevation through October. As long as such an operation won't interfere with the planned productivity studies below Libby, Kiefer observed. Litchfield replied that, according to Marotz, while those studies have been approved, they have not been funded, so Montana has been unable to hire the crews needed to conduct that monitoring work. We are monitoring, he said, but most of the productivity analysis in 2004 will be model-based. Kiefer said that is extremely disappointing, because Idaho agreed to this operation on the understanding that a good study would be conducted. Litchfield said baseline productivity information will be collected in 2004; he suggested that interested TMT members contact Marotz directly to find out exactly what Montana will be doing this year. It was agreed that Montana will provide a report on this work at the TMT's upcoming year-end review meeting.

I would like to find out how it occurred that we reduced BiOp protection measures to conduct this study, then failed to get the paperwork in place in order to allow the study to go forward, said Kiefer, in order to avoid similar disappointment in the future. The way to avoid it in the future is to plan the study a year in advance, rather than a few weeks in advance, Bettin replied.

So what do we want to do, operationally, at Libby? Silverberg asked. Turner suggested that Libby outflow be held at a weekly average of 12.5 Kcfs through October 3; at the TMT's September 29 meeting, we can then discuss how to ramp flows down. We hear your input in terms of a preferred October operation at Libby, that you would like to see an average flow of 8 Kcfs-9 Kcfs through the month, and will discuss that with Bonneville, Turner said – it should be possible to craft an operation that gets us pretty close to that outflow volume. Is there any opportunity to ramp down Libby outflow sooner, in order to save some water for chum flows later? Boyce asked. We would be interested in hearing a specific proposal from the salmon managers, said Bettin; however, it is not a BiOp requirement to reduce Libby outflow at this time. Greg Hoffman, COE at Libby, asked that the flow not vary more than one unit, or about 5 kcfs, from low to high discharge levels within a week.

Would it be possible to reduce outflow somewhat now while still retaining the operational flexibility Bonneville needs? Steve Haeseker asked. That's possible, said Bettin; given current power prices, power needs and chum needs may well coincide. It could be a win-win for chum and power, Kiefer observed. That may well be true, Bettin replied. Can we get some agreement on reducing the weekly average somewhat at today's meeting? Haeseker asked. Could you give us the flexibility to maintain 9 Kcfs as a minimum Libby outflow, but let us go as high as needed to meet load? Bettin asked. If we have that flexibility, I think I can save some water for you, he added. If we can do that with the understanding that the weekly average outflow won't exceed 12.5 Kcfs, Litchfield replied. That would be fine with BPA, said Bettin.

After a few minutes of additional discussion, it was agreed to hold 9 Kcfs as a minimum Libby outflow, with flows allowed to fluctuate upward as needed to meet load, with the caveat that the weekly average outflow from the project will not exceed 12.5 Kcfs, starting today, and the weekly flow range not to exceed 5 kcfs. It was further agreed to revisit this topic at the September 29 meeting.

In response to one other issue raised during the Libby subgroup conference call, Turner said he had checked with Seattle District, and had learned that, in cases where an unplanned outage causes a sudden reduction in Libby outflow, spilling to meet the minimum outflow of 4 Kcfs would be expected to cause an exceedance of the 110% TDG state standard.

4. Albeni Falls Fall/Winter Operation.

This is the time of year in which we typically begin drafting Albeni Falls to its winter operating level, said Turner. In 2003, the U.S. Fish and Wildlife Service in coordination with NOAA Fisheries submitted an SOR that included a request to operate Albeni Falls to hold Lake Pend Oreille at elevation 2055' during the fall and winter of 2004/2005. We want to inform the TMT that the Corps is going to begin drafting Albeni Falls in the next several days to achieve elevation 2060' – 2061' by September 30, and to 2055' by approximately November 20. The current elevation at Albeni Falls is 2062.3'. Paul Wagner, NOAA Fisheries, concurred with this operation. No TMT objections were raised to this proposed operation.

Could you delay the start of the draft until October, for chum? Haeseker asked. There are already agreements on lake elevations, so I'd have to check, and get back to you, Turner replied. Kiefer said he, too, will check with others at IDFG to see whether such a delay would detrimentally impact kokanee spawning in Albeni Falls reservoir. If there is an opportunity to delay the draft somewhat, Oregon would support that, said Boyce. What is the planned Grand Coulee operation for September? he asked. Typically the Bureau of Reclamation operates to hit elevation 1282' – 1283' by September 30, Turner replied; the current project elevation is 1282.7', so essentially they would be passing inflow between now and the end of the month. Actually, we're filling Grand Coulee right now, while power demand is relatively low, said Tony Norris; we can't commit to a specific elevation target at this time. Turner said that, for now, the Corps' planned operation will proceed.

5. Lower Granite Powerhouse Outage and MOP Operation.

Turner said that the plan, at this point, is to go to a daily outage during the hours of 7 a.m. to 5 p.m., returning two units to service at night. In other words, he said, we won't need to go to a 24-hour outage in order to conduct this work – we'll be able to pond, then get the water out at night. Inflows to Lower Granite popped up to 39 Kcfs yesterday, with a lot of local rain and increased Brownlee outflow. We don't expect that to be the norm next week, however, he added. The daily powerhouse outage at Lower Granite will occur from September 20-25; on September 26, the Lower Granite powerhouse will return to normal operation. BPA would like to see an operating range of 1.5 feet, rather than 1 foot. No TMT objections were raised to this increase in operational flexibility.

In response to a question from Haeseker, Turner said that, during the outage, Lower Granite will operate 1 unit at speed-no-load (5 Kcfs) while spilling approximately 6 Kcfs through the RSW; that should result in about a foot of fill into Lower Granite pool, which will then be drafted out at night at about 30 Kcfs. We will fill as needed to conduct the operation, and to try to avoid exceeding the 110% TDG standard, Turner said. Boyce said Oregon would prefer that the Corps provide some spill at night, rather than passing all flow through the powerhouse, in

order to benefit juvenile migrants. Bettin said the action agencies do not intend to spill at night. I understand that this request is outside the BiOp, said Boyce; however, it would benefit juvenile fish, and I would ask that the action agencies consider it.

Kiefer said that, in future years, he would prefer to conduct this operation, if possible, to benefit the maximum number of juvenile fall chinook migrants and collect information on RSW operations, while still meeting the Corps' maintenance needs. Understood, said Turner – we'll put outages that have been scheduled for next year into the draft Fish Passage Plan for regional review. He added that the current forecast shows an average flow of 20-21 Kcfs in the Lower Snake next week.

6. Autumn Treaty Fishery.

Kyle Martin said there is no major news, in terms of safety-related incidents during the treaty fishery; pool elevations have also been relatively stable, which is good news. The tribes plan to continue its autumn treaty fishery through next Friday. Most of the fishing effort –56-58% of the nets – are in John Day pool, with only about 15% of the nets in Bonneville pool. Are they catching their allotment? Litchfield asked. I haven't heard, Martin replied. Cindy LeFleur said her understanding is that the tribal fishers are catching more fish as the season progresses, from very few fish in week 1 to 20,000 fish in week 2 to 26,000 fish in week 3. The total allotment is 150,000 fish, but the run size has increased, so the allotment will likely increase as well. Turner noted that the Corps has sent a soft constraint to the John Day operators requesting operation in the top foot of the project's current 1.5 foot operating range.

7. TMT Year-End review Agenda and Schedule.

Silverberg distributed copies of the tentative agenda for the TMT's annual year-end review meeting; it was agreed to set this meeting for November 10 at either CRITFC in Portland or at the Water Resource Education Center in Vancouver. She went briefly through the proposed agenda for the meeting; the group offered a variety of clarifying questions, comments and suggested agenda items.

8. Draft 2005 Water Management Plan.

Turner said the action agencies have produced a "first-cut" 2005 Water Management Plan; this document is available via hot-link from today's agenda on the TMT homepage. He invited the TMT to review this document and to share any informal comments and suggestions they may have with him (not Scott Boyd) prior to the September 29 TMT meeting. Formal comments are not being requested at this time, because the action agencies are consulting with both NOAA Fisheries and U.S. Fish and Wildlife on revised Biological Opinions.

Litchfield noted that he is somewhat hesitant to engage in this process, noting that, every year, Montana submits the same comments, which are then ignored. Tony Norris replied that the action agencies are required to submit an annual implementation plan demonstrating how they intend to meet the Biological Opinion requirements; the annual Water Management plan is an outgrowth of the annual Implementation Plan. Until the BiOp is changed, the action agencies

don't have a great deal of latitude, operationally. Norris suggested that Litchfield submit his comments to the Implementation Team, which is the primary place to make comments on the annual Implementation Plan. Litchfield replied that he understands how the process has worked in years past; what I'm trying to say is that I don't like how the process works, currently, he said – it seems counterproductive to submit the same comments year after year, only to have them ignored. Martin and Boyce said CRITFC and Oregon echo those concerns. Boyce observed that, in past years, the annual WMP had been produced in more of a collaborative fashion, rather than as the sole purview of the action agencies. Again, our operational discretion is limited, under the 2000 BiOp, Norris replied.

9. Status of Operation.

Turner said day-average flow at Bonneville was 104 Kcfs yesterday; it has been 93-130 Kcfs over the past week. McNary's day-average flow was 96.6 Kcfs yesterday, and has averaged 95-127 Kcfs over the past week. Lower Granite's day-average flow was 38 Kcfs yesterday, up from an average of 23-29 Kcfs over the past week, due to increased precipitation and Brownlee outflow. MOP +1 operation continues at that project; the other three Lower Snake projects have now been filled above MOP and are back in their normal operating range. Dworshak is currently at elevation 1521.6 feet; the project is releasing 4.8 Kcfs; over the next few days, we will ramp down to 2.8 Kcfs (one unit), then down to minimum outflow a day or so later, once the pool gets close to elevation 1520'. Hydro surveys below the project will require minimum flow or possibly one small unit operation once they go to work, which may occur for a few hours tomorrow. The bottom line is that we need to get another 1.5 feet out of that project before we go to minimum outflow at Dworshak, Turner said. Albeni Falls is releasing 11.5 Kcfs; it will increase later this week.

Hungry Horse is at elevation 3540', with 1.9 Kcfs outflow, said Norris. We could actually go below that discharge, to 900 cfs, he said, but they are doing some work on the ring gates. The 1.9 Kcfs discharge will continue as long as precipitation keeps inflows to the project up. Grand Coulee is at elevation 1282 and filling.

Moving on to the status of the adult fish migration, LeFleur said the preseason forecast for 2004 upriver bright fall chinook was 322,000; a total of 264,000 brights have passed Bonneville to date, yesterday alone, 34,000 passed the project, and it now appears that the preseason forecast may have underpredicted the actual run. We're seeing the same pattern in the 2004 tule fall chinook run; the preseason forecast was 132,000, and we're already at 142,000, with a prediction of 162,000. LeFleur said her feeling is that both the upriver bright and tule runs are skewing late in 2004; she added that the sport fishery below Bonneville has been sizzling for the past two weeks. There was a commercial fishery in August that caught 12,000 fish; another commercial fishery will begin next week.

In response to a question from Litchfield, LeFleur said Lower Granite recorded a one-day record chinook count the other day, so the fish are moving everywhere in the system. Wagner added that the juvenile run is now nearly complete, with daily indices in the low three-digit range at the Lower Snake projects. 2004 escapement at Lower Granite was in the range of the very high preseason projection of 1.5 million. Do you know when the 95% passage date occurred in

2004? Bettin asked. Not off the top of my head, Wagner replied – as always, it depends on what component of the run you're looking at. The group briefly discussed the possibility of continuing to monitor passage at the Snake River projects during the winter; it was agreed to ask FPOM to consider that possibility.

Bettin said there are no power system problems to report at this time.

On the water quality front, Adams provided a graph showing Dworshak outflows and Lower Granite tailwater temperatures, as well as the changes in water temperature in Dworshak Reservoir over time in 2004; he noted that, in general, the TMT's water temperature management efforts were successful in keeping temperatures in the Lower Granite tailwater below 68 degrees F in 2004. Turner said it is his understanding that, once Dworshak goes to minimum outflow, the single generating unit will be operated in overshot mode. He added that, for next year, the TMT may want to consider warmer water temperature releases from Dworshak – perhaps back to 48 degrees as was done a couple of years ago – because while the Lower Snake temperature stayed well below 68 degrees, there is some evidence that the low water temperature in the Clearwater may have delayed the growth of subyearling fall chinook rearing below Dworshak and been detrimental to those fish.

10. Other.

A. USGS Chum Study. Turner said the Corps received an email from Ken Tiffan of USGS regarding a proposed chum study this fall, which would involve 10 replicates of increasing flows at Bonneville Dam, from 125 Kcfs to 175 Kcfs at 10 Kcfs per hour over a nine-hour period, in early November and early December, observing the movement of radio-tagged female chum during the changing flow regime. There are 5 daytime and 5 nighttime tests proposed. Turner asked the TMT to provide any comments they may have on this proposed research operation to him as soon as possible. I'm just putting this on the table for now, he said, adding that he will invite Tiffan to attend a future TMT meeting to provide further detail on the proposed study. In the meantime, Turner will have the USGS research proposal linked to the agenda for the September 29 TMT meeting.

11. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, September 29. Meeting summary prepared by Jeff Kuechle.

TMT Participant List
September 15, 2004

Name	**Affiliation**
Rudd Turner	COE
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team

Russ Kiefer	IDFG
Mike O'Bryant	CBB
Scott Boyd	COE
Ruth Burris	PGE
Tim Heizenrater	PPM
Steve Haeseker	USFWS
Tony Norris	USBR
Nic Lane	BPA
Jim Litchfield	Montana
Paul Wagner	NOAAF
Russ George	WMCI
Kyle Martin	CRITFC
David Benner	FPC
Scott Bettin	BPA
Greg Hoffman	COE
Margaret Filardo	FPC
Ron Boyce	ODFW
Bruce MacKay	Consultant
Richelle Beck	D. Rohr & Associates
Mike Buchko	Powerex
Cindy LeFleur	WDFW

TECHNICAL MANAGEMENT TEAM
MEETING NOTES
September 8, 2004
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON

TMT Internet Homepage: http://www.nwd-wc.usace.army.mil/TMT/index.html

1. Greeting and Introductions

The September 8 Technical Management Team, Libby subgroup, conference call was chaired by Rudd Turner of the Corps. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Turner at 503/808-3935.

Turner explained that this conference call was convened because of the need to seek input on the current Libby operation. My understanding is that we are still working off SOR 2004 MT-2, said Turner; the understanding was that we would hold 12.5 Kcfs outflow at Libby until elevation 2439 feet was reached, some time around September 15. John Wellschlager observed that, because the Montana SOR was not agreed to fully, the project actually is being operated as specified in the letter from Bob Lohn, NOAA Fisheries regional director.

Turner said Libby is currently at 2444.8 feet; inflow to the project has increased to about 11 Kcfs in recent days. The current STP model run shows inflows decreasing in the next few days; the Corps expects to reach elevation 2439' by September 30. The project then would ramp down outflow gradually according to the BiOp ramp rates to reach the project's minimum outflow of 4 Kcfs by October 7.

Wellschlager said he does not believe that the NOAA Fisheries letter anticipated that 12.5 Kcfs outflow would continue through September 30. What biological needs are we addressing by maintaining that level of outflow? he asked. Brian Marotz replied that the optimal quantity of wetted riffle habitat in the Kootenai River is maintained at 9 Kcfs outflow from Libby; he recommended that Libby outflow be ramped down to 9 Kcfs as soon as possible. That would allow us to avoid a sudden reduction in Libby outflow, he said, to avoid stranding.

Wellschlager said that this is normally the time of year when BPA is allowed a certain degree of flexibility in Libby operations; he observed that a flow range of 9 to 12.5 Kcfs doesn't provide a great deal of flexibility. BPA would like to support Montana's SOR, he said, but no one anticipated that that would include releasing a flat 12.5 Kcfs until September 30. Montana's preference would be to maintain as flat a flow as possible through the end of September, said Jim Litchfield. And our preferred operation would be to preserve opportunities to make money for our ratepayers, said Wellschlager; if we're handcuffed at one of our headwater projects, at this time of year, that's a problem for BPA. It could be that the actual operation will be very close to what Montana is requesting, he said, but again, we would prefer to keep our options open. Chris

Ross noted that the Council's Mainstem Amendments stipulate a draft to 2439' at Libby by the end of September. Marotz observed that, if operational flexibility is the goal, given the ramp rates in the Biological Opinion, BPA would have a greater degree of flexibility at a target outflow of 9 Kcfs than they would at 4 Kcfs. That's a fair statement, said Wellschlager.

The group spent a few minutes discussing the available operational alternatives at Libby. Litchfield said Montana is willing to live with a weekly average flow, which provides some flexibility, as long as elevation 2439' is achieved by September 30. The group discussed an operation under which the Corps would target elevation 2439' at Libby by September 30, releasing whatever week-average flow is necessary to achieve that elevation, with a hard constraint of a minimum outflow of 9 Kcfs and a maximum outflow above 12.5 Kcfs (the project could discharge as much as 20 Kcfs) as necessary to achieve the September 30 target elevation while avoiding flooding. Libby outflow would then be ramped down to 4 Kcfs by October 7, at the rates described in the Biological Opinion. Ultimately, the group endorsed this operation, but with the proviso that the action agencies will make best effort to implement these parameters. It was agreed to maintain an average Libby outflow of 12.5 Kcfs at least over the next week; the TMT will revisit this topic at its September 15 meeting.

Ross asked what biological monitoring is planned under the flat Libby operation through the end of September. Marotz said Montana has developed a monitoring plan, and BPA has agreed to fund it; however, the contract has not yet been signed, and the additional personnel have not yet been hired. No additional new field data will be collected until those people are hired. There will be hydrologic data collected, which will be run through biological models. Cathy Hlebechuk noted that an ongoing USGS research project below Bonneville might limit the operational flexibility to drop flows too low.

Ross then raised another Libby issue: the Libby outage over the weekend, which caused flows to drop as low as 1.7 Kcfs for an hour, followed by seven hours at 3.9 Kcfs. He said the action agencies need to think about ways to avoid slamming the project shut when unscheduled outages occur, perhaps through spill. He asked the group to consider the available operational alternatives that might be put in place when outages occur. Scott Bettin noted that the problem with spill is that, with a flow of only 1.7 Kcfs, any spill would significantly increase TDG levels downstream.

David Wills said the Fish and Wildlife Service would like to be clear that the group, today, reached agreement on a Libby operation through September 30; however, that this does not constitute a consensus that the group agreed to support the Council's Mainstem Amendments. With that, today's conference call was adjourned.

TMT Participant List

September 8, 2004

Name	**Affiliation**
Rudd Turner	COE
Cindy Henriksen	COE
Cathy Hlebechuk	COE
Jim Litchfield	Montana
Brian Marotz	Montana
David Wills	USFWS
Bob Hallock	USFWS
John Wellschlager	BPA
Scott Bettin	BPA
Chris Ross	NOAAF
Greg Hoffman	COE
Steve Kearns	BPA

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday September 29, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

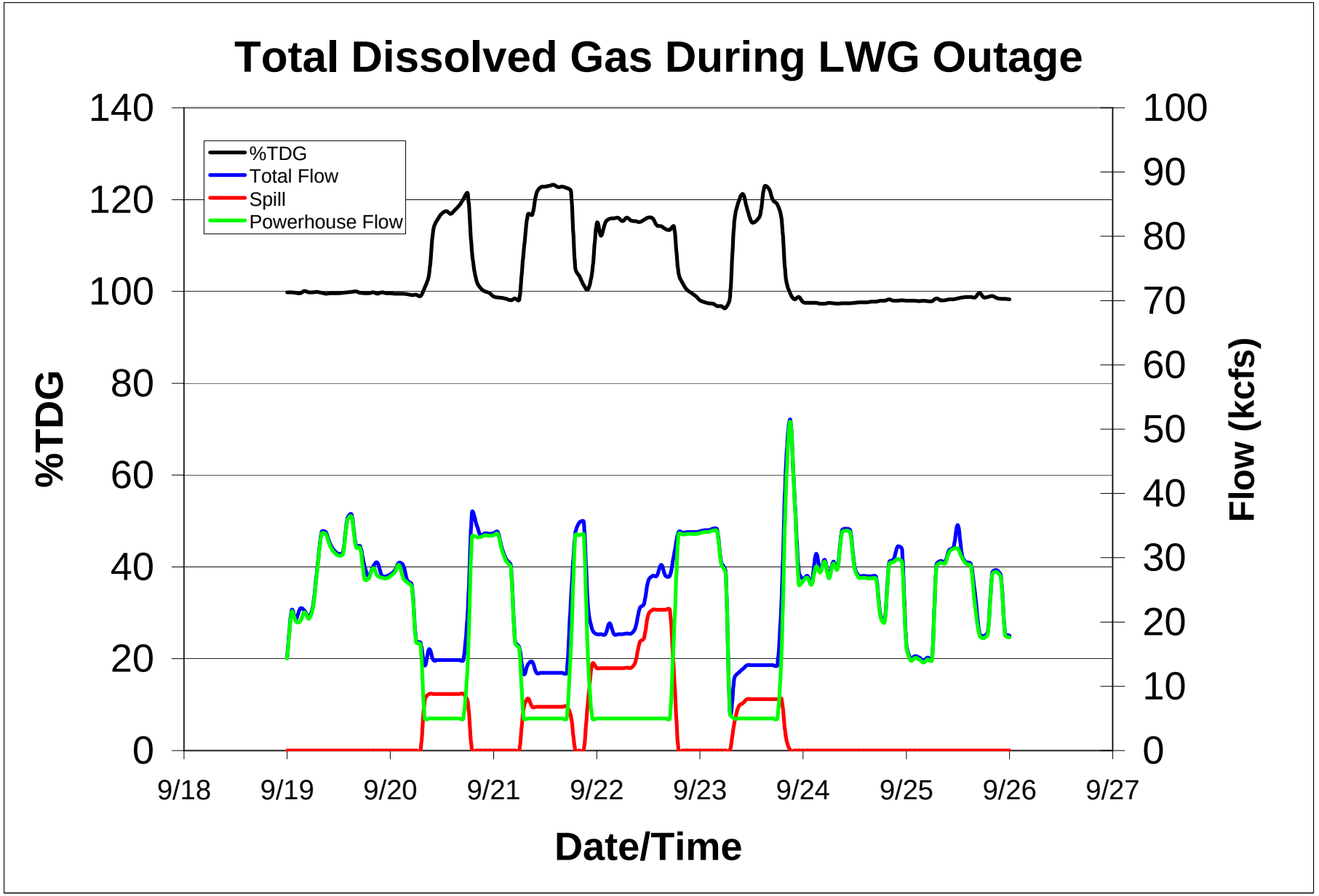
All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Libby operations.
3. Albeni Falls operation.
4. Tribal fishery. [SOR 2004 C-11]
5. Water Management Plan comments.
6. Chum spawning study. [USGS proposal]

   [Determining the influence of high flows of the spawning behavior of chum salmon at Ives Island - Ken Tiffan U.S. Geological Survey]
   [Power Point - Ken Tiffan U.S. Geological Survey]
   [Gs - Ken Tiffan U.S. Geological Survey]
   [tc - Ken Tiffan U.S. Geological Survey]
7. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality -
      [Total Dissolved Gas During LWG Outage]
8. Other
   - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942


Total Dissolved Gas During LWG Outage
%TDG
Total Flow
Spill
Powerhouse Flow
140
120
100
80
60
40
20
0
100
90
80
70
60
50
40
30
20
10
0
%TDG
Flow (kcfs)
9/18
9/19
9/20
9/21
9/22
9/23
9/24
9/25
9/26
9/27
Date/Time

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

September 29, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Libby Operations:

Cathy Hlebechuk, COE, reported that Libby elevation is currently at 2446.8' and releasing a flat flow of 9.6 kcfs. The COE plans to continue with this release through the first week in October, maintaining an objective to lower Libby to 2411' by December 31st. Cathy also reported that boat ramp work needs to be done by the US Forest Service, which would require 5.6 kcfs for 12 days and 4 kcfs for 2 days. This work needs to happen by October, but could potentially wait until next year – Cathy will update TMT at the next TMT meeting. TMT members did not object to continuing with flat 9.6 kcfs releases out of Libby; the COE will continue to send updates on Libby operations to TMT via email.

Albeni Falls:

Lake Pend Oreille is at 2061.4'. A letter was sent to the action agencies (editor's note: the letter was actually sent to the TMT) from the Lakes Commission requesting that the reservoir go no lower than 2061' by the end of September. The request will be met this year partly due to a big rain event in September. The COE will then target elevation 2055' around November 15-20, through a gradual draft during October. No objections to this operation were raised. There will be a check-in on Albeni Falls operations at the next TMT meeting.

Tribal Fishery, SOR 2004 C-10, C-11:

Kyle Martin, CRITFC, presented two SOR's from the tribes for fall fisheries. SOR C-10 requested that, from September 20-24: operate the Bonneville pool at 76.5-75.5', The Dalles at 159.5-158', and John Day at 264.5-263.5'. SOR C-11 requested the same pool elevations for September 27-30. Kyle reported that most of the fishing has occurred at the John Day pool.

The COE will operate the pools at the following: Bonneville at a hard constraint 75-76.5' and soft constraint 75.5-76.5'; The Dalles with no operational change, keeping in mind the request; and John Day at a hard constraint 262.5-264' and soft constraint 263-264'.

Cindy LeFleur, WDFW, noted that the limiting constraint on the fall chinook fishery this year is steelhead, as the tribes are nearing their catch limit.

2005 WMP Comments:

TMT decided to couch the follow-up discussion on WMP comments from the last meeting, and re-visit the discussion at a later time.

Chum Spawning Study:
Ken Tiffan, USGS, presented information about a proposed chum study. His power point presentation is available as an attachment to today's agenda. The purpose of the study is to:

- determine the elevation at which spawning behavior would be altered;
- determine where the chum go during high flow periods and when they return to redds;
- determine whether normal spawning behavior resumes after a flow-induced change in behavior; and
- determine whether chum will spawn in higher riverbed elevations as higher flows inundate these areas.

To do this, the study would require:

- 1 day and 1 night test each week for 5 weeks (10 tests), from November 10-December 8
- Ramp from 125-175 kcfs in hourly 10 kcfs increments over 5 hours, then ramp down at the same rate
- Daytime tests on Wednesdays, to avoid conflict with other field activities
- Tag 6 fish per week, for a total of 30 fish

In response to a question raised by a TMT member, Ken noted that the area below Bonneville was chosen to do the study because it is a critical spawning area for chum. BPA clarified with the group that if redds move to higher areas, de-watering may occur and that this is acceptable to TMT members for the purposes of the study. TMT members did not object to the study. The study information was also shared with FPAC. Ken will continue to coordinate with the COE and BPA on implementing the study. TMT will receive updates on results as they are available.

System Status:
Reservoirs: Libby is at elevation 2446.8', releasing a 9.6 kcfs. Albeni Falls is at 2061.4', with 26 kcfs out. Dworshak is at 1520.9', releasing minimum flows (1.7 kcfs) and operating unit 2 on undershot mode. Temperatures at Dworshak are 47-48°. Bonneville is releasing 100-135 cfs out. Grand Coulee is at 1287.2'. Hungry Horse is at 3540' and holding through December 31st for ring gate maintenance.

Fish status: 543,000 adult fall chinook have passed Bonneville, 372,000 of which are brights. This number is much higher than the pre-season forecast. Cindy LeFleur, WDFW, reported that the Technical Advisory Committee (TAC) was scheduled to meet later today to discuss increasing the forecasted numbers for fall chinook. Steelhead are tracking at less than the pre-season forecast; 270,000 have been observed so far.

Water quality: There was a Lower Granite outage that caused some TDG exceedances. 123% was the peak exceedance. Fluctuations of TDG are expected to continue over the

next few days as a result of the power outage. It was noted that a second line at Lower Granite would be very useful.

Next Meeting, October 27, 9-12:
TMT members did not feel that it would be necessary to meet sooner than October 27th, but will keep October 13th on their calendars as a placeholder for a meeting or conference call. Agenda items for the next TMT meeting include:

- Libby operations
- Albeni Falls operations
- Summary of tribal fishery (at TMT year end review)
- WMP comments
- Status Update

NOTE: The TMT Year End Review will be held on Wednesday, November 10th, from 10-3. Further details including location and agenda will follow. Thank you for your continued participation in the Regional Forum process.

TECHNICAL MANAGEMENT TEAM MEETING NOTES

September 29, 2004
Corps of Engineers Northwestern Division Headquarters
Portland, Oregon

1. ***Greetings and Introductions***.

The September 29 meeting of the Technical Management Team, held at the Corps of Engineers' Northwestern Division headquaters, was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Please contact Hlebechuk at 503/808-3935 with any questions or comments about these minutes.

Harkless led a round of introductions and a review of today's agenda.

2. ***Libby Operations***.

Hlebechuk said Libby is now releasing a flat 9.6 Kcfs; the current project elevation is 2446.8 feet. The Corps' plan for next week is to continue to release 9.6 Kcfs, and to evaluate how best to draft Libby to elevation 2411 by December 31. We'll get a November forecast in the first week in November, she said, and we'll look at that time whether 2411 is really the target elevation, or whether a somewhat higher elevation may be appropriate. The Forest Service has requested an opportunity to do some boat ramp work below Libby at the end of October; they would like to see 12 days at 5.6 Kcfs outflow from Libby, plus 4 Kcfs for two days, in order to accomplish

that work. Given the higher-than-expected reservoir elevations and inflows at Libby so far this fall, there may be an opportunity to postpone that work. The Corps will inform the TMT of any change in operation via email, Hlebechuk said.

3. ***Albeni Falls Operation***.

The Corps reported that Albeni Falls is currently at elevation 2061.4 feet and is releasing just over 26 Kcfs. Hlebechuk said the Corps had (editor's note: the letter was sent to TMT) received a letter from Ford Elsessnor of the Idaho Lakes Commission, requesting that Albeni Falls not be drafted below 2061 prior to September 30. We decided that it would be possible to accommodate that request, Hlebechuk said, for this year only, given that we're only drafting the project to elevation 2055 this year. By November 15, preferably, or possibly by November 20, Albeni Falls will reach elevation 2055; the project will draft gradually through the month of October. We discussed the possibility of postponing that draft to help chum at the last TMT meeting, said Hlebechuk; IDFG and USFWS were going to look into that. Sharon Kiefer said her understanding is that November 20 works, from IDFG's perspective, with respect to the kokanee spawning; IDFG does not want to see that occur any later than November 20.

4. ***Tribal Fishery***.

On September 23, the action agencies received SOR 2004 C-11. This SOR, covering operations during the autumn treaty fishery, requests the following specific operations:

- From 6 a.m. Monday, September 27, through 6 p.m. September 30
- Operate Bonneville pool within 1 foot of full pool (elevation 76.5-75.5)
- Operate The Dalles pool within 1 foot of full (159-158 feet)
- Operate John Day pool within 1 foot of full (264.5-263.5 feet)

It looks as though this will be the last fisheries SOR for 2004, said Martin; the estimated run size for fall Chinook at Bonneville has increased to 564,000, which has provided some additional harvest opportunities for the tribes. Martin said there have been no major problems reported with the fall fishery to date. He said he will provide the results of CRITFC's ongoing fisher survey at the TMT's year-end review meeting on November 10, as well as his annual report on pool elevation compliance during the various 2004 tribal fisheries. Hlebechuk said the action agencies had agreed to impose a hard constraint of 262.5-264 at John Day pool, and a soft constraint of 263-264, as well as a hard constraint of 75-76.5 at Bonneville pool. At The Dalles pool, we're aware of the request and frequently stay within that range, added Scott Bettin.

5. ***Water Management Plan Comments***.

We put this on the agenda as a follow-up from last meeting, said Harkless; the action agencies are not yet taking formal comments on the draft 2005 Water Management Plan, she said, but there was some interest, on the part of the TMT, in commenting on

issues that arise every year. No comments have been received to date, said Tony Norris. Bettin noted that there is a 45-day comment period on the BiOp remand; once those comments are received, they can be incorporated into a new Water Management Plan. The idea was to take some of the comments that have been submitted multiple times in the past, from Montana, Idaho and Oregon, in particular, and address them in advance, Bettin noted; this agenda item was intended to offer an opportunity for those agencies to provide those comments. We'll revisit this at a future TMT meeting, Harkless said.

6. ***Chum Spawning Study***.

Ken Tiffan of the USGS provided a presentation on this proposed study; Harkless noted that this presentation is available via hotlink from today's agenda on the TMT homepage. Tiffan said the purpose of this study is to look at the effects of elevated flow on chum spawning at Ives Island, generally in the form of reverse load following. His presentation touched on the following major topics:

- A diagram comparing habitat area watered up when flows are above and below 150 Kcfs
- Chum courtship behavior and spawning events documented at night in 2003 (videos)
- Proposed 2004 work – examine whether elevated flows affect chum salmon spawning behaviors (none, temporary displacement, but return to spawn, displaced but spawn elsewhere, displaced and do not spawn)
- Objectives of the 2004 study – determine the flow and elevation at which chum spawning behavior is altered, etc.)
- Approach of the 2004 study – deploy hydrophones, and tag up to 30 fish with sonic tags to provide a two-dimensional schematic of fish movement, measure spawning bed temperature, measure redd establishment in newly-inundated areas, use acoustic camera to record spawning behavior at night, measure digs per minute vs. velocity, collect water velocity information using an acoustic Doppler water profiler
- Requesting experimental flows to inundate new areas during the test – ramp up from 125 Kcfs to 175 Kcfs over five hours, then ramp back down at 10 Kcfs per hour.

We're proposing one daytime and one nighttime test per week from November 10 to December 8, for a total of 10 tests, Tiffan said; fish will be tagged on Mondays, and ideally, the tests would take place within a few days. Six fish will be tagged each week. The bottom line is that we want to see whether fish will start constructing redds at higher elevations during the day or night, whether hyporheic conditions become established at higher elevations during periods of elevated flows, whether high flows affect spawning success, and whether we can identify the flow, tailwater elevation and velocity that change chum spawning behavior, said Tiffan.

The group offered a few clarifying questions and comments. In response to a question from John Wellschlager, Tiffan said the reason USGS is focusing on the

Ives Island area is that it is the most popular chum spawning site; it is also a site that we can cover with this technique, he added. Bettin said BPA is comfortable with the proposed study, as long as it is understood that the action agencies will not be obligated to continue to provide higher flows to keep any higher-elevation redds established during the test watered-up. Understood, replied David Wills. Also, said Bettin, if we experience a really big fall water year, can you modify the study if flows are always above 150 Kcfs? Probably, Tiffan replied – it would depend how high flows were. In response to another question, Cindy LeFleur said WDFW's pre-season estimate of the 2004 Columbia River chum run is 12,000 fish, a pretty good run. Tiffan said he will coordinate the details of the test operation with the action agencies; he added that he has already coordinated the study with FPAC. We'll look for updates at future TMT meetings, Harkless said.

7. ***Status of Operation***.

Hlebechuk reiterated that Libby was at elevation 2446.8 as of midnight last night; the project has filled 2 feet since the beginning of the month. Albeni Falls is releasing 26 Kcfs. Dworshak is at elevation 1520.8, with 1.7 Kcfs outflow, minimum discharge, and a release temperature at 47-48 degrees F. Bonneville outflow has ranged between 100 and 135 Kcfs over the past week. Norris said the current elevation at Grand Coulee is 1287.2 feet; at Hungry Horse, 3540 feet. Hungry Horse will remain at elevation 3540 through the end of the year. Wellschlager noted that 2004 August-September precipitation was the highest on record.

With respect to current fish passage information, LeFleur said 372,000 upriver bright fall chinook have passed Bonneville to date; the run has a huge tail this year. We are seeing a lot of three-year-old fish this year, she said; the run size forecast will likely be increased again later today (listen to the very beginning of Tape 2 for total run numbers). Bettin noted that the three-year-old fish returning this year were from the 2001 brood. LeFleur said the adult steelhead run continues to track slightly below pre-season forecasts; she noted, however, that steelhead are harder to forecast than chinook. Fishing is no longer sizzling, but continues to be good in spots, LeFleur added.

Wellschlager said there are no significant power system problems to report at this time. With respect to water quality, Jim Adams reported that TDG levels below Lower Granite exceeded 123% on three of the four days of the recent powerhouse outage; he noted that it didn't seem to matter whether the spill was passed via the RSW or over the spillway.

8. ***Next TMT Meeting date***.

The next face-to-face meeting of the Technical Management Team was set for October 27, although it was agreed that the TMT participants will keep their calendars open for a potential October 13 meeting; in the interim, the TMT will meet as needed if issues arise. Meeting summary prepared by Jeff Kuechle.

TMT Participant List
September 29, 2004

Name	**Affiliation**
Robin Harkless	Facilitation Team
Mike O'Bryant	CBB
Rudd Turner	COE
John Wellschlager	BPA
Tony Norris	USBR
Cathy Hlebechuk	COE
Kyle Martin	CRITFC
Paul Wagner	NOAAF
Scott Bettin	BPA
Tom Haymaker	PNGC
Russ George	WMCI
Ken Tiffan	USGS
Tim Heizenrater	PPM
Laura Hamilton	COE
Ruth Burris	PGE
Nic Lane	BPA
Sharon Kiefer	IDFG
David Wills	USFWS
Jim Adams	COE
Greg Hoffman	COE
Kara Lynn Fitzgerald	COE
Bruce MacKay	Consultant
Cindy LeFleur	WDFW
Margaret Filardo	FPC
Dan Bedbury	EWEB
Lance Elias	PPL
Martin Hatscher	SCL

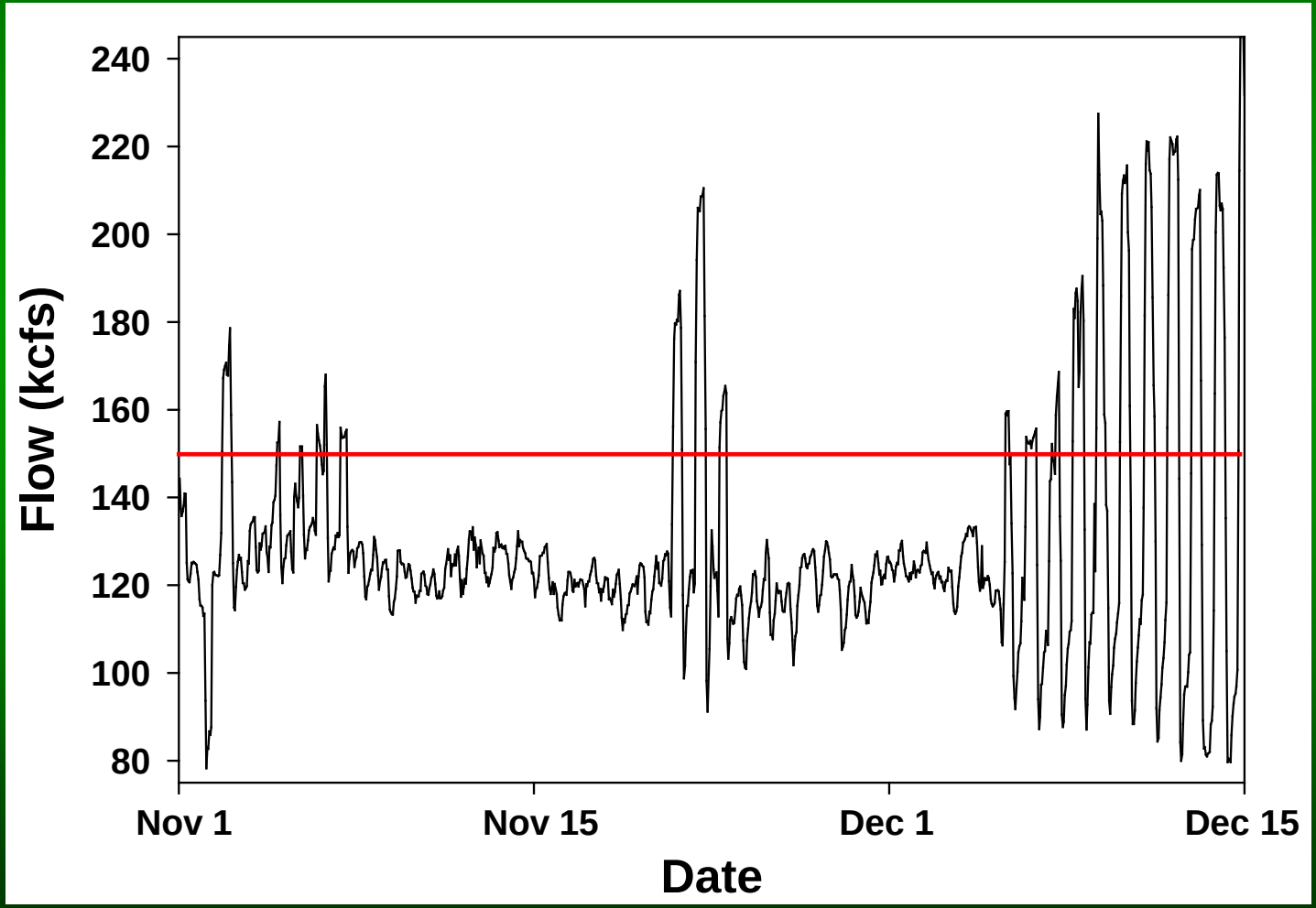
Testing the Effects of Elevated Flows on the Spawning Behavior of Chum Salmon in the Columbia River

Kenneth F. Tiffan
U.S. Geological Survey
Western Fisheries Research Center
Cook, Washington

USGS

Background

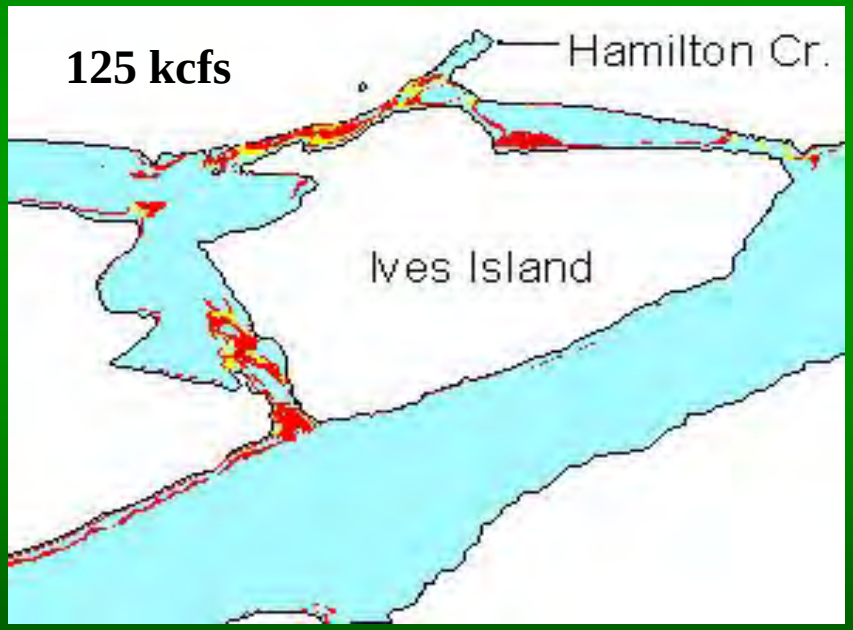
From November 1 through December 15, 2003, tailwater elevations exceeded 13 feet on 17 occasions and they exceeded 14 feet on 14 occasions, with most of these events occurring at night in December due to reverse load following.

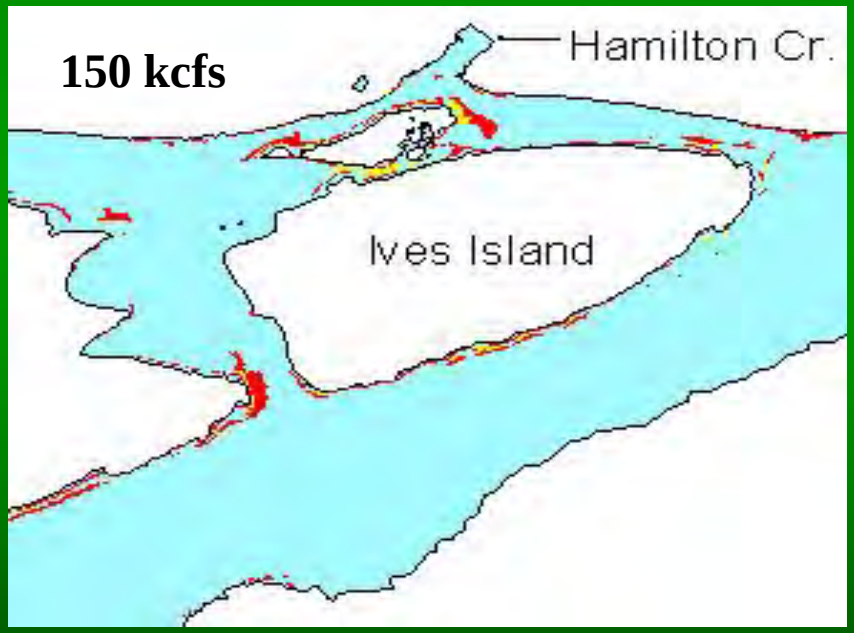


USGS

Background

These tailwater elevations corresponded to flows >150 kcfs. Our previous habitat work showed a significant reduction in the amount of suitable chum spawning habitat at flows >150 kcfs in the area below the mouth of Hamilton Creek (Garland et al. 2003) likely due to increased water velocities.

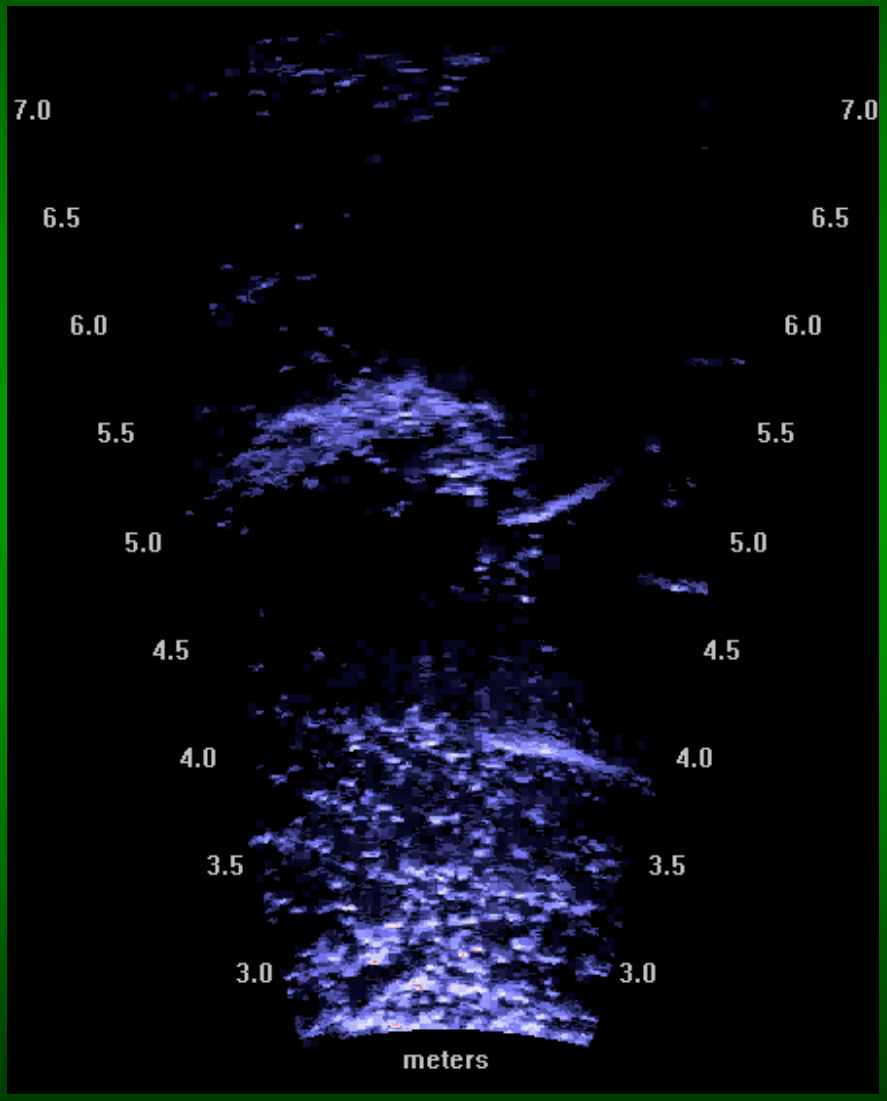




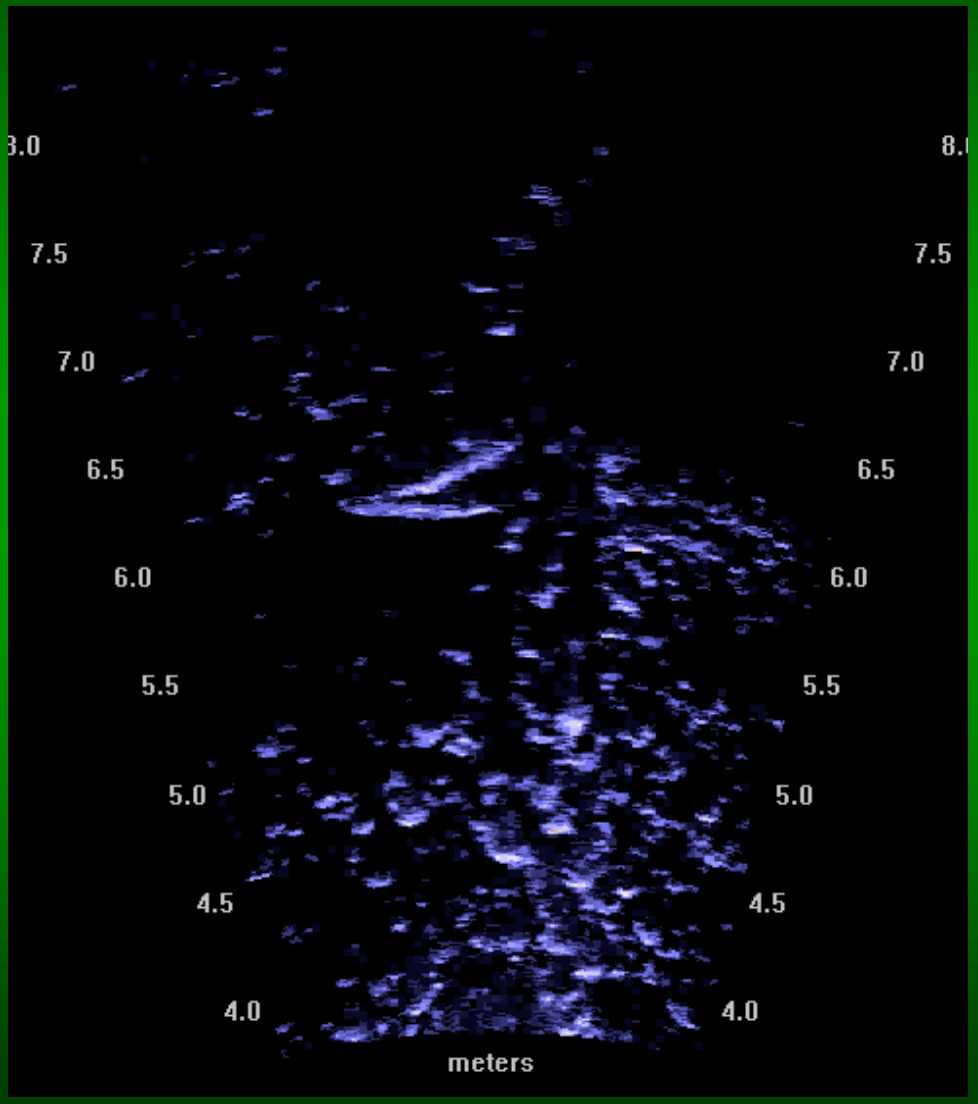
USGS

Background

Night spawning of chum salmon was documented in 2003.



Courtship behavior



Spawning event

USGS

Proposed 2004 Work

Do elevated flows affect chum salmon spawning behavior?

Expected responses:

1. **None**
2. **Temporary displacement, but return to spawn**
3. **Displacement with spawning elsewhere**
4. **Displacement without spawning elsewhere**

USGS

Objectives

1. Determine the flow and tailwater elevation at which chum salmon spawning behavior is altered.

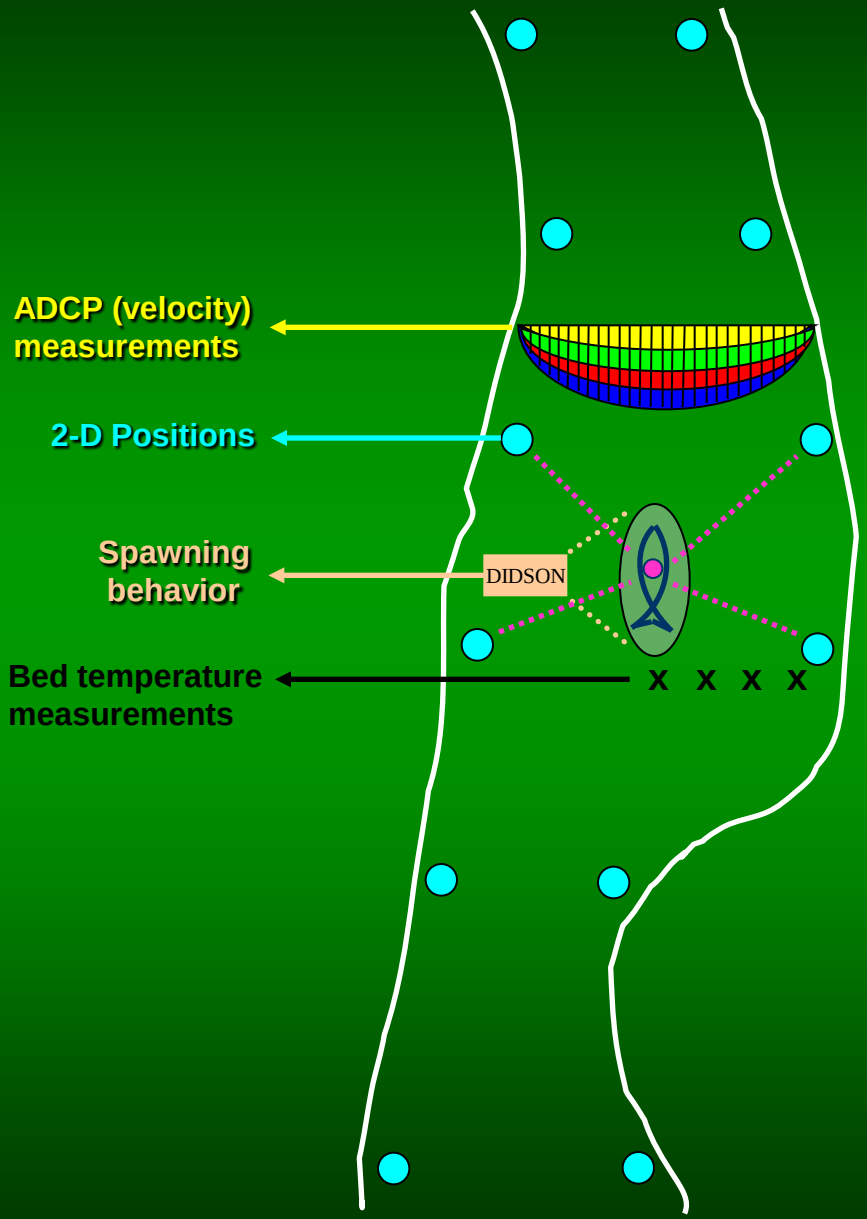
2. Determine where fish go in response to high flows and when they return to their redds.

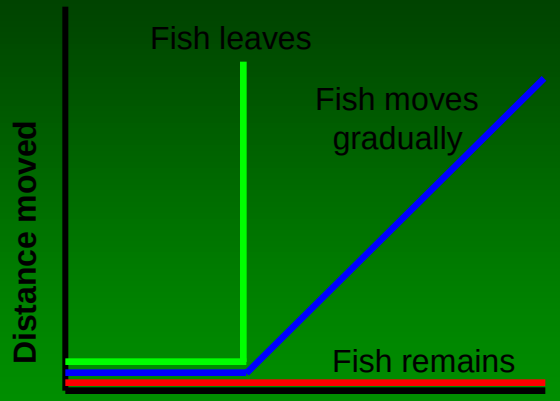
3. Determine if normal spawning behavior resumes after a flow-induced change in behavior.

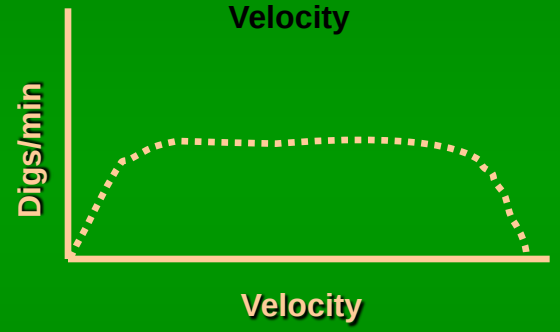
4. Determine if fish will spawn at higher riverbed elevations as higher flows inundate these areas.

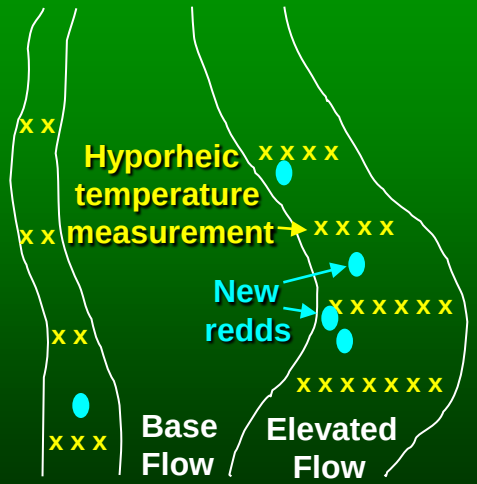
USGS

Approach

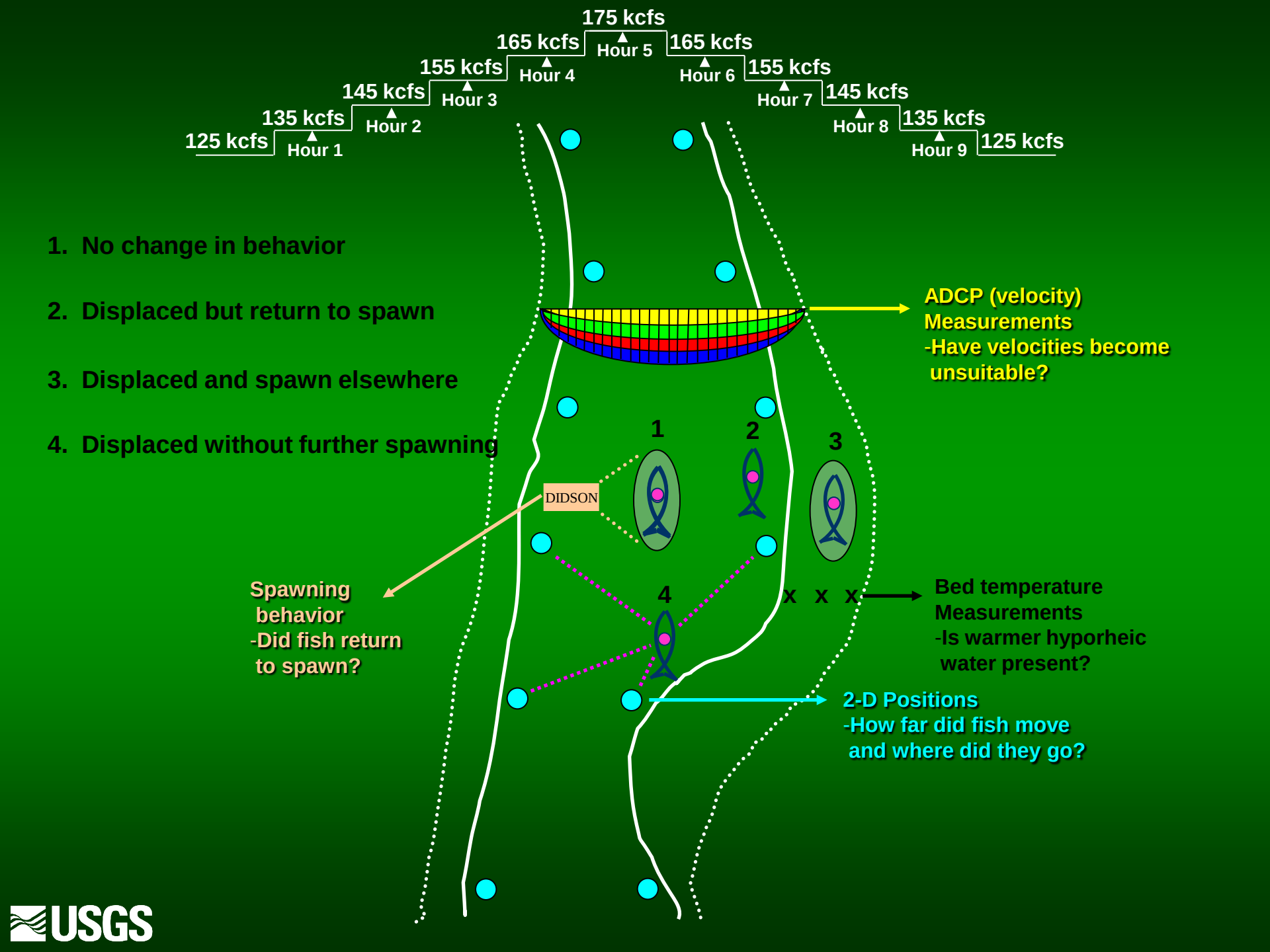








USGS


175 kcfs
Hour 5
165 kcfs
Hour 4
165 kcfs
Hour 6
155 kcfs
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155 kcfs
Hour 7
145 kcfs
Hour 2
145 kcfs
Hour 8
135 kcfs
Hour 1
135 kcfs
Hour 9
125 kcfs
125 kcfs
1. No change in behavior
2. Displaced but return to spawn
3. Displaced and spawn elsewhere
4. Displaced without further spawning
ADCP (velocity) Measurements
-Have velocities become unsuitable?
1
2
3
4
DIDSON
Spawning behavior
-Did fish return to spawn?
x x x
Bed temperature Measurements
-Is warmer hyporheic water present?
2-D Positions
-How far did fish move and where did they go?
USGS

Proposed Experimental Flow Needs

1 daytime and 1 nighttime test each week for 5 weeks from November 10 to December 8 (10 tests total)

Ramp from 125 kcfs to 175 kcfs in hourly 10-kcfs increments over 5 hours then ramp back down to 125 kcfs in the same manner

Daytime tests should be on Wednesdays since no other field activities occur on that day

6 fish will be tagged and released each week

USGS

Expected Products

Determination of whether fish will start constructing a redd at higher elevations during the day or night

Determination of whether hyporheic conditions become established at higher elevations during periods of elevated flows

Determination of affect of high flows on spawning success

Identification of the flow, tailwater, and velocity that change chum spawning behavior

USGS

Determining the influence of high flows of the spawning behavior of chum salmon at Ives Island

Project 1999003 (Task 4.4)

Ken Tiffan
U.S. Geological Survey

This document is a detailed study plan for work proposed on BPA project 1999003 by the U.S. Geological Survey for the period from October 1, 2004 through September 30, 2005. This plan is an adaptive response to new information acquired on chum salmon behavior in 2003 and current management practices to protect spawning chum salmon below Bonneville Dam. This work was proposed in the project's FY05 statement of work to the BPA, but more detail is provided here to solicit the input of the FPAC, TMT, and BPA to keep this study relevant to the needs of the fishery managers.

Background

The current management strategy to protect spawning chum salmon at Ives Island is to maintain a stable Bonneville Dam tailwater elevation of 11.5 feet. From November 1 through December 15, 2003, tailwater elevations exceeded 13 feet on 17 occasions and they exceeded 14 feet on 14 occasions, with most of these events occurring at night in December due to reverse load following. These tailwater elevations corresponded to flows in excess of 150 kcfs. Our previous habitat assessment work showed a significant reduction in the amount of suitable chum spawning habitat at flows >150 kcfs in the area below the mouth of Hamilton Creek (Garland et al. 2003) likely due to increased water velocities.

Working hypothesis

As flows increase, chum salmon spawning habitat suitability will decrease to a point at which fish behavior will be altered.

Expected responses

1. **None** – fish maintain position over their redds (no change in behavior).
2. **Temporary displacement, but return to spawn** – fish temporarily move into slower water velocities near shore and subsequently return to their redds and spawn when conditions become suitable.
3. **Displacement with spawning elsewhere** – fish are displaced from their original locations and seek new areas for spawning.
4. **Displacement without spawning elsewhere** – fish are displaced from their redds and do not complete spawning.

Objectives

1. Determine the flow and tailwater elevation at which chum salmon spawning behavior is altered.
2. Determine where fish go in response to high flows and when they return to their redds.

3. Determine if normal spawning behavior resumes after a flow-induced change in behavior.
4. Determine if fish will spawn at higher riverbed elevations as higher flows inundate these areas.

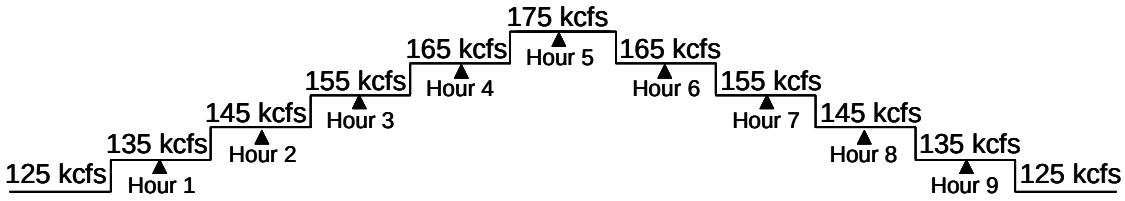
Approach

We will capture, tag, and release chum salmon with acoustic tags and determine their 2-D locations during tests using fixed hydrophones and an acoustic receiver. Spawning behavior (e.g., digging, tail crossing, chasing) before and after tests will be documented using an acoustic camera. During and after high-flow tests, higher riverbed elevations will be searched for evidence of chum salmon redd construction. At higher flows, hyporheic temperatures will be measured to determine the suitability of higher riverbed elevations for chum salmon spawning.

Methods

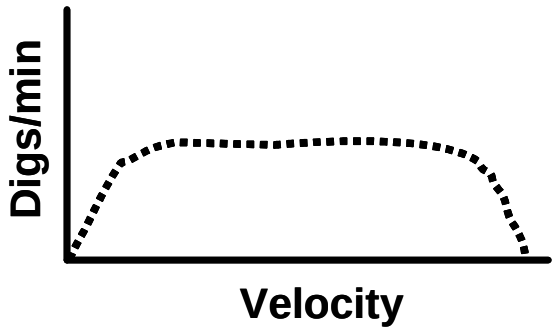
A total of 30 female chum salmon will be collected in conjunction with WDFW seining activities. Six fish will be gastrically tagged with an acoustic transmitter each week from November 9th through December 9th. Fish will also be floy tagged to allow for visual identification in the study area. The location of tagged fish will be determined with an acoustic receiver and hydrophones placed throughout the area from the mouth of Hamilton Creek to the fish wheel pilings. The study will be limited to this area in 2004 due to logistical and equipment constraints. The acoustic receiver will log the two-dimensional fish locations continuously. An acoustic camera will be set up to observe at least one fish per test.

On ten separate occasions, or trials, we will request experimental increases in flow from Bonneville Dam to measure fish responses. Five of these will be at night and five will be during the day. We will coordinate flow requests so as not to interfere with the work of other study cooperators. We request that flows be increased from 125 kcfs to 175 kcfs over a period of 5 h in 1-h increments and ramped back down in a similar manner as shown below.

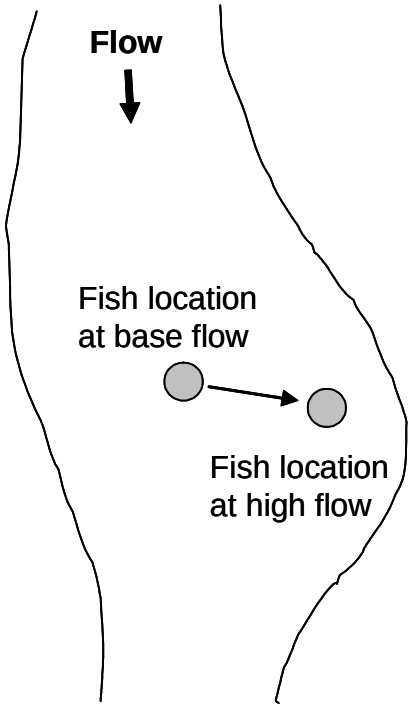


The basis for our upper flow limit of 175 kcfs is that hourly flows of this magnitude occurred an average of 13 out of the 60 days in the November 1-December 30 spawning period for the last six years. In addition, in all years except the high-flow year of 1999, an average of 92% of hourly flows were less than 175 kcfs.

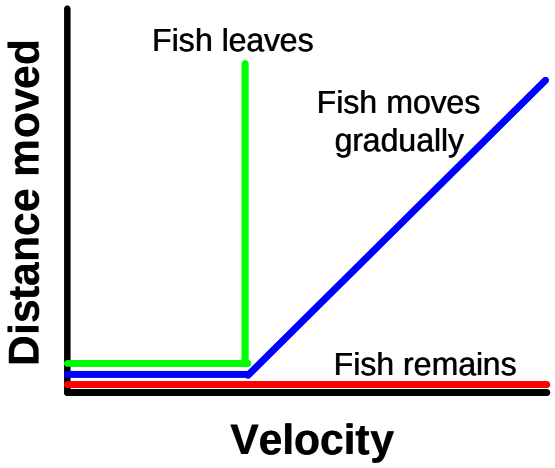
As discussed above, we expect that at some flow and velocity threshold, fish spawning behavior will be altered or will cease altogether. The figure below shows one possible response in female chum salmon digging activity to increasing water velocity.



This particular behavioral response can be quantified by using an acoustic camera before and during increased-flow events. Acoustically-tagged fish will also allow us to determine if chum salmon are removed from their base-flow spawning location to some other location when flows increase as illustrated below.

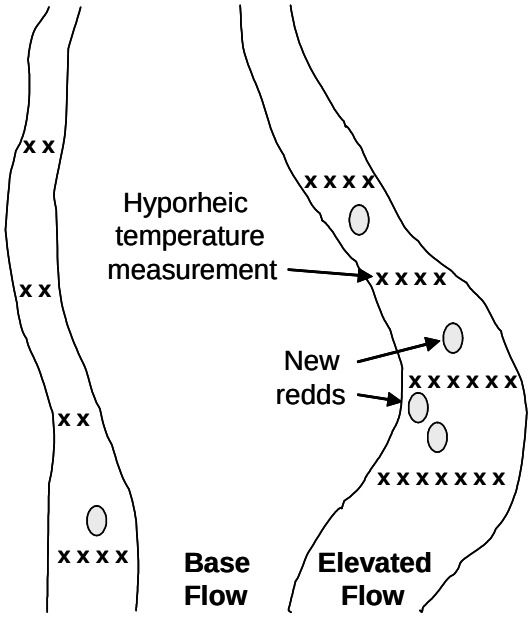


We anticipate that there are three possible movement responses that fish might exhibit to increased flow and velocity as shown below.



First, fish behavior and location may not be altered by increased flow and will remain in their current position regardless of flow (red line). Second, as flow and velocity increase, fish may gradually move away as they remain in suitable velocities (blue line). Third, a velocity threshold may exist above which fish seek refuge elsewhere. We will measure water velocities at original fish locations before flow increases and then hourly at these locations with each flow/time step using a current meter or an acoustic Doppler current profiler (ADCP) so that velocity can be related to behavioral responses. When flows return to base levels, we will use the acoustic camera to determine if normal spawning behavior continues at original redd locations.

It is possible that as shoreline areas become inundated at higher flows, fish may move into these areas and spawn at these higher elevations as illustrated below. During periods of elevated flow, we will search for fish presence in these areas, and we will determine if fish begin constructing redds at these higher elevations through direct observation or by searching for redds the following day after flows return to base levels. In addition, we



will establish transects in the inundated areas, as shown above, and collect riverbed temperatures (15 cm deep) to determine if warmer hyporheic temperatures exist that would be conducive to chum salmon redd construction.

Expected Products

1. Identification of flow and velocities at which chum salmon spawning behavior is altered.
2. Determination of behavioral response of chum salmon to elevated flows.
3. Determination if chum salmon complete spawning if behavior is disrupted by elevated flows.
4. Determination of whether chum salmon will spawn at higher elevations when flows are elevated.

Coordination

These activities have been coordinated so as not to interfere with WDFW seining activities. Fish for tagging will be collected during WDFW seining. USFWS has permitted take for the proposed tagging under their ESA Section 10 permit.

Critical Uncertainty

The proposed activities will require support by FPAC, TMT, and BPA to ensure experimental flows are provided.

TECHNICAL MANAGEMENT TEAM					
BOR: *Tony Norris / John Roache*			**BPA:** *Scott Bettin / John Wellschlager*		
NMFS: *Paul Wagner / Chris Ross*			**USFWS:** *David Wills / Steve Haeseker*		
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*		**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*	
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*					

TMT MEETING

Wednesday October 27, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Venita Bar update.
   [Vernita Bar Redd Survey, October 24, 2004]
3. Chum SOR.
   [#2004-19, October 26, 2004]
4. Autumn Treaty Fishing Summary.
   [Impact of Pool Fluctuations on the 2004 Autumn Treaty Fishery, October 27, 2004]
5. Burbot SOR.
6. Libby operations.
7. Albeni Falls operation.
8. Water Management Plan comments.
9. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality
10. Other
    - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232 Telephone (503) 238-0667
Fax (503) 235-4228
www.critfc.org

TO: Technical Management Team (TMT)
FROM: Kyle Martin, *Senior Hydrologist*, CRITFC Hydro Program
DATE: October 27th, 2004
SUBJECT: Impact of Pool Fluctuations on the 2004 Autumn Treaty Fishery

CRITFC submitted five System Operation Requests (2004-C9, C-10, C-11, C-12, C13) via the TMT forum to support autumn treaty fishing. The CRITFC requests asked for (1) specific pool elevations and (2) stable pool elevations during each week of treaty fishing. Criterion #1 asked to operate the pools as a hard constraint within a one-foot specified elevation range. The Corps replied with a commitment as a hard constraint to a 1.5-foot range, or 1-foot as a soft constraint, as they have done so since 1996. The table shows the hourly compliance of CRITFC's elevation criteria and the Corps' criteria during the treaty fishery. Averages from the seven-week 2003 autumn season are also shown. Tribal harvest includes 124,700 Chinook and 13,200 steelhead.

2004	Bonneville Pool	The Dalles Pool	John Day pool
1 foot range (CRITFC):	75.5 - 76.5 ft	158.5 -159.5 ft	263.5 - 264.5 ft
AUGUST 25 - 27	74%	36%	15%
AUGUST 31 - SEPT 3	74%	55%	20%
SEPTEMBER 7 - 10	22%	91%	42%
SEPTEMBER 13 - 17	100%	91%	41%
SEPTEMBER 20 - 24	96%	80%	50%
SEPTEMBER 27 - 30	91%	96%	41%
OCTOBER 4 - 8	94%	64%	100%
OCTOBER 13 - 16	94%	66%	100%
average:	**81%**	**72%**	**51%**
2003 average:	73%	84%	39%
			Aug-Sep: 262.5 - 264 ft
1.5 foot range (COE):	75 - 76.5 ft	158 -159.5 ft	Oct: 263.5 - 265 ft
AUGUST 25 - 27	100%	100%	100%
AUGUST 31 - SEPT 3	100%	69%	100%
SEPTEMBER 7 - 10	41%	100%	100%
SEPTEMBER 13 - 17	100%	100%	100%
SEPTEMBER 20 - 24	100%	100%	100%
SEPTEMBER 27 - 30	100%	100%	100%
OCTOBER 4 - 8	100%	99%	100%
OCTOBER 13 - 16	100%	100%	100%
average:	**93%**	**96%**	**100%**
2003 average:	92%	96%	100%

For pool fluctuations (Criterion #2), shown in Figures 1 through 24, Bonneville pool saw 0.3 – 1.3 foot swings (compared to 0.3 - 1.2 foot swings in autumn 2003). The Dalles pool saw 0.3 – 1.7 foot swings (compared to 0.3 – 1.4 foot swings in autumn 2003). John Day pool saw 0.3 – 1.2 foot swings (compared to 0.3 – 1.0 foot swings in autumn 2003).

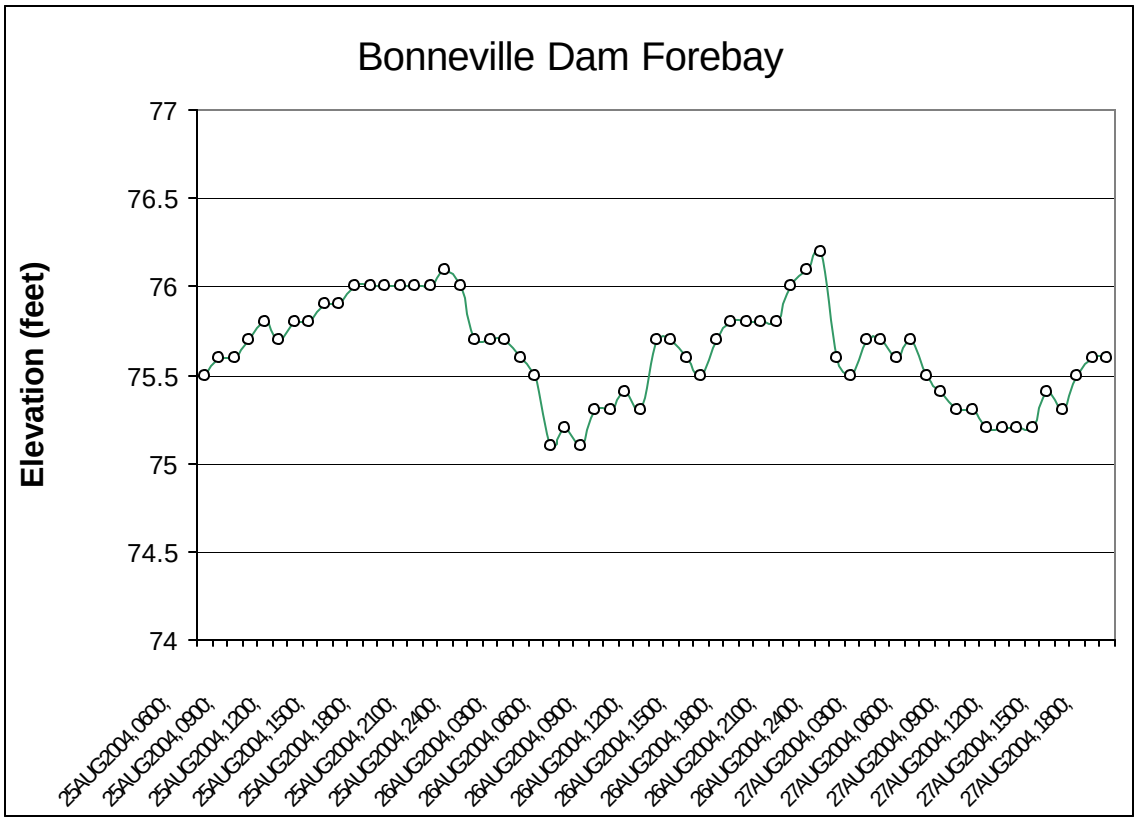


Figure 1. Observed BON pool elevations during August 25-27, 2004 autumn treaty fishing.

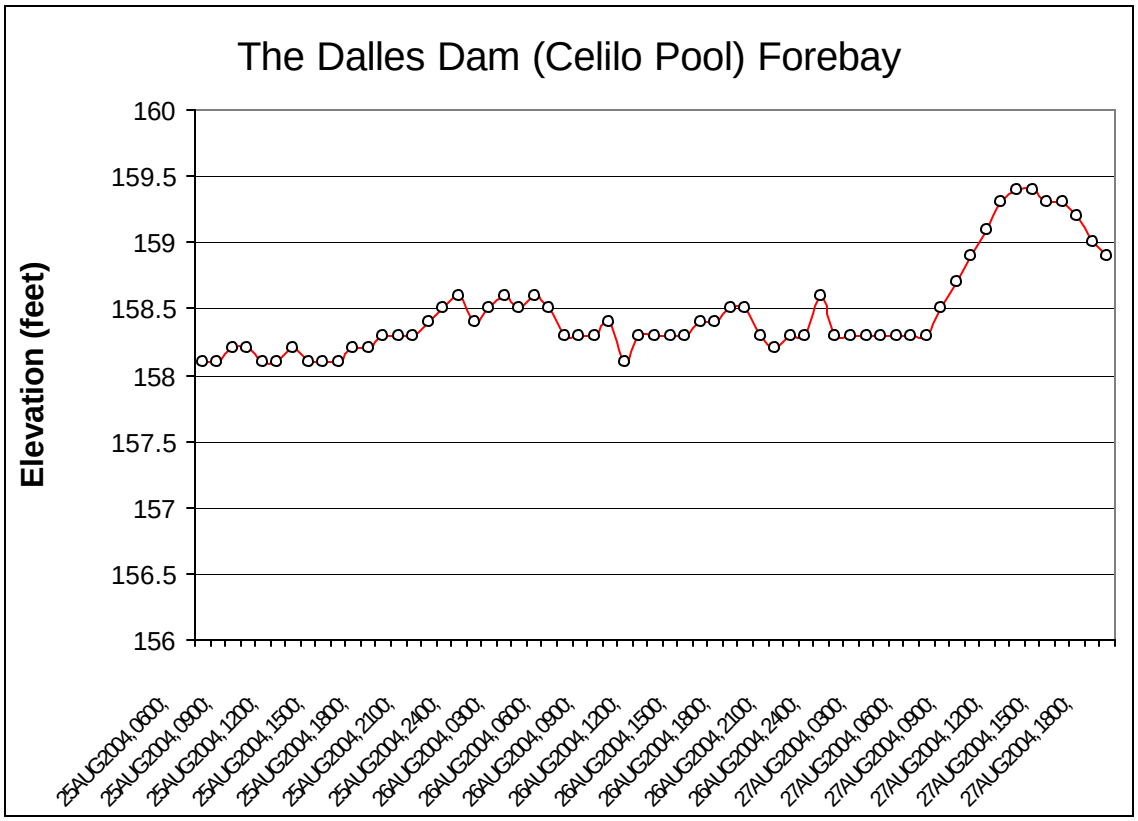


Figure 2. Observed TDA pool elevations during August 25-27, 2004 autumn treaty fishing.

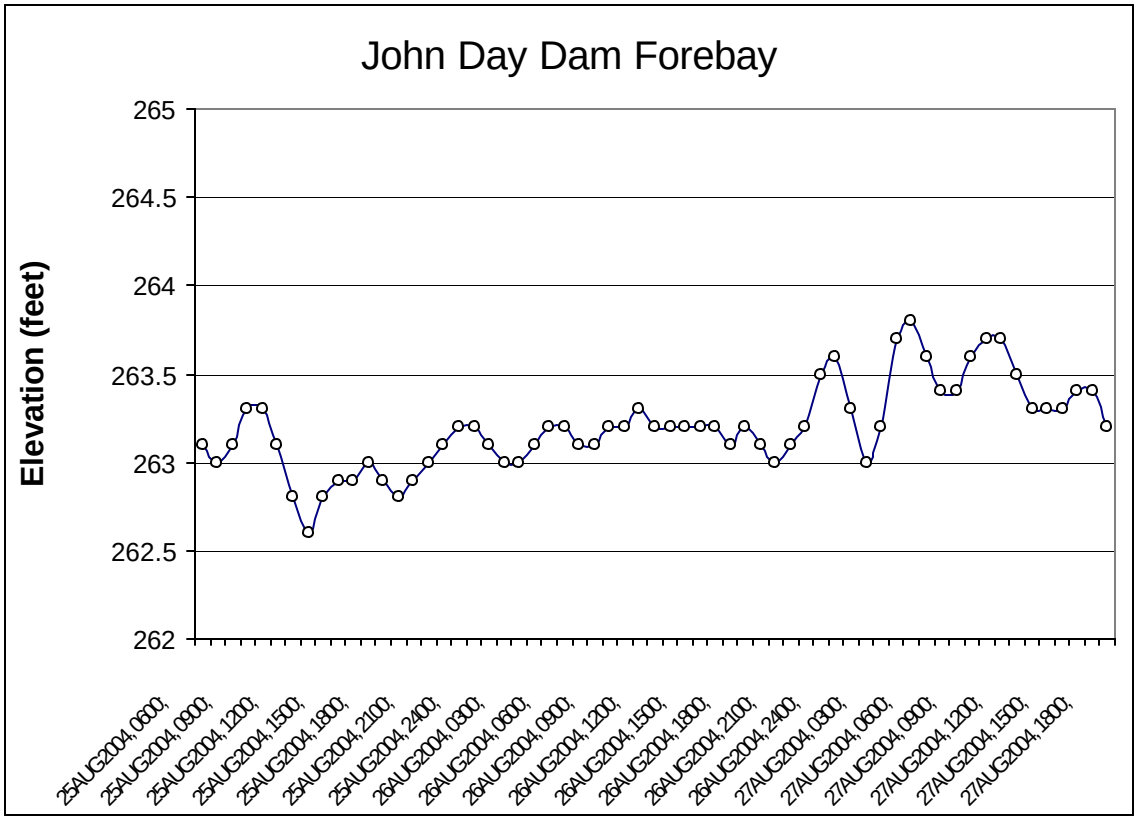


Figure 3. Observed JDA pool elevations during August 25-27, 2004 autumn treaty fishing.

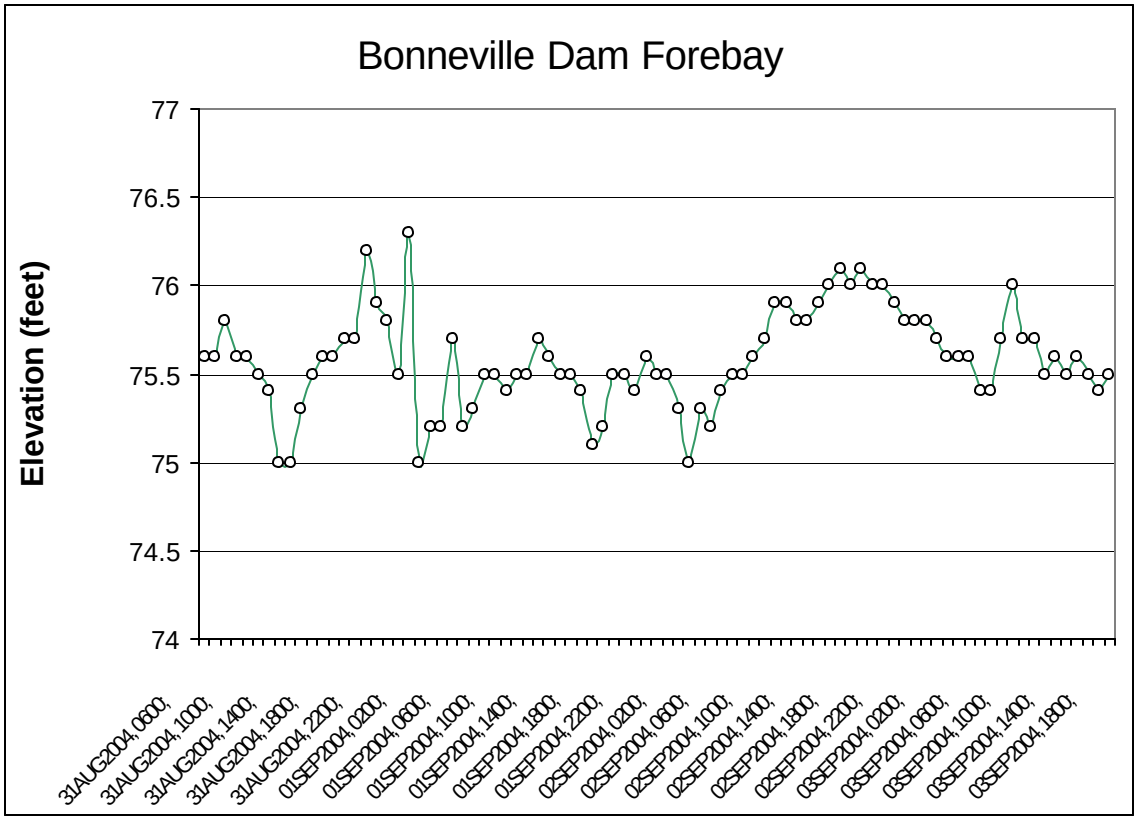


Figure 4. Observed BON pool elevations during August 31-Sept. 3, 2004 autumn treaty fishing.

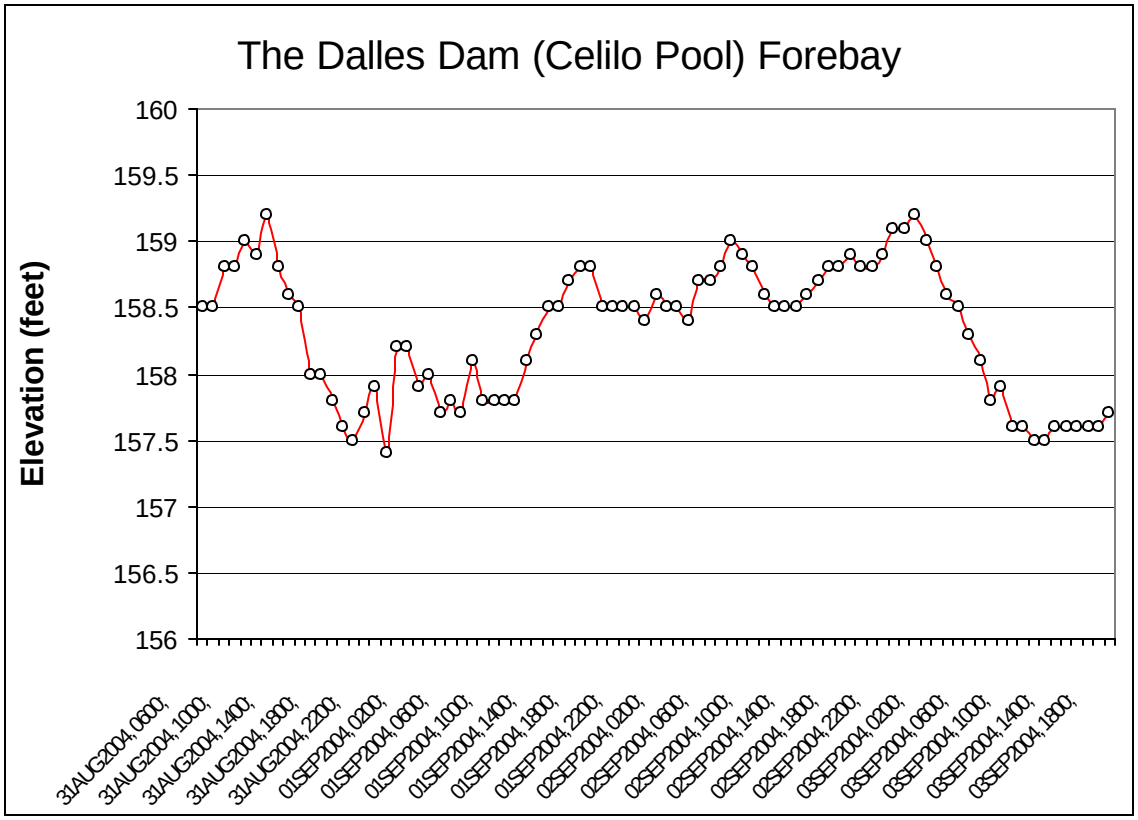


Figure 5. Observed TDA pool elevations during August 31-Sept. 3, 2004 autumn treaty fishing.

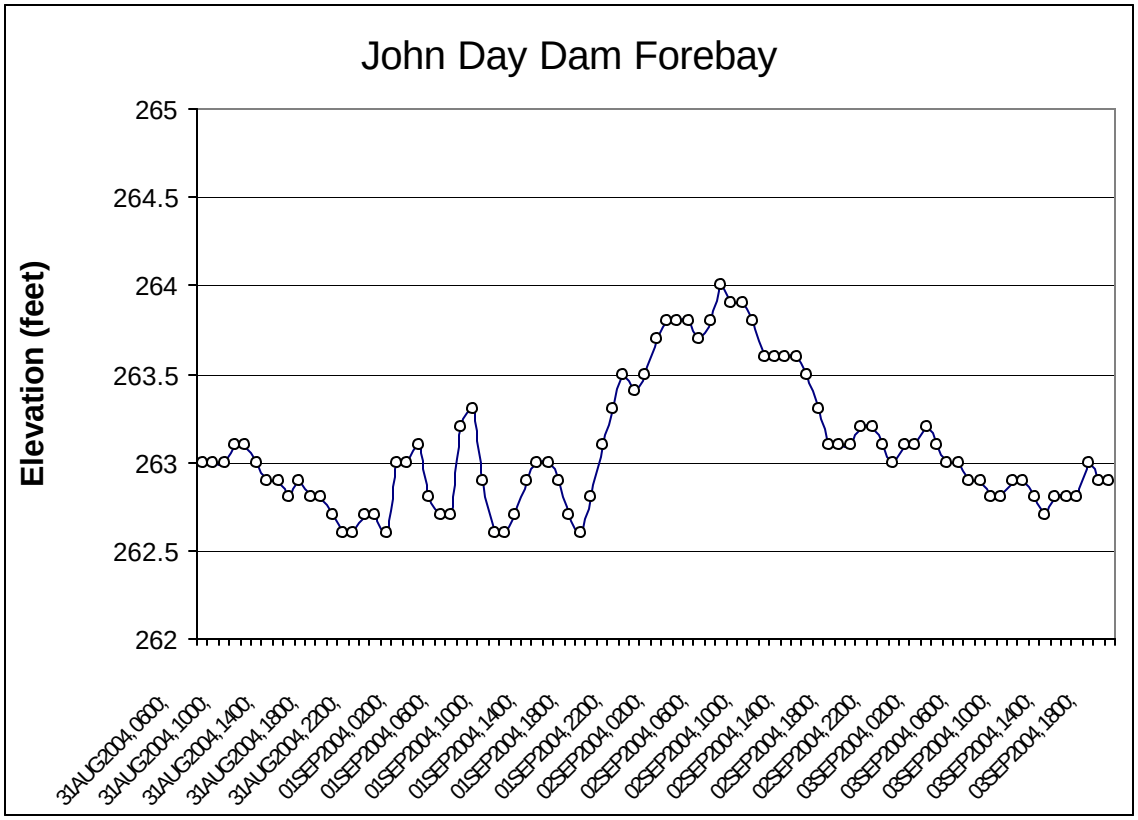


Figure 6. Observed JDA pool elevations during August 31-Sept. 3, 2004 autumn treaty fishing.

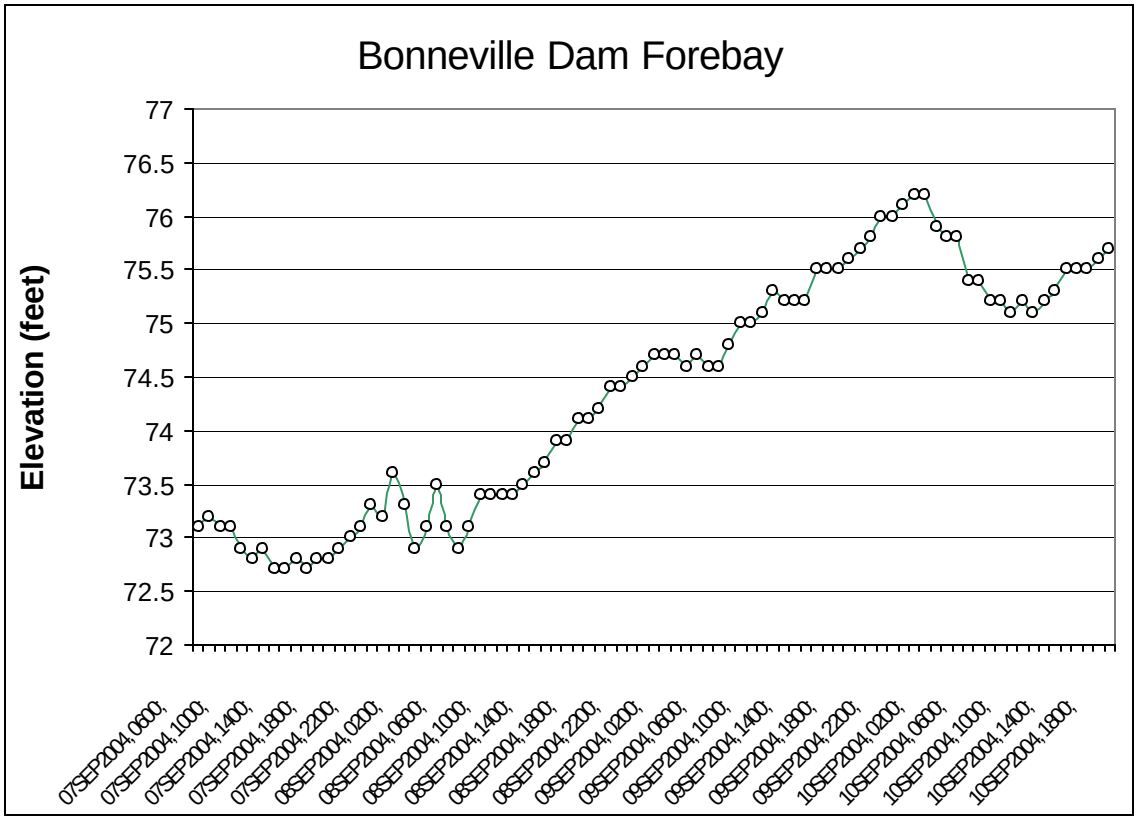


Figure 7. Observed BON pool elevations during September 7-10, 2004 autumn treaty fishing.

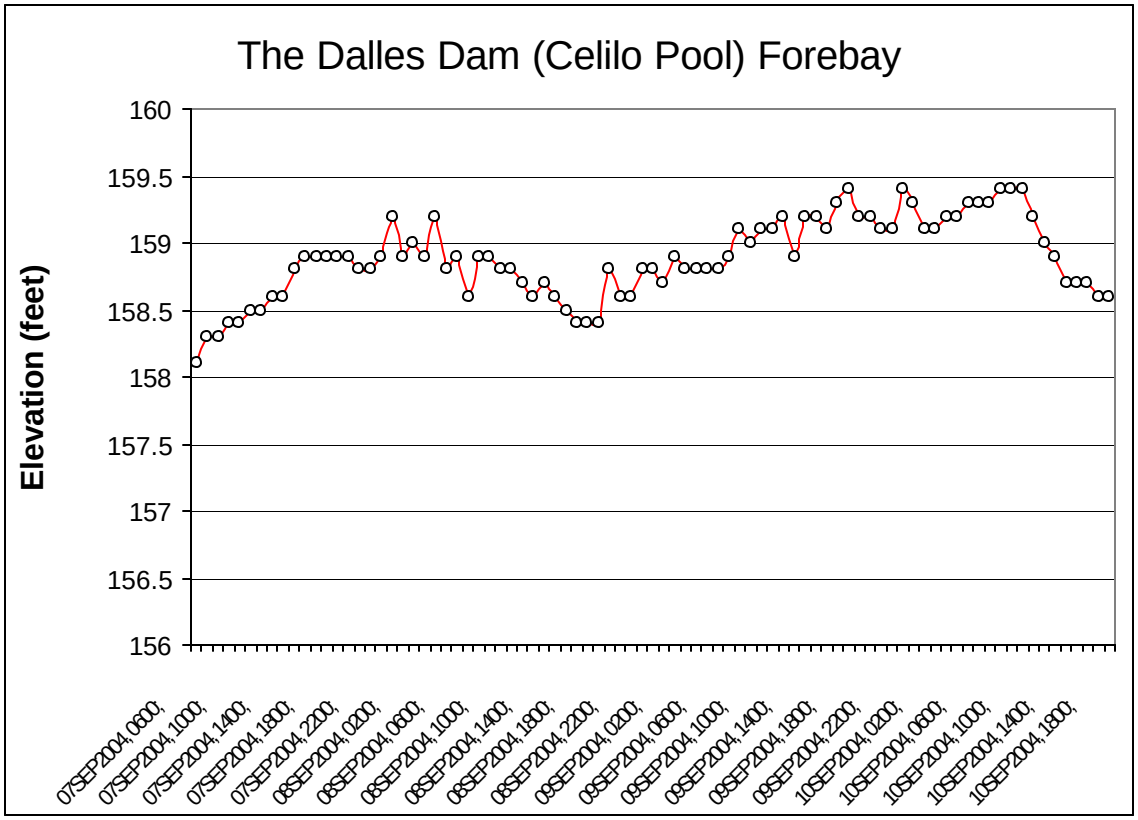


Figure 8. Observed TDA pool elevations during September 7-10, 2004 autumn treaty fishing.

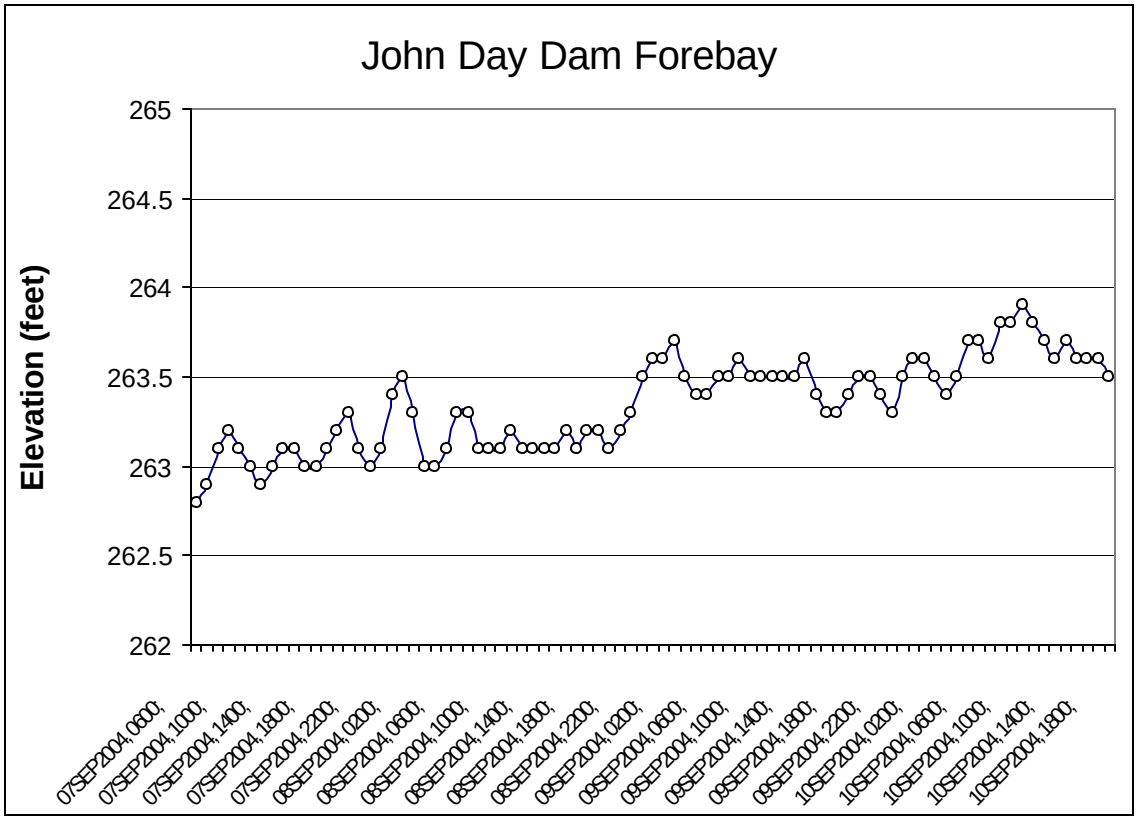


Figure 9. Observed JDA pool elevations during September 7-10, 2004 autumn treaty fishing.

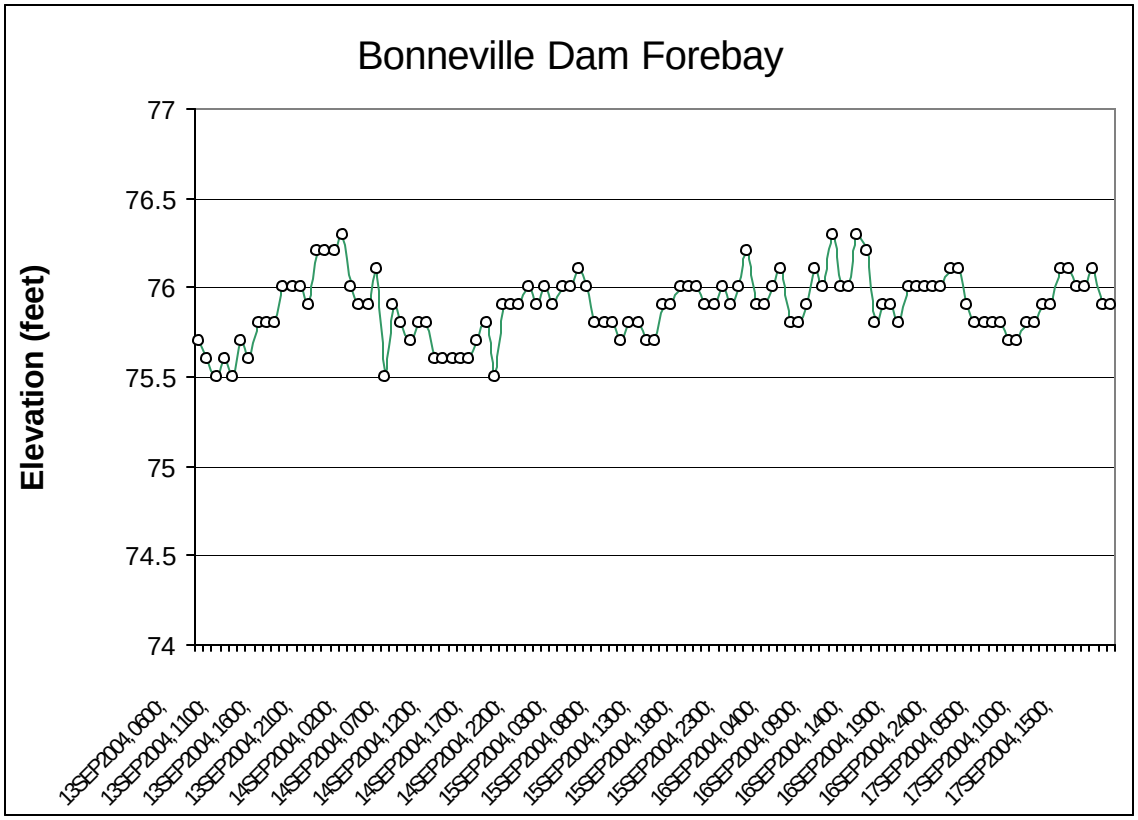


Figure 10. Observed BON pool elevations during September 13-17, 2004 autumn treaty fishing.

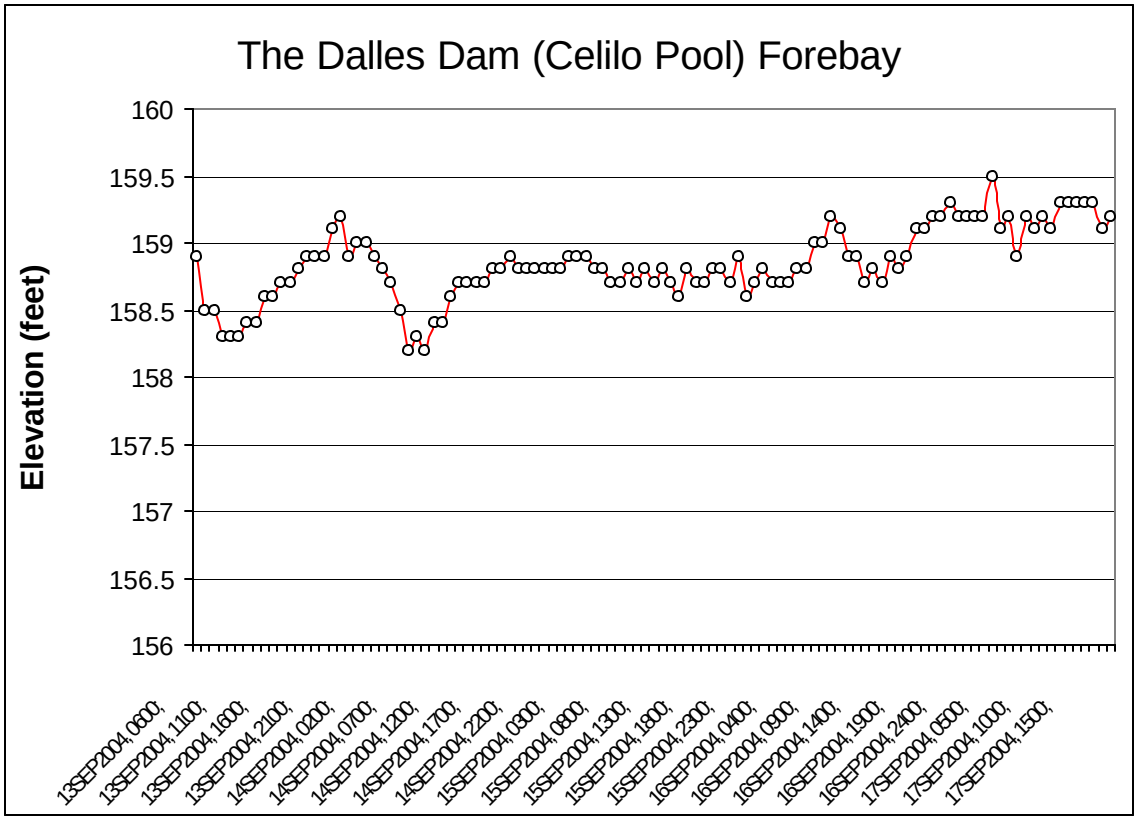


Figure 11. Observed TDA pool elevations during September 13-17, 2004 autumn treaty fishing.

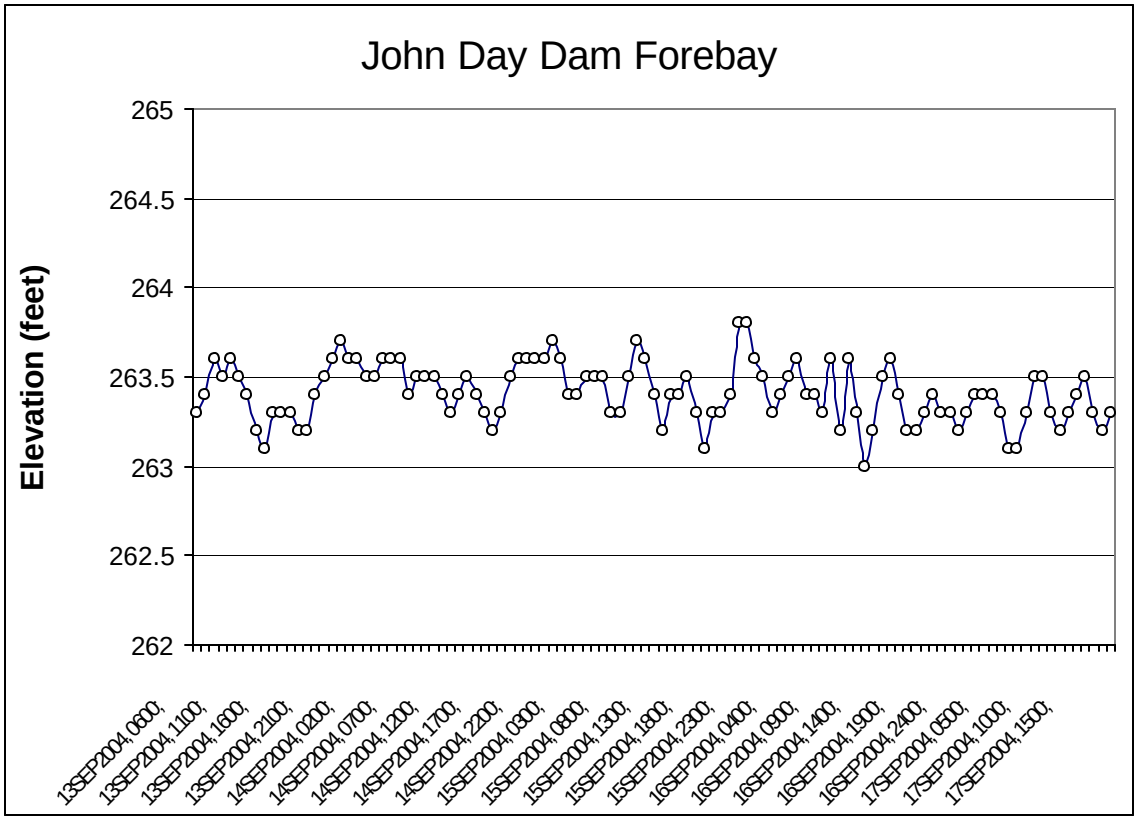


Figure 12. Observed JDA pool elevations during September 13-17, 2004 autumn treaty fishing.

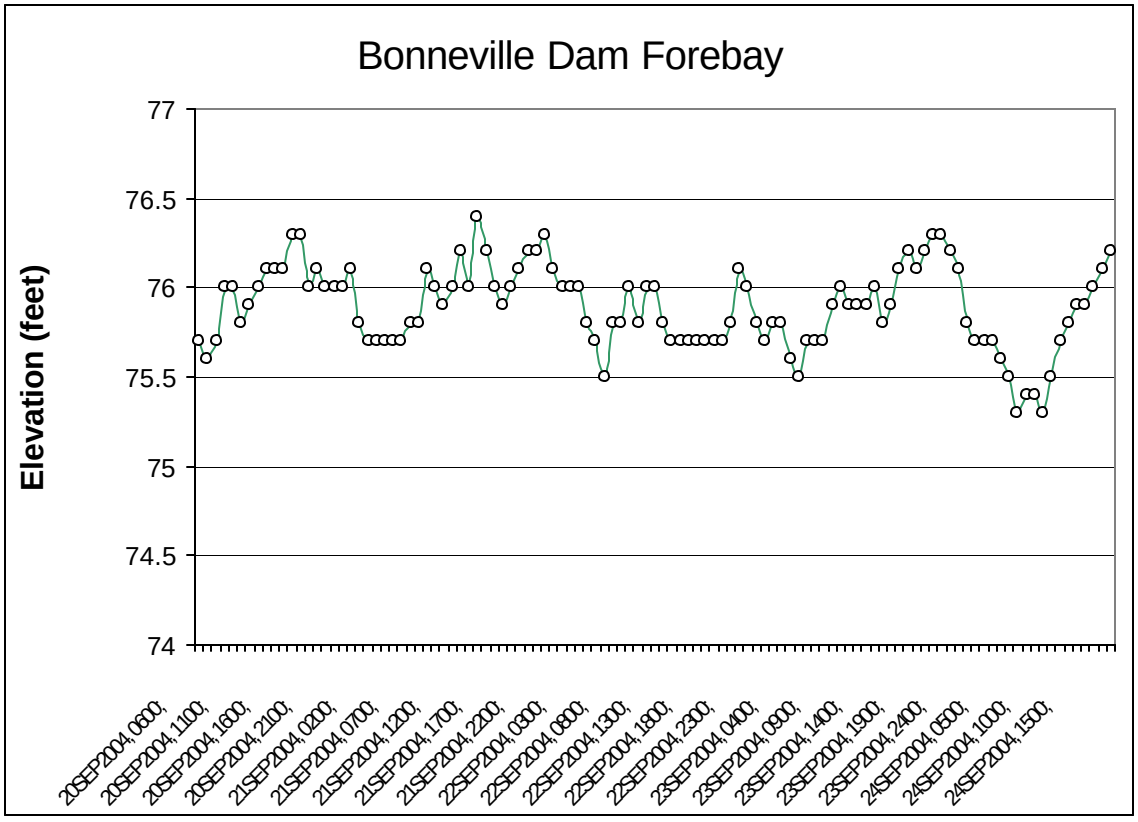


Figure 13. Observed BON pool elevations during September 20-24, 2004 autumn treaty fishing.

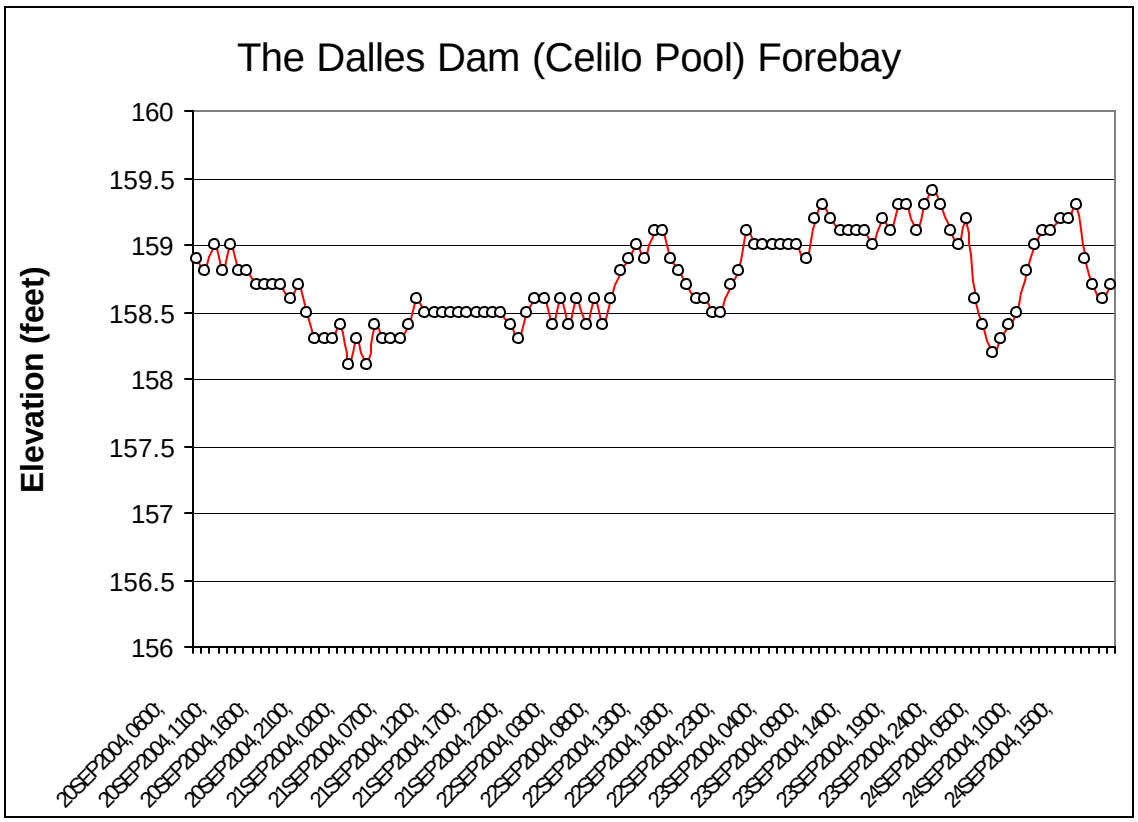


Figure 14. Observed TDA pool elevations during September 20-24, 2004 autumn treaty fishing.

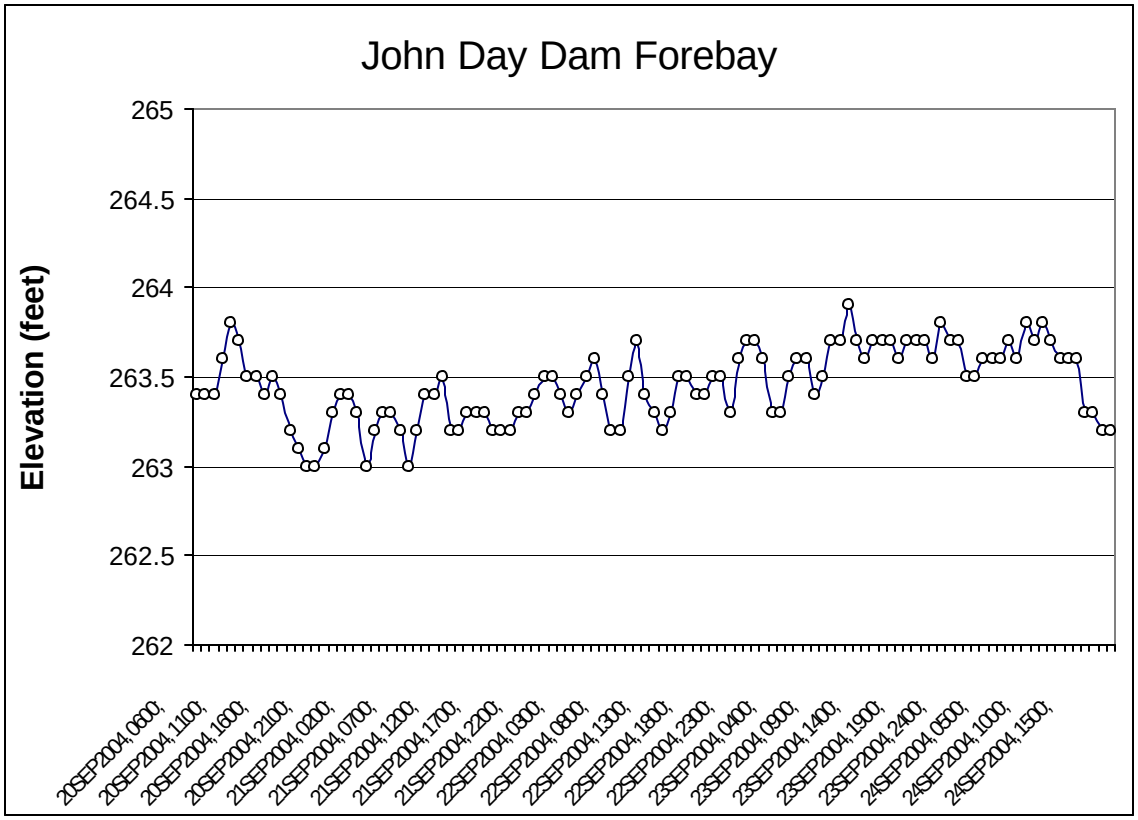


Figure 15. Observed JDA pool elevations during September 20-24, 2004 treaty fishing.

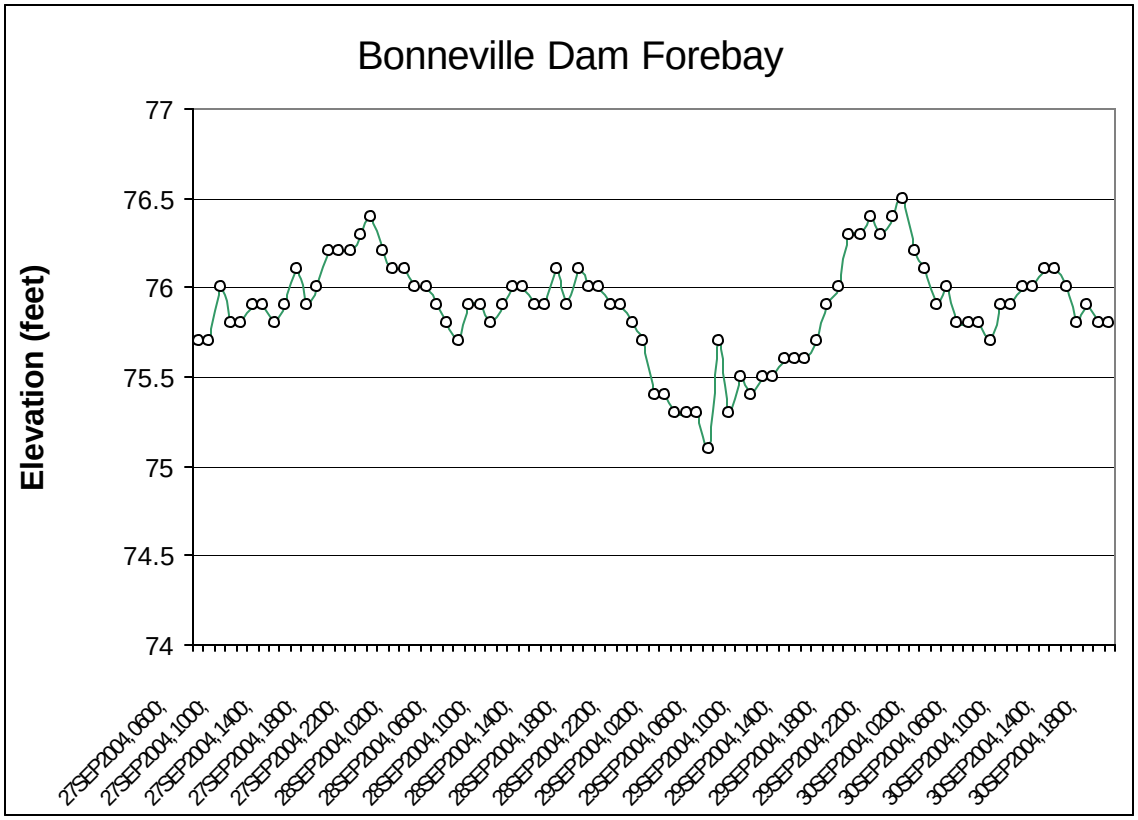


Figure 16. Observed BON pool elevations during September 27-30, 2004 treaty fishing.

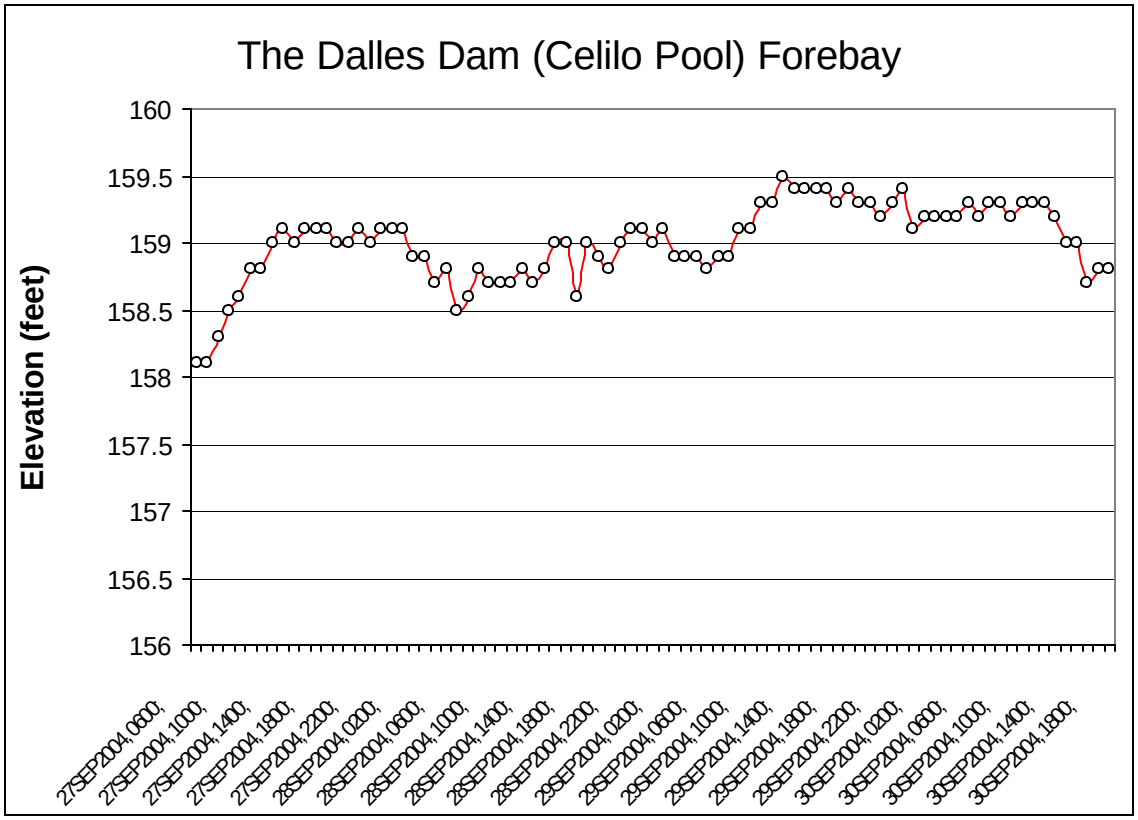


Figure 17. Observed TDA pool elevations during September 27-30, 2004 treaty fishing.

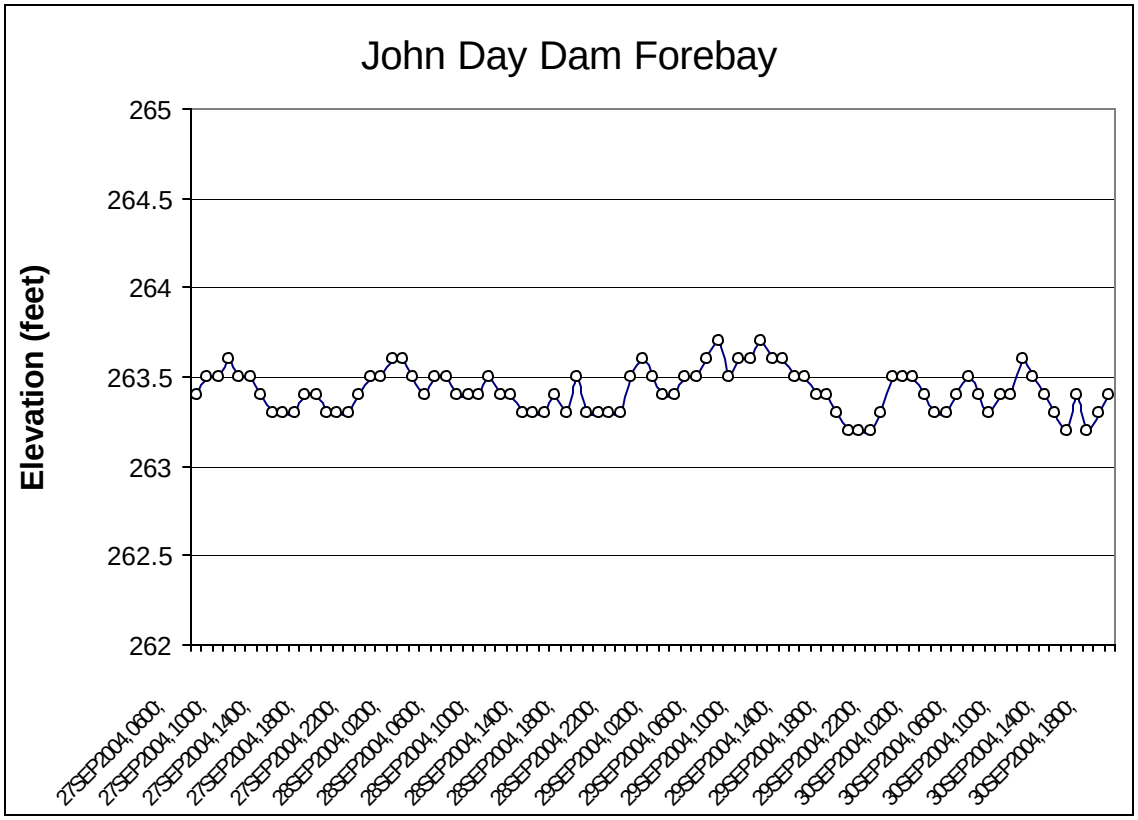


Figure 18. Observed JDA pool elevations during September 27-30, 2004 treaty fishing.

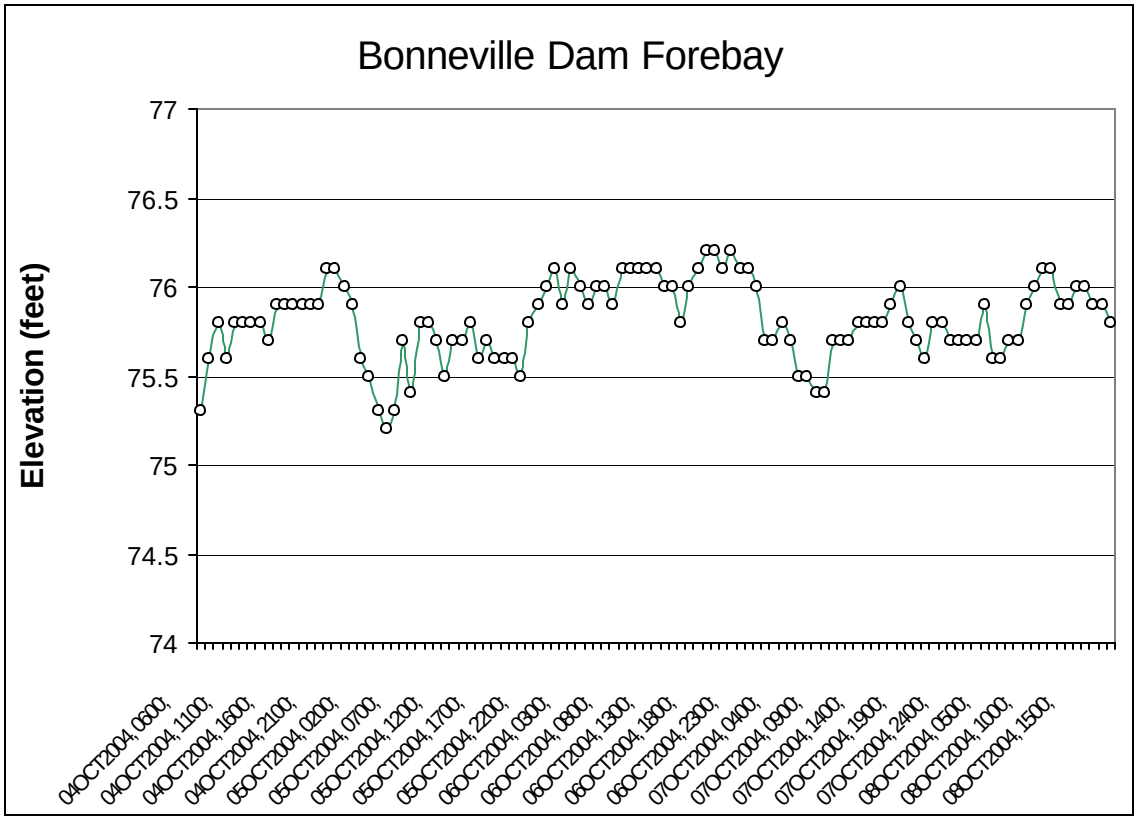


Figure 19. Observed BON pool elevations during October 4-8, 2004 autumn treaty fishing.

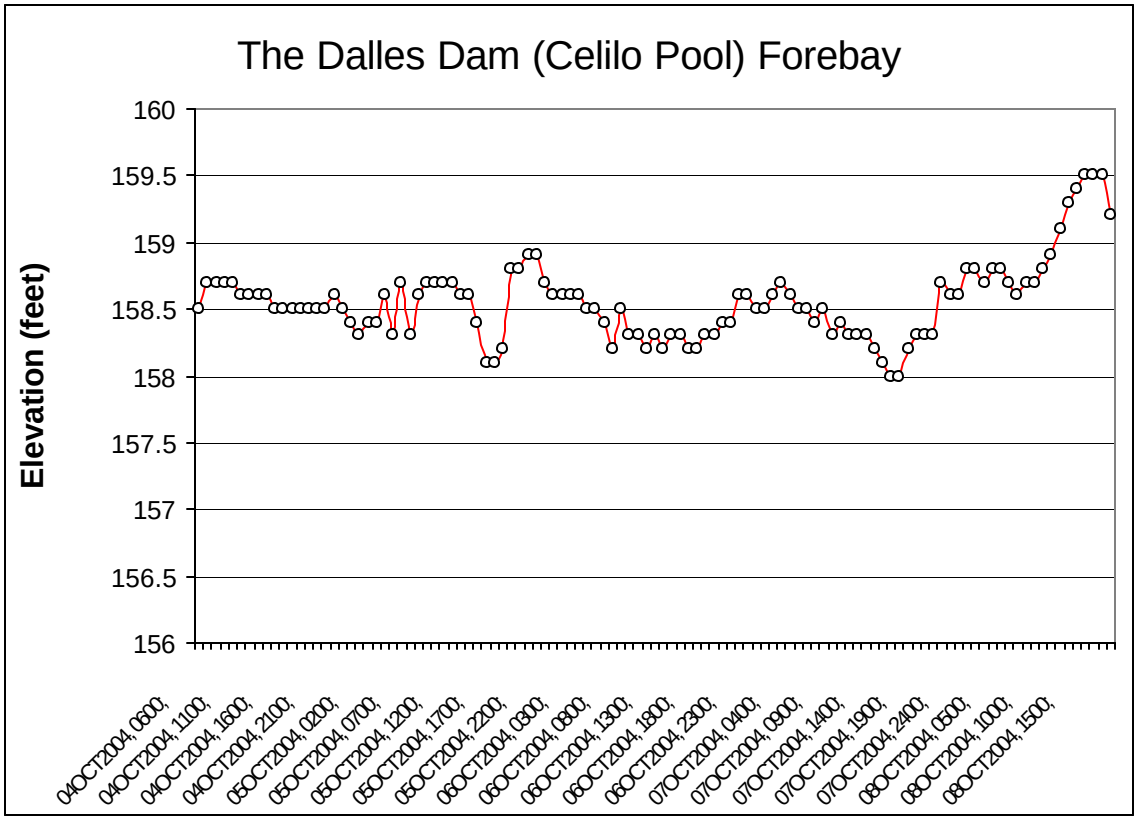


Figure 20. Observed TDA pool elevations during October 4-8, 2004 autumn treaty fishing.

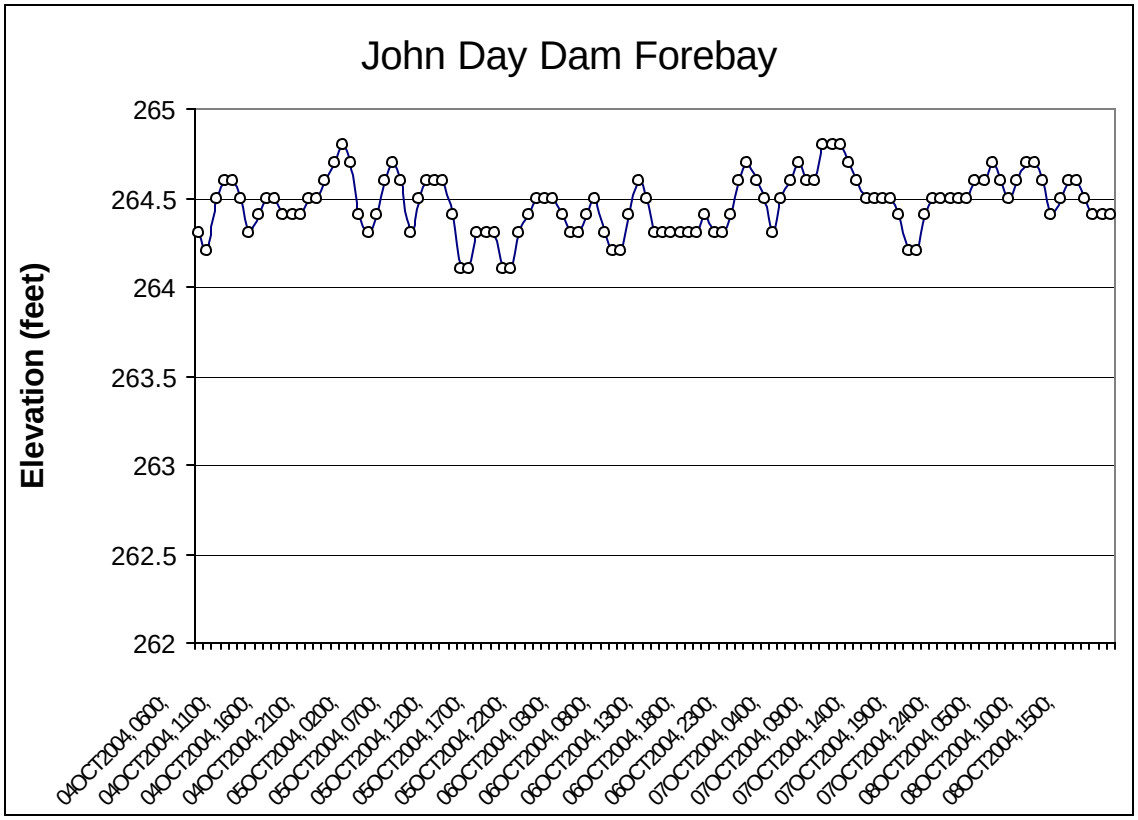


Figure 21. Observed JDA pool elevations during October 4-8, 2004 autumn treaty fishing.

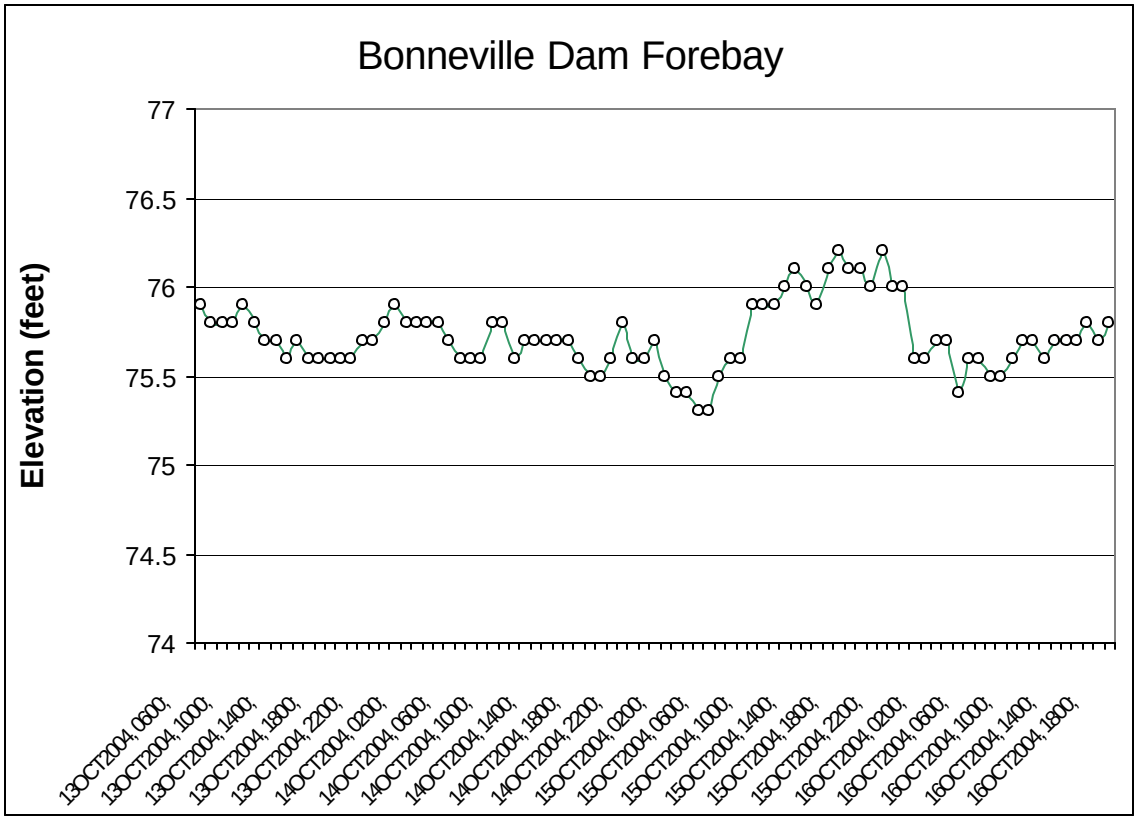


Figure 22. Observed BON pool elevations during October 13-16, 2004 autumn treaty fishing.

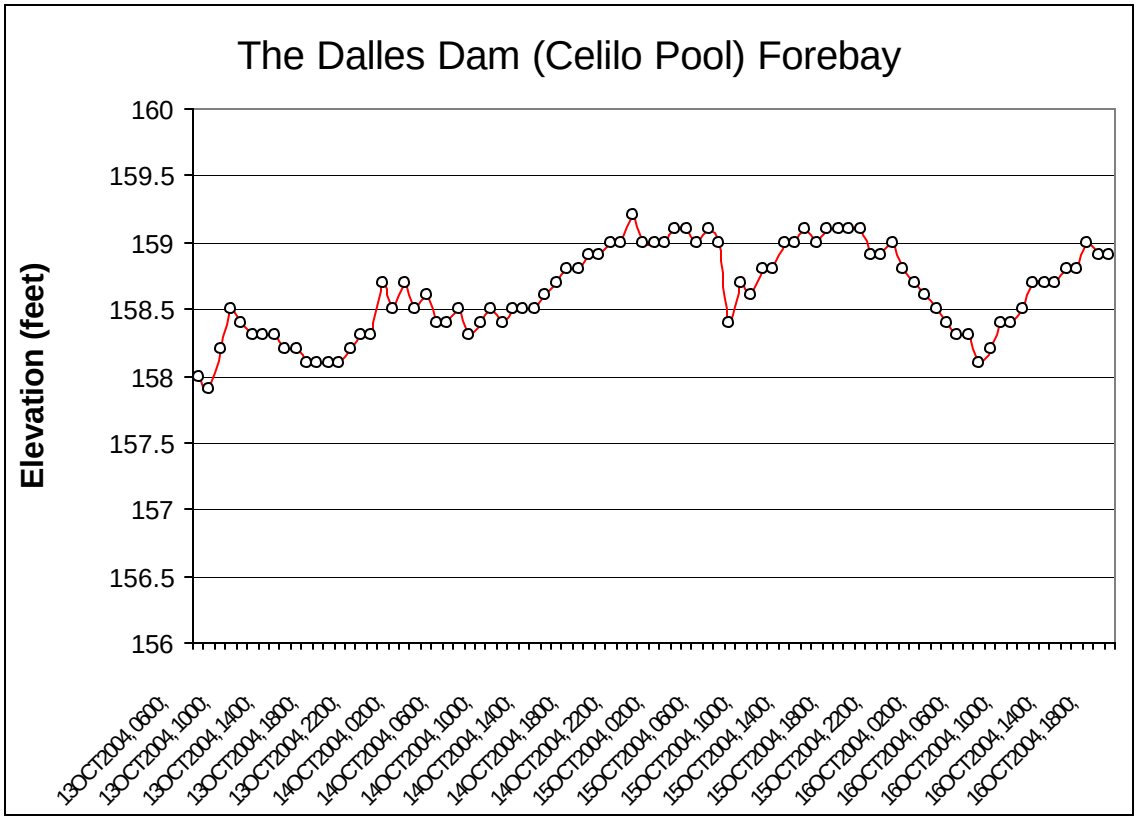


Figure 23. Observed JDA pool elevations during October 13-16, 2004 autumn treaty fishing.

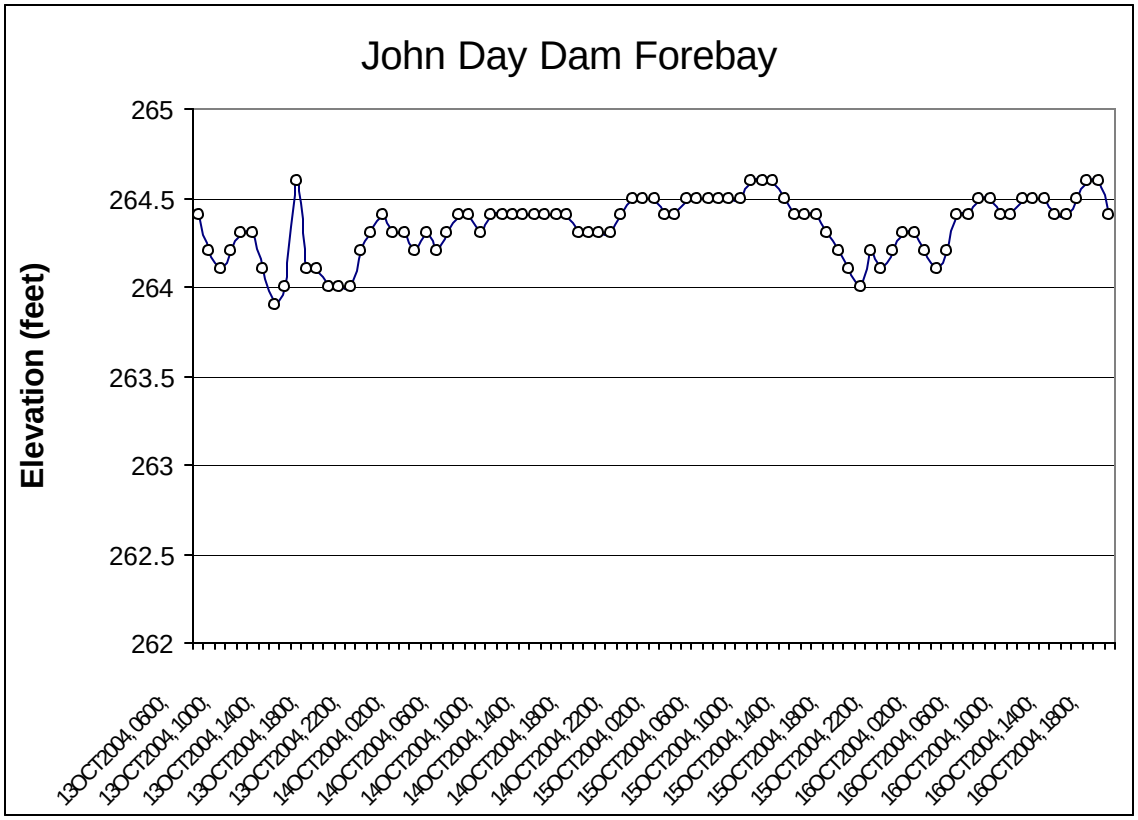


Figure 24. Observed JDA pool elevations during October 13-16, 2004 autumn treaty fishing.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

October 27, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Vernita Bar Update:

Chris Carlson, Grant County PUD, reported that a redd count was taken on Wednesday (10/20), at which time flows were at 36 kcfs. Six redds were counted within the index area, between 36-50 kcfs. There will be another survey on Sunday, 10/31. The PUD has requested 50 kcfs out of Priest Rapids over the weekend. So far, spawning patterns are similar to previous years. The PUD expects to see five spawning chum during the next survey. Chris will continue to update TMT on Vernita Bar at future meetings. Information from the surveys will also be posted on the TMT web page.

Chum SOR: 2004-19:

The salmon managers developed an SOR for chum operations this year, requesting that Bonneville be operated to the 2000 BiOp recommendation – beginning when chum are present, operate to a minimum 11.5' daytime tailwater elevation to provide adequate coverage for chum spawning. A specific date was not given in the SOR. Ron Boyce, Oregon, reported that a survey taken yesterday (10/26) found no coho or chum, but an increase in chinook numbers was observed. Cindy LeFleur, Washington, reported that chum are present in the Grays River basin. The salmon managers expect that, based on what has happened during the previous six years, chum will arrive around November 4-6. It was further clarified that the SOR is requesting 11.5', and the salmon managers are expecting that elevation to equal 125 kcfs daily average flows. The salmon managers do have concerns about night time flows, and for now will wait to see the results of this year's USGS test which is scheduled to begin on 11/10.

After further discussions, TMT agreed to the following guidelines for chum operations:

Effective Thursday 10/28 at 0700 hours:
24 hours/day Hard constraint minimum 10.5' Bonneville tailwater
24 hours/day Soft constraint minimum 11' Bonneville tailwater

If chum are present on Friday, 10/29, Dave Wills or Paul Wagner will notify Cathy Hlebechuk or Julie Ammann.
Effective 0700 - 1900 hours daily starting Saturday, 10/30, target tailwater 11.5' and soft constraint 11.3' - 11.7'
Effective 0700 - 1900 hours daily starting Monday, 11/1, target 11.5' and hard constraint 11.3' - 11.7'

If chum are NOT present on 10/29:
Effective 0700 - 1900 hours daily starting Monday, 11/1, 10.5' - 12' hard constraint

If chum are present Tuesday 11/2, Dave Wills or Paul Wagner will notify Cathy Hlebechuk or Rudd Turner
Effective 0700 - 1900 hours daily starting Wednesday, 11/3, target tailwater 11.5' and soft constraint 11.3' - 11.7'
Effective 0700 - 1900 hours daily starting Thursday, 11/4, target 11.5' and hard constraint 11.3' - 11.7'

Autumn Treaty Fishing Summary:
Kyle Martin, CRITFC, provided a summary of the five SORs presented by the tribes for Autumn treaty fishing in 2004, and described how often the COE operated to meet the requests over the season. At Bonneville, the COE met the request 81% of the time, 72% at The Dalles, and 51% at John Day. Overall, operations were good for the fishery. One concern and suggestion Kyle offered was that the John Day pool, which has become more important to the tribes in recent years, was at times operated to low elevations. Kyle suggested that in future years, the COE's teletype say something like: 'Operate to the upper range at John Day to accommodate access for the tribal fishery'. There was an agreement in 1996 between the tribes and the COE that, from CRITFC's perspective, is now out-dated and needs to be re-examined due to changes in the fishers' needs. Kyle acknowledged that pool fluctuations were kept to a minimum this year, and that this was appreciated. A survey will go out to the tribal fishers that will help inform the COE and TMT of their needs for operations in future years.

Kyle also handed out a notice of the annual "What Will the Winter Be Like" event at OMSI on Thursday, October 28th. All were welcome to attend.

Burbot SOR:
The Kootenai Valley Resource Initiative is developing an SOR which will request cooler water in November and December for burbot. Amy Reese, COE, said the SOR should be out by Thursday (10/29). It will be posted on the TMT web page as soon as it is available. TMT will be informed via email of any actions taken on the SOR, and will re-visit the issue at the next TMT meeting.

The following email update was sent to TMT members on Thursday, 10/29 from Cathy Hlebechuk, COE: 'As soon as a signed SOR is received, the Corps plans on implementing the temperature recommendation. It's going to take at least 1 week to pull the selector gates and adjust them properly.'

Libby Operations:
Cathy Hlebechuk, COE, reported that Libby is currently at elevation 2447', releasing 4.7 kcfs and filling slightly. The COE is operating to reach elevation 2411' by the end of December. Project flows will increase starting Monday, 11/1, using BiOp ramp rates to get up to 19 kcfs on 11/2, then down to 14 kcfs over the weekend.

Albeni Falls:
The COE is operating to reach elevation 2055' by November 15th. The project is releasing 24 kcfs out, and the current elevation is 2056.5'.

Water Management Plan Comments:
The action agencies will post the latest draft 2005 WMP on the TMT web page on November 3rd. The action agencies are requesting that comments be received by November 24th. Cathy Hlebechuk, COE, will also forward the draft WMP to TMT members next week to remind folks that it is on the web.

Status of Operations:
Reservoirs: Dworshak is operating at minimum flows. TMT was notified that a unit was tripped off on 10/20 for approximately 5 hours; 1 kcfs was spilled through regulating outlets; no known problems resulted from this incident. The Bonneville spill bay calibration work was done last week (10/18-20); now the 18 spill bays are appropriately calibrated. Hungry Horse is at elevation 3541.2' and Grand Coulee is at elevation 1285.9'.

Fish: Adult coho and chinook are spawning; chum are about to arrive.

Water quality: The Dworshak outage on 10/20 caused an increase in TDG, up to 118%. A question was raised for the TMT to consider: In a future similar event, would you prefer releasing the 1 kcfs and resulting in up to 130% TDG, or do not release any cool water, resulting in warmer temperatures? Jim Adams, COE, also noted that the next Water Quality Team meeting will held on Monday, November 8th, at which a person from Aquatic Informatics, Inc. will speak to the group about a data correction software program. All are welcome to attend this meeting.

Next Meeting, November 10, 10-3 YEAR END REVIEW:
An agenda for the TMT Year End Review will be sent out and posted on the web sometime next week. The meeting will be held at CRITFC, in the basement conference room. Presenters should contact Kyle Martin with any special A/V needs. Power point presentations should be saved on a disk, and will be run through Kyle's laptop.

November 24 Meeting Agenda:
- Vernita Bar Update
- Update on Chum Operations
- Libby Operations
- Burbot SOR
- WMP Comments
- Status Update

Technical Management Team Meeting Notes

October 27, 2004
Corps of Engineers Reservoir Control Center, Portland, OR

1. Greetings and Introductions.

The October 27 meeting of the Technical Management Team was held at the Corps of Engineers' Reservoir Control Center in Portland, OR. The meeting was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. Harkless led a review of today's agenda and a round of introductions.

The following is a summary – not a verbatim transcript – of the items discussed and decisions made at this meeting. Anyone with questions or comments should contact Hlebechuk at 503/808-3942.

2. Vernita Bar Update.

Chris Carlson said Grant County PUD conducted its most recent redd count on October 24; field personnel saw a number of fish spawning in deeper areas, and counted six redds. That meant the initiation of spawning for the 36-50 Kcfs zone started on October 20. Our daytime target was 55 Kcfs; the indications are that the fish are really into spawning at this time. Our request is for a flow out of Priest Rapids of 50 Kcfs for the coming week, Carlson said.

How does 2004 compare to last year? Paul Wagner asked. The timing is very similar, Carlson replied – we're on track with previous years. We are seeing a bit more activity at this point in the season than we have in most previous years; there are more fish this year – close to 100,000, up from 88,000 last year – which may be influencing spawning behavior. In response to a question, Carlson said he anticipates that spawning above the 50 Kcfs zone should begin by October 31. The final redd count will be done on November 28, to be sure that the end of spawning has occurred. The group devoted a brief discussion to the mechanics of Grant County PUD's redd surveys. Carlson said he is available to provide a report at a potential TMT meeting on November 3.

3. Chum SOR.

On October 26, the action agencies received SOR 2004-19. This SOR, supported by NOAA Fisheries, USFWS, IDFG, ODFW, WDFW, IDFG, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC, requests the following specific operations:

- As required by the 2000 Biological Opinion, beginning when chum are present and continuing until further notice, provide a minimum instantaneous tailrace elevation of 11.5 feet at Bonneville Dam. On average, it is anticipated that daily average flows will not exceed 125 Kcfs.

David Wills provided an overview of this SOR, the full text of which is available via hotlink from today's agenda on the TMT's Internet homepage. Please refer to this document for full details and justification. Have any chum been observed on the Ives island spawning grounds yet? John Wellschlager asked. There was a survey yesterday, replied Ron Boyce; no chum or coho were observed, but the number of fall chinook had really increased – to 52 lives and 22 redds. Any reports from Grey River downstream? Scott Bettin replied. There are fish down there, Cindy LeFleur replied; chum are one to two weeks early in that basin, and are present in significant numbers – up to 300 fish have been counted on a given day. Normally, in past years, we've used the Greys River chum as an indicator that chum will be arriving at Ives Island a week or two later, Bettin observed. I don't know when the Greys River fish began to arrive, LeFleur replied – it could be that they've been there for awhile. She added that surveys will begin at the Multnomah Creek spawning grounds on Friday, October 29.

What indicator do you want to use for the start of the chum operation? Bettin asked. The presence of chum in the Ives Island area, Wills replied. How many chum? Wellschlager asked. We can't give you an exact number, Boyce replied; typically, over the past six years, within a day or two of seeing the first chum arrive, the fish begin to spawn, something that has occurred no later than November 6 each year. Once those fish start to show up, they need the water, because they start spawning as soon as they appear. Boyce said he has requested that WDFW do their survey on Tuesday or Thursday of next week; once the results of that survey are available, I would suggest that we convene TMT immediately.

Hlebechuk noted that the SOR specifications request an instantaneous 11.5-foot tailrace elevation, and it is anticipated that daily average flows will not exceed 125 Kcfs. We have no way of knowing what other factors – rainstorms etc. – might influence the amount of water needed to maintain that tailwater depth, she said. We were just giving you a ballpark estimate, Wills replied – we weren't trying to constrain you, operationally. And would that be during daytime hours only? Hlebechuk asked. We were thinking that would be a viable tailwater operation 24 hours a day, Wills replied – that's our request. And it's OK for us to conduct our planned test beginning November 10, covering the next six weeks? Bettin asked. Yes, Wills replied.

Given that there is a lot of water in the river right now, said Wellschlager, it would be prudent to try to reach agreement today – how about a minimum of 10.5 feet during the week, and no higher than 12 feet during daylight hours, given the fact that flows are higher than that now? Your proposal is a 10.5-foot instantaneous minimum during the day, beginning Monday, November 1? Boyce asked. Yes, Bettin replied. The group discussed the hours for this operation; Wills said the salmon managers understand that this would be a 24-hour operation only in a perfect world, and that 7 a.m.-7 p.m. are the most crucial hours for the minimum tailrace elevation to be maintained.

After a brief caucus, Hlebechuk said that, starting on November 1, the action agencies are willing to provide a minimum tailrace elevation of 10.5 feet and a maximum tailrace elevation of 12 feet between 7 a.m. and 7 p.m. We thought we were talking about starting immediately, Wills said. I think we'll be there by default, anyway, Wellschlager replied; however, the additional operational flexibility over the coming weekend would be helpful. Boyce noted that the action agencies have been providing pretty flat flows during the week. Correct, but again, we'd like some additional flexibility over the weekend – what about if we agree to a minimum of 10.5 feet, but no upper cap until Monday, beginning tomorrow morning at 6 a.m.? Wellschlager asked. That would be acceptable, Boyce replied, although at the current tailwater elevation, the fish had only 1.5 feet of coverage over 80 percent of the main spawning area. The last thing we want to do is dewater chinook redds, he said. You have been maintaining pretty stable flows, he said; I would like to see that continue, to avoid dewatering chinook redds.

We don't know what's going to happen, said Wellschlager; at this point, we're willing to provide a minimum tailwater depth of 10.5 feet at Bonneville through the weekend. He noted that no chum have yet been observed on the spawning grounds; if they begin to be seen, it is at the salmon managers' discretion to convene an emergency TMT call. Still, couldn't we build in a buffer, in the form of a slightly higher minimum tailwater depth – say 11 feet? Boyce asked. You'll be doing another redd survey on Friday morning? Hlebechuk asked. Correct, Boyce replied. Could we agree to an operation that will cover that eventuality at today's meeting? Hlebechuk asked.

We hear what you're asking for, but if it rains like it's forecast to do, it may not be possible to implement it all the time – there are conditions under which it may not be possible to maintain the tight operation you're requesting, said Bettin. Could we agree to a soft constraint of 11.3-11.7 feet through the weekend, in terms of a minimum tailwater depth, then, if chum are observed on Friday, go to a hard constraint of 11.5 feet on Monday? Hlebechuk asked. That way, we wouldn't have to have an emergency meeting, Wellschlager observed. So if you're notified that chum are present on Friday, you can implement the soft constraint beginning Saturday, and go to a hard constraint on Monday? Boyce asked. Yes, Wellschlager replied.

Boyce reiterated his request for a soft constraint of a minimum tailwater depth of 11 feet to protect chinook redds, beginning immediately. We hear your concern, and if conditions allow, we will do it. So a hard constraint of 10.5 feet, but operate at 11 feet if possible? Hlebechuk asked. Correct, Wellschlager replied. Bettin noted that, given expected tidal and precipitation conditions over the weekend, it may be difficult to maintain an 11-foot tailwater depth at Bonneville. A range is reasonable, given the number of factors affecting that tailwater elevation, said Paul Wagner. Again, we understand what you're trying to do for chinook, and will do our best to accommodate it, said Bettin.

Hlebechuk then summarized the expected operation:

<u>Effective Thursday 10/28 at 0700 hours</u>:
24 hours/day Hard constraint minimum 10.5' Bonneville tailwater
24 hours/day Soft constraint minimum 11' Bonneville tailwater

If chum are present on Friday, 10/29, Dave Wills or Paul Wagner will notify Cathy Hlebechuk or Julie Ammann.
Effective 0700 - 1900 hours daily starting Saturday, 10/30, target tailwater 11.5' and soft constraint 11.3' - 11.7'
Effective 0700 - 1900 hours daily starting Monday, 11/1, target 11.5' and hard constraint 11.3' - 11.7'

If chum are NOT present on 10/29:
Effective 0700 - 1900 hours daily starting Monday, 11/1, 10.5' - 12' hard constraint

If chum are present Tuesday 11/2, Dave Wills or Paul Wagner will notify Cathy Hlebechuk or Rudd Turner
Effective 0700 - 1900 hours daily starting Wednesday, 11/3, target tailwater 11.5' and soft constraint 11.3' - 11.7'
Effective 0700 - 1900 hours daily starting Thursday, 11/4, target 11.5' and hard constraint 11.3' - 11.7'

In any event, the 11.3-11.7 foot tailwater elevation will go into effect the morning after chum are observed at Ives Island, although it may be a soft constraint until the following day, given pre-scheduling logistics. It was agreed that Hlebechuk will send out an email summarizing this operation to the TMT membership. It was further agreed that a call from the salmon managers to the action agencies, rather than a special TMT call, will be sufficient to trigger the start of this operation.

Wellschlager emphasized that, while it is possible to implement this operation in 2004, which is shaping up to be a good water year, it is not a precedent-setting operation. However, we're pleased that we're able to work with you on this this year, he said.

4. Autumn Treaty Fishery Summary.

Kyle Martin provided an overview of the 2004 autumn treaty fishing season. He noted that the tribes had submitted five SORs covering eight weeks of commercial treaty fishing this year, which was somewhat unusual. These SORs requested specific reservoir elevations at Bonneville, The Dalles and John Day pools; compliance with the requested operation at Bonneville pool was 81% in 2004; at The Dalles, 72%; at John Day, 51%. Martin noted that the majority of the nets were located in John Day pool; there were some complaints from tribal fishers during the first and second weeks of the autumn treaty fishery about access to nets. After the second week, there were no complaints, said Martin, which indicates that a range of 262-263.5 feet is not optimal. If, in future years, the action agencies could operate at the upper end of the John Day operating range, that would help tribal fishers. Martin added that the 51% compliance rate at John Day pool was 12% higher than the 2003 compliance rate.

Bettin noted that constraints on pool elevations can be very expensive to Bonneville; if there is a cheaper way to alleviate the tribal fishers' concerns – by providing additional access points, or removing debris, for example – Bonneville would be quite interested in that. Martin said he will do some additional research in an effort to

discover the specific problems encountered by tribal fishers, and will discuss this issue further with Bettin.

Martin added that Bonneville pool was in compliance with the 1.5-foot operating range the Corps agreed to provide 93% of the time, The Dalles pool, 96% of the time and John Day pool, 100% of the time. The actual pool fluctuations observed in 2004 (ranging from 0.3-1.7 feet) were similar to those observed in 2003. Hlebechuk noted that, in 1996, CRITFC Chairman Ted Strong met with Colonel Mogren; the agreement that came out of that meeting was that the Corps could accommodate the request for a 1.5-foot operating range in Bonneville pool only – more flexibility was needed in the other two pools for power production. Martin replied that, while this is true, the agreement is outdated, and needs to be revisited, given the changes in the tribal fishers' fishing patterns in recent years. Rudd Turner added that the Corps' preferred reservoir operation at John Day is in place partly to speed juvenile migration through that pool; he said that, in his view, it isn't clear that the operation in support of the tribal fishery should supercede the needs of those juveniles. Obviously there are a lot of factors that need to be considered, Martin replied.

5. Burbot SOR.

Hlebechuk said the burbot SOR has not yet been submitted. Wills said he was unaware that a burbot SOR is imminent, noting that he has not spoken to Bob Hallock recently. He did speak to Sue Ireland of the Kootenai Valley Resource Initiative; there is unlikely to be a request for a burbot flow in November or December, although there is some desire to explore cooling flows from Libby. Amy Reece of the Corps said it should be possible to use selective withdrawal at Libby to release somewhat cooler water for burbot pre-spawning. Bettin added that he expects the SOR to be available by this Friday; it will be posted to the TMT homepage once it is received.

6. Libby Operations.

Libby is currently releasing 4.7 Kcfs and filling slightly; current elevation at the project is 2447 feet, said Hlebechuk. We're expecting the December 31 elevation target at Libby to come in at 2411 feet, which means that we need to increase flows to 19 Kcfs by next Tuesday, November 2. On Friday night, we'll reduce Libby outflow to three units (14-15 Kcfs) over the weekend. After that, we'll be looking to draft Libby gradually through the end of December, Hlebechuk said.

7. Albeni Falls Operations.

Albeni Falls is drafting to 2055 by November 15, said Hlebechuk, the project is releasing 24 Kcfs and is at elevation 2056.5 feet, currently. She noted that the Bonners County sheriff's office called to report a possible murder, with a burial in the lake; they requested that we draw the pool down to elevation 2051. We replied that that would not be possible, Hlebechuk said. Given the fact that the evidence isn't going to disappear, and they're not even sure that it's there, the Corps has decided not to change the current operation, she said.

8. Water Management Plan Comments.

Hlebechuk said the most recent draft of the 2005 Water Management Plan will be posted to the TMT website by next Wednesday, November 3; she asked that any comments on this draft be submitted by November 24. She added that the Corps will begin working on the fall/winter update soon.

9. Current Operations Status.

Hlebechuk said that Dworshak continues to release minimum outflow; it is filling slowly, and is currently at about elevation 1522. There was a problem with Unit 1, which the Corps has been using to provide the minimum project discharge; CO2 discharge from the unit tripped off last Wednesday due to deteriorating cables. Unit 2, the other small unit, was out of service at the time, but project personnel were able to get it back on-line within five hours. The Corps released 1 Kcfs spill through the regulating outlets during the outage; no problems were reported at the hatchery downstream. Unit 1 is now back on-line.

The Bonneville spillbay calibration took place as scheduled last week, Hlebechuk continued; the results of that survey will be available in January or February.

Tony Norris reported that Hungry Horse is currently at elevation 3541.2 feet; Grand Coulee is at 1285.9 feet. With respect to fish, there isn't much to report on fish at this point, said Wagner; we're waiting for the chum to arrive. LeFleur added that there is still a trickle of fall chinook passing Bonneville at this time; the next major migration will be spring chinook. In response to a question from Bettin, LeFleur said the expectation is that 2005 will be another good chinook fishing year.

Wellschlager said there is nothing significant to report on the power supply front. Jim Adams said TDG reached 118% below Dworshak six or seven hours after the 1 Kcfs regulating outlet spill was released from the project; had this been a more prolonged operation, the Corps estimates that TDG levels might have reached 130%. We may want to consider a lesser outflow in the event of a similar powerhouse outages at this time of year in the future, Adams said.

10. Next TMT Meeting Date.

The next TMT meeting after the November 10 TMT annual review was set for Wednesday, November 24. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
October 27, 2004

Name	**Affiliation**
Robin Harkless	Facilitation Team
Ron Boyce	ODFW

Cindy LeFleur	WDFW
Paul Wagner	NOAA Fisheries
John Wellschlager	BPA
Tony Norris	USBR
Kyle Martin	CRITFC
Mike O'Bryant	CBB
Cathy Hlebechuk	COE
Tim Heizenrater	PPM
Scott Bettin	BPA
Nic Lane	BPA
Rudd Turner	COE
Jim Adams	COE
David Wills	USFWS
Steve Haeseker	USFWS
Mike Buchko	Powerex
Amy Reece	COE
Greg Hoffman	COE
David Benner	FPC
Chris Carlson	GCPUD
Ruth Burris	PGE
Bruce MacKay	Consultant
Tom Le	PSE

MEMORANDUM October 26, 2004

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, October 24, 2004

Discussion: On Sunday, October 24, 2004 the third official Vernita Bar ground redd count was conducted to determine the Initiation of Spawning in the 36 kcfs – 50 kcfs zone and above the 50 kcfs zone at Vernita Bar. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 38 kcfs. Results of this survey are provided in the table below.

	---------- Redd Count by Flow Level (kcfs) ----------						Total Number
Transect	(36 – 50)	(50 – 55)	(55 – 60)	(60 – 65)	(65 – 70)	(Above 70)	Of Redds
Above A	4	0	0	0	0	0	4
A – AB	1	0	0	0	0	0	1
AB – B	1	0	0	0	0	0	1
Below B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
Totals	6	0	0	0	0	0	6

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of Spawning has been set to be on October 20 for the 36 – 50 kcfs elevation zone (the Wednesday before the weekend on which the Monitoring Team identifies five or more redds within the zone). Initiation of Spawning has not been established for the zone above the 50 kcfs elevation.

Last year, on October 26 there were two redds observed in the 36-50 kcfs zone, three redds within 50-55 kcfs, two redds between 55-60 kcfs, one redd between 60-65 kcfs and none above 65 kcfs elevation.

The next redd count will occur on October 31, 2004 and require a USGS gauging station flow of 50 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Linda Jones
Jeff Atkinson
Scott Bettin
Steve Brown
Scott Carlon
Dennis Dauble
Mike Erho
Gary Garnant
Paul Hoffarth
Lance Elias
Chuck Goligoski
Shane Bickford
Gary Donabauer
Steve Hays
Leon Hoepner
Rick Klinge
John Muir
Rod Noteboom
Greg Lange
Russ George
Tom Lorz
Bill Berry
Geoffrey McMichael
Robert Mueller
Paul Wagner
Bill Tweit
Bob Heinith
Cliff Sears
Lon Topaz
Rudd Turner
Dispatch
F & W Team
PRD Operators
Relicensing Library
WAN Operators
Kelly Harlan
Shane Scott
Greg Patton

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

COLUMBIA RIVER REGIONAL FORUM

Technical Management Team

Annual Review of Lessons Learned: 2004

November 10, 2004
10 am - 3 pm

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. **Welcome and introductions.**
2. **2004 Comparison to Previous Years**
   - **Water and Runoff patterns . Cathy Hlebechuk, COE**

     [Comparsion] [Observed Runoff]
     [Libby Reservoir 2004]
     [Hungry Horse Reservoir 2004]
     [Grand Coulee Reservoir 2004]
     [Priest Rapids 2004] [Priest Rapids 2003] [Priest Rapids 2002] [Priest Rapids 2001]
     [Dworshak Reservoir 2004]
     [Lower Granite 2004] [Lower Granite 2003] [Lower Granite 2002] [Lower Granite 2001]
     [McNary 2004] [McNary 2003] [McNary 2002] [McNary 2001]
   - **Temperature/TDG Level Variations . Jim Adams, COE**

     [Technical Management Team - 2004 Year End Review - Water Quality]
   - **Fish Passage . Jerry McCann, Fish Passage Center**

     [Smolt Migration 2004]
   - Clues about Relative Survival of Adults - Jeff Fryer, CRITFC

     [Clues as to the relative survival of 2001 outmigrants as revealed by the age composition of Chinook and sockeye salmon at

[Bonneville Dam]

- Weather . Kyle Martin, CRITFC

  [Summary of Water Year 2004 Weather, November 10th, 2004]
  [Winter 2004-2005 Climate Forecast]
  [CRITFC Forecast]
- Adult Fish Runs/Fisheries Review: Forecasts and Techniques. Cindy LeFleur, WDFW

  [Preliminary Review of 2004 Columbia River Fish Runs and Fisheries]

3. Snake River Review
   - EPA Water Temperature Modeling. Kyle Martin, CRITFC

     [Clearwater River at Peck (1979, 1991, 1994 weather and Lower Granite Dam (1979, 1991, 1994 weather)]
   - Fall Chinook Survival Studies
     - Life History Winter Passage. Ken Tiffan, USGS

       [Investigation passage of ESA-listed juvenile fall Chinook salmon at Lower Granites Dam during winter when the fish bypass system is not operated]
4. 2004 Study Information That Might Impact 2005 Operations
   - NOAA Survival Studies. Bill Muir, Paul Wagner

     [Hydropower System Smolt Survival, 1993-2004]
     [Juvenile collection and transportation reseacrh program]
     [Appendix C - Adult Returns from Previous and In-progress Studies]
     [Appendix Table D1 - Snake River wild steelhead studies]
   - Ice Harbor Results: Spring/Summer. COE Walla Walla

     [IHR summer]
     [IHR spring]
   - Bonneville/Spring Creek. COE

     [BON hydroacoustics]
     [BON FPE]
     [BON exec.sum.]
   - MT Resident Fish Study . Brian Marotz, MTFG

     [Monitoring the Effects of NPCC Mainstem Amendments on Resident Fish in Montana]
5. Other Lessons Learned
   - Impacts of 2001 operations on adult returns
     - Impacts on adult returns . Russ Kiefer, IDFG
       [Impacts of 2001 Migration Conditions on Adult Returns]
     - Study of effects of transport on adult escapement survival. Chris Perry, Univ. of Idaho
6. Evaluation of TMT Process
   - Discuss evaluation process.Jacqueline Abel

NOTE: Lunch will be brought in for all participating in or attending the meeting.
A $6 contribution is encouraged and RSVP required to guarantee enough food for everyone!
Please call the facilitation team by 12 pm 11/8 at 503-248-4703 to RSVP.

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942

COMPARISON OF WY 01, 02, 03 AND 04 ACTUAL FLOLWS AND OBJECTIVES

MCNARY ACTUAL OUTFLOW AND FLOW OBJECTIVES

April 10 to June 30	2001	2002	2003	2004
Actual Avg Flow	124	269	231	203
Objective	220	246	220	220

July 01 to Aug 31	2001	2002	2003	2004
Actual Avg Flow	92	189	135	134
Objective	200	200	200	200

LOWER GRANITE ACTUAL AVG OUTFLOW AND FLOW OBJECTIVES

April 03 to June 20	2001	2002	2003	2004
Actual Avg Flow	47.5	83	90	70
Objective	85	97	87	85

June 21 to August 31	2001	2002	2003	2004
Actual Avg Flow	26	41	32	33
Objective	50	51	50	50

PRIEST RAPIDS ACTUAL AVG OUTFLOW QAND FLOW OBJECTIVES

April 10 to June 30	2001	2002	2003	2004
Actual Avg Flow	77	181	141	125
Objective	135	135	135	135

OSERVED 2001, 2002, 2003 AND 2004 VOLUME RUNOFF IN MILLION ACRE FEET

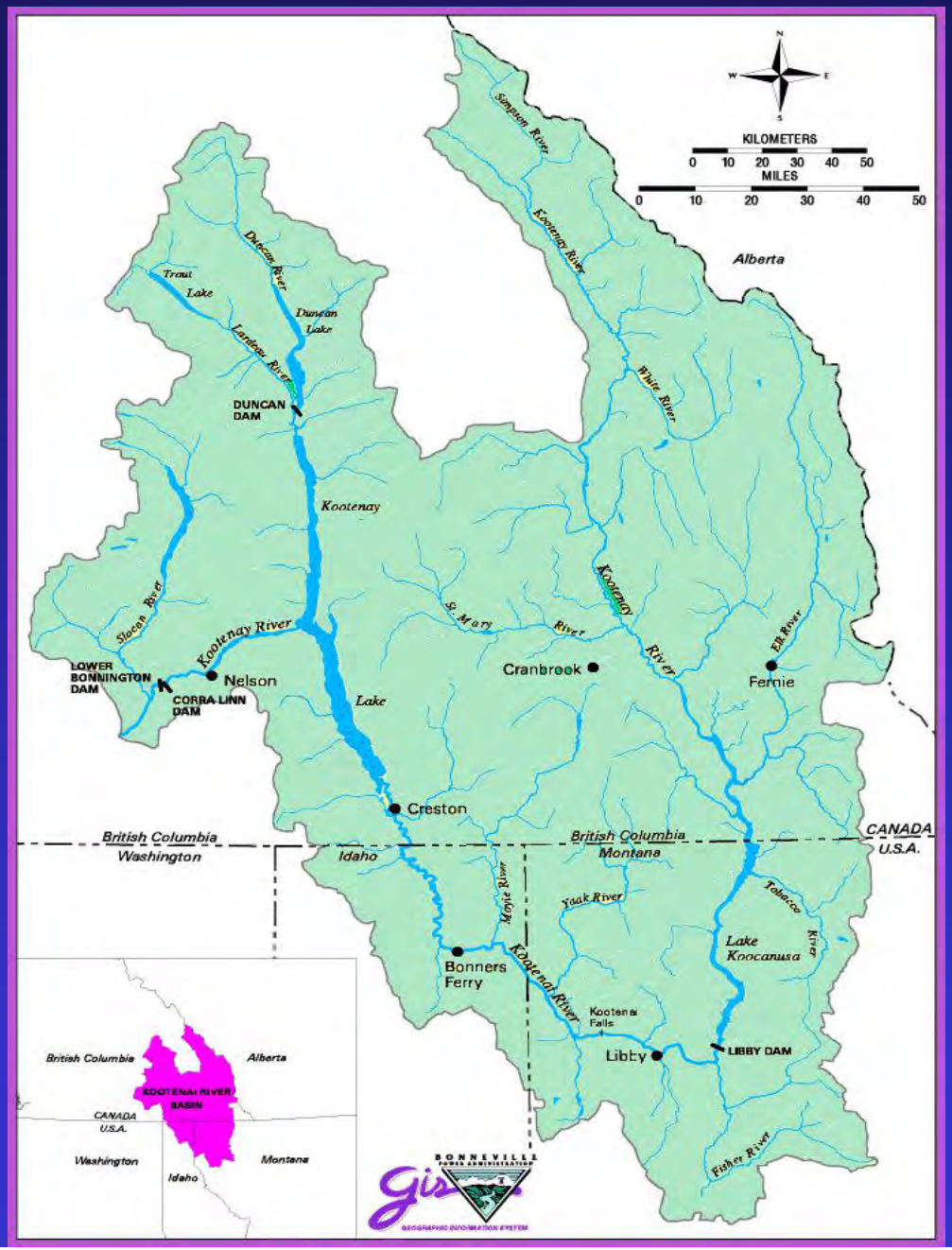
	JAN-JUL 01		JAN-JUL 02		JAN-JUL 03		JAN-JUL 04		APR-AUG01		APR-AUG02		APR-AUG03		APR-AUG04	
PROJECT	OBS	%	OBS	%	OBS	%	OBS	%	OBS	%	OBS	%	OBS	%	OBS	%
HUNGRY HORSE	1.3	57	2.3	103	1.82	82	1.9	85	1.27	60	2.21	107	1.66	80	1.78	86
LIBBY	3.34	52	7.18	114	5.19	82	4.6	73	3.17	50	7.1	114	5.08	81	4.68	75
ALBENI FALLS	7.74	50	15.92	104	12	78	11.6	76	7.01	51	14.68	110	10.05	75	10.4	77
GRAND COULEE	37.39	59	68.02	108	54.18	86	50.3	80	37.42	61	65.32	108	50.24	83	49.3	82
DWORSHAK	1.82	51	4.35	123	3.56	100	3.04	86	1.54	55	3.87	141	2.35	86	2.5	91
LOWER GRANITE	14.38	48	23.99	80	23.81	79	20.7	69	11.06	48	20	87	17.65	77	16.1	70
THE DALLES	58.19	55	103.75	97	87.69	82	83	77	52.79	57	93.8	101	73.77	79	73	78

Monitoring the Effects of NPCC Mainstem Amendments on Resident Fish in Montana

Brian Marotz
Fisheries Program Manager

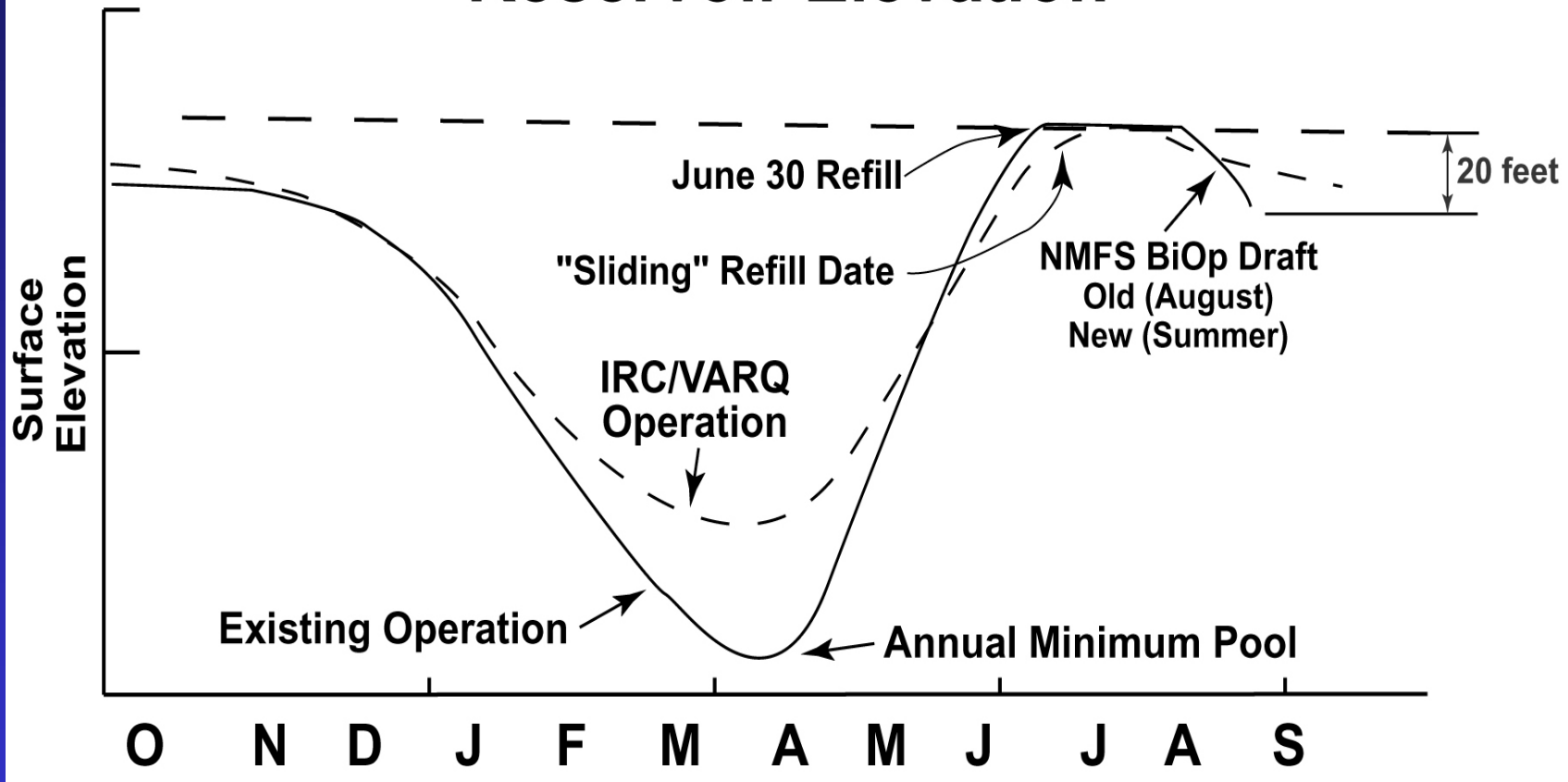
Fisheries Biologists: Grant Grisak, Clint Muhlfeld and Jim Dunnigan

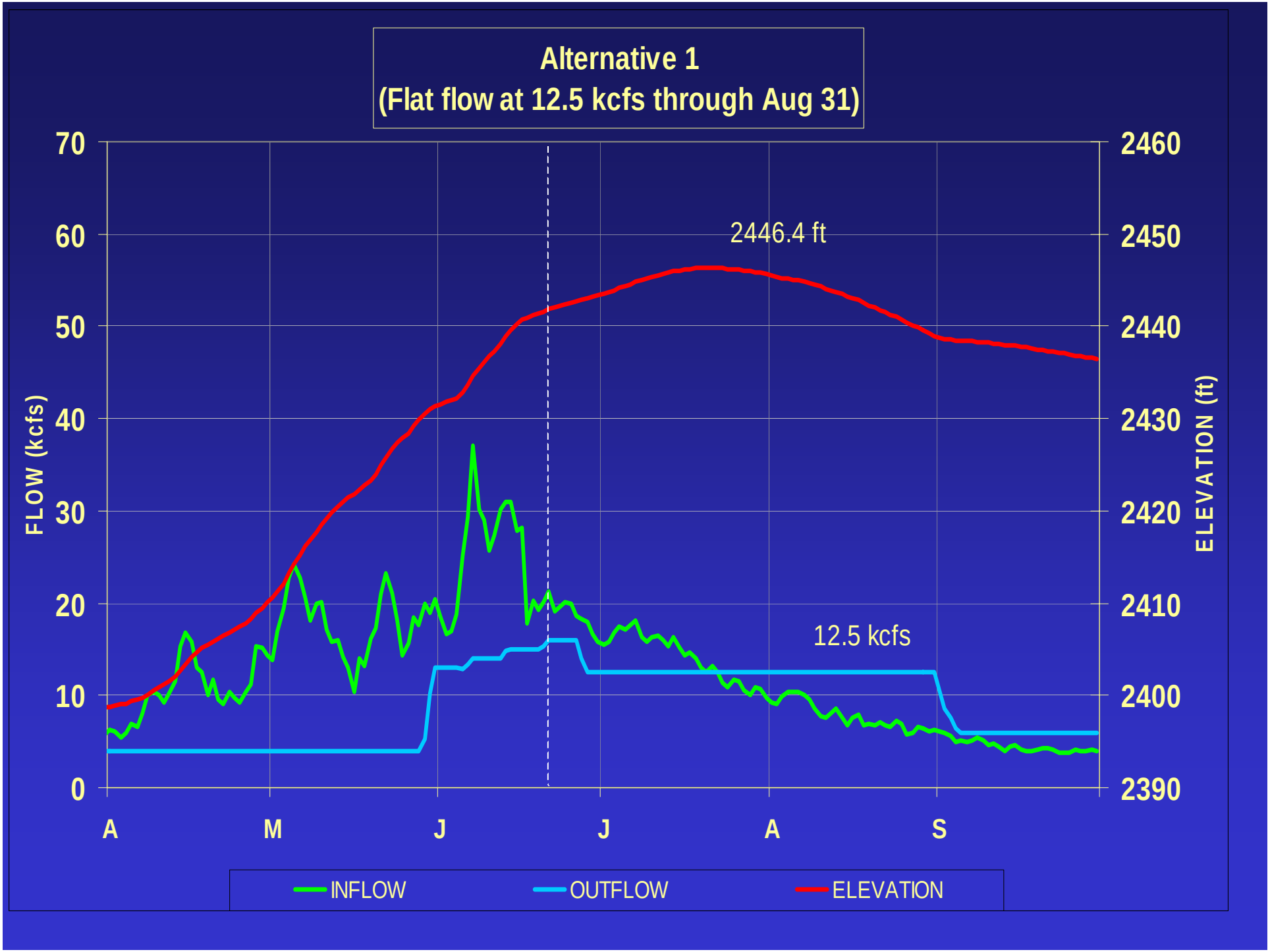
Kootenai Subbasin

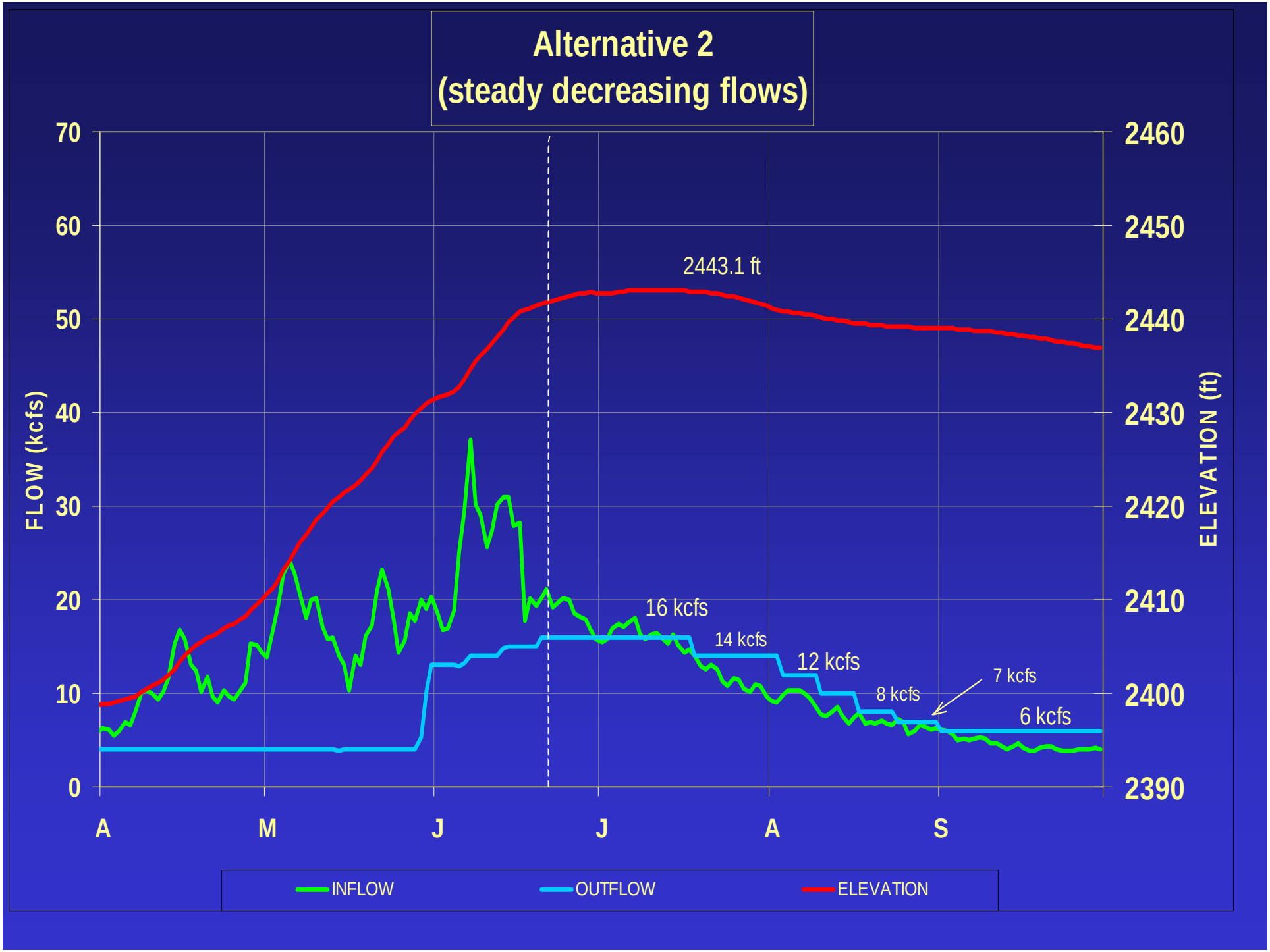


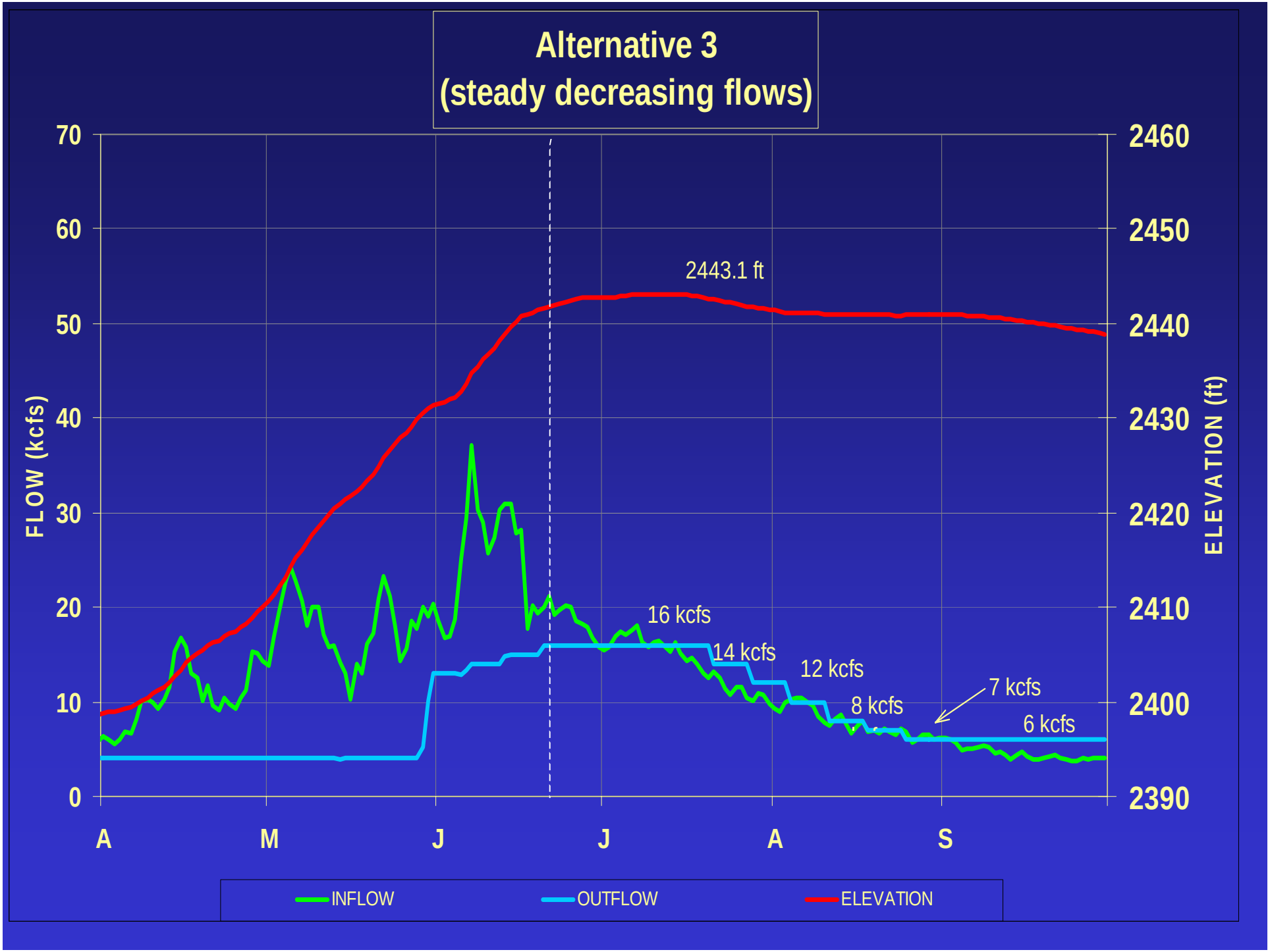

Libby Dam - Lake Koocanusa

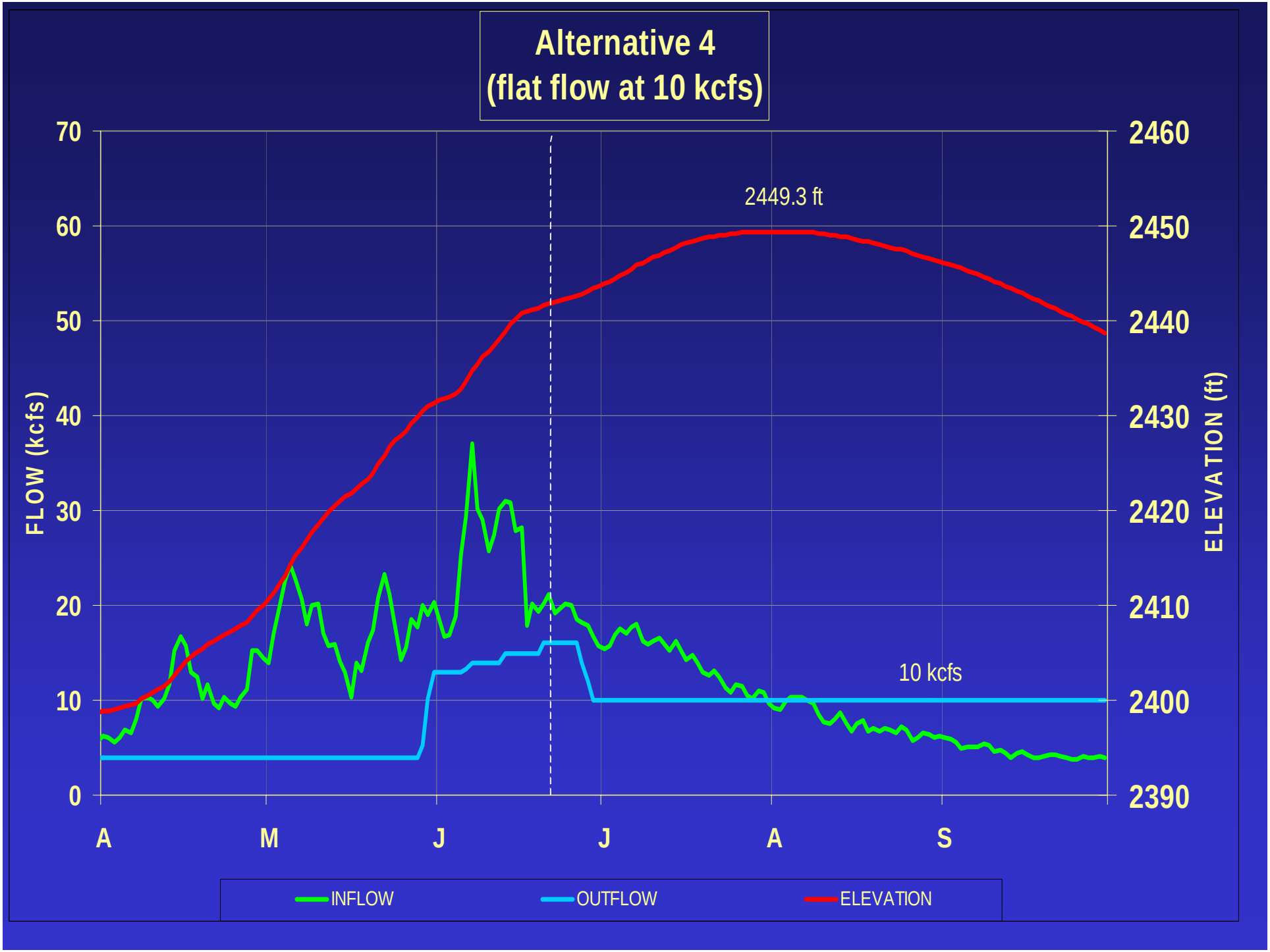
Reservoir Elevation

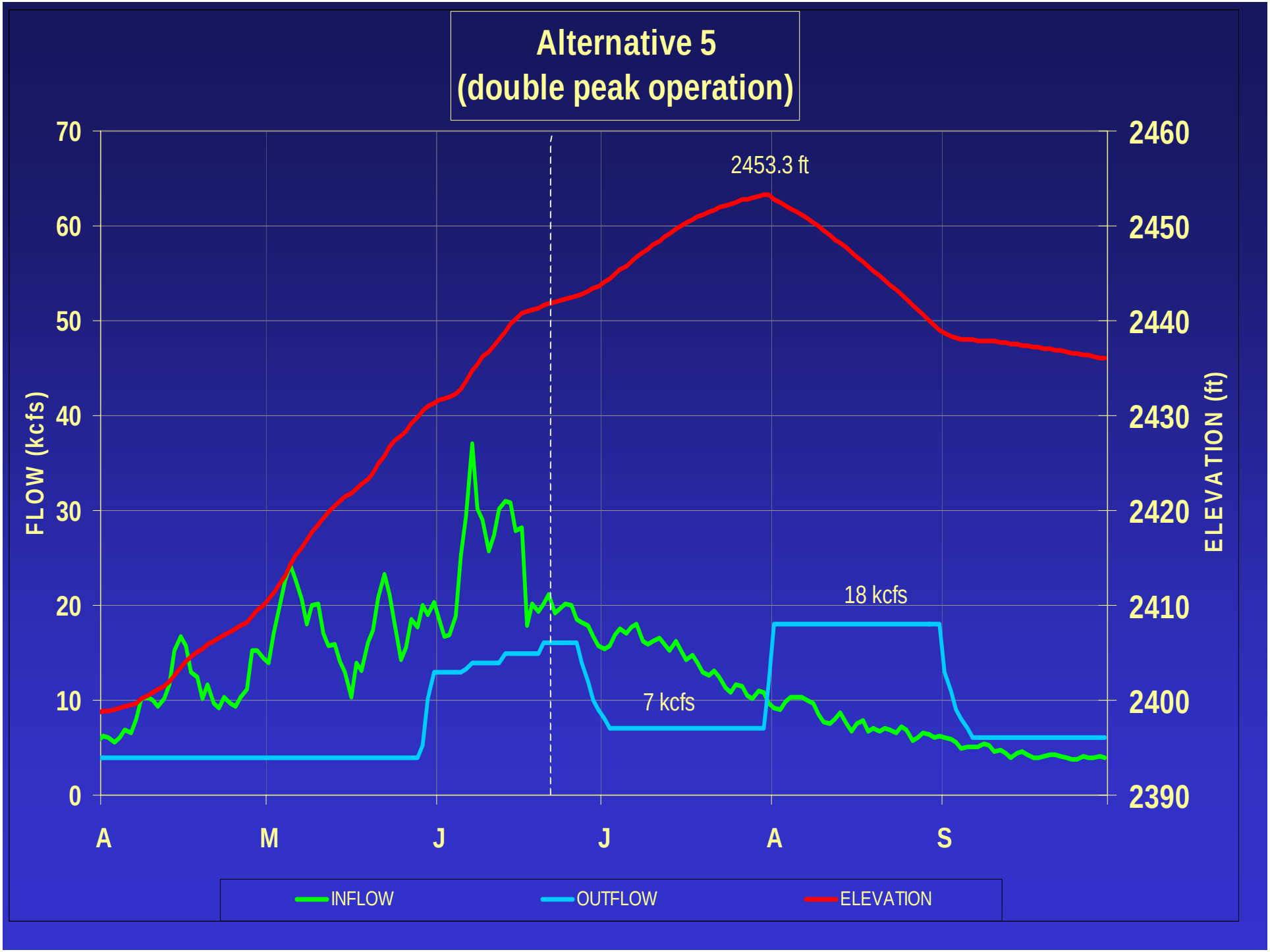


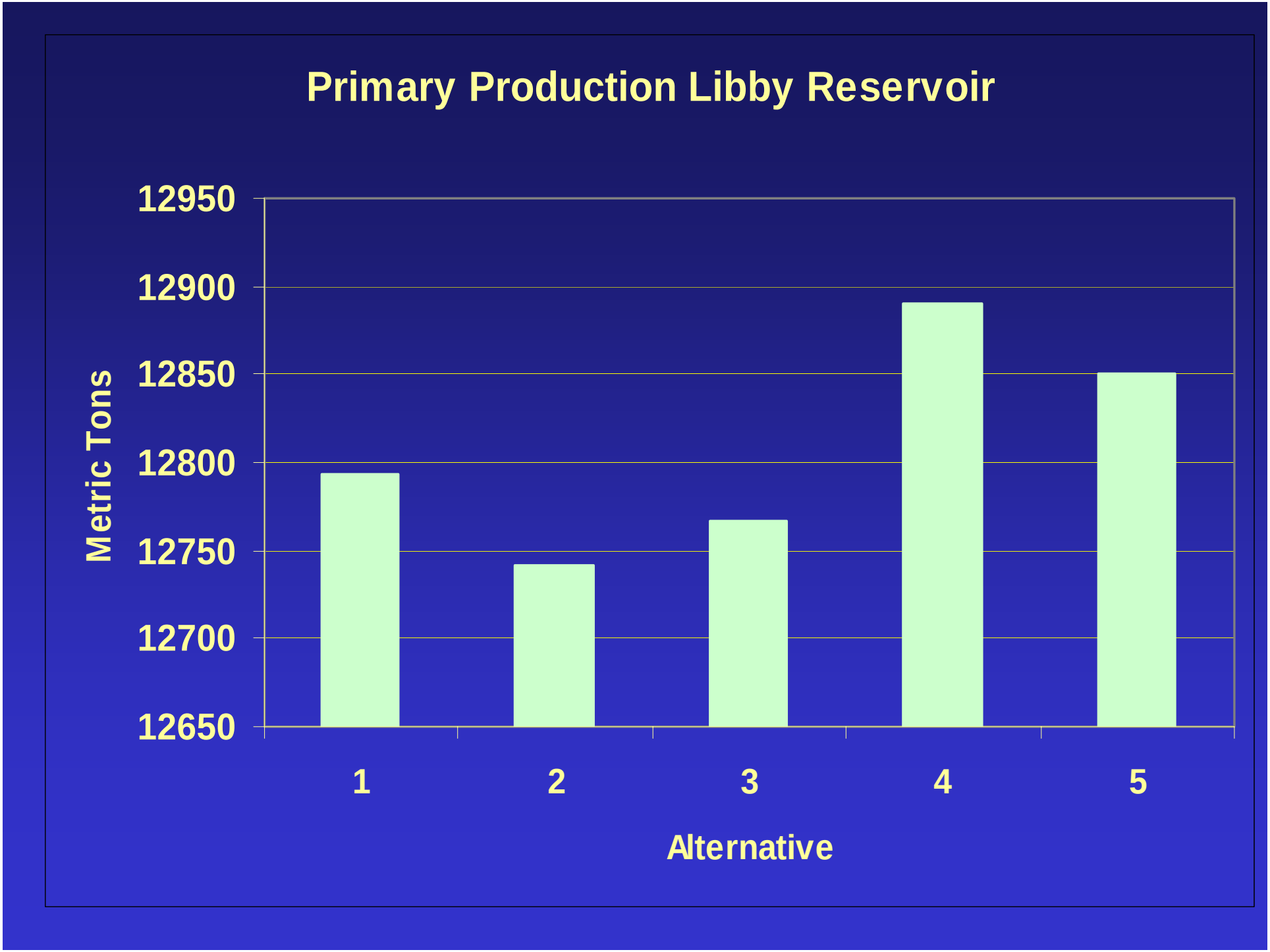

Alternative 1
(Flat flow at 12.5 kcfs through Aug 31)
70
60
50
40
30
20
10
0
FLOW (kcfs)
2460
2450
2440
2430
2420
2410
2400
2390
ELEVATION (ft)
2446.4 ft
12.5 kcfs
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION


Alternative 2
(steady decreasing flows)
FLOW (kcfs)
ELEVATION (ft)
70
60
50
40
30
20
10
0
2460
2450
2440
2430
2420
2410
2400
2390
2443.1 ft
16 kcfs
14 kcfs
12 kcfs
8 kcfs
7 kcfs
6 kcfs
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION

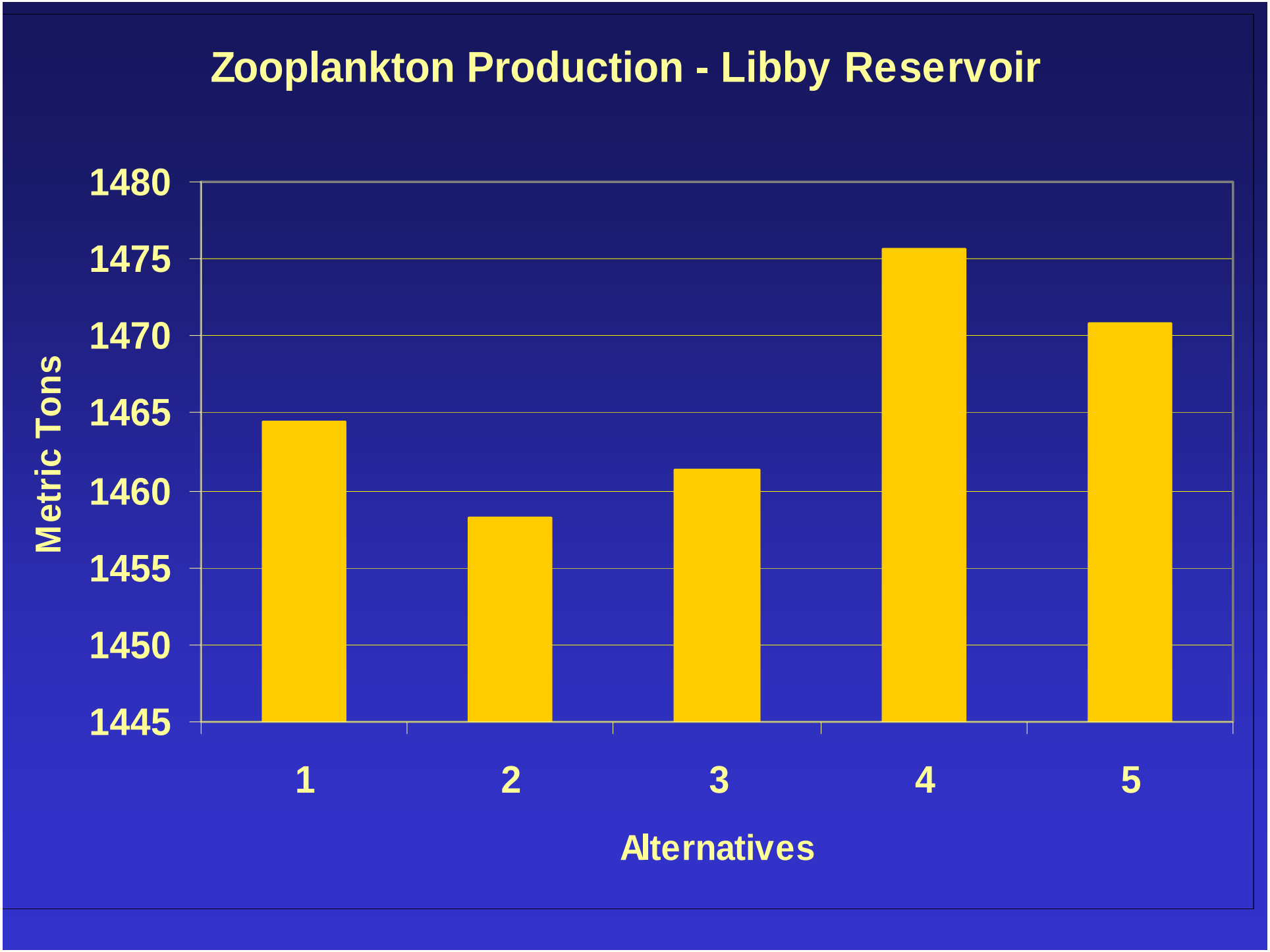

Alternative 3
(steady decreasing flows)
FLOW (kcfs)
ELEVATION (ft)
70
60
50
40
30
20
10
0
2460
2450
2440
2430
2420
2410
2400
2390
2443.1 ft
16 kcfs
14 kcfs
12 kcfs
8 kcfs
7 kcfs
6 kcfs
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION

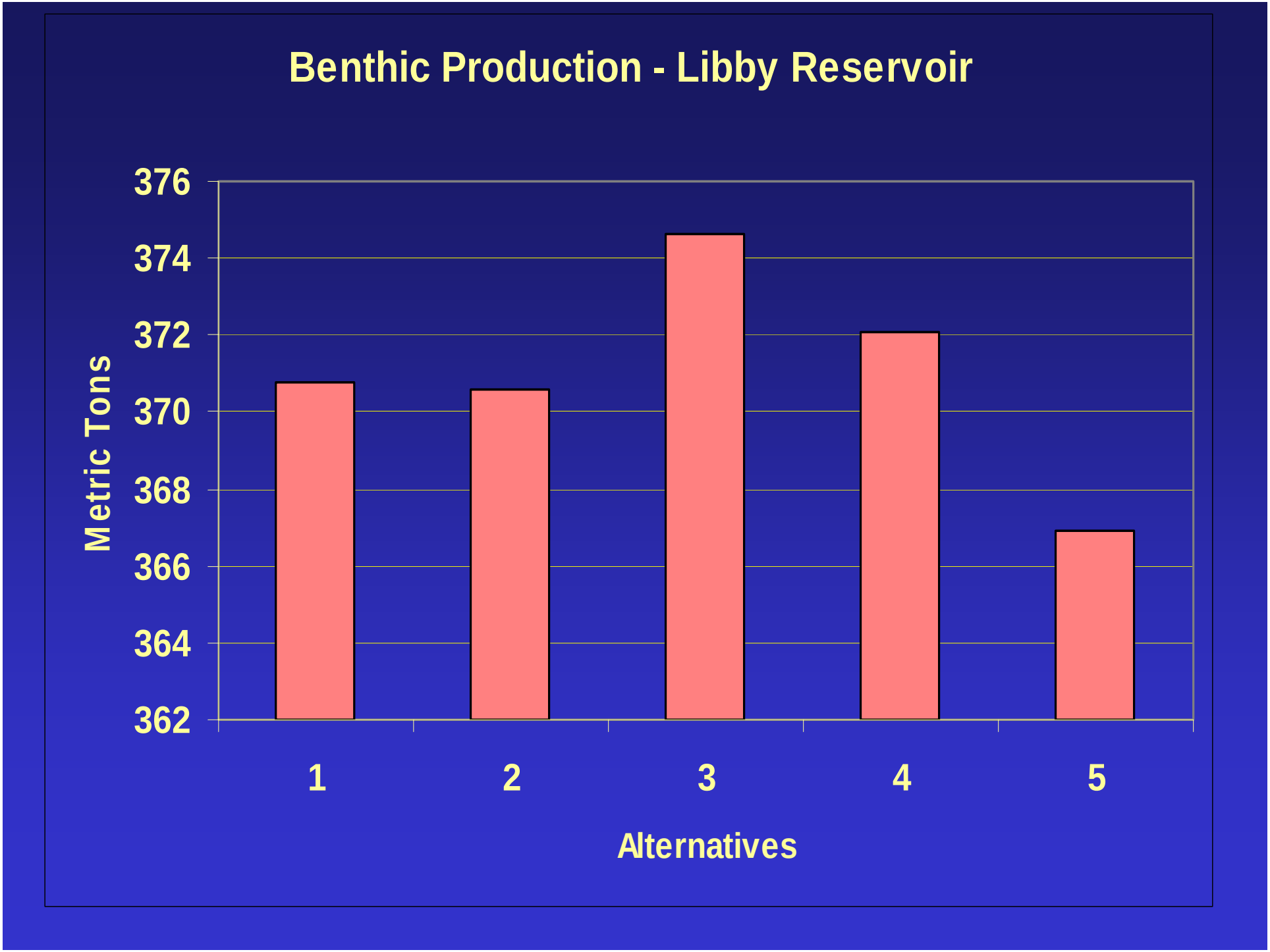

Alternative 4
(flat flow at 10 kcfs)
FLOW (kcfs)
ELEVATION (ft)
70
60
50
40
30
20
10
0
2460
2450
2440
2430
2420
2410
2400
2390
2449.3 ft
10 kcfs
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION

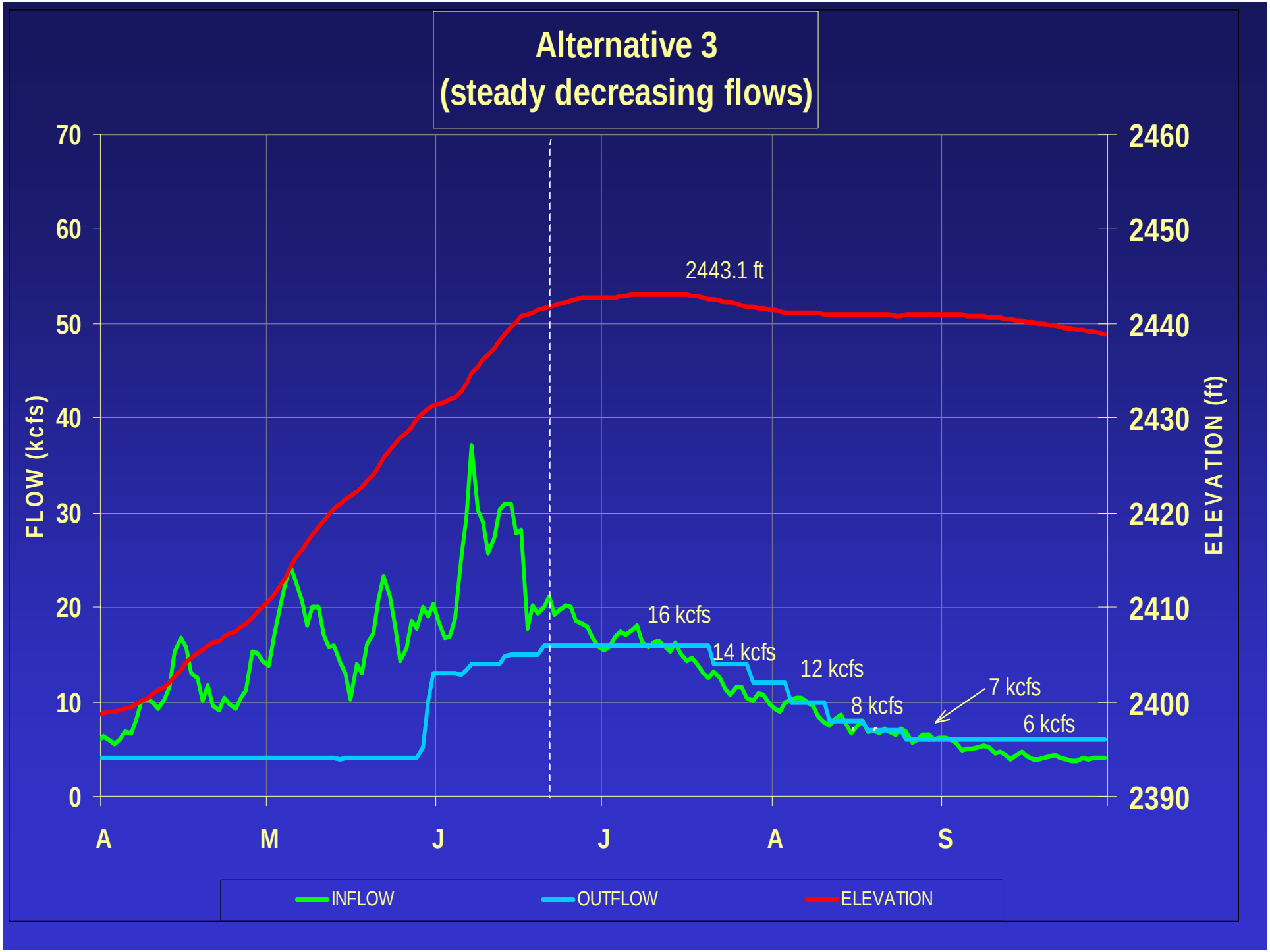

Alternative 5
(double peak operation)
2453.3 ft
18 kcfs
7 kcfs
FLOW (kcfs)
ELEVATION (ft)
70
60
50
40
30
20
10
0
2460
2450
2440
2430
2420
2410
2400
2390
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION

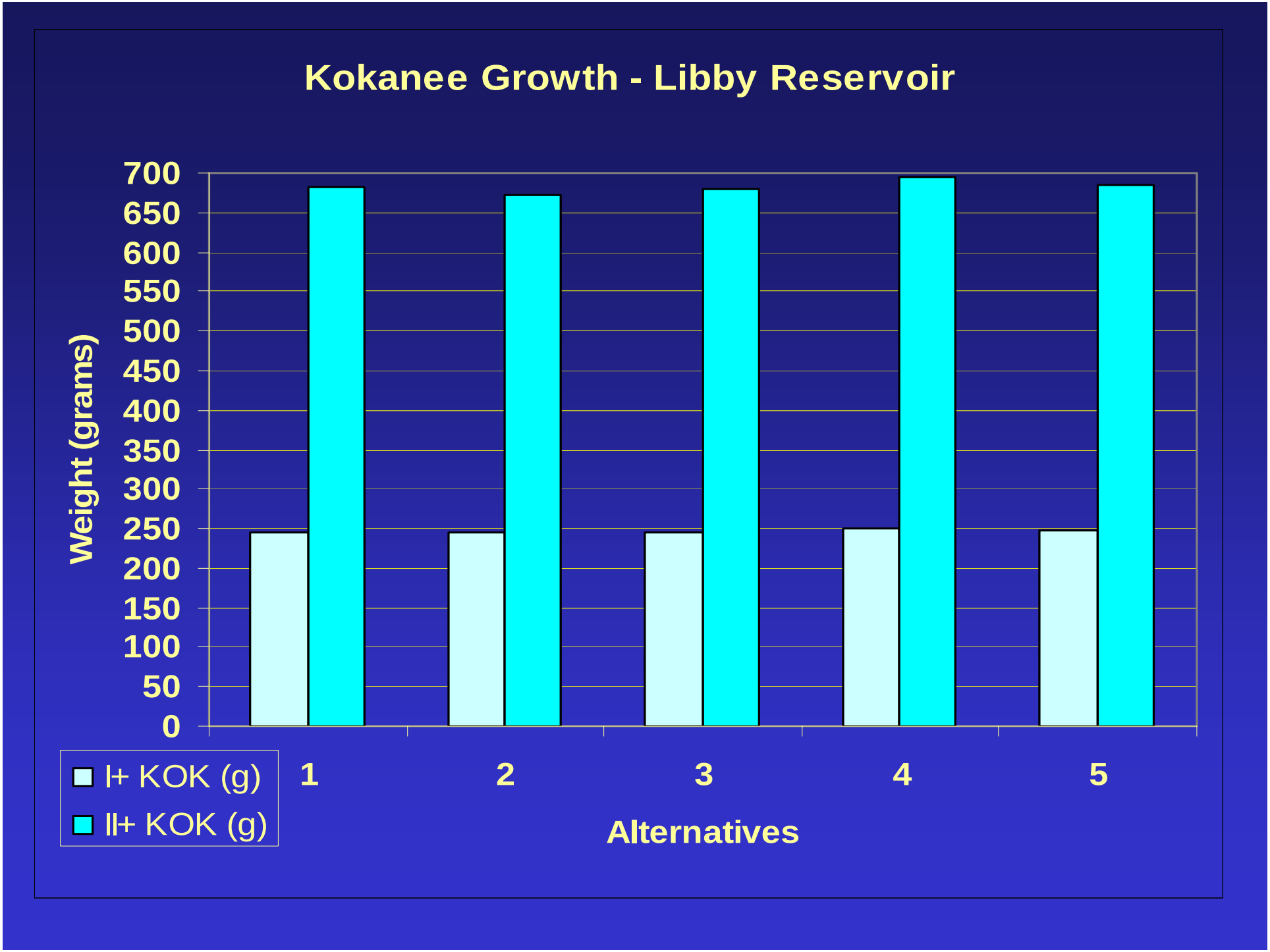

Primary Production Libby Reservoir
12950
12900
12850
12800
12750
12700
12650
Metric Tons
1
2
3
4
5
Alternative

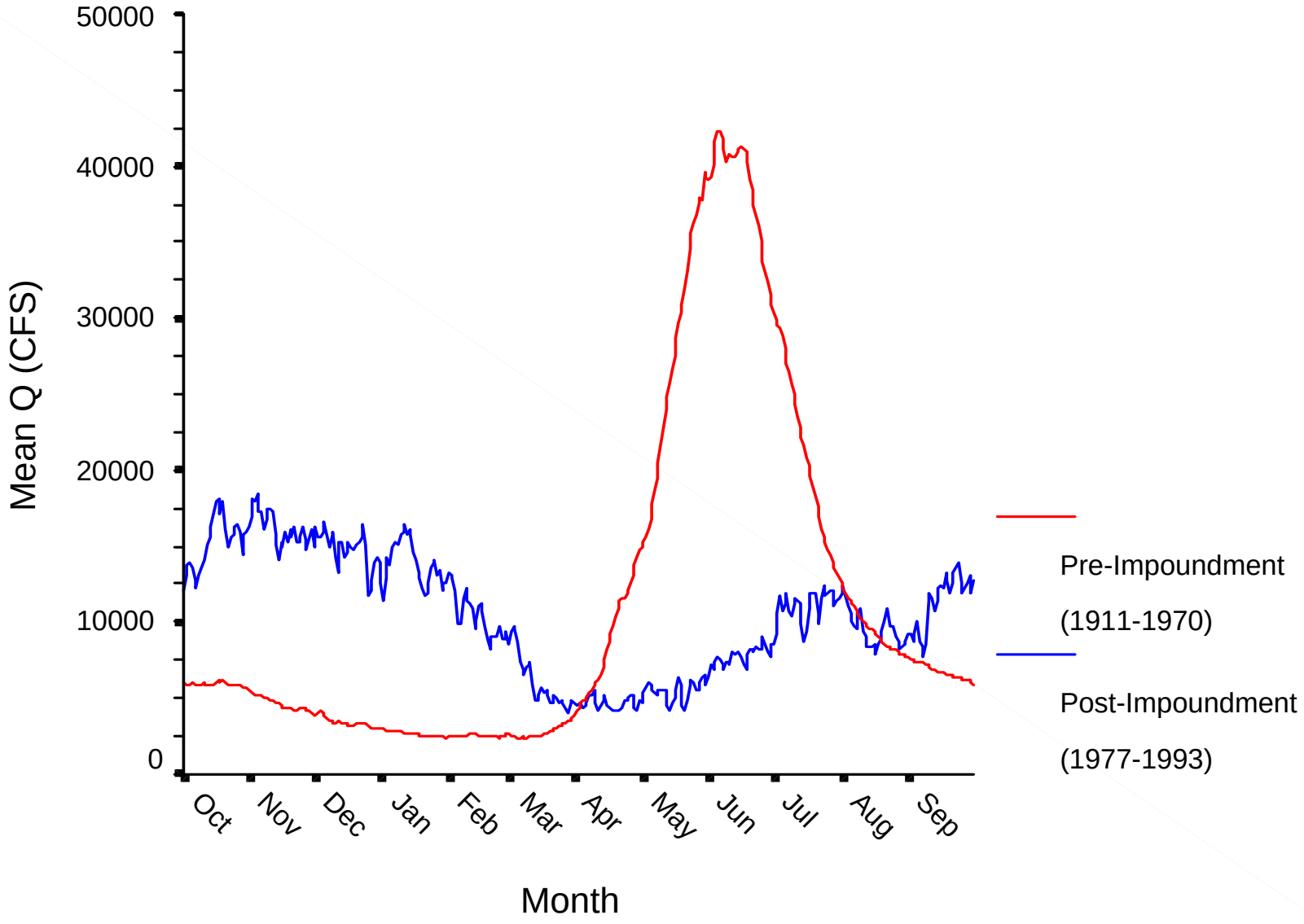
Zooplankton Production - Libby Reservoir



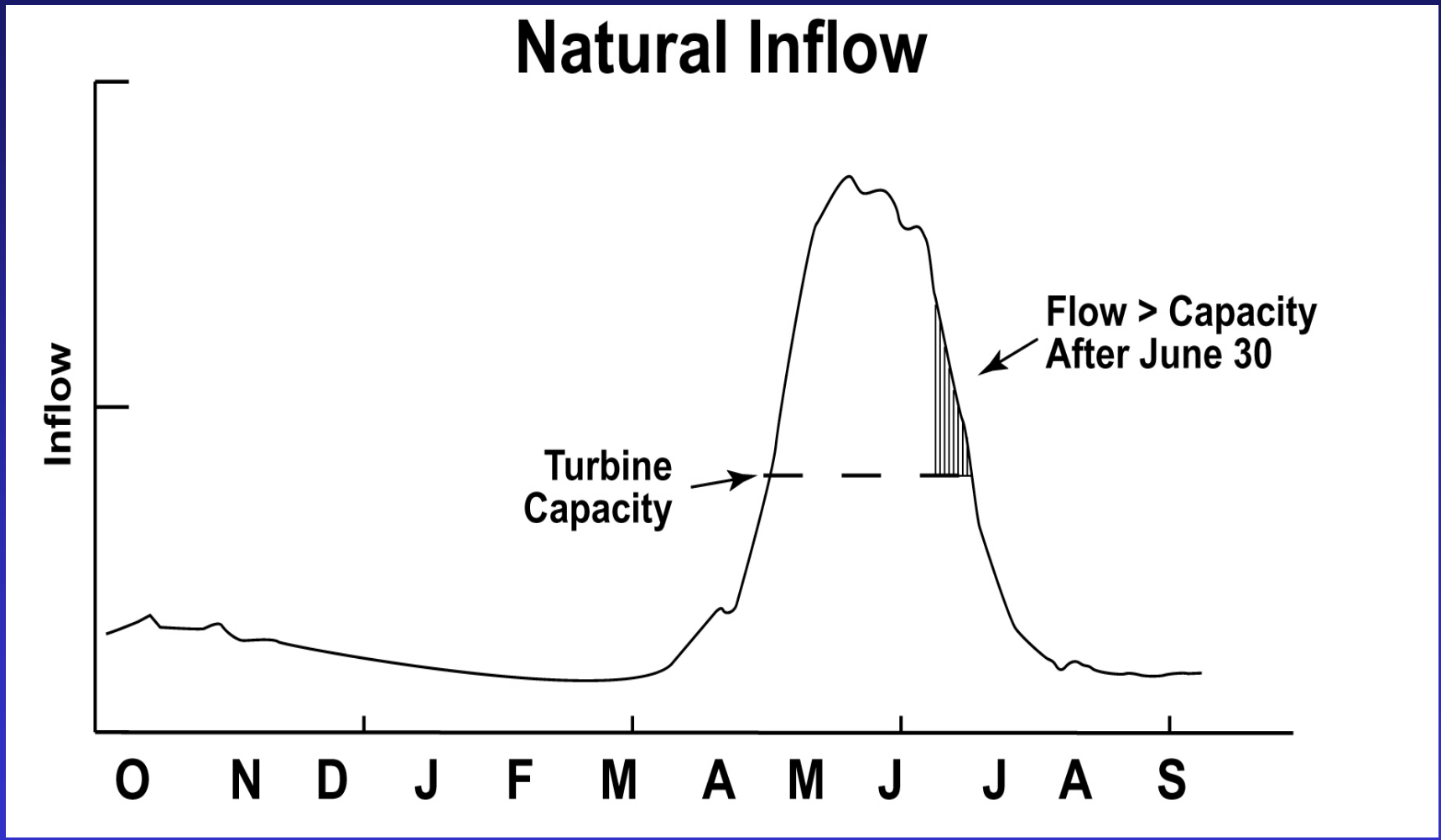

Benthic Production - Libby Reservoir
376
374
372
370
368
366
364
362
Metric Tons
1
2
3
4
5
Alternatives

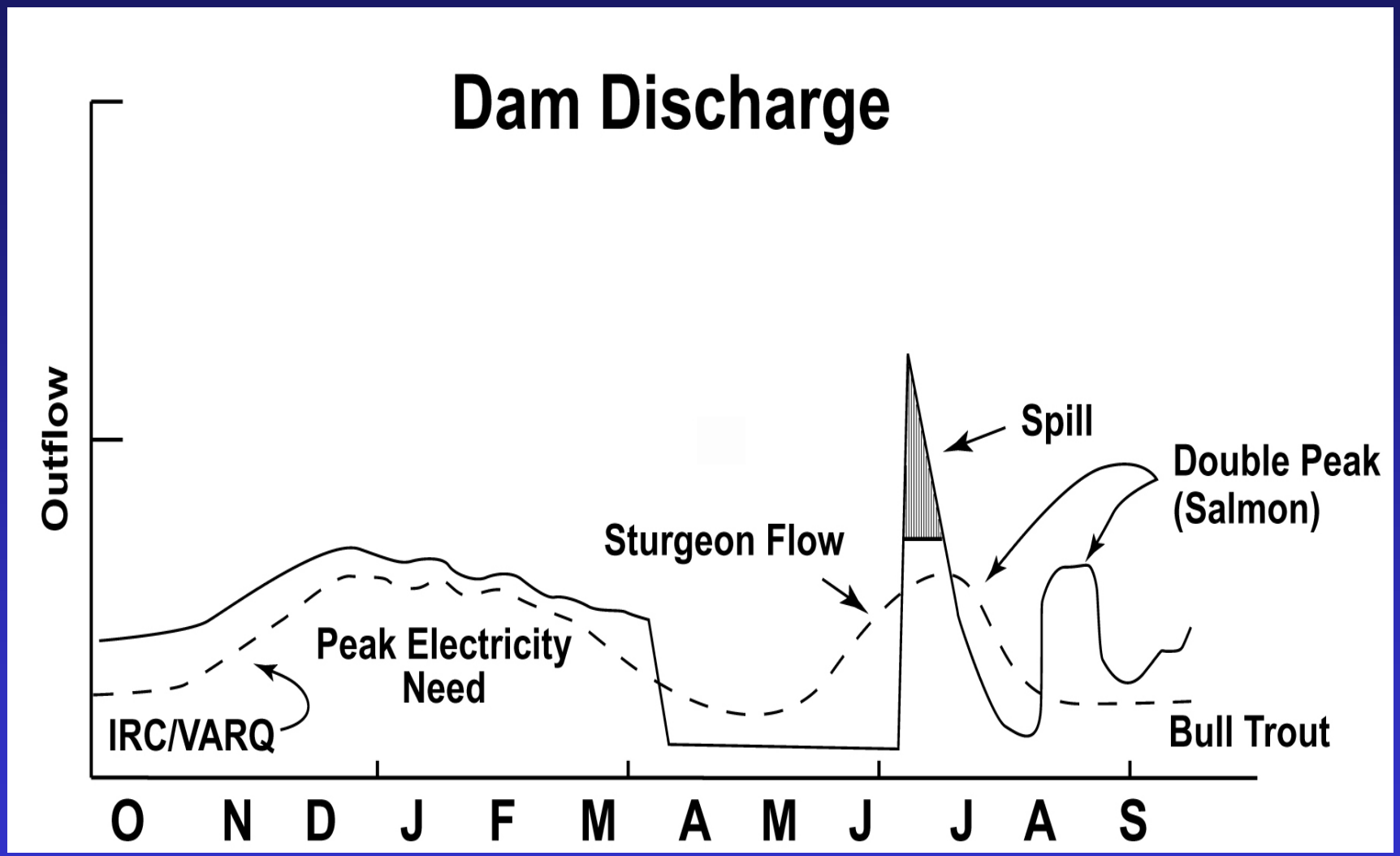

Alternative 3
(steady decreasing flows)
FLOW (kcfs)
ELEVATION (ft)
70
60
50
40
30
20
10
0
2460
2450
2440
2430
2420
2410
2400
2390
2443.1 ft
16 kcfs
14 kcfs
12 kcfs
8 kcfs
7 kcfs
6 kcfs
A
M
J
J
A
S
INFLOW
OUTFLOW
ELEVATION

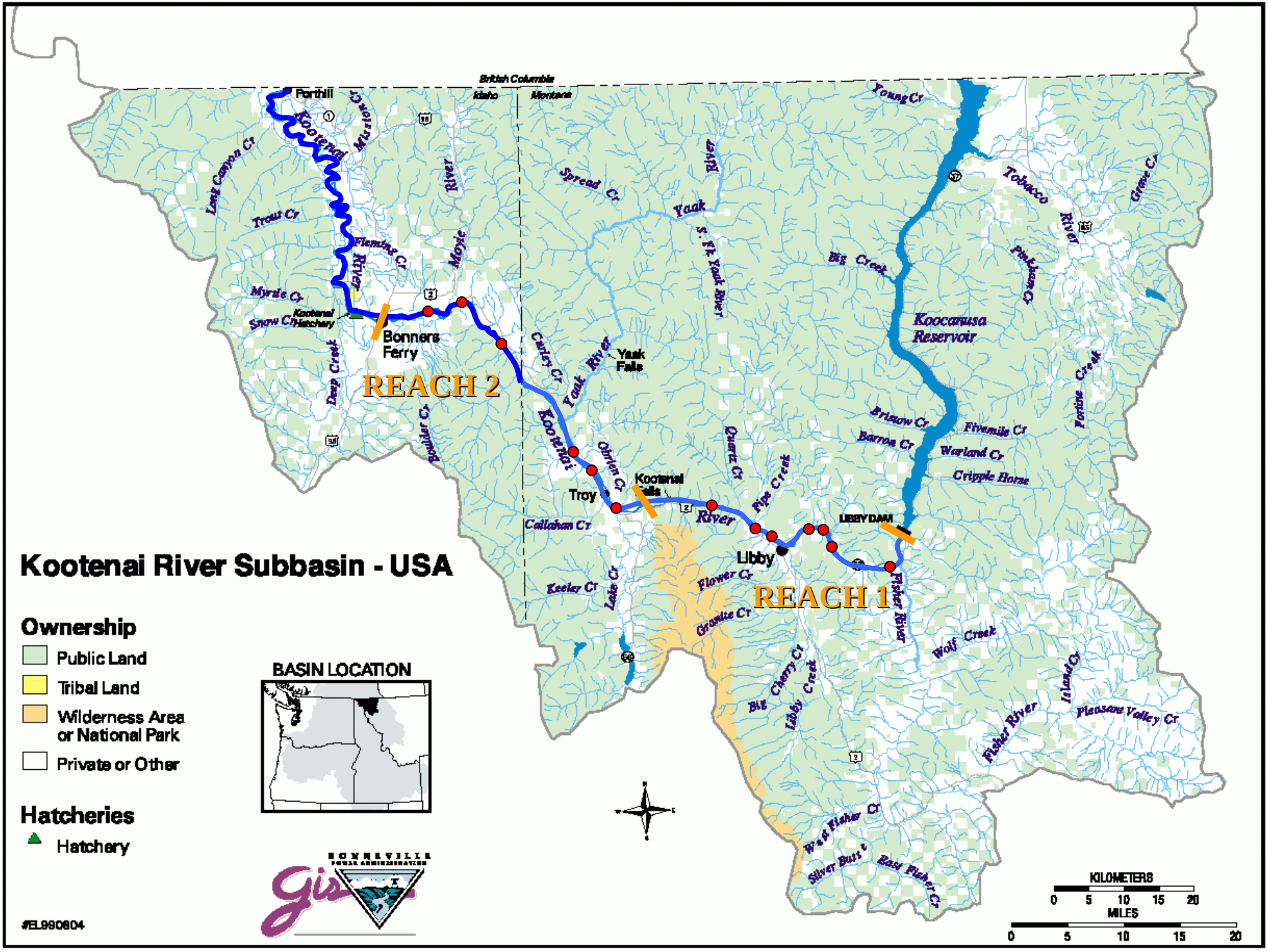

Kokanee Growth - Libby Reservoir
Weight (grams)
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1
2
3
4
5
Alternatives
I+ KOK (g)
II+ KOK (g)


50000
40000
30000
20000
10000
0
Mean Q (CFS)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Month
Pre-Impoundment
(1911-1970)
Post-Impoundment
(1977-1993)

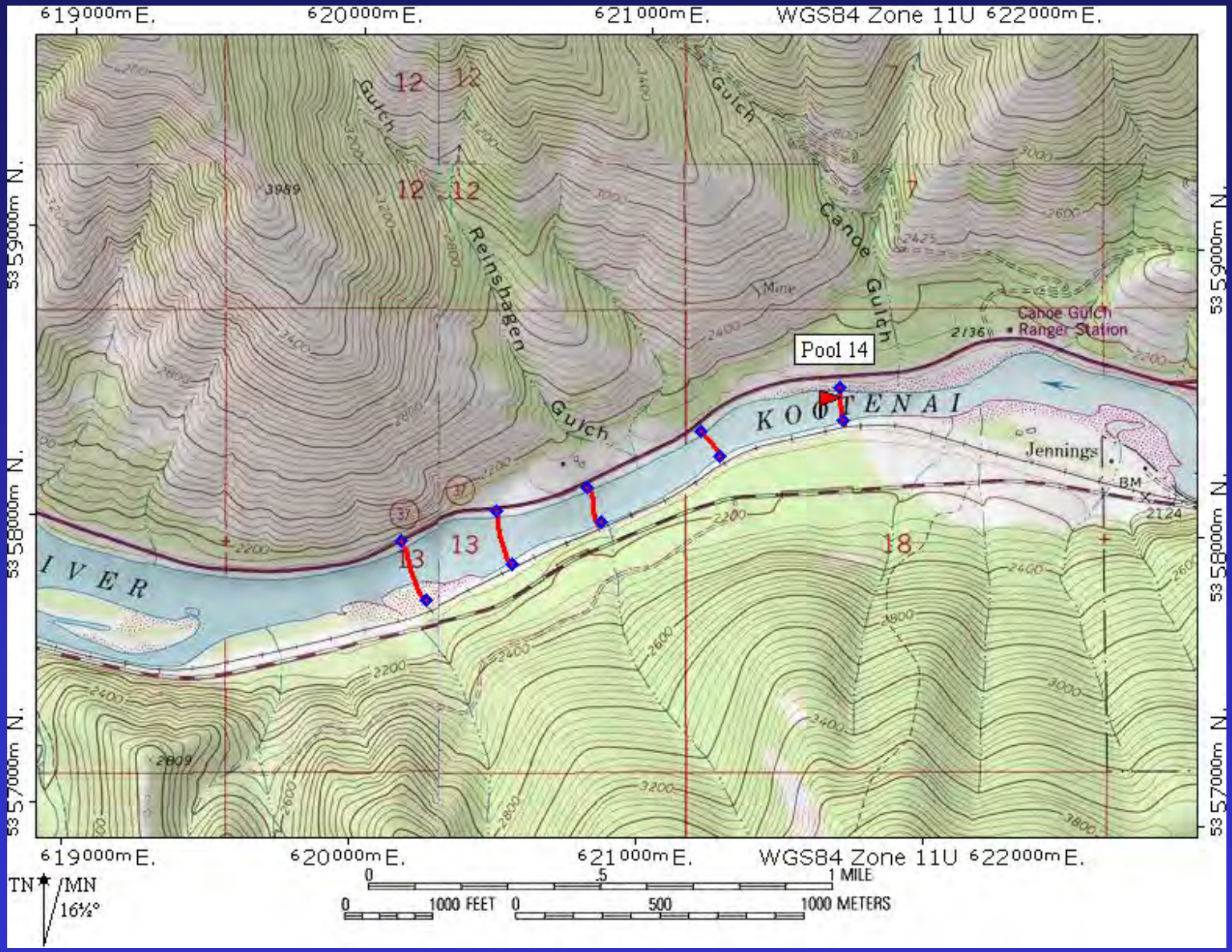
White Sturgeon Tiered Flows


Natural Inflow
Inflow
Flow > Capacity
After June 30
Turbine
Capacity
O
N
D
J
F
M
A
M
J
J
A
S

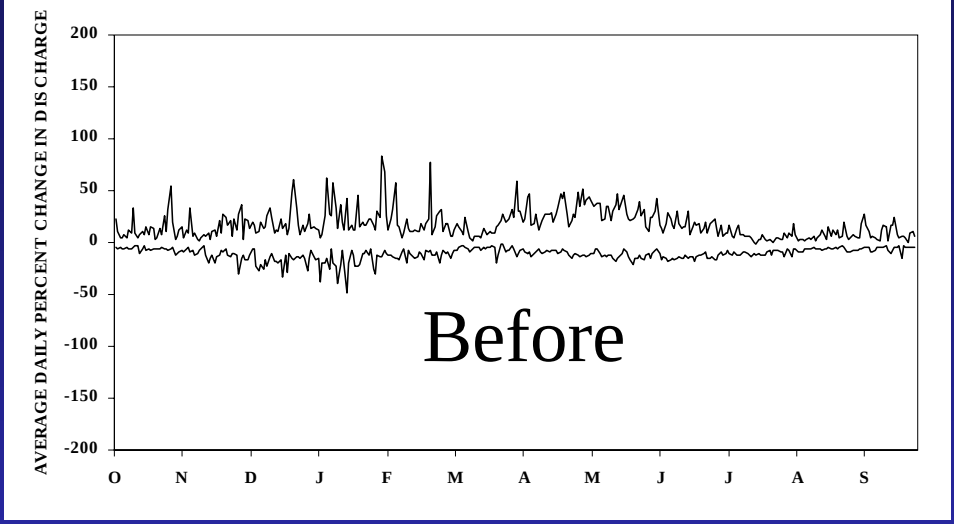

Dam Discharge
Outflow
Spill
Double Peak
(Salmon)
Sturgeon Flow
Peak Electricity
Need
IRC/VARQ
Bull Trout
O
N
D
J
F
M
A
M
J
J
A
S

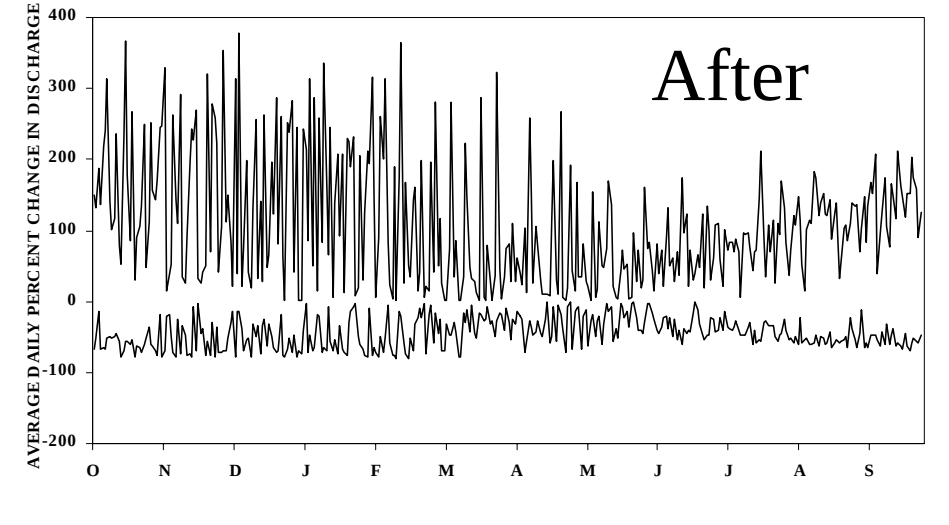

Kootenai River Subbasin - USA
Ownership
Public Land
Tribal Land
Wilderness Area or National Park
Private or Other
Hatcheries
Hatchery
BASIN LOCATION
REACH 2
REACH 1
Porthill
Bonners Ferry
Troy
Libby
Kootenai Falls
Yaak Falls
Koocanusa Reservoir
LIBBY DAM
British Columbia
Idaho
Montana
Kootenai River
Moyie River
Yaak River
Callahan Cr
Keeler Cr
Lake Cr
Flower Cr
Granite Cr
Big Cherry Cr
Libby Creek
Wolf Creek
Fisher River
Pleasant Valley Cr
Island Cr
West Fisher Cr
Silver Butte
East Fisher Cr
Young Cr
Tobacco River
Grave Cr
Pinkham Cr
Big Creek
Fortine Creek
Fivemile Cr
Warland Cr
Cripple Horse
Barron Cr
Brimow Cr
Pipe Creek
Quartz Cr
O'Brien Cr
Curley Cr
Boulder Cr
Deep Creek
Snow Cr
Myrtle Cr
Fleming Cr
Trout Cr
Long Canyon Cr
Mission Cr
Spread Cr
KILOMETERS
0 5 10 15 20
MILES
0 5 10 15 20
#EL990804

Pool 14: GPS-based transects



Daily Discharge Variability

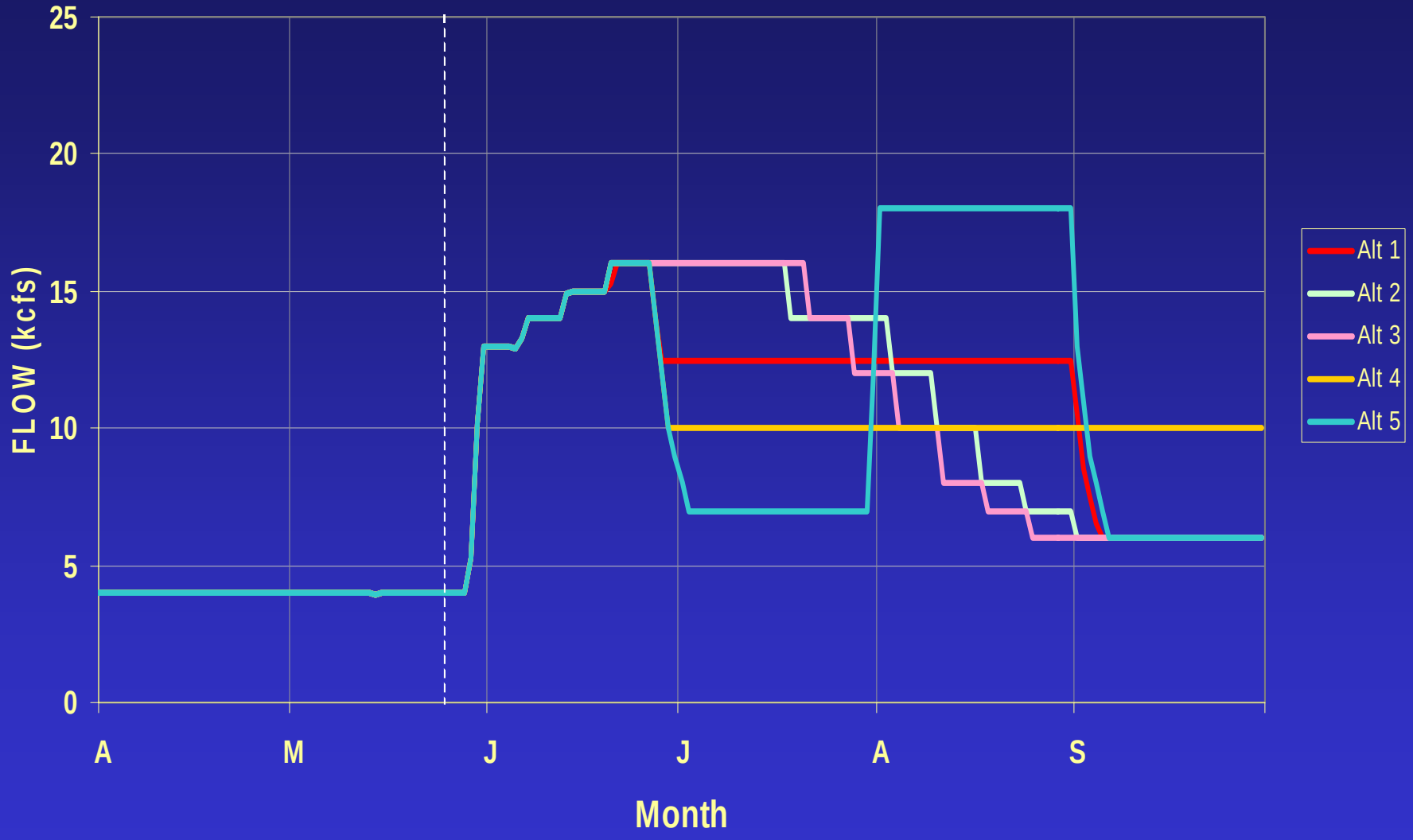


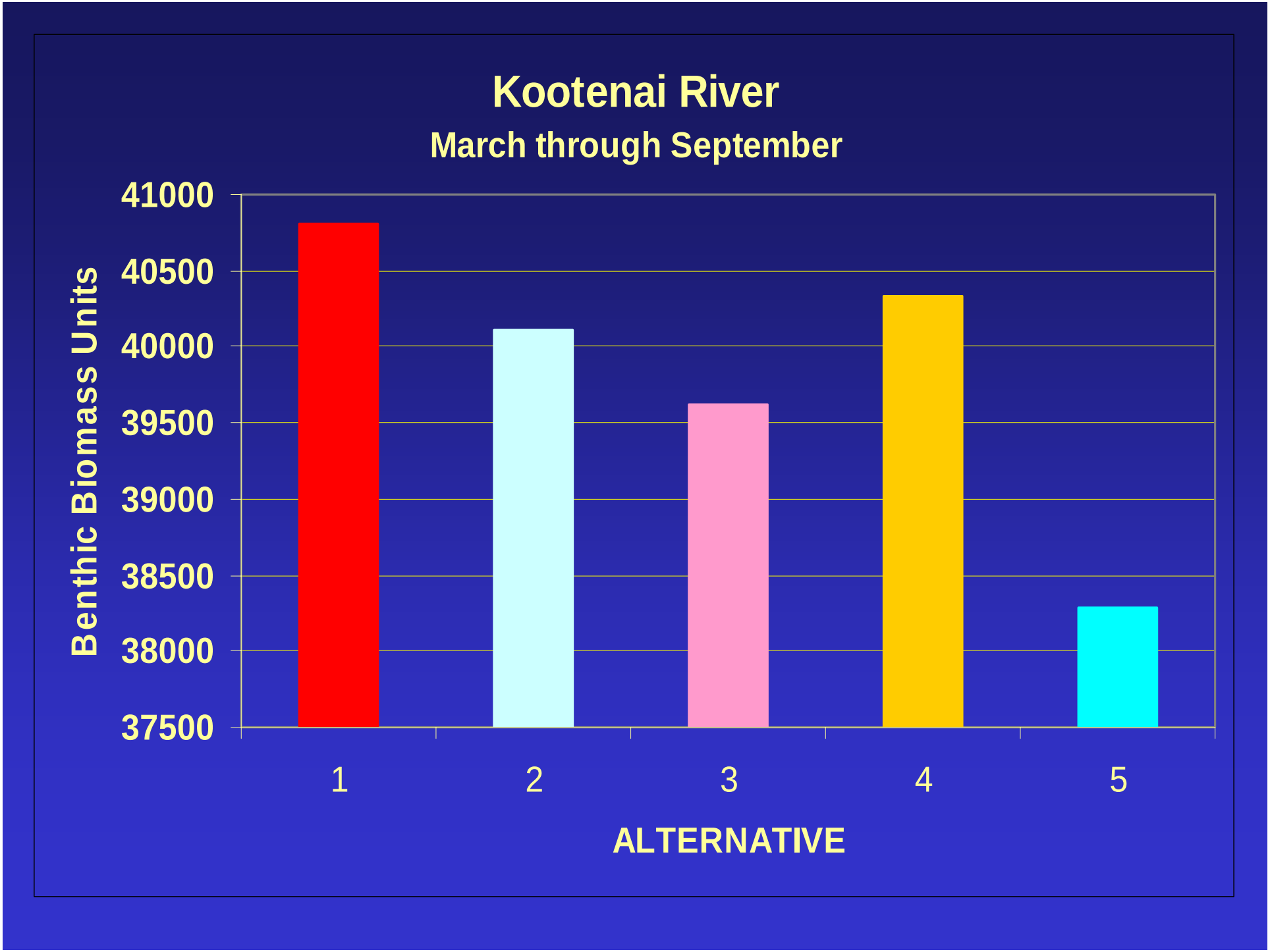


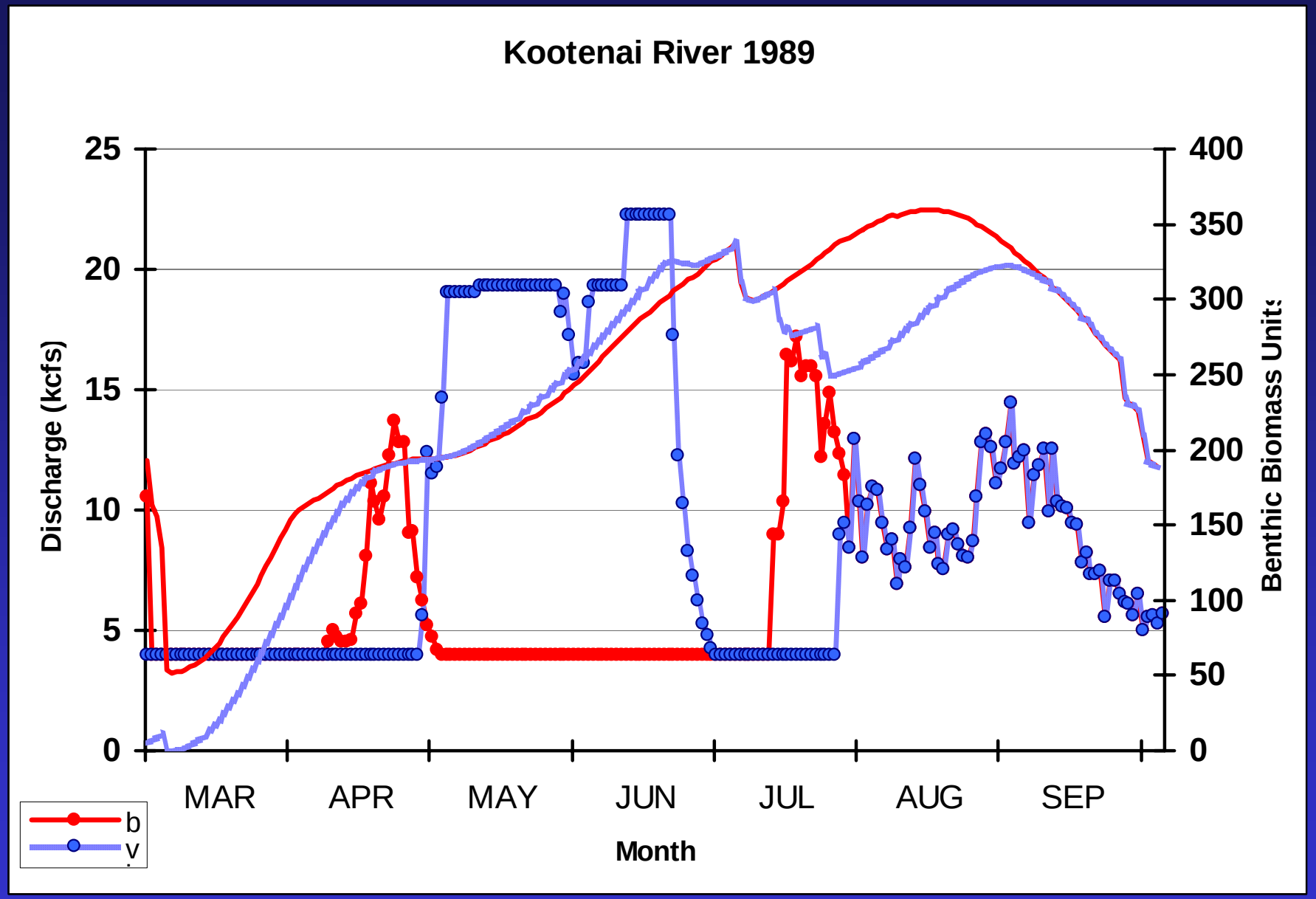
Rehabilitate primary and secondary productivity

Restore the quantity, seasonal pattern, and stability of stream flows and reservoir conditions

Discharge Alternatives

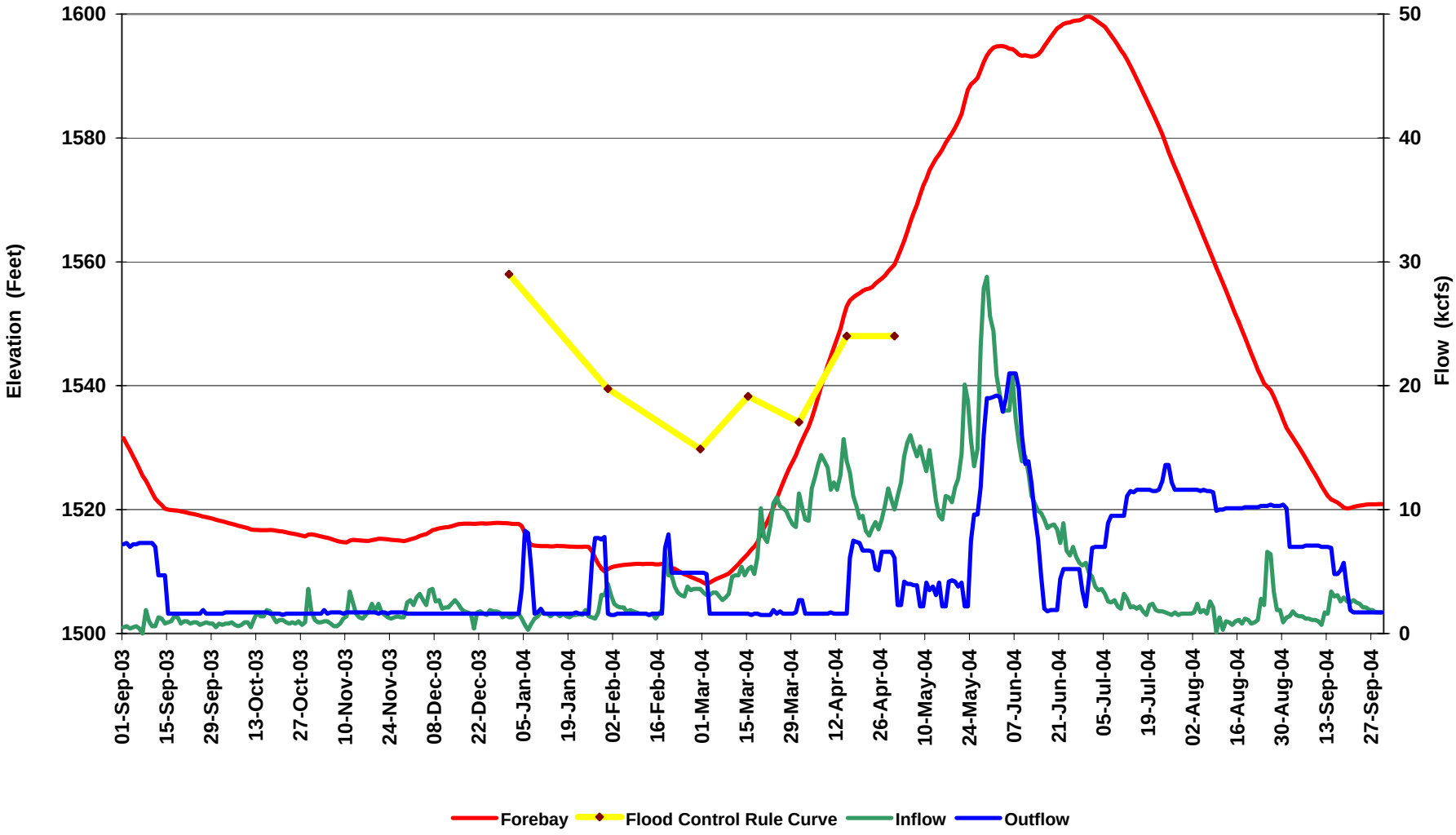


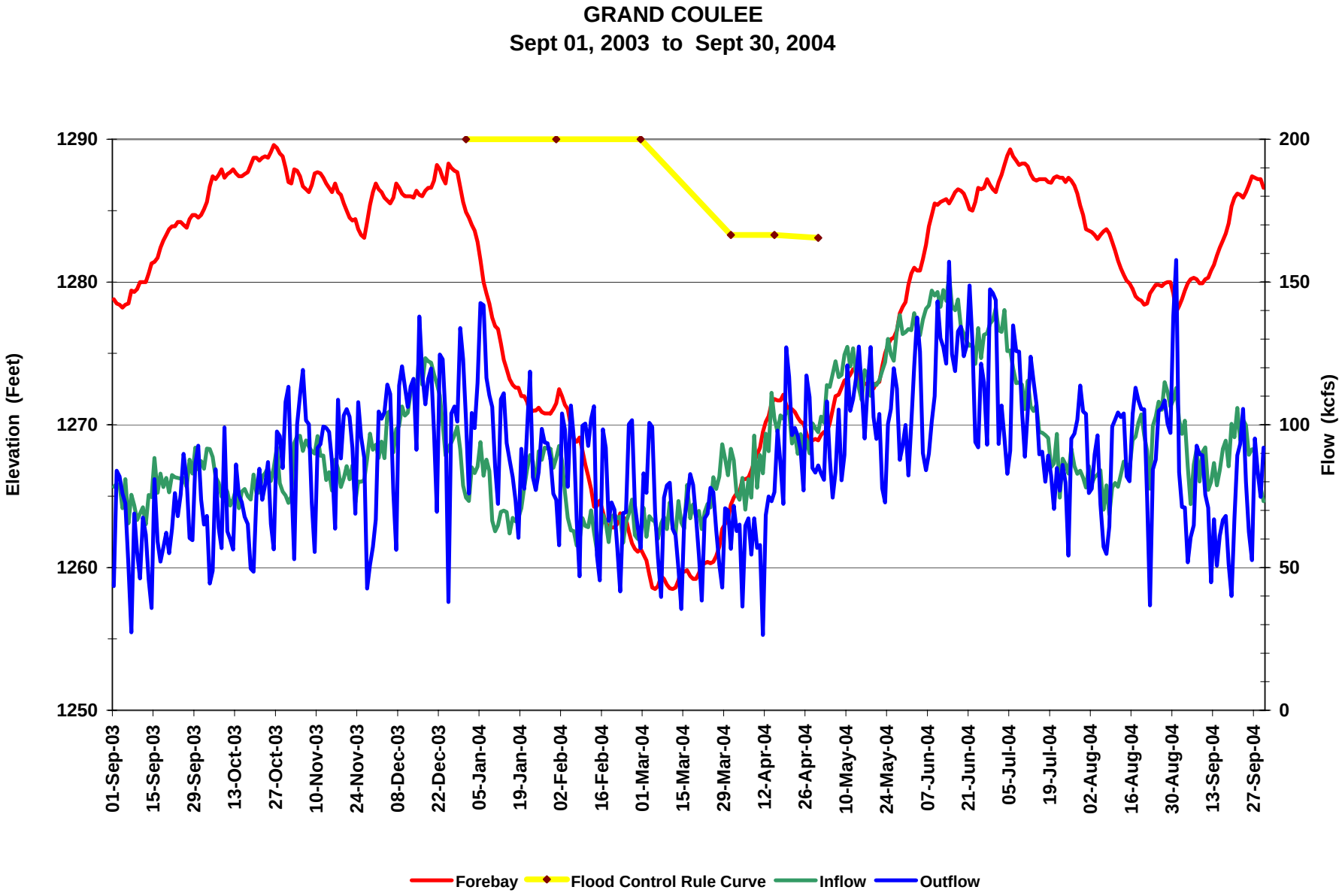

Kootenai River
March through September
Benthic Biomass Units
41000
40500
40000
39500
39000
38500
38000
37500
1
2
3
4
5
ALTERNATIVE


Kootenai River 1989
Discharge (kcfs)
Benthic Biomass Units
25
20
15
10
5
0
400
350
300
250
200
150
100
50
0
MAR
APR
MAY
JUN
JUL
AUG
SEP
Month
b
v

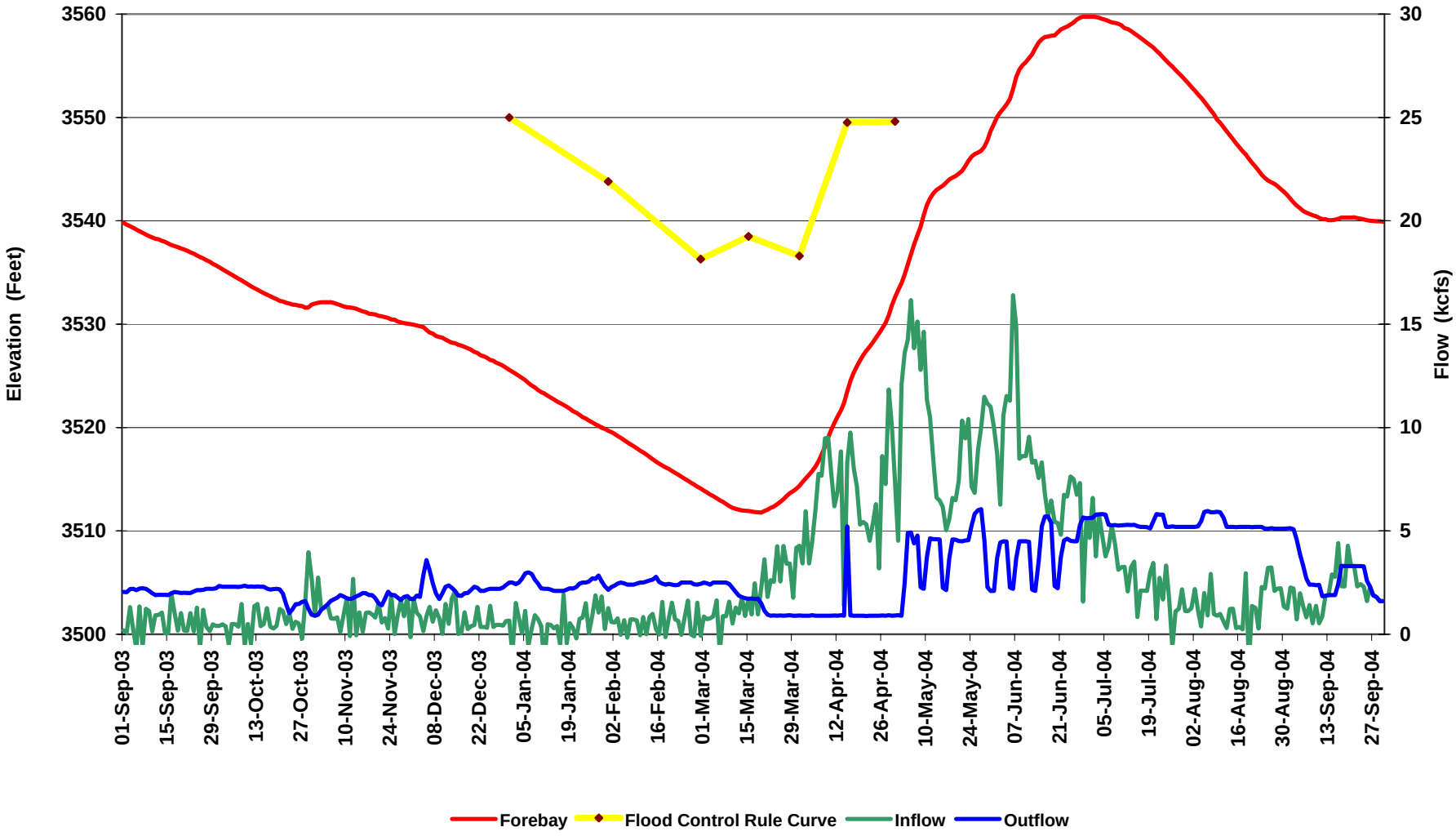

Bull Trout

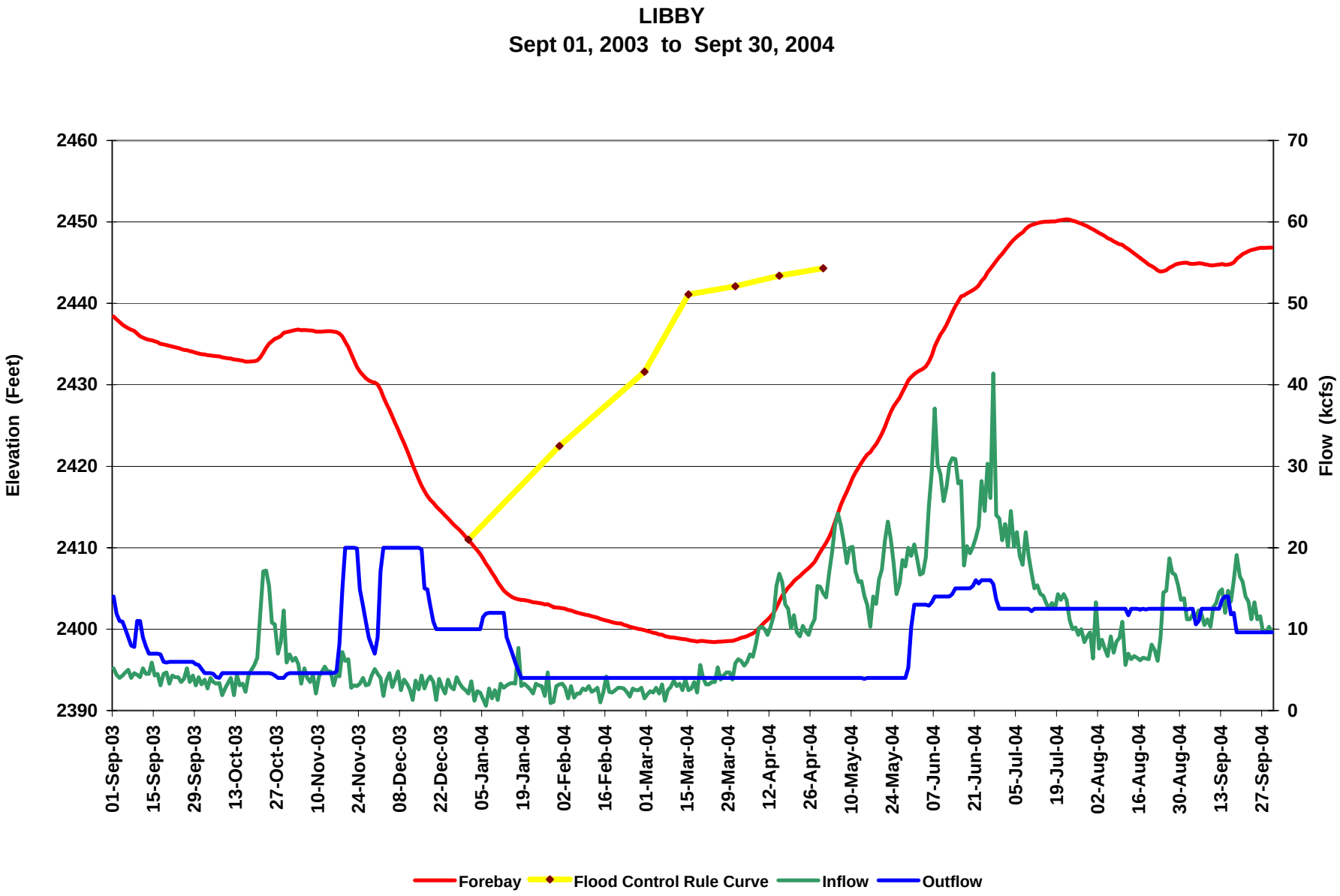
DWORSHAK
Sept 01, 2003 to Sept 30, 2004



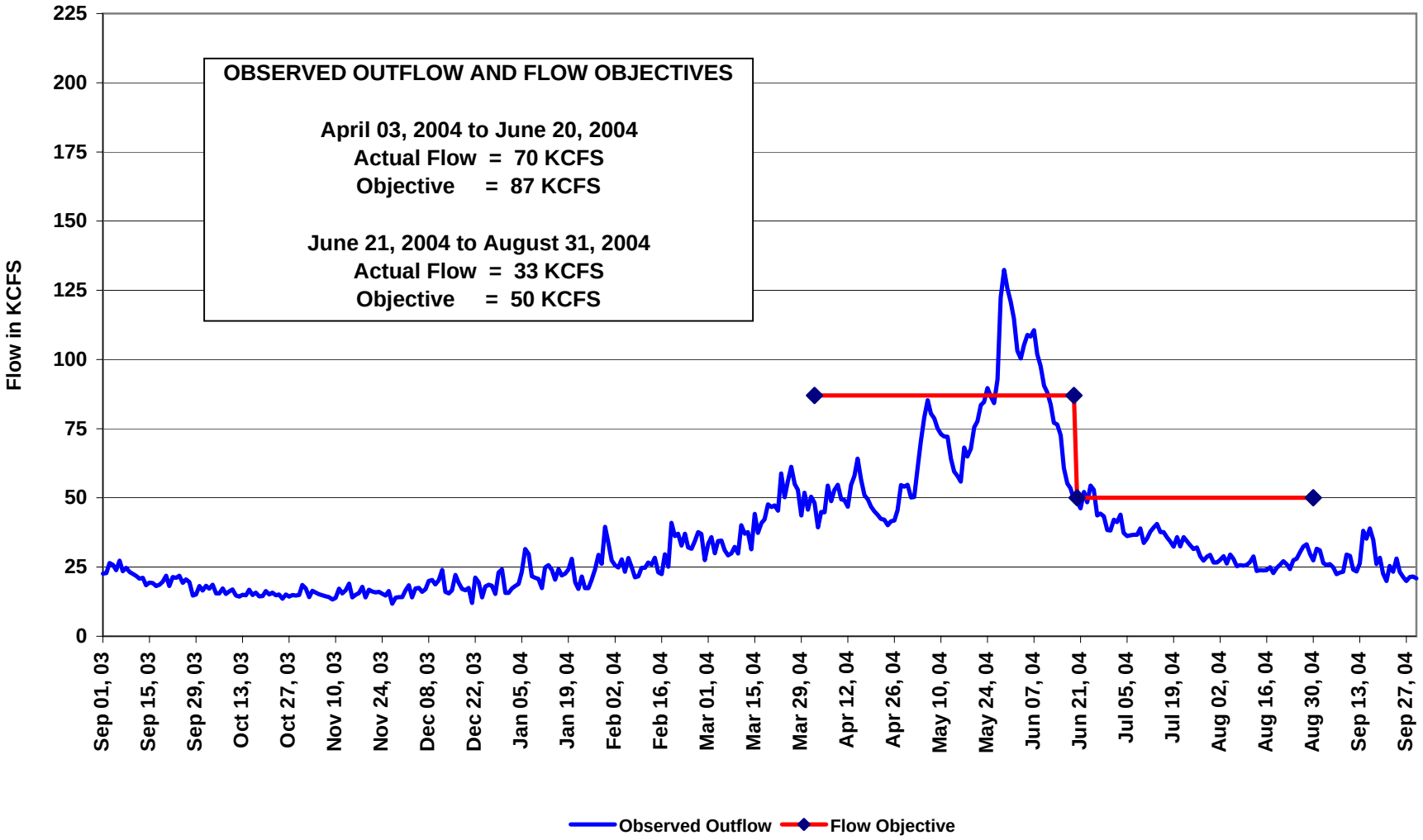

GRAND COULEE
Sept 01, 2003 to Sept 30, 2004
Elevation (Feet)
Flow (kcfs)
1290
1280
1270
1260
1250
200
150
100
50
0
01-Sep-03
15-Sep-03
29-Sep-03
13-Oct-03
27-Oct-03
10-Nov-03
24-Nov-03
08-Dec-03
22-Dec-03
05-Jan-04
19-Jan-04
02-Feb-04
16-Feb-04
01-Mar-04
15-Mar-04
29-Mar-04
12-Apr-04
26-Apr-04
10-May-04
24-May-04
07-Jun-04
21-Jun-04
05-Jul-04
19-Jul-04
02-Aug-04
16-Aug-04
30-Aug-04
13-Sep-04
27-Sep-04
Forebay
Flood Control Rule Curve
Inflow
Outflow

HUNGRY HORSE
Sept 01, 2003 to Sept 30, 2004

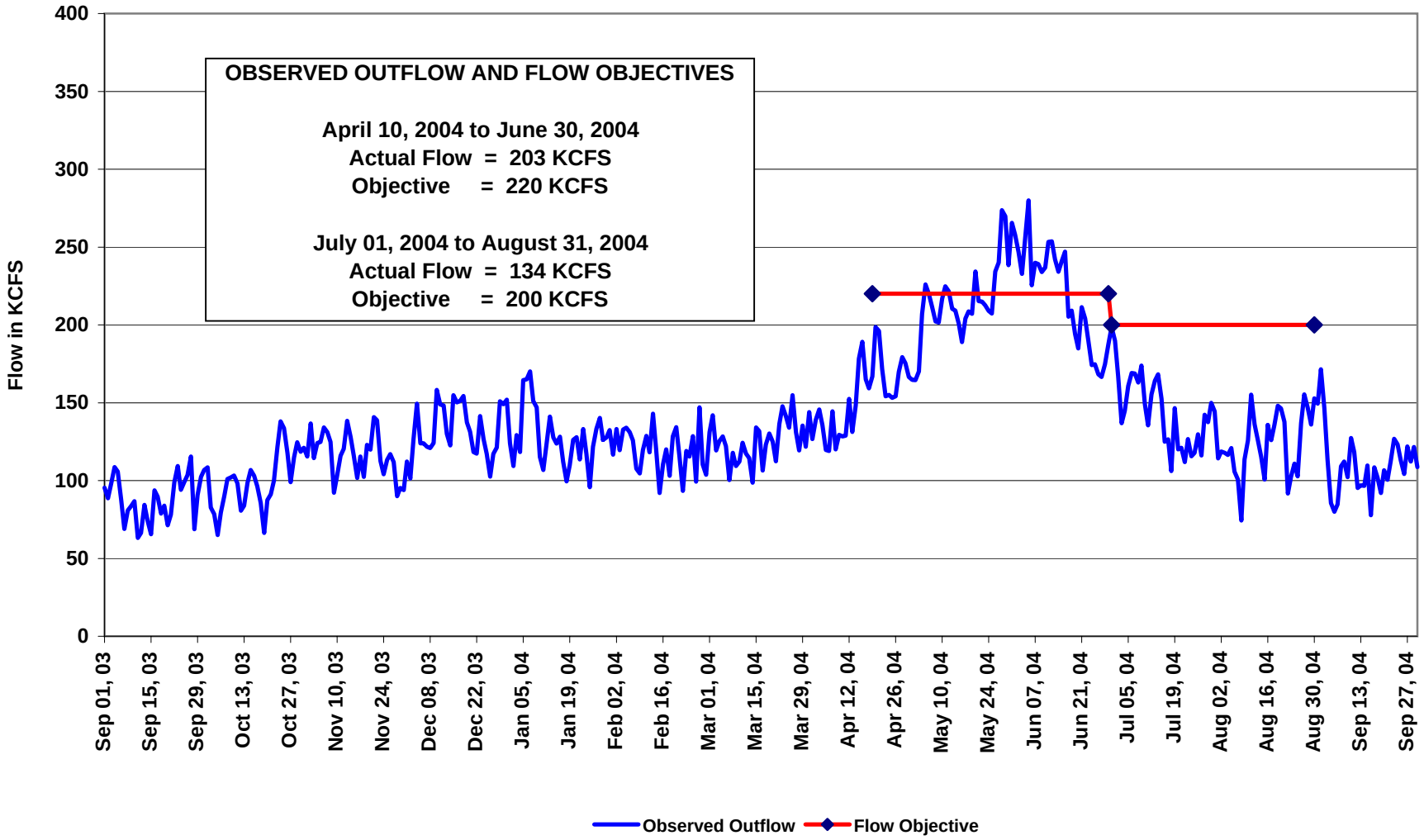



LIBBY
Sept 01, 2003 to Sept 30, 2004
Elevation (Feet)
Flow (kcfs)
2460
2450
2440
2430
2420
2410
2400
2390
70
60
50
40
30
20
10
0
01-Sep-03
15-Sep-03
29-Sep-03
13-Oct-03
27-Oct-03
10-Nov-03
24-Nov-03
08-Dec-03
22-Dec-03
05-Jan-04
19-Jan-04
02-Feb-04
16-Feb-04
01-Mar-04
15-Mar-04
29-Mar-04
12-Apr-04
26-Apr-04
10-May-04
24-May-04
07-Jun-04
21-Jun-04
05-Jul-04
19-Jul-04
02-Aug-04
16-Aug-04
30-Aug-04
13-Sep-04
27-Sep-04
Forebay
Flood Control Rule Curve
Inflow
Outflow

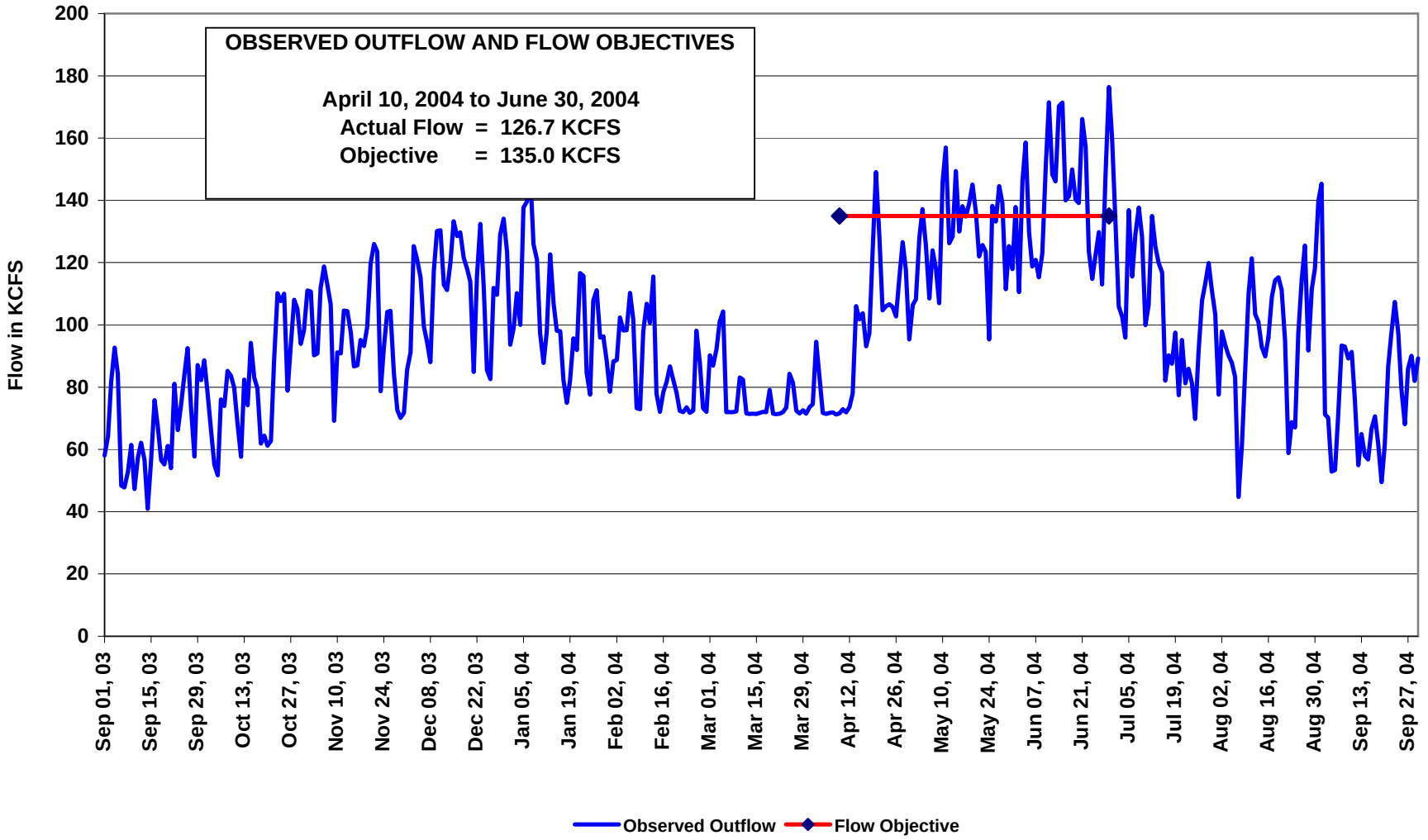
LOWER GRANITE RESERVOIR
Sept 01, 2003 to Sept 30, 2004



MCNARY RESERVOIR
Sept 01, 2003 to Sept 30, 2004



PRIEST RAPIDS RESERVOIR
Sept 01, 2003 to Sept 30, 2004



Technical Management Team
2004 Year End Review

Water Quality

Fixed Monitoring Stations

- Corps operated a total of 29 FMS's
  - ⇨Portland District: 8 Stations
  - ⇨Walla Walla District: 16 Stations
  - ⇨Seattle District: 5 Stations
- Bureau of Reclamation Operated 4 FMS's
- Mid-C PUD's Operated 10 FMS's
- 2 New Stations in 2004
  - ⇨Albani Falls Forebay
  - ⇨Cascade Island
- Data can be obtained at "Dataquery"
  - ⇨ http://www.nwd-wc.usace.army.mil/perl/dataquery.pl

Total Dissolved Gas

Project	Start Spill	End Spill	Days of Spill
Dworshak	Various Dates		45 days
Lower Granite	4 April	22 April	19 Days
Little Goose	8 April	22 April	15 Days
Lower Monumental	25 April	13 May	19 days
Ice Harbor	15 April	31 August	139 days
McNary	15 April	24 June	71 days
John Day	15 April	31 August	139 days
The Dalles	15 April	31 August	139 days
Bonneville	15 April	31 August	139 days
Chief Joseph	No Spill		

Total Dissolved Gas

Comparison of Exceedences with Previous Years TDG Exceedences from High 12-hr Average in 24 hours				
Year	Days in Spill Season	Number of Days Exceeded	Percent Exceeding TDG Standard (%)	Percent Consistent with TDG Standard (%)
2004	3020	71	2.4	97.6
2003	3020	243	8.0	92.0
2002	3020	490	16.2	83.8
2001	3020	13	0.4	99.6
2000	3020	252	8.3	91.7
1999	3020	411	13.6	86.4
Ave.	**3020**	**247**	**8.17**	**91.8**

Total Dissolved Gas

TYPES OF EXCEEDANCES FOR 2003 AND 2004 SPILL SEASON			
2004	**2003**	**TYPE**	**DEFINITION**
4	68	1	Exceedance due to high runoff flows and flood control efforts.
0	0	2	Exceedance due to Intertie line outages.
0	0	3	Exceedance due to unit outages during repair or maintenance.
0	0	4	Exceedance due to BPA inability to handle load so water was spilled.
0	1	5	Exceedance due to a break down in communication. Teletype went out, but no change occurred or Project operator interpreted teletype differently than what was intended.
16	106	6	Exceedance due to uncertainties when using best professional judgement to apply the spill guidance criteria (travel time; degassing; water temperature effects; spill patterns).
0	18	7	Exceedance due to high TDG levels coming from the Mid-Columbia River (see Pasco FMS).
3	0	8	Exceedance due to high TDG levels coming from the Snake River. (see Ice Harbor tailwater FMS).
0	0	9	Exceedance due to a load rejection. The powerhouse was not working and the river was spilled.
6	7	10	Exceedance due to lack of Information (FMS gage malfunction therefore no data.
0	9	11	Exceedance due to mechanical problems (gate stuck open, passing debris, etc.)
25	20	12	Exceedance due to sharp rise in water temperature (3-5 ºC change in a day).
7	33	13	Exceedance due to bulk spill pattern being used which generated more TDG than expected.
10	0	12/7	Exceedance due to combination of exceedance type 12 and 7.
71	**262**	**--**	**TOTALS**

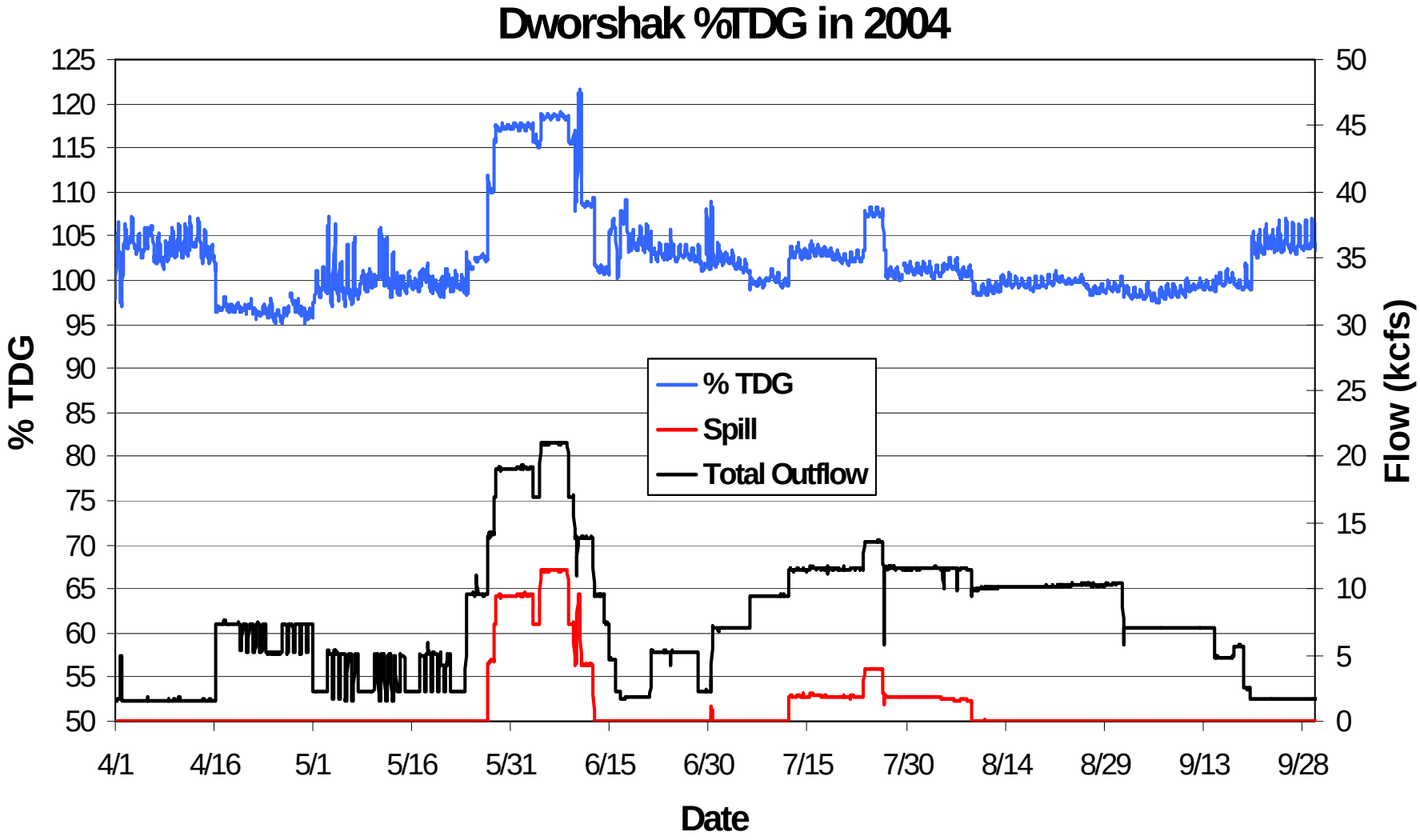
Total Dissolved Gas

EXCEEDANCES AT FMS FROM 1999 - 2004							
	2004	2003	2002	2001	2000	1999	Totals
Water Quality Gages	**Quantity**	**Quantity**	**Quantity**	**Quantity**	**Quantity**	**Quantity**	**Quantity**
Lower Granite Forebay	0	0	0	5	2	0	7
Lower Granite Tailwater	0	15	17	0	4	15	51
Little Goose Forebay	3	10	17	0	2	39	71
Little Goose Tailwater	0	6	6	0	9	6	27
Lower Monumental Forebay	1	19	49	0	28	44	**141**
Lower Monumental Tailwater	1	10	6	0	12	26	55
Ice Harbor Forebay	4	35	24	0	34	44	**141**
Ice Harbor Tailwater	2	4	6	0	4	12	28
McNary Forebay - Wa.	10	24	43	1	14	22	114
McNary Forebay - Or.	23	32	45	5	22	19	**146**
McNary Tailwater	7	12	31	0	17	50	117
John Day Forebay	0	10	11	0	1	8	30
John Day Tailwater	0	0	29	0	12	43	84
The Dalles Forebay	5	11	18	0	5	1	40
The Dalles Tailwater	0	4	11	0	5	5	25
Bonneville Forebay	1	17	30	0	14	19	81
Cascade Island	0	---	---	---	---	---	0
Warrendale	0	1	19	0	6	2	28
Camas/Washougal	14	33	65	2	58	51	**223**
Chief Joseph Forebay	0	0	53	0	3	4	60
Chief Joseph Tailwater	0	0	11	0	0	1	12
Total Number of Exceedances	**71**	**243**	**491**	**13**	**252**	**411**	**1481**

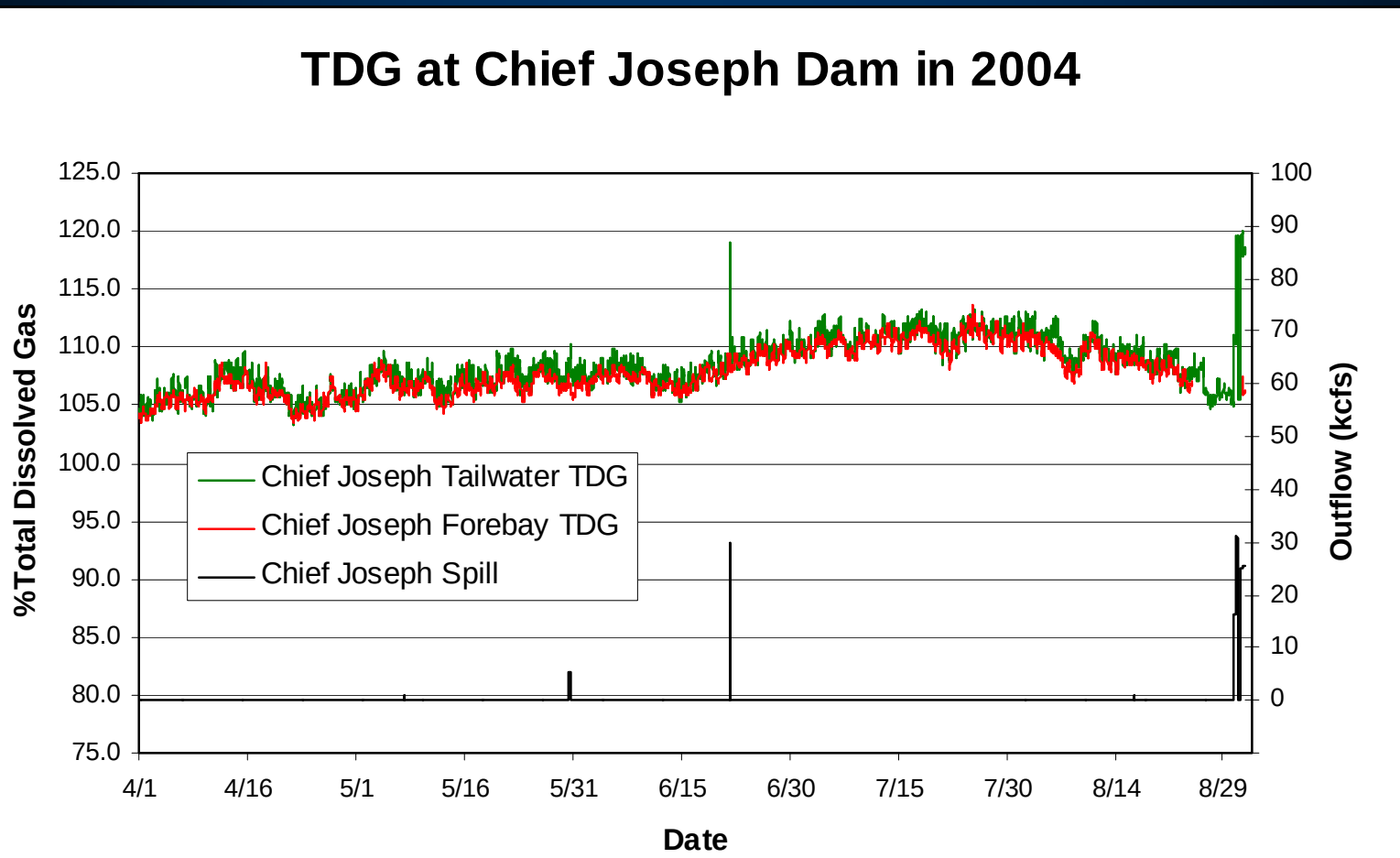
Total Dissolved Gas

TDG Exceedances at Dworshak Dam in 2004				
Date	# of Hours	TDG Levels (%)	Type of Exceedance	Cause
27 May-6 June	338	110.1 – 119.0	1	Exceedance due to high runoff flows and flood control efforts.
10 June	13	113.9 – 121.5	1	Exceedance due to high runoff flows and flood control efforts.
TOTALS	351	--	--	--

Total Dissolved Gas



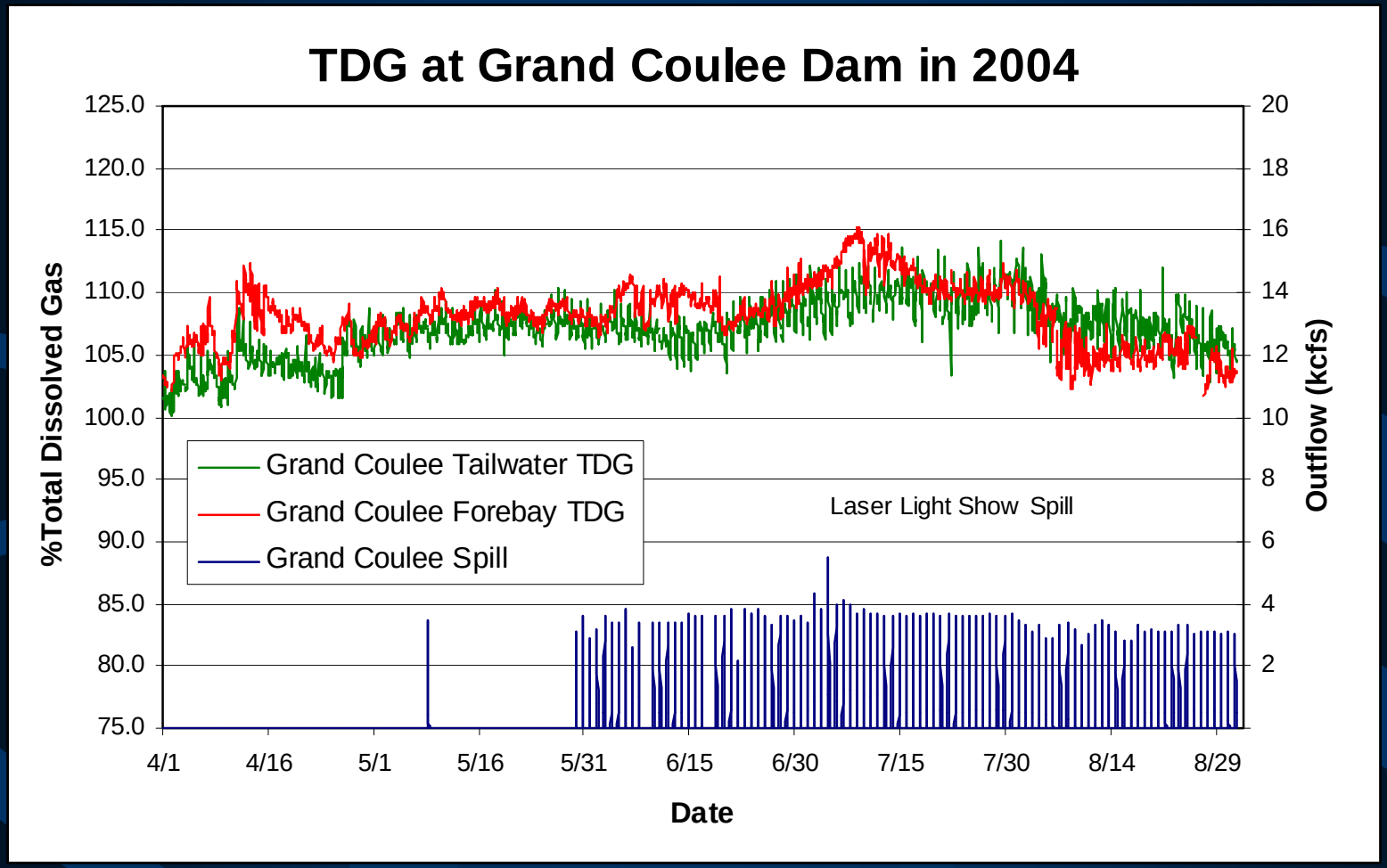
Total Dissolved Gas



Number of Hours of Forebay TDG Exceedance = 712
Number of Hours of Tailwater TDG Exceedance = 927

Hours of Spill = 43

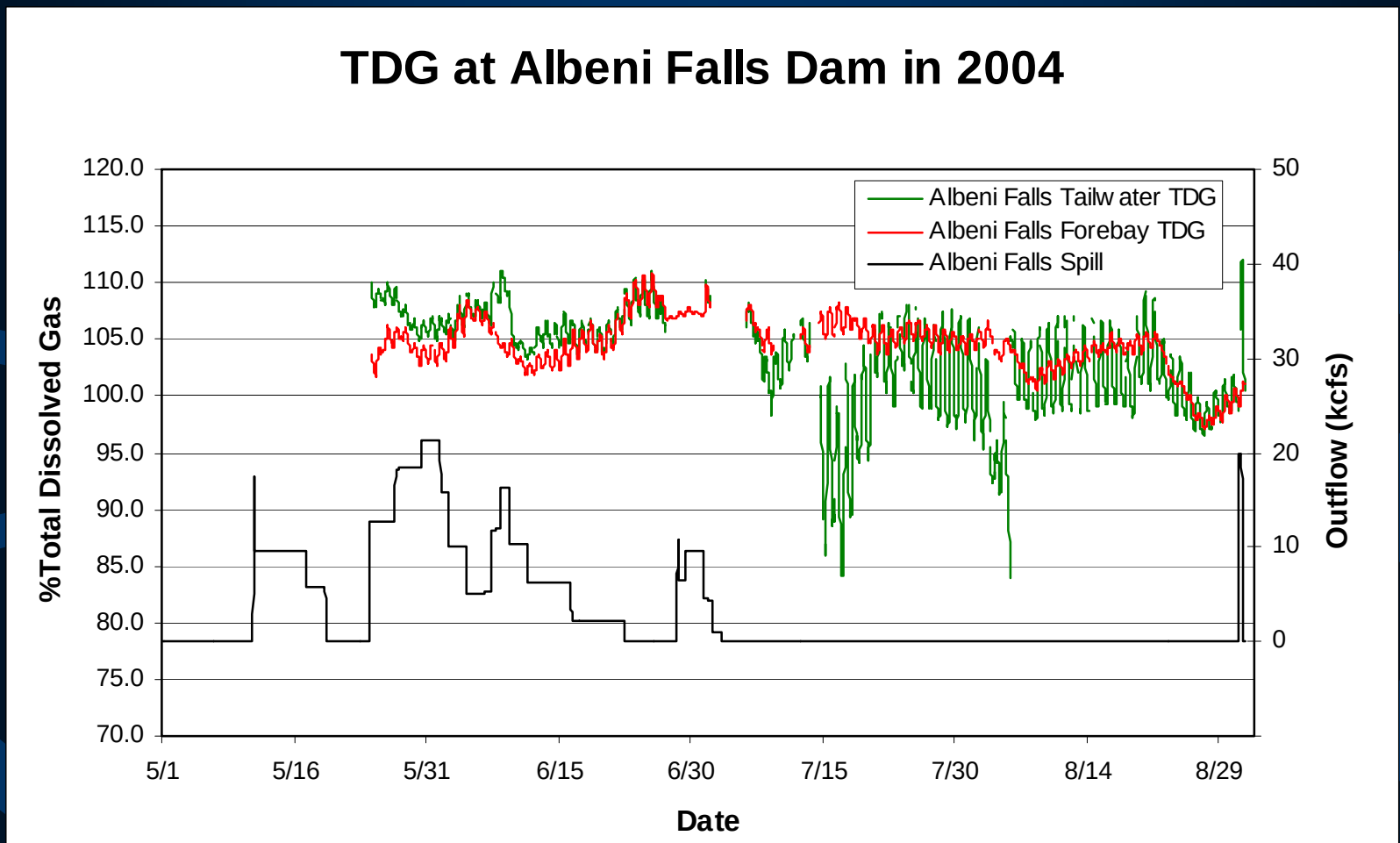
Total Dissolved Gas



Number of Hours of Forebay TDG Exceedance = 832
Number of Hours of Tailwater TDG Exceedance = 388

Hours of Spill = 170

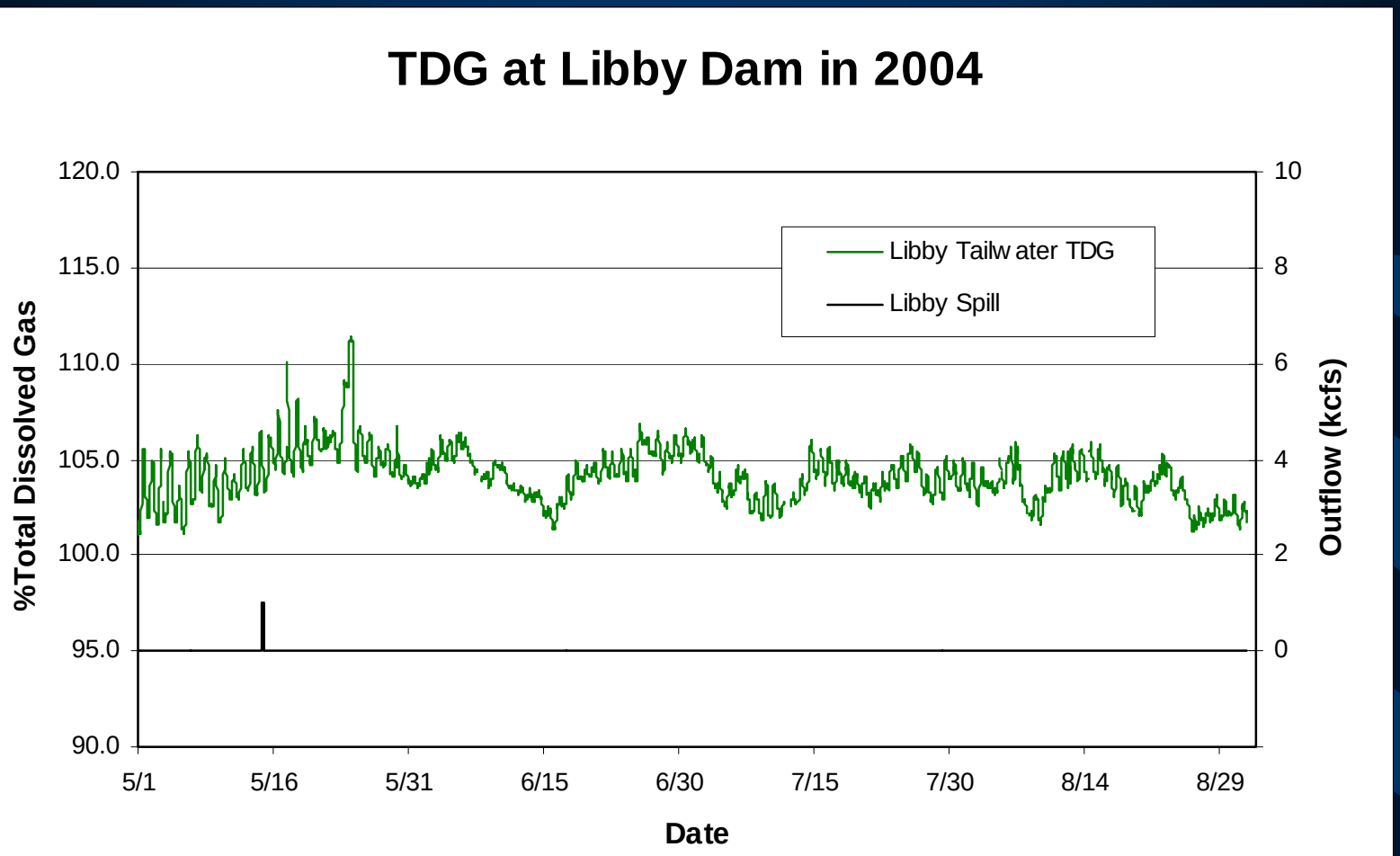
Total Dissolved Gas



Number of Hours of Forebay TDG Exceedance = 18
Number of Hours of Tailwater TDG Exceedance = 31

Hours of Spill = 1,029

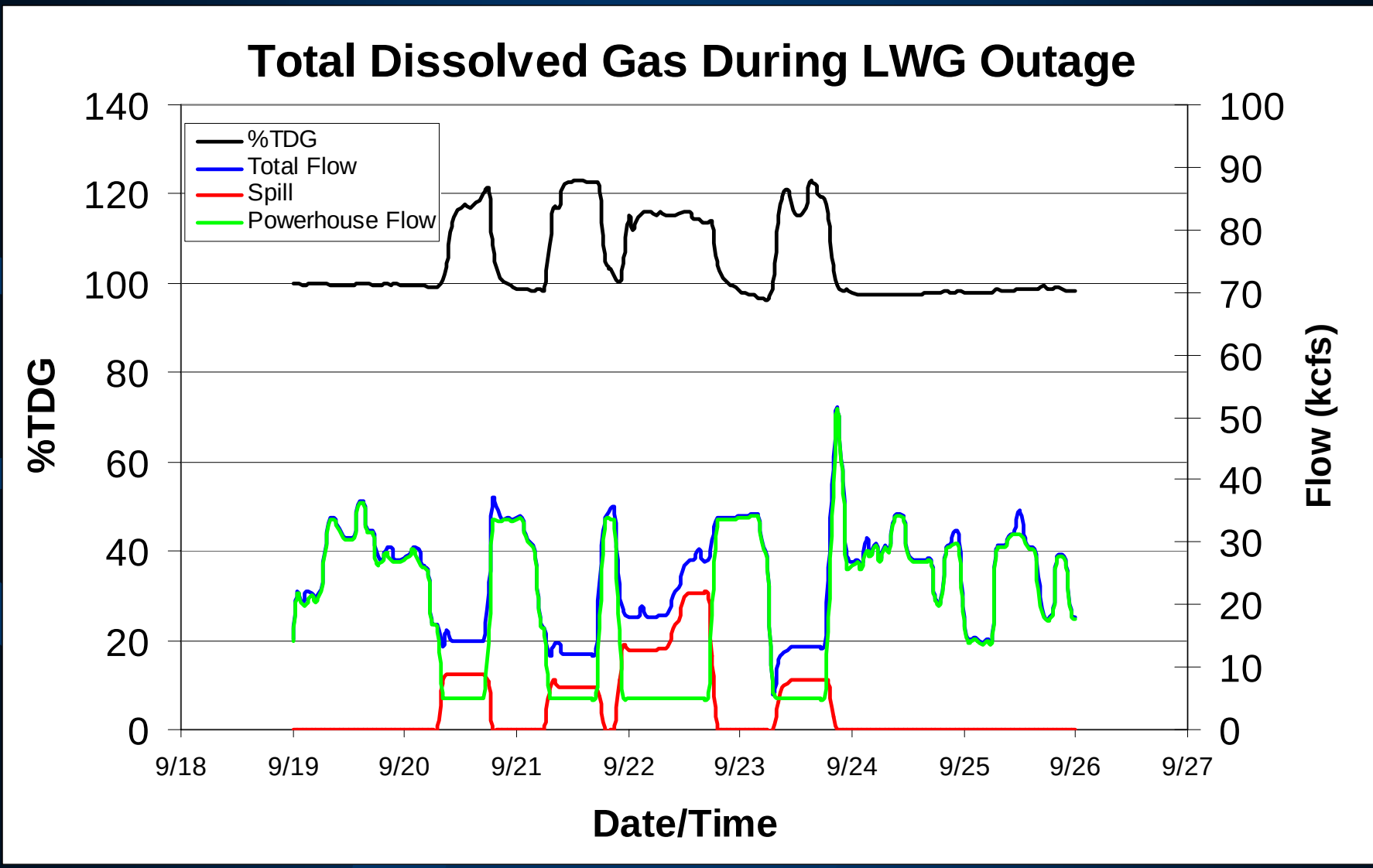
Total Dissolved Gas



Number of Hours of Tailwater TDG Exceedance = 11

Hours of Spill = 5

Total Dissolved Gas



Total Dissolved Gas Exchange in the Columbia River Basin: Decision Support SYSTDG

In Season Spill Management of TDG

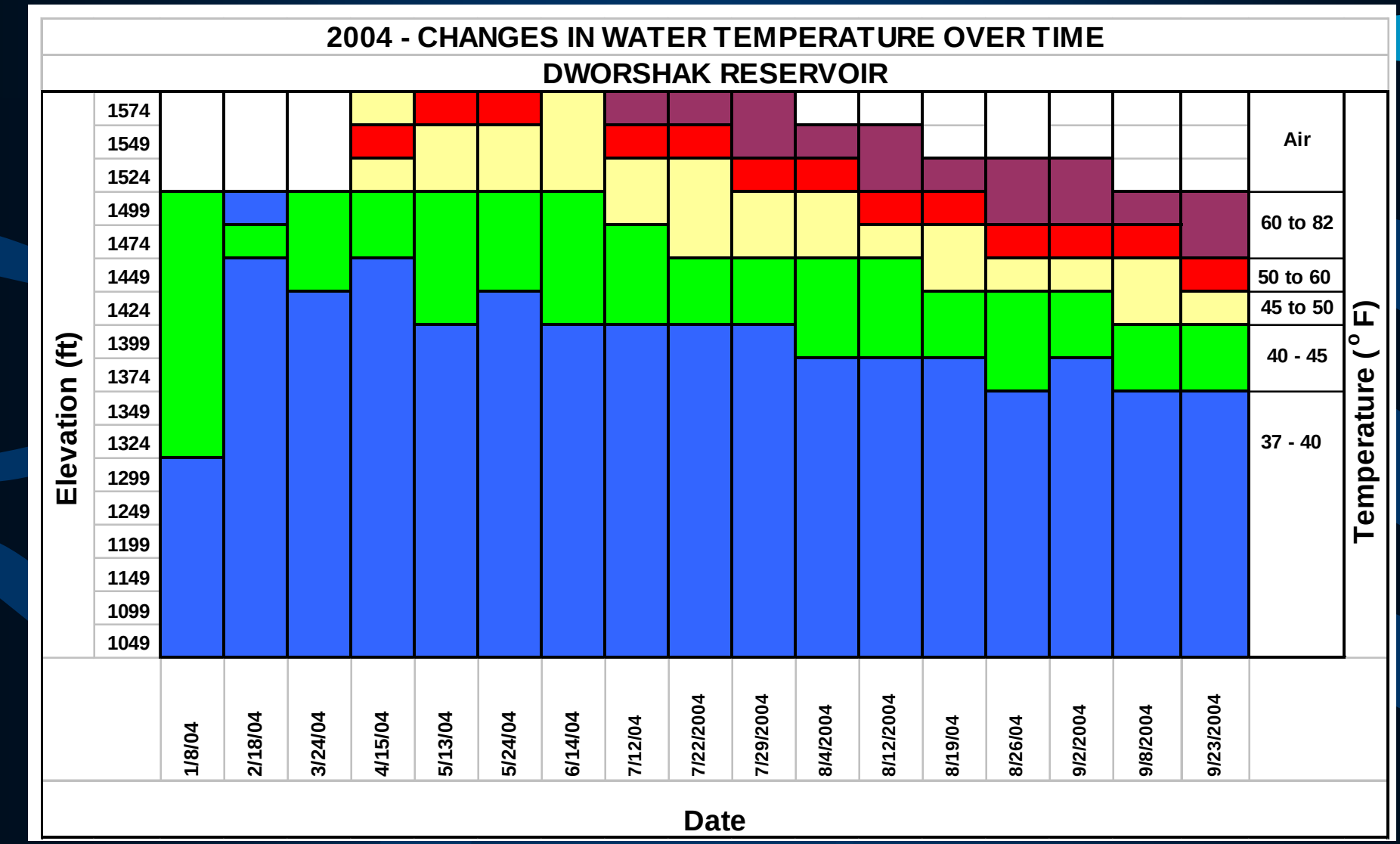
- How did we arrive at current conditions?
  - Hindcast using current conditions
- Are adjustments needed to current spill caps?
  - Reduction in spill volume (125/120/115 TDG criteria)
  - Increase spill volume to meet FP objectives
- Where are we headed tomorrow?
  - Forecasting operations and environmental properties
  - Optimization of spill levels

Dworshak Summer Operations

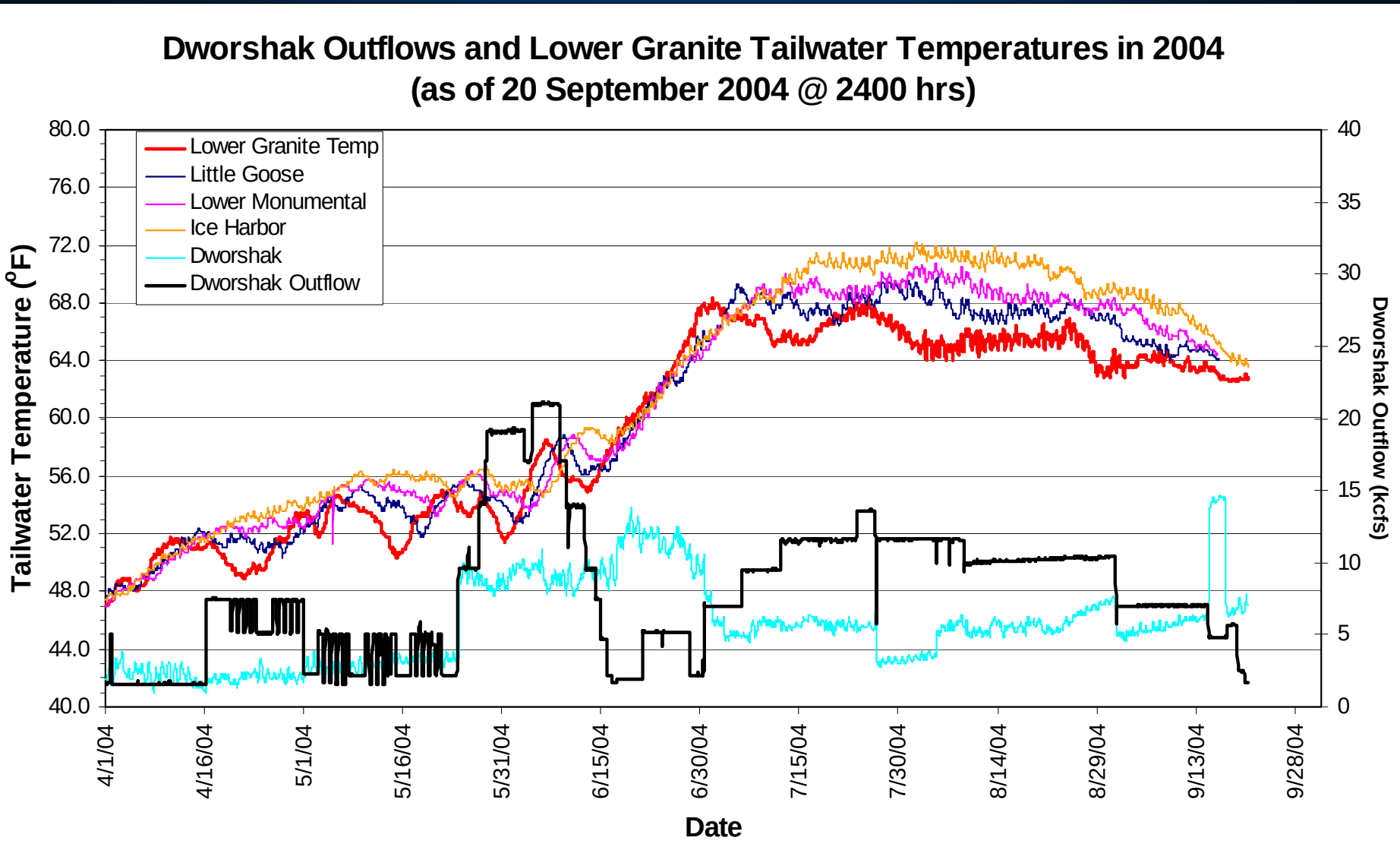
Dworshak Dam

Lower Granite Dam Tailwater

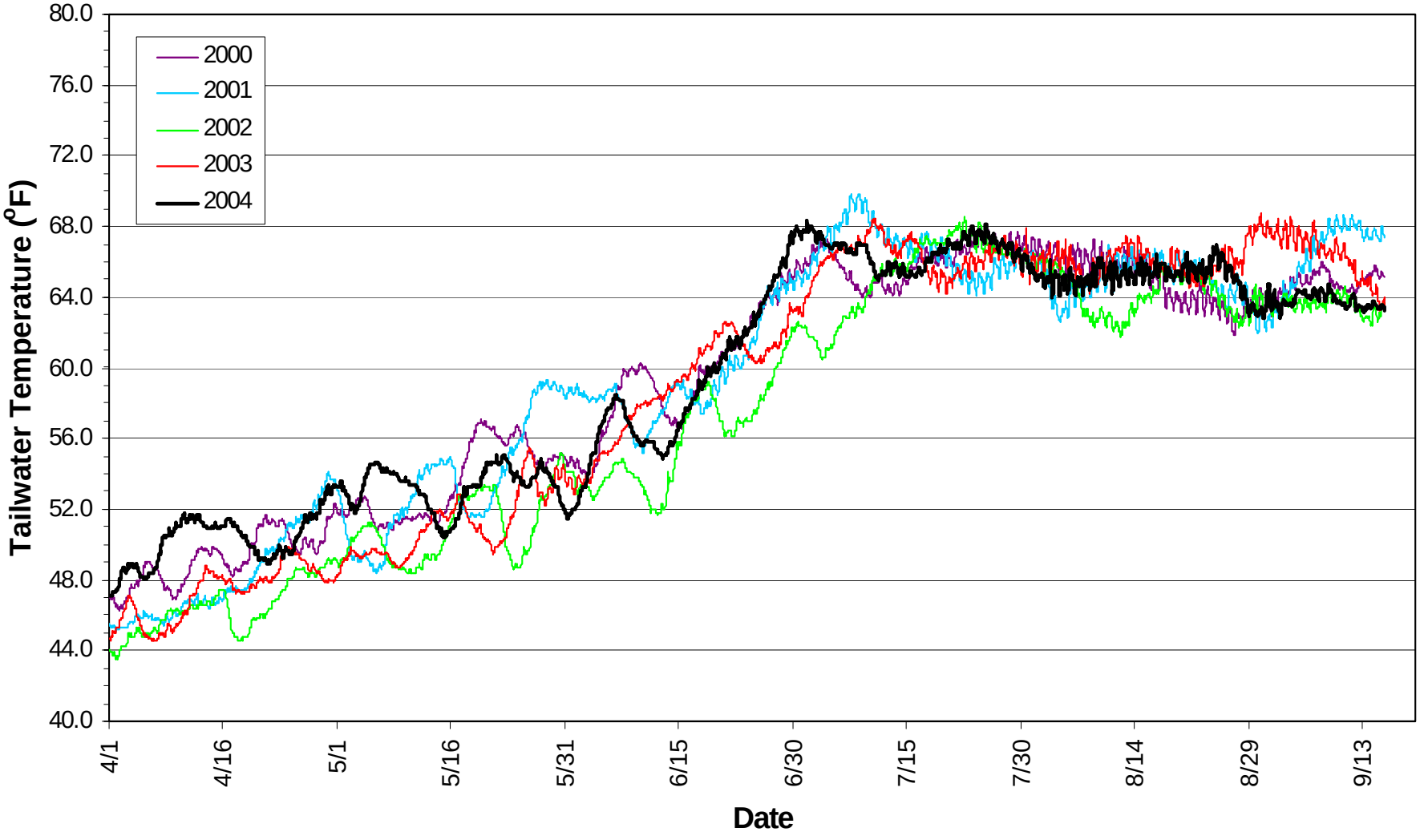
Dworshak Summer Operations



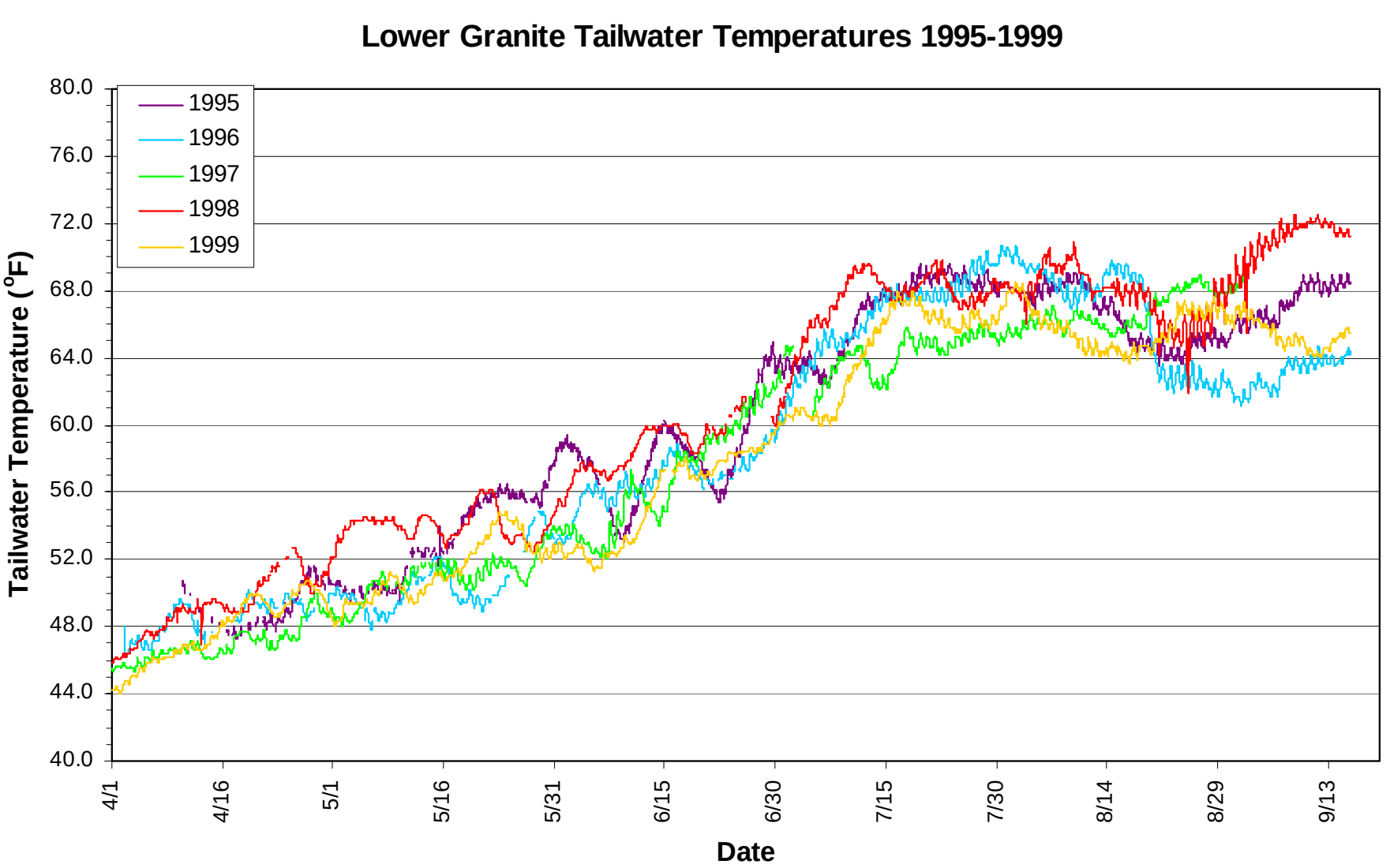
Dworshak Summer Operations



Dworshak Summer Operations



Dworshak Summer Operations



Dworshak Summer Operations

Lower Granite Tailwater Temperatures 1995-2004

Year	Hours of Exceedance	Index of Exceedance
2004	7	2
2003	63	14
2002	17	4
2001	172	123
2000	0	0
1999	23	6
1998	981	1721
1997	137	56
1996	526	613
1995	593	363

10-Year Statistics

Hours of Exceedance

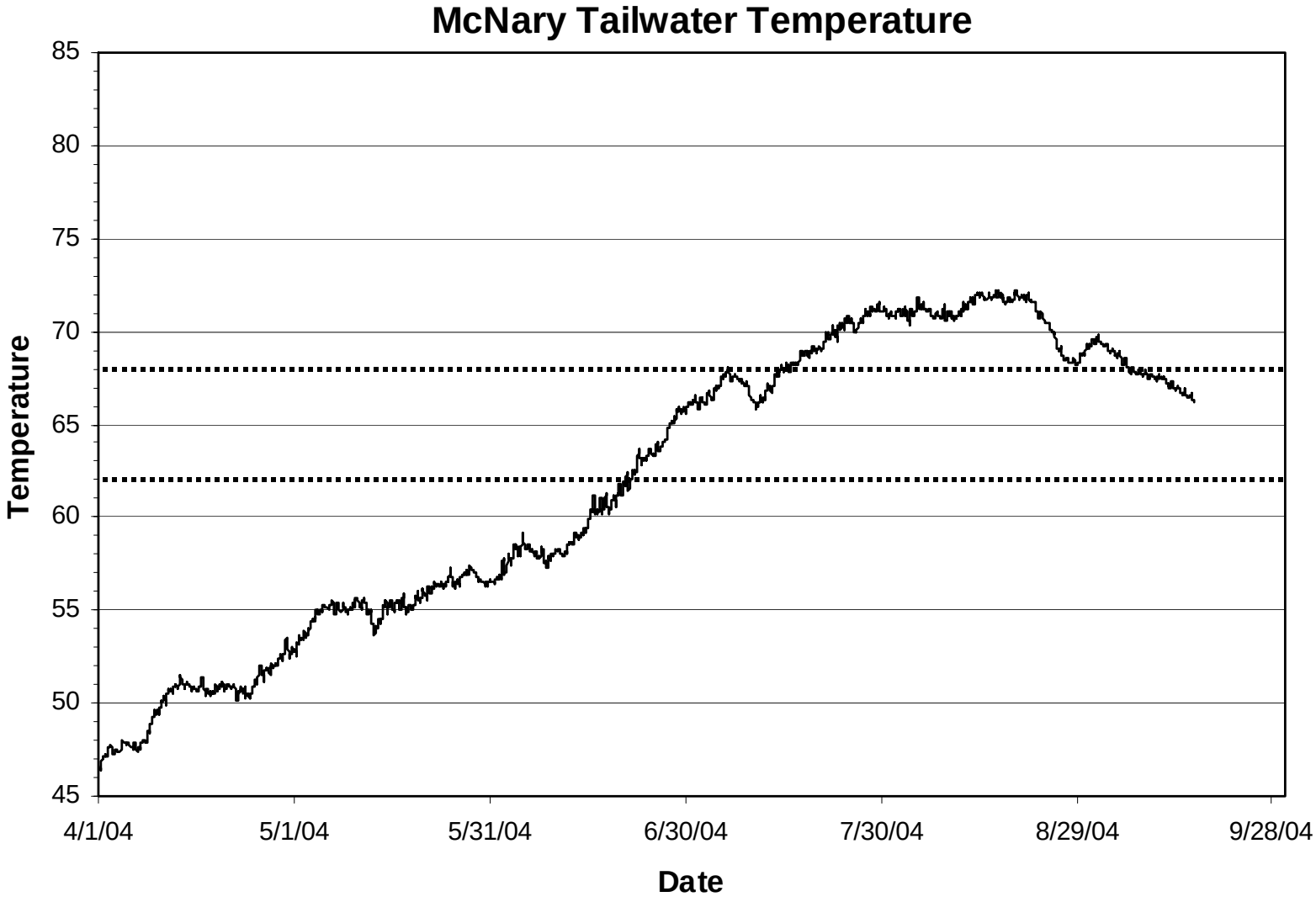
Range: High = 981 hrs (1998)
Low = 0 hrs (2000)
Average 1995-1999: 452 hrs
Average 2000-2004: 52 hrs
10-Year Average: 252 hrs

Index of Exceedance

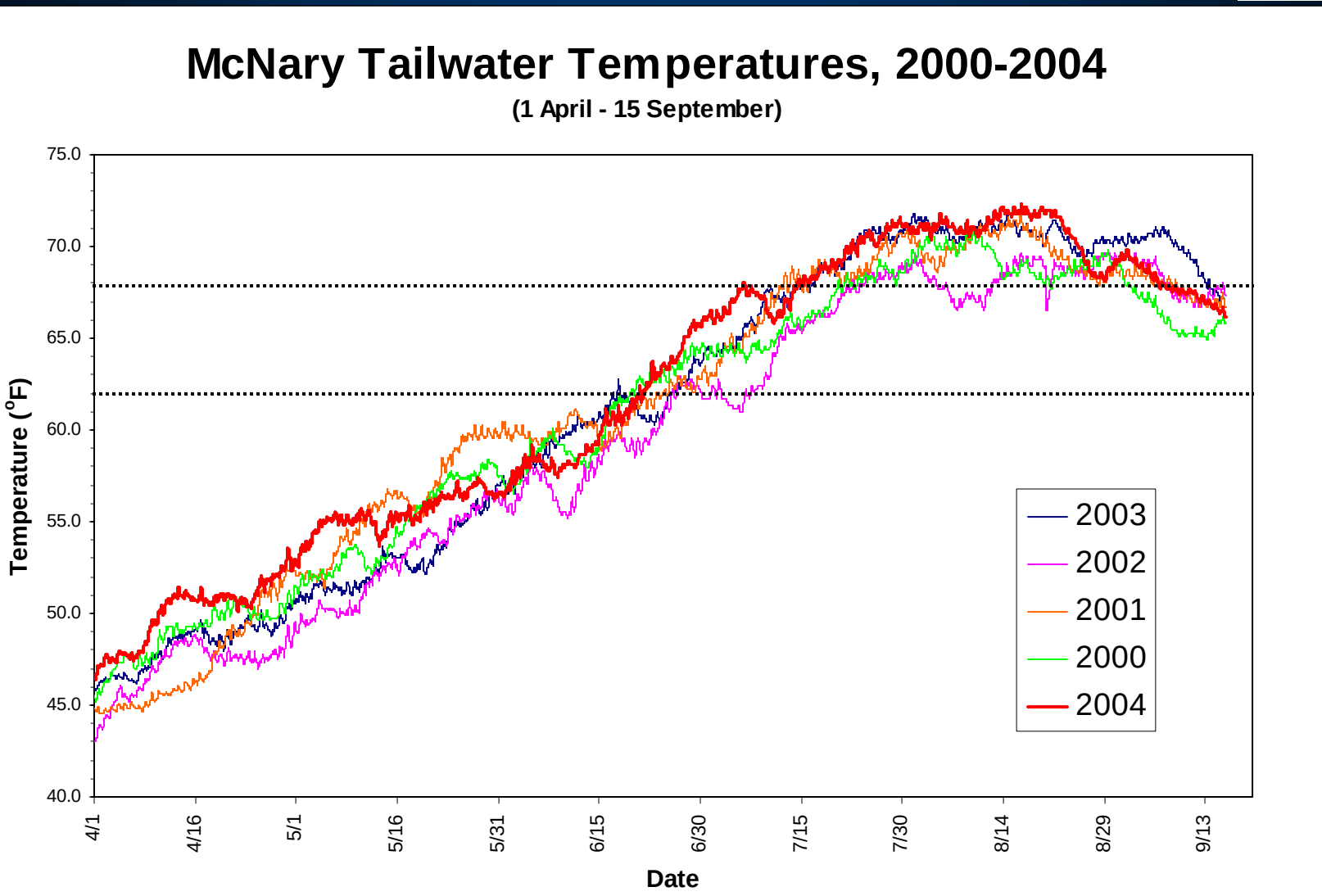
Range: High = 1,721 degree-hrs (1998)
Low = 0 degree-hrs (2000)
Average 1995-1999: 552 degree-hrs
Average 2000-2004: 29 degree-hrs
10-year Average: 290 degree-hrs

Index of Exceedance = (# hours temperature exceeds 68 ºF standard) x (Number of degrees above 68 ºF standard)

McNary Temperatures



McNary Temperatures



McNary Temperatures

McNary Tailwater Temperatures
1995-2004

Year	Hours of Exceedance	Index of Exceedance
2004	1260	2938
2003	1399	3318
2002	817	716
2001	1259	1872
2000	911	1063
1999	454	303
1998	1532	4709
1997	887	757
1996	766	575
1995	1421	2833

10-Year Statistics

Hours of Exceedance

Range: High = 1,532 hrs (1998)
Low = 454 hrs (1999)
Average 1995-1999: 1,012 hrs
Average 2000-2004: 1,129 hrs
10-Year Average: 1,071 hrs

Index of Exceedance

Range: High = 4,709 degree-hrs (1998)
Low = 303 degree-hrs (1999)
Average 1995-1999: 1,835 degree-hrs
Average 2000-2004: 1,981 degree-hrs
10-year Average: 1,908 degree-hrs

Index of Exceedance = (# hours temperature exceeds 68 ^{o}F standard) x (Number of degrees above 68 ^{o}F standard)

Questions?

HYDROACOUSTIC EVALUATION OF JUVENILE SALMONID FISH PASSAGE AT BONNEVILLE DAM

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Pacific Northwest National Laboratory
North Bonneville Field Office
P.O. Box 241
North Bonneville, WA 98639

ABSTRACT

The primary goal of this study was to provide project-wide estimates of fish-passage efficiency (FPE), spill efficiency, and spill effectiveness for run-of-river fish passing the Bonneville Project in 2004. Other fish-passage measures included FPE by powerhouse, fish-guidance efficiency (FGE) by turbine, and horizontal, vertical, and diel distributions of fish passage at both powerhouses and the spillway. These data provide a fourth year of estimates for the entire project and the first year of estimates with the new Powerhouse 2 Corner Collector (B2CC). Sampling with 70 420-kHz hydroacoustic transducers was continuous except for a short break each morning for downloading and archiving data. At least one split-beam transducer was used for each type of transducer deployment to provide deployment-specific data on speeds, trajectories, and target strengths of fish for detectability modeling.

During the Spring Creek hatchery release of sub-yearling Chinook salmon in early March, Project FPE was evaluated for several operational conditions: (1) 5 days of 50,000 cfs spill, (2) 5 days of B2CC operation without spill, and (3) several days of neither spill nor B2CC operation. An analysis of variance and multiple-range test on hourly data indicated that each condition produced significantly different estimates of FPE ($P < 0.0001$). The spill condition produced the highest Project FPE (62%; n=96), followed closely by the B2CC operation (54%; n=96), and then by no spill + no B2CC (42%; n=108). Major metrics calculated from the sum of passage through various routes during each test condition were as follows:

CONDITION	FPE %	Spill Efficiency (%)	Sluice Efficiency % of Project	B1 Sluice Efficiency % of B1	B2CC Efficiency % of B2
50,000 CFS SPILL	60	34	6	24	0
B2CC and No Spill	51	1	29	15	35
NO SPILL OR B2CC	34	1	7	15	0

There were no test conditions for spill in spring but there were a few multi-day tests of low spill during the day and night that deviated from the normal day and night spill pattern. All intakes of modified Unit 17 were sampled to estimate fish guidance efficiency (FGE). The FGE was 49%

[1] Pacific Northwest National Laboratory, Richland, WA
[2] BAE Systems, Stevenson, WA
[3] University of Washington, School of Fisheries

at 17A, 52% at 17B, and 70% at 17C in spring and 32% at 17A, 52% at 17B, and 47% at 17C in summer.

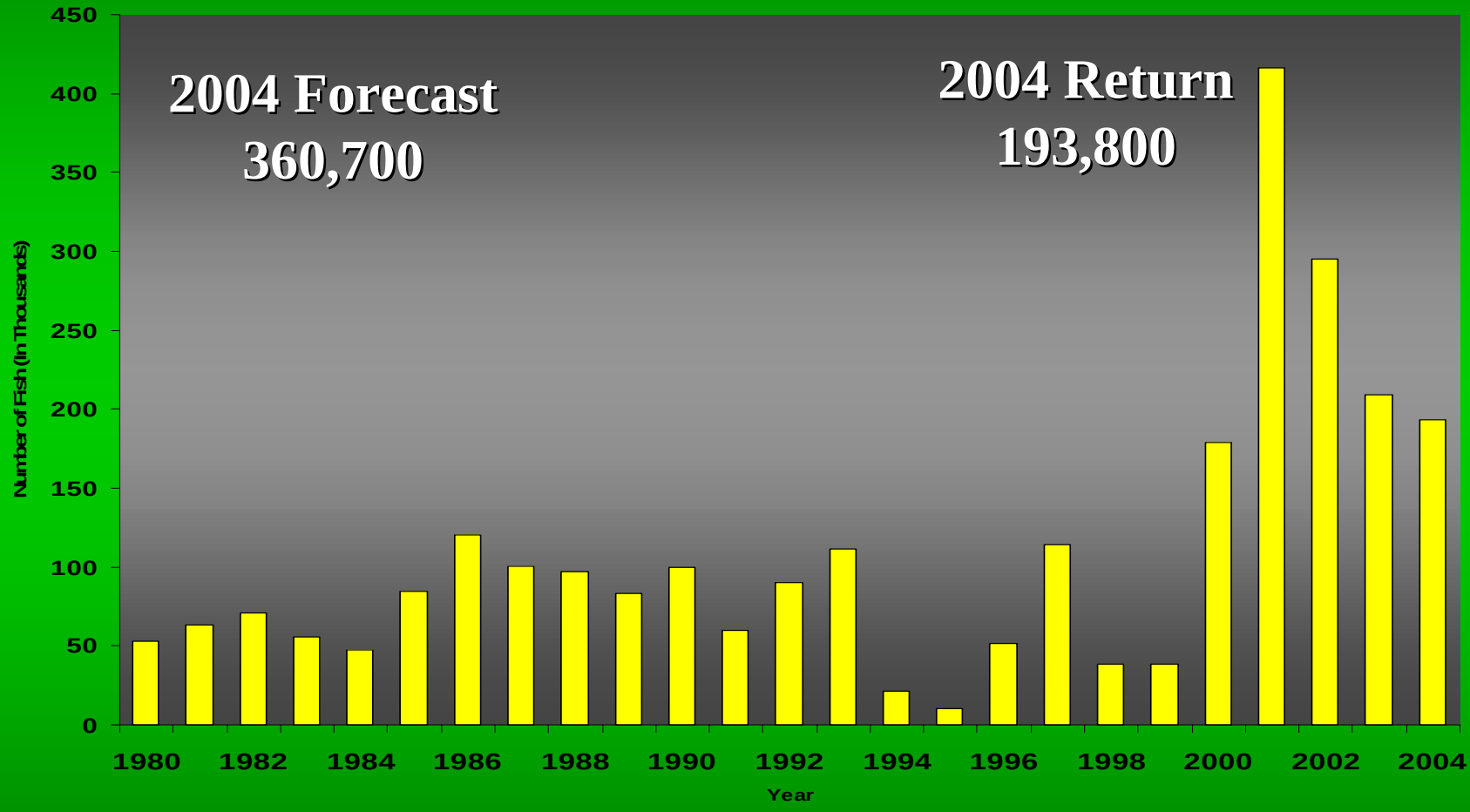
Preliminary estimates of major metrics (%) for spring and summer seasons are tabled below. The 95% confidence limits on all estimates were within ± 3%.

Metric	Spring	Summer
FPE	70	64
Spill Efficiency	43	31
Sluice Efficiency (B1 and B2CC at % of Project)	17	26
B1 Sluice Efficiency (% of Project)	7	7
B2CC Efficiency (% of Project)	10	19
B1 Sluice Efficiency (% of B1)	27	21
B2CC Sluice Efficiency (% of B2)	33	54

The efficiency of the B2CC likely is an underestimate because sampling with an acoustic camera indicates that schools of fish enter the B2CC, and fixed-aspect hydroacoustics cannot always resolve all individual fish for counting. In addition, turbulence sporadically shedding from piers at Unit 11 entrains air, making echograms un-trackable 30-50% of the time. Hanging blocked trash racks in the upper slots of Unit 11 would greatly reduce turbulence. We are working on a regression of DIDSON counts of fish in schools on simultaneous hydroacoustic counts, and this may provide a correction for underestimates by the latter method.

Preliminary Review of 2004 Columbia River Fish Runs and Fisheries

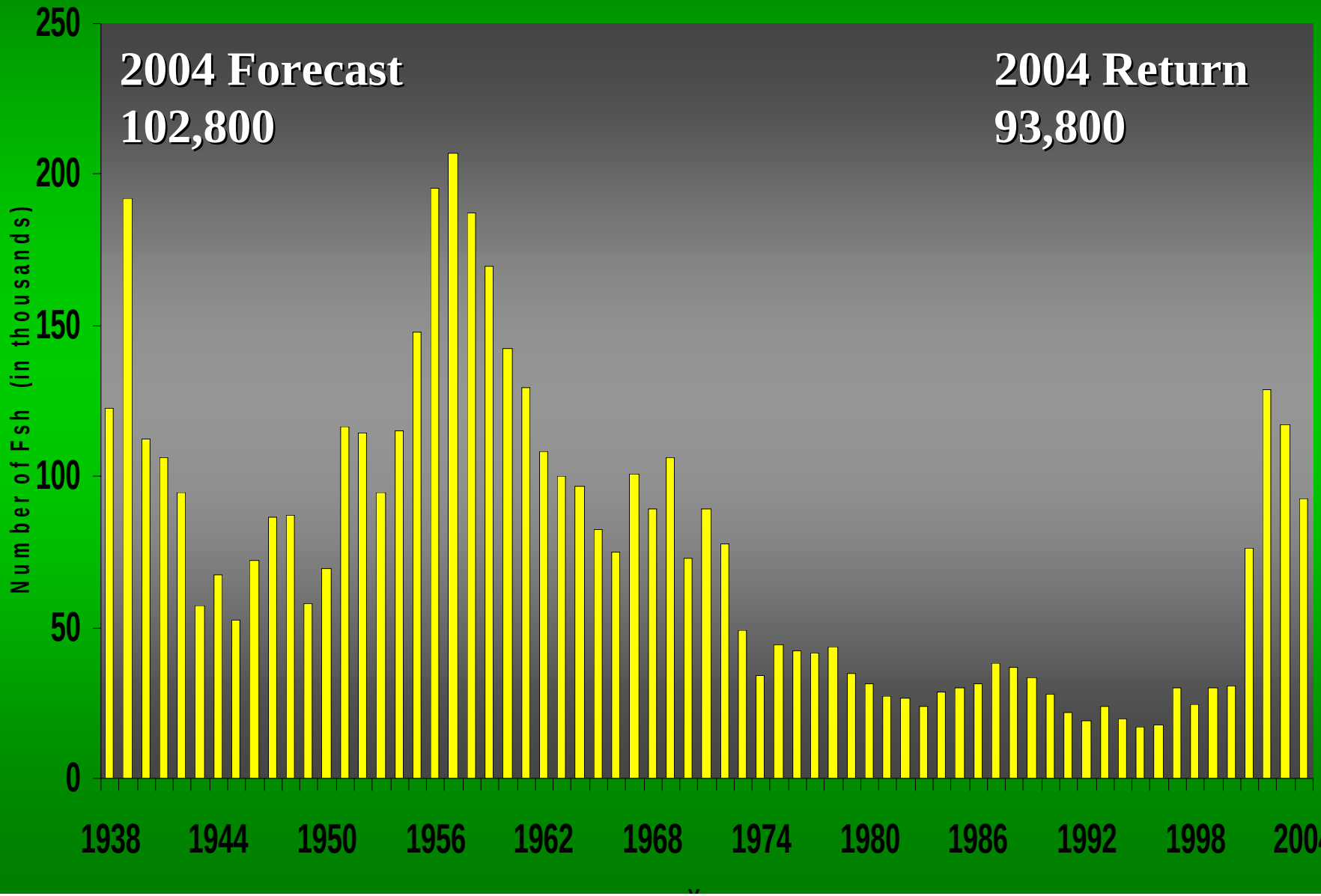
Upriver Spring Chinook Returns 1980-2004



Spring Chinook Fisheries 2004

- 164,000 angler trips
  - 23,700 spring chinook kept
- Commercial harvest of 13,500 fish
- SAFE commercial harvest of 10,600 fish
- Treaty harvest of 17,400 fish

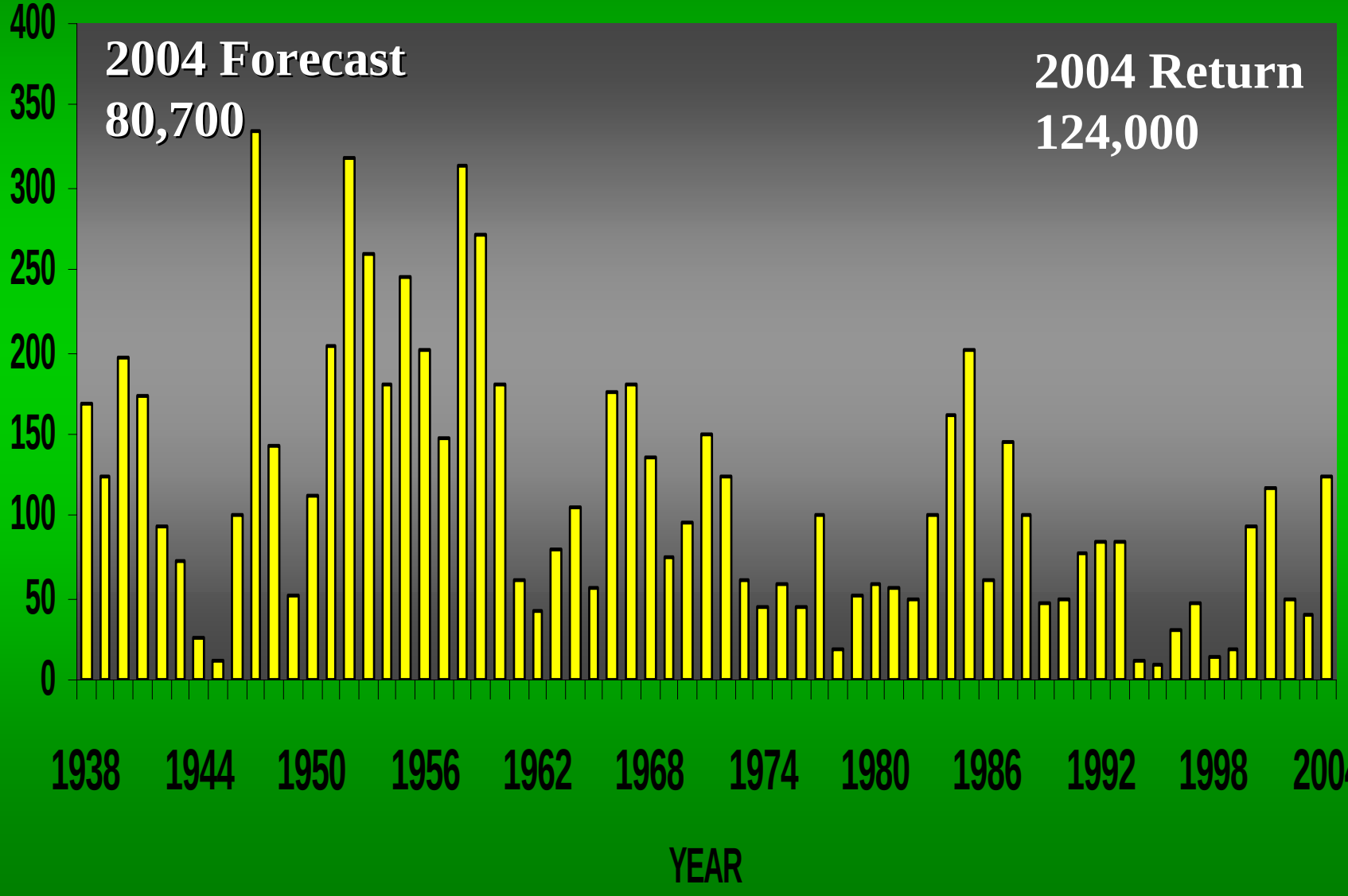
Columbia River Summer Chinook Returns 1938-2004



Summer Chinook Fisheries 2004

- 41,900 angler trips
  - 1,100 summer chinook kept
- Commercial harvest of 200 fish
- Treaty harvest of 8,700 fish

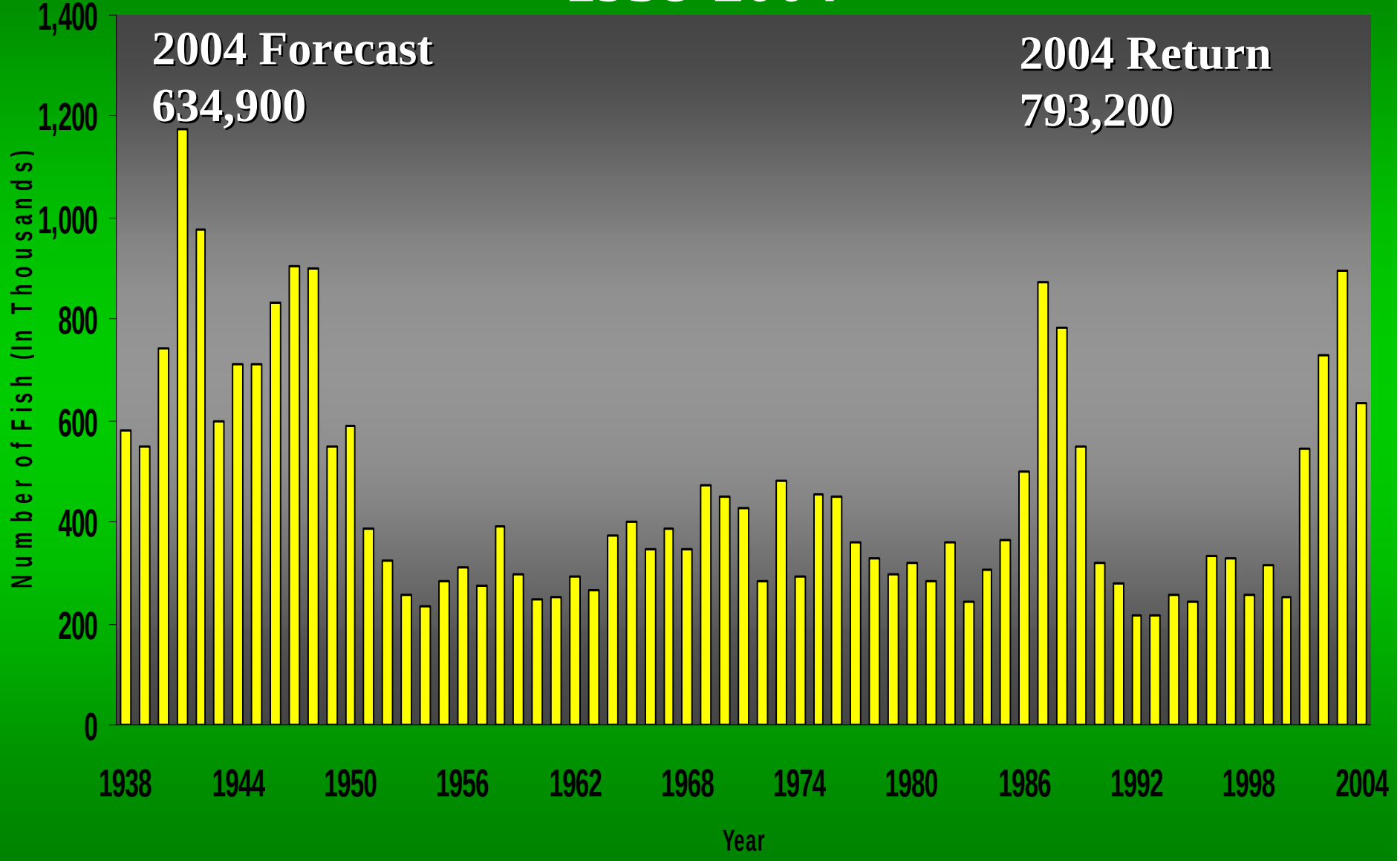
Columbia River Sockeye Returns
1938-2004



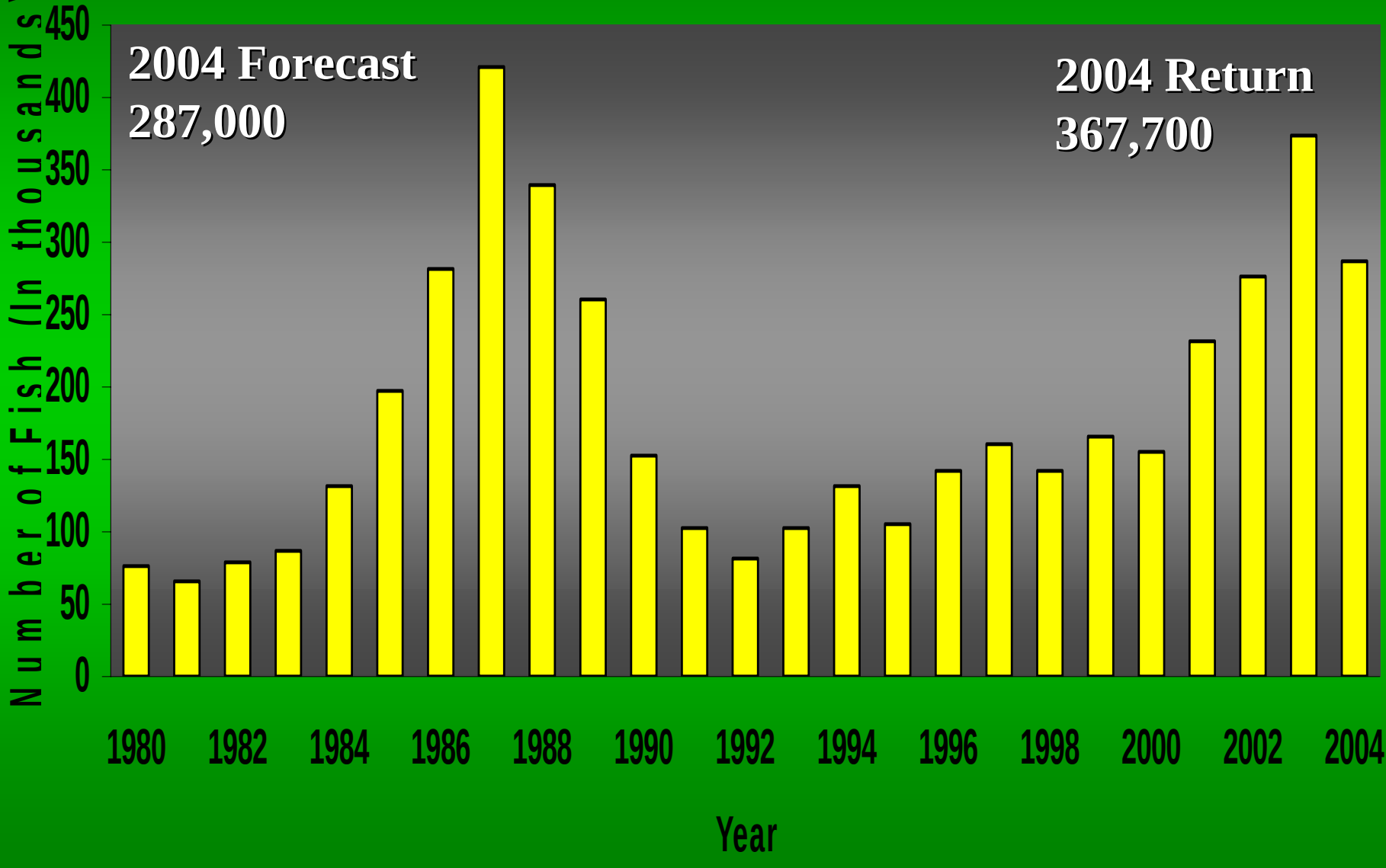
Sockeye Salmon Fisheries 2004

- Non-Indian commercial harvest of 700 fish
- Treaty commercial harvest of 4,700 fish
- Sport fisheries minor in Columbia River
  - Lake Wenatchee harvest 5,400 fish

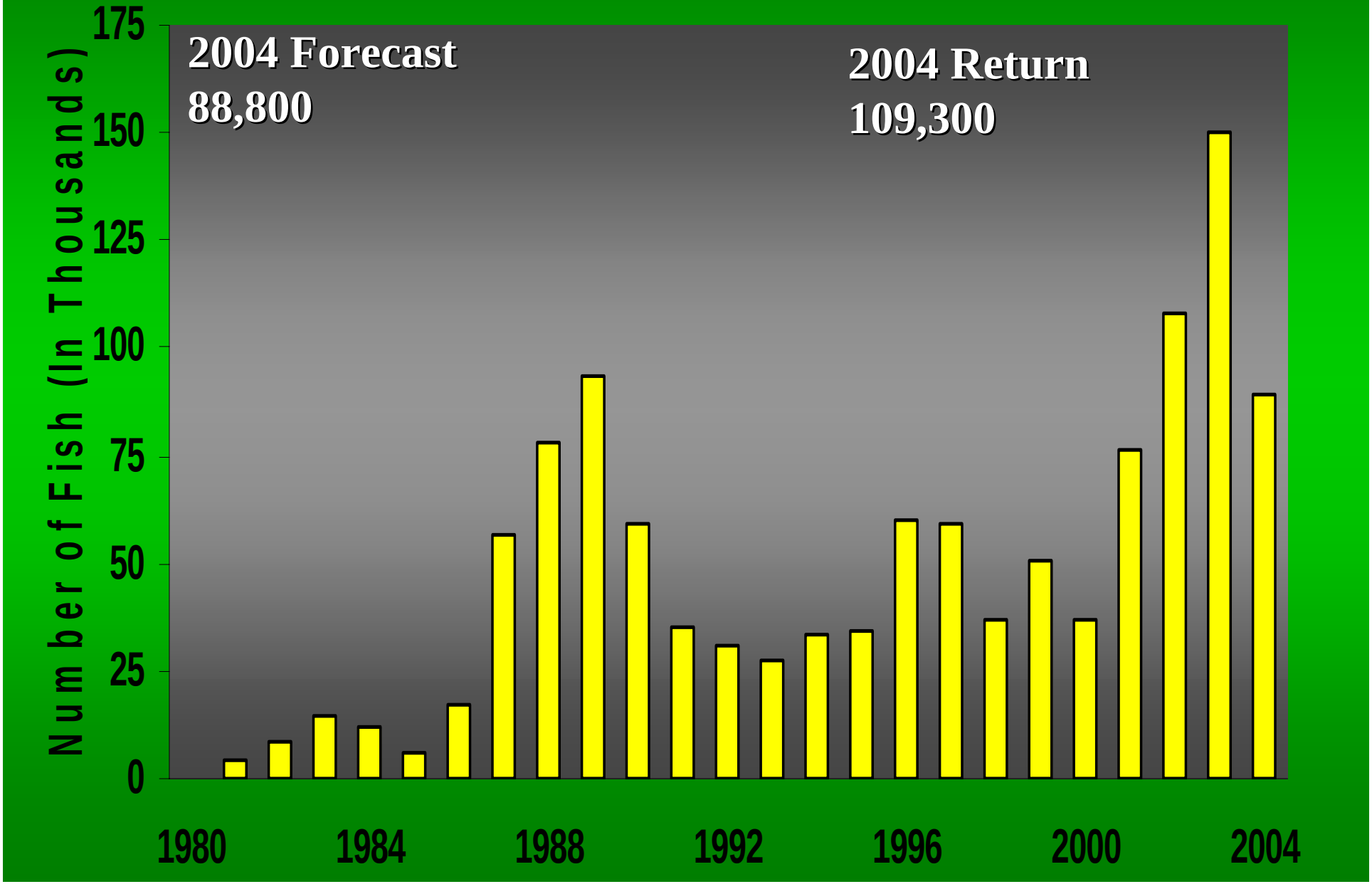
Columbia River Fall Chinook Returns
1938-2004



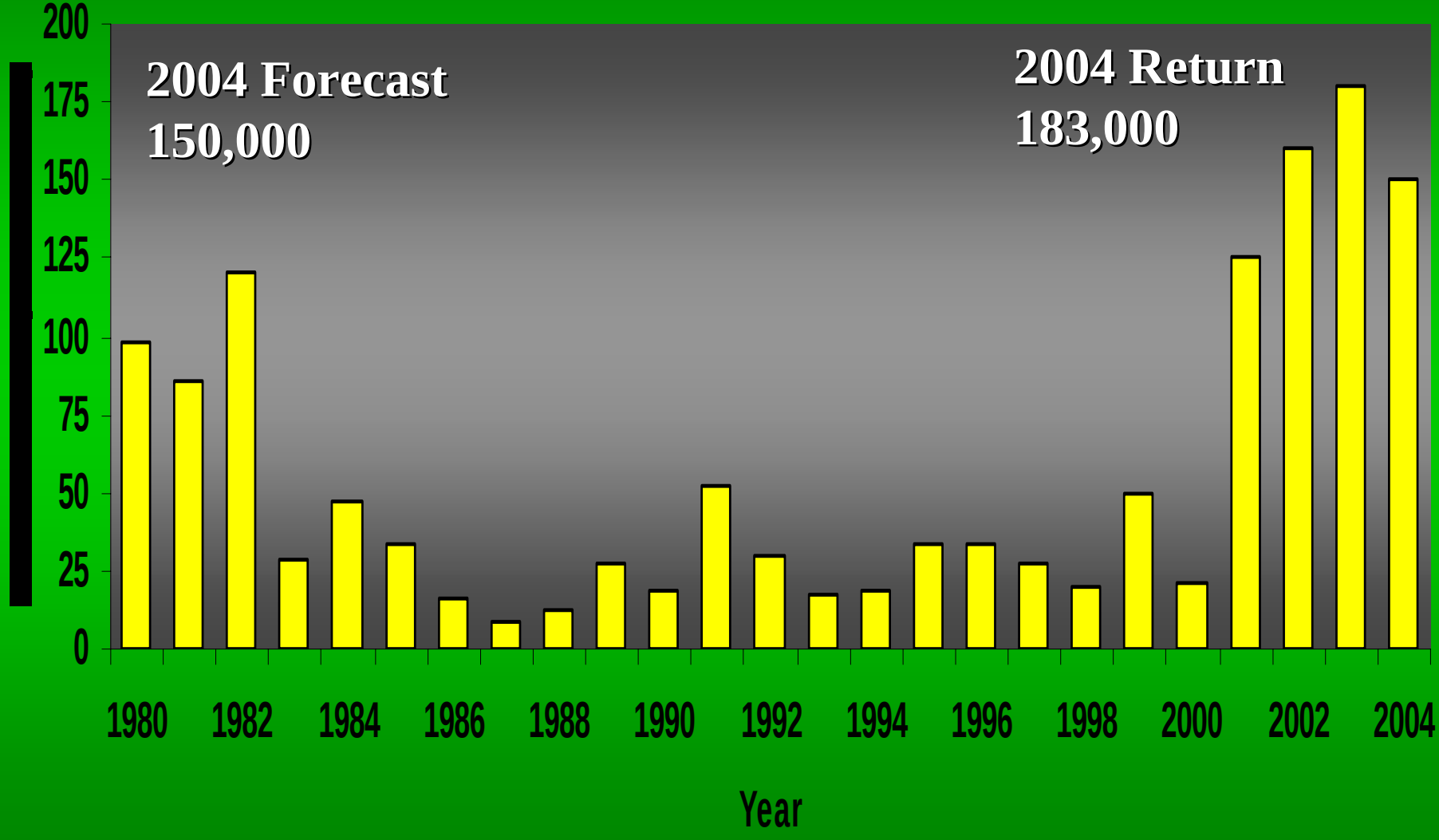
Upriver Bright Fall Chinook Returns 1980-2004



Mid-Columbia Bright Fall Chinook Returns
1980-2004



Bonneville Pool Hatchery Fall Chinook Returns 1980-2004



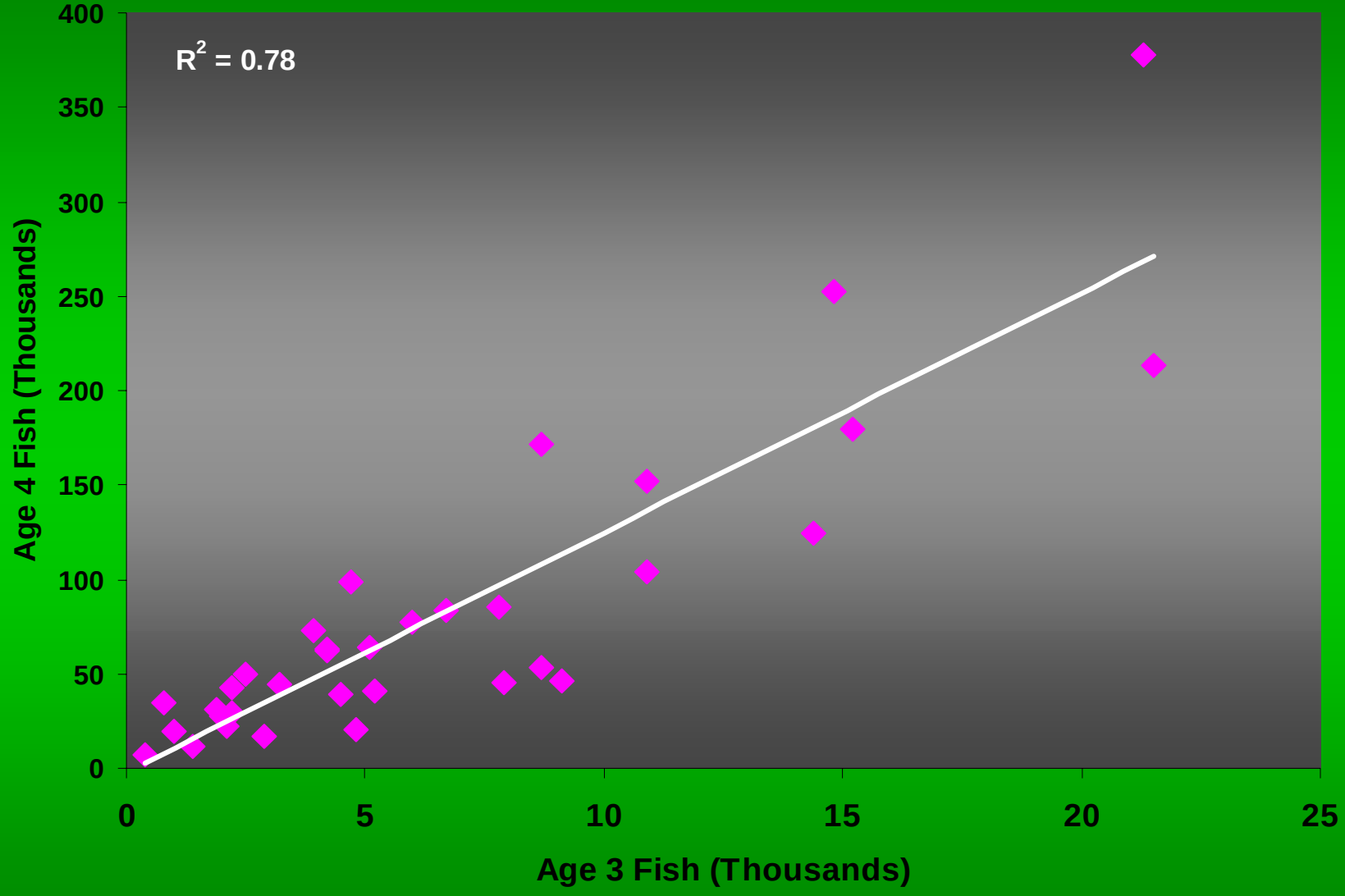
Fall Chinook Fisheries 2004

- 82,500 Angler trips
  - chinook kept 34,100
- Commercial harvest of 39,600
- Treaty harvest of 125,900

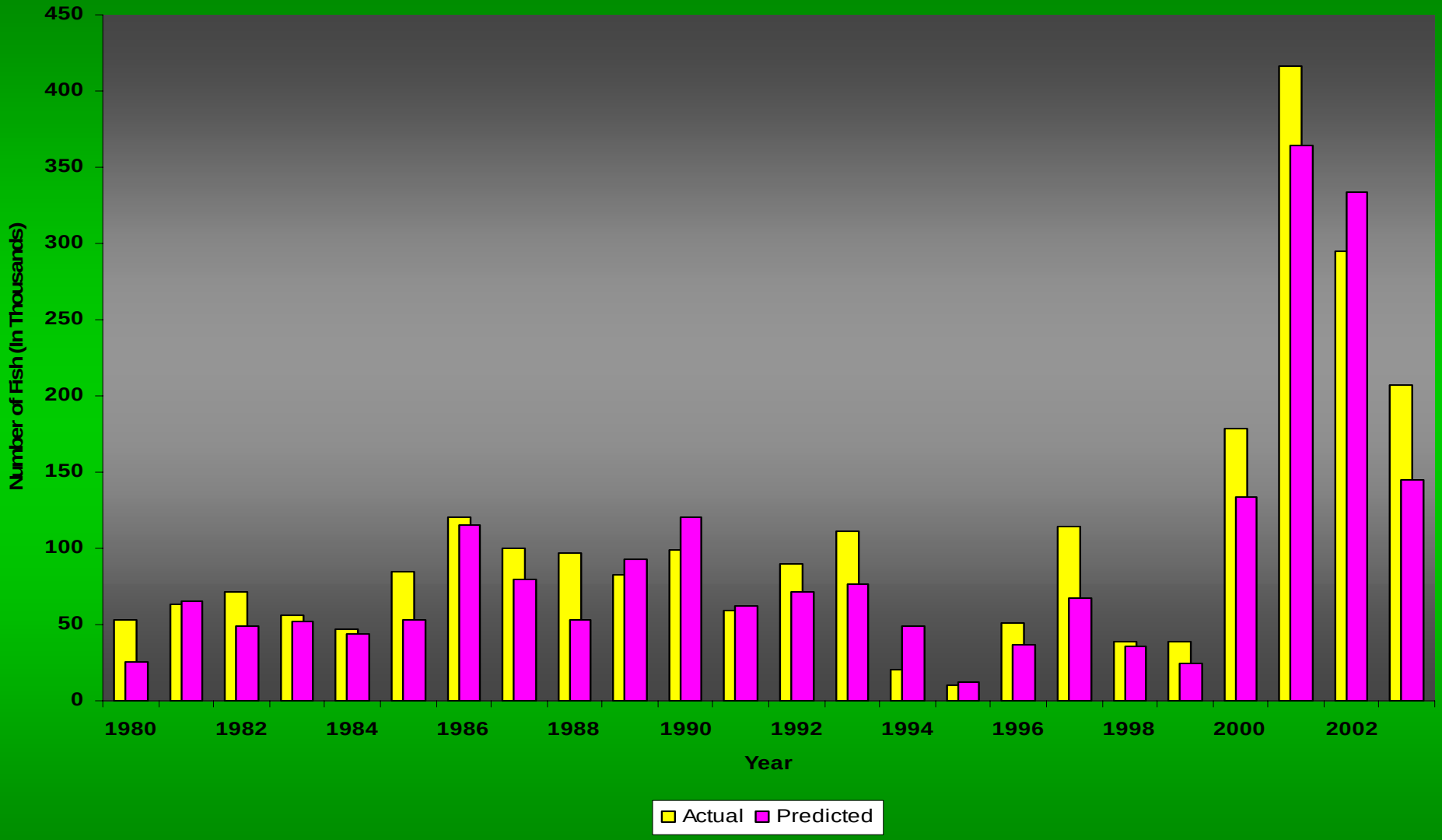
Forecasting Techniques

- Total Returns include:
  - fishery harvest
  - hatchery and natural escapement
  - dam counts
- Database divided into stock and age components
  - CWT and scale analysis
- Forecasts by brood year

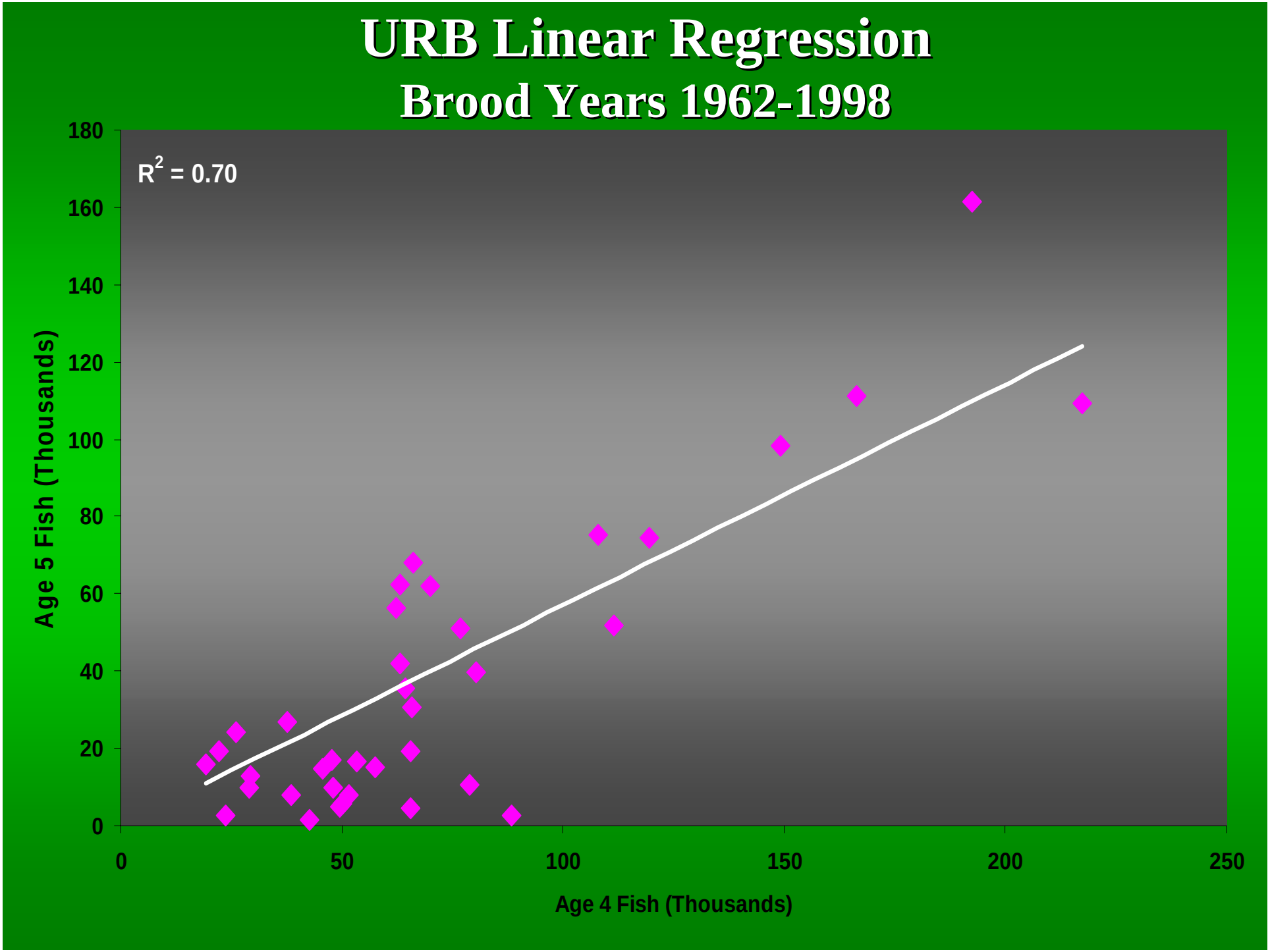
Upriver Spring Chinook
Brood Years 1967-2000



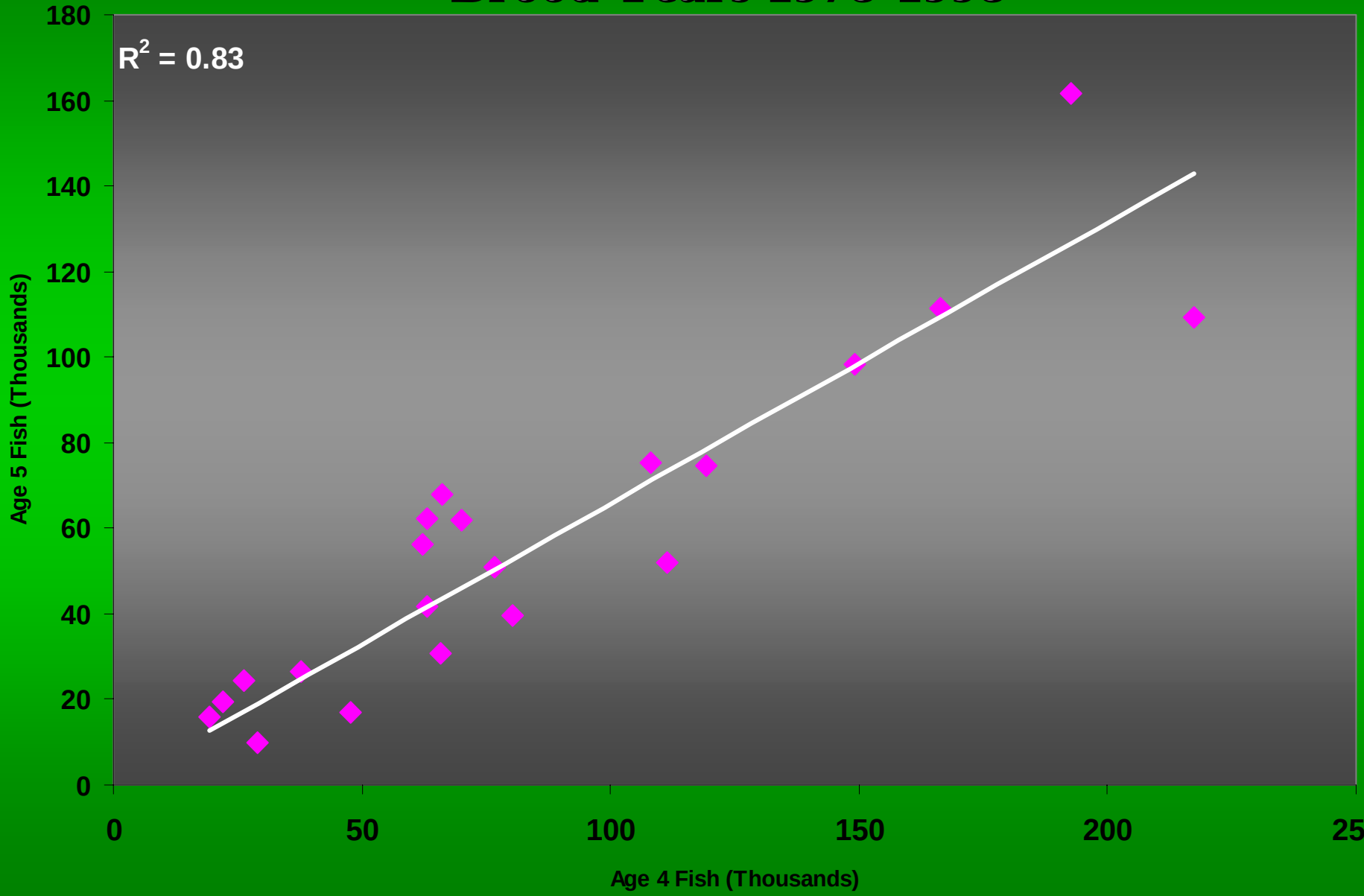
Forecast Accuracy
Upriver Spring Chinook



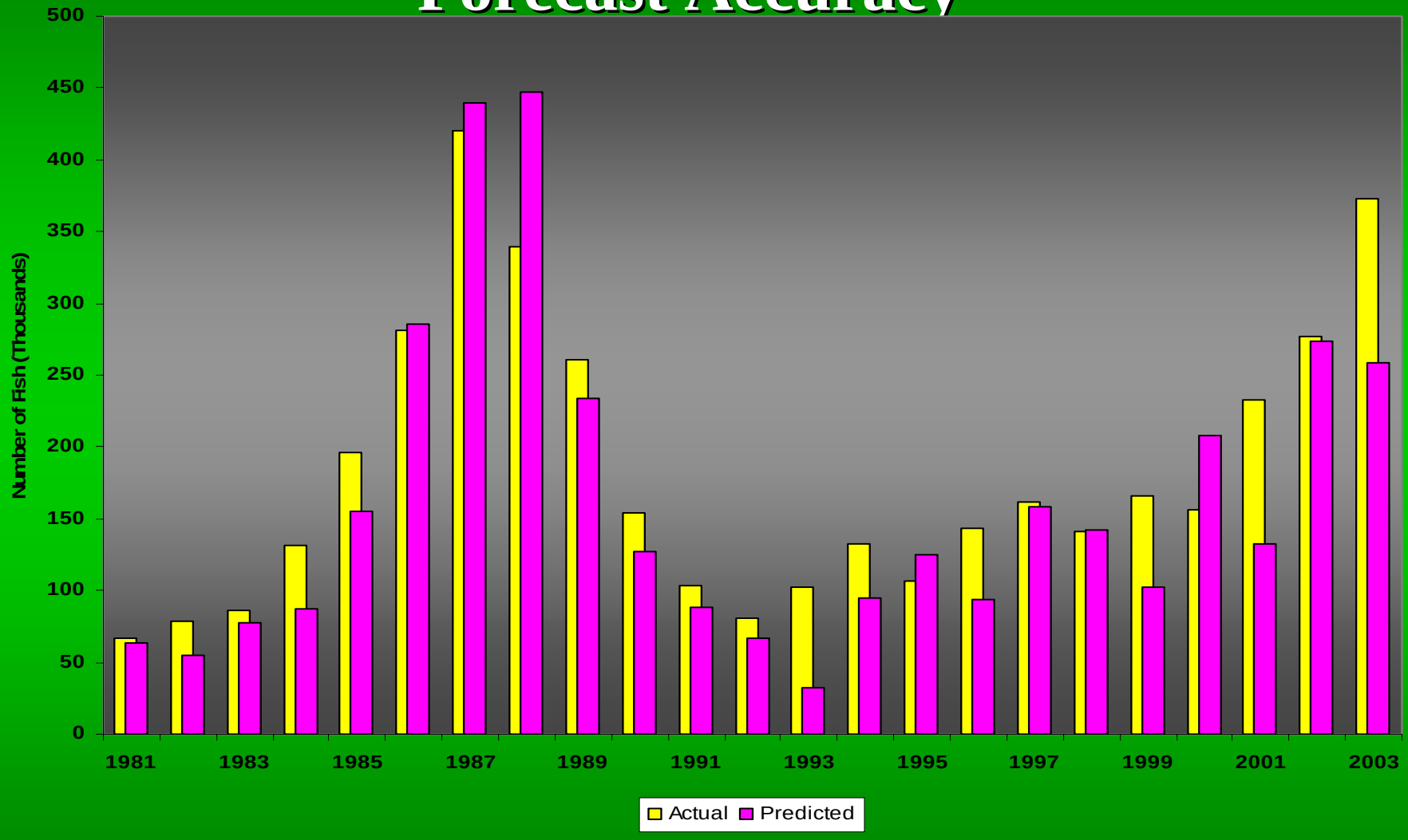
URB Linear Regression
Brood Years 1962-1998



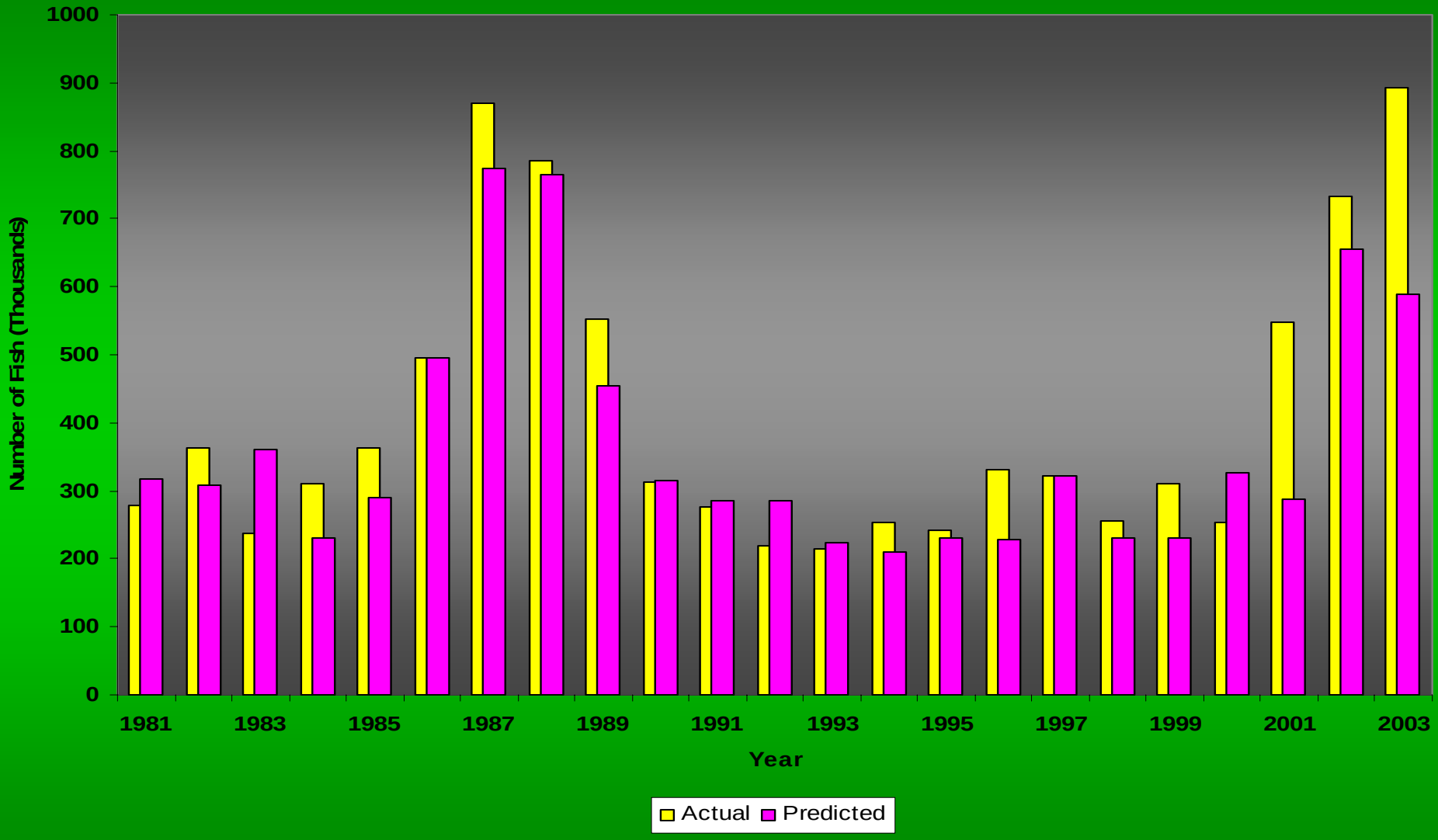
URB Linear Regression
Brood Years 1978-1998



Upriver Bright Fall Chinook Forecast Accuracy



Fall Chinook Forecast Accuracy



Clues as to the relative survival of 2001 outmigrants as revealed by the age composition of Chinook and sockeye salmon at Bonneville Dam

Jeffrey K. Fryer, Ph.D.

Columbia River Inter-Tribal Fish Commission

CRITFC's Bonneville sampling program

- Conducted weekly at the Bonneville Dam Adult Fish Facility on the Washington shore. Fish are anesthetized, length measured, clip and condition information gathered, and scales (4 for sockeye, 6 for Chinook) collected.
- Target sample size is a minimum of 500 fish per run (spring, summer, fall Chinook, and sockeye).
- I have aged all scales since the late 1980's with corroboration by John Sneva (WDFW).

CRITFC's Bonneville sampling program

- Sampling has occurred annually since
  - 1985 for sockeye salmon
  - 1987 for spring Chinook
  - 1990 for summer Chinook
  - 1997 for fall Chinook
- High water temperatures have sometimes stopped sampling, mostly for fall Chinook. In 2004, no sampling occurred between July 24 and September 1.

Spring Chinook at Bonneville Dam

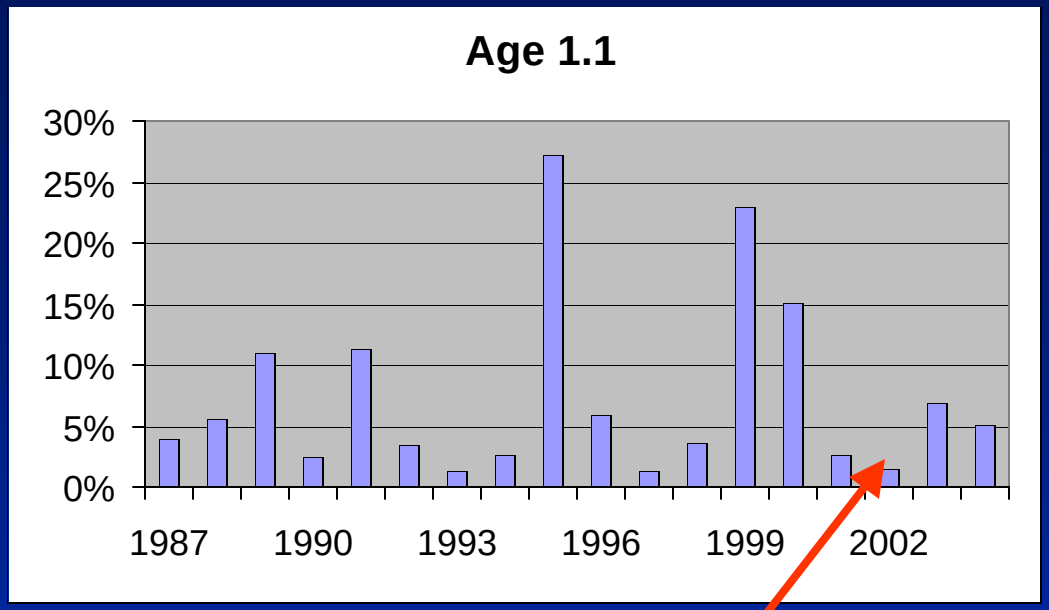
Mean Age Distribution since 1987:

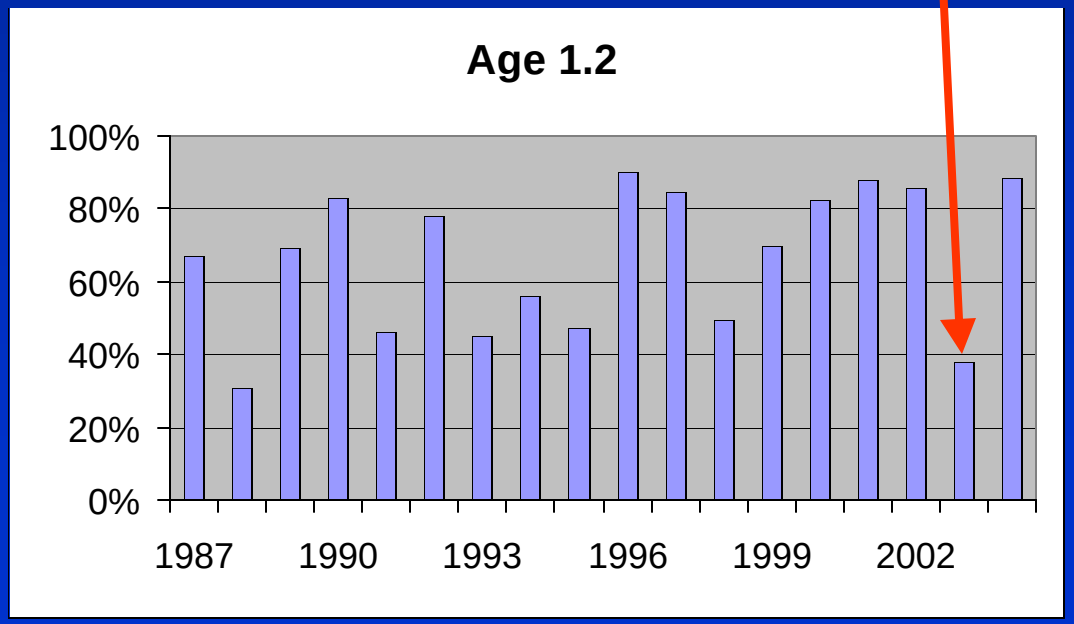
- 73% Age 1.2
- 21% Age 1.3
- 6% Age 1.1
- Less than 0.1% other age classes

Spring Chinook

2002 Age 1.1 returns: 1.4% of run, tied for second lowest since 1987.

2003 Age 1.2 returns: 38% of run, second lowest since 1987.

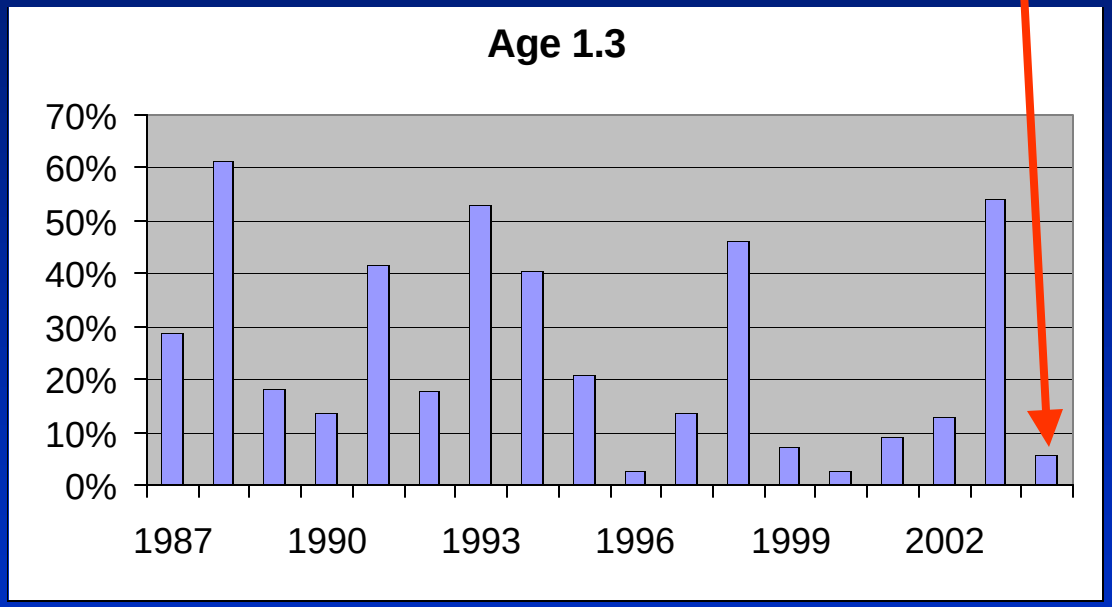




Spring Chinook

2004 Age 1.3 returns: 5.6% of run, third lowest since 1987.

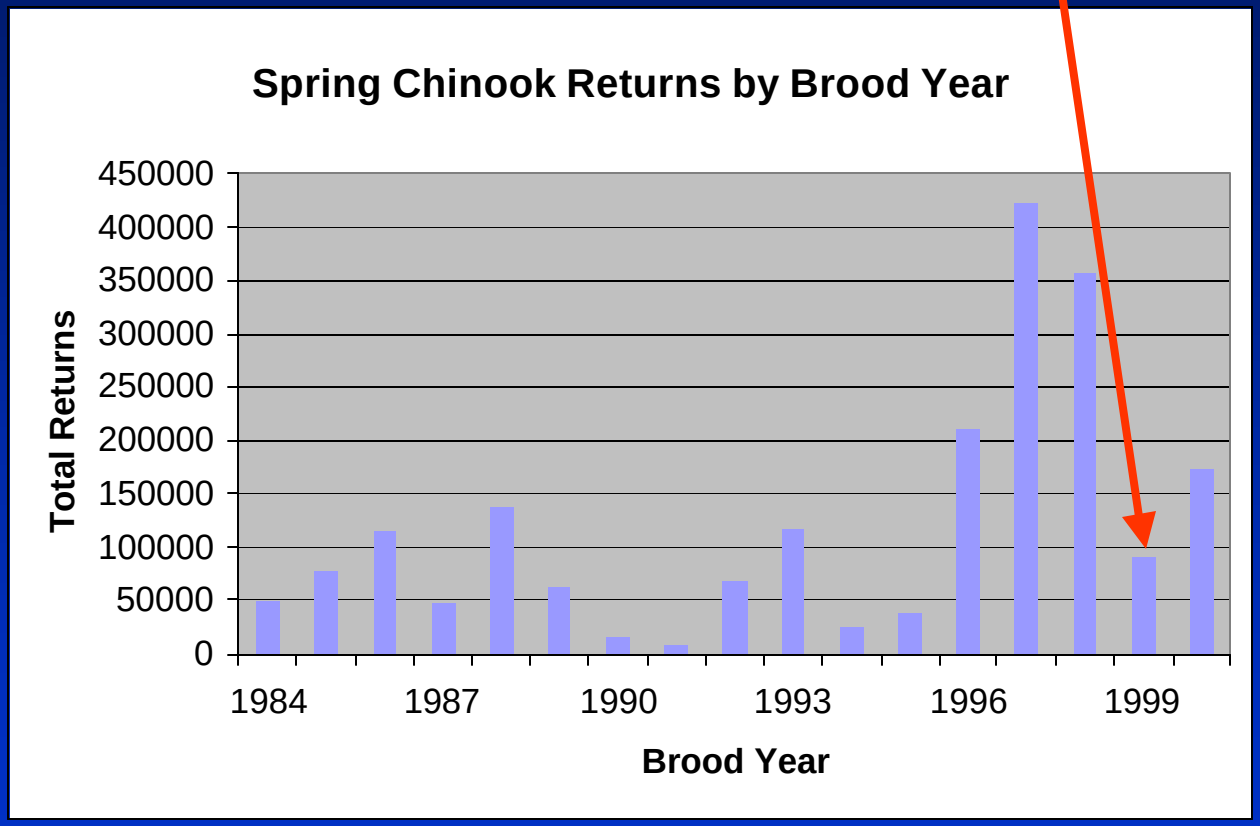
2001 Outmigrants



Spring Chinook

1999 brood still 8th highest in 17.

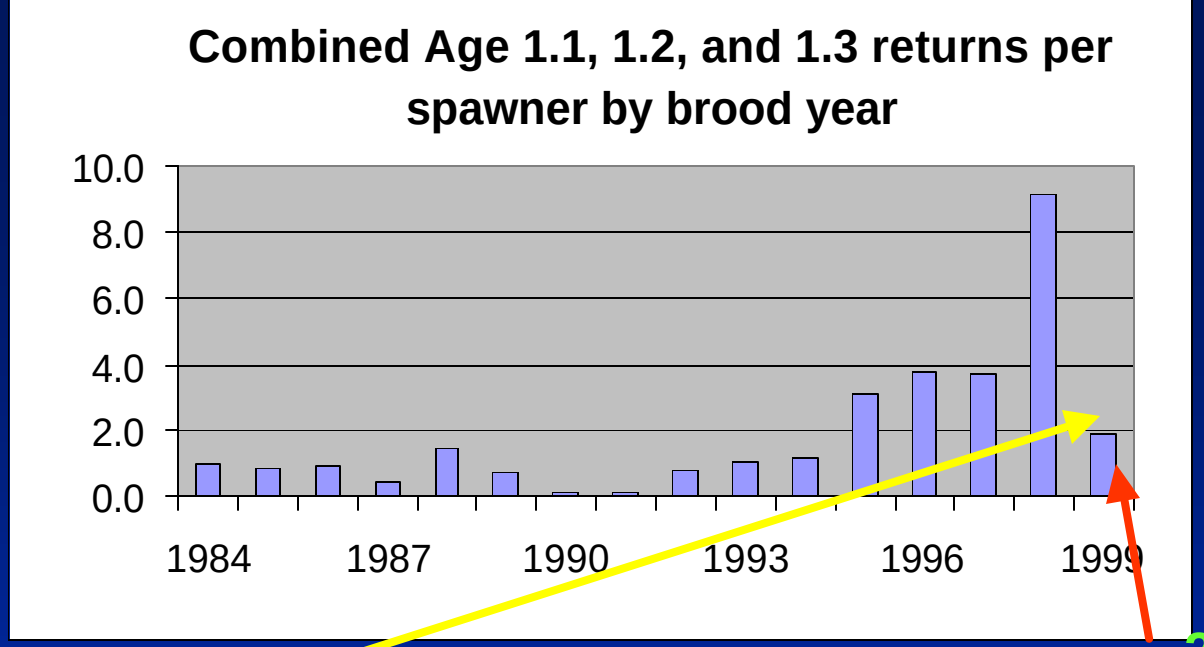
2001 Outmigrants



- This approach does not take into account the number of spawners. A better measure may be returns per adult spawner.

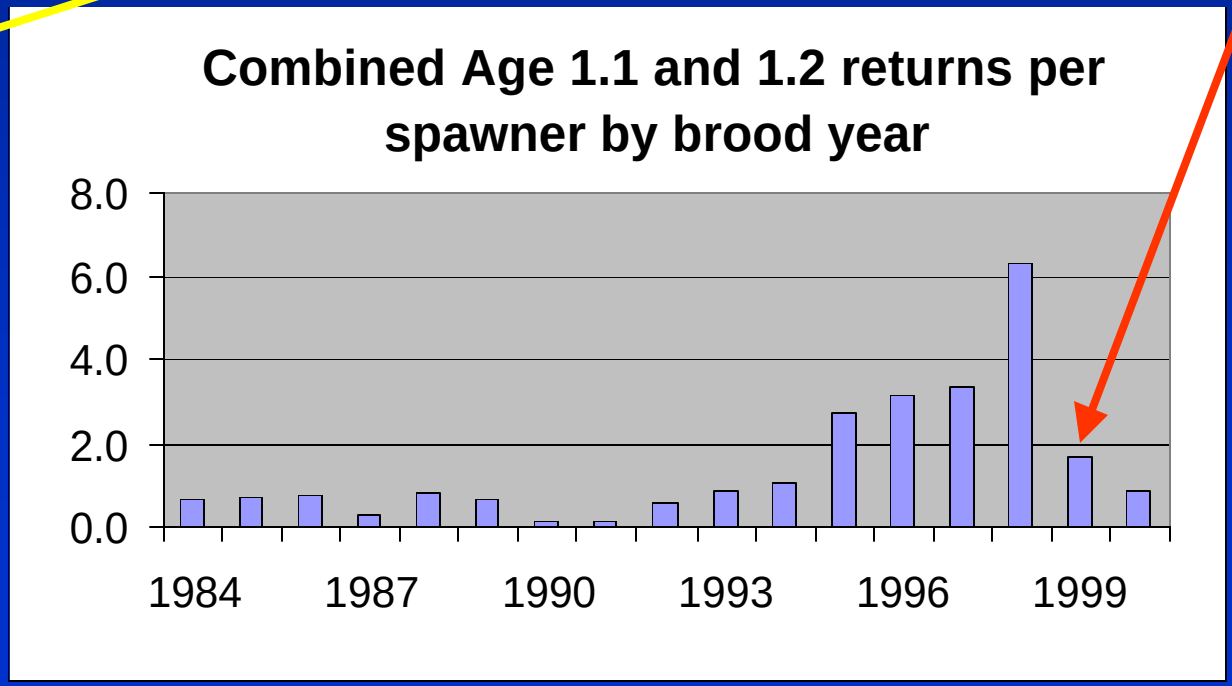
- Spawners are estimated as the adult return to Bonneville for a given brood year. The effect of fisheries and pre-spawning mortality on the number of spawners were not factored out, except for fisheries in the case of sockeye salmon. Fisheries have not been significant for spring and summer Chinook until very recently.

Returns per spawner



2001 Outmigrants

Had the fifth highest rate of return since 1984 but lowest in past 5 years.



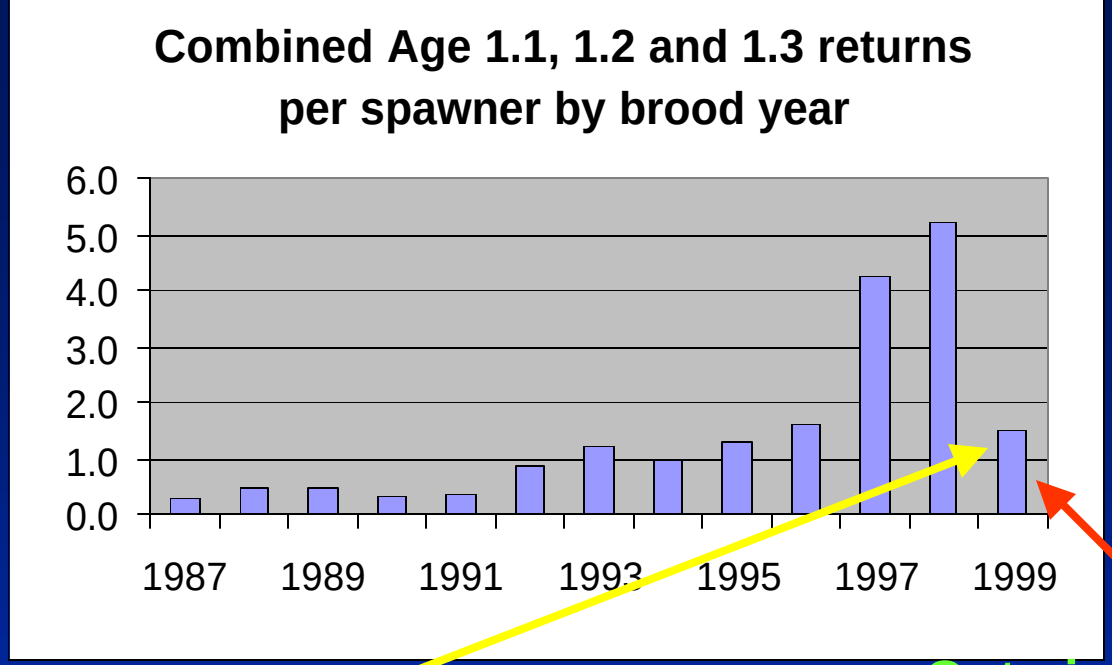
Spring Chinook 1999 Brood Year (2001 outmigrants)

- The low return, when compared to 1995-1998 brood years, tends to support the hypothesis that the 1999 brood year was adversely affected by migrating downstream during a drought year. However, returns from the 2000 brood year also look low. (Though this may also be a result of considering all 200,000 fish returning in 2000 as spawners.)

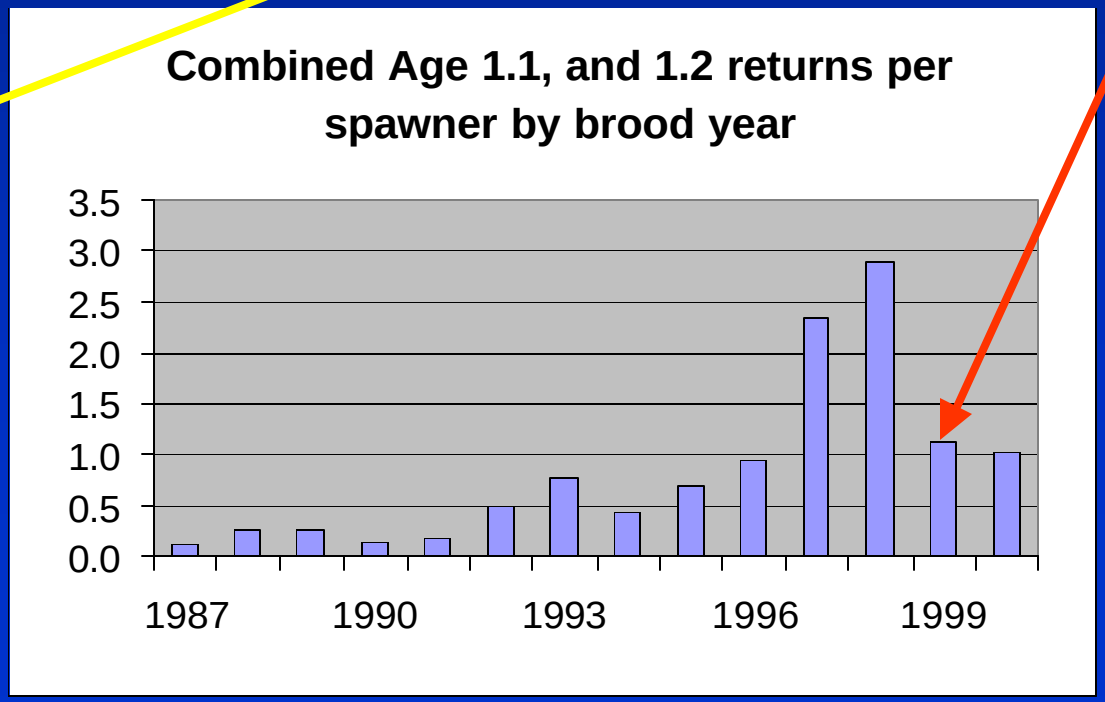
Summer Chinook

- Complicated by multiple age classes; Ages 1.1, 0.3, 1.2, 0.4, and 1.3 all average over 5% of the run (1990-2002), while Age 0.1, 0.2, 0.5 and 1.5 have also been observed.
- Multiplicity of age classes and a broad range of scale patterns makes age estimation more difficult.

Summer Chinook returns per spawner

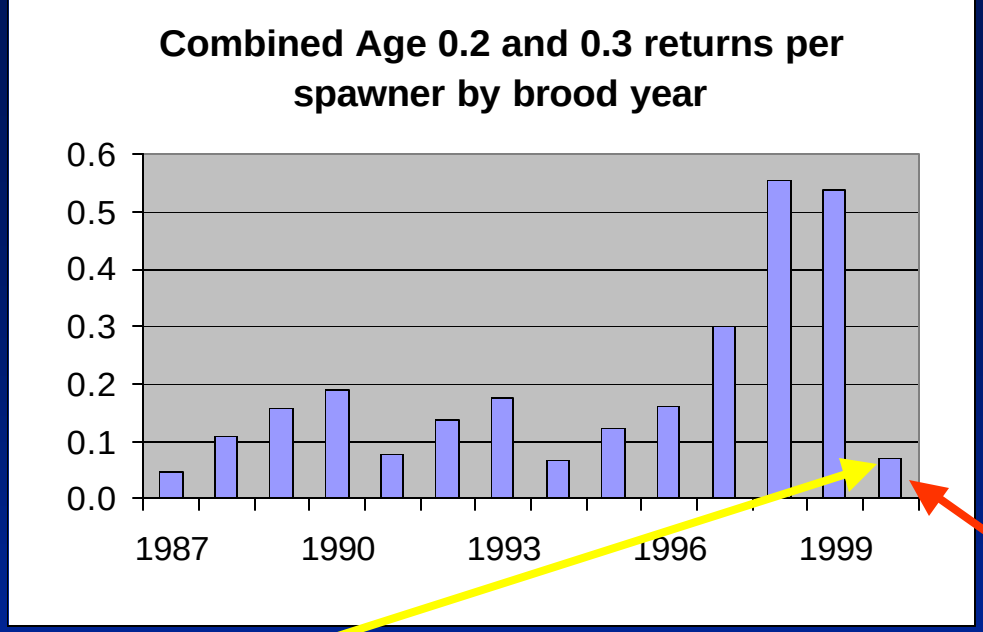


2001 Outmigrants

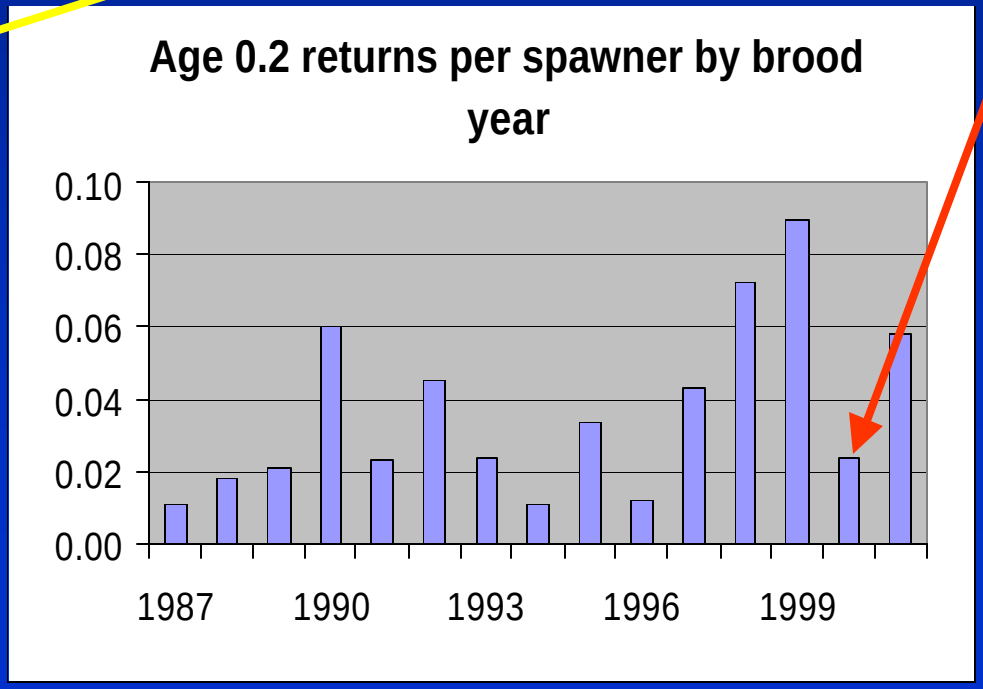


Fourth highest combined rate of return of yearling outmigrants (1.1, 1.2, 1.3) in 14 years but lowest in past 4 years.

Summer Chinook returns per spawner



2001 Outmigrants

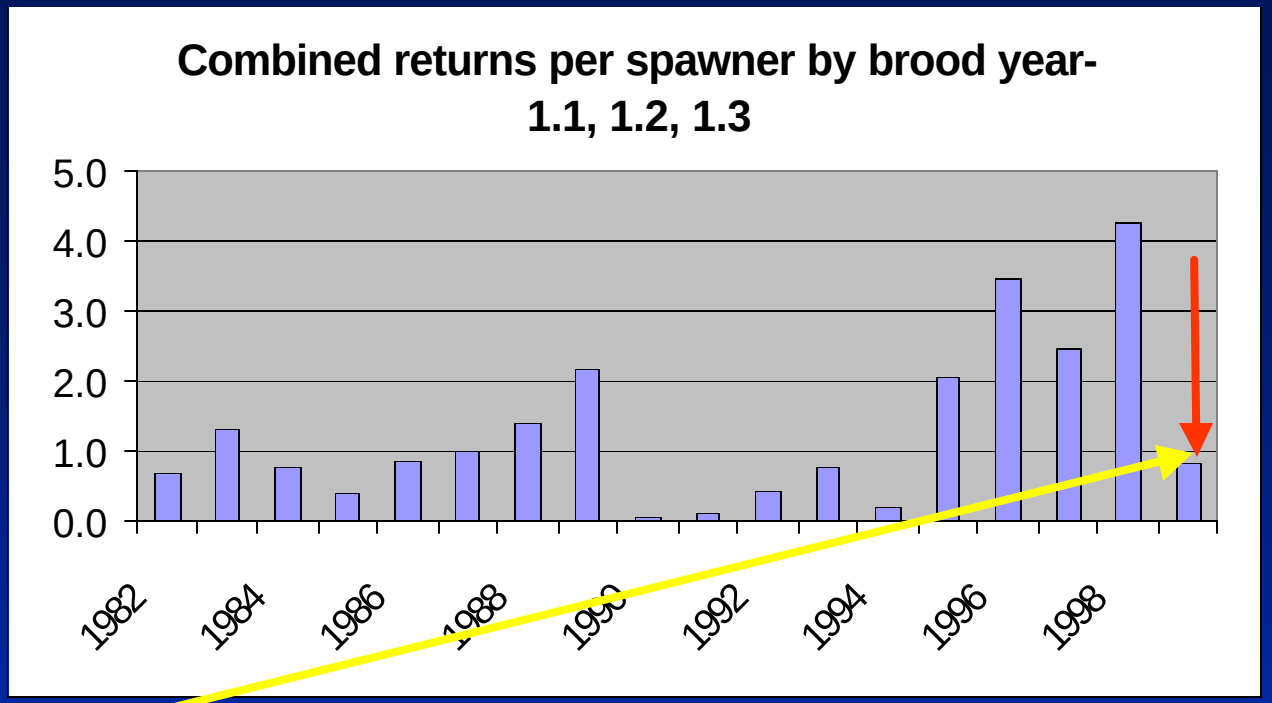


Third lowest combined rate of return of subyearling outmigrants (0.2 and 0.3) in 14 years.

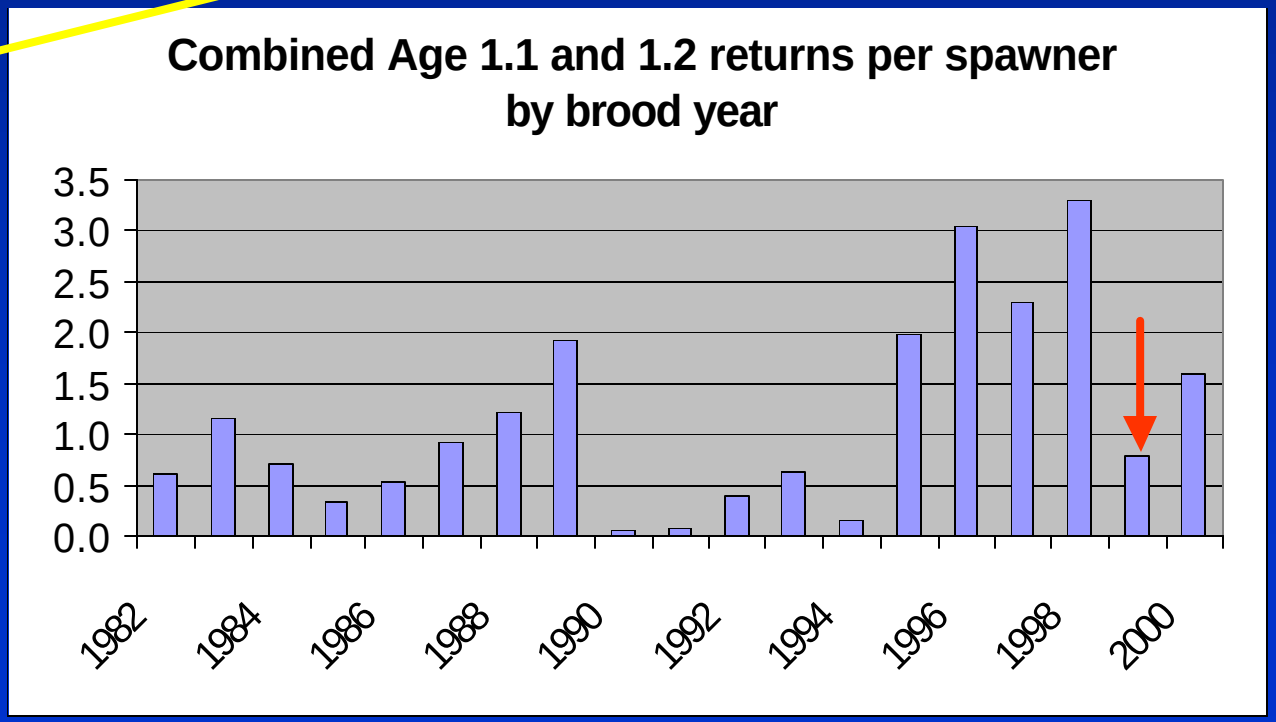
Summer Chinook 2001 outmigrants

- If age composition differences we observed can be explained by 2001 outmigration conditions, then these conditions adversely affected subyearling outmigrants much more than yearling outmigrants.

Sockeye Returns per Spawner (fishery effects factored out)



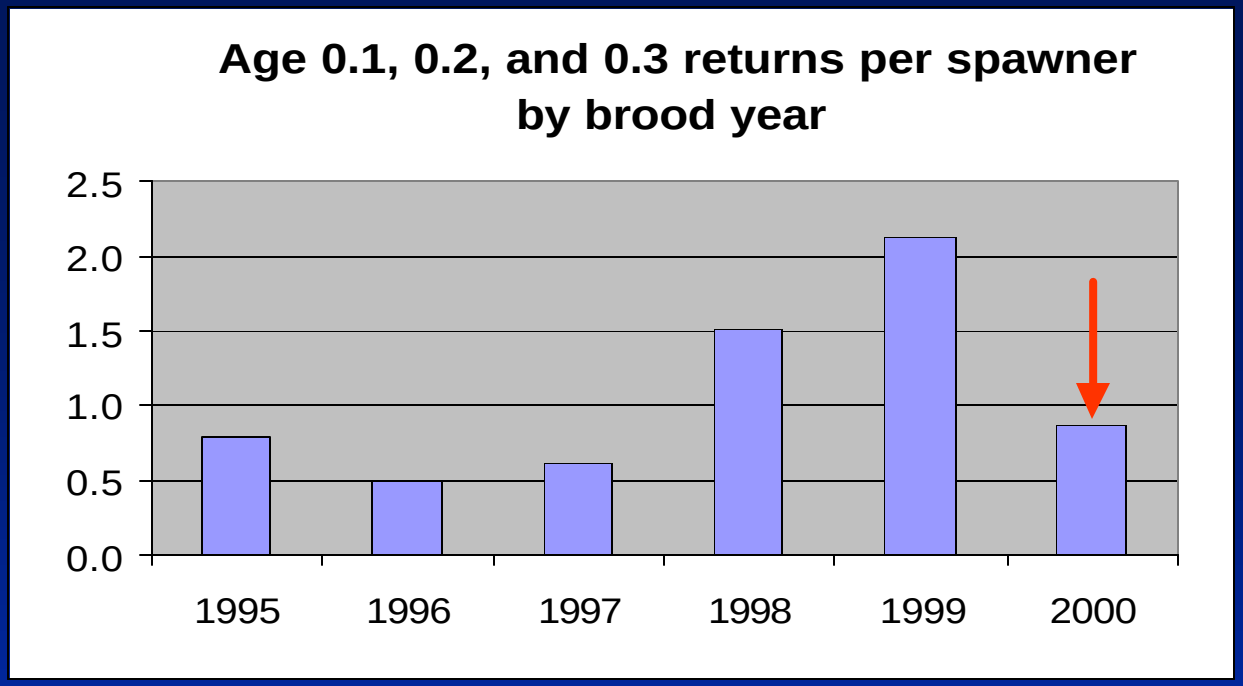
Tenth highest combined rate of return of Age 1.1,1.2, and 1.3 fish in 19 years but by far the lowest in the past five years.

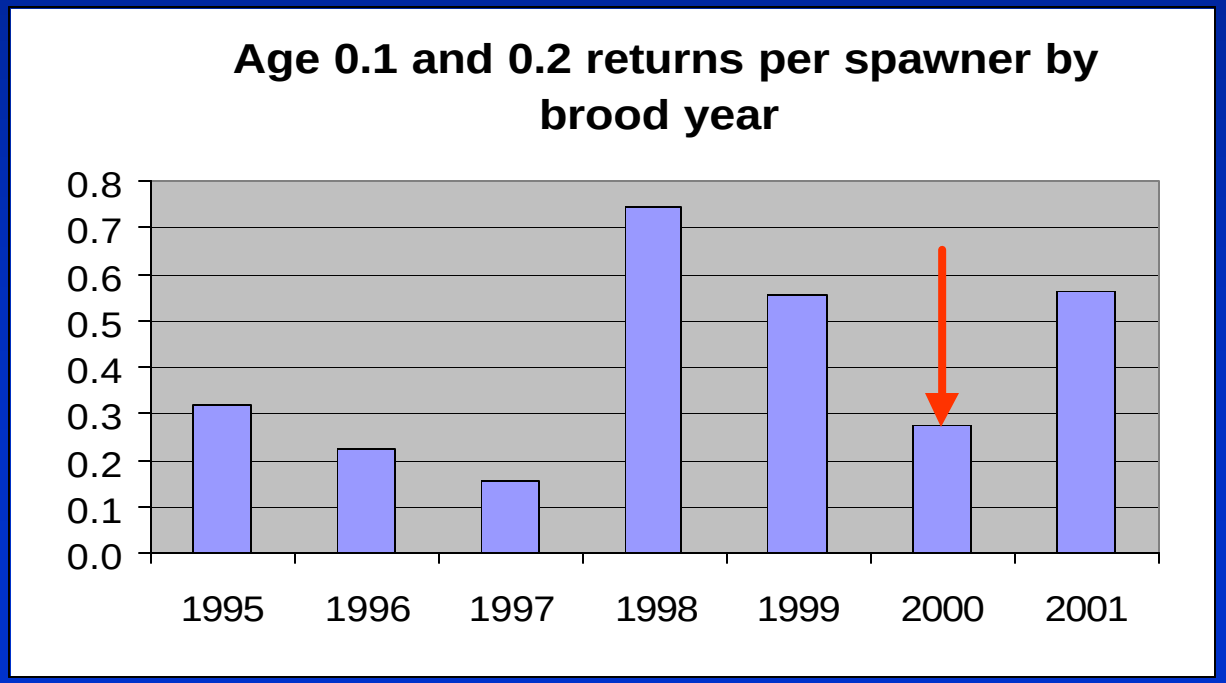


Fall Chinook

- Only eight years of data, four of which were adversely impacted by the suspension of sampling due to high water temperatures. (This included 2003 and 2004.)

Fall Chinook Returns per Spawner





Conclusions

- The abundance of age classes of returning Chinook and sockeye salmon that outmigrated in 2001 was low relative to immediately preceding years.
- Comparing 2001 outmigrants with 2002 outmigrants, subyearling Chinook and sockeye salmon returned at a lower rate in 2001 than in 2002, while yearling Chinook returned at a similar rate. This suggests that subyearling Chinook and sockeye juveniles were more affected than yearling Chinook by the poor outmigration conditions that occurred in 2001.

Conclusions

- The rate of return of Chinook and sockeye salmon outmigrating in 2001was generally greater than that for fish outmigrating before 1998.
- After 2005, we will have a more complete picture of both the 2001 and 2002 outmigration with the return of Age 0.4 and 1.4 fish outmigrating in 2001 and Age 0.3 and 1.3 fish outmigrating in 2002.
- Similar analyses in future years should better account for fisheries and surpluses at hatcheries as they make up an increasing portion of the run when run sizes get large.

Smolt Migration 2004

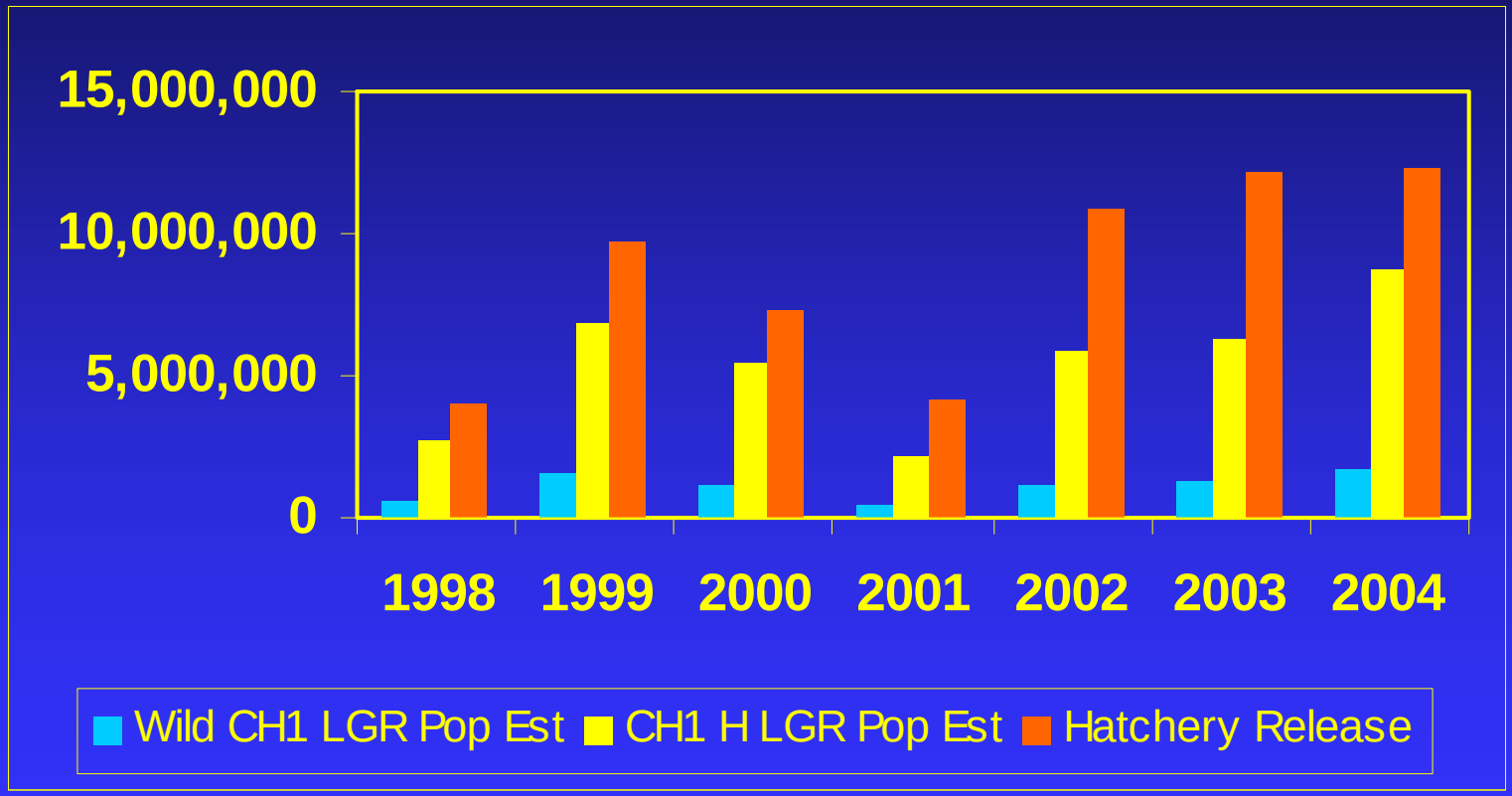
Jerry McCann

Fish Passage Center

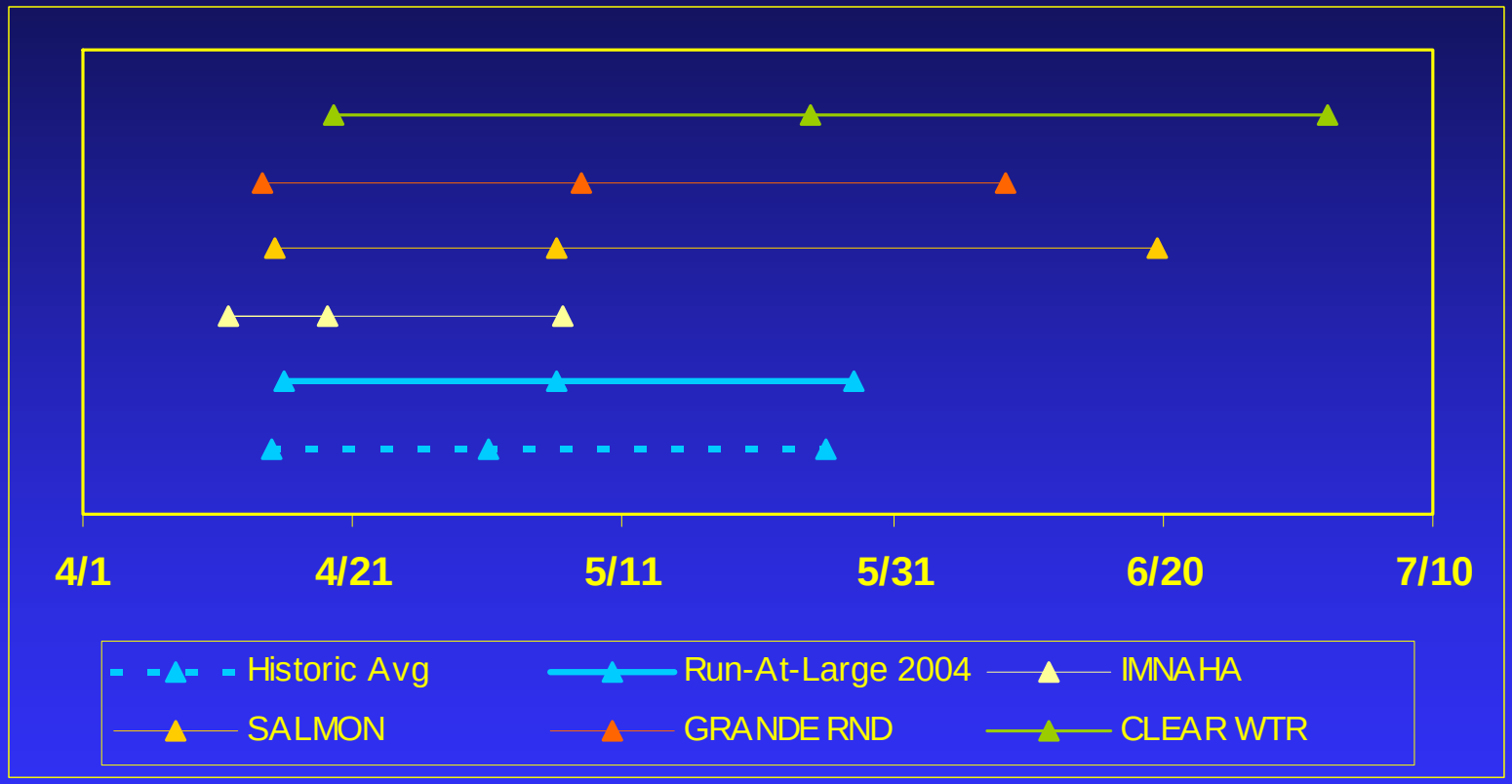
Review of 2004 Smolt Migration

- Run Size
- Timing
- Travel Time
- Survival

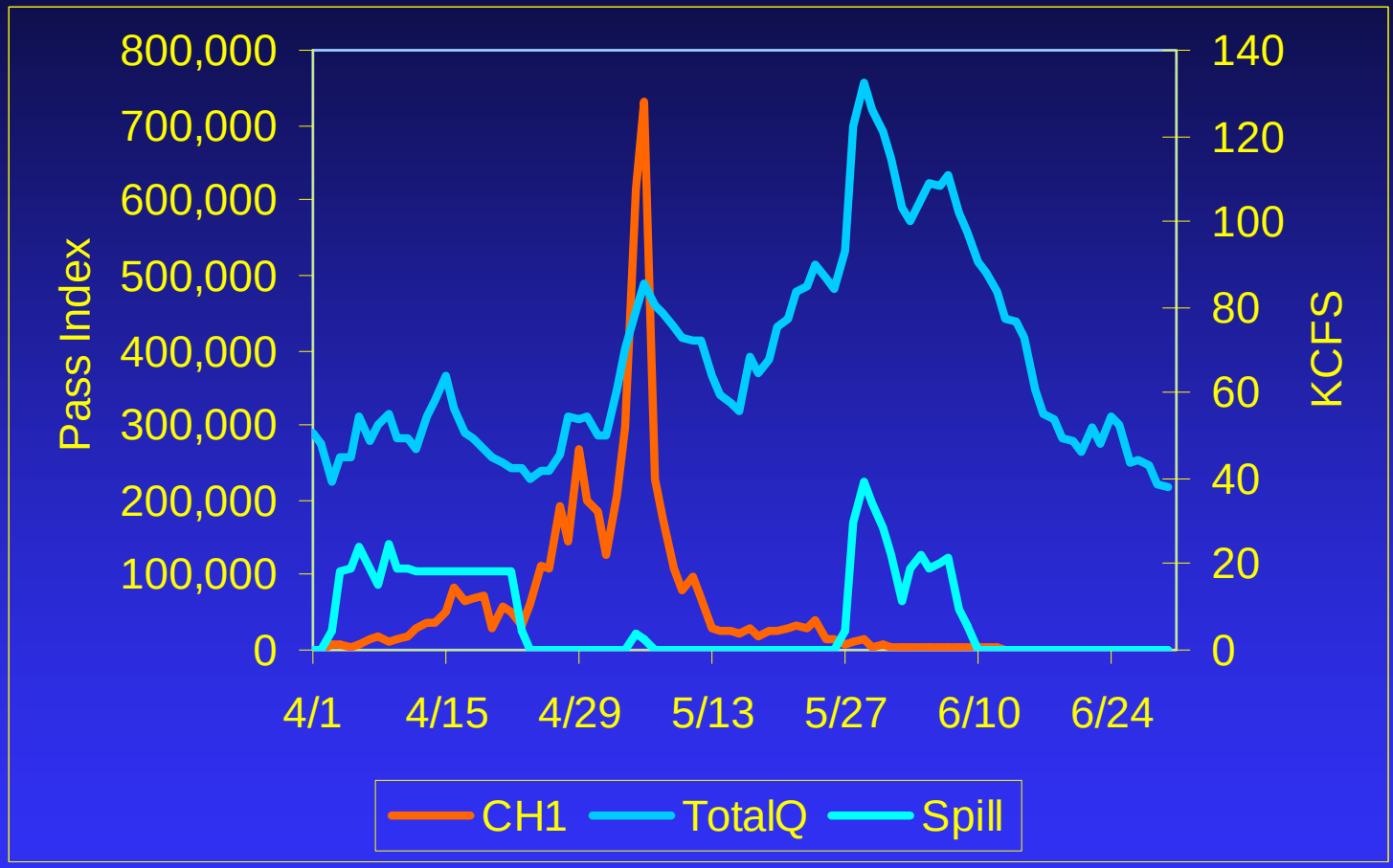
Yearling Chinook Population at Lower Granite and Hatchery Releases



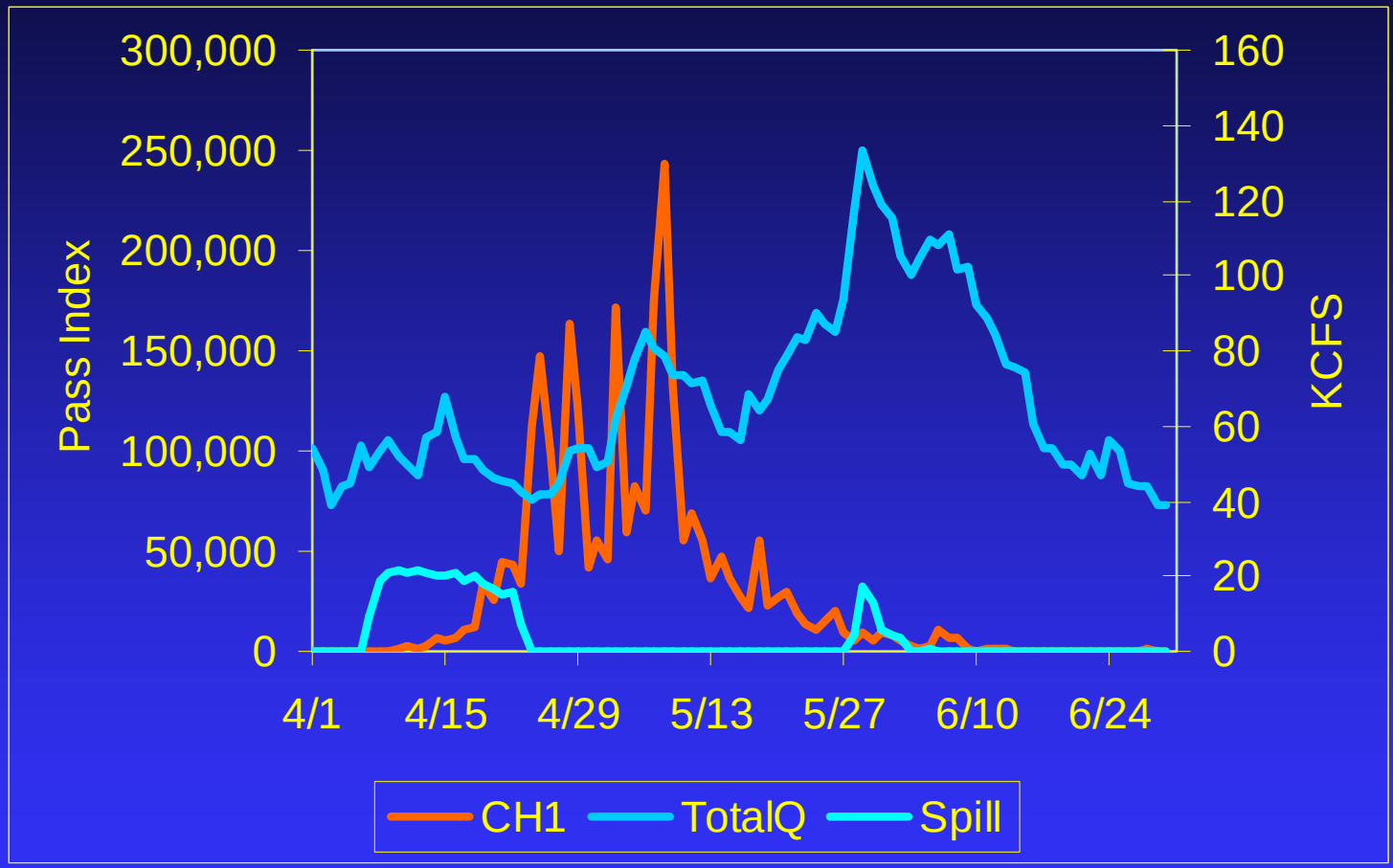
Yearling Chinook Timing at LGR



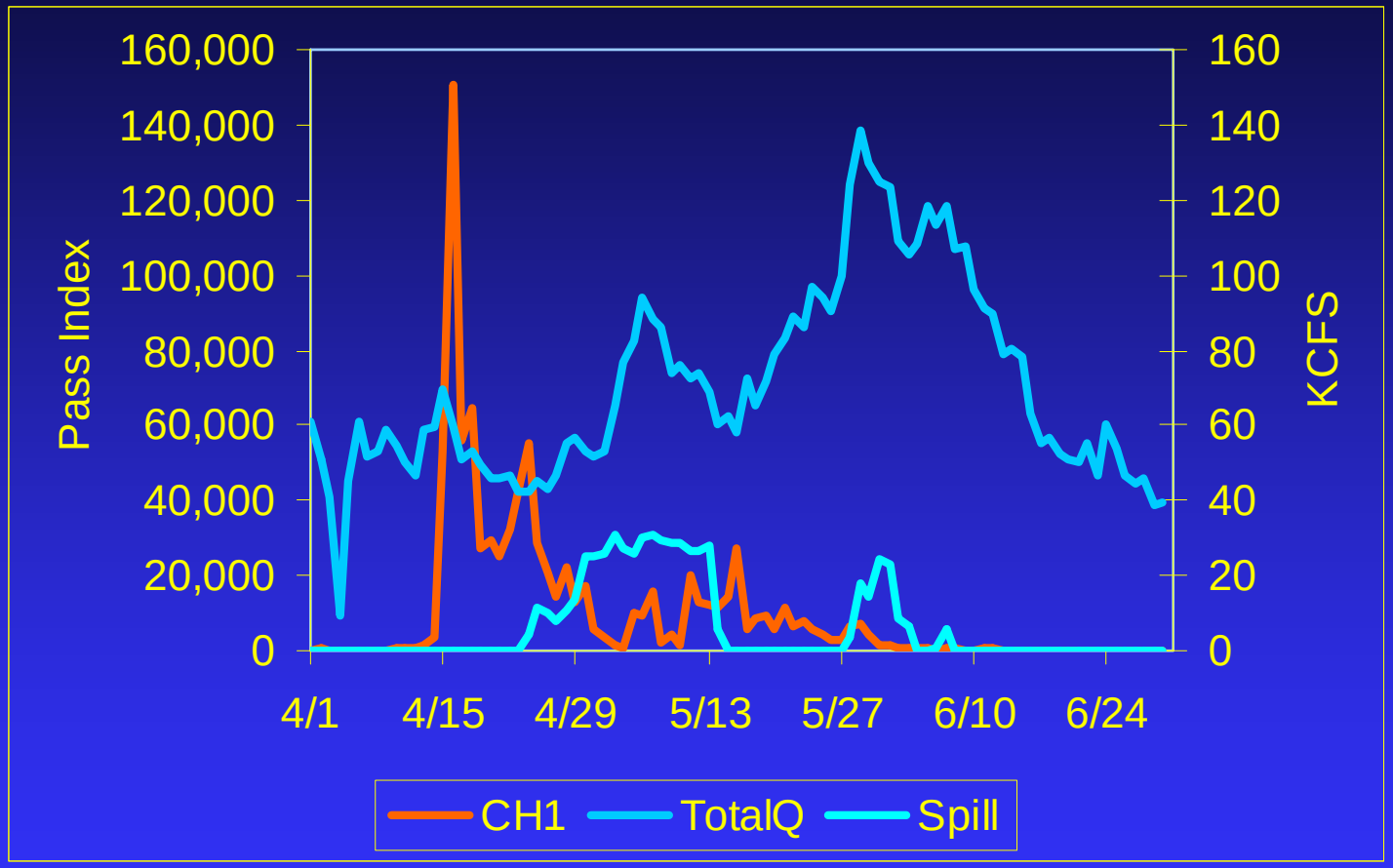
Yearling Chinook at Lower Granite 2004



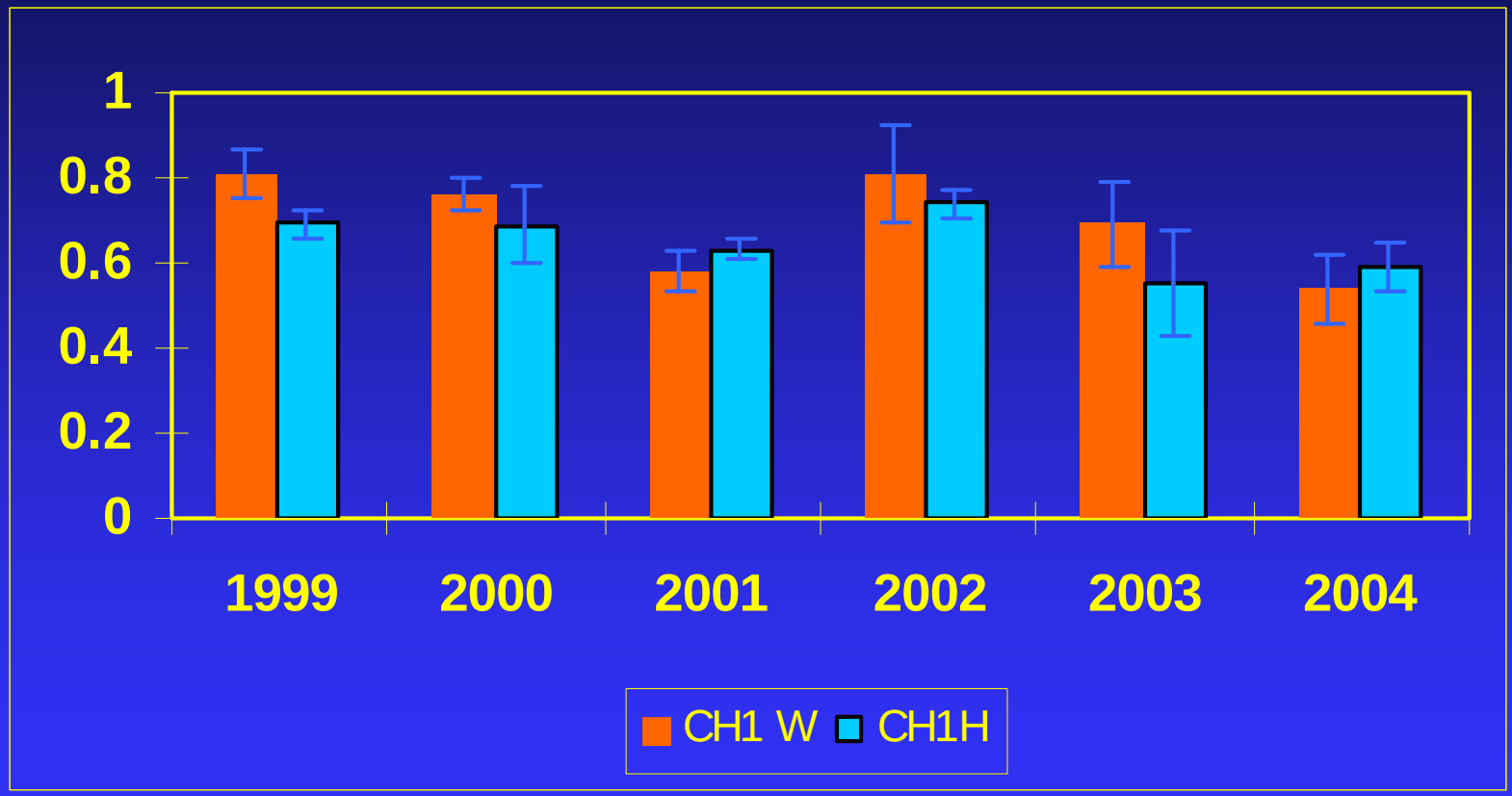
Yearling Chinook at Little Goose 2004



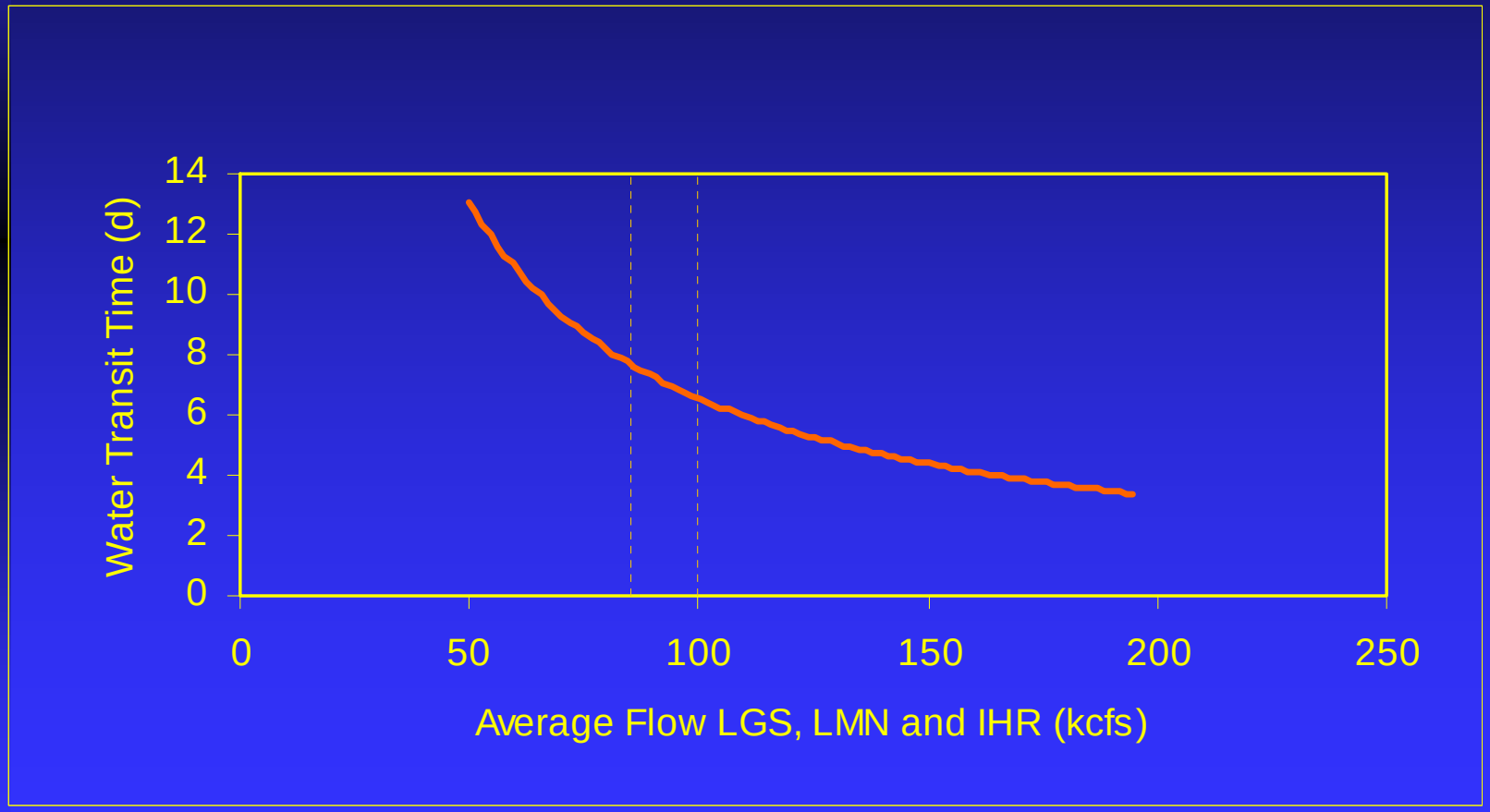
Yearling Chinook at Lower Mon. 2004



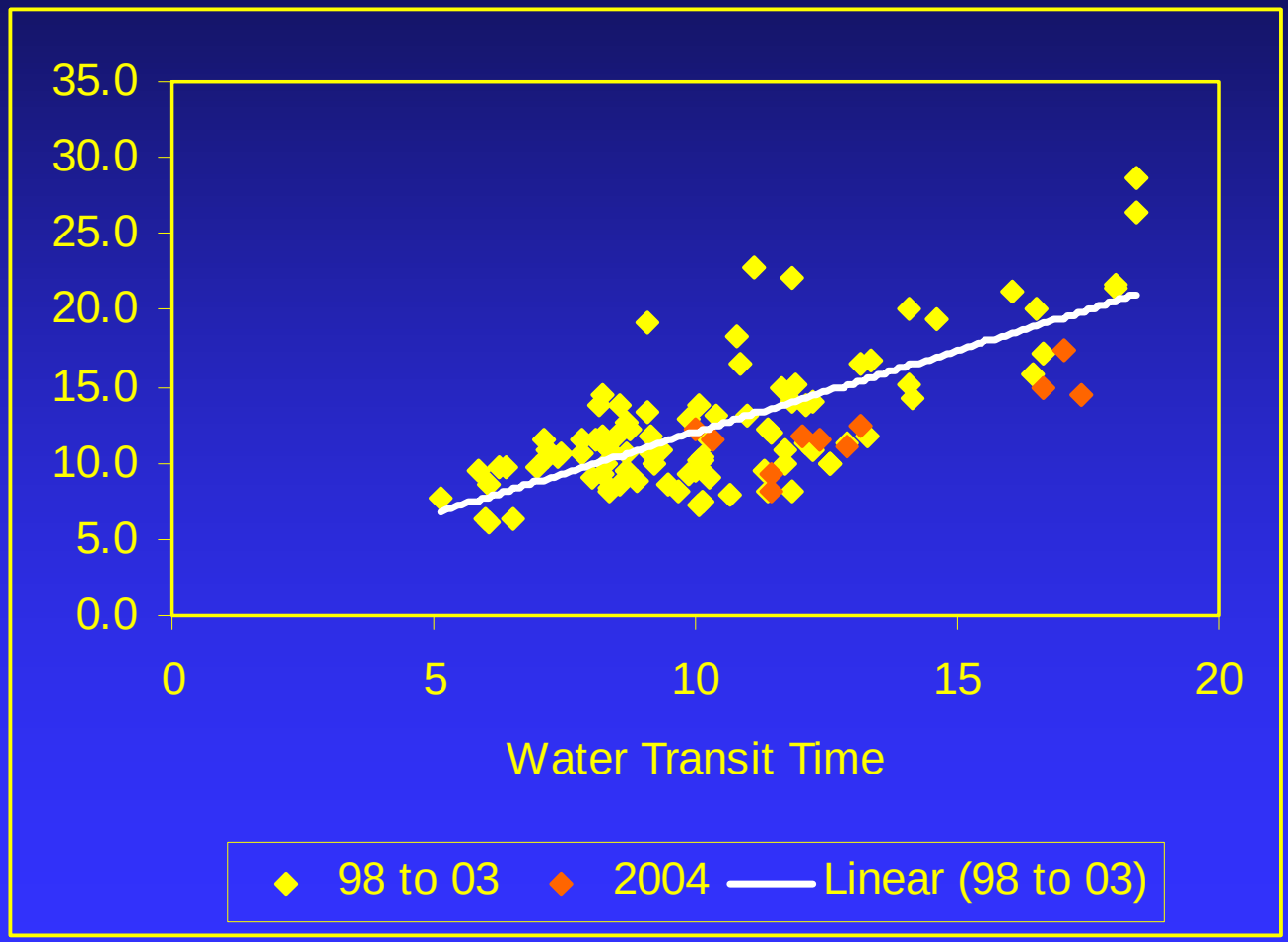
Survival of Yearling Chinook from Salmon R Trap to LMN



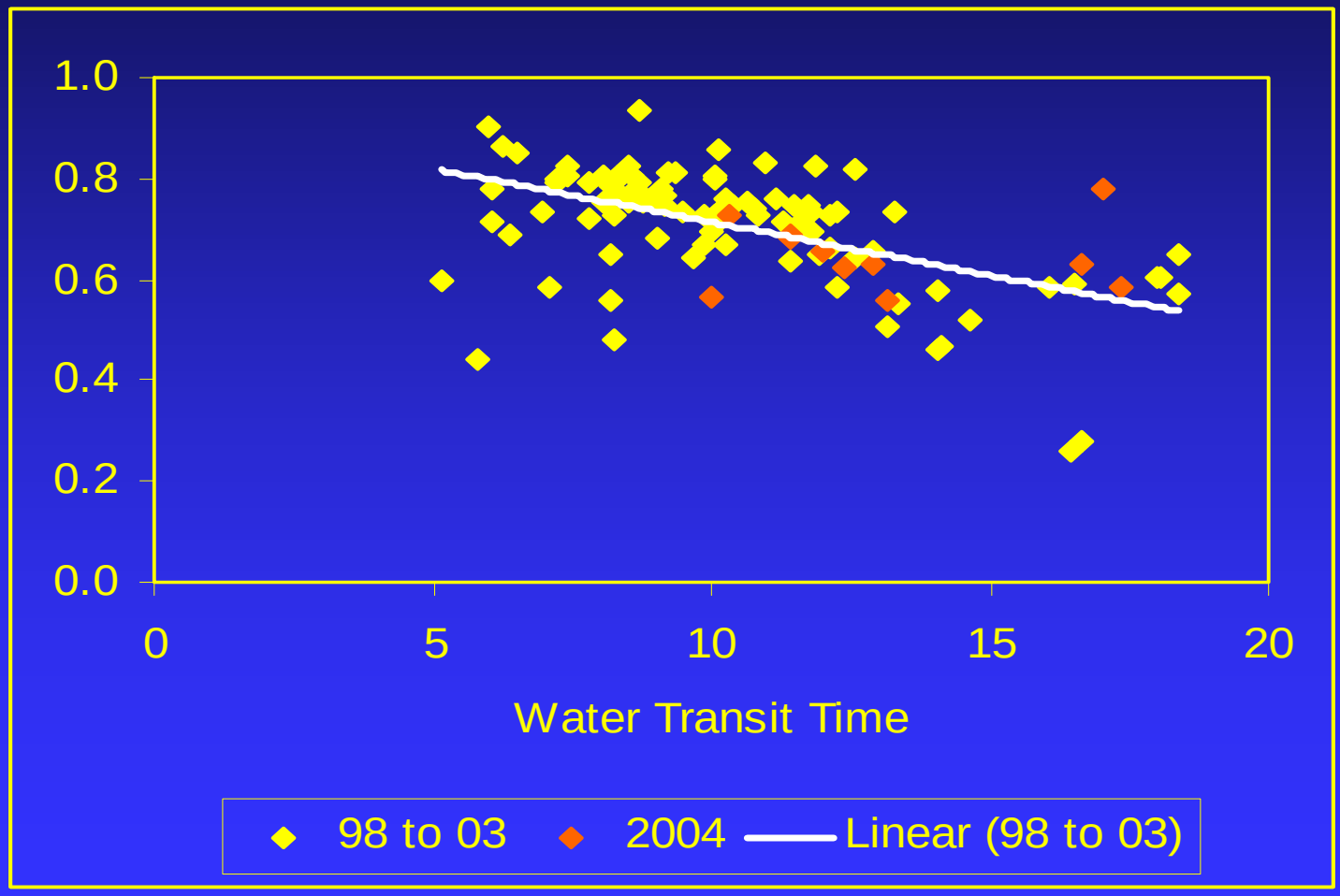
Water Transit Time Lower Granite to Tailwater Ice Harbor Dam versus average flow at LGS, LMN and IHR dams



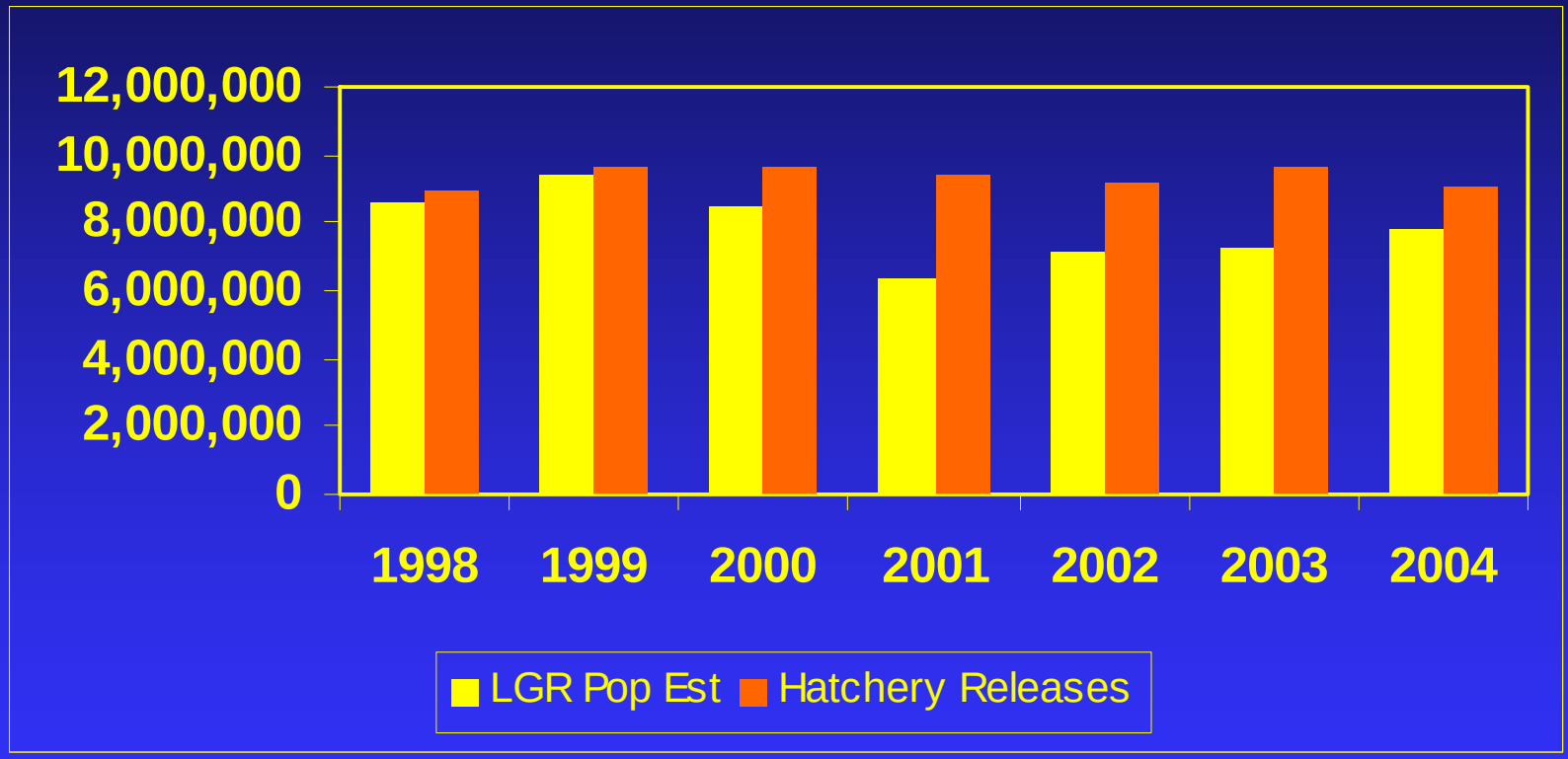
Travel Time LGR to MCN for Hatchery and Wild Yearling Chinook '98 to '03 and 2004



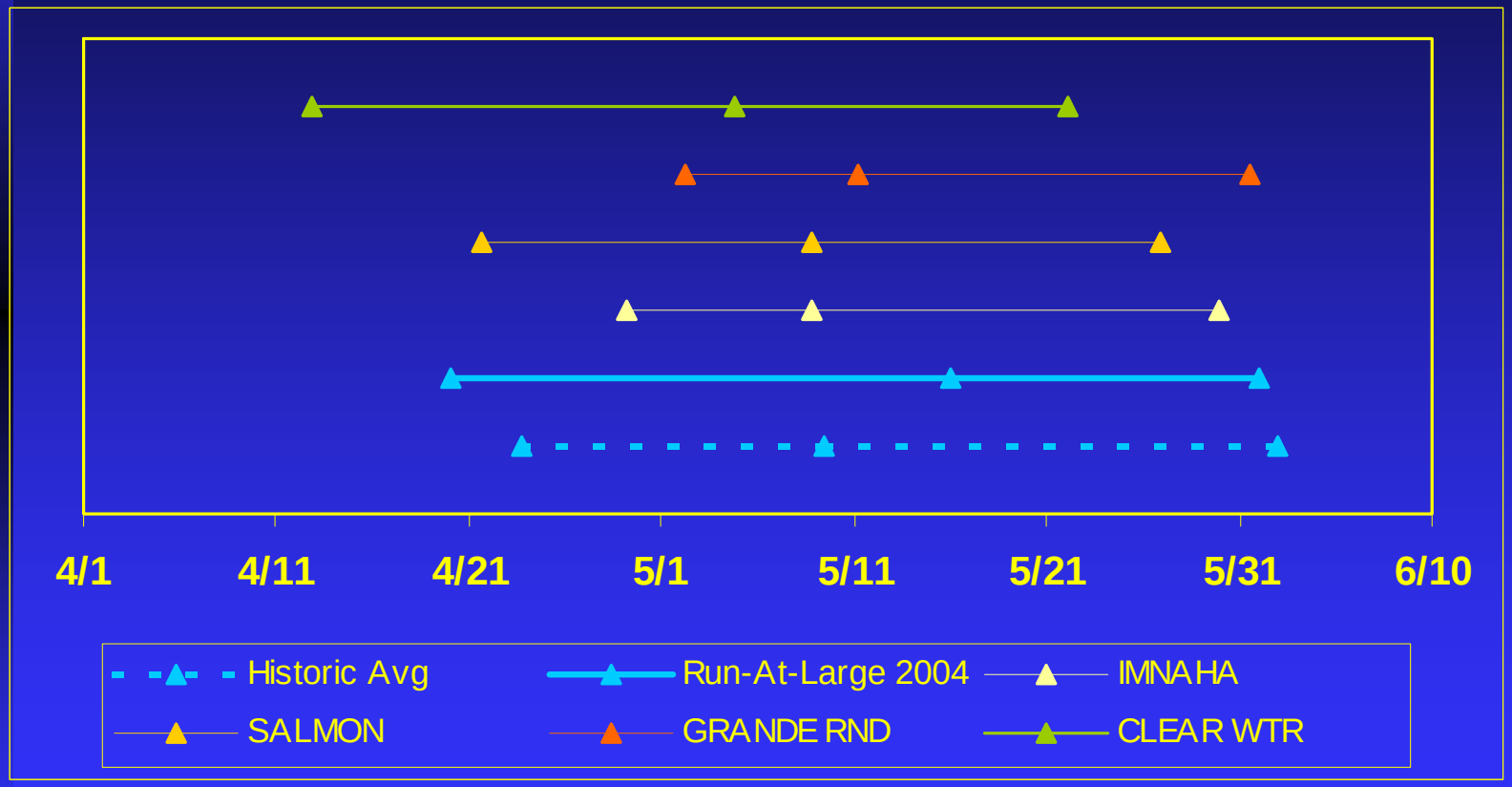
Survival LGR to MCN for Hatchery and Wild Yearling Chinook '98 to '03 and 2004



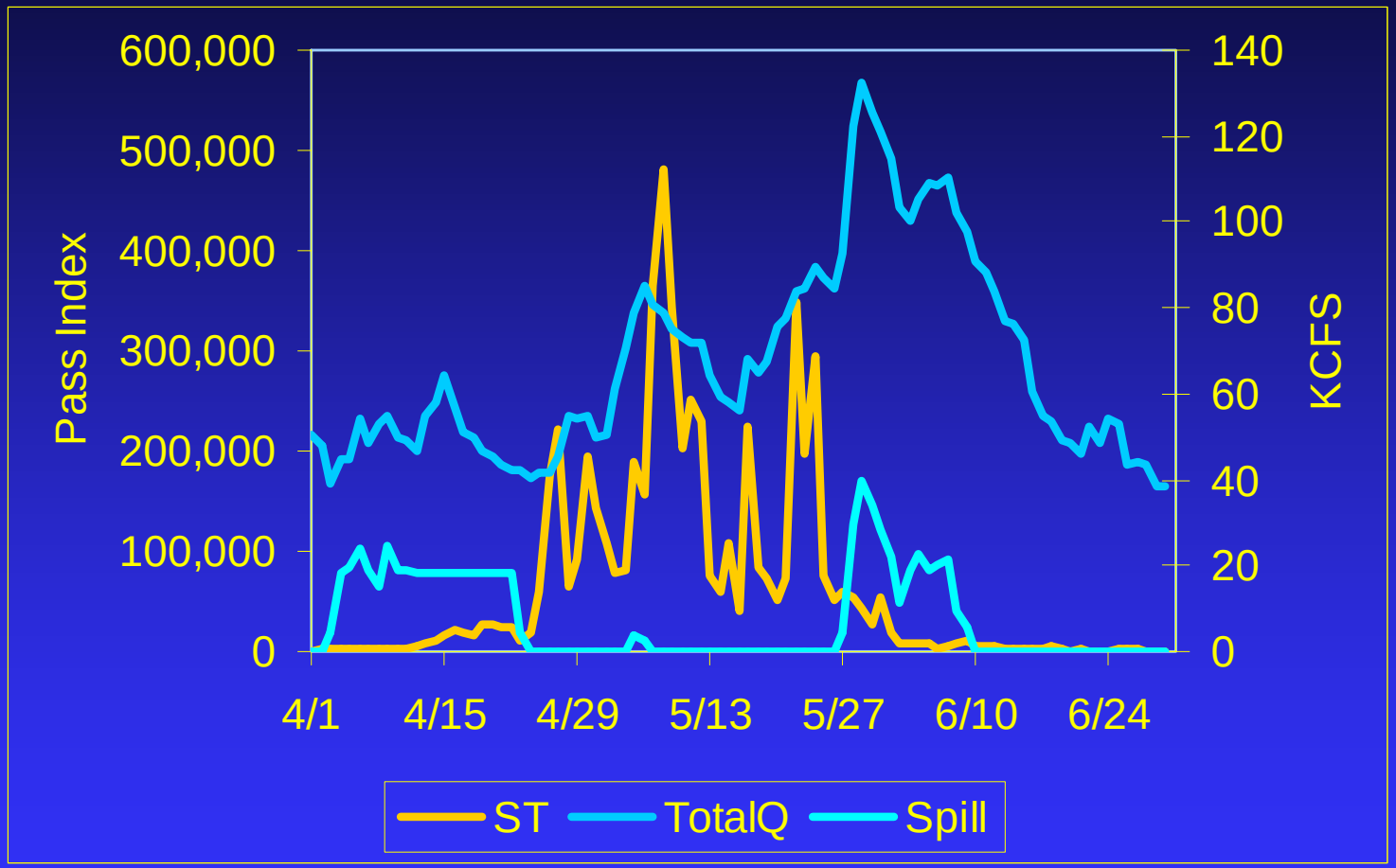
Combined H&W Steelhead Population at Lower Granite and Hatchery Releases



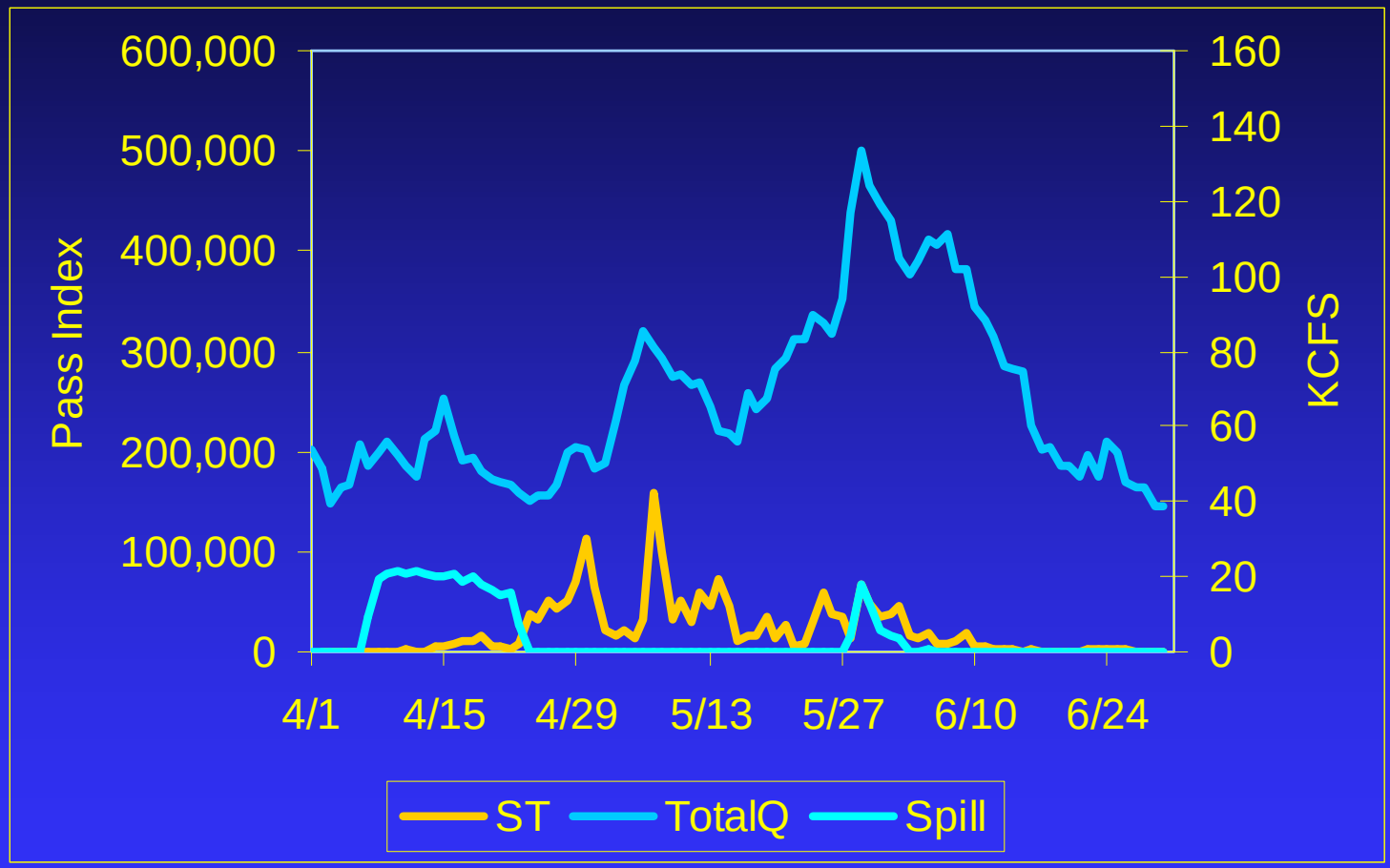
Steelhead Timing at Lower Granite



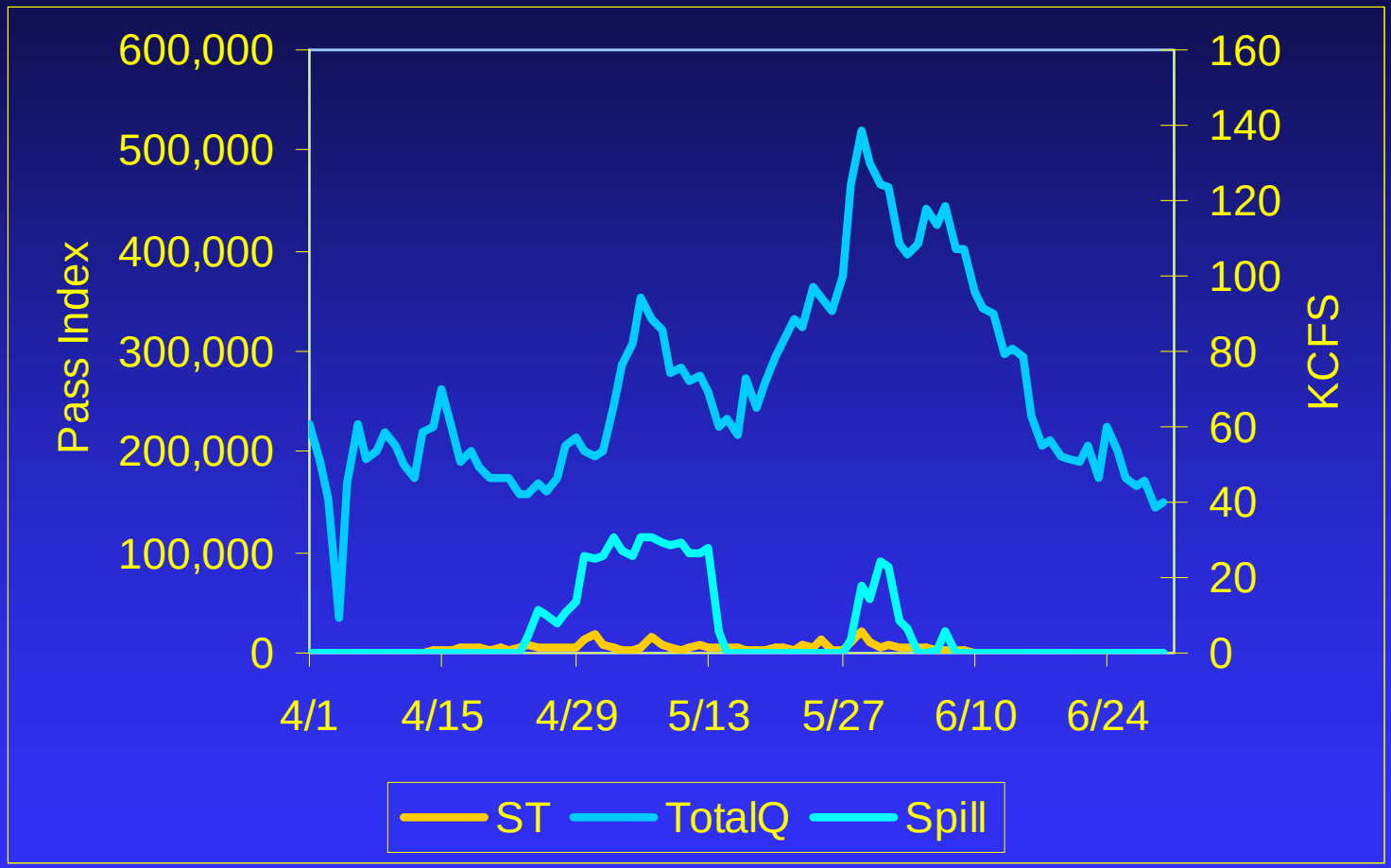
Steelhead at Lower Granite 2004



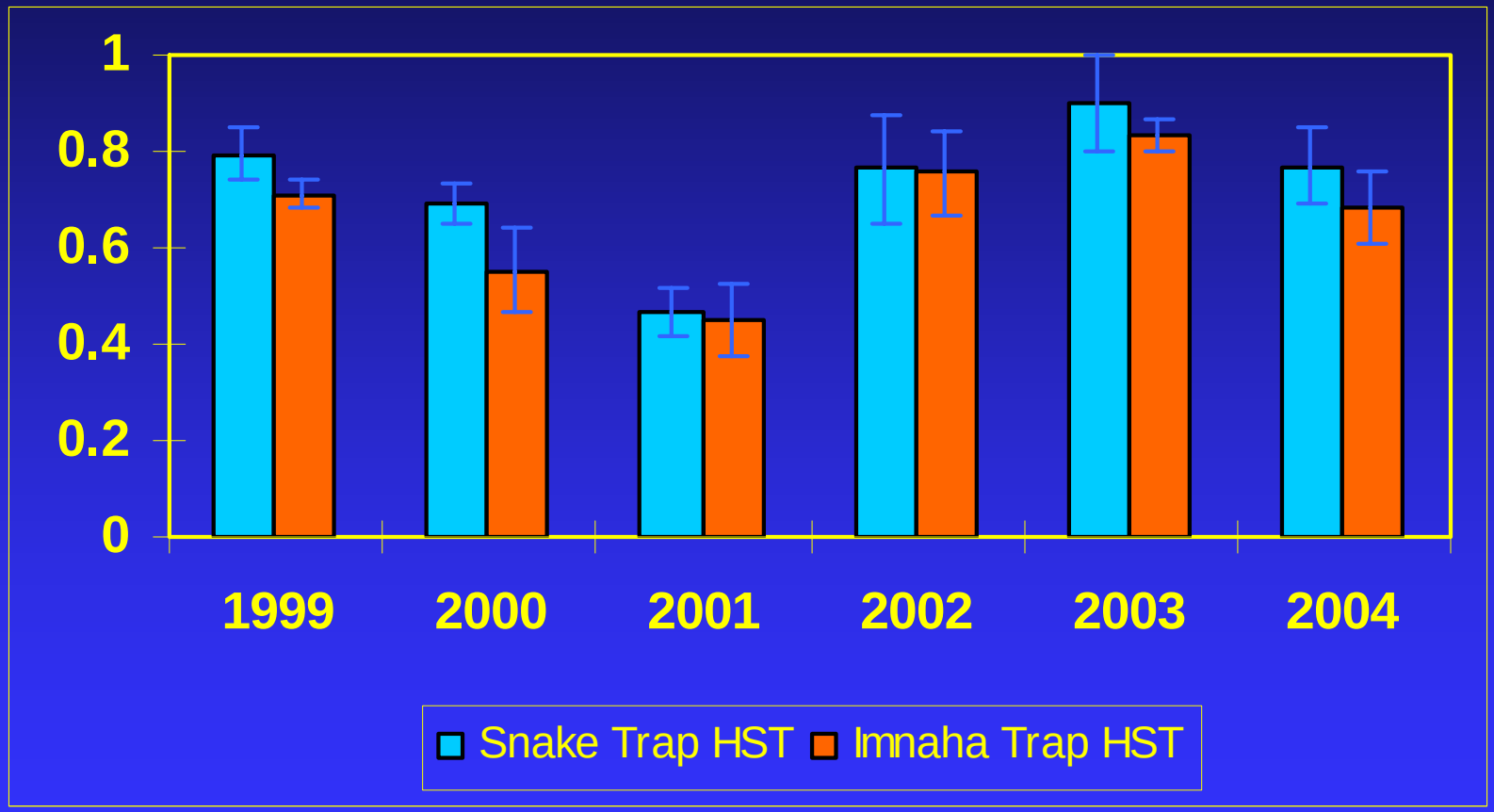
Steelhead at Little Goose 2004



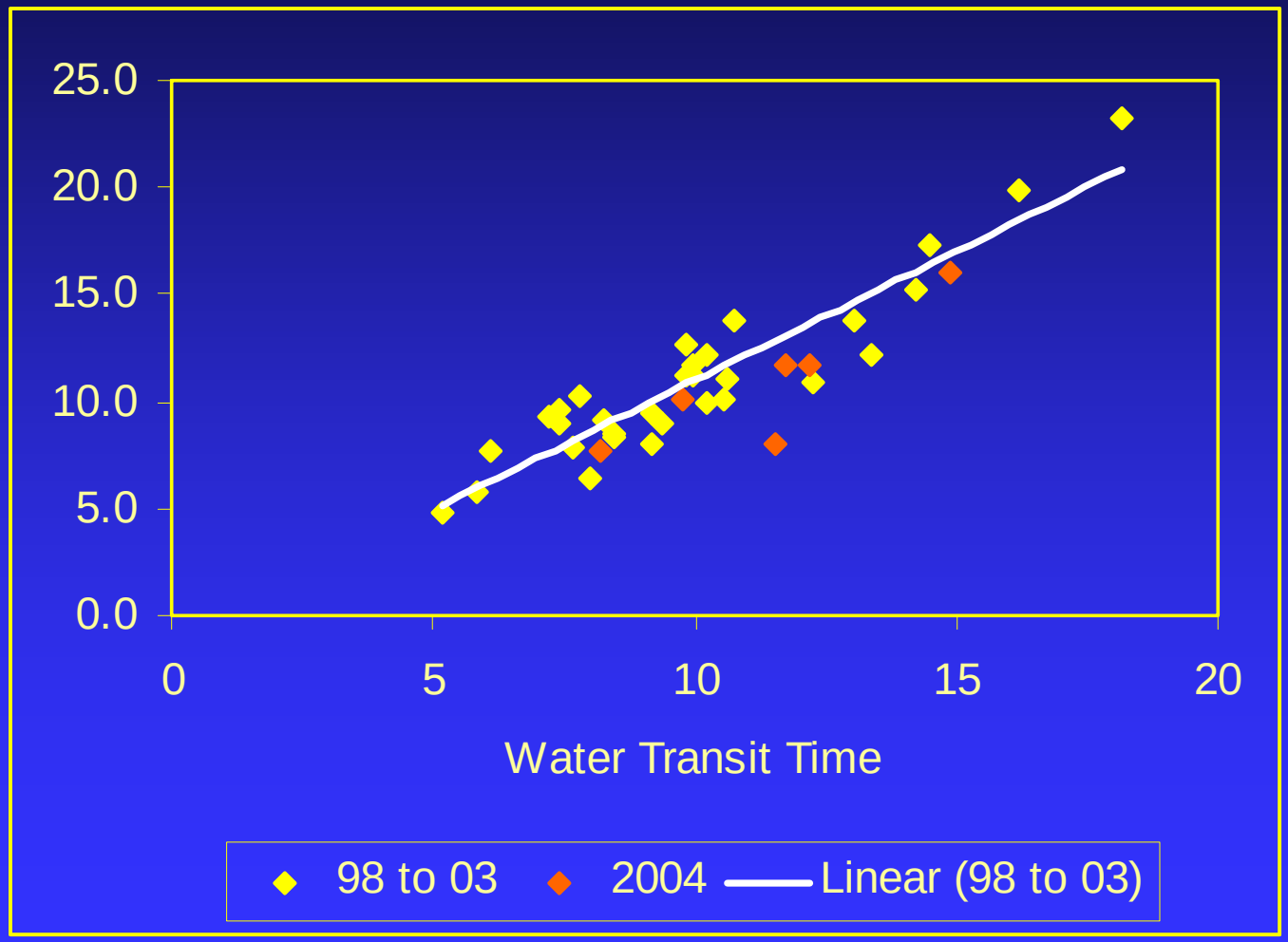
Steelhead at Lower Mon. 2004



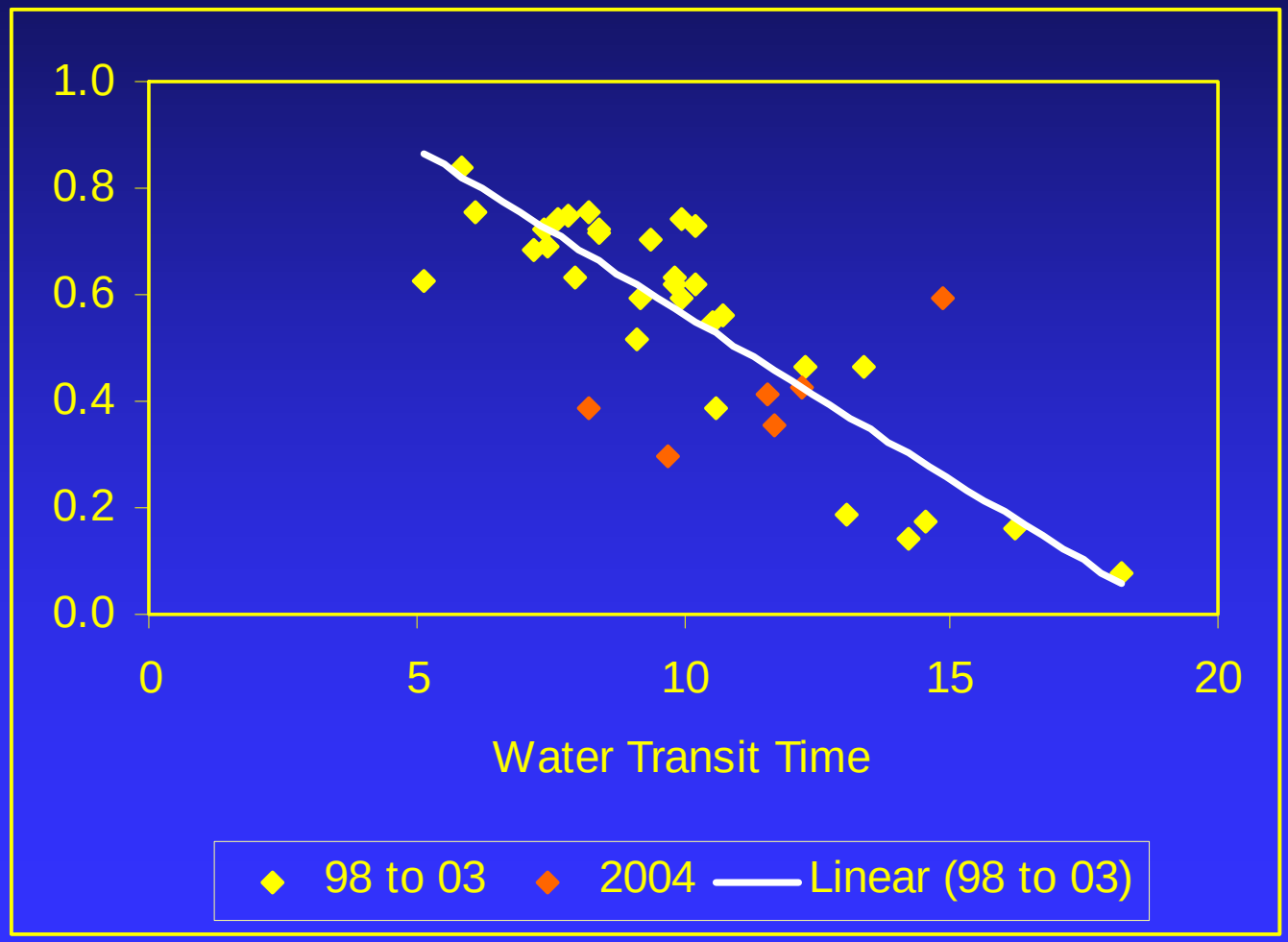
Survival of Hatchery Steelhead from Traps to LMN



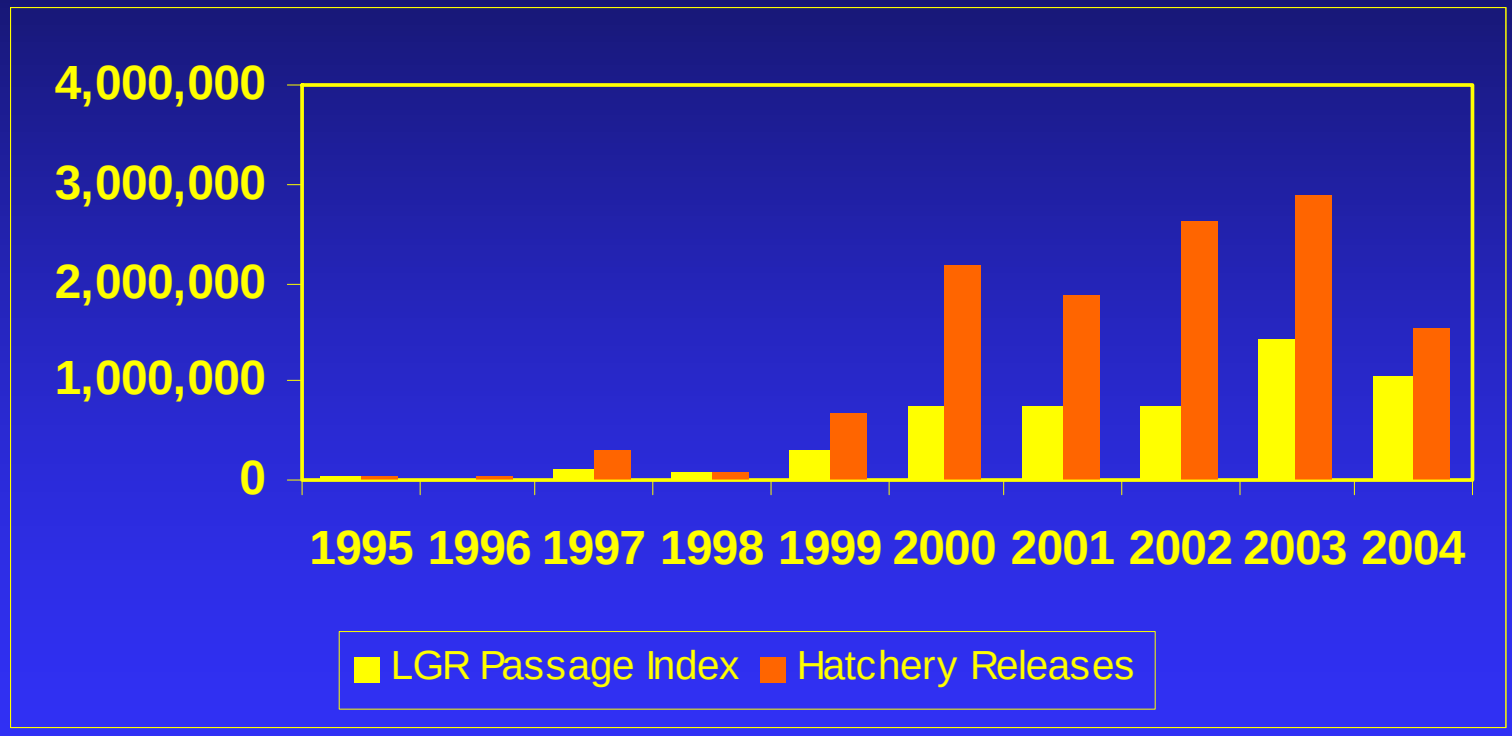
Travel Time LGR to MCN for Steelhead ‘98 to ‘03 and 2004



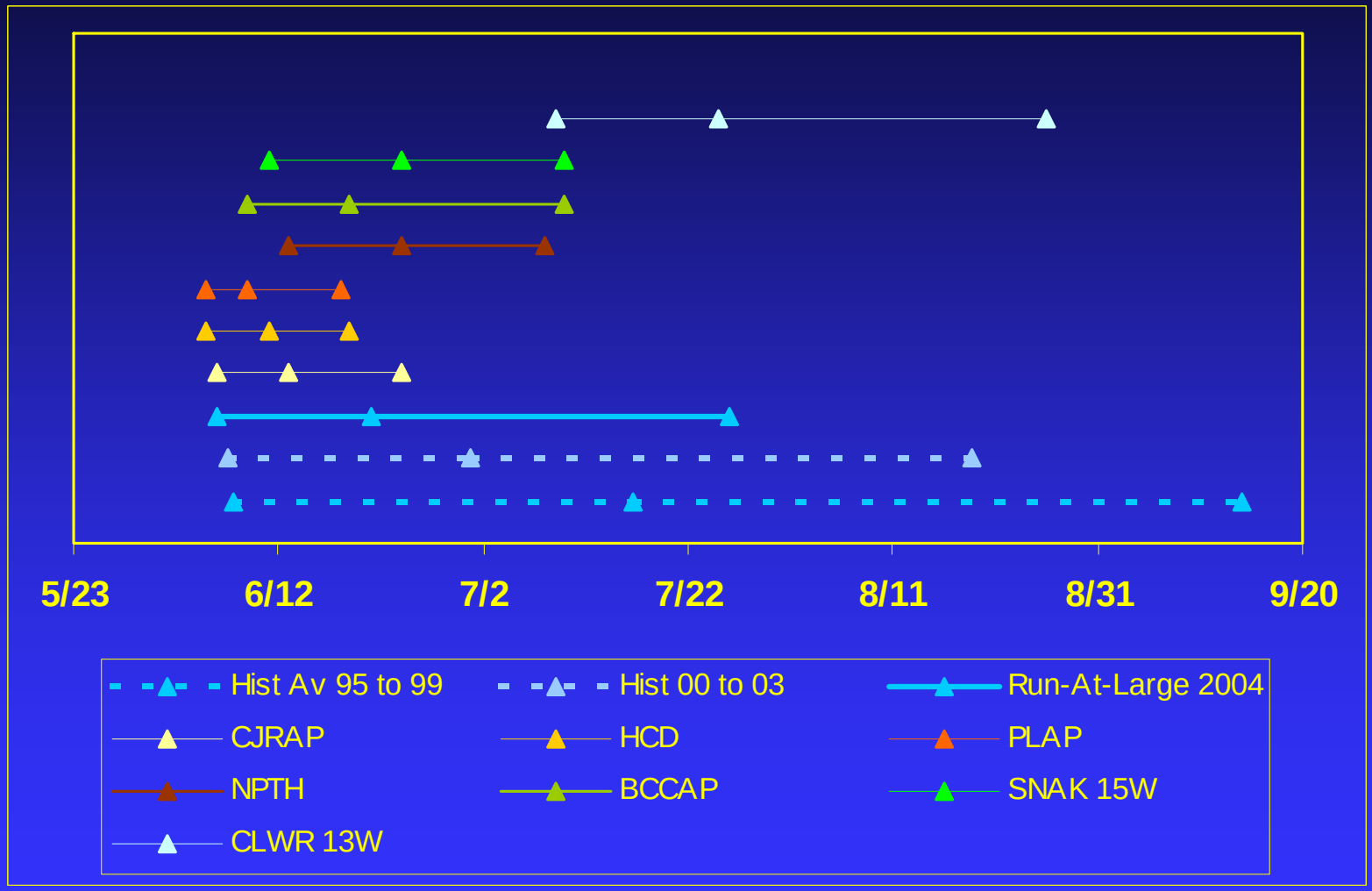
Survival LGR to MCN for Steelhead ‘98 to ‘03 and 2004



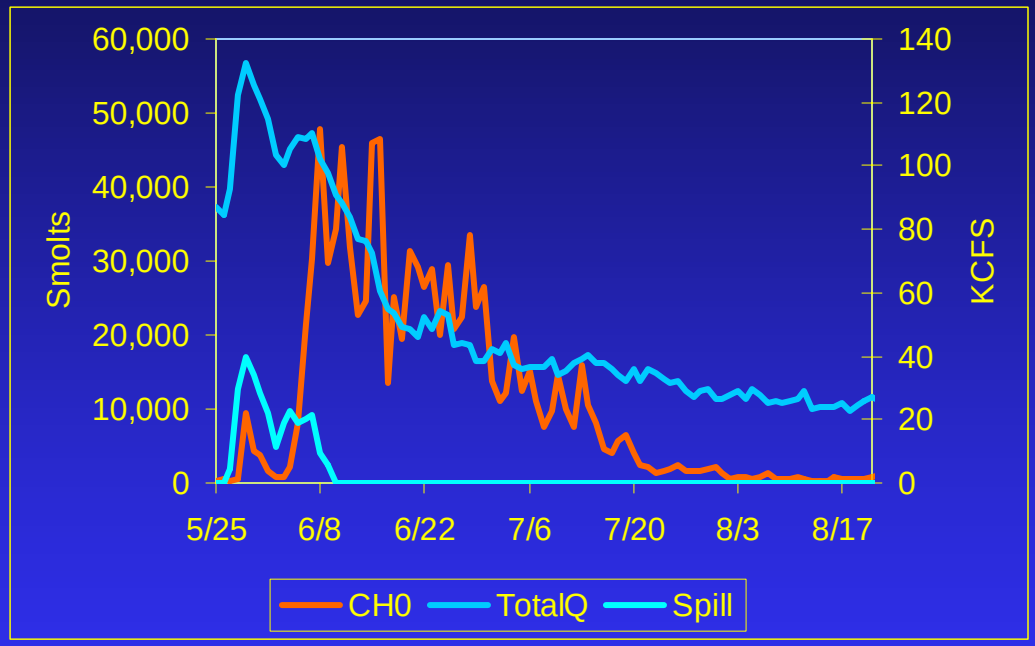
Hatchery/Supplementation Releases of Subyearling Chinook above LGR



Subyearling Chinook Timing at LGR



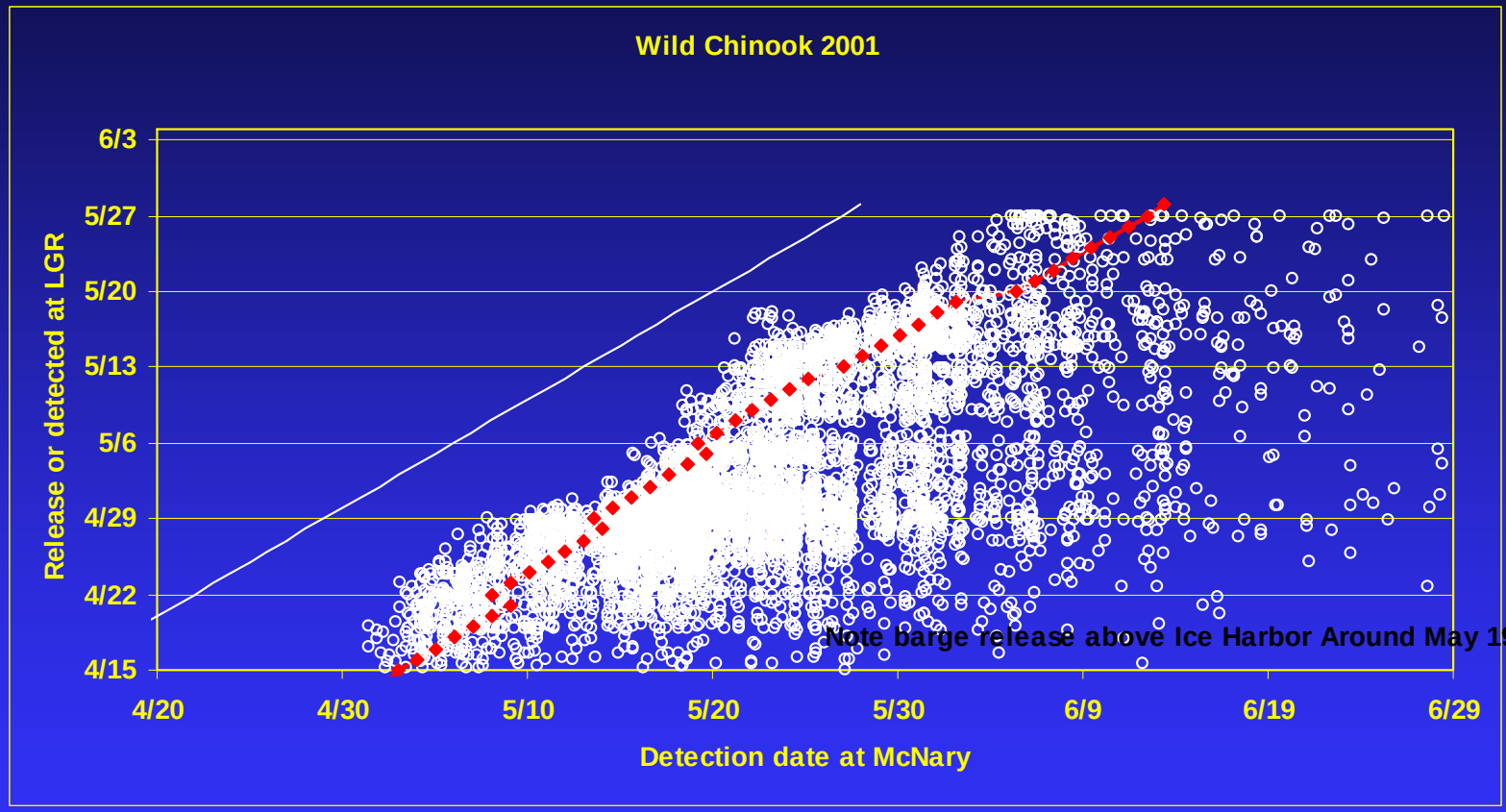
Subyearling Chinook at LGR 2004



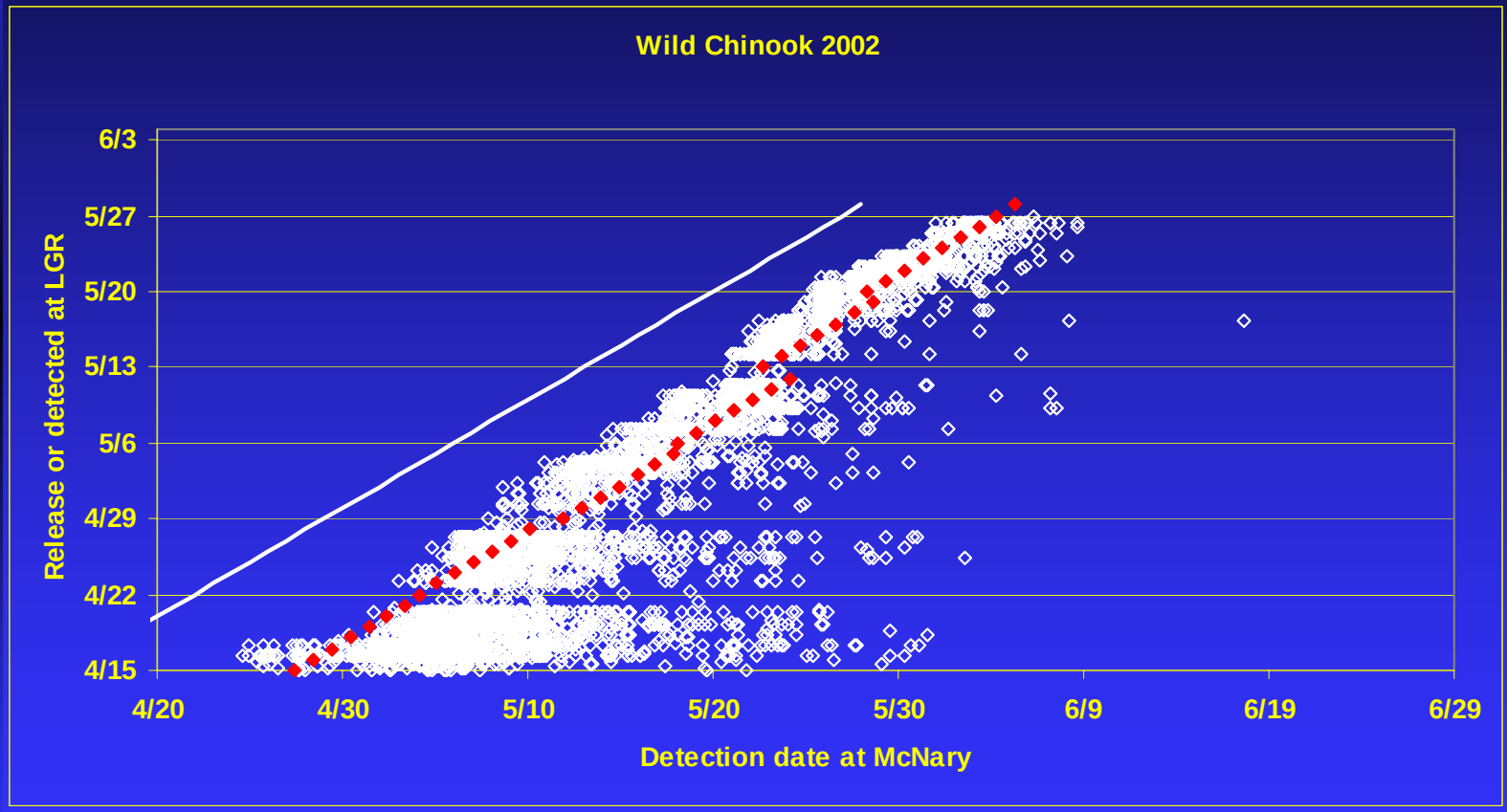
Conclusions

- Population size at LGR large in spring
- Operations at LGR, LGS maximized transport and made poorer in-river conditions
- Low Survival for Snake River yearling chinook and steelhead LGR to MCN reach
- Timing for subyearlings earlier than historic average due to supplementation

Wild Chinook LGR to McNary Travel Time 2001

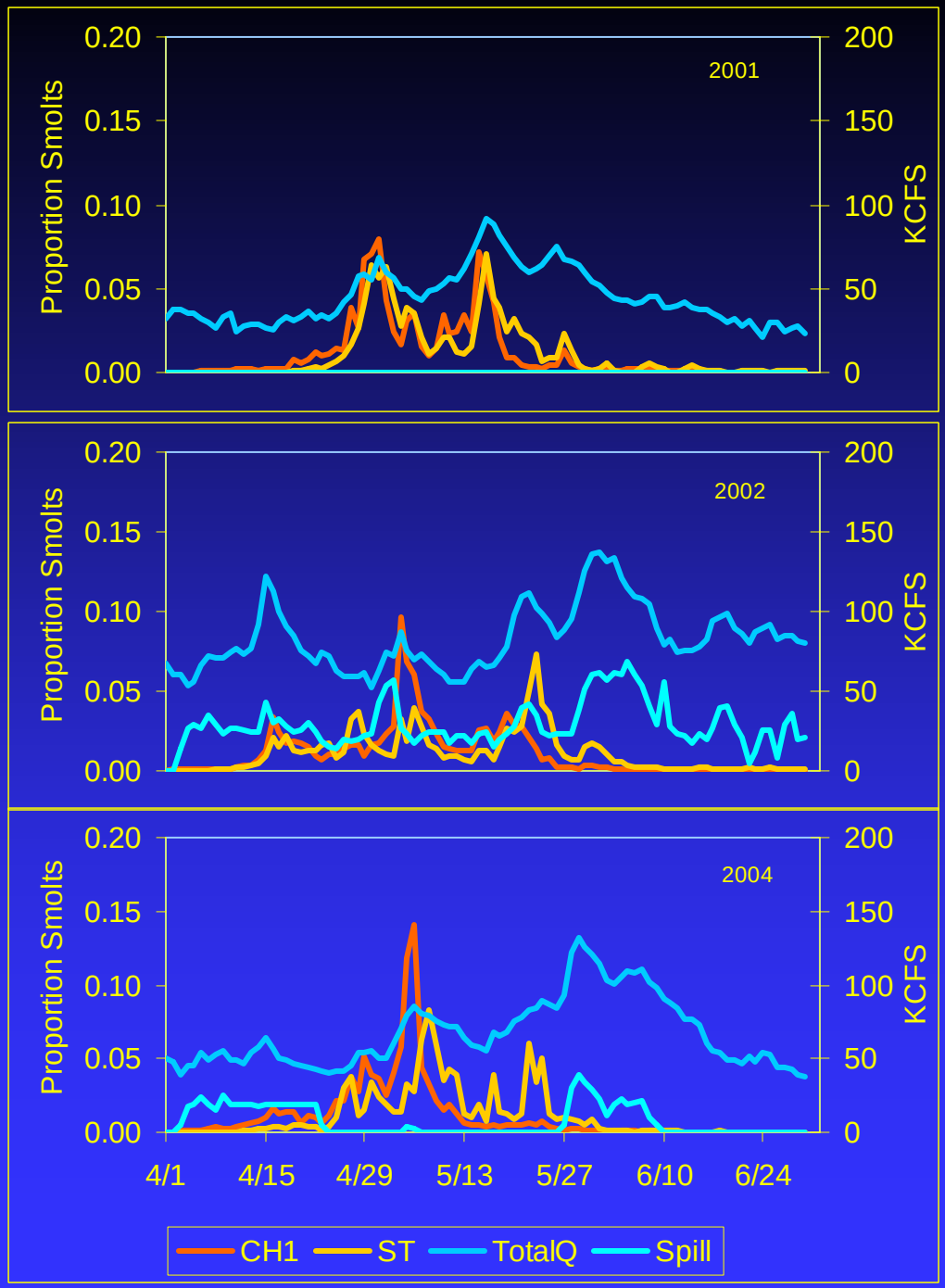


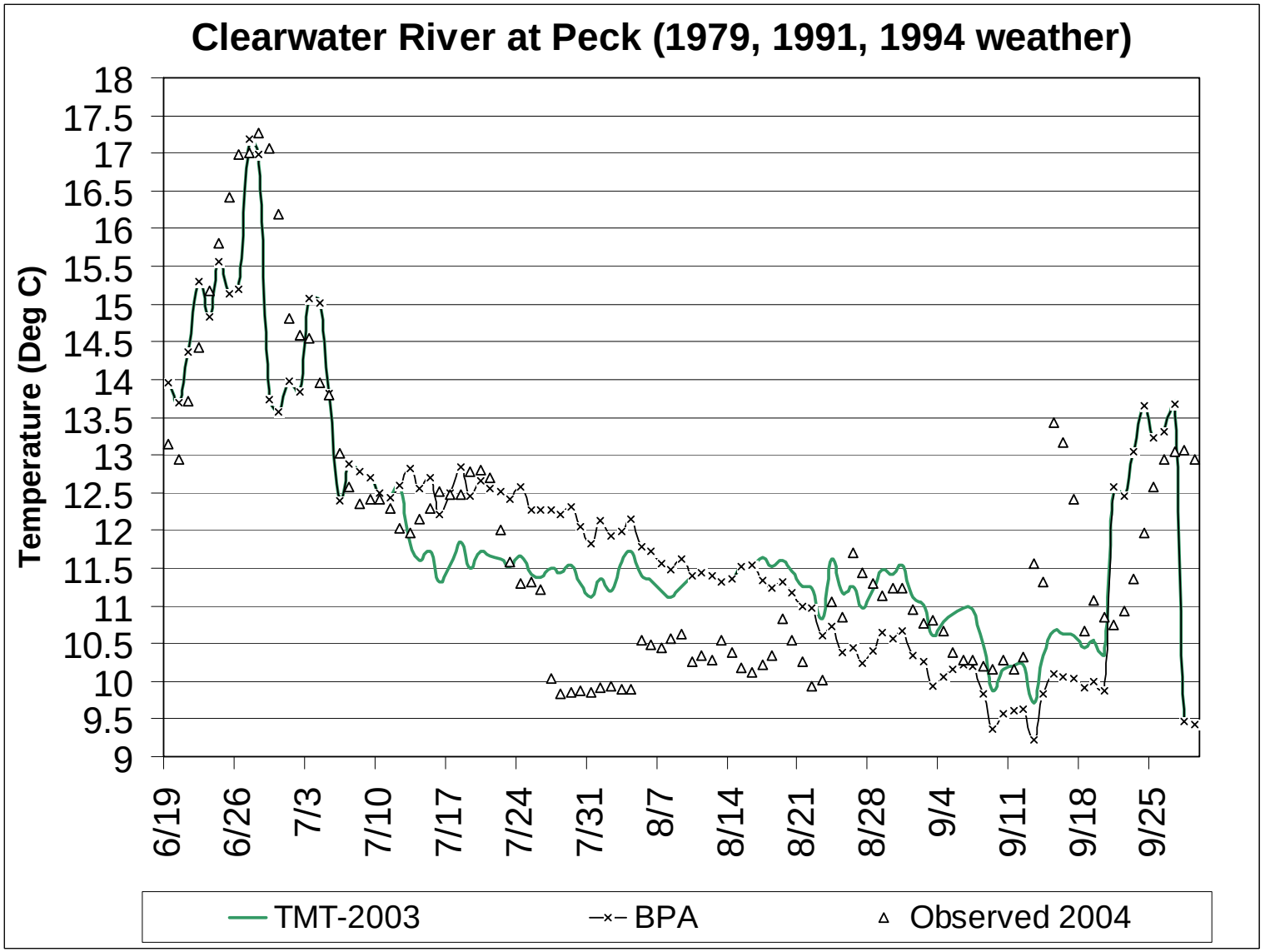
Wild Chinook LGR to McNary Travel Time 2002

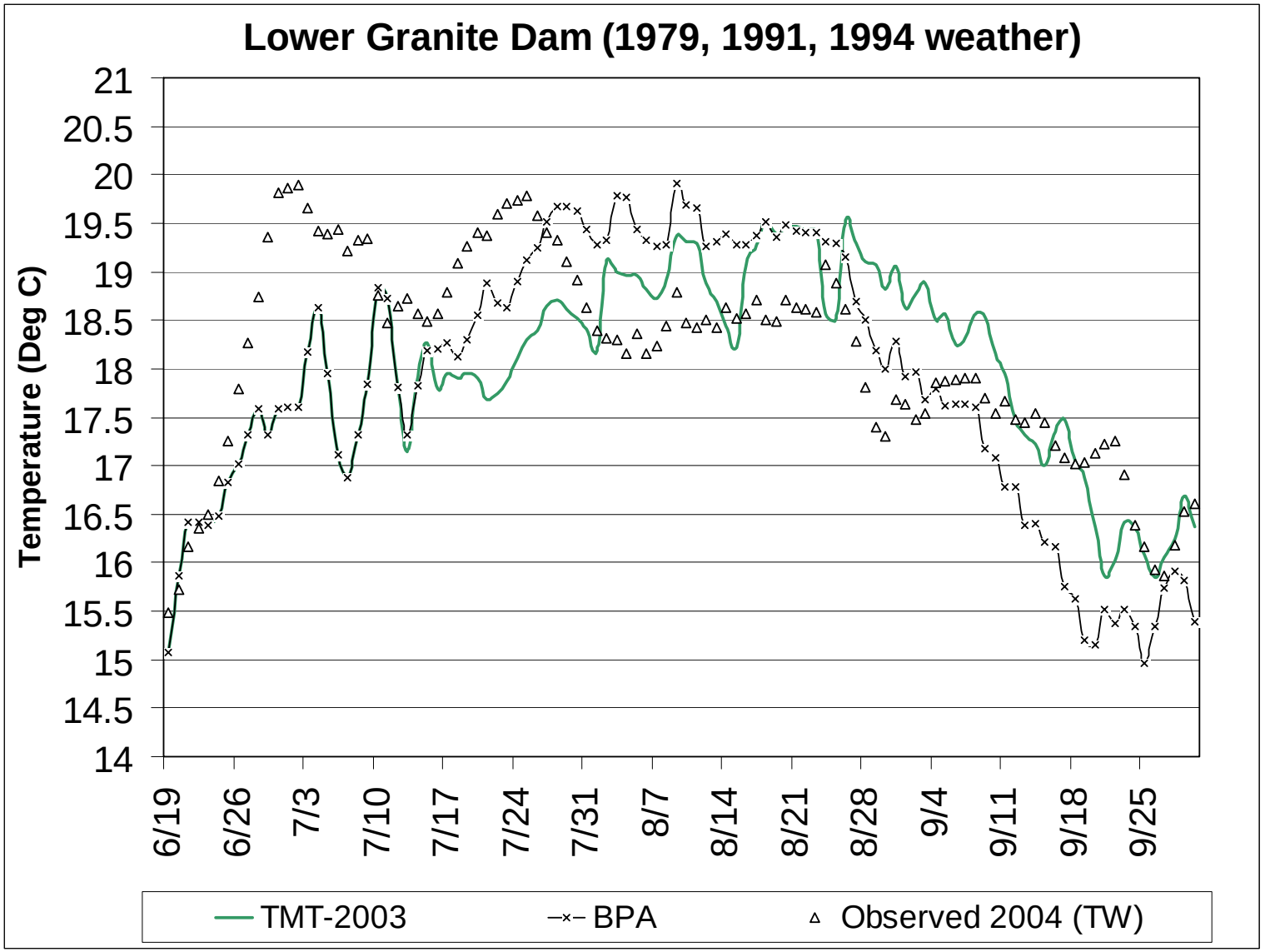


Wild Chinook LGR to MCN

	SURVIVAL	*WTT*	*0.1*	*0.5*	*0.9*
SURVIVAL	1				
WTT	-0.546283	1			
0.1	-0.234268	0.644868	1		
0.5	-0.322707	0.661808	0.981807	1	
0.9	-0.570706	0.704685	0.821351	0.886621	1


2001
2002
2004
Proportion Smolts
KCFS
0.20
0.15
0.10
0.05
0.00
200
150
100
50
0
4/1
4/15
4/29
5/13
5/27
6/10
6/24
CH1
ST
TotalQ
Spill


Clearwater River at Peck (1979, 1991, 1994 weather)
Temperature (Deg C)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
TMT-2003
BPA
Observed 2004


Lower Granite Dam (1979, 1991, 1994 weather)
Temperature (Deg C)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
15.5
15
14.5
14
6/19
6/26
7/3
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/4
9/11
9/18
9/25
TMT-2003
BPA
Observed 2004 (TW)

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
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WINTER WEATHER 2004 - 2005 FORECAST

Oregon Chapter-American Meteorological Society Meeting, October 28th, 2004

Kyle Martin, *Senior Hydrologist* and USDA Certified Meteorologist

Climate prediction tools used:

1. University of Washington Climate Impacts Group VIC Hydro model: (http://www.hydro.washington.edu/Lettenmaier/Models/VIC/VIChome.html)
2. Assume ***"warm ENSO conditions"*** and warm phase Pacific Decadal Oscillation.
3. Analog Water Years: 1919, 1920, 1924, 1926, 1930, 1931, 1940, 1941, 1942, 1952, 1958, 1959, 1964, 1966, 1969, 1970, 1973, 1977, 1978, 1980, 1983, 1987, 1988, 1992, 1995, 1998, and 2003.
4. Multi-variable ENSO Index: (http://www.cdc.noaa.gov/people/klaus.wolter/MEI/)
5. Sea Surface Temperature departure forecasts: (http://www.cpc.ncep.noaa.gov/products/people/wwang/cfs_fcst/images/glbSSTMonMask.gif)
6. Dr. Landscheidt's Solar Cycle Model: (http://www.john-daly.com/theodor/new-enso.htm) Sunspot data: (ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SUNSPOT_NUMBERS/MONTHLY)

Winter 2004 - 2005 Climate Forecast for Portland:

Month:	Temperature (mean monthly):	"Hedge"	Precipitation (% normal):	"Hedge"
November	Near Normal (-1.8 to + 1.8 degF)	0.4	Below Normal (70 - 90%)	75%
December	Near Normal (-1.8 to + 1.8 degF)	0.3	Near Normal (90 - 110%)	97%
January	Near Normal (-1.8 to + 1.8 degF)	0.7	Near Normal (90 - 110%)	100%
February	Above Normal (> +1.8 degF)	2	Near Normal (90 - 110%)	89%
March	Near Normal (-1.8 to + 1.8 degF)	1.3	Near Normal (90 - 110%)	89%

Snow (% probability): November 33%, December 63%, January 67%, February 48%, March 56%.
Snow (inch): Nov. 0.4 (+/- 1.5), Dec. 2.0 (+/- 4.6), Jan. 2.7 (+/- 5.3), Feb. 0.2 (+/- 0.8), March 0.1.

Water Supply Forecast (Columbia River at The Dalles), January - July 2005, Million-Acre-Feet:
UW-CIG VIC Hydro model (run through regression): **92 - 94 MaF** or 85 - 87% of normal.
Multi-variable ENSO Index (regressed vs. The Dalles WSF): **98 MaF** or 91% of normal.

Winter 2003 – 2004, Kyle Martin's Climate Forecast vs. Observed Data for Portland:

Month:	Temperature (mean monthly):	Hedge	**Obs.**	Precipitation (% normal):	Hedge	**Obs.**
November	Near Normal (-1.8 to + 1.8 degF)	-0.1	**-0.6**	Near Normal (90 - 110%)	95%	**73%**
December	Near Normal (-1.8 to + 1.8 degF)	-0.6	**2.3**	Near Normal (90 - 110%)	93%	**130%**
January **	Below Normal (< -1.8 degF)	-1.8	**-1.6**	Below Normal (70 - 90%)	75%	**96%**
February **	Below Normal (< -1.8 degF)	-1.9	**2.1**	Near Normal (90 - 110%)	100%	**95%**
March	Near Normal (-1.8 to + 1.8 degF)	1.2	**4**	Near Normal (90 - 110%)	102%	**41%**

** Due to an EXCEL error, forecast temperatures should have been "near normal" for January (+1.3), February (+0.4).

WY 2004 Water Resources Forecast: predicted 104 MaF vs. the observed, unregulated, 83 MaF.

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
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TO: Technical Management Team (TMT)
FROM: Kyle Martin, *Senior Hydrologist*, CRITFC Hydro Program
DATE: November 10th, 2004

SUBJECT: **Summary of Water Year 2004 Weather**

At the request of the TMT, this memo summarizes monthly weather events that impacted basin flows and fish migrations during Water Year 2004 (October 2003 - September 2004). WY 2004 was noted for extreme variability in precipitation and temperature patterns (Figures 1 and 2).

Autumn saw above normal temperatures and above normal precipitation patterns. The Snake basin stayed dry until December. October set many new high records in the 72 to 88 ^{o}F range. November and December set a few new daily high and low temperature records.

Winter started out with a bang on January 5th – 7th with a major storm that brought up to nine inches of snow to western Washington and Oregon with freezing rain in the mix. Daily temperature departures plunged to -13 to -18 ^{o}F (west side) to -14 to -36 ^{o}F (east side). A few stations set new daily precipitation records during winter. An extended dry spell started in February and impacted snowpacks through April. March set many new daily high temperature records in the 70 to 80 ^{o}F range across the region.

Spring was extreme. A warm, dry April quickly transitioned into a warm, wet May, then back to a warm, dry June. April set many new high records in the 77 to 86 ^{o}F range across the basin. A few stations set new daily precipitation records in May and June.

Summer was also extreme. A dry hot summer was in store for migrating salmon. Many record-breaking daily high temperatures were set in July in the 95 to 103 ^{o}F range in western Oregon. Strong storms broke the hot dry-spell by late August and mid-September and set many new daily precipitation records. August was warm and wet. September was cool and wet.

Cumulative precipitation totals for Water Year 2004 for Columbia at The Dalles ended at 104%. The driest basins (Figure 3) were the Snake River Plain (87%), Southeast Washington (93%), and Central Washington/east slopes of the Washington Cascades (96%). The wettest basins were the Okanogan (115%), John Day/Umatilla (112%), and Clearwater (111%).

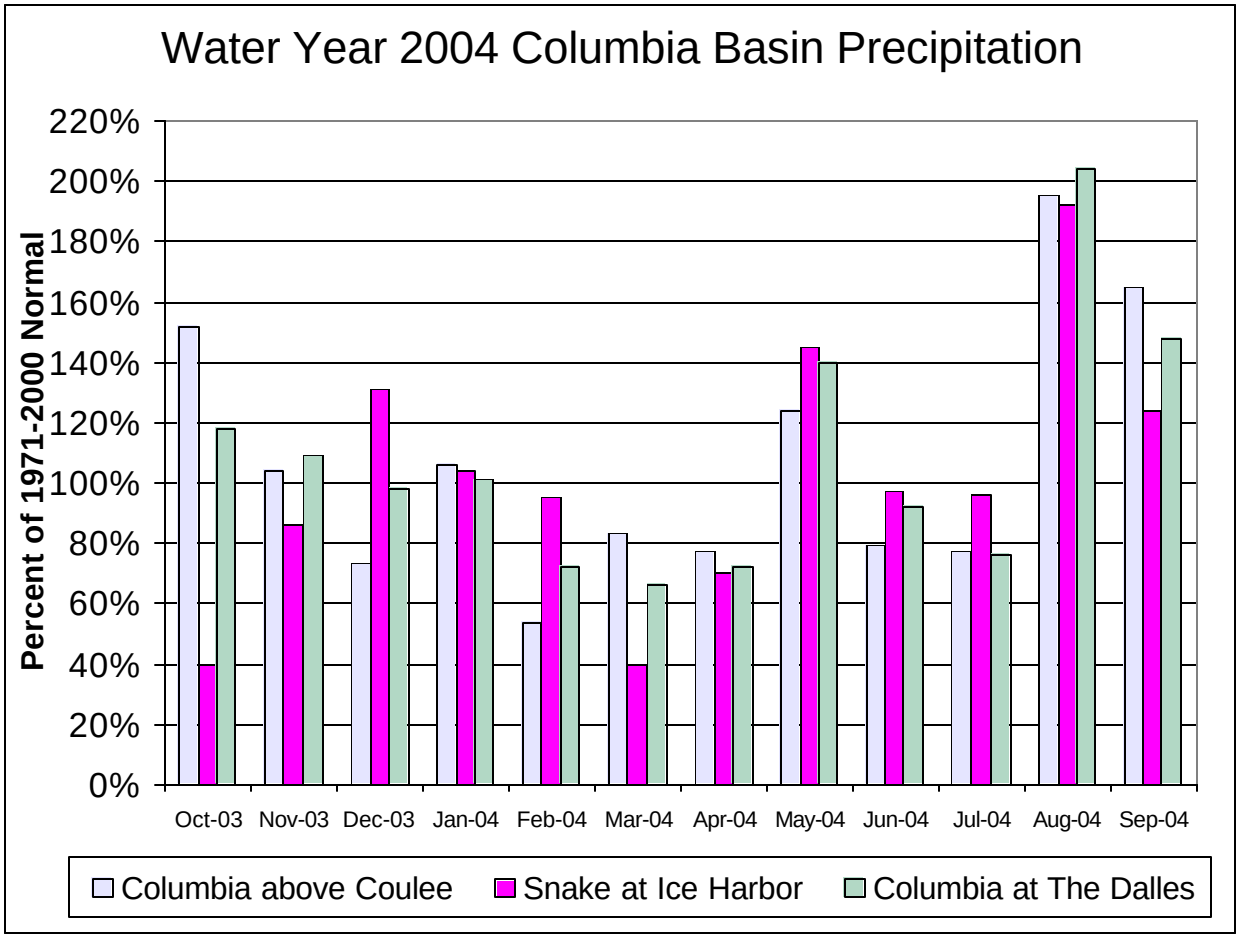


Figure 1. Water Year 2004 Division Precipitation Summary (NOAA-NWS-Portland data).

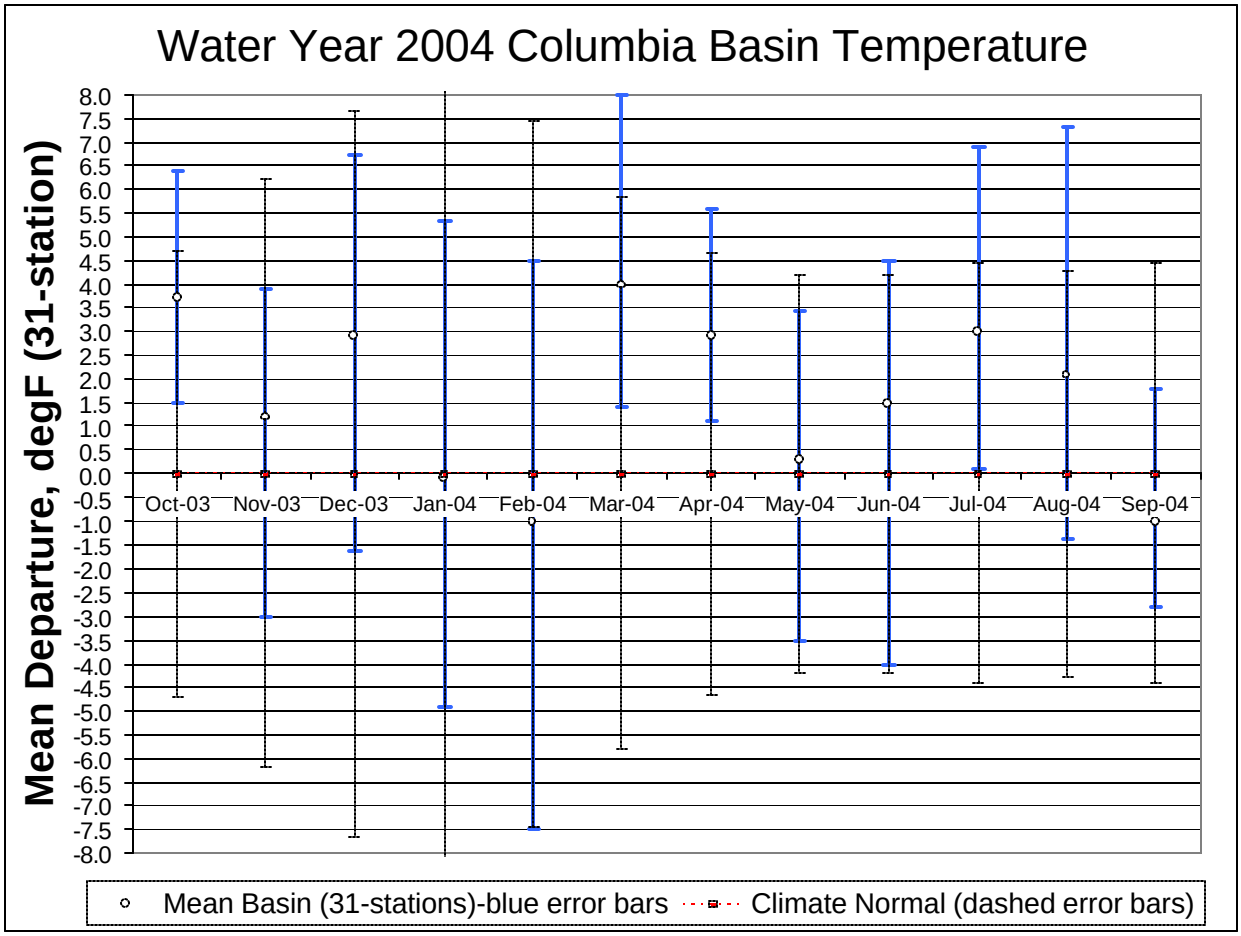


Figure 2. Water Year 2004 Temperature Departure Summary (NOAA-NWS-Portland data).

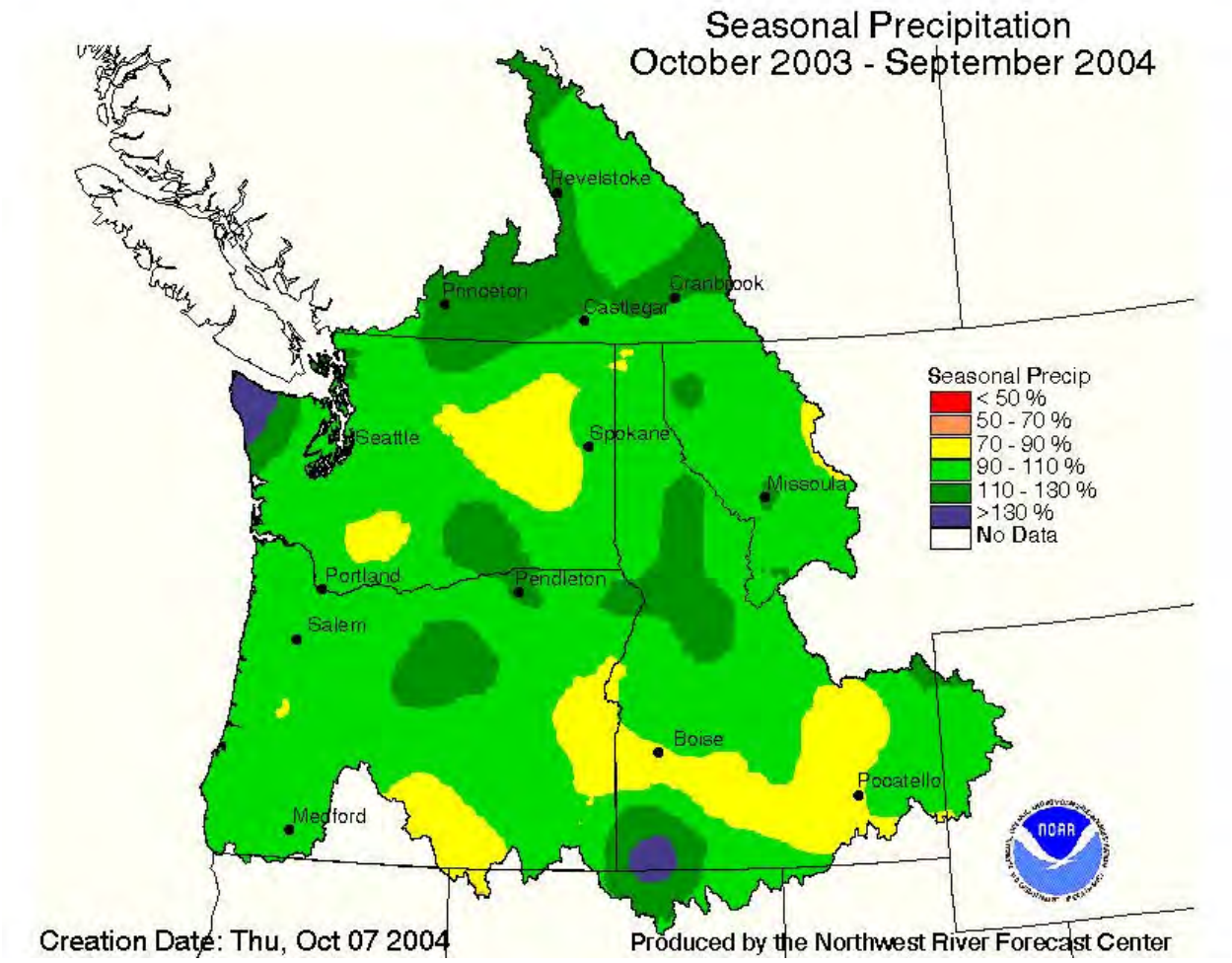


Figure 3. Water Year 2004 Columbia Basin Cumulative Seasonal Precipitation.

Winter 2004-2005 Climate Forecast

Kyle Martin

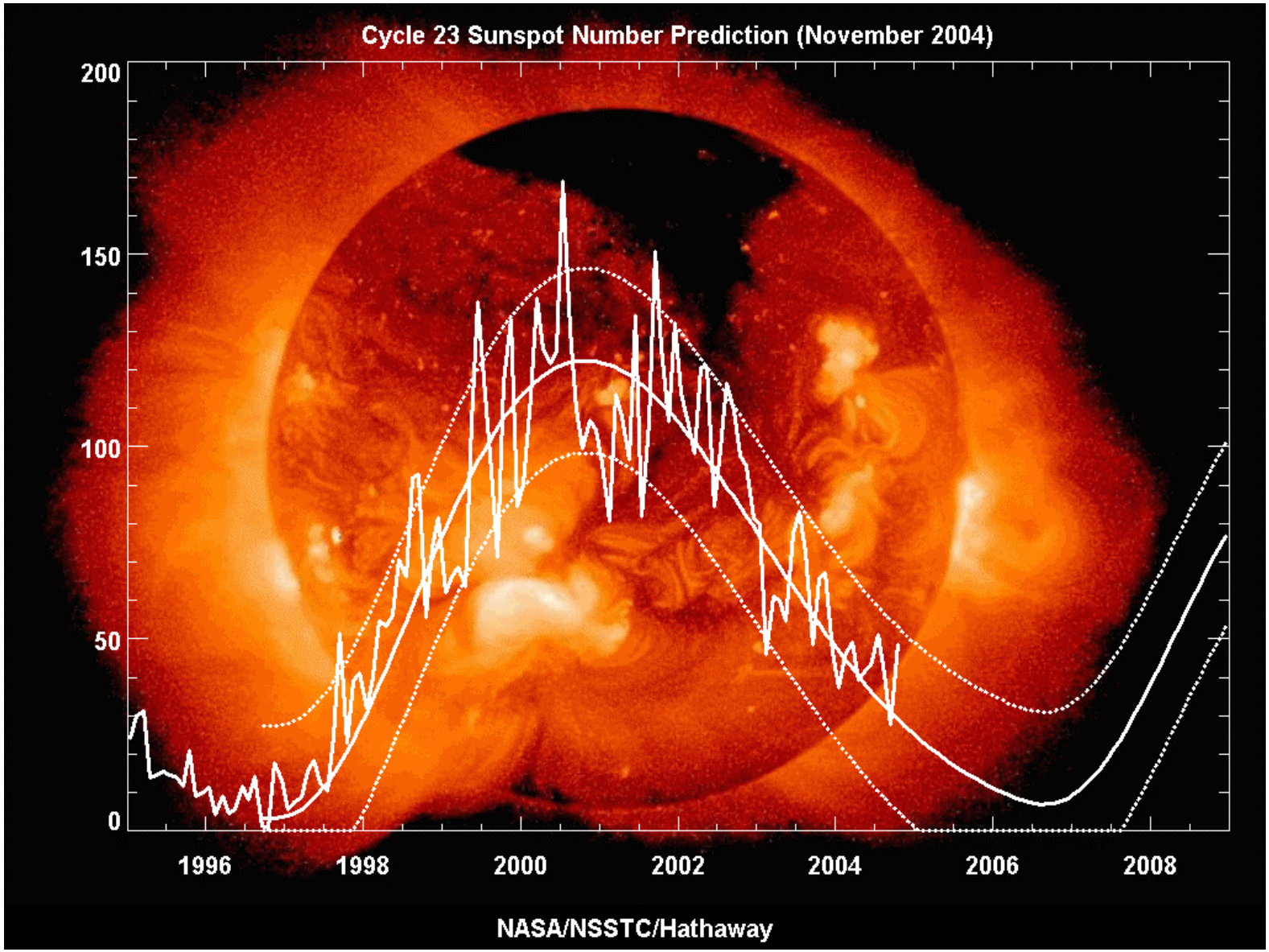
Senior Hydrologist

November 10th, 2004

Columbia River Inter-Tribal Fish Commission

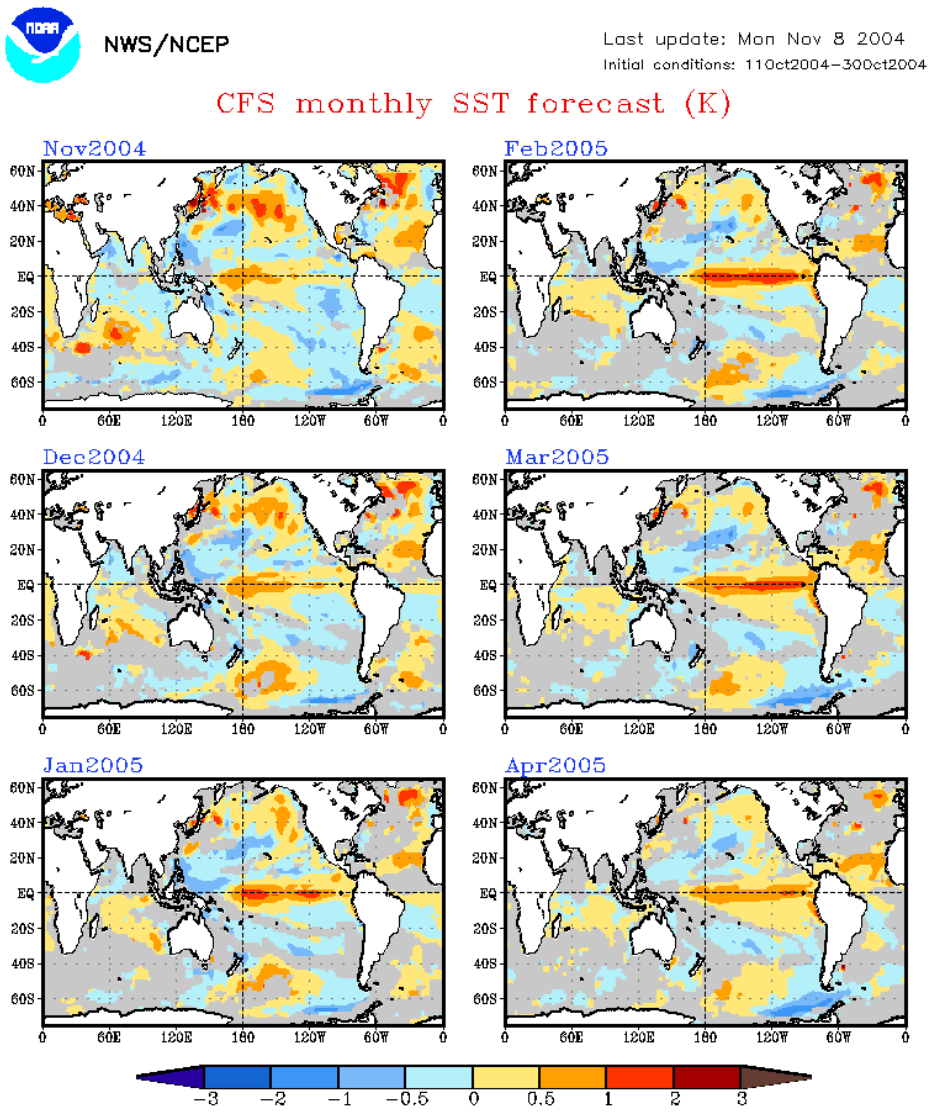
Introduction

- Forecast uses the Tribal approach-- holistic.
- Big-picture: Solar-Forcing (e.g., sunspot cycles) does influence our global weather patterns. *In memoriam:* Dr. Landscheidt, 1922 – 2004.
- Track ENSO via Multi-variable ENSO Index.
- Sea-Surface Temperature Departure Forecasts.
- Hydro-Climate approach: use 2005 water year volume forecast and find analog years.



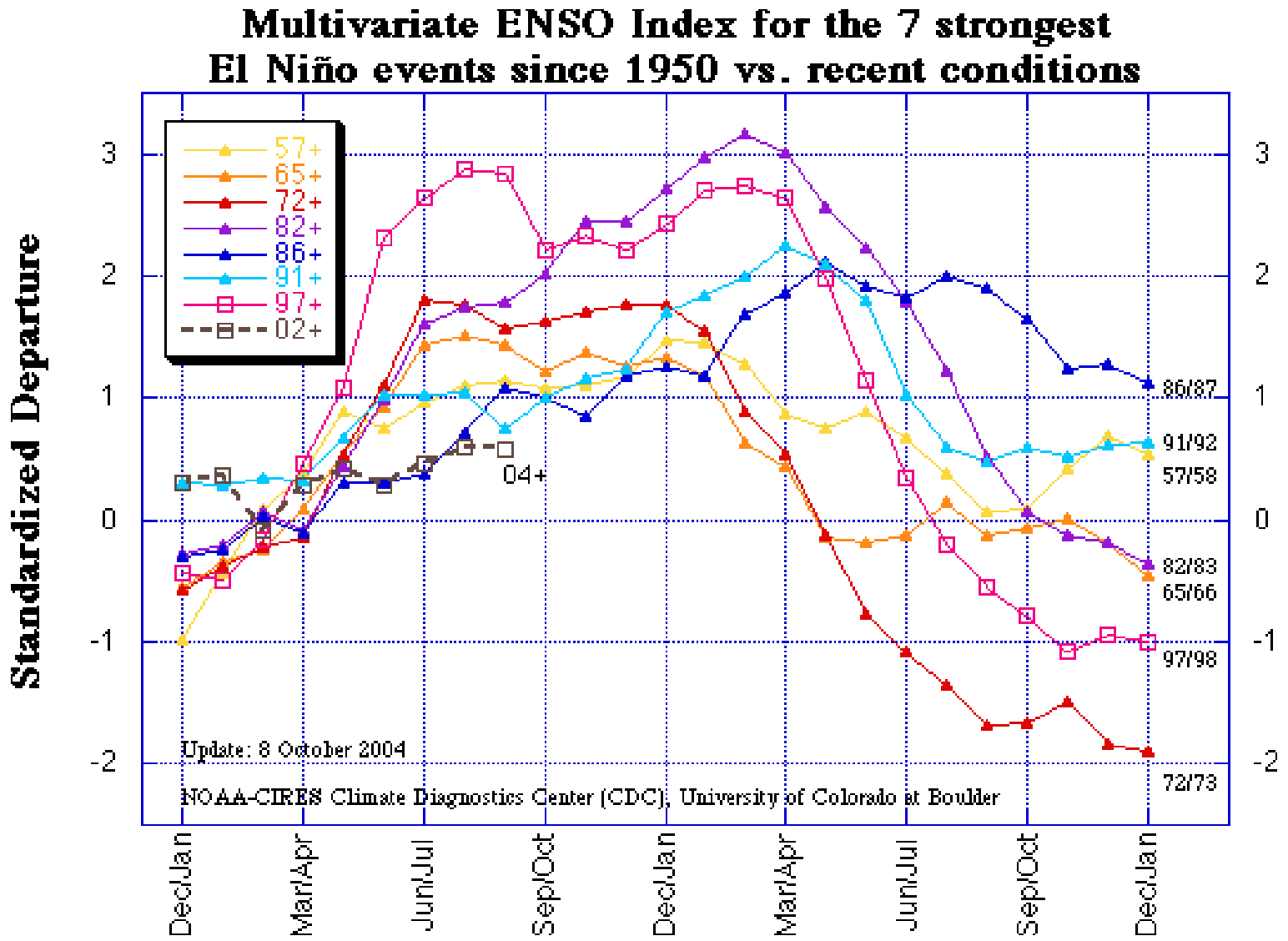
http://science.msfc.nasa.gov/ssl/pad/solar/images/ssn_predict_l.gif

SEA SURFACE TEMPERATURE DEPARTURE FORECAST

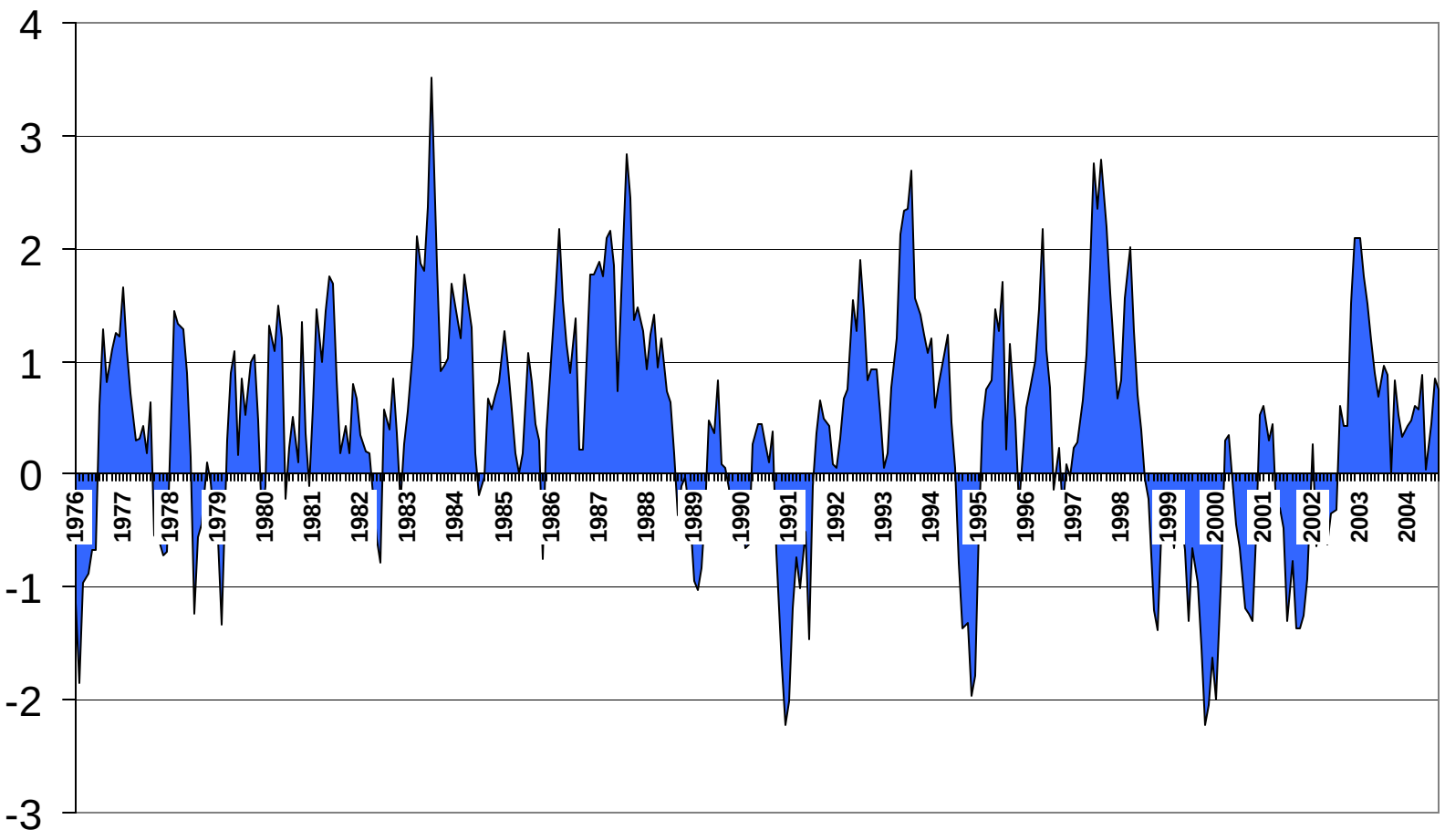


Ensemble average of 20 members from initial conditions of 110ct2004 to 300ct2004.
Base period for climatology is 1982–2003. Base period for bias correction is 1982–2003.
Forecast skill in grey areas is less than 0.3.

MEI-- MULTI-VARIABLE EL NINO INDEX

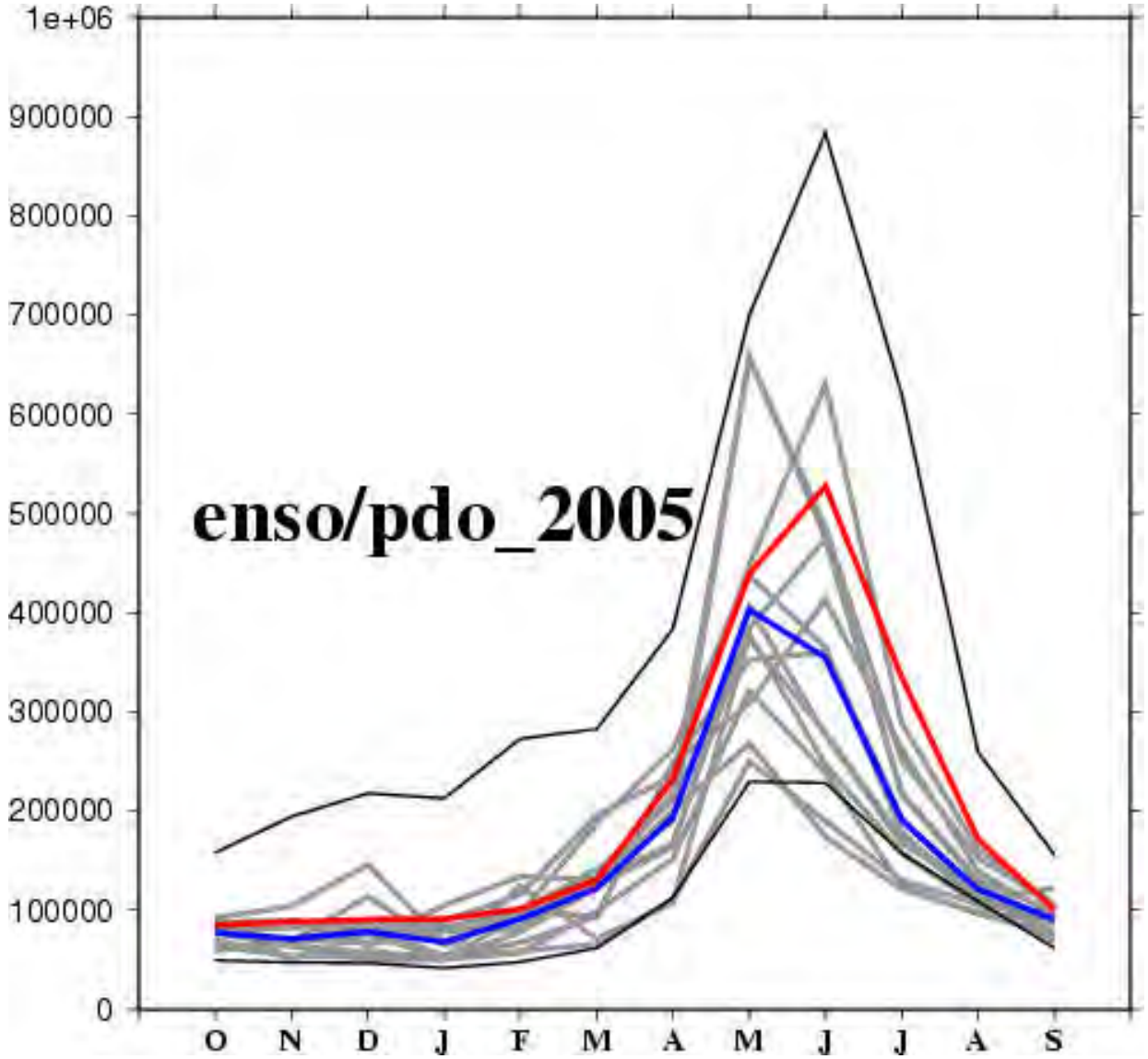


PACIFIC DECADAL OSCILLATION (PDO)

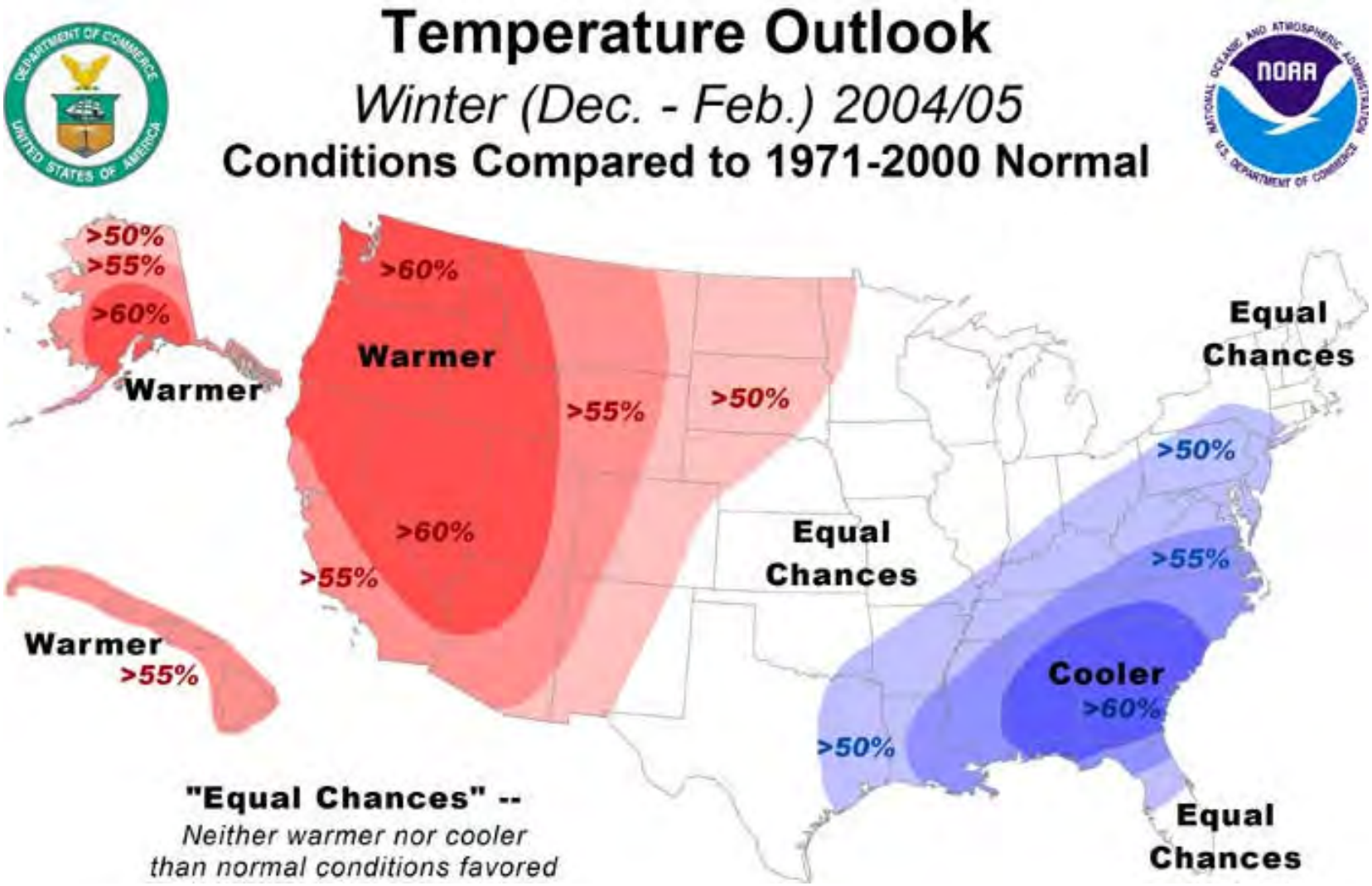


Source: UW-Climate Impacts Group

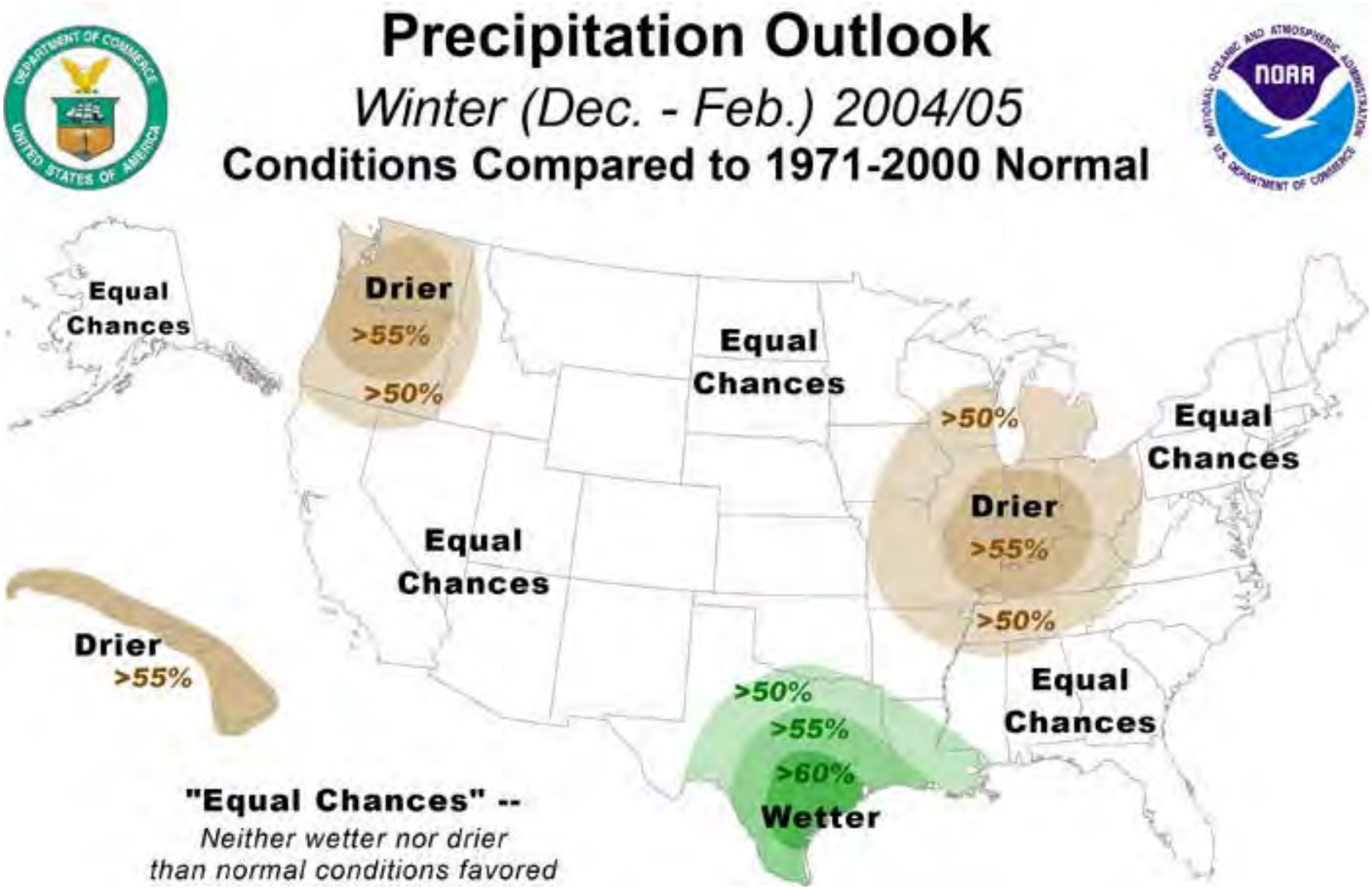
UW CLIMATE IMPACTS GROUP EXPERIMENTAL FORECAST- COLUMBIA AT THE DALLES



NOAA CLIMATE PREDICTION CENTER FORECAST- WINTER 2004-2005



NOAA CLIMATE PREDICTION CENTER FORECAST- WINTER 2004-2005



Summary: The CRITFC Winter Forecast

Month:	Temperature (mean monthly):	"Hedge"	Precipitation (% normal):	"Hedge"
November	Near Normal (-1.8 to + 1.8 degF)	0.4	Below Normal (70 - 90%)	75%
December	Near Normal (-1.8 to + 1.8 degF)	0.3	Near Normal (90 - 110%)	97%
January	Near Normal (-1.8 to + 1.8 degF)	0.7	Near Normal (90 - 110%)	100%
February	Above Normal (> +1.8 degF)	2	Near Normal (90 - 110%)	89%
March	Near Normal (-1.8 to + 1.8 degF)	1.3	Near Normal (90 - 110%)	89%

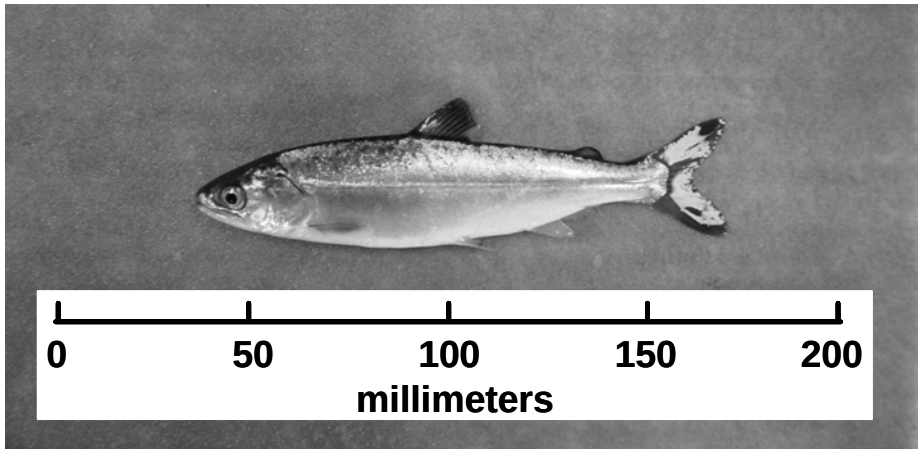
...but what about snow events?!

Investigating passage of ESA-listed juvenile fall Chinook salmon at Lower Granite Dam during winter when the fish bypass system is not operated

Project 200203200

U.S. Fish & Wildlife Service | Washington Department of Fish and Wildlife | USGS science for a changing world | Bonneville Power Administration

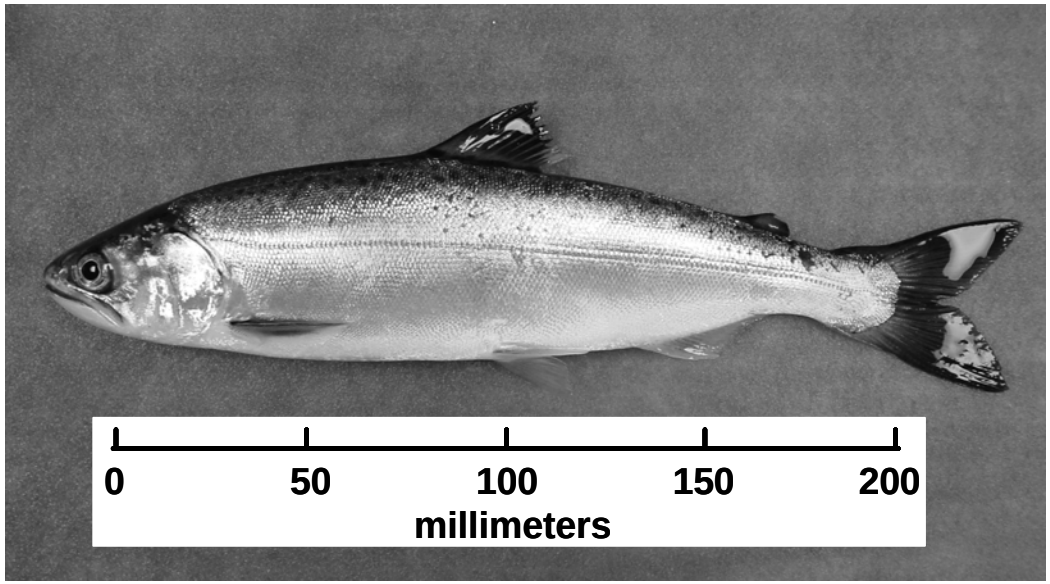
Results of analyses on juveniles



Ocean-type

Wild, N = 47, FL = 139, K = 1.2

Hatchery, N = 1,162, Fl = 112, K = 1.2



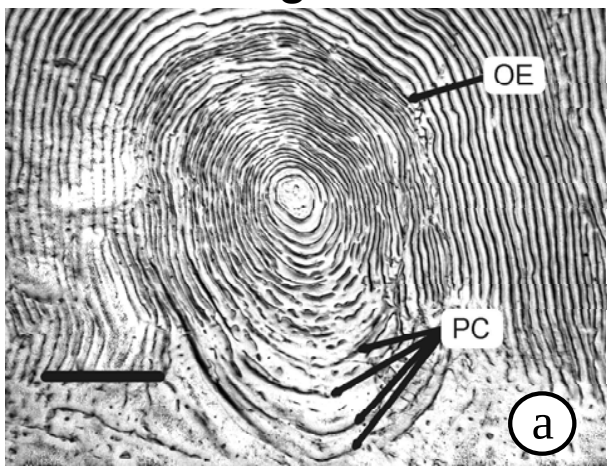
Reservoir-type

Wild, N = 38, FL = 222, K = 1.1

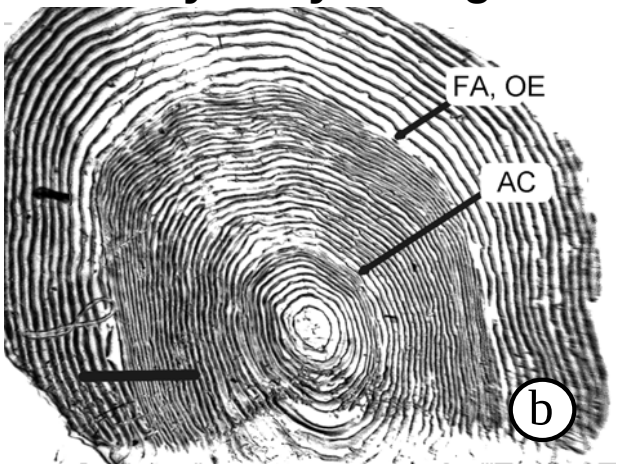
Hatchery, N = 42, Fl = 224, K = 1.1

Scale pattern analysis

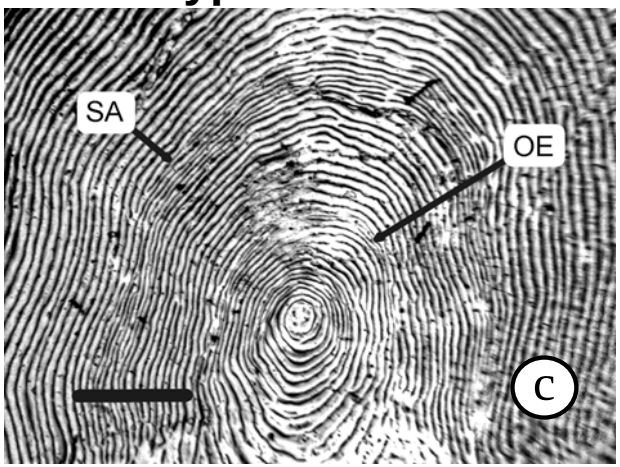
LFH Yearling



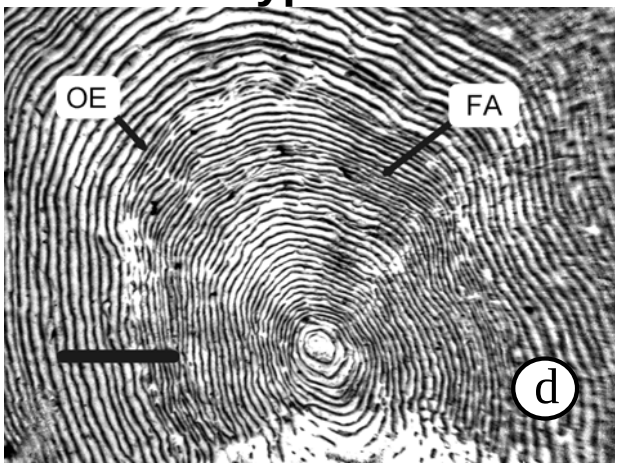
Hatchery subyearling



Ocean-type



Reservoir-type

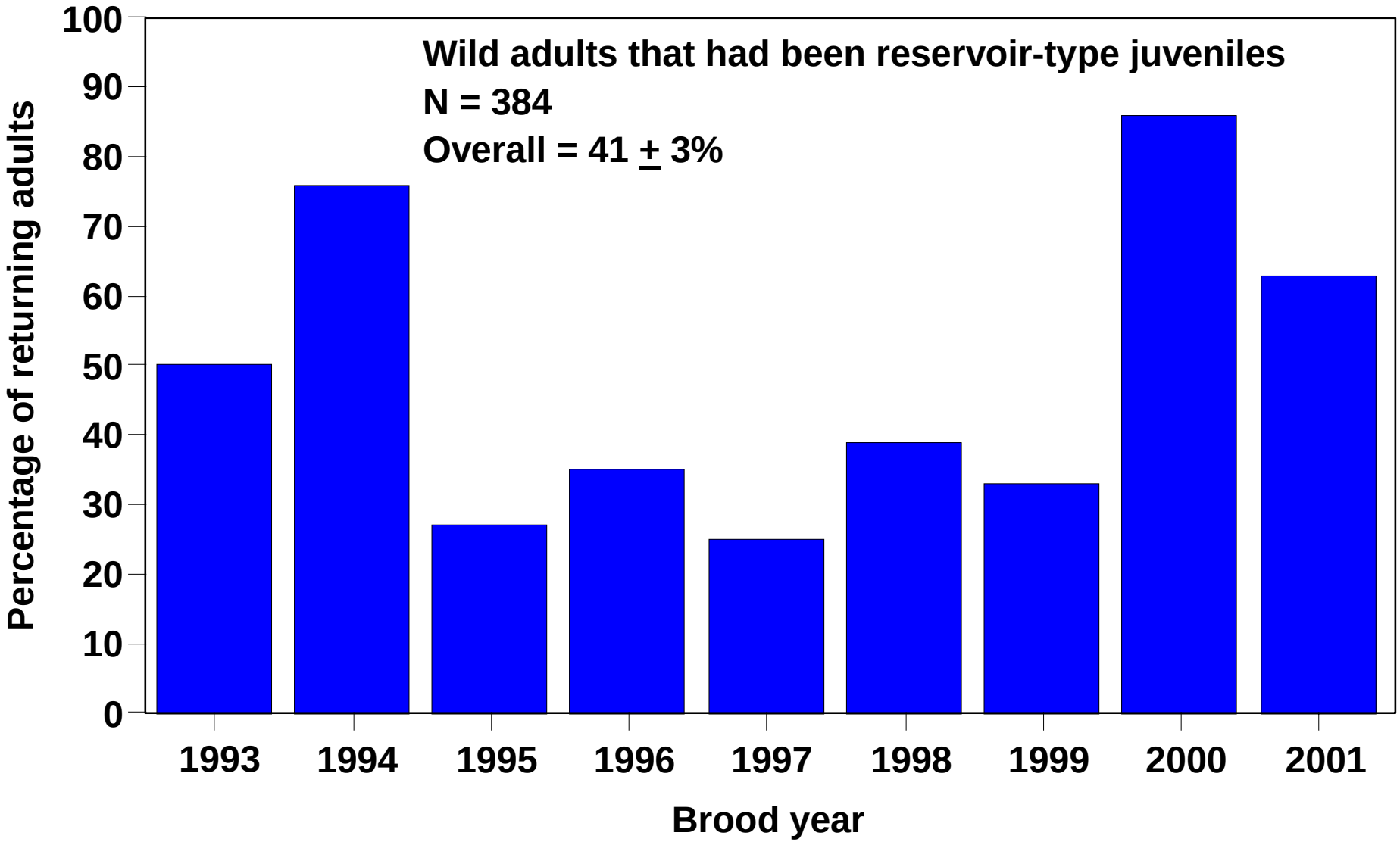


Adult collection

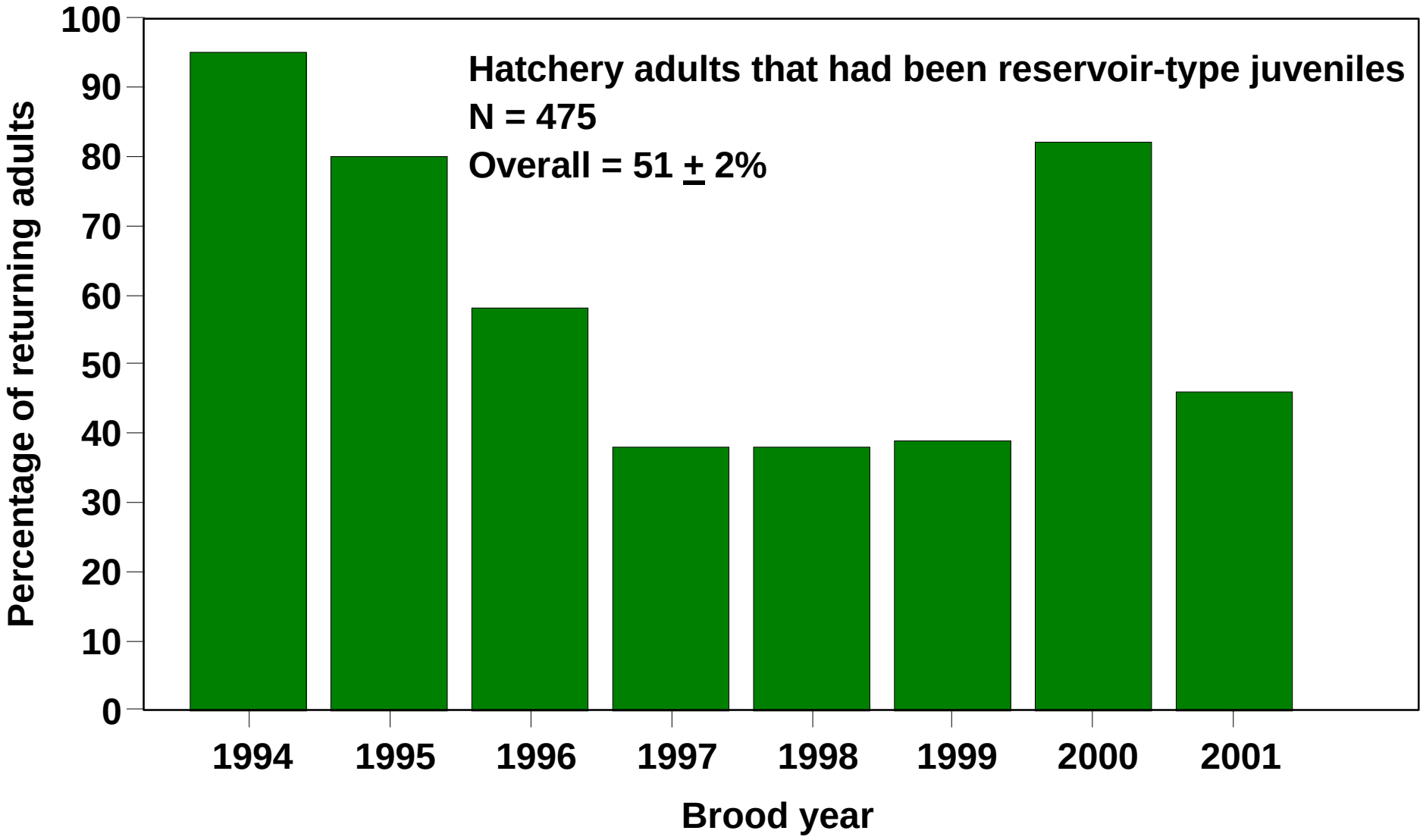
Collected adults at Lower Granite Dam 1998—2003.

Sampled scales, measured fork length and estimated gender.

Results of analyses on wild adults
(6 return years representing 11 brood years)



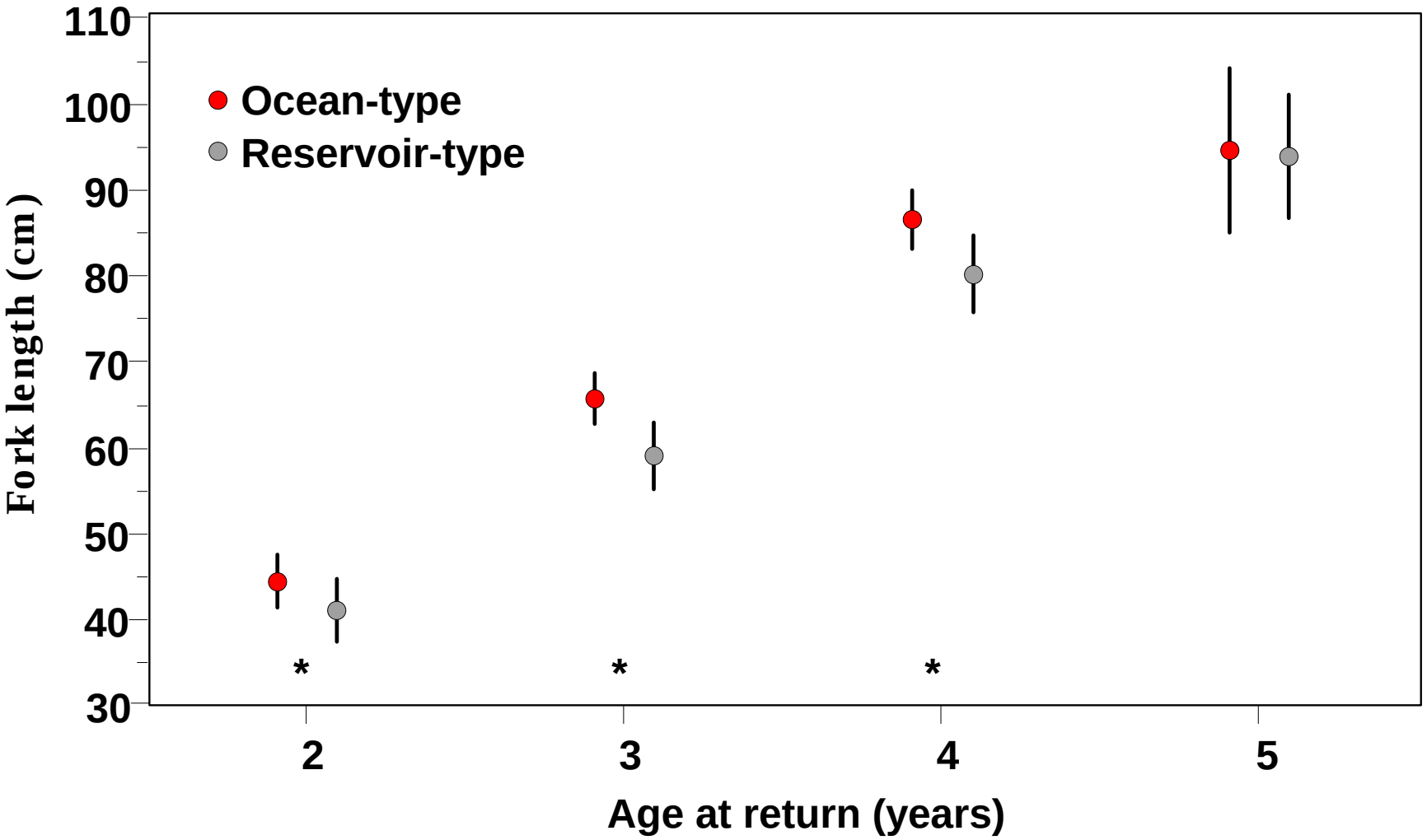
Results of analyses on hatchery adults
(6 return years representing 10 brood years)



Gender composition was independent of juvenile life history type, whereas age composition was dependent on juvenile life history type (e.g., wild males).

Juvenile life history type	Number collected	Percentage by age class					X^2	P
		2	3	4	5	6		
Ocean	135	16.3	29.6	46.7*	6.7	0.7	15.9	0.003
Reservoir	87	16.1	28.7	31.0	24.2*			

Size composition was dependent on juvenile life history type (e.g., wild males).



Connor, W. P., J. G. Sneva, K. F. Tiffan, R. K. Steinhorst, and D. Ross. In press. Two alternative life history types for fall Chinook salmon in the Snake River basin. Accepted for publication in Transactions of the American on 9 August, 2004.

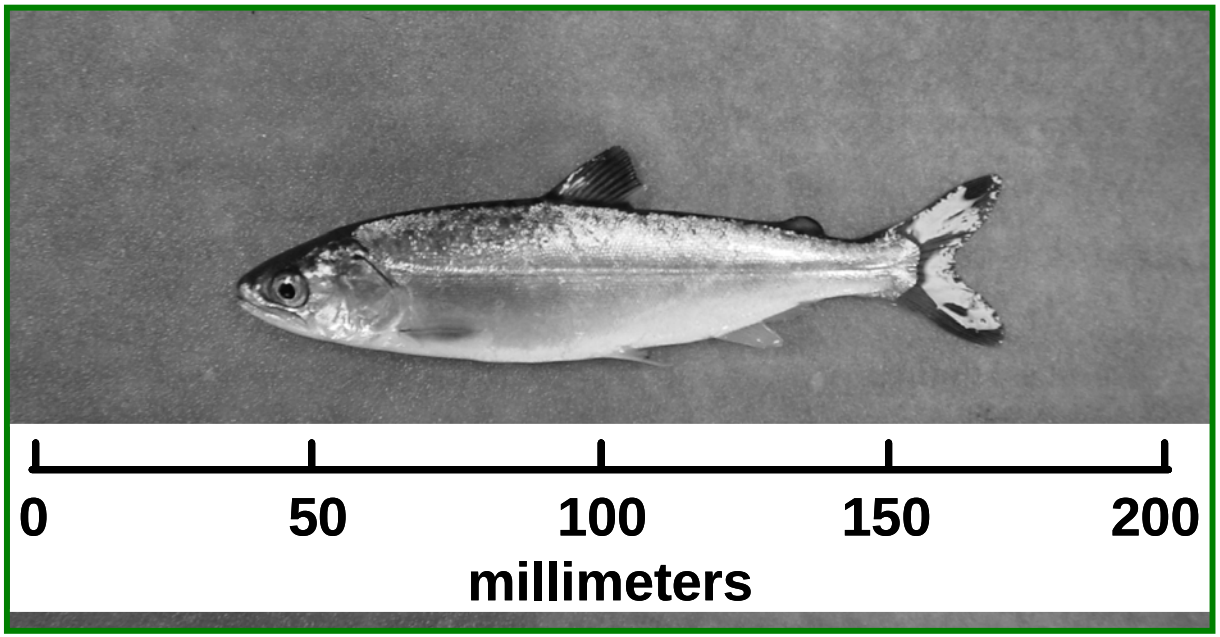
-There is no typical juvenile life history type for fall Chinook salmon in the Snake River basin, rather two alternatives, namely, ocean-type and reservoir-type.

-Both of these alternative juvenile life histories are important to the recovery of fall Chinook salmon in the Snake River basin.

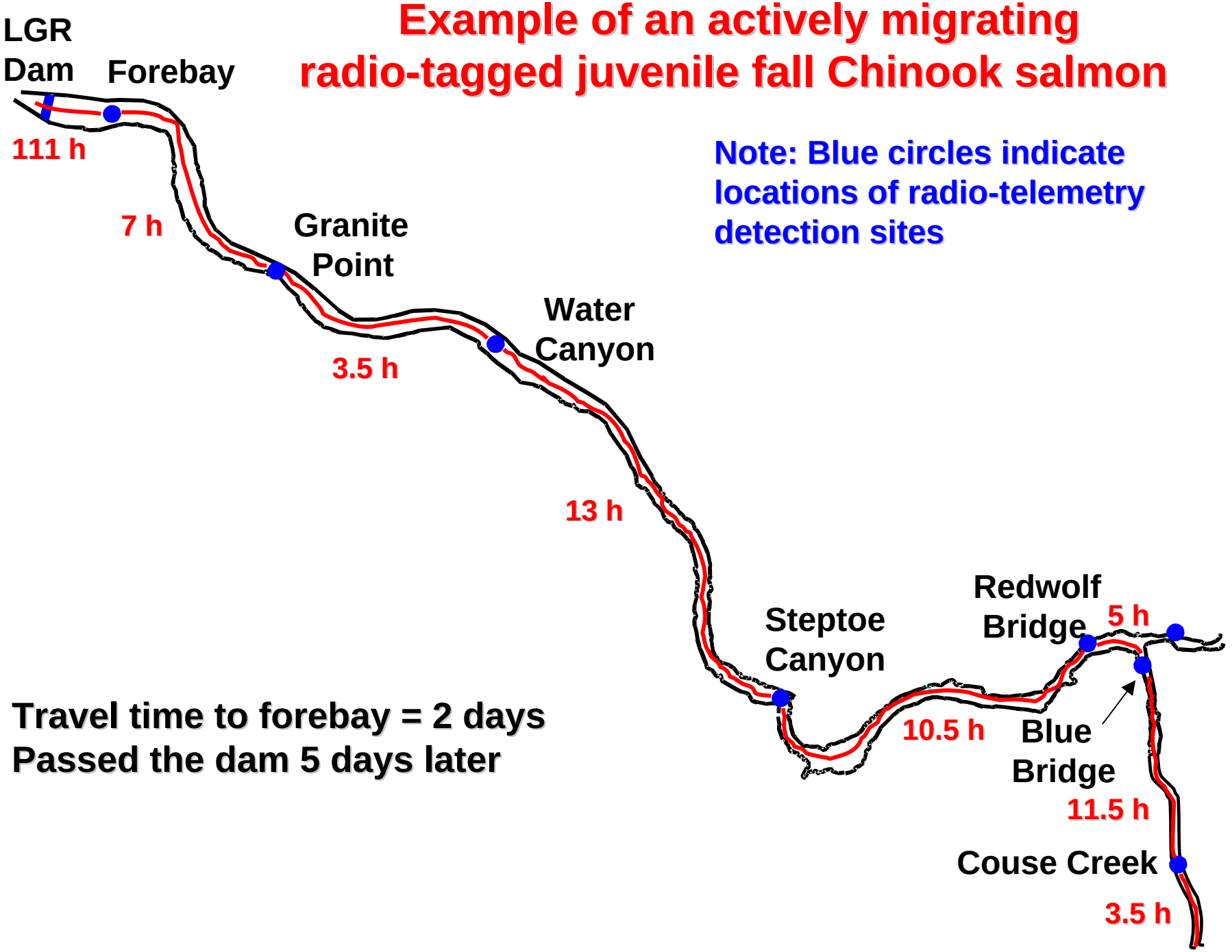
- There is very little known about reservoir-type juveniles.

Details on ocean-type juveniles

1) Discontinuous shoreline rearing
2) Rapid dispersal into LGR reservoir
3) Discontinuous downstream dispersal
4) Active seaward movement



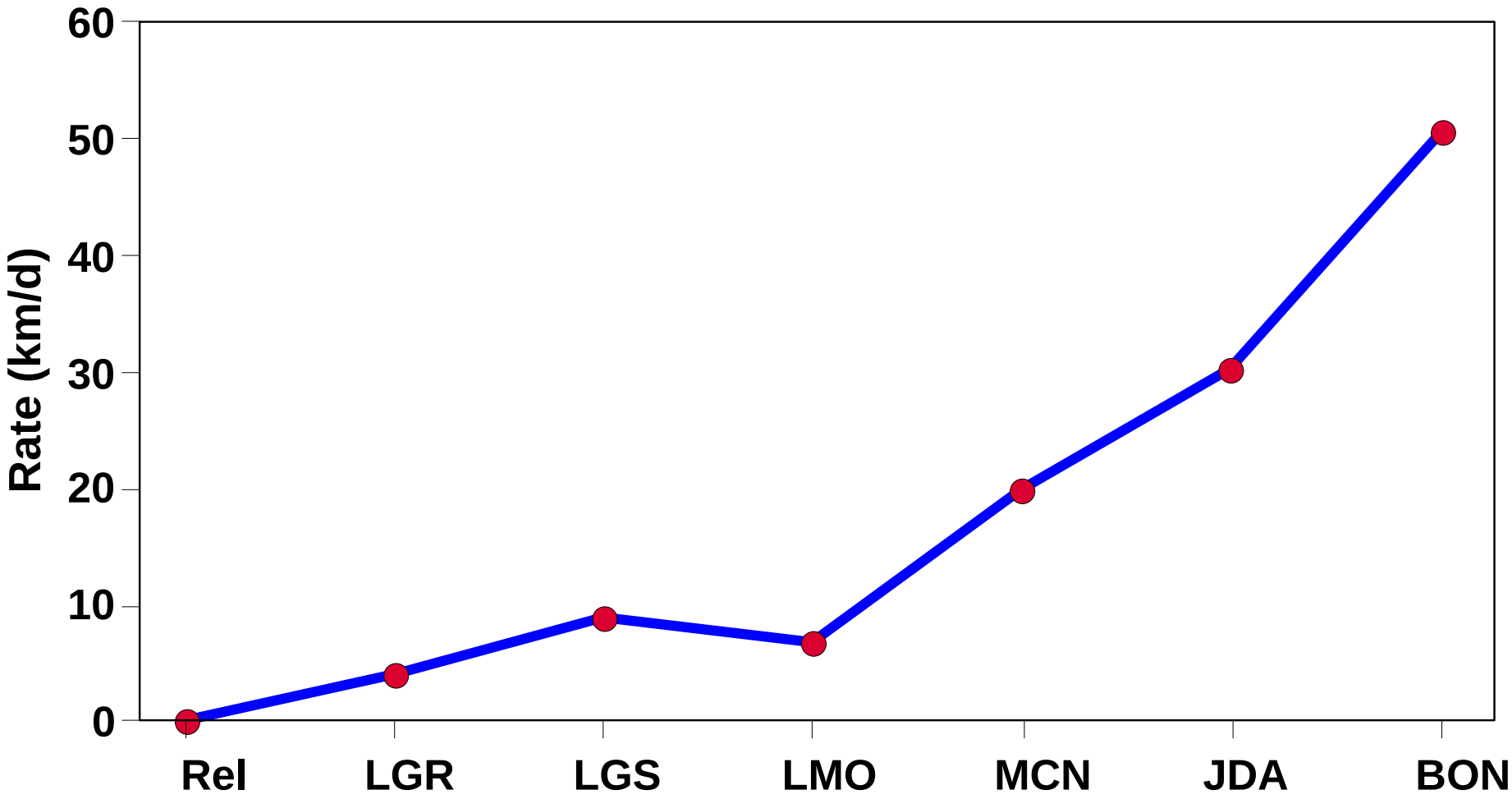
Example of an actively migrating radio-tagged juvenile fall Chinook salmon



Note: Blue circles indicate locations of radio-telemetry detection sites

Travel time to forebay = 2 days
Passed the dam 5 days later

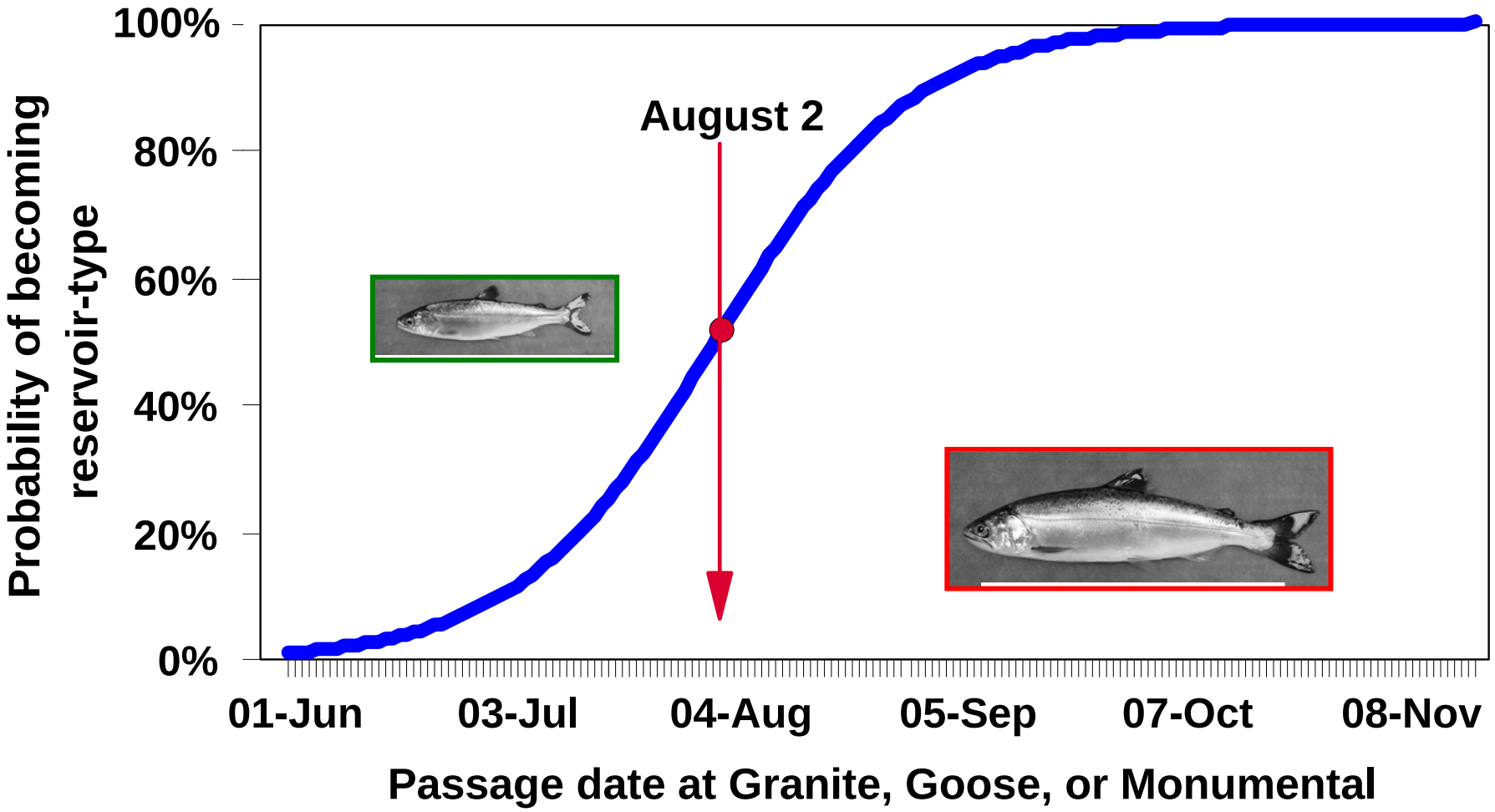
Observed rates of seaward movement for wild ocean-type subyearlings PIT tagged in the Snake River in 2003



What determines life history-type?

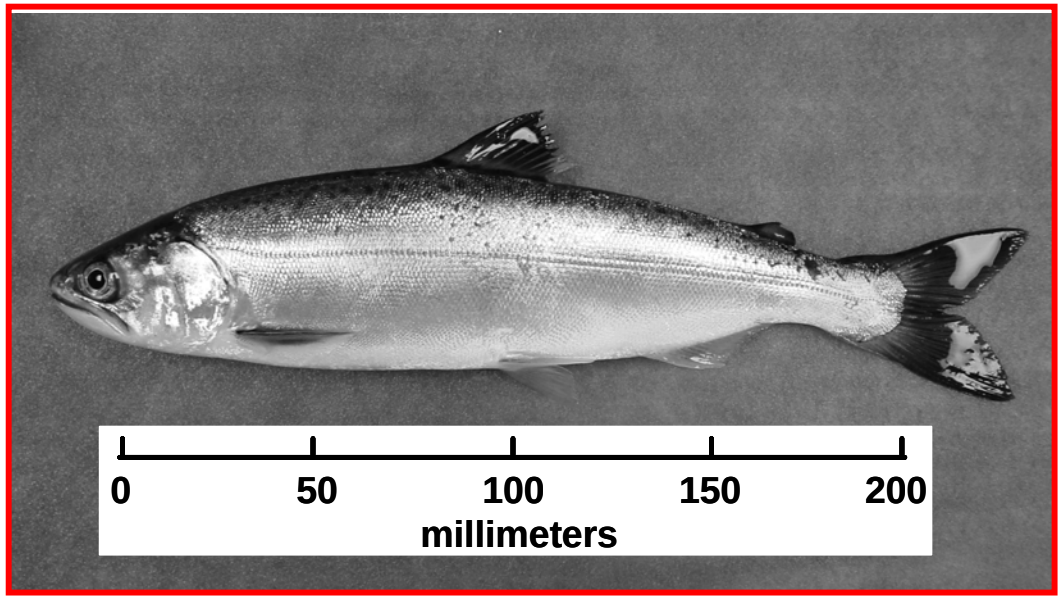
Logistic regression (*N* = 52; wild and hatchery combined)

Accuracy 85%

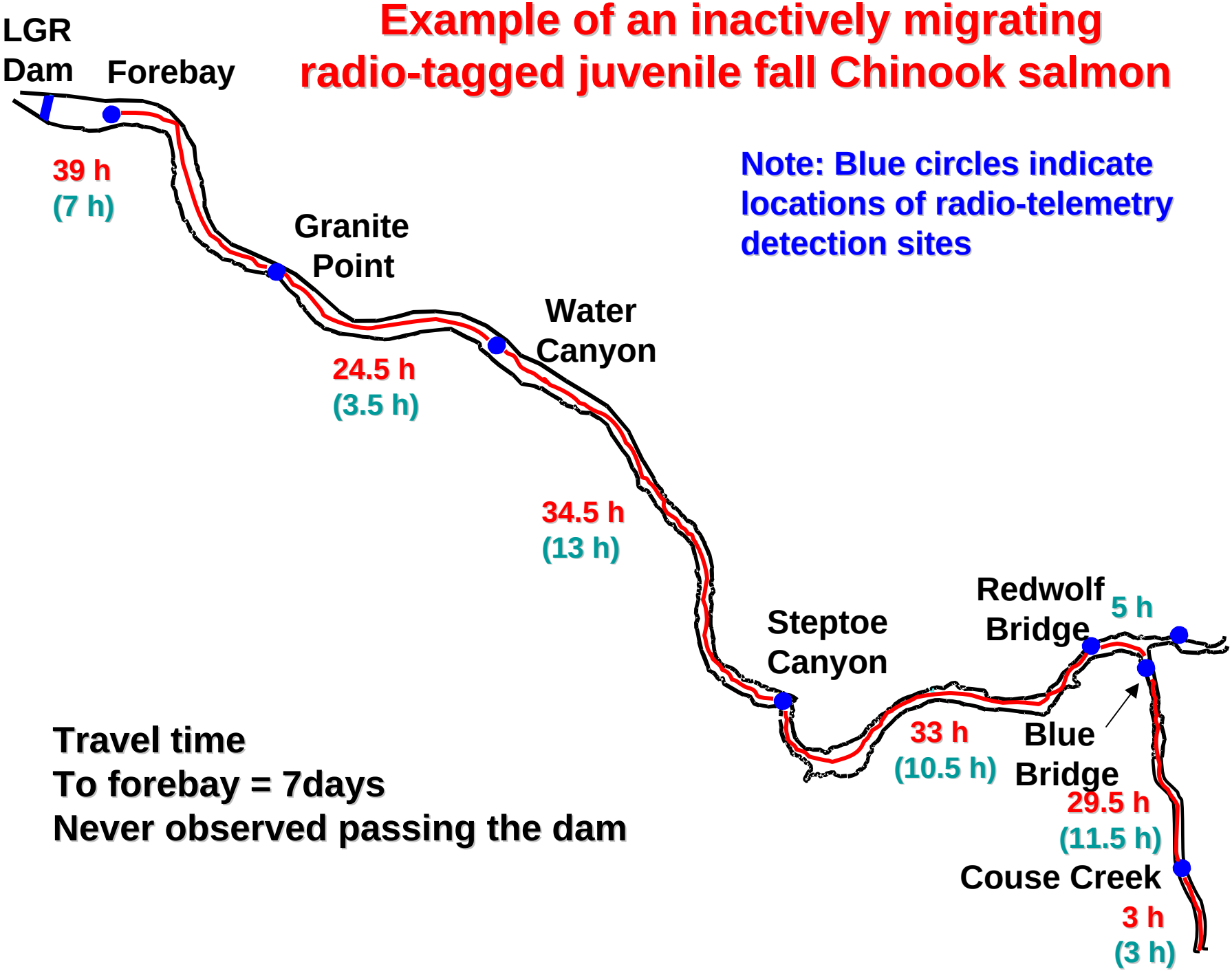


Speculative details on reservoir-type juveniles

1) Discontinuous shoreline rearing
2) Rapid dispersal into LGR reservoir
3) Discontinuous downstream dispersal
4) Disrupted/delayed seaward movement
5) Discontinuous downstream dispersal
6) Active seaward movement as yearlings

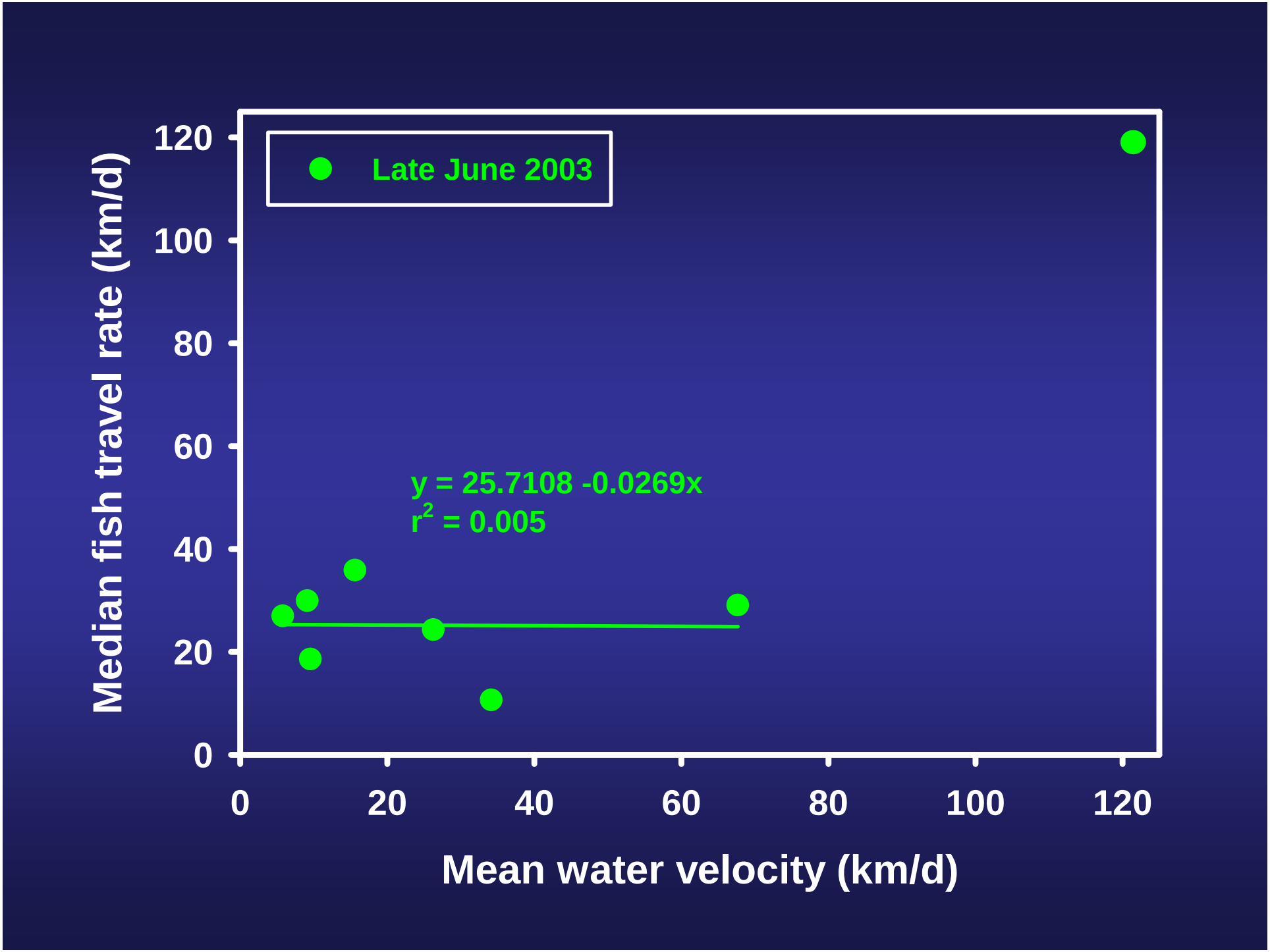


Example of an inactively migrating radio-tagged juvenile fall Chinook salmon

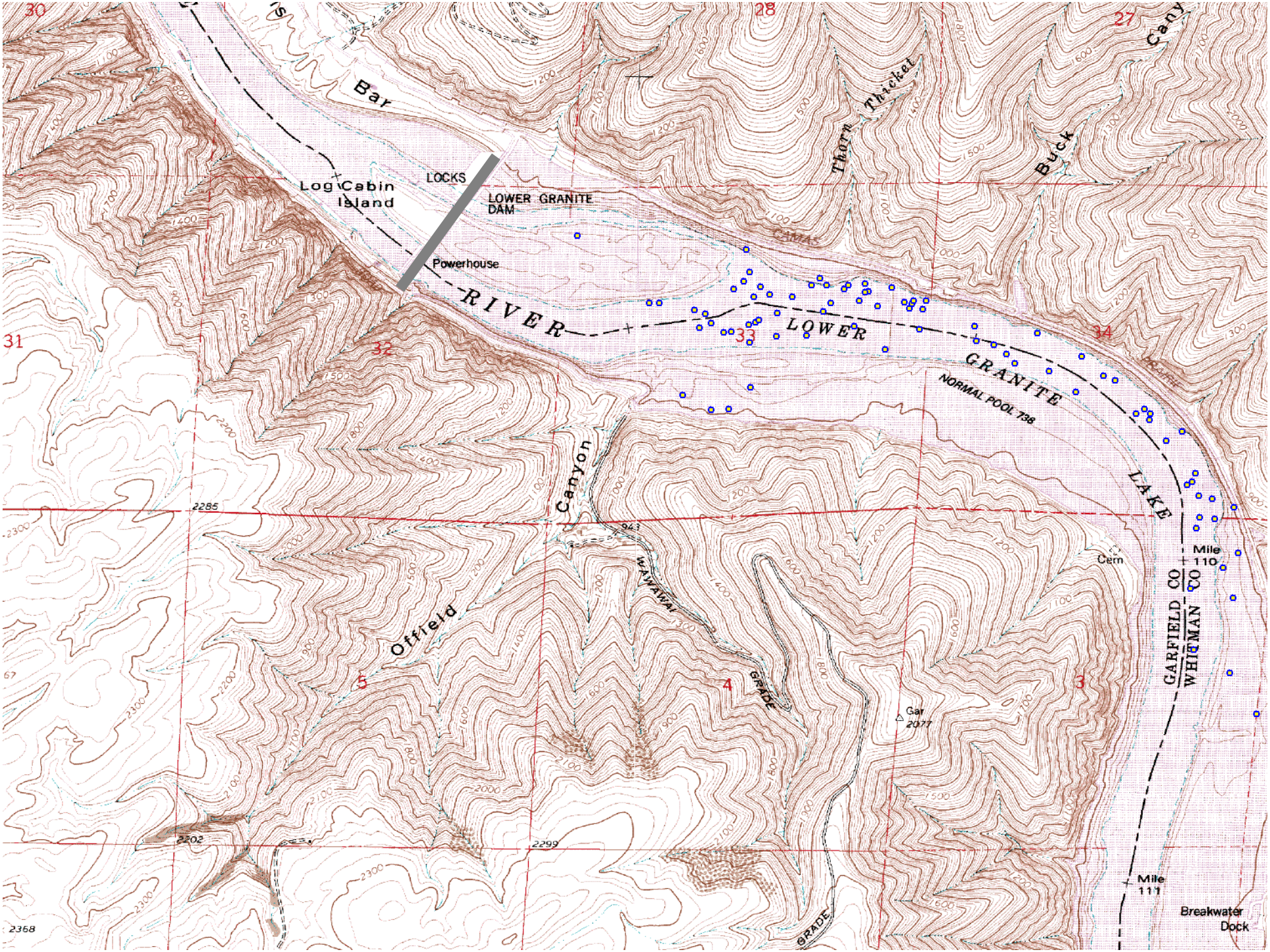


Note: Blue circles indicate locations of radio-telemetry detection sites

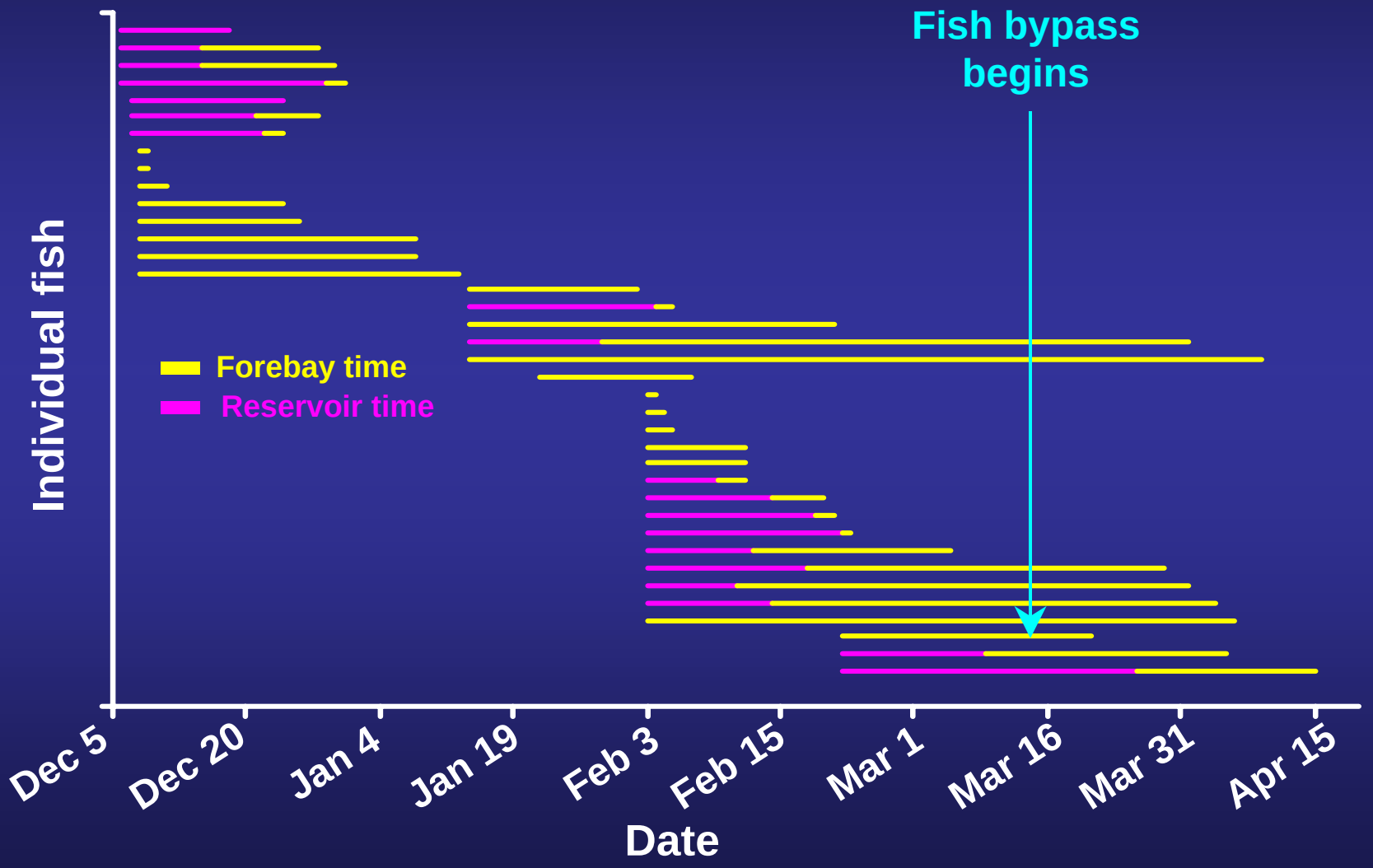
Travel time
To forebay = 7days
Never observed passing the dam


Late June 2003
y = 25.7108 -0.0269x
r2 = 0.005
Median fish travel rate (km/d)
Mean water velocity (km/d)
0
20
40
60
80
100
120

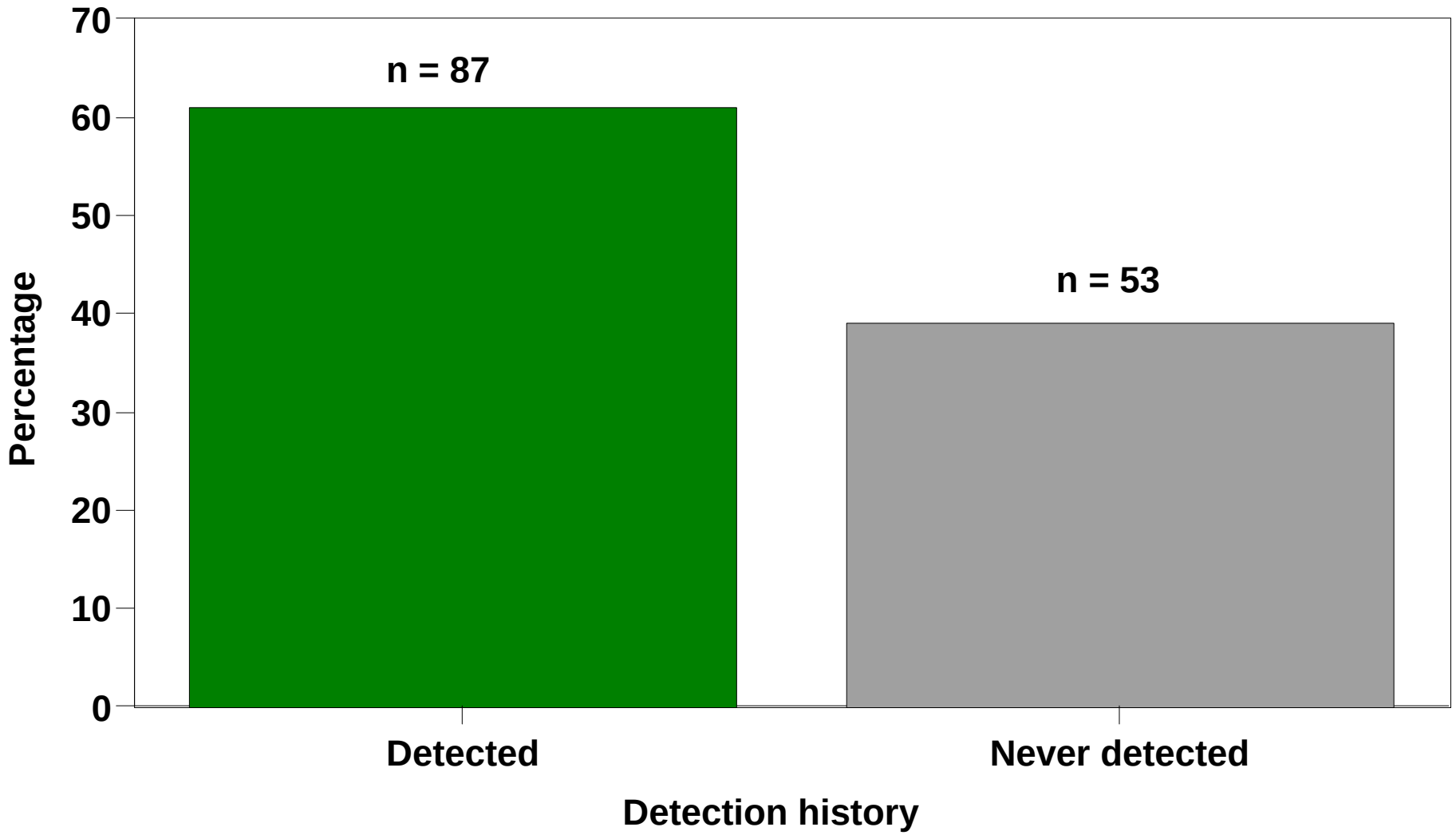
When do reservoir-type juveniles pass dams?

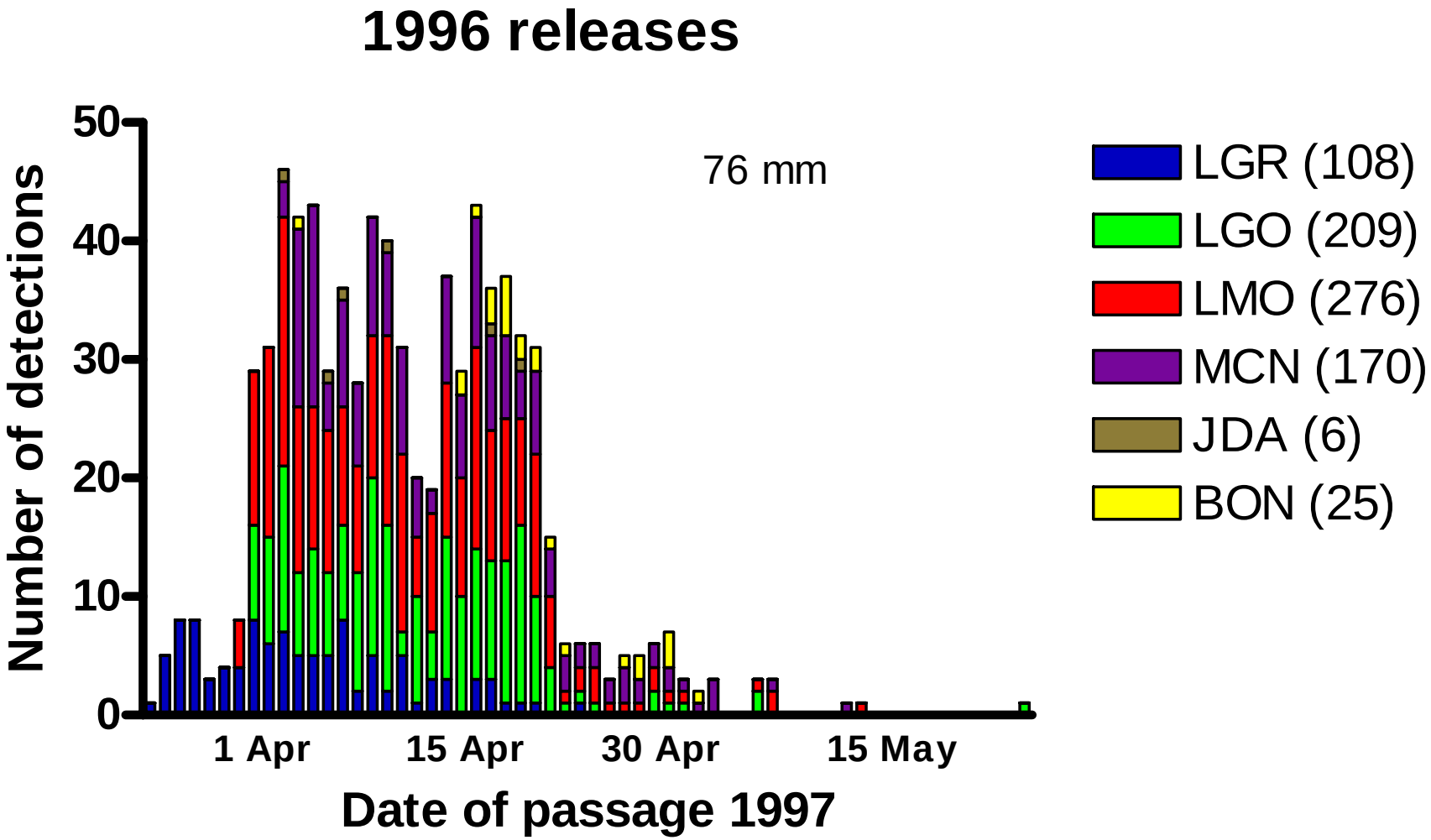

Bay
Log Cabin Island
LOCKS
LOWER GRANITE DAM
Powerhouse
RIVER
LOWER GRANITE
NORMAL POOL 738
LAKE
Thorn Thicket
Buck
Canyon
Offield
WAWAWAI
GRADE
GRADE
Cem
Gar 2077
Mile 110
Mile 111
Breakwater Dock
GARFIELD CO
WHITMAN CO
30
28
27
31
32
33
34
5
4
3
2285
2202
2299
2368

Mean length = 198 mm (169-247), mean weight = 85.9 g (51.2-137.6)
62% (38/61) of tagged fish passed Lower Granite Dam
76% (29/38) of fish that passed, did so before bypass began



Juvenile detection histories of adults that were PIT tagged as juveniles




1996 releases
76 mm
Number of detections
50
40
30
20
10
0
1 Apr
15 Apr
30 Apr
15 May
Date of passage 1997
LGR (108)
LGO (209)
LMO (276)
MCN (170)
JDA (6)
BON (25)

Observations on releases of PIT-tagged hatchery fall Chinook salmon subyearlings

- Released 175,443 PIT tagged fish
- 4,932 smolts were transported
- 53,324 smolts were bypassed
- 3,386 smolts were known to have migrated the following year
- 369 adults have returned

*** 1995-2000, 1999 releases excluded because of tag frequency change**

SARs Estimated LGR to LGR

Disposition	# Adults	SAR*
Transported	22	0.51
Bypassed	183	0.56
Known reservoir-types	51	1.35
Never detected	113	??

Management and Research Questions

Which are the primary reservoirs used by reservoir-type juvenile fall Chinook salmon?

What is the passage timing of reservoir-type juvenile fall Chinook salmon in reservoirs?

How abundant are reservoir-type juvenile fall Chinook salmon?
(Preliminary estimates: 13% to 39% for the Snake River 1998-2003)

How much turbine mortality occurs during winter passage at dams?

How does flow augmentation, spill, etc. influence the prevalence of reservoir-type juveniles?

Movement, distribution, and passage behavior of radio-tagged yearling Chinook salmon, steelhead, and subyearling Chinook salmon at Bonneville Dam associated with FPE and survival tests, 2004

Table 1. Preliminary USGS data of radio-tagged yearling Chinook salmon, steelhead, and subyearling Chinook salmon that passed Bonneville Dam, Powerhouse 2 (PH2), 2004. Data are from radio-tagged fish released from John Day and The Dalles dams. Release periods were from 27 April through 29 May for yearling Chinook salmon and steelhead and from 19 June through 29 July for subyearling Chinook salmon. Data includes the number of fish that passed PH2 and went through the corner collector (corner collector efficiency) as well as PH2 Fish Passage Efficiency (FPE).

Species	Corner Collector Efficiency	PH2 FPE
Yearling Chinook	36% (1282/3511)	57% (2012/3511)
Steelhead	74% (1939/2624)	84% (2212/2624)
Subyearling Chinook	37% (1928/5240)	50% (2642/5240)

Table 2. Preliminary USGS data of radio-tagged yearling Chinook salmon, steelhead, and subyearling Chinook salmon that passed Bonneville Dam during 2004. Project Fish Passage Efficiency (FPE) is defined as the number of fish that pass through non-turbine routes (Spillway, PH2 DSM, PH2 Corner Collector, PH1 Sluiceway and PH1 navigation lock) divided by the total number of fish passing through the project. Spillway Efficiency is calculated by dividing the number of fish that pass through the spillway by the number of fish that pass through the project.

Species	Passage Route	N	Project FPE	Spillway Efficiency
Yearling Chinook				
	Spillway	1965		
	PH2 DSM	730		
	PH2 Corner Collector	1282		
	PH1 Sluiceway	256		
	PH1 Navigation Lock	5		
	Overall		71% (4238/5960)	33% (1965/5960)
Steelhead				
	Spillway	1016		
	PH2 DSM	273		
	PH2 Corner Collector	1939		
	PH1 Sluiceway	187		
	PH1 Navigation Lock	11		
	Overall		86% (3426/3981)	26% (1016/3981)
Subyearling Chinook				
	Spillway	3083		
	PH2 DSM	714		
	PH2 Corner Collector	1928		
	PH1 Sluiceway	196		
	PH1 Navigation Lock	20		
	Overall		68% (5941/8739)	35% (3083/8739)

Table 3. Summary of passage performance metrics for yearling Chinook salmon, steelhead, and subyearling Chinook salmon, as determined by USGS from radio-telemetry studies at Bonneville Dam during 2000, 2001, 2002 and 2004 (preliminary). No data were gathered during 2003.

Metric	Year	Yearling Chinook	Yearling Steelhead	Subyearling Chinook
Spillway Efficiency				
	2000	44%	33%	65%
	2001	16%	No Data	2%
	2002	57%	55%	No Data
	2004	33%	26%	35%
Project FPE				
	2000	73%	78%	91%
	2001	56%	No Data	40%
	2002	76%	84%	No Data
	2004	71%	86%	68%

Table 4. Preliminary USGS data of radio-tagged yearling Chinook salmon, steelhead, and subyearling Chinook salmon that passed Bonneville Dam during 2004. Data are from radio-tagged fish released from John Day and The Dalles dams. Release periods were from 27 April through 29 May for yearling Chinook salmon and steelhead and from 19 June through 29 July for subyearling Chinook salmon. Median travel time (h) from time of passage at Bonneville Dam (rkm 235) to first detection at the third survival gate (rkm 181).

Passage Route	Yearling Chinook	Yearling Steelhead	Subyearling Chinook
Spillway	14.23	13.30	17.14
PH2 DSM	15.27	15.21	18.14
PH2 Corner Collector	13.64	12.97	17.04
PH1 Sluiceway	13.86	13.09	16.38
PH1 Navigation Lock	19.64	14.27	15.47
Turbine (PH1 and PH2)	14.25	14.10	16.85

Contact: Noah_Adams@usgs.gov
(509) 538-2299 ext. 254

Executive Summary Table. Preliminary results describing the survival of radio-tagged yearling Chinook salmon and steelhead trout through an MGR turbine unit and the Ice and trash sluiceway at Bonneville Dam's first powerhouse generated (paired release recapture models) and through the spillway, all routes through Powerhouse 1, and through the Powerhouse 2 corner collector, juvenile bypass, and turbine units (route specific survival model). Estimates generated using the paired release recapture models used fish released directly into the route and releases in the immediate tailrace area and for the route specific survival models used fish released at The Dalles Dam and in the Bonneville Dam tailrace. Results are preliminary and may need to be adjusted pending the results of our evaluation of the expected tag life for these evaluations.

	Paired Release-Recapture Model			
	Yearling Chinook salmon		Steelhead trout	
Route	S	95%CI	S	95%CI
MGR Turbine Powerhouse 1 Unit 4B [A, C]	0.956	± 0.032	0.952	± 0.047
Powerhouse 1 Ice & Trash sluiceway [C]	1.00	± 0.044	0.985	± 0.062

	Route Specific Survival Model			
	Yearling Chinook salmon		Steelhead trout	
Site	S	95%CI	S	95%CI
Spillway [C]	0.910	0.888, 0.931 [B]	0.979	0.956, 1.002 [C]
Powerhouse 1 [C]	0.913	0.873, 0.949 [B]	0.965	0.926, 0.999 [B]
Powerhouse 2 turbines (unguided) [C]	0.951	0.929, 0.972 [B]	0.889	0.848, 0.927 [B]
Powerhouse 2 Juvenile Bypass [C]	0.970	0.943, 0.995 [B]	0.951	0.907, 0.989 [B]
Powerhouse 2 Corner Collector, [C]	1.016	0.999, 1.032 [B]	1.030	1.014, 1.047 [B]

[A]- Control below front roll of B1 powerhouse
[B]- Profile likelihood 95% confidence interval
[C]- Operation of Powerhouse 1 was intermittent throughout the study period.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

November 10, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members. Most presentations were accompanied by Power Point or other electronic information. Please go to the agenda on the TMT web page to see more detailed information.

2004 TMT YEAR END REVIEW

2004 Comparison to Previous Years

- *Water and Runoff Patterns*: Cathy Hlebechuk, COE, presented information on 2004 operations for each of the projects. Of note, a sturgeon pulse operation was implemented at Libby. 12.5 kcfs flat flows were released from late August through the end of September, due to record high rainfall in Montana during late summer. Dworshak operations showed an earlier spill ramp-up this year than in previous years, intended to "get ahead" of fish run timing and higher water temperatures. Grand Coulee experienced very low snow pack runoffs in the spring, and began filling when the March final forecast was released.
    - **LESSONS LEARNED**: As in past years, it was noted that the uncertainty of the water year makes it difficult to balance the river. This fact is demonstrated through the 85% target. How might TMT do a better job operating closer to flood control instead of so much for power? Can we do a better job of balancing fish and power needs? Are language changes to the BiOp needed?
    - **Next Steps**: The BOR will give a presentation to FPAC about how the 85% target is computed at Grand Coulee each year.
- *TDG/Temperature:* Jim Adams, COE, reported on 2004 temperatures and total dissolved gas (TDG) exceedances. This year had the best TDG compliance since 2001. Two new fixed monitoring stations were added this year, at Albeni Falls forebay and tailwater, and Cascade Island (i.e., Bonneville tailwater). Data access is currently available through the CHROMS data base, but the COE is in the process of switching to CWMS. There were 71 days of TDG exceedances – about 2.4% total (so, 97.6% compliance with the standard.) Most exceedances were due to a sharp rise in water temperature, particularly at McNary. Regarding temperature issues, Dworshak releases were as low as 43° F at one point during the season. To our knowledge, this is the lowest targeted temperature at the project. Temperatures at Lower Granite tailwater temperature exceeded 68 degrees only 7 – 10 hours in Water Year 2004.

    - **LESSON LEARNED***:* Dworshak tailwater temperatures were very effective in maintaining Lower Granite tailwater temperature below the state standard a majority of the time. However, they did not appear to impact temperatures downstream at McNary.
    - **Next Steps:** Jim will provide TMT with a report that explains Type 12 exceedance. He also announced that the COE will hold workshops on SYSTDG in March and May.
- *Fish Passage*: Jerry McCann, FPC, reported on 2004 smolt migration: run size, timing, travel time, and survival.
    - Yearling chinook: The run at large showed similar numbers and travel time as compared to historical numbers. Transportation operations this year collected over 50% of the hatchery and wild yearling chinook at Lower Granite. Survival was low this year with in-river at roughly 60%. These numbers are similar to 2001 and could have been due to the lack of spill operations.
    - Steelhead: Population estimates and travel time were similar to previous years, about 5.8 million (5.3 million transported). Transport operations were similar to that of yearling chinook. Survival of hatchery steelhead was high, similar to 2002. Total in-river survival was approximately 40%, which Jerry described as low and similar to recent years.
    - Subyearling chinook: The population index was high (about 1.6 million at Lower Granite). Timing of the run was earlier than historically, ending in late July. This was likely influenced by the supplementation program.
    - **LESSONS LEARNED**: Jerry ended his presentation with a question to the group: Are we overlooking low flow effects by not looking more closely at travel time? We might want to be more aware of travel time impacts when managing the system. From the Fish Passage Center's perspective, low flows and low spill equal slower travel time, which correlates to lower survival.
- *Clues About Relative Survival of Adults*: Jeff Fryer, CRITFC, presented updated information on 2001 outmigrating chinook and sockeye at Bonneville that was first presented at last year's TMT year end review. Generally, 2001 outmigrating summer chinook, sockeye and fall chinook showed particularly low adult returns. The subyearlings appear to be harder hit by 2001 conditions than yearling chinook. Sockeye show the worst numbers than any in the last 6 years. Summer and spring chinook show low returns in the last five years but higher than in the 1980's.
    - **LESSONS LEARNED**: 2001, though bad, was better than pre-1998 returns. After 2005, there will be better information available related to the 2001 drought year.
- *Weather*: Kyle Martin, CRITFC, reported on 2004 weather conditions, summarizing that the early January snow/ice storm caused high precipitation and very low temperatures early in the year, but it was a warm year otherwise. Late summer rains helped put water in the system that would not otherwise have been there. Kyle's winter forecast is as follows: near average November-January temperatures, below average precipitation in November, and near average precipitation in January-March. The likelihood of a snow event in the Portland area is greatest in January (~67%

chance). Kyle shared his review and predictions at the American Meteorology Society's annual meeting at OMSI in October.

- *Adult Fish Runs/Fisheries Review*: *Forecasts and Techniques:* Cindy LeFleur, WDFW, presented information on adult fish runs and fisheries for 2004. The forecasted return of up-river spring chinook was 360,700. Actual observed were 193,800. Summer chinook returns were forecasted at 102,800, while 93,800 were observed. 41,900 angler trips were taken – 1100 summer chinook were harvested, of which 200 went to the commercial harvest – this was the first time since the 1970's that commercial fishers kept any summer chinook. Sockeye were forecasted at 80,700; 124,000 returned. Fall chinook adult returns were forecasted at 634,000; 793,200 were observed. Upriver brights, Mid-Columbia brights, and Bonneville pool hatchery fish all showed greater returns than expected. Cindy explained the forecasting techniques: Total returns divide into stock and age components, forecasts are then done by brood years. She noted that the forecasts are usually accurate, and numbers are under-predicted if anything.

Snake River Review:

- *Snake River Fall Chinook Survival Studies*: Ken Tiffan, USGS, updated the group from last year's year end review on Billy Connor's '98-'03 Fall Chinook survival studies that examined effects of summer flow augmentation on survival (an additional year of data was collected for the study.)
    - **LESSON LEARNED**: Billy Connor's analysis from the studies last year was that lower temperatures and higher velocity are supportive conditions for increasing survival rates of migrating juveniles in the Snake River. This year, remaining questions include: At which reservoirs are the 'reservoir-types' (smaller sizes, older returns) residing? What is their passage timing? What is the abundance? How much turbine mortality occurs during winter passage? How does spill, flow augmentation, etc., influence their prevalence?
    - A concern was raised about missing/undetected fish. How many went through turbines in the winter when de-watered, passed, or went through turbines the following year?
- *EPA Water Temperature Modeling*: Kyle Martin, CRITFC, showed graphs of past and 2004 observed temperatures at the Clearwater River at Peck and Lower Granite. Dave Statler, Nez Perce, offered comments regarding Dworshak operations in 2004:
    - **LESSONS LEARNED**: Attempts to refill as early as possible were an improvement in operations this year; the project filled within 10'.
    - **LESSONS LEARNED**: The water reserved into September which cooled the Snake River was also an improvement this year.
    - **LESSONS LEARNED**: Dave suggested that an area for improvement at Dworshak would be efforts to mimic the spring freshet flows and the natural hydrograph, by operating to the upper flood control rule curve as often as possible and by providing a gentler climb as opposed to the flat, then steep climb in March. It

was noted that there would be TDG exceedance concerns to consider.

2004 Study Information that Might Impact 2005

- *NOAA Survival Studies*: Bill Muir, NOAA, shared information on hydrosystem smolt survival studies from 1993-2004. The study showed that: spring flows were similar to 2001 conditions; in-river survival was the lowest measured since 2001; the vast majority of Snake River smolts were transported; and steelhead mortality was high between McNary and John Day due to tern predation.
    - **LESSONS LEARNED**: Birds appear to be more efficient predators when there are lower flows in the Lower Monumental-John Day reach.
- *Juvenile Collection and Transportation Research Program*: Paul Wagner, NOAA, presented information on behalf of Doug Marsh – a more detailed review was given at the AFEP meeting on November 17th. The study looked at 2004 wild yearling chinook and wild steelhead returns (all of which had been transported) from 2001. NOAA is conducting a monitoring program in 2004, rather than a comparison between in-river and barged fish. Chinook and steelhead transport studies are in progress. Adult returns from previous and in-progress studies are on NOAA's website. NOAA is hoping to have funds to do more research on steelhead, as there is currently very little data.
    - **Next Steps**: NOAA was asked to comment on whether they will make any changes in their management strategy based on the SAR numbers and information collected through the study.
- *Ice Harbor Results: Spring/Summer*: Rudd Turner, COE, reported that there was a bulk vs. flat spill study done at Ice Harbor in the spring and summer of 2004. Results from the spring study show a slightly higher survival percentage for yearling chinook with bulk spill vs. flat spill because passage efficiency was higher with bulk spill. In the summer, there were more similarities between bulk and flat spill with spill efficiency and effectiveness being the same for each. These results likely will impact 2005 operations.
- *Bonneville/Spring Creek:* Rudd also reported on fish passage efficiency for the new corner collector at Bonneville. Fish passage efficiency was 60% with 5 kcfs spill; 51% with the B2 corner collector; and 34% with no spill or corner collector.
- *Montana Resident Fish Study:* Brian Marotz, MTFG, discussed Montana's fish studies: this year modeling, next year biological data. He also discussed Montana's proposed Libby operation as described in the NPCC's Mainstem amendments, and compared it to what actually occurred at Libby in 2004. As described above, a 12.5 kcfs flow was implemented in late August through September. This, from Brian's perspective, was the best operation for Montana's needs seen in 20 years and lead to a very biologically productive year in the reservoir. A concern was raised that this was considered a 'study', with little chance of being able to measure the effectiveness of such a small amount of change to the system. This takes resources away from other research needs. From some perspectives, this is a policy call that needs a policy decision. Brian said he agreed, and that he designed the study in a way that would gather useful information to help with future management.

- **LESSONS LEARNED**: Brian concluded that: minimizing the drawdown at Libby and avoiding a double peak by providing a flat flow can increase overall productivity for resident fish in Montana.

Other Lessons Learned:

- *Impacts of 2001 Operations on Adult Returns*: Russ Kiefer, Idaho, presented information to support the theory that flow and spill are more important than the direct survival estimates might show. He also hypothesized that there is little to no benefit of transport on wild spring/summer chinook, except during low flow years. Russ took studies from various places, compiled them and analyzed them to come up with the conclusions he presented today. His full presentation can be found as a link to today's agenda.
    - **LESSONS LEARNED**:
        - Transportation only benefits wild chinook in low flow years;
        - Dams cause significant latent mortality that flow/spill can reduce;
        - The Victoria Index may be useful as a source for understanding ocean productivity.
        - Direct survival models greatly underestimate the benefits of spill and flow on adult returns.

Facilitation Services Evaluation:

As in past years, Jacqueline Abel will be collecting the annual facilitation services evaluations that were handed out today. The evaluations are due by November 24th (this date has been extended) and are attached to the notes for your convenience. Others that are not official 'members' of the TMT are encouraged to fill the survey out; please note at the top of the form that you are a non-member. TMT members are also welcome to provide feedback to the facilitation team, either directly or through Jacqueline, about ideas for the upcoming process discussion that will be held in December. The facilitation team values your feedback and encourages everyone to take the time to respond thoughtfully and thoroughly to the evaluations. Thank you.

SUMMARY:

- Attempts to refill Dworshak as early as possible were an improvement in operations this year, as well as reserving water for September. A suggested area for improvement is to increase efforts to mimic the spring freshet flows and the natural hydrograph by operating to the upper flood control rule curve as often as possible.
- A more comprehensive monitoring program could provide more answers to important questions about steelhead and late summer migrants. Steelhead are lacking and need more research.
- Operations at Libby proved beneficial to Montana needs this year. Concern was raised that the Montana operation was considered a 'study', and that it may take resources away from other research needs.
- The Victoria Index may be useful as a source for understanding ocean productivity.

Next Meeting, November 24th, 9am-noon:

- Chris Perry (U of ID) presentation on Snake River issues
- Reflections on Lessons Learned from 2004

- Chum update
- Spring Creek Update
- Water Management Plan-Update
- Process meeting schedule

1. Greetings and Introductions.

Today's meeting, the 2004 end-of-season review for the Technical Management Team, was held on November 10 in Portland, Oregon. The meeting was chaired by Cathy Hlebechuk and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the items discussed at this meeting. Anyone with questions about these notes should contact Hlebechuk at 503/808-3938.

2. 2004 Comparison to Previous Years.

A. Water and Runoff Patterns. Cathy Hlebechuk provided a comparison of the actual flows recorded during the 2004 water management season with actual flows in 2001, 2002 and 2003. She noted that all of this information is available via the TMT website. In 2004, at McNary, the flow objective was 220 Kcfs; the average flow from April 10 to June 30 was 203 Kcfs. During the summer period, from July 1-August 31, the McNary target was 200 Kcfs, while the actual average flow was 134 Kcfs. At Lower Granite, for the spring period (April 3-June 20), the target was 85 Kcfs, while the actual average flow was 70 Kcfs. For the summer period, the Lower Granite objective was 50 Kcfs, and the actual average flow was 33 Kcfs. At Priest Rapids, the target was 135 Kcfs, and the actual average flow was 125 Kcfs. Hlebechuk also provided observed runoff statistics for various basins in 2004, noting that, in general, during the spring period, runoff was 69-85% of normal; for the summer period, observed runoff ranged between 75% and 86% of normal. In other words, she said, 2004 was generally pretty similar to 2003.

Hlebechuk noted that one of the unusual features of the 2004 water year was the fact that, particularly in the Libby basin, late-summer precipitation was extraordinarily high – in fact, some believe that precipitation during August-September 2004 may have been the highest on record.

Moving on to Hungry Horse, Tony Norris said the 2004 operation was benign, with the exception of the late-August period, when enormous volumes of inflow arrived unexpectedly. That's just something we never see at that project at that time of year, he said. That extended into September, and certainly minimized any impacts of the decision to hold Hungry Horse above elevation 3540 on August 31, in order to have some water to release in September. Norris distributed a handout showing Hungry Horse daily operations (inflow, outflow and reservoir elevations) after September 1.

Norris also described Grand Coulee operations in 2004; the most noteworthy aspect of operations at that project in 2004 was Reclamation's failure to achieve Grand Coulee's April 10 flood control elevation. Norris distributed another handout showing Grand Coulee project operations from January 1-April 10; this shows why we missed the

April 10 target, he said, primarily because the drop in basin snowpack during March and April was the second-largest on record in the Columbia River basin. The group devoted a few minutes of discussion to the reasons why the Grand Coulee flood control target was not achieved. Russ Kiefer noted that one difficulty, in operating the system, is that these flood control decisions must be made in the winter, when there is the least amount of certainty about the magnitude of the upcoming runoff volume, but when the demand for water for generating power is at its peak. It's a difficult balancing act every year, he said; however, from the perspective of the salmon managers, it seems that, every year, we use the maximum possible flexibility when it comes to generating power, which often causes the volume for fish to come up short. One question I have is, how can we do a better job in the future, in terms of coming closer to our flood control elevations?

Moving on to 2004 Dworshak operations, Hlebechuk said the project released minimum outflow through January, and did meet its April 10 flood control elevation target. Dworshak reached full pool (elevation 1600) by June 30; the decision was made to release full powerhouse discharge for flow augmentation purposes. In 2004, the action agencies once again received and agreed to implement an SOR requesting that 200 kaf of Dworshak storage be retained for release in September. The actual volume released from Dworshak from September 1-15 was 165 kaf; however, because of high project inflows during August and September, the actual volume delivered during that period was 214 kaf, up slightly from the 206 kaf delivered in 2003. John Wellschlager noted that, in 2004, the decision was made to begin releasing full powerhouse discharge plus a small amount of spill from Dworshak somewhat sooner than has been the case in recent years; the goal of this "front-loading" operation was to get ahead of the water temperature curve at Lower Granite. It appears that the operation was successful in doing so, Wellschlager said. Overall, Dworshak was a success story in 2004, said Hlebechuk – everything worked out very well, in terms of refill, temperature control and flow augmentation.

Moving on to Priest Rapids, Hlebechuk said the 2004 seasonal flow target was 135 Kcfs; actual average flows were 125 Kcfs. At Lower Granite, the flow target for the spring period was 85 Kcfs; actual flows were 70 Kcfs. At McNary, the spring target was 220 Kcfs; actual average flow was 203 Kcfs in 2004. For the summer period, the McNary target flow was 200 Kcfs; actual flows were 134 Kcfs.

B. Temperature/TDG Level Variations. Jim Adams provided an overview of the Corps' water quality monitoring efforts during the 2004 spill season; he touched on the following major topics:

- The Corps operates 29 FMS in the FCRPS; two of these stations – Albeni Falls forebay and Cascade Island below Bonneville – were new in 2004; data from these stations is available via the Corps website
- Days of spill, with start and end dates, at all 10 federal projects
- Comparison of exceedences with previous years – relatively few in 2004, compared to previous years, to be expected given the low water year
- Types of exceedences
- Total exceedences at various projects, 1999-2004
- TDG exceedences at Dworshak in 2004

- Day-average TDG levels at Dworshak, April 1-September 28, 2004
- TDG levels during the Lower Granite outage, September 20-26, 2004
- Decision support SYSTDG – in-season spill management of TDG
- The SYSTDG homepage
- Sample outputs from SYSTDG
- Dworshak summer operations – spill, total outflow, TDG and temperature
- McNary tailwater temperatures through the season, 2004 – somewhat warmer than the average over the last five years

C. Fish Passage. Jerry McCann briefed the TMT on results from the Fish Passage Center's smolt monitoring program for 2004; he noted that his main focus would be on data from the Snake River. He addressed run size, travel timing and survival for these stocks. Among the highlights:

- The relative population indices for Snake River wild, yearling and hatchery spring chinook, 1998-2004 (2004 was the largest year on record, with 12.2 million hatchery releases, about 8 million yearlings and nearly 2 million wild juveniles. A total of 11.8 million chinook smolts were collected at Lower Granite in 2004; 11.25 million were transported)
- Yearling chinook timing at Lower Granite (hatchery and wild combined) – similar to the historic average timing in 2004
- Lower Granite daily yearling chinook passage index vs. flow and spill, April 1-June 30, 2004 (graph), showing a huge daily peak (>700,000) during the first week in May
- Little Goose daily yearling chinook passage index vs. flow and spill, April 1-June 30, 2004
- Lower Monumental daily yearling chinook passage index vs. flow and spill, April 1-June 30, 2004
- Survival of hatchery and wild yearling chinook from Salmon River trap to Lower Monumental, 1999-2004 – survival from the trap to Lower Monumental was relatively low in 2004, on par with survival in 2001
- Water transit time vs. average flow at Little Goose, Lower Monumental and Ice Harbor, 2004 (graph)
- Travel time vs. water transit time, Lower Granite-McNary, 1998-2004 (graph) – 2004 travel time was in the middle of the historic range
- Yearling chinook survival vs water transit time, Lower Granite-McNary, 1998-2004 – about 60% in 2004, again, in the middle of the historic range.
- The relative population indices for Snake River wild and hatchery steelhead, 1998-2004 (2004 Lower Granite hatchery/wild population estimate of 9 million fish, consistent with most recent years; passage index was 5.8 million at lower Granite; 5.3 million were transported)
- Steelhead timing at Lower Granite (hatchery and wild combined) – similar to the historic average timing in 2004
- Lower Granite, Little Goose and Lower Monumental daily steelhead passage index vs. flow and spill, April 1-June 30, 2004 (graphs)
- Survival of hatchery and wild yearling chinook from Snake River and Imnaha traps to Lower Monumental, 1999-2004 – survival from the traps to Lower

Monumental was relatively high in 2004

- In-river steelhead survival vs water transit time, Lower Granite-McNary, 1998-2004 – about 40% in 2004, again, at the low end of the historic range.
- Hatchery/supplementation releases of subyearling fall chinook above Lower Granite, 1995-2004 (2004 numbers the lowest since 2000 due to low egg take at Lyons Ferry hatchery; Lower Granite population index – 1.6 million fish – was relatively high, however).
- Subyearling chinook timing at Lower Granite, 1995-2004 – 2004 timing earlier than other recent years, with the 95% passage point occurring in mid-July.
- Lower Granite daily subyearling chinook passage index vs. flow and spill, April 1-June 30, 2004 (graph).

McCann then offered the following conclusions:

- The population size at Lower Granite is large in the spring
- Operations at Lower Granite and Little Goose maximized transport and made for poorer in-river conditions
- Low 2004 survival for Snake River yearling chinook and steelhead for the Lower Granite-McNary reach
- Timing of the subyearling chinook outmigration was earlier than the historic average due to supplementation.

You mentioned that the poor in-river conditions in 2001 led to lower survival, and laid out some relationships between flow, travel time and the lack of spill, said Dave Statler – are you saying these are the primary drivers that led to the increase in mortality, and the decrease in survival? That was exactly what I was trying to get at, McCann replied – our analyses consistently show that water particle travel time and spill have the two highest correlations to survival in the reaches we're looking at.

D. Clues About Relative Survival of Adults. CRITFC's Jeff Fryer provided a presentation titled "Clues As To the Relative Survival of 2001 Outmigrants As Revealed by the Age Composition of Chinook and Sockeye Salmon at Bonneville Dam." He touched on the following major topics:

- CRITFC samples fish weekly at the adult fish facility on the Washington shore at Bonneville for morphology and fish condition, and to collect scales for aging the fish. The annual target is 500 fish (spring/summer and fall chinook, sockeye and steelhead); normally this target is met or exceeded. The program has been conducted since the mid-1980s.
- High water temperatures (over 72 degrees F) can reduce the frequency of or completely stop sampling during the late summer period, primarily for fall chinook; no sampling occurred between July 24 and September 1 in 2004.
- Over the years, for spring chinook, 75% of the returning adults have been 4-year-old fish; with the remaining 25% divided between 3-year-old and 5-year-old fish.
- Data from the 2001 outmigration
- Returns per adult spawner
- Returns from brood year 1999-origin spring chinook (which outmigrated in

2001): the fifth-highest return since 1984, but the lowest in the past five years, indicating that the 1999 brood year was likely adversely affected by the drought conditions in 2001.

- Summer chinook returns from BY'99: aging not as certain with this stock due to a variety of factors; stock includes both subyearling and yearling outmigrants; adult returns from BY'99 yearlings the fourth-highest on record, but the lowest in the last several years; adult returns from BY'99 subyearlings the third-lowest in 14 years of data. Based on this data, it appears that the drought conditions in 2001 had a greater adverse effect on subyearling summer chinook outmigrants than on yearling summer chinook outmigrants.
- Sockeye returns from BY'99: near the median for the 14 years of adult return data, but the lowest in the last six years. The 2001 outmigrants have returned as adults at a much lower rate than sockeye that outmigrated in 2002.
- Fall chinook returns from BY'99: not as much data on this stock, due to high water temperatures; outmigrate as subyearlings; similar pattern to the BY'99-origin summer chinook outmigrants, with a low rate of adult returns.
- Conclusions: field personnel saw a relatively low rate of adult return for all BY'99-origin (2001 outmigration) stocks, particularly for chinook that outmigrated as subyearlings and for sockeye. For those fish that outmigrated as yearlings, adult return rates from the 2001 and 2002 outmigrations were similar. It appears that subyearling chinook and sockeye were more affected by the poor outmigration conditions in 2001 than were yearling outmigrants. Adult returns from the 2001 outmigration were still better than the years in the mid-1990s. Next year's adult return data will provide a more complete picture of the success of the 2001 and 2002 outmigrations.

E. Weather. Kyle Martin briefed the TMT on weather year 2004, notable for extreme variability in precipitation and temperature patterns. It was a colder than normal year west of the Cascades; a major winter storm brought up to nine inches of snow and freezing rain to western Oregon and Washington. This was followed by an extended dry spell (February-April) that adversely affected snowpacks in many basins. May was warm and wet, but the summer months were extremely hot and dry. A series of strong storms then brought record amounts of precipitation to the region. September was also cool and wet.

Martin said cumulative precipitation at The Dalles in 2004 was 104% of average; percipitation was also above-average in the Okanogan (115% of average), John Day/Umatilla (112%) and Clearwater (111%) basins. Precipitation was below normal in the Snake River Plain (87%), the central Washington/east slopes of the Washington Cascades (96%) and southeast Washington (93%).

Martin then provided a presentation titled "Winter 2004-2005 Climate Forecast." Among the highlights:

- Sunspot number prediction (graph) – on the downward curve of a 12-year cycle

that peaked in 2001
- Sea surface temperature departure forecast
- Multi-variable El Niño index (NEI) – currently low
- Pacific decadal oscillation (PDO)
- UW Climate Impacts Group experimental forecast – Columbia at The Dalles 2005
- NOAA Climate Prediction Center forecast – winter 2004/2005 – significantly warmer and drier than average throughout the Northwest

Martin offered the following month-by-month summary forecast:

- November: near-normal temperatures, below-normal precipitation
- December: near-normal temperatures and precipitation
- January: near-normal temperatures and precipitation
- February: above-normal temperatures, near-normal precipitation
- March: near-normal temperatures and precipitation

He noted that there is a 33% probability of snow in November, 63% in December, 67% in January, 48% in February and 56% in March. He also said that, according to the UW-CIG VIC hydro model, January-July runoff at The Dalles will be 92-94 MAF, 85-87% of normal; the Multi-variable ENSO Index puts it at 98 MAF, 91% of normal.

F. Adult Fish Runs/Fisheries Review: Forecasts and Techniques. Cindy LeFleur provided a presentation titled "Preliminary Review of 2004 Columbia River Fish Runs and Fisheries." She touched on the following major topics:

- Upriver spring chinook returns, 1980-2004 (2004 return: 193,800, compared to a pre-season prediction of 360,700 – still the fourth-largest run since 1980)
- Spring chinook fisheries 2004 – 164,000 angler trips, 23,700 spring chinook kept, commercial harvest of 13,500 fish, SAFE commercial harvest of 10,600 fish; treaty harvest of 17,400 fish
- Columbia River summer chinook returns, 1938-2004 – 2004 return 93,800, just under the predicted 102,800
- Summer chinook fisheries 2004: 41,900 angler trips, 1,100 summer chinook kept, commercial harvest of 200 fish; treaty harvest of 8,700 fish
- Columbia River sockeye returns 1938-2004 – 2004 return of 124,000, half again as large as the forecast 80,700
- Sockeye salmon fisheries 2004 – non-Indian commercial harvest of 700 fish; treaty commercial harvest of 4,700 fish; sport fisheries minor in Columbia River; Lake Wenatchee harvest of 4,700 fish
- Columbia River fall chinook returns 1938-2004 – 2004 return of 792,200, well above the predicted 634,900
- Upriver bright fall chinook returns 1980-2004 – 2004 return 367,700, well above the predicted 287,000, the fourth-highest return since 1980.
- Mid-Columbia bright fall chinook returns – 109,300, compared to a forecast of 88,800, the fourth-highest return since 1980
- Bonneville pool hatchery fall chinook returns 1980-2004 – 2004 return 183,000, the third-highest on record

- Fall chinook fisheries 2004 – 82,500 angler trips, 34,100 chinook kept; commercial harvest of 39,600; treaty harvest of 125,900
- Forecasting techniques
- Forecast accuracy – upriver spring chinook, upriver bright fall chinook, fall chinook (graphs)

3. Snake River Review.

A. EPA Water Temperature Modeling. Martin provided an overview of EPA's water temperature modeling efforts in the Clearwater and Lower Snake Rivers. He put up a series of comparative results – predicted vs. actual – for 2004. Martin noted that, in the Clearwater, the model tracked the major highs and lows remarkably well. The correlation at Lower Granite isn't nearly as good, said Martin; however, overall, this tool appears to be working very well.

Statler said that, with respect to Dworshak operations, in recent years, there have been attempts to refill the project as early as possible, which is good, from a reservoir environment/production standpoint. Also, he said, for the past several years, we have been able to save some water to release in early September – in 2004, for example, we were at elevation 1535 on August 31, and the remaining 15 feet of storage was evacuated during the first two weeks in September – that's another positive thing.

With respect to springtime operations at Dworshak, he said, the closer we can come to mimicking the spring freshet, and the closer we can come to the flood control rule curve, the better. Statler noted that, last winter, there were several short-term increases in Dworshak outflow; that is water that could have been used to keep Dworshak's elevation higher entering the spring refill period, and to mimic the natural hydrograph during the early April period. In the future, he said, that is one area that, in my humble view, could be improved. Wellschlager noted that Dworshak is a multipurpose headwater project; the January spike in Dworshak outflow coincided with the major winter storm event that drove loads upward. The lion's share of the shaping at that project was done to help the outmigration, he said; however, we have to have at least some operational flexibility for power as well. Still, to the degree that we can steadily increase Dworshak outflow during April, while still refilling the project, the better off we'll be, biologically, Statler said.

B. Fall Chinook Survival Studies. Ken Tiffan led this presentation, titled "Investigating Passage of ESA-Listed Juvenile Fall Chinook Salmon at Lower Granite Dam When the Fish Bypass System Is Not Operated." He touched on the following topics:

- Results of analyses on juveniles – ocean-type vs. reservoir-type
- Sample scale pattern analyses – LFH yearling, hatchery subyearling, ocean-type, reservoir-type
- Adult collections 1998-2003 – sampled scales, measured fork length, estimated gender

- Results of analyses on wild adults, hatchery adults (graphs)
- Gender, size and age composition data by juvenile life history type (ocean vs. reservoir) – graphs
- Details on ocean-type juveniles
- Observed rates of seaward movement for wild ocean-type subyearlings PIT-tagged in the Snake River in 2003 (graph)
- What determines life-history type? Passage date at Granite, Goose or Monumental vs. probability of becoming reservoir-type (graph)
- Speculative details on reservoir-type juveniles
- Median fish travel rate (km/d) vs. mean water velocity (graph)
- When do reservoir-type juveniles pass dams? Up to 76% of fish that passed did so before bypass began at Lower Granite
- Juvenile detection histories of adults that were PIT-tagged as juveniles – 60% detected, 40% never detected
- 1996 releases vs. number of detections, by date of passage (graph)
- Observations on releases of PIT-tagged hatchery fall chinook salmon subyearlings -- released 175,443 PIT-tagged fish, 4,932 smolts were transported, 53,324 were bypassed, 3,386 were known to have migrated the following year, 369 adults have returned
- SARs estimated from Lower Granite to Lower Granite – transported: 0.51; bypassed: 0.56; known reservoir-type: 1.35; never detected: ??

Tiffan then offered the following management and research questions:

- Which are the primary reservoirs used by reservoir-type juvenile fall chinook salmon?
- What is the passage timing of juvenile reservoir-type fall chinook salmon in reservoirs?
- How abundant are reservoir-type juvenile fall chinook? Preliminary estimate: 13%-39% for the Snake River, 1998-2003
- How much turbine mortality occurs during winter passage at dams?
- How much does flow augmentation, spill etc. influence the prevalence of reservoir-type juveniles?

Kiefer noted that, during yesterday's flow/survival symposium, some of the ISAB members in attendance had noted that the SARs for yearling fall chinook were higher than the SARs for subyearlings. They jumped to the conclusion that that life history has a survival advantage, he said; what we don't know is the survival of those fish from June of their Age 0 year to April of their yearling year – that's one caution we need to bear in mind when we look at those SAR numbers. The other question is, how many of the undetected fish went through turbines or spill as subyearlings, how many passed the detector dams in the winter, when the facilities are not watered up, and how many passed via spill or turbine passage the following spring? Kiefer said. We know some fish move past the dams during the winter; when you look at PIT-tag collections for yearling fish at any of the dams, we do see a few fish passing early in the season, but not that many. Some time in early April, the numbers increase, as the water warms up. One thing we probably should do is choose a site or sites at which to water up the systems earlier in the year, to give us a better picture of what's happening during the winter months, Kiefer

said. Tiffan replied that, in his view, winter passage appears to be more of a random event, as the fish move around and are attracted by turbine flow, than a purposeful seaward migration.

With the new extended-life batteries, what's your expectation about performance? asked Ron Boyce – will you be able to track the fish throughout the Snake and the Lower Columbia? The minimum tag life is 139 days, so the tags of fish that we release in the next week or so will last into mid-April, Tiffan replied. And your plan is to monitor the entire Snake? Boyce asked. We're monitoring to just below the Ice Harbor tailrace, Tiffan replied.

4. 2004 Study Information that Might Impact 2005 Operations.

A. NOAA Survival Studies. Bill Muir provided a presentation titled "Hydropower System Smolt Survival 1993-2004." Among the highlights:

- Snake River conditions, 2001-2004 – flow by date (graph)
- No spill provided at Lower Granite and Little Goose dams from April 24-May 31; no spill provided at Lower Monumental from May 14-31.
- Transportation was maximized – 91% of non-tagged spring chinook, 97% of non-tagged steelhead
- Hatchery yearling chinook salmon 1993-2004 – survival from release to Lower Granite vs, distance to Lower Granite (graph)
- Estimated yearling chinook (92.3%) and steelhead (86%) survival, Lower Granite to Little Goose, by year
- Estimated yearling chinook (87.5%) and steelhead (82%) survival, by year, Little Goose to Lower Monumental
- Estimated yearling chinook (81.8% and steelhead (51.9%) survival, by year, Lower Monumental to McNary
- Tern predation – 18.4% of all PIT-tagged steelhead leaving Lower Monumental were found on Crescent Island in 2004, up from about 10% in 2002. Tag data from other McNary pool islands is not yet available
- Estimated survival of yearling chinook (80.9%) and steelhead (46.5%), by year, McNary to John Day
- Estimated survival of yearling chinook (73.5%) and steelhead (??), by year, John Day to Bonneville
- Estimated survival of yearling chinook (39.5%) and steelhead (??), by year, Lower Granite to Bonneville
- Per-project extrapolation, chinook and steelhead hydrosystem survival, by year (graph)

Muir then offered the following conclusions:

- Flow during the 2004 migration season in the Snake River was similar to 2001
- In-river survival was the lowest measured since 2001
- However, the vast majority of Snake River smolts were transported
- Steelhead mortality was high between Lower Monumental and John Day dams,

due in part to bird predation.

What is the long-term trend with respect to tern predation at Crescent Island? Martin asked. I'm told it hasn't changed much, in terms of the population of the colony, but it appears that the birds are becoming more efficient, Muir replied. It appears that 2001 was a good training year, in which the birds found that this was a pretty good place to eat.

Should we consider shutting down the corner collector periodically to allow you to collect PIT-tag data at Bonneville? Scott Bettin asked. It would be better for you to finish the corner collector PIT-tag detector, Martin replied. It may not work, said Bettin – if that's the case, we could consider shutting off the corner collector for one or two days a week to give the researchers a chance to collect data. It depends on how important you feel it is to develop an empirical survival estimate for that reach, Muir replied – personally, I don't think it's critical. I would agree that a better option would be to get the corner collector detector up and running, he added.

Paul Wagner then provided a presentation titled "Juvenile Collection and Transportation Research program." He touched on the following topics:

- Snake River studies – 2004 research objectives (transportation vs. in-river migration study
- Wild yearling chinook salmon and wild steelhead studies – Lower Granite
- Results from 2001 outmigration – 16,512 fish transported, 159 returned, SAR 0.96
- 2001 chinook – juvenile tagging and adult return distributions (graph)
- 2001 transportation marking – wild spring/summer chinook salmon trends: SAR by date transported (graph)
- 2001 transportation marking – wild spring/summer chinook salmon age class, conversion rate, travel time (table)
- 2001 transportation marking – wild steelhead: 15,273 fish transported, 357 returned as adults, SAR 2.33
- 2001 steelhead – juvenile tagging and adult return distributions (graph)
- 2001 transportation marking – wild steelhead – trends: SAR by date transported (graph)
- 2001 transportation marking – wild steelhead age class, conversion rate, median travel time (table)
- 2004 juvenile tagging operations, numbers tagged by project, number of fish transported, number migrating in-river (table)
- Snake River transport studies in progress, by stock (table)
- Columbia River studies – 2004 research objectives
- Transport studies – Columbia River 2004 juvenile tagging: number tagged by location, numbers transported, numbers migrating in-river (table)
- Columbia River transport studies in progress (table)

Wagner said that, in general, transport shows a consistent benefit for steelhead; the data is less clear on spring/summer chinook. Do these data suggest that some sort of change in management strategy would be appropriate? Margaret Filardo asked. For steelhead, we're seeing numbers in the 4% range, which is trending toward recovery, said

Wagner; for spring/summer chinook, the numbers we've seen in some recent years have been in the 3% range. There are a couple of caveats; for example, the PIT-tag data tend to underrepresent the run at large, said Wagner. They're good for comparison purposes – groups that are tagged side by side, then given different treatments. However, in terms of predicting the actual returns to the dam, they seem to underestimate that. While we look at the SARs, 1.5% is as good as we've gotten; however, that isn't necessarily what we're seeing in terms of the run at large, Wagner said.

B. Ice Harbor Results: Spring/Summer. Rudd Turner provided preliminary data summaries for the study of passage behavior and survival of radio-tagged subyearling chinook at Ice Harbor Dam in the spring and summer periods of 2004 (4-day block design of bulk vs. flat spill):

- Average project and spillway operations, June 26-July 31 (table)
- Preliminary results of 2004 passage behavior and survival study for radio-tagged subyearling chinook at Ice Harbor – median forebay residence time, median tailrace egress time, spill efficiency, spill effectiveness, FPE, spillway survival, dam survival under bulk spill vs. flat spill conditions (table) – dam survival 88.3% under bulk spill vs. 86.4% under flat spill
- Average project and spillway operations, May 1-June 6, 2004
- Preliminary results of 2004 passage behavior and survival study for radio-tagged subyearling chinook at Ice Harbor – median forebay residence time, median tailrace egress time, spill efficiency, spill effectiveness, FPE, spillway survival, dam survival under bulk spill vs. flat spill conditions (table) – dam survival 93% under bulk spill vs. 90% under flat spill.

Turner noted the Ice Harbor RSW, currently under construction, will be delivered to the project in February; in March, the Corps will begin doing balloon-tag evaluations to look at fish entry and survival through the new structure. There will be some sort of Ice Harbor spill test in the spring of 2005, although the details have yet to be decided; the overall goal will be to evaluate biological performance with the RSW in place against previous performace.3

C. Bonneville/Spring Creek. Turner also provided an abstract from a paper titled "Hydroacoustic Evaluation of juvenile Salmonid Fish Passage at Bonneville Dam." They also provided tables showing preliminary corner collector efficiency, Powerhouse 2 FPE, passage route, project FPE and spillway efficiency for yearling chinook, steelhead and subyearling chinook. In addition, the Corps provided an "executive summary" table showing the survival of radio-tagged yearling chinook and steelhead through a minimum-gap runner turbine and the ice and trash sluiceway at PH1. All of these documents and tables can be viewed online and downloaded via hotlinks on today's agenda on the TMT homepage. Overall, said Turner, the corner collector seems to be working well.

D. Montana Resident Fish Study. Brian Marotz provided a presentation titled "Monitoring the Effects of NPPC Mainstem Amendments on Resident Fish in Montana." Marotz noted that the funding for this project was only recently approved by the Council; fieldwork is scheduled to begin soon on the Flathead and Kootenai, but for 2004, only

modeling results are available. In the course of his presentation, Marotz touched on the following major topics:

- Libby reservoir elevation, by month, under the old and new NOAA Fisheries BiOp and IRC/VARQ operations (graph)
- Alternative 1 – flat flow at 12.5 Kcfs through August 31 – flow vs. elevation at Libby (graph)
- Alternative 2 – steady decreasing flows – flow vs. elevation at Libby
- Alternative 3 – steady decreasing flows – flow vs. elevation at Libby
- Alternative 4 – flat flow at 10 Kcfs – flow vs. elevation at Libby
- Alternative 5 – double peak operation – flow vs. elevation at Libby
- Primary production in Libby reservoir, by alternative – highest under Alternative 4
- Zooplankton production in Libby reservoir, by alternative – highest under Alternative 4
- Benthic production in Libby reservoir, by alternative – highest under Alternative 3
- Kokanee growth in Libby reservoir, by alternative – highest under Alternative 4
- Mean flow over time, pre- and post-impoundment (graph)
- White sturgeon tiered flows – discharge over time (graph)
- Natural inflow over time (graph)
- Dam discharge under the current operating regime vs. IRC/VARQ operations (graph)
- Daily discharge variability before and after impoundment (graphs)
- Discharge alternatives 1-5 – Libby Dam outflows, April-September (graph)
- Kootenai River benthic biomass units, March-September, by alternative (highest under Alternative 1).

One thing that puzzles me is that this amendment has been characterized as a study, said Kiefer. It states in the hypothesis that you expect to see a significant increase in the productivity of the Montana reservoirs as a result of this change in operations, in exchange for an unmeasurable impact to anadromous fish. Yet in this presentation, you're saying you expect to see a 1.2% increase in phytoplankton production, Kiefer said. My concern isn't so much with the proposed operation – my concern is that it is being couched as a study. I am confident that we will not be able to measure a biological difference either for bull trout or for salmon as a result of this operation, Kiefer said – we have a lot of other high-priority needs that aren't being filled, and this "study" takes resources away from that other work. I don't see that you're even going to be able to measure a 1.2% increase in phytoplankton production, let alone the effects of that increase on bull trout production.

That was the first thing I said when I was told we were going to be doing this, Marotz replied – I asked "why?" What I decided to do, for that reason, is to not dodge that bullet, he said – I've been talking about this stuff for 20 years. You ask what this will mean for fish – well, my fish live between or above dams. They don't go through counting facilities, so you're right – it is going to be extremely tough to measure increases in bull trout production. My feeling was, all right, if everybody wants this done, we're going to do it, but I'm going to design this project so that it yields not only that

information, but other information we need for management purposes – it's not going to be a throwaway project, by any means.

5. ***Other Lessons Learned***.

A. Impacts of 2001 Operations On Adult Returns. Russ Kiefer led this presentation, titled "Impacts of 2001 Migration Conditions on Adult Returns – Evidence that Flow and Spill Are More Important Than Direct Survival Estimates Indicate." Among the highlights:

- T/C for wild spring/summer chinook, by migration year (graph)
- D value for wild spring/summer chinook, by migration year (graph)
- Little to no benefit of transport to wild spring/summer chinook except in low-flow years
- The relative SAR of migration year 2001 in-river smolts declined by about four-fold compared to the MY1994-2002 average
- The most plausible explanation is that increased migration delay, turbine passage and bypass passage caused a dramatic increase in mortality for in-river smolts
- SAR impacts of MY2001 conditions on in-river smolts were approximately four times greater than direct survival estimates indicate
- Yakima River and Snake River wild chinook SARs, 1982-2002 (graph)
- Yakima River wild chinook SARs and ocean productivity (the "Victoria Index"), MY1984-2001 (graph)
- The 2001 smolt migration faced poor flows but good ocean conditions; the state, tribal and USFWS modelers all predicted poor to mediocre adult returns
- Predicted S:S vs. water particle travel time (graph)
- Snake River fall chinook adult returns, 1996-2003 (graph)
- What do the adults tell us? First, that transportation only provides a benefit to wild chinook in low-flow years; second, that dams cause significant latent mortality that flow and spill reduce; third, that the Victoria Index may be useful in predicting ocean productivity, and fourth, that direct survival estimates greatly underestimate the benefits of flow and spill on adult return rates

What would you do differently during a drought year? Bettin asked. Kiefer relied that, at a previous TMT meeting, Jim Litchfield had argued that, with respect to the importance of flow and spill for fish, the fish that went out under some of the worst migratory conditions on record in 2001 seemed to experience no detrimental impacts, in terms of the adult returns from that outmigration year. I'm not trying to say we should operate the system differently during a drought year, Kiefer said; my point is that there was a big biological impact associated with 2001 outmigration conditions. Flow and spill are more important than the direct survival estimates would indicate.

With that, today's meeting was adjourned. Meeting summary prepared by Jeff Kuechle, BPA contractor

PRELIMINARY DATA SUMMARY

For

Passage Behavior and Survival of Radio-tagged Subyearling Chinook Salmon at Ice Harbor Dam, 2004.

Darren A. Ogden
NOAA Fisheries

November 2, 2004

Table 1. Average project and spillway operations at Ice Harbor Dam, 26 June – 31 July, 2004.

	Total Discharge (kcfs)		Total Spill (kcfs)		Percent Spill	
Operations	Mean	Range	Mean	Range	Mean	Range
Bulk Spill	36	5 – 81	29	3 – 70	78.3	20 – 100
Flat Spill	46	18 - 103	36	18 - 45	81.0	42 – 100

Table 2. Preliminary results of 2004 passage behavior and survival study for radio-tagged subyearling Chinook salmon at Ice Harbor Dam (the 10^{th} and 90^{th} percentiles are provided for travel time data; 95% confidence intervals are provided for passage efficiency and survival estimates).

Metric	Bulk Spill	Flat Spill
Median FB Residence	3.2 hrs (0.9 – 19.2)	4.4 hrs (1.0 – 19.9)
Median TR Egress	51 mins (38 – 159)	49 mins (38 – 138)
Spill Efficiency	93.2% (88.8 – 97.6%)	93.3% (87.6 – 98.9%)
Spill Effectiveness	1.2 : 1 (1.1 – 1.3 : 1)	1.2 : 1 (1.0 – 1.3 : 1)
Fish Passage Efficiency	94.6% (90.2 – 99.1%)	97.0% (92.0 – 102.0%)
Spillway Survival	97.5% (90.9 – 104.6%)	93.5% (87.4 – 100.0%)
Dam Survival	88.3% (70.1 – 111.2%)	86.4% (71.3 – 104.7%)

PRELIMINARY DATA SUMMARY

for

Passage Behavior and Survival of Radio-tagged Hatchery Yearling Chinook Salmon at Ice Harbor Dam, 2004.

M. Brad Eppard
NOAA Fisheries

November 2, 2004

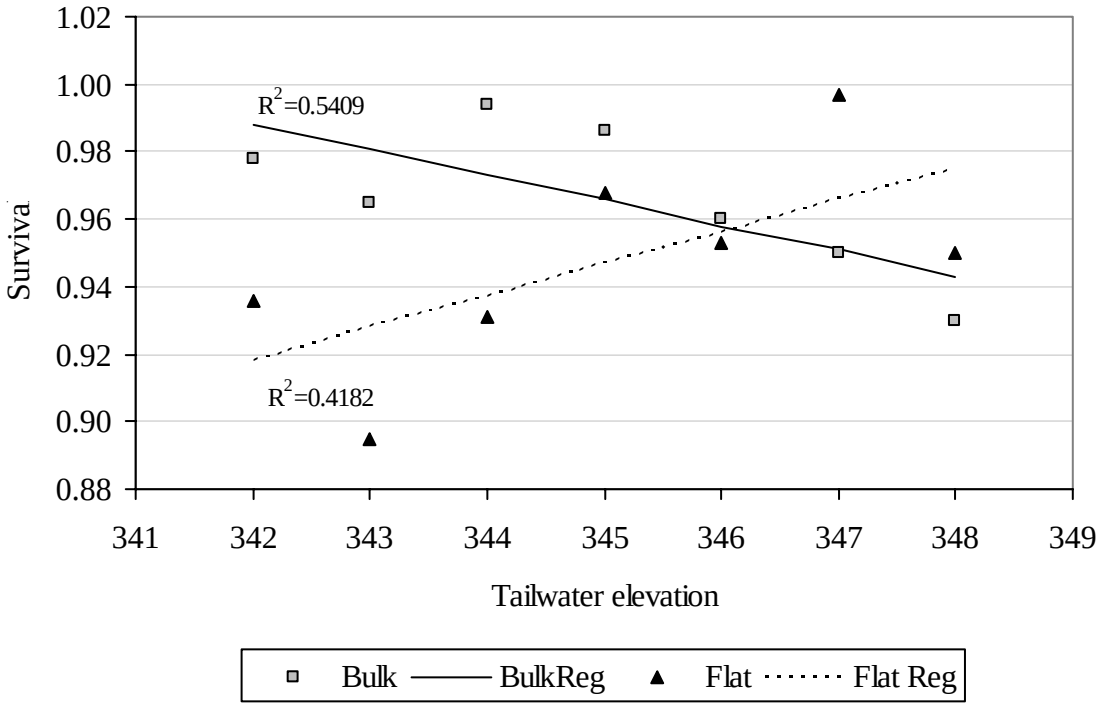
Table 1. Average project and spillway operations at Ice Harbor Dam, 01 May – 06 June, 2004.

	Total Discharge (kcfs)		Total Spill (kcfs)		Percent Spill	
Operation	Mean	Range	Mean	Range	Mean	Range
Bulk Spill	86	30 – 156	71	21 – 93	84.6	55 – 100
Flat Spill	90	33 – 137	44	30 – 69	54.0	33 - 100

Table 2. Preliminary results of 2004 passage behavior and survival study for radio-tagged hatchery yearling chinook salmon at Ice Harbor Dam (the 10^{th} and 90^{th} percentiles are provided for travel time data; 95% confidence intervals are provided for passage efficiency and survival estimates).

Metric	Bulk Spill	Flat Spill
Median FB Residence Time	1.4 hrs (0.6 – 4.5 hrs)	2.4 hrs (0.9 – 9.7 hrs)
Median TR Egress (min)	23 min (16 – 66 min)	22 min (16 – 38 min)
Spill efficiency	98% (96 – 99%)	88% (83 – 92%)
Spill effectiveness	1.2:1 (1.0 - 1.3:1)	1.5:1 (1.3 – 1.8:1)
Fish passage efficiency	99% (98 – 100%)	95% (93 – 97%)
Relative spillway survival	97% (94 – 100%)	95% (93 – 97%)
Relative dam survival	93% (86-100%)	90% (85-94%)

Figure 1. Regression analysis of relative spillway passage survival and tailwater elevation for bulk and flat spill operations at Ice Harbor Dam, 2004.



Juvenile collection and transportation research program

National Marine Fisheries Service

Snake River studies

2004 Research Objectives

Transportation vs. in-river migration study - yearling and subyearling chinook salmon and steelhead

- 2004 juvenile tagging
- adult returns from yearling and subyearling chinook salmon and steelhead tagging in 2000, 2001, 2002, and 2003

Wild yearling chinook salmon and wild steelhead studies--LGR

2001 Transportation Marking – Wild S/S Chinook Salmon

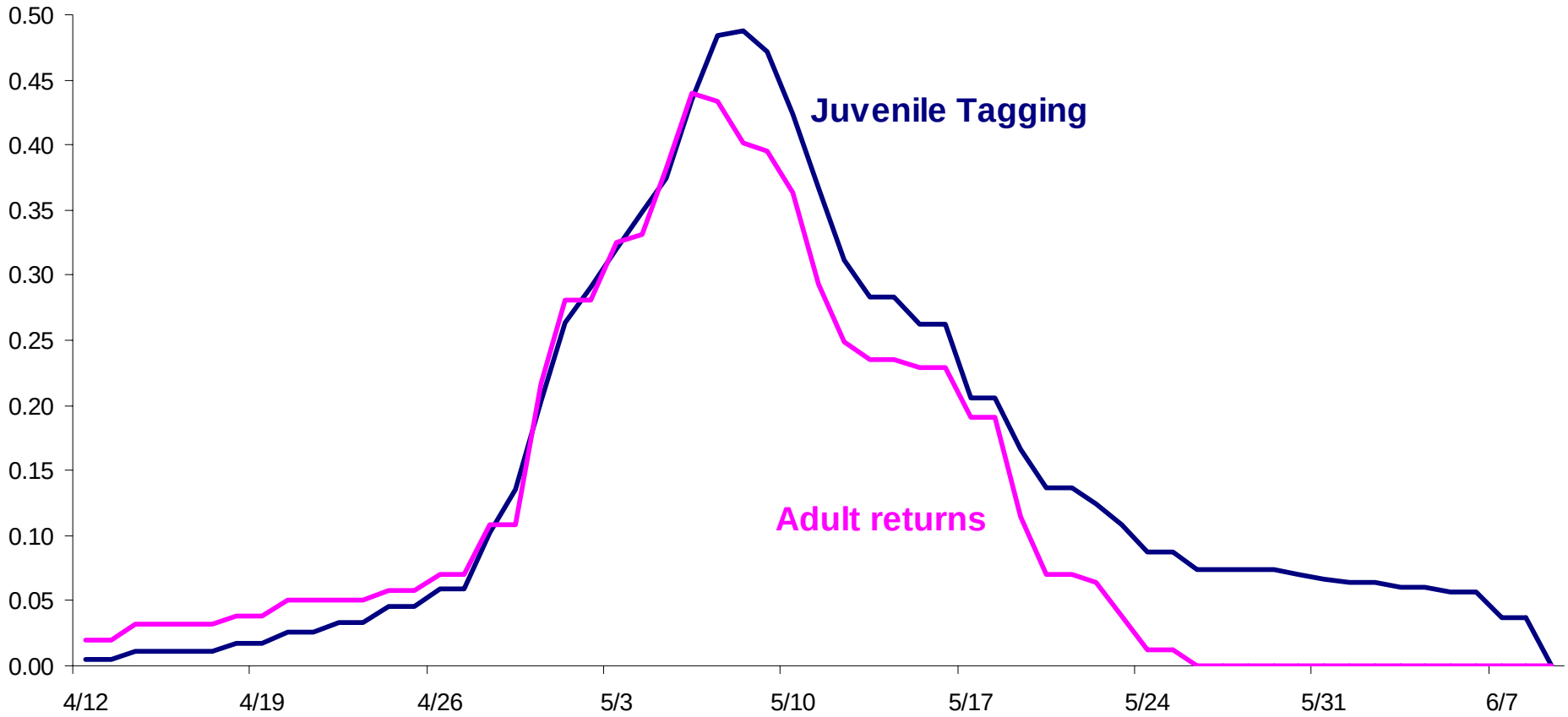
Juvenile tagging

- Total release number 16,512
- Record low flows
- All tagged fish released into barges at LGR

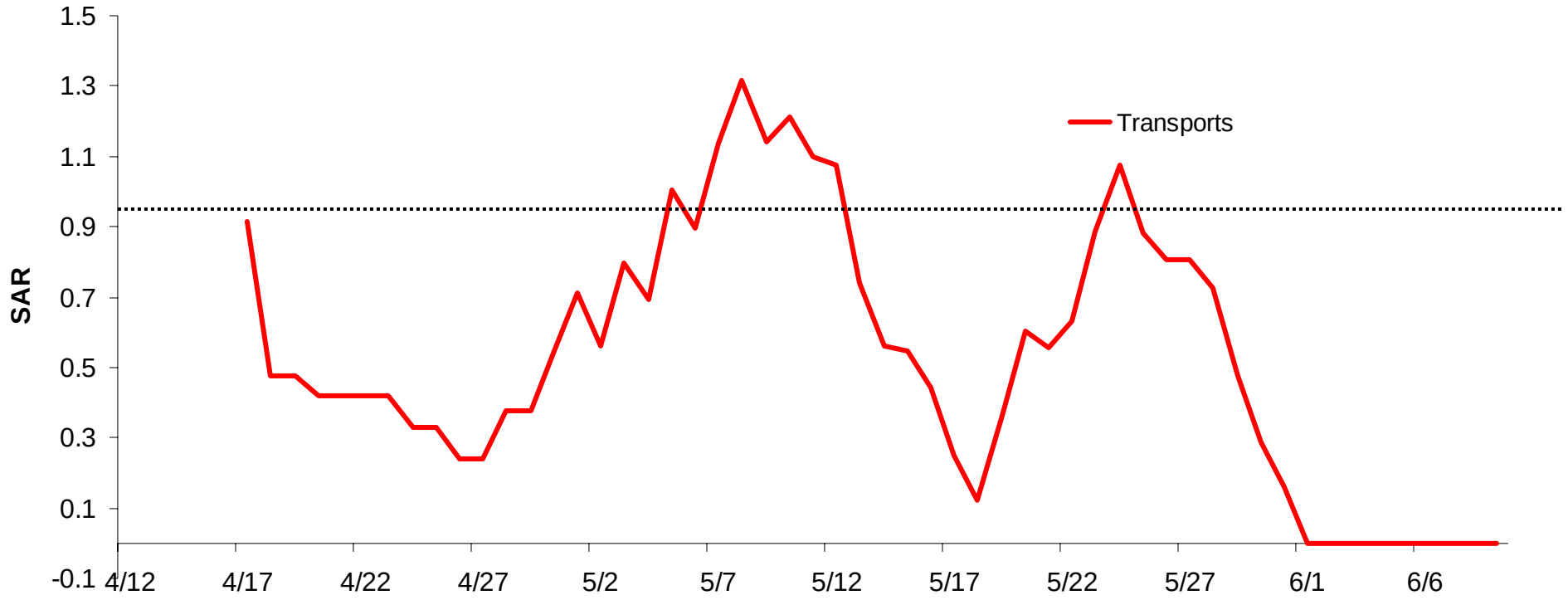
2001 Transportation Marking – Wild S/S Chinook Salmon

	Juvenile numbers	Returns by Age-class Jack	2-ocn	3-ocn	SAR
Transports	16,512	21	113	25	0.96 (0.84,1.11)

2001 Chinook – Juvenile tagging and Adult return distributions



2001 Transportation Marking – Wild S/S Chinook Salmon Trends



2001 Transportation Marking – Wild S/S Chinook Salmon

Age-class	Group	Conversion rate	Travel time
2-ocn	Transport	88.5	14.0
3-ocn	Transport	77.4	14.5
Totals	Transport	87.1	

2001 Transportation Marking – Wild Steelhead

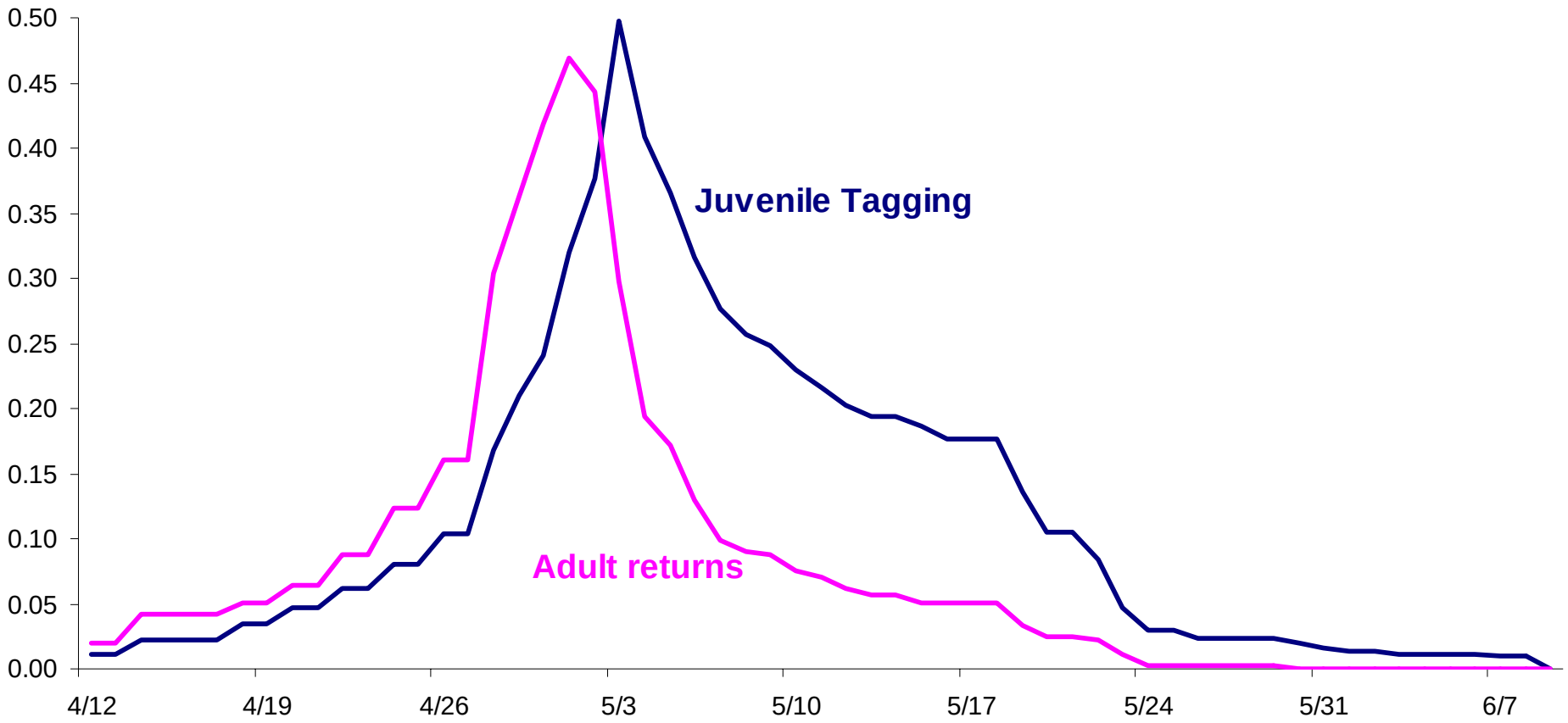
Juvenile tagging

- Total release number 15,273
- Record low flows
- All tagged fish released into barges at LGR

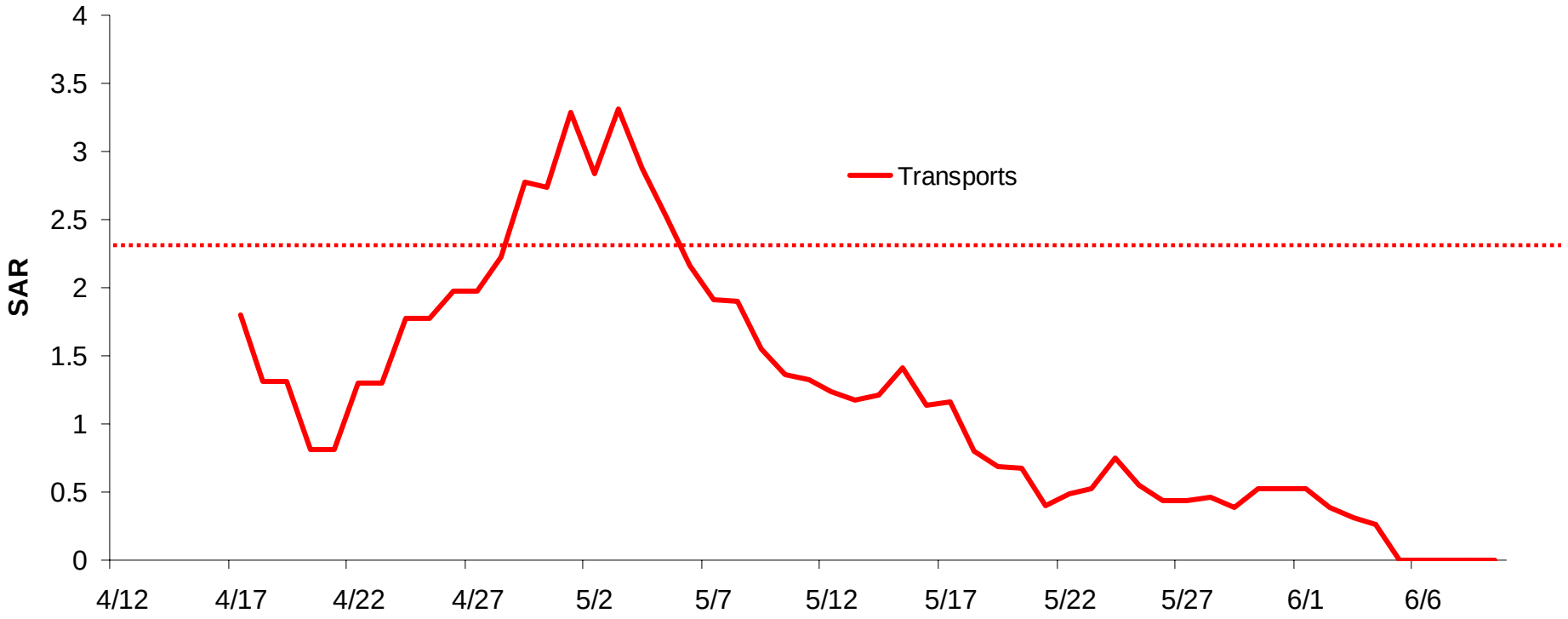
2001 Transportation Marking – Wild Steelhead

	Juvenile numbers	Returns by Age-class 1-ocn	2-ocn	3-ocn	SAR
Transports	15,273	200	156	1	2.33 (2.11, 2.55)

2001 Steelhead – Juvenile tagging and Adult return distributions



2001 Transportation Marking – Wild Steelhead - Trends



2001 Transportation Marking – Wild Steelhead

Age-Class	Group	Conversion rate (%)	Median travel time	Spring %
1-ocn	Transport	64.2	54	15.0
2-ocn	Transport	73.4	43	7.7

2004 Juvenile tagging operations

	Number tagged		
	Transports		
	LGR	LGS	Inrivers
- Lower Granite Dam Spring studies			
- Wild spring/summer chinook salmon	11,208	--	--
- Wild steelhead	8,103	--	--
- Snake River subyearling chinook salmon (tagged at LGR)			
- Summer marking	3,608	15,664	12,089
- Sept/Oct marking	1,907	--	--

Snake River Transport studies in-progress

Tagging year	Juvenile numbers: Transports LGR	LGS	Inrivers	Adult returns by age-class: Jacks	2-ocn	3-ocn	4-ocn	5-ocn
LGR Spring/summer Chinook salmon								
2003	7,118	13,062	20,845	2	–	–		
2002	4,970	9,649	13,717	25	178	–		
LGR Steelhead								
2003	3,384	11,976	11,154	81	–	–		
2002	4,879	13,963	15,405	292	162	–		
Snake River subyearling Chinook salmon								
2003	16,117	–	19,089	9	–	–	–	–
2002	12,337	–	75,235	55	99	–	–	–
2001	18,904	–	45,553	41	40	26	–	–

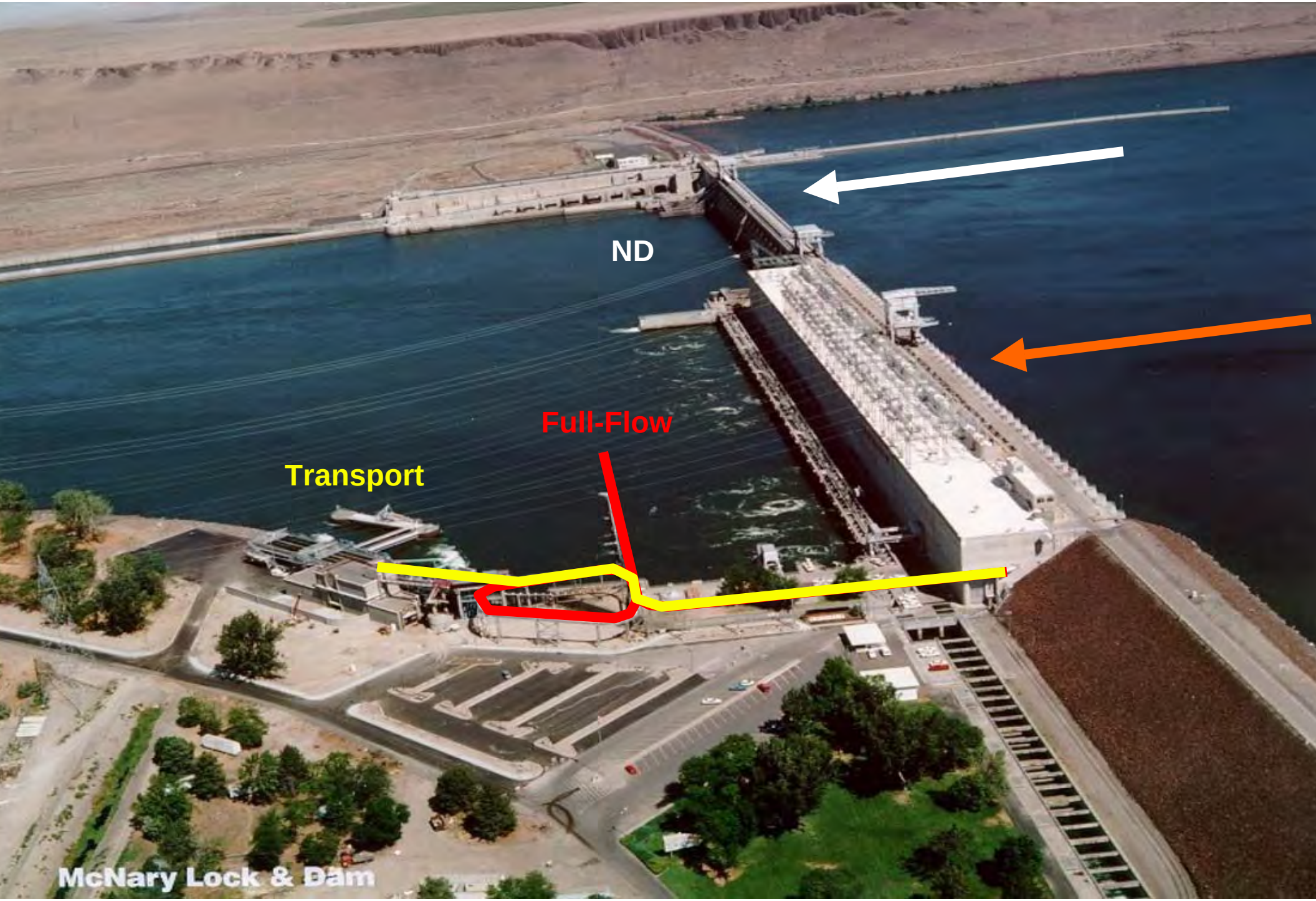

2002 8 16

Columbia River studies

2004 Research Objectives

Transportation vs. in-river migration vs. full-flow bypass study – yearling and subyearling Chinook salmon and steelhead

- 2004 juvenile tagging
- adult returns from subyearling Chinook salmon (2001-02), yearling Chinook salmon (2002-03) and steelhead (2003) tagging


ND
Full-Flow
Transport
McNary Lock & Dam

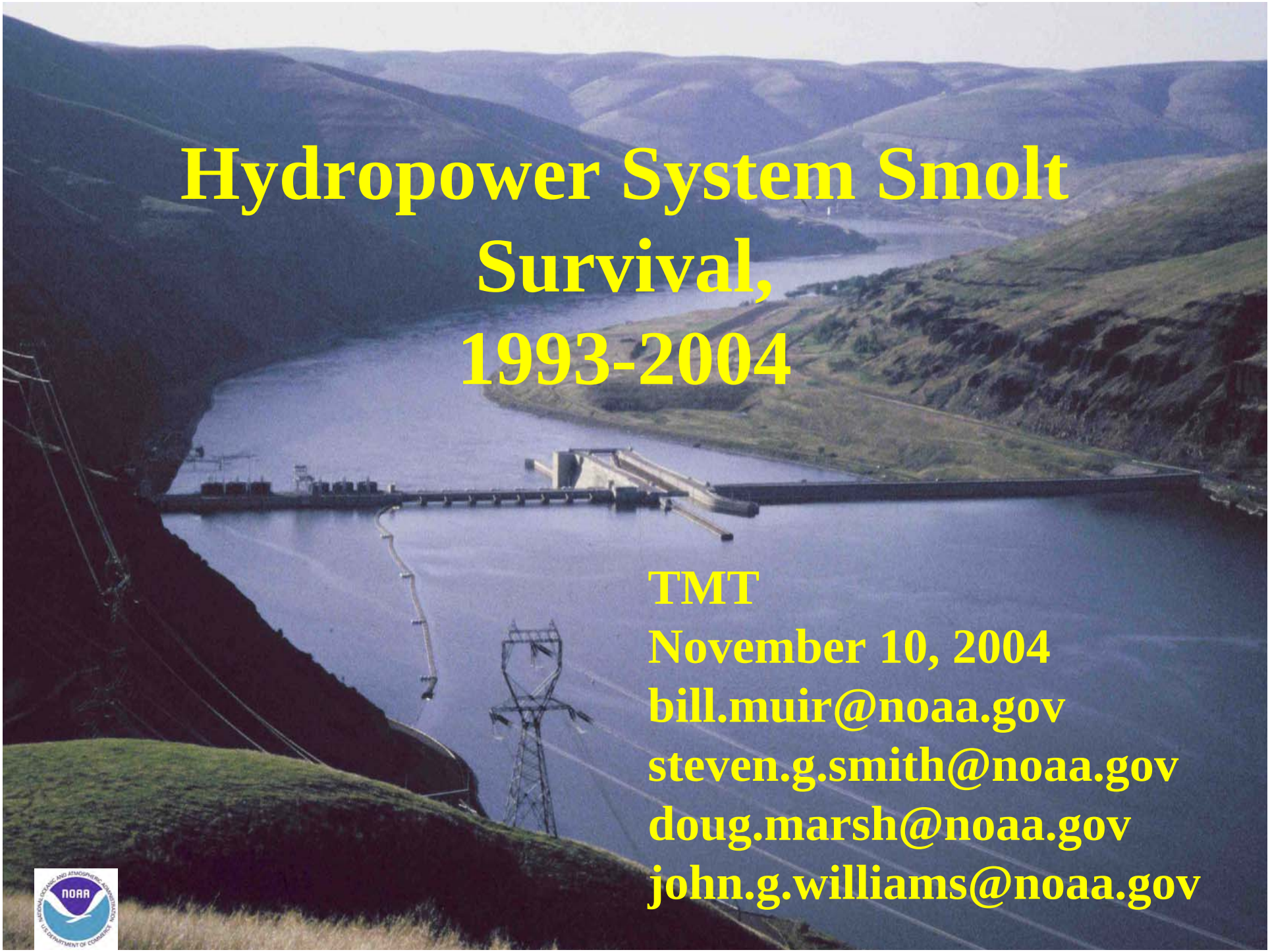
Transport studies– Columbia River 2004 juvenile tagging

	Number tagged	Transport	Full-Flow	Inriver
- Hatchery Spring Chinook transport study				
- Winthrop	19,887	1,263	1,184	17,320
- Methow	34,844	1,577	1,765	31,365
- Entiat	58,625	6,133	7,018	44,280
- Leavenworth	216,703	15,293	15,407	184,217
- Hatchery Steelhead transport study				
- Wells	238,697	5,372	6,463	226,150
- Winthrop	49,475	1,141	1,372	46,777
- Eastbank	83,729	1,918	2,591	78,971
- Chelan	9,584	170	210	9,186
- Ringold	96,494	3,871	5,002	86,788

Columbia River Transport studies in-progress

Tagging year	Juvenile numbers			Adult returns by age-class				
	Transports	Full-Flow	Inrivers	Jacks	2-ocn	3-ocn	4-ocn	5-ocn
Columbia River subyearling chinook salmon (tagged at McNary Dam)								
2002	38,320	–	56,310	143	200	–	–	–
2001	23,250	–	38,546	33	29	63	–	–
Upper Columbia River hatchery yearling spring chinook salmon								
2003	31,323	37,469	283,129	109	–	–		
2002	50,381	–	282,004	36	607	–		
Upper Columbia River hatchery steelhead								
2003	15,353	19,526	449,996	2,625	–	–		


2004 1 21



Hydropower System Smolt Survival, 1993-2004

TMT
November 10, 2004

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Results for

- Migration conditions during 2004

Results for

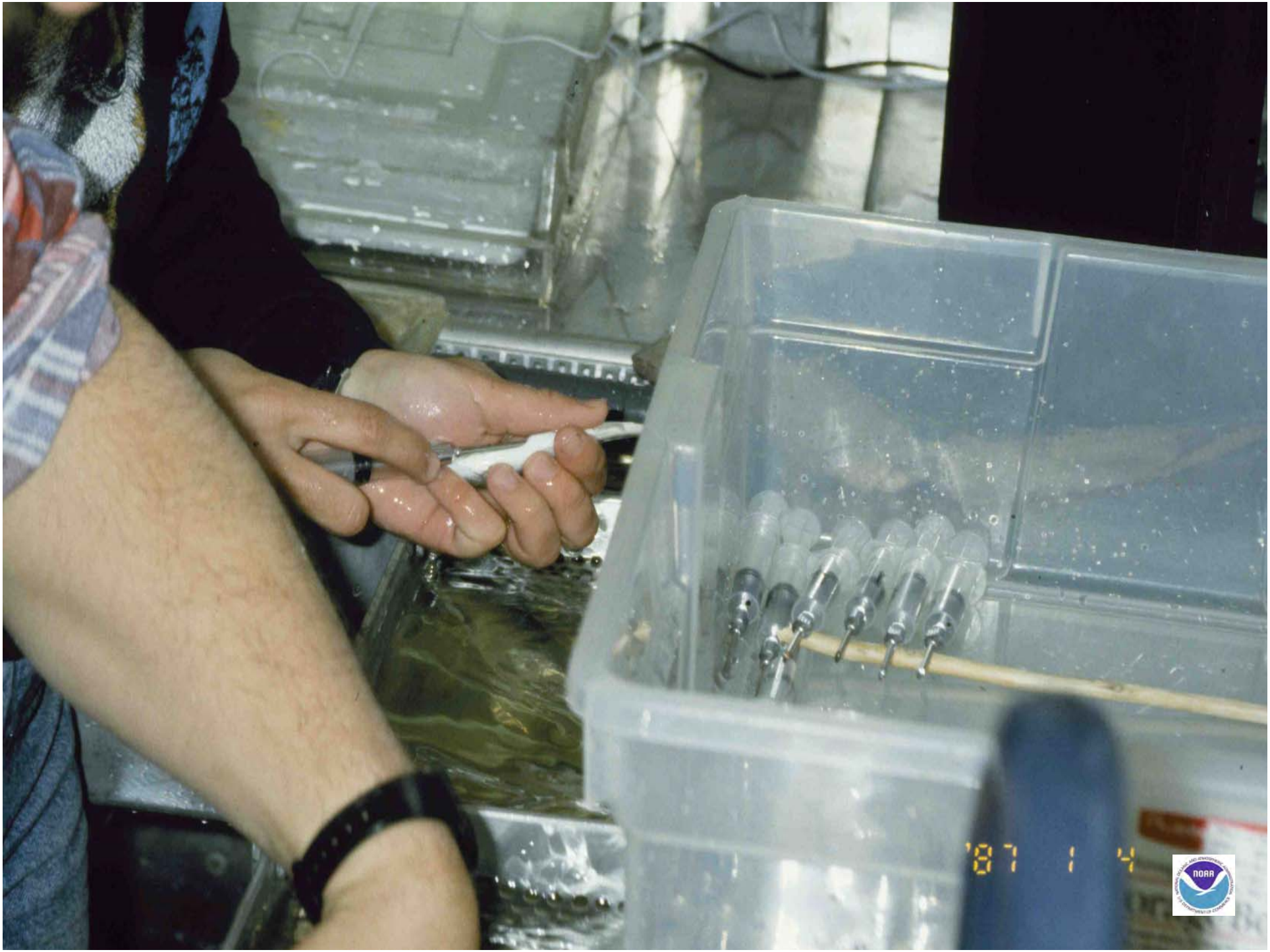
- Migration conditions during 2004
- Yearling chinook salmon survival from Snake River Basin hatcheries to LGR

Results for

- Migration conditions during 2004
- Yearling chinook salmon survival from Snake River Basin hatcheries to LGR
- Yearling chinook salmon and steelhead survival through individual reaches

Results for

- Migration conditions during 2004
- Yearling chinook salmon survival from Snake River Basin hatcheries to LGR
- Yearling chinook salmon and steelhead survival through individual reaches
- Their survival through the entire hydropower system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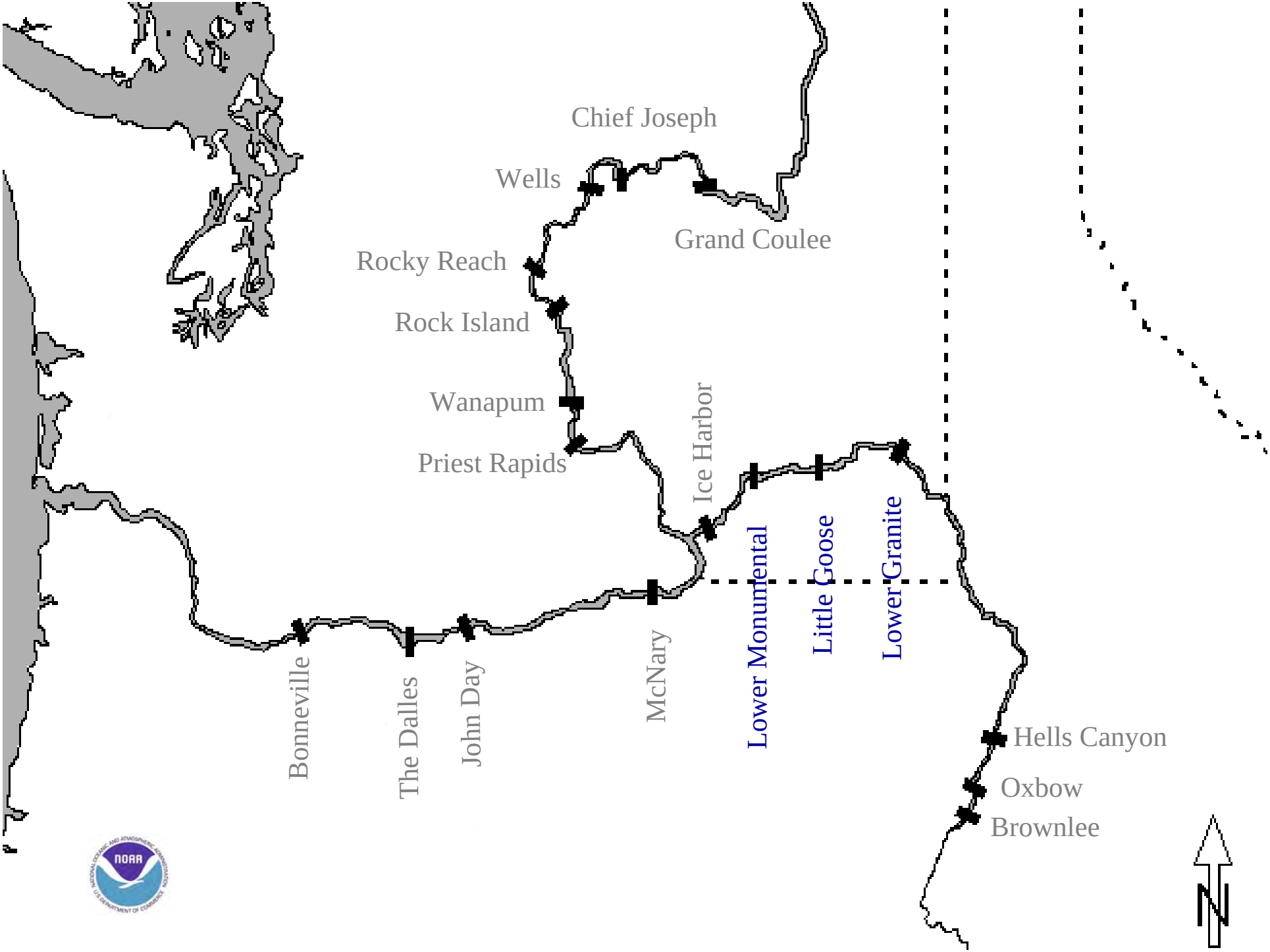
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Rocky Reach
Rock Island
Wanapum
Priest Rapids
Ice Harbor
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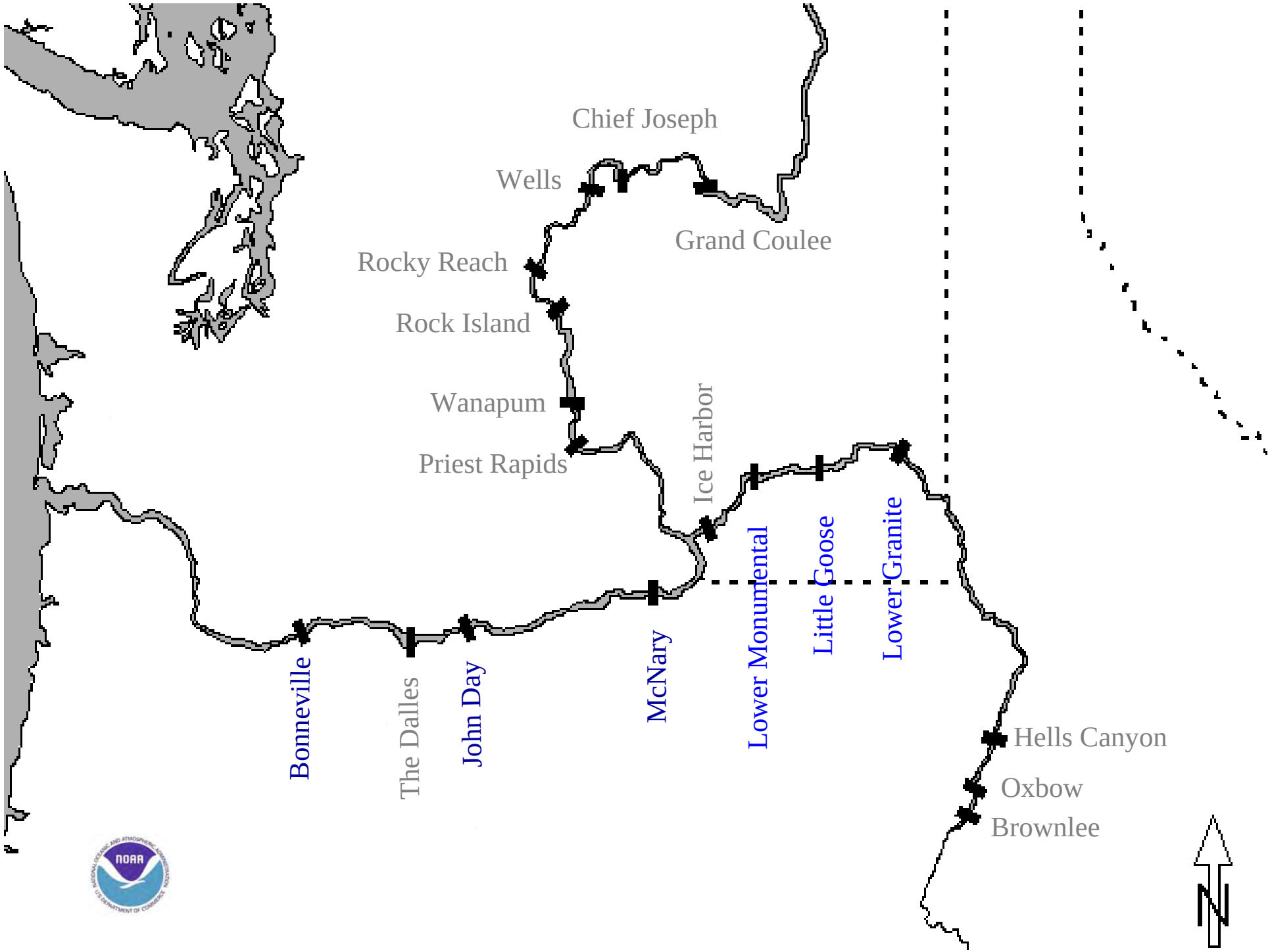
Little Goose
Lower Granite
McNary
John Day
The Dalles
Bonneville
Hells Canyon
Oxbow
Brownlee
N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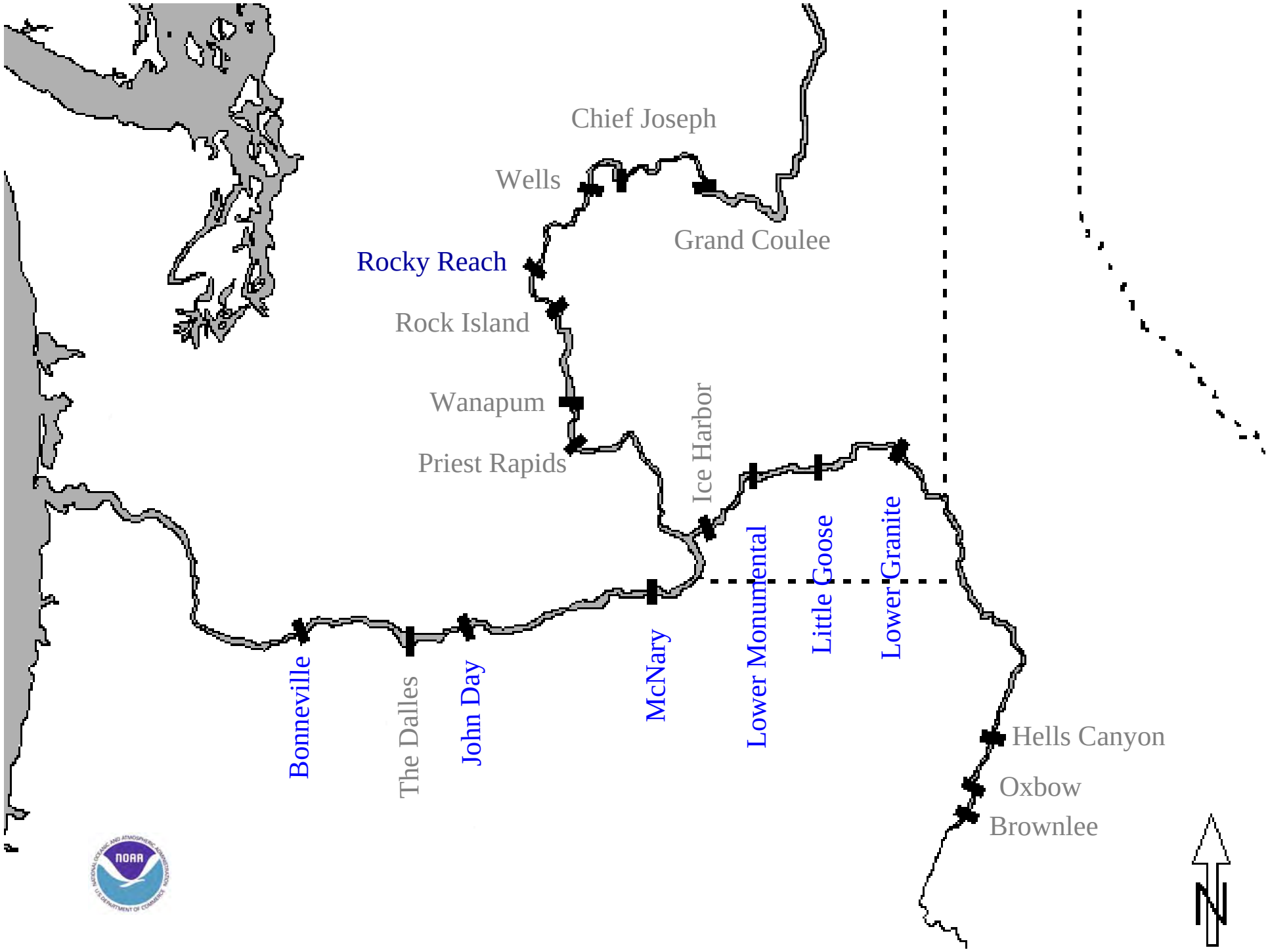
John Day
The Dalles
Bonneville
Hells Canyon
Oxbow
Brownlee
N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Ice Harbor
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Little Goose
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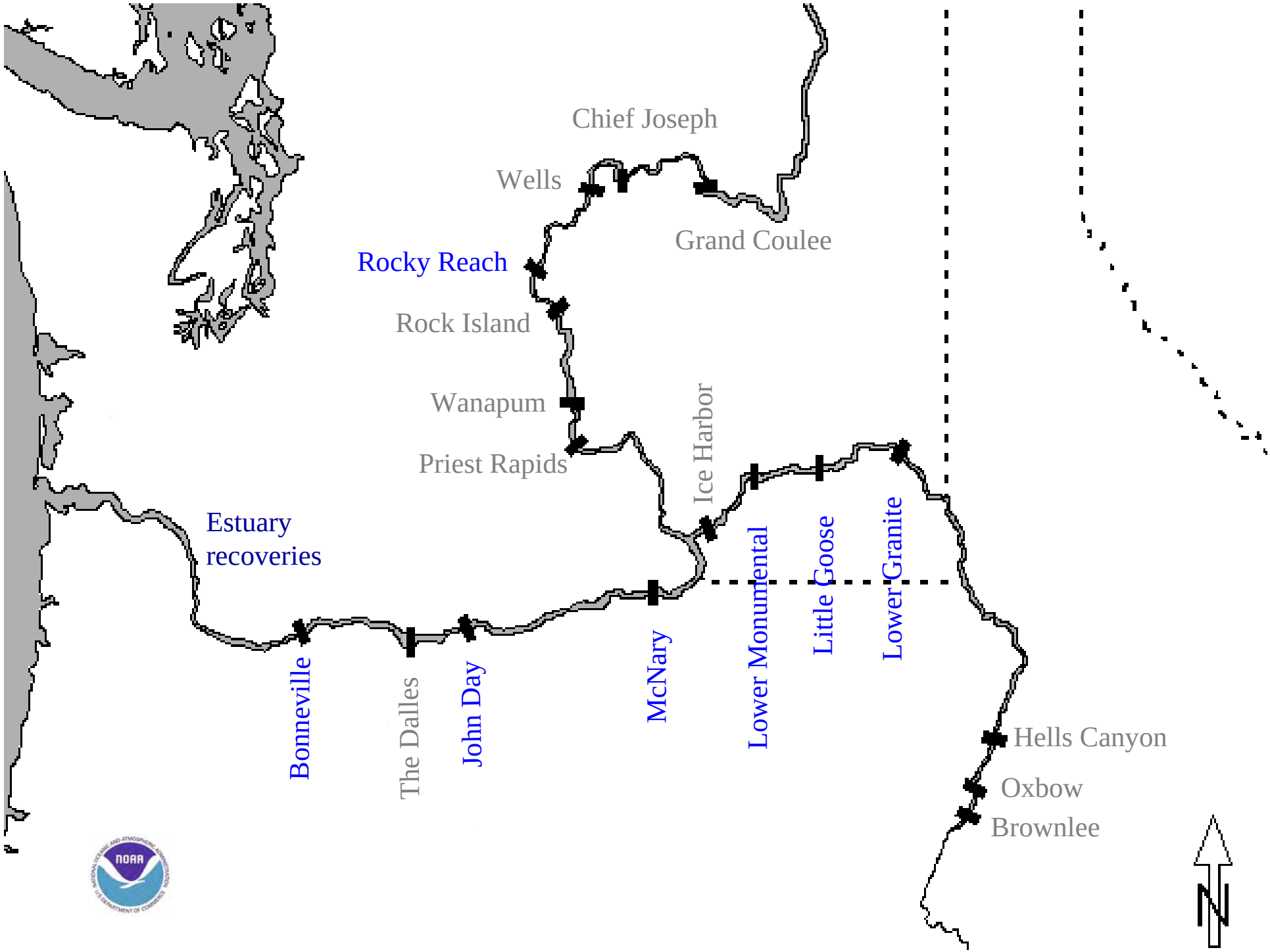
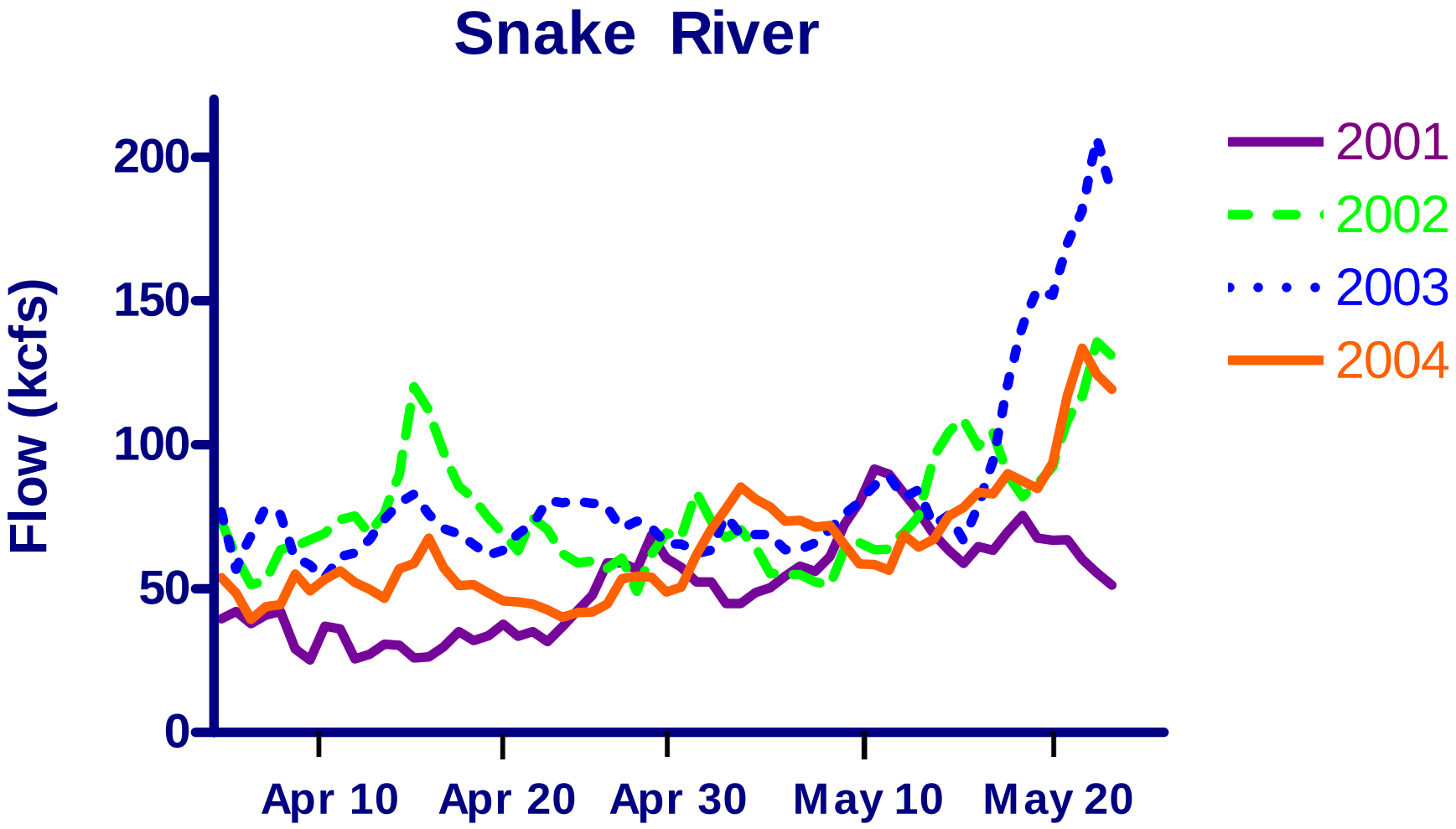
McNary
John Day
The Dalles
Bonneville
Hells Canyon
Oxbow
Brownlee
N


Chief Joseph
Wells
Grand Coulee
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Ice Harbor
Estuary
recoveries
Bonneville
The Dalles
John Day
McNary
Lower Monumental
Little Goose
Lower Granite
Hells Canyon
Oxbow
Brownlee
N

River conditions



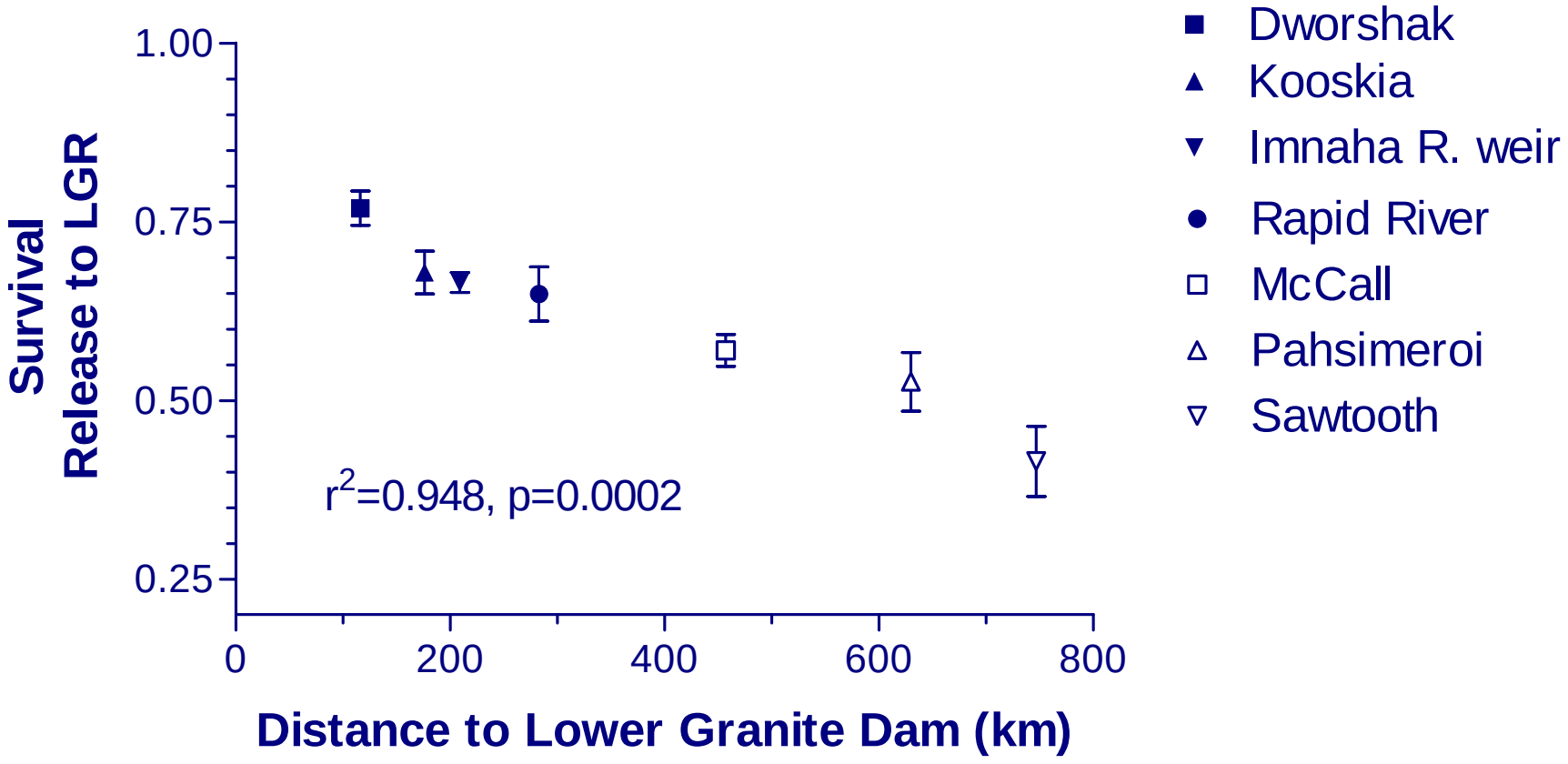
No spill provided

- Lower Granite and Little Goose – 24 April - end of May
- Lower Monumental – 14 May - end of May

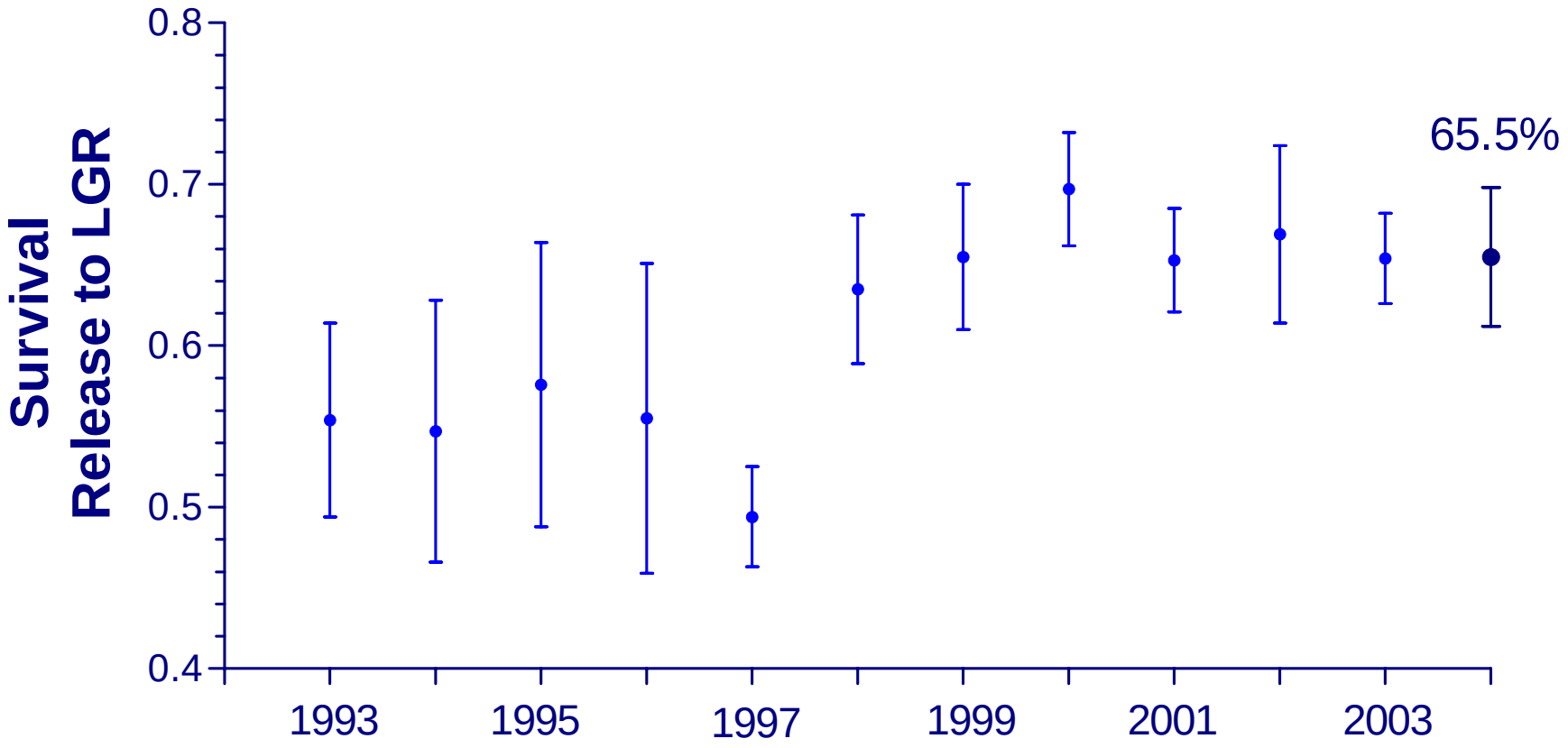
Transportation maximized

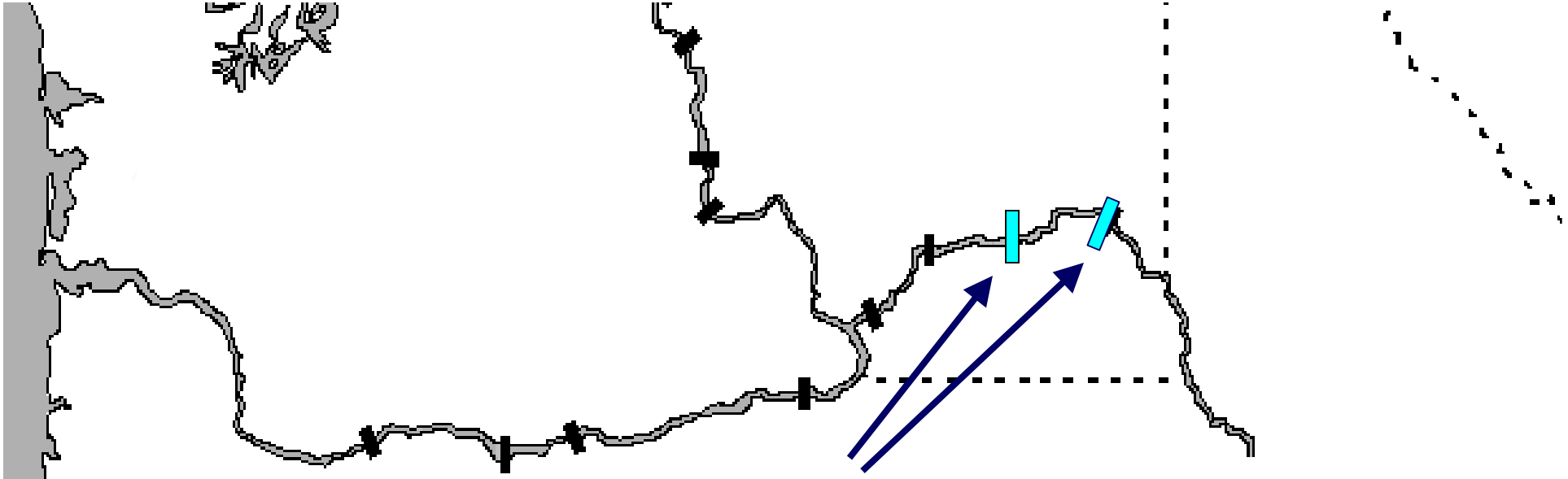
- 91% of non-tagged spring chinook
- 97% of non-tagged steelhead

Hatchery yearling chinook salmon (1993-2004)

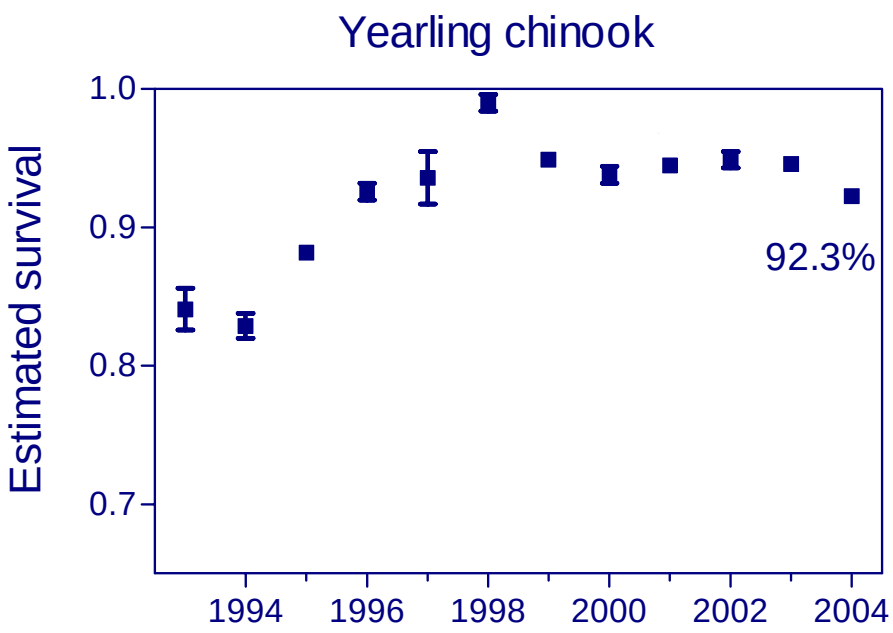


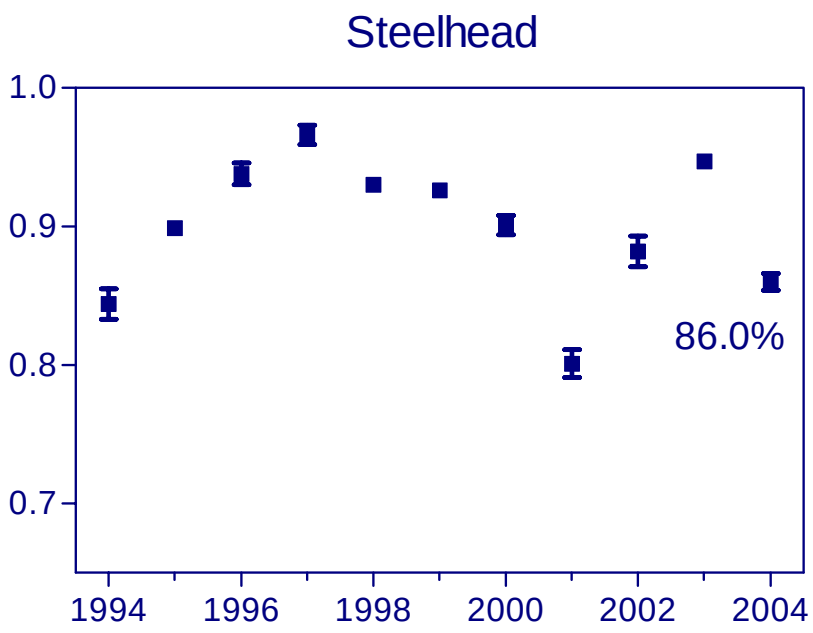
Yearling chinook salmon
All Snake River Basin hatcheries combined

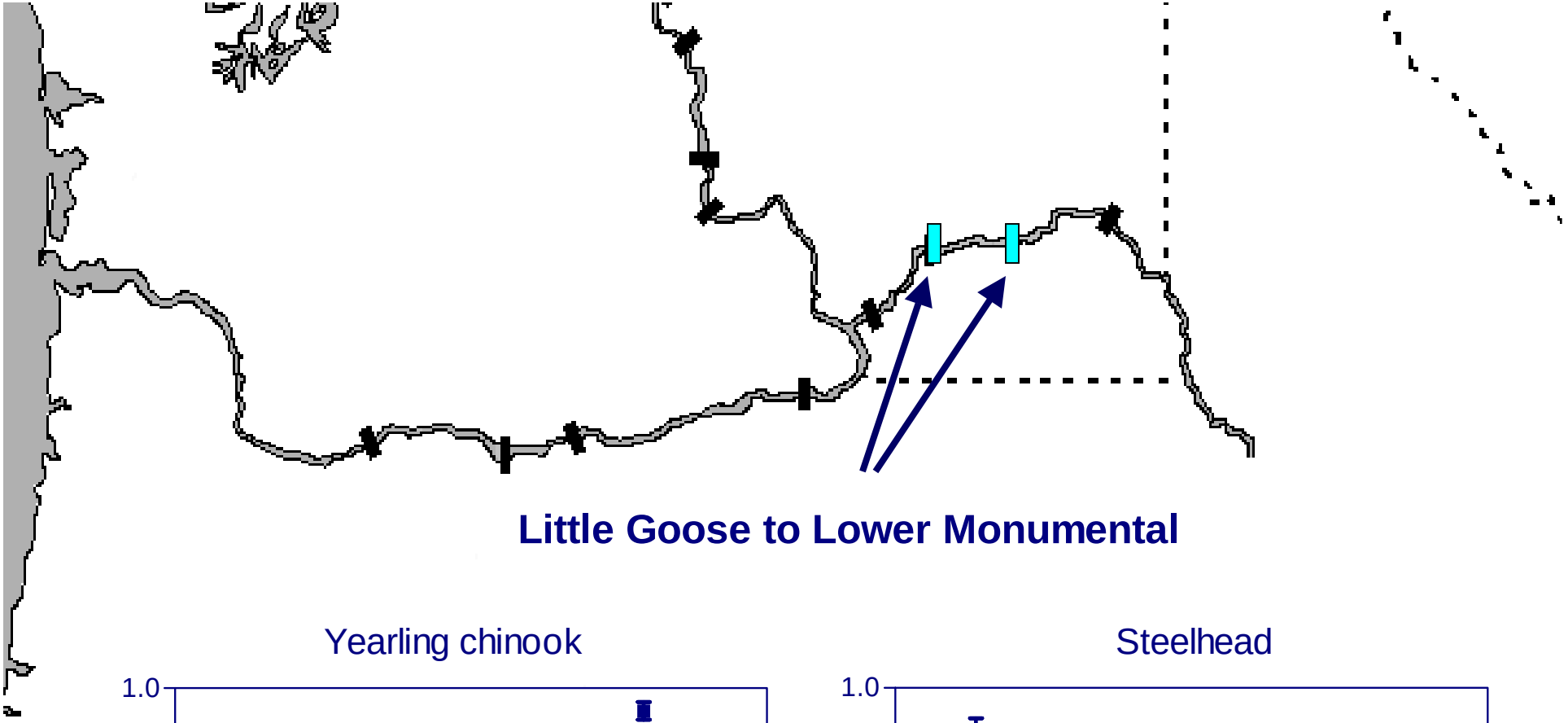




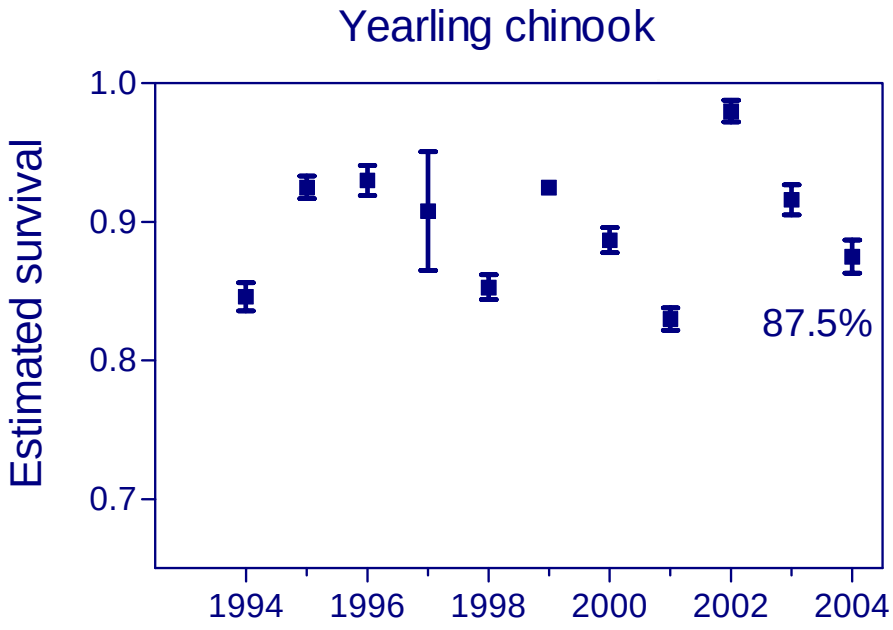
Lower Granite to Little Goose

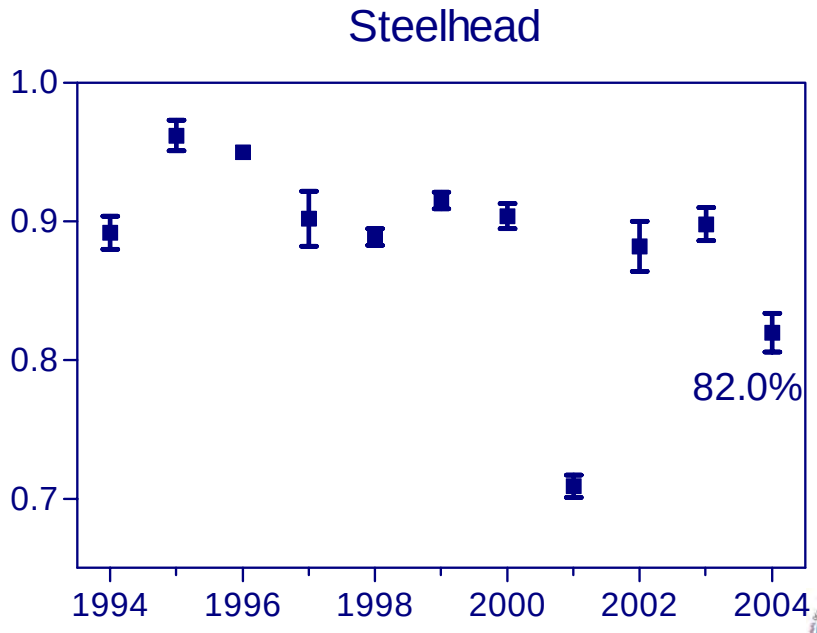


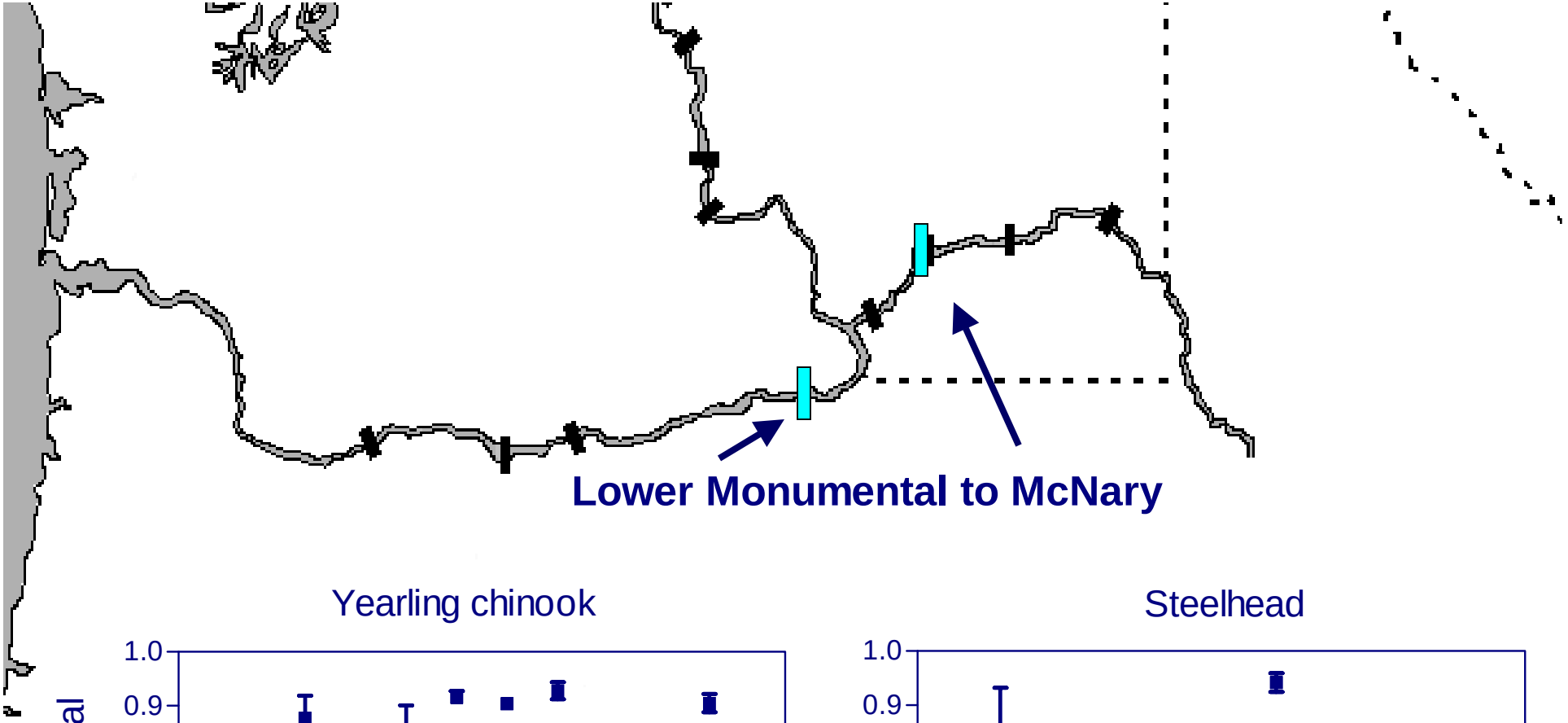


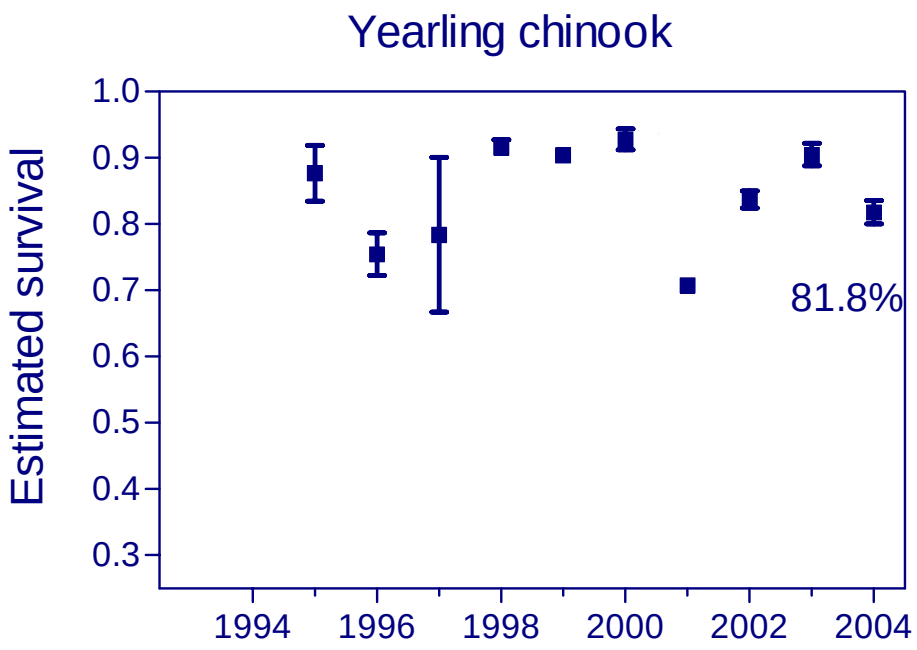


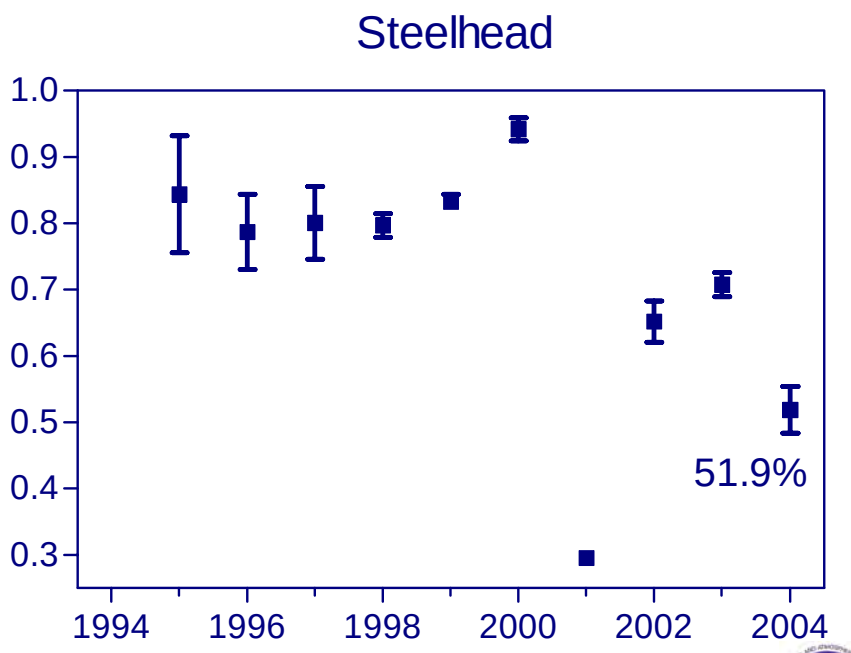
Little Goose to Lower Monumental

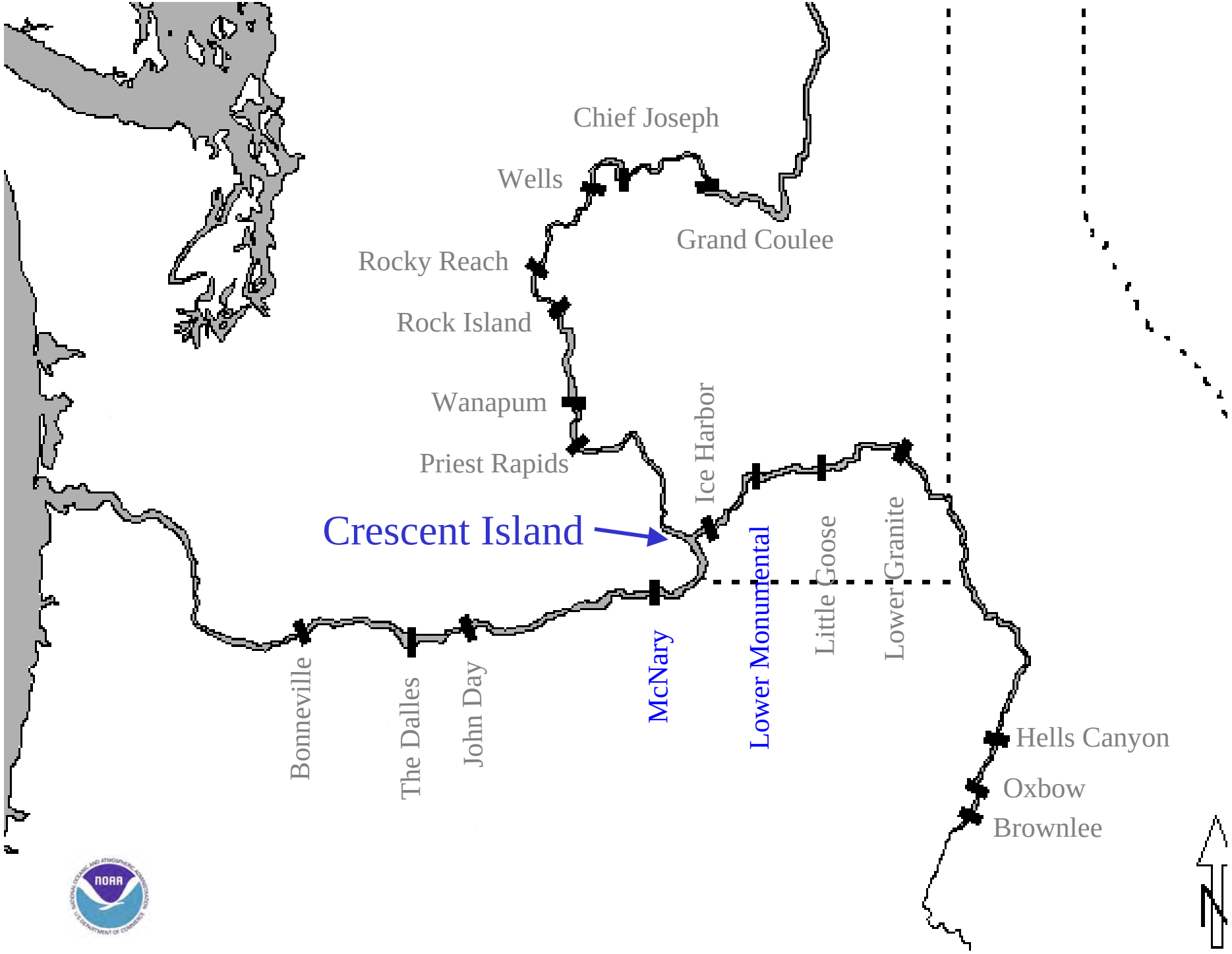




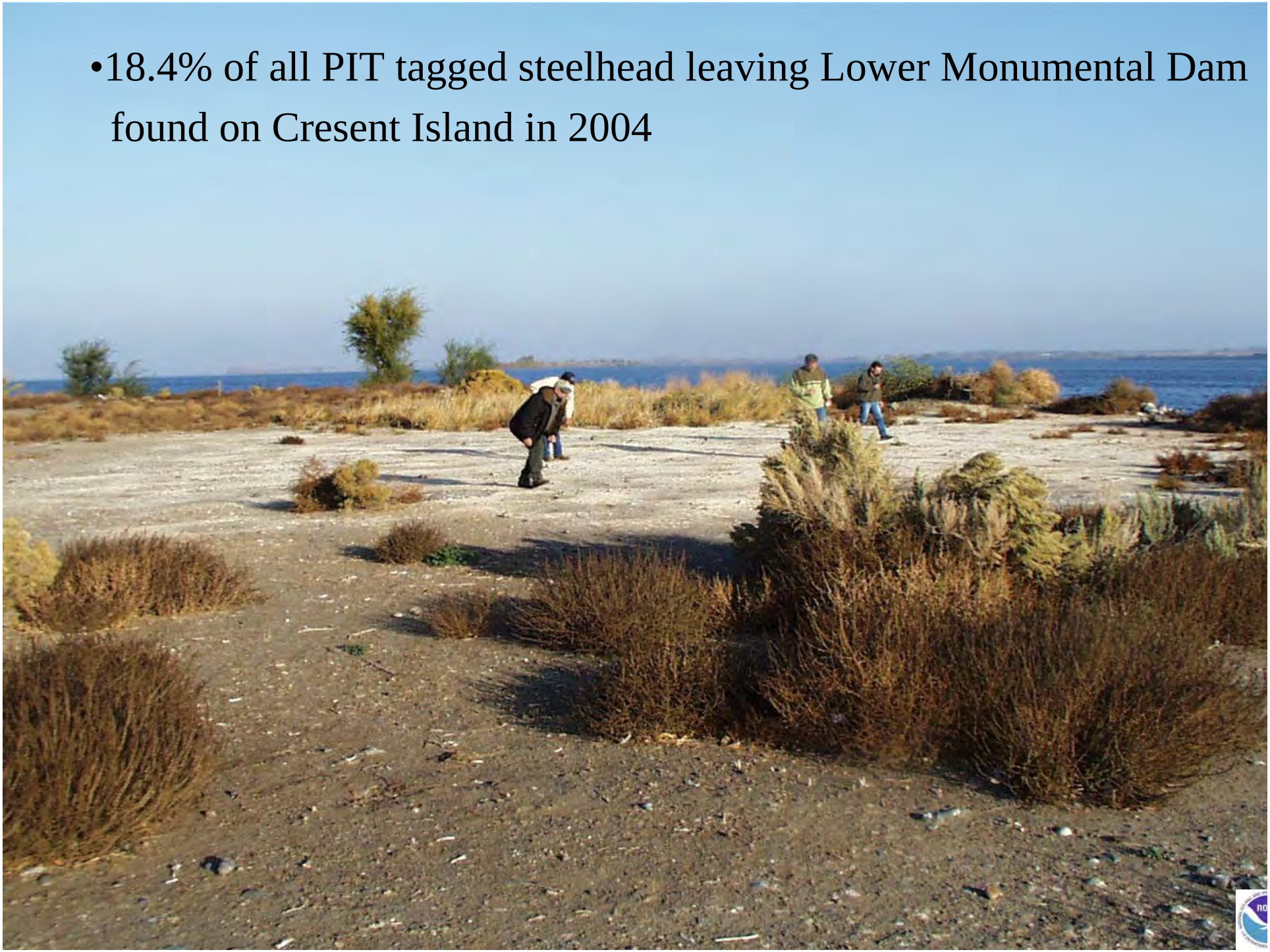

Lower Monumental to McNary


Yearling chinook
Estimated survival
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
81.8%
1994
1996
1998
2000
2002
2004

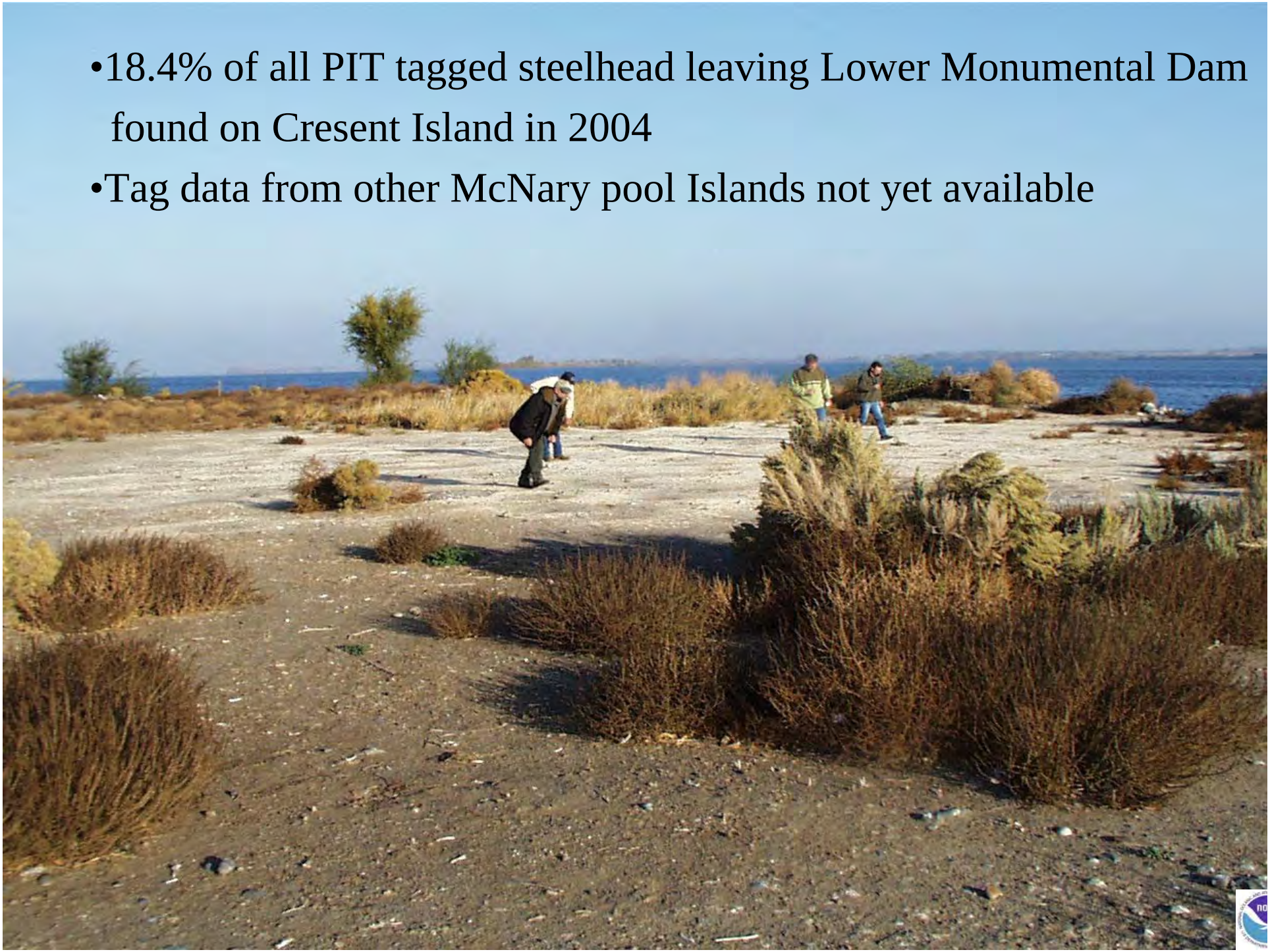

Steelhead
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
51.9%
1994
1996
1998
2000
2002
2004

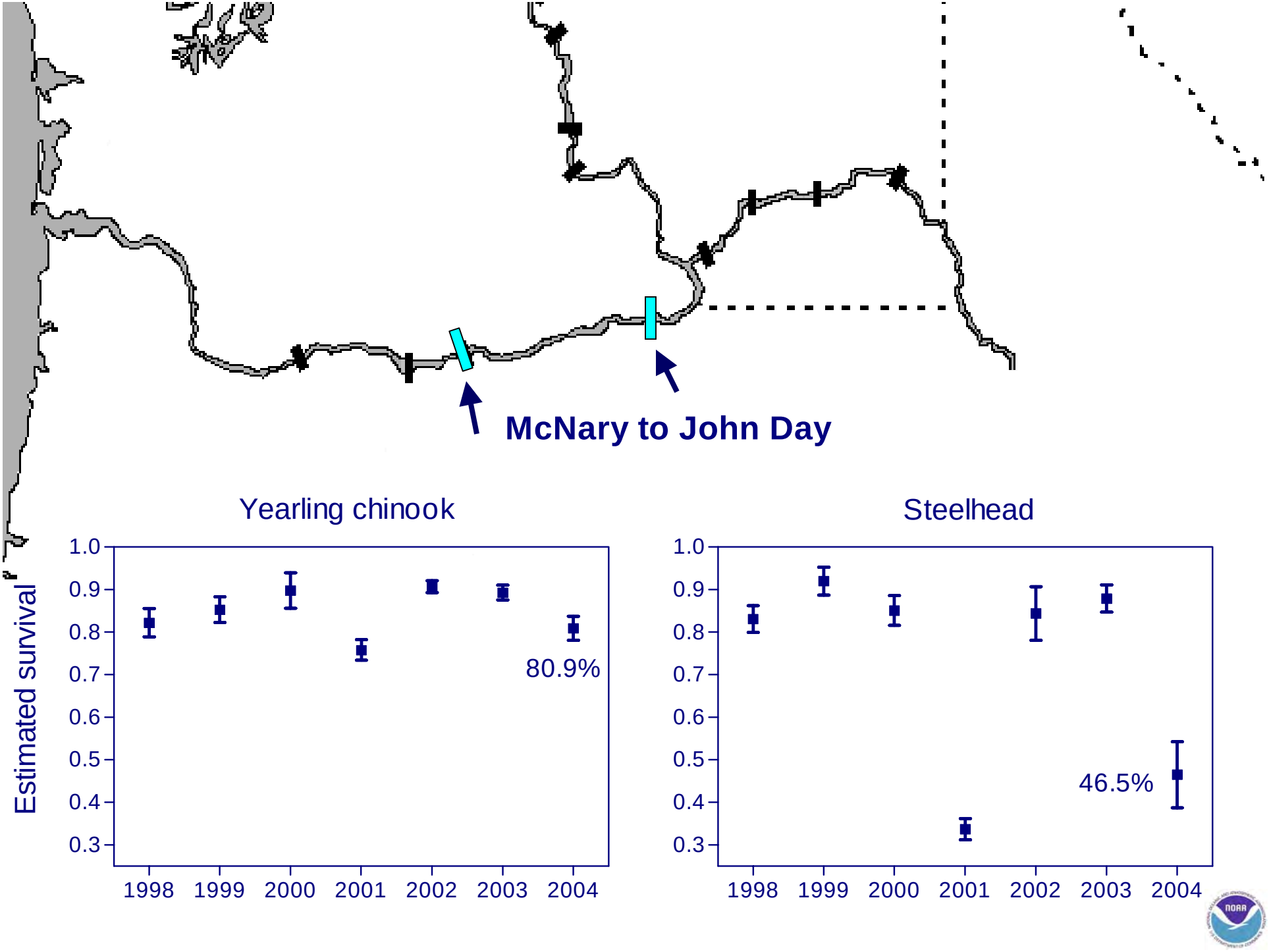

Chief Joseph
Wells
Grand Coulee
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Ice Harbor
Crescent Island
Lower Monumental
Little Goose
Lower Granite
McNary
Bonneville
The Dalles
John Day
Hells Canyon
Oxbow
Brownlee
N

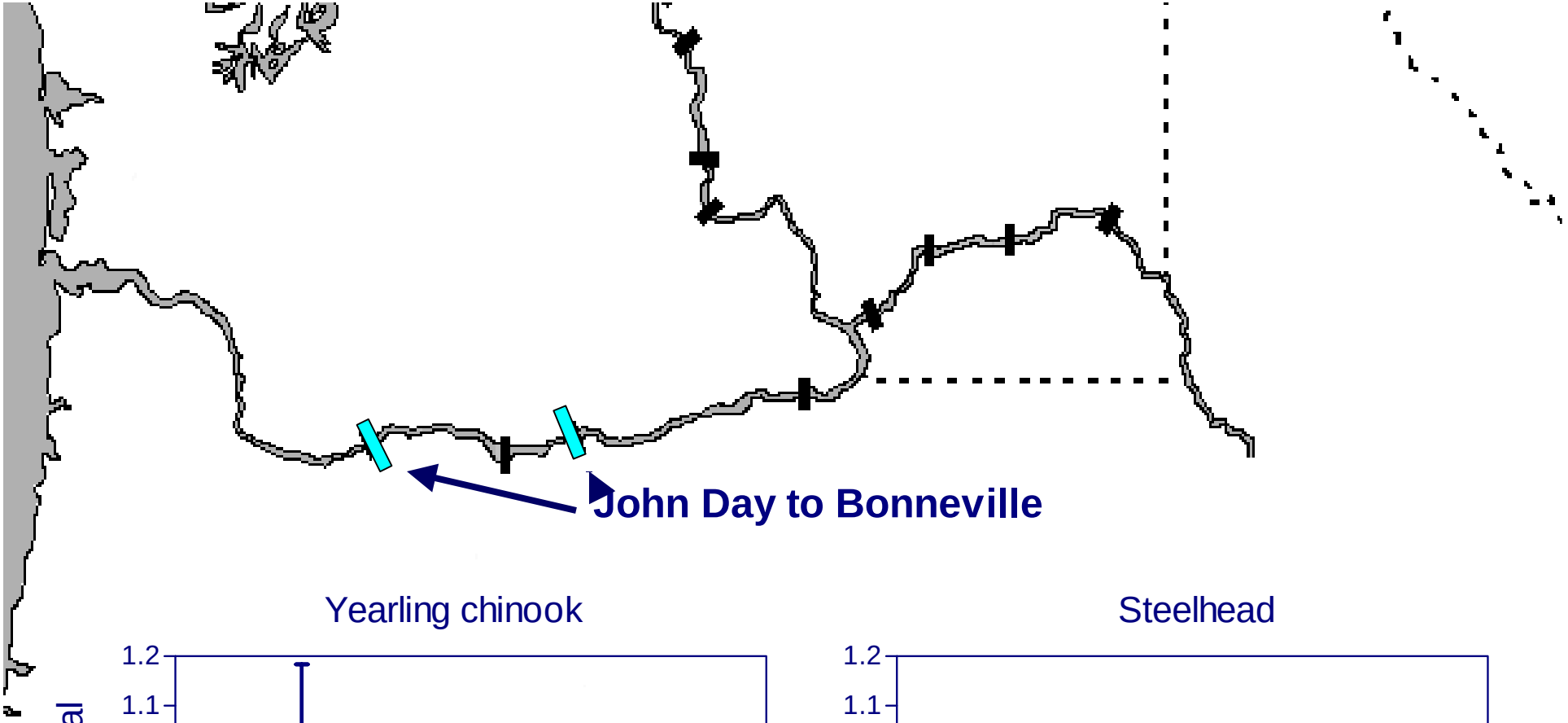
•18.4% of all PIT tagged steelhead leaving Lower Monumental Dam found on Cresent Island in 2004

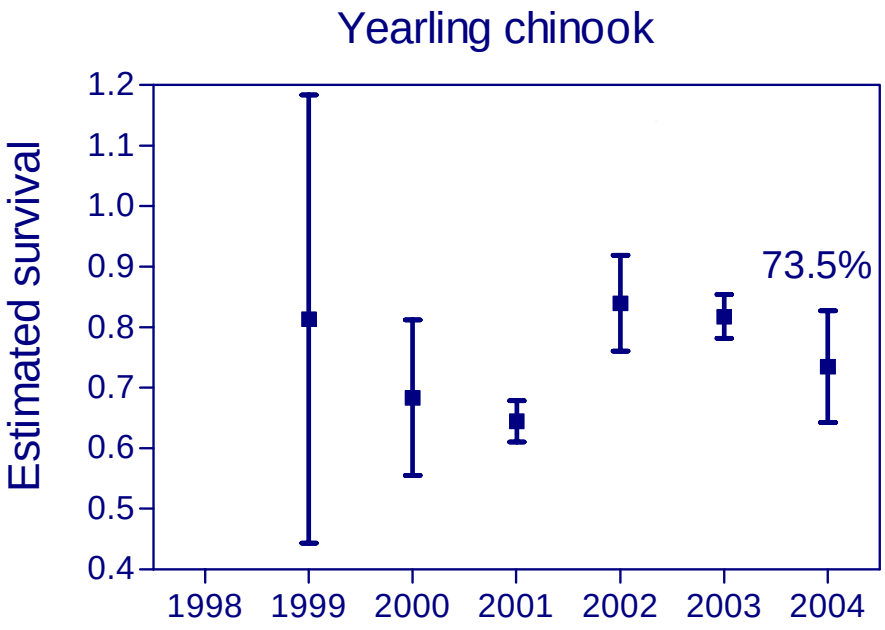


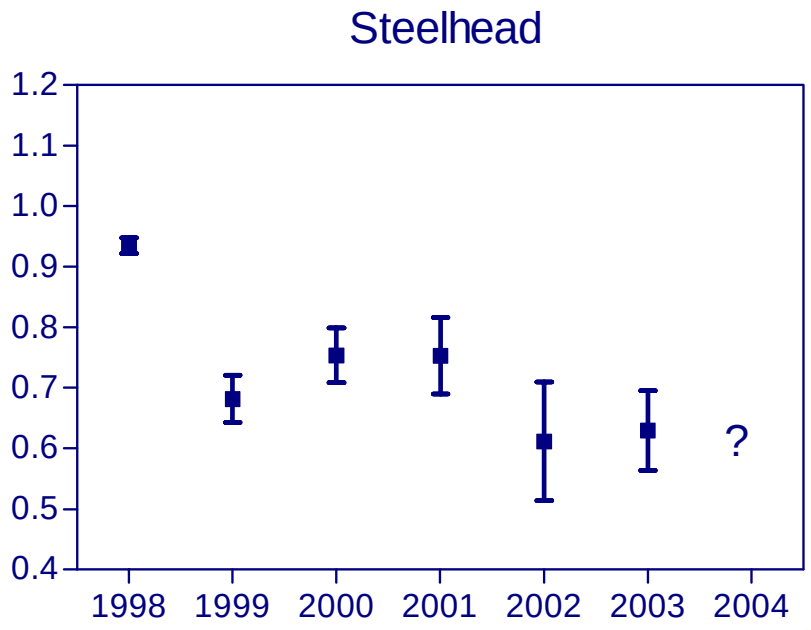
- 18.4% of all PIT tagged steelhead leaving Lower Monumental Dam found on Cresent Island in 2004
- Tag data from other McNary pool Islands not yet available

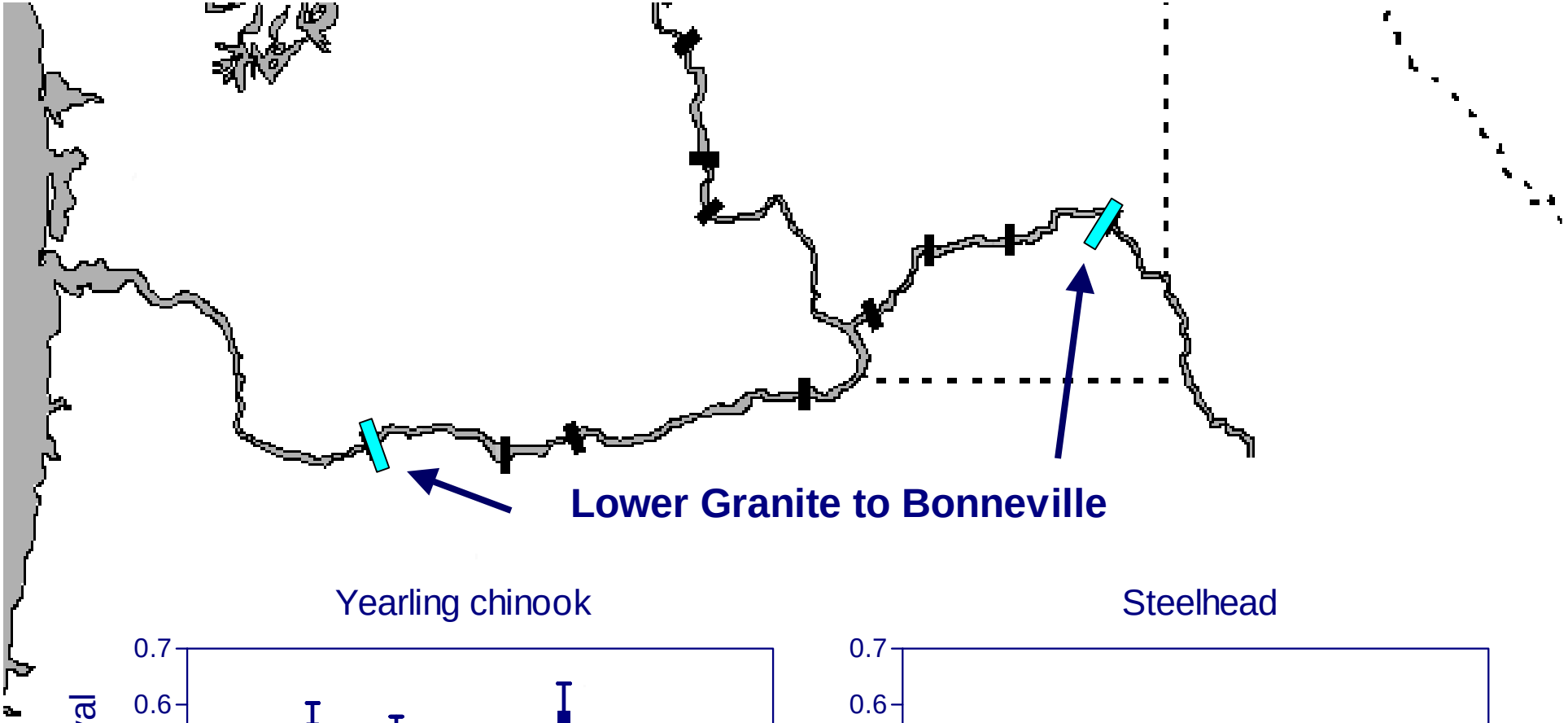


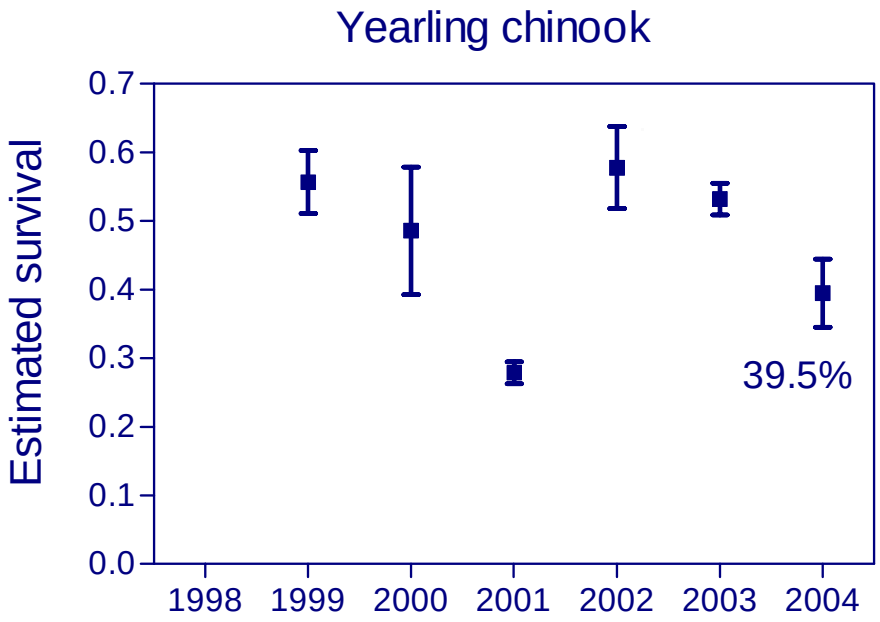

McNary to John Day
Yearling chinook
Steelhead
Estimated survival
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
80.9%
46.5%
1998
1999
2000
2001
2002
2003
2004

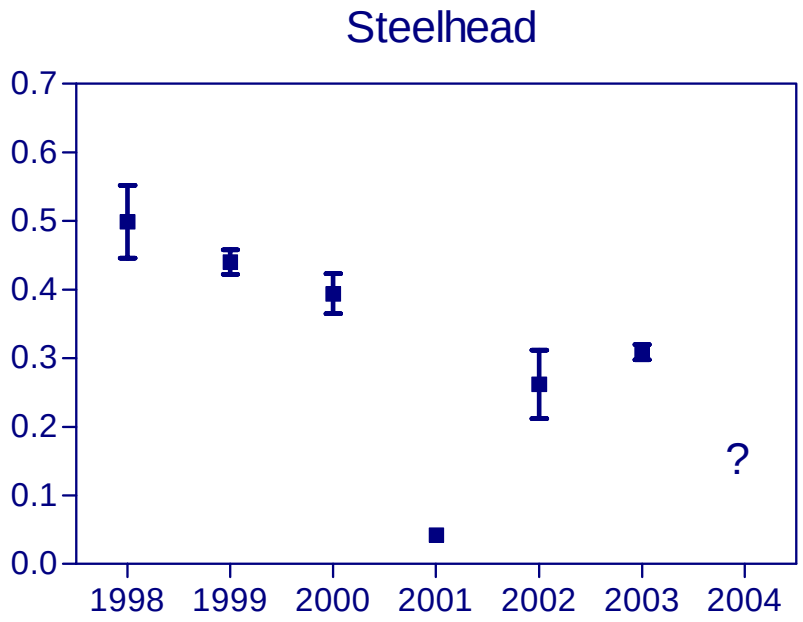

John Day to Bonneville

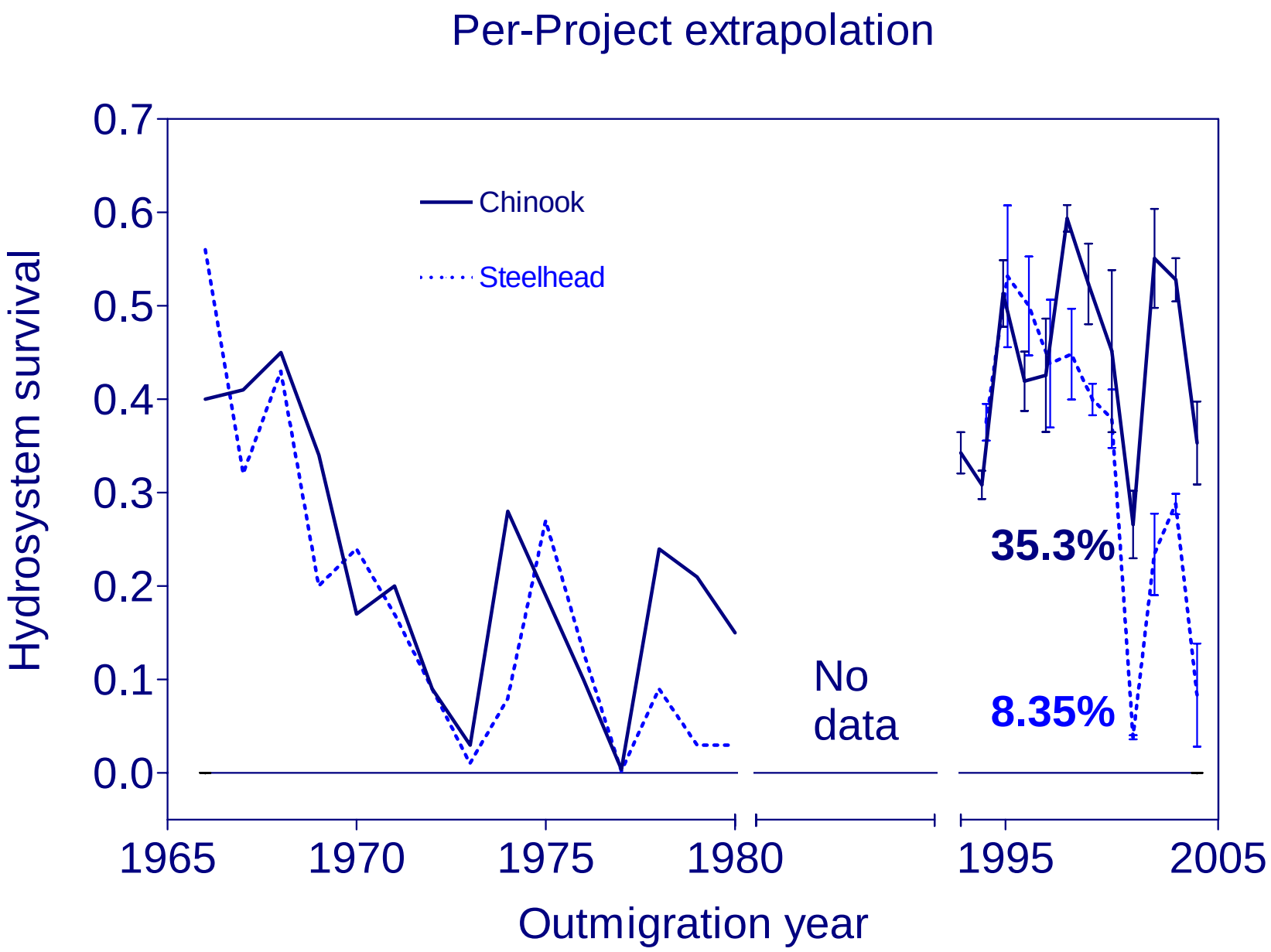

Yearling chinook
Estimated survival
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
73.5%
1998
1999
2000
2001
2002
2003
2004


Steelhead
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
?
1998
1999
2000
2001
2002
2003
2004


Lower Granite to Bonneville


Yearling chinook
Estimated survival
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
39.5%
1998
1999
2000
2001
2002
2003
2004


Steelhead
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
?
1998
1999
2000
2001
2002
2003
2004


Per-Project extrapolation
Hydrosystem survival
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Chinook
Steelhead
35.3%
8.35%
No
data
1965
1970
1975
1980
1995
2005
Outmigration year

Conclusions

- Flow during the spring migration season in the Snake River was similar to 2001

Conclusions

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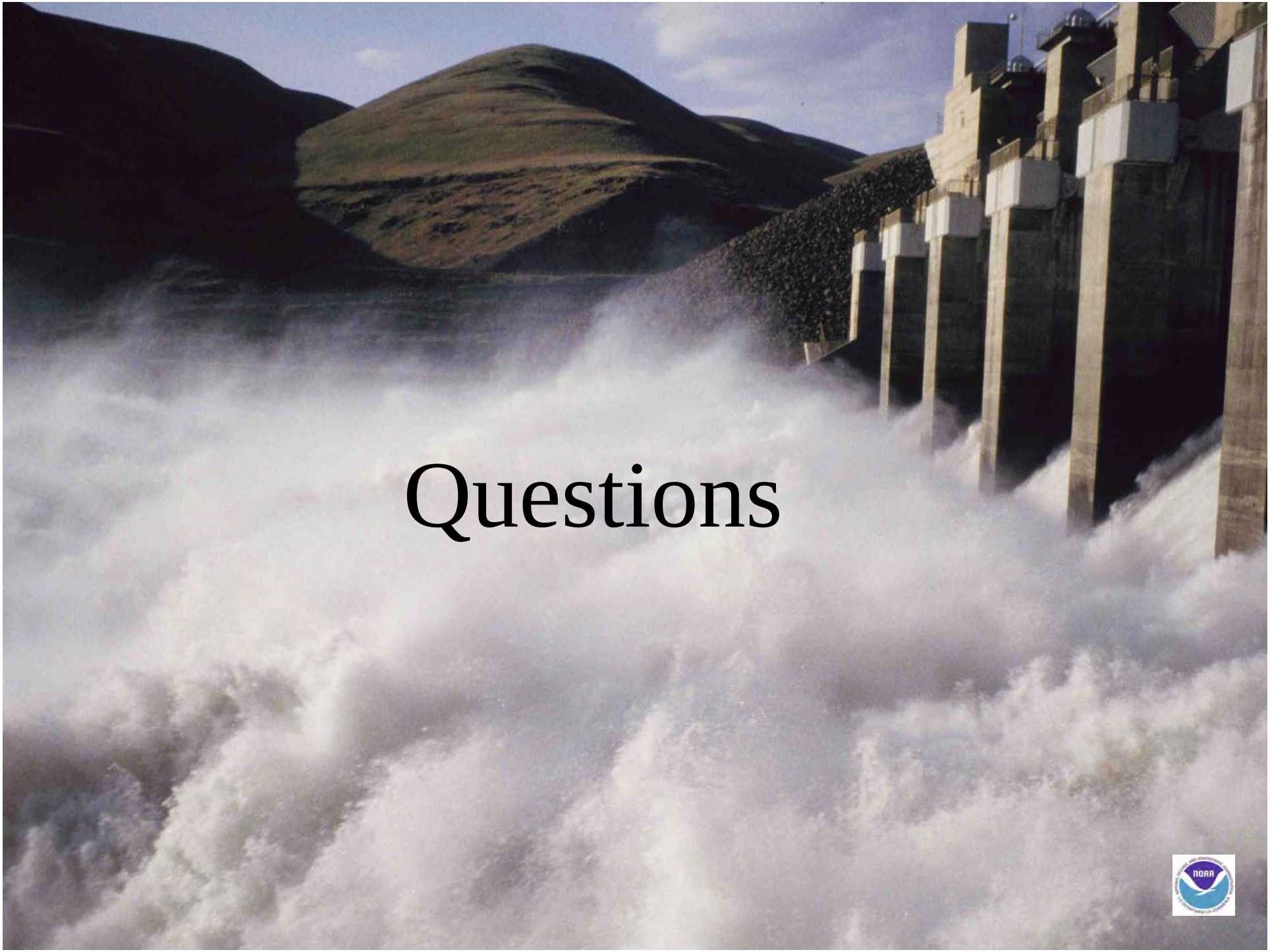
- Inriver survival was the lowest measured since 2001

Conclusions

- Flow during the spring migration season in the Snake River was similar to 2001
- Inriver survival was the lowest measured since 2001
- However, the vast majority of Snake River smolts were transported

Conclusions

- Flow during the spring migration season in the Snake River was similar to 2001
- Inriver survival was the lowest measured since 2001
- However, the vast majority of Snake River smolts were transported
- Steelhead mortality was high between LMO and JD dams, due in part to bird predation


Questions

APPENDIX C

Adult Returns from Previous and In-progress Studies

Appendix Table C1. Snake River wild spring/summer chinook salmon studies.

Tagging year	Juvenile fish numbers		Returns by Age-class			SAR		T/I	95% C.I.	Status
	Transport	Inriver	Jack	2-ocean	3-ocean	Transport	Inriver			
2003	7,118	43,108	1	–	–	–	–	–	–	In-progress
2002	4,970	34,059	28	234	–	–	–	–	–	In-progress
2001	**16,512**	**–**	**21**	**113**	**25**	**0.95**	**–**	**–**	**(0.84, 1.11)**	**Completed**
2000*	17,367	26,329	16	263	355	1.47	1.44	1	(0.9, 1.1)	Completed
1999	8,384	1,920	11	164	27	2.1	1.35	1.6	(1.0, 2.4)	Completed
1998	5,689	2,932	6	42	14	0.6	0.95	0.6	(0.4, 1.0)	Completed
1996	7,949	3,915	1	8	3	0.11	0.08	1.5	(0.5, 7.5)	Completed
1995	24,066	6,794	1	70	36	0.38	0.22	1.7	(1.1, 2.6)	Completed

* Transport group formed of fish collected and transported from Little Goose Dam, adjusted with Sandford and Smith (2002).

Appendix Table C2. Snake River hatchery spring/summer chinook salmon studies.

Tagging year	Juvenile fish numbers		Returns by age-class			SAR		T/I	95% C.I.	Status	Annual report containing final results
	Transport	Inriver	Jack	2-ocean	3-ocean	Transport	Inriver				
1999	42,273	16,664	99	935	41	1.97	1.45	1.4	(1.2, 1.6)	Completed	2001
1998	39,596	23,552	48	297	34	0.62	0.57	1.1	(0.9, 1.4)	Completed	2001
1996	35,632	20,186	7	43	22	0.13	0.1	1.2	(0.8, 2.0)	Completed	1999
1995	83,064	25,757	34	444	70	0.54	0.32	1.7	(1.4, 2.1)	Completed	1998

Appendix Table C3. Upper Columbia River hatchery spring/summer chinook salmon studies.

Tagging year	Juvenile fish numbers			Returns by Age-class			SAR		T/I	95% C.I.	Status	Annual report containing final results
	Transport	Bypass[a]	Inriver	Jack	2-ocean	3-ocean	Transport	Inriver				
2003	31,323	37,469	–[b]	109	–	–	–	–	–	–	In progress	Fall 2006
2002	50,381	–	–[b]	36	607	–	–	–	–	–	In progress	Fall 2005

a "Bypass" fish were fish guided, then bypassed back to the river through the full-flow outfall pipe; they did not enter the collection facility. This passage route was not used in 2002.

b The"Inriver" number has not been determined at this time.

Appendix Table D1. Snake River wild steelhead studies.

Tagging year	Juvenile fish numbers		Returns by Age-class			SAR					Annual report containing final results
	Transport	Inriver	1-ocean	2-ocean	3-ocean	Transport	Inriver	T/I	95% C.I.	Status	
2003[a]	3,384	31,544	–	–	–	–	–	–		In-progress	--
2002[b]	4,899	43,506	270	–	–	–	–	–		In-progress	--
2001	**15,273**	**--**	**200**	**156**	**–**	**2.33**	**–**	**–**	**(2.11, 2.55)**	**Completed**	**Current**
2000[b]	**24,744**	**23,506**	**839**	**581**	**0**	**3.98**	**1.85**	**2.15**	**(1.99, 2.40)**	**Completed**	**Current**
1999[b]	6,062	1,471	41	53	0	1.42	0.54	2.6	(1.6, 5.6)	Completed	2002

a - Juvenile numbers are raw numbers

b - Juvenile numbers have been modified by Sandford and Smith (2002)

Appendix Table D2. Snake River hatchery steelhead studies.

Tagging	Juvenile fish numbers		Returns by Age-class			SAR		T/I	95% C.I.	Status	Annual report containing
	Transport	Inriver[a]	1-ocean	2-ocean	3-ocean	Transport	Inriver				
1999	41,109	10,442	240	283	2	1.08	0.78	1.4	(1.2, 1.7)	Completed	2001

a - Juvenile numbers have been modified by Sandford and Smith (2002)

Appendix Table D3. Snake River hatchery fall chinook salmon studies.

Tagging year	Juvenile fish numbers		Returns by Age-class					SAR					Annual report containing final results
	Transport	Inriver	Jack	2-ocean	3-ocean	4-ocean	5-ocean	Transport	Inriver	T/I	95% C.I.	Status	
2003	16,109	19,161	--	--	--	--	--	--	--	--	--	In-progress	--
2002	12,344	76,334	95	--	--	--	--	--	--	--	--	In-progress	--
2001	18,907	26,340	71	75	--	--	--	--	--	--	--	In-progress	--

Appendix Table D4. Columbia River fall chinook salmon tagged at McNary Dam studies.

Tagging year	Juvenile fish numbers		Returns by Age-class					SAR					Annual report containing final results
	Transport	Inriver	Jack	2-ocean	3-ocean	4-ocean	5-ocean	Transport	Inriver	T/I	95% C.I.	Status	
2002	38,322	56,648	143	--	--	--	--	--	--	--	--	In-progress	--
2001	23,250	38,546	33	29	--	--	--	--	--	--	--	In-progress	--

Impacts of 2001 Migration Conditions on Adult Returns

Evidence that Flow & Spill are more Important than Direct Survival Estimates (like SIMPAS) Indicate

by

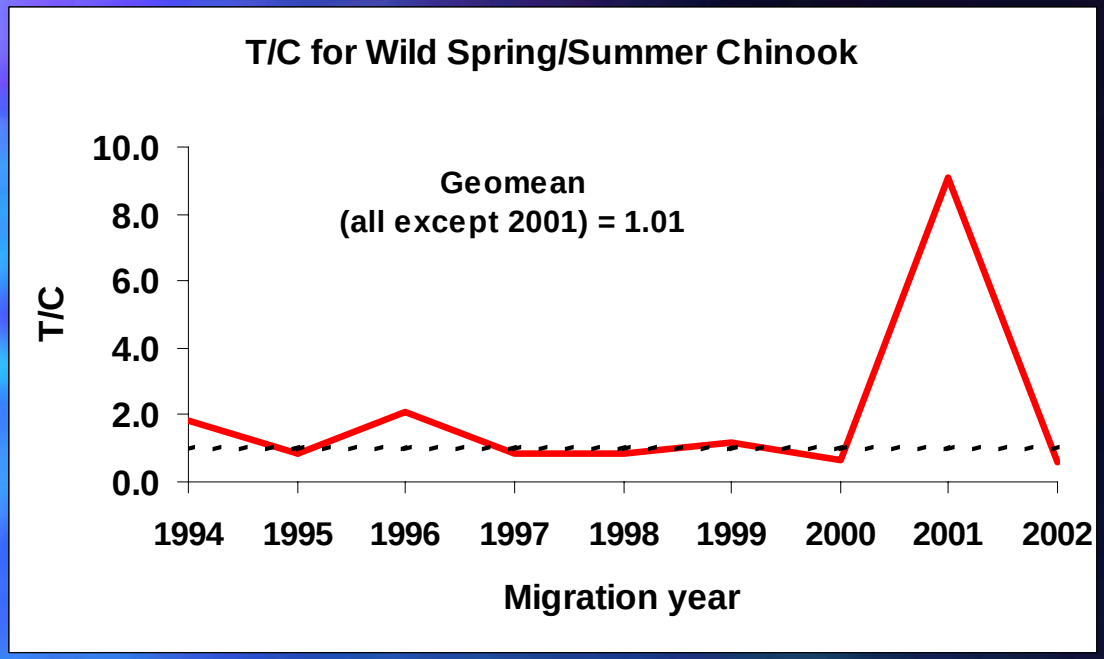
Russ Kiefer

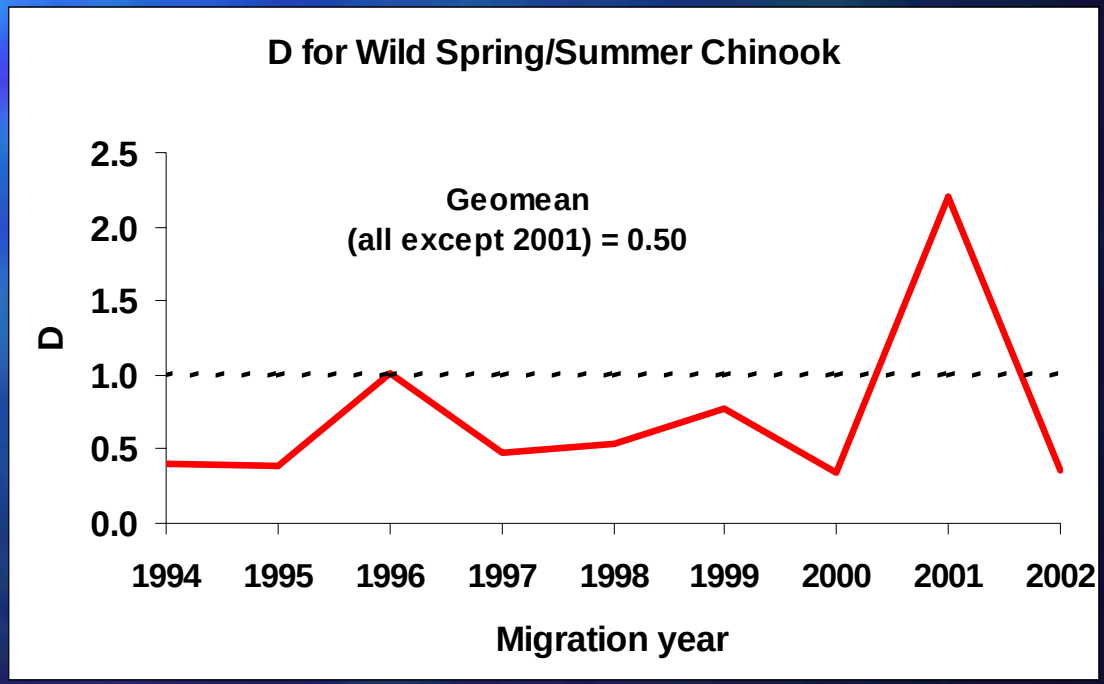
Idaho Department of Fish & Game

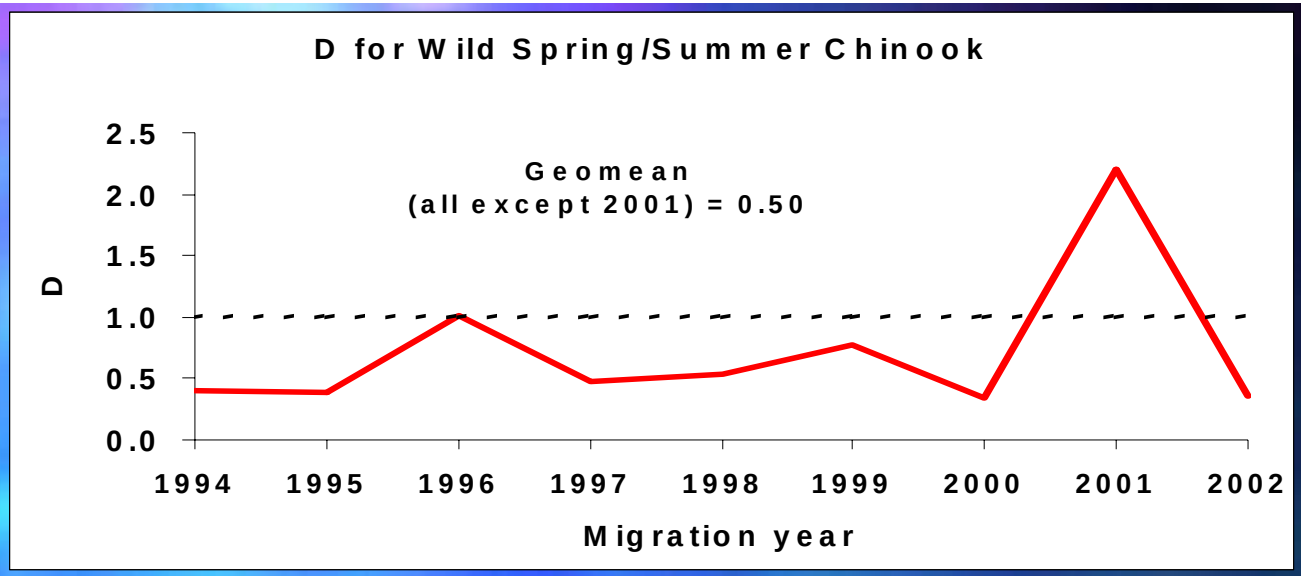
Little to no benefit of transport to wild spring/summer chinook (except in low flow years)

T/C = 1.0

D = 0.50





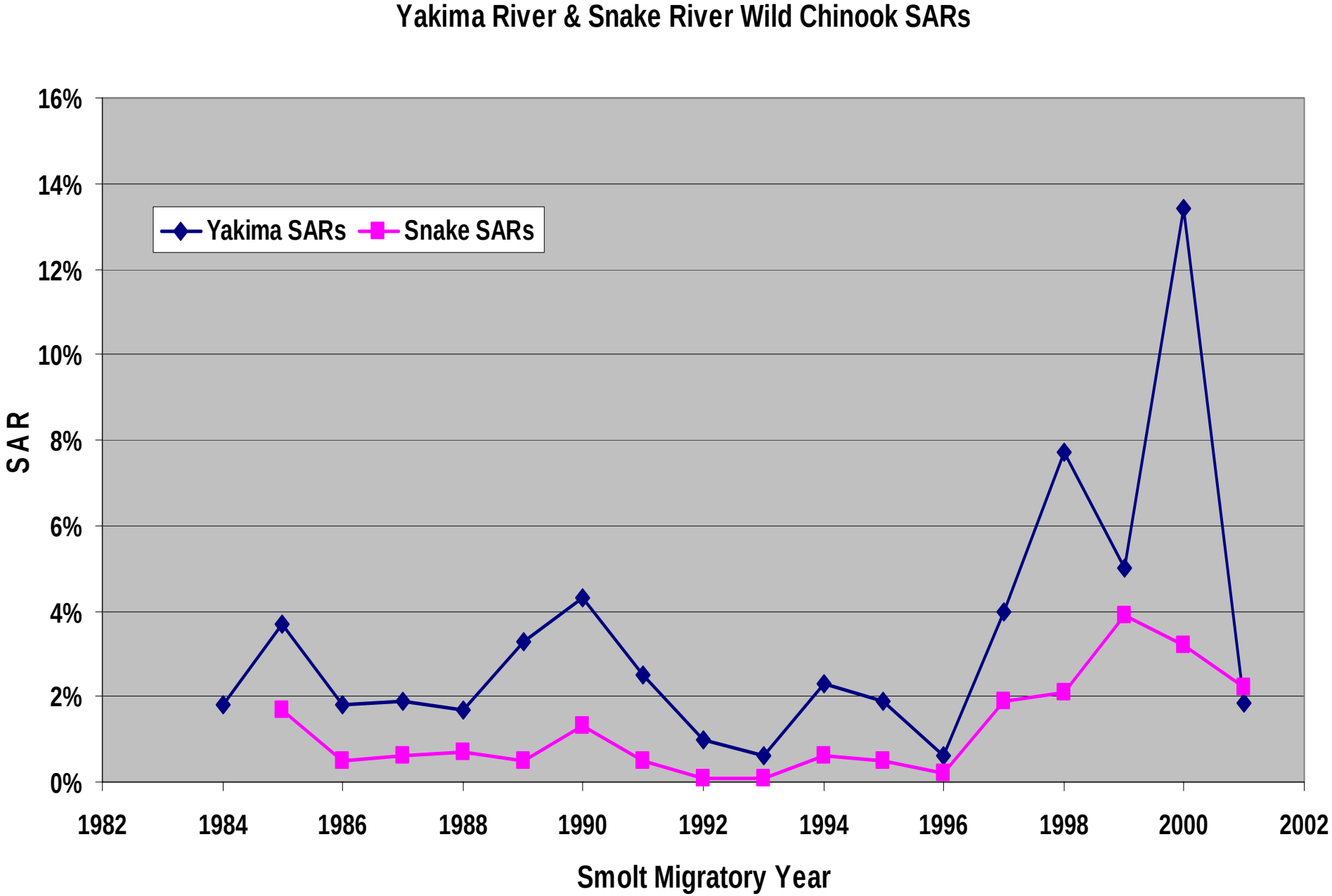


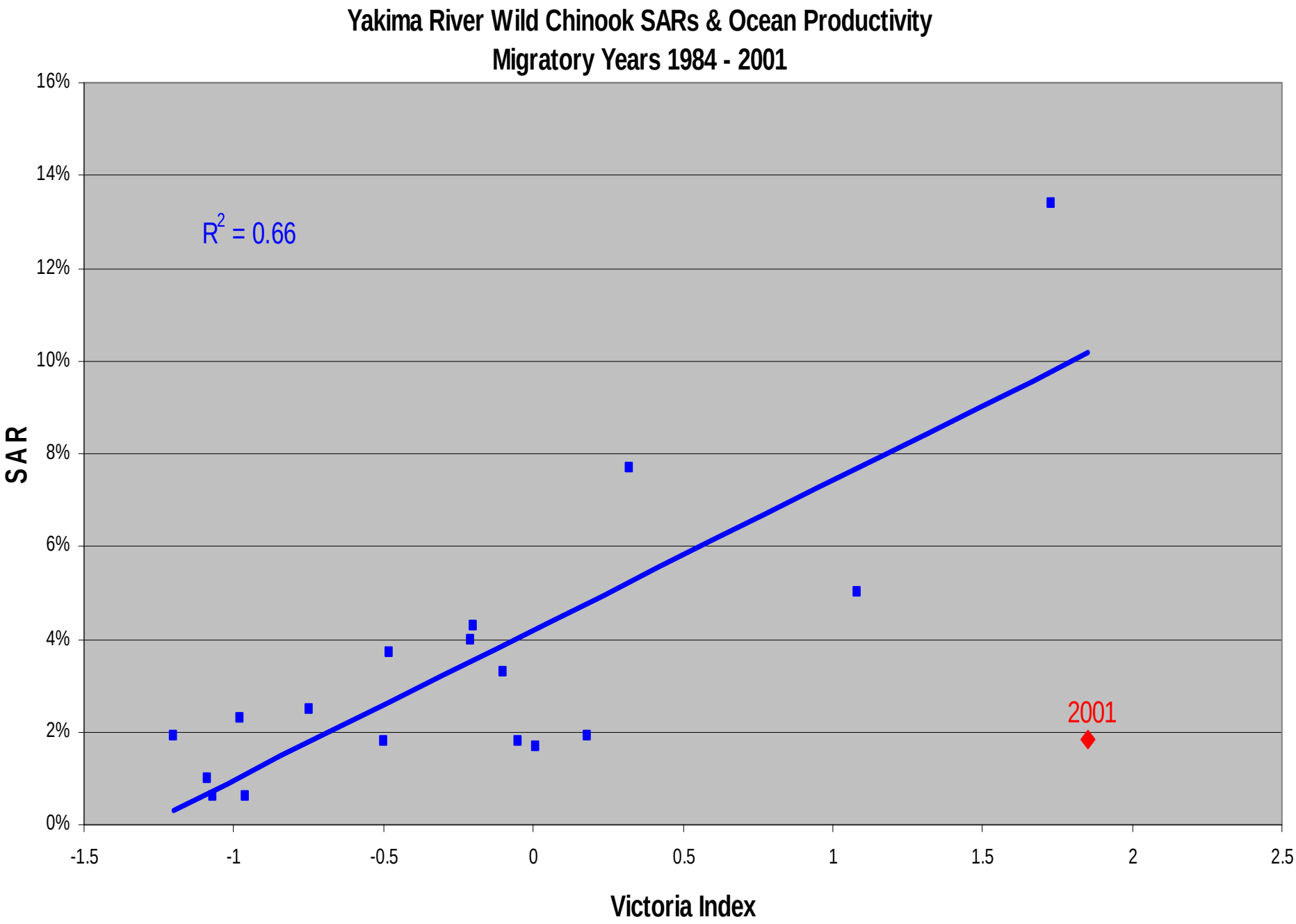
D-values measure the relative SARs of transported and in-river smolts estimated to have survived to below BVD

The relative SAR of MY 2001 in-river smolts declined by about 4-fold compared to the average of MY 1994-2002 (excluding 2001)

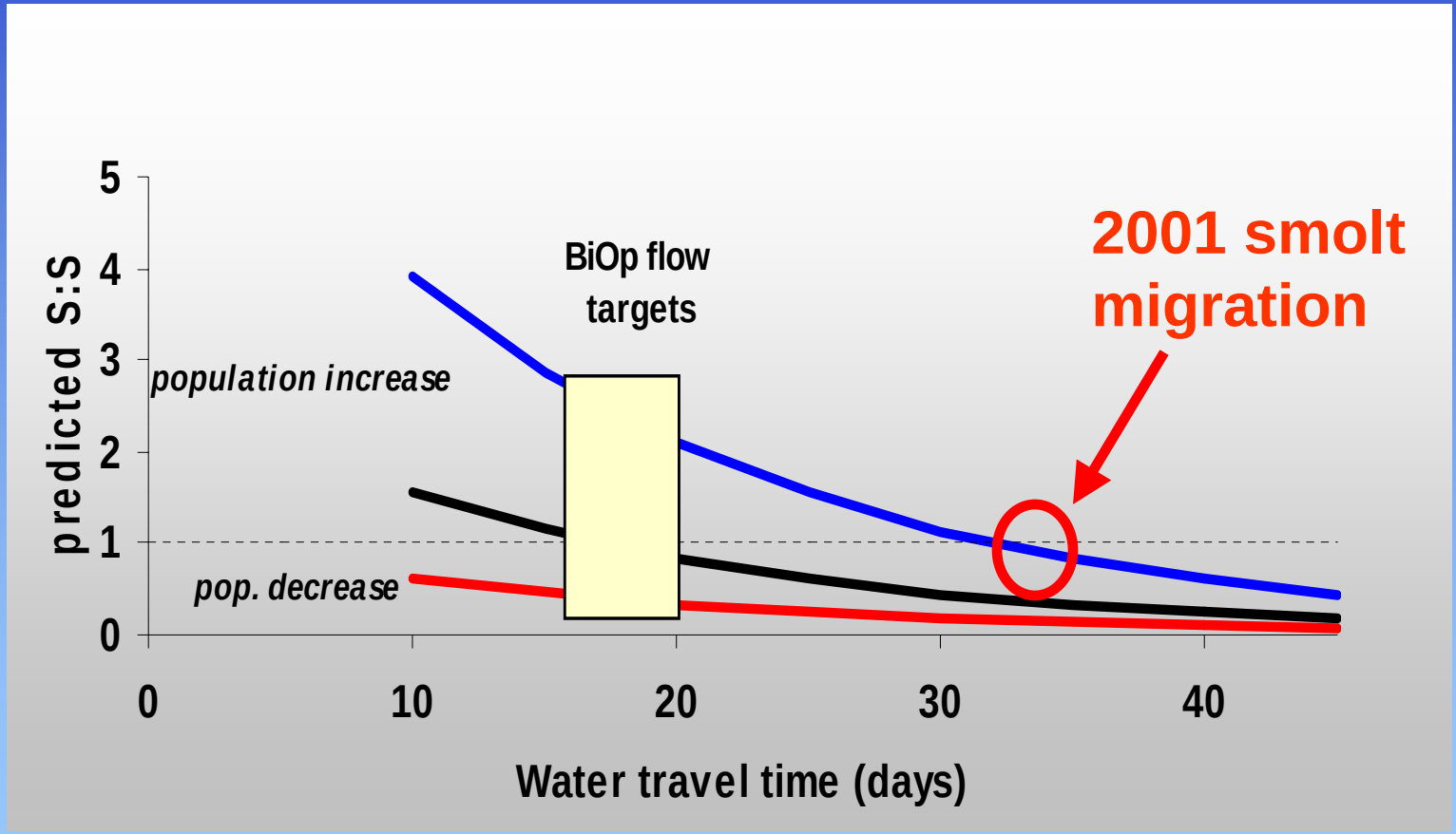
The most plausible explanation is that increased migration delay, turbine passage, and bypass passage caused a dramatic increase in latent mortality of in-river smolts

SAR impacts of MY 2001 conditions on in-river smolts were approximately 4 times greater than direct survival estimates indicate


Yakima River & Snake River Wild Chinook SARs
16%
14%
12%
10%
8%
6%
4%
2%
0%
SAR
Yakima SARs
Snake SARs
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
Smolt Migratory Year

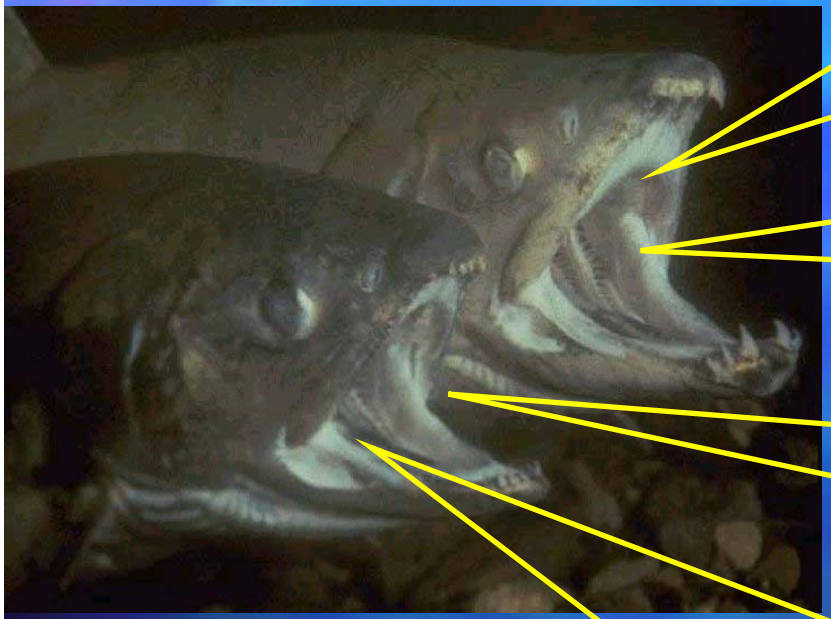

Yakima River Wild Chinook SARs & Ocean Productivity
Migratory Years 1984 - 2001
16%
14%
12%
10%
8%
6%
4%
2%
0%
SAR
R^2 = 0.66
2001
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Victoria Index

2001 smolt migration, poor flows but good ocean. States, Tribes, & USFWS model predicted poor to mediocre returns




Snake River Fall Chinook Adult Returns
Proportion Subyealings
90
80
70
60
50
40
30
20
10
0
1996
1997
1998
1999
2000
2001
2002
2003
Subyearling Migratory Year
Wild Fall Chinook
Hatchery Fall Chinook

So What Do the Adults Tell Us!



Transportation only provides a benefit to wild chinook in low flow years

Dams cause significant latent mortality that flow & spill reduce

The Victoria Index may be useful in predicting ocean productivity

Direct Survival Models greatly underestimate the benefits of flow & spill on adult return rates

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner / Cathy Hlebechuk*			

TMT MEETING

Wednesday November 24, 2004 0900 - 1200 hours

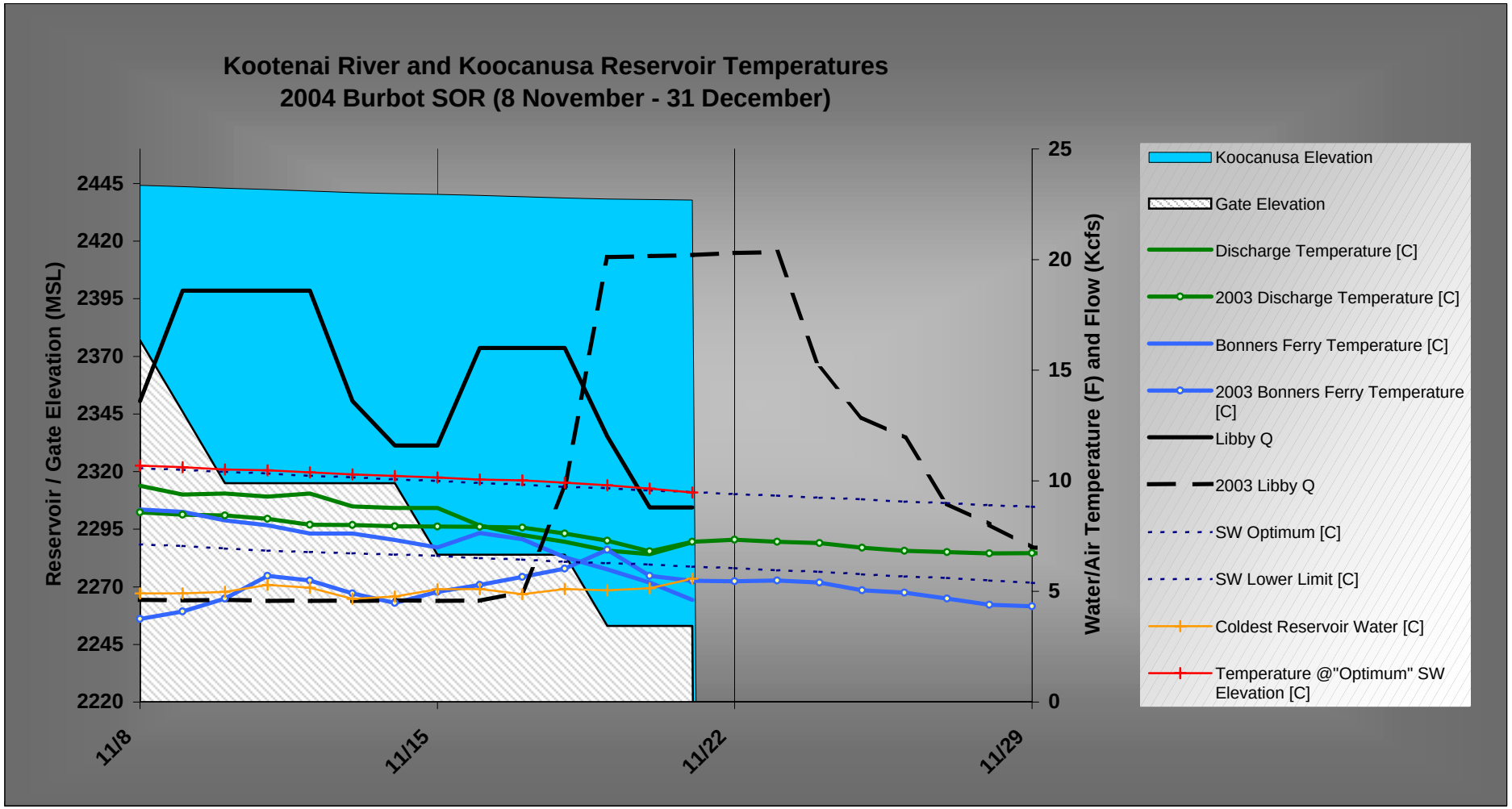
Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Venita Bar Update.
   [Vernita Bar Redd Survey, November 21, 2004]
3. Effects of Transport History on Performance on Adult Salmonid Migrants (Chris Peery, University of Idaho)
4. Reflections on Lessons Learned from 2004.
5. Chum Update.
6. Burbot SOR.
   [#2004-FWS2]
   [Kootenai River and Koocanusa Reservoir Temperatures]
7. Water Management Plan comments.
   [Water Management Plan Draft 11-04-04]
8. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality
9. Other
   - Set agenda for next meeting

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935, or Cathy Hlebechuk at (503) 808-3942


Kootenai River and Koocanusa Reservoir Temperatures
2004 Burbot SOR (8 November - 31 December)
Reservoir / Gate Elevation (MSL)
Water/Air Temperature (F) and Flow (Kcfs)
2445
2420
2395
2370
2345
2320
2295
2270
2245
2220
25
20
15
10
5
0
11/8
11/15
11/22
11/29
Koocanusa Elevation
Gate Elevation
Discharge Temperature [C]
2003 Discharge Temperature [C]
Bonners Ferry Temperature [C]
2003 Bonners Ferry Temperature [C]
Libby Q
2003 Libby Q
SW Optimum [C]
SW Lower Limit [C]
Coldest Reservoir Water [C]
Temperature @"Optimum" SW Elevation [C]

Technical Management Team
10 November 2004

Effects of Transport History on Performance on Adult Salmonid Migrants.

Chris Peery
Department of Fish and Wildlife Resources
University of Idaho
Moscow, ID 83844-1141

Background

From 2000 to 2003, we radio-tagged

457 Snake River spring/summer Chinook Salmon and
727 Snake Rive steelhead.
60% of Chinook salmon had been barged
62% of steelhead had been barged

Known-source fish were monitored to determine homing, straying, survival and fallback for barged in in-river migrants.

Homing

Chinook salmon – About 10% lower homing rate for transported fish.

		Percent (n) that homed			
Group by:	Year	River	Barge	χ^2	*P*
Chinook salmon					
All fish	All	92.6 (161)	82.5 (245)	8.5	0.004
Adult return	2000	75.0 (8)	64.3 (14)	0.3	0.604
	2001	93.8 (81)	83.4 (151)	5.0	0.025
	2002	95.2 (42)	82.5 (40)	3.4	0.065
	2003	90.0 (30)	85.0 (40)	0.4	0.536
Outmigration	1998	85.7 (14)	63.2 (19)	2.1	0.151
	1999	94.1 (85)	82.2 (163)	6.7	0.010
	2000	91.9 (62)	92.5 (40)	0.0	0.918
	2001		82.6 (23)		
Fin clipped	All	90.6 (53)	80.3 (117)	2.8	0.096
No clips	All	93.5 (108)	84.4 (128)	4.8	0.028

Homing

Steelhead – Generally less effect than for Chinook salmon, except 2003.

		Percent (n) that homed			
Group by:	Year	River	Barge	χ^2	*P*
Steelhead					
All fish	All	88.7 (238)	75.6 (409)	16.4	<0.001
Adult return	2001	89.3 (112)	72.7 (154)	11.0	<0.001
	2002	87.3 (110)	79.1 (201)	3.2	0.073
	2003	93.8 (16)	70.4 (54)	3.7	0.055
Outmigration	1999	83.3 (36)	75.4 (61)	0.8	0.360
	2000	89.3 (186)	78.8 (226)	8.1	0.004
	2001		70.1 (87)		
	2002	93.8 (16)	68.6 (35)	3.9	0.049
Fin clipped	All	87.1 (70)	79.7 (59)	1.3	0.252
No clips	All	89.3 (168)	74.9 (350)	14.5	<0.001

Fallback

Barged Chinook salmon fell back more and more often than in-river migrants.

		Percent (n) that fell back				Fallback frequency		
Group by:	Year	River	Barge	χ^2	*P*	River	Barge	*t--test P*
Chinook salmon								
All fish	All	7.5 (161)	19.2 (245)	10.8	0.001	1.1 (12)	2.7 (47)	0.015
Adult return	2000	25.0 (8)	50.0 (14)	1.3	0.251	1.0 (2)	3.1 (7)	
	2001	2.5 (81)	15.2 (151)	8.9	0.003	1.0 (2)	3.1 (23)	
	2002	14.3 (42)	25.0 (40)	1.5	0.221	1.0 (6)	2.5 (10)	0.085
	2003	6.7 (30)	17.5 (40)	1.8	0.180	1.5 (2)	1.1 (7)	
Outmigration	1998	21.4 (14)	36.8 (19)	0.9	0.341	1.0 (3)	3.1 (7)	
	1999	1.2 (85)	17.2 (163)	13.9	<0.001	1.0 (1)	3.2 (28)	
	2000	12.9 (62)	20.0 (40)	0.9	0.336	1.1 (8)	1.4 (8)	0.278
	2001		17.4 (23)				1.0 (4)	
Fin clipped	All	3.8 (53)	18.0 (117)	6.3	0.012	1.0 (2)	3.8 (21)	
No clips	All	9.3 (108)	20.3 (128)	5.5	0.019	1.1 (10)	1.8 (26)	0.137

Fallback

Steelhead – similar pattern as Chinook salmon, effect not as strong.

		Percent (n) that fell back				Fallback frequency		
Group by:	Year	River	Barge	χ^2	*P*	River	Barge	*t--test P*
Steelhead								
All fish	All	10.5 (238)	18.1 (409)	6.7	0.010	1.2 (25)	2.1 (74)	0.003
Adult return	2001	8.9 (112)	18.8 (154)	5.1	0.024	1.2 (10)	2.1 (29)	0.050
	2002	12.7 (110)	13.4 (201)	0.0	0.860	1.1 (14)	1.6 (27)	0.129
	2003	6.3 (16)	33.3 (54)	4.6	0.032	1.0 (1)	2.8 (18)	
Outmigration	1999	11.1 (36)	14.8 (61)	0.3	0.661	1.0 (4)	1.7 (9)	
	2000	10.8 (186)	15.5 (226)	2.0	0.160	1.2 (20)	1.9 (35)	0.031
	2001		20.7 (87)				2.3 (18)	
	2002	6.3 (16)	34.3 (35)	4.5	0.033	1.0 (1)	2.8 (12)	
Fin clipped	All	14.3 (70)	13.6 (59)	0.0	0.906	1.1 (10)	2.3 (8)	0.047
No clips	All	8.9 (168)	18.9 (350)	8.5	0.004	1.2 (15)	2.1 (66)	0.032

Summary

During low flow years and when spill reduced, proportion of fish transported will increase.

Fish that were barged as juveniles had lower survival to natal areas, likely because of greater straying and fallback behavior.

Evidence related specifically to 2001 outmigration year not complete.
Most PIT tagged fish were transported; no in-river comparison group.
2004 data not yet complete and less coverage than in past years.

2005 Water Management Plan

Draft – November 04, 2004

TABLE OF CONTENTS

1.0 Introduction

1.1 Draft BiOp and Updated Proposed Action

On September 9, 2004 NOAA Fisheries released "State/Tribal Review Draft Biological Opinion Operation of the Federal Columbia River Power System including the 19 Bureau of Reclamation Projects in the Columbia Basin (Revised and reissued pursuant to court order, NWF v. NMFS, Civ. No. CV 01-640-RE (D. Oregon))" (Draft BiOp). The Draft BiOp can be found at http://www.salmonrecovery.gov/R_biop.shtml. Also on September 9, 2004 the Action Agencies released "FINAL Draft Updated Proposed Action for the FCRPS Biological Opinion Remand" (Draft Proposed Action) The Draft Updated Proposed Action can be found at http://www.salmonrecovery.gov/implementation.shtml.

The Draft Updated Proposed Action states, "To a large extent, this Updated Proposed Action continues the implementation of many of the actions contained in the 2000 BiOp"[1] and "The Action Agencies are currently implementing the RPA of the 2000 BiOp. Under this Updated Proposed Action, we would implement the majority of measures in the 2000 RPA without modification and refine some of the more general offsite measures described in the 2000 RPA."[2]

In addition the action agencies are engaged in Endangered Species Act (ESA) Section 7 consultation with the U.S. Fish and Wildlife Service on the operation of Libby Dam as part of the Federal Columbia River Power System as part of their 2000 BiOp titled "Effects to Listed Species from Operations of the Federal Columbia River Power System".

Based on the above information this first draft of the 2005 Water Management Plan assumes that Action Agencies will be implementing the 2000 NMFS and USFWS BiOps' water management actions unless indicated elsewhere. Changes adopted through action agency ESA consultations will be incorporated into this Water Management Plan.

1.2 Preparation of Plans

This Water Management Plan for 2005 has been prepared as part of the implementation planning process outlined in the 2000 National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) Biological Opinions (BiOps) concerning operation of Federal Columbia River Power System (FCRPS) dams. This plan describes how the FCRPS dams and reservoirs will be operated for the 2005 water year (October 1, 2004, through September 30, 2005) to implement the BiOps' water management measures in a manner consistent with the actions called for in both BiOps and progress toward the performance standards specified in the NMFS 2000 BiOp, and non-BiOp related, requirements and purposes, such as flood control, hydropower, irrigation and recreation. The FCRPS hydrosystem performance standards are presented in section 12.

Per the BiOps, the action agencies will annually prepare a 1-year Water Management Plan that covers FCRPS hydro operations in the upcoming water year. These plans will generally be

[1] Draft Updated Proposed Action Page 1
[2] Draft Updated Proposed Action Page 13

drafted in July and completed by the end of September. The plan will cover the upcoming water year, which begins on October 1 and ends on September 30 the following year. This 1-year plan will be written when very little information is known about the future year's water supply. Therefore, the annual Water Management Plan will generically describe how the FCRPS will be operated during the year. It will also include any special operations (such as any special tests, flood control procedures planned for the year, etc.) that are known at the time the plan is developed.

This plan contains several uncertainties that previous plans did not address. Firstly, the NMFS FCRPS BiOp is in remand per U.S. Federal District Courts ruling by Judge Redden. The current provisions of the 2000 BiOp will remain in place until a new BiOp is developed. Another uncertainty is how the Northwest Power and Conservation Council's recommendations will be addressed. Many of their proposals called for studies. The extent these studies will impact operations are uncertain at this time. In addition, there are a number of project operations that may be revised based on research results that are not available at this time.

The action agencies will also develop more detailed in-season action plans to describe how the FCRPS projects will be operated under actual conditions with current water supply forecasts. The first action plan will be prepared in the fall to address the fall/winter operation of the FCRPS projects. A spring update will be drafted in January and finalized in the March/April time period to address the spring and summer operation of the FCRPS projects. These action plans will take into account changes in the BiOp adopted by NOAA in this time frame.

1.3 BiOp Strategies

This Water Management Plan addresses strategies to enhance juvenile and adult fish survival through a coordinated set of hydro project management actions to achieve performance standards, and to provide benefits to resident fish. The plan is structured to address water management actions associated with the following strategies and substrategies, as defined in the Endangered Species Act 2005/2005-2009 Implementation Plan for the Federal Columbia River Power System. These strategies generally remain the same in the Draft Updated Proposed Action except where noted below.

1.3.1 Hydro Strategies and Substrategies for Listed Species of Anadromous Fish

Hydro Strategy 2 – Manage water to improve juvenile and adult fish survival

Substrategy 2.1 – Reservoir operations to enhance fish survival: Actions under this substrategy are project operations that benefit fish at or near the project or its reservoir.

Substrategy 2.2 – System flow management to enhance fish survival: This substrategy includes coordinated system operations for mainstem flow management and redd protection.

Substrategy 2.3 – Spill operations for project passage: This substrategy includes spill operations at individual projects to provide a better project passage for juvenile fish while avoiding high dissolved gas levels or adult fallback problems.

Substrategy 2.5 – This has been changed in the Draft Updated Proposed Action to Operate to Achieve Maximum Fish Benefits in a Cost Effective Manner[3]

Substrategy? Other actions to enhance water management: This substrategy includes water management related actions that are being done to improve fish survival, such as studies, water quality actions, and water conservation improvements.

Hydro Strategy 3 – Operate and maintain fish passage facilities to improve fish survival

Substrategy 3.3 (Number is changed in Draft Updated Proposed Action[4] – Juvenile fish transport actions to enhance fish survival. This substrategy includes the transportation of juvenile fish around FCRPS dams.

1.3.2 Strategy and Substrategies for Listed Species of Resident Fish

Strategy 1 – Promote the reproduction and recruitment of Kootenai River white sturgeon (KRWS).

Substrategy 1.1 – Create conditions below Libby Dam that facilitate KRWS natural reproduction and juvenile survival. This substrategy includes operations at and below Libby Dam that aid in Kootenai River white sturgeon recovery.

Strategy 2 – Determine the impacts of the FCRPS on bull trout and mitigate for those impacts.

Substrategy 2.2 – Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats. This substrategy includes actions to improve conditions for bull trout.

[3] Draft Updated Proposed Action page 17
[4] Draft Updated Proposed Action page 18

1.4 Non-BiOp Operations

Each year the action agencies implement water management actions that are not required by the BiOps, but are aimed at meeting other project requirements and purposes such as flood control, power generation, irrigation, navigation, recreation, and fish and wildlife not listed under the ESA. The table below includes some of the fish and wildlife related non-BiOp water management actions that may be implemented and the time of year such actions typically occur. These actions are further described in section 12.

Action	**Time of Year**
Keenlyside Dam (Arrow) - mountain whitefish actions	December - January
Keenlyside Dam (Arrow) - rainbow trout actions	April - June
Libby - burbot actions	December - February
Dworshak – flow increase for hatchery release	March
Grand Coulee – kokanee	September - October
Hanford Reach Protection Flows	March - June
Vernita Bar Protection Flows	November - April
McNary - waterfowl nesting	March - May
McNary - waterfowl hunting enhancement	October - January
John Day - goose nesting	March - May
John Day - waterfowl hunting enhancement	October - January
Bonneville - Tribal fishing	April - September
Bonneville - Spring Creek Hatchery release	March

1.5 Changes From Last Year's Plan

This is the fourth annual water management plan developed under the NMFS and USFWS 2000 BiOps.

2.0 Hydro System Operation

2.1 Priorities

The NMFS and USFWS BiOps list the following strategies for flow management:

- Limit the winter/spring drawdown of storage reservoirs to increase spring flows and the probability of reservoir refill.
- Draft from storage reservoirs in the summer to increase summer flows.
- Provide minimum flows in the fall and winter to support mainstem spawning and incubation flow below Bonneville Dam.

The Action Agencies have reviewed these strategies and other actions called for in the BiOps and developed the following priorities (in order) for flow management and individual reservoir operations:

1. Operate storage reservoirs (Hungry Horse and Libby) to meet minimum flow and ramp rate criteria for resident fish.
2. Refill the storage projects by June 30 to provide summer flow augmentation. A late snowmelt runoff may delay refill in order to avoid excessive spill.
3. Operate storage projects to be at their April 10 flood control elevations to increase available flows for spring flow management.
4. Provide fall and winter flows for chum salmon spawning and incubation.

The Action Agencies implement several independent FCRPS project operations to benefit fish at or near each project or its reservoir. Reservoirs are to be operated to meet project minimum outflows, to reduce outflow fluctuations to avoid stranding resident fish and degrading fish habitat and productivity, to reduce cross sectional area to speed juvenile passage, and to make specific temperature releases to improve water temperatures for fish. These operations are generally the highest priority and not likely to change.

In an operating year that begins on October 1, the flow needs are not encountered in the same order as the BiOp priorities (e. g. the first decision to be made is for chum spawning flows which ultimately have a lower priority than summer flows), so chronologically, the Action Agencies will attempt to operate during the year as follows.

The initial objective is to operate the storage reservoirs (Dworshak, Hungry Horse, Libby, and Grand Coulee) to be at flood control levels by early April. This level varies by runoff forecast. Reaching early April flood control levels will be affected by how much water was released for flood control, power generation, and fishery flows to support both lower Columbia chum and Hanford reach fall Chinook spawning, and to meet Columbia Falls minimum flow requirements.

The next objective is to attempt to refill the storage reservoirs by about June 30 without causing excessive spill, to maximize available storage of water for the benefit of summer migrants. The June 30 refill in general has priority over spring flow (April, May, June) objectives, while attempting to meet the spring flow objectives and other fish needs.

The final objective is the management of available storage to augment summer (July and August) flows to achieve flow objectives and for water temperature moderation. The storage reservoirs will be drafted to their specified August 31 draft limits to augment summer flows and/or moderate river temperatures. Draft limits are a higher priority than the summer flow objectives in order to meet other project uses and reserve water in storage for the following year.

These objectives are intended as general guidelines in overall system operations. The BiOps also embrace the concept of adaptive management. Adaptive management is the concept that the operation of the system should be adjusted based on acquired knowledge about current conditions in the system and effects of our management actions on it, as opposed to following a rigid set of rules. Some items to be considered are current information on fish migration, stock status, biological requirements, biological effectiveness, and hydrologic and environmental conditions. System managers recognize that there is often insufficient water to meet all the actions specified in the BiOps and meet other system uses such as flood protection, power system reliability, irrigation, recreation, and navigation needs. The use of water for any one fish species or project purpose will most likely affect the amount of water available for other fish species or project purposes. Therefore, the Action Agencies, in coordination with regional parties through the TMT, endeavor to consider the multiple uses of the system, while providing, as a high priority, the measures to benefit listed species.

2.2 Conflicts

As stated above, there often is not enough water available in the Columbia River basin to meet every action item stated in the BiOps and provide for other project purposes. Below are some of the main conflicts that may occur.

2.2.1 Flood control draft versus project refill

One way to maximize flood control is to provide abundant storage space in the event a large flood occurs. Conversely, the BiOps require that the storage projects be as full as possible to increase the likelihood of refill and provide flows for spring flow management and summer flow augmentation.

Flood control procedures specify the amount of storage needed to provide flood protection. The space is provided to reduce the risk of forecast and runoff uncertainty. In an effort to reduce forecast error and to better anticipate the runoff timing or water supply for a given year, the BiOps call for the action agencies to study system flood control requirements and forecast procedures to determine if they can be improved.

2.2.2 The provision of spring flows versus project refill and summer flow augmentation

Again, because water supply and runoff forecasts are not 100 percent accurate, it is difficult to estimate how much water is available for spring flows and still assure refill at the storage projects by June 30. If too much water is allowed to flow through the storage reservoirs in the

spring, there is an increased risk of not refilling the projects. This will reduce the water supply available for summer flow augmentation. On the other hand, if the reservoirs fill too early in the spring, late season rain or snowmelt may cause flood damage downstream, or cause excessive spill and produce higher dissolved gas levels.

2.2.3 Chum tailwater elevations versus refill/spring flows

Setting the Bonneville tailwater elevation level for chum spawning and incubation in recognition of the spring refill priority is one of the decisions that the Action Agencies, in consultation with the interagency Technical Management Team (TMT), have to make with the least amount of reliable information. Decisions about the tailwater elevation level for chum spawning and incubation are made in the October/November time period, long before the action agencies have reliable information on the coming year's expected water supply. The early season Southern Oscillation Index (SOI) provides an indication of the upcoming year's water supply. If the tailwater elevation level selected is too high (causing higher flows), there is a risk of refill failure. Choosing to refill runs the risk of reducing the tailwater elevation that can be supported through the spawning season and dewatering chum redds. A chum seining project will be in place below BON for 2005. This program will move chum salmon into Duncan Creek and provide fish to the Washougal hatchery. This will ensure chum production in the unlikely event that chum flows cannot be provided. The area below Bonneville Dam is also utilized by fall chinook and coho spawning when water is provided to the spawning grounds.

2.2.4 Sturgeon pulse versus summer flow augmentation

Water released from Libby Dam for spring sturgeon flows (pulse) during April -through July may reduce the water available for summer flow augmentation from Libby, although VARQ has been implemented to minimize that possibility. If the pulsed water cannot be stored in Grand Coulee, spring flows will be provided, potentially at the expense of summer flows.

2.2.5 Fish operations versus other project uses

In addition to flood control operation, there are other project purposes that may conflict with operations carried out for the purpose of enhancing fish survival. For example, keeping the flow steady below a project for resident and anadromous fish needs conflicts with the ability to use a project to follow electrical load changes; spilling water for juvenile fish passage reduces the amount of power that can be generated to meet demand; and augmenting flows during fish migration periods may conflict with the shape of power demand. Additionally, irrigation demands and recreation elevations at headwater reservoirs may impact the amount of water available for spring flows. The development of the Biological Opinion for the FCRPS included consultation with the federal operating agencies on the operations of the Hydrosystem, and the impact on listed stocks. These negotiations included consideration of the multiple uses of the Hydrosystem. These negotiations and the multiple uses of the Hydrosystem are part of the foundation of the Biological Opinion.

2.2.6 Conflicts and priorities

The conflicts described above pose many challenges to the Action Agencies in meeting the multiple uses of the Federal hydro system. Given these challenges, the priorities for flow management and individual reservoir operations outlined in section 2.1 will guide the Action

Agencies in their operational decision-making when conflicts arise. Discussion of conflicts between operational requirements and alternatives for addressing such conflicts will occur in TMT with disputes taken to IT and at times to the Federal Executives.

2.3 Emergencies

The 2000 BiOps acknowledge that emergencies and other unexpected events occur and may cause deviations from fish operations. Such deviations may be short in duration, such as a deviation to respond to an unexpected unit outage or power line failure, or longer in duration, such as experienced in 2001 in response to the low water conditions and unprecedented power market conditions. The TMT has developed Emergency Protocols to be followed to respond to short-term emergencies. (See Appendix 1 or see TMT homepage at http://www.nwd-wc.usace.army.mil/TMT for current version of protocols.)

2.4 Research

Research studies sometimes require special operations that differ from routine operations otherwise described in the Biological Opinions. These studies are generally developed through technical workgroups of the Regional Forum (e.g., System Configuration Team (SCT) and the USACE's Anadromous Fish Evaluation Program Fish Facilities Design Review Work Group (FFDRWG) and Studies Review Work Group (SRWG) and further described in 1- and 5-Year Implementation Plans. In most cases, operations associated with research entail relatively minor changes from routine operations and are coordinated in technical forums (e.g., TMT, FPOM). In some cases, the nature or magnitude of operational changes for research may require further coordination and review in policy forums (e.g., Implementation team (IT)). Generally, research planning and coordination occurs throughout the late fall and winter, with final research plans established by late winter/early spring. In extraordinary events such as extreme low runoff conditions or an emergency, planned research may be modified prior to spring to accommodate anticipated unique circumstances and/or to reallocate resources to obtain the greatest value given the circumstances. The Council's recommended changes in mainstem hydro operations will require the development of specific experimental designs that may be implemented next spring and summer. These experiments are under development and may be incorporated into the experimental protocols for next year as soon as they become available.

3.0 Decision Points and Water Supply Forecasts

3.1 Decision Points

Table 1 below lists the key water management decisions/actions and when they need to be made. Some decision points, such as setting flow objectives, are clearly articulated in the BiOps. Other decision points, such as setting weekly flow augmentation levels, require much discussion and coordination. Some of the decision points given below are spelled out in the BiOps and some are based on experience. These decisions are made by the action agencies in consideration of actions called for in the BiOps and input received through the Regional Forum (TMT, IT, Regional Executives).

Table 1. Water Management Decision Points/Actions

	Early October	November	Winter (December – March)	Early April	Early May	June	Early July
Operations	• Assess potential of providing tailwater elevations/flows for chinook populations below Bonneville Dam *(Non-BiOp Action)* • Assess potential tailwater elevations / flow levels to support chum spawning below Bonneville Dam • Preliminary discussions of flood control/ project refill strategy • Albeni Falls fall/winter drawdown strategy discussion	• Early season forecast using SOI • Evaluate VARQ rule curves • Evaluate likely tier for sturgeon water volume • Consider Kootenai burbot operations	• Determine winter/spring chum flow levels below Bonneville Dam • Determine flood control and refill strategies, including any available flood control shifts • Minimum flows from Hungry Horse Dam and minimum Columbia Falls flows are set by April-August forecast • Begin discussing spring operations • Spring Creek Hatchery release –March *(Non-BiOp Action)* • Begin spring transport discussions • Hanford Reach Operations Discussed *(Non-BiOp Action)*Outlook for meeting flow objectives prepared • Determine end of Dec flood control elevation at Libby based on Dec SOI –based forecast	• Spring flow objectives are set by the April final volume forecasts • Determine spring flow management strategy including priority for refill • Determine start dates and levels by project for spring spill • Determine start date for MOP at Lower Snake River projects • Determine John Day forebay elevations	• Use May final forecast to calculate the appropriate volume of the sturgeon tiered flow release from Libby using new, coordinated formula • Determine required outflow from Libby for bull trout.	• Summer flow objective at Lower Granite determined by June final volume forecast • Determine summer flow augmentation strategy (early June) • Complete Dworshak temperature modeling and determine release strategy • Decision on McNary juvenile fish transportation (late June) • Switch to 30% spill 24 hours a day at John Day.	• Grand Coulee summer reservoir draft limit determined by July Final April – August volume forecast

	Early October	November	Winter (December – March)	Early April	Early May	June	Early July
	• Hanford Reach /Vernita Bar flows set *(Non-BiOp Action)*						
Plans	Develop fall/winter update to the annual water management plan		Preliminary work on spring/summer update to the annual water management plan	Start operational plans for Libby and Hungry Horse Dams	Libby and Hungry Horse operational plans due		
Forecasts			January, February, and March volume forecasts released by the RFC	April final forecast released by RFC	May final forecast released by RFC	June final forecast released by RFC	

3.2 *Water Supply Forecasts*

Water supply forecasts serve as a guide to how much water is available for fish and other operations.

During the flow management season (April 3 - August 31) weekly flow projections are provided to the TMT.

The National Weather Service's Northwest River Forecast Center, USACE Northwest Division Hydrologic Engineering Branch, Reclamation, and others prepare water supply forecasts to manage the Columbia River. Table 2 below lists the forecasts that are referenced by the NMFS 2000 BiOp and the USFWS 2000 BiOp.

Table 2. Water Supply Forecasts Used to Determine BiOp Actions

Forecast Point	Forecast period	Forecast	What does it control	BiOp reference	RPA Action Item
Lower Granite	April – July	April Final	Spring flow objective at Lower Granite	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
Lower Granite	April – July	June Final	Summer flow objective at Lower Granite	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
The Dalles	April – August	April Final	Spring flow objective at McNary Dam	NMFS BiOp at Section 9.6.1.2.1 Page 9-57	NMFS Action 14
Hungry Horse	April – August	March Final provided by Reclamation	Hungry Horse minimum flows	NMFS BiOp at Section 9.6.1.2.3 Page 9-63 USFWS BiOp at Section 3.A.1 Page 6	NMFS Action 19
Hungry Horse	April – August	March Final provided by Reclamation	Columbia Falls minimum flow	NMFS BiOp at Section 9.6.1.2.3 Page 9-63 USFWS BiOp at Section 3.A.1 Page 7	NMFS Action 19
The Dalles	April – August	July Final	Grand Coulee summer draft limit	NMFS BiOp at Section 9.6.1.2.3 Page 9-64	NMFS Action 19
Libby	April – August	Not Specified	Volume of water for sturgeon flow at Bonners Ferry and minimum bull trout flows between sturgeon and salmon flows	USFWS BiOp at Section 8.1 Page 74 and USFWS BiOp at Section 3.A.2 Page 15	USFWS Action 8.1.c NMFS Action 19

Table 3 summarizes the major fish-related reservoir and flow operations by project. More detailed descriptions of each of these operations follow.

Table 3. Major Fish-Related Reservoir and Flow Operations

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Libby	Winter: Operate to VARQ flood control rule curve and achieve appropriate elevation by April 10 Spring: Refill by June 30 and operate to meet flow objectives	April – July Augment flows at Bonners Ferry for sturgeon pulse	Year Round: Operate to minimum flows and project ramping rates to minimize adverse affects of flow fluctuations	Operate to meet flow objectives and June 30 refill if possible without excessive spill	July/August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 2,439 feet	Fall/winter storage may be used to support chum flows
Hungry Horse	Winter: Operate to VARQ flood control by April 10 Spring: Refill by June 30 if possible without excessive spill and operate to meet flow objectives		Year Round: Operate to Columbia Falls minimum flows and project ramping rates to minimize adverse affects of flow fluctuations		July/August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 3,540 feet	Fall/winter storage may be used to support chum flows
Albeni Falls	Winter: Operate to flood control rule curve Spring: Refill by June 30 and operate to meet flow objectives		Fall/Winter: Reach 2055' by November 20 and maintain this elevation until kokanee fry emergence (approximately end of April)			Fall/winter storage may be used to support chum flows

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Grand Coulee	Winter: Operate to 85% confidence of meeting April 10 flood control elevation Spring: Refill by June 30 and operate to meet flow objectives				July-August: Draft for summer flow augmentation, not to exceed reservoir draft limit of 1,280 feet (>/= 92 maf forecast at The Dalles) or 1,278 feet (< 92 maf forecast at The Dalles)	Fall/winter storage may be used to support chum flows
Grand Coulee (continued)					July/August: Operate Banks Lake at elevation 5 feet less than full to provide more water for summer flow augmentation	
Dworshak	Winter: Operate to flood control rule curve by April 10 Spring: Refill by June 30 and operate to meet flow objectives				Draft for summer flow augmentation and water temperature reduction, not to exceed reservoir draft limit of 1,520 feet	Fall/winter storage may be used to support chum flows
Lower Granite				Flow objective of 85-100 kcfs Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	Flow objective of 50-55 kcfs Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	
Little Goose				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Lower Monumental				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	
Ice Harbor				Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	Operate within 1 foot of MOP to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	
McNary				Flow objective of 220-260 kcfs Apr 1 – Oct 31 Operate to 1% peak efficiency	Flow objective of 200 kcfs Apr 1 – Oct 31 Operate to 1% peak efficiency	
John Day				Apr 10-Sep 30 Operate within 1.5 feet of minimum level that provides irrigation pumping to reduce juvenile travel time Apr 1 – Oct 31 Operate to 1% peak efficiency	Apr 1 – Oct 31 Operate to 1% peak efficiency Operate within 1.5 feet of level that will allow irrigation to reduce juvenile travel time	
The Dalles				Apr 1 – Oct 31 Operate to 1% peak efficiency	Apr 1 – Oct 31 Operate to 1% peak efficiency	

Project	Flood Control & Refill	Sturgeon	Bull Trout	Spring Anadromous	Summer Anadromous	Chum
Bonneville				Apr 1 – Oct 31 Operate to 1% peak efficiency	Apr 1 – Oct 31 Operate to 1% peak efficiency	If hydrologic conditions indicate system can likely maintain minimum flow below BON of 125 kcfs Nov 1 - April, implement mainstem chum flows. If not, provide flows below BON to enable access to creeks for spawning.

4.0 Sub-Strategies: Hydrosystem Substrategy 2.1: Reservoir operations to improve fish survival

4.1 Lower Snake Projects (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor)

4.1.1 Reservoir Passage

All Lower Snake projects will operate within 1 foot of Minimum Operating Pool (MOP) from approximately April 3 until small numbers of juvenile migrants are present. This normally occurs in late August.[5] Lower Granite Dam shall not return to normal operating pool until enough natural cooling has occurred in the fall, generally after October 1. The purpose of this action is to provide a smaller reservoir cross section to reduce juvenile salmon travel time and reduce flow fluctuations. Elevations may be modified to maintain the minimum navigation channel requirements.

4.1.2 Juvenile Fish Survival

To enhance juvenile passage survival, turbines at all Lower Snake projects will be operated within 1% of peak efficiency during the juvenile and adult migration seasons (April 1 through October 31).[6] (See appendix C, Corps of Engineers 2005 Fish Passage Plan)

4.2 Lower Columbia Projects (McNary, John Day, The Dalles, Bonneville)

To enhance juvenile passage survival, turbines at all the Lower Columbia projects will be operated within 1% of peak efficiency during the juvenile and adult migration seasons (April 1 through October 31).[7] A test of operating above the 1% peak operating efficiency is scheduled to be conducted at McNary Dam during the 2005 juvenile migration.

4.2.1 John Day

4.2.1.1 Pool level

John Day pool shall operate within a 1½-foot range of the minimum level that provides irrigation pumping from April 10 to September 30.[8] The purpose of this action is to provide a smaller reservoir cross section to reduce juvenile salmon travel time.

[5] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 20 Note page numbers for the NMFS BiOp refers to the PDF version.
[6] NMFS BiOp at Section 9.6.1.4.4 Page 9-93, Action 58
[7] NMFS BiOp at Section 9.6.1.4.4 Page 9-93, Action 58
[8] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 20

5.0 Hydrosystem Substrategy 2.2: System flow management to improve fish survival

5.1 Flow Objectives

The purpose of the flow objectives is to aid in achieving the hydro system biological performance standards by providing better instream flow to aid in juvenile salmon and steelhead migration and enhance water quality. However, as recognized in the BiOps, it is not possible to achieve the flow objectives in many water years because there is limited water and reservoir storage. This Water Management Plan strives to achieve the best possible mainstem passage conditions, recognizing the priorities established in this document and the need to balance the limited water and storage resources available in the region.

5.1.1 Lower Granite

5.1.1.1 Spring anadromous fish

The April final runoff volume forecast at Lower Granite Dam for April to July determines the spring flow objective at Lower Granite Dam.[9] When the forecast is less than 16 million acre-feet (maf) the flow objective will be 85 kcfs. If the forecast is between 16 maf and 20 maf the flow objective will be linearly interpolated between 85 kcfs and 100 kcfs. If the forecast is greater than 20 maf the flow objective will be 100 kcfs. The planning dates for the flow objective are from April 3 to June 20.

5.1.1.2 Summer anadromous fish

The June final runoff volume forecast at Lower Granite Dam for April to July determines the summer flow objective at Lower Granite Dam.[10] When the forecast is less than 16 maf the flow objective will be 50 kcfs. If the forecast is between 16 maf and 28 maf the flow objective will be linearly interpolated between 50 kcfs and 55 kcfs. If the forecast is greater than 28 maf the flow objective will be 55 kcfs. The planning dates for the flow objective will be from June 21 to August 31.

5.1.2 Priest Rapids—Spring anadromous fish

The spring flow objective at Priest Rapids dam is 135 kcfs.[11] The planning dates are from April 10 to June 30.

5.1.3 McNary

5.1.3.1 Spring anadromous fish

The spring flow objective at McNary Dam is set according to the April final runoff volume forecast at The Dalles Dam for April to August.[12] When the forecast is less than 80 maf the flow objective will be 220 kcfs. If the forecast is between 80 maf and 92 maf the flow objective will be linearly interpolated between 220 kcfs and 260 kcfs. If the forecast is greater than 92 maf the

[9] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[10] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[11] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14
[12] NMFS BiOp at Section 9.6.1.2.1 Page 9-57, Action 14

flow objective will be 260 kcfs. The planning dates for the flow objective will be from April 10 to June 30.

Weekend flows are often lower than weekday flows due to less electrical demand in the region. During the spring and summer migration period (April through August), the action agencies strive to maintain MCN flows during the weekend at a level which is at least 80% of the previous weekday average.

5.1.3.2 Summer anadromous fish

The summer flow objective at McNary Dam is 200 kcfs.[13] The planning dates for the flow objective will be from July 1 to August 31.

5.2 All Storage Projects

The purpose of the following actions is to refill FCRPS storage projects as much as possible for spring flows, summer flow augmentation and to cool water temperatures.

The FCRPS dams will be operated during the winter season in order to achieve a high probability of water surface elevations within 0.5 foot of the flood control rule curve by April 10, and to refill by June 30, except as specifically provided by the TMT.[14] The Action Agencies, in consideration of recommendations of the Technical Management Team, will determine the availability and amount of any additional FCRPS storage draft beyond the flood control rule curve for the purpose of flow augmentation, consistent with refill by June 30 for summer flow augmentation.

During the spring, the Action Agencies shall operate the FCRPS to meet the flow objectives and refill the storage reservoirs (Albeni Falls, Dworshak, Grand Coulee, Hungry Horse, and Libby) by approximately June 30.[15] (See Grand Coulee Section 5.9 for special operations this year) If both these objectives cannot be achieved, the TMT will make an in-season recommendation, weighing considerations unique to each particular year. Because research results indicate that increased flows have more direct survival benefits for summer migrants than for spring migrants, modest reductions in spring flows to facilitate reservoir refill would generally be preferable to refill failure.

During the summer, the Action Agencies draft mainstem storage reservoirs (Libby, Hungry Horse, Dworshak, Grand Coulee, Banks Lake) within the NMFS BiOp's specified draft limits, based on flow recommendations provided by TMT. TMT considers a number of factors when developing its flow recommendations, such as: the status of the migration, attainment of flow objectives, water quality, and the effects that reservoir operations will have on other listed and resident fish populations.

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[13] NMFS BiOp at Section 9.6.1.2.1 Page 9-58, Action 14
[14] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[15] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18

5.3 Libby

5.3.1 Flood Control

The Corps plans to use the new SOI forecast procedure in December to determine the December 31 flood control elevation. In below average water years the end of December draft elevation may be higher than 2411 feet.

Libby will be operated during the winter season in order to achieve a high probability of water surface elevations within 0.5 foot of the VARQ flood control elevation by April 10 and to refill by June 30 and avoid the risk of filling too quickly and having to spill, except as specifically provided by the TMT.[16]

During the spring, the Action Agencies shall operate Libby to refill by approximately June 30 while contributing to meeting the flow objectives and the pulse for sturgeon. [17]

5.3.2 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Libby to help meet the flow objectives for juvenile salmon out-migration in the lower Columbia. The summer reservoir draft limit is 2,439 feet,[18] which determines the maximum draft available for summer flow augmentation from Libby Retention of July/August water in Lake Koocanusa is possible under a Libby-Canadian storage water exchange, but is not guaranteed. This exchange agreement also reduces the second flow peak created by July/August salmon flow through Kootenay Lake July and August. The purpose of this action is to reduce or eliminate the second peak in the Kootenai River, thus protecting bull trout and sturgeon. Additionally, the exchange agreement reduces the draft of Lake Koocanusa and increases upstream benefits (Note: This type of exchange is allowed under the current Libby Coordination Agreement, which was signed February 16, 2000. Because the operation must have mutual benefit and the magnitude of the water year is not known earlier, the operation, if any, for a given water year is not finalized until June or July of that year.)

The Northwest Power Planning and Conservation Council mainstem amendments call for an evaluation of the relative risks posed to resident fish versus the benefits provided to anadromous fish by drafting the reservoir to 2439' by September 30 in the lowest 20% of volume runoff years and to elevation 2449' by September 30 in all other years. The TMT will consider implementation of this plan during the fall season.

5.4 Hungry Horse

5.4.1 Flood Control

Hungry Horse began operating using VARQ starting January 1, 2001.[19] The purpose of this action is to provide more water for flow augmentation.

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[16] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[17] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[18] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19
[19] NMFS BiOp at Section 9.6.1.2.3 Page 9-62 Action 19

Hungry Horse will be operated during the winter season to achieve a high probability[20] of water surface elevations within 0.5 foot of the flood control rule curve by April 10 and to refill by June 30, except as specifically provided by the TMT.[21]

5.4.2 Refill

During the spring, the Action Agencies shall operate Hungry Horse to contribute to meeting the flow objectives and refill by approximately June 30.[22]

5.4.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Hungry Horse to help meet the flow objectives. The summer reservoir draft limit is 3,540 feet.[23] This limit determines the maximum draft available for summer flow augmentation from Hungry Horse.

The Northwest Power Planning and Conservation Council mainstem amendments call for an evaluation of the relative risks posed to downstream resident fish versus the benefits provided to anadromous fish by drafting the reservoir to 3,540 feet by September 30 in the lowest 20% of volume runoff years and to elevation 3550' by September 30 in all other years. The TMT will consider implementation of this plan during the fall season.

5.5 Albeni Falls

5.5.1 Fall draft for fish

The reservoir will be drafted by November 20th to elevation 2055 for Kokanee spawning. This elevation will be maintained as a minimum until Kokanee emergence ends.

5.5.2 Flood Control Draft

Albeni Falls will be operated during the winter season using standard flood control criteria.

5.5.3 Refill

During the spring, Albeni Falls will be refilled in accordance with standard flood control criteria. The Action Agencies shall operate Albeni Falls to meet the flow objectives and refill by approximately June 30.[24]

[20] No specific probability of refill is specified in the BiOps. According to the BiOps (NMFS 9-62) the probability of being at April 10 flood control is 60% when operating using VARQ.
[21] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[22] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[23] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19
[24] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18

5.6 Upper Snake River Reservoir Operation for Flow Augmentation

The purpose of this action is to provide water from the upper Snake Reservoirs for flow augmentation.

Reclamation will attempt to provide 427 kaf of flow augmentation from the Reclamation projects in the upper Snake River basin consistent with the NMFS 2002 Supplemental Biological Opinion and Idaho state law.[25]

5.7 Brownlee, Dworshak, and Grand Coulee Flood Control

Opportunities to shift flood control requirements from Brownlee and Dworshak to Grand Coulee shall be considered.[26] These shifts may be implemented after coordination with TMT. The purpose of this action is to provide more water for flow augmentation in the lower Snake River. This will occur when the shifts will not compromise flood control and they have been coordinated.

5.8 Dworshak

5.8.1 Flood Control

Dworshak will be operated during the winter season in order to achieve a high probability[27] of water surface elevations within 0.5 foot of the flood control rule curve by April 10 and to refill by June 30, except as specifically provided by the TMT.[28]

5.8.2 Refill

During the spring, the Action Agencies shall operate Dworshak to meet the flow objectives and refill by approximately June 30.[29]

After summer fish operations, flows from Dworshak shall be limited to minimum one turbine operation (approximately 1,500 cfs) unless higher flows are required for flood control or power generation in a cold snap.[30] The purpose of this action is to assist in the filling of Dworshak reservoir.

5.8.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Dworshak to help meet the flow objectives. The summer reservoir draft limit is 1,520 feet.[31] This limit determines the maximum draft available for summer flow augmentation from Dworshak. As was the case in 2002 and 2003, water may be held above 1,520 feet and discharged in early September in some water years.

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[25] NMFS BiOp at Section 9.6.1.2.6 Page 9-70, Action 32
[26] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 21
[27] No specific probability of refill is specified in the BiOps
[28] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[29] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[30] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Actions 18 & 19
[31] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 19

5.8.4 Water quality

During the summer, releases shall be made from Dworshak to attempt to maintain water temperatures at the Lower Granite tailrace fixed monitoring site at or below 68 F.[32] Although the NOAA 2000 FCRPS BiOp stated the goal was to maintain the forebay at this temperature, modeling and experience have demonstrated that the tailrace temperature is more representative of river conditions and temperature exposure of migrating salmonids. The purpose of this action is to improve water quality (by lowering water temperature) in the Lower Snake River. This fishery action also assists in cooling the downstream lower Snake River closer to the state water temperature standards.

[32] NMFS BiOp at Section 9.6.1.2.3 Page 9-65, Action 19

5.9 Grand Coulee

5.9.1 Flood Control

Grand Coulee will be operated during the winter season in order to achieve an 85% probability of water surface elevations within 0.5 foot of the flood control rule curve by April 10. The TMT may provide other specific operations.[33] Grand Coulee Dam will be held below elevation 1255 feet for a minimum of 6 weeks during April and May to accomplish required maintenance on the spillway drum gates. The maintenance on the drum gates has been delayed the past three water years due to low water conditions. This year the maintenance is mandatory.

5.9.2 Refill

During the spring, the Action Agencies shall operate Grand Coulee to refill by approximately July 4.[34] The ability to meet flow objectives in May and June may be affected by drum gate maintenance.

5.9.3 Summer anadromous fish

During the summer (July and August) the Action Agencies shall operate Grand Coulee to help meet the flow objectives for juvenile salmon out migration. The July Final forecast produced by RFC determines the summer reservoir draft limit. The draft limit is 1,280 feet in years when the April through August forecast for The Dalles is equal to or exceeds 92 maf. If the forecast is less than 92 maf the draft limit will be 1,278 feet.[35] This limit determines the maximum draft available for summer flow augmentation from Grand Coulee.

5.10 Banks Lake Summer Draft

Banks Lake will be drafted to elevation 1,565 feet by the end of August.[36] The purpose of this action is to provide more water for summer flow augmentation.

5.11 Bonneville Dam Chum Tailwater Elevations

The purpose of the following actions is to provide spawning areas and protect redds of chum salmon.

Tailwater elevations will be regulated below Bonneville Dam to support spawning of chum salmon if the best hydrologic data available by early October indicate that precipitation, runoff, and reservoir storage are likely to support the operation from the start of spawning (late October or early November) until the end of emergence (generally through the start of the spring flow management season in April). The SOI has been given consideration in previous years as a method to get a relative gage as to what the coming year's precipitation may be. The chum spawning operation cannot adversely affect implementation of NMFS's 2000 FCRPS higher priority RPA actions (see section 2.1) or the parties' ability to comply with the Vernita Bar

[33] NMFS BiOp at Section 9.6.1.2.1 Page 9-56, Action 14 and NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[34] NMFS BiOp at Section 9.6.1.2.3 Page 9-61, Action 18
[35] NMFS BiOp at Section 9.6.1.2.3 Page 9-64, Action 19
[36] NMFS BiOp at Section 9.6.1.2.4 Page 9-67, Action 23

agreement. If these conditions cannot be met, the Action Agencies will work with NOAA Fisheries and the regional salmon managers to identify operations that would benefit salmon while maintaining these other fish protection measures. Such operations may include intentionally managing flows below what is necessary for mainstem spawning to discourage redds from being established in the area or shaping flows in a manner that would discourage redd development (reverse load factoring). In the BiOp, the chum spawning operation calls for the FCRPS projects to provide a minimum flow below Bonneville Dam of 125 kcfs (or more as coordinated) from when chum salmon are found in the area around Ives and Pierce islands (but no later than November 1) through December 31. The NMFS BiOp recommends flows from Bonneville Dam be maintained within 5 kcfs of the established minimum.[37] However, in recent years, operating to the Bonneville tailwater gage during daylight hours was found to be an effective management tool. During nighttime hours, discharges more the 5 kcfs over the daytime discharge level may occur. Operations with discharges more than 75 kcfs over the daytime discharge level have occurred without impacting where chum redds were placed. The tailwater gage better reflects the effects of tides, tributary inflow, and groundwater influence below Bonneville Dam. The Action Agencies intend to operate to a minimum Bonneville tailwater elevation as agreed to at TMT in operating year 2005. In recent years, the tailwater operation has started when chum are present in the area and this is the plan in 2005. .

If water supply conditions indicate that it is not possible to maintain this minimum tailwater elevation at Bonneville Dam, flow will be provided at times during the chum-spawning season to allow access to Hamilton and Hardy Creeks if the creeks are flowing. Details will be set through coordination in TMT.[38]

From January 1 to the start of spring flows April 10, if the chum operation is possible, the minimum tailwater elevation at Bonneville Dam will be the daily minimum water surface elevation established by coordination in the TMT.[39]

Chum salmon will be captured and used as broodstock to initiate/bolster a spawning population in the recently restored habitat of Duncan Creek. The NPPC Duncan Creek project outlines the logistics for a brood movement and fry-rearing program. The salvage operation would expand the numbers of fish captured and reared in this newly established brood collection program to make up for the lack of tributary or mainstem spawning

The Implementation Team sought criteria that NOAA Fisheries uses to make decisions regarding the provision of water for chum spawning. A memo responding to this request is attached in Appendix 5.

[37] NMFS BiOp at Section 9.6.1.2.1 Page 9-58, Action 15
[38] NMFS BiOp at Section 9.6.1.2.1 Page 9-60, Action 16
[39] NMFS BiOp at Section 9.6.1.2.1 Page 9-59, Action 15

6.0 Hydrosystem Substrategy 2.3: Spill operations for project passage

This substrategy addresses spill at certain FCRPS projects to provide improved survival and better project passage for juvenile fish while avoiding adult fallback problems and creating greater than 120% saturation levels of total dissolved gas in the tail race and 115 % at the designated downstream monitoring stations at the forebay of the next dam downstream.

The planning dates for spring spill for juvenile fish migration are April 3 to June 20 in the Snake River, and April 10 to June 30 in the lower Columbia River.[40] Spill levels and times are indicated below.[41] The NMFS 2000 FCRPS BiOp stated that no spill for juvenile fish passage at the three Snake River collector projects shall occur when seasonal average flows are projected to be below 85 kcfs.[42] The specificity of the 85 kcfs criteria was debated in TMT and IT during the 2003 and 2004 flow season. NOAA Fisheries provided criteria regarding the provision of spill when flows are forecasted to be close to the 85 kcfs threshold. These criteria are attached in Appendix 6.

Planning dates for summer spill for juvenile fish migration are June 21 to August 31 in the Snake River, and July 1 to August 31 in the lower Columbia River.[43] There will be no summer spill at the four collector projects (Lower Granite, Little Goose, Lower Monumental, and McNary).[44]

Spill for the various projects are shown in the table below:

In regard to summer spill the Draft Updated Proposed Action states “The Corps, BPA and NOAA Fisheries will be exploring further definition of and subsequent exercise of the annual hydrosystem performance measure approach outlined in Section II (Adaptive Management Framework) and/or a revision to the Updated Proposed Action to address summer spill issues in the context of achieving appropriate biological performance.[45]

[40] NMFS BiOp at Section 9.6.1.4.3 Page 9-88, Action 54
[41] NMFS BiOp at Section 9.6.1.4.4 Page 9-88, Action 54 and NMFS BiOp at Section 9.6.1.3.4 Page 9-76, Action 41
[42] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 40
[43] NMFS BiOp at Section 9.6.1.4.3 Page 9-88, Action 54
[44] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 42
[45] Draft Updated Proposed Action Page 2

Table 4. Spill at run-of-river projects to aid out migration of juvenile anadromous fish.

Project	Planning Dates	Time	Spring Spill	Summer Spill	Amount	Minimum Generation Requirements kcfs
Lower Granite	April 3– June 20	24 hours a day	Yes	No	19 kcfs (RSW with training)	11.5[a]
Little Goose	April 3– June 20	1800-0600	Yes	No	120/115 gas cap	11.5[a]
Lower Monumental	April 3– June 20	24 hours a day	Yes	No	45% or 50% of outflow	11.5[a]
Ice Harbor	April 3– August 31	24 hours a day [d]	Yes	Yes	120/115 gas cap 1800-0500 45 Kcfs 0500-1800	7.5 – 9.5[a]
McNary	April 10– June 30[b]	1800-0600	Yes	No	120/115 gas cap	50
John Day	April 10– August 31	1800-0600 1900-0600 May 15– July 20 June 21 24 hours a day	Yes	Yes	60% of outflow until June 20 Min spill 30% Starting June 21 30% of outflow	50
The Dalles	April 10– August 31	24 hours a day	Yes	Yes	40% of outflow	50
Bonneville	April 10– August 31	24 hours a day	Yes	Yes	120/115 gas cap nighttime 75 kcfs daytime [c] 50 min flow	30

a – Minimum generation requirements at the Lower Snake River Projects may not be needed all the time.

b – Collection of subyearling fall chinook for transportation at McNary Dam shall not be initiated until in-river migratory conditions are deteriorating (i.e., no longer spring-like).[46] In general, the switch from spring to summer operation will occur on or about June 20. Spring-like is defined as favorable flow and water temperature conditions; i.e., river flows are at or above the spring flow target (220 to 260 kcfs) at McNary Dam, and ambient water temperatures are below 62°F (17°C). Actual dates shall be set by TMT coordination.

c – Day and nighttime vary during the spill season and are set in the Fish Passage Plan.

d- An RSW is planned for installation this winter at Ice Harbor.

[46] NMFS BiOp at Section 9.6.1.3.4 Page 9-77, Action 43

Note: Spill for juvenile fish passage may be reduced or turned off for short periods of time because of navigation problems at the projects or to allow for juvenile fish barges to dock and undock. Also research at projects that spill may change the details of spill at the project.

7.0 Hydrosystem Substrategy ?: Other actions to enhance water management

This substrategy includes water management related actions that are being done to improve fish survival, such as studies, water quality actions, and water conservation improvements.

7.1 Libby

7.1.1 TDG and Water temperature monitoring

Water temperature profiles in the south end (near-dam, or forebay area) of Lake Koocanusa during May and June will be monitored to provide information necessary for timing of sturgeon spawning/rearing flow augmentation.[47] Also, water temperature profiles in the forebay are used to determine whether warmer temperatures may be provided to assist sturgeon spawning

During the summer of 2003, the Seattle District installed a TDG monitoring sensor at a fixed monitoring station below Libby Dam on the spillway side of the river (left bank, looking downstream) directly across the river from the USGS stage gage.

7.1.2 Libby VARQ

The purpose of VARQ is to better ensure reservoir refill and to provide more (and more reliable) water for spring flows and summer flow augmentation without reducing flood control protection.

An Environmental Impact Statement (called the Upper Columbia Alternative Flood Control and Fish Operations EIS) is being prepared and additional public and Canadian (including Columbia River Treaty) coordination will be conducted before VARQ can be implemented at Libby, Hungry Horse, and Grand Coulee for the long term. VARQ will continue to be implemented on an interim basis until a final decision is made regarding long-term implementation. This decision will be made in 2005 upon completion of the EIS.[48]

7.1.3 Libby Storage Reservation Diagram and Runoff Volume Forecast Procedure

The purpose of the Libby storage reservation diagram study and investigation of a new forecast procedure and the investigation into a variable 31 December draft point is to see if more water can be made available for spring flows without reducing flood control protection.

[47] USFWS BiOp at Section 8.3.h Page 82 Note page numbers in USFWS BiOp may vary depending on how it is printed.

[48] NMFS BiOp Section 9.6.1.2.3 Page 63, Action 19; NMFS BiOp Section 9.6.1.2.3 Page 9-66, Action 22; and USFWS BiOp Section 8.1.b page 73

The investigation of the forecast procedure has been completed and the December forecast will be used to determine an appropriate end of December flood control elevation. If the December water supply forecast is well below average, the Libby end of December flood control target may be higher than elevation 2411 feet. Forecasts will be done in water year 2005 using the new method. [49]

7.1.4 Coordination

An annual operational schedule to be supplemented on a monthly basis will be provided to the USFWS annually on or about May 1 but not later than May 10. The annual schedule shall include month-end estimates of water surface elevation at Koocanusa Reservoir and estimates of monthly discharge from Libby Dam. The monthly supplement shall include a report of actual operations over the previous month and shall include daily water surface elevation at Koocanusa Reservoir and hourly spill and releases at Libby Dam.[50] The purpose of this action is to provide for better coordination. The Action agencies plan to do this required coordination at TMT meetings.

7.2 Hungry Horse Coordination

Reclamation will fulfill the USFWS recommendation for annual and monthly reporting by contributing to the annual water management plan and presenting weekly and biweekly reports of Hungry Horse operations through the TMT process.[51]

Reclamation will also fulfill the USFWS recommendation for reporting actual operations by making available pertinent historic elevations and flows as related to Hungry Horse Dam through its current website at http://mac1.pn.usbr.gov/pn6200/esatea.html. These actions are described in accordance with the US Bureau of Reclamation, Pacific Northwest Region Findings and Commitments Implementing December 2000 Biological Opinions for the Federal Columbia River Power System and Other Related Actions, Section III, B, 2, paragraph 23.

Reclamation began operating under VARQ at Hungry Horse in 2001. The VARQ EIS is scheduled to be completed in the spring of 2005.

7.3 Water Quality Actions

7.3.1 Water Quality Plans

One- and five-year water quality plans are to improve fish passage and survival through water quality improvement measures. The intent of the water quality plans is to recommend FCRPS facility and operational improvements related to water quality, total dissolved gas (TDG) and

[49] NMFS BiOp Section 9.6.1.2.6 Page 33, Action 36; USFWS BiOp at Section 8.1.h Page 76; and USFWS BiOp at Section 8.1.i Page 76
[50] USFWS BiOp at Section 11.A.1.1.c Page 93
[51] USFWS BiOp at Section 11.A.1.2.A Page 93

water temperature monitoring, and related studies. The BiOp also includes RPAs 130 to 143, which are water quality actions.[52]

Operationally oriented water quality RPAs 131 and 132 are addressed in the annual Water Management Plan. RPA 143 has long-term water management planning goals and is also addressed in the Water Management Plan. The other capital investment water quality RPAs related to facility improvements will be addressed in the 1-year and the 5-year Research, Monitoring, and Evaluation Plans.

7.3.2 Total Dissolved Gas Monitoring

Exposure to high levels of TDG over long periods of time can be harmful or lethal to fish. Environmental monitoring at the dams is necessary where voluntary spill is employed for juvenile fish passage to ensure that gas levels do not exceed TDG thresholds established in the NMFS (now called NOAA Fisheries) BiOp, and variance levels established by the state water quality agencies. According to RPA 131 of the BiOp, the physical monitoring program is to include QA/QC components; redundant and backup monitors at as many locations as the Water Quality Team determines necessary; calibration of monitoring equipment at least every 2 weeks; adequate funds for spot-checking monitoring equipment, error checking, correcting, and recording functions for CROHMS data; and daily reporting.

There are two purposes for the Corps to monitor total dissolved gas (TDG) and water temperature at 10 Columbia River Basin dams: 1) to monitor project performance in relation to water quality standards, and 2) to provide water quality data for anadromous fish passage at Columbia/Snake mainstem dams. The monitoring program is considered an integral part of the Corps' Reservoir Control Center water management activities.

TDG is the primary water quality parameter monitored. High saturation level TDG can cause physiological damage to fish. Water temperature is also measured because it affects TDG saturation levels, and because it influences the health of fish and other aquatic organisms. Both TDG and water temperature are closely linked to project water management operations (e.g., water released over the spillways, releases through the powerhouses and other facilities, and forebay and tailwater water surface elevations).

One component of the NMFS 2000 BiOp water quality strategy was for the Corps to take the actions necessary to implement the spill program at the dams called for in the BiOp, including obtaining variances from appropriate State water quality agencies. The Corps took the necessary actions to prepare for the 2002 and 2003 spill seasons. The Corps will follow a similar process prior to the 2004 season. The variance provides for a revision of the total dissolved gas standard from 110% to a revised standard of 115% in the forebays and 120% in the tailwaters of McNary, John Day, The Dalles, and Bonneville dams, and the Camas location, from April 1, 2003, to August 31, 2003. The 115% and 120% caps are based on the 12 highest hourly measurements per calendar day. Also, a cap of total dissolved gas of 125%, based on the two highest hours, is in effect.

[52] NMFS BiOp Section 9.4.2.4 Page 9-29, Action 5

In 1999, the State of Washington had issued a modified TDG water quality standard, which is in effect through the 2003 water year. Additional actions with the State of Washington were not required for the 2002 water year. The Corps will be meeting with the Washington Department of Ecology in late 2003 to discuss the possibility and process for developing a multiple year TDG rule modification starting in the 2004 spill season.

The State of Idaho was not approached in 2002 concerning a variance to water quality standards. The State, in conjunction with the Tribes, provided a set of conditions in 2001 to be met as part of the variance process. The Corps did not pursue obtaining a variance from the State of Idaho for 2002 or 2003 and does not plan to do so in 2004.

The Reservoir Control Center is responsible for monitoring the TDG and water temperature conditions in the forebays and the tailwaters of the lower Columbia River/lower Snake River dams, and selected river sites. The operational water management guidelines in Oregon are to change spill levels and, subsequently, spill patterns at the dams (daily if necessary) so that the forebays are as close to, but do not exceed, daily (12 highest hours) average of 115% TDG, and the tailwater levels are close to, but do not exceed, daily (12 highest hours) average of 120% TDG. Also, a cap of total dissolved gas of 125%, based on the two highest hours, is in effect.

The Corps prepares a Total Dissolved Gas Management Plan each year (see Appendix 4). It is a supporting document for the Water Management Plan. The Plan summarizes the roles and responsibilities of the Corps as they relate to dissolved gas monitoring. The Plan stipulates what to measure, how, where, and when to take the measurements, and how to analyze and interpret the resulting data. The Plan also provides for periodic review and alteration or redirection of efforts when monitoring results and/or new information from other sources justifies a change. The Plan identifies channels of communication with other cooperating agencies and interested parties.

The Corps will be monitoring similarly to what occurred since 2000.

See: http://www.nwd-wc.usace.army.mil/TMT/

The 2004 Plan of Action can be found listed under the TDG category of the Reservoir Control Center Water Quality Team page on the following web site:

http://www.nwd-wc.usace.army.mil/TMT/wqwebpage/mainpage.htm

7.3.3 Other Water Quality Actions

The following water quality topics are covered in Appendix 4: Total Dissolved Gas Model, Temperature Model and Temperature Monitoring Needs, Water Quality Database.

7.4 Canadian Storage for Flow Augmentation

The purpose of the actions below is to see if more water from Canadian storage projects can be obtained for flow augmentation.

One (1) maf of Treaty storage shall be requested and negotiated when available with BC Hydro to be provided and released during the migration season.[53]

[53] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 24

BPA shall continue to work with BC Hydro to negotiate a non-Treaty storage agreement to provide for storage during the spring with subsequent release in July and August, for flow enhancement as long as operations forecasts indicate that water stored in the spring can be released in July and August.[54]

A study regarding the shaping and release of water behind Canadian Treaty storage projects in July and August was completed in 2001. [55]

7.5 Albeni Falls Coordination

The action agencies, the USFWS, and Idaho Department of Fish & Game shall meet annually to evaluate Lake Pend Oreille kokanee monitoring results and make necessary adjustments through subsequent in-season management.[56] The purpose of this action is to review IDFG monitoring results and to ensure winter lake operation protocol is addressing the needs of kokanee spawning and hence, threatened bull trout, which feed on kokanee.

7.6 Public Coordination

The purpose of the following actions is to provide for better regional coordination.

Actions in the Water Management Plan will be coordinated with NOAA Fisheries, USFWS, and the states and tribes in preseason planning and in-season management of flow and spill operations. This coordination shall occur in the Technical Management Team process.[57]

At all appropriate decision points, the action agencies shall routinely seek timely input and concurrence from the USFWS on all matters affecting USFWS listed fish through the Columbia River Treaty, International Joint Commission Orders, and all other decision making processes involving transboundary waters in the Columbia River basin. This shall include notification of all meetings and decision points and provision of opportunities to advise the action agencies during meetings and in writing, as appropriate.[58]

7.7 Dworshak Draft to 1,500 Feet Adult Evaluation

The NMFS BiOp calls for drafting Dworshak to 1,500 feet in order to evaluate whether releasing approximately 200 kaf of water during September provides a benefit to adult migrants.[59] The 2004 UPA does not call for this evaluation. .

Water conditions at the end of 2002 *and a TMT decision in 2003* allowed approximately 200 KAF of storage from Dworshak to be released in September for the purpose of this study. The

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[54] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 25
[55] NMFS BiOp at Section 9.6.1.2.5 Page 9-67, Action 26
[56] USFWS BiOp at Section 11.A.1.4.d Page 94
[57] NMFS BiOp at Section 9.4.2.2 Page 9-27, Action 3 and NMFS BiOp at Section 9.4.2.2 Page 9-60, Action 17
[58] USFWS BiOp at Section 8.1.g Page 76
[59] NMFS BiOp at Section 9.6.1.2.6 Page 9-71, Action 34

preliminary data from the 2002 test was presented to TMT in the fall of 2002. A final report on the 2002 operation is anticipated in 2004.

7.8 Other Reclamation Water Management Actions

The following actions from the NMFS BiOp are intended to provide additional benefits to listed fish.

Reclamation will consult with NMFS before committing any of its uncontracted storage space or entering into new contracts. No contracts are scheduled for review in 2004.[60]

Reclamation shall pursue water conservation improvements at its projects. Reclamation annually receives numerous proposals for conservation projects from its irrigation districts and others. FY 2002 project selection criteria have been developed with a new ESA emphasis and will be applied to proposals considered for Reclamation projects.[61]

Reclamation provided NOAA Fisheries with a report on unauthorized use of Reclamation project water in March 2003. [62]

Reclamation shall complete ESA consultations on its tributary projects below Chief Joseph Dam. Consultations are in progress for the Crooked River, Deschutes, Arnold, Umatilla, Yakima, Upper Snake and Tualatin Projects.[63]

The Action Agencies shall acquire water for in-stream use from Reclamation's Upper Snake River Projects. Reclamation, NMFS, and others are participating in settlement discussions under the Snake River Basin Adjudication. Implementation of flow augmentation in 2004 will involve a settlement, another ESA consultation on the Upper Snake projects, and authorizing legislation from Idaho.[64]

The study of salmon attraction problems in the wasteways and drains is complete. Water quality monitoring and evaluation of return flows has been initiated and will be ongoing in 2004.[65]

8.0 Hydrosystem Substrategy 3.3: Juvenile fish transport actions to improve fish survival

This substrategy addresses actions to collect juvenile fish at some FCRPS projects while providing a balance between transported and in-river juvenile fish migration.

The Draft Updated Proposed Action states "The Action Agencies will continue to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. However, rather than beginning transport in accordance with the 2000 BiOp and the associated NOAA Fisheries

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[60] NMFS BiOp Section 9.6.1.2.6 Page 68, Action 27
[61] NMFS BiOp Section 9.6.1.2.6 Page 68, Action 28
[62] NMFS BiOp Section 9.6.1.2.6 Page 69, Action 29
[63] NMFS BiOp Section 9.6.1.2.6 Page 69, Action 30
[64] NMFS BiOp at Section 9.6.1.2.6 Page 9-70, Action 32
[65] NMFS BiOp Section 9.6.1.2.7, Page 74-75, Actions 37, 38, 39

Section 10 permit, we would not initiate transportation in the lower Snake River until temperatures, as measured at the Lower Granite forebay TDG monitor, exceeded 9°C for 2 consecutive days or April 15, whichever would come first. In lieu of transport, fish would be bypassed back to the river through what is believed to be the least intrusive PIT tag detection routes and allowing for some level of smolt monitoring. Results of McNary transportation studies with upper Columbia Chinook and steelhead may result in proposed modifications to spring transport at that facility.[66]

8.1 Snake River Collector Projects

All non-research juvenile salmonids collected at the Snake River collector projects will be transported (Lower Granite, Little Goose, and Lower Monumental dams).[67] A review of the information relative to when spring transport should be initiated will occur during the winter of 2004/2005. Current research information should be available to help inform this decision consistent with NOAA Fisheries' BiOp action 51.

8.2 McNary

Juvenile spring migrants collected at McNary Dam shall be bypassed.[68]

Collection of subyearling fall chinook for transportation at McNary Dam shall not be initiated until in-river migratory conditions are deteriorating (i.e., no longer spring-like).[69] In general, the switch from spring to summer operation will occur on or about June 20. Spring-like is defined as favorable flow and water temperature conditions; i.e., river flows are at or above the spring flow target (220 to 260 kcfs) at McNary Dam, and ambient water temperatures are below 62°F (17°C). Actual dates shall be set through coordination with TMT.

9.0 Resident Fish Substrategy 1.1: Create conditions below Libby Dam that facilitate Kootenai River white sturgeon (KRWS) natural reproduction and juvenile survival

9.1 Libby

9.1.1 Sturgeon

The purpose of the actions below is to provide water for sturgeon spawning.

Water shall be stored in Libby reservoir and supply, at a minimum, water volume during May and June, based upon water availability or the "tiered" approach as defined through coordinated reevaluation that took place in March 2002 among USACE, USFWS, and MDFWP, and summarized in the table below. This water shall be in addition to storage needs for listed bull trout, salmon, and the 4,000 cfs minimum releases from Libby Dam. Accounting on these total tiered volumes shall begin when the USFWS determines benefits to conservation of sturgeon are most likely to occur. This may include releases timed to enhance survival of eggs, yolk sac

[66] Draft Updated Proposed Action page 36.
[67] NMFS BiOp at Section 9.6.1.3.2 Page 9-76, Action 40
[68] NMFS BiOp at Section 9.6.1.3.4 Page 9-76, Action 41
[69] NMFS BiOp at Section 9.6.1.3.4 Page 9-77, Action 43

larvae, or larvae reared under the preservation stocking program and released into the Kootenai River. Releases may be timed to serve both wild fish and hatchery eggs/fish. Sturgeon flows will generally be initiated between mid-May and the end of June to augment lower basin runoff entering the Kootenai River below Libby Dam.[70]

[70] USFWS BiOp at Section 8.1.c Page 73,

Table 5. "Tiered" volumes of water for sturgeon flow enhancement to be released from Libby Dam according to the April - August volume runoff forecast at Libby. Actual flow releases would be shaped according to seasonal requests from the USFWS and in-season management of water actually available.[71]

Forecast runoff Volume (maf*) at Libby	Sturgeon flow volume (maf) from Libby Dam
0.00 < forecast < 4.80	Sturgeon flows not requested
4.8	0.8
5.4	0.8
6.35	1.12
7.4	1.2
8.5	1.2
8.9	1.6
Forecast > 8.9	1.6

Note: For forecasts between 4.8 and 8.9 maf interpolate from the values shown in the table above.

The purpose of the actions below is to provide for the annual sturgeon pulse.

Libby outflow will fulfill the operational guidelines provided by the USFWS annually prior to and during the sturgeon spawning/incubation period. During 2004, operational guidelines will include a request to deliver a high flow of water for 4 or 5 days at a time when both Kootenay Lake-Kootenai River stages are low and local runoff is high, to evaluate the potential of increased stream energy to scour sand from buried gravel within designated critical habitat. However, this would be done within established flood control criteria. Specific release recommendations will be developed in consultation with action agencies and submitted annually through the TMT or similar regional process.[72]

Efforts will be coordinated to attempt to limit sturgeon-spawning flows so they do not exceed a river stage elevation of 1,764 feet at Bonners Ferry. (Note: This may not always be possible during periods of unusual local runoff that may be beyond the control of Libby Dam.)[73]

[71] Letter from Michael White (USACE) to Anne Badgley (USFWS) dated August 23 2002
[72] USFWS BiOp at Section 8.2.c Page 80
[73] USFWS BiOp at Section 8.3.b Page 80

During sturgeon recruitment flow periods, local inflow will be allowed to supplement Libby Dam releases to the maximum extent feasible, while assuring public safety by monitoring water levels throughout relevant areas of the Kootenai River basin.

TMT will work with USFWS to implement 2005 BiOp sturgeon operations.

9.1.2 Coordination

Libby Dam flows shall be regulated consistent with existing treaties, Libby Project authorization for public safety, other laws, and the 1938 International Joint Commission order to achieve water volumes, water velocities, water depths, and water temperature at a time to maximize the probability of allowing significant sturgeon recruitment.[74]

10.0 Resident Fish Substrategy 2.2: Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats

10.1 Libby

The following minimum flows to protect bull trout between the sturgeon and salmon flows will be provided based on the April to August volume runoff forecast at Libby.

If Koocanusa Reservoir elevations are below salmon guidelines (2439 ft) on July 1, and salmon augmentation will not occur for that year, the action agencies shall provide 6,000 cfs for the bull trout minimum flow during July and August (lowest water years). If additional water is available, increases in minimum flows may be determined through the TMT process.[75]

[74] USFWS BiOp at Section 8.1.a Page 73
[75] USFWS BiOp at Section 11.A.1.1.b Page 93

Table 6. Minimum bull trout releases in July from Libby Dam.

Forecast runoff Volume (maf*) at Libby	Min bull trout flows between sturgeon and salmon flows
0.00 < forecast < 4.80	6 kcfs
4.80 < forecast < 6.00	7 kcfs
6.00 < forecast < 6.70	8 kcfs
6.70 < forecast < 8.10	9 kcfs
8.10 < forecast < 8.90	9 kcfs
8.90 < forecast	9 kcfs

(USFWS BiOp at Section 3.A.2 Page 13)

**maf = million acre-feet*[76]

10.1.1 Ramp Rates

The purpose of the following actions is to provide better conditions for resident fish by limiting the flow fluctuations and setting minimum flow levels.

Operational constraints will be implemented at Libby Dam intended to minimize adverse effects of rapid and severe river flow fluctuations on bull trout, including year-round minimum flows and ramping rates, seasonal water management, conducting studies to monitor the adequacy of the constraints, and providing for modification of the operational constraints depending on study results.[77] Exact operational constraints are shown in paragraphs below.

The following ramp rates will guide project operations to meet various purposes, including power production.

[76] USFWS BiOp at Section 8.3.g Page 81
[77] USFWS BiOp at Section 10.A.1 Page 87

Table 7. Prescribed ramp rates to protect resident fish and their food organisms, and to minimize levee erosion, in the Kootenai River.

Daily and Hourly Maximum Ramp Up Rates for Libby Dam (as measured by daily flows, not daily averages, restricted by hourly rates)			
Flow Range	**Ramp Up Unit (Daily max)**	**Ramp Up (Hourly max) 1 Oct – 30 Apr**	**Ramp Up (Hourly max) 1 May – 30 Sep**
4,000 - 6,000 cfs	Limit ramp up to one unit per day (approx. 5,000 cfs per day)	2,000 cfs/hr	1,000 cfs/hr
6,000 - 9,000 cfs	Limit ramp up to one unit per day (approx. 5,000 cfs per day)	2,000 cfs/hr	1,000 cfs/hr
> 9,000 - 17,000 cfs	Limit ramp up to two units per day (approx. 10,000 cfs per day)	3,500 cfs/hr	2,000 cfs/hr
> 17,000 cfs	No limit	7,000 cfs/hr	3,500 cfs/hr

(USFWS BiOp at Section 3.A.2 Page 13)

Daily and Hourly Maximum Ramp Down Rates for Libby Dam (as measured by daily flows, not daily averages, restricted by hourly rates)			
Flow Range	**Ramp Down Unit (Daily Max)**	**Ramp Down(Hourly max) 1 Oct – 30 Apr**	**Ramp Down (Hourly max) 1 May – 30 Sep**
4,000 - 6,000 cfs	Limit ramp down to 500 cfs per day	500 cfs/hr	500 cfs/hr
> 6,000 - 9,000 cfs	Limit ramp down to 1,000 cfs per day	500 cfs/hr	500 cfs/hr
> 9,000 - 17,000 cfs	Limit ramp down to 2,000 cfs per day	1,000 cfs/hr	1,000 cfs/hr
> 17,000 cfs	Limit ramp down to one unit per day (approx. 5,000 cfs per day)	5,000 cfs/hr	3,500 cfs/hr

(USFWS BiOp at Section 3.A.2 Page 14)

Daily and hourly ramping rates may be exceeded during flood emergencies to protect health and public safety and in association with power or transmission emergencies.[78]

Variances to ramping rates during years where runoff forecasting or shortage shortfalls occur, or variances are necessary to provide augmentation water for other listed species, will be negotiated through the TMT process. This is expected in only the lowest 20th percentile water years.[79]

[78] USFWS BiOp at Section 3.A.2 Page 14
[79] USFWS BiOp at Section 3.A.2 Page 14

Note: The ramp rates will be followed except when they would cause a unit(s) to operate in the rough zone, a zone of chaotic flow in which all parts of a unit are subject to increased vibration and cavitation that could result in premature wear or failure of the units. In this case the project will utilize a ramp rate, which allows all units to operate outside the rough zone. The action agencies will provide additional information to the USFWS describing operations outside the "rough zone."[80]

10.2 Hungry Horse

10.2.1 Ramp Rates

The purpose of the following actions is to provide better conditions for resident fish by limiting the flow fluctuations and setting minimum flow levels.

Operational measures will be implemented at Hungry Horse Dam to minimize adverse effects of rapid and severe river flow fluctuations on bull trout, including year-round minimum flows and ramping rates, and seasonal water management; conduct studies to monitor the adequacy of the constraints; and provide for modification of the operational constraints depending on study results.[81] Exact operational measures are shown in paragraphs below.

The following ramp rates will guide project operations to meet various purposes, including power production.

[80] USFWS BiOp at Section 3.A.2 Page 13
[81] USFWS BiOp at Section 10.A.1.2 Page 88

Table 8. Ramp rates prescribed for Hungry Horse Dam releases to protect resident fish and their food organisms in the Flathead River.

Daily and Hourly Maximum Ramp Up Rates for Hungry Horse Dam (as measured by daily flows, not daily averages, restricted by hourly rates).		
Flow Range (measured at Columbia Falls)	**Ramp Up Unit (Daily Max)**	**Ramp Up Unit (Hourly max)**
3,200 - 6,000 cfs	Limit ramp up 1,800 cfs per day	1,000 cfs/hour
> 6,000 - 8,000 cfs	Limit ramp up 1,800 cfs per day	1,000 cfs/hour
> 8,000 - 10,000 cfs	Limit ramp up 3,600 cfs per day	1,800 cfs/hour
> 10,000 cfs	No limit	1,800 cfs/hour

(USFWS BiOp at Section 3.A.1 Page 8)

Daily and Hourly Maximum Ramp Down Rates for Hungry Horse Dam (as measured by daily flows, not daily averages, restricted by hourly rates)		
Flow Range (measured at Columbia Falls)	**Ramp Down Unit (Daily max)**	**Ramp Down Unit (Hourly max)**
3,200 - 6,000 cfs	Limit ramp down to 600 cfs per day	600 cfs/hour
> 6,000 - 8,000 cfs	Limit ramp down to 1,000 cfs per day	600 cfs/hour
> 8,000 - 12,000 cfs	Limit ramp down to 2,000 cfs per day	1,000 cfs/hour
> 12,000 cfs	Limit ramp down to 5,000 cfs per day	1,800 cfs/hour

(USFWS BiOp at Section 3.A.1 Page 8)

Daily and hourly ramping rates may be exceeded during flood emergencies to protect health and public safety and in association with power or transmission emergencies.[82]

Variances to ramping rates during years where runoff forecasting or storage shortfalls occur, or variances are necessary to provide augmentation water for other listed species, will be coordinated through the TMT process. This is expected in only the lowest 20th percentile water years.[83]

Note: The ramp rates will be followed except when they would cause a unit(s) to operate in a zone that could result in premature wear or failure of the units. In this case the project will utilize a ramp rate, which allows all units to operate outside the rough zone. The action agencies will provide additional information to the USFWS describing operations outside the "rough zone."[84]

[82] USFWS BiOp at Section 3.A.1 Page 8
[83] USFWS BiOp at Section 3.A.1 Page 8
[84] USFWS BiOp at Section 3.A.1 Page 7

The minimum outflow for Hungry Horse Dam will be determined monthly starting with the January forecast, with final flows based on the March final runoff forecast for Hungry Horse Reservoir for the period April 1 to August 31. These forecasts will be provided by Reclamation to the TMT. If the April to August forecast is greater than 1,790 kaf, the minimum flow shall be 900 cfs. If the forecast is less than 1,190 kaf, the minimum flow shall be 400 cfs. If the forecast is between 1,190 and 1,790 kaf, the minimum flow will be linearly interpolated between 400 and 900 cfs.[85] The minimum flow from Hungry Horse can be lowered to 145 cfs when the river at Columbia Falls reaches flood level (13 feet).

The minimum flow at Columbia Falls will be determined monthly starting with the January forecast, with the final flows based on the March final runoff forecast for Hungry Horse Reservoir for the period of April 1 to August 31. If the April to August forecast is greater than 1,790 kaf, the minimum flow shall be 3,500 cfs. If the forecast is less than 1,190 kaf, the minimum flow shall be 3,200 cfs. If the forecast is between 1,190 and 1,790 kaf, the minimum flow will be linearly interpolated between 3,200 and 3,500 cfs.[86]

10.3 Albeni Falls

10.3.1 Lake winter elevation

A proposal has been made to operate Lake Pend Oreille in the fall/winter to an elevation of 2,055 feet during the 2004/2005 season.

[85] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19 and USFWS BiOp at Section 3.A.1 Page 6
[86] NMFS BiOp at Section 9.6.1.2.3 Page 9-63, Action 19 and USFWS BiOp at Section 3.A.1 Page 7

11.0 FCRPS Hydrosystem Performance Standards

Table 9. FCRPS hydrosystem survival performance rates (%) for affected life stages.

ESU	Adult Survival Rate		Juvenile Survival Rate		
	FCRPS System	Per FCRPS Project 1	FCRPS In-river Only		FCRPS Combined [2] (Transport + In-river + Differential Mortality of Transported Fish)
			System	Per Project [1]	
Chinook Salmon					
SR spring/summer	85.5	98.1	49.6	91.6	57.6
SR fall	74.0	96.3	14.3	78.4	12.7
UCR spring	92.2	98.1	66.4	90.3	66.4
UWR	N/A	N/A	N/A	N/A	N/A
LCR	98.1	98.1	90.7	90.7	90.7
Steelhead					
SR	80.3	97.3	51.6	92.1	50.8
UCR	89.3	97.3	67.7	90.7	67.7
MCR	89.3	97.3	67.7	90.7	67.7
UWR	N/A	N/A	N/A	N/A	N/A
LCR	97.3	97.3	90.8	90.8	90.8
CR chum salmon	N/A	N/A	N/A	N/A	N/A
SR sockeye salmon	88.7	98.5	N/A	N/A	N/A

(NMFS BiOp Section 9.2.2.2.1, Page 9-12, Table 9.2-3)

Source: Adult standards taken from Table 9.7-2. Juvenile standards taken from Table 9.7-1.

[1] Per-project in-river survival rate calculated as the xth root of the system in-river survival rate (where x = number of FCRPS projects encountered). They are provided for illustrative purposes only. They are *NOT* intended to be interpreted as project-specific standards, or to be used in any way to support curtailment of survival improvement measures at an individual project.

[2] Values represent averages over the water years and D values in Table 9.7-1.

12.0 Fish and Wildlife Related Non-BiOp Actions

The following non-BiOp actions are typically options available to be addressed by TMT during the water management year.

12.1 Keenlyside Dam (Arrow)

12.1.1 Mountain Whitefish

Spawning flow levels are set the third week in December between 45 and 55 kcfs. Spawning continues through mid-January. Egg protection flows are set 5 to 15 kcfs lower than the spawning flow through the end of March.

12.1.2 Rainbow Trout

Rainbow trout spawning begins in April. Protection levels begin somewhere between 15 and 25 kcfs. The goal is to have stable flows or ever-increasing flows through June.

12.2 Libby

12.2.1 Burbot

Providing low flows from Libby Dam to aid upstream migration of burbot to spawning areas above Kootenay Lake on the Kootenai River in Idaho is considered each winter. These low flows may occur over several periods of time or may last for an extended period from December through February. The details of this operation for 2005 are being developed and may be included in the fall/winter update. Negotiations on a Memorandum of Agreement are underway for this species. Use of VARQ and implementation of the variable end of December flood control target elevation may aid this operation in years with medium runoff forecasts, and a variable December draft may help as well if and when it is implemented.

12.3 Dworshak

12.3.1 Flow increase for Dworshak National Fish Hatchery release.

Release 4 – 6 kcfs from Dworshak in order to move juvenile fish into the mainstem Clearwater River during the spring hatchery release.

12.4 Grand Coulee

12.4.1 Kokanee

Fill Grand Coulee to 1,283 feet by October 1. Maintain elevation 1,283 to 1,285 feet or greater through October for brood stock collection and access to tributaries.

12.5 Hanford Reach Protection Flows

Grant County PUD limits outflow from Priest Rapids Dam to minimize juvenile fish stranding.

12.6 Vernita Bar Protection Flows

Flow management occurs from Priest Rapids Dam in the fall to ensure that fall chinook salmon establish redds (spawn) at an elevation that enables the redds to have a high likelihood of not being dewatered prior to emergence of fry. Daytime flows are regulated to a range between 50 and 70 kcfs during October and November when redds are being established. Flow fluctuations are limited from the time of fish emergence in early April through early June. (Note: This is included pursuant to the Vernita Bar Settlement Agreement and the annual Hanford reach stranding agreement.)

12.7 McNary

12.7.1 Waterfowl nesting

To improve waterfowl nesting conditions in the McNary pool between March and May each year, we operate the pool in the top 1 foot of the pool range for several hours every 4 days.

12.7.2 Waterfowl hunting enhancement

In order to enhance Waterfowl hunting, we hold the McNary pool constant several times a week from October to January.

12.8 John Day

12.8.1 Goose nesting

To encourage geese to nest in areas that are not typically inundated by frequent fluctuations in the John Day pool between March and May each year, we operate the pool in the top 1 foot of the pool range for several hours every 4 days.

12.8.2 Waterfowl hunting enhancement

In order to enhance Waterfowl hunting, we hold the John Day pool constant several times a week from October to January.

12.9 Bonneville

12.9.1 Tribal Fishing

To support tribal fishing, the Bonneville pool is normally held between elevation 75 and 76.5 feet during tribal fishing seasons.

12.9.2 Spring Creek Hatchery Release

The U.S. Fish and Wildlife Service typically releases between 7 and 8 million tule fall chinook fry from the Spring Creek National Fish Hatchery upstream of Bonneville Dam in March. In 2005 the action agencies plan to operate Bonneville Dam with a powerhouse 2 priority, to operate all units with fish screens, and to operate the bypass facility in order to provide project passage for this hatchery release. The B2 Corner Collector will be operated for a period of days (to be determined) during the March 2005 release. The Fish and Wildlife Service, Corps of Engineers and Bonneville Power Administration reached mutual agreement on an operation at Bonneville Dam for the March 2004 release of sub-yearling chinook from Spring Creek Hatchery in support of a two-treatment evaluation in which the effectiveness of spill as compared to operation of the new B2 corner collector will be evaluated. The agreement was reached in exchange for a commitment to no spill for March Spring Creek releases in 2005 and 2006 (unless we see significant problems with the new B2 corner collector, in which case we will revisit 2005 and 2006 operations for the March hatchery release).

13.0 Conclusion

This draft 2005 Water Management Plan will be coordinated with the Technical Management Team. Seasonal action plans will be developed as described in the introduction to this plan. Additionally, operations may be adjusted in-season based on recommendations from the TMT.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM
November 24, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS
Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Vernita Bar Update:
Chris Carlson, Grant County PUD, reported that a Vernita Bar redd count conducted on 11/21 found 99 redds between 50-55 kcfs; 67 between 55-60 kcfs; 32 between 60-65 kcfs; 9 between 65-70 kcfs; and 3 above 70 kcfs. The counts indicated that the protection level/critical elevation be set at 65 kcfs. The next redd count was scheduled for Sunday, 11/28. The PUD is using the Hanford Reach Fall Chinook Protection Agreement as guidance for operations. Chris will provide an update to the TMT at the December 8th meeting. Updates are also available on the TMT web page.

Effects of Transport History on Performance on Adult Salmonid Migrants:
Chris Peery, University of Idaho, provided a power point presentation intended for the TMT Year End Review. Radio tagged fish (Snake River spring/summer chinook and steelhead) were studied from 2000-2003 to see whether homing ability was effected by transportation. The following summarizes his presentation (which can also be found on the TMT web page):

- During low flow years and when spill is reduced, the proportion of transported fish will increase.
- Fish that were transported as juveniles had lower survival to natal areas, likely because of greater straying and fallback behavior.
- Evidence related specifically to the 2001 out-migrant year is not complete.
- 2004 data is forthcoming. Note there will be no comparison of transported vs. in-river fish, as the sample size for in-river is small.
- The study shows that there may be not as much benefit to transportation, perhaps even a cost, than previously assumed.

Reflections on Lessons Learned from 2004:
Donna Silverberg, facilitator, asked TMT members to consider lessons learned from 2004 operations and the impacts they might have on management practices for 2005. Ron Boyce, Oregon, noted that this reflection has been happening in other processes (e.g. AFEP and through comments to the BiOp Remand) and that the region should find a way to summarize these comments to enhance collective decision-making in the future. Other members agreed and suggested that the group identify subject areas (e.g. transportation, challenges of low flow years) and discuss with the TMT during future meetings or separate work group discussions. John Wellschlager, BPA, noted that 2004 was a low flow year, and an intense year for management. A positive lesson learned was that everyone maintained professionalism during the challenging

times. Dave Wills, USFWS, echoed this point and said that nobody got personal when disagreements arose. Russ Kiefer, Idaho, said that while there was some disappointment from 2004, for the most part everyone listened and tried to understand others' views. He raised concern that new information shows fewer benefits and potential detriments of transportation and encouraged TMT to look closely at this during discussions of 2005 management practices. Ron Boyce added that the TMT process worked well this year, partly because the members work well as a group. From Ron's perspective, there was a process outside TMT that drove operations of the river in 2004, and he believes that operation decisions in the future should be more responsive of technical information.

ACTION: TMT members will make a list of topics at the December 8th TMT meeting, and decide when/how to discuss them to aid 2005 operation management decisions.

Chum Update:
Ron Boyce reported on a chum survey conducted between 11/16 and 11/23 – 123 were counted on the final day of the survey. Fall chinook numbers continue to be high; up to 377 redds have been counted. Most of the redds have been found in Hamilton Creek and the area between Ives and Pierce Islands. Chum numbers thus far have not been high as 2002, although this may change as the season progresses. The operation for chum was successful this year. Timing was good thanks to BPA and COE real-time and on site operators.

Burbot SOR 2004 FWS-2:
Dave Wills, USFWS, reported that the Kootenai Valley Resource Initiative submitted a request on 11/5 to the COE and BPA to operate Libby to reach temperatures to meet burbot needs. Montana granted an exemption to the usual temperature agreement with USFWS to accommodate the request. Temperature reductions were successful at Libby (dropping 1-2°F), although not quite as low as burbot need. Temperatures are expected to reach 39°F in mid-December. Earlier coordination with Montana this year will prove to be an improvement on operations for burbot. The SOR will continue through the end of 2004. Follow-up results will be presented to TMT in January.

ACTION: BPA and the COE will look into flexibility of shifting water from Libby to Grand Coulee, per a suggestion from a TMT member. This issue will be re-visited at a future TMT meeting.

Water Management Plan Comments:
No comments to the 2005 WMP have been submitted as of today's meeting. The salmon managers' individual agencies plan to submit comments by next week (Nov. 29-Dec. 3). Jim Adams, COE, noted that the water quality section needs to be updated and the latest draft WMP will be sent out to folks in the next two weeks. Process suggestions from the public are welcome.

Status of Operations*:*
Reservoirs: Cathy Hlebechuk, COE, reported that Libby is currently at elevation 2437.2', with inflows of 6 kcfs and outflows at 10 kcfs. The COE is operating the project to reach elevation 2411' by the end of December. The COE will use the December early bird forecast to set flood control elevations. Albeni Falls is operating to stay within 2055-2055.5' elevation, with current

inflows at 16 kcfs and outflows at 12 kcfs. Dworshak is filling slightly, at elevation 1526.6'. Lower Granite is operating at 19 kcfs in and 19 kcfs out. The RSW at Lower Granite will be moved to Ice Harbor in February. TMT members have been invited to view the RSW before it is moved to the project. (NOTE: The field trip was scheduled for Tuesday, December 14th at 8 AM). Bonneville is releasing 129 kcfs. Grand Coulee is at elevation 1285'. Hungry Horse is at elevation 3540', and will remain so through the end of December.

Fish: Juvenile sites have closed down so there will be no more data collection through the end of the year.

Power: The power system is running to meet chum needs. A rod re-sequencing at CGS during the weekend of Nov. 27-28 required 8 hours of no power.

Water quality: There was nothing to report at this time.

TMT Meeting Schedule:
The next TMT meeting is scheduled for **Wednesday, December 8th**. Agenda items include:

- Issues from Year End Review/Game Plan
- Chum Update
- Vernita Bar

There may be a TMT call on chum on **December 15th at 9:00 am**. There will be no TMT meeting on December 22nd. The following face to face meeting will be held on **January 5th**.

TMT Process Meeting: The action agencies met on November 29th to plan for the upcoming TMT process meeting. The salmon managers will have their planning meeting on December 21st at FPAC. The TMT process meeting will be held sometime in early January. (Details to follow.)

Technical Management Team Meeting Notes

Custom House Building, Portland, OR
November 24, 2004

1. Greetings and Introductions.

The November 24 meeting of the Technical Management Team in Portland, Oregon was

chaired by Cathy Hlebechuk of the Corps and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at that meeting. Anyone with questions about these notes should contact Helebchuk at 503/808-3942.

2. Vernita Bar Update.

Chris Carlson of Grant County PUD reported that field personnel counted redds in the 50 Kcfs to 70 Kcfs flow band during their last Hanford Reach fall chinook spawning ground survey. They observed 99 redds between 50 and 55 Kcfs, 67 redds between 55 and 60 Kcfs, 32 redds between 60 and 65 Kcfs, and nine redds between 65 and 70 Kcfs. We also noticed some females during the most recent survey that were working redds closer to shoreline area, Carlson said, noting that 70 Kcfs is the maximum critical elevation allowed under the Hanford Reach agreement. End of emergence will occur some time in the spring; until then, the critical elevation will be maintained to protect these redds.

Carlson said that, based on the additional spawning, the monitoring team decided to do an additional redd count on November 28. The results of this survey will be used to determine whether this year's crical elevation will be 65 Kcfs or 70 Kcfs. He noted that Grant is basing this operation on the new Hanford Reach agreement, although it has not yet been formally signed – we're just assuming that that's what we'll be operating under this year, he said. Carlson said he will provide another update at the next TMT meeting on December 8.

3. Effects of Transport History on Performance of Adult Salmonid Migrants.

Chris Peery of the University of Idaho provided a presentation titled "Effects of Transport History on Performance on Adult Salmonid Migrants." He noted that the goal of the study is to investigate whether or not fish that were transported as juveniles showed impaired homing ability as adults. He touched on the following major topics:

- Background – from 2000 to 2003, radio-tagged 457 Snake River spring/summer chinook and 727 Snake River steelhead. Just over 60% of the chinook had been barged, and 62% of the steelhead had been barged. Known-source fish were monitored to determine homing, straying, survival and fallback for barged and in-river migrants.
- Chinook showed about a 10 lower homing rate for transported fish (table)
- Steelhead generally showed less effect than did chinook, except in 2003, when 23.4% fewer barged steelhead homed (table)
- Fallback – barged chinook fell back more and more often than in-river migrants (table)
- Fallback – steelhead showed a similar pattern as chinook, but the effect was not as strong (table)

Peery then provided the following summary points

- During low-flow years and when spill is reduced, the proportion of fish transported will increase
- Fish that were barged as juveniles had lower survival to natal areas, likely because of greater straying and fallback behavior

- Evidence related specifically to the 2001 migration year is not complete. Most PIT-tagged fish were transported, so there was no in-river comparison group. The 2004 data are not yet complete; there was less coverage than in past years.

You show for both species that the percentage of returns tends to be trending down, yet adult returns have been trending upward over the last three to four years, said Wellschlager – am I missing something? Adult numbers peaked in 2001 and have trended downward in more recent years, Peery replied; obviously ocean conditions improved about that time, and it's possible that ocean conditions have begun to decline, or that a carrying capacity threshold has been reached. So you're saying that the percentage of change in adult returns is matching your numbers pretty well? Wellschlager asked. They correlate pretty well, Peery replied – obviously the condition of fish at freshwater entry has a significant impact on their ultimate chances of surviving to spawn.

With respect to his homing numbers, Peery said 19% of the barged chinook fell back, compared to 11% for in-river migrants. What this tells us is that the fish that were transported incur some sort of impairment in homing. The number in parentheses is the sample size? Wellschlager said. Correct, Peery replied. Some of those sample sizes are pretty low – are they statistically significant? Wellschlager asked. I wouldn't say they're statistically significant, replied Peery, but they provide further evidence of the homing problems we're seeing. In response to another question, Peery said Bonneville, The Dalles and John Day are the projects where the most fallback occurs. Particularly in the vicinity of The Dalles, there are a number of tributaries to confuse these fish. Ice Harbor is another place where we see quite a few of these Snake River-origin fish fall back.

It's odd that the majority of the fallback is occurring in the lower river, said Wellschlager – I would assume, intuitively, that you would see more fallback at the Snake projects, where the fish were barged through. Peery replied that it is possible that the larger volumes of spill at the lower river projects is a confusing factor. David Wills observed that even the 2001 sample, where only two of 81 sample fish fell back, may still be statistically significant; Russ Kiefer agreed. Remember too that this is selective data for Snake River fish, further subdivided into river and barge and year class – you're going to have small sample sizes. And I'm not questioning the value of this information, said Wellschlager – I'm just trying to understand its statistical significance.

Peery said the average difference in homing for steelhead, for all years combined, is 7.6% lower for barged fish than for in-river fish. Moving on to his summary, Peery reiterated that the condition of the fish as they enter fresh water appears to be declining somewhat over the past several years, perhaps due to El Nino effects. Did you look at tributary dip-ins in the lower river? Boyce asked. We did, and are analyzing that data now, Peery replied – we'll be summarizing that information as well.

Wills asked whether the researchers had looked at the relative contribution rates of these fish, in terms of overall survival, using CWT technology. No, that's outside our scope, Peery replied – this was specifically a homing study. We wanted to know whether barging had an impact on homing and fallback, and it appears that it does. He noted that, overall, fallback in the system has declined significantly in recent years, but added that fish that fall back show a 4-7%

reduction in survival compared to fish that outmigrated in-river. It's up to the managers to decide how significant they think that is.

This is very useful information, Boyce observed; there were some earlier studies that indicated similar observations. Obviously the point of transport is to increase juvenile survival, said Peery; if that survival improvement is enough to offset the detrimental effects those fish face when they return as adults, then it may provide a net survival gain for these stocks. Most transport studies are done in terms of adult returns to Lower Granite, said Wagner – wouldn't this information be reflected in the survival to Lower Granite numbers? I can't answer that directly, but if you see a net gain in numbers of adults returning to Lower Granite, then you may have your answer, Peery replied. In response to another question, Peery said his results do take harvest into account. He said that, off the top of his head, the average harvest on Snake River chinook is about 10%; for Snake River steelhead, it is about 25%.

Your homing rate is back to Lower Granite, said Margaret Filardo – if homing is impaired to Lower Granite, isn't there reason to think that those homing problems would continue once the fish pass Lower Granite? Yes, Peery replied – we have some numbers on that, but haven't quantified them yet. That's a good point, said Boyce; it would also be interesting to have information on the relative spawning success of the in-river and transported fish. Peery invited anyone with further questions to contact him directly.

4. Reflections on Lessons Learned from 2004.

At the TMT year-end review meeting, we asked that the participants reflect on lessons learned in 2004 – things that might impact how we operate the system and make management decisions in 2005, said Silverberg. have you had a chance to think about that, or do you need more time?

Boyce said this is certainly a valuable discussion to have; it will occur through the Regional Forum and AFEP. One thing that is lacking is trying to get a way to summarize it all, so that we can have a discussion and agree on future direction. We're getting there, he said, but we're not there yet.

As far as what I've learned, there are some key issues identified through the AFEP process; I also learned some things in reviewing the remand publications, but I have not yet put my thoughts down on paper. I think we should give people a little more time, then have that more deliberate discussion, Boyce said.

I think it's important to have that discussion well in advance of the management season, Silverberg observed; we need to identify a time when we could have that conversation.

With respect to transport operations in 2005, said Boyce, I think we've gotten a lot of relevant information recently; the salmon managers have been discussing a change in direction specific to transportation. However, you need to share that information with the non-salmon-manager members of TMT, Silverberg observed. We're talking about more of a spread-the-risk strategy, additional spill studies and other changes, said Boyce – perhaps we need to schedule a

special, subject-by-subject meeting at TMT to discuss transport and other issues. Kyle Martin suggested that it would be appropriate to discuss this at the next TMT meeting.

Wellschlager noted that 2004 was a pretty intense year, a low water year, which always adds pressure. One good thing, from my perspective, is that we didn't let things get personal. We all represent our agencies, and although those agencies often have very different views of how the system should be managed, I thought people were willing to hear each other out. Low flow years are challenging, said Paul Wagner; the question is, how do you manage when flows are low? Transport is one tool, but it carries some baggage, as Chris Peery's report indicates. That applies to all years.

Cathy Hlebechuk echoed Wellschlager's comments; she asked whether the salmon managers agreed that, while the discussion was often intense, the overall tone was non-personal and professional. Wills agreed, saying that the tone in 2004 was very different than the tone in 2001. Perhaps we carried that experience with us into 2004. Kiefer said that last year was both the best and worst year he has had at TMT, because it was his first year at TMT. Generally, however, I felt it was mostly professional, although there were a few times when I was disappointed, said Kiefer. We certainly represent different agencies, with different interests. I was disappointed that we're seeing that transportation doesn't provide the benefits we would like to see; we are going to have some cost savings through the Ice Harbor RSW in 2005, yet the Updated Proposed Action is essentially unchanged since the 2000 BiOp. I believe that if we're working to improve adult returns, we should be trying to get as many fish as possible over spillways in the most cost-effective manner, rather than relying so heavily on transport. The UPA doesn't move the region in that direction, and that was a disappointment, Kiefer said.

Boyce said that, in his view, TMT does a good job, but it was irrelevant in 2004 – most of the action was tied up in lawsuits, when it came to operations. As far as the TMT process, I thought it worked well, and that we work well as a group, recognizing that there are processes above TMT that are actually driving operational decisions on the river. From a technical standpoint, I think the TMT should be more responsive to emerging information, Boyce said. That's one area where I would like to see improvement, he said – that new information should drive our recommendations to the operating agencies.

It sounds as though the TMT is still processing all of the information we've received in the past few weeks, Silverberg observed; perhaps what we should do is brainstorm about issues of concern at the December 8 meeting, and schedule a separate meeting at which to discuss them in depth. It was so agreed.

5. Chum Update.

Boyce directed the TMT's attention to the Fish Passage Center homepage, which showed that the November 23 spawning ground survey found 210 chinook redds and 123 chum redds in the Ives Island area, as well as 137 live fall chinook and 105 live chum. Chum really picked up last week, and picked up further in yesterday's survey, he said. Fall chinook continue to be very strong; we have seen up to 377 redds in our recent surveys. Most of the action is in Section 2, just below the confluence with Hamilton Creek. Both chum and fall chinook spawning is in full

swing; it doesn't appear, however, that 2004 is going to be a huge chum spawning year, said Boyce. At Hardy Creek, in the most recent survey, no chum redds were found, but 29 were found at Hamilton Springs. Boyce noted that a very large number of chum redds have been counted in the West Fork Grays River this year.

Is it too soon to make any projections about how the 2004 chum return stacks up against previous years? Wellschlager asked. The returns for 2004 appear to be tracking fairly well with last year's returns, which were down somewhat, said Boyce; the 2004 count of live fish is not likely to approach the 6,694 live chum counted in 2002.

Overall, it appears that we were successful in getting the water on the fish at the proper time this year, said Boyce. Hlebechuk thanked the BPA real-time staff and Bonneville project operators for the good job they've done in maintaining the requested tailwater elevations. I'd like to second that, said Boyce.

6. Burbot SOR.

On November 5, the action agencies received SOR 2004-FWS 2. This SOR, submitted by USFWS on behalf of the Idaho Office of Species Conservation, the Kootenai Tribe of Idaho, IDFG, the City of Bonners Ferry and Boundary County, Idaho, requests the following specific operations:

- Use the selective withdrawal system at Libby Dam to release the coolest possible water during November and December, before temperature stratification limits the temperature control capability.

Wills provided an overview of the SOR, noting that it had been discussed at the TMT's last management meeting, but was not final at that time. The Kootenai Valley Resource Initiative Group would have preferred to specify lower flows, during this period as well, he said, but following a meeting with BPA and the Corps regarding expected runoff at Libby, it was clear that it would not be possible for the action agencies to reduce Libby outflow this year. The requested operation has been initiated, and is going well, Wills said.

Greg Hoffman said the selector gates are being withdrawn, and water is being withdrawn from elevation 2222 beginning today. Montana and the Corps have an agreement throughout the year for temperature guidelines below Libby; Montana has granted an exemption to that agreement for this operation. This is a test to see whether or not we can bring temperatures down at this time of year, said Hoffman. It appears that we are able to do so, although perhaps not to the extent that burbot need, he said. What temperatures do you expect to see over the next couple of months? Boyce asked. We're looking at 39 degree-water (7 degrees C) coming out at Libby, Hoffman replied; last year we saw 4 degrees C at Bonners Ferry, probably because of atmospheric cooling in the intervening stretch of river. He noted that earlier coordination on the burbot operation is desirable for next year; that may allow us to release colder water, he said, adding that he will provide a wrap-up of the operation at one of the TMT's January meetings.

Is there any possibility of shifting flood control from Libby to Grand Coulee this spring, given the need to draw Grand Coulee down for the drum gate work, and given the fact that most of the climatologists are predicting below-average precipitation during the late winter period? Kiefer asked. That's not the way it works, Tony Norris replied. Elevation 1255 is actually pretty high, said Norris – if it's an above-average water year, the flood control elevation would actually be below 1255. However, we have heard Idaho's request, and will see if there is something we can do, operationally, to accommodate it, said Scott Bettin. We can look at it, but I don't know if there's any chance of shifting flood control from Libby to Grand Coulee, primarily because of the VARQ requirements, added Hlebechuk. We'll check back on this issue at a future TMT meeting, Silverberg said.

7. Water Management Plan Comments.

Hlebechuk said no comments have been received, to date, on the 2005 WMP. Wills said the salmon managers anticipate providing comments some time next week. CRITFC will probably have its comments in on Monday, added Martin. Jim Adams noted that the water quality section of the WMP has not yet been updated; he will do that over the next couple of weeks.

8. Status of Operations.

Hlebechuk said Libby elevation has finally dropped below 2439, to 2437.2 feet; the current project inflow is 6 Kcfs, with outflows of 10 Kcfs. Libby's November water supply forecast was 98% of normal; although the Corps doesn't use the November forecast to change the Libby flood control operation, if the forecast holds true, it would result in a December 31 flood control elevation of 2411 feet. Albeni Falls is operating in its winter elevation range of 2055-2055.5 feet, with inflows of 16 Kcfs and outflows of 12 Kcfs. The Corps plans to increase outflow to pass inflow soon. Dworshak inflows have been running 2.5 Kcfs, with 1.5 Kcfs out; current project elevation is 1526 feet. Average flow at Lower Granite, currently, is 19 Kcfs; the Ice Harbor RSW is scheduled to be barged upriver in December. It was agreed that there may be an opportunity for a TMT field trip, to see the RSW before the manufacturer ships it upriver. Daily average flows at Bonneville have been 129 Kcfs (with a range of 120 Kcfs-134 Kcfs) over the past seven days. The USGS testing took place on Wednesday and Thursday of last week; further testing is scheduled for tonight and Friday.

Reclamation reported that Grand Coulee is hovering at just under elevation 1285; Hungry Horse is holding elevation 3540 through January 31 – flows pop up and down depending on inflows. Will the Corps use the SOI forecast to determine the flood control elevation at Libby? asked Dan Bedbury of EWEB. The November forecast is a guide, but we act upon the December forecast, Hlebechuk replied – if the December forecast is below 96% of normal, the flood control elevation would be somewhat higher – if it's 85% of normal, for example, 2426 would be the highest elevation we would draft to. The December water supply forecast should be available during the first week in December, Hlebechuk added.

Wagner said that, from a fish perspective, all of the action is in chum; the juvenile facilities have now been shut down for the winter. Power supply? Silverberg asked. We're

running the system for chum at the moment, said Wellschlager; there is a rod resequencing at the Columbia Generating System scheduled for this weekend; they will dump load for eight hours over the weekend.

The fieldwork is now complete on the Bonneville spill bay recalibration, said Hlebechuk; however, they don't have funding to write up their final report. TMT needs that information prior to the start of the spill season. The important thing is that we know that when we call for 50 Kcfs spill, we actually receive 50 Kcfs spill, Wills observed.

9. Next TMT Meeting Date.

The next TMT meeting was set for Wednesday, December 8. It was agreed to schedule a check-in call on chum operations, if necessary, for December 15. January 5 would then be the next scheduled face-to-face meeting of the TMT. Meeting summary prepared by Jeff Kuechle.

TMT Participant List
November 24, 2004

Name	**Affiliation**
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
David Wills	USFWS
Cathy Hlebechuk	COE
John Wellschlager	BPA
Paul Wagner	NOAAF
Laura Hamilton	COE
Rudd Truner	COE
Kyle Martin	CRITFC
David Benner	FPC
Russ George	WMCI
Tim Heizenrater	PPM
Nic Lane	BPA
Jim Adams	COE
Tom Haymaker	PNGC
Russ Kiefer	IDFG

Ron Boyce	ODFW
Tont Norris	USBR
Dan Bedbury	EWEB
Mike Buchko	Powerex
Chris Peery	U of I
Ruth Burris	PGE
Margaret Filardo	FPC
Scott Bettin	BPA
Chris Carlson	GCPUD
Lance Elias	PPL

MEMORANDUM November 22, 2004

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 21, 2004

Discussion: On Sunday, November 21, 2004 a Vernita Bar ground redd count was conducted to determine the 2004 – 2005 Critical Flow Elevation. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). The NOAA Fisheries representative was unable to attend. Observers to the redd count included Rita Bjork (GCPUD), Dave Borkowski (CWU Graduate Student), David Child (GCPUD), Matt Collims (CWU Graduate Student), Dave Duvall (GCPUD), Joyce Edie (Mattawa Area News), Paul Erickson (Tri-City Herald), Gary Garnant (GCPUD), Lisa Leitz (South County Sun), and Lynn Miller (Tri-City Herald). Flows from Priest Rapids Dam at Vernita Bar were about 50 kcfs. Results of this survey are provided in the table below.

	---------- Redd Count by Flow Level (kcfs) ----------						Total Number
Transect	(36 – 50)	(50 – 55)	(55 – 60)	(60 – 65)	(65 – 70)	(Above 70)	Of Redds
Above A	--	25	14	4	0	0	43
A – AB	--	23	11	9	1	0	44
AB – B	--	28	21	14	6	3	72
Below B	--	16	13	4	1	0	34
C	--	7	8	1	1	0	17
Totals	--	99	67	32	9	3	210

No redd counts were taken below the 50 kcfs elevation.

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Critical Flow Elevation would be set at the 65 flow elevation (If there are fewer than 15 redds above the 65 kcfs elevation, then the Critical Elevation will be the first 5 kcfs elevation above the elevation containing the 16th highest redd within the survey area on Vernita Bar). There are 12 redds counted above the 65 kcfs elevation. Because some spawning activity was still taking place, the monitoring team decided to conduct another redd count on November 28, 2004. Results of this redd count will confirm the 65 kcfs Critical Elevation or adjust the Critical Elevation to 70 kcfs.

Initiation of Spawning had been established earlier this spawning season to be October 20 for the zone between the 36 – 50 kcfs elevations and October 27 for the zone above the 50 kcfs elevation

During last year's November 23 redd count, no redd counts were taken between the 36 – 50 kcfs elevations, 174 redds within 50-55 kcfs, 149 redds between 55-60 kcfs, 123 redds between 60-65 kcfs, 30 redds between 65-70 kcfs and 7 above the 70 kcfs elevation.

The next redd count will be on November 28, 2004 and require a USGS gauging station flow of 50 kcfs. This redd count will be used to determine the 2004 – 2005 Hanford Reach Critical Flow Elevation.

Please contact me if you have any questions.

c: Linda Jones
Jeff Atkinson
Scott Bettin
Steve Brown
Scott Carlon
Dennis Dauble
Mike Erho
Gary Garnant
Paul Hoffarth
Lance Elias
Chuck Goligoski
Shane Bickford
Gary Donabauer
Steve Hays
Leon Hoepner
Rick Klinge
John Muir
Rod Noteboom
Greg Lange
Russ George
Tom Lorz
Bill Berry
Geoffrey McMichael
Robert Mueller
Paul Wagner
Bill Tweit
Bob Heinith
Cliff Sears
Lon Topaz
Rudd Turner
Dispatch
F & W Team
PRD Operators
Relicensing Library
WAN Operators
Kelly Harlan
Shane Scott
Greg Patton
Cathy Hlebechuk

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cathy Hlebechuk / Cindy Henriksen / Rudd Turner*			

TMT MEETING

Wednesday December 8, 2004 0900 - 1200 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Vernita Bar Update. [Vernita Bar Redd Survey, November 28, 2004]
3. Issues for further discussion from 2004 Lessons Learned
4. Chum Update.
5. Water Management Plan comments. [Water Management Plan Draft 11-04-04]
6. Lower Snake Projects - annual winter operational flexibility.
7. Corps of Engineers move logistics - new building, security, etc. New address is Brewery Blocks 4 Building (above P.F. Chang's Restaurant), 1125 N.W. Couch Street, Suite 400. The first TMT meeting to be held there will be in January.
8. Status of Operation
    1. Reservoirs
    2. Fish
    3. Power System
    4. Water Quality
9. Other
    - Set TMT meeting schedule for January - February
    - Set agenda for next meeting

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935

MEMORANDUM November 29, 2004

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 28, 2004

Discussion: On Sunday, November 28, 2004 the last Vernita Bar ground redd count was conducted to determine the 2004 – 2005 Critical Flow Elevation. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). The NOAA Fisheries representative was unable to attend. Flows from Priest Rapids Dam at Vernita Bar were about 50 kcfs. Results of this survey are provided in the table below.

	---------- Redd Count by Flow Level (kcfs) ----------						Total Number
Transect	(36 – 50)	(50 – 55)	(55 – 60)	(60 – 65)	(65 – 70)	(Above 70)	Of Redds
Above A	--	--	--	9	0	0	9
A – AB	--	--	--	12	2	0	14
AB – B	--	--	--	22	10	4	36
Below B	--	--	--	8	5	2	15
C	--	--	--	4	1	0	5
Totals	--	--	--	55	18	6	79

Redd counts were not taken below the 50 kcfs elevation because hatching is estimated to have begun the day earlier, November 27. Redds were not counted between 50 – 60 kcfs for two reasons. First, the 65 kcfs Critical Elevation had already been identified the previous week and therefore could go no lower, and second, counting redds above 60 kcfs would be sufficient to document redd construction since last weekend.

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Critical Flow Elevation will remain at the 65 flow elevation (If there are 15 to 30 redds above the 65 kcfs elevation, the Critical Elevation will be the 65 kcfs elevation). There are 24 redds counted above the 65 kcfs elevation. Since last week, 23 more redds were counted within the 60-65 kcfs elevations, 9 redds between 65-70 kcfs and 3 redds above the 70 kcfs elevation. No spawning activity was observed during this Sunday's redd count.

Initiation of Spawning had been established earlier this spawning season to be October 20 for the zone between the 36 – 50 kcfs elevations and October 27 for the zone above the 50 kcfs elevation

There was no need to count redds last year at this time, but during last year's November 23 redd count, 174 redds were counted within the 50-55 kcfs elevations, 149 redds between 55-60 kcfs, 123 redds between 60-65 kcfs, 30 redds between 65-70 kcfs and 7 above the 70 kcfs elevation.

There will be no more redd counts this year. A separate memorandum will be sent to Grant County PUD Dispatch outlining this season's flow protection plan for the Vernita Bar and Hanford Reach redds.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Linda Jones
Jeff Atkinson
Scott Bettin
Steve Brown
Scott Carlon
Dennis Dauble
Mike Erho
Gary Garnant
Paul Hoffarth
Lance Elias
Chuck Goligoski
Shane Bickford
Gary Donabauer
Steve Hays
Leon Hoepner
Rick Klinge
John Muir
Rod Noteboom
Greg Lange
Russ George
Tom Lorz
Bill Berry
Geoffrey McMichael
Robert Mueller
Paul Wagner
Bill Tweit
Bob Heinith
Cliff Sears
Lon Topaz
Rudd Turner
Dispatch
F & W Team
PRD Operators
Relicensing Library
WAN Operators
Kelly Harlan
Shane Scott
Greg Patton
Cathy Hlebechuk

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 8, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Vernita Bar Update:

Paul Wagner, NOAA, gave a report for Chris Carlson, Grant County PUD, who was not able to be on the TMT call today. A survey was done on November 28th that indicated the protection level should remain at 65 kcfs. This level will remain as such for the rest of the year, and no more surveys will be taken.

Issues for Further Discussion from 2004:

TMT members are interested in furthering discussions about key lessons learned from 2004 to help with management in 2005. Issues listed so far included low flow years, communication, and transportation.

ACTION: The facilitation team will gather information from TMT members about additional topic ideas and thoughts on approach for discussing the issues. This will be an agenda item at the next face to face meeting on January 5th.

Chum Update:

Ron Boyce, Oregon, reported on the Ives Island survey results through December 7th. Chinook and chum are still spawning – 130 chum and 186 chinook were counted in the area. Numbers are similar to those in 2003. The chum operation appears to be successful this year. Dave Wills, USFWS, reported on Hamilton Springs and Hardy Creek live chum surveys. On 11/19, zero were found at Hardy and 29 at Hamilton. On 11/24, 4 were found at Hardy and 60 at Hamilton. On 12/03, 40 were found at Hardy and 134 at Hamilton.

BPA, the COE and BOR discussed raising the day time minimum tailwater elevation at Bonneville to provide flexibility to manage the increase of water in the system. They requested that the elevation be raised by .5', which should not impact spring refill targets.

ACTION: TMT members agreed to the proposed change to the tailwater, which will be changed effective today (12/8). The tailwater elevation will range from 11.7-12.1'. The operation will maintain the highest redds unless/until TMT determines that it is impractical to do so.

Water Management Plan Comments:

The COE has received comments from the BOR. The water quality section will be

updated by Friday. CRITFC, Oregon, Washington, Idaho, USFWS and NOAA are planning to submit comments by the end of the year. Question: Will the WMP be brought in line with the new BiOp (e.g. transportation operations)?

ACTION: Paul Wagner will review the WMP for consistency with the 2004 BiOp and report to the TMT at the next meeting.

It was noted that it might make sense to wait for the final agency record of decision before finalizing the WMP. It was also suggested that the process of developing the plan could be improved to increase a sense of ownership.

Lower Snake Projects:
Cathy Hlebechuk, COE, summarized last year's TMT coordinated agreement for operations at the Lower Snake River projects. The projects were operated at zero nighttime flow for up to six hours between 6pm-6am, from December 1-the end of February. Per this agreement, the action agencies planned to begin the zero flow operation at all four projects as soon as possible. Idaho raised the question: If significant fish movement occurs in February, would the action agencies end the zero flow operation early to accommodate them? The COE responded that no counts will be done until March and encouraged the salmon managers to review the University of Idaho study that indicates that there may be no effect of zero nighttime flow on migrating fish. It was noted that failure to detect an impact does not necessarily mean no impact. Idaho believes that if fish are moving, the operation should change to a more 'normative' river to accommodate their movement.

COE Building Move:
The COE will be moving from the Customs House to a new location on December 18th: 1125 NW Couch St, Conference Room 4A34 in the Brewery Blocks 4 Building. There will be tighter security so folks are encouraged to come early to TMT meetings. Also, if you are a member of the public and plan to attend the TMT meetings regularly, contact Cathy Hlebechuk at 503-808-3942 so she can register your name into the security system. If you are not in the system, you will need to call Cathy, Cindy Henriksen, or Rudd Turner if you plan to attend the meeting. The first TMT meeting in the new building will be held on Wednesday, January 5th.

Status of Operations*:*
Reservoirs: Cathy Hlebechuk, COE, reported that Libby is currently at elevation 2429', with inflows of 5 kcfs and full powerhouse, 25 kcfs, out. The COE is operating the project to reach elevation 2411' by the end of December. Albeni Falls is passing inflows, at 20 kcfs out. Dworshak is filling slightly, at elevation 1532.8'. Lower Granite is operating at 20 kcfs in and out. The RSW at Lower Granite will be moved to Ice Harbor in February. The field trip to view this RSW was scheduled for Tuesday, December 14th at 8 AM. Anyone interested needs to contact Cathy Hlebechuk – space is limited! Bonneville is releasing 140-150 kcfs. The tailwater range, effective today, will be 11.7-12.1'.Grand Coulee is at elevation 1286.5'. Hungry Horse is at elevation 3541', and will remain so through the end of December.

Fish: Cindy LeFleur, WDFW, reported that Washington posted a pre-season outlook for 2005 passage on the Fish Passage Center web page. The forecast so far predicts that numbers will be down from '03 and '04.

Power: The power system is currently operating to manage the influx of water.

Water quality: There was nothing to report at this time.

Other: Tony Norris reported that the BOR is moving its offices, and all employees will be without computer and phone communication during the week of December 20th. Phone numbers will remain the same.

TMT Meeting Schedule:
There may be a TMT call on chum on **December 15th at 9:00 am**. There will be no TMT meeting on December 22nd. The following face to face meeting will be held on **January 5th**. There will be a discussion on the WMP: transport and spill triggers. A process meeting will also be scheduled for sometime in January. The action agencies and salmon managers have or are scheduled to have planning meetings before that time.

Upcoming Meeting Dates: 1/19, 2/2, 2/16, 3/2, 3/16, 3/30

1. Greetings and Introductions.

Today's meeting, held at the Corps' Reservoir Control Center in Portland, was chaired by Cathy Hlebechuk and facilitated by Donna Silverberg. the following is a summary (not a verbatim transcript) of the items discussed and decisions made at that meeting. Please call Hlebechuk at 503/808-3939 with questions about these notes.

2. Vernita Bar Update.

Paul Wagner reported that the last Vernita Bar ground redd count was conducted on November 28 to determine the 2004-'05 critical flow elevation. The results of the survey were as follows:

Redd Count by Flow Level

60-65 Kcfs: 55 redds
65-70 Kcfs: 18 redds
Above 70 Kcfs: 6 redds
Total redds: 79

Wagner noted that redds were not counted below 60 Kcfs, because the 2004-'05 critical elevation had already been set at 65 Kcfs. Since the November 28 survey, 23 more redds have been counted within the 60-65 Kcfs elevation band, nine new redds have been documented between 65 and 70 Kcfs, and three new redds above 70 Kcfs. The

protection level will remain at 65 Kcfs for the remainder of the year. He added that there will be no further redd counts this year.

3. Issues for Further Discussion from 2004 Lessons Learned.

If you recall, said Silverberg, we discussed this issue at the last TMT meeting; she asked whether the other TMT participants had had an opportunity to give the lessons learned topic further thought. I think it deserves further thought, said Wagner, but the salmon managers have had no formal conversations about it, as yet. Silverberg said she will contact the TMT members by phone in advance of the next face-to-face TMT meeting on January 5 to discuss their concerns. Some of the items that have been touched on include communication, the fact that there are often larger forces at work than TMT during low-flow years; and the limits on TMT's operational flexibility in low-flow years.

4. Chum Update.

Ron Boyce provided this update. He noted that, in the most recent spawning ground survey, on December 7, field personnel observed 186 fall chinook redds and 132 chum redds, as well as 29 live fall chinook and 49 live chum. Spawning, in other words, continues in full swing. Most of the spawning is taking place in Section 2, at the confluence of Hamilton Creek. Things are progressing as expected, and this year's operation appears to be successful, said Boyce. David Wills added that Fish and Wildlife Service crews have been surveying chum spawning at Hardy Creek and Hamilton Springs; the most recent survey, on December 3, found 40 live chum in Hardy Creek and 134 live chum in Hamilton Springs. In response to a question from John Wellschlager, Boyce said the total spawner numbers for 2004 are mirroring those for 2003 pretty closely.

Wellschlager said BPA has been talking with the Corps about the possibility of raising the Bonneville tailwater by 0.5 feet, given the large slug of water that is expected to be coming downstream as a result of the current precipitation event. We think we can do that without impacting spring refill targets, he said; in any event, we're going to need some tools to manage through this. You can't constrain flow to 11.5 feet below Bonneville? Boyce asked. Not for the coming week, at least, Wellschlager replied – we're running oout of storage space at Grand Coulee. You would increase the tailwater elevation by half a foot and maintain that through emergence? Wills asked. Yes, Wellschlager replied, noting that the half-foot increase in Bonneville tailwater elevation translates into a 5 Kcfs increase in Bonneville outflow, to about 130 Kcfs. The group devoted a few minutes of discussion to the BiOp language regarding chum operations, specifically, its requirements with respect to the restrictions on tailwater elevations through emergence.

Wellschlager said that, currently, to manage the tailwater elevation, tributary/local flow and tidal effects must also be factored in with Bonneville outflow. We're also looking at the anticipated increase in Bonneville inflow, and at the decreasing storage capacity at Grand Coulee, he said. One option, to deal with these factors, is to raise the

minimum tailwater elevation, Wellschlager said; we may also need to have some excursions outside the nighttime tailwater fluctuation constraint of 7 feet. We're proposing to raise the current tailwater range from 11.3-11.7 to a range of 11.7 to 12.1 feet, from 7 a.m. to 7 p.m., effective today. And it would stay that way through February? Cindy LeFleur asked. It would stay that way through the end of spawning, and after that, we'll do what the BiOp tells us to do, said Wellschlager – if we exceed the 135 Kcfs threshold discussed in the BiOp, we'll have a little more operational flexibility through emergence. In response to another question, Wagner said the position of the highest redd is the first criteria the TMT will look at in determining the minimum incubation flow.

After a few minutes of further discussion, no TMT objections were raised to this proposed change in operation.

5. Water Management Plan Comments.

Hlebechuk said that, so far, she has received comments only from the Bureau of Reclamation on the draft 2005 Water Management Plan. Kyle Martin said Bob Heinith is still working on CRITFC's comments. Boyce said ODFW was sidetracked by the issuance of the new BiOp and Updated Proposed Action. Both ODFW and CRITFC said they will submit their comments by Christmas week. WDFW, IDFG and the Fish and Wildlife Service also plan to submit comments some time in the next two weeks.

Boyce asked why the 2005 WMP is not fully consistent with the UPA, particularly with respect to transportation. The action agencies replied that, until the Records of Decision are issued, it isn't known precisely how they will respond to the UPA, operationally. We're still studying it, in other words, said Wellschlager. In response to a question from Boyce, Wellschlager said Bonneville plans to issue its ROD on the UPA by mid-December. Shouldn't we wait to finalize the Water Management Plan until we know how the action agencies are going to respond to the UPA? Boyce asked. That makes sense from our perspective, Wellschlager replied. However, said Hlebechuk, we need to continue to make progress on the draft WMP.

Boyce added that, in his view, the process for developing the annual WMP can be improved; it's not much of a collaborative effort, he said, which means that the salmon managers have very little ownership of that document. When all you're asking us to do is to submit comments that will be put into an appendix, that doesn't give us a lot of incentive, he said.

6. Lower Snake Projects – Annual Winter Operational Flexibility.

Hlebechuk said that, in the Water Control Plan, the Lower Snake projects have gone to zero nighttime flow from December 1-February 29, traditionally. TMT discussed that last year, and we reached an agreement to implement zero flow for no more than six hours out of eight between 10 p.m. and 6 a.m. Our plan is to go to that operation at all four projects immediately, although Ice Harbor will need to generate at night to provide heat for the powerhouse.

Russ Kiefer noted that, in some years, when conditions warm up in February, significant movement of steelhead is seen. If we see those fish start to move in February, is there some flexibility to alter this proposed operation? Kiefer asked. Hlebechuk replied that counting won't begin at the lower Snake projects until March 1, when counting will begin at Lower Granite. She added that a 1998 study by the University of Idaho concluded that limited periods of zero nighttime flow during February did not significantly impact steelhead migration, although there was some evidence of delay. The fish ladders will be out of service for maintenance from January 3-February 18 at Lower Granite and from January 3-January 27 at Little Goose, added Larry Beck.

Kiefer noted that, just because there is no counting doesn't mean there are no fish moving; if conditions warrant, he said, it would be best if we can go to a more normative river condition.

Silverberg observed that there is some time between now and February; she encouraged the salmon managers and the action agencies to think further about this issue, and come prepared to discuss it, if necessary, at the January 5 TMT meeting.

7. Corps of Engineers Move Logistics.

Hlebechuk noted that the Corps' move to their new quarters in the Brewery Blocks 4 building (1125 NW Couch St.) will take place on December 17. The TMT meetings will be held in conference room 4A34. Security at the new building will be tighter; visitors will need to pre-register through Hlebechuk, then, on meeting days, check in at the security desk on the 5th floor to obtain a security badge. She suggested that the TMT participants arrive early for the first meeting, until more is known about the increased security procedures.

8. Status of Operation.

The Corps reported that Libby was at elevation 2429 feet as of midnight last night, with 5 Kcfs inflow and 25 Kcfs outflow, full powerhouse discharge. The December final forecast shows 99% of normal for the Libby basin, which puts the December 31 flood control target at 2411. The project has been weekly load shaping, and will continue to adjust outflow to reach elevation 2411 by December 31. Albeni Falls continues to pass inflow, about 20 Kcfs, operating within 0.5 feet of its winter elevation limit. Dworshak: 1532. 8 feet, filling nicely, releasing minimum outflow. Lower Granite's average outflow has been in the 20 Kcfs range over the past week; outflow may increase to near 30 Kcfs with the current precipitation event. Bonneville outflow has been in the 140-150 Kcfs range, on average, over the past week. Reclamation said Grand Coulee is currently at elevation 1286.5; the current elevation at Hungry Horse is 3541, and the project is releasing 1.4 Kcfs.

LeFleur said she has released a "first look" pre-season forecast of chinook and coho numbers for 2005; the bottom line is that it looks as though pretty much everything will be down in 2005, compared to 2004. The forecast is available via the FPC homepage.

Wellschlager said there are no significant problems to report with the power system; the action agencies are attempting to manage the ongoing precipitation event and the higher flows that will be coming down the system.

9. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, January 5, then every two weeks thereafter. It was agreed that, if necessary, the TMT will convene via conference call next Wednesday, December 15. Meeting summary prepared by Jeff Kuechle.

TMT Meeting Participant List
December 8, 2004

Name	Affiliation
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
Cathy Hlebechuk	COE
Tony Norris	USBR
Paul Wagner	NOAAF
Mike O'Bryant	CBB
Ron Boyce	ODFW
Russ Kiefer	IDFG
Cindy LeFleur	WDFW
Dave Benner	FPC
Kyle Martin	CRITFC
Russ George	WMCI
John Wellschlager	BPA
Nic Lane	BPA
Laura Hamilton	COE
Ruth Burris	PGE
David Wills	USFWS
Larry Beck	COE

Glenn Traeger	Avista
Tom Le	PSE
Bruce MacKay	Consultant
Margaret Filardo	FPC

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cathy Hlebechuk / Cindy Henriksen / Rudd Turner*			

TMT CONFERENCE CALL

Wednesday December 15, 2004 0900 - 0915 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. Chum Check in.

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 15, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Chum Operations Update:

John Wellschlager, BPA, reported to the TMT that, due to continuing influxes of water in the system, Grand Coulee is nearly full and there is a high likelihood that the daytime maximum tailwater elevations at Bonneville would be exceeded. He requested feedback from the salmon managers on which operation, to address the high flows, would have the least impact on chum: run the project at full turbine capacity operations for an extended period of time (2-3 hours) at both the beginning and end of the daytime period, or raise the tailwater elevation at Bonneville by .2'?

Ron Boyce, Oregon, reported that based on field observations, Friday's (12/10) chum survey did not show evidence of spawning at higher levels than the 11.5' range. This needs to be verified by GPS information. Live numbers are down – 8 live chum were observed on Friday and 4 were observed yesterday (12/14). 23 redds were observed on Friday, and 45 were observed yesterday. The salmon managers expressed interests in maintaining incubation protection for the chum, and in refilling Grand Coulee in the spring. They recommended raising the tailwater to an 11.9-12.3' range.

ACTION: The COE will issue a teletype, effective immediately, to raise the Bonneville tailwater elevation to an 11.9-12.3' range.. The next face to face TMT meeting will be held in the new COE building (1125 NW Couch St, Conference Room 4A34 in the Brewery Blocks 4 Building) on January 5th.

Upcoming Meeting Dates: 1/5, 1/19, 2/2, 2/16, 3/2, 3/16, 3/30

1. Greetings and Introductions.

Today's meeting, held at the Corps' Reservoir Control Center in Portland, was chaired by Cathy Hlebechuk and facilitated by Donna Silverberg. the following is a summary (not a verbatim transcript) of the items discussed and decisions made at that meeting. Please call Hlebechuk at 503/808-3932 with questions about these notes.

2. Vernita Bar Update.

Paul Wagner reported that the last Vernita Bar ground redd count was conducted on November 28 to determine the 2004-‘05 critical flow elevation. The results of the survey were as follows:

Redd Count by Flow Level

60-65 Kcfs: 55 redds
65-70 Kcfs: 18 redds
Above 70 Kcfs: 6 redds
Total redds: 79

Wagner noted that redds were not counted below 60 Kcfs, because the 2004-‘05 critical elevation had already been set at 65 Kcfs. Since the November 28 survey, 23 more redds have been counted within the 60-65 Kcfs elevation band, nine new redds have been documented between 65 and 70 Kcfs, and three new redds above 70 Kcfs. The protection level will remain at 65 Kcfs for the remainder of the year. He added that there will be no further redd counts this year.

3. Issues for Further Discussion from 2004 Lessons Learned.

If you recall, said Silverberg, we discussed this issue at the last TMT meeting; she asked whether the other TMT participants had had an opportunity to give the lessons learned topic further thought. I think it deserves further thought, said Wagner, but the salmon managers have had no formal conversations about it, as yet. Silverberg said she will contact the TMT members by phone in advance of the next face-to-face TMT meeting on January 5 to discuss their concerns. Some of the items that have been touched on include communication, the fact that there are often larger forces at work than TMT during low-flow years; and the limits on TMT’s operational flexibility in low-flow years.

4. Chum Update.

Ron Boyce provided this update. He noted that, in the most recent spawning ground survey, on December 7, field personnel observed 186 fall chinook redds and 132 chum redds, as well as 29 live fall chinook and 49 live chum. Spawning, in other words, continues in full swing. Most of the spawning is taking place in Section 2, at the confluence of Hamilton Creek. Things are progressing as expected, and this year’s operation appears to be successful, said Boyce. David Wills added that Fish and Wildlife Service crews have been surveying chum spawning at Hardy Creek and Hamilton Springs; the most recent survey, on December 3, found 40 live chum in Hardy Creek and 134 live chum in Hamilton Springs. In response to a question from John Wellschlager, Boyce said the total spawner numbers for 2004 are mirroring those for 2003 pretty closely.

Wellschlager said BPA has been talking with the Corps about the possibility of raising the Bonneville tailwater by 0.5 feet, given the large slug of water that is expected to be coming downstream as a result of the current precipitation event. We think we can

do that without impacting spring refill targets, he said; in any event, we're going to need some tools to manage through this. You can't constrain flow to 11.5 feet below Bonneville? Boyce asked. Not for the coming week, at least, Wellschlager replied – we're running oout of storage space at Grand Coulee. You would increase the tailwater elevation by half a foot and maintain that through emergence? Wills asked. Yes, Wellschlager replied, noting that the half-foot increase in Bonneville tailwater elevation translates into a 5 Kcfs increase in Bonneville outflow, to about 130 Kcfs. The group devoted a few minutes of discussion to the BiOp language regarding chum operations, specifically, its requirements with respect to the restrictions on tailwater elevations through emergence.

Wellschlager said that, currently, to manage the tailwater elevation, tributary/local flow and tidal effects must also be factored in with Bonneville outflow. We're also looking at the anticipated increase in Bonneville inflow, and at the decreasing storage capacity at Grand Coulee, he said. One option, to deal with these factors, is to raise the minimum tailwater elevation, Wellschlager said; we may also need to have some excursions outside the nighttime tailwater fluctuation constraint of 7 feet. We're proposing to raise the current tailwater range from 11.3-11.7 to a range of 11.7 to 12.1 feet, from 7 a.m. to 7 p.m., effective today. And it would stay that way through February? Cindy LeFleur asked. It would stay that way through the end of spawning, and after that, we'll do what the BiOp tells us to do, said Wellschlager – if we exceed the 135 Kcfs threshold discussed in the BiOp, we'll have a little more operational flexibility through emergence. In response to another question, Wagner said the position of the highest redd is the first criteria the TMT will look at in determining the minimum incubation flow.

After a few minutes of further discussion, no TMT objections were raised to this proposed change in operation.

5. Water Management Plan Comments.

Hlebechuk said that, so far, she has received comments only from the Bureau of Reclamation on the draft 2005 Water Management Plan. Kyle Martin said Bob Heinith is still working on CRITFC's comments. Boyce said ODFW was sidetracked by the issuance of the new BiOp and Updated Proposed Action. Both ODFW and CRITFC said they will submit their comments by Christmas week. WDFW, IDFG and the Fish and Wildlife Service also plan to submit comments some time in the next two weeks.

Boyce asked why the 2005 WMP is not fully consistent with the UPA, particularly with respect to transportation. The action agencies replied that, until the Records of Decision are issued, it isn't known precisely how they will respond to the UPA, operationally. We're still studying it, in other words, said Wellschlager. In response to a question from Boyce, Wellschlager said Bonneville plans to issue its ROD on the UPA by mid-December. Shouldn't we wait to finalize the Water Management Plan until we know how the action agencies are going to respond to the UPA? Boyce asked. That makes sense from our perspective, Wellschlager replied. However, said Hlebechuk, we need to continue to make progress on the draft WMP.

Boyce added that, in his view, the process for developing the annual WMP can be improved; it's not much of a collaborative effort, he said, which means that the salmon managers have very little ownership of that document. When all you're asking us to do is to submit comments that will be put into an appendix, that doesn't give us a lot of incentive, he said.

6. Lower Snake Projects – Annual Winter Operational Flexibility.

Hlebechuk said that, in the Water Control Plan, the Lower Snake projects have gone to zero nighttime flow from December 1-February 29, traditionally. TMT discussed that last year, and we reached an agreement to implement zero flow for no more than six hours out of eight between 10 p.m. and 6 a.m. Our plan is to go to that operation at all four projects immediately, although Ice Harbor will need to generate at night to provide heat for the powerhouse when the weather gets cold.

Russ Kiefer noted that, in some years, when conditions warm up in February, significant movement of steelhead is seen. If we see those fish start to move in February, is there some flexibility to alter this proposed operation? Kiefer asked. Hlebechuk replied that counting won't begin at the lower Snake projects until March 1, when counting will begin at Lower Granite. She added that a 1998 study by the University of Idaho concluded that limited periods of zero nighttime flow during February did not significantly impact steelhead migration, although there was some evidence of delay. The fish ladders will be out of service for maintenance from January 3-February 18 at Lower Granite and from January 3-January 27 at Little Goose, added Larry Beck.

Kiefer noted that, just because there is no counting doesn't mean there are no fish moving; if conditions warrant, he said, it would be best if we can go to a more normative river condition.

Silverberg observed that there is some time between now and February; she encouraged the salmon managers and the action agencies to think further about this issue, and come prepared to discuss it, if necessary, at the January 5 TMT meeting.

7. Corps of Engineers Move Logistics.

Hlebechuk noted that the Corps' move to their new quarters in the Brewery Blocks 4 building (1125 NW Couch St.) will take place on December 17. The TMT meetings will be held in conference room 4A34. Security at the new building will be tighter; visitors will need to pre-register through Hlebechuk, then, on meeting days, check in at the security desk on the 5th floor to obtain a security badge. She suggested that the TMT participants arrive early for the first meeting, until more is known about the increased security procedures.

8. Status of Operation.

The Corps reported that Libby was at elevation 2429 feet as of midnight last night, with 5 Kcfs inflow and 25 Kcfs outflow, full powerhouse discharge. The December final forecast shows 99% of normal for the Libby basin, which puts the December 31 flood control target at 2411. The project has been weekly load shaping, and will continue

to adjust outflow to reach elevation 2411 by December 31. Albeni Falls continues to pass inflow, about 20 Kcfs, operating within 0.5 feet of its winter elevation limit. Dworshak: 1532. 8 feet, filling nicely, releasing minimum outflow. Lower Granite's average outflow has been in the 20 Kcfs range over the past week; outflow may increase to near 30 Kcfs with the current precipitation event. Bonneville outflow has been in the 140-150 Kcfs range, on average, over the past week. Reclamation said Grand Coulee is currently at elevation 1286.5; the current elevation at Hungry Horse is 3541, and the project is releasing 1.4 Kcfs.

LeFleur said she has released a "first look" pre-season forecast of chinook and coho numbers for 2005; the bottom line is that it looks as though pretty much everything will be down in 2005, compared to 2004. The forecast is available via the FPC homepage.

Wellschlager said there are no significant problems to report with the power system; the action agencies are attempting to manage the ongoing precipitation event and the higher flows that will be coming down the system.

9. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, January 5, then every two weeks thereafter. It was agreed that, if necessary, the TMT will convene via conference call next Wednesday, December 15. Meeting summary prepared by Jeff Kuechle.

TMT Meeting Participant List
December 8, 2004

Name	Affiliation
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
Cathy Hlebechuk	COE
Tony Norris	USBR
Paul Wagner	NOAAF
Mike O'Bryant	CBB
Ron Boyce	ODFW
Russ Kiefer	IDFG
Cindy LeFleur	WDFW

Dave Benner	FPC
Kyle Martin	CRITFC
Russ George	WMCI
John Wellschlager	BPA
Nic Lane	BPA
Laura Hamilton	COE
Ruth Burris	PGE
David Wills	USFWS
Larry Beck	COE
Glenn Traeger	Avista
Tom Le	PSE
Bruce MacKay	Consultant
Margaret Filardo	FPC

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cathy Hlebechuk / Cindy Henriksen / Rudd Turner*			

TENTATIVE TMT CONFERENCE CALL

Wednesday December 22, 2004 0900 - 1000 hours

New Corps Office, Brewery Block 4 Bldg
1125 N.W. Couch Street, Suite 400
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

- This meeting is tentative and will be held only if needed to change chum elevations based on field observations.

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935

TECHNICAL MANAGEMENT TEAM			
BOR: *Tony Norris / John Roache*		**BPA:** *Scott Bettin / John Wellschlager*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *David Wills / Steve Haeseker*	
OR: *Ron Boyce*	**WA:** *Cindy LeFleur*	**ID:** *Russ Kiefer*	**MT:** *Jim Litchfield*
COE: *Cathy Hlebechuk / Cindy Henriksen / Rudd Turner*			

TMT CONFERENCE CALL

Wednesday December 29, 2004 0900 - 1000 hours

New Corps Office, Brewery Block 4 Bldg
1125 N.W. Couch Street, Suite 400
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and introductions.
2. December 27 Chum survey results and discussion.
3. "Chris Ross, (NOAA-F)' retirement lunch January 5"?
4. Other
    a. Set agenda for next meeting

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 29, 2004

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Chum Operations Update:

Ron Boyce, ODFW, sent an email to TMT members yesterday (12/28) that reported: The 12/28 survey observed no chum lives so it appears that chum spawning is complete. Oregon discussed this at FPAC and supported maintaining incubation flows at a minimum 12.3' Bonneville tailwater elevation until ODFW and USFWS can provide TMT information on actual chum redd elevations. ODFW committed to getting that information to TMT prior to the Jan 19th TMT meeting.

Paul Wagner, NOAA, reported the information from ODFW and offered that because the location results from the redd surveys would not be known for another two weeks, NOAA supported a 12' minimum tailwater at Bonneville.

BPA said they are sensitive to the salmon managers' concern that redds may be higher than the previously observed 11.5', and recommended operating Bonneville tailwater at a minimum 11.9' until the final survey results are known, and then revisiting the operation. The COE agreed that maintaining the current minimum tailwater elevation, 11.9', and lifting the maximum 12.3' constraint, would be the preferred operation since the elevation had been down to 11.9' in previous weeks and because the latest known information shows redds at 11.5'. The COE would like to be informed if additional surveys are going to be conducted, so that operations can be changed to accommodate the surveyors. Paul offered that there are no further surveys planned to his knowledge, and will check with a contact at the USFWS to make certain this is the case.

NOAA did not object to the proposed 11.9' minimum tailwater elevation, and requested that, in the future, the action agencies communicate more clearly the decision criteria that will be used for this type of operation. CRITFC supported the action agencies' proposed operation and requested that any excess water saved be used for spring migrants.

ACTION: Effective immediately, the daytime maximum tailwater elevation at Bonneville will be lifted and the 24-hour minimum will remain at 11.9'. This operation will be re-visited when the final redd survey results are known (expected the week of January 10th). If there are additional surveys planned, the USFWS will coordinate with the COE.

Next Meeting, January 5th, 9am:
The next face to face TMT meeting will be held in the new COE building (1125 NW Couch St, Conference Room 4A34 in the Brewery Blocks 4 Building) on January 5th. Following the TMT meeting, there will be a lunch held at Jake's Grill in honor of Chris Ross's retirement. Cathy Hlebechuk will send an email invitation with further details and an RSVP request prior to 1/5.

Agenda

1. Issues for further discussion from 2004 Lessons Learned
2. Chum Update
3. Water Management Plan comments
   [2005 Water Management Plan Draft]
   [Appendix 4 - TDG Management Plan]
4. Status of Operation
   a. Reservoirs
   b. Fish
   c. Power System
   d. Water Quality
5. Other
   - Set agenda for next meeting
6. Chris Ross. (NOAA-F) retirement lunch (location TBD)

Upcoming Meeting Dates: 1/5, 1/19, 2/2, 2/16, 3/2, 3/16, 3/30