

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 January 5, 2005 0900 - 1000 hours

New Corps Office, Brewery Block 4 Bldg
1125 N.W. Couch Street, Suite 4A34
Above PF Chang's Restaurant
Entrance on Couch Street
Portland, Oregon
Conference call line: 503-808-5190

NOTE: This is the first TMT meeting at the new building.

There will be tighter security at the new building. Visitors must pre-register before they come to the meeting. Please call Cathy Hlebechuk (503/808-3942), Rudd Turner (503/808-3935) or Cindy Henriksen (503/808-3942) so they can register you in the security system. Those TMT members that attend on a regular basis don't need to call their name in every time there is a meeting. Cathy, Rudd and Cindy will make sure you are registered before each meeting. Those people that attend meetings occasionally need to call Cathy, Rudd or Cindy each time they are planning on attending a TMT meeting. Those that are already pre-registered in the security system are Benner, Boyce, Burris, Filardo, George, Harding, Harkless, Kiefer, Le, Lefleur, Lane, MacKay, Martin, Norris, O'Bryant, Ross, Ruff, Silverberg, Wagner and Wellschlager.

Pre-registered visitors must enter the building and go to the 5th floor to check in with the guard and get a visitor's badge. Visitors must have photo i.d. also. Once you receive your visitor's badge, the guard will either call Cathy, Rudd or Cindy to escort you to the meeting room or they will let you go there yourself. The room is on 4th floor, room 4A34.

*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@cnmv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Issues for further discussion from 2004 Lessons Learned
3. Chum Update.
4. [\[2005 Water Management Plan comments\]](#) 
[\[2005 Water Management Plan Draft\]](#) 
[\[Appendix 1 - Emergency Protocols\]](#) 
[\[Appendix 4 - TDG Management Plan\]](#) 
5. Status of Operation
 - a. Reservoirs
 - b. Fish
 - c. Power System

d. Water Quality

6. Other

- Set agenda for next meeting

[\[Calendar\]](#) 

7. Chris Ross. (NOAA-F) retirement lunch (location TBD)

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

January 5, 2005

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.

Issues for Discussion from 2004 Lessons Learned

As the New Year began, TMT members were asked if they had any other follow-up comments from the lessons learned discussions in November & December:

- One member reflected that he and others need to **pay more attention to the planning process** and not just on adaptive management. While some issues can be managed in-season, others, especially those with known controversy around them, would be better suited to discussion during the planning phase for inclusion in the Water Management Plan.
 - To make progress on this, the group should highlight the areas where there is new or expected information so that everyone has an expectation that a discussion is needed prior to a decision being made.
ACTION: TMT should develop a list of the issues members think will be difficult this year and begin working through them to reach resolution, sooner than later.

- One issue that may need further discussion due to new information (and soon): **transportation** and the planned starting date of April 20th. New information has come out that should be discussed more completely. The question is--where should those discussions occur and who should be part of them? Is there a way for the group to get out of entrenched positions and start fresh with new ideas and information about spill, bypass and transport? Options discussed included:
 - Hold an informal work session of TMT, with some invited experts, to review the current state of information, discuss the pros, cons and uncertainties of what is known, and then reach a consensus on action for this spring based on that information; or
 - Develop a formal proposal for a regional symposium that reviews the science, does a weight of evidence analysis, and produces concrete actions to follow.

Some noted that other regional bodies are engaged in discussions or decision processes that have bearing on the transportation issue such as SCT, FPOM and AFEP. If a more formal approach is taken, they should be part of the symposium. Also, the discussion may need to be expanded to include both spring and summer. However, if this were to occur, it may need to be done in two separate discussions or (some felt) it will be too big to get done. The COE noted that these

discussions need to occur very quickly (i.e. by the end of January would be preferred) if they are to have an impact on this year's management actions.

ACTION: TMT members will consider whether they would like to proceed with the informal approach to the transportation issue by Friday January 7, 2005.

- **If yes, what information or presentations are needed for a thorough discussion? Are there UPAs or legal implications that should be considered prior to such a discussion? Who is willing to help plan such a meeting (whether it is a meeting or a symposium)? When should the discussion take place?**
- **If no (to the informal process) how should the issue move forward? Answers should be emailed to Donna Silverberg by end of business Friday 1/7/05.**

ACTION: Paul Wagner will address the question: How much flexibility is given in the new BiOp for management adjustments to be made in-season based on recommendations from TMT (and other Regional Forum bodies)?

- Finally, it was noted that flood control operations and implications of the drum gate work scheduled later this year will need further discussion at upcoming TMT meetings.

Chum Update

Oregon Rep, Ron Boyce, said that no chum were observed at the last survey on 12/28. He said that detailed information about redd elevations will be shared at the January 19 TMT meeting. He will do his best to get information out to TMT members prior to that meeting. The estimate on total returns of chum in 2004 will be shared with the group as soon as it is complete. The COE is operating the tailwater at BON to a minimum of 11.9'.

- The action agencies noted that, in the future, it would be useful to have the redd elevations sooner to assure for effective management.

Water Management Plan

The COE told the group that the Fall Winter Update has been added to the website for review and comment by TMT and others. Additionally, comments from CRITFC and WA about the WMP have been added. COE is still waiting for comments from other agencies. OR's rep said his agency had internal discussions and decided not to provide comments this year. ID's rep noted their comments will be delivered shortly.

ACTION: The action agencies will let the group know whether or not they will provide formal responses to the state and tribal agencies' comments on the WMP as soon as possible.

Status of Operations

HH is at elevation 2542.1, discharging to meet Columbia Falls minimums.

GCL is at 1286.7

LIB is at 2409.4', ramping down to minimum flows

- A question was asked about: why is any water being released from LIB given the predictions of a very low flow year? The initial response was to provide benefit to resident fish and

benthic production in the river banks. **ACTION: Russ Keifer will discuss the issue with Brian Marotz (MT) and Dave Wills will discuss with USFWS biologists and bring the issue back to TMT for an update.**

- **ACTION: COE will respond to questions about flood control flexibility for the projected drought year at the next TMT meeting 1/19.**

ALB is at 2055.4' (trying to maintain the 2055-2056 elevation)

DWR is at 1549.35' and hit 1548.5' at the end of December

- **ACTION: COE will check on the cause of spill observed at the project in December and report to TMT.**

TDA is expecting a planned outage in February. COE will report when they know more.

BON has been operating at 158 kcfs.

The COE stated that they are currently waiting for the final forecast to determine operations at LIB and DWR. They plan to do an ESP analysis for possible flexibility at DWR for power needs.

- **ACTION: COE will provide TMT information about the timeline and procedure for making power flexibility decisions at DWR. This information will also be included in the WMP.**

Power System: The BPA rep thanked the group for its assistance with flexibility needs at BON in December. He also noted that with the predicted cold snap, more water may need to move through the system to meet demand.

Water Quality: The Water Quality Team is discussing the possibility of moving a number of gas monitors in the system. If TMT members are interested they are welcome to join the discussion (**NOTE:** this meeting has been re-scheduled for January 24, NOT 1/10 as reported at the TMT meeting).

Next Agenda for 1/19/2005 meeting

- Chum elevations and estimated total returns for 2004
- Libby Selector Gates
- Water Supply Forecast
- Flood Control and flexibility issues
- DWR: Flexibility criteria & impacts on 'other operations'; Update on Dec. spill
- Decision regarding transportation issues workshop/symposium

Technical Management Team Meeting Notes

January 5, 2004
Brewery Blocks
Portland, OR

1. Greetings and Introductions.

Today's meeting, held at the Reservoir Control Center's swank new Brewery Blocks offices, was chaired by Cathy Hlebechuk and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at today's meeting. Anyone with questions about these notes should contact Hlebechuk at 503/808-3942.

2. Lessons Learned from 2004.

Paul Wagner said that, in the future, he would like the TMT to pay more attention to the planning process, particularly in regards to the development of the Water Management Plan. When issues arose last year, often, what we heard was, why wasn't this addressed earlier in the planning process? he said. There is often a desire to use more adaptive management during the in-season management period; however, there are certain issues that seem to recur year after year, and one of my objectives is to try to do a better job of addressing those as far in advance as possible, so people aren't taken by surprise by some significant change in plan, Wagner said.

As we go through this year's plan, I would like to highlight areas where there is new information or incomplete information, so that people have an idea where various agencies are in advance, he continued. During the most recent chum operation, for example, there was a desire on the part of the management agencies to have a firm operation, while the salmon managers wanted to retain some flexibility. Sometimes, when you look at the operation a month ahead, things can be pretty vague, Wagner said. I'd like to try to bring the present into the future as much as possible this year, he said. So you'd like to try to identify some of the more controversial upcoming issues ahead of time, so that we can address them and attempt to reach agreement prior to the in-season management period? Silverberg asked. Essentially, yes, Wagner replied.

The problem is that, when we're caught in a crisis, it's hard to stay ahead of the curve, said John Wellschlager. I agree that it would be useful to try to do that this year, if we can. The issue that leaps immediately to mind is transportation, said Wagner – we should probably discuss what the new transportation program will be, under the 2004 BiOp. There are new criteria for deciding the spill vs. transport question; there is a stream of information that is continuing to come in about the benefits of transportation, and it would be worth our time to discuss that new information in advance of the transportation season. I'll put that on the agenda for our next meeting, Silverberg said.

Russ Kiefer noted that Idaho will be providing its comments on the 2005 WMP soon. One of the things we say in those comments is that there is new information available on transport; one of our comments was that we look forward to discussing that information and its accompanying analysis. We discussed this yesterday at FPAC; I was concerned about the fact that the current draft of the WMP says we will not initiate transport until April 20. That is going to be a critical issue, and it seems to have been decided without input from the region. We talked

about how we can get out of entrenched positions, open our minds, look at the information and explore the management possibilities. We need to talk about the transition points – how we decide when to bypass fish and leave them in the river, and when to go to transportation. One of the things we talked about was the possibility of holding a symposium on this specific issue, he said – what is the flow level at which we would cut off spill and go to maximum transportation?

How does that sound to the action agencies? Silverberg asked. I like the idea of having an index based on the water year, said Wellschlager; that's an unofficial reaction, but I think such an index could be useful. Does the idea of a separate symposium make sense to you? Silverberg asked. I think that, from the standpoint of heading off contention, it would make sense, said Kiefer. The dates are all laid out for us, Wagner observed – the question is, do those dates fully reflect the most current information, including the new information about the response of steelhead to transportation? Wellschlager noted that there is an obvious conflict between the salmon managers' desire for operational flexibility, and the action agencies' need for well-defined operational parameters for power, flood control etc.

Rudd Turner said that, with respect to transport, if TMT gets involved in the transportation discussion, it would become the third group in the region that is actively discussing that issue. The others are SCT and FPOM. If we want to do a symposium, we should try to do that quickly – in the next two or three weeks – to help inform our discussion of the Fish Passage Plan and the RSW decision process the SCT is involved in.

We recognize the fact that well-defined dates and triggers are important to the action agencies, said Kiefer. It was agreed that Silverberg will work with Wills and Hlebechuk to organize the symposium. Ron Boyce observed that it will take some time to plan this symposium, if it is to address the full range of available new information; it is probably unreasonable to expect it to happen in January. One of the things we've heard today is that, in order to impact the 2005 management process, the symposium needs to happen very quickly. Still, one thing we don't need is another half-baked symposium with no ownership, Boyce observed. I agree that we need to work with the action agencies in developing that, however, he said.

Wagner noted that the Fish Passage Plan could recognize that there is ongoing work on this issue, and that the actual management approach may change. To my mind, the information on the benefits of spill at lower flows is the critical management issue, as laid out in the Williams et al tech memo, Boyce said; unless things change quickly, it's starting to look as though that's exactly the scenario we're going to see this April. Dave Statler noted that there are also many questions associated with the benefits of spill vs. transportation during the summer period – it is important to understand and recognize what we don't know, as well as what we do know, he said. He noted that there is a January 13 AFEP meeting in Walla Walla on fall chinook studies that will address some of these summer transport vs. spill issues.

After a few minutes of further discussion, it was agreed that there would be value in a transportation vs. spill symposium; however, more discussion is needed before the scope, date and agenda are set in stone. It was further agreed that, rather than a formal symposium, the process might take the form of a targeted TMT work session. Silverberg asked the TMT

participants to let her know by Friday where they stand on the symposium issue. Statler added that a further benefit of such a symposium or work session would be to clarify the adaptive management component of the UPA.

One other lesson learned I would like to address is flood control operations, said Boyce; I'd like a good understanding of the drum gate work at Grand Coulee, for example, and what flexibility may exist in flood control operations given the fact that this is likely to be a low runoff year. Kyle Martin said a recent tribal/state tech memo discusses the lessons learned in 2004, including the fact that, in 2004, some opportunities were missed in terms of modifying flood control drafts. Wellschlager and Tony Norris said their agencies will be providing a written response to this technical memo.

3. Chum Update.

Boyce said he had sent out a report indicating that the last chum spawning survey of the season was done on December 28; no chum were observed, although five live fall chinook were seen. He said ODFW, WDFW and the USFWS are putting together the data on GPS redd locations and elevations; that information will be presented at the January 19 TMT meeting. Do you have an estimate on the total return this year? Wellschlager asked. Not yet, but we're working up that information as well, Boyce replied. Boyce added that it was his understanding that, after the third bump, the Bonneville tailwater elevation would be maintained until the chum redd elevation data was available. The last instruction we issued was that the tailwater elevation range specified 11.9 to 12.3 feet, Hlebechuk replied. I thought it was 12.1-12.3 feet, said Boyce. I'm recalling that our last agreement was 11.9-12.3 feet, with 11.9 feet as the lower-end minimum until your survey was done, said Wellschlager. Wagner noted that there was some frustration about the lack of clarity regarding the operation that would begin once chum spawning was officially over, and the "top" was lifted off. So 11.9 feet will remain the 24-hour minimum tailwater elevation? Boyce asked. Correct, was the reply. If it would be possible to maintain whatever we got down to over the weekend until we complete our mapping, that would be helpful, said Boyce. We did get down to 11.9 feet during certain hours over the weekend, Hlebechuk said. We'll get the redd mapping information to the TMT as soon as it's available, Boyce added. Would it be possible to get the redd elevation data a little sooner next year? Larry Beck asked. We'll talk about that, Boyce replied.

4. 2005 Water Management Plan.

Hlebechuk said that, to date, the Corps has received comments on the 2005 Water Management plan only from CRITFC and Washington; we're waiting for comments from the other TMT participants. Kiefer said IDFG has sent its comments to the Governor's office, and they should be approved and forwarded to the Corps soon. Boyce said Oregon will not be providing WMP comments this year. Will the action agencies respond formally to the comments received? Martin asked. We haven't decided yet, Norris replied. Turner added that the draft fall/winter update is linked to the on-line version of the WMP.

5. Status of Operation.

Norris said Hungry Horse is currently at 3542.1 feet, discharging to meet the Columbia Falls minimum, 3.6 Kcfs. Grand Coulee is at 1286.7 feet. Hlebechuk said Libby is at 2409.4 feet, currently ramping down from four units to minimum outflow. The December 31 elevation at the project was 2410.7 feet. We're also working on an outage at Libby, which has been postponed for some time now, which will require the transmission line to be out of service for 12 hours. We will operate at speed-no-load (2 Kcfs) during the outage while spilling up to the 120% TDG cap, as best we can.

Why do you need to spill? Kiefer asked. To maintain the minimum flow of 4 Kcfs, Hlebechuk replied. When inflow to Libby is 1.8-1.9 Kcfs, why do we have a minimum flow of 4 Kcfs? Kiefer asked. Average inflow the last 20 days was 4.5 Kcfs, said Hlebechuk; 4 Kcfs is the minimum flow that was coordinated. It has been lower in the past, she added. The concern is that, at lower flows, more of the benthic area would be exposed to cold air, killing off its biological productivity, said Adams. I don't think it's a BiOp requirement at this time of year, however, added David Wills. Your interest is trying to save water in Libby during a drought year? Silverberg asked. Yes, Kiefer replied. Hlebechuk suggested that Kiefer contact Montana's Brian Merotz regarding this issue.

At a late November TMT meeting, we were discussing Libby, said Kiefer; it was releasing 20-25 Kcfs to meet its December 31 flood control elevation. I asked that the action agencies consider what flexibility they might have to increase that flood control elevation, because all of the long-range forecasts I was seeing were predicting a drought year in 2005. I would challenge that statement, said Wellschlager. The Corps has drafted to 2411 by December 31 every year, said Hlebechuk; under the new BiOp, we can increase the Libby's December 31 flood control elevation if the December final forecast shows 95% of average or less for that basin. It came in at 98%, so we stayed at 2411. Martin noted that NOAA's most recent forecast shows a cold, dry January, with near-normal precipitation in February and March. None of our forecasters are hanging their hat on a below-average water year, Wellschlager observed – there are just too many variables between now and this spring. Kiefer expressed frustration that he had asked the Corps to investigate what flexibility might exist, but received no reply until today's meeting. Again, my concern is that we're continuing to draft Libby, despite the fact that more and more forecasters are predicting a below-average water year. I simply wanted to know whether there is an opportunity to conserve some water now, he said.

Moving on, Hlebechuk said Albeni Falls is releasing 17 Kcfs; the elevation range at that project increased to 2055-2056 on January 1. Current Albeni Falls elevation is 2055.4. Dworshak is releasing minimum outflow and is at 1549.3 feet, currently, up from 1540.7 on December 15 and 1548.5 feet on December 31. We're waiting for the January final Libby and Dworshak forecasts, which should be available on Monday, January 10; those will be used to determine how much flexibility we have in setting the January 31 flood control elevations at those projects. At Bonneville, average flow has been 158 Kcfs over the last 20 days.

With respect to potential flexibility at Dworshak, the WMP doesn't really speak to that issue, Wagner said. We need to change that, said Hlebechuk. It would be nice to have more

information about timeline, procedure and criteria for making that decision, Wagner said.

On the power system front, Wellschlager thanked the salmon managers for working with the action agencies on the Bonneville flow issue. He noted that it is cold outside, and loads are up; it could get even colder next week, which means that we may be pushing more water through the system.

Jim Adams said that, with respect to water quality, there have been recent WQT discussions about the fixed monitoring station below Bonneville Dam, as well as moving some of the gauges at the Lower Snake projects and at McNary. We're thinking of using the Cascade Island gauge to manage spill at Bonneville in 2005, and eliminating the Warrendale gauge, he explained. Adams encouraged any TMT participants who are interested in this topic to attend the next Water Quality Team meeting.

Hlebechuk added that the Corps is planning four hours of spill, most likely on February 22, at The Dalles, for vortex testing at spill bay 6.

6. Next TMT Meeting Date.

Next Technical Management Team meeting was set for Wednesday, January 19. Meeting summary prepared by Jeff Kuechle. (meeting lasted 2.5 hours)

**TMT Participant List
January 5, 2005**

Name	Affiliation
David Wills	USFWS
Donna Silverberg	Facilitation Team
Tony Norris	USBR
Paul Wagner	NOAAF
John Wellschlager	BPA
Jim Adams	COE
Russ Kiefer	IDFG
Kyle Martin	CRITFC
Russ George	WMCI
Nic Lane	BPA
Laura Hamilton	COE

Ruth Burris	PGE
Cathy Hlebechuk	COE
Rudd Turner	COE
Tim Heizenrater	PPM
Larry Beck	COE
Kevin Bannister	PNGC
Lee Corum	PNUC
Karl Kanbergs	COE
Tina Lundell	COE
Ron Boyce	ODFW
Kevin Nordt	Mid-Cs
David Benner	FPC
Greg Hoffman	COE
Glenn Traeger	Avista
Cindy LeFleur	WDFW
Martin Hatscher	SCL
Tom Le	PSE

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TMT MEETING

Wednesday January 19 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

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AGENDA

1. Welcome and introductions.
2. Status of Libby selective withdrawal system (Greg Hoffman, Libby project)
 - a. [\[Kootenai River and Koochanusa Reservoir Temperatures 2004 Burbot SOR \(8 November - 31 December\)\]](#) 
 - b. [\[Kootenai River and Koochanusa Reservoir Temperatures 2003 - 2004 Air Temperature vs. River Temperature vs Q\]](#) 
3. January Final Water Supply Forecast (Harold Opitz, nwrfs)
 - a. [\[Water Supply Forecast \(Issued 01-07-2005\)\]](#)
 - b. [\[Water Supply Forecast \(Issued 01-07-2005\)\]](#)
 - c. [\[Water Supply Precipitation Summary\]](#)
 - d. [\[Water Supply Precipitation Summary\]](#)
4. January Final Water Supply Forecast for Libby and Dworshak (Chan Modini, Corps)
 - a. [\[Libby Forecast\]](#)
 - b. [\[Dworshak Forecast\]](#)
 - c. [\[\(Flood control summary\)\]](#)
5. Chum Update including elevation of redds and preliminary return numbers
 - a. [\[Computed Elevations and Depths for 190 Chum Redds, 2004 Spawning season\]](#) 
6. Methodology to determine Dworshak operational flexibility Jan - March (Julie Ammann, Corps)
 - a. [\[Dworshak Flexibility, Based on soil/snow conditions from 10 January 2005 \(Power Point\)\]](#)
7. Dworshak flexibility used to date, historical end of December elevations (Cathy Hlebechuk, Corps)
 - a. [\[Dworshak Historical Dec 31 Elevations\]](#) 
8. SOR 2005-01, Operations at Dworshak Reservoir (Dave Wills, USFWS)
 - a. [\[#2005-1\]](#) 
9. Transportation/spill Symposium discussion
10. Water Management Plan and Fall/Winter Update comments
 - a. [\[Water Management Plan Draft 14-Jan-2005\]](#) 
 - b. [\[Fall / Winter Update Draft 11-Jan-2005\]](#) 
11. Status of Operation

- a. Reservoirs
- b. Fish
- c. Power System
- d. Water Quality
 - 1. [\[2004 Dissolved Gas and Water Temperature Monitoring Report\]](#)
 - 2. [\[DRAFT CORPS OF ENGINEERS PLAN OF ACTION FOR DISSOLVED GAS MONITORING IN 2005\]](#) 

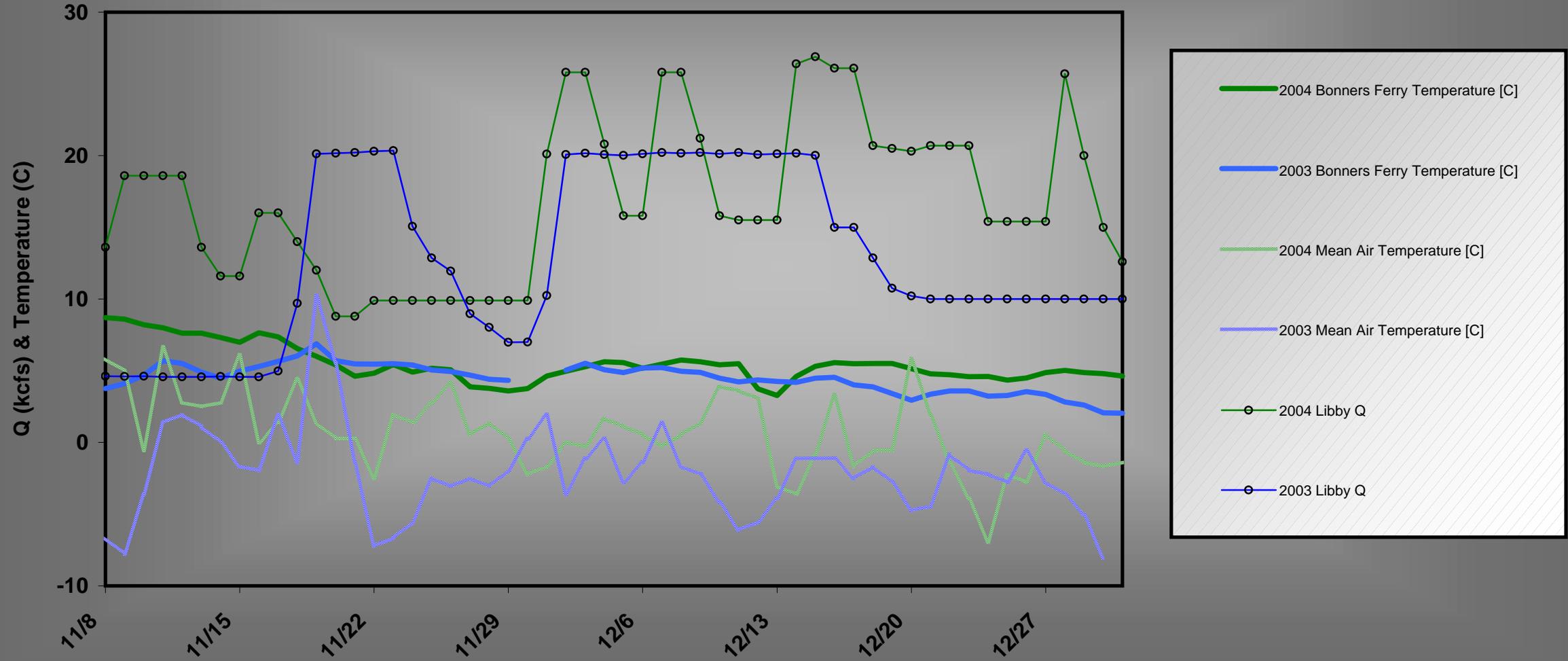
12. Other

- Set agenda for next meeting. - [\[Reference Calendar\]](#) 

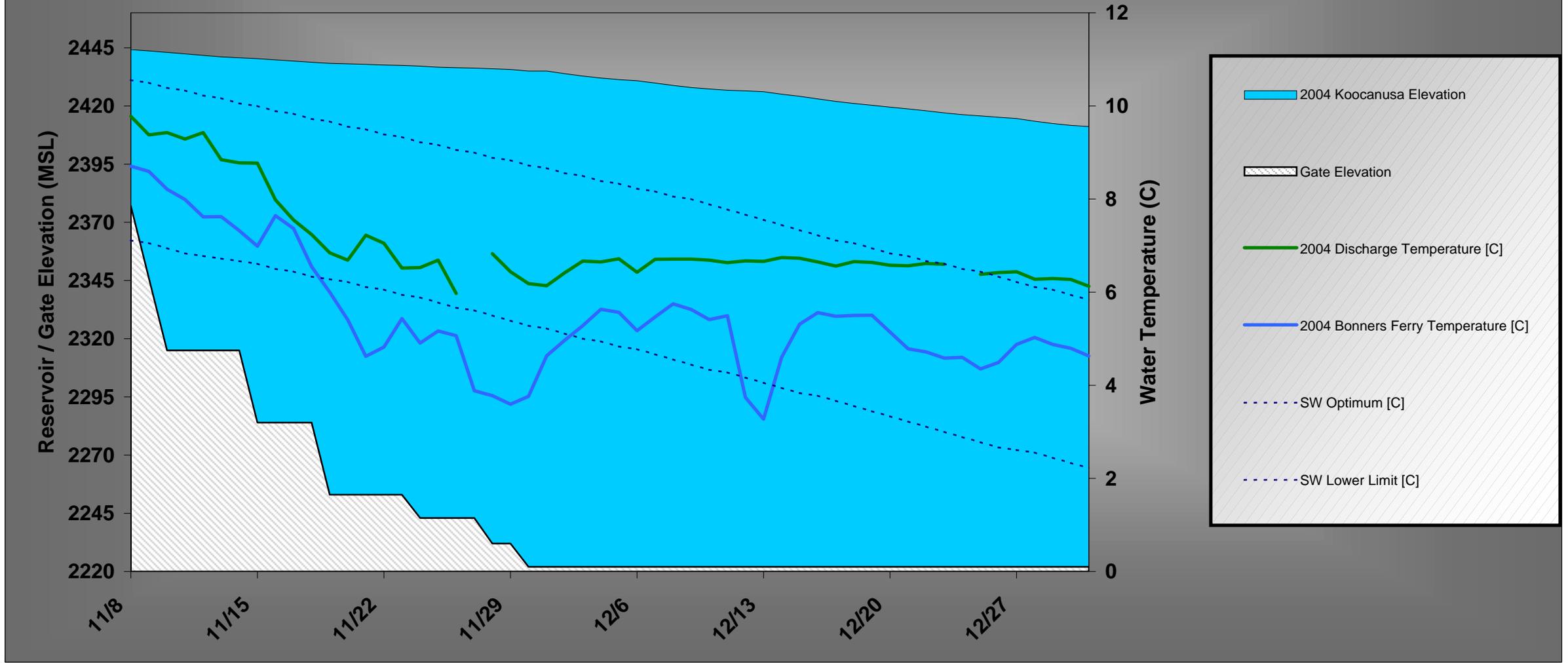
Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935

Kootenai River and Koocanusa Reservoir Temperatures 2003 - 2004

Air Temperature vs. River Temperature vs Q

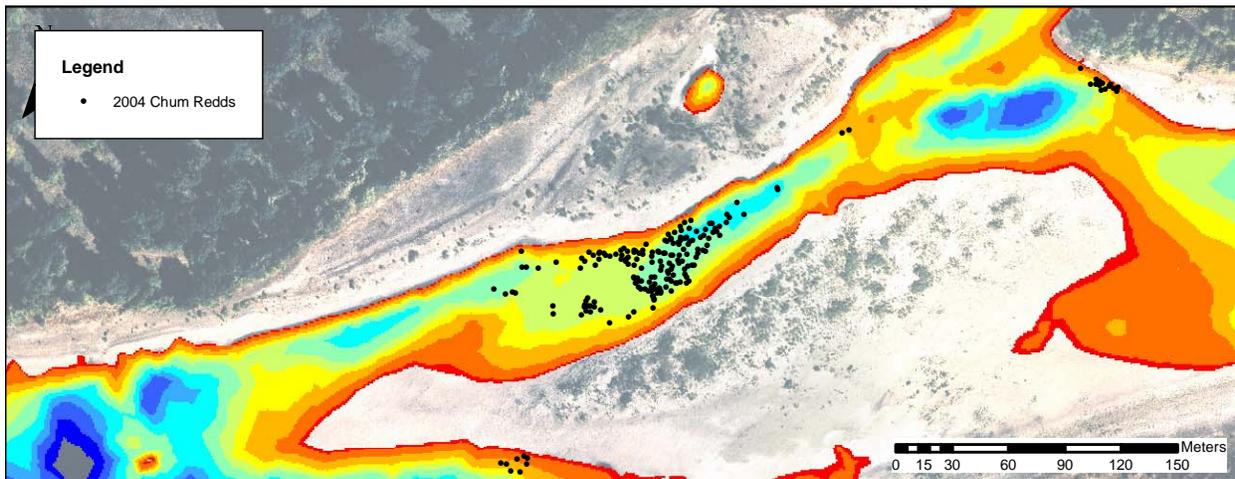


Kootenai River and Koocanusa Reservoir Temperatures 2004 Burbot SOR (8 November - 31 December)



Hlebechuk									
18 Jan 05									
Dworshak Flexibility Used to Date					Dworshak Historical Dec 31 elevations				
Date-Time	Act Outflow	Min Outflow	ksfd used					31-Dec	
1-Jan-05	1.500	1.500	0.0			31-Dec-93		1539.6	
2-Jan-05	1.500	1.500	0.0			31-Dec-94		1492	
3-Jan-05	1.500	1.500	0.0			31-Dec-95		1553.4	
4-Jan-05	1.500	1.500	0.0			31-Dec-96		1530.5	
5-Jan-05	1.500	1.500	0.0			31-Dec-97		1505.1	
6-Jan-05	1.500	1.500	0.0			31-Dec-98		1532.5	
7-Jan-05	1.500	1.500	0.0			31-Dec-99		1537.8	
8-Jan-05	1.500	1.500	0.0			31-Dec-00		1517	
9-Jan-05	1.500	1.500	0.0			31-Dec-01		1523.6	
10-Jan-05	7.400	1.500	5.9			31-Dec-02		1516.7	
11-Jan-05	1.500	1.500	0.0			31-Dec-03		1539.6	
12-Jan-05	1.500	1.500	0.0			31-Dec-04		1548.4	
13-Jan-05	7.400	1.500	5.9						
14-Jan-05	6.600	1.500	5.1						
15-Jan-05	1.500	1.500	0.0						
16-Jan-05	1.500	1.500	0.0						
17-Jan-05	1.500	1.500	0.0						
Total	42.400	25.500	16.9						

Computed Elevations and Depths for 190 Chum Redds, 2004 Spawning season



USFWS-USGS 2003 - Hydraulic Model: Depth averaged finite element (products= depth, velocities, surface elevations)

GIS Model: ArcGIS (spatial analysis, redd elevation & depths over redds)

Redd Depths computed for three Tailwater Elevations (TW): 12.0, 11.5 and 11.0 feet.
Hamilton Creek Discharge (H) simulated at base (97.0 cfs) and no-flow (0.0 cfs).

Redd Depths (ft)	12.0 TW H = 97	12.0 TW H=0	11.5 TW H = 97	11.5 TW H=0	11.0 TW H=97	11 TW H=0
Exposed	8	16	12	21	19	31
0-1	32	65	49	91	72	107
1-2	102	94	107	77	92	52
2-3	48	15	22	1	7	0
3-4	0	0	0	0	0	0

Spawning Sites

Year	3		2		1		Total
	Redds	Distribution	Redds	% Total	Redds	% Total	
2004	309	46.96%	105	15.96%	244	37.08%	658
2003	347	32.37%	394	36.75%	331	30.88%	1072
Year change	-38		-289		-87		-414



Dworshak Flexibility

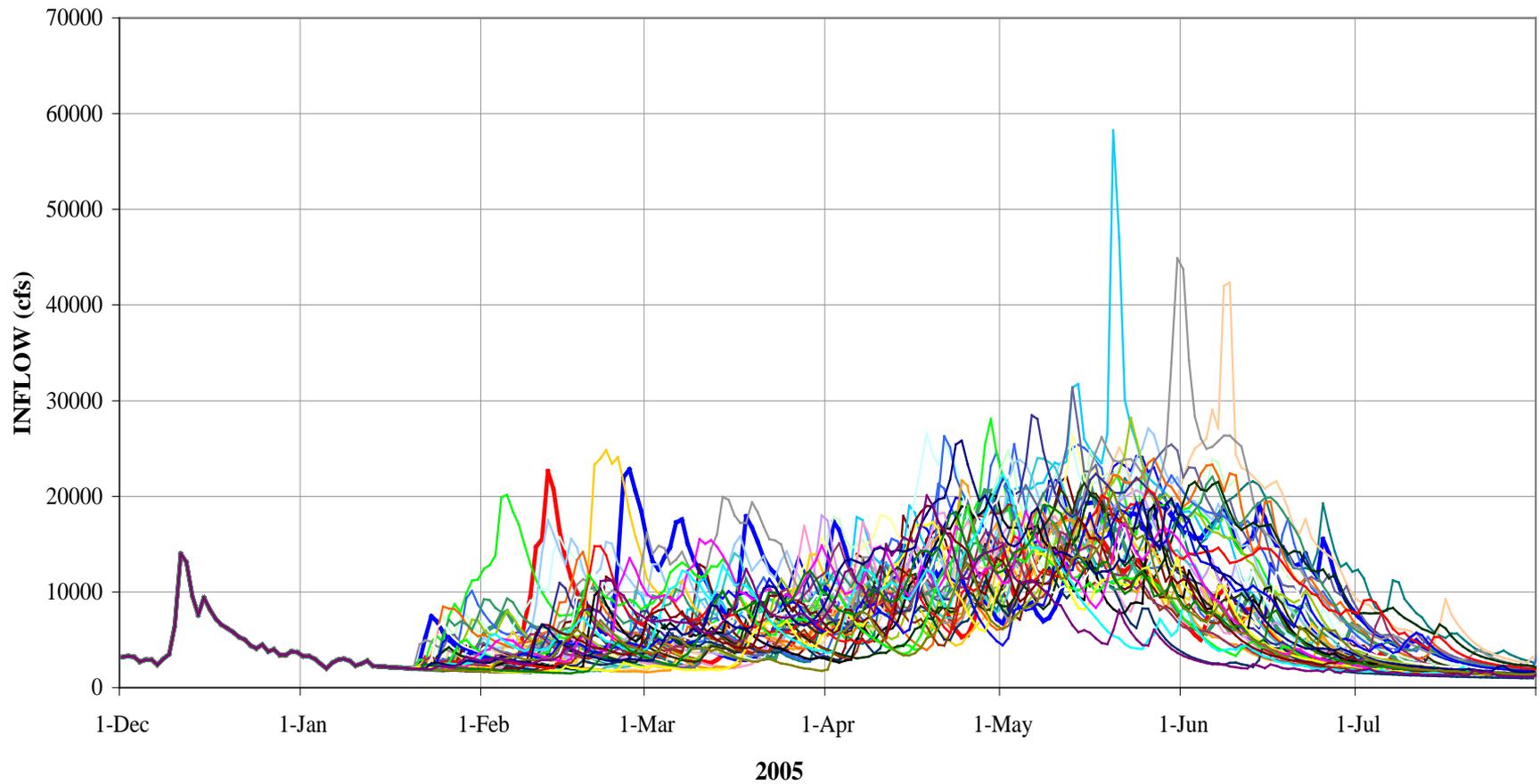
Based on soil/snow conditions from
10 January 2005

Purpose

- To utilize ESP to determine if additional releases were likely to be made from Dworshak Dam between January and March '05
- To re-shape these releases when power demands are higher, i.e., cold periods, while refilling to the March 31 shifted flood control elevation

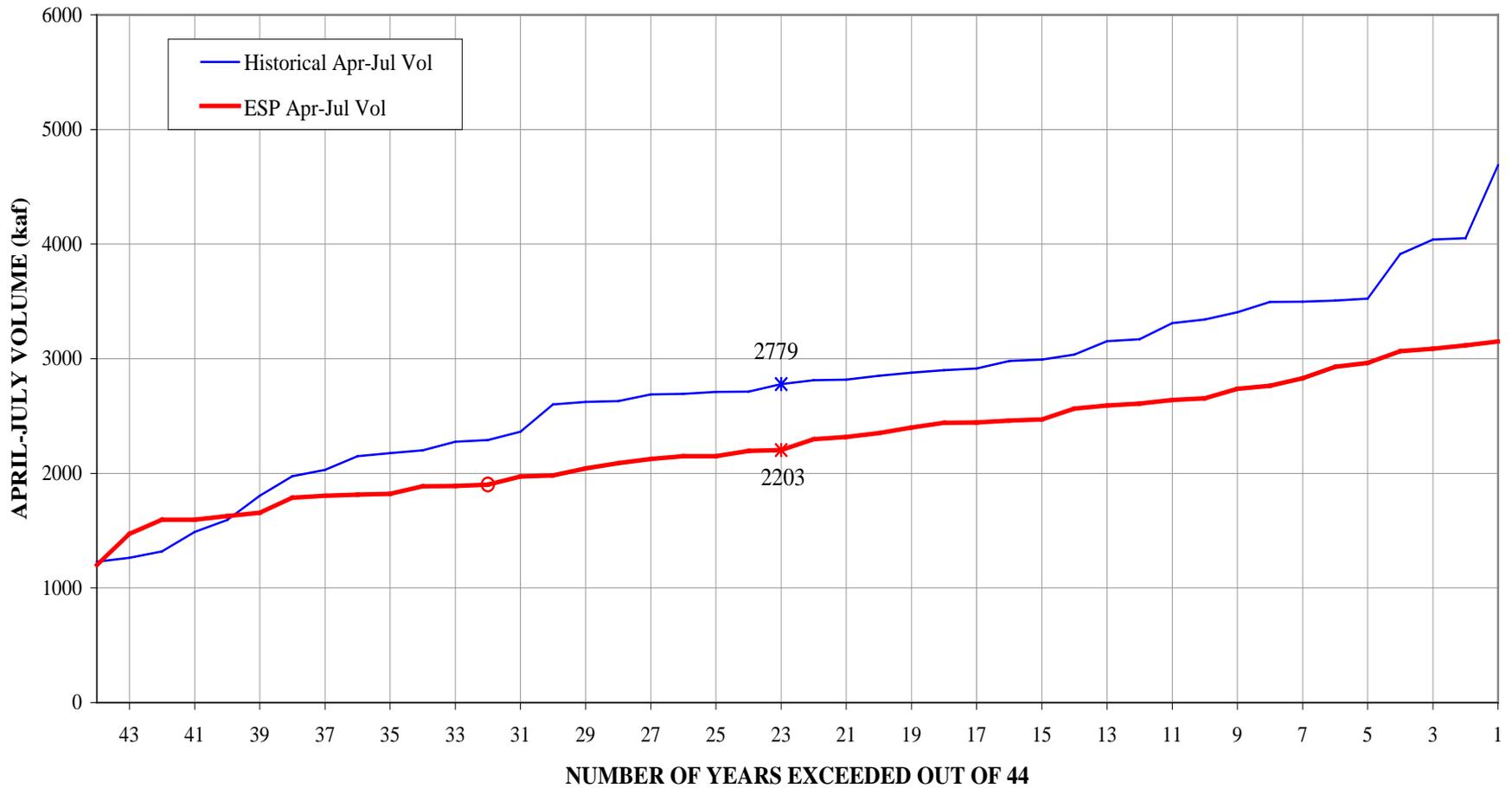
Inflows

DWORSHAK ESP INFLOWS

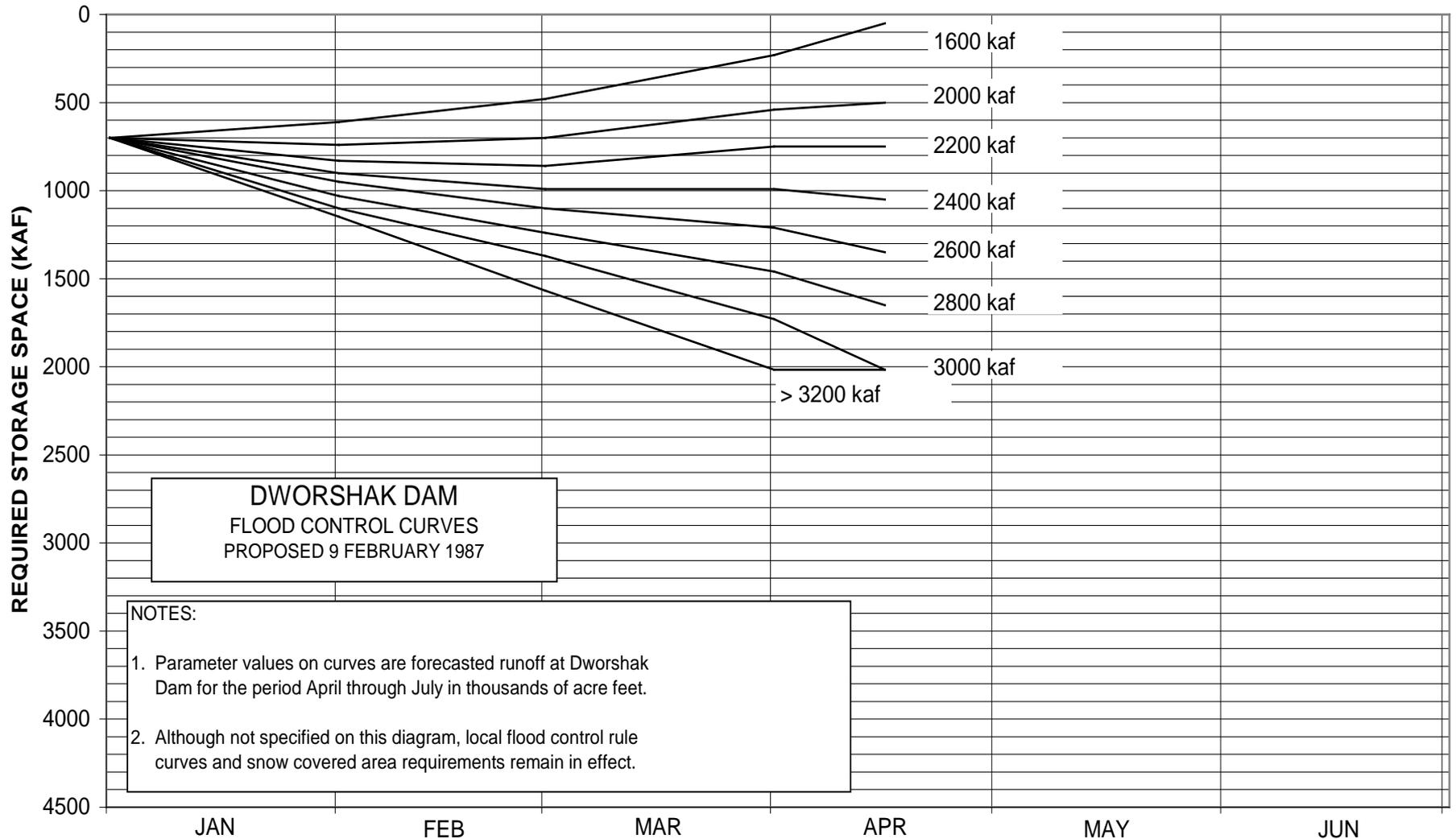


Volumes

HISTORICAL VERSUS ESP FORECASTED VOLUMES



Flood Control Elevations

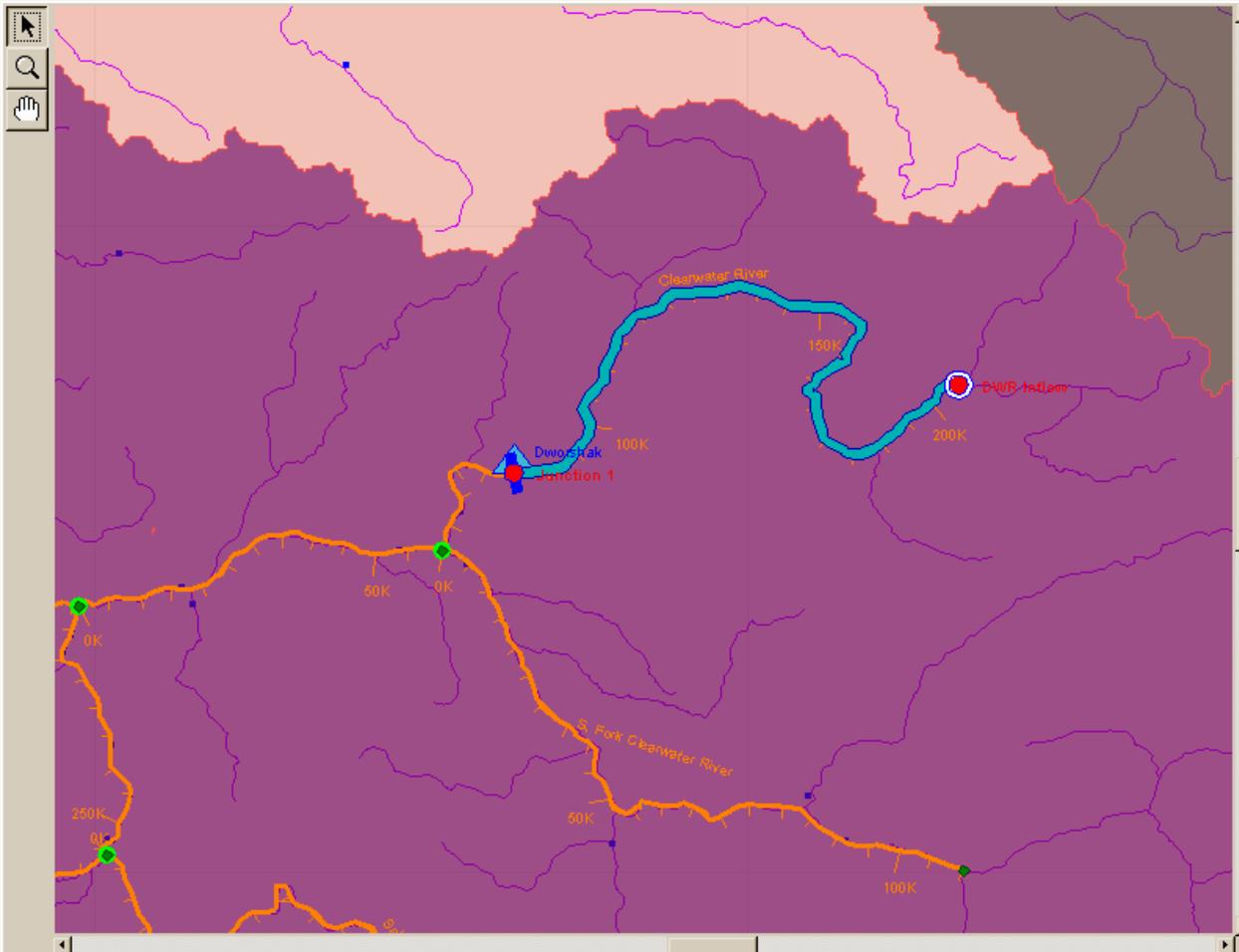


ResSim Model

HEC-ResSim - ColumbiaRCC

File Edit View Simulation Alternative Reports Tools Help

Module: Simulation



Simulation Control

Simulation: 12 Jan 2005, 0000
Lookback: 10 Jan 2005, 0000
End: 01 Aug 2005, 0000

- DWR ESP 011105
 - DWR 1951
 - DWR 1952
 - DWR 1953
 - DWR 1954
 - DWR 1955
 - DWR 1956
 - DWR 1957
 - DWR 1958
 - DWR 1959
 - DWR 1960
 - DWR 1961
 - DWR 1962
 - DWR 1963
 - DWR 1964
 - DWR 1965
 - DWR 1966
 - DWR 1967
 - DWR 1968
 - DWR 1969
 - DWR 1970
 - DWR 1971

Compute DWR 1951

Scripts

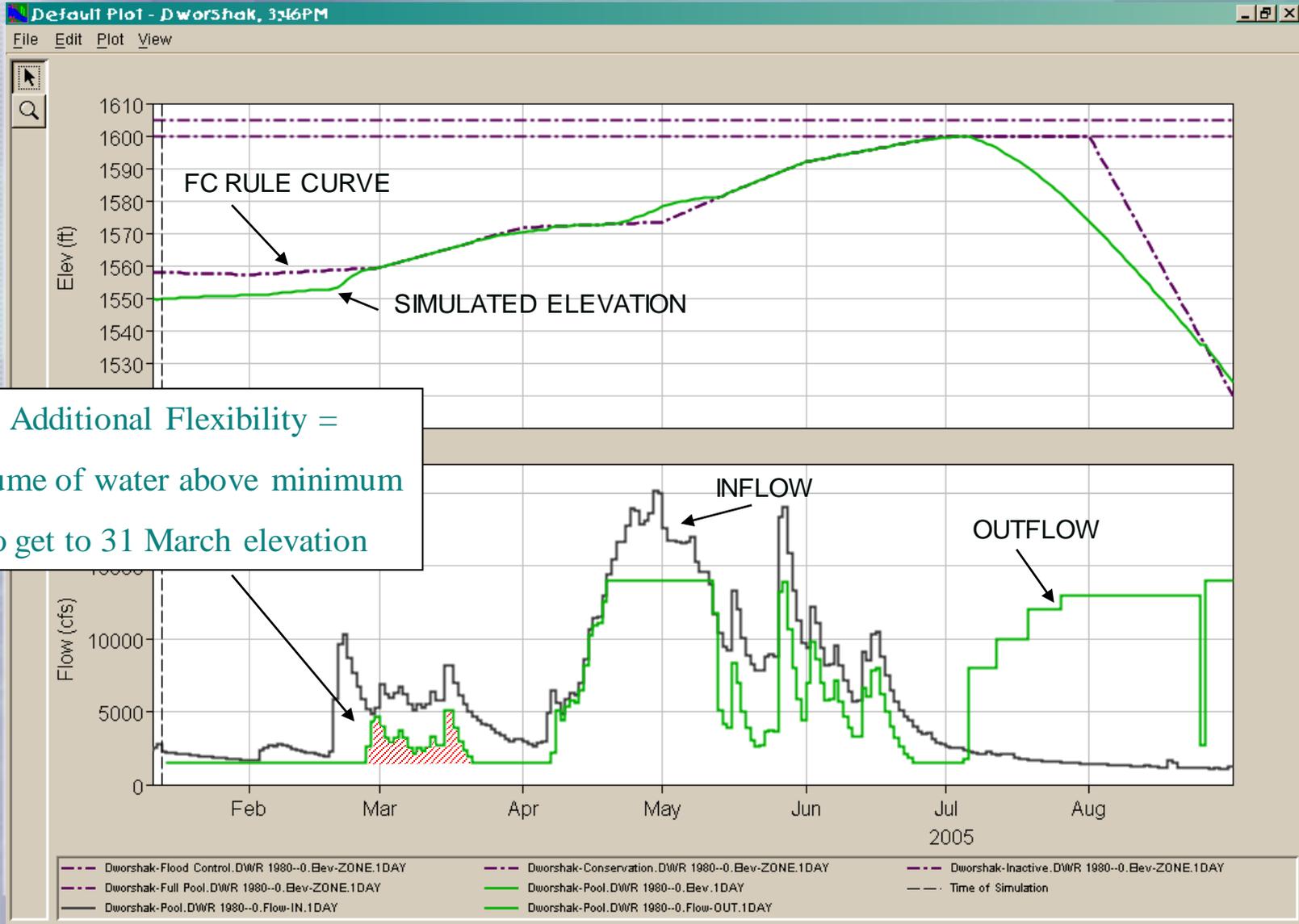
Run All ESP Years

Ready

Local Workspace ColumbiaRCC opened

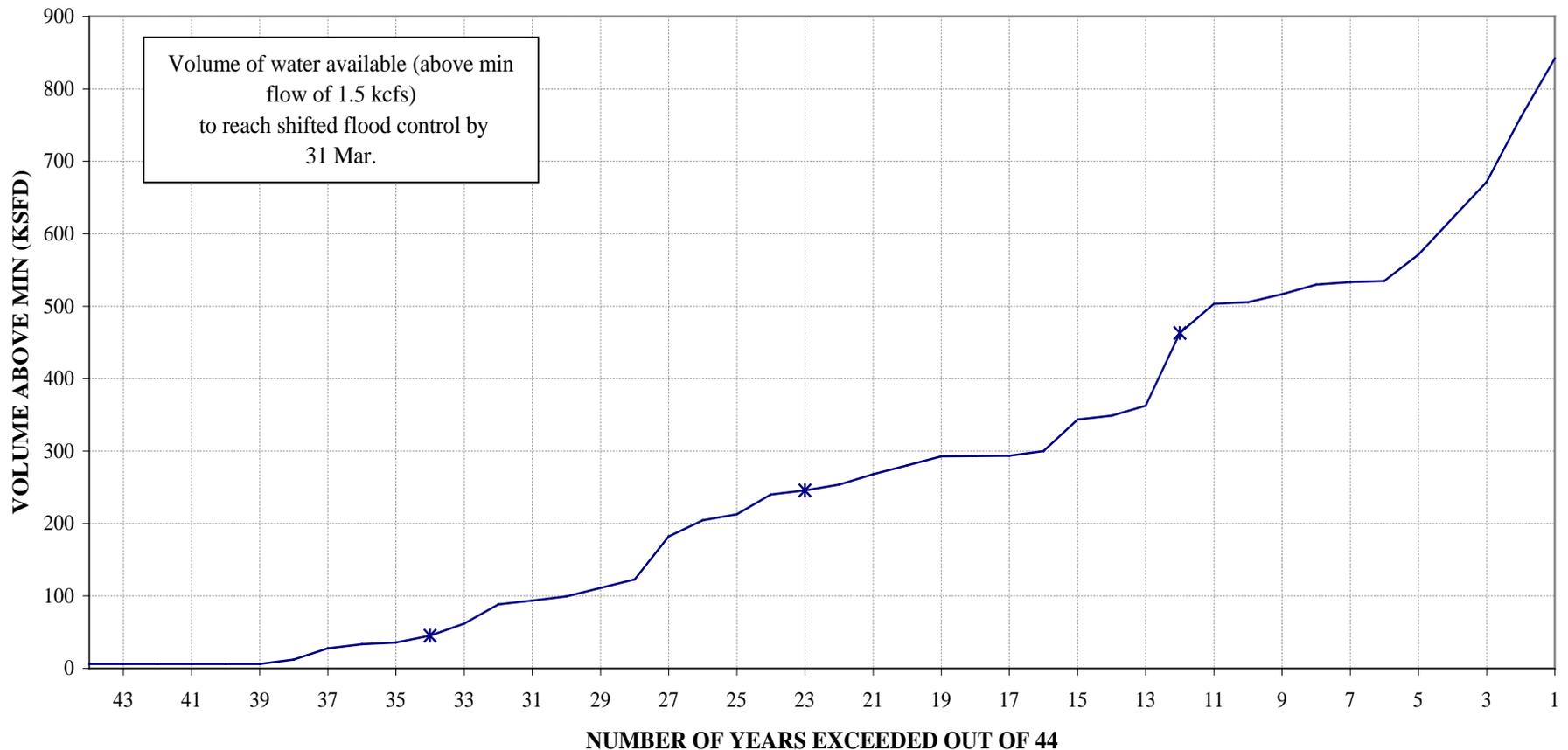
Single Year Results

Temp/precip pattern from 1980
on initial soil/snow conditions
from 10 January 2005



Additional Volume Available

**Available Volume Above Minimum Flow from 01 Jan - 31 Mar
to Reach the 31 March Shifted Elevation**



Summary

- Goal is to provide flexibility while meeting the end of March shifted flood control elevations.
- Additional analyses will be done at least every other week to monitor changing conditions.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

January 19, 2005

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.

Status of Libby Selective Withdrawal System:

In response to a burbot SOR put forth last year, the COE initiated an investigation on effects on temperature at Bonners Ferry and Libby, and found that reservoir elevations at Libby have more of an effect on release temperatures than atmospheric conditions or flow. Greg Hoffman reported that the COE looked at available data since 1999; handouts were provided, and showed that 'latent heat storage' determined the amount of cool water available. Temperatures were reduced by 1-2° in November from Libby to Bonners Ferry.

Next Steps: Greg will present information from the investigation next week to the Kootenai Valley Resource Initiative burbot sub-committee. A more complete analysis from this investigation will be shared with TMT when it is done, in the next 2-4 weeks.

NW River Forecast Center January Final Water Supply Forecast:

Harold Opitz, NOAA's Northwest River Forecast Center, shared forecast information for 2005. He provided handouts (also linked to the TMT agenda) showing October 1-January 10 precipitation throughout the Columbia Basin region, which shows mostly below normal precipitation. The Dalles forecast predicts 80% of normal water supply this year. The ESP run will be updated weekly and can be used as an additional tool in predicting water supply and making management decisions. The ESP can be used to do 'contingency runs', in MAF, to show different assumptions on the final monthly water supply (e.g. low or high water/temperature years). The Lower Granite forecast predicts 69% of normal water supply this year. A question was asked why, given other climatologists' predictions that this will be a dry warm year, does the NWFRC assume a normal year from February through September? Harold responded that it is difficult to statistically show a variance from 100%; this in his opinion is the best guess, and he offered that for management purposes, contingency forecasts combined with observed conditions can be used to make management decisions.

COE January Water Supply Forecast for Dworshak and Libby:

Chan Modini, COE, offered information on the COE's water supply forecast for Libby and Dworshak. Handouts can be found as links to today's agenda. The forecast at Libby dropped slightly from November 1 (98.8%) to January 1 (92.6%). Dworshak fluctuated between October 1 (86%), December 1 (90%), and January 1 (72%). Dworshak is currently at 1550.5' and filling to a target of 1557.4' (editor's note: the system flood control elevation is 1557.4' and the local flood control elevation is 1556.3', so 1556.3' is the target) by the end of January.

Chum Update:

Joe Skiliki, USFWS, reported on the results of a model he ran to compare chum redd elevations and flows in spawning areas. Per TMT request, ODFW provided GPS data of redd location to USFWS, who then overlaid the data onto the model.

Next Steps: TMT members had questions and concerns over the specifics of the data and the study, and its implications for future management decisions. The group agreed to the following next steps:

- Continue the current operation, as agreed to and implemented on December 15th, of an 11.9' minimum tailwater at Bonneville, while the salmon managers and other TMT members discuss and evaluate the information from the study (The COE will implement the 11.9' tailwater conservatively to provide protection for chum redds later in the season);
- The COE will communicate with USFWS their specific GPS information needs for discussion at the next TMT meeting;
- TMT members will review documentation of criteria and past decisions on chum operations; and
- All will revisit this issue at the next TMT meeting, scheduled for February 2.

Dworshak:

Flexibility Methodology – Julie Ammann, COE, described the methodology used to determine flexibility at Dworshak: to use ESP to determine if additional releases are likely to be made from January-March 2005, and to reshape releases when power demands are higher while refilling to a March 31 flood control elevation. The COE uses the ResSim model which inputs rules such as flood control and max spill, and weather forecasts to predict the amount of flexibility in water volume that may be used to get to the end of March target. These analyses will be run by the COE at least every other week to monitor changing conditions. A suggestion was made to use selected years that are more representative of the expected water supply for this year, rather than all 44 possibilities.

Dworshak Flexibility Used to Date – Cathy Hlebechuk, COE, provided information on flexibility used so far, a total of 16.9 ksfd from January 1-17th, 2005.

SOR 2005-1 – The salmon managers put forth the SOR requesting that Dworshak be maintained to the highest elevation within the flood control curve, and that the 50 ksfd not be evacuated as planned by the COE over the next week for power operations. Continue to release minimum discharges of 1.5 kcfs until further notice. The objective was to use caution with flexibility at Dworshak this year, given the current weather supply forecast of warm, dry conditions. The salmon managers recognize that power needs are a priority during cold snaps.

BPA and the COE responded that they are sensitive to the concern with the lower water supply forecast and are committed to using caution at Dworshak. The ramp-up that occurred last week was due to a forecasted arctic front.

ACTION: The COE will use caution with flexibility at Dworshak. If a weather event occurs before the next TMT meeting, the COE will notify TMT if it plans to use flexibility to accommodate power needs because of the weather condition. The action agencies have looked

into other areas for flexibility as well (e.g. Grand Coulee), and will continue to keep TMT apprised that this is happening. It was noted that the news release for anglers in Idaho was helpful in keeping them informed about what is happening at the reservoir.

Transportation/Spill Symposium:

Per discussions at the last TMT meeting, some salmon managers responded to the facilitator that a well thought-out and organized symposium on transportation and spill cannot be put together in time for results to go into the Fish Passage Plan. For now, the salmon managers will review new data and, if any new information stands out as critical for decision-making, will bring this information to TMT for further discussion.

WMP Updates:

The latest draft Fall/Winter Update (January 11, 2005) is on the web, including comments from Washington and CRITFC. The action agencies will finalize the update by the end of January, and will respond to comments at the next TMT meeting on February 2.

ACTION: Cathy Hlebechuk will confirm with Russ Kiefer the schedule for finalization of the Fish Passage Plan, which was thought to be February 10.

Status of Operations:

Reservoirs – Grand Coulee is at elevation 1280.9'. Drum gate maintenance at the project is scheduled to begin April 1 and work will continue for 6 weeks, during which time Grand Coulee will be held at 1255'. Libby will undergo a line test on Thursday, January 20. The COE will operate the project at speed/no load plus spill 1-1.5 kcfs while working to stay within the state TDG standards. Libby is at elevation 2408.3'. Dworshak is at 1550.5'.

Fish – No report.

Power – No report.

Water quality – The final 2004 TDG and Temperature Monitor Report and the draft 2005 Monitoring Plan are available on the web, linked to today's agenda. The WQT will be discussing the 2005 plan at their next meeting, January 24 at NOAA Fisheries.

ACTIONS/NEXT MEETING AGENDA:

Actions from 1/5/05 meeting:

- NOAA management flexibility with new BiOp – to be discussed at the TMT process meeting
- Transport symposium – addressed today
- WMP – response to comments at Feb. 2nd TMT meeting
- Cause of spill at Dworshak – addressed by COE to IDFG off-line
- Dworshak flexibility – addressed today

The facilitation team will provide a handout that tracks themes from previous years by month, to help TMT get ahead this year in addressing recurring issues.

Next TMT meeting, February 2nd, 9am-noon:

- WMP Response to Comments
- Dworshak Operations/Flexibility Discussion
- Chum Redds Information/Operations Discussion
- Status of Operations

Technical Management Team Meeting Notes

January 19, 2005
Brewery Blocks, Portland, OR

1. Greetings and Introductions.

The January 19 TMT meeting 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 this meeting. Anyone with questions about these notes should contact Hlebechuk at 503/808-3942.

2. Status of Libby Selective Withdrawal System.

Hlebechuk noted that, in 2004, an SOR was submitted requesting lower-temperature releases from Libby in support of burbot spawning; Greg Hoffman headed up the selective withdrawal investigation. Hoffman provided a graph showing the effects of using the Libby selective withdrawal system on water temperatures in the Kootenai River below the project. Montana's concerns was that we might dip below the optimum temperature line; we actually went above the line, Hoffman said. During further investigation, I found that reservoir elevation had more of an impact on water temperature than flow rate or atmospheric conditions, he said. In looking at the data since 1999, this indicated that the volume of water in Libby has more effect than atmospheric conditions or flow rates. The second graph compares 2003 and 2004; I was trying to determine if there was a difference in release temperatures and temperatures at Bonners Ferry. Reservoir elevations in 2004 were higher than in 2003; water temperatures were greater in 2004, due to latent heat retention. Overall, it appears that we can lower temperatures in November by about 1.5 degrees, until we reach an isothermic condition. Once we hit January, atmospheric conditions seem to have the primary impact on water temperatures.

Has this been presented to the Bonners Ferry burbot group? David Wills asked. Yes, Hoffman replied. And what was the difference between release temperatures in 2003 and 2004? Ron Boyce asked. The 2003 information is not available, Hoffman replied; I tried to do a direct comparison, but the 2003 data was missing. So the difference we're seeing could be a result of release temperature, rather than reservoir elevation? Boyce asked. It could be, but it appears to be a multivariate problem, Hoffman replied. Again, what we wanted to do was impact temperatures in November, and it did appear that we were able to lower temperatures at Bonners Ferry by about 2 degrees C, Hoffman said. He added that next year, modeling should give a clearer picture of what is going on with temperature at Libby.

What is the status of the 2005 burbot migration? Paul Wagner asked. I spoke to IDFG yesterday, and to date, they have caught only three burbot all year, so there isn't much going on,

Hoffman replied. He added that he can provide an update on this topic at a future TMT meeting; it was so agreed.

3. January Final Water Supply Forecast.

Harold Opitz began by going to the NOAA website to display a pair of maps of the Pacific Northwest showing weekly precipitation for October 1-January 10 and seasonal precipitation, October 2004-December 2004. As you can see, there is anything from <50% of normal east of the Cascades to 70-90% of normal basinwide. The bottom line is that we're well below normal in terms of precipitation and snowpack across the basin, except for a few pockets of 90-110% and 110-130%, Opitz said.

There are two complementary forecasts – the official forecast and the ESP forecast, Opitz continued. The official 2005 forecast for The Dalles is currently 85.7 MAF, 80% of average. The ESP forecast shows the same. The ESP numbers will be updated weekly, on Tuesday or Wednesday; the official forecast is issued three times per month. Opitz added that in order to achieve average runoff at The Dalles, precipitation over the remainder of the forecast period would need to be 125% of average.

Moving on to the forecast for Grand Coulee, Opitz said the current official forecast is for a January-July water supply of 57.2 MAF, 91% of average; ESP is currently predicting 55.4 MAF. For Lower Granite, the official January-July forecast is 20.7 MAF, 69% of normal; ESP is currently showing 21.8 MAF for the same period. Opitz said the RFC is also going to be putting out regression peak flow data; this data will be available for all of the sites in the domain via the RFC website. He also touched on the most recent data from the Climate Prediction Center (CPC), which is currently showing warm, dry conditions throughout the Northwest for the next few months. In other words, he said, it is unlikely that the below-average runoff forecast will change.

Your water supply forecast assumes average precipitation between now and the end of the forecast period, said Kyle Martin – does your forecast trend in the expected below-normal precipitation? The January final forecast assumes 85% of normal precipitation from here on out, Opitz replied. Our concern, from the fish side, is that your forecast is overly optimistic; we don't want to find out, suddenly, that we're out of water, said Martin. I would suggest that you look at the contingency forecasts and decide which way you think things are going to trend, Opitz replied – there is simply a high degree of uncertainty in the January forecast, and as we get closer to the in-season management picture, we'll have a better idea of what actual conditions will be.

Isn't it true that you don't know what's going to happen from here on out, in terms of precipitation? John Wellschlager asked. In other words, realistically, it could go either way at this point. Our ability to predict future above- or below-average precipitation is limited, Opitz replied; however, you can lean one way or another, based on probability distributions, and unless we get hellacious amounts of precipitation between now and June, this is going to be a below-normal runoff year.

Russ Kiefer noted that, at a climate symposium a couple of months ago, the prediction, pretty much across the board, was for a dry year in 2005. NOAA Fisheries, the University of Washington and CRITFC have all consistently predicted the same thing. My question is, can the climatologists help us do a better job of decision-making, for the purposes of water management? It has been frustrating, for the salmon managers, because the first priority should be for flood control, the second should be for power generation, and the third should be to provide water for listed salmon species. When we use some of our storage to make money while prices are good, it always seems as if the runoff predictions are more optimistic than they are later, when the salmon managers are asking for water for fish, Kiefer said.

Wellschlager said he had never said 2005 wasn't going to be a below-average runoff year; his point was that we had not yet reached a crisis point. To suggest that we can build our reservoir operations around what climatologists believe in October is simply unworkable, he said.

It's true that we climatologists could do a better job; first of all, we should be able to better inform your decisions about how much risk you're willing to take, said Opitz. We need to approach it from a statistical sense and tell you, here are the bounds I'm comfortable within; it will then be up to you to decide how much risk you're comfortable with. Opitz added that, in 2001, the early-season forecasts, which called for above-average snowpack and precipitation, were completely wrong; by January, the forecast had turned around 180 degrees. I agree that we need to do whatever we can do to get an improvement, however, Opitz said. In terms of telling you where all of this will end up in June or July, I can't do it right now, Opitz said.

My point is simply that I am not convinced that the Corps' decision to release water from Dworshak last week was a prudent one, said Kiefer – I think that, in forecast below-average years, we need to be more, rather than less, conservative.

4. January Final Water Supply Forecast for Libby and Dworshak.

Chan Modini provided a presentation on the Corps' January final forecasts for Libby and Dworshak. At Libby, the current April-August forecast is 5.8 MAF, just under 93% of average. At Dworshak, the Corps' January 31 flood control elevation is 1557.4 feet, and the final April-July forecast is 1.91 MAF, 72% of normal, down from 2.37 MAF, 90% of normal, in the Corps' December final forecast. The group devoted a few minutes of discussion to how the Corps developed these estimates, including the impact of the Southern Oscillation Index (SOI) trend. Modini noted that January is the first month in which on-the-ground Sno-Tel data is available; hence the generally greater accuracy of the January final forecast.

In response to a question, Modini said Dworshak's end-of-February flood control elevation, if this forecast holds true, would be 1561.5; its March 31 flood control elevation would be 1573 feet, and its April 15 flood control elevation would be 1577.3. The current elevation at the project is 1550 and filling, said Hlebechuk. Modini added that, in response to Kiefer's concern about including climate information in the forecasts, the Corps does include SOI data in its Dworshak and Libby forecasts.

5. Chum Update – Elevation of Redds and Preliminary Return Numbers.

Wills noted that, at the last TMT meeting, the salmon managers were asked to provide information on chum redd elevations in the Ives complex area to take a look at the Bonneville operation, to ensure that the redds were being adequately protected. Joe Skalicki from the Fish and Wildlife Service developed this information; he noted first that, in 2004, 658 redds were observed by field personnel, down from 1,072 in 2003. The other important thing to consider is where these fish spawn, he said; there are now three main sites: the Ives Island complex, the downstream complex near the falls, and the third is all the way downstream at the I-205 bridge. In 2004, at Ives Island, 244 redds were surveyed; at Site 2, 105 redds, and at Site 3, 309 redds.

With respect to redd elevations and the adequacy of the current Bonneville incubation flow operation, Skalicki noted that the I-205 spawning site is 20 miles downstream from Bonneville; the model that is currently available to USFWS does not include this site, but in general, more redds will be exposed at the I-205 site at a Bonneville tailwater elevation of 12 feet than will be exposed at the Ives Island spawning area, the closest spawning site to the dam. He drew the group's attention to a table of Ives Island redd depths at three tailwater elevations (12.0, 11.5 and 11.0), noting that, based on field measurements at a Bonneville discharge of 130 Kcfs, the model figures are quite accurate. At a tailwater elevation of 12 feet, with Hamilton Creek running 97 cfs, a total of 8 chum redds would be exposed; at a Bonneville tailwater depth of 11.5 feet, 12 redds would be exposed; at 11 feet, 19 redds would be exposed. With zero flow from Hamilton Creek, the number of redds exposed increased to 31 at an 11-foot Bonneville tailwater depth.

In response to a question from Hlebechuk, Boyce said ODFW marked the location of each redd using a highly-accurate GPS instrument. We then take the 2-D location of each redd and apply a 3-D location and water surface elevation in the model, Skalicki said. So the model is saying that a tailwater elevation of 12 feet, and a Hamilton Creek discharge of 97 cfs, eight redds would be exposed – has that been verified? Cindy Henriksen asked. No, Skalicki replied. What you wanted was a GPS location for each redd; that data has now been overlaid with the model, which includes a finely-detailed 3-D bathymetric map of the Ives Island area, said Wills. The model also takes into account flows and tailwater elevation from Bonneville, as well as tributary flows from the Willamette and other systems. In other words, said Skalicki, this is the best available science, and we're pretty confident in its accuracy.

After a few minutes of further discussion, Silverberg observed that it is obvious that the Corps has serious concerns about the GPS redd information, but it is not very obvious what those concerns are. She suggested that it might be beneficial for the Corps to sit down with the salmon managers to alleviate those concerns. Wellschlagler observed that, based on this data, it appears that more than two-thirds of the chum spawners are spawning well below Bonneville; he said it may make sense to revisit the current philosophy of Bonneville operations prior to next year's chum operation.

Boyce said it would be appropriate for the TMT to revisit the current Bonneville tailwater elevation, in light of the information that the current operation will leave some redds high and dry. It was agreed to take a caucus break to discuss this.

When the meeting resumed, Wills said that, from the salmon managers' perspective, it was not their intention to request more water at this time; they need some additional time to digest and discuss it. For now, we continue to endorse the existing Bonneville tailwater SOR, he said, which stipulates a minimum tailwater elevation of 11.9 feet.

One follow-up question, said Wellschlager – a couple of weeks ago, it was suggested that 11.5 feet would be the incubation elevation. Yet when we look at this information, it shows that up to 32 redds would be exposed at an 11.9-foot incubation elevation – that's 64 fish spawning above a level that you said was safe, said Wellschlager. What happened in the intervening two weeks? The 32 redds have at least some water – up to a foot – over the top, Skalicki replied – those are not the redds that would be exposed. I would also point out that, on December 15, you committed to maintain a minimum tailwater elevation of 11.9 feet through incubation, said Boyce. No, I committed to maintain 11.9 feet through the end of spawning, Wellschlager replied. Hlebechuk said the notes from that meeting bear out Wellschlager's contention.

After a few minutes of further discussion, it was agreed that, for now, the action agencies will maintain a minimum Bonneville tailwater depth of 11.9 feet until the next TMT meeting, at which this topic will be revisited. At that point, we can talk about next steps, Silverberg said. Is the goal to keep all redds watered up, or is there a percentage of redds that we're willing to allow to dry up? Kiefer asked. We're trying to evaluate all of those questions, Wills replied. Wagner said that, in the past, NOAA Fisheries has made that call; in 2001 and 2003, for example, NOAA made the call to reduce protection levels in light of poor water supply forecasts. Margaret Filardo requested that Bonneville operate in the most conservative manner possible in order to conserve water for the February-March incubation period.

6. Methodology to Determine Dworshak Operational Flexibility, January-March.

Julie Ammann said there have been a lot of questions recently about operational flexibility at Dworshak, specifically, about how the decision was made last week to increase Dworshak outflow in response to the cold snap. She went through the methodology used to arrive at this decision, touching on the following topics:

- Purpose
- Dworshak ESP inflows, December 1-July 31 (graph showing 44 ESP model runs)
- Volumes – historical vs. ESP forecast volumes, April-July, 1948-1991
- Flood control elevations – storage reservation diagram (graph) showing 44 different flood control drafts at Dworshak
- The ResSim model, a new product that is replacing HEC-5
- Single-year ResSim results, showing additional flexibility – the volume above minimum flow needed to achieve Dworshak’s March 31 flood control elevation – in other words, the volume it would be possible to release between now and March 31 and still achieve Dworshak’s March 31 flood control elevation (graph)
- Additional volume available (graph)
- Summary: the goal is to provide some flexibility through the system while meeting the March 31 shifted flood control elevations; additional analysis will be done at least every other week to monitor changing conditions.

It would be nice to see where the current Dworshak water year is falling, in terms of its rank within the historic average, said Wagner. If you look at the historic vs. forecast ESP values, 2005 would be number 39 out of 44 – in other words, it would be one of the five lowest years in the 44-year record, Ammann replied. Martin suggested that PDO phase and ENSO signal should be incorporated in this analysis for maximum accuracy.

7. Dworshak Flexibility Used to Date – Historical End-of-December Elevations.

Hlebechuk said that last week, when Dworshak flows were increased, 17 Ksf were used above minimum outflow from Dworshak. She presented a chart showing how this compares to previous years’ Dworshak operations, including the project’s December 31 elevation. She noted that Dec 2004 elevation of 1548.4’ was the second highest end of December elevation since 1993, when the Dworshak summer draft started.

8. SOR 2005-1: Dworshak Reservoir Operations.

On January 12, the action agencies received SOR 2005-1. 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 Dworshak reservoir to the highest elevation possible within the flood control rule curves. Do not evacuate 50 Ksf (99.2 KAF) as planned by COE over the next week for power operations. Continue to release minimum discharge (1.5 Kcfs) until further notice.

The full text of this document is available via hot-link from the today’s agenda on the TMT homepage; please refer to this document for further details. Wills went briefly through its contents, noting that this SOR resulted from the salmon managers’ deep concern about the RFC’s steadily-declining water supply forecast across the basin, as well as about the action agencies’ reliance on the ESP model. The action last week has already been taken, said Kiefer, but the SOR still has relevance given the possibility of future cold weather events. We recognize that the reliability of the power system has the highest priority, but given the fact that most climatologists are predicting warmer, dryer

conditions for the coming months, we urge the action agencies to be as conservative as possible in their water releases.

Wellschlager said the Corps, Bonneville and the Bureau always try to be judicious about water use at this time of year; we are cognizant that the 2005 water supply forecast is below normal. Dworshak outflow was ramped up Monday and Tuesday in anticipation of the arrival of an arctic front; Dworshak outflow was then ramped back down until the front actually appeared over the weekend. Again, said Wills, we're not going to argue the need for the power when these cold snaps occur; our concern is the reliability of the model runs used to decide that flexibility exists, now or in the future. We need to have agreement about the reliability of the tools used to reach such a conclusion, he said, and we're not there yet.

We appreciate your concerns about being as conservative as possible, and about developing a better understanding of the analysis, said Hlebechuk. We are trying to be cautious about how that flexibility is used; we, too, are concerned about refill. There is no forecast of cold weather in the immediate future, she added; however, you never know when that might change. My plan would be to send out email notification to the other TMT members if that change occurs, Hlebechuk said. Kiefer noted that there is still a significant amount of steelhead fishing in the lower Clearwater; he thanked the Corps for their prompt notification of the change in Dworshak operations last week, because it is a matter of fisherman safety.

9. Transportation/Spill Symposium Discussion.

Wills said that, after the last TMT meeting, the salmon managers were asked to provide thoughts and ideas as to how this symposium might transpire; while not all salmon managers were able to participate, basically, we recommended that a well-thought-out and planned symposium would be the best way to approach this topic. It will not be possible to do that in a short time-frame. We are going to conduct a salmon managers review of the available information; if there is something that strikes us as important, from a management perspective, we will bring it to TMT for evaluation and discussion, Wills said.

10. Water Management Plan Fall/Winter Update Comments.

Hlebechuk said the latest WMP and fall/winter update drafts have now been posted to the TMT homepage. Washington, CRITFC and Idaho have now submitted comments. Our plan is to finalize the plan by the end of January; we will respond to comments received at the next TMT meeting, she said. Is there still time to provide comments to the Fish Passage Plan? Kiefer asked. That will be finalized during the second week in February, said Jim Adams; I would think that you have until around February 1 to submit comments. Hlebechuk said she will check on that and report back to Kiefer.

11. Status of Operations.

Tony Norris said Coulee is at 1280.9 feet; the plan is to draft to elevation 1255 for 6 weeks of drum gate maintenance beginning April 1. We don't want to run the risk of drafting below elevation 1255 prior to that, so we are taking a cautious approach, he said. So Grand Coulee will be passing inflow, essentially, from April 1-mid May? Kiefer asked. Yes, Norris replied.

At Libby, we're having a line test on Thursday, which means all five units will be running speed-no-load, plus 1-1.5 Kcfs of spill, Hlebechuk said. Dworshak has filled two feet since December 31, to 1550. Libby is at 2408.3. We have received money for the Bonneville spillway rating curve work, she added. Norris said the current Hungry Horse elevation is 3541.2; the January-July water supply forecast for that project is 1.96 MAF, 90% of normal.

Wellschlager said that, from a power system perspective, the recent arctic event wasn't as bad as was feared. From a water management perspective, the 2004 TDG and temperature monitoring report and 2005 monitoring plan are now available via the TMT website, said Adams.

12. Other.

Silverberg reminded the group that it was agreed, at the last TMT meeting, that TMT would attempt to develop a list of recurring issues for discussion "ahead of the curve." That process is ongoing, she said.

13. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, February 2. It was agreed that the annual TMT process meeting will be held in the afternoon, following this meeting. Meeting summary prepared by Jeff Kuechle.

**TMT Participant List
January 19, 2005**

Name	Affiliation
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
Cathy Hlebechuk	COE
Tony Norris	USBR
John Wellschlager	BPA
David Wills	USFWS
Paul Wagner	NOAAF
Cindy Henriksen	COE

Russ Kiefer	IDFG
Tom Haymaker	PNGC
Jim Adams	COE
Laura Hamilton	COE
Kyle Martin	CRITFC
Julie Ammann	COE
Steve Hayseker	USBR
Russ George	WMCI
Ruth Burris	PGE
Tim Heizenrater	PPL
Karl Kanbergs	COE
Ray Gonzales	COE
Harold Opitz	NWS
Todd DeCook	PPM
Don Faulkner	COE
Chan Modini	COE
Ron Boyce	ODFW
Cindy LeFleur	WDFW
Cara Lambert	EWEB
Margaret Filardo	FPC
Greg Hoffman	COE
Mike O'Bryant	CBB
Glenn Traeger	Avista
Bruce MacKay	Consultant
David Benner	FPC

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner /

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 February 02, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
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@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Chum information including elevation and number of redds. Set incubation flows.
3. Dworshak Operations
4. Response to Water Management Plan comments / finalization of Water Management Plan
 - a. [\[2005 Water Management Plan - FINAL - January 31, 2005\]](#) 
5. Finalization of Fall/Winter Update
 - a. [\[Fall / Winter Update to the 2005 Water Management Plan - FINAL - JANUARY 31, 2005\]](#) 
6. Spring Creek Hatcher
7. Status of Operation
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
8. Other
 - Set agenda for next meeting. - [\[Reference Calendar\]](#) 
 - Head count for RSW tour Feb 7 at 3 p.m. and Feb 8 at 8 a.m.

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 Meeting Notes

Reservoir Control Center Offices, Brewery Blocks

Portland, Oregon

February 2, 2005

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:

As follow up to the last TMT meeting, Cathy Hlebechuk, COE, asked if there were any additional questions about the COE's methodology to developing operations at the project. Dworshak reached 1557.2' at the end of January and is currently operating at minimums. The COE's February final water supply forecast is 61% of normal at the project, with end of February flood control elevation at 1570'. No additional questions were raised on this issue.

Response to WMP Comments/Finalization:

The action agencies posted the final 2005 WMP and Fall/Winter Update this week. The finalization of the WMP was delayed due to consultation on the 2004 BiOp and RODs. The action agencies plan to be back on track next year and finalize the 2006 Plan in the Fall. The action agencies considered and provided responses today to some of the written comments received from Idaho, Washington and CRITFC. The responses are summarized below (details are available in the meeting minutes):

CRITFC:

- The action agencies added a paragraph on page 2 describing what is in the Fish Passage Plan and how it is reviewed, and a link to the plan (instead of combining the two plans).
- Added specificity on operating Dworshak to 1520' in September (in response to comments from CRITFC and Idaho)

Idaho:

- Struck resident from 'stranding fish' on page 5 priorities for operating reservoirs.
- Clearly indicated which BiOp (2004) was being referred to throughout the document, and references to the action agencies' UPA. In this document, there are more references to the UPA than the BiOp.

Washington:

- Clarified that there needs to be a balance between chum flows/reservoir refill and flexible power; included chum flows as a priority for flow management and reservoir operations.
- The COE agrees with WA's comment that 'refill is a high priority'. The WMP already states this.

Other:

- The WMP is the ‘big picture’ of how the action agencies plan to operate the FCRPS. The updates consider in-season forecasts, study plans that might impact operations and water supply specifics as soon as they are known.
- The action agencies noted that the role of TMT in discussing items in the WMP has not changed from before. There are some areas that are not issues for TMT to discuss, (e.g. re-writing the 2004 BiOp or UPA), and others that are (e.g. operations that make sense in the context of fish and reservoir conditions).
- The Fall/Winter update describes current conditions (generally below average), chum flows, burbot operations, Vernita Bar, Spring Creek hatchery release, and spring flow – operations from October 1-March 31.
- The draft Spring/Summer update will be available for discussion at the next TMT meeting, February 16.
- CRITFC noted that the action agencies’ response to CRITFC’s 2004 proposed River Operations Plan was not sufficiently specific so as to be helpful.
- The action agencies do not plan to submit formal responses in writing – instead the COE plans to use TMT as the forum to provide responses. (CRITFC noted a preference for written responses.)

Spring Creek Hatchery Release:

The USFWS had a March 3 planning date for the hatchery release. The COE requested that the operation start a day earlier to coordinate with water quality monitors scheduled to be put in place on March 1 or 2. The USFWS agreed to this request. Brad Eppert, COE, offered the COE’s recommendation: run the corner collector for four days starting 24 hours after the release to move smolts through the project (based on hydro acoustic and other monitors). The USFWS is looking at the implications and at this point, think a four day minimum and starting no later than 24-hours after the release would be acceptable. The USFWS and COE will continue coordination on this operation.

ACTION: Dave Wills will provide an update at the next TMT meeting.

Chum Information:

The salmon managers reviewed the data presented at the last TMT meeting and expressed concern with going below 11.9’ for downstream chum populations at this time. They are organizing a trip to do GPS survey work downstream, and would like to see modeling that shows the effect of changes in elevation at the project on downstream spawning areas. The salmon managers would like to wait to reduce the elevation until this information is gathered and they can go through the dewatering criteria noted in the WMP. Tony Norris, BOR, commented that .2’ of water at the project will likely have little effect downstream (I-205), based on hydrologic modeling experience.

The action agencies agreed to allow two more weeks to gather information. The operation will continue at 11.9’ until the TMT revisits with new information at the next TMT meeting (Feb. 16).

ACTION: The COE reported they had studied the effect of Bonneville flows, Willamette flows and tide on Vancouver stage. They said Bonneville flows had little impact on Vancouver stage, the Willamette flows and tide had a major effect. The salmon managers will look at this study to see the effects.

Status of Operations:

Reservoirs – Grand Coulee is at elevation 1288.4'. Tony reminded the group that drum gate maintenance at the project is scheduled to begin April 1 and work will continue for 6 weeks, during which time Grand Coulee will be held at 1255'. Hungry Horse is at 3544.6' and close to flood control. To avoid a filling and spilling scenario, Hungry Horse might be drafted. Libby is at 2411.9' and minimum outflow. Libby was operated at speed/no load of 2500 cfs; plus spill of approximately 1250 cfs through both spill bays closing one bay resulted in increased TDG at the powerhouse and a slow decrease in TDG levels on the spillway side. Dworshak is at 1557.4' and drafting minimum flows. Albeni Falls is operating 16 kcfs out; Bonneville released 130-148 kcfs over the last week.

Fish – No report.

Power – Running to meet load.

Water quality – No additional reports.

ACTIONS/NEXT MEETING AGENDA:

Actions from 2/2/05 meeting:

- 'Field trip' to do GPS surveys downstream of Bonneville – salmon managers
- Modeling to show effects of elevation changes at BON to downstream chum spawning areas – COE
- Coordination on Spring Creek hatchery release – COE and USFWS

Next TMT meeting, February 16th, 9am-noon:

- Chum – Updated Information
- Spring Creek Hatchery Update
- Draft Spring/Summer Update WMP
- Status of Operations

1. Greetings and Introductions.

Chair: Hlebechuk. Facilitator: Silverberg.

2. Chum Update.

David Wills said FPAC has had some discussions about the redd location information presented at the last TMT meeting. Basically, we have some concerns about going below 11.9 feet, and the effects that would have on the downstream chum populations, he said. We weren't comfortable with recommending going below 11.9 feet at this time; we'd like to organize a field

trip to do some GPS measurements at the downstream spawning sites, so that we have an opportunity to do a little ground-truthing before we make a decision about dewatering criteria and where to set the tailwater level for chum incubation. We felt it would be prudent to wait a little, gather some more information, and review the dewatering criteria in Appendix 5 so that, as a technical group, we can arrive at a more informed, better decision, Wills said.

We can also survey the Ives Island-area sites, said Wills; however, we also want to look at the downstream areas. You're talking mainly about the I-205 bridge site? John Wellschlager asked. There's the Ives complex, the Multnomah Falls Creek site and the I-205 site, Wills replied. There are a lot of river miles between Bonneville and I-205, noted Tony Norris; as an engineer, I would have to say that a couple of tenths difference in Bonneville tailwater elevation would have very little effect on the elevation at I-205 – tides and local inflows from the Willamette and other systems would have 98% of that effect. If you want to press that issue, I'd like to see some actual data in support of your position, Norris said. And I think we are talking about doing that sort of modeling work, Wills replied.

Cathy Hlebecuk noted that, in reading the BiOp, it appears to her that the I-205 complex may be outside the scope of the BiOp. The BiOp covers the entire ESU, which includes the chum that spawn at I-205, Wagner replied. Essentially, it sounds as though the salmon managers would like a couple more weeks to do some of this analysis before setting the chum incubation flow, Silverberg said. And the action agencies would not oppose that idea, said Wellschlager – however, given the dwindling water supply, I don't want to give you guys false hope, in terms of how much additional water may be available for chum. I mainly don't want to give credence to a precedent that would say that small fluctuations in Bonneville tailwater depth will have an impact at I-205, said Norris. I understand, said Wills, but my concern also extends to later in the season, once emergence begins in March or April. It was agreed to revisit this topic at the February 16 TMT meeting; in the meantime, Wills said he will coordinate the above-referenced field trip for some time next week. In the meantime, the chum incubation elevation will continue at 11.9 feet, at least through the next two weeks.

3. Dworshak Operations.

The purpose of this agenda item was mainly to see whether anyone has any questions on the methodology behind the Dworshak operations, said Hlebecuk. The reservoir was at 1557.2 on January 31, about a foot above flood control. It resumed minimum outflow last night. Is it likely to stay there? asked Wagner. Unless the forecast changes – it went down from 71% in the Corps' January final forecast to 61% in the February final. The target will be 1570 at the end of February.

With respect to the forecast, said Cindy LeFleur, is that the water supply forecast? Yes, Hlebecuk replied. The River Forecast Center will also produce a forecast for Dworshak, but the Corps' forecast is the official one, used to guide Dworshak operations.

4. 2005 Water Management Plan.

Rudd Turner said the action agencies posted the final 2005 WMP and the final fall/winter update to the TMT homepage earlier this week – those documents are there for your use. We ran a bit late on these plans this year, primarily due to the consultations on the Biological Opinion. Once the ESA documents were finalized and the RODs signed, we were able to finalize the WMP. Next year, we should be back on our normal schedule.

We considered the comments from those agencies that submitted them – Idaho, Washington and CRITFC, primarily, Turner said. In response to CRITFC's comments, we added a paragraph addressing their request that we incorporate the Fish Passage Plan into the Water Management Plan; we decided not to combine the two, because they're separate plans with separate review processes – the Fish Passage Plan is coordinated through FPOM. We did add a paragraph describing the Fish Passage Plan to the beginning of the Water Management Plan, which can be found on Page 2. We also added some specificity to the language referencing Dworshak going to 1520 in September, in a couple of places in the WMP, Turner said.

Idaho had a comment about operating reservoirs to minimum outflows, said Turner; we did strike the requested language (on Page 5) in response to that comment. There was also an Idaho comment regarding which version of the BiOp we were talking about, and I think we were able to clean all of those references up, Turner said. Washington discussed chum flows and reservoir refill, and the need for a balance between them and flexible power operations; that comment was addressed in Section 2.1. WDFW also commented on the high priority for refill; we agree with that comment, said Turner.

There were a number of other comments, Turner continued; there are some things implied and stated about the role of TMT in allowing further discussion of reservoir operations for flood control. We do hope to cover some of that ground in TMT this year. Some comments did appear to be outside the scope of what TMT is typically able to address, he said; we can't rewrite the 2004 BiOp or the UPA – we can only apply them. Changing the way we do flood control, for example, is something that will have to be addressed in other forums.

Will you provide a written response to all of the comments received? Russ Kiefer asked. We don't intend to provide formal written comments, Turner replied; we had hoped to provide any responses people would like to hear at today's meeting, and memorialize them in the meeting notes. Again, the fall/winter update is now final as well; it describes current water supply conditions in the basin, chum flows, burbot operations, flood control, Spring Creek Hatchery releases and Snake River zero flow, and addresses some of the comments received on those topics.

It is frustrating, from CRITFC's perspective, that you're unwilling to provide a formal response to our comments, or to CRITFC's annual River Operations Plan, observed Kyle Martin. I have a letter addressing those concerns, said Hlebechuk. Clearly we plan to go back and look at the comments we provided, how they were addressed in the Water Management Plan, and will provide an Idaho response some time in the next few weeks, Kiefer said. In response to a question, Turner said the Corps is working on the spring/summer update to the Water Management Plan right now, and should be able to present a draft at the next TMT meeting.

Cindy Henriksen said that, to be clear, the action agencies did respond to the 2004 CRITFC River Operations Plan by letter. Thank you for the letter, said Martin, but it was very non-specific.

Wagner asked about the procedural connectivity between making operational changes and the development of the annual Implementation Plan and Water Management Plan. Tony Norris observed that there are technical issues and policy issues; any significant changes to operations are generally considered policy-type decisions, that need to be made through the Implementation Plan and the Water Management Plan. The problem is that the scope is never clearly defined, between technical and policy-level decisions, said Wagner. I'm afraid that grey area will always be there, observed John Wellschlager. Still, it may be helpful to try to spell some of that out, said Silverberg – we should be able to communicate the action agencies' thinking a little more clearly, both with respect to the grey areas and where the distinction between policy and technical is clear. The spring transport issue is one that comes readily to mind, said Wagner – we've talked about that for a couple of years now, and have been able to work it out in season, but to be able to make that work more smoothly, and avoid the process violation "red card," it would be helpful to have some process discussion ahead of time. Wellschlager said that, in his view, the spring transport issue is an example of where the process has actually worked well – we were able to work out a compromise in-season, he said.

This is a critical issue for Idaho as well, said Kiefer; it was one of our comments to the Water Management Plan, and was not really addressed. Our comment was that we look forward to participating in the discussions of best available science to inform transport decision-making, but the states and tribes, so far, have been excluded from those discussions. We have information that shows that undetected fish returned at a higher rate than transported fish from the 2002 outmigration, when the RSW was operating. That doesn't really match up with the information the action agencies and NOAA have been using to make that decision, said Kiefer, but we haven't really been given a spot at the table, at which we can influence the decisions for the fish we have management responsibility for.

Silverberg said that transport has been discussed at several recent TMT meetings; there was also some discussion of holding a symposium on that topic. True, said Kiefer, but there is also the process issue, and when we have the opportunity to provide our input to the decision-making process. It's a question of managing expectations, data collection and submittal, said Wagner – we don't want to hear that we're too late to propose a change in operations, because we missed out on a deadline to submit information to the Implementation Plan or the Water Management Plan. Wellschlager replied that while change may be more difficult to negotiate in 2005, it is certainly possible for 2006; meanwhile, the action agencies have to lay out their plans for the multi-purpose use of the system, in advance, which does impose certain timeline restrictions. He added that, in his view, there is still a great deal of conflicting information about the efficacy of transport for various stocks.

My question is, when is Idaho's opportunity to influence the discussion of how many Idaho fish will be transported, and when, said Kiefer. That's why we talked about setting up a transport symposium, Turner replied. But again, it's going to be very difficult for that discussion

to have an influence on 2005 transport operations, especially given the fact that we have not yet seen NOAA Fisheries' adult return data for 2004, Kiefer said. Again, the question, essentially, is how we frame up the issue, and get a timely discussion, so that any new information can be used to guide upcoming operations, said Wagner. There are some opportunities to exchange and discuss information at FPOM, said Turner; the part of the question I can't answer is where, exactly, that leads.

5. 2005 Fall/Winter Update.

This topic was covered during a previous agenda item.

6. Spring Creek Hatchery.

We received a note from Dave Wills about Spring Creek Hatchery, saying that the planning date for the release is March 3, said Hlebechuk – is there any chance that there might be any flexibility in that date? We could move it up a day, to March 2, Wills replied. Jim Adams noted that there is some question about the availability of water quality monitoring devices if the date is moved up, but said he will do his best to ensure that they will be in place.

Brad Eppard of the Corps said the plan is to run the corner collector for four days, beginning March 3, 24 hours after the Spring Creek release; there is also a need for adult attraction flow at that time. In our minds, that would be the minimum operation, said Wills. We're still doing some last-minute evaluation of the 2004 FPE information; there was general disappointment that, last year, FPE went down while the corner collector was operating. I wouldn't want to see the corner collector operation begin any later than 24 hours after the release, he said. Turner noted that Bonneville flows are expected to be about 130 Kcfs at the time of the release, so the fish won't be coming down real fast. We will ask the project to open the corner collector at whatever time you think is appropriate, Turner said. Wills said he will talk to the hatchery personnel to decide what time, exactly, the corner collector operation should begin. Wills added that there may be some budgetary issues associated with the biological monitoring program; still, we're hoping that everything will fall into place, given the fact that we can't delay the release. Turner thanked the Fish and Wildlife Service for their willingness to move the release date forward.

7. Status of Operation.

Norris said Grand Coulee is currently at 1288.4 feet; Hungry Horse is at 3544.6 feet, close to its flood control operation. I should note that, at Hungry Horse, with the implementation of VARQ, flood control and meeting the Columbia Falls minimums drive reservoir operations at Hungry Horse, he said. VARQ limits the probability of refill at that project far more than the BiOp operation – we achieve the April 10 flood control elevation at Hungry Horse 40% of the time vs. 60% of the time. We're able to target flood control more readily now, he said. Will Hungry Horse be drafted below its current elevation? asked one meeting participant. That depends on a variety of factors, Norris replied – for example, we might increase outflow, and fall below flood control, to avoid filling and spilling at that project.

Hlebechuk said Libby was at 2411.9 feet last night, with minimum outflow; Dworshak is releasing minimum flow, and was at 1557.4 feet at midnight last night. Its February 28 flood control elevation is 1570 feet. Albeni Falls is releasing 16 Kcfs, and operating between 2055 and 2056 feet. Bonneville released 130-148 Kcfs over the past seven days. We did the line outage at Libby last week, and that worked out fine. Jim Adams said Libby released 2.5 Kcfs speed-no-load, plus about 1.8 Kcfs of spill through two bays at the beginning of the outage. Later in the outage, as TDG was creeping up, spill was reduced to about 900 cfs through one bay. TDG levels hovered between 121% and 123% during the outage.

At The Dalles, on February 22, there are a couple of line outages scheduled, so there will be a number of units out of service, and there may be some spill, Hlebechuk continued. Turner noted that there is a four-hour spill test planned at that project, on February 22, relating to the installation of a stoplog to alleviate the vortex below Bay 6.

The power system is running to meet load, said Wellschlager.

8. Next TMT Meeting Date.

The next Technical management Team meeting was set for February 16.

**TMT Participant List
February 2, 2005**

Name	Affiliation
Donna Silverberg	Facilitation Team
David Wills	USFWS
Paul Wagner	NOAAF
Russ Kiefer	IDFG
Cindy LeFleur	WDFW
Tony Norris	USBR
John Wellschlager	BPA
Cathy Hlebechuk	COE
Cindy Henriksen	COE
Jim Adams	COE
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Todd Cook	PPM
Don Faulkner	COE
Tom Le	PSE
Ruth Burris	PGE
Kevin Nordt	Mid-Cs
Bruce MacKay	Consultant
Lance Elias	PPL
Richelle Beck	D. Rohr & Associates
Glenn Traeger	Avista

TECHNICAL MANAGEMENT TEAM

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OR: Ron Boyce

WA: Cindy LeFleur

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TMT MEETING

Wednesday February 16, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

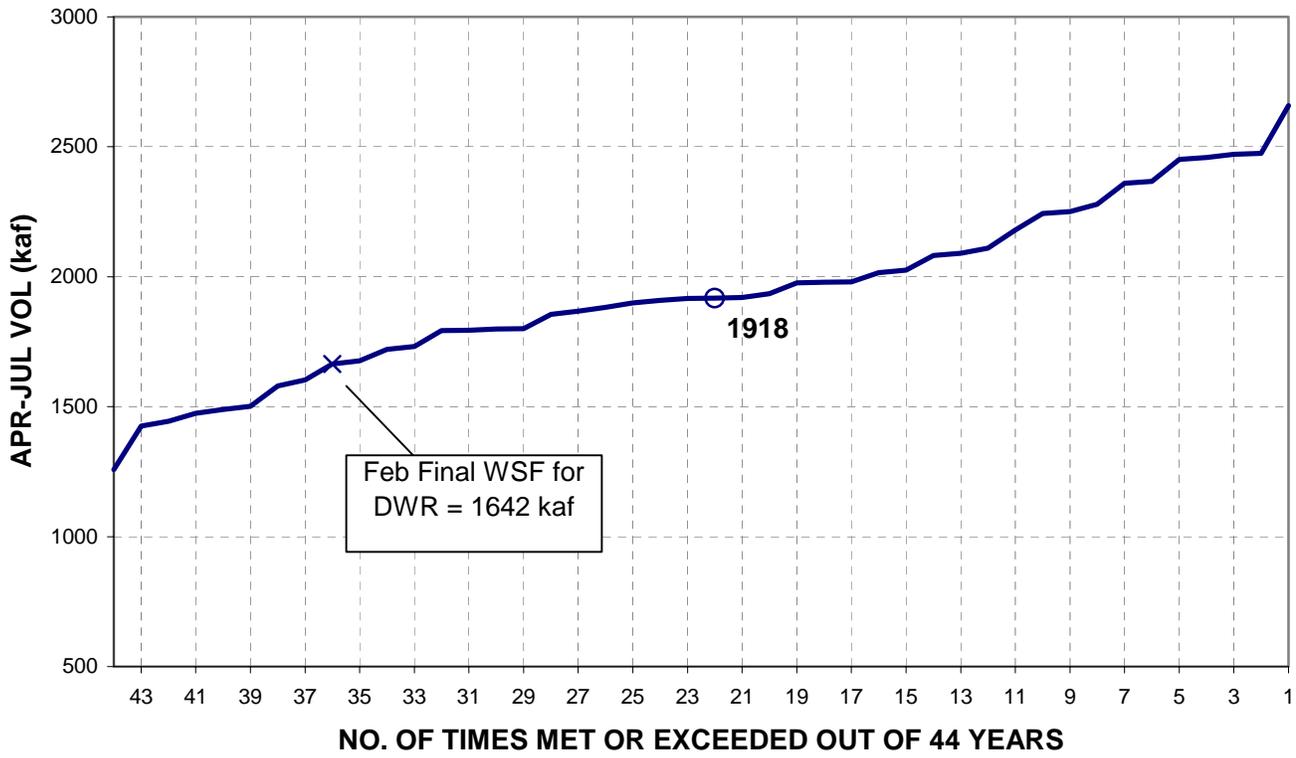
*All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed.
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AGENDA

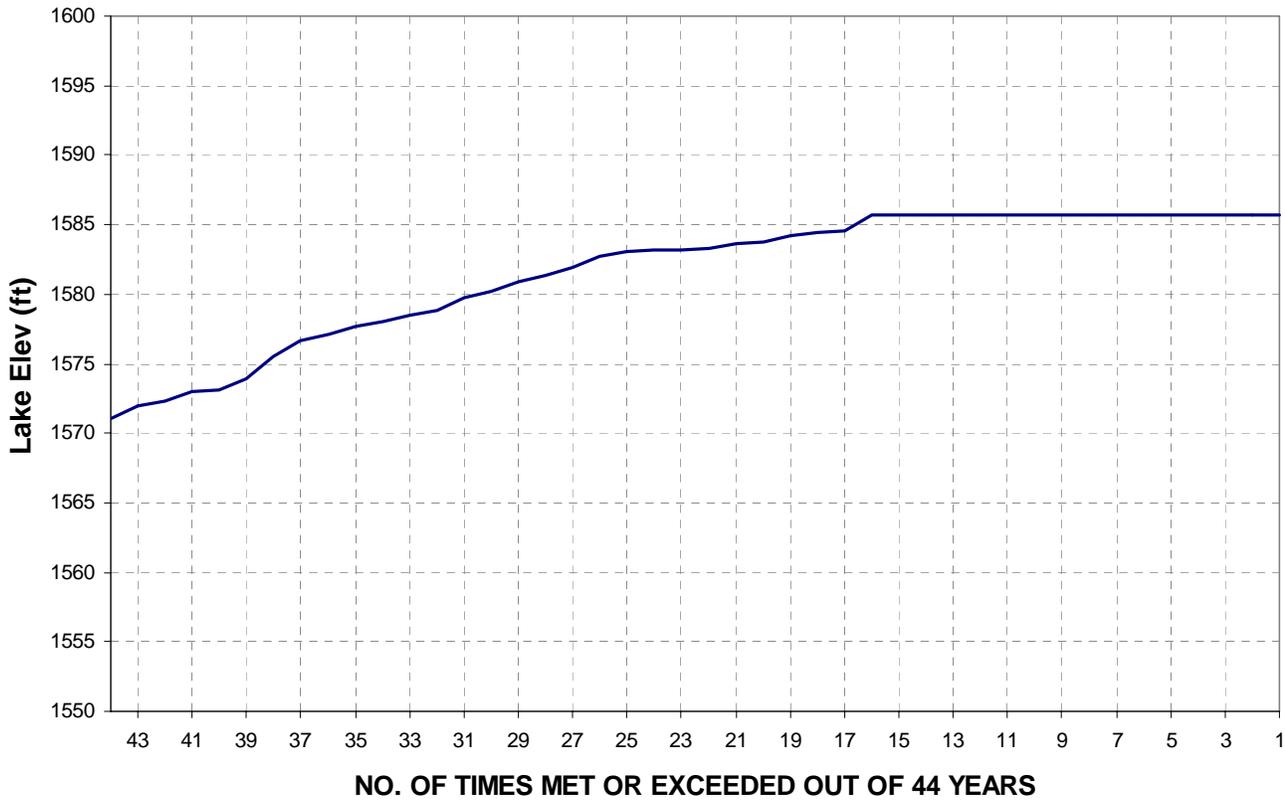
1. Welcome and introductions.
2. Spring Creek Hatchery Release
3. Spring/Summer Update
 - a. [\[DRAFT 16 February 2005 \]](#) 
4. Lower Granite Seasonal Average forecast
 - a. [\[Lower Granite Seasonal Average Flows from QADJ 01 Apr - 30 Jun and LWG ESP Volumes Versus Seasonal Average Flow\]](#) 
5. Dworshak ESP volumes/projected 31 March elevation
 - a. [\[DWR ESP Volumes and DWR Projected 31 March Elevation \]](#) 
6. Q Adjust model using February Final Forecast
 - a. [\[Summary of February 2005 QADJ Model Runs - 14-Feb-05 and McNary Outflow May-June Average\]](#) 
7. Chum information including elevation and number of redds. Set incubation flows.
8. Status of Operation
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
9. Other
 - Set agenda for next meeting. - [\[Reference Calendar\]](#) 

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

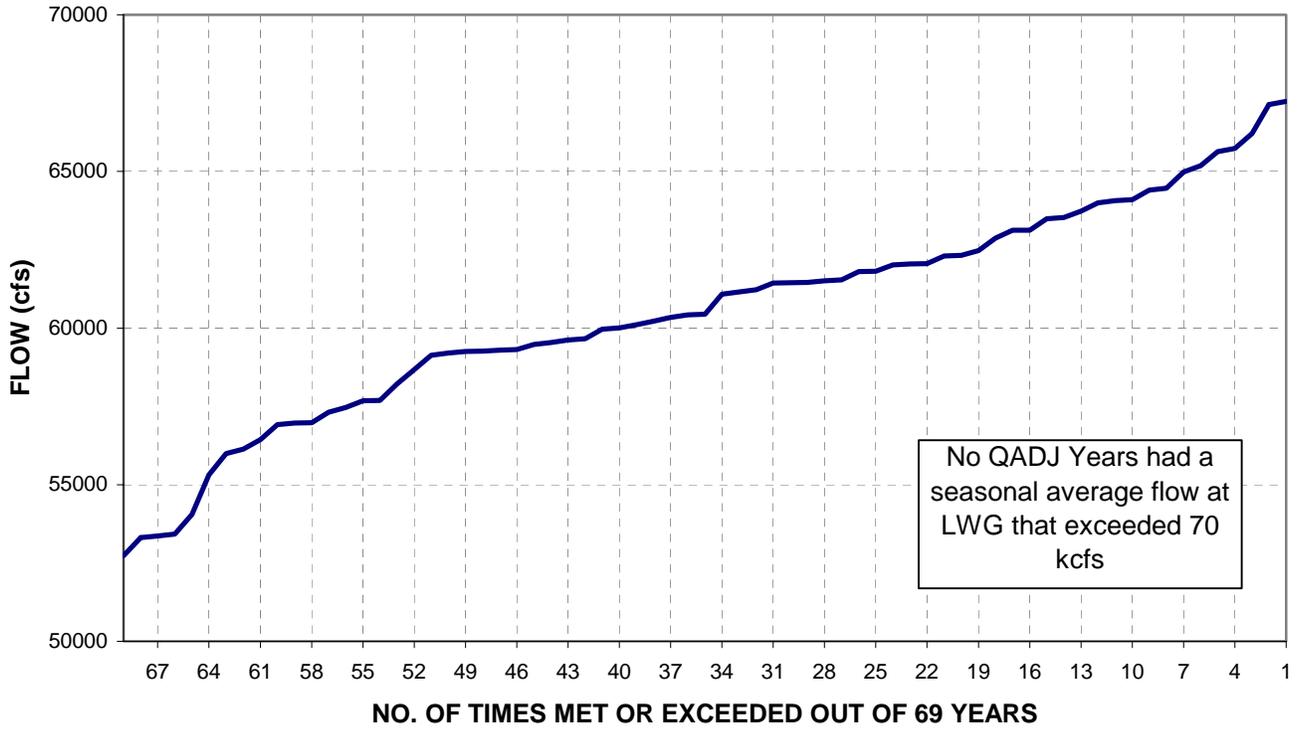
DWR ESP VOLUMES



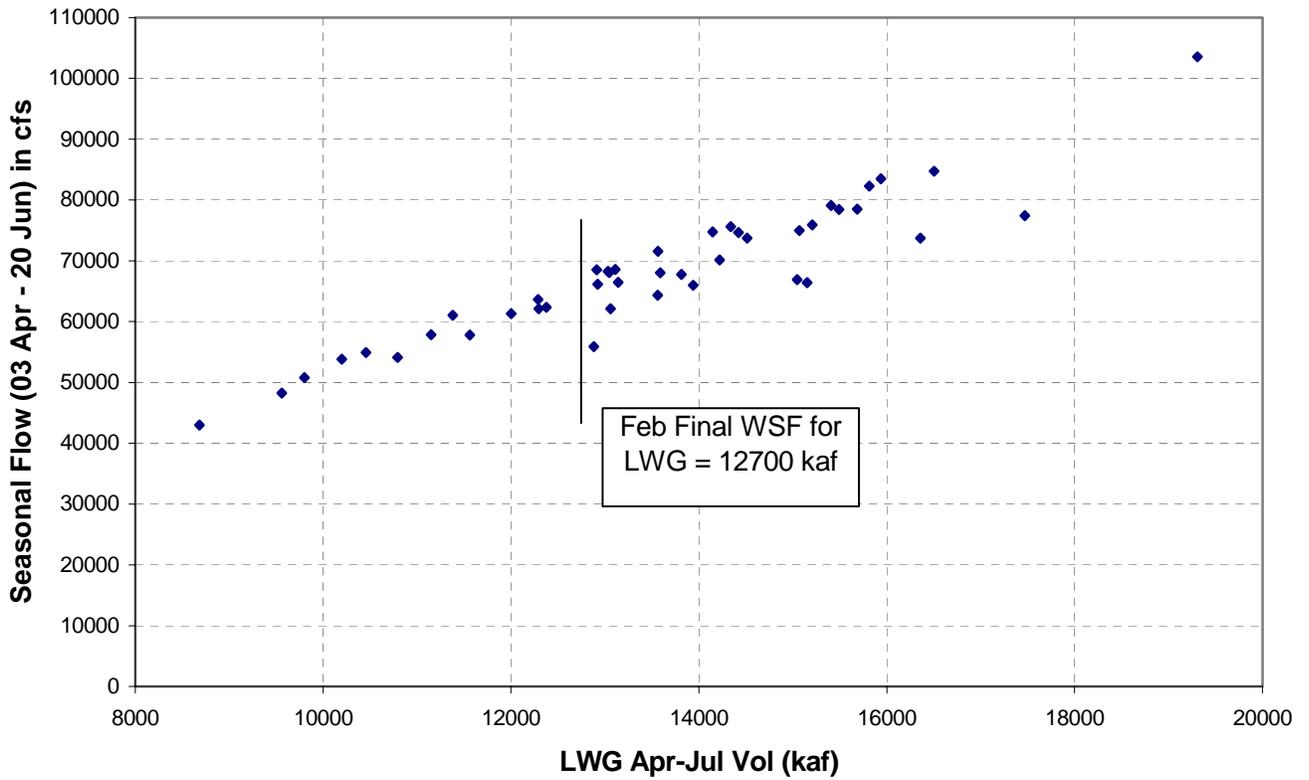
DWR PROJECTED 31 MARCH ELEV



**LOWER GRANITE SEASONAL AVERAGE FLOWS from QADJ
01 Apr - 30 Jun**



LWG ESP Volumes Versus Seasonal Average Flow



Assumptions:

- * Streamflows were adjusted to the February Final Water Supply Forecast for the period of February thru August of 81.7 MAF at The Dalles (75% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations were observed data from January 31, 2005.
- * Grand Coulee helps meet Vernita Bar minimum flow objective of 65 kcfs in Feb-Mar drafting to elevation 1255.0 ft in March for drum gate maintenance. Coulee holds elevation 1255 ft through April and fills to 1290 in June. Summer BiOp drafts are 1285 ft in July and 1280 ft in August.
- * Hungry Horse operates to VARQ flood control or minimum flow from Jan - May and meets minimum flow of 3400 cfs at Columbia Falls, targets full in June, and drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool).
- * Dworshak targets elevation 1585.7 ft in Mar, 1594.4 ft by 15 Apr through May, based on a GCL/DWR shifted flood control operation and maximum releases of 15 kcfs in April and 13 kcfs May-Jun. DWR targets full in June and targets 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Jan - Apr. Targets 13,900 cfs in May and 10,800 cfs in June for Sturgeon, based on an Apr-Aug forecast of 5.644 MAF and a Tier 3 required pulse of 0.88 MAF. Targets full in July with a minimum flow of 7,000 cfs for bull trout. Drafts to 2439 ft by 31 Aug.

Results:

Priest Rapids Meets Flow Objectives of 65 kcfs from Feb - Apr 15 and 135 kcfs from Apr 16 - Jun.

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Feb	69	95
Mar	69	88
Apr 15	47	74
Apr 30	10	102
May	50	150
Jun	69	147

Lower Granite Meets Flow Objectives of 85 kcfs in Apr - May, 73.3 kcfs in June and 50 kcfs in Jul - Aug:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Apr 30	2	50
May	12	72
Jun	15	64
Jul	1	34
Aug 15	0	26
Aug 31	0	25

Bonneville Meets Flow Objectives of 125 kcfs in Feb - Apr:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Feb	58	142
Mar	49	139
Apr 15	45	136
Apr 30	60	168

McNary Meets Flow Objectives of 220 kcfs from Apr 15 - Jun 30 and 200 kcfs in Jul - Aug:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Apr 30	3	149
May	20	206
Jun	30	221
Jul	3	167
Aug 15	0	137
Aug 31	0	130

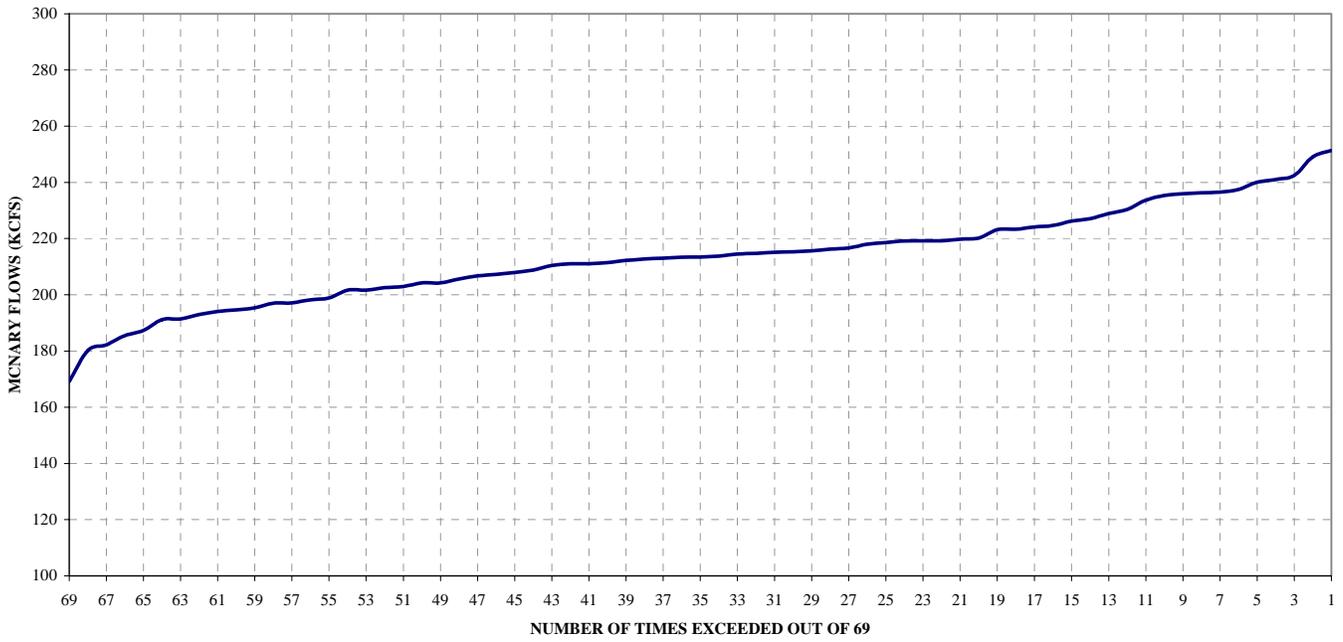
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	59	2458
Hungry Horse	69	3560
Grand Coulee	69	1290
Dworshak	68	1600

Period Average Flows (kcfs)

	FEB 1-28	MAR 1-31	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	14.4	15.2	17.7	20.4	22.8
HGH	2.2	2.0	0.8	1.1	7.5	6.1	6.7	8.6	0.8
GCL	89	82	67	91	130	155	136	112	105
PRD	95	88	74	102	150	178	147	119	110
DWR	1.6	1.6	1.6	2.5	8.6	5.2	9.8	9.9	10.2
BRN	9	11	12	13	12	11	8	9	8
LWG	23	29	41	50	72	64	34	26	25
MCN	125	124	121	149	206	221	167	137	130
BON	142	139	136	168	217	229	173	142	135

**MCNARY OUTFLOW
MAY-JUNE AVERAGE**



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

February 16, 2005

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.

Spring Creek Hatchery Release:

The USFWS will accommodate the COE's request to release the Spring Creek hatchery fish on March 2 (PM), and the COE will open the corner collector on March 3 (AM). Due to the lower flows, the USFWS requested that the corner collector operation continue for 6 days (instead of 4, as discussed at the January 19 TMT meeting) to provide protection in case of a slower egress. BPA and the COE responded that this was an unexpected request, and that they needed to coordinate further with the USFWS after the TMT meeting.

ACTION: Cindy Henriksen will email TMT when a decision is made about the Spring Creek hatchery release operation.

WMP Spring/Summer Update:

The spring/summer update was posted on the TMT web page on February 15. The February final water supply forecast (which is below average) is driving the planned operations for spring and summer at this point. The February final shows Lower Granite April-August at 12.7 MAF, The Dalles at 69.2 MAF, which would recommend a flow objective of 85 kcfs at Lower Granite, and 220 kcfs average McNary in the spring. The spring/summer update includes planned operations for drum gate work in the spring at Grand Coulee, and a summer draft limit of 1278'. In the lower Snake River, the operating ranges shown are the same as those that were implemented last year, where Lower Granite, Little Goose and Ice Harbor operated at MOP + 1.

The action agencies proposed that the Hanford Reach Agreement be removed as an appendix and put as a stand alone document and posted to the TMT web page. TMT members agreed to this.

There was an SRWG meeting planned for the afternoon of February 16, at which the group would look at research possibilities given the projected low flows for this year. Discussions are on-going about Lower Snake research. In response to a question, it was noted that SRWG and SCT make decisions about research.

Next Steps – TMT will review the draft spring/summer update and come prepared to discuss it at the next TMT meeting, on March 2. The document will be updated monthly to include new final forecasts, the next being around March 10. A suggestion was made

to find a better way to determine 'flood risk' and flood control elevations. The COE has been looking at the feasibility, cost estimate and scope for a study proposal to look at the flood risk issue. Cindy Henriksen will keep TMT apprised of developments of the study proposal.

Lower Granite Seasonal Average Forecast

Cindy Henriksen presented the Q Adjust and ESP models for Lower Granite. The Q Adjust looks at possibilities for flow given current expected reservoir operations on a monthly time scale. The Q Adjust showed 62 kcfs April-June average monthly flow at Lower Granite. The ESP runs show volumes using daily time step averages from historical years. Lower Granite shows an April-July range of 8.5-19 MAF. The ESP tool can be used to show what volume of water would be needed to reach a particular flow objective.

Cindy pointed out that, depending on the question asked of the modelers, the models can show different things (e.g. inform research decisions, inform operations decisions). Also, while the dots on the ESP graph are representative of weather in particular years, they are not fully representative of a particular water year. It was suggested that the COE begin presentations on the models with more detailed information about the question that was asked in order to better understand what the graph is saying. Generally, the management implication from the Lower Granite model is that the likelihood of spill through the season is low.

Dworshak ESP Volumes

The question asked with the Dworshak model was: How often historically does Dworshak reach shifted flood control elevations at the end of March? The model showed that Dworshak met its flood control target during 16 out of 44 years. The take away message from this model is that there is not a lot of flexibility in the system given today's conditions.

Q-Adjust Model Using February Final Forecast

The McNary May-June average outflow ranges from 170-250 kcfs. The Priest Rapids table showed that 47 of 69 years met 65 kcfs by April 10, and 10 of 69 years met 135 kcfs on April 30. Lower Granite did not meet flow objectives of 50 kcfs, according to the model, in July-August. A suggestion was made to add The Dalles information to the bottom of the chart.

Chum Information/Operations

Dave Wills, USFWS, provided elevations and GPS information about redds, per a request from the COE. The salmon managers were not able to organize a site visit since the last TMT meeting, and are hoping to schedule it soon. The action agencies now want to lower the tailwater to 11.5' in order to reserve water that may be needed later upstream, given the low water supply forecast. This would give some flexibility at Grand Coulee. The salmon managers suggested that instead of lowering the tailwater, stabilize flows out of Bonneville. BPA responded that this would have a potential cost associated with it, and at this point, there has been no demonstration that there is a need for higher flows for chum redds.

ACTION: John Wellschlager, BPA, will check with operators to find out what timeframe (number of hours, day(s) of the week) would be acceptable for a stable flow operation to allow the salmon managers to do a site visit. John will coordinate with Dave Wills, and Dave will schedule a field visit based on the information. It was suggested that the I-205 area be looked at for tidal influence. Operations to move the RSW to Ice Harbor showed that Bonneville operations have little to no influence on tidal elevations downstream. The Bonneville tailwater will be operated at an 11.9' soft, constraint, 11.5' hard constraint elevation.

Status of Operation

Reservoirs – Hungry Horse is at 3545.8'. Grand Coulee is at 1280.3'. Libby is filling, and at 2413'. Dworshak is also filling, and at elevation 1563'. Lower Granite is releasing about 20 kcfs. Brownlee is 9' from full.

Fish – Russ Kiefer, IDFG, reported that 9 burbot were caught this year, which reveals a continuing downward trend. For more detailed information about burbot, folks can contact Russ.

Power system – No report.

Water quality – Jim Adams, COE, reported on TDG characteristics during the Libby outage. At speed/no load, TDG levels were at 122%. With spill, TDG was at 126%. Three miles downstream of spill, TDG was 116%, and six miles downstream it was at 113%.

Also, there was a letter sent out from the WQT about comments and recommendations to the Fixed Monitoring System that included a recommendation to retire the Camas/Washougal site. The COE does not support this recommendation at this time, and plans to submit a follow-up letter clarifying this.

ACTIONS/NEXT MEETING AGENDA:

Actions from 2/16/05 meeting:

- Coordination re: Spring Creek hatchery release – COE, BPA, USFWS
- Email to TMT re: Spring Creek operation – Cindy Henriksen
- Coordination on information about timing of a field trip to do GPS surveys downstream of Bonneville – John Wellschlager and Dave Wills
- Schedule a field trip to do GPS surveys – Dave Wills and salmon managers

Next TMT meeting, March 2, 9am-noon:

- Chum Operations Update – Dave Wills
- Draft Spring/Summer Update WMP – TMT
- Update on Implementation Plans – Action Agency Caucus Group
- Status of Operations
 - Fish forecasts for 2005 – Cindy LeFleur

1. Greetings and Introductions.

The February 16 meeting of the Technical management Team was chaired by Cindy Henriksen and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions about these notes should contact Henriksen at 503/808-3945.

2. Spring Creek Hatchery Release.

The Fish and Wildlife Service agreed at the last TMT meeting to release the Spring Creek fish on March 2, at the request of the Corps, said David Wills; we can do it in either the morning or the afternoon. It was agreed to schedule an afternoon release, then open the corner collector the following morning, March 3, for four days. Rudd Turner noted that flows are projected to be fairly low next week. Wills said the low flows are a concern for the Fish and Wildlife Service, and it may be advisable to keep the corner collector open for an extra two days, if possible. When will you make this request? Henriksen asked. Right now, Wills replied.

The flows we're expecting next week in the lower river aren't anything other than we would expect in a low-flow year, said Henriksen. My recollection is that we also provided an additional flow volume during last year's Spring Creek operation; again, this is the flow volume you would expect to see in a year like this. I'm not seeing the need for an additional corner collector operation this year, she said. Still, that is our recommendation, said Wills. Part of it is that we're a bit surprised, said John Wellschlager – we walked away from the last TMT meeting feeling as if we had an agreement in principal. I believe I prefaced my remarks at the last TMT meeting by saying that what we were requesting was the minimum operation, Wills replied; it doesn't strike me that two additional days of corner collector operation is a major departure from what we discussed last week.

After a few minutes of additional discussion, Henriksen said the action agencies will consider the Fish and Wildlife Service request for two additional days of corner collector operations; they will discuss it among themselves and inform USFWS and the other TMT members of their decision via email. Jim Adams said the Cascade Island and Camas/Washougal gauges will be operational well in advance of the Spring Creek release; the Warrendale and Bonneville forebay stations will also be operational during the release.

3. Spring/Summer Update.

We posted the spring/summer update to the TMT homepage yesterday, said Henriksen; it represents the February final forecast. The update provides an overview of the action agencies' plan as to how they intend to operate the FCRPS projects this spring and summer. The February final forecast predicts a runoff volume of 12.7 MAF, April-July, for Lower Granite, and 69.2 MAF, April-August, at The Dalles. These low water supply forecasts point to spring flow objectives for fish that would be at the low end of the sliding scale. Accordingly, the Spring/Summer Update shows spring flow objectives of 85 Kcfs at Lower Granite and 220 Kcfs at McNary. Priest Rapids' spring flow

objective, as always, will be 135 Kcfs. At Libby, the sturgeon pulse would be 877 kaf, within the tier one volume. The Grand Coulee drum gate work is also included in more detail, as are Dworshak temperature and flood control operations. Grand Coulee is expected to draft to 1278 by August 31. For MOP operations we're showing operations at the Lower Snake projects at a similar elevation to last year, Henriksen added.

One question we had was the 2005 Hanford Reach operation, which is covered under Appendix C, Henriksen said. We were thinking of removing the actual language of the Hanford Reach agreement from the spring/summer update and putting it on the website instead. That would be fine, said Paul Wagner.

There are also descriptions of the potential spring spill operations at the Lower Snake dams, Henriksen said; based on the February final forecast, the Q-Adjust runs are showing flows in the below 70 Kcfs for the Lower Snake projects during the spring, which would make this a transport season. If there is no spill this spring, that will impact research, she said. Wills noted that there is an SRWG meeting scheduled for this afternoon; he said it would be helpful to have any pertinent information regarding the spill situation in advance of that meeting. In response to a question from Wagner, Rudd Turner said any changes to the planned research program will be addressed through SRWG and SCT, and through IT if disputes occur.

Mainly, we wanted people here at TMT to be aware of the situation presented by the February final forecast and its associated modeling, Henriksen said. She noted that the Ice Harbor RSW was moved into the lower river last week, and is making its way upstream toward the dam. It is still scheduled to be in place before the spring freshet begins. Turner said he has heard that it will take one month to transport and install the RSW.

The rest of the document talks about summer spill operations, transport from the Lower Snake collector projects, summer spill at McNary, spring spill at McNary (until conditions are no longer springlike). John Day will be operated between 262.5 feet and 264 feet, the lowest elevation at which irrigation withdrawals are possible. The Dalles will spill 40% of total river flow or up to the gas cap; Bonneville will spill up to the gas cap at night and 75 Kcfs during the day. The update also discusses the water quality spill priority list and gas cap levels, Henriksen said. We will operate up to the 115% gas cap as measured at the Camas/Washougal gauge, as per the Oregon waiver, she added.

The rest of the update is still relatively blank, particularly the sections covering planned biological research, Henriksen continued – much of that research has not yet been finalized. In terms of next steps, if you have comments or questions, they're welcome; we will also update the spring/summer update on a monthly basis, as additional monthly final forecasts are received. The document will be finalized after the April final forecast is received, although the March final forecast will be an important indicator of the type of water year to expect in 2005.

One comment, said Russ Kiefer – these flow projections and expected operations are as dismal as we expected. Yet just three weeks ago, the Corps was drafting Dworshak for local flood control. There has to be a better way to decide how to set those flood

control elevations. Wellschlager noted that Dworshak was drafted to meet its January 31 flood control elevation, which cannot be violated. Hindsight is always 20/20, he said, but by statute, the Corps cannot violate those flood control elevations. Henriksen added that the Corps is finalizing a scope of work to look at re-evaluating how flood control elevations are set for the FCRPS storage projects; the feasibility-level Scope of work study should be conducted in 2005. It was agreed to revisit the spring/summer update at the March 2 TMT meeting.

4. Lower Granite Seasonal Average Forecast.

Henriksen showed the group a pair of graphs, the first titled “Lower Granite Seasonal Average Flows from QADJ.” She noted that this is a monthly time-step model that shapes the water supply forecast according to the shape of the 69 historic water years for the period February 1-June 30. Overlaying expected reservoir operations, she said, Lower Granite spring seasonal average flows ranged between 52 Kcfs and 68 Kcfs, with an average of about 62 Kcfs. Basically, this is intended to give you a range of potential seasonal average flows to think about.

The second graph was titled “Lower Granite ESP Volumes vs. Seasonal Average Flow.” Henriksen explained that this modeling exercise covers 44 historic weather sequences, starting with current snowpack and soil moisture data, then looks at historic weather in a daily timestep, calculating the resulting volumes from that operation. This shows possible Lower Granite runoff volumes between 8.5 MAF and 19 MAF. With our current projected runoff of 12.7 MAF, the average flow volume at Lower Granite would be less than 70 Kcfs for the spring season, Henriksen explained. She explained that essentially what this graph shows is that, if you start with current soil moisture and snowpack data, then apply the precipitation and weather from one of the historic water years from this date forward, one of the points on this graph would result. Again, the goal is to show the TMT the bookends of the potential 2005 water supply and runoff, Henriksen said. It was observed that the other thing this graph shows is that, to achieve a seasonal average flow of 85 Kcfs at Lower Granite, the runoff volume would have to increase from 12.7 MAF to about 16 MAF, an improvement of 3.3 MAF over what is currently projected to occur between now and June 30.

Henriksen said she had asked her modeling experts to answer the question, “Based on the February final forecast of 12.7 MAF at Lower Granite, what magnitude of seasonal average flow can we expect at Lower Granite from April 1-June 30?” The answer, from both of these modeling exercises, was less than 70 Kcfs.

The group discussed the extent to which ESP and Q-Adjust are used to guide operations. The Corps characterized ESP, in particular, as an informational tool, rather than a tool on which to base decisions. Dave Statler observed that, in the past, the Corps has used ESP to direct individual reservoir operations. Henriksen replied that each question the model is asked is a little different, in terms of how the results are applied. In this particular case, she explained, the goal of the question ESP was asked was to inform the Corps’ 2005 research decisions, and to assess the likelihood that the Lower Snake projects will spill this spring. And it sounds as though the likelihood of spring spill at the Lower Snake projects is very low in 2005, Wagner observed.

Anyway, I wanted to get this information to TMT, said Henriksen; again, we will be updating these graphs as the season progresses and more monthly final forecasts are received.

5. Dworshak ESP Volumes/Projected March 31 Elevation.

This is a subset of the ESP data we just saw from Lower Granite, Henriksen said; again using the 44 historic water years that were modeled, we calculated Dworshak's April-July runoff. What I asked the modelers was, using the ESP tool, how often does Dworshak reach a March 31 shifted flood control elevation of 1585.4, if we release minimum outflow between now and March 31? What this shows is that in 16 of the 44 water years, Dworshak would reach 1585.4 by March 31. In other words, there is still a likelihood that Dworshak will achieve its March 31 shifted flood control elevation in 2005, Henriksen said. She added that the February final water supply forecast is 1.64 MAF at Dworshak, at the lower end of the historic range. It sounds as though there isn't much flexibility in Dworshak operations in 2005, Wagner observed. Not today, no, Henriksen replied.

Statler noted that Dworshak's February final forecast has decreased from the January final forecast, which was about 1.8 MAF. My point is that the earlier you run this model, the more uncertainty you're dealing with, in applying ESP, and the more caution you should use in making water management decisions early in the season, he said. Wellschlager reiterated that the January water release from Dworshak was done for flood control, not for power; it was mandatory, not elective. In response to a question, Henriksen said Dworshak's February 28 flood control elevation is 1571 feet.

6. Q Adjust Model Using February Final Forecast.

Henriksen said that, with respect to the QAdjust modeling runs for McNary, looking at the range of flows expected at that project in the spring, and the number of years the 220 Kcfs average flow target would be met, based on the 69 historic water years, McNary's average flow ranged from a low of 170 Kcfs to a high of 250 Kcfs. McNary met the 220 Kcfs target in only three of the 69 historic years during April, in 20 of the 69 years during May, and in 30 of the 69 years during June. In response to a question, Henriksen said the QAdjust model assumes Treaty operations for the Canadian projects. Also according to the QAdjust model, Priest Rapids is very unlikely to achieve its 135 Kcfs spring seasonal flow objective, while Bonneville is very likely to achieve its February 1-April 30 chum incubation flow objective of 125 Kcfs. In response to a request from Wills, Henriksen said the Corps modelers will add The Dalles to the Periodic Average Flows table. In response to another question, Henriksen said she would check on the discrepancies in the numbers between the periodic table and some of the data in the tables; after doing so, she said the data in the periodic flow table is correct, and the numbers in the project-by-project tables have now been corrected.

7. Chum Update.

Wills provided a table showing 195 individual chum redd elevations and GPS locations, in response to a request from Cathy Hlebechuk at the last TMT meeting. The highest redd, in terms of gravel elevation, is just over 10 feet NGVD. Henriksen said the Corps will assimilate and convert this data to elevation above mean sea level, which will tell the Corps where the redds are in comparison to Bonneville tailwater elevations. Wellschlager reminded the group that this information was requested in response to an assertion at an earlier TMT meeting by Ron Boyce that a minimum Bonneville tailwater elevation of 12.1 feet was needed to protect the redds during incubation.

Our hope was that, by this meeting, we could reduce the minimum tailwater elevation to 11.5 feet, Wellschlager said. It would be very helpful to have that flexibility, given the below-average water supply forecast across the basin, Henriksen said. So by going to 11.5, you're hoping to save water for later in the season? Wills asked. That's the intent, Henriksen replied. Where do you save that water? asked Cindy LeFleur. At Grand Coulee, primarily, Norris replied – if we keep the tailwater elevation at Bonneville at 11.9 feet, we may have to draft Grand Coulee lower than elevation 1255. You could also save water by reducing the peak flows at Bonneville, Steve Haeseker observed. Henriksen observed that most of the precipitation that has fallen in the last month has done so in liquid form, which has then flowed straight down through the system.

As we've said in the past, said Wellschlager, the emphasis at TMT is, demonstrate the need for a higher tailwater elevation at Bonneville. To us, that evidence has not yet been presented, but bear in mind that there are costs associated with this operation. Speaking for the action agencies, we feel we've been reasonable, and given you an opportunity to present your case. I understand, said Wills; we've tried to put that information together, but haven't been able to do so. Even so, the salmon managers would prefer that the Bonneville tailwater elevation be maintained at 11.9 feet. Steve Haeseker suggested an alternative: hold the tailwater elevation steady at 11.5 feet for 24 hours, to allow field crews to assess the impacts of this operation on redd coverage.

After a few minutes of additional discussion, the action agencies said Bonneville will be operated to maintain an 11.9-foot tailwater elevation as a soft constraint, and 11.5 feet as a hard constraint. Henriksen added that, if the salmon managers can give the action agencies a few days of lead time, it may be possible to hold a steady tailwater elevation of 11.5 feet for several hours to allow them to conduct the redd survey, perhaps on a weekend. Give us a date and a time-frame, and we'll work with you, said Wellschlager, adding that he will check with his operational personnel to see which day of the week would be best for the survey, as well as how many hours it may be possible to hold a constant tailwater elevation.

In response to a question from Kiefer, Wellschlager said daily tidal fluctuations are 2.5-3 feet at the I-205 chum spawning site; last week, in a special operation to float the Ice Harbor RSW upstream, the action agencies increased Bonneville outflow by 50 Kcfs. The increase in I-205 elevation in response to that operation was 0.4 feet, so clearly, tidal influence is a much greater factor at that site. The bottom line is that we can't appreciably influence the river depth at I-205 through operations at Bonneville, said Wellschlager.

In the interim, to be clear, we will be maintaining 11.5 feet as a hard constraint and 11.9 feet as a soft constraint, Henriksen said. It was agreed to revisit this topic at the next TMT meeting.

8. Status of Operation.

Reclamation said Hungry Horse is currently at elevation 3545.8 feet; Grand Coulee is at 1280.3 feet and drafting about a foot per day. The draft limit at that project is 1.5 feet per day. So it will be at 1255 by April 1? LeFleur asked. Yes, but there's some variability there, Norris replied – we don't want to end March below 1255. In response to another question, Norris said Grand Coulee's normal April 10 flood control elevation, if the drum gate repairs were not occurring this year, would be 1283 feet.

The Corps reported that Libby is at elevation 2413 and filling slightly; it has filled only about 2 feet since January 1. Dworshak is at 1563 and continuing to fill, with a February 28 flood control point of 1571 feet. Lower Granite outflow is averaging about 20 Kcfs. Brownlee is 9 feet from full, with no flood control this year.

Wagner said there is nothing to report on the fish front at this time. Kiefer added that IDFG caught nine burbot this year, down from 19 last year.

Wellschlager said there are no significant power system issues to report. Jim Adams said the Corps is preparing a draft report on the TDG impacts of the recent Libby outage; speed-no-load produced TDG of about 122% on the powerhouse side of the Kootenai River just downstream of the dam; Meanwhile the spillway side of the river just downstream of the dam produced up to 126 % TDG. By 6 miles downstream, TDG levels had fallen to 113%. Second, he said, some of you may have received a letter from Mark Schneider and the Water Quality Team, describing the WQT's conclusions regarding fixed monitoring stations in 2005; there was an error in the letter, where it stated that the entire WQT was in favor of retiring the Camas/Washougal fixed monitoring station. That is incorrect; the Corps and Bonneville do not support that change, Adams said.

9. Next TMT Meeting date.

The next meeting of the Technical Management Team was set for March 2. Meeting summary prepared by Jeff Kuechle.

**TMT Attendance List
February 16, 2005**

Name	Affiliation
Robin Harkless	Facilitation Team
Paul Wagner	NOAAF
John Wellschlager	BPA

Russ Kiefer	IDFG
Tony Norris	USBR
Cindy Henriksen	COE
Rudd Turner	COE
Ray Gonzalez	COE
Julie Ammann	COE
Jim Adams	COE
Greg Wolfe	Constellation
David Wills	USFWS
Steve Haeseker	USFWS
Tim Heizenrater	PPM
Tom Haymaker	PNGC
Nic Lane	BPA
Russ George	WMCI
Ruth Burris	PGE
Kevin Nordt	Mid-Columbias
David Benner	FPC
Kyle Martin	CRITFC
Laura Hamilton	COE
Dan Spear	BPA
Steve Kern	PNGC
Larry Beck	COE
Don Faulkner	COE
Dan Bedbury	EWEB
Glenn Traeger	Avista
Bruce MacKay	Consultant
Victoria Watkins	Pyra Energy Group
Cindy LeFleur	WDFE
Dave Statler	NPT

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner /

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 March 02, 2005 0900 - 1200 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute" after dial in.
"Please MUTE your Phone"**

*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 Operations Update - Dave.
3. Spring/Summer Update
 - a. [\[Draft - 16 February 2005\]](#) 
4. Update on Implementation Plans . Action Agency Caucus Group.
 - a. [\[2005-2007 FCRPS Implementation Plan\]](#) 
5. Status of Operation
 - a. Reservoirs
 - b. Fish
 1. [\[COLUMBIA RIVER FALL CHINOOK 2005 PRESEASON FORECASTS - Cindy LeFleur\]](#) 
 2. [\[Spring Creek Hatchery release - SOR #2005-02.pdf\]](#) 
 - c. Power System
 - d. Water Quality
6. Other
 - Set agenda for next meeting. - [\[Reference Calendar\]](#) 

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 FALL CHINOOK 2005 PRESEASON FORECASTS

Stock Group	2005 February Forecasts	2004 Actual Returns	2004 February Forecasts
Lower River Hatchery - LRH	74,100	108,900	77,100
Lower River Wild - LRW	20,200	22,300	24,100
Bonneville Pool Hatchery - BPH	114,100	175,300	138,000
Upriver Bright - URB	352,200	367,900	292,200
Bonneville Upriver Bright - BUB	47,100	54,500	40,000
Pool Upriver Bright - PUB	42,300	63,100	50,400
Columbia River Total	650,000	792,000	621,800

2005 Forecasts

- ❖ LRH - Good return. Less than recent four years. Similar to recent 10-year average of 80,600.
- ❖ LRW - Good return. Similar to last three years. Greater than recent 10-year average.
- ❖ BPH - Strong return. Less than last four years. Greater than recent 10-year average of 82,700.
- ❖ URB - Strong return - includes record high age-4 component. Similar to last two years. 4th largest return since 1964. 65% greater than recent 10-year average of 212,600.
- ❖ BUB - Good return. Less than recent three years. Greater than recent 10-year average of 34,700.
- ❖ PUB - Good return. Less than recent three years. Greater than 10-year average of 38,400.
- ❖ Total forecast of 650,000 Columbia River fall chinook is less than recent three years but greater than recent 10-year average of 468,000.

February 10, 2005
Washington Department of Fish and Wildlife
U.S. v Oregon Technical Advisory Committee Sub-group

2005-2007 FCRPS Implementation Plan



US Army Corps
of Engineers

U.S. Army Corps of Engineers



Bureau of Reclamation

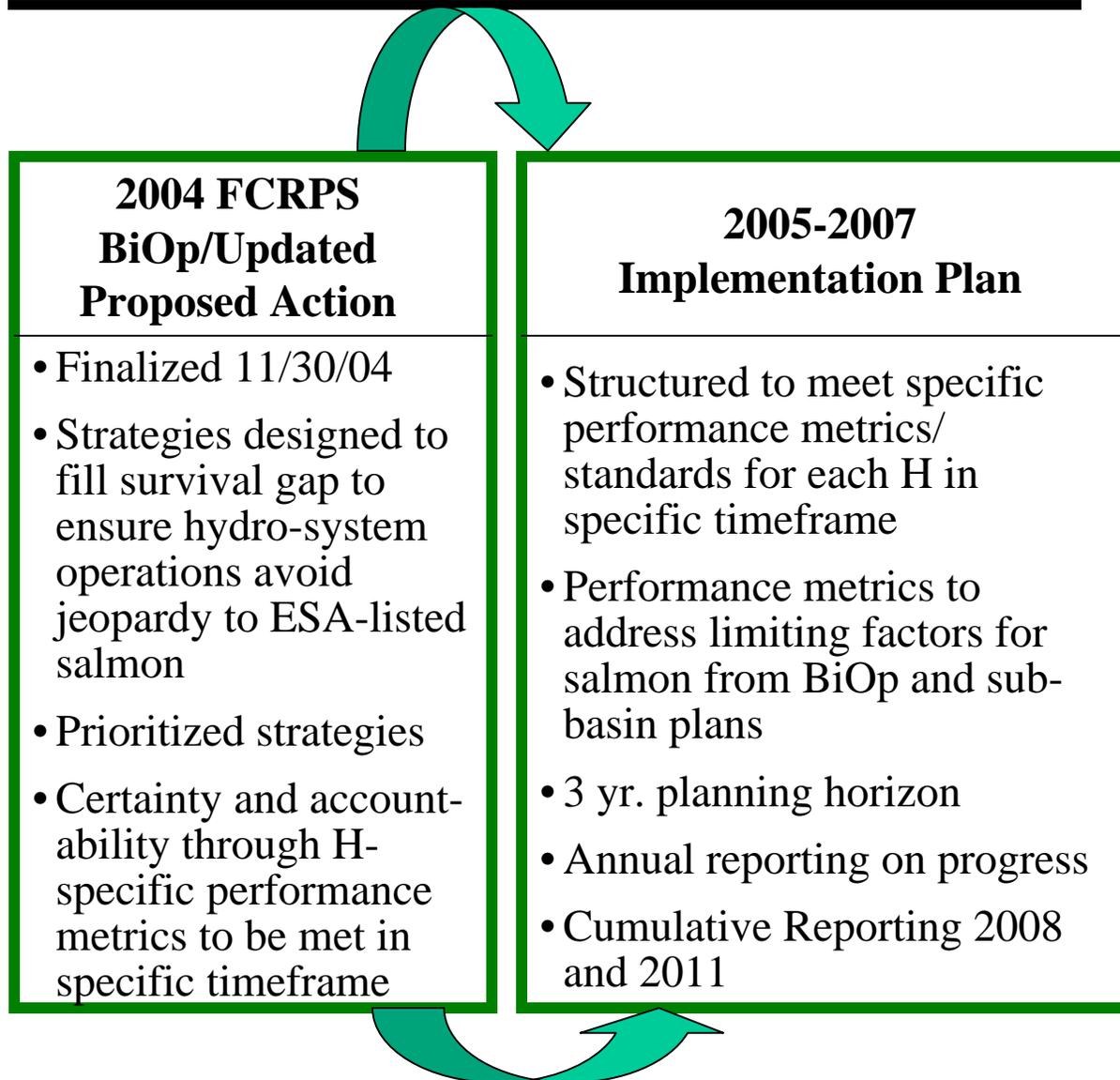


Bonneville Power Administration

Outline of Today's Briefing

- **Overview of BiOp/Updated Proposed Action**
- **Overview of Implementation Plans and Progress Reporting**
- **Implementation Plan Structure and Performance Elements**

UPA/BiOp/IP Overview



Schedule and Process

- 3-year Implementation Plans
- Annual Progress Reports
- Comprehensive Evaluations – 2008 and 2011

Annual Progress Reporting

- Based on ESU and H-Specific performance metrics in BiOp & UPA
- Performance metric examples include:
 - **Hydro:** adult abundance and trends, adult survival, total system and in-river juvenile survival
 - **Predator Control:** annual predation rates (pikeminnow and Caspian Terns)
 - **Habitat:**
 - Tributary: cfs water protected, miles of complexity restored and riparian habitat protected, # irrigation diversion screens addressed
 - Estuary: acres of shallow water habitat protected, restored or enhanced
 - **Hatcheries:** operation of safety-net programs, construction of Oxbow Hatchery for Sockeye production, Lower Granite trap expansion

Comprehensive Evaluation Reports

- In 2008 for 2005-2007 implementation
- In 2011 for 2008-2010 implementation
- Evaluates progress towards achieving UPA 3- and 6-year performance metrics/standards

What's in the Draft Implementation Plan?

- Near- and long-term priorities for the implementation strategies
- Specific implementation details for 2005 to 2007 to achieve the ESU-specific life-stage targets
- Addresses implementation of the 2004 BiOp Incidental Take Statement

What's in the Draft Implementation Plan?

- Prioritized actions address needs of the greatest number of ESUs first, such as:
 1. Hydro-system operations, structural dam modifications, juvenile fish transportation, and predator management, prior to utilizing other offsetting actions.
 2. Habitat and/or hatchery actions with potential to improve survival for targeted ESUs commensurate with survival needs not being met through other actions.
- Comprehensive monitoring program to determine effectiveness of actions implemented under the UPA

Conservation Actions

- Action Agencies agreed in the UPA to continue existing programs to support additional habitat improvements, initiatives, and measures
- Not included in draft IP: although these programs are intended to provide a survival benefit, they were not considered in BiOp jeopardy analysis
- Conservation actions may be included in annual progress reports as contributing to recovery

Strategies Guiding
Implementation

Hydro-system Strategies

- Configure dam facilities to improve juvenile and adult fish passage survival
- Manage water to improve juvenile and adult fish survival
- Reservoir operations, system flow management and spill operations to improve fish survival
- Operate and maintain fish passage facilities to improve fish survival
- RM&E Program

2005-2007

Hydro-system Highlights

- Ice Harbor Dam removable spillway weir for juvenile fish 2005
- Developing surface bypass at McNary, Little Goose, John Day and Lower Monumental dams
- The Dalles Dam Behavior Guidance System (forebay) 2007
- Juvenile fish bypass system and monitoring improvements at several dams
- Snake River fall chinook study 2005
- Flow augmentation and spill continue
- Juvenile fish transport program adjusted based on research

Predator Control Strategies

- Redistribute Avian Predators
- Reduce Predation by Northern pikeminnows
- RM&E

2005-2007

Predator Control Highlights

- Redistribute Caspian Terns Nesting on East Sand Island to habitats located outside of the Columbia River Basin, pending EIS process
- Analyze double-crested cormorant population in the Columbia River; evaluate management alternatives
- Analyze Caspian tern population of the Mid-Columbia River; evaluate management alternatives
- Expand Northern Pikeminnow Management Program

Habitat Strategies

- Tributary Habitat Protection and Improvement
- Habitat Protection and Improvement in the Estuary

2005-2007

Tributary Habitat Highlights

- Implement stream-flow, entrainment, channel morphology, and riparian protection and enhancement actions in the Wenatchee, Entiat, and Methow sub-basins
- Provide technical assistance for stream-flow, entrainment, and channel morphology projects in the Little Salmon, Lemhi, Upper Salmon River, and John Day sub-basins
- Consider implementing proposals for stream-flow and riparian protection and enhancement projects in the Okanogan sub-basin

2005-2007

Estuary Habitat Highlights

- Crims Island – complete by 2006
- Sandy River – complete by 2007
- Germany Creek – complete by 2006
- Columbia Wetland – complete by 2007
- Grays River Project – complete by 2007
- Chinook River Restoration – complete by 2010

Hatcheries Strategies

- Implement a Safety-Net Program as an Interim Measure to Avoid Extinction
- Reduce Potentially Harmful Effects of Artificial Production to Aid Recovery

2005-2007

Hatcheries Highlights

- Design and construct improvements to the Lower Granite Dam adult salmon/steelhead trapping and holding facilities
- Continue the Snake River fall Chinook supplementation program in the upper Clearwater River subbasin
- Develop a proposal for design, construction, and O&M for Oxbow Hatchery to allow for additional production of Snake River sockeye smolts
- Continue artificial production safety net hatchery programs determined by NOAA to effectively reduce the risk of extinction
- Complete Phase III Hatchery Genetic Management Plans

RM&E Strategies

- Status Monitoring
- Action Effectiveness Monitoring and Research
- Critical Uncertainties Research
- Project Implementation Monitoring
- Data Management System
- Regional Coordination

RM&E Highlights

- Continue smolt monitoring program and PIT tag information system
- Monitor adult returns with PIT tag detection system
- Evaluate the effectiveness of spill, transportation, and system configuration changes
- Continue evaluations of delayed mortality
- Develop a comprehensive estuary and ocean strategy
- Address the relationships of estuary habitat to salmon production and survival
- Continue to implement tributary habitat monitoring projects

Summary

- IP is the follow-up to November 30, 2004, final UPA that included collaboration and public input
- Regional discussions will continue over the long-term, on how best to adjust actions based on performance results
- The Action Agencies are interested in continued input through regional forums

TECHNICAL MANAGEMENT TEAM MEETING NOTES

March 2, 2005
Corps of Engineers Reservoir Control Center
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.

WMP Spring/Summer Update:

Cindy Henriksen, COE, reported that since the last TMT meeting, at which the draft spring/summer update to the WMP was first presented, there had been no comments submitted to the action agencies and no changes made to the draft. The March final water supply forecast, expected available around March 10, could change flow objectives and flood control elevation targets. Specific changes to this year's update from last year include Upper Snake flow and spill triggers. Cindy noted that the MOP operations implemented last year are included in this year's WMP.

ACTION: TMT will review the next draft update at the March 16 TMT meeting.

Implementation Plan:

Eric Braun, COE, and Nic Lane, BPA, provided a handout and briefed the group on the action agencies' 2005-2007 Implementation Plan, including scheduling of annual progress reports and comprehensive evaluations in 2008 and 2011. The draft implementation plan addresses near and long term priorities for the implementation strategies, includes specific implementation details for 2005 and 2007 to achieve the ESU specific life-stage targets, and addresses implementation of the 2004 BiOp Incidental Take statement. Strategies guiding implementation are specified for the hydro-system; predator control; habitat; hatcheries; and research, monitoring and evaluation (RM&E). The action agencies are interested in continued input through regional forums on implementation of the BiOp using adaptive management practices.

A question was asked about funding for actions in the plan. Allocations will go to the 'best use of available funds'. Adjustments can be made, such as for research, based on changing conditions. Funding prioritization and other budget issues are discussed at SCT in the Regional Forum, and at the NPCC outside the Regional Forum. The IP does not include budget information for specific actions. It was suggested that regional guidance, discussion and oversight about the Implementation Plan could occur at IT. This suggestion will be shared with IT members who are currently working to develop an IT work plan.

ACTION: The Implementation Plan will be posted at www.salmonrecovery.gov within the next few days. Once posted, there will be a 30-day opportunity for comment. Anyone that is interested in getting on the federal caucus email notification list for postings to the site should share with Nic Lane and/or call Katherine Cheney at BPA.

Status of Operations

Reservoirs – Grand Coulee is at elevation 1274.3’ and targeting 1255’ by the end of March. Hungry Horse is at 3545.8’, Libby is at elevation 2412’, releasing 4 kcfs and not expected to reach April 10 flood control elevation. Dworshak is at 1565’, with a March 31 flood control elevation target of 1585’. Day average flows are 20 kcfs at Lower Granite, 110-120 kcfs at McNary, and 120 kcfs at Bonneville. The March early bird forecast for The Dalles Jan-July is 71.2 MAF (66% of normal), 50.6 MAF (80% of normal) at Grand Coulee, and the April-Jul at Lower Granite is 105 MAF (49% of normal).

Fish – Cindy LeFleur, WDFW, provided a Columbia River fall chinook pre-season forecast, which indicates that all stocks will experience good to strong returns. The upriver brights show the strongest forecasted return. The forecast for the total fall chinook return is 650,000 (compared to last year’s actual of ~800,000). The forecast is based on the best technical estimate of federal, state and tribal fisheries managers. Forecasts are adjusted throughout the season.

Ron Boyce, ODFW, provided a chum operations update. Four chum have been caught so far. The estimated emergence start date was January 19. Ron also noted that in 2000-2004, the last catch date ranged from April 25-May 24. Additional information can be found on the Fish Passage Center website (which will be linked to future TMT agendas).

SOR 2005-2

The salmon managers submitted SOR 2005-2 for fishery operations at Bonneville following the March 2 Spring Creek hatchery release. Dave Wills, USFWS, thanked BPA and the COE for providing conditions last week to allow the salmon managers to do a site visit to find where chum redds were located. Based on this observation, the following specifications were written into the request:

- Starting March 3 AM, operate the B2 corner collector for five days, until March 8 AM. Provide a sixth day if sufficient numbers of hatchery fish (sufficient = ‘low hundreds of fish per day’) are still passing the project.
- Operate to maintain a minimum 12.5’ tailwater elevation in order to not exceed 105% TDG at the chum redds locations at Ives Island and on the Oregon shore to the Multnomah Falls area.
- Use flexibility in the system to accomplish this while maintaining the target 1255’ elevation at Grand Coulee for drum gate work in April.

The action agencies expressed concern about the last minute request for an extra foot of depth compensation for any longer than 4 days because the river is not set up to do this. It will take time to get water down from Grand Coulee. And, with the water supply forecast trending downward and no precipitation forecasted in the near future, there is great concern about having a sufficient amount of water left after the operation to maintain

protection of the redds at 11.5'. The COE expressed interest in monitoring TDG levels overnight after the corner collector is opened, to determine if the tailwater elevation could be lowered without exceeding 105%. Alternative options for operations were generated by the group:

- Stop using the corner collector;
- Revisit depth compensation issue with new surveys to determine whether tailwater can be lowered while still protecting the redds from dissolved gas harm;
- Close spill bays 1 and/or 18 if there are low numbers of adults passing;
- Do real time start of operation if travel time is slow (later in the day on March 3);
- Operate PH 1 by keeping corner collector water in the middle of the river to address TDG concerns;
- Fluctuate tailwater elevations throughout the 24-hour period to control gas levels.

ACTION: The COE will begin the operation (open the corner collector) on March 3 when fish are present (as late as 3 pm). The COE will collect TDG data overnight and the salmon managers will gauge TDG levels at the chum redd locations. With this new information and further thought on the options generated today, TMT will revisit the issue during a conference call on **Friday, March 4, at 1 pm** (call-in number 503-808-5190). *NOTE* – there may be a need for additional calls to discuss the operation on Saturday, March 5 and/or Monday, March 7, depending on changing conditions.

ACTIONS/NEXT MEETING AGENDA:

Actions from 3/2/05 meeting:

- Gather TDG data at Bonneville – COE
- Gather TDG data at chum redds locations – Salmon Managers
- TMT conference call to discuss SOR 2005-2, Friday 3/4, 1pm – All
- Implementation Plan posted to www.salmonrecovery.gov – Action Agencies
 - 30-day comment period – All
- Update WMP spring/summer update – COE

Next TMT meeting, March 16, 9am-noon will include at least the following:

- Update on SOR 2005-2 Operations
- Bonneville Spill Gate Calibration
- Draft WMP Spring/Summer Update– March final forecast, modeling information
- WMP Issues?
 - MOP Operations

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the issues discussed and decisions made at today's meeting. Anyone with questions about these notes should contact Henriksen at 503/808-3945.

2. Chum Update.

Ron Boyce reported that ODFW had only caught four emerging chum in its spawning ground surveys so far, up through last week. We did an initial projection of emergence timing, he said, which came out to January 19 for the earliest spawners. We also developed a range of dates for last-caught newly-emerged fry for the last 5 years -- it ranged from April 25-May 24, said Boyce. The bottom line is that we have caught very few newly-emerged chum so far, but we have caught a number of newly-emerged chinook. In response to a question, Boyce said the four chum were caught in the standard seining area. He added that this information is posted to the FPC website, and said he will provide further updates as more information becomes available.

3. Spring/Summer Update.

Henriksen said the Spring/Summer update was discussed at the last TMT meeting; we have not received any comments or made any significant changes since the last TMT meeting, she said. We're waiting for the March final water supply forecast to update the flow objectives, flood control elevations etc. contained in the spring/summer update. The forecast should be available the middle of next week; we should have our flood control calculations re-worked a day or two later. The spring/summer update will then be revised, and we'll do some hydrologic modeling runs to look at seasonal flows at Lower Granite and elsewhere, Henriksen said.

Will we need to revisit this once it has been updated? Silverberg asked. Yes, Henriksen replied. The only real change is the spill trigger in the Lower Snake; we have the same MOP operation in this year's update that we did last year. Tony Norris said he will be updating the Upper Snake flow augmentation numbers in the update; Reclamation is currently estimating that about 250 kaf will be available from the Upper Snake in 2005. Henriksen said the Corps will try to complete its updates prior to the March 16 TMT meeting.

4. Update on Implementation Plans.

Eric Braun and Nic Lane led this update, titled "2005-2007 FCRPS Implementation Plan." They touched on the following major topics:

- UPA/BiOp/IP Overview – 2004 FCRPS Updated Proposed Action vs. 2005-2007 Implementation Plan
- Schedule and process – 3-year implementation plans with annual progress reports, with comprehensive evaluations in 2008 and 2011
- Annual progress reporting – based on ESU and H-specific performance metrics in the BiOp and UPA; performance metric examples include (hydro) adult abundance and trends, adult survival, total system and in-river juvenile survival; (predator control) annual predation rates; (habitat) cfs tributary water protected, miles of complexity restored; (estuary) acres of shallow water habitat protected; (hatcheries) operation of safety-net programs, construction of Oxbow Hatchery for sockeye protection etc.
- Comprehensive evaluation reports – evaluates progress toward achieving UPA 3- and 6-year performance metrics/standards

- What's in the draft Implementation Plan? Near- and long-term priorities for the implementation strategies; specific implementation details for 2005 to 2007 to achieve ESU-specific life-stage targets; address implementation of the 2004 BiOp incidental take statement; prioritized actions address needs of greatest number of ESUs first; comprehensive monitoring program to determine the effectiveness of actions implemented under the UPA
- Conservation actions – the action agencies have agreed to continue existing programs to support additional habitat improvements, initiatives and measures; not included in the draft IP, however. Conservation actions may be included in annual progress reports as contributing to recovery
- Strategies guiding implementation – hydrosystem strategies
- 2005-2007 hydrosystem highlights – Ice Harbor RSW in 2005, develop surface bypass at McNary, Little Goose, John Day and Lower Monumental; The Dalles BGS in 2007; juvenile fish bypass system and monitoring improvements at several dams; Snake River fall chinook study in 2005; flow augmentation and spill continue; juvenile fish transport program adjusted based on research
- Predator control strategies – redistribute avian predators; reduce Northern pikeminnow predation; RM&E. Includes an expanded Northern pikeminnow management program
- Habitat strategies – tributary habitat protection and improvement; habitat protection and improvement in the estuary
- Hatcheries strategies – implement a safety-net program as an interim measure to avoid extinction; reduce potentially harmful effects of artificial production to aid recovery
- RM&E strategies – status monitoring, action effectiveness monitoring and research, critical uncertainties research, project implementation monitoring, data management system, regional coordination

Lane offered the following summary of his presentation:

- The Implementation Plan is the follow-up to the November 2004 final UPA that included collaboration and public input
- Regional discussions will continue over the long term, on how best to adjust actions based on performance results
- The action agencies are interested in continued input through the Regional Forum teams

Are you planning to accept comments on the Implementation Plan? Kyle Martin asked. We're posting the IP to the salmonrecovery.gov website, and are soliciting comments, Braun replied. Comments will be accepted for 30 days once the plan has been posted, he added.

Is there any provision for increased PIT-tagging? asked Cindy LeFleur. I'm not sure, Braun replied – the number of PIT tags is generally established in the study plans. Most PIT-tagging is transportation study-related, added Paul Wagner – I'm not aware of any specific plan to re-allocate those tags. There is no base number that we use as a monitoring tool, he said. In response to a question from Rudd Turner, Braun said comments on the IP itself will come directly to the action agencies; any issues related to

the specific actions in the IP will be addressed through the Regional Forum teams – the TMT, IT and SCT. The Implementation Team will be the forum for reporting on implementation progress. In response to another question, Lane said funding for some actions will be prioritized through the Council process; funding for system configuration line-items will be prioritized through the System Configuration Team.

5. Status of Operation.

Norris said Grand Coulee is at elevation 1274.3 feet and drafting toward elevation 1255 by the end of the month; Hungry Horse is at 3545.8 feet and running to meet the Columbia Falls minimum. Henriksen said the March early-bird water supply forecast is continuing on a downward trend. At Lower Granite, the early-bird is down to nearly 10 MAF. Libby is releasing 4 Kcfs and hovering at elevation 2412. It is not expected to meet elevation 2435, its March 31 flood control point. At Dworshak, the current elevation is 1565, 35 feet from full. Its March 31 flood control elevation is 1585; we're examining that within the Corps. We're pursuing some additional information from the NRCS as to the snow-covered area in the basin, which will dictate how much space we need to evacuate for flood control at Dworshak. Current flows are low; Lower Granite has been averaging about 20 Kcfs – 17-22 Kcfs on a day-average. The flow at McNary is 110-120 Kcfs. Bonneville has been relatively steady at a day average of about 120 Kcfs.

Henriksen said the March early-bird forecast at The Dalles is now 71.2 MAF, 66% of average, down from 85 MAF at the beginning of January. At Grand Coulee, the March early-bird forecast is 50.6 MAF, 80% of average. At Lower Granite, the April-July March early-bird forecast is 10.5 MAF, only 49% of average. The most recent Brownlee forecast was at 35% of average. Henriksen noted that the early-bird forecast is used to show the trend of the forecast, rather than for management purposes – it includes snow and runoff, but it's not a complete data set. My understanding is that Arrow is holding its own? Wagner said. Correct, Norris replied – that's the only thing that's saving our bacon.

Moving on to fish, LeFleur said WDFW's 2005 Columbia River fall chinook forecast is for a total of 650,000 returning adults, down from 792,000 actual 2004 returns. She noted that the February 2004 pre-season forecast was 621,800; actual returns exceeded the forecast by 170,000 fish. She noted that the upriver bright return looks particularly strong in 2005, as much as 65% greater than the recent 10-year average of 212,600.

Wills said the Fish and Wildlife Service has submitted an SOR (SOR 2005-2) covering spill for the Spring Creek release; the salmon managers (USFWS, IDFG, ODFW, WDFW, NOAA Fisheries, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC) are requesting the following specific operations following the March 2 release of the Spring Creek fish:

- No operation of unscreened units at PH1 or PH2, and follow the turbine operating priority in the Fish Passage Plan
- Operate PH2 as the first priority; fully load PH2 before operating PH1
- Operate turbine units within 1% peak efficiency

- Operate juvenile and adult facilities according to criteria
- Beginning the morning of March 3, operate the corner collector for a period of 5 days, to the morning of March 8. Provide a sixth day, to the morning of March 9, of corner collector operation and tailwater compensation if there are sufficient numbers of hatchery fish still passing the project. The presence of low hundreds of fish per day shall be interpreted as “sufficient” for the provision of an additional day of protection, based on fish passage index numbers for the sample ending the morning of March 8.
- Concurrent with the operation of the corner collector, operate the Bonneville project to maintain a minimum 12.5-foot project tailwater elevation. Based on last year’s corner collector operation, which produced TDG readings approaching 108%, a 12.5-foot minimum project tailwater should be sufficient to maintain a maximum level of 105% TDG (factored for depth compensation) at the chum redds in the Ives Island complex, and on the Oregon shore to the Multnomah area.
- We request that the action agencies use the flexibility in the system to accomplish this while maintaining the target elevation of 1255 feet at Grand Coulee by March 31 to accommodate drum gate maintenance planned by reclamation.

The group devoted a few minutes of discussion to TDG monitoring and regulation in association with this operation. In response to a question, Jim Adams said it is his belief that the Cascade Island and Camas/Washougal gauges are reporting accurate data at this time. In response to another question, Wills said a total of 7.4 million Spring Creek fish are being released today, half of the hatchery’s 2005 production.

Wellschlager said the action agencies have been discussing this SOR; he said the one sticking-point has been the additional foot of depth compensation the salmon managers are requesting. The lower river really isn’t set up to maintain that operation for more than four days, he said. One thing we talked about yesterday was starting out at 12.5 feet, monitoring the TDG levels and modulating the tailwater elevation if, by chance, TDG levels are lower than expected. The problem is that we’re going to have to suck the lower river pretty much dry to accomplish this operation, he said. The fear is that if we go more than four days, the lower river physically won’t have enough water to maintain the 11.5 foot tailwater depth beyond Sunday, said Wellschlager.

One other issue, said Wellschlager – having somebody out at the corner collector sampling facility starting tomorrow morning, so that we can turn on the corner collector as soon as the fish start arriving, but not before. That’s reasonable, Will replied.

In response to a question from Turner, Jim Adams said that, with TDG levels already near 108%, even without the corner collector in operation, he would expect to see TDG levels in excess of 108% once corner collector operation begins. However, the real measure is what the TDG level is over the redds at Ives Island, Margaret Filardo observed – the TDG level at the fixed monitoring stations below Bonneville is just an indicator. Larry Beck noted that there is currently 2.3 Kcfs of attraction spill through the end bays at Bonneville; if we shut that off temporarily, would that reduce TDG levels? Yes, Adams replied, but it’s hard to say how much.

After a few minutes of additional discussion, Henriksen reiterated that the lower river isn't necessarily set up for the additional foot of compensation depth requested by the salmon managers. The forecast, as we've heard, is trending downward. We've agreed to open the corner collector tomorrow morning, she said; the question is, where is the additional 15-20 Kcfs going to come from? At the moment, we're planning to use some of the storage in John Day pool, but there is a minimum irrigation elevation, 262.5 feet, at that project, and irrigation is already underway on both the Oregon and Washington shores. If we have to continue using John Day to support this operation through the weekend, we will go below the minimum irrigation pumping depth over the weekend. The irrigators can go without water for a few days, but if this operation continues into Monday, we need to figure out where the water to maintain the operation, and to refill John Day pool, is going to come from. There is some storage at Grand Coulee, but we're physically limited by travel time and by the 1-foot-per-day draft limit at that project. With a two-day travel time from Grand Coulee to John Day, under the best circumstances, the action agencies are concerned about maintaining this operation for even four days, let alone six, potentially, Henriksen said.

Options include potentially stopping the corner collector operation, or adjusting the tailwater elevation based on field surveys at the spawning site, Henriksen said. The request for a 12.5-foot tailwater elevation was based on an estimate, said Wills; we will look closely at the TDG measurements at the redds. I think I would prefer to wait until Monday, to look at fish numbers, at TDG levels and at how much water the operation has used, before making the decision about whether or not to continue the operation, he said. In response to another question from Beck, Wills said he is willing to discuss shutting down attraction spill at Bays 1 and 18 during the Spring Creek operation with the other salmon managers, but cannot agree to shutting off spill at today's meeting. Turner mentioned another potential option: operating a couple of MGR units at PH1 to move the corner collector flow more into the center of the river. Julie Ammann suggested that it may also be feasible to fluctuate the Bonneville tailwater depth depending on time of day.

After a brief caucus break, Henriksen said the action agencies are ready to start the requested operation tomorrow. We've had a good brainstorming session today, she said; it is the Corps' preference to have the guys at the project monitoring fish arrival tomorrow, and start operating the corner collector as soon as significant numbers of fish begin to arrive (no later than 3 p.m.), rather than waiting until Friday. That way, she said, we'll have TDG data by Friday, to give us a better read of the TDG impacts of the corner collector operation. It was agreed that there will be a TMT conference call this Friday. It was further agreed that the salmon managers will discuss the possibility of fluctuating the Bonneville tailwater elevation, and which hours it might be possible to do so. Initially, however, it was agreed that the action agencies will raise the Bonneville tailwater elevation to 12.5 feet. Wellschlager added that, if a miracle occurs and the Corps is able to save some water on this operation, the action agencies may be willing to consider an additional day of Bonneville operations in support of the Spring Creek Hatchery release.

Wellschlager said the chum operation continues to dictate the power operation; there are no major power system issues to report at this time.

6. Next TMT Meeting Date.

The next face-to-face Technical Management Team meeting was set for March 16. A TMT conference call was set for this Friday at 1 p.m. to discuss Bonneville operations in support of the Spring Creek Hatchery release(503/808-5190). There may be the need for calls on Saturday and Monday as well. Meeting summary prepared by Jeff Kuechle.

**TMT Participant List
March 2, 2005**

Name	Affiliation
Cindy Henriksen	COE
Donna Silverberg	Facilitation Team
Tony Norris	USBR
Julie Ammann	COE
Rudd Turner	COE
Ray Gonzales	COE
John Wellschlager	BPA
Laura Hamilton	COE
Eric Braun	COE
Robin Harkless	Facilitation Team
Ruth Burris	PGE
Russ George	WMCI
Nic Lane	BPA
Tom Haymaker	PNGC
Paul Wagner	NOAAAF
Cindy LeFleur	WDFW
David Wills	USFWS
Margaret Filardo	FPC
Larry Beck	COE
Don Faulkner	COE
Karl Kanbergs	COE
Dan Spear	BPA

Lee Corum	PNUCC
David Benner	FPC
Kyle Martin	CRITFC
Kevin Nordt	Mid-Cs
Dan Bedbury	EWEB
Michael Schilmoeller	NWPCC
DeAnn Pavlik	Spokane Tribe
Bruce MacKay	Consultant
Jiong Ji	Avista
Tom Le	PSE
Richelle Beck	D. Rohr & Assoc.
Mike Buchko	Powerex
Ron Boyce	ODFW
Andrew Englander	SOWS

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner /

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

Friday March 04, 2005 1300 - 1400 hours

Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
"Please MUTE your Phone"**

*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@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Spring Creek Hatchery release and operations.

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

March 4, 2005

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.

SOR 2005-2

As follow-up to Wednesday's TMT discussion of SOR 2005-2 (see **3/2/05** notes for details), there was a conference call held today, March 4, at 1:00 pm to discuss Bonneville operations given new TDG information gathered at Bonneville and the chum redd sites. Since Wednesday, the following occurred:

- B2 corner collector was opened at 3:40 pm on Thursday, March 3.
- Spill bays 1 and 18 were closed at 4:55 pm to decrease TDG levels being monitored at the project.
- Fish arrived at the project shortly after the spill bays were closed.
- Project has been operating at 12.5' tailwater.

Dave Wills, USFWS, reported on TDG levels at the chum redd sites. Yesterday, March 3, TDG levels ranged from 107% at the Multnomah Falls area and 107-109% at Ives Island. This morning, March 4, TDG levels were 107% again at Multnomah Falls and 105-106% at Ives Island. Jim Adams, COE, noted that TDG levels were higher last night, lower this morning, and appear to be increasing today. Readings taken this afternoon and evening, he offered, would be most representative of what levels will look like over the weekend. He also noted that the best reads for the purposes of this operation are at the Warrendale and perhaps Camas gauges, but not Cascade Island.

TMT checked in again at 4:00 pm, after gathering additional TDG readings this afternoon. TDG levels were at 106-107% according to gauge readings (the salmon managers were unable to do additional readings at the Multnomah Falls area or Ives Island.) NOAA's perspective was that the higher level of TDG is a concern and recommended stopping the corner collector operation at this point. The USFWS does not want to jeopardize the listed fish, and are concerned that fish are not being provided depth compensation at the Multnomah Falls area with the current operation. NOAA and USFWS recommended continuing operating the corner collector until tomorrow (March 5) evening, and adding an additional foot of water for depth compensation and to move the spring creek hatchery fish downstream, until the corner collector is turned off. The COE was supportive of gathering more data on the corner collector and supported this operation. BPA agreed to the operation as well.

ACTION: The action agencies and salmon managers agreed to the following operation:

- Run the corner collector until Saturday (March 5) evening, around 7:00 pm.
- Operate Bonneville tailwater to 13.5' until the corner collector is closed, then drop to 12.5' for 2 or more hours, depending on how much water is available for the operation based on calculations done by BPA and the COE.
- Cindy Henriksen and John Wellschlager will coordinate the details of the operation, after gathering additional information (e.g. when an operator will be available to turn the corner collector off and how much water will be available for the operation at 12.5' after the corner collector is turned off.). Cindy will email the teletype to TMT after operation details are resolved.
- Spill bays 1 and 18 will be re-opened for spill attraction sometime Sunday (March 6) morning.
- *Next Steps*: The salmon managers are interested in looking long term at how to accommodate chum redds at the Multnomah Falls area, given the observation this year that the redds are not covered with 12.5' depth compensation and TDG levels tend to be above 105%.

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner /

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday March 16, 2005 0900 - 1200 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
"Please MUTE your Phone"**

*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@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Update on SOR 2005-2 Operation.
3. Bonneville Spillway Gate Calibration Update - Laurie Ebner
 - a. [\[Bonneville Lock and Dam, Revision to Fish Passage Plan Spill Patterns FEB2005\]](#) 
4. The Dalles spillway gate operation in 2005 - Mike Langeslay
5. Spring/Summer Update
 - a. [\[Draft - March 16, 2005 - Larry Beck\]](#) 
 - b. MOP Operation at Lower Snake River projects in 2005
 - c. Ice Harbor Balloon Tag Test
 - d. [\[QADJ run Results - March-15, 2005\]](#) 
 - e. Start of Bonneville Spill
6. Status of Operation
 - a. Reservoirs
 1. [\[Water Supply Forecast and Observed - RFC and CORPS\]](#) 
 2. [\[Deterioration of April - August WSF at Libby Dam - Bar Chart\]](#) 
 3. Flow Augmentation Volumes at Headwater Reservoirs
 - a. [\[DWORSHAK ESP INFLOWS - March 8, 2005\]](#) 
 - b. [\[Volumes at Dworshak - 1 April Through 30 June\]](#) 
 - c. [\[Volumes at Hungry Horse - 1 April Through 30 June\]](#) 
 - d. [\[Volumes at Libby - 1 April Through 30 June\]](#) 
 - b. Fish
 1. [\[TMT Team Field Trip to Ives Island for Chum redd\]](#) 
 2. [\[Ives Island juvenile chf catch 1999-2004 - Ives Island juvenile chum catch through April 1, 2000-2005 & Ives Island juvenile chum catch, 2000-2005\]](#) 

c. Power System

d. Water Quality

7. Other

- Set agenda for next meeting. -

[\[Reference Calendar\]](#) 

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

Subject:
Bonneville Lock and Dam, Revision to Fish Passage Plan Spill Patterns FEB2005

1. Introduction/Background:

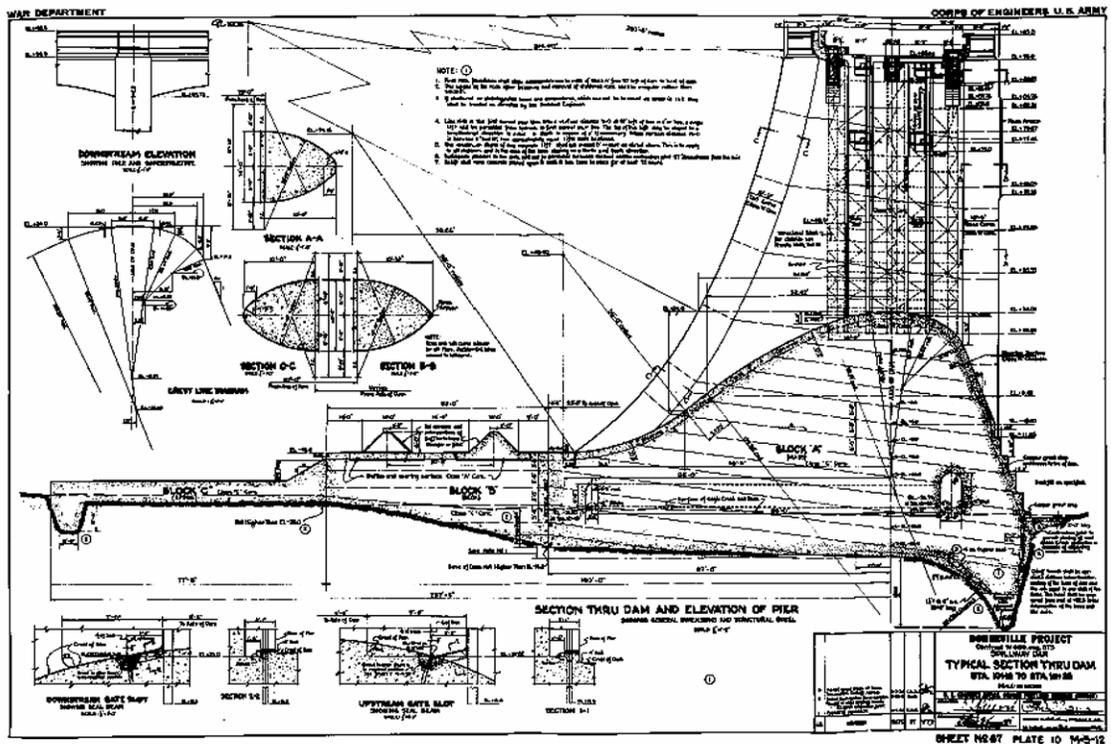
Location: Bonneville Dam and Lake, Columbia River Basin



General Overview of Project



View of Spillway



Cross Section View of Spillway

Since additional flow deflectors were installed at Bonneville Dam Spillway (immediately prior to the 2002 spill season) a discrepancy between the computed inflow (The Dalles Outflow + tributary inflow) and outflow from Bonneville Dam was identified. This discrepancy occurred during times of spill. The reported spillway discharge turned out to be greater than the actual discharge (as measured downstream of the project). The magnitude of this discrepancy varied but was on the order of 20 Kcfs.

It has been determined that there are two major issues that have resulted in this flow discrepancy. One is a mis-calibration in the gate opening mechanism. The other is an out of date rating curve that gives the relationship between gate opening and flow.

During July 2004, it was discovered that the spillway gate hoist controller (GDACS) at Bonneville had been mis-calibrated and actual gate openings were up to 4 inches less than was reported. The greatest impact of this mis-calibration was on discharges at smaller gate openings. This effect was magnified by the new spill pattern developed for the new flow deflectors, which utilizes a larger number of gates at smaller openings for a given total spillway flow as compared to previous patterns.

The calibration errors would be significant primarily when the project was trying to meet a target discharge such as the 75 Kcfs daytime spill. When the project discharges to the gas cap the gas concentration downstream determines the spill volume that can be passed. The actual volume may have been misreported but the volume was set to meet the water quality requirements downstream. When the total river flows exceed the powerhouse capacity, the excess flow is also discharged through the spillway, increasing the 75 Kcfs daytime spill. In this case the spill is governed by total inflow and not increasing the forebay elevation.

During the investigation of the flow discrepancy between The Dalles (TDA) and Bonneville (BON) the spillway rating curves for both projects were scrutinized. Upon review the original TDA spillway-rating curve is consistent with current EM guidance. In addition the TDA discharge is verified by using a USGS gauging station just downstream of the TDA project. The BON spillway-rating curve is based on the orifice equation with the discharge coefficient determined from the original design physical model studies. In the 1970s the gate lip design was changed to reduce gate vibration. The lip changed from a rounded to a sharp edge design that also reduced the gate efficiency, especially at lower discharges. However, it does not appear that the rating curve was updated, and operation continued with the original rating curve. With older spill patterns, this difference was not particularly noticeable.

This memorandum will document the recommended BON spillway-rating curve and provide a relationship between actual spill in 2002 through 2004 given the reported spill in the Columbia River Operational Hydromet Management System (CROHMS) database for that same period. The relationship will not be exact but will provide a reasonable estimate of the actual spill volumes during the 2002, 2003 and 2004 spill season.

2. Rating Curve Revision:

The original Bonneville Spillway Rating Curve is based on the following orifice equation (HDC 311-1):

$$Q = C_d A \sqrt{2gH}$$

Where:

Q is the discharge in cfs

C_d is the discharge coefficient

A is the area of the opening in ft^2

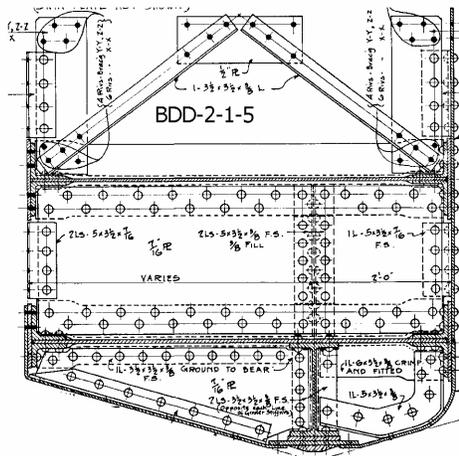
$A = B \cdot \text{Height of opening}$

B is the width of the opening in ft

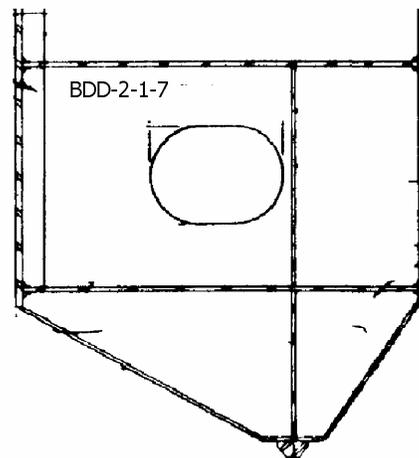
g = gravity (32.2 ft/sec^2)

H is the height of water from centerline of the opening to the surface

Physical model work conducted during the original design phase has been used to compute the discharge coefficient, C_d . The discharge coefficient from the original model work ranged from 1.1 for small gate openings to 0.7 for large gate openings (greater than 5 ft). For small gate openings the discharge coefficient appears to be unusually high. Typical discharge coefficients range from 0.65 to 0.75 for tainter gates, 0.7 to 0.85 for regulating gates and 1.0 for very efficient tube orifices. It is most likely that the original gate lip may have been extremely efficient for small gate openings where as the current gate lip may be more typical of vertical sluice gates. Another possible factor is that gate leakage in the model may have adversely affected the flow measurements.



Original Rounded Gate Lip



Current Sharp Edge Gate Lip

Comparison of original and current Bonneville Spillway gate lips

Discharge under high head vertical lift gates can be computed using the standard orifice equation (HDC 311-1) or using a relationship between gate-controlled discharge to free discharge (HDC 312). A spillway-rating curve was developed using both methods and they are presented in Figure 1. Included in Figure 1 is the original spillway-rating curve. The discharge coefficient for small gate openings is set equal to 0.80 in the rating curve called "Corrected Orifice Equation". The original rating curve falls above the other two rating curves for small gate openings. For this application a discharge coefficient of 0.80 was assumed for small gate openings. For example, for a 74.0 ft forebay, a gate opening equivalent to 1 dog, or 1.06 ft, yield a coefficient of 1.01 under the old rating curve for a flow of 3047 cfs, while the new rating curve would fix the coefficient at 0.80 for a flow of 2411 cfs. For a single bay this is a difference of 636 cfs, and across 18 bays the difference would be on the order of 11000 cfs (assuming for this example that all bays are open 1.06 ft). As the gate opening increases, the coefficients match up better, and the differences themselves become less significant.

Thus the recommended rating curve for the Bonneville Spillway is documented in Table 2, which details a full rating curve for a full range of forebays (70 ft NGVD to 77 ft NGVD) and gate openings in both dogs and feet up to 12 dogs, or 22.15 ft.

Note that this will allow GDACS to compute the spillway discharge given the reported gate openings. The spill patterns recommended in the Fish Passage Plan and incorporated into the GDACS system at Bonneville need to have the discharge associated with a specific set of gate openings (the pattern) updated using the revised rating curve.

RELATIONSHIP BETWEEN REPORTED AND ACTUAL SPILL

Using the spill patterns detailed in the Fish Passage Plan and incorporating the revised rating curve and the actual gate openings, the following comparison can be made for reported versus actual spill volumes. This assumes a Bonneville forebay elevation of 74.0 feet NGVD. The relationship would vary slightly for different forebay elevations and the impact of forebay elevation can be seen in Table 3. The results in Table 1 are presented in Figure 3 and a trend line has been fitted through the data points where:

$$ActualSpill = 0.001x^2 + 0.8788x - 23.45$$

Where:

x = reported spill

For example, if the reported spill from the CROHMS database showed 89 kcfs, using the *ActualSpill* formula the spill would actually be 63 kcfs.

Table 1 Comparison for spill patterns used since 2002, both ratings corrected for gate opening Assumed correction applied to all gates to determine "Actual Gate Opening" All values based on a Bonneville Forebay Elevation of 74.0 ft NGVD							
		Gate Corrected Only			Gate and Gate Coefficient Corrected		
Nominal Spill	Reported Spill	PRE2005 Rating Curve Flow	Difference	% Difference	FEB2005 Rating Curve Flow	Difference	% Difference
kcfs	kcfs				kcfs	kcfs	%
50	49.9	33.4	16.5	33.0	23.1	26.8	53.8
75	74.6	62.8	11.8	15.9	47.6	27.0	36.2
100	100.2	91.1	9.1	9.1	74.8	25.4	25.4
125	125.2	117.1	8.1	6.5	102.4	22.8	18.2
150	150.2	142.1	8.1	5.4	131.1	19.1	12.7

For a given requested spill, the spill pattern that closest matched was selected from the Fish Passage Plan. Table 1 shows the impact of the gate opening correction and the gate opening correction in conjunction with the gate coefficient correction.

3. Recommendations:

As of this writing (FEB2005) the GDACS system has been properly calibrated (see MFR "Bonneville Spillway Recalibration Field Trip Report", 18OCT2004) by the project and reports an accurate gate opening. As of this writing the rating curve in GDACS has not been updated.

Recommended Actions:

- GDACS system used to control the spillway needs to be updated with the revised rating curves
- The Fish Passage Plan needs to be updated with the revised rating curves in the Bonneville Spill Pattern, it is recommended that the FEB2005 rating curve for a 74.0 ft NGVD forebay be used
- GDACS gate calibration should be confirmed prior to spill season and documented. Due to mechanical issues the hoists in general and the gantry operated bays in particular may loose calibration over time, and may do so to varying degrees (see MFR "Bonneville Spillway Recalibration Field Trip Report", 18OCT2004)

- Spill should be monitored during the 2005 spill season to determine if discrepancy has been corrected to an acceptable level, if not, a field test may be required to update the rating curve due to the non-standard lip design.

4. References:

"Spillway Flow Discrepancy, Executive Summary", 15 pgs, Prepared by David B. Smith, Bonneville Project, dated 27JUL2004.

"Bonneville Spillway Recalibration Field Trip Report", 18oct2004bonnswrecal-1, written by HIGA, Nathan T., dated 18OCT2004, EC-HD files.

"Hydraulic Design Criteria" (HDC), US Army Corps of Engineers Waterways Experiment Station, 1988.

Written by
HIGA, Nathan T.
Engineer, Hydraulic Design Section

Technical Review, Approval: Laurie L. Ebner, P.E.

CF: CENWP-EC-HD Files



Bonneville Spillbay 17, looking across top of gate towards right pier, the markings shown correspond to dogs. However the dogs match the old 50 ft tall gates, and not the current 60 ft tall gates. Calibrating to the dogs resulted in the gates being open approximately 0.3 ft lower than reported by the hoisting equipment.



Local gate control with front panel open during recalibration process.

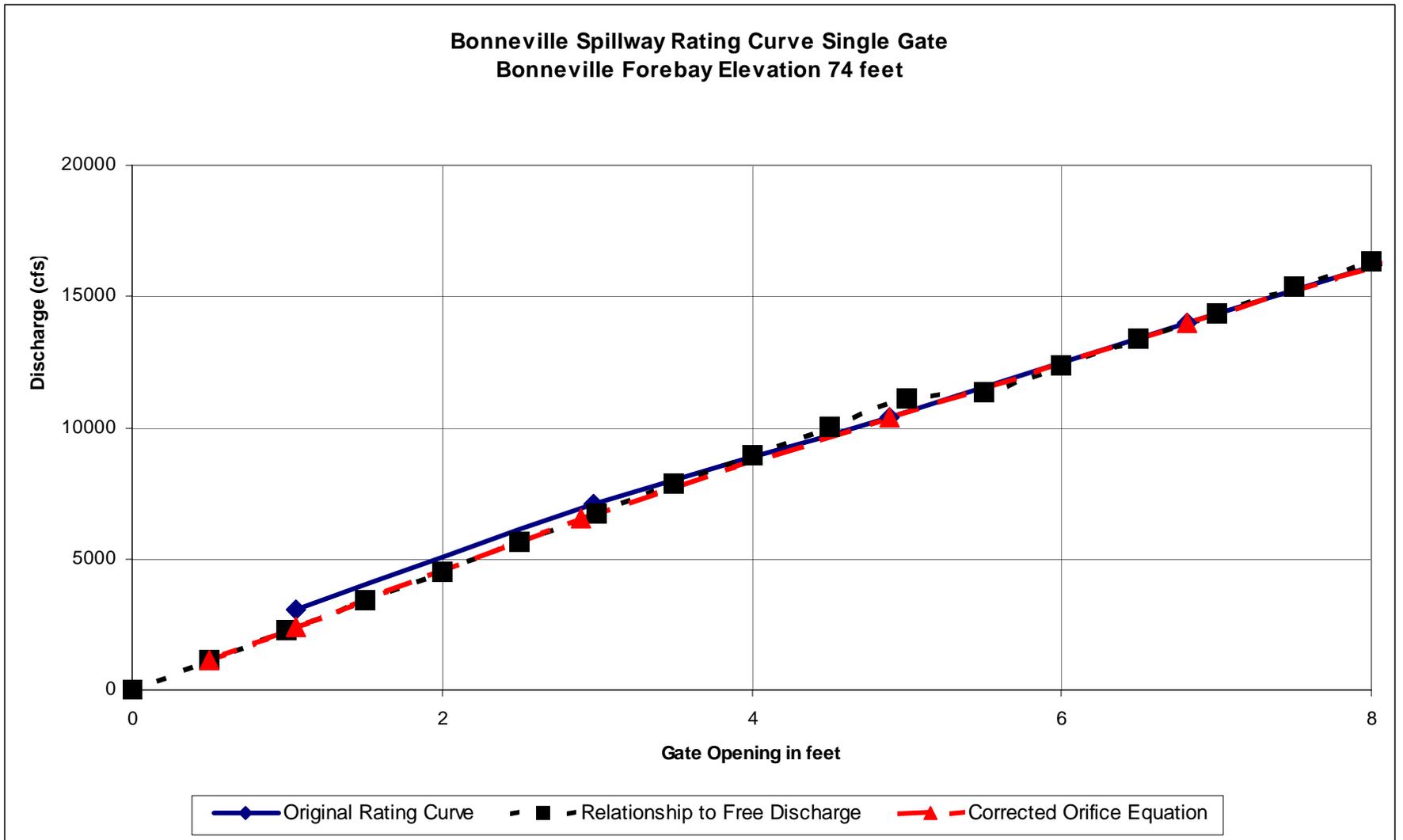


Figure 1 Bonneville Spillway Rating Curve Single Gate, Bonneville Forebay Elevation 74 ft.

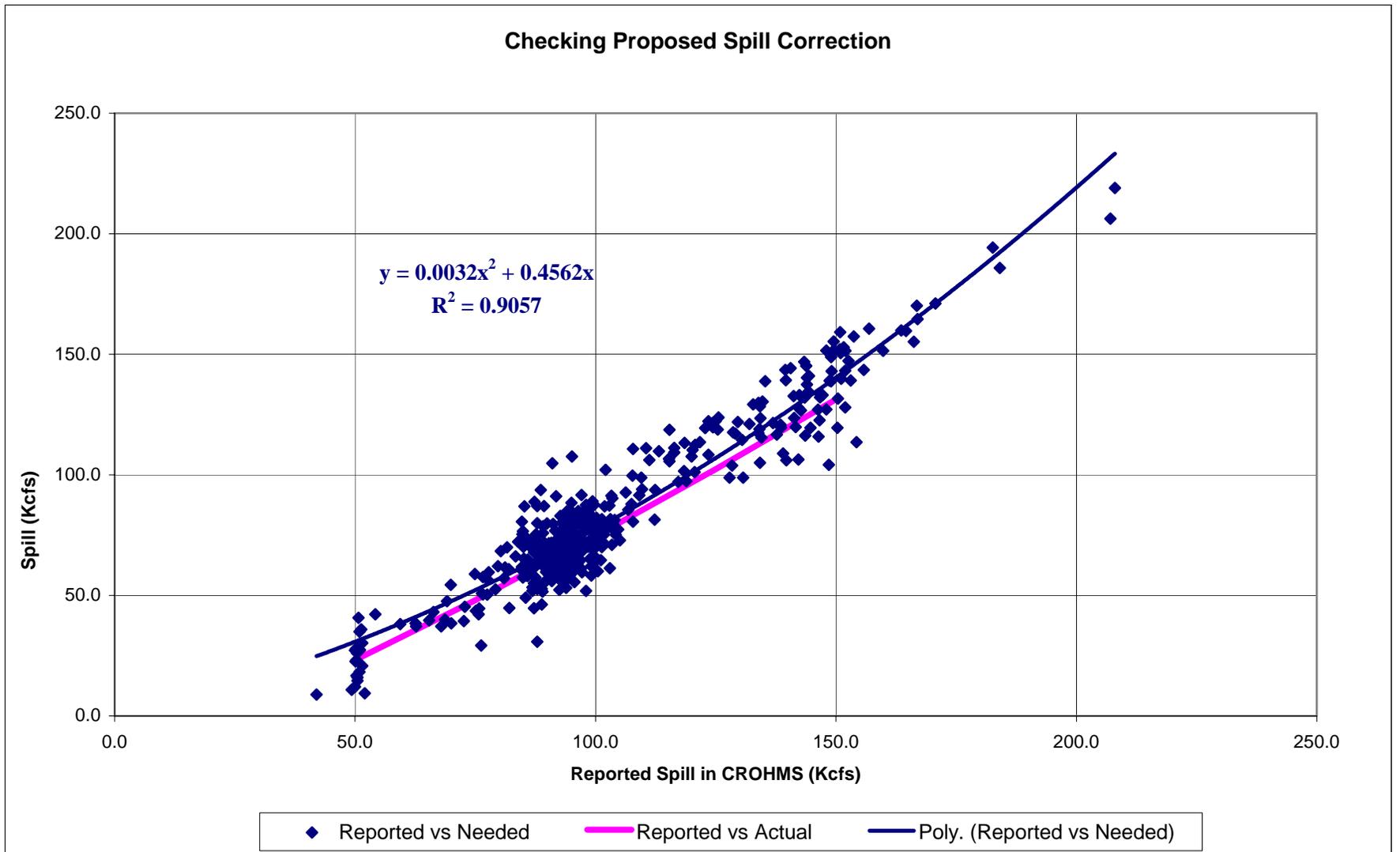


Figure 2 Checking Proposed Spill Correction

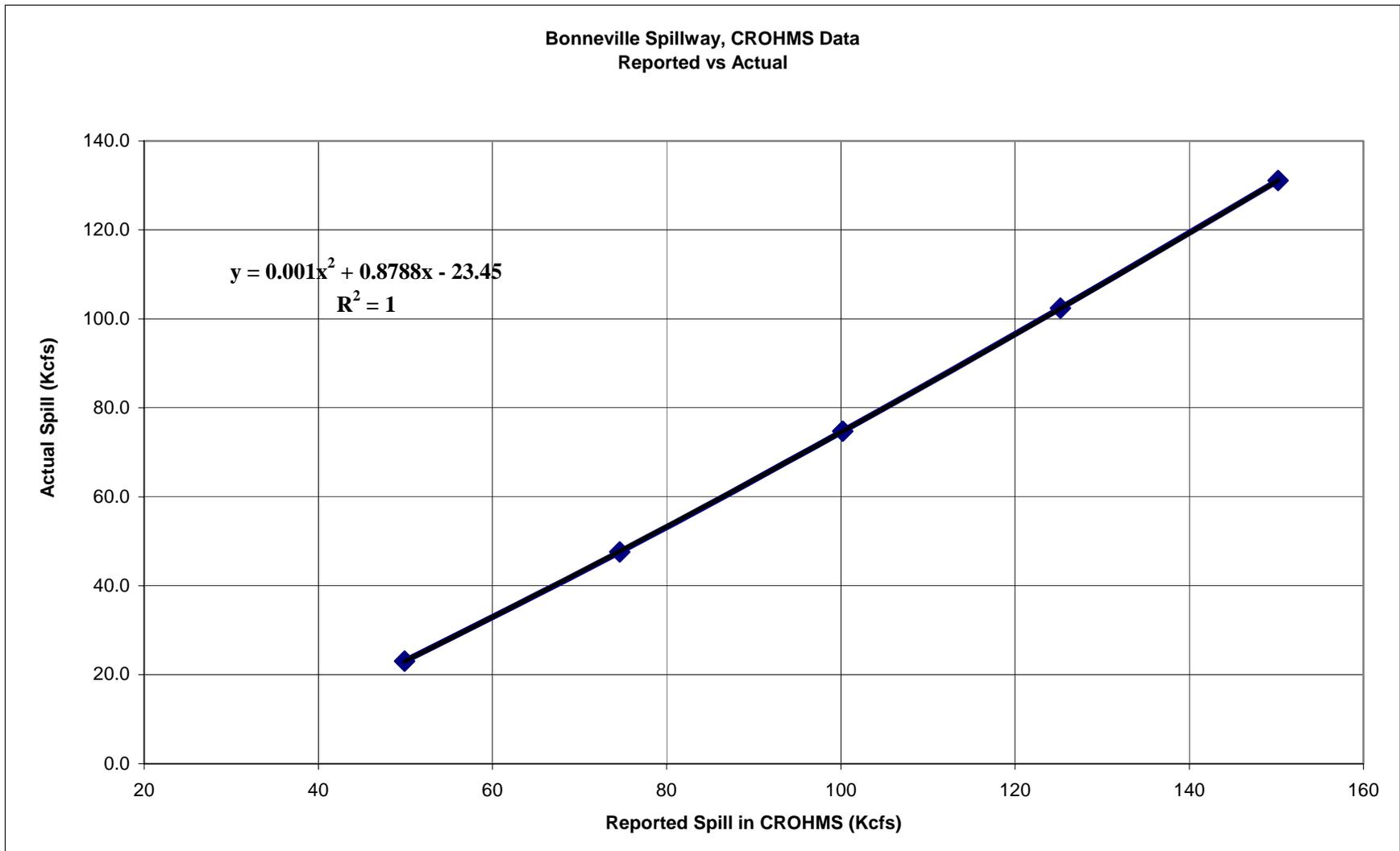


Figure 3 Bonneville Spillway, CROHMS Data, Reported vs Actual Flow

Table 2 Bonneville Spill from a single bay with respect to Opening in Dogs (& feet) and Lake Elevation, flow in CFS.

60 foot Gate

Computed by LLE on February 11, 2005

Backed checked and compared to work by NTKH on 09FEB2005

Forebay Elevation FB ft	Gate Opening																		
	dogs	0			1			2			3			5			6		
	feet	0	0.5	1	1.06	1.5	2	2.5	2.9	3	3.5	4	4.5	4.89	5	5.5	6		
70	0	1102	2179	2307	3233	4265	5275	6069	6265	7235	8187	9120	9837	10037	10938	11824			
70.2	0	1104	2184	2312	3240	4274	5287	6082	6279	7251	8205	9141	9859	10060	10963	11851			
70.4	0	1106	2188	2317	3247	4283	5298	6095	6293	7267	8223	9161	9881	10083	10988	11878			
70.6	0	1109	2193	2322	3254	4293	5310	6109	6306	7283	8241	9182	9903	10105	11012	11904			
70.8	0	1111	2198	2327	3261	4302	5321	6122	6320	7299	8260	9202	9925	10128	11037	11931			
71	0	1113	2202	2331	3268	4311	5333	6135	6334	7315	8278	9222	9947	10150	11062	11958			
71.2	0	1116	2207	2336	3275	4320	5344	6148	6347	7331	8296	9243	9969	10172	11086	11985			
71.4	0	1118	2212	2341	3282	4330	5356	6162	6361	7347	8314	9263	9991	10195	11111	12011			
71.6	0	1120	2216	2346	3289	4339	5367	6175	6375	7363	8332	9283	10013	10217	11135	12038			
71.8	0	1123	2221	2351	3296	4348	5378	6188	6388	7378	8350	9303	10035	10239	11160	12064			
72	0	1125	2226	2356	3303	4357	5390	6201	6402	7394	8368	9323	10057	10262	11184	12091			
72.2	0	1127	2230	2361	3309	4366	5401	6214	6415	7410	8386	9343	10078	10284	11208	12117			
72.4	0	1130	2235	2366	3316	4375	5412	6227	6429	7426	8403	9363	10100	10306	11232	12144			
72.6	0	1132	2239	2371	3323	4384	5424	6240	6442	7441	8421	9383	10121	10328	11257	12170			
72.8	0	1134	2244	2375	3330	4393	5435	6253	6456	7457	8439	9403	10143	10350	11281	12196			
73	0	1137	2248	2380	3337	4402	5446	6266	6469	7472	8457	9423	10165	10372	11305	12222			
73.2	0	1139	2253	2385	3344	4411	5457	6279	6483	7488	8474	9443	10186	10394	11329	12248			
73.4	0	1141	2258	2390	3350	4420	5469	6292	6496	7504	8492	9462	10207	10416	11353	12274			
73.6	0	1143	2262	2395	3357	4429	5480	6305	6509	7519	8510	9482	10229	10438	11377	12300			
73.8	0	1146	2267	2400	3364	4438	5491	6318	6523	7534	8527	9502	10250	10459	11401	12326			
74	0	1148	2271	2404	3371	4447	5502	6331	6536	7550	8545	9522	10271	10481	11424	12352			
74.2	0	1150	2276	2409	3377	4456	5513	6344	6549	7565	8562	9541	10293	10503	11448	12378			
74.4	0	1153	2280	2414	3384	4465	5524	6356	6562	7581	8580	9561	10314	10524	11472	12404			
74.6	0	1155	2285	2419	3391	4474	5535	6369	6576	7596	8597	9580	10335	10546	11496	12430			
74.8	0	1157	2289	2423	3398	4483	5546	6382	6589	7611	8615	9600	10356	10568	11519	12455			
75	0	1159	2294	2428	3404	4492	5557	6395	6602	7627	8632	9619	10377	10589	11543	12481			
75.2	0	1162	2298	2433	3411	4501	5568	6407	6615	7642	8649	9639	10398	10611	11566	12507			
75.4	0	1164	2303	2438	3418	4509	5579	6420	6628	7657	8667	9658	10419	10632	11590	12532			
75.6	0	1166	2307	2442	3424	4518	5590	6433	6641	7672	8684	9677	10440	10653	11613	12558			
75.8	0	1168	2312	2447	3431	4527	5601	6445	6654	7687	8701	9697	10461	10675	11637	12583			
76	0	1170	2316	2452	3437	4536	5612	6458	6667	7702	8718	9716	10482	10696	11660	12608			
76.2	0	1173	2320	2456	3444	4545	5623	6471	6680	7718	8735	9735	10503	10717	11683	12634			
76.4	0	1175	2325	2461	3451	4553	5634	6483	6693	7733	8753	9754	10524	10739	11707	12659			
76.6	0	1177	2329	2466	3457	4562	5645	6496	6706	7748	8770	9773	10544	10760	11730	12684			
76.8	0	1179	2334	2470	3464	4571	5656	6508	6719	7763	8787	9793	10565	10781	11753	12709			
77	0	1182	2338	2475	3470	4579	5666	6521	6732	7778	8804	9812	10586	10802	11776	12734			

Table 2 Bonneville Spill from a single bay with respect to Opening in Dogs (& feet) and Lake Elevation in CFS. 60 foot Gate

Computed by LLE on February 11, 2005

Backed checked and compared to work by NTkH on 09FEB2005

Forebay Elevation FB ft	Gate Opening															
	dogs	4				5				6						
	feet	6.5	6.81	7	7.5	8	8.5	8.73	9	9.5	10	10.5	10.64	11	11.5	12
70	12695	13228	13553	14398	15231	16053	16428	16865	17668	18462	19248	19467	20028	20801	21568	22331
70.2	12724	13259	13584	14431	15267	16091	16467	16905	17710	18506	19295	19514	20076	20851	21621	22386
70.4	12753	13289	13615	14465	15302	16129	16505	16945	17752	18550	19341	19561	20125	20902	21674	22441
70.6	12782	13319	13646	14498	15338	16166	16544	16985	17794	18594	19387	19608	20173	20952	21726	22495
70.8	12811	13350	13677	14531	15373	16204	16582	17024	17836	18638	19433	19654	20221	21003	21779	22550
71	12840	13380	13708	14564	15408	16241	16621	17064	17877	18682	19479	19701	20269	21053	21831	22605
71.2	12869	13410	13739	14597	15443	16278	16659	17103	17919	18726	19525	19747	20317	21103	21883	22659
71.4	12898	13440	13770	14630	15478	16316	16697	17143	17960	18769	19570	19793	20365	21153	21935	22713
71.6	12926	13470	13801	14663	15513	16353	16735	17182	18001	18813	19616	19840	20412	21203	21987	22767
71.8	12955	13500	13832	14696	15548	16390	16773	17221	18043	18856	19661	19886	20460	21252	22039	22821
72	12983	13530	13862	14729	15583	16427	16811	17260	18084	18899	19707	19932	20507	21302	22091	22875
72.2	13012	13560	13893	14761	15618	16464	16849	17299	18125	18942	19752	19977	20555	21351	22143	22929
72.4	13040	13589	13924	14794	15653	16500	16887	17338	18166	18985	19797	20023	20602	21401	22194	22983
72.6	13069	13619	13954	14827	15687	16537	16924	17377	18207	19028	19842	20069	20649	21450	22245	23036
72.8	13097	13649	13984	14859	15722	16574	16962	17415	18247	19071	19887	20114	20696	21499	22297	23090
73	13125	13678	14015	14891	15756	16610	16999	17454	18288	19114	19932	20160	20743	21548	22348	23143
73.2	13153	13708	14045	14924	15791	16647	17037	17492	18329	19157	19977	20205	20790	21597	22399	23196
73.4	13182	13737	14075	14956	15825	16683	17074	17531	18369	19199	20021	20250	20837	21646	22450	23249
73.6	13210	13767	14105	14988	15859	16719	17111	17569	18410	19242	20066	20295	20883	21695	22501	23302
73.8	13238	13796	14135	15020	15894	16756	17149	17607	18450	19284	20110	20340	20930	21743	22551	23355
74	13266	13825	14165	15052	15928	16792	17186	17646	18490	19326	20155	20385	20976	21792	22602	23407
74.2	13294	13854	14195	15084	15962	16828	17223	17684	18530	19369	20199	20430	21023	21840	22652	23460
74.4	13321	13883	14225	15116	15996	16864	17260	17722	18570	19411	20243	20475	21069	21888	22703	23512
74.6	13349	13912	14255	15148	16030	16900	17297	17760	18610	19453	20287	20520	21115	21936	22753	23565
74.8	13377	13941	14285	15180	16063	16936	17333	17798	18650	19495	20331	20564	21161	21984	22803	23617
75	13405	13970	14315	15212	16097	16971	17370	17835	18690	19536	20375	20609	21207	22032	22853	23669
75.2	13432	13999	14344	15243	16131	17007	17407	17873	18730	19578	20419	20653	21253	22080	22903	23721
75.4	13460	14028	14374	15275	16164	17043	17443	17911	18770	19620	20462	20697	21298	22128	22953	23773
75.6	13487	14057	14403	15307	16198	17078	17480	17948	18809	19661	20506	20741	21344	22176	23002	23824
75.8	13515	14085	14433	15338	16231	17114	17516	17986	18849	19703	20550	20785	21389	22223	23052	23876
76	13542	14114	14462	15369	16265	17149	17552	18023	18888	19744	20593	20829	21435	22271	23101	23928
76.2	13569	14143	14491	15401	16298	17184	17589	18060	18927	19786	20636	20873	21480	22318	23151	23979
76.4	13597	14171	14521	15432	16331	17220	17625	18098	18966	19827	20679	20917	21525	22365	23200	24030
76.6	13624	14200	14550	15463	16365	17255	17661	18135	19006	19868	20723	20961	21570	22412	23249	24081
76.8	13651	14228	14579	15494	16398	17290	17697	18172	19045	19909	20766	21004	21615	22459	23298	24133
77	13678	14256	14608	15525	16431	17325	17733	18209	19084	19950	20809	21048	21660	22506	23347	24184

Table 2 Bonneville Spill from a single bay with respect to Opening in Dogs (& feet) and Lake Elevation, flow in CFS.

60 foot Gate

Computed by LLE on February 11, 2005

3/3

Backed checked and compared to work by NTkH on 09FEB2005

Forebay Elevation FB ft	Gate Opening																	
	dogs	7					8					9					10	
	feet	12.56	13	13.5	14	14.48	14.5	15	15.5	16	16.4	16.5	17	17.5	18	18.31	18.5	
70		22422	23089	23844	24597	25318	25348	26097	26846	27595	28195	28345	29096	29850	30606	31076	31365	
70.2		22477	23146	23904	24659	25382	25412	26164	26915	27666	28268	28419	29172	29928	30687	31159	31449	
70.4		22532	23204	23963	24720	25446	25476	26230	26983	27737	28341	28492	29248	30006	30768	31241	31532	
70.6		22587	23261	24023	24782	25509	25539	26296	27052	27808	28413	28565	29324	30084	30848	31323	31615	
70.8		22642	23317	24082	24843	25573	25603	26362	27120	27879	28486	28638	29399	30162	30928	31405	31698	
71		22697	23374	24141	24904	25636	25667	26427	27188	27949	28558	28711	29474	30240	31009	31487	31781	
71.2		22752	23431	24199	24965	25699	25730	26493	27256	28019	28630	28783	29549	30317	31088	31568	31863	
71.4		22806	23487	24258	25026	25762	25793	26558	27324	28089	28702	28856	29624	30395	31168	31650	31945	
71.6		22861	23544	24317	25087	25825	25856	26624	27391	28159	28774	28928	29699	30472	31248	31731	32027	
71.8		22915	23600	24375	25148	25888	25919	26689	27459	28229	28846	29000	29773	30548	31327	31812	32109	
72		22969	23656	24433	25208	25951	25981	26754	27526	28298	28917	29072	29847	30625	31406	31892	32191	
72.2		23023	23712	24491	25268	26013	26044	26819	27593	28368	28988	29144	29921	30702	31485	31973	32272	
72.4		23077	23768	24549	25329	26075	26106	26883	27660	28437	29059	29215	29995	30778	31564	32053	32353	
72.6		23131	23823	24607	25389	26137	26169	26948	27726	28506	29130	29286	30069	30854	31642	32133	32434	
72.8		23184	23879	24665	25449	26199	26231	27012	27793	28575	29201	29358	30142	30930	31721	32213	32515	
73		23238	23934	24722	25508	26261	26293	27076	27859	28643	29271	29429	30216	31006	31799	32292	32596	
73.2		23291	23989	24780	25568	26323	26354	27140	27926	28712	29342	29499	30289	31081	31877	32372	32676	
73.4		23345	24045	24837	25627	26385	26416	27204	27992	28780	29412	29570	30362	31156	31954	32451	32756	
73.6		23398	24100	24894	25687	26446	26478	27268	28058	28849	29482	29641	30435	31232	32032	32530	32836	
73.8		23451	24154	24951	25746	26507	26539	27331	28124	28917	29552	29711	30507	31307	32109	32609	32916	
74		23504	24209	25008	25805	26568	26600	27395	28189	28984	29622	29781	30580	31381	32187	32688	32996	
74.2		23557	24264	25065	25864	26629	26661	27458	28255	29052	29691	29851	30652	31456	32264	32766	33075	
74.4		23609	24318	25122	25923	26690	26722	27521	28320	29120	29761	29921	30724	31531	32340	32844	33154	
74.6		23662	24373	25178	25981	26751	26783	27584	28385	29187	29830	29991	30796	31605	32417	32923	33233	
74.8		23714	24427	25235	26040	26811	26844	27647	28450	29254	29899	30060	30868	31679	32493	33001	33312	
75		23767	24481	25291	26098	26872	26904	27710	28515	29321	29968	30129	30940	31753	32570	33078	33391	
75.2		23819	24535	25347	26156	26932	26965	27772	28580	29388	30036	30199	31011	31827	32646	33156	33469	
75.4		23871	24589	25403	26215	26992	27025	27835	28644	29455	30105	30268	31082	31900	32722	33233	33548	
75.6		23923	24643	25459	26273	27052	27085	27897	28709	29522	30173	30336	31154	31974	32797	33310	33626	
75.8		23975	24697	25515	26330	27112	27145	27959	28773	29588	30242	30405	31224	32047	32873	33387	33704	
76		24027	24750	25570	26388	27172	27205	28021	28837	29655	30310	30474	31295	32120	32948	33464	33781	
76.2		24078	24804	25626	26446	27232	27265	28083	28901	29721	30378	30542	31366	32193	33024	33541	33859	
76.4		24130	24857	25681	26503	27291	27324	28144	28965	29787	30446	30610	31436	32266	33099	33618	33936	
76.6		24181	24910	25736	26561	27351	27384	28206	29029	29853	30513	30679	31507	32338	33174	33694	34014	
76.8		24232	24963	25792	26618	27410	27443	28268	29093	29919	30581	30746	31577	32411	33248	33770	34091	
77		24284	25016	25847	26675	27469	27502	28329	29156	29984	30648	30814	31647	32483	33323	33846	34168	



Paul Wagner from TMT is ready to head out.



And the crew sails away.



TMT on the move at Ives Island.



Chum redd at Ives Island (red marker at center).



TMT on the way to observe Chum redds.



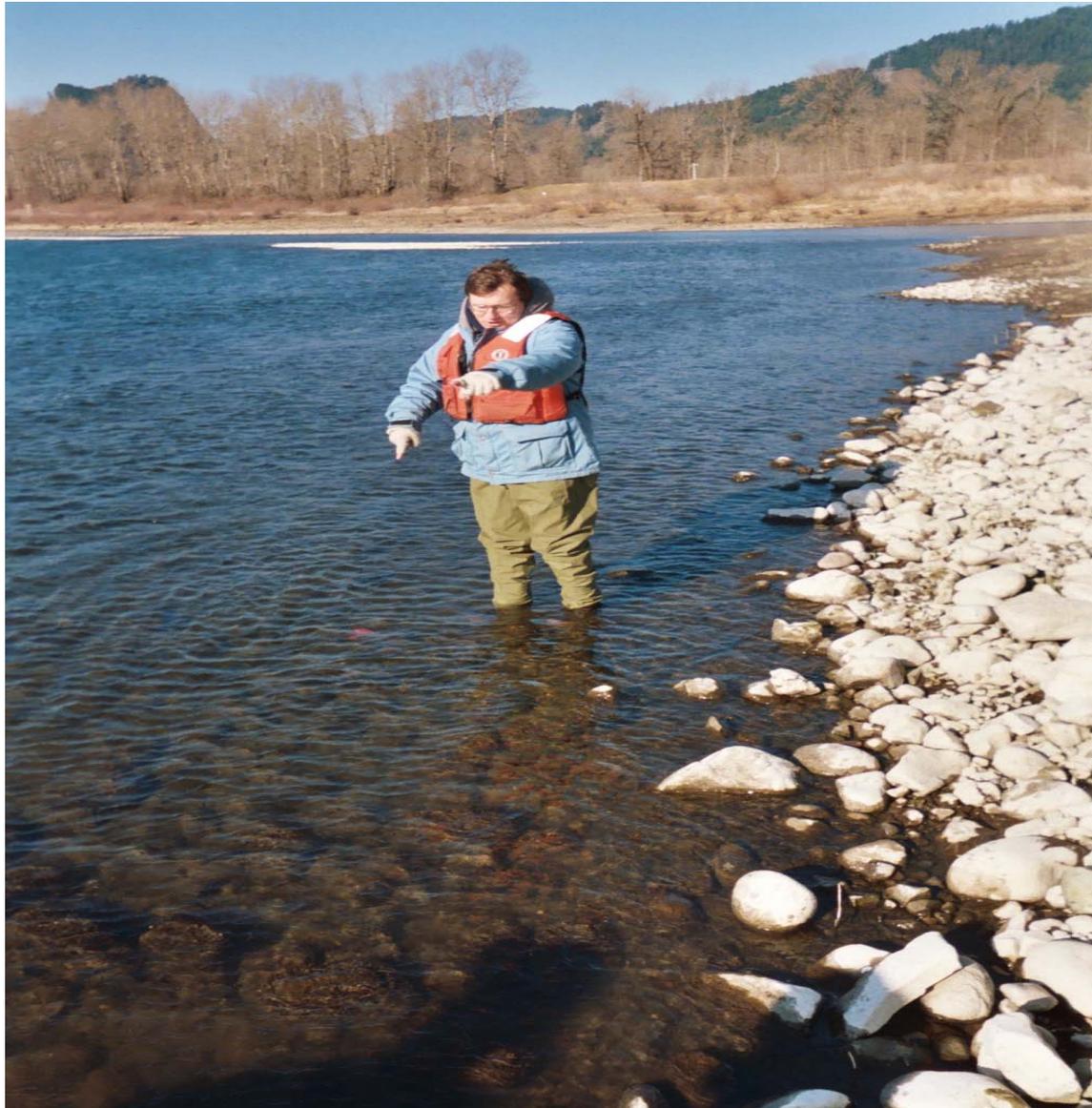
Standing by a Chum redd.



David Wills by a Chum redd.



Surrounding a Chum redd.



1 Chum redd by a red marker and one upstream.



Walking near salmon redds.



Using GPS to locate a Chum redd.



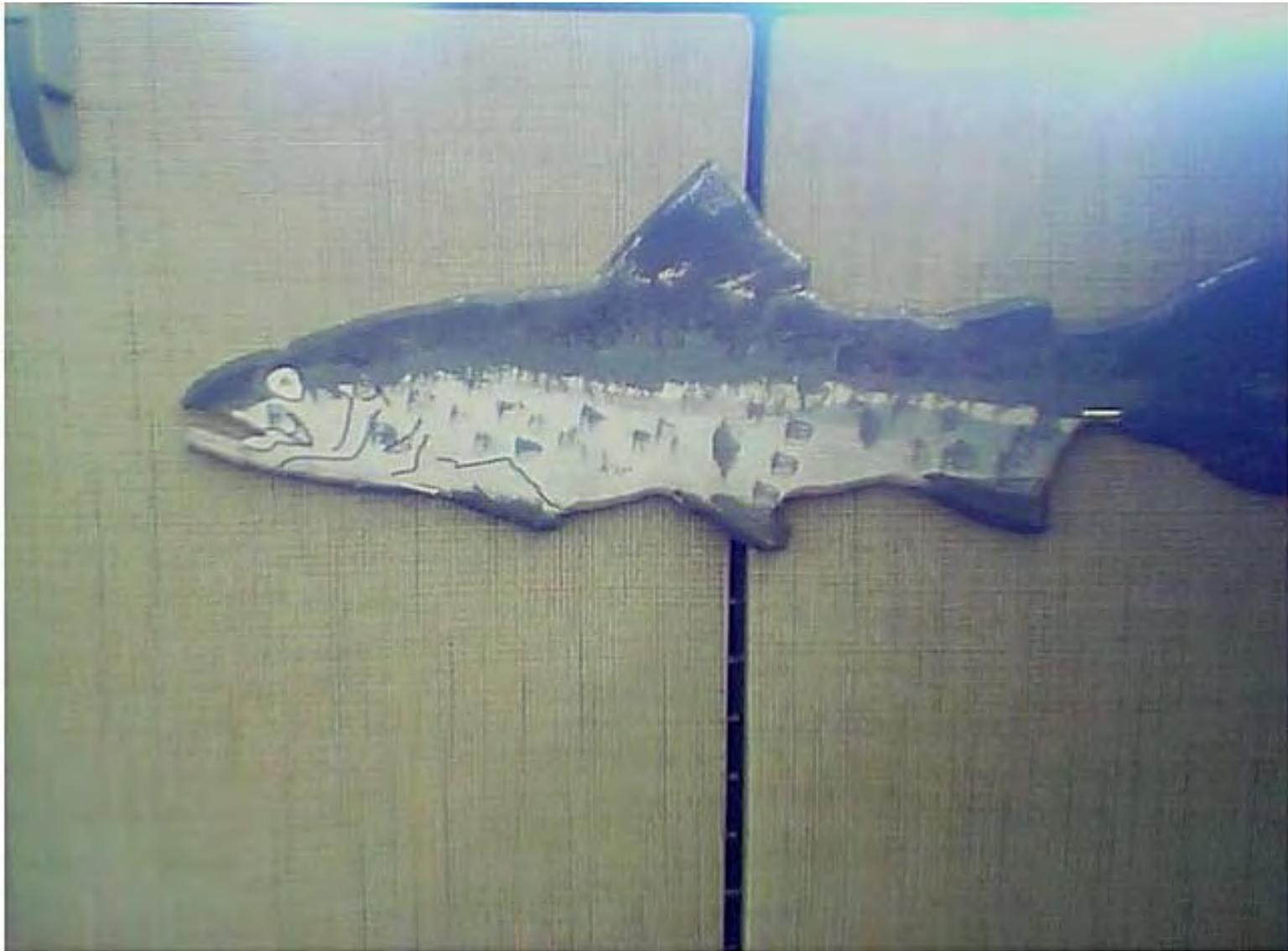
David Wills next to an Ives Island Chum redd.



Shallow Chum redd between Rudd Turner and Scott Bettin.

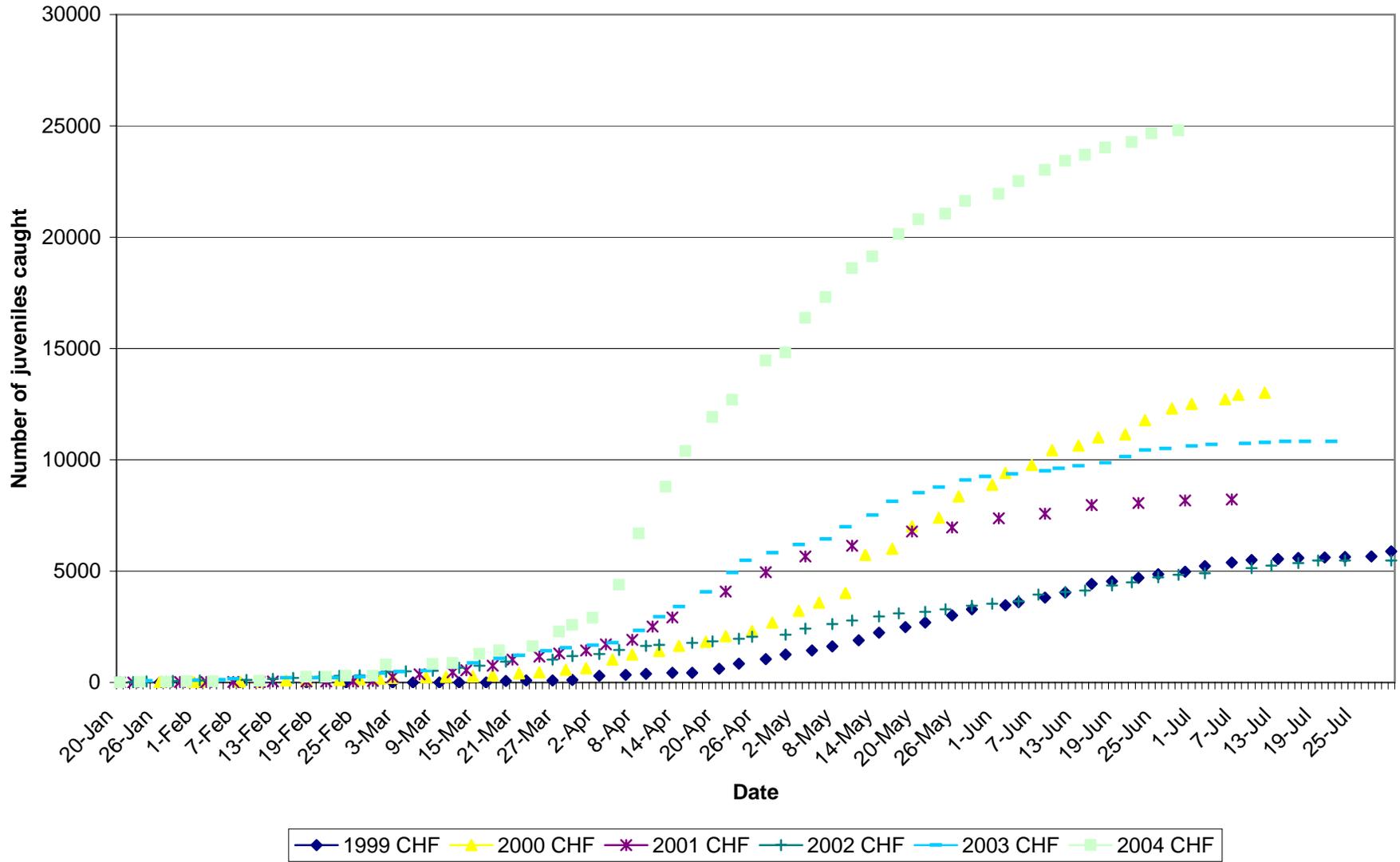


Red redd marker below water line.

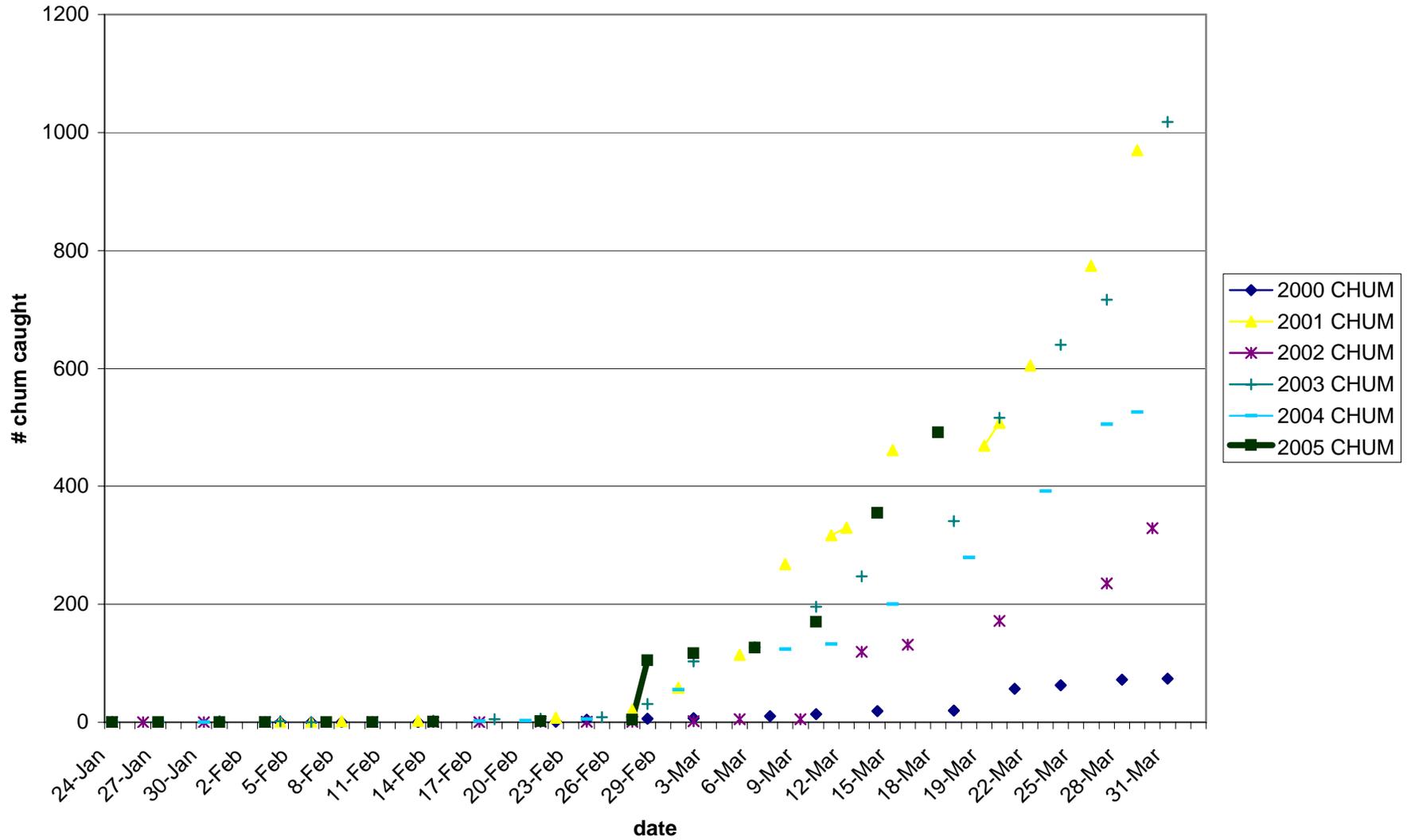


THE END

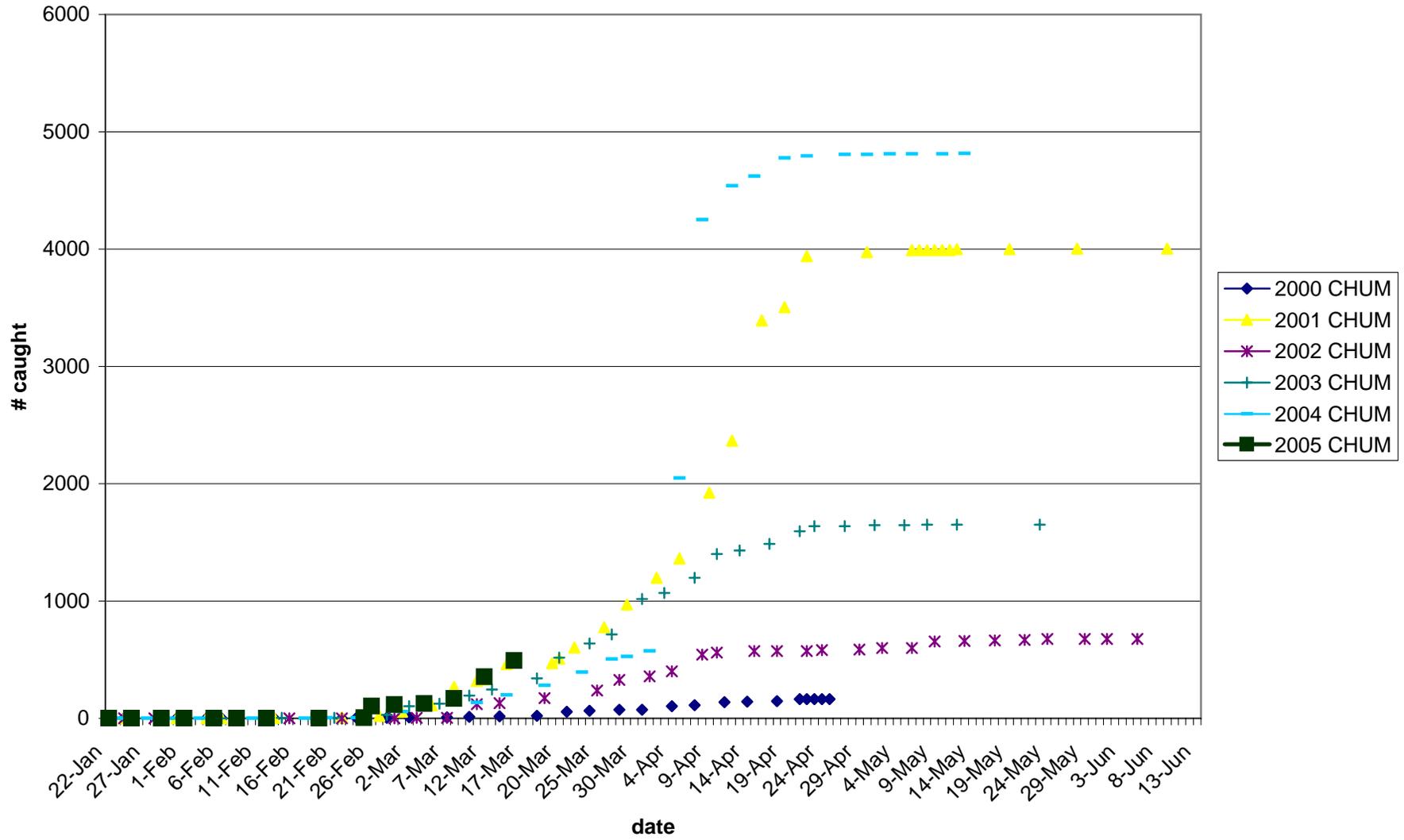
Ives Island juvenile chf catch, 1999-2004.



Ives Island juvenile chum catch through April 1, 2000-2005.

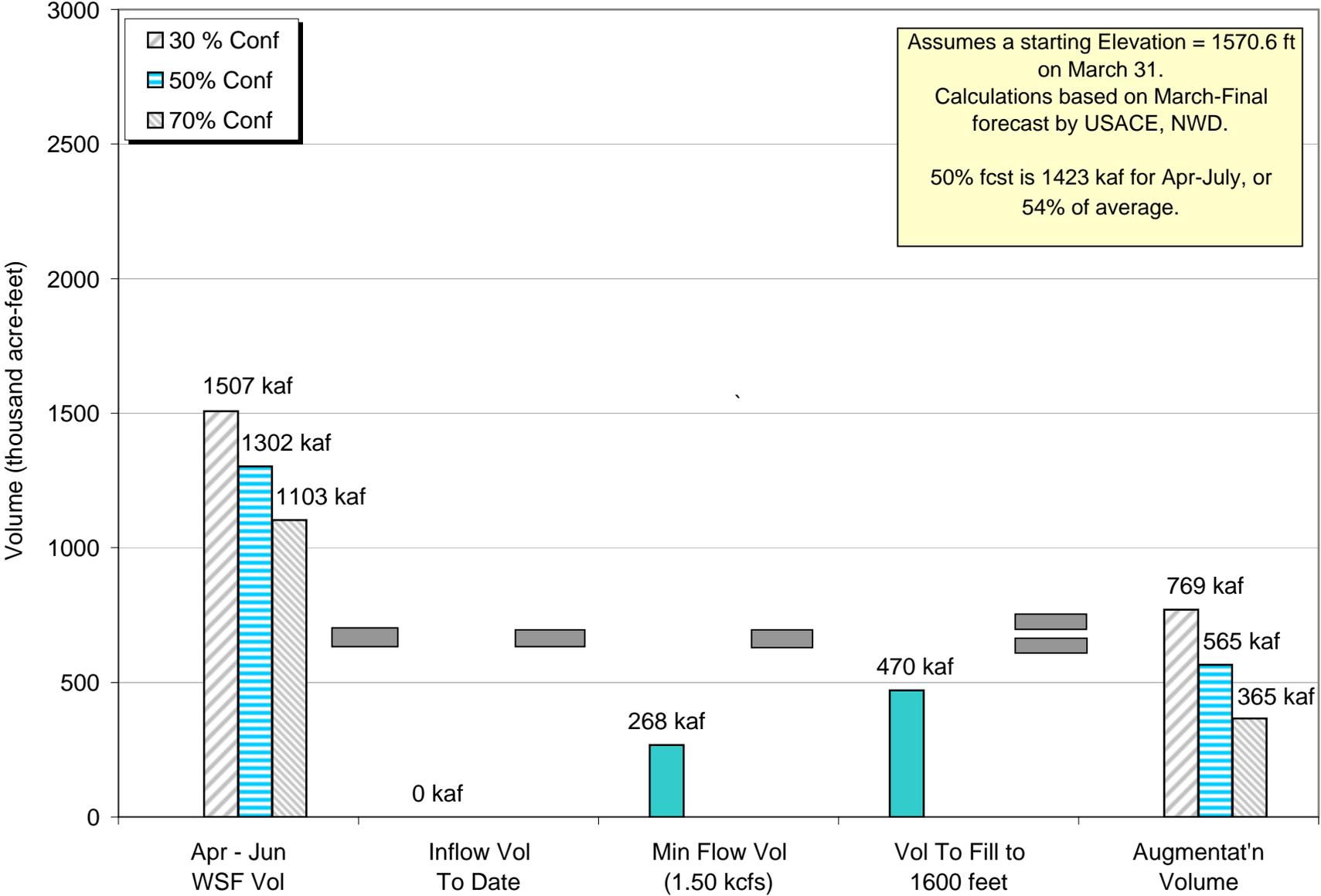


Ives Island juvenile chum catch, 2000-2005.

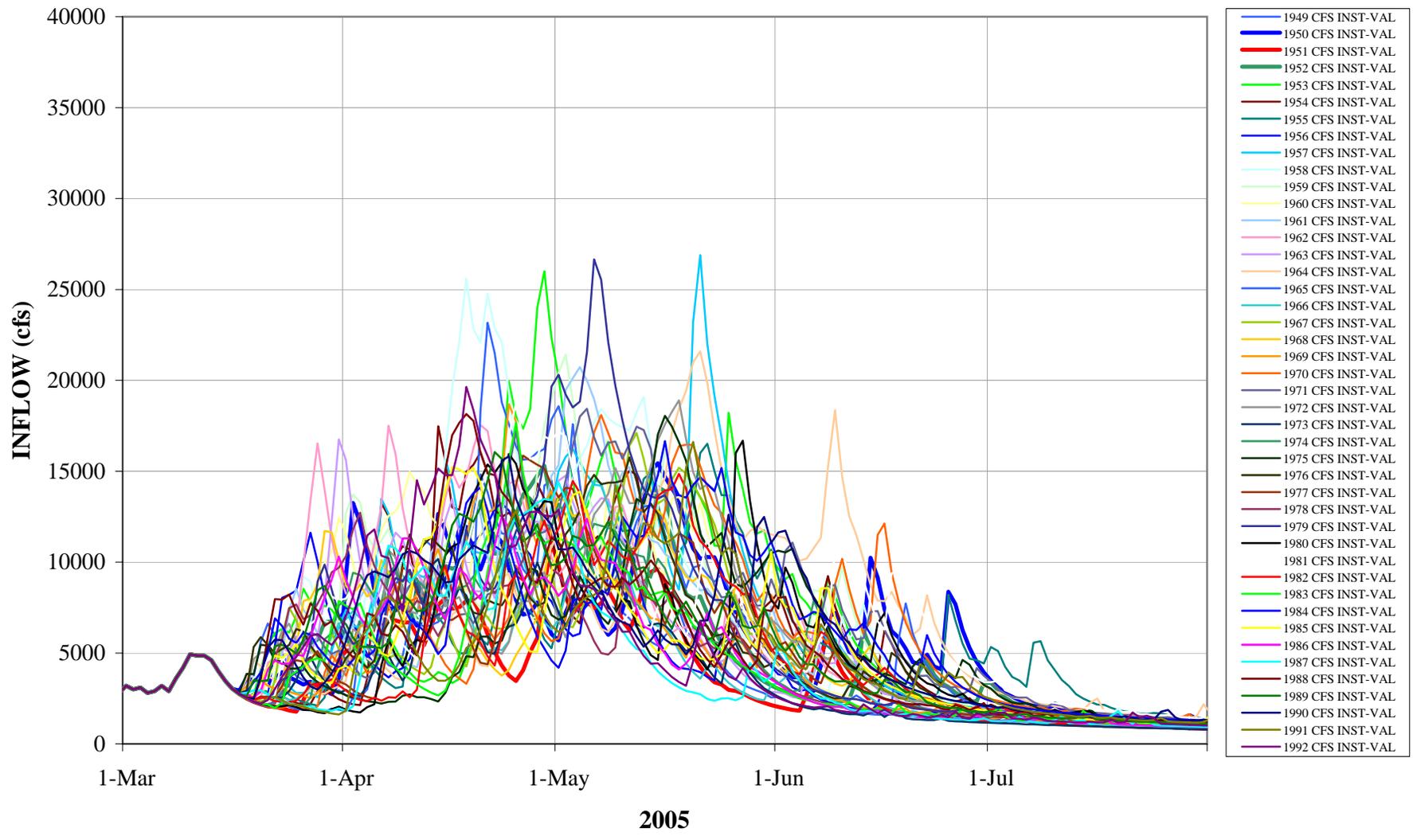


Volumes at Dworshak
1 April Through 30 June

Assumes a starting Elevation = 1570.6 ft on March 31.
Calculations based on March-Final forecast by USACE, NWD.
50% fcst is 1423 kaf for Apr-July, or 54% of average.

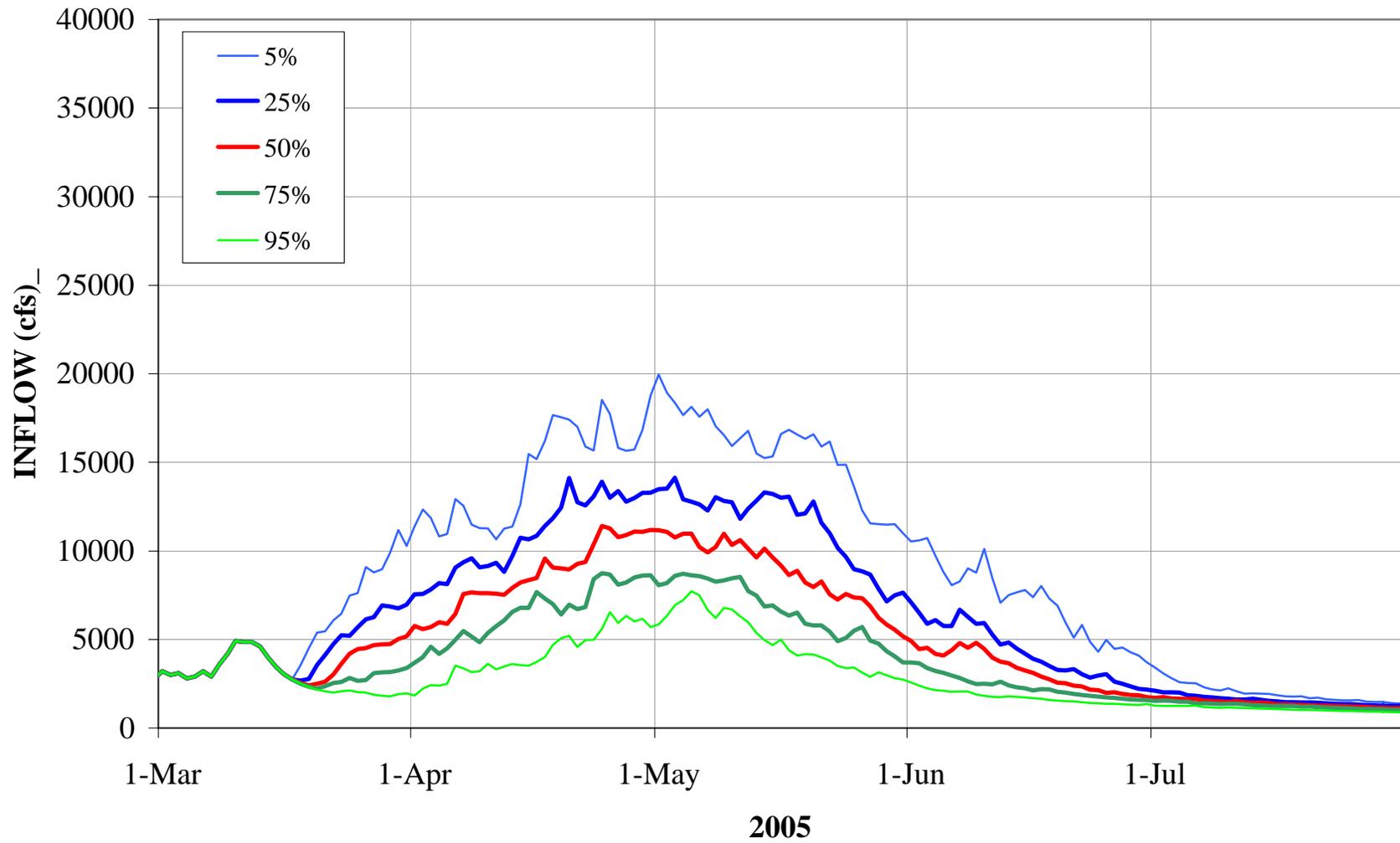


DWORSHAK ESP INFLOWS - March 8, 2005

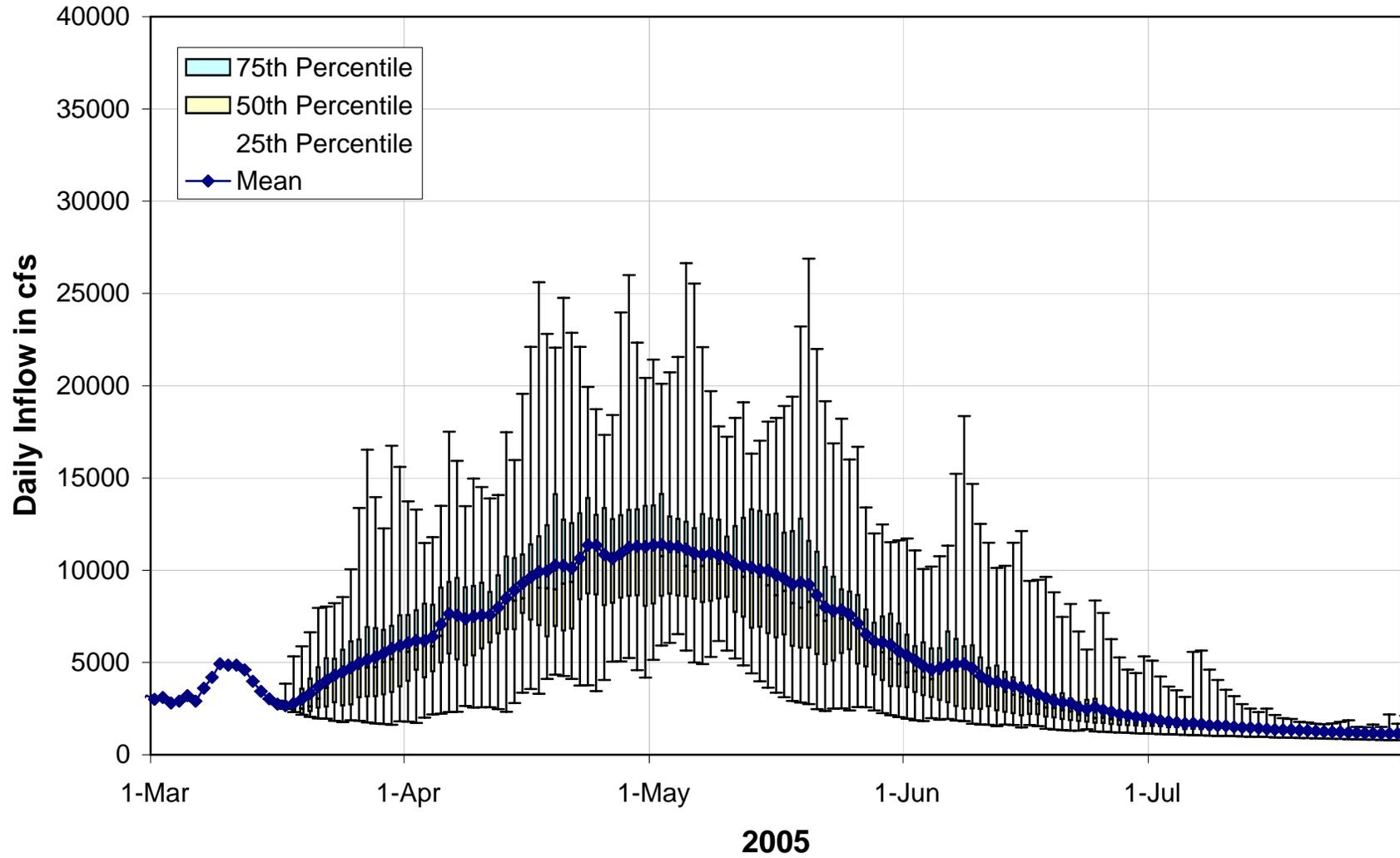


DWORSHAK ESP INFLOWS

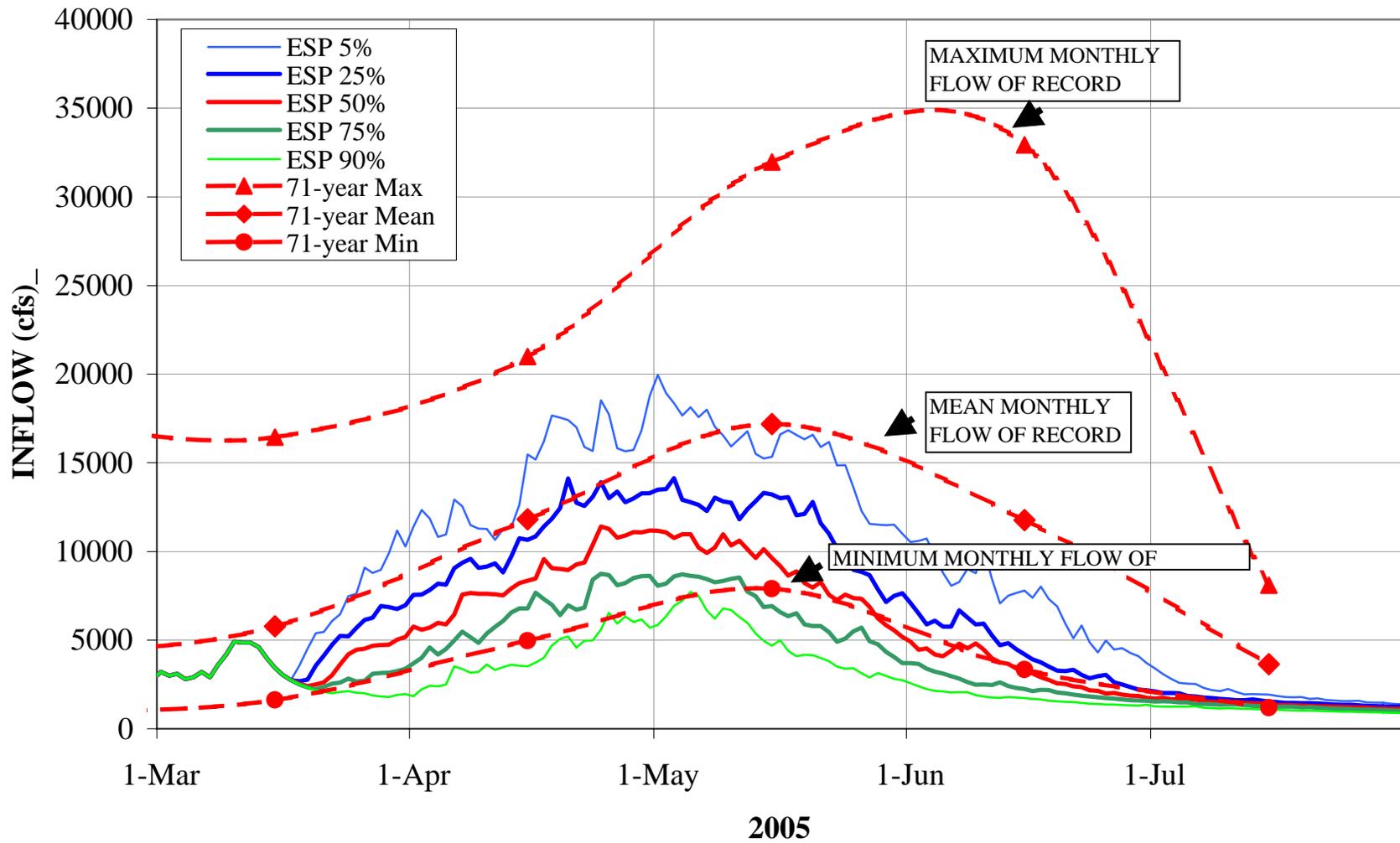
Exceedance Probabilities for Daily Flows



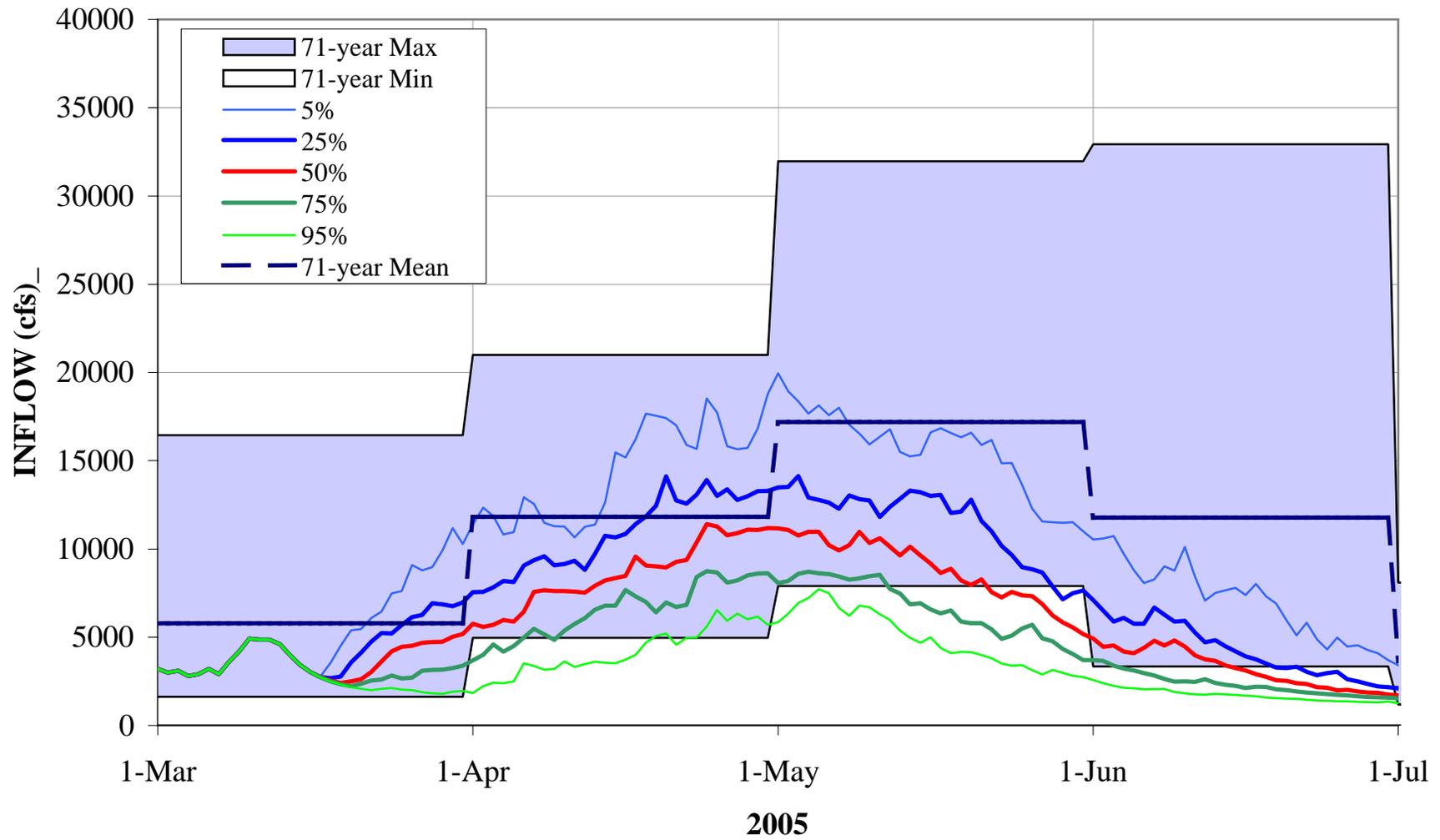
Dworshak ESP Inflows - Daily Box-Whiskers Plot



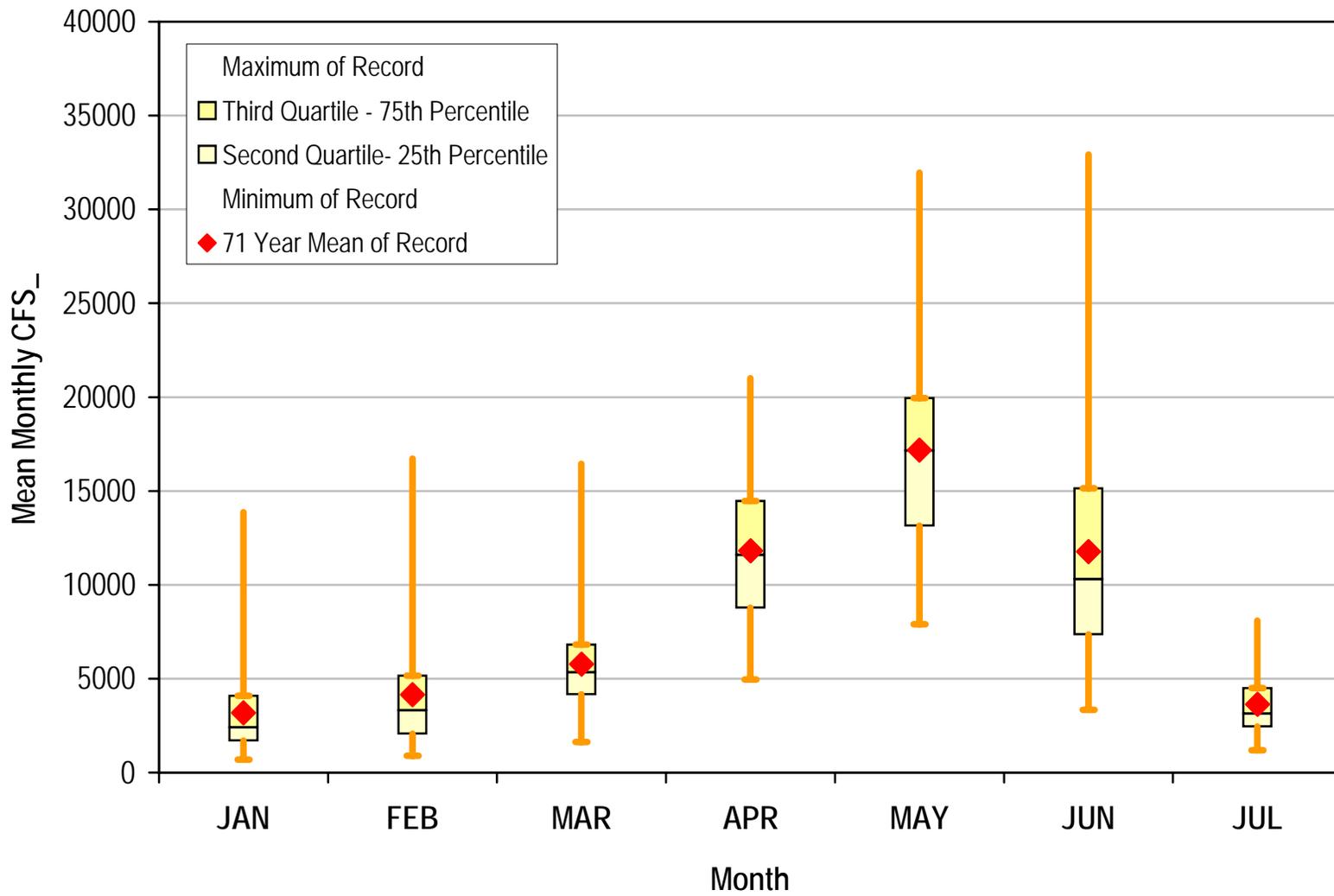
DWORSHAK ESP 2005 DAILY INFLOWS COMPARED TO 71-YEAR HISTORIC MONTHLY MAX/MINs



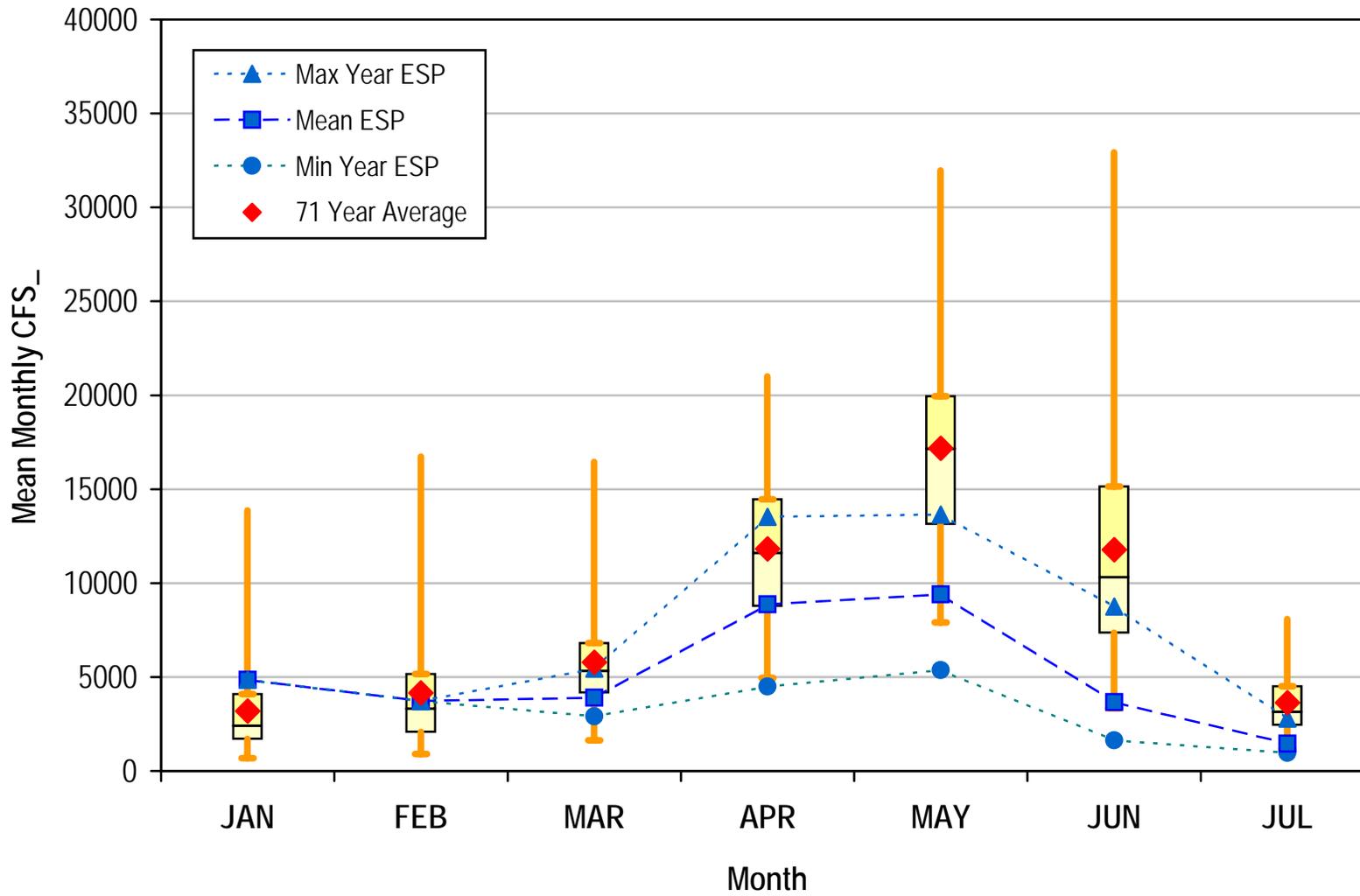
DWORSHAK ESP 2005 DAILY INFLOWS COMPARED TO 71-YEAR HISTORIC MONTHLY MAX/MINs



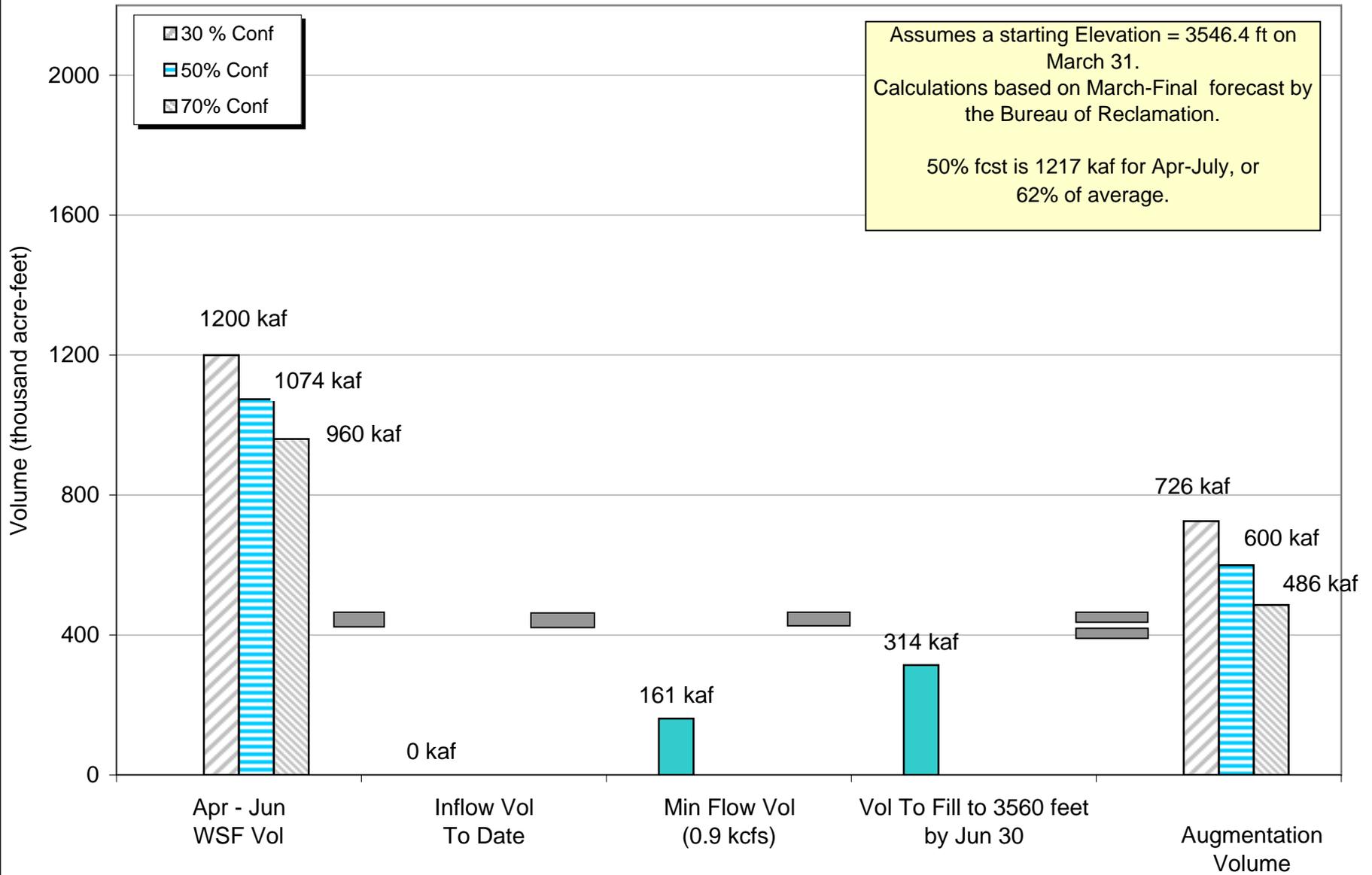
Dworkshak - Monthly Distributions of 71-Year Historic Inflows



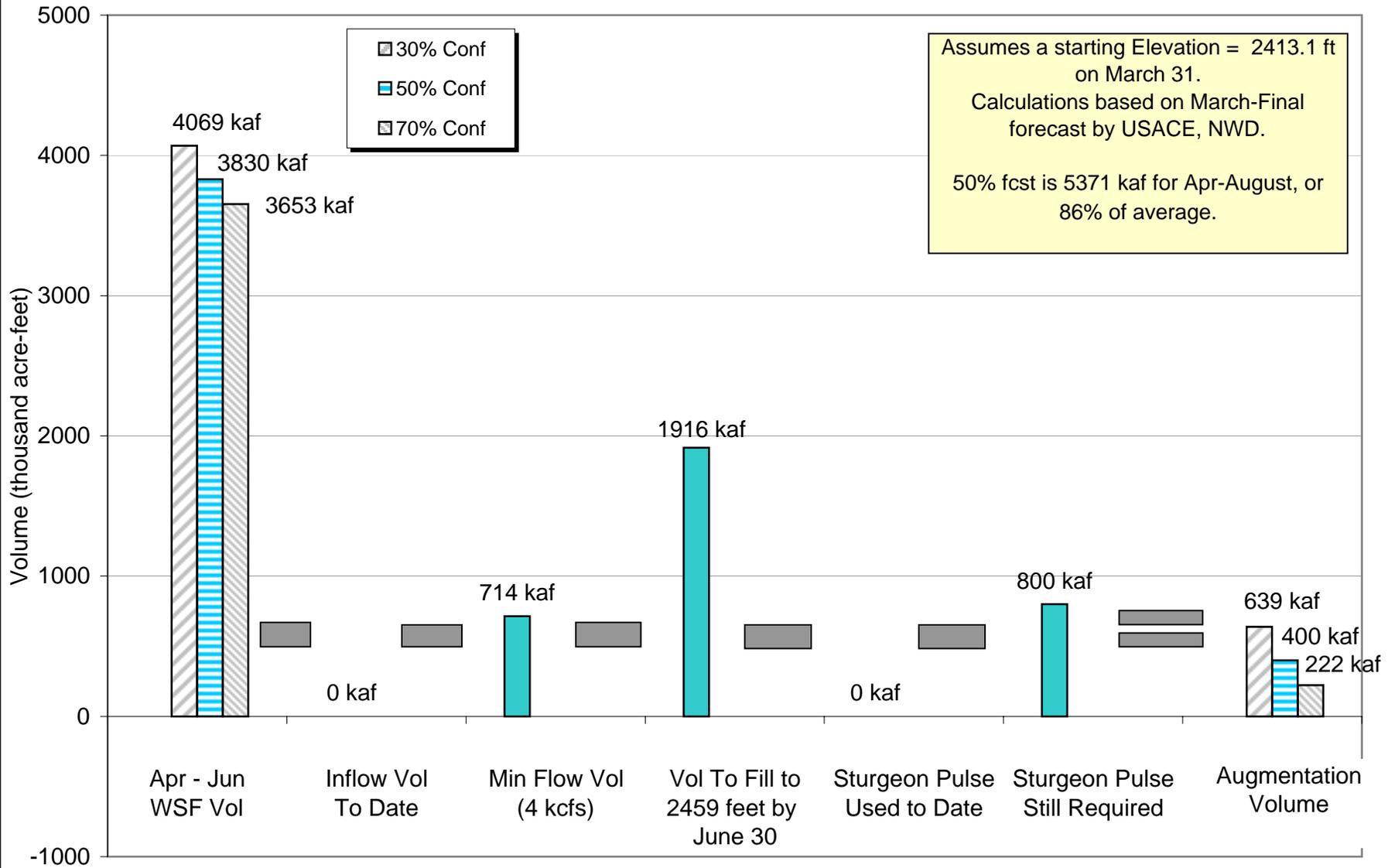
Dworkshak - Monthly Distributions of 71-Year Historic Inflows Overlaid with 2005 ESP Flow Distributions



Volumes at Hungry Horse 1 April Through 30 June



Volumes at Libby 1 April Through 30 June



Technical Management Team Meeting Notes

March 16, 2005
Corps NW Division Headquarters
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.

Update on SOR 2005-2:

Dave Wills re-capped operations at Bonneville over the last two weeks, per SOR 2005-2: The Spring Creek hatchery release began on March 2 and the corner collector operation at Bonneville began the afternoon of March 3. Surveys taken on March 4 showed TDG levels in the Ives Island area at 106%, with about 1' of depth compensation. In the Multnomah Falls area, due to tidal influences, there was low depth compensation coverage and TDG levels were around 107%. Given this, the tailwater elevation was raised to 13.5' for 24 hours, and the operation ended in the afternoon on March 5. During this operation, 60% of the Spring Creek release passed Bonneville. TDG levels remain high below Bonneville, which is a concern without depth compensation. Many questions were raised during this operation, and the salmon managers would like to continue logging data (temperature/TDG/depth) at known chum spawning areas to aid management actions later. The Warrendale gauge does provide some information, but more accurate information could be gathered through the data loggers.

ACTION: The COE will explore the possibility of putting data loggers in chum spawning areas this season. The salmon managers will confirm what the appropriate TDG levels for chum should be based on scientific literature.

Bonneville Spillgate Calibration Update:

Nathan Higa, COE, reported that the COE discovered a discrepancy between spill calibrations and actual spill at Bonneville upon completion of flow deflector work at the project in 2004. As a result, a study was conducted (linked to the TMT web page). The Dalles appeared to be correct in its calculations, so was used to define new rating curves, and an 'actual spill' equation was developed for Bonneville. Table 1 in the study shows reported vs. actual spill – for example, where 49.9 kcfs was reported, 23.1 kcfs was actually spilled. The new calculation will correct this discrepancy. It was clarified that TMT will need to consider TDG and study operations with the new corrections. There may be a need to reevaluate BiOp numbers once the actual effects on the river and fish are known.

The Dalles Spillway Gate Operation in 2005

Mike Langeslay, COE, reminded TMT that a test in Bay 6 at The Dalles revealed that the condition of wire ropes on the spillway gates was deemed unsafe. The COE is looking at operations that will meet BiOp spill through fixed gate settings; operating bays 1-6 open using two openings and three settings through spring should get the project close to 40% spill. Daily fluctuations are the biggest concern. The COE is also looking at a long term replacement plan for bays 1-6, to be completed by next year's spill season. There was a call scheduled for 8 am on 3/17 to report on the condition of the ropes. The COE will have additional information to report at the next TMT meeting.

WMP Spring/Summer Update

The latest draft spring/summer update was posted on the TMT web page today (3/16). It includes the March final water supply forecast, which is down from the February final. Comments from the TMT on the update are welcome. Some information will be included in a later draft (e.g. prospects for meeting flow objectives and sturgeon pulse operations). Changes from the previous draft include: language was added about the potential to not meet April 10 refill at Hungry Horse, and that an estimated 175-225 kaf will be available for Upper Snake flow augmentation this year.

ACTION: Tony Norris, BOR, will provide information about the composition of available water volume for Upper Snake flow augmentation at the next TMT meeting.

MOP: The Update includes MOP operations that were implemented last year (MOP +1 at all projects except Lower Monumental) in the Snake River projects. No dredging has occurred yet so the COE plans to implement the same MOP operations as recent years to maintain the safety of navigation channels.

Ice Harbor Balloon Tag Test: Spill at the Lower Snake usually begins on April 3. An 11-day balloon tag test at Ice Harbor is scheduled to start on March 31, at different levels of flow – the 'high' flow test will require that the full operating range be used at all Lower Snake reservoirs. The purpose of the test is to study injuries to fish from the spillway deflector. The issue is being discussed at FFDRWG, who is working out the schedule and details of the test. There is some concern with having enough flow in early April for migrants. If anyone has comments on the operation, call Mike Smith (COE) at 509-527-7275.

ACTION: TMT will discuss this at its March 23rd conference call.

Q Adjust Runs: Julie Ammann, COE, shared the latest Q Adjust runs. The models take the current water supply forecast and runs it 69 different ways based on observed historic runoff, to meet multiple objectives. The model shows that Grand Coulee will likely refill for the June target. It was noted that the model points out the need to find a balance between spring and summer operations this year.

ACTION: TMT will discuss Priest Rapids and Bonneville flow objectives at the March 30 TMT meeting. The COE welcomes feedback on the format of the model.

Start of Spill at Bonneville: The current BiOp calls for spill start at Bonneville on April 10 at 75 kcfs. Given high TDG levels and low water in the river, the COE would like feedback from the salmon managers about how to manage this.

ESP Runs and Graphics

Randy Wortman, COE, shared different graphic depictions of ESP runs for April-June Dworshak, Hungry Horse and Libby inflows. The COE would like feedback on the presentations.

ACTION: TMT members should review the nine options and select those most preferred for the March 30 meeting. A suggestion was made to include bull trout minimums into calculations for Libby.

ACTION: TMT will discuss decision-making around the start of spill at Bonneville during low water years at the March 30 TMT meeting.

Status of Operations

Reservoirs – The March final forecast is down from February. Libby is at 5.3 MAF and elevation 2412-13'. The USFWS sturgeon pulse operation recommendation for Libby is forthcoming. Grand Coulee is at elevation 1265.2'. Hungry Horse is at 3546.5' and operating to meet Columbia Falls minimums. The Dworshak water supply forecast is 1.4 MAF (54% of normal). The project is at elevation 1569' and refilling. The Lower Granite water supply forecast is 9.96 MAF (less than in 2001).

Fish – The salmon managers shared slides from the chum redd field trip. Ron updated on chum numbers, which can be found on the Fish Passage Center website. Emergence timing is somewhat early, but overall this year's chum emergence appears to be similar to 2004. TMT will continue discussions as the season progresses. The salmon managers will begin discussing chum operations criteria now to stay ahead of a potential 'emergency' operation given the decreasing water supply forecast.

ACTION: Ron will send chum information to Cindy to attach to future agendas until the end of chum emergence.

Power system – The system is operating to meet 11.5' tailwater at Bonneville and 1255' at Grand Coulee.

Water quality – Nothing to report.

ACTIONS/NEXT MEETING AGENDA:

Actions from 3/16/05 meeting:

- Explore the possibility of putting data loggers at chum spawning areas – COE
- Share composition of estimated volumes for Upper Snake flow augmentation – Tony Norris
- Provide feedback to the COE on Q Adjust and ESP model formats – TMT
- Send chum information to be linked to future TMT agendas – Ron Boyce

*There will be a **TMT Conference Call** on March 23, to discuss the following:*

- Ice Harbor balloon tag test and operations
- Preliminary information on spring flow shape from salmon managers

*The next **TMT Face to Face Meeting** will be held on March 30, 9am-noon. The agenda will include the following items:*

- Chum update
- Spring Creek spill update
- Upper Snake operations
- WMP Spring/Summer Update
- The Dalles operations
- Bonneville spill
- Water supply at Priest Rapids
- Feedback on graphs/graphics
- Chum operations during low flow years

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions about these notes should contact Henriksen at 503/808-3945.

2. Update on SOR 2005-2 Operation.

David Wills said that, on March 2, the fish were released as scheduled from Spring Creek Hatchery; on Thursday morning, we were out on the river taking pre-operational TDG measurements. Corner collector operation started at 3:30 on March 3. Adult attraction spill at the Bonneville end bays was shut off at that time to minimize TDG, and water levels were starting to come up. The next morning, we took some more TDG readings; the Ives Island spawning area was covered by a foot of water, with TDG at about 106% – plenty of depth compensation. The depth compensation didn't translate as well to the Multnomah Creek spawning area, however; soon after the corner collector operation began, we were seeing TDG of about 107% with no depth compensation at that site, said Wills.

The TMT held two conference calls on Friday, March 4, and decided to shorten the duration of the operation and raise the Bonneville tailwater to 13.5 feet for 24 hours. By Saturday afternoon, the operation had ended, and end-bay spills were turned back on Sunday morning. The operation wasn't a complete success, said Wills; only about 60% of the release group had passed Bonneville by the time the operation ended. Also, TDG levels have remained high, which is a concern for both the Ives Island and Multnomah spawning sites. We'll need to have some further discussion about the questions and implications raised by this year's operation, said Wills. In terms of next steps, we have

asked the Corps to put automatic data recorders for TDG, water depth and temperature at the Multnomah and Ives Island spawning sites, to see if we can get some data on how our operations are affecting the emerging chum, Wills added.

Would the Warrendale gauge be a good surrogate for conditions at Multnomah? Henriksen asked. Warrendale seemed to be close, but there are diurnal differences, Wills replied. Also, the Warrendale gauge won't give us depth information. Would the data loggers be a part of a larger study? Henriksen asked. My thought was that information from the data loggers would give us information on whether or not our chum protection operation is having the desired effect this year, Wills replied. It would also give us information that could be useful in the future, said Paul Wagner; the Multnomah spawners represent about 30% of the mainstem chum population, and we did change the Spring Creek operation to protect them. It would be nice to know whether that worked.

Henriksen noted that the data loggers will not provide data that would be useable in season. Still, it could help us make decisions about spill for fish passage later this spring, Wills replied. Henriksen said the request for data loggers had taken her somewhat by surprise; however, we can explore that possibility, she said. How solid is the information on the impacts of various TDG levels on redds, and how important is depth compensation? Russ Kiefer asked. My understanding is that, from a TDG perspective, the eggs aren't as much of a concern as the alevins, Wills replied; the 105% threshold comes in part from the Oregon state standard. My understanding is that the pressure difference with depth is a known, well-substantiated fact, said Wills. The 105% threshold came from a literature search conducted by NOAA Fisheries biologists years ago, said Wagner; it is part of established protocol, but it may need to be revisited.

We'll get a further chum update at the next TMT meeting, said Silverberg.

3. Bonneville Spill Gate Calibration Update.

Nathan Higa of the Corps provided this update, noting that he had done many of the calculations underlying the revised rating curve. The Bonneville spill gate calibration project was undertaken by the Corps in response to our discovery, last summer, that the spillway gate openings and spill volumes were not what we thought at Bonneville, said Henriksen. The Corps undertook a study to correct that problem; that study is now available via the Corps homepage.

Higa provided an overview of this report, using the overhead projector. He touched on the following major topics:

- History – gate seal modifications in the 1970s changed Bonneville's spill performance, but the rating curves were not updated. This was not necessarily a major problem until the flow deflectors were installed and the spill pattern changed. The rating curve at The Dalles is, to Higa's knowledge, correct; the Corps used it to change Bonneville's rating curve.
- The relationship between reported and actual spill at Bonneville
- Table 1 – comparison for spill patterns used since 2002, both ratings corrected for gate opening. Assumed correction applied to all gates to determine "Actual Gate

opening.” All values are based on a Bonneville forebay elevation of 74.0 feet NGVD.

Higa noted that the study showed that the smaller the gate opening, the larger the error – for example, at a reported spill volume of 50 Kcfs, only 23.1 Kcfs spill was actually being provided at Bonneville. At 75 Kcfs reported spill, only 47.6 Kcfs was actually provided. At 100 Kcfs reported spill, 74.8 Kcfs was actually provided. At 150 Kcfs reported spill, 131.1 Kcfs was actually provided. Again, said Higa, at the older spill patterns, this wasn’t a big deal, but now it is.

Higa added that he has recommended that spill be monitored during the 2005 season, to ensure that the new rating curve is actually correcting the problem. Otherwise, he said, a more expensive field study will be required. How will you know whether, based on the discrepancy between Bonneville and The Dalles, that there is a need to calibrate further? Boyce asked. We’ll look at the streamflow data and other available measurements, and if everyone is happy, we’ll probably call it good, Higa replied. We feel that, with the recalculated rating curve, we now have a much better idea about what is actually being spilled at Bonneville, he added – we’re confident that the anomaly between Bonneville and The Dalles spill and flow will be corrected this year. If the discrepancy remains, is there anything we can do in season? Boyce asked. I think the two projects will be very close this year, said Henriksen – we probably will not see a significant discrepancy, but we will continue to monitor the data. The bottom line is that, when we order the project to spill 75 Kcfs, we will actually be spilling 75 Kcfs, she said.

Is there any other project at which this problem may be occurring? Boyce asked. You have to bear in mind that, at small gate openings, it’s difficult to precisely calculate spill, particularly at projects with a large spillway and a lot of small openings, replied Tony Norris. We haven’t discovered any other discrepancies like this one, Henriksen said. Each project has its own unique large spill gates and spillways, however. The newer projects – those which use tainter gates -- were all hydraulically modeled, Norris added, so their coefficients and spill characteristics are well known. Higa added that Bonneville is a unique project, one which utilized a variety of somewhat theoretical concepts which, for a variety of reasons, have never been used on another project.

Are the updated, corrected numbers now being reported on the website? Wills asked. Yes, Henriksen replied. Dave Clarkston noted that there may be some ramifications of this change for fish operations – in gas exchange, for example, because gas levels may be higher. We have also established a limit of 120 for nighttime spill, based on adult studies – the actual number may turn out to be lower, once a more accurate volume of spill is being delivered.

4. The Dalles Spillway Gate Operation 2005.

Mike Langeslay said that, about a month ago, when the Corps was going to do its vortex suppression test in Bay 6, they were notified that that bay couldn’t be used because the wire ropes were in such poor condition. Mechanical design section hired a cable expert to look at the entire spillway, and he told us that we shouldn’t operate The Dalles spillway this year, because the cables appeared to be more than 40 years old and

were in deplorable condition, Langeslay said. We have been looking at our options, including dogging the gates open. The question is, at what setting? How can we meet the BiOp 40% total river flow spill requirement at a single gate opening? We feel we may be able to change the openings once or twice during the season; 6 feet and 8 feet have been suggested for early and later in the season. It also appears that the cables at two of the gates – Bays 1 and 2 – may be in better shape than the others, so it may be possible to operate those bays with greater flexibility, Langeslay said.

Boyce asked what the Corps would do later in the spring, when flows increase during the freshet. That's what Mike was saying about a second gate opening, 8 feet – that would give us a total of about 72 Kcfs of spill, which should be adequate, Henriksen replied. The question is how close we can come to 40% of total river flow, said Langeslay – we're either going to be over it or under it, depending on the flows that are coming down. He added that, at 6 feet open, each bay (Bays 1-6) would spill about 9 Kcfs; at 8 feet open, each bay would spill 12 Kcfs. In response to another question, Langeslay said the Corps is already working on a long-term fix for this problem; however, it is expected to take a year to replace the wire ropes and, probably, the drums, for Bays 1-6.

Henriksen noted that WES and FPOM have been discussing this situation, with some physical modeling being done at WES. The Corps' current strategy is to operate Bays 1-6 at a fixed opening – 6 feet – during the early spring and summer, and at a fixed 8 feet during the freshet. Personnel are out at the dam today examining the feasibility to operate bays one and two this summer. More information will be known about those tests tomorrow. Discussions are continuing within FPOM and with BPA to prepare a final recommendation. This topic will be brought back when more information is ready to be shared.

5. Spring/Summer Update.

As we discussed at the last TMT meeting, we did get a revised spring/summer update out this morning, said Henriksen. It is in legislative format to show what has been changed. Please note that the full text of the revised spring/summer update is available via hotlink from today's agenda on the TMT homepage. She went briefly through the revised spring/summer update to show the TMT what is new. This is primarily updated technical data in response to the water supply forecast, she said, and I would like to accept these legislative changes and start with a clean copy next time.

Henriksen noted that the March final water supply forecast at Libby is 5.37 MAF, down significantly from the February final forecast; this will result in a Tier 2 sturgeon pulse in 2005. At Hungry Horse and Libby, it is unlikely that the April 10 flood control elevations will be met, said Tony Norris. However, that doesn't mean the projects won't refill by June 30, he added. The minimum flow requirement at Columbia Falls is what really drives Hungry Horse operations, Norris added. At Grand Coulee, the spring/summer update reports that it is not realistic to expect the project to reach full – elevation 1290 – by July 1. We could get there, but it would be at the expense of flows. We're still expecting to draft Grand Coulee to 1278 by August 31.

This is the first time I've heard that Grand Coulee will not refill in 2005, said Boyce. Again, we can refill the project, but that will result in low flows in the lower river, said Norris. The TMT will need to continue to discuss the balance between flows and refill.

Henriksen noted that the Corps intends to fill Dworshak by June 30. With respect to Upper Snake flow augmentation in 2005, Reclamation is now forecasting that between 175 and 225 kaf of water will be available in 2005. Norris noted that southern Idaho is in the throes of a severe drought; the Upper Snake flow augmentation water is made available on a willing buyer/willing seller basis only. He said he will bring a breakdown of where that water will come from to the next TMT meeting.

Moving on, Henriksen touched on the revised and updated flood control elevations at each project; these elevations have gone up as the water supply forecast has continued to decline. Henriksen noted that the planned minimum operating pool operations have not changed since the last draft of the spring/summer update. Ice Harbor, Little Goose and Lower Granite are planned to operate at MOP +1, while Lower Monumental is planned to operate at MOP. This operation is the same one that has been implemented in the lower Snake River for the past several years. This operation is expected to continue because the Corps has been unable to complete any dredging in the lower Snake River again this year. Last year was a low water year and the siltation issues within the navigation channel have not abated. Therefore, the Corps expects to have to operate the projects at these same elevations again this year to maintain the fourteen-foot navigation depth through the channel.

With respect to spring spill at the Snake River dams, the forecast continues to show flows of less than 70 Kcfs through the Lower Snake this spring; the current forecast at Lower Granite is 9.96 MAF, which translates into an average flow of less than 50 Kcfs. That means there will be no regular spill at the Lower Snake collector projects this spring. Henriksen noted that the details of the spring spill programs at The Dalles, Bonneville and other Lower Columbia projects are still being worked out; she urged anyone with questions about these operations to refer to the text of the revised spring/summer update. In response to a question from Kiefer, Henriksen said the action agencies are interested in comments on the spring/summer update.

Henriksen noted spill would normally start at the Lower Snake projects on April 3. However, an 11-day balloon-tag test is scheduled to start at March 31 at Ice Harbor; the test includes high, medium and low-flow treatments. We will need to use the full operating range of all four Lower Snake projects in order to achieve the high flows required for the test, Henriksen said. What are the flows going to be if you use the full operating range at all four pools? Boyce asked. I don't have that information in front of me, said Larry Beck; the purpose of the test is to look at injuries associated with the spillway deflectors at Ice Harbor, at various tailwater elevations. On what dates would the water be drafted and refilled? Boyce asked. Mark Smith replied that the Corps sent out a heads-up objectives and treatment schedule to FFDRWG two weeks ago; we're still developing the actual patterns we're going to test, he said. The RSW will be installed at Ice Harbor by the 25th or the 26th, and the test will start after that. To answer your original question, we're still working out some of the fine details of the test, Smith said. My

concern is flows in the lower river during April, when we will have some migrants coming down through the system, said Boyce.

We need an average of about 22 Kcfs coming through the system during the test period, added Beck; right now, we're right on the edge. Julie Ammann noted that, during the high-flow treatment, a day-average flow of more than 50 Kcfs will be needed. Wouldn't it be possible to do this test later, when you wouldn't have to artificially inflate flows? Boyce asked. My understanding is that that would impact the telemetry study, Smith replied. Also, we wouldn't be able to operate the projects at MOP, added Ammann. Smith asked anyone with questions or comments on the Ice Harbor balloon-tag test to contact him directly at 509/527-7275.

Moving on, Ammann summarized the results of the Corps' most recent QADJ model runs. These show the likelihood of the seasonal flow objectives being met at Priest Rapids, Lower Granite and Bonneville, based on the current water supply forecast, shaped 69 different ways based on historic water years. The bottom line is that the QADJ runs show that Grand Coulee is likely to refill (55 out of 69 years) if the seasonal average flow target at Priest Rapids is adjusted downward somewhat. At Bonneville, the resultant flows would be below 125 Kcfs during the first part of April during about half of the scenarios modeled. At Lower Granite, spring seasonal average flows (April-June) fluctuate between 41 and 50 Kcfs, depending on the shape of the runoff; there is virtually no chance that any of the monthly April-August flow targets will be met at that project. The same is true of McNary. This is based on the March final forecast? Wagner asked. Correct, Ammann replied. And the forecast is continuing to trend downward? Wagner asked. Correct, Ammann replied.

In response to another question, Ammann said that, under an assumed Priest Rapids flow of 70 Kcfs during April, it was possible to meet the 125 Kcfs, 11.5-foot minimum tailwater objectives at Bonneville in only about half of the 69 historic years. The group devoted a few minutes of discussion to the table of period average flows, by project.

I guess the bottom line is that this is a year when we'll really need to talk about the balance between spring and summer, Boyce observed. Yes, and it also underscores the fact that our flexibility is very limited at Grand Coulee this year. When do we need to start making some operational decisions? Silverberg asked. By April 1, Norris replied.

Moving on to the start of spill at Bonneville, Henriksen reiterated that, according to the most recent QADJ model runs, even with Grand Coulee drafting to elevation 1240 under some scenarios, flows at Bonneville are quite low during some months. As per the UPA, the plan is to start spill of 75 Kcfs during the day, and up to the gas cap at night, on April 10 at Bonneville, Henriksen said. As the tailwater at Bonneville Dam is 11.5 feet and there is minimal depth coverage over the redds at Ives Island and Multnomah Falls I would like the salmon managers to consider whether starting spill at Bonneville with its resultant TDG on April 10 is the best choice for emerging chum redds downstream. It would probably be a good idea for the other TMT participants to start thinking about the Priest Rapids and Bonneville operations in what is expected to be a very low-flow year.

6. Status of Operation.

Henriksen said the March final water supply forecasts are attached to today's agenda on the TMT homepage. She reiterated that the March final forecast at Libby is 5.3 MAF, the reservoir is at elevation 2412 and refilling slightly. Grand Coulee is at 1265.2 feet and drafting toward 1255 by April 30; Hungry Horse is 3546.5 feet and releasing Columbia Falls minimum flow, said Norris. The Corps reported that Dworshak's water supply forecast is down to 1.42 MAF, 54% of average. The project is on minimum outflow and refilling – it's at 1569 feet, currently, 31 feet from full. As reported earlier, the April-July forecast at Lower Granite is now 9.9 MAF, less than the observed runoff in 2001 of 10.3 MAF. However, it could still rain, Wagner noted – the spring period isn't over yet. This is now officially the third-lowest water supply forecast on record at The Dalles, Norris noted.

Henriksen touched briefly on the Corps' most recent headwater project ESP runs, showing how much flow augmentation volume may be available from the headwater projects over and above what is needed to achieve June 30 refill. Randy Wortman led this presentation, touching on potential daily inflows and outflows at Dworshak. The bottom line is that, for much of the April-July period, both daily inflows are well below the historic means, according to these ESP runs, said Wortman. He noted that any TMT feedback as to how better to model and present the ESP information would be helpful.

All of this translates into estimates of the volume of water available for spring flow augmentation, over and above the volume needed for project refill at the headwater projects, Henriksen explained. At Dworshak, for example, based on the March final forecast, we might have up to 565 kaf available, based on a 50% confidence of refill. That volume falls to 365 kaf under a 70% refill probability, and rises to 769 kaf if the TMT is willing to accept a 25% confidence of refill. At Hungry Horse, the potential flow augmentation volume is 600 kaf at 50%, 486 kaf at 70%, and 726 kaf at 25%. At Libby, the potential volumes are 639 kaf, 400 kaf and 222 kaf, even factoring in an 800 kaf sturgeon pulse. In response to a question, Jeff Laufle said the Fish and Wildlife Service doesn't know yet when the sturgeon pulse will begin; some years it's in May, and some years it starts in June.

Moving on to fish, the group reviewed photos from the late-February TMT field trip to the Ives Island spawning site. Wills said the take-home message from the trip was that, at a tailwater elevation of 11.5 feet, several chum redds were observed to be high and dry, while several others were right at the edge of being dewatered. There has been some discussion of dropping the minimum Bonneville tailwater to 11.3 feet; at this point, the salmon managers are comfortable with keeping the tailwater elevation at 11.5 feet.

Boyce reported that, according to the most recent field survey data, seine catches – about 170 chum to date – are right in the middle of what has been seen in recent years. Emergence timing appears to be essentially normal, perhaps slightly earlier than normal, although overall numbers may be somewhat lower this year, due to lower spawning escapement last fall. He said he expects that emergence will likely end some time in May. Boyce said he will provide additional chum updates at future TMT meetings; in the

meantime, it would probably be a good idea for the TMT to start thinking about criteria for ending the chum protection operation, if a real water supply crunch occurs.

Nic Lane said there are no significant power system issues to report; we're drafting Grand Coulee toward elevation 1255. Jim Adams said there are no water quality issues to report, currently.

7. Next TMT Meeting Date.

It was agreed to schedule a TMT conference call for March 23. The next face-to-face meeting of the Technical Management Team was set for March 30. Meeting summary prepared by Jeff Kuechle.

TMT Meeting Participants

March 16, 2005

Name	Affiliation
Donna Silverberg	Facilitation Team
Cindy Henriksen	COE
Ray Gonzales	COE
Nic Lane	BPA
Tony Norris	USBR
David Wills	USFWS
Paul Wagner	NOAAF
Russ Kiefer	IDFG
Julie Ammann	COE
Bruce Glabau	BPA
Russ George	WMCI
Laura Hamilton	COE
Dave Benner	FPC
Margaret Filardo	FPC
Robin Harkless	Facilitation Team
Ruth Burris	PGE
Tim Heizenrater	PPL

Paul Koskie	COE
Brad Ebbert	COE
Todd Cook	PPM
Dan Spear	BPA
Ron Boyce	ODFW
Michael Coffey	BPA
Greg Hoffman	COE
Bruce MacKay	Consultant
Glenn Traeger	Avista
Tom Le	PSE
Victoria Watkins	PIRA Energy Group
Mike Buchko	Powerex
Larry Beck	COE
Karl Kanbergs	COE

Assumptions:

- * Streamflows were adjusted to the March Final Water Supply Forecast for the period of March thru August of 63.5 MAF at The Dalles (62% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations were observed data from February 28, 2005.
- * Grand Coulee drafts to 1255 ft in March for drum gate maintenance. Coulee tries to meet 70,000 cfs at Priest Rapids in Apr1, 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project tries to meet 90,000 cfs in June at Priest Rapids, but fills to at least 1285 ft and up as high as 1290 if flows are above 90,000 cfs. Summer BiOp drafts are 1282.5 ft in July and 1278 ft in August.
- * Hungry Horse operates to VARQ flood control or minimum flow from Jan - May and meets minimum flow of 3250 cfs at Columbia Falls, targets full in June, and drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool).
- * Dworshak targets elevation 1587.5 ft in Mar, 1595.7 ft from Apr 15 - 30 and targets full in June. DWR drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Jan - May, targets full in June with a minimum flow of 14,500 cfs out in June for sturgeon, based on last years requested sturgeon flows. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Mar	69	93	65
Apr 15	68	72	65
Apr 30	30	95	110
May	20	117	130
Jun	62	101	90

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	37	85
May	0	55	85
Jun	2	49	73
Jul	0	29	50
Aug 15	0	23	50
Aug 31	0	22	50

Bonneville Meets Flow Objectives of 125 kcfs in Feb - Apr:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Mar	57	138
Apr 15	33	126
Apr 30	56	152

McNary Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	138	220
May	0	171	220
Jun	0	147	220
Jul	1	162	200
Aug 15	0	113	200
Aug 31	0	112	200

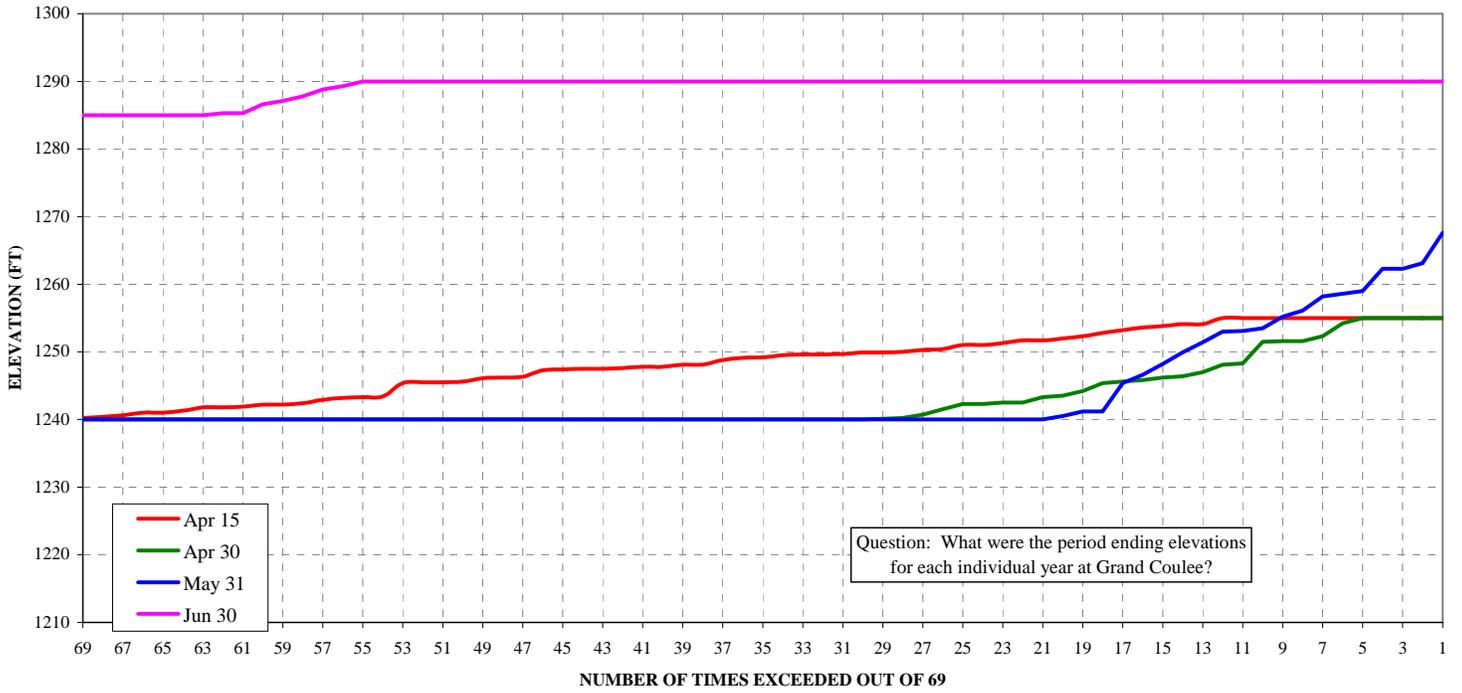
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	69	2459
Hungry Horse	69	3560
Grand Coulee	57	1289
Dworshak	69	1600

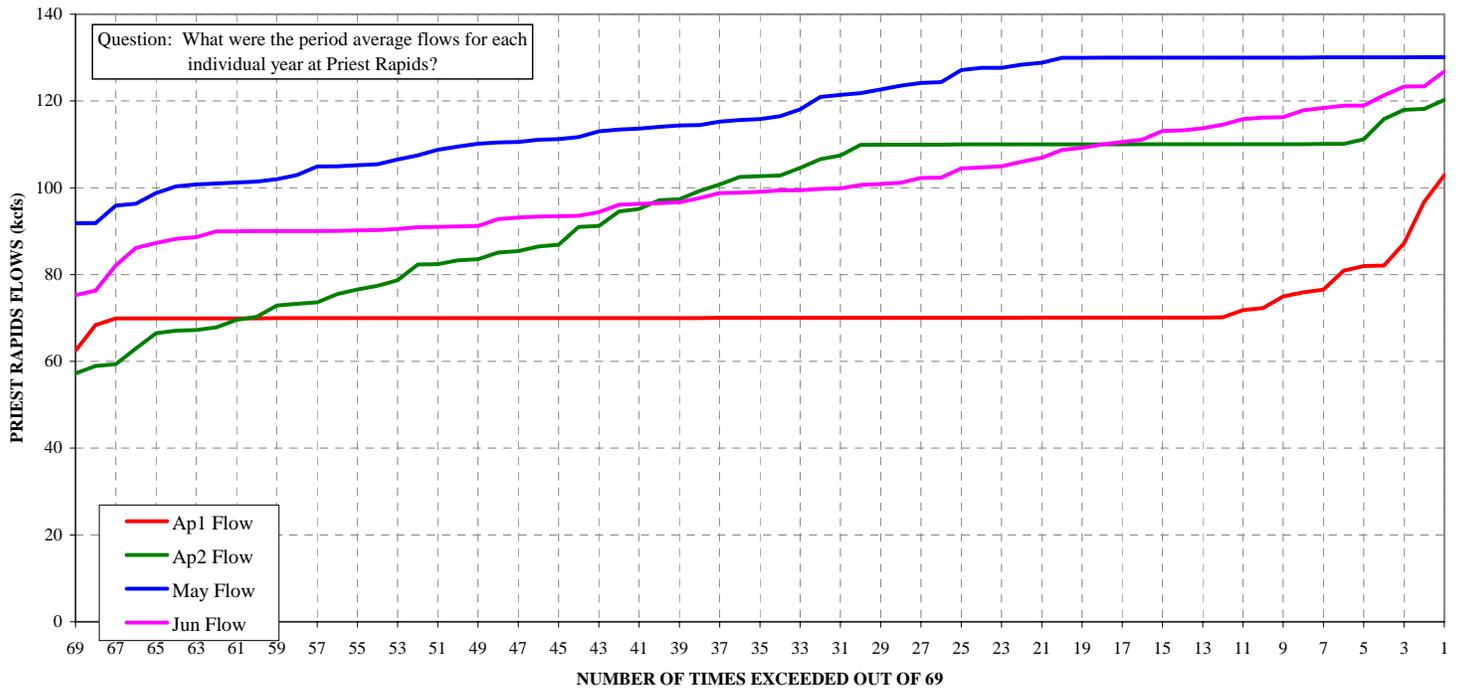
Period Average Flows (kcfs):

	FEB 1-28	MAR 1-31	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	5.8	21.3	21.5	19.4	16.5
HGH	1.0	2.2	0.5	0.5	5.0	6.1	5.8	5.4	4.2
GCL	101	90	70	93	113	97	138	93	92
PRD	111	93	72	95	117	101	138	92	91
DWR	1.6	1.5	1.6	2.1	6.8	5.2	10.0	10.0	9.4
BRN	10	12	14	14	14	12	9	9	9
LWG	21	22	31	37	55	49	29	23	22
MCN	134	124	114	138	171	147	162	113	112
TDA	140	134	122	148	175	149	164	115	113
BON	138	138	126	152	177	151	165	117	115

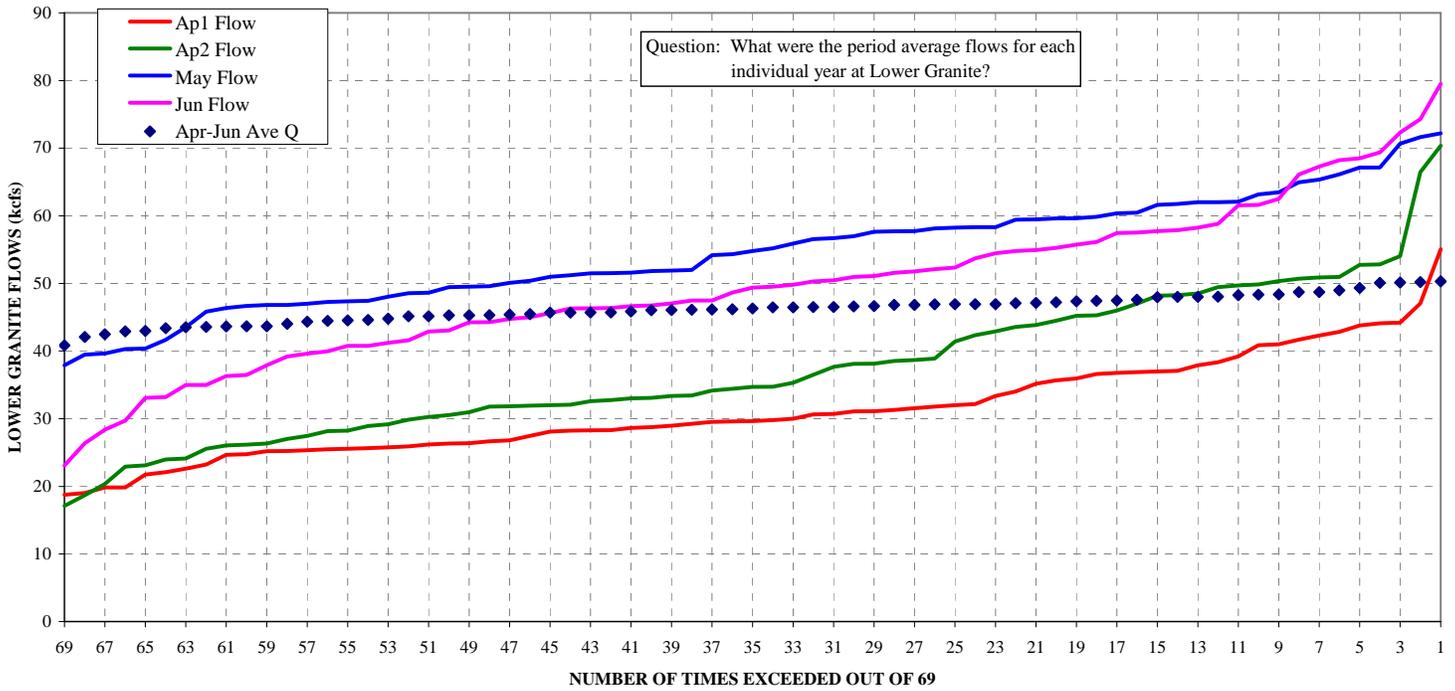
GRAND COULEE LAKE ROOSEVELT ELEVATIONS



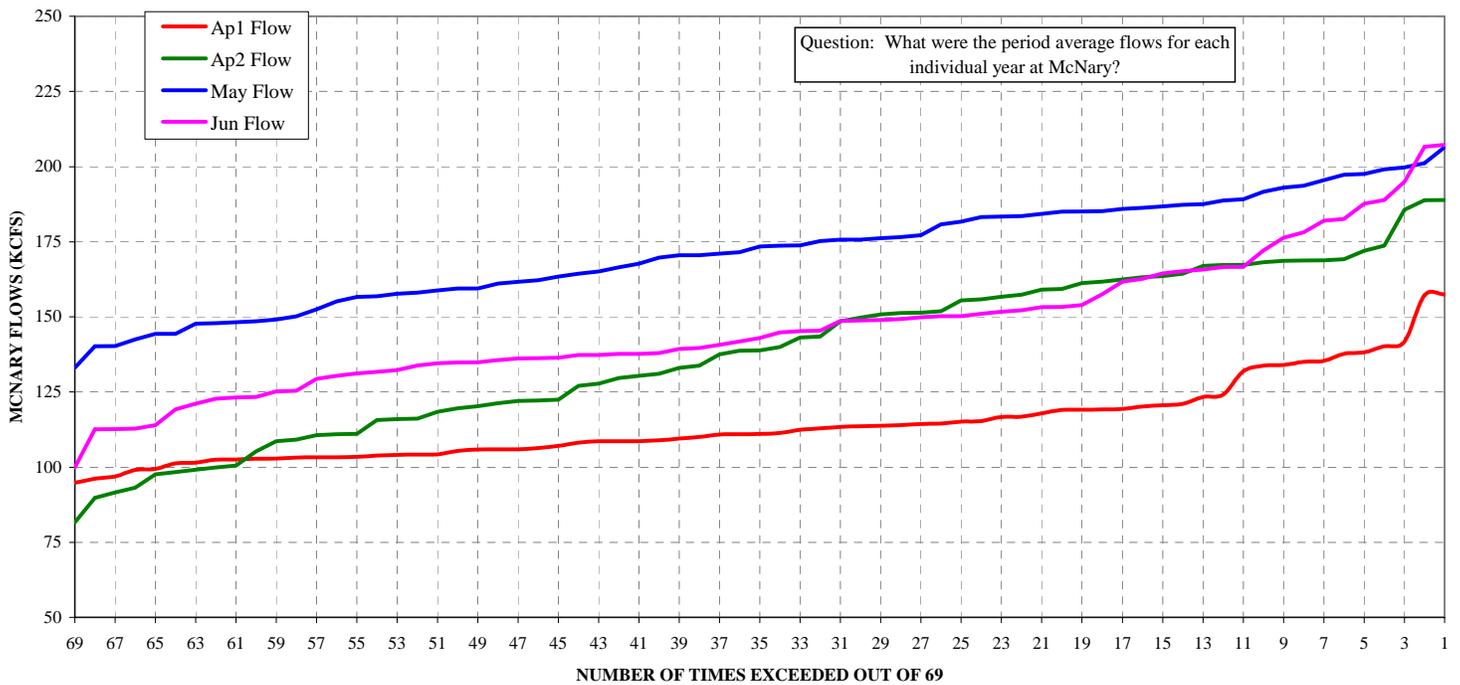
PRIEST RAPIDS APRIL - JUNE FLOWS



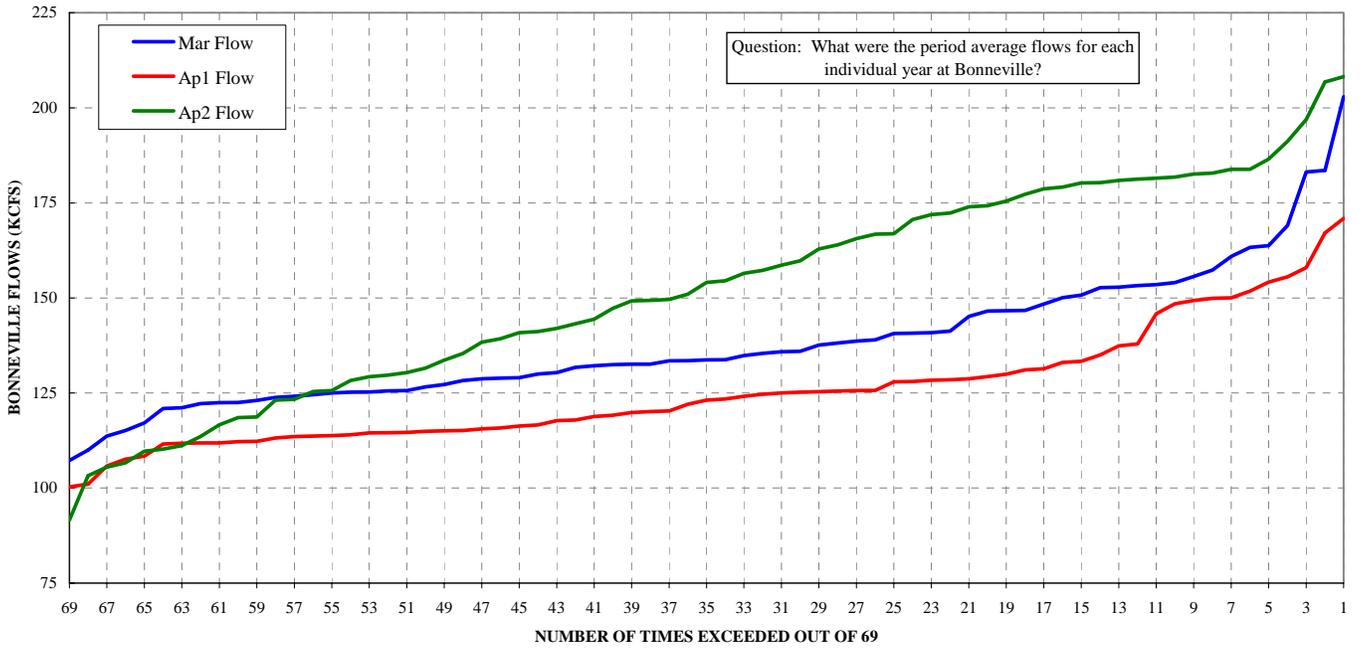
**LOWER GRANITE
APRIL - JUNE FLOWS**



**MCNARY OUTFLOW
APRIL - JUNE AVERAGES**



BONNEVILLE OUTFLOW March and April Flows



TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner /

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday March 23, 2005 0900 - 1200 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

"Please MUTE your Phone"

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. Ice Harbor Balloon Tag Test and start of spring operation.
[\[Test Summary\]](#) 
3. Shape of Priest Rapids flow in April.
4. Other
 - Set agenda for next meeting. -
[\[Reference Calendar\]](#) 

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

IHR Balloon Tag Test will consist of 3 sets of 3 tailwater conditions:

Plunge: A low tailwater elevation (near 338 ft) during the test period, which will require flows for the day to fluctuate between 9.5 - 15 kcfs.

Skim: A medium tailwater elevation (near 342 ft) during the test period, which will require flows for the day to fluctuate between 9.5 - 55 kcfs.

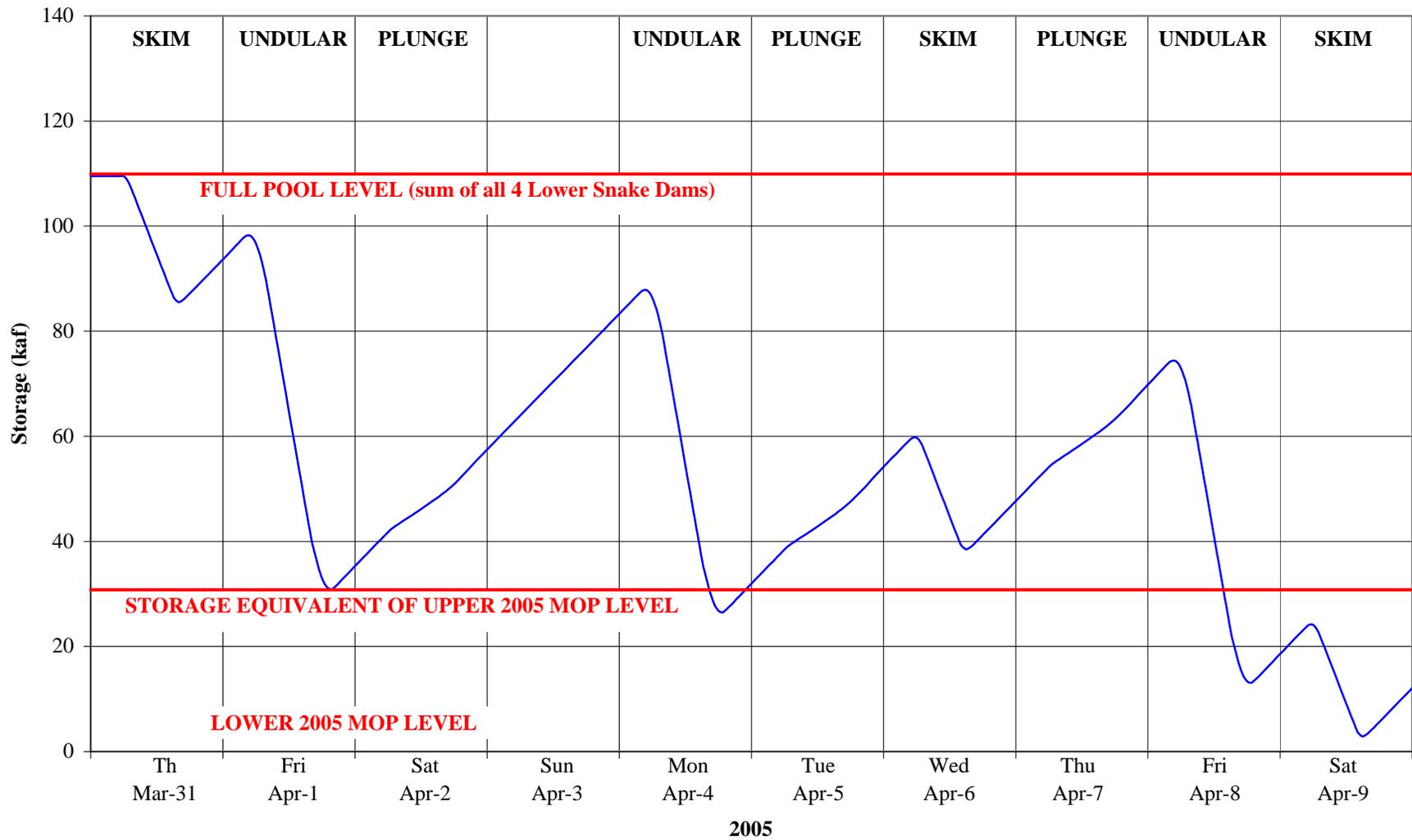
Undular: A high tailwater elevation (near 346 ft) during the test period, which will require flows for the day to fluctuate between 9.5 - 95 kcfs.

Proposed Test Schedule:

Test Day	Date	Flow Regime	Day of the Week
1	31-Mar	Skim	Th
2	1-Apr	Undular	F
3	2-Apr	Plunge	S
4	3-Apr	Off	S
5	4-Apr	Undular	M
6	5-Apr	Plunge	T
7	6-Apr	Skim	W
8	7-Apr	Plunge	Th
9	8-Apr	Undular	F
10	9-Apr	Skim	S

Note: There will be no UPA spill during this test. Nighttime flows will need to be decreased to 9.5 kcfs to store water needed for the next treatment.

DRAFT SCENARIO - Lower Snake Composite Storage During IHR Balloon Tag Test



TECHNICAL MANAGEMENT TEAM CONFERENCE CALL NOTES

March 23, 2005
Corps Reservoir Control Center
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.

Ice Harbor Balloon Tag Test

Cindy Henriksen, COE, summarized the Walla Walla COE's proposed Ice Harbor balloon tag test, which was also described in two documents attached to today's agenda. The test was proposed to run from March 31-April 9, during which time three treatments would occur:

- "Plunging": Low flow treatment over a 24-hour period with flows ranging from 9.5 kcfs at night to 15 kcfs during the day, with a day average outflow of 12 kcfs.
- "Skimming": Medium flow treatment with flows ranging from 9.5 kcfs at night to 55 kcfs daytime, with a day average outflow of 30 kcfs.
- "Undular": High flow treatment with flows ranging from 9.5 kcfs night to 95 kcfs daytime flows, with a day average outflow of 48-52 kcfs.

All four Lower Snake projects would be affected by the test, as they would be used to draft during daytime periods requiring higher flows. The graph shows that storage at the Lower Snake projects would start (March 31) at full pool, and end (April 9) at lower MOP storage levels. No UPA nighttime spill would occur during the test, but spill would occur during daytime test periods. The spill periods would be up to 10 hours.

The Walla Walla COE has been coordinating the test through FFDRWG and expressed an interest in continuing to coordinate through TMT, welcoming feedback on the proposed test. Concerns from the salmon managers were raised:

- With this year's low flows, the test may not provide the information we are looking for. Walla Walla COE recognized the strain on the river with low flows. Still, they felt the potential real-time risks to fish were pressing enough to move forward at this time with the test.
- Injuries to fish/decreases in survival may be impacted by other factors (e.g. gate locations) more so than tailwater – is this test necessary? Available information suggests that tailwater elevations have an effect on fish injuries.
- Is the test critical this year, or could it be postponed? There are potential risks to fish right now, and the test results could effect future RSW and bulk spill operations at the project.

The salmon managers needed time to consider and discuss the proposed test. The COE needed to make a decision in the next day, so TMT agreed to reconvene for a conference call at 3:00 pm today.

UPDATE: After further discussing the test proposal, the salmon managers expressed concern about the effects of the study (fluctuating flows) on delay and mortality in forebays, particularly at Lower Granite. They recommended postponing the test until next year before spring migration season, to allow time to look at the nature of the study, the technology around the study, and the study design. The COE Reservoir Control Center believes this is important research and has safety concerns with implementing the test during this low flow period, so recommended that it be conducted at a later time.

ACTION: The salmon managers will draft a letter summarizing their concerns and share it with the Walla Walla COE. The COE will take comments from TMT into consideration as they make a final decision about the test. They will send an email with their decision through Cindy Henriksen to TMT tomorrow (3/24). There will be an update on this issue at the 3/30 TMT meeting.

Priest Rapids Flow in April

The action agencies requested feedback from the salmon managers about chum operations criteria, given the low water year and concerns with high TDG levels in the river. The latest chum emergence information was posted and linked to the 3/16 TMT meeting agenda – the COE requested clarification on some of the links.

ACTION: The salmon managers are working on flow scenarios for operations after April 10 (the expected end of chum emergence), which they will share with the COE in the next few days to inform the COE's Q Adjust runs. One suggestion was to consider lowering the Bonneville tailwater before April 10 if chum emergence appears to be ending early. There will be a follow-up discussion on this at the March 30 TMT meeting.

The salmon managers requested that the action agencies continue to be mindful of the water 'budget' when making operating decisions as we continue through the season. It was noted that the tailwater at Bonneville went slightly above 11.5' yesterday due to other system operation issues.

Next Face to Face TMT Meeting, March 30, 9am-noon

Agenda Items:

- Chum update/Operations during low flow years
- Spring Creek spill update
- Upper Snake operations
- WMP Spring/Summer Update
- The Dalles operations
- Bonneville spill
- Water supply at Priest Rapids
- Feedback on graphs/graphics

- CRITFC 2005 River Operations Plan

1. Greetings and Introductions.

Today's Technical Management Team conference calls were chaired by Cindy Henriksen and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. Ice Harbor Balloon Tag Test and Start of Spring Operation.

Henriksen said that the proposed Lower Snake operation during the testing period has been hot-linked to today's agenda on the TMT homepage. The test is scheduled to start March 31 and will run through April 9. There are three treatments of spill: skimming, undular and plunging. This entails specific tailwater elevations for each treatment. The plunging spill treatment involves a low tailwater elevation, 338 feet at Ice Harbor. That translates into flows of 9.5 Kcfs at night and up to 15 Kcfs during the day for 8 hours. The skimming spill test would result in Lower Snake flows of 55 Kcfs during the day down to 9.5 Kcfs at night. The undular treatment will require up to 95 Kcfs for 7-8 hours during the day, down to 9.5 Kcfs at night while the reservoirs refill.

I say reservoirs in the plural, said Henriksen, because all four Lower Snake projects will be used to contribute to these different flows, particularly the undular flows. These projects will draft during the day, then refill at night. Across the 10-day test period, these projects will start out full, and will be below MOP at the end of the test.

Other impacts of this test include the fact that, during the test period, there will be no other UPA spill at Ice Harbor, Henriksen said. Also, the other Lower Snake projects will not be able to operate in their MOP or MOP+1 ranges during the test period.

How long does the test run each day? Kyle Martin asked. For 7-8 hours, and up to 10 hours, during the daytime test period, Henriksen replied. I've been trying to figure out, for a single three-day block, what the average daily flow is, and how that will affect flows in the lower river, said Wills. The test plan is based on an average flow of 22 Kcfs through the Lower Snake; the flows will be re-shaped downstream, Henriksen replied. Day-average flows will be up to 30 Kcfs under the medium tailwater treatment, added Julie Ammann, 12 Kcfs during the low tailwater, and on undular, 48-52 Kcfs.

There will be no spill when flows are 12 Kcfs? Paul Wagner asked. No, that would be all spill, Ammann replied. And at night, it would be all powerhouse flow? Wagner asked. Correct, Ammann replied – there would be no powerhouse flow at Ice Harbor during the day. The objective is to use existing river flows to provide all water for this test, rather than taking any water out of storage, John Wellschlager added.

Has this test gone through the regional approval process? Wagner asked. The coordination has been done through FFDRWG, Mark Smith replied; I guess the

coordination is ongoing. I'm hoping this group will help with that. The study has been coordinated, although we haven't gotten a lot of comments back. We're planning to go forward unless the TMT is strongly opposed, Smith said, but we're still considering coordination, and are still open to comments.

Russ Kiefer said he has heard some concerns: with these low flows, the test we can provide may not be truly representative of what we really want to test, for example. Also, there is some concern from CRITFC and USFWS that the differences in spillway survival we've seen in the past may be more due to low gate openings and where the fish were released than what tailrace conditions were like. I think we should make sure that we can convince folks that there really is an issue we need to address, he said. If so, the cost of manipulating MOP and the lack of nighttime spill to the fish needs to be worth the information we're going to gain, Kiefer said – we need to be sure this is a question that really needs to be answered.

Lynn Reese replied that, in terms of the target tailwater elevations, based on the Corps' analysis, we feel we can hit the conditions we want. The low flows may cause a slight adjustment in the releases we would like to see from the projects, but the idea is to hit the tailwater conditions we're targeting, as well as the time duration. We're working with Reservoir Control and others to make sure we're getting the proper conditions. With respect to the second part of your question, the influence of gate openings, our view of the evidence is that the problem is the tailwater conditions. This test is designed to nail that question, and it has major operational and biological implications. The sense is that bulk spill gives us the best tailwater conditions, but there is still a question about where the greatest survival benefit occurs. We have a theory that's based on some pretty strong information, and this test will nail it, from our perspective, particularly the question of bulk spill vs. flat spill, Reese said. We see this as one of the most important tests that we've done.

When you say "we" did an analysis, is that the agencies, tribes, Corps and the region? Michelle DeHart said. Have other people reviewed the test design? We've been looking at the 2003-2004 research information at FFDRWG, Reese replied; from my perspective, it's "we, the region." So do I understand that "we, the region" agree with the proposed study design at Ice Harbor? DeHart asked. The Corps did most of the analysis and presented it at FFDRWG for comment, Smith replied. Other agencies have reviewed that analysis, and based on the comments received, the Corps designed this study. Did the agencies and tribes agree with the analysis you presented, and with the test design? DeHart asked. Leading up to this design, we held meetings to which the states, tribes and other salmon managers were invited, said Reese. I think this has been coordinated through all of the interested agencies, said Smith. But did they agree? DeHart asked. This study requires a significant river operation, so have the agencies and tribes agreed with you on the basis of this study and the conduct of this study? I would say yes, except on the river operations, Smith replied – originally, we planned to do the study earlier, before the spill season was to begin. I'm a little less confident on the operation because the test has been shifted into the spill season, due to delays with RSW installation. My point is that coordination and agreement aren't the same thing, said DeHart.

The point is that there has been ample opportunity to comment, said Henriksen; we would prefer to talk about the test as it is before us. We have to consider, also, what will happen after the test, because by that time it will be April 10. According to the UPA, we would not be spilling at the collector projects, but we would be doing some testing of the RSW for approximately 10 days. That would not be full UPA spill because of the testing of the RSW, Henriksen said. You should be prepared that you may get some comments on the design and on the analysis, said DeHart.

What I'm hearing is that if people object to the operations required to perform this study, this is the time to weigh in, said Wagner. Our next TMT meeting is on the 30th, Henriksen replied; if we don't get any feedback from you today, by next TMT meeting, we'll be poised and ready to begin, because we need to set up the river and get people in the field.

I'm not seeing the test as critical this year, given the low flows, said Wills. What's preventing us from postponing the test until next year? It's a question of risk, Reese replied – every year we operate Ice Harbor without knowing what's causing the injury problems, it puts real-time fish at risk. There is a potential that this test could impact what bay adjacent the RSW we operate for training spill. If we have injury issues with the RSW, this may give us some indication as to why, and help us refine the operation for next year. The training spill question will be determined through an analysis of hydraulic conditions, added Reese – it's a real-time thing we were hoping to factor in this year.

With respect to bulk spill, I'm scratching my head, said John Wellschlagler – if you're in an operation and it's not giving you the results you want, what's to prevent you from switching the training spill to another bay? It's a question of how quickly we can turn around the information, Reese replied – this balloon tag information is the only way we can get a quick turnaround on injury data.

Is there another time we could do this test? Henriksen asked. There's always another time, Reese replied; we have discussed moving the test to the fall, possibly in November. However, the average flow would be, perhaps, 20-40 Kcfs. It's a little bit of a longshot that we would be able to do the test this fall, which could mean pushing the test out to next March. That means another year of impacts to fish. But this test will not impact operations this year? Wagner asked. Correct, Reese replied, but to me, this may be one of our best years to do the test, in terms of minimizing the impact to migrating fish.

Do you understand the operation as it's being proposed, and the impacts to other Lower Snake operations, such as delaying the MOP+1 operation and delaying UPA spill until the 20th of April or so? Henriksen asked. Why the 20th of April? Wagner asked. Because we will be testing the RSW for 10 days after the Ice Harbor test is completed, Henriksen replied.

After a few minutes of additional discussion, it was agreed that the salmon managers will discuss the proposed test, and the TMT will re-convene via conference call at 3 pm today.

When the call resumed, Wills said the salmon managers had discussed the balloon tag test, and have concerns about the effects of the operation on delay and mortality in the forebays, particularly at Lower Granite, due to the fluctuating flows. Given the risks associated with this low-flow year, in terms of getting a meaningful study, which may need to be repeated, in the salmon managers' view, the risks of continuing outweigh the risks of delaying the study, he said. We also have some concerns about the study design, which we would like to address at a later time. Tom Lorz said the salmon managers will be sending a letter outlining these concerns to the Corps. And when you say you have concerns about the study design, where would those be addressed? Henriksen asked. Through FFDRWG, Wills replied.

Smith said that, in his view, this study needs to occur. There are risks associated with the study; the question is, how real are those risks? We have set up the test, and in my view, the conditions we have set up, there is some softness in the tailwater target for the undular and skimming flow, said Reese. We need to have some further discussions with Reservoir Control, and with the biologists, about the feasibility of the test this year, he said.

Russ Kiefer said he had talked to Tom Lorz, Steve Haeseker and others, and we have some concerns about balloon-tag and hose-release studies that have not yet been addressed. We are also concerned about doing this test during the spring migration season, rather than prior to the start of the season, as originally proposed. We are drafting a joint letter recommending that we spend some time in the coming year reviewing those concerns, and making sure we're using the right technology to address these questions. We're going to be sending a letter expressing our concerns, and the fact that we are unanimously not in support of doing the study this year, Kiefer said. Wagner said that, if other salmon managers have a problem with this study, then NOAA Fisheries is not comfortable with it either.

Henriksen said that, from an RCC perspective, this is a very difficult operation to try to pull off, given the low-flow conditions this year. I would feel more comfortable waiting until we have more flow in the river, she said; that will give the Lower Snake pools more ability to recover, from an operational standpoint.

I would like to take this information to our upper management, said Reese. We definitely hear folks loud and clear, said Smith; however, we need to have some additional in-house discussions before the Corps makes its final decision. Paul Ocker said that, from a Division perspective, this is important research; however, if it was to be pushed to a different time, we wouldn't have a problem with that. The decision is up to Walla Walla, however, he added.

It sounds, then, as though there will be some internal discussions later today at Walla Walla District, and that the Corps will send out an email laying out their final decision by tomorrow morning, said Harkless.

3. Shape of Priest Rapids Flow in April.

This question has an impact on flows at Bonneville, and our ability to maintain an 11.5-foot tailwater elevation at Bonneville after April 10, said Henriksen. Spill is scheduled to begin on April 10, so one question is, where are we with chum emergence? The latest information we have was appended to the agenda for the past TMT meeting, said Wills. I think we'd like to look at the data again and link it properly, said Henriksen – there was a bit of a disconnect between the text and the graphic information. Our concern is that, with the spill, and the 11.5-foot tailwater, I'm assuming that we're going to see very high TDG levels, which could be a problem for any chum that are left, said Wellschlager. We have been discussing that point with the salmon managers, and we would like to wait for another couple of weeks to see where we're at, said Wills. There was a commitment to get all of the temperature data together, so that we have a clearer picture of what's going on by the next TMT meeting, said Wagner. Henriksen reminded the group that, with Grand Coulee drafting toward elevation 1255 by March 31, there is limited ability to shape flow in the lower river in April. We need to discuss how best to shape the Grand Coulee draft to support the chum operation between now and the end of April, she said.

We're looking at different scenarios, piecing together different ideas and different flow scenarios, said Wills. Hopefully we'll be able to present those at the next TMT, he said. Can you give us some idea of what you're thinking of? Henriksen asked. As a default, since we've invested this much time in the chum, we would suggest maintaining this operation through April 10, when we would start spill, said Wagner. The TDG from spill would be a risk to the chum, but not providing spill would be a risk to the upriver stocks. It would be nice if we could budget whatever water is available from drafts in the Lower Snake and the Columbia into the April 1-10 period, to maintain the tailwater elevation at Bonneville through April 10 while minimizing the stress on Grand Coulee, Wagner said. For example, if you could not bring John Day to 262.5 before April 1, that would be helpful.

So you're saying maintain the 11.5-foot tailwater through April 10? Henriksen asked. Correct, Wagner replied. And what happens after April 10? Henriksen asked. That's what we need to discuss, said Wagner. Could we begin gradually reducing the tailwater elevation prior to April 10? Wellschlager asked. Do the fish from the shallower redds emerge earlier than the deeper redds, because the temperatures are warmer in the shallower areas? That's what the data from Ives Island indicates, but we have less information on the redds in the Multnomah area, Wagner replied. The latest Q-ADJ run shows an average flow of 152 Kcfs at Bonneville during the last two weeks in April, one participant observed. That is correct, said Henriksen, but the data from the Q-ADJ study also shows that in about 12 out of the fifty years studies, the flow at Bonneville is less than 125 kcfs, too. Those are the years that may be problematic.

After a few minutes of additional discussion, it was agreed to revisit this issue at the March 30 TMT meeting. Wills said the salmon managers will provide the Corps with several post-April 10 operational scenarios to model prior to the March 30 meeting.

Dave Hurson noted that the Corps is planning to begin maximum transportation from the Lower Snake collector projects within the week.

4. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for March 30. Meeting summary prepared by Jeff Kuechle

**TMT Meeting Participants
March 23, 2005**

Name	Affiliation
Cindy Henriksen	COE
David Wills	USFWS
Paul Wagner	NOAAF
John Wellschlager	BPA
Nic Lane	BPA
Dan Spear	BPA
Robin Harkless	Facilitation Team
Kyle Martin	CRITFC
Russ George	WMCI
Bruce MacKay	Consultant
Lee Corum	PNUCC
Tom Le	PSE
David Benner	FPC
Lynn Reese	COE
Mark Smith	COE
Tim Wick	COE
Tine Lundell	COE
Laura Hamilton	COE

Larry Beck	COE
Julie Ammann	COE
Cindy LeFleur	WDFW
Tony Norris	USBR
Dave Hurson	COE
Paul Ocker	COE
Tom Lorz	CRITFC
Russ Kiefer	IDFG

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday March 30, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

"Please MUTE your Phone"

*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@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Hanford Reach Update - Russell Langshaw
[\[Priest Rapids Operations\]](#) 
3. Operations during low flow years
 - a. Chum Update.

[\[Link to Fish Passage Center\]](#)
[\[Ives Island juvenile chum catch through April 1, 2000-2005 & Ives Island juvenile chum catch, 2000-2005 - Larry Beck - Corps\]](#) 
 - b. Start of Bonneville Spill.
 - c. Shape of flow at Priest Rapids through April, May, June.

[\[State, Federal and Tribal Fishery Agencies Joint Technical Staff - MEMORANDUM - March 23, 2005\]](#)

4. Spring Creek spill update - Dave Wills
5. WMP Spring/Summer Update - Corps
 - a. Start of Spring Operations on the lower Snake River.
[\[QADJ Model Results - March-29-2005\]](#) 
 - b. [\[Draft - March 30, 2005 - Larry Beck\]](#) 
6. Upper Snake operations - Tony Norris
7. The Dalles operations - Laurie Ebner
8. Feedback on graphs/graphics
9. CRITFC 2005 River Operations Plan
 - a. [\[River Operations Plan\]](#) 
 - b. [\[Overview\]](#) 
10. Status of Operation

- a. Reservoirs
- b. Fish
- c. Power System
- d. Water Quality

11. Other

- Set agenda for next meeting. -
[\[Reference Calendar\]](#) 

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

State, Federal and Tribal Fishery Agencies Joint Technical Staff

MEMORANDUM

TO: Cindy Henriksen, COE



FROM: Dave Wills, FPAC Chairman

DATE: March 23, 2005

Subsequent to recent discussions at the Technical Management Team and review of the March 15 Q-Adjust model output, the agencies and tribes are considering alternative operations, and flow scenarios. We are requesting that the COE conduct the following analysis to facilitate operations discussions.

- Re-run the Q-adjust model with the new runoff volume forecast. At the last TMT meeting COE staff indicated that the March 15 Q-adjust run was not accurate because of change in runoff volume forecast.

Based upon the March 15 Q-adjust output, very low flow periods are predicted for the first half of April and the last half of June. The early April period is significant for chum salmon below Bonneville and the late June period is significant for juvenile fall chinook passage in the mid-and lower Columbia River.

Based upon the , March 15 Q adjust run, the agencies and tribes are requesting the following modifications to the Q-Adjust run to attempt to improve the flows in these two periods.

- Re-run the Q-Adjust model with Grand Coulee only filling to 1285 by June 30, therefore improving the late June period flow in the mid and lower Columbia River. In the early April period drawdown John Day pool to MIP, and then draft Snake River pools to MOP and increase Dworshak outflows to 5 kcfs.

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
15-Mar	71.4	69.9	73.2		3.3	None	N/A	
16-Mar	71.7	70.9	72.4	73.2	1.5	None	N/A	
17-Mar	72.1	70.9	74.0	72.4	3.1	None	N/A	
18-Mar	72.0	70.6	76.3	74.0	5.7	None	N/A	
19-Mar	79.1	70.9	104.6	76.3	33.7	None	N/A	
20-Mar	71.5	70.6	76.0	57	5.4	None	N/A	
21-Mar	71.3	70.7	72.0	57	1.3	20	Yes	Start of Emergence, 70 kcfs Critical Eleve
Week	72.7							

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
22-Mar	71.5	70.6	72.6	87.5	2.0	30	Yes	
23-Mar	72.0	70.8	73.2	76.7	2.4	20	Yes	
24-Mar	73.4	71.1	80.4	77.2	9.3	20	Yes	
25-Mar	84.3	71.6	99.1	87.6	27.5	30	Yes	
26-Mar	81.4	70.8	95.6	86.5	24.8	30	Yes	
27-Mar	72.4	70.9	73.2	61	2.3	20	Yes	
28-Mar	71.6	70.4	72.8	61	2.4	20	Yes	
Week	75.2							

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
29-Mar	72.6	71.1	74.9	77.2	3.8	20	Yes	
30-Mar	71.5	70.4	72.8	79.7	2.4	20	Yes	
31-Mar	73.6	70.2	89.0	75.3	18.8	20	Yes	
1-Apr	74.5	71.1	89.3	80.1	18.2	30	Yes	
2-Apr	94.6	82.1	107.5	79.5	25.4	20	No	Grand Coulee refill bias payback caused i
3-Apr	82.7	71.2	90.6	55	19.4	20	Yes	
4-Apr	71.7	70.5	73.5	55	3.0	20	Yes	
Week	77.3							

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
5-Apr	71.4	70.7	72.2	87.1	1.5	30	Yes	
6-Apr	71.4	70.7	72.2	82.4	2.5	30	Yes	
7-Apr	71.7	70.7	73.2	77.2	12.2	20	Yes	
8-Apr	71.9	70.4	82.6	70.6	1.4	20	Yes	
9-Apr	71.2	70.4	71.8	68.7	2.0	20	Yes	
10-Apr	71.6	70.7	72.7	59	17.9	20	Yes	
11-Apr	72.9	70.5	88.4	59	6.9	20	Yes	
Week	71.9	70.3	77.2					

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
12-Apr	73.6	70.9	85.7	79.3	14.8	20	Y	
13-Apr	78.0	70.7	85.7	87.7	15.0	30	Y	
14-Apr	106.0	71.3	130.5	100.6	59.2	30	N	Variable CHJ estimates and actuals, Sche
15-Apr	101.8	79.8	110.2	92.7	30.4	30	Y	
16-Apr	103.7	87.4	122.8	99.6	35.4	30	N	Variable CHJ estimates and actuals, Sche
17-Apr	93.1	71.6	123.2	78	51.6	20	N	Variable CHJ estimates and actuals, Sche
18-Apr	97.3	78.7	121.2	78	42.5	20	N	Variable CHJ estimates and actuals, Sche
Week	93.4							

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
19-Apr	124.9	79.8	183.6	105.9	103.8	30	N	Higher Monday flows, variable CHJ estim
20-Apr	149.1	145.5	152.9	129.9	7.4	40	Y	
21-Apr	128.3	111.8	150.8	136.3	39.0	40	Y	
22-Apr	104.7	82.4	126.1	126.6	43.7	40	N	Spill adjustment calculation error, band cl
23-Apr	106.0	90.2	113.8	101.4	23.6	30	Y	
24-Apr	106.6	105.3	109.5	105	4.2	30	Y	
25-Apr	105.8	104.1	107.3	105	3.2	30	Y	
Week	117.9							Calculated minimum weekend flow = 105

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
26-Apr	102.7	81.0	116.0	107.7	35.0	30	N	Not enough morning load to sustain high
27-Apr	114.8	100.2	134.4	118.0	34.2	40	Y	
28-Apr	126.6	110.6	151.9	119.4	41.3	40	N	Round error for hourly integrated dischar
29-Apr	117.7	109.2	122.5	113.3	13.3	40	Y	

30-Apr	95.3	81.2	110.0	106.2	28.8	30	Y
1-May	106.4	103.3	109.7	100	6.4	30	Y
2-May	108.2	100.6	129.4	100	28.8	30	Y
Week	110.2						

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
3-May	127.9	100.4	147.7	103.9	47.3	30	N	Higher Monday flows, not enough mornin
4-May	137.2	122.6	158.7	136.9	36.1	40	Y	
5-May	125.3	99.6	138.3	126.4	38.7	40	Y	
6-May	108.5	94.8	128.0	103.5	33.2	30	N	Not enough morning load to sustain high
7-May	123.9	112.6	144.6	112.7	32.0	40	Y	
8-May	117.9	102.5	145.1	111	42.6	40	N	Adjustments to hold WAN forebay up for t
9-May	107.0	105.4	110.1	111	4.7	40	Y	
Week	121.1							

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
10-May	145.9	105.2	189.3	119.6	84.1	40	N	Higher Monday flows and inflows exceed
11-May	157.0	138.5	187.8	149.1	49.3	60	Y	
12-May	126.2	113.1	141.9	129.9	28.8	40	Y	
13-May	128.4	112.8	149.3	128.2	36.5	40	Y	
14-May	149.4	129.4	175.2	129.6	45.8	40	N	High mid-day load, WAN fish testing (low
15-May	130.0	117.9	155.3	112	37.4	40	Y	
16-May	138.1	119.9	154.7	112	34.8	40	Y	
Week	139.3							

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
17-May	134.8	119.0	169.8	145.1	50.8	60	Y	
18-May	138.9	115.3	159.2	136.6	43.9	40	N	Within 5 kcfs (USGS = 33 kcfs)
19-May	145.1	119.1	161.7	138.0	42.6	40	N	Within 5 kcfs (USGS = 35 kcfs)
20-May	136.2	125.1	156.9	139.2	31.8	40	Y	
21-May	122.0	96.4	140.4	120.5	44.0	40	N	Within 5 kcfs (USGS = 30 kcfs)
22-May	125.6	121.0	136.4	110	15.4	40	Y	
23-May	123.5	120.3	127.5	110	7.2	40	Y	
Week	132.3							

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
24-May	95.3	77.9	119.8	122.5	41.9	40	N	Within 5 kcfs (USGS = 37 kcfs)
25-May	138.2	116.4	163.0	125.6	46.6	40	N	High night inflows and loads (USGS = 45
26-May	133.2	111.5	146.7	130.7	35.2	40	Y	
27-May	144.6	112.0	155.7	127.5	43.7	40	N	Within 5 kcfs (USGS = 40 kcfs)
28-May	139.1	125.1	154.1	142.3	29.0	60	Y	
29-May	111.5	106.0	123.0	116	17.0	40	Y	
30-May	125.3	116.3	145.3	116	29.0	40	Y	
Week	126.7							

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
31-May	117.9	105.6	143.4	125.1	37.8	40	Y	
1-Jun	137.9	112.2	147.9	104.9	35.7	30	N	After 3 day weekend, 16hrs high flows he
2-Jun	110.5	96.5	133.3	115.6	36.8	40	Y	
3-Jun	146.3	124.2	162.8	131.2	38.6	40	Y	
4-Jun	158.6	145.5	174.9	147.7	29.4	60	Y	
5-Jun	129.7	109.9	169.4	108	59.5	30	N	Low Fri late 8 hr flows (ave 31kcfs) to high
6-Jun	118.8	103.3	131.8	108	28.5	30	Y	
Week	131.4							

Priest Rapids Operations					Day's	Band	Was it	Comments
Date	Ave.Q	Min.Q	Max.Q	Prog.Q	Delta	Constraint	Met?	If NO, reason why.
7-Jun	120.9	108.9	131.7	151	22.8	60	Y	
8-Jun	115.3	103.5	145.3	111.2	41.8	40	N	Within 5 kcfs (USGS = 35 kcfs)
9-Jun	122.9	114.1	133.4	119.6	19.3	40	Y	
10-Jun	150.7	133.6	179.6	120.5	46.0	40	N	High end day held to next day (USGS = 4
11-Jun	171.5	160.7	180.3	151.4	19.6	60	Y	
12-Jun	148.3	130.6	172.4	125	41.8	40	N	Within 5 kcfs (USGS = 32 kcfs)
13-Jun	---	---	---	---	---	---	---	<-- End Protection Flows, 0001 hours (US
Week	138.3							

CRITFC 2005 River Operations Plan



Bob Heinith, Kyle Martin, Tom Lorz

CRITFC Hydro Program

March 30, 2005

Plan Goals



- Establish a normative (i.e. natural peaking) mainstem hydrograph as much as possible by modifying flood control and use of upstream storage.
- Reduce water particle and fish travel time by increasing flows and selective drawdown.
- Establish normative dam passage conditions through optimizing spill and surface bypass.

2005 Water Supply Forecast

- March Mid-Month 67.7 MaF (TDA Jan.- July)
- March Final Forecast 70.7 MaF (TDA Jan. - July)
- 2001...58.2 MaF (TDA January-July)
- 1977...53.8 MaF (TDA January-July)
- 1973...71.2 MaF (TDA January-July)

2001 Juvenile Salmon In-River System Survival Rates v. 2000 BiOp Standards-Must Do Better in 2005

- SR Sp-Chinook 2001, 16% BiOp 49.6%
- SR Steelhead 2001, 4% BiOp 51.6%
- SR Fall-Chinook 2001, 1.5% BiOp 14.3%



Key Plan Recommendations

- Use CBFWA for river operations planning and decision-making process.
- BPA appears financially solvent: No “emergency” curtailment of spill in 2005.
- Water conservation: no additional river water withdrawal for drought conditions.
- Water conservation: BPA and Reclamation continue 2001 water acquisition programs.

Key Recommendations (cont)



- Modify flood control rule curves-- little to no chance of flood events in 2005.
- Draw down Lower Granite pool by 10 feet during summer migration.
- Delay the refill of Lake Roosevelt until autumn to increase spring and summer flows.
- Reduce power peaking flow fluctuations in the river and particularly Hanford Reach.
- Conduct spring RSW tests at LWG and IHR; conduct summer RSW test at IHR.

Key Recommendations (cont): Flow Augmentation over BiOp



- 487 KaF from Upper Snake and 60 KaF in-stream flow rights consistent with SRBA.
- 500 KaF from Canadian Non-Treaty Storage.
- 200 KaF from Libby.
- 50 KaF from Hungry Horse.
- 250 KaF from Banks Lake.
- 237 KaF from Brownlee in July-August (interim FERC Settlement Agreement)

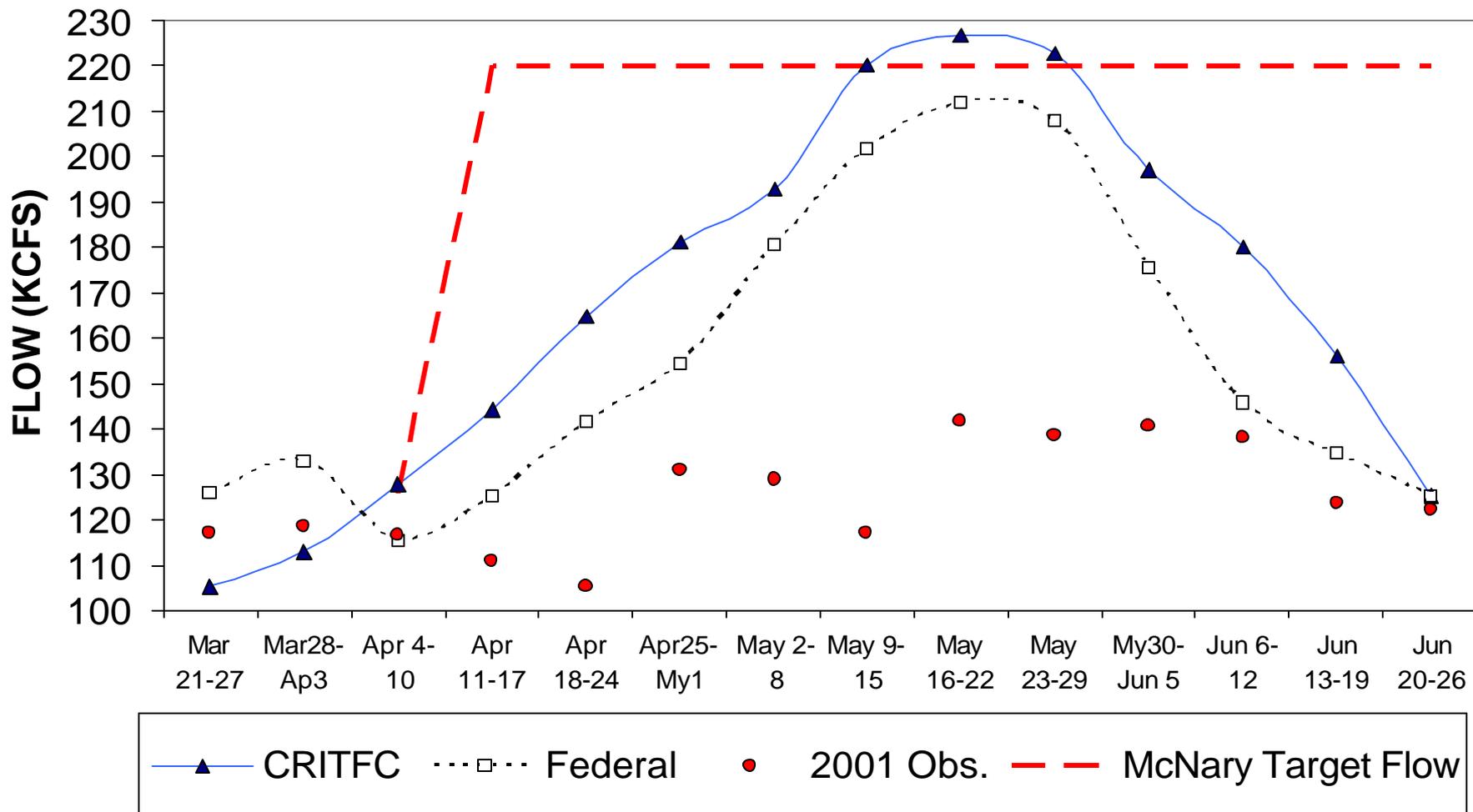
Key Recommendations (cont)



- Provide 24 hour spill for spring and summer migrations at all dams (Federal plan calls for “no spill” at 3 Snake dams).
- Increase spill volumes and timing.
- Spread-the-risk for juvenile transportation (no more than 50% of fish transported).
- Improve lamprey passage.
- Improve fish facilities through additional inspections and emergency protocols.

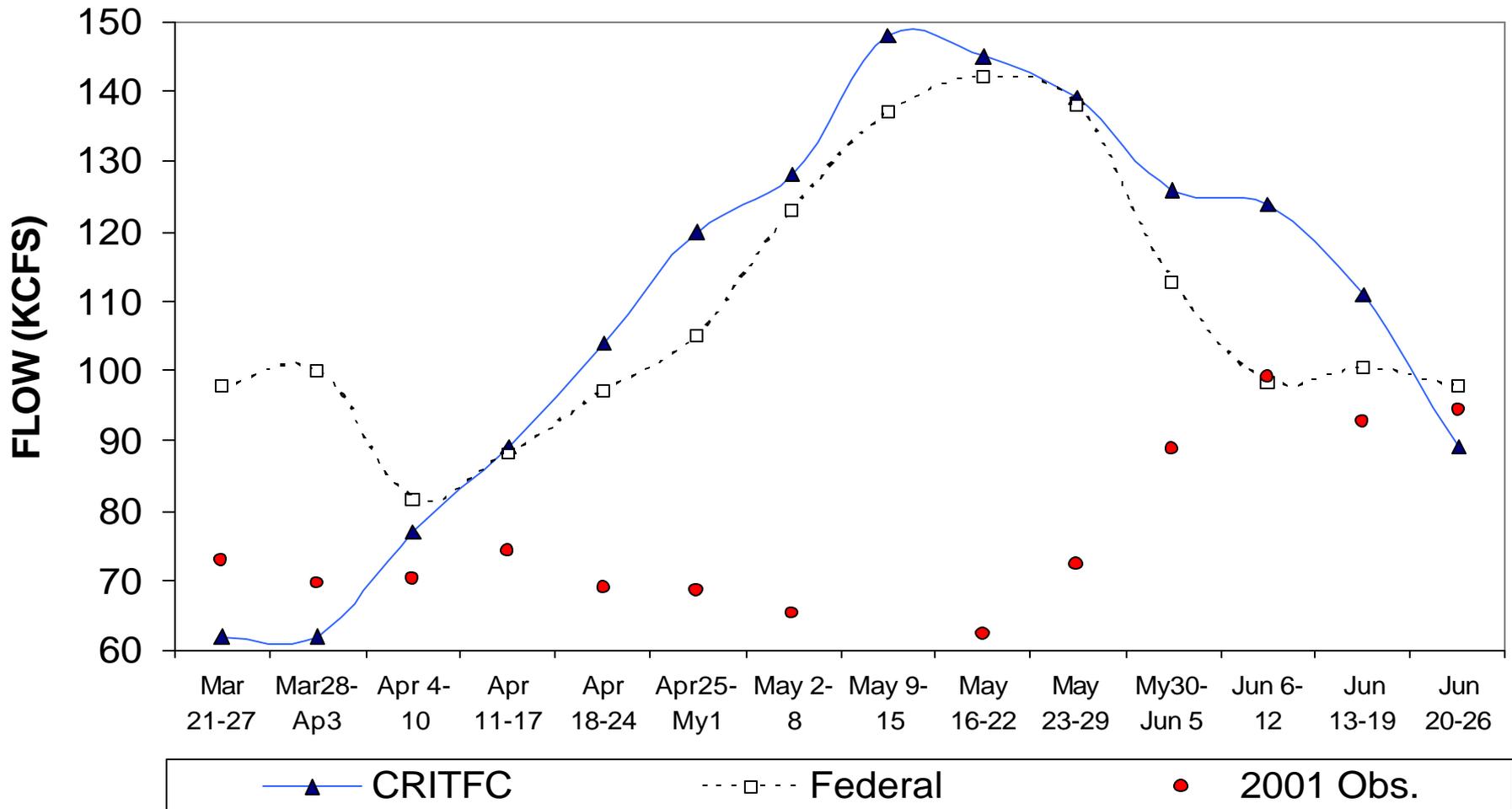
Flow Improvements: Exceed BiOp Spring Flow Targets for Migration Peak

THE DALLES SPRING FLOWS: WY 2005



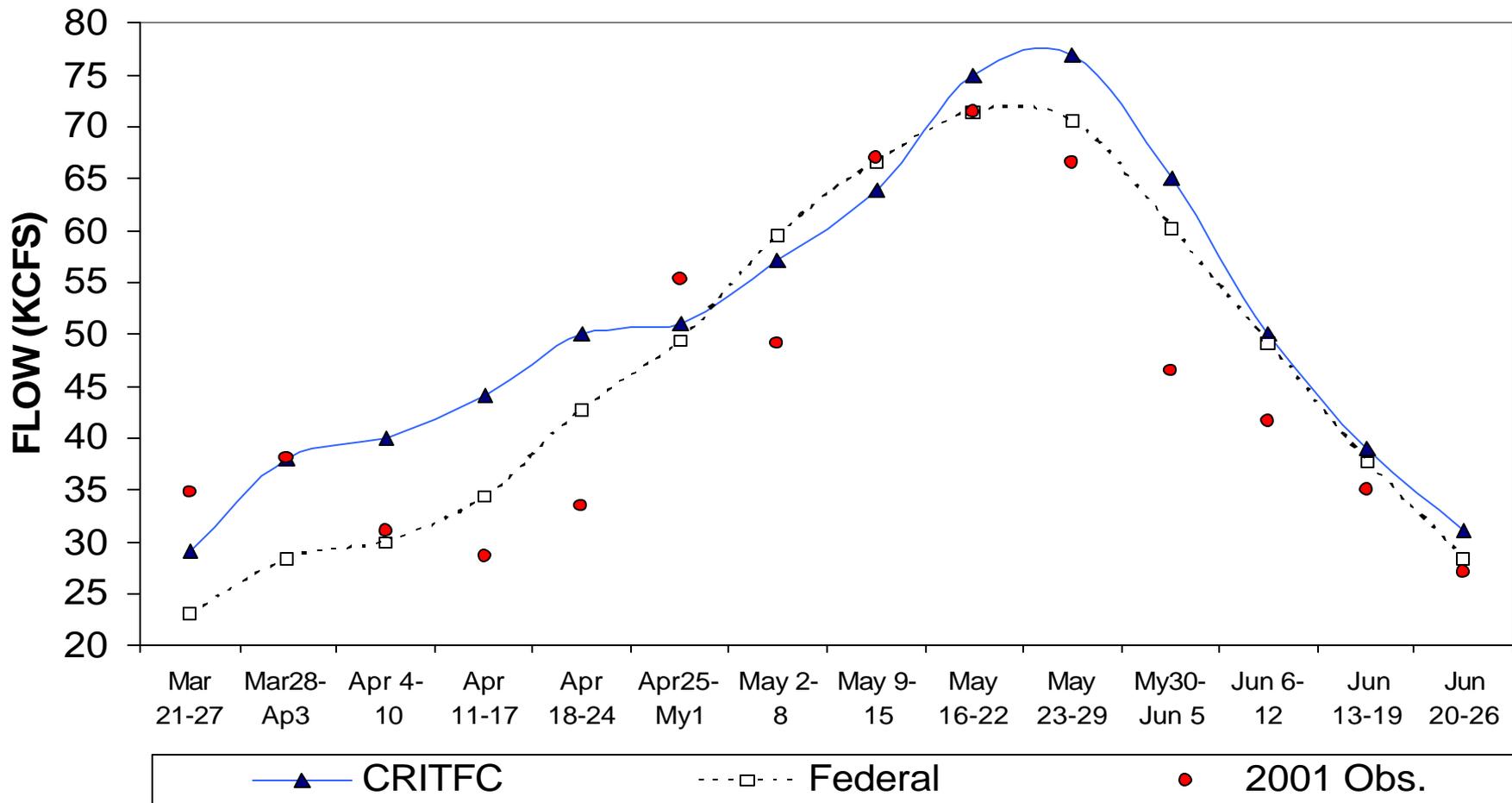
Flow Improvements: Exceed BiOp Spring Flow Targets for Migration Peak

PRIEST RAPIDS SPRING FLOWS: WY 2005



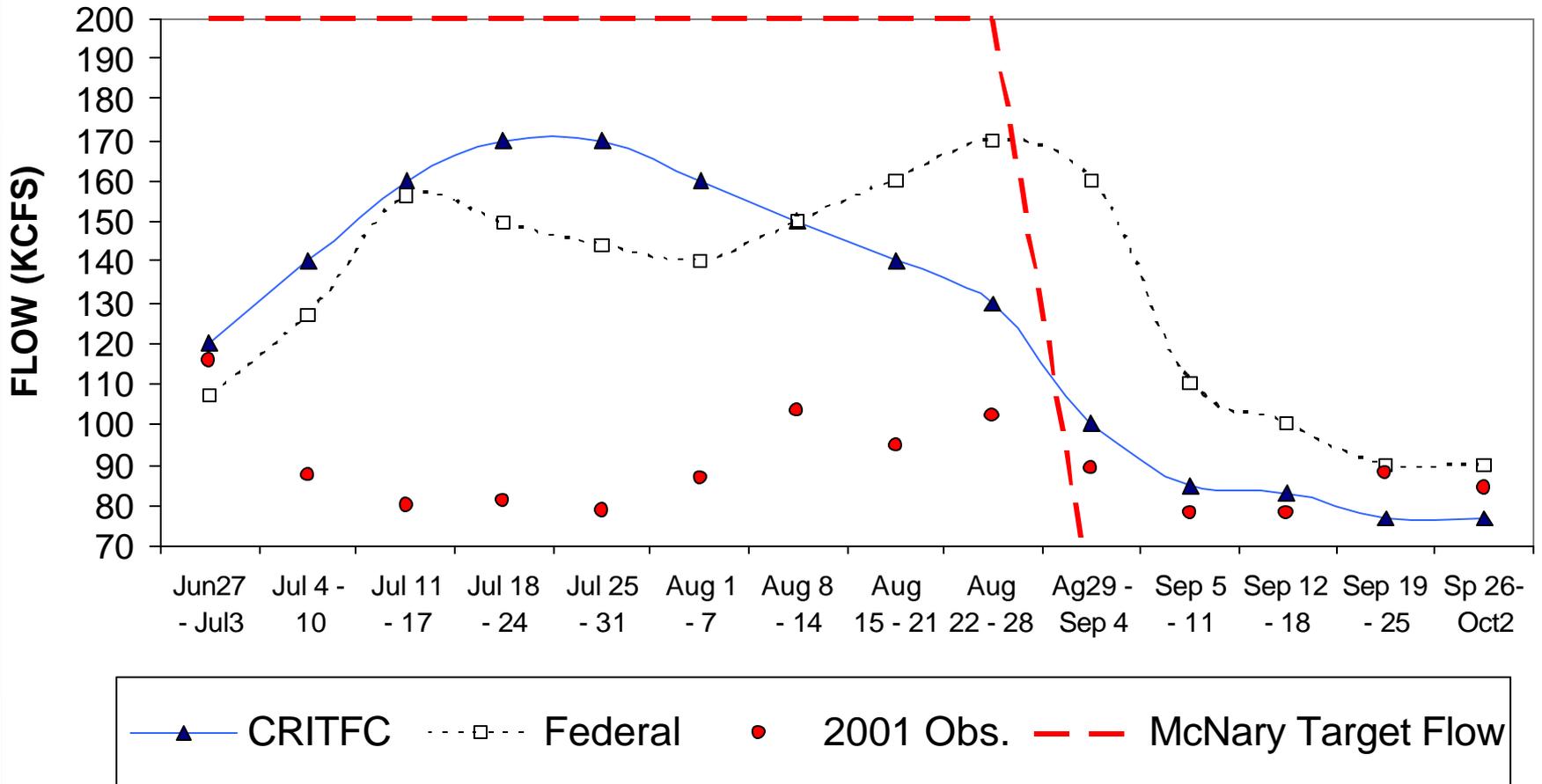
Flow Improvements: Target Flows for Migration Peak

LOWER GRANITE SPRING FLOWS: WY 2005



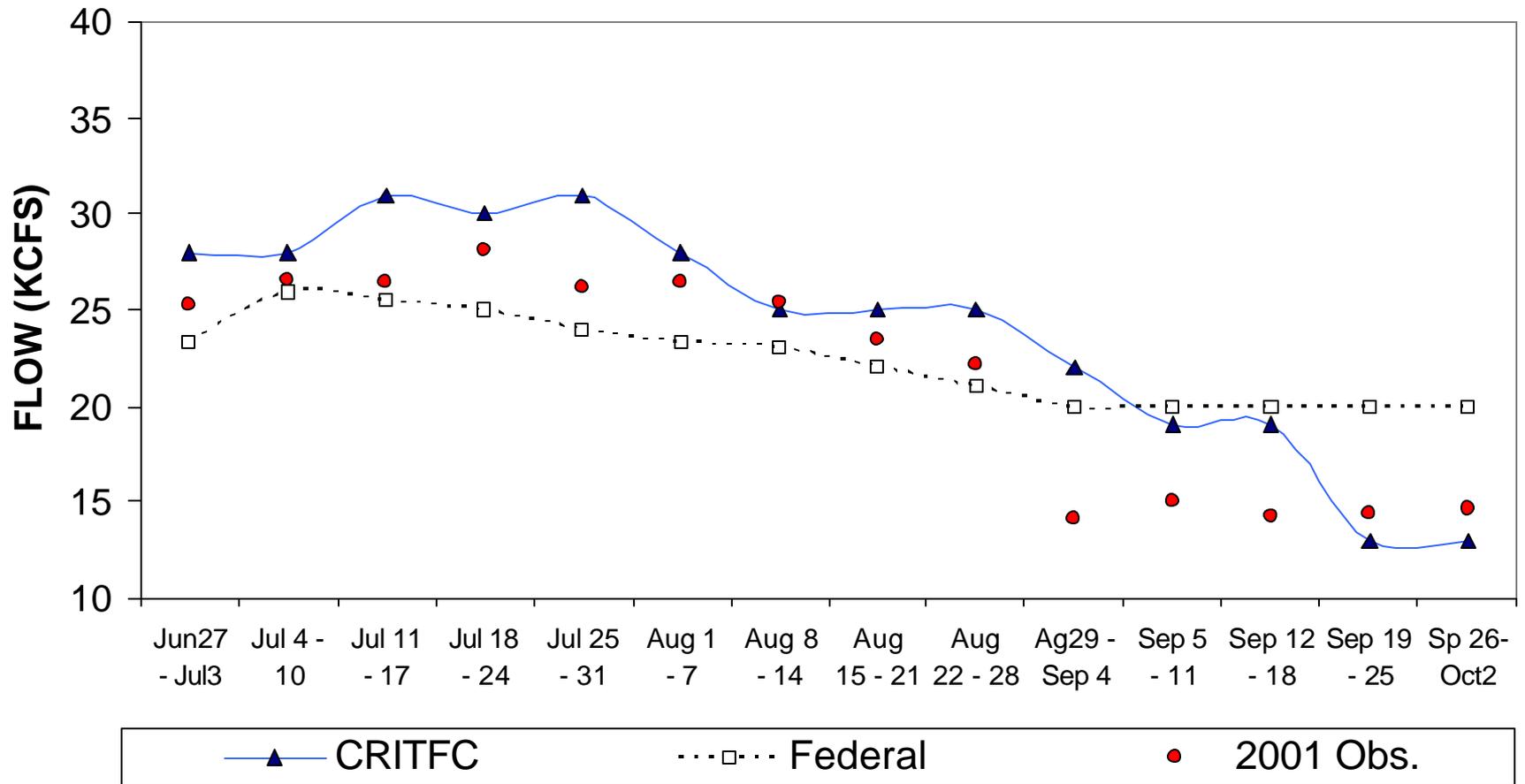
Flow Improvements: Summer

THE DALLES SUMMER FLOWS: WY 2005



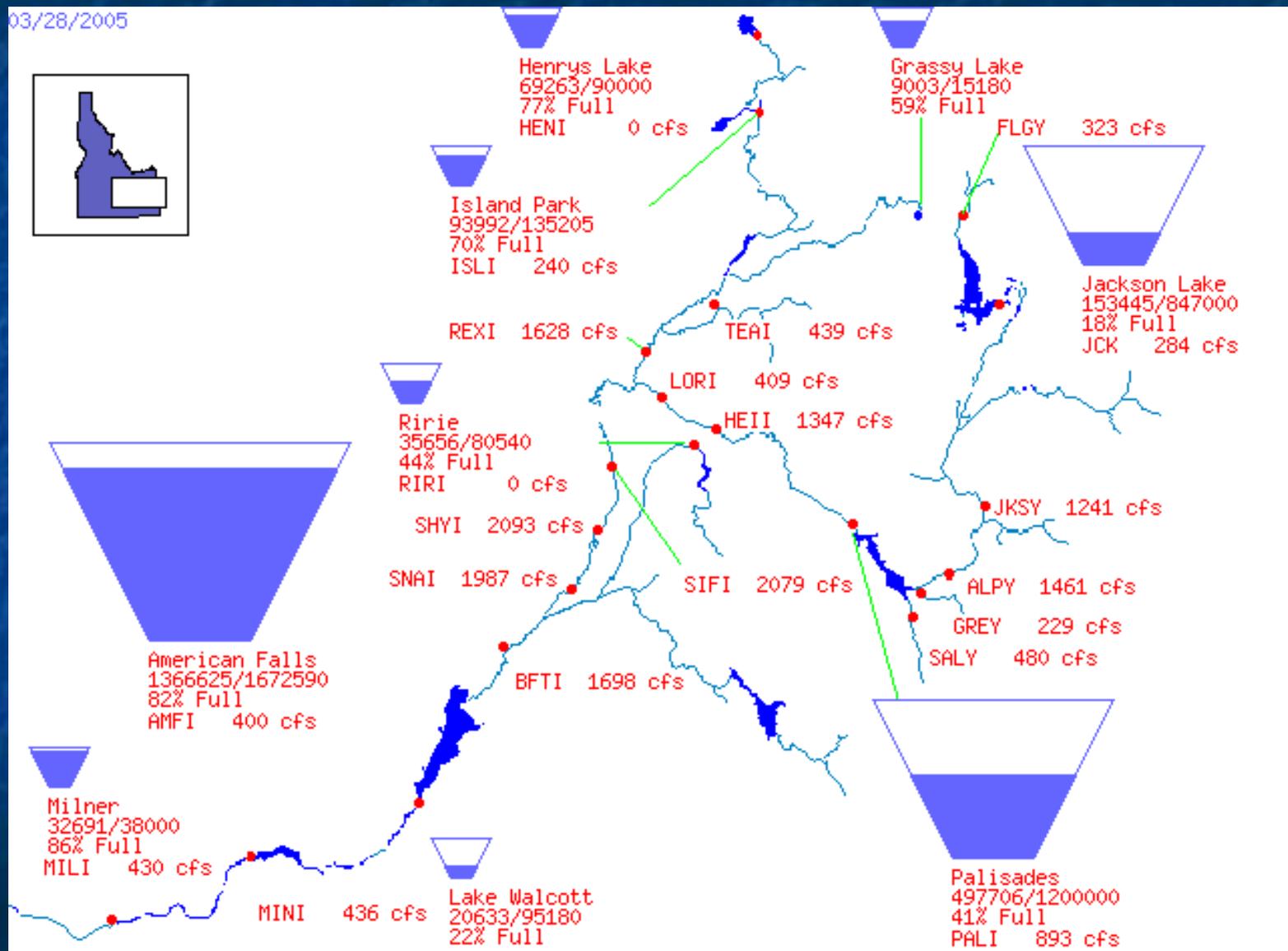
Flow Improvements: Summer

LOWER GRANITE SUMMER FLOWS: WY 2005



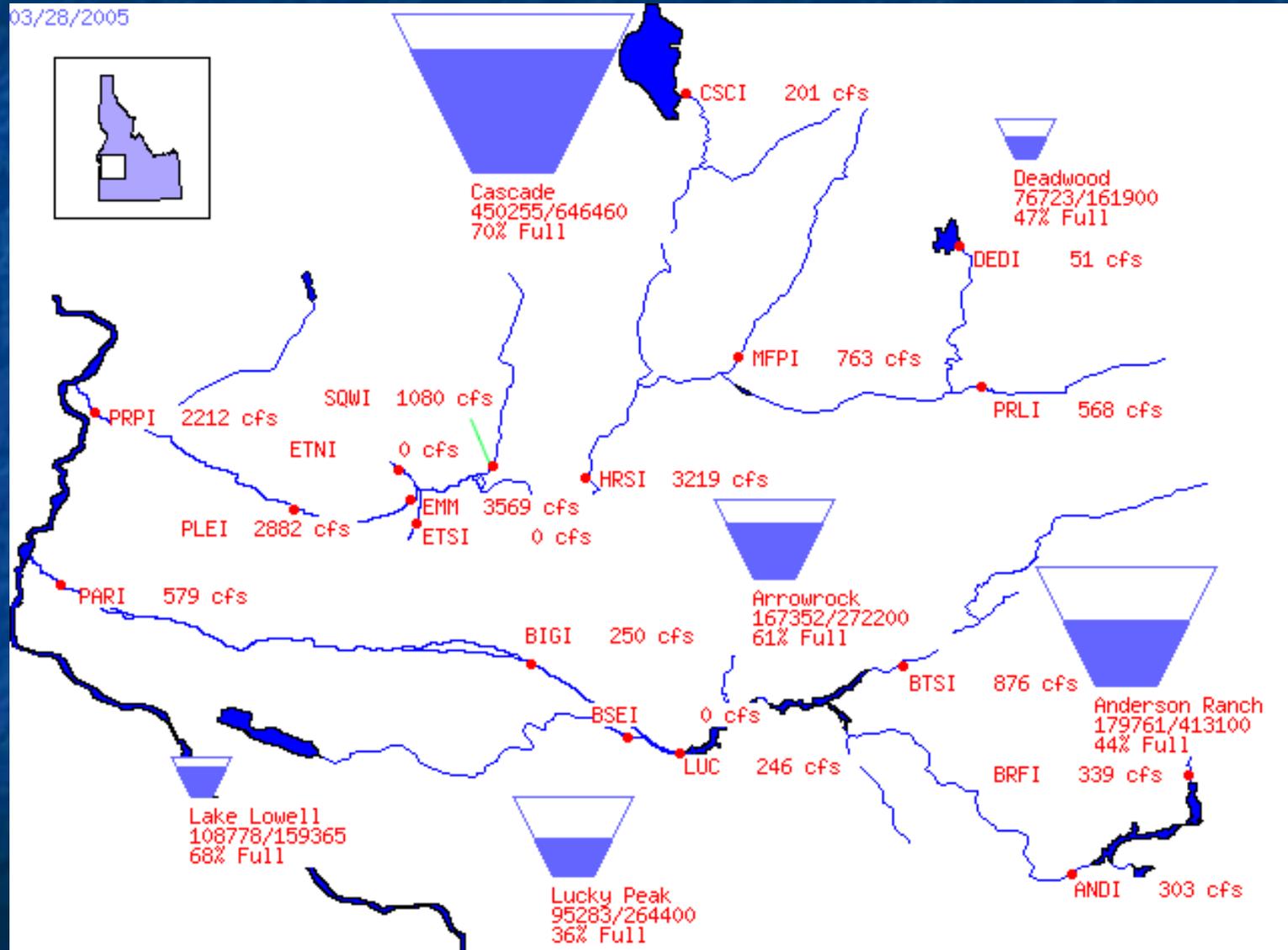
Upper Snake River Storage

03/28/2005



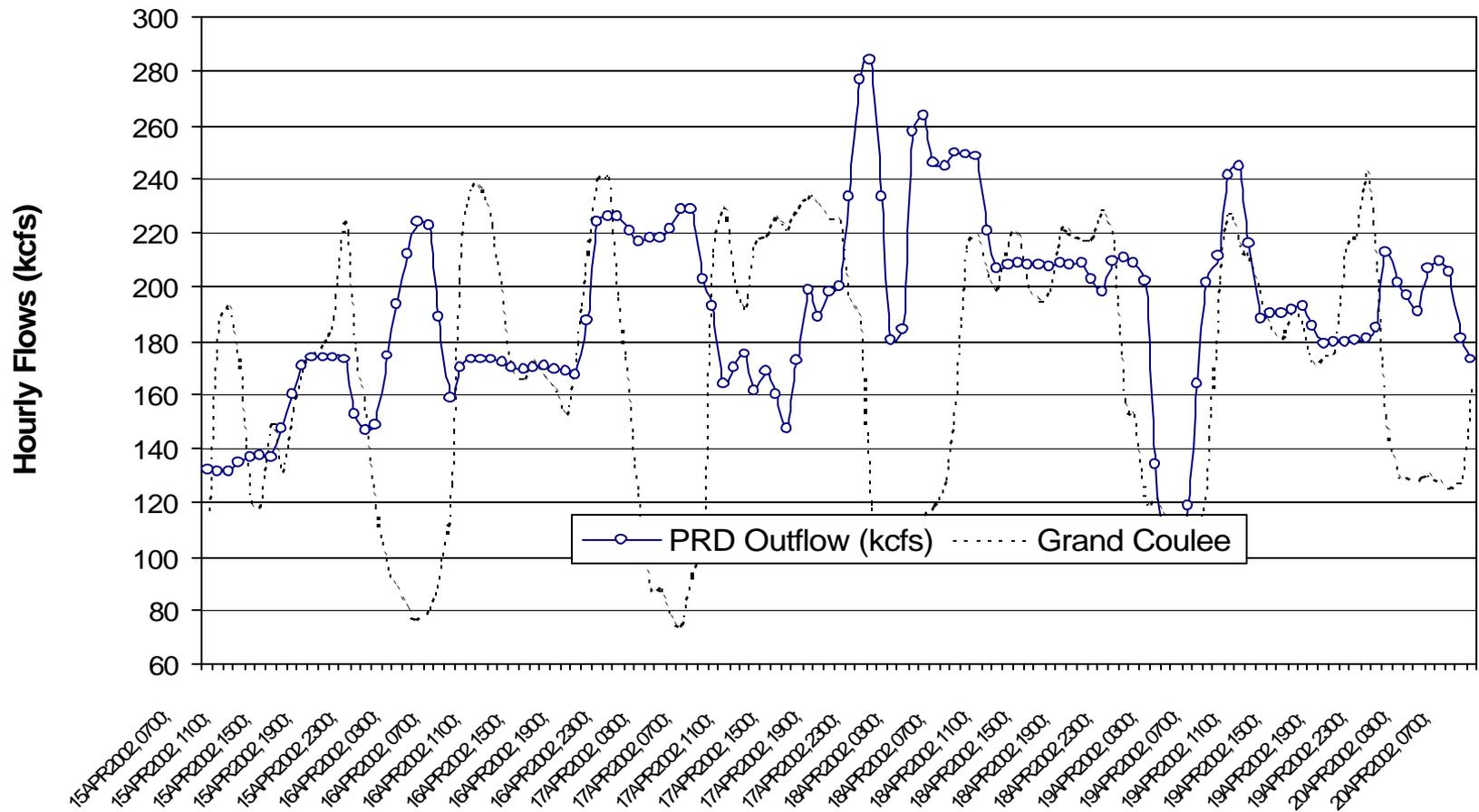
Upper Snake River Storage

03/28/2005



Hanford Reach: Reduce Flow Fluctuations/Stranding/Entrapment

Columbia River at Hanford Reach





Spill Operations

- Spring initiation planning date: March 20 for early migrants including kelt passage.
- Spring Spill: 24-hours all dams; slightly increased volumes over BiOp schedule, no TDG impacts anticipated.
- Summer Spill: 24-hours at all dams, slightly increased volumes over BiOp schedule.
- Summer ending planning date: September 15 for late migrants and to reduce adult fallback impacts.



Summary

- Request written response to ROP recommendations from Federal operators.
- Respond by April 13 TMT meeting

Columbia River Inter-Tribal Fish Commission



2005 River Operations Plan

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Columbia River Inter-Tribal Fish Commission 2005 River Operations Plan

March 24, 2005

Overview

The Columbia River Inter-Tribal Fish Commission (CRITFC) presents the 2005 River Operations Plan (ROP) for the Federal Columbia River Power System (FCRPS), the Hells Canyon Complex and mid-Columbia FERC-licensed hydro-projects including Rock Island, Rocky Reach, Wanapum and Priest Rapids. The ROP is a detailed extension of the mainstem recommendations from the CRITFC tribes' Columbia River Anadromous Fish Restoration Plan, *Wy-Kan-Ush-Mi Wa-Kish-Wit* (Spirit of the Salmon; Nez Perce et al. 1995). The ROP outlines dam and reservoir operations consistent with the aggressive, non-breach alternative offered by the federal government in the 2000 FCRPS Biological Opinion.

The ROP contains recommendations for water management and dam operations, including flows, reservoir elevations, spill, and fish facility operations.¹ Further, the ROP contains recommendations for water acquisition. Each of the recommended actions will contribute singularly and cumulatively to increase mainstem anadromous fish protection and survival. This is important because another poor runoff year is occurring in 2005. Current runoff rates in the Snake River are equivalent to those in 2001 (Table 1) while upper Columbia runoff forecast rates are similar to 1992 at 93-99% of normal, and are still dropping (Table 1). Given the severe water conditions, this Plan attempts to “spread the pain” of water shortages equitably among the various river demands.

The Northwest River Forecast Center-National Weather Service estimates a 2005 March mid-month water supply forecast (January through July) of 67.7 MaF (63% of normal) at The Dalles, which compares to a 2001 final water runoff of 58.2 MaF at The Dalles (Table 1). The March final forecast has dropped 12 MaF from the February final forecast (Table 1). The worst water year on record was 1977 with a runoff of 53.8 MaF (50% of normal).

¹ The ROP also expands upon CRITFC's December 17, 2004 recommendations on the federal 2005 Water Management Plan (Attachment 4).

**Table 1. 2001-2005 Water Supply Comparisons for
Index Points in the Columbia Basin (from FPC)**

Location	February Final		March Final		Actual 2001
	% Average MaF (1971- 2000)	Actual Runoff Volume (KaF)	Probable Runoff Volume (% of Average)	Actual Runoff Volume (KaF)	
The Dalles (Jan- July)	77	82400	66	70700	58200 (54%)
Grand Coulee (Jan-July)	91	57200	79	54700	37400 (59%)
Libby Res. Inflow, MT (Jan- July)	90	5650	77	4860	3341 (53%)
Hungry Horse Res. Inflow, MT (Jan-July)	75	1660	67	1480	1300 (59%)
Lower Granite Res. Inflow (Apr- July)	59	12700	46	9960	10300 (48%)
Brownlee Res. Inflow (Apr-July)	41	2590	28	1740	1970* (31%)
Dworshak Res. Inflow (Apr-July)	66	1750	56	1470	1470 (56%)

*The value shown is the June 2001 final forecast.

The goals of the ROP are to provide, as much as possible with existing water supplies:

- A normative (i.e., natural peaking) hydrograph, achieved by reasonable flood control modifications and use of additional upstream storage.
- A reduction of water particle and fish travel time by implementing partial draw downs and increasing flows.
- Normative dam passage conditions through optimizing spill and surface bypass.

Singularly and cumulatively, these actions will result to increase juvenile and adult salmon and lamprey survival by: 1) reducing the time of juvenile salmon entry into saltwater, 2) creating enhanced water quality conditions in the mainstem and estuary and Columbia River near-ocean plume to enhance critical habitat, and, 3) minimizing predation and residualization losses (ISG 1996; Bunn and Arthington 2002). In crafting ROP flow regimes, judicious use of available storage and altered flood control modifications creates a peaking hydrograph in early June at the Columbia at The Dalles to assure flow and increase critical mainstem habitat for anadromous fish.

In addition, implementation of ROP measures is important to protect the progeny of some recent high adult escapement years. Near historical levels of adult salmon escapement in 2003 and 2004 indicate that many juvenile salmon will be out-migrating this spring and summer through the mainstem Snake and Columbia River hydro-system of 13 dams and reservoirs where fish can still pass. For example, 2004 adult escapement estimates for Hanford Reach bright fall chinook indicate that 15-45 million fry are emigrating from the Reach spawning areas this spring (Hoffarth 2005). Thus, it is critical that substantial anadromous fish productivity with respect to recruits from the 2003 and 2004 brood years be protected through the hydro-system by the implementation of the appropriate river operations contained in this ROP.

Flow augmentation, spill, and selected drawdown to reduce water particle travel time are major components of the ROP, consistent with the normative river paradigm (ISG 1996). These combined operations will increase fish survival and speed migrations to salt water. A key objective of the ROP is to decrease water particle travel time in the lower Snake and Columbia Rivers by 10% over what is proposed by the federal government.

The ROP objectives are as follows:

- Reduce power peaking impacts on fish (i.e. Hanford Reach)
- Enhance adult and kelt passage
- Enhance water temperature criteria to meet Clean Water Act standards
- Enhance river conditions for the tribal treaty fisheries
- Enhance fish facility operations
- Direct mainstem research to resolve critical uncertainties.

The spring and summer spill season in the ROP is extended and enhanced over that required in the 2000 FCRPS Biological Opinion and the 2005 Federal Water Management Plan. Also offered in the ROP is a list of key fish facility mitigation projects, which, if implemented, could result in significant improvements in fish passage survival. The ROP also offers a water management paradigm that avoids the weaknesses of week-to-week trade offs common to the Technical Management Team, Implementation Team, and Regional Executive Committee forums.

Tribal treaty fishing occurs in all of Zone 6 from McNary to Bonneville dams. The ROP includes water management regulations to promote the treaty fishery during the limited fishing periods. Given the expected adult run forecasts for 2005, based on Pacific Salmon Commission and Columbia River forecasts, treaty fisheries are likely to occur in 2005 from April through October. Scaffold fisheries will occur most of the period with ceremonial, subsistence and some commercial net fisheries occurring during limited days. Pool elevation restrictions and steady flows should be provided during tribal fisheries for all of Zone 6, not just Bonneville Pool.

Federal operations, including spill curtailment and the droughts in 2001 and 2003, where federal target flows were not met, caused significant fish losses. In-river survival rates for juvenile salmon ranged from 1.5-16% in 2001 and are compared with 2000 FCRPS Biological Opinion survival standards (NOAA 2004; FPC 2002; Table 2). Despite good ocean conditions and hatchery returns, ESU interim recovery standards are far from being met and in many cases adult returns from recent brood have been declining (Reclamation 2005; Oosterhout 2005). For example, in NOAA Fisheries last published report on the status of Upper Columbia River Steelhead before it issued the 2004 FCRPS Biological Opinion, NOAA found that the level of survival improvement still required to achieve recovery targets was “high” and that “...the natural survival rate would have to increase nearly seven-fold to meet the indicator criteria under all assumptions and for all spawning aggregations” (Toole 2003 in Oosterhout 2005). Given the critical status of ESUs with respect to recovery it is critical that measures in the 2005 CRITFC River Operations Plan be fully implemented. CRITFC urges the federal government, Idaho Power Company, and the Mid-Columbia Public Utility Districts to seriously consider implementing the recommendations in this Plan.

Snake River Spring Chinook	2001 - 16%	2000 BiOp 49.6 %
Snake River Steelhead	2001- 4%	2000 BiOp 51.6%
Snake River Fall Chinook	2001 - 1.5%	2000 BiOp 14.3%

Key Plan Recommendations

Decision Making

- The Technical Management Team (TMT) and Implementation Teams are useful for regional information sharing but they do not suffice for river operations decision-making and are not government-to-government forums.² Further, the TMT is prevented from candid discussions of operational alternatives due to the presence of power marketing agents.³
- To avoid these serious problems, the federal operators and NMFS should use the Columbia Basin Fish and Wildlife Authority as a technical forum to discuss river operations where all 13 Columbia Basin tribes can have meaningful input. Disputed issues should be raised to an executive committee table comprised of policy representatives from the tribes and states and federal entities.

Emergency Declarations and Energy

- The definition of “emergency” and related procedures must be recast for 2005 to exclude any BPA financial problems. The definition of “emergency” must be based on unforeseen circumstances. Any power sales revenues accruing to BPA and attributable to an emergency operation must be set aside for salmon mitigation, where such amounts will be in addition to and not in- lieu of previously planned BPA expenditure levels.
- Currently, the Pacific Northwest as a region is roughly 1,500 MW (megawatts) power surplus under critical (low) water conditions. This compares to 2001, when the Pacific Northwest region had a 4,000 MW deficit.
- The difference in system-generation (Table 3) between the ROP and Federal operations varies from -1557 (spring) to -933 MW (summer).
- Water and energy supply conditions in California are much better in 2005 than they were in 2001. Sierra-Nevada Mountain snow-packs range from 100% to 150% of normal.
- In mid-February 2005 the Northwest Power and Conservation Council projected:

“No danger of blackouts (due to low flows)”

² CRITFC’s member tribes formally withdrew from TMT and other NMFS’ ESA forums in 1997, due to the lack of formal government-to-government consultation mandated in various federal agency policies including the 1997 Secretarial Order to the Departments of Interior and Commerce.

³ Many power-marketing representatives from private or public corporations attend TMT meetings. These representatives are present to learn of real-time federal operators’ river operation plans, in order to maximize power-marketing arrangements. As a result, federal operators are hesitant to disclose vital information and make decisions for fishery management to the tribes, state and federal fishery managers in this forum. TMT was not burdened with this situation in the early years of its implementation, but now it is a serious obstacle to regional information sharing, and has greatly diminished and compromised the effectiveness of TMT.

“No danger of extreme prices spikes (due to low flows)”

- The NWPCC also projected that the water supply picture:
 - Will likely cause some increase in electricity prices
 - Will likely reduce BPA’s spring and summer revenues (from spot market sales)
 - Should not affect end-of-summer reservoir elevations
 - Not likely to meet Biological Opinion target flows

Water Conservation

- Water and land acquisition programs begun in 2001 by BPA and Reclamation should be continued. BPA and Reclamation should seek additional water from irrigators.
- The states should refrain from allowing additional water withdrawals during the 2005 fish migrations. For example, the State of Washington should not, as in 2001, honor additional irrigation withdrawals from the mainstem Columbia and Snake because of the 2005 drought situation. The National Research Council’s 2004 Report, *Managing the Columbia River: Instream flow, water withdrawals and salmon survival*”, states that when river flows become critically low or when water temperatures become excessively high, “...pronounced changes in salmon migratory behavior and lower survival rates are expected.”

Flow Augmentation

- Upper Snake Storage. The full 427 KaF from the upper Snake should be delivered in July and early August, consistent with the 2000 Biological Opinion. An additional 60 KaF should be made available from natural flow rights.⁴ Figures 3 and 4 indicate that the upper Snake has adequate storage to provide these flows.
- Brownlee Storage. Approximately 237 KaF will be provided during July and the first part of August for Snake River summer migrants.
- Upper Columbia Storage. Approximately 1 MaF will be provided over 2000 FCRPS Biological Opinion volumes (500 KaF from Canada; 250 KaF from Banks Lake; 200 KaF from Libby, and 50 KaF from Hungry Horse).

Modified Flood Control

- Given drought conditions, the Corps of Engineers and the Bureau of Reclamation should modify flood control operations this year. Further, the ongoing draw down of Lake Roosevelt 45 feet from full for drum gate repairs creates additional flood control space.

⁴ Consistent with the term sheet from the SRBA, the Upper Snake may acquire or rent on a permanent basis 60,000 acre feet of consumptive natural flow water rights diverted and consumed below Milner and above Swan Falls from the mainstem of the Snake River.

The ROP uses altered flood control rule curves, earlier reservoir refill and delay of refill at Lake Roosevelt to increase spring and summer flows by 4.5% in the Lower Columbia at major river index points (Martin 2004).⁵ Because of low runoff forecasts and the fact that upper basin storage reservoirs are already well below flood control rule curves, there is little to no flood risk in implementing the CRITFC Plan this year.⁶

Drawdown

- In order to increase water particle travel and correspondingly decrease juvenile fish migration time in an extreme low water year, a drawdown of Lower Granite pool ten feet to msl 723 feet from June 20 - August 31 is recommended.

Spill

- 24 hour spill is recommended at all Corps dams during spring and summer.
- The ROP spill planning dates are March 20 - September 15 (Snake) and March 20-September 30 (Columbia). Actual spill periods will be determined by fish passage. The extended spill period accommodates early spring juvenile migrants and kelts. The federal 2005 Water Management Plan proposes spring spill planning dates of April 3 - June 20 (Snake) and April 10 - June 30 (Columbia).
- CRITFC recommends a provision for summer spill at Lower Granite, Little Goose, Lower Monumental and McNary dams above the requirements of the 2000 FCRPS Biological Opinion.
- CRITFC recommends a provision for daytime spill at John Day, McNary and the Lower Snake River dams. When implemented, daytime spill at most dams has been demonstrated to be as successful, or more so, than nighttime spill.
- The Corps of Engineers should complete their timely application for a total dissolved gas waiver to the appropriate water quality agencies to allow for both spring and summer spill at the eight federal dams and five Mid-Columbia dams.

⁵ ROP operations were modeled against probable future federal river operations for 2005. The federal operations are based upon the historical 50-year flow record and the 2000 FCRPS Biological Opinion. The Northwest Power and Conservation Council's GENESYS Hydro-regulation model (Version 2.7.1) was used to simulate recommended monthly flow and reservoir elevations at index points across the region.

⁶ The NWRFC's peak flow procedure for March 2005 suggests a spring peak daily flow of 243 kcfs for the Columbia at The Dalles this year. Hence, for the 243 kcfs flow level, the peak flow frequency analysis, using WY 1929-1978 data, suggests that the flow exceedence probability for the Columbia at The Dalles is 98% for the CRITFC plan, 98% for Federal operations, and 98% for historical observed data. When they become available later this spring, the Northwest River Forecast Center's NWSRFS-STP hydro model results, in daily time steps, will be used to update and fine-tune the ROP for spring and summer operations. Water supply forecast correction curves (Martin 2002) suggest a low water year with runoff at the Dalles at about 64 MaF. Hence, CRITFC expects the water supply forecast to decline a little more.

Dam Facility Operations and Research

- Fish facilities should be operated according to CRITFC and other salmon managers' recommendations for the Corps of Engineers' 2005 Fish Passage Plan.⁷ Inspection of facilities should be increased to a minimum of three inspections per day. Turbine operations should be maintained within the 1% peak efficiency band during the fish migration season.
- Fish facilities should have full components of spare parts and backup systems, consistent with CRITFC and other fishery agencies recommendations to the Corps' 2005 Fish Passage Plan.
- Monitoring systems for water quality should be installed by the federal operators throughout the dams and reservoirs with real-time tracking of data.
- Mainstem research that involves fish handling and tagging and modifications to fish protection measures should be extremely limited, should not compromise fishery operations and should meet consensus tribal and fishery agency approval.

Fish Facility Mitigation Projects

- A list of mitigation projects has been compiled for dam fish passage facilities (Appendix 2). Funding of these projects would individually and collectively increase juvenile and adult passage success and survival.
-

Juvenile Transportation

- "Spread the risk" operations are recommended for Snake River spring and summer migrants, where no more than 50% of the migration is transported. All fish diverted into screen bypass systems should be transported unless temperatures in holding facilities become too warm (i.e. exceed water quality standards).⁸ Bouwes (2004) found that cessation of juvenile fall chinook transportation and providing a spring-like spill program in the summer produced large increases in adult returns over current federal transport operations.

⁷ Formal CRITFC comments on the 2005 Corps' passage plan were submitted on January 14, 2005.

⁸ Some fish will be bypassed back to the river as part of ongoing research projects.

2005 FCRPS Flow Operations

Despite the fact that target flows called for in the 2000 FCRPS Biological Opinion will not be met in 2005, the CRITFC ROP recommends that the federal operators reshape available runoff and reservoir storage to create a natural peaking (i.e., normative) flow regime.⁹ This is considerably different than the double-peaked hydrograph that the federal operators are projecting to implement, similar to federal hydrograph management in 2001 (*see* Figure 1).

The ROP's flow scenario would best meet the migration and habitat requirements for anadromous fish. Available storage and runoff should be shaped to meet natural peaking, normative hydrographs at Priest Rapids, Lower Granite, The Dalles and other index points (Table 3 and Attachment 1). The object is to provide flushing flows during the main portions of the juvenile and adult migrations and to leave as much storage as possible for resident fish and tribal cultural resource protection

Salmon and flow are positively related to increases in survival and productivity. This fact has been established in various forums worldwide including a 1994 independent scientific review under the Northwest Power and Conservation Council, Federal biological opinions, and recent analyses by the fishery agencies and tribes (Agencies and Tribes 2001; Marmorek et al. 2004; Connor et al. 2003). In their 1995-1998 FCRPS Biological Opinion, NMFS provided minimum flow recommendations for listed salmon and established seasonal, flat, "target flow" regimes, which were considered the minimum flows necessary to prevent jeopardy to listed salmon populations. The 2000 and 2004 FCRPS Biological Opinions continue the concept of "target flows" for salmon, where specific seasonal average flows are to be met at Lower Granite, Priest Rapids and McNary Dam. In reality, the target flows have not been. During the creation of the target flow concept, NMFS and the federal operators realized that the seasonal targets would not be met during the lowest series of water years, such as 2003 and 2001, and in other years. The 2005 March mid-month forecast ranks as the 5th lowest year of the last 76 years.

The 2000 Biological Opinion differs from the 1995-1998 Biological Opinion in that the federal operators have more discretion to avoid implementing measures that will insure that flow targets are met. For example, the 1995-1998 Biological Opinion required the Corps to shift flood control storage further down the system and modify flood control rule curves to allow

⁹ The April 30th storage volume difference in ROP's altered flood control operation and the federal Water Management Plan's standard flood control operation is 1072 KaF, distributed between Mica, Arrow, Libby, Grand Coulee, Brownlee, and Dworshak projects.⁹ The ROP applies this storage to both spring and summer salmon migrants through the creation of the natural river operation. If they proceed as planned, federal flood control drafts will likely result in a loss of storage that may impact spring flows and the ability to meet the April 10th refill requirement called for by the 2000 FCRPS Biological Opinion. For example, federal flood control operations already conducted a pre-season draft of more than 1 MaF at Libby by December 31st. Since the draft occurred before the first official water supply forecast in January, Libby is now struggling to reach its Upper Rule Curve. Also, drafts for power, in the guise of flood control operations, puts all FCRPS projects at risk for meeting early spring elevation targets. As of March 23rd, 2005, Arrow was 36 feet below its April 30th flood control rule curve target elevation (a troubling observation of FCRPS operations, given the relatively favorable water supply forecast for the Upper Columbia), as was Libby (-30 feet), Hungry Horse (-10.5 feet), Dworshak (-26.3 feet), and Brownlee (-3.5). The loss of this storage may also reduce the ability to 1) meet the April 10th refill requirement and, 2) meet McNary spring target flows called for by the FCRPS 2000 Biological Opinion.

reservoirs to store more of the spring runoff for fish summer flows. In the 1995-1998 Biological Opinion, the Bureau of Reclamation was to provide an additional one million acre-feet (MaF) of water from the upper Snake for salmon flows. Again, this operation has yet to be realized.

The ROP's hydrograph generates peak flows that are well below flood stages in Portland and other locations¹⁰ (Figures 1 and 2) and is better able to meet flow objectives (Table 3). Alternative flood control curves were modeled with GENESYS (Martin 2004). CRITFC's Prescribed Rule Curves values are listed in Table 4. Seven water years (1929-31, 1937, 1941, 1973, and 1977) are used in the modeling as their volumes average out to near the official 67.7 MaF forecast. Those years reflect a neutral-to-cold PDO and neutral-to-slight El Nino trend.

In the ROP, the receding limb of the hydrograph that provides summer fish flows would be augmented by adding drafts of upper basin storage beyond what is required in the 2000 FCRPS Biological Opinion. Drafts include an additional 500 KaF from Non-Treaty Storage from BC Hydro projects, 250 KaF from Banks Lake, 250 KaF from Montana, and 237 KaF from Hells Canyon Complex storage. Additional storage from the Upper Snake (Figures 3 and 4) is available to help meeting minimum velocity equivalents through the Lower Snake and Lower Columbia rivers. The resultant summer flows would create better migration conditions by reducing both salmon travel time and mainstem river temperatures.

Specific Project Flow and Reservoir Management

- **Dworshak.** Refill of Dworshak Reservoir by the end of June is a high priority (Appendix 3). The majority of flow should be dedicated to summer migrants and temperature control to attempt to meet Clean Water Act standards in the Lower Snake River. Consistent with the Nez Perce Tribe-State of Idaho Plan, Dworshak should fill to mean sea level (msl) 1600 feet by June 30 for juvenile and adult summer migrants and temperature control. A draft to msl 1580 feet by July 31 may be needed to alleviate temperature problems in the lower Snake River that usually occur during summer. Dworshak should draft to msl 1520 feet by September 15. Neither CRITFC nor the Nez Perce Tribe supports any drafts down to 1500 feet. Such a draft would compromise refill for the next water year and expose tribal cultural resources to unlawful theft and vandalism.
- **Lower Granite Reservoir** should be drawn down to msl 723 feet from June 20 – August 31 to decrease juvenile and adult travel time and to increase the effectiveness of selective withdrawal of cool water from Dworshak for Lower Snake River temperature control. Juvenile bypass screens will be removed with the drawdown and only one unit operates

¹⁰ The Corps defines flood stage as 550 kcfs and bank-full as 450 kcfs, as gauged at The Dalles Dam. The peak monthly flow in CRITFC's 2005 Plan with altered flood control rule curves is 210 kcfs at The Dalles, or 240 kcfs below bank-full. The Corps' QADJ procedure suggests a monthly June peak of 149 kcfs is likely in 2005 with federal operations. In the 2002 Biological Assessment for the Lower Columbia Channel Deepening, the Corps states that flood control was managed to keep peak flows at The Dalles at 550 kcfs in 1970 and prior years. The Corps has managed peak flows at The Dalles to ~360 kcfs in recent years, without Congressional authorization.

for station service. The rest of the river is spilled. Lower Granite should be gradually refilled by October 31 with most of the refill occurring in October.

- **Little Goose, Lower Monumental, and Ice Harbor** pools should be maintained at minimum operating pool during the fish passage season as required by the FCRPS Biological Opinion.
- **Hells Canyon Complex.** The 110 KaF described in the 1998 FERC Biological Assessment for the Hells Canyon Complex should augment Snake River spring flows in May. For summer flows in July and the first part of August, Brownlee should contribute an additional 237 KaF described in the 2004 Interim Settlement Agreement for the relicensing of the Project. As also described in the Agreement, Idaho Power Company should pass through upper Snake water through the Hells Canyon Complex in July and August for salmon migrations in the Snake River.
- **Lake Roosevelt.** The ongoing drum gate work will drain the reservoir to msl 1255 feet for six weeks ending in mid-May. In order to limit impacts to spring flows at the peak of the spring salmon migration, reservoir refill should be limited to msl 1280 feet by June 30th (see: Appendix 3). Lake Roosevelt is drafted to msl 1270 feet by August 31 for summer flows. The reservoir should then be filled to msl 1275 feet by September 30 and 1283 feet by October 31. It is important that power peaking flows from Grand Coulee be limited during the Hanford Reach juvenile fall chinook susceptibility period for 3-6 week from mid-March to mid-May as determined by field monitoring. Thus, Grand Coulee should remain on Mid-Columbia Hourly Coordination for this period.
- **Banks Lake.** Storage of 260 KaF (a 10 foot draft at Banks Lake) should remain in Lake Roosevelt during July and first-half of August instead of being pumped into Banks Lake. This extra 5-foot draft over that called for by the 2004 FCRPS Biological Opinion will provide additional flow augmentation for salmon.
- **Canadian storage.** Storage should be released to fill out the natural runoff in mid- April through June to provide flows for spring migrants when inflows are passed through Lake Roosevelt and to refill Roosevelt after the drumgate work is concluded in mid-May. (Attachment 1). An extra 500 KaF from Canadian Non-Treaty storage over the 1 MaF called for by the FCRPS Biological Opinions should be allocated for summer Columbia River flows.
- **Montana VAR-Q Operations.** The CRITFC 2005 Plan recommends that modified VAR-Q operations be implemented at Libby and Hungry Horse without compensating drafts of Lake Roosevelt (Appendix 3). This action would hold storage in upper basin reservoirs for later anadromous fish migrations and reduce impacts to resident fish.
- **Libby.** Storage should be managed for sturgeon flows in late June and early July, downstream salmon migrations and resident fish needs by implementing modified VAR-Q operations. Libby fills within one-foot of full by late July (Appendix 3). Libby should be drafted to avoid drafting Dworshak, which has substantial temperature control

capacity in the lower Snake. CRITFC recommended operations leave the reservoir 5.9 feet from full by June 30, or 4.6 feet lower than FCRPS operations, but creates a smoother down-river summer flow regime. An extra 200 KaF (or 4% of April-September water supply forecast) should be drafted by August 31 to augment with lower Columbia flow augmentation.

- **Hungry Horse.** Storage should be managed for salmon flows and resident fish needs by implementing modified VAR-Q operations. CRITFC recommended operations leave the reservoir at full by June 30, or the same as the proposed federal FCRPS operations (Appendix 3). An extra 50 KaF (or 4% of April-September water supply forecast) should be drafted by August 31 to help with lower Columbia flow augmentation.
- **Power peaking/load following.** Should be restricted to: 1) avoid stranding of juvenile salmon in the Hanford Reach, 2) allow fish ladders and other fish passage facilities to operate within established criteria and protocols and, 3) allow proper conduct of tribal treaty fisheries. Power peaking impacts are greater in low flow years than in average flow years.
- **Meeting Clean Water Act Standards** for dissolved gas and temperature is a high priority. Juvenile salmon should be left in river to take advantage of cool water releases and to avoid high temperatures and fish kills in screen and transportation systems.

Hanford Reach Flows

- Power peaking should be restricted to avoid stranding of Hanford Reach juvenile chinook, especially during the key fry susceptibility period (March 15 – May 15). Fluctuations during this period should not exceed specified criterion during each 24-hour period in the CRITFC 2005 Hanford Stranding Operations Recommendations (Appendix 1). To accomplish these fluctuation reductions, all seven Mid-Columbia Projects should stay on Mid-Columbia Hourly Coordination during all of the early migration and susceptibility period. Grant PUD should fund evaluation efforts in the Hanford Reach and should cooperate with tribal and fishery agency 2005 Hanford Reach monitoring and evaluation efforts.

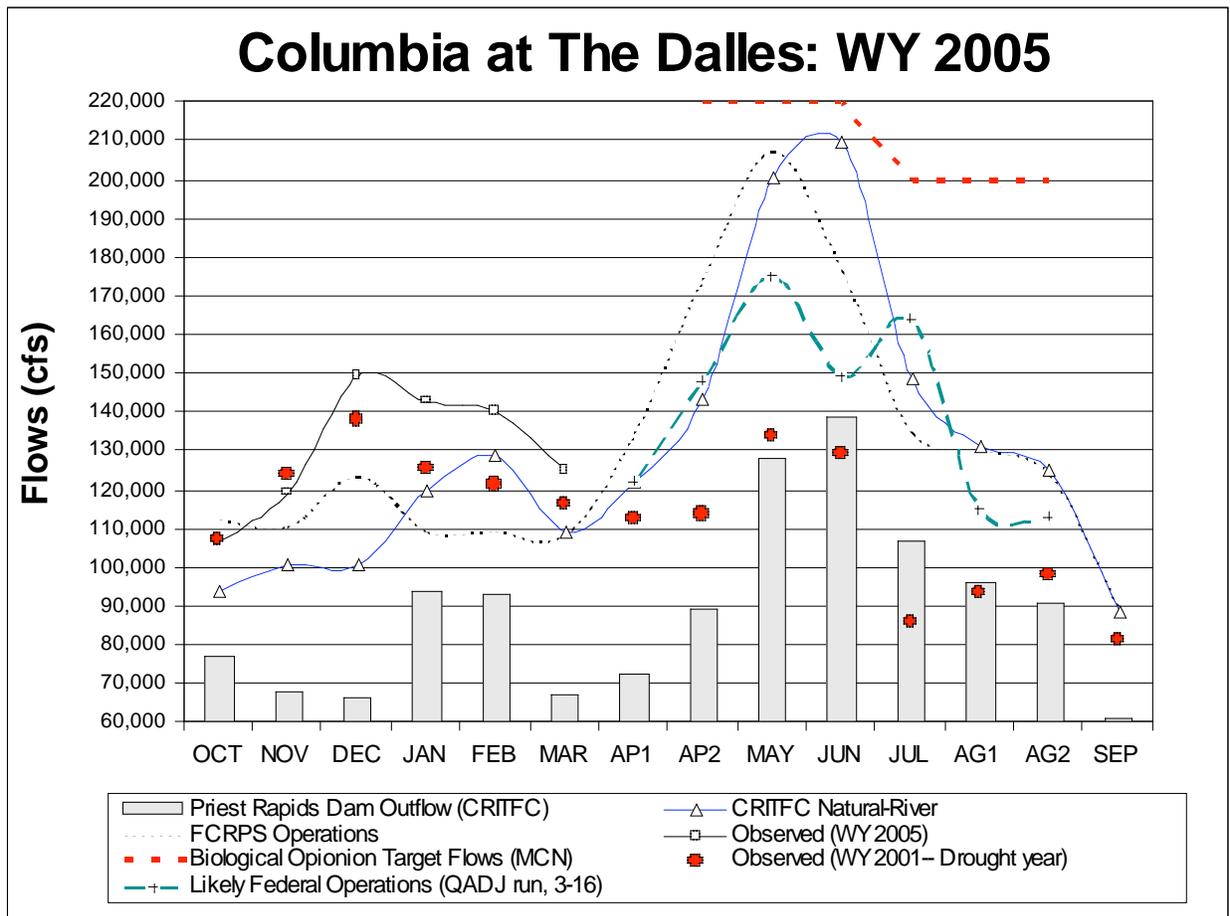


Figure 1. The 2005 CRITFC River Operations Plan hydrograph for the Columbia at The Dalles and Columbia at Priest Rapids as compared to FCRPS operations, as modeled in GENESYS. The “likely” Federal operation (dashed green line), as given by the Corps’ QADJ procedure, is also shown. The 2000 Biological Opionion Target Flows (MCN) and observed river flows for WY 2005 (to date) and WY 2001 are plotted for reference.

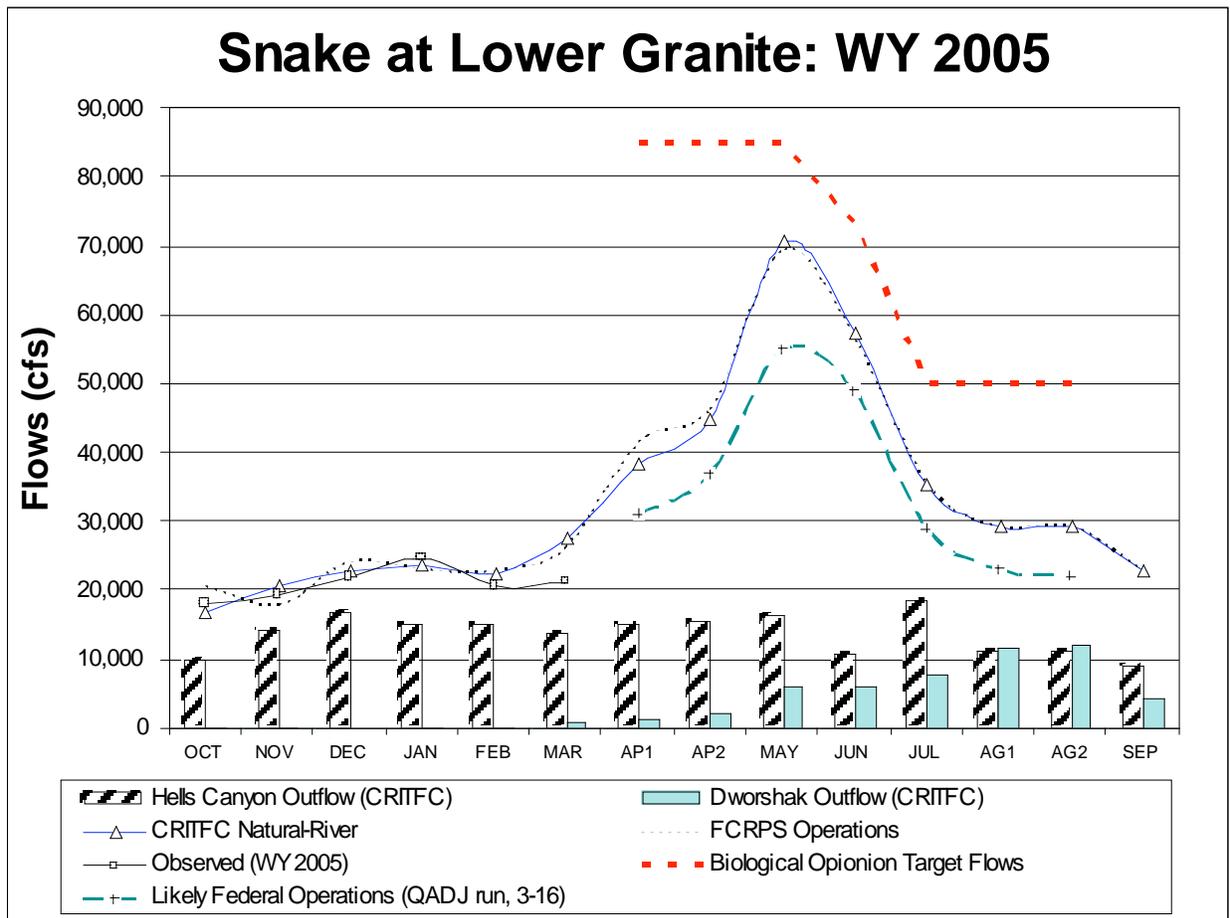


Figure 2. The 2005 CRITFC River Operations Plan hydrograph for the Snake River at Lower Granite as compared to FCRPS operations, as modeled in GENESYS. The historical years used for GENESYS modeling likely overestimate 2005 flows. The “likely” Federal operation (dashed green line), as given by the Corps’ QADJ procedure, is also shown. The 2000 Biological Opinion flow targets and observed WY 2005 river flow are plotted for reference.

Bureau of Reclamation, Pacific Northwest Region Major Storage Reservoirs in the Upper Snake River Basins

03/23/2005

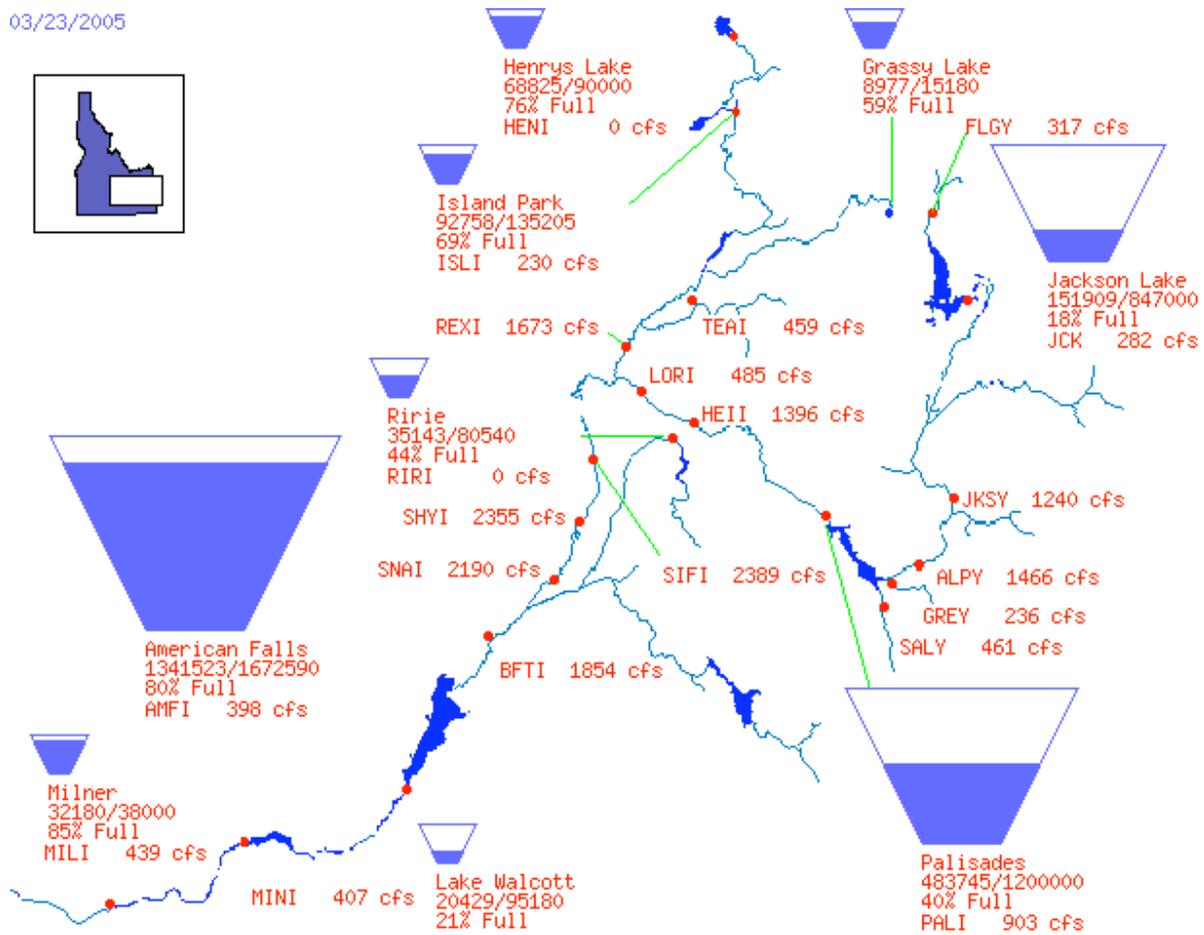


Figure 3. March 23, 2005 storage in the Bureau of Reclamation's Upper Snake Projects.

Bureau of Reclamation, Pacific Northwest Region Major Storage Reservoirs in the Boise & Payette River Basins

03/23/2005

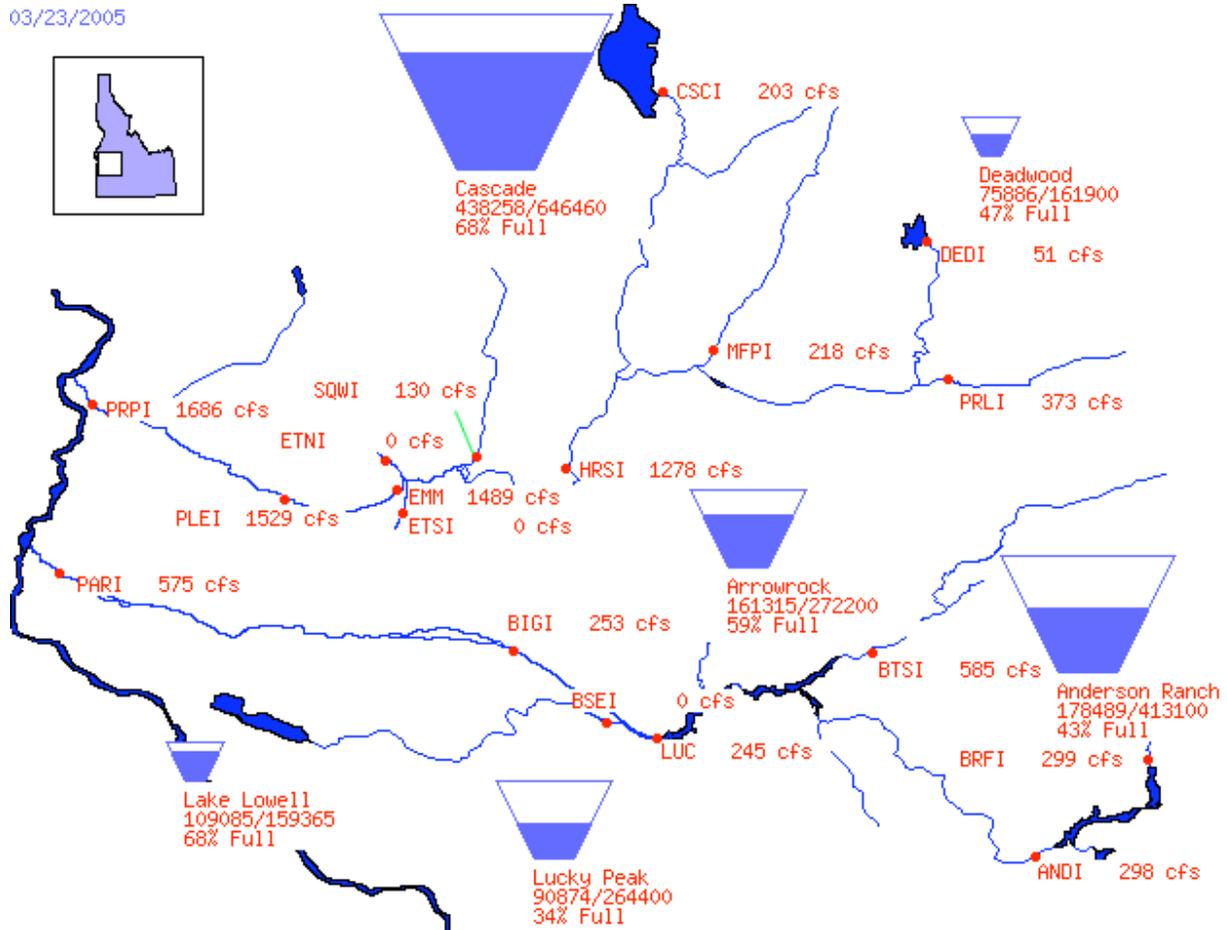


Figure 4. March 23, 2005 storage in the Bureau of Reclamation's Boise and Payette Projects.

WATER YEAR 2005 (average of 7 years: WY 1929-31, 1937, 1941, 1973, and 1977)

<i>Spring (April 10 - June 30, Columbia):</i>	<u>CRITFC</u>	<u>Federal</u>	<u>Difference</u>
Seasonal Flow (McNary), cfs	181,835	176,522	5,313
Seasonal Flow (Lower Granite), cfs	57,384	57,304	80
System Generation, MWa	11,682	13,239	-1,557
<i>Summer (July 1 - August 31):</i>	<u>CRITFC</u>	<u>Federal</u>	<u>Difference</u>
Seasonal Flow (McNary), cfs	133,348	126,291	7,057
Seasonal Flow (Lower Granite), cfs	35,828	35,734	94
System Generation, MWa	9,525	10,458	-933
<i>August 31st pool elevations, feet:</i>	<u>CRITFC</u>	<u>Federal</u>	<u>Difference</u>
Mica, BC	2453.3	2458.2	-5.0
Arrow, BC	1411.2	1411.2	0.0
Libby	2434.2	2439.0	-4.8
Hungry Horse	3537.7	3540.0	-2.3
Grand Coulee	1270.1	1278.0	-7.9
Brownlee	2059.0	2059.0	0.0
Dworshak	1535.1	1535.1	0.0
Snake Flow Augmentation (KaF):	427	427	0
Brownlee Flow Augmentation (KaF):	237	237	0
BC Non-Treaty Storage (KaF):	500	0	500
Banks Lake (KaF):	250	125	125
Montana (LIB 200 KaF, HGH 50 KaF):	250	0	250

SPILL OPERATIONS

<i>Spring Spill (cfs)</i>	<u>CRITFC Plan</u>			Total Spill	<u>Federal Plan</u>		Total Spill	<u>Difference</u>
	Bypass	Forced			Bypass	Forced		
<i>(April 3 - June 20):</i>								
Lower Snake (avg.)	36,780	0	36,780	0	0	0	36,780	
<i>(April 10 - June 30):</i>								
Lower Columbia (avg.)	71,817	14,219	86,036	45,252	12,764	58,015	28,021	
<i>Summer Spill (cfs)</i>	<u>CRITFC Plan</u>			Total Spill	<u>Federal Plan</u>		Total Spill	<u>Difference</u>
<i>(June 21 - August 31):</i>	Bypass	Forced			Bypass	Forced		
Lower Snake (avg.)	20,224	0	20,224	0	0	0	20,224	
<i>(July 1 - August 31):</i>								
Lower Columbia (avg.)	71,652	463	72,115	46,307	59	46,365	25,749	

Table 3. Summary of GENESYS modeled flow, elevation, and spill for the CRITFC River Operations Plan vs. expected Federal (Biological Opinion) Operations. Seven water years approximating 2005 runoff conditions were selected from the historical record to forecast flows.

SYSTEM FLOOD CONTROL (GENESYS model)

WATER YEAR 2005 (average of 7 water years, WY 1929-31, 1937, 1941, 1973, and 1977)

Spring Operations					
CRITFC	PRC--Prescribed Rule Curve				
Elev. (msl ft)	Mica, BC	Arrow, BC	Grand Coulee	Brownlee	Dworshak
April 15th	2398.6	1407.9	1254.1	2077.0	1570.3
April 30th	2398.9	1405.0	1255.0	2077.0	1581.9
May 31st	2408.9	1400.0	1263.0	2069.0	1599.9
June 30th	2428.2	1398.4	1280.0	2077.0	1600.0
Federal Flood Control Elevations					
Elev. (msl ft)	Mica, BC	Arrow, BC	Grand Coulee	Brownlee	Dworshak
April 15th	2395.5	1408.5	1253.8	2077.0	1565.1
April 30th	2393.1	1400.6	1255.0	2077.0	1575.1
May 31st	2403.6	1391.6	1263.0	2069.0	1597.7
June 30th	2428.2	1397.2	1290.0	2077.0	1600.0

Summer Operations					
CRITFC	PRC--Prescribed Rule Curve				
Elev. (msl ft)	Mica, BC	Arrow, BC	Grand Coulee	Brownlee	Dworshak
July 31st	2451.8	1419.6	1270.1	2059.0	1580.0
August 15th	2456.5	1419.8	1270.1	2059.0	1560.0
August 31st	2457.1	1417.7	1270.1	2059.0	1535.1
September 30th	2455.3	1418.0	1275.0	2059.0	1520.0
Federal Biological Opinion Elevations					
Elev. (msl ft)	Mica, BC	Arrow, BC	Grand Coulee	Brownlee	Dworshak
July 31st	2453.4	1419.6	1285.0	2059.0	1580.0
August 15th	2460.2	1419.8	1280.0	2059.0	1560.0
August 31st	2461.8	1417.7	1278.0	2059.0	1535.1
September 30th	2460.3	1418.0	1282.7	2059.0	1520.0

Table 4. Recommended Modified Flood Control Rule Curves, as modeled in GENESYS.

2005 Spill Program for the Columbia Basin

Under the terms of the 2000 Biological Opinion, with the low 2005 projected flows, no spring or summer spill is required at three of the four Snake River dams. In contrast the 2005 River Operations Plan recommends a program to provide 24-hour spill at all Corps dams in spring and summer in order to significantly increase overall passage success and survival for the 2005 juvenile and adult migrants. This includes protection of Pacific lamprey. Lamprey passage through screen bypass systems has been problematic, with significant numbers of lamprey being observed to be impinged on screen bars (Morsund et al. 2002). Spill has been demonstrated to be the most effective and safest means of juvenile project passage (Fishery Managers 1994; FPAC 2003; Whitney et al. 1998; NPPC 1999). Spill also best protects the beneficial use under the Clean Water Act by providing salmon access to lower temperatures found at depth in the reservoirs instead of higher temperatures found in dam bypass and transportation systems. Spill also provides safer downstream passage for steelhead kelts and adults that fallback over dams than powerhouse routes.

Principal features of this spill program include:

- Provision for spring and summer spill at Snake River and McNary dams. The current 2000 and 2004 FCRPS Biological Opinions do not require summer spill, despite the lack of scientific evidence that indicates transporting summer migrants would be advantageous compared to spilling migrants over dams.¹¹ CRITFC has advocated for a summer spill program and transport study (with summer spill) in the Lower Snake River for at least the last five years. This controversy was expressed in the fall fishery negotiations in *U.S. v. Oregon* in the last several years. CRITFC will continue to oppose any Snake River or McNary transport study that does include a reasonable spill and flow component.
- Extension of spill season. The Plan also recommends that the spill season be extended in duration over that offered in the 2000 FCRPS Biological Opinion. Because mainstem river temperatures have been warmer than in past years, it is very likely that juvenile migrations will start earlier than in the past and kelts will be migrating and need downstream protection. Early spill will better protect spring chinook kelts emigrating seaward. Recent radio-telemetry studies indicate that about half of steelhead spawners return to sea and that spill increases kelt survival (English et al. 2001; English et al. 2003; Evans et al. 2001; Evans 2002).¹² Spill should begin at mainstem dams about March 20, depending on the status of the migrations. Depending on monitoring assessments, spill should be extended to September 15 at lower Columbia Dams to assist millions of late

¹¹ Recent analysis entitled: *Review of the Bonneville Power Administration's analysis of the biological impacts of alternative summer spill operations* (Bouwes 2005), indicates that ceasing transportation and employment of a spring season spill regime in the summer could result in increasing adult returns from 44,000-139,000 salmon.

¹² Telemetry data from these studies indicate that in 2001 with no spill and screen system turbine passage, only 3.8% of radio-tagged kelts survived from Lower Granite Dam to the Bonneville Dam tailrace. These studies indicate that if spill and sluiceway passage is provided, 86-93% of kelts will use these routes, which insure substantially higher survival rates through the dams.

migrating juvenile salmon and to reduce powerhouse injuries to adult steelhead and fall chinook that fall back at dams. Recent analysis by the Fish Passage Center indicates that a significant number of ESA- listed fish, including Clearwater fall chinook and unlisted fish, migrate through the hydro-system in September (FPC 2003).

- Real- time spill ramping impacting fish passage goals. During the 2002-4 spill seasons, spill levels were ramped up and down depending on the TDG readings from monitoring sites below dams. Atmospheric conditions, combined with temperature greatly influence the accuracy of TDG monitoring sites. Depending on TDG levels that would violate gas waivers from the state water quality agencies, spill levels were reduced to levels well below the TDG waiver levels, and this condition was continued for several hours. Thus, spill volumes required in the 2000 FCRPS Biological Opinion were not provided. It appears to CRITFC that Corps' actions to hold spill at levels below the gas waivers for hours after reducing spill is negatively impacting regional passage goals. For example, total dissolved gas levels at Bonneville's tailwater location are quite variable and these levels can impact spill operations at Bonneville, The Dalles and, to a lesser degree, John Day.

It is our understanding that the Corps has established a protocol to address ramping down spill when the monitoring sites are above the standard, however, a protocol for the real-time expedited ramping up spill when the monitoring sites are under the gas waiver and the spill level is lower than intended in the 2000 FCRPS Biological Opinion has not been completed. The Corps should install the capacity to resolve this issue at all FCRPS dams by implementing project operational measures in the 2005 Fish Passage Plan and ensure that all dam operators closely follow the measures.

Priorities:

Refer to Table 5 for the details of project spill operations. All proposed operations conform to existing total dissolved gas constraints.

Bonneville (BON). Spill is very effective and efficient at Bonneville. Past survival studies indicate that for juvenile migrants, spill resulted in a relative survival to the estuary of 98% compared to screen bypass and turbine passage survival of 80% and 82% respectively. Recent installation of spillway deflectors decreased total dissolved gas levels to allow increased spill levels. CRITFC recommends daytime spill to the 120 kcfs until an additional fallback and potential delay of adults can be evaluated to determine if daytime spill to the cap is warranted. Fallback information for 2000 and 2002 showed little difference between fallback within 24 hours of exiting the adult ladder under low (75 kcfs) and gas cap spill. A 2002 balloon tag study showed higher survival and lower mortality under the higher spill rates at Bonneville (Normadeu, 2002 the final draft is still under review). Nighttime spill would set at ~150 kcfs or Gas Cap. At least three days of spill should be allocated at these levels to protect release of the Spring Creek Hatchery fall chinook migration during mid-March.

The Dalles (TDA). Due to concerns with juvenile turbine passage (survivals in the low 80% range; 2000 FCRPS Opinion, Appendix D), it is prudent to increase non-turbine passage routes, which include the sluiceway and spillway. Spill is the only passage route that can immediately increase juvenile passage survival. The 1995-1998 FCRPS biological opinion required spill at 64% of daily average flow. Based upon questionable survival studies, NMFS decreased spill to 40% of daily average flow. In 2002 project survival decreased significantly. This subjects more juveniles to turbine passage. The ROP recommends an increase in spill from the 2000 FCRPS Opinion level from 40% to 50% of daily average flow. North loading of the spillway with these flows would avoid placing juvenile salmon toward shallow island predation zones where they were placed with the 64% spill. The 2003 research and fish passage at TDA is best served by maintaining a constant spill level during the migration season.

John Day (JDA). Critical uncertainties remain regarding spill operations at John Day. Research in 2001 (Beeman, Counihan et al. USGS, 2001) indicated that radio-tagged juveniles using the screened bypass outfall had a direct survival of 88-92%, while juveniles passing through spill survived in the 98-100% range. CRITFC proposes the best operation is provision of 30% of daily average flow during the day with 45 – 50% daily average flow at night. Night spill is very effective at passing fish. However the large volume of spill required to generate the high fish passage efficiency may in part, create poor conditions at the screened bypass outfall, which in 2002, may have led to lower survival. (Beeman and Counihan 2002) Furthermore project operations of the turbine units were shown to be different than that outlined in the Corps Fish Passage Plan (FPP). Hydraulic studies indicated a marked improvement in tailrace conditions at the outfall when turbine priority was followed as outlined in the FPP. Because indirect mortality rates and lowered smolt-to-adult survival rates occur for smolts that pass through screened bypass systems and bypass systems select against juvenile lamprey and certain salmon stocks, we recommend maximizing spill at John Day and examining fish passage without turbine intake screens through comparative survival studies as a high priority. In the future, to increase passage we recommend investigations of removable spillway weirs or similar surface spill options at JDA to increase fish passage efficiency. Current estimates for turbine passage in 2002 were extremely low with large confident intervals. Therefore, it is prudent to reduce the exposure of juveniles to the powerhouse and potential turbine passage.

McNary (MCN). McNary is the only Lower Columbia dam that is not scheduled by the 2000 BiOp to have voluntary spill 24 hours a day in either spring or summer. The ROP's recommended hydrograph will create some involuntary spill at McNary as the powerhouse is hydraulically limited to flows up to about 140 kcfs. However, there is regional discussion of eliminating the 1% turbine operating range at this project which would further reduce any amount of involuntary spill. McNary passes a substantial number of Columbia Basin salmon from the Mid-Columbia, Snake River and Hanford Reach. The existing screened bypass system has structural and hydraulic problems; PIT-Tag studies indicate that juveniles that experience multiple screen bypass passage have lower smolt-to-adult returns than juveniles that pass thorough spill and turbines (Bouwes et al. 2002; Budy et al. 2002). Of about 200,000 juvenile spring chinook marked and released in 1995 from the bypass system, no adults returned. Transportation results to date have been equivocal. Juvenile survival rates for spill range from 94-97%; screen system passage survival ranges from 85-90%; and turbine survival ranges from 67-74% (Perry et al. 2004). Based upon this data, additional spill is needed at this project to

increase salmon survival. Thus, to spread-the-risk¹³ and encourage better tailrace egress conditions to avoid predators and delay, the ROP recommends that the Corps provide daytime spill at a level commensurate with the current nighttime Biological Opinion spill operation and provision for 24 hour summer spill.

Ice Harbor (IHR). For 2005, CRITFC recommends a comprehensive study to evaluate RSW passage as a whole at Ice Harbor. Several survival studies have been done at IHR in recent years with a large variety in survival estimates for both spring and summer. (Eppard et al. 2002 and 2003) It appears that high spill volumes in low tail water and low flow conditions do not provide optimal passage for juveniles. Whether this problem is due to mechanical/hydraulic conditions at the spillway, poor egress from the tailrace, which increases predation, or some combination of these factors is unclear. CRITFC recommends conducting a study that compared a nighttime spill level less than the 100-kcfs/TDG cap to the existing spill level. Further refinement and study of the current spill patterns should also be examined to insure the best egress conditions possible.

Lower Monumental (LMN). Under the 2000 FCRPS Biological Opinion, the Corps will not provide spring or summer spill. With the repairs to the stilling basin complete, CRITFC strongly recommends the implementation of 24-hour spill for spring migrants and summer migrants. Transportation at Lower Monumental for spring migrants has shown to return fewer adults than Lower Granite, indicating that some serious problem in the screened bypass system or transportation system may be selecting against migrants. Summer migrant transportation has not been examined yet, but results from summer migrant transportation at McNary are not encouraging. We recommend spread the risk for migrants at this project and comparative survival studies that require removal of turbine intake screens. Further, NMFS has suggested an operational change in the spill program at Lower Monumental. The 2000 FCRPS Biological Opinion indicated a 24-hour spill to gas cap operation. The proposed federal 2005 spill operation is one based on spill rates of approximately 50% of the instantaneous flow in order to reduce tailrace eddies. Whether or not this change would be beneficial for salmon has not been reviewed and CRITFC recommends a carefully structured evaluation before spill is modified. Survival and passage data from other projects, such as Priest Rapids, indicate that salmon migration timing and survival has not been reduced from large eddy conditions in tailraces. For summer, we recommend spread-the-risk for summer migrants at this project through comparative survival studies. We recommend spill of all flow except one turbine unit needed for station service for adult passage and other needs.

Little Goose (LGS). Under the 2000 FCRPS Biological Opinion, the Corps will not provide spring or summer spill. CRITFC strongly recommends the implementation of 24-hour spill for spring migrants and summer migrants. Smolt-to-adult survivals for juveniles that pass through screened bypass systems indicate fewer adults lower rates than for juveniles that pass through non-screened bypass routes. Spring transportation at Little Goose has been equivocal (Bouwens et al. 2002), thus, CRITFC recommends a spread the risk approach for juvenile migrants with about half passed in spill and the other half transported. Summer migrant transportation has not

¹³ Under the CRITFC Plan, "Spread the risk" entails an operation where approximately half of the migrants are passed through the dam via surface bypass and/or spill and the other half are passed through turbine screened systems and transported in trucks or barges.

been examined yet, but results from summer migrant transportation at McNary are not encouraging. We recommend spread the risk for summer migrants at this project and comparative survival studies and spill of all flow except one turbine unit needed for station service for adult passage and other needs.

Lower Granite (LWG). Under the 2000 FCRPS Biological Opinion, the Corps will not provide spring or summer spill, except for possible RSW tests. For 2005, the Corps has left the removable spillway weir (RSW) installed in an attempt to increase fish passage effectiveness. CRITFC believes that the weir, with some auxiliary spill, should be tested in spring 2005 against spill at levels that approach total dissolved gas cap limits to determine if there is a difference in project fish passage efficiency (FPE). Auxiliary spill should be set at 22 kcfs to insure that juveniles are provided the best possible tailrace egress conditions, and that they are attracted to the RSW zone of influence in the forebay. RSW/spill tests should only compare two conditions to insure that there are adequate test blocks to insure results have statistical precision and robustness. For summer, CRITFC recommends a 10 foot drawdown of Lower Granite pool, remove turbine screens to avoid gatewell trapping of juvenile salmon and spill all flow except one turbine unit needed for station service for adult passage and other needs.

Wanapum. Spill should be provided as specified by the 2000 Spill Memorandum of Agreement (MOA) between Grant PUD and the Joint Fishery Parties, as modified by mutually agreeable research. The Agreement specifies that Grant will spill 43% of daily average flow in the spring and 49% of daily average flow in the summer to pass 95% of the juvenile migrants and meet an 80% FPE and 95% survival standard estimate. The beginning and end of spring spill is determined by the Mid-Columbia Coordinating Committee and the beginning of summer spill is June 15 or when fish are present, whichever occurs first and ends between August 15 and August 30 based upon in-season monitoring.

Priest Rapids. Spill should be provided as specified by the 2000 Spill Memorandum of Agreement (MOA) between Grant PUD and the Joint Fishery Parties as modified by mutual agreement for research. The Agreement specifies that Grant will spill 61% of daily average flow in the spring and 39% of daily average flow in the summer to pass 95% of the juvenile migrants and meet an 80% FPE and 95% survival standard estimate. The beginning and end of spring spill is determined by the Mid-Columbia Coordinating Committee and the beginning of summer spill is June 15 or when fish are present, whichever occurs first and ends between August 15 and August 30 based upon in-season monitoring. Spill at Priest should be increased by an equal amount of spill foregone at Wanapum if total dissolved gas restrictions limit Wanapum spill from achieving MOA required percentages.

Table 5. 2005 River Operations Plan Spill Program

Project	Biological Opinion Spring Spill	CRITFC Spring Spill	Biological Opinion Summer Spill	CRITFC Summer Spill
BON				
Day	75 kcfs	120 kcfs	75 kcfs	120 kcfs
Night	120-150 kcfs (Cap)	120-150 kcfs (TDG Cap)	120-150 kcfs (TDG Cap)	120-150 kcfs (TDG Cap)
TDA				
Day	40% of flow	50% of flow	40% of flow	45% of flow
Night	40% of flow	50% of flow	40% of flow	45% of flow
JDA				
Day	0	30% of flow	30% of flow	45% of flow
Night	60% flow or max 180	45% vs. 60% (BiOp)	30% of flow	45% of flow
MCN				
Day	0	50% of flow	0	50% of flow
Night	TDG Cap	TDG Cap	0	50% of flow
IHR				
Day	45 kcfs	45 kcfs	20 kcfs	River flow other than one unit station service
Night	100 kcfs	~50% flow vs. 100 kcfs	20 kcfs	River flow other than one unit station service
LMN				
Day	0	40 kcfs (TDG Cap) vs. ~50% of flow	0	River flow other than one unit station service
Night	0	40 kcfs (TDG Cap) vs. ~50% of flow	0	River flow other than one unit station service
LGS				
Day	0	45 kcfs (TDG Cap)	0	River flow other than one unit station service
Night	0	45 kcfs (TDG Cap)	0	River flow other than one unit station service
LWG				
Day	0	22 kcfs vs. 60 kcfs	0	River flow other than one unit station service
Night	0	22 kcfs vs. 60 kcfs	0	River flow other than one unit station service

References

- Agencies and Tribes (CRITFC, USFWS, WDFW, IDFG, Nez Perce). 2001. April 20, 2001 letter in Response to April 5, 2001 Northwest Power Planning and Conservation Council Recommendations on 2001 Federal Columbia River Power System Operations and Fish Survival. Portland, Oregon.
- Beeman, J., and T. Counihan. 2001. Survival estimates of migrant juvenile salmonids in the Columbia River from John Day Dam Through Bonneville using Radio-Telemetry, 2001. USGS Western Fisheries Research Center, Columbia River Research Laboratory. Cook WA.
- Beeman, J. and T. Counihan et al. 2001. Summary of Juvenile Salmonid FPE, Survival and tailrace egress based on radio telemetry at John Day Dam in Spring 2002. AFEP Presentation. USGS Western Fisheries Research Center, Columbia River Research Laboratory. Cook WA.
- Bouwes, N. 2004. Review of the Bonneville Power Administration's analysis of the biological impacts of alternative summer spill operations. Report to the Columbia Basin Fish and Wildlife Authority. Portland, Oregon.
- Bouwes, N., C. Petrosky, H. Schaller, P. Wilson, E. Weber, S. Scott and R. Boyce. 2002. Comparative survival study (CSS) of PIT Tagged Spring/Summer Chinook. Status Report for Migration Years 1997-2000. Mark/Recapture Activities. Contract #8712702 to Bonneville Power Administration. By Columbia Basin Fishery Agencies and Tribes. Fish Passage Center. Portland, Oregon.
- Budy, P., G.P. Thiede, N. Bouwes, C.E. Petrosky and H. Schaller. 2002. Evidence linking delayed mortality of Snake River salmon to their earlier hydrosystem experience. *North American Journal of Fisheries Management*. 22:35-51.
- Bunn, S.E. and A.H. Arthington. 2002. Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Biodiversity. *Environmental Management*, v. 30 (4), pp. 492-507.
- Connor, W.P., R. Kirk Steinhorst and H.L. Burge. 2003. Migration behavior and seaward movement of wild subyearling fall chinook salmon in the Snake River. *North American Journal of Fisheries Management* 23:414-430.
- Dawley, D.M., R.D. Ledgerwood, L.G. Gilbreath and P.J. Bentley. 1996. Relative survival of subyearling chinook that have passed Bonneville Dam via the spillway, first or second powerhouse bypass system or turbines or tailrace. Draft Report. Indirect survival studies. Adult recoveries of indirect survival studies. Direct measure survival studies. NMFS. Seattle, WA.

- Deriso, R.B., D. Marmorek and I. Parnell. 2001. Retrospective patterns of differential mortality and common year-effects experienced by spring and summer chinook salmon (*Oncorhynchus tshawytscha*) of the Columbia River. *Can. J. Fish. Aquat. Sci.* 58:2919-2430.
- Deriso, R.B., D.R.Marmorek and I.J. Parnell. 1996. Retrospective Analysis of Passage Mortality of Spring Chinook of the Columbia River. Chapter 56 *in* Marmorek et al. 1996. Plan for Analyzing and Testing Hypotheses (PATH): Final report on retrospective analyses for fiscal year 1996. Compiled and edited by ESSA Technologies, Ltd. Vancouver, B.C.
- English, K.K., C. Sliwinski, B. Nass, and J.R. Stevenson. 2003. Assessment of adult steelhead migration through the Mid-Columbia River using radio-telemetry techniques, 2001-2002. Draft report to Mid-Columbia Public Utility Districts. LGL Limited. Sidney, B.C.
- Eppard, B. 2002. Ice Harbor Dam Spillway Survival Migrational Characteristics of Juvenile Chinook Salmon Trough McNary Dam (AFEP Presentation). Fish Ecology Division Northwest Fisheries Science Center National Marine Fisheries Service. Seattle WA.
- Evans, A. 2002. Steelhead (*Oncorhynchus mykiss*) kelt outmigration from Lower Granite Dam to Bonneville Dam: abundance, downstream conversion rates, routes of passage and travel times. Contract No. DACW68-01-0016 to Corps of Engineers. Columbia River Inter-Tribal Fish Commission. Portland, Oregon.
- Evans, A., and R. Beaty. 2001. Identification and enumeration of Steelhead (*Oncorhynchus mykiss*) kelts in the juvenile collection systems of Lower Granite and Little Goose dams, 2000. Contract No. DACW68-00R--0016 to Corps of Engineers. Columbia River Inter-Tribal Fish Commission. Portland, Oregon.
- FPC (Fish Passage Center). 2002. Annual Report of the Fish Passage Center- 2001. Portland, Oregon.
- Fishery Managers (Columbia River Inter-Tribal Fish Commission, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife). 1994. Scientific Rationale for Implementing a Spring and Summer spill program to increase juvenile salmonid survival in the Snake and Columbia Rivers. CRITFC. Portland, Oregon.
- Gilbreath, L.G., E.M. Dawley, R.D. Ledgerwood, P.J. Bentley and S.J. Grabowski. 1993. Relative survival of subyearling chinook salmon that have passed Bonneville Dam via the spillway or second powerhouse turbines or bypass system: Adult recoveries

through 1991. Coastal Zone and Estuarine Services Division. NMFS. Seattle, Washington.

Heede, B.H. and J.N. Rinne. 1990. Hydrodynamic and fluvial morphologic processes: implications for fisheries management and research. *North American Journal of Fisheries Management*. 10:249-268.

Hamlet, A. F. and D. P. Lettenmaier. 2004. One-year Lead Time Experimental Streamflow Forecasts for the Columbia River at The Dalles. Climate Impacts Group, University of Washington, Seattle, Washington.
(<http://www.ce.washington.edu/~hamleaf/DallesForecast.html>)

Hoffarth, P. 2005. Historical estimates of fall chinook fry emergence into the Hanford Reach. Unpublished data. Washington Department of Fisheries. Kennewick, WA.

Hoffarth, P. District Fisheries Biologist. Washington Department of Fish and Wildlife. Kennewick, WA. February 20, 2003. Personal communication.

Hyatt, K. Fishery Scientist, Department of Fisheries and Oceans, Canada. February 13, 2003. Personal communication.

ISAB (Independent Scientific Advisory Board) 1998. Recommendations for stable flows in the Hanford Reach during the time when juvenile fall chinook are present each spring. August 3, 1998 Memorandum from the Independent Scientific Advisory Board to J. Etchart, Chair. Northwest Power and Conservation Council. Portland, Oregon.

ISG (Independent Science Group). 1996. *Return to the River*. Restoration of Salmonid Fish in the Columbia River ecosystem. Northwest Power and Conservation Council. Portland, Oregon. (<http://www.nwcouncil.org/library/return/2000-12.htm>)

Martin, K. 2002. Water Supply Forecast Correction Curves. Presentation to the Oregon Chapter of the American Meteorological Society. Portland, Oregon.
(http://www.critfc.org/tech/03-forecast_report.html)

Martin, K. 2004. Altered Flood Control, Climate Change, and Rebuilding Pacific Northwest Salmon Stocks. Presented at CRITFC's Regional Flood Control Workshop. Columbia River Inter-Tribal Fish Commission, Portland, Oregon.
(http://www.critfc.org/text/nat_riv.html)

Nez Perce, Yakama, Umatilla and Warm Springs Tribes. 1995. *Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon*. The Anadromous Fish Recovery Plan of the Tribes. Vol. I. CRITFC, Portland, Oregon.

- NPCC (Northwest Power and Conservation Council). 1999. Report and recommendations of the NPCC upon Review of the Corps of Engineers' Columbia River Fish Mitigation Program. Report 99-5. Portland, Oregon.
- Oosterhout, G. 2005. Third Declaration. Civ. No. CV 01-00640-RE. District Court of Oregon.
- Perry, R.W. and six co-authors. 2004. Survival and migration behavior of juvenile salmonids at McNary Dam, 2004. *In: Army Corps of Engineers 2004 Anadromous Fish Evaluation Program*. November 15-18, 2004. Portland, Oregon.
- Reclamation (US Bureau of Reclamation). 2005. Draft Biological Assessment for Bureau of Reclamation Operations and Maintenance in the Snake River Basin above Brownlee Reservoir. Boise, Idaho.
- Wilson, P.H. 2003. Using population projection matrices to evaluate recovery strategies for Snake River spring and summer chinook salmon. *Conservation Biology* 17:782-794.
- Yuen, H. and R.Sharma. 2004 (in review). Using simulation techniques to estimate management parameters on Snake River steelhead: declines in productivity make rebuilding difficult. U.S. Fish and Wildlife Service and Columbia River Inter-Tribal Fish Commission. Vancouver Washington and Portland, Oregon.

Appendix 1

2005 Hanford Protection Operations to Reduce Juvenile Hanford Reach Fall Chinook Entrapment/Stranding and Mortality

Power peaking causing flow fluctuations from federal and FERC licensed dams in the mid-Columbia River can be extreme (Figure 1), with shoreline water levels varying up to 13 feet over a 24 hour period. When this occurs during the early emergence and migration of Hanford fall chinook from redds, hundreds of thousands of fry are stranded in pools or other entrapments left by the receding river. Fry are susceptible to avian or fish predation, thermal shock, stress and desiccation. Most of the significant stranding occurs with shoreline fluctuations of 1-3 feet (Wagner et al. 2000). Fluctuations at flows of 120 kcfs and under are especially problematic because they dewater significant shoreline areas and cause greater risks of stranding (Table 1). Due to 2003 drought conditions, flows are likely to be in this range. Thus, CRITFC recommends no more than plus or minus 10 kcfs changes in mainstem flows in the Reach over a 24 hour period measured from noon to noon the previous day.

Biological and hydrological monitoring of the stranding has occurred since 1998 with funding provided by BPA and Grant PUD. The tribes and fishery agencies initially recommended that ever increasing or stable flows be provided in the Reach, consistent with the recommendations of the NPCC's Independent Scientific Advisory Board (ISAB 1998). In the CRITFC tribes' *Wy-Kan-Ush-Mi Wa-Kish-Wit* (Spirit of the Salmon) restoration plan, fluctuation of no more than 10 % of the previous day's average flow in the Reach is recommended. However, the federal and mid-Columbia FERC power operators claimed that this operation could not be accomplished because of power needs. Instead they offered regimes that targeted flow fluctuations to plus or minus 20-40 kcfs over the previous 24-hour flows. Tribes and fishery agencies were left with no recourse and could but monitor the dead and stranded salmon over the next three years.

In 1999-2001, the federal and mid-Columbia FERC power operators implemented an operational regime aimed at limiting flow fluctuations to reduce stranding. In 1999, the operators attempted to keep flow fluctuations within a plus or minus 20 kcfs range. In other words, the river flow levels from Priest Rapids dam could fluctuate up to 40 kcfs in a 24-hour period. The estimated fry "at risk" of mortality¹⁴ from these levels for 17 miles of the Reach (about one third of the Reach) in 1999 was about 382,000 and about 255,000 in 2000. The confidence intervals around these estimates were wide because more sampling effort is needed. The overall annual fry production for the Reach has been estimated by WDFW as 16-27 million salmon.¹⁵ The operators believed that these losses were acceptable as a cost of doing business for regional power production. To date, no mitigation or compensation for these losses has been offered by the operators.

¹⁴ "At risk" are fry that have been stranded and are not likely to get passage back to the river in time to avoid predation, thermal shock or other mortality.

¹⁵ The reader should note the difficulties and uncertainties in deriving these estimates in footnote four and text below.

In 2001, the operators wanted greater power peaking flexibility, thus, they proposed a flow fluctuation of 40-80 kcfs in a 24-hour period. Given the extreme low flow conditions, with the second worst runoff conditions in the 70-year record, CRITFC objected to this flow band and proposed no more than a 10 kcfs fluctuation in a 24 hour period. The fishery agencies and operators agreed to proceed with up to a 40-80 kcfs band. The result was more than a four-fold increase for “at risk” fry or an estimate of about 1.6 million fry.

Based upon: 1) review of the five years susceptibility data (Figure 2), 2) additional information supplied by the USFWS on dewatered areas below Priest Rapids Dam, 4) final results from the ADFG/CRITFC evaluation of entrapment during the 2003 Hanford fall Chinook emigration, and, 3) taking into account likely 2005 Hanford Reach flow regimes from 50-170 kcfs, we recommend the specific operations provided below. These are offered to reduce stranding impacts on Hanford Bright fall chinook, ESA-listed steelhead and Pacific Lamprey. In order to achieve the recommended flow bands: 1) the federal operators should limit power peaking from Grand Coulee and release additional water on weekends to assure the FERC-licensed operators can keep the flows within the CRITFC recommended 10-20 kcfs maximum flow fluctuations, 2) all seven mid-Columbia hydro-project should stay on Mid-Columbia Hourly Coordination during all of the fall chinook susceptibility period (roughly the third week of March to third week in May to early June). During the period of high fry stranding susceptibility, if necessary, the federal operators should rely on other generation sources than Grand Coulee to meet power contract obligations to reduce flow fluctuations. In turn, the Mid-Columbia FERC operators, in particular Grant PUD, will have to fill reservoirs on Fridays to assure that appropriate Reach flows would be maintained over weekends when reduced power demand and/or flood control operations limit upriver flows from federal dams.

Monitoring of stranding impacts and overall loss estimates for the middle section of the reach may be implemented by Grant PUD and WDFW using similar methods and effort as in 2003. The USGS may continue studying behavioral aspects of stranding in conjunction with these efforts.

The following are CRITFC’s recommendations for 2005 operational constraints for flow releases below Priest Rapids Dam to reduce mortality of emerging and rearing juvenile fall chinook in the Hanford Reach. In 2004, an unusually large escapement of adult chinook has created an estimated 15-45 million fry into the Reach (Hoffarth 2005). It is critical that the following criteria be implemented by the federal and Mid-Columbia PUD operators to protect this significant productivity.

2005 Hanford Juvenile Fall Chinook Flow Recommendations

Starting Program Operating Constraints

Seining of the six established index sites will be conducted three days per week (Monday, Wednesday, and Friday) beginning one week prior to the estimated start of emergence. Once a daily total of 50 sub-yearling fall chinook salmon fry are captured, a daily flow fluctuation constraint of 40 kcfs would be imposed. This constraint will continue until a daily total of 100 fry are captured from the index sites at which time the following proposed flow constraints will be implemented. After the 100 chinook criteria have been met, index sampling would be decreased to once weekly (Wednesday).

When PRD daily discharge is between 36 and 80 kcfs.

When average daily discharge at Priest Rapids is between 36 and 80 kcfs, the mid-Columbia projects will limit flow fluctuations to no more than 10 kcfs in a 24-hour period.

- Flow bands between 36 and 80 kcfs dewater the most area with the least amount of fluctuation and have the most potential for catastrophic fish kills.
- River configuration - long shelves, and shallow water entrapments, substrates that heat up or drain quickly.

When PRD daily discharge is between 80 and 110 kcfs.

When average daily discharge at Priest Rapids is between 80 and 110 kcfs, the mid-Columbia projects ¹⁶ will limit flow fluctuations to no more than 10 kcfs in a 24-hour period.

- Flow bands between 80 and 110 kcfs hold optimal rearing habitat. Data suggests these areas hold large entrapments and some stranding sites including backwater sloughs with good rearing habitat.
- These flow bands are located at the upper most reaches of the lower river floodplain terraces. Evaluation years 1999 and 2000, showed the highest susceptibility areas between 80 and 120 kcfs.

When PRD daily discharge is between 110 and 140 kcfs.

When daily average discharge is between 110 and 140 kcfs, the mid-Columbia projects¹ will limit fluctuations to no more than 20 kcfs in a 24-hour period.

- Data suggests that flow bands between 120 and 190 kcfs offer reduced susceptibility but not in the reach directly below Priest Rapids Dam.

¹⁶ The seven mid-Columbia projects refer to Grand Coulee, Chief Joseph, Wells, Rocky Reach, Rock Island, Wanapum and Priest Rapids that are operated under mid-Columbia hourly coordination agreements.

- River configuration - steep banks, area of exposed shoreline drop significantly between 110 and 140 kcfs.

When PRD daily discharge is between 140-170 kcfs

When daily average discharge is between 140 and 170 kcfs, the mid-Columbia projects¹ will limit fluctuations to no more than 20 kcfs in a 24 hour period.

- Data suggests that flow bands between 120 and 190 kcfs offer reduced susceptibility in the SHOALS reach, but not in the reach just below Priest Rapids Dam.

When PRD daily discharge is 170 kcfs and above

When daily average discharge is 170 and above, the mid-Columbia projects¹ will limit fluctuations to no more than 20 kcfs in a 24-hour period. A minimum hourly flow of 150 kcfs will be maintained.

- Constraints will protect the backwater areas of the sloughs (Hanford Slough and White Bluffs Slough) from dewatering.

Ending Program Operating Constraints

CRITFC and WDFW recommend that flow constraints be terminated after the accumulation of 1400 temperature units (TU) past calculated end of spawning under the Vernita Bar Settlement Agreement.

- Evaluations from 1999-2003 show that in general stranding and entrapment susceptibility drops significantly after 1200 TU's and after 1400 TU it is assumed that susceptibility has reduced to allow for termination of constraints. The last fish found stranded and entrapped in 1999 and 2000 fell relatively close to 1400 TU's. The 2001 evaluation showed fish becoming entrapped and stranded past this deadline but at decreased rates. Figure 2 below indicates that the range of juvenile chinook susceptibility based upon abundance and fork length is about 8 weeks.

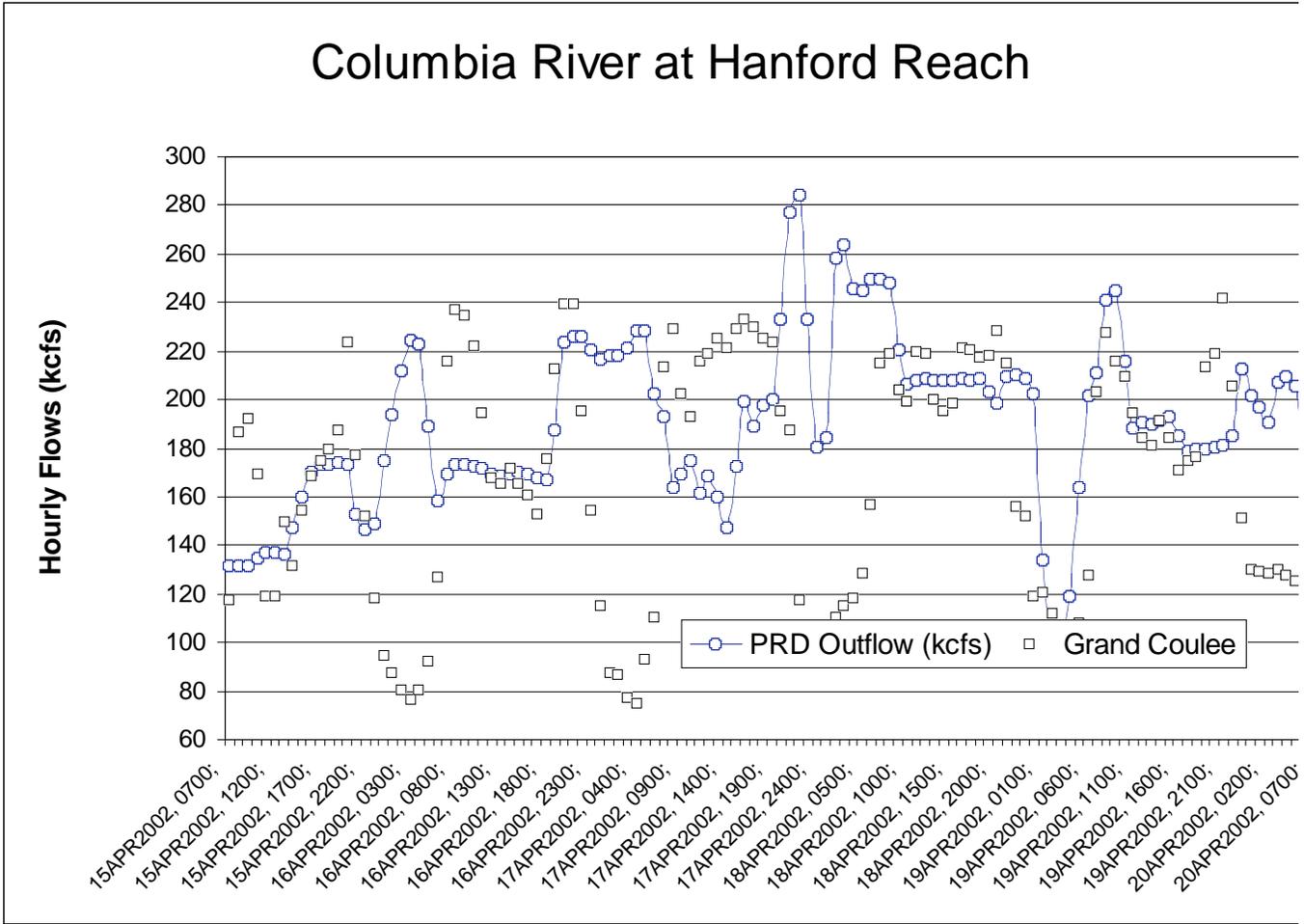


Figure 1. Hourly flows in the Hanford Reach during the 2002 juvenile fall chinook out-migration.

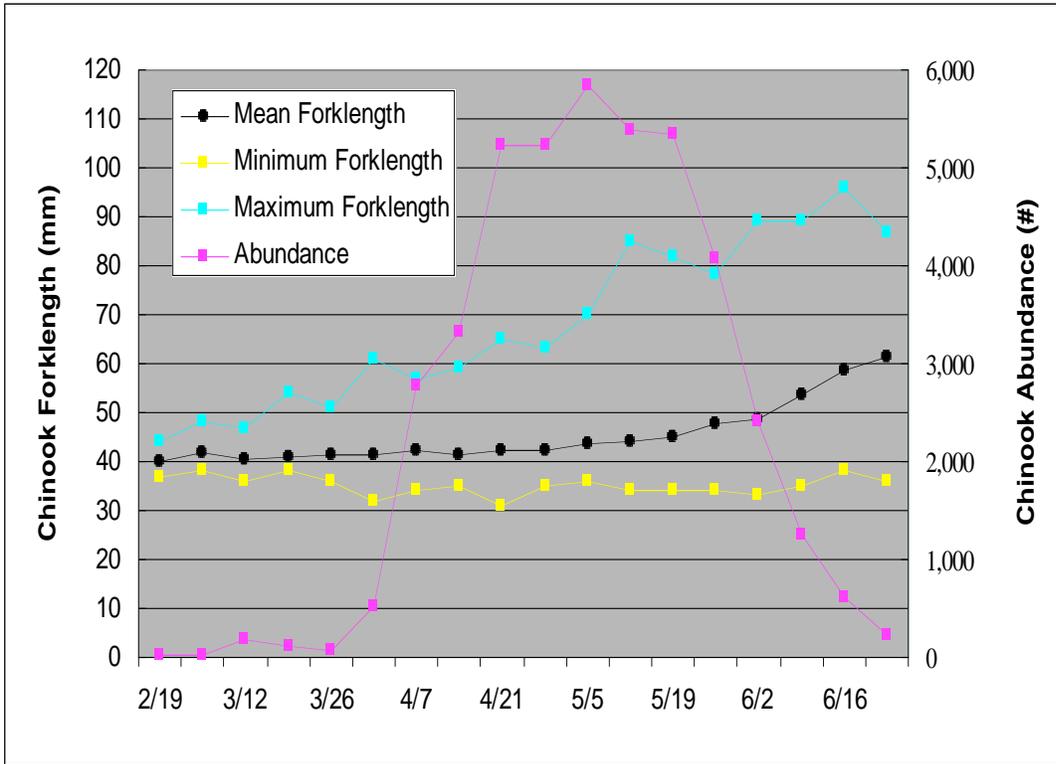


Figure 2. Juvenile fall chinook abundance and size in nearshore areas of the Hanford Reach, February 19 – June 23, 2003

Table 1. Flow bands and number of stranded and entrapped juvenile fall chinook salmon found on the Hanford Reach of the Columbia River in 2002 (From WDFW 2003).

Flow Band (kcfs)	Total Shoreline Within Study Area (hectares)	Number of Flow Fluctuations During Season	Shoreline Exposed During Season (hectares)	Number of Plots Sampled	Area Sampled (hectares)	Number of Plots with Chinook	Number of Chinook Found at Risk	Number of Chinook Found at Risk per Hectare
50-80	1,234.64	2.98	3,683.97	28	7.03	12	98	13.93
80-120	1,203.43	4.90	5,895.14	36	8.84	6	65	7.36
120-160	701.12	18.54	12,997.51	51	15.42	7	15	0.97
160-200	767.48	20.00	15,347.91	44	10.16	3	8	0.79
200-240	691.96	9.82	6,797.96	27	7.21	0	0	0.00
240-280	569.80	8.83	5,031.03	8	2.18	1	2	0.92
Total	5,168.43	65.07	336,320.91	194	50.84	29	188	3.70

Appendix 2

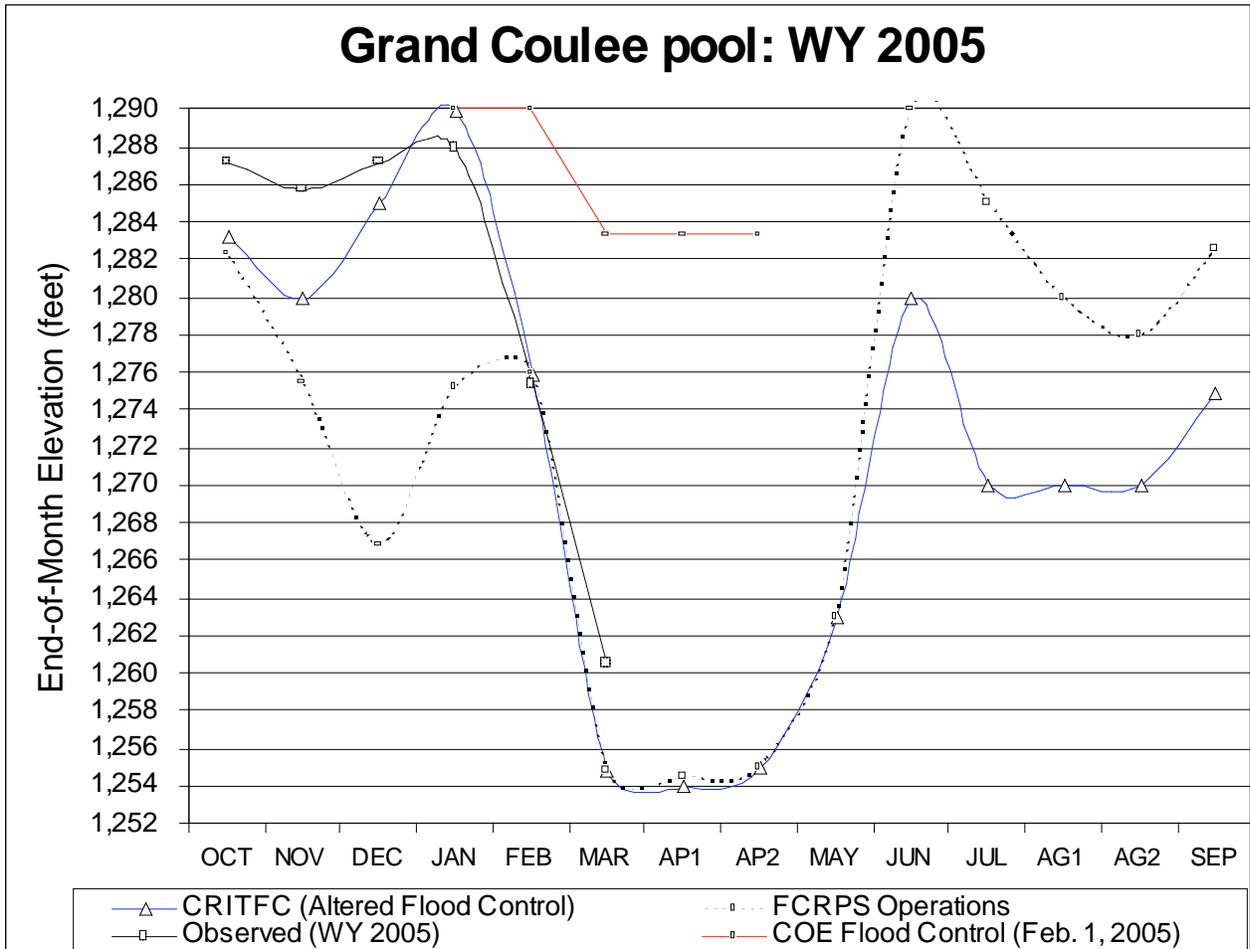
2005 Fish Facility Mitigation Projects

The following are outstanding issues regarding specific improvements needed at dam fish passage facilities, consistent with CRITFC's comments on the Corps' 2005 Annual Fish Passage Plan.

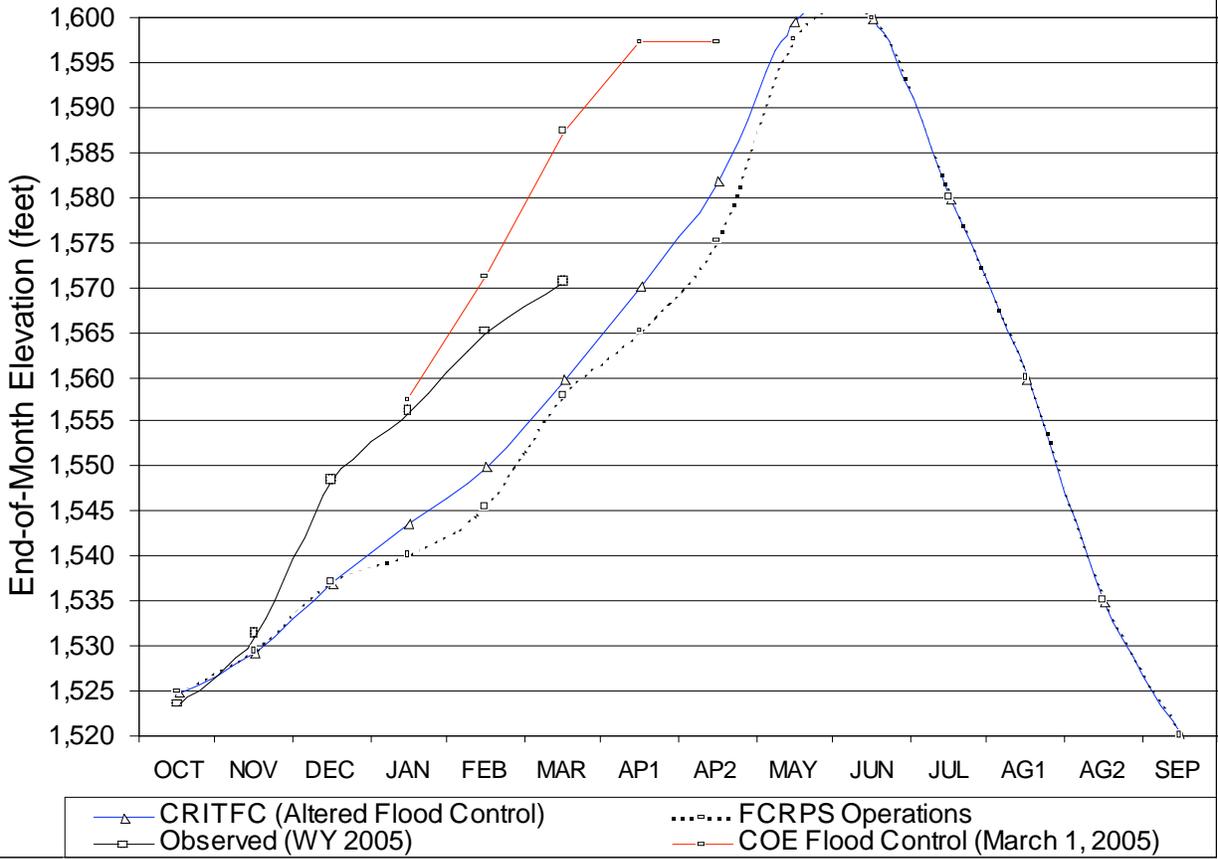
- 1) Bonneville Dam. Automated Chain gates at Bonneville Powerhouse I sluiceway. This would allow for improved operation and better compliance with sluiceway criteria. The sluiceway has been shown to be a passage route for both juveniles and kelts; insuring that the sluiceway stays in criteria assures better access and utilization of this passage route.
- 2) Bonneville Powerhouse Two. Adult fishway trash rake system. The system was installed in 2003. Monitoring and evaluation of the new system should be conducted before fish passage season on April 10 and at timely intervals throughout the entire spring and summer passage season. This work should be coordinated closely with the tribes and agencies through the District's operations and maintenance subgroup.
- 3) John Day Dam- North shore fishway pump. The fishway pump is currently unable to provide entrance criteria for both north shore adult entrances due to a potential constriction in the hydraulic conduit. Funds could be used to determine a remedy for this situation.
- 4) John Day Dam- Full Flow PIT-Tag detection on the juvenile transport flume. Currently, adults that fallback over the dam can spend extended periods of time in the juvenile system since there is no way to move them from the channel. Several hundred adults are removed each time the system is dewatered. This dewatering is stressful to adults and has led to mortality. A full flow PIT-Tag detection system would allow for operation of the juvenile facility so that adults would not hold in the dewatering section of the transport flume. Further, juvenile stress would be reduced since the dewatering structure would not need to be operated.
- 5) McNary Dam juvenile screen system outfall. Concern has been raised about increased avian predation in conjunction with the outfall. Methods for reducing predation should be designed, implemented and evaluated for effectiveness.
- 6) Bonneville Dam. Bradford Island adult ladder repair and modernization. Currently the Bradford Island ladder is the oldest in the Columbia River Basin and renovation and repairs are underway. Increased funding would assure that the work would be expedited. This ladder system passes a significant portion of the entire Basin's returning adults, thus, expedient repairs are critical.

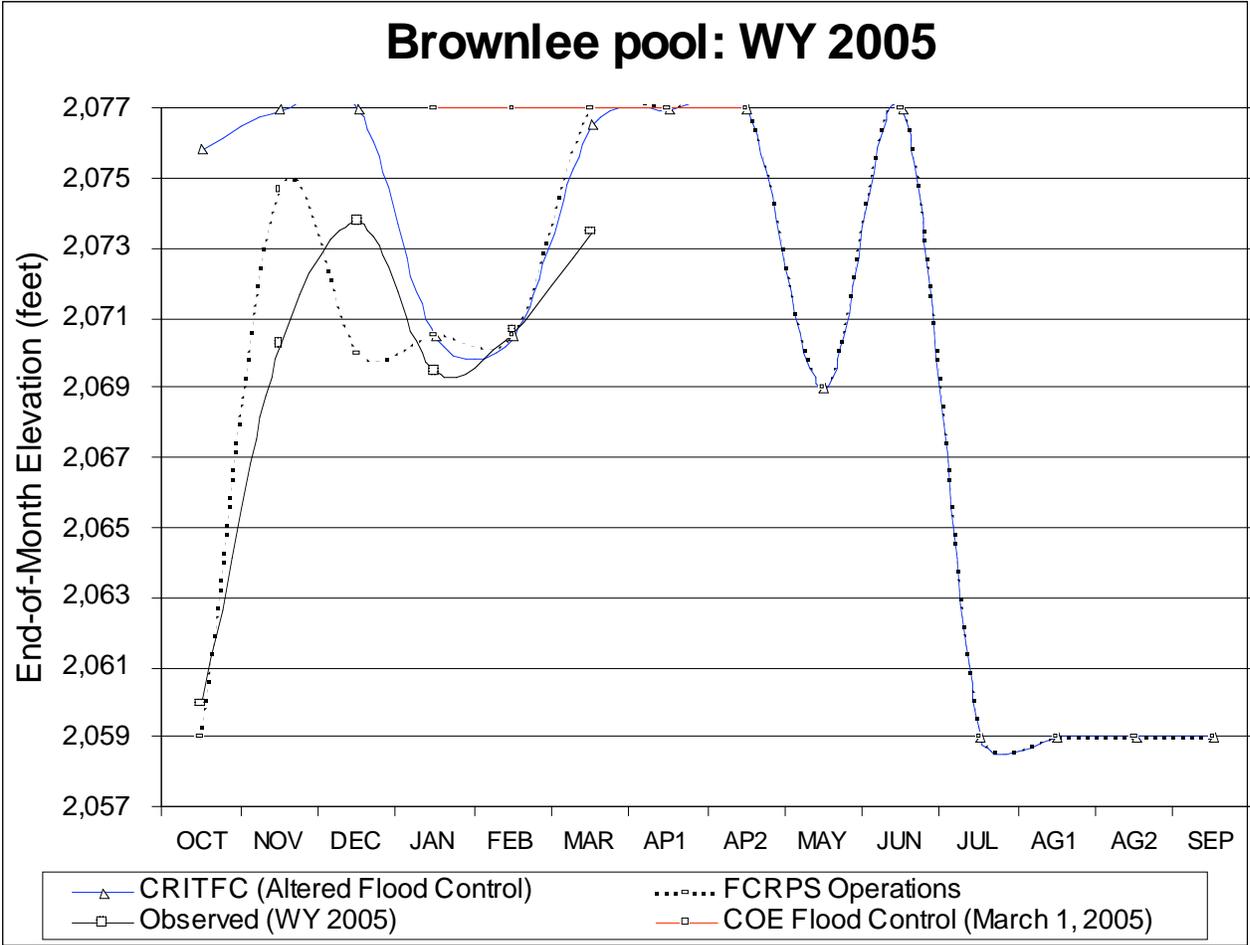
- 7) Adult lamprey passage. Currently the Corps is spending about 0.2 % of the Columbia River Juvenile Fish Program on lamprey passage. Lamprey are an extremely important resource for tribes and have been petitioned for ESA listing. Passage studies indicate that only about 50% of tagged adult lamprey successfully pass Bonneville Dam and few if any reached McNary Dam. The Corps should fund a comprehensive lamprey passage program at all Corps' dams, consistent with regional lamprey restoration efforts.
- 8) McNary Dam Fishway Pumps. Currently only two pumps for the McNary auxiliary water at the fishway work, and one of these pumps is in poor condition. The Corps should bring a spare pump on line and plan to repair on line pumps as soon as possible.
- 9) The Dalles spill gates. Currently several spillway tainter gate cables are broken and need repair, or the gates cannot be opened for fish spill patterns. The Corps should replace these cables immediately.
- 10) Lower Granite Dam gantry crane. The existing crane is damaged and needs immediate repair or replacement. Without the crane, damaged or defective screens for the bypass system cannot be removed and repaired.
- 11) Bonneville Dam. Full flow pit-tag detector. The full flow detector should be installed as quickly as possible to allow identification of tagged fish through larger passage system areas.

Appendix 3—GENESYS modeled pool elevations

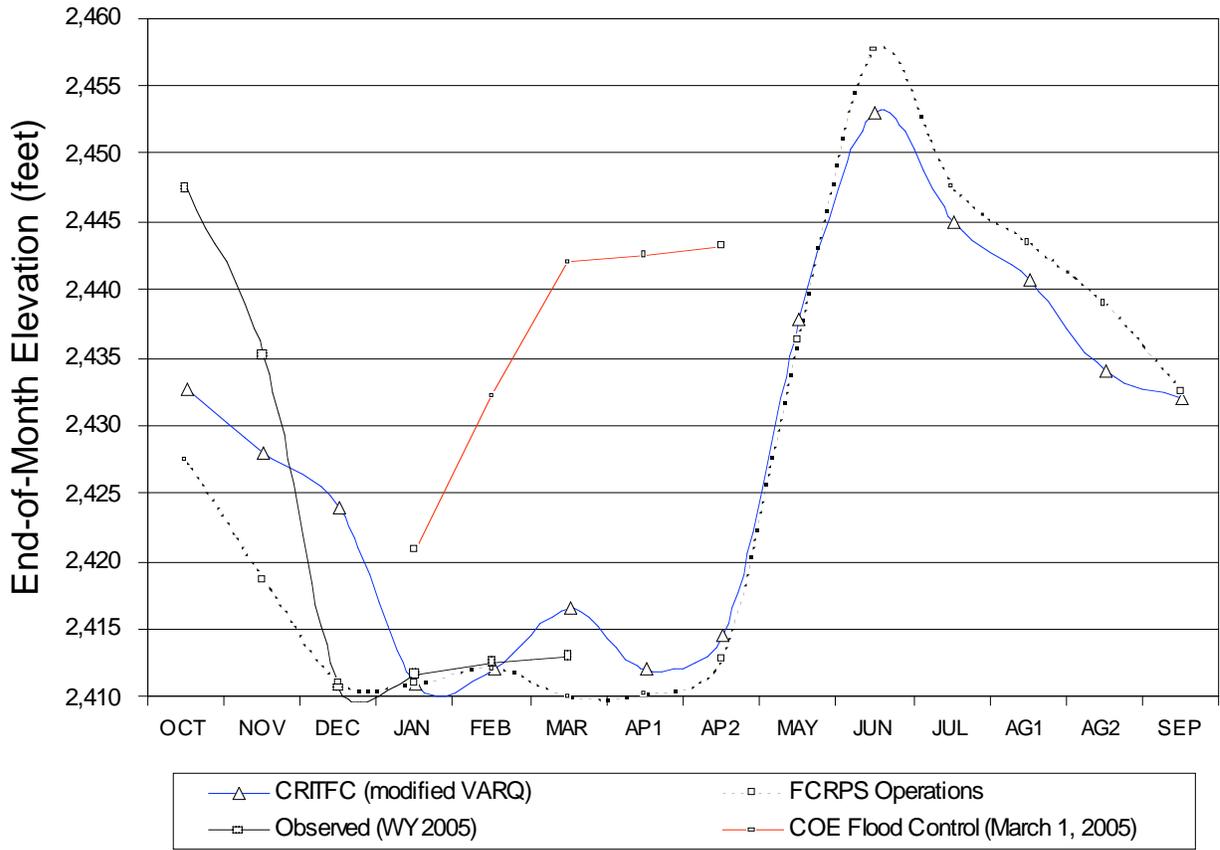


Dworshak pool: WY 2005

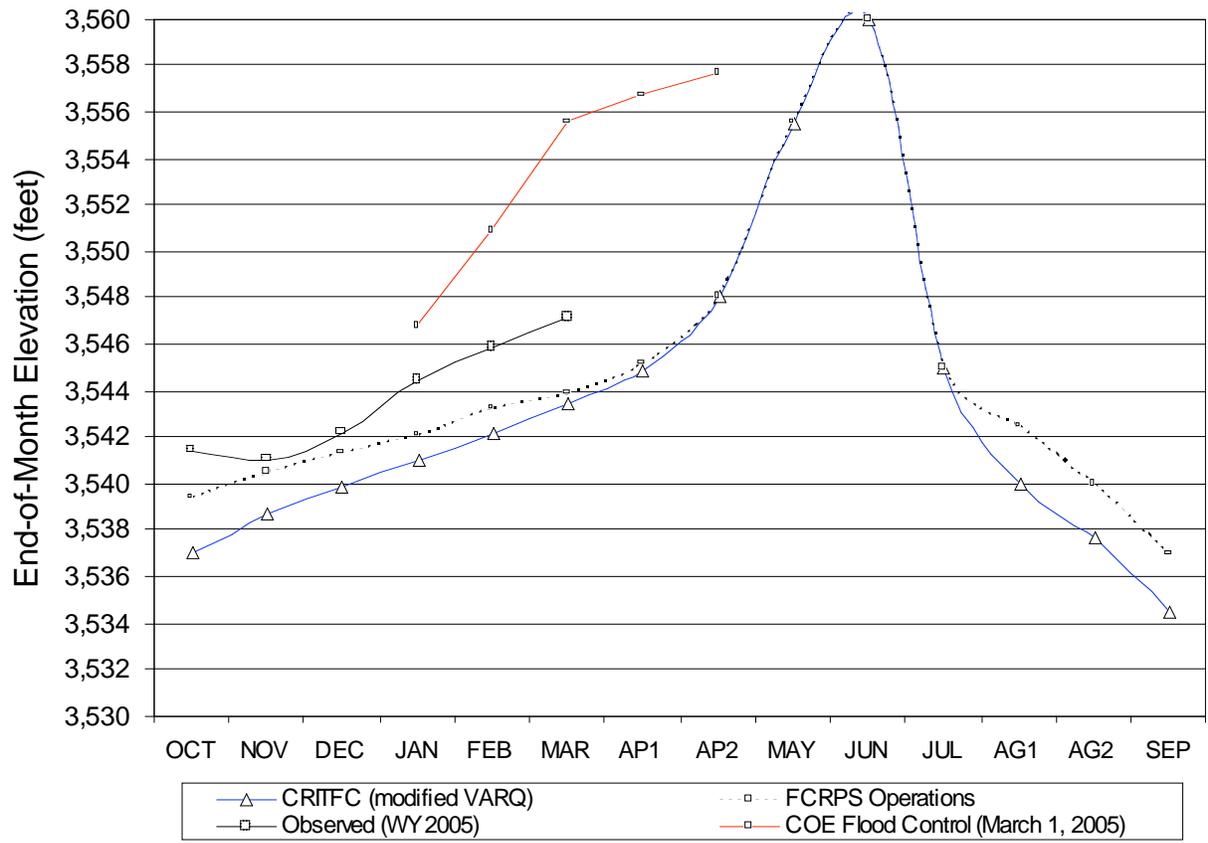




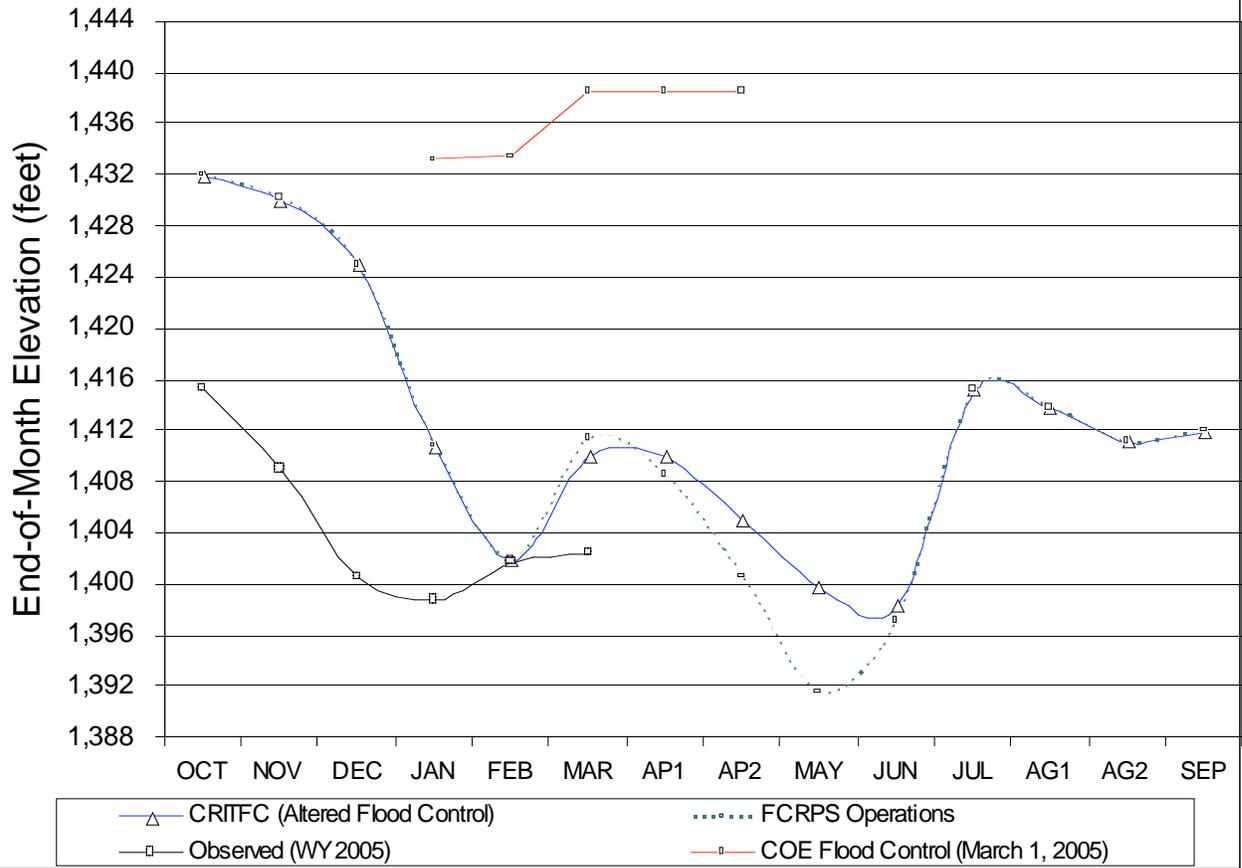
Libby pool: WY 2005



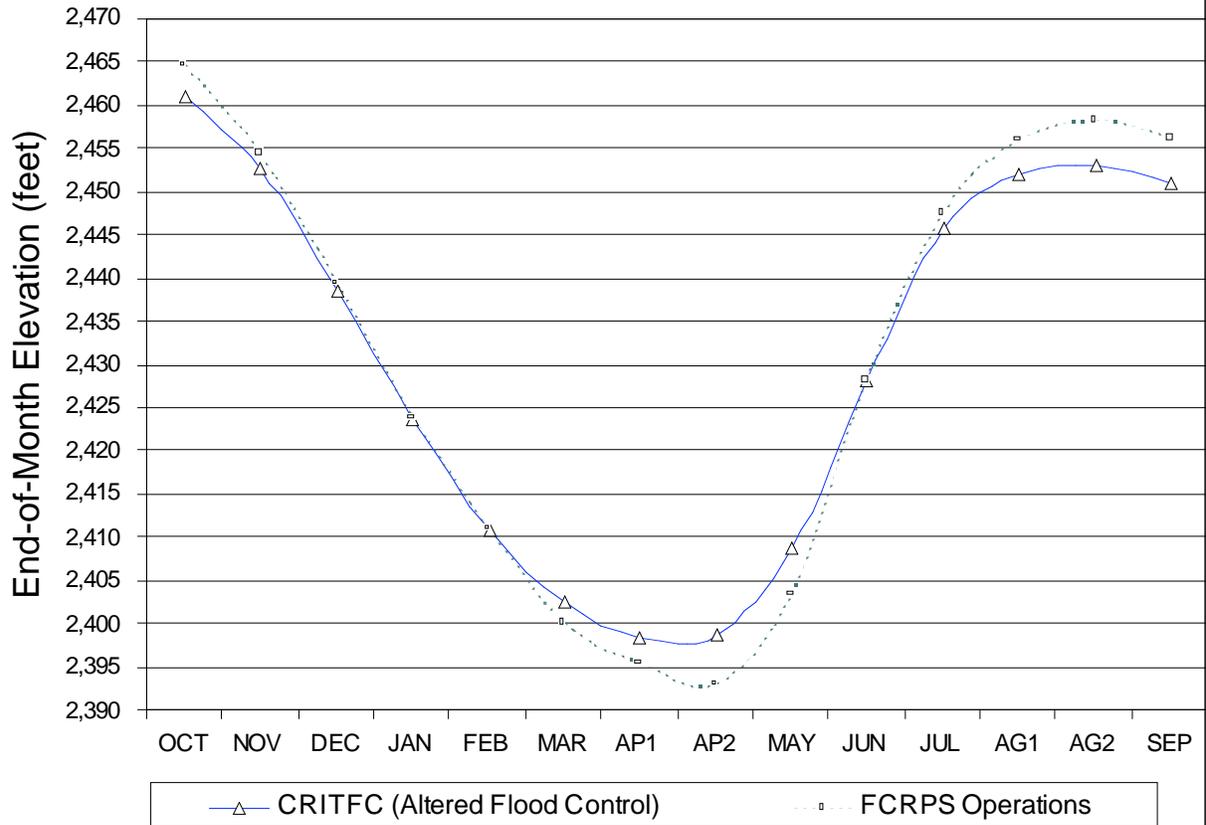
Hungry Horse pool: WY 2005



Arrow Lakes (BC) pool: WY 2005



Mica (BC) pool: WY 2005





Attachment 1

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SUBJECT: Comments on Draft 2005 FCRPS Water Management Plan for the Federal Columbia River Power System

Dear Mr. Anderson and Mr. Ruff:

On behalf of its member tribes, the Columbia River Inter-Tribal Fish Commission (CRITFC) appreciates the opportunity to comment on the November 4, 2004 draft 2005 Water Management Plan (DWMP) for the Federal Columbia River Power System (FCRPS). The actions in the plan have a significant bearing on the restoration of listed and unlisted salmon, Pacific lamprey that are a candidate for ESA listing, listed and unlisted sturgeon and other tribal trust resources. We incorporate by reference the December 15, 2004 State, Federal and Tribal Agencies Joint Technical Staff memo commenting on the DWMP (Attachment 1).

We believe that significant information that is necessary to develop the final 2005 WMP has yet to be available or materialize. It is premature at this time to be considering many foundation WMP issues. However, we realize that water management actions, particularly flood control operations (i.e. Libby) and below Bonneville chum and Vernita Bar flow operations, begin to be implemented in November and December.

In the future we suggest that that a first draft of the plan be released on September 1 with a 30 day comment period to address early water management actions. Subsequently, when critical information on flow forecasts and research study results are available, a final draft should be released for a 30 day comment period on January 15. This information includes but is not limited to:

- The first official water supply forecast is not released until mid-January 2005. Water supply forecasts are integral to the final water management plan. The plan should contain specific, state-of-the-art methodologies to provide reasonable water supply predictions before the mid-January forecast. We offer several of these methodologies in specific DWMP comments below.
- Research results for many hydro-system and fishery studies that will highly influence draft plan measures are not currently available.
- Other issues such as new transmission capability that are still under development.

General Comments

- In 2004, neither summer nor spring target flow objectives were met for the Columbia and Snake Rivers, similar to most past years since the issuance of the FCRPS Biological Opinion in 1995. Meeting target flows is the overall priority of the WMP. Flow runoff in 2004 was a little less than normal, but if operational actions suggested by CRITFC were implemented by the Action Agencies, we believe the target flows could have been met.
- The DWMP should be based upon a “normative river system” paradigm necessary for anadromous fish recovery, expressed and described in the NPCC’s landmark salmon recover document, *Return to the River* (Williams et al. 1996) and the CRITFC tribes salmon recovery plan, *Wy-Kan-Ush-Mi Wa-Kish-Wit* (Nez Perce et al. 1995). Chief elements of the normative river system include a spring peaking hydrograph with an extended summer reclining limb, minimum flow fluctuations and spill over dams during fish migrations. The “target flows” in the DWMP at key river index sites are flat, seasonal flow that are often missed. Further, the daily cycle of peaking flows allowed in the DWMP significantly and negatively impacts salmon life histories and critical habitat in the mainstem river (ISAB 2001-3; ISAB 1998).
- The DWMP should be supported by the state-of-the-art science with respect to the biological and ecological needs of anadromous fish. The stated objectives of the plan should include important components of the 1999 NWPPC review of the Corps of Engineers’ capital construction plan:
- ***protect biodiversity*** -- passage solutions must be designed to benefit the range of species, stocks and life-history types in the river, which may require multiple passage solutions at a project, and
- ***favor passage solutions that best fit natural behavior patterns and river processes*** -- the best passage solutions are those that take into account and work with the behavior and ecology of the species and life-history types using the river system, that mimic the natural situations and processes that emigrating salmonids encountered in their evolutionary history.

Flat target flows, 24 hour flow fluctuations and passing fish through screen systems and turbines and transporting fish are not supported by the relevant science of anadromous fish ecological needs expressed in *Return to the River*, or other important studies (see: Vannote et al. 1980, Heede and Rinne 1990; Power et al. 1996; Hynes 1970; Lichatowich and Mobrand 1995 and ISAB 2003).

- The DWMP fails to integrate the operation of the Canadian Projects which are part of the Columbia River Treaty that significantly impact Columbia River flows and water quality. Yet, annual and five year plans through the Columbia River Treaty and the Pacific Northwest Coordinating Agreement are implemented that impact water quantity and quality through flood control, resident fish, recreational use, irrigation and power generation. The 1995 Action Agencies' System Operations Review EIS adopted the 1995-1998 FCRPS BiOp as the preferred alternative, which included examination of the Canadian storage projects in the environmental baseline. The final WMP should have provisions that allow consideration of obtaining additional water through flood control modifications and power swaps with Canadian entities. In taking this approach, the DWMP disregards over 17 million acre feet of Canadian storage to provide better flows and mainstem habitat for the listed and unlisted anadromous fish stocks.
- The DWMP fails to describe the impacts of flow management on the estuary and near ocean plume. The accumulation of evidence from studies indicate that increasing flows lead to biological productivity of fish stocks by increasing estuary habitat and organic and inorganic inputs into the near ocean plume (Simenstad et al. 1982; Sherwood et al. 1990; NOAA 2004). Pulses of high flows creating a semblance of a normative hydrograph, such as that provided in high flow years, is linked to higher adult anadromous fish returns.
- Available evidence with respect to extant juvenile in-river survival rates indicates that the FCRPS operations in the DWMP, which are nearly identical to past water management plans, will not achieve rates necessary to recover listed ESUs. For example in the July 1, 2004 Findings Report on Actions Agencies' 2004/2004-2008 Implementation Plan, NOAA Fisheries stated that in-river survival for Snake River juvenile fall chinook was 10.2% on average from 1995-1999, and only averaged 8.7% from 2000-2003. Further, in that report NOAA Fisheries stated that the 2010 in-river survival performance standard has not yet been met, and is not expected to be met for six more years. The 2000 FCRPS BiOp set a performance standard of 14.3% in-river survival for 2010. It is evident that more aggressive water management actions, such as provided in these comments and CRITFC's *River Operations Plans* (CRITFC 2004) are necessary if juvenile in-river performance standards are to be met.
- The conduct and process of the Technical Management Team does not allow the free exchange of information between the fishery managers and the FCRPS operators. This is because power marketing representatives are allowed to observe and "listen in" on discussions regarding river operations that influence power marketing and sales, which may place federal operators at an economic disadvantage. This "openness" leads the federal operators to restrict fishery manager access to important river operation

information, such as forecasted daily reservoir outflows and reservoir elevations. Thus, the tribes and other fishery managers cannot access critical information to plan operations to best benefit fish populations before and during the fish migration season.¹⁷ To address this problem, we recommend that the federal operators convene a routine pre-season and in-season forum that excludes the marketing representatives, but allows the free exchange of hydrological and other information to the tribes and other fisheries managers. We suggest that the final water management plan (WMP) include a reference to this forum.

- As we have stated in the past, CRITFC strongly recommends that the Corps' Annual Fish Passage Plan be appended to the final WMP. The FPP has specifics on spill operations, transportation, research and fish facility operations that are intricately tied to the WMP. Both of these documents are called for by the 2000 Biological Opinion. It does not make sense that the FPP and WMP are kept in separate forums and never formally integrated.
- Although the CRITFC tribes officially withdrew from the NMFS' Adaptive Management Forum in 1997,¹⁸ the federal operators and federal fishery agencies still have a trust responsibility to formally consult with the CRITFC tribes before implementing actions, such as in the WMP, that will impact their trust and treaty resources. The current forum assigns the federal executives full authority to make critical operational decisions without the tribes at the table and without tribal consultation. For example, and as stated in the DWMP, the federal executives and the USFWS decided to eliminate spill protection at Bonneville Dam for the annual Spring Creek Hatchery release of fall chinook in March without even contacting the tribes. CRITFC can assist the federal agencies in arranging river operations consultations. The final WMP should contain a specific section indicating how the federal agencies intend to coordinate and consult with the tribes regarding all actions that will affect their treaty trust resources as required by the 1998 Secretarial Order for the Departments of Commerce and Interior, BPA's obligations to tribes, and the Corps' Nationwide Policy for Native American Tribes.
- The final WMP should include reference to and the details of the Detailed Operating Plan and annual PNCA planning hydro-regulations and non-power fishery constraints data submittals as the overarching plan to operate the FCRPS. The Corps and Reclamation's respective data submittals create the foundation for real-time decision making for river operations. Thus, while real-time river operations may be "tweaked" by the TMT, the actual plan to operate the river has already been established the February before the water year begins by the PNCA parties.

¹⁷ This information includes forecasted elevation at storage reservoirs and outflow information. Without this information, fishery managers cannot make well-informed decisions about flow management for fishery needs.

¹⁸ In a letter dated May 16, 1997 from Ted Strong, CRITFC Executive Director to Will Stelle, NMFS Regional Director, CRITFC informed the federal government that it would, "... no longer participate in the NMFS adaptive management process, except as necessary to obtain information on system operations and configuration that cannot otherwise be obtained." In reaching this conclusion, CRITFC stated, "It is absolutely inappropriate for the policies of the United States, with respect to fulfillment of our treaties, to be determined by technical committees of biologists and engineers." CRITFC recommended that, "NMFS and the other federal agencies work with the Commission's member tribes to establish meaningful government-to-government relationship between the federal agencies and the tribes." And, "Consultations must be structured to reach agreement between NMFS and the tribes on policy issues before technical issues are referred to technical committees".

- The DWMP lacks emphasis on water quality. Other than a section on dissolved gas and reference to Dworshak cool water releases, the plan is essentially silent on water quality actions to establish preferred temperatures and turbidity for the survival and productivity of anadromous fish. For example, water temperatures at the McNary juvenile bypass facility violate standards for an extended period of time every summer. There is no mention of point source pollution from the FCRPS (i.e., leaks from turbine and other equipment on dams) and there are no plans or contingencies outlined to address oil spills and other emergencies related to river operations.
- There are no specific operations required to reduce load following or power peaking operations in the plan. Such operations can cause desiccation of salmon redds, stranding of juvenile anadromous and resident fish and cause delay of juvenile and adult salmon. The final plan should acknowledge the impacts of power peaking on fish and offer management actions to reduce these impacts, such as limited peaking to some small percentage of the predicted base flow for the month. Such actions as experimental measures were offered by the ISAB in Report 2003-1, *Review of flow augmentation: Update and Clarification*. The ISAB further highlighted the federal agencies' lack of addressing this issue in their recent report, *ISAB Findings from the Reservoir Operations/Flow survival symposium* (ISAB 2004-2).

Specific Comments

Section 1.2: Preparation of Plans

The DWMP does not refer to the tribes' *Spirit of the Salmon* (Nez Perce et al. 1995) anadromous fish restoration plan that has specific measures for river operations for all anadromous fish. As in the 2000 FCRPS Biological Opinion, the federal agencies should include reference to the tribes' plan, consistent with the federal agencies' obligations to consult and provide trust responsibility to the tribes.

As stated above, river operations implemented in past water management plans have not provided SR Fall Chinook juvenile in-river survival rates necessary to meet BiOp standards. The operations proposed in the DWMP are nearly identical to those in recent water management plans. For UCR Spring Chinook the FCRPS BiOp states that despite the strong adult returns, both recent and 5-year and long-term productivity trends remain below replacement. The SR Steelhead ESU is also not replacing itself despite the recent abundance of adult returns. With respect to the URC Steelhead ESU: 1) the Biological Review Team is concerned about the lack of data regarding productivity for this ESU, 2) the low replacement rate for this ESU (0.25-0.30) has not appreciably increased and, 3) the mean proportion of natural spawners declined 10% from 1992-1996 to 1997-2001. Yet, the DWMP does not offer any additional protective measures over that of past water management plans (i.e. more normative conditions with more flow and spill) that could specifically reduce hydro impacts to this stock to avoid extinction.

Section 1.3: BiOp Strategies

This section lacks any reference to a basin-wide, ecosystem approach to increase productivity of listed and unlisted anadromous and resident fish (see *Return to the River*; Williams et al. 1996). Simply measuring reach survival of migrating juvenile fish from one point of the river downstream to another point as a performance standard is an important metric but it is not adequate to evaluate anadromous fish productivity. For example, delayed mortality from hydro-system passage does not occur until after the fish leave the last dam and enter saltwater (Budy et al. 2002). Further, there is no mention of increasing adult survival through the hydro-system and increasing spawning success, two metrics essential to increasing anadromous fish productivity (Lichatowich and Cramer 1979). This section should be expanded beyond mere reach survival-performance standards.

Pacific lamprey should be specifically identified in this section.

Section 1.3.1. Hydro Strategies and Sub-strategies

Actions to meet water quality standards are needed for this section. Among other things, actions should include investigation of selected water releases from Lake Roosevelt, keeping fish out of dam bypass and transportation systems under elevated temperature conditions that exceed standards, avoiding trapping adult fish under elevated temperature conditions that exceed standards, and monitoring of disease at dams under elevated temperature conditions. As stated previously in these comments, the foundation of the final WMP should be establishment of a natural peaking (i.e., normative) hydro operation (CRITFC 2004; Martin 2004) that provides for the environmental and passage conditions that support anadromous fish productivity to recovery goals (Williams et al. 1996).

While operations for Kootenai sturgeon are specified, there are no specified operations for other Columbia and Snake River sturgeon. Peaking flows and spills in dam tailraces have been shown by ODFW and USGS to promote sturgeon recruitment.

Section 1.4: Non-Biological Opinion Actions

Tribal fishing is a very high priority action and operations to promote tribal fishing consistent with treaties should be listed for all of Zone 6 that includes John Day and The Dalles pools—not just Bonneville. Other actions that significantly affect fish survival are lower priority and include filling the McNary pool for power boat races on the July 4th weekend and raising pools from MOP for navigation.

Section 2.1: Hydro-System Priorities

The action agencies should meet with the fishery managers in a formal meeting before establishing priorities in the plan. We recommend that:

- The spring refill operation of reservoirs to their upper rule curve by approximately April 10 should be priority one. This will ensure that spring flows can be shaped to a normative hydrograph and that target flows can be met.
- Refill of reservoirs by June 15 should be priority two. Earlier refill will ensure summer flow augmentation will be met.
- Reduction of flow fluctuations during spawning, rearing and migration should be the next priority.
- Operation of storage reservoirs to meet criteria for bull trout and sturgeon as the next priority.

Meeting these priorities should take precedence over meeting power generation needs. If flood control is operated with flexibility and a reasonable minimum spawning flow for chum is established and maintained through reduction of lower river power peaking, it is not necessary to consider reducing Hanford Reach flows established to protect thousands of fall chinook redds. The 2000 FCRPS Biological Opinion, through adoption of the 1995 FCFPS Biological Opinion, established scientific evidence why the flow targets must be met as the minimum to avoid jeopardy to listed stocks. Meeting flow targets must be given a higher priority than meeting minimum elevations in reservoirs at the end of August and not the other way around as stated by the DWMP.

Adaptive management is not, as described in the DWMP, “.... The concept that the operation of the system should be adjusted based on acquired knowledge about current conditions in the system...”, but is instead involves active management actions (McAllister and Peterman 1992) that will increase the ability to discriminate between alternative states of nature (Hilborn 1987). This requires that exploratory, probing actions be employed that provide information about the true state of nature. An example of this probing could be that no fish are transported in an average flow year. The final WMP should reflect this difference in the use of the terminology. We concur with the ISAB (2003) that, “... decisions to implement actions that have any potential for adversely affecting an ESU will be required to satisfy a burden of proof that no harm is likely to be done as a result of the action.”

We disagree with the statement that, “...[t]he 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.” This is not correct. For example, storage added to natural runoff will provide good migration conditions for a particular year class for all anadromous fish stocks that are present. On the other hand, filling of reservoirs for recreational purposes, such as boat races, will increase water particle travel time through those reservoirs and delay fish migrations. The final WMP should correct this broad, incorrect statement.

Because chum spawning requirements affect storage and refill for all anadromous fish the following year, a precautionary approach should be used when setting chum flows in November and December. Preseason forecasts, groundwater storage and the previous year’s runoff and meteorological conditions should be carefully considered when setting minimum chum flow

spawning regimes. For example, the Climate Impacts Group has projected a 92 MaF January-July runoff at The Dalles for 2005, while CRITFC independently projects a 94 MaF runoff for the same period. Use of this information and the status of deficient groundwater supplies from the below normal runoff in 2004 supports limiting minimum chum spawning flows below Bonneville Dam to 120-125 kcfs. Power peaking from load following tends to complicate chum spawning and the maintenance of flows to protect chum redds. CRITFC strongly encourages the Corps and the other federal operators to consider reducing load following at Bonneville Dam to reduce these impacts.

The 2000 FCRPS Biological Opinion requires flow and spill measures to increase the survival of listed anadromous fish in order to avoid jeopardy and to meet tribal trust obligations, since these fish must pass many dams and reservoirs. The action agencies must consult, not coordinate, with the fishery managers including the tribes on all aspects of river operations that affect this very high priority. The final WMP should reflect these commitments and responsibilities.

Section 2.2.1: Conflicts: Flood Control Drafts vs. Project Refill

In order to meet the 2000 Biological Opinion river operations requirements and other requirements, flood control rule curves should be modified. In 2004, water was prematurely released from Lake Roosevelt for flood control. A reduction in water runoff after the release resulted in the reduction of the probability of spring flows not being met and summer flow augmentation being reduced. Early release of Lake Roosevelt storage in March for flood control can also increase the potential for stranding and entrapment of Hanford Reach fall chinook. Premature release of storage for flood control is a serious problem that is not addressed in the DWMP.

There is additional flood control space located in Canadian reservoirs that is available for purchase that could be utilized as part of this modification.¹⁹ The DWMP fails to include relaxing flood control management in Arrow, Mica, Grand Coulee, Libby, Dworshak, and Brownlee. Further, several advanced hydro-modeling tools that incorporate future climate information are available to be used to modify flood control or improve existing flood control, especially when conducting long-range water planning.²⁰ These include: probabilistic streamflow and climate forecasts, multivariate ENSO (El Nino Southern Oscillation) index, ENSO Risk Model, and sea-surface temperature departure analysis. As mentioned above, the Climate Impacts Group now produces a one-year lead ensemble forecast for the Columbia at The Dalles that should be considered. Even NOAA's NWRFC is now experimenting with long-range ESP-based flow forecasts for The Dalles that could be considered. A comprehensive package of the above tools is needed to better manage all Columbia Basin reservoirs. These methods are recommended in the 2000 FCRPS Biological Opinion and should be included in the final plan.

¹⁹ This space of 500 KaF, is noted in the 1995 FCRPS Biological Opinion.

²⁰ RPA Number 35 in the 2000 FCRPS Biological Opinion specifies use of these new technologies that, "...[w]ould enhance system response and afford greater precision in system flood control operations". To our knowledge, the federal operators are not using available technologies that could make available more water available for fish flows.

Section 2.2.2: Spring Flows vs. Project Refill

CRITFC continues to advocate for a natural peaking flow or normative hydrograph concept. Since 2001, we have offered the federal operating agencies detailed *River Operations Plans* that meets the dual objectives of a peaking hydrograph and meeting reservoir refill levels. We have yet to receive any written comments on these plans. Again, we ask the federal operators to review our *River Operations Plans*, provide written comments and consider using them as a paradigm to meet flow objectives and reservoir elevations.

Section 2.2.3: Chum Tailwater Elevations vs. Spring Flows

We responded to this issue in our above comments.

Section 2.2.4: Sturgeon Pulse vs. Summer Flows

The DWMP fails to adequately describe how the proposed sturgeon operation comports with VAR-Q operation at Libby that is likely to occur in WY 2005. The final WMP should carefully explain this issue.

Section 2.2.5: Fish Operations vs. Other Project Uses

If non-power constraints are identified in detail and specified in the 2004 PNCA planning, there should only be minimal in-season conflicts between fish and power operations. Spill levels and flows should be clearly specified from the PNCA non-power constraint in the 2005 final WMP. Irrigation demands and recreational elevations can and should be modeled prior to the water management season to determine if conflicts will exist. In any case, they should have a lower priority than meeting fish flows under the Endangered Species Act. If pre-season runoff forecasting tools are utilized and an increased level of precision and detail is applied to planning to avoid conflicts before the fish passage season begins, in-season conflicts should be minimal and all parties involved with water management actions will know beforehand what to expect. The tribes have not been consulted on the conflicts between other project uses and fish operations. The federal agencies have a trust responsibility to provide consultations with the tribes before actions are implemented.

Section 2.2.6: Conflicts and Priorities

As mentioned above, CRITFC's member tribes withdrew from the NMFS' Adaptive Management Forum several years ago. The regional federal executives have a trust responsibility to meet with our member tribes' government officials before and during the fish passage season with respect to FCRPS operations.

Section 2.3: Emergencies

Short-term FCRPS emergencies that impact fish flows, spill and dam operations over a few hours or days should be avoided. If they do occur, tribal technical and policy representatives should be immediately notified and consulted and appropriate in-kind mitigation should be

implemented as soon as possible. In no case should fish operations be interrupted due to financial reasons such as poor financial planning.

Section 2.4 Research

Consistent with the paradigm of active adaptive management (McAllister and Peterman 1992; Hilborn 1987), operations that are considerably different from the status quo in the DWMP should be implemented and evaluated using state-of-the-art scientific designs (McAllister and Peterman 1992; Marmoreck et al. 2004) developed cooperatively with the fishery managers.

Section 4.1.1: Reservoir Passage

The Corps operated the four Lower Snake reservoirs to MOP+1.5 in 2004, as it did in 2003, contrary to the Biological Opinion. CRITFC expects that Lower Snake reservoirs will be operated within one foot of MOP in 2005.

Section 4.2.1.1: John Day Pool Level

The Corps needs to restrict the John Day pool to one-foot fluctuations when SORs are submitted for treaty fishing. During the Autumn 2004 fishing season, many tribal fishers complained that the pool was too low (262.5 to 263 foot range) in late August and early September 2004. This fact was mentioned at TMT on October 27th, 2004.

Section 5.1: Flow Objectives

The 1995 FCRPS Biological Opinion stated that the minimum flows were set as bare thresholds to avoid jeopardizing the listed salmon ESUs. If the minimum flows are not met, then the listed species are placed in jeopardy. Thus, every effort must be made to meet the minimum flows through modification of flood control and purchase of flood control space and purchase of power produced off of the river. This effort includes meeting the minimum flows during weekends. To migrating salmon that need flows for critical life history functions, a weekend is the same as a weekday. The FCRPS must be adjusted to meet the needs of salmon, instead of salmon trying to exist in the face of federal operators running the FCRPS to achieve financial gains.

As noted elsewhere in these comments, in CRITFC's *River Operations Plan*, we have developed a natural peaking hydrograph that meets seasonal target flow objectives and reservoir refill objectives more often than Federal operations. A natural peaking flow regime also provides the physical habitat parameters—sediment transport, nutrient cycling, enhancement of mainstem and estuarine riparian corridors and water quality elements—that are critical to salmon life histories (Williams et al. 1996). Using this paradigm, combined with trended-and corrected (Martin 2002) Water Supply Forecasts during the fish passage season, the Federal Operators can deliver more water in a timely manner to better coincide with the salmon's life cycle and better protect listed and unlisted salmon and other anadromous fish. We recommend that these paradigms be tested for the FCRPS in WY 2005.

Section 5.2 All Storage Projects

Available research indicates a direct flow-survival relationship for juvenile steelhead, which are spring migrants (NMFS 1998). For example, Mullan et al. (1992 in NMFS 1998) ran a regression of smolt-to-adult returns of Wells hatchery steelhead against spring flows which indicated that flows over 140 kcfs resulted in smolt-to-adult returns that were three times higher than for lower flows. Berggren and Filardo (1993) also showed a strong relationship with steelhead migrations and increased flows. Under low flows in 2001, only 4% of Snake River steelhead were estimated to survive, the survival rate in 2002, a near normal runoff year, was about 26%. All efforts, described above, must be made to achieve spring flows and reservoir refill. All of these elements should be included in the final WMP.

For Grand Coulee, we understand the need to lower the pool to msl 1255 feet for maintenance work. This elevation is 11.4 feet less than CRITFC's URC for April 30th. CRITFC is concerned about the possibility of missing refill and lower seasonal flows in the Hanford Reach. We request that the maintenance work be done as early in the season as possible so as to minimize the impact on refill and Hanford Reach spring flows.

The Hells Canyon Complex operation coordinated with federal operations is not detailed in this section. In the final WMP, the Hells Canyon Complex operations for fish should be specified. Included in these specifications should be 1) arrangements between the Corps and Idaho Power should be made so that a flood control shift of up to 110 KaF can be realized from Brownlee to augment spring flows in the lower Snake River if desired by the fishery managers. The Bureau of Reclamation should assure that that 427 KaF of upper Snake flow augmentation will be delivered in a timely manner for 2005 fish migrations. Water from the upper Snake reservoirs and the Hells Canyon Complex should augment natural flows. Water from Brownlee should be released in July to save limited Dworshak cool water for later temperature control.

Section 5.8.3: Dworshak Summer Operations

Dworshak should be prioritized for temperature control, not flow augmentation. Summer drafts should be limited to 1535 feet by August 31st unless additional water is needed for temperature control. Dworshak should be targeted for refill to msl 1600 feet by June 1 or earlier and be targeted for msl 1520 feet by mid-to-late September. Lower Snake pools should not refill while Dworshak flow augmentation continues during September. A monitoring program should be put in place to evaluate effectiveness of Dworshak operations. The Corps should provide the Nez Perce Tribe with financial resources to protect cultural sites and resources during reservoir draw downs. All of these elements should be included in the final WMP.

Section 6.0 Hydrosystem Substrategy 2.3: Spill operations for project passage

The final WMP should describe the 120% total gas pressure as conservative, because, among other things, salmon can and do achieve depth compensation in the river from elevated levels of dissolved gas. This comports with the relevant regional research (Backman et al. 2002, Backman and Evans 2002), a risk assessment by the regions' fishery managers (Columbia Basin Agencies and Tribes 1995) and the water quality appendix to the 2000 FCRPS Biological

Opinion. All of these indicate that total dissolved gas levels cause little harm up to 125% TGP. Thus, spill management should not be overly concerned about some excursions above 120% TGP.

Recent data obtained from turbine survival and transportation studies at McNary Dam indicate that turbine and bypass system mortality of summer migrants is very high (15-26 %; Perry et al. 2004) and that transportation from McNary and the Snake River dams, with respect to smolt-to-adult returns is at best the same as in-river passage and may be worse (NOAA 2004; CRITFC 2004). Implementing a spread-the-risk spill passage operation²¹ for McNary and the lower Snake dams for summer migrants should be included in the final WMP. Further, it is critical to evaluate the removable spillway weir at Lower Granite for summer migrant passage to determine if this technology is a viable complement to conventional spill.

Further, substantial numbers of juvenile salmon migrate in September (FPC 2003 unpublished data; Connor et al *in press*) and recent evidence indicates that “reservoir type” SR Fall chinook migrate throughout the late fall, winter and early spring (Connor et al. *in press*). Given these facts, serious consideration should be given to extending salmon flows and spill through September.

Recent data for spill at Bonneville Dam indicates that adult fallback is not substantially affected by daytime spill. The final WMP should examine a 24-hour spill program at Bonneville without a daytime spill cap.

Bonneville spill for Spring Creek National Hatchery fall chinook is not mentioned in this section. The final WMP should include a 3-7 day spill program in March to protect this stock of international importance.

Section 7.1.3: Libby Storage Reservation Diagram

The December 31st preemptive draft at Libby to msl 2411 feet should not be implemented in this year to leave additional water in storage for WY 2005. Right now, the Corps is starting their pre-season draft. We ask that the Corps to draft to no lower than msl 2424 feet by December 31st.

Section 7.7: Dworshak Draft to 1500 feet

CRITFC does not support any draft below msl 1520 feet. Drafts below this level may reduce refill probabilities the following year and cultural resources are particularly exposed at drawn down elevations and are vulnerable to vandalism and theft.

Section 7.8: Other Reclamation Water Management Actions

The final WMP should incorporate, in detail, what specific actions will be taken in 2005 to reduce illegal water spreading. The Columbia Basin Institute, in its 1994 report on the

²¹ This action would entail summer spill at McNary and the lower Snake dams as necessary to pass 50% of summer migrants over the spillways or a combination of removable spillway weirs and spillways. .

Columbia Basin Irrigation Project, identified 800 to 1000 KaF, out of the 2800 KaF being diverted by the Bureau of Reclamation, that is illegally spread by some irrigation districts. The upper Snake contribution from Reclamation reservoirs should be specified in the final WMP as a minimum of 427 KaF.

Section 12.4.1: Kokanee—Grand Coulee

The upper Columbia Tribes have indicated to us that Lake Roosevelt needs to be at msl 1283 feet by the end of September to allow kokanee spawning access to tributaries. Filling to elevation 1285 feet by October 1 is not necessary for kokanee spawning and such refill could reduce lower Columbia flows in September that would negatively impact CRITFC' member tribes treaty fisheries in September and October.

12.5 Hanford Reach Protection Flows

Flow fluctuations from Grand Coulee and Chief Joseph dams can overwhelm efforts of the mid-Columbia public utility districts to re-regulate and stabilize flows into the Hanford Reach. Stable flows in the Hanford Reach are vital to protect millions of emerging and migrating fall chinook from stranding and entrapment and to protect redds and spawning activity specified under the Vernita Bar Agreement. The federal operators should work with the PUDs to limit flow fluctuations during the juvenile susceptibility period from late March until early June and in October and November for adult spawners. The federal agencies should remain on Mid-Columbia Hourly Coordination during these times of fish life history susceptibility to flow fluctuations. These issues should be specific and detailed in the final WMP.

Section 12.9.1: Tribal Fishing

As previously mentioned in these comments, CRITFC's member tribes' treaty fisheries occur in all of Zone 6 (Bonneville to McNary dams). Pool elevation restrictions and steady flows should be provided during tribal fisheries for all of Zone 6, not just Bonneville Pool. The federal operators have a trust and treaty responsibility to provide this operation. The final WMP should specify these requirements.

Section 12.9.2 Spring Creek Hatchery Releases

The 2004 evaluation of the corner collector at Bonneville Powerhouse II during the Spring Creek release indicated that the Bonneville Project fish passage efficiency was reduced from 60% to 51% from a 50 kcfs spill operation to a no spill and corner collector operation (Ploskey et al. 2004). As survival rates through the turbines are considerably less than through the bypass system and corner collector, there is a distinct survival disadvantage for the Spring Creek migration when no spill is implemented.

Further, it has been determined through WES hydraulic studies that a minimum of 50 kcfs spill should be provided for good tailrace egress conditions to occur below the corner collector. Implementation of active adaptive management requires modifying project operations based upon monitoring and evaluation when the goal is to increase passage protection for juvenile

salmon. The 2005 final WMP should require 24 hour spill at the dissolved gas cap level during the majority of the Spring Creek out migration through the dam, which historically occurs over 3-5 days.

While, as stated in the DWMP, the Corps and other federal agencies entered into a 2004 agreement on Bonneville operations during the 2005-2006 Spring Creek release that does not require any spill, the best available scientific information now at hand indicates that not providing spill at the project to pass 7-8 million Spring Creek fish will significantly reduce their direct survival and probably, based upon route specific studies at Bonneville and other dams, reduce adult returns (Gilbreath 1993; Dawley 1996; Marmorek et al. 2004; Budy et al. 2002). Further, the Corps never consulted with the tribes regarding this agreement and impacts to their trust resources from Spring Creek Hatchery. Apparently, the Corps has failed to consider the implication of reducing survival of these fish on international fisheries under the U.S.-Canada Pacific Salmon Treaty. Fish released from this hatchery are in themselves mitigation for the construction of Bonneville and other lower Columbia River dams. Thus, the Corps is eliminating mitigation fish without mitigating for these fish that were established as mitigation for the original harm to natural stocks of lower Columbia fall chinook. This is not acceptable.

Conclusion

CRITFC appreciates the opportunity to review and comment on the 2005 DWMP. We request a staff to staff meeting with your agencies and other federal agencies as appropriate to discuss these comments and recommendations for consideration in the final WMP. Should you have questions about these comments, please contact Bob Heinith at (503) 238-0667.

Sincerely,

/s/

Olney Patt, Jr.
Executive Director

Attachment 1

CC: Commissioners, tribal staffs, tribal attorneys, CBFWA Fish Managers, Regional Executives, C. Henriksen, Corps RCC

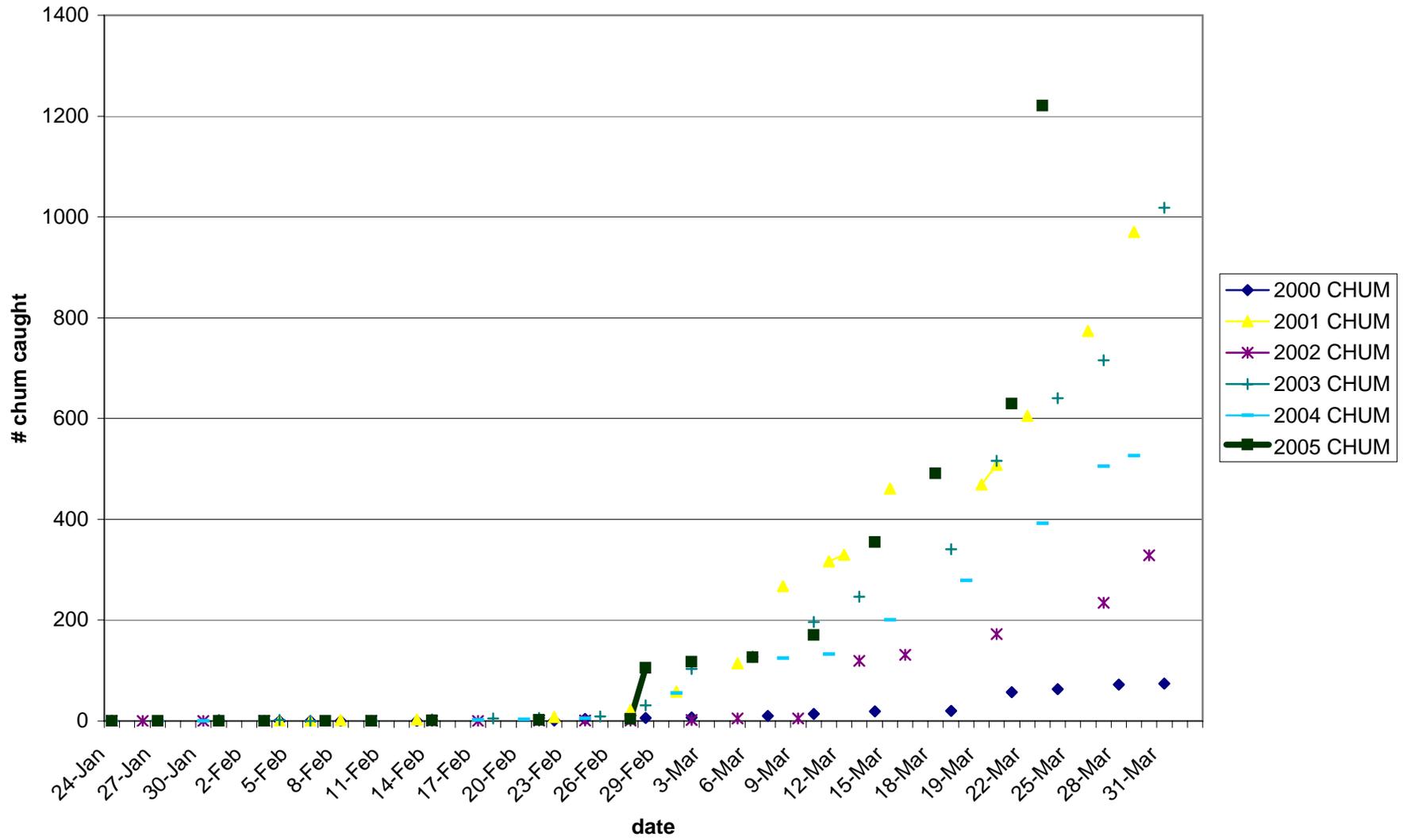
References

- Backman, T.W.H., A.F. Evans, M.S. Robertson and M.A. Hawbecker. 2002. Gas bubble trauma incidence in juvenile salmonids in the lower Columbia and Snake Rivers. *North American Journal of Fisheries Management*. 22:965-972.
- Backman, T.W.H. and A.F. Evans. 2002. Gas bubble trauma incidence in adult salmonids in the Columbia River Basin. *North American Journal of Fisheries Management*. 22:579-584.
- Berggren, T.J. and M. Filardo. 1993. An analysis of variables influencing the migration of juvenile salmonids in the Columbia River Basin. *North American Journal of Fisheries Management* 13:48-63.
- Budy, P., G.P. Thiede, N.Bouwes, C.Petrosky and H. Schaller. 2002. Evidence linking delayed mortality of Snake River Salmon to their earlier hydrosystem experience. *North American Journal of Fisheries Management*. 22:35-51.
- CRITFC (Columbia River Inter-Tribal Fish Commission). 2004. *2004 River Operations Plan*. Portland, Oregon.
- CRITFC. 2004. Comments on the Federal Agencies Summer Spill Proposals. April and June 2004. Portland, Oregon.
- Columbia Basin Agencies and Tribes. 1995. *Spill Risk Assessment*. Columbia Basin Fish and Wildlife Authority. Portland, Oregon.
- Cushman, R.M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. *North American Journal of Fisheries Management*. 5:330-339.
- Dawley, E.M., R.D. Ledgerwood, L.G. Gilbreath and P.J. Bentley. 1996. Relative survival of subyearling chinook salmon that have passed Bonneville Dam via the Spillway, First or Second Powerhouse Bypass System or Turbine and Tailrace. Draft Report. Adult recoveries and indirect survival studies and direct measures survival studies. Report to Corps of Engineers. By Coastal Zone and Estuarine Services Division. NMFS. Seattle.
- FPC (Fish Passage Center). 2003. Unpublished data on juvenile salmon migration timing in the Columbia River. Portland, Oregon.
- Gilbreath, L.G., E.M. Dawley, R.D. Ledgerwood, P.J. Bentley and S.J. Grabowski. 1993. Relative survival of subyearling chinook salmon that have passed Bonneville Dam via the spillway or second powerhouse turbines or bypass system: Adult recoveries through 1991. Coastal Zone and Estuarine Services Division. NMFS. Seattle, Washington.
- Heede, B.H. and J.N. Rinne. 1990. Hydrodynamic and fluvial morphologic processes: implications for fisheries management and research. *North American Journal of Fisheries Management*. 10:249-268.

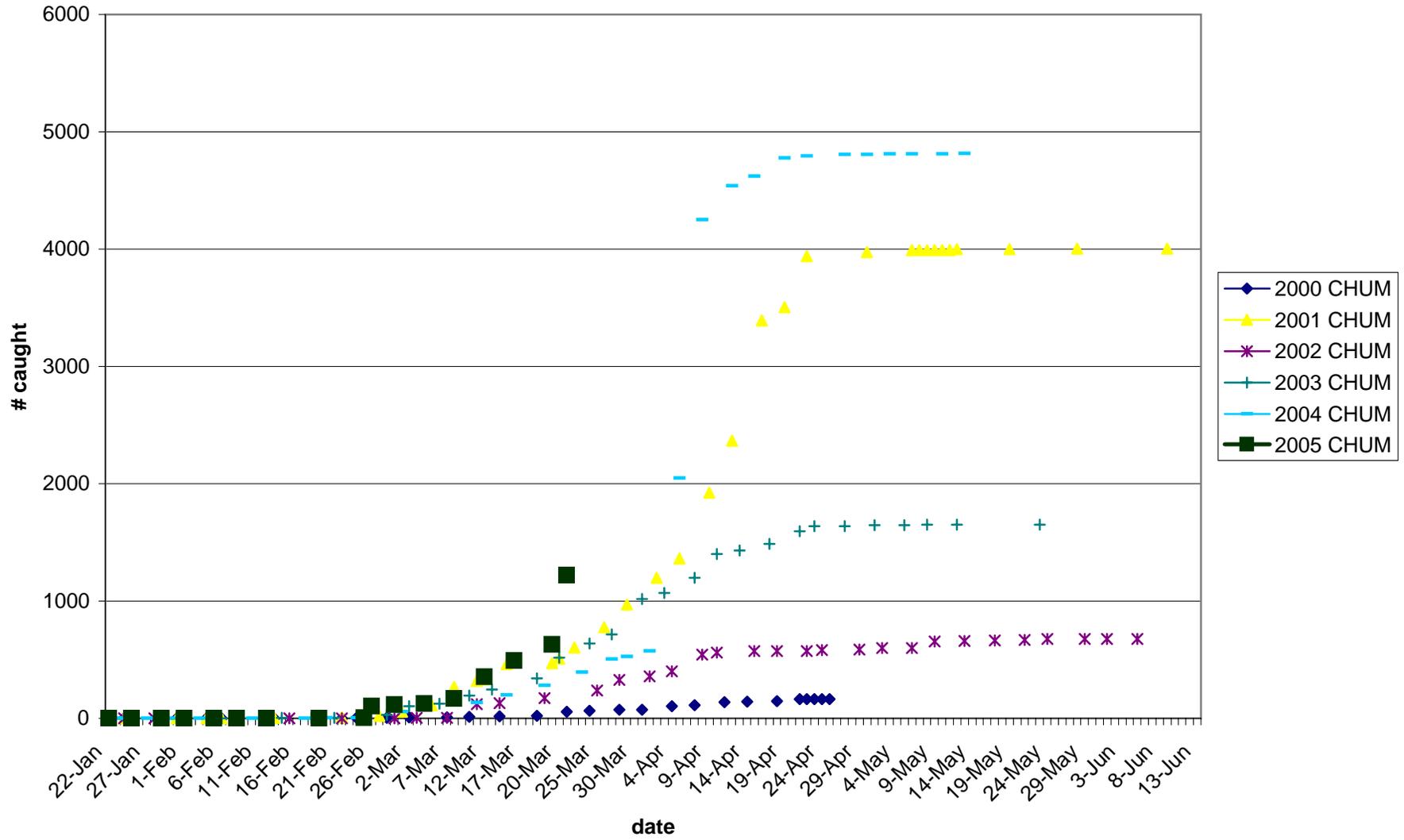
- Hilborn, R. 1987. Living with uncertainty in resource management. *North American Journal of Fisheries Management*. 7:1-5.
- Hynes, H.B. 1970. The ecology of flowing waters in relationship to management. *Journal of the Water Pollution Control Federation* 42:418-424.
- ISAB (Independent Scientific Advisory Board). 2004. ISAB Findings from the reservoir operations/flow survival symposium. November 9-10, 2004. Sponsored by the Northwest Power and Conservation Council and NOAA Fisheries. ISAB 2004-2. Portland Oregon.
- ISAB. (2003). Review of flow augmentation: update and clarification. Report 2003-1 to the Northwest Power and Conservation Council, National Marine Fisheries Service and Columbia River Basin Indian Tribes. Portland, Oregon.
- ISG. (Independent Science Group). 1996. *Return to the River*. Restoration of salmonid fish in the Columbia River ecosystem. Northwest Power and Conservation Council. Portland, Oregon.
- Lichatowich, J.A. and L.E. Mobernd. 1995. Analysis of chinook salmon in the Columbia River from an ecosystem perspective. Contract No. DE-AM79-92BP25105 to the Bonneville Power Administration. Submitted by Mobernd Biometrics, Inc. Vashon Island, Washington.
- Lichatowich, J. and S. Cramer. 1979. Parameter selection and sample sizes in studies of anadromous salmonids. Information Report Series, Fisheries. Number 80-1. Contract DACW-57-C-0027 to the Corps of Engineers. Oregon Department of Fish and Wildlife. Portland, Oregon.
- Marmorek, D.R., M. Porter, I.J. Parnell and C. Peters, eds. 2004. Comparative survival study workshop, February 11 – 13, 2004; Bonneville Hot Springs Resort. ESSA Tech. Ltd., Vancouver B.C.
- Martin, K. 2004. Altered Flood Control, Climate Change, and Rebuilding Pacific Northwest Salmon Stocks. Presented at CRITFC's Regional Flood Control Workshop. Columbia River Inter-Tribal Fish Commission, Portland, Oregon. (http://www.critfc.org/text/nat_riv.html)
- Martin, K. 2002. Water Supply Forecast Correction Curves. Lecture, Oregon Chapter, American Meteorological Society. Portland, Oregon. (http://www.critfc.org/tech/03-forecast_report.html)
- McAllister, M.K. and R.M. Peterman. 1992. Experimental design in the management of fisheries: a review. *North American Journal of Fisheries Management*. 12:1-18.

- Mundie, J.H. 1991. Overview of effects of Pacific coast river regulation on salmonids and the opportunity for mitigation. American Fisheries Society symposium. 10:1-11.
- Nez Perce, Umatilla, Warm Springs and Yakama Tribes. 1995. *Wy-Kan-Ush-Mi Wa-Kish-Wit. Spirit of the Salmon*. The Columbia River Anadromous Fish Restoration Plan. Columbia River Inter-Tribal Fish Commission. Portland, Oregon.
- NMFS. 1998. Supplemental Biological Opinion on Operation of the Federal Columbia River Power System including the Smolt Monitoring Program and the Juvenile Fish Transportation Program, during 1998 and future years. Seattle, Washington.
- NOAA 2004. Passage of adult and juvenile salmon through Federal Columbia River Power System dams. Technical memorandum. Northwest Fisheries Science Center. National Marine Fisheries Service. Seattle, Washington.
- Peery R.W. and six co-authors. 2004. Survival and migration behavior of juvenile salmonids at McNary Dam, 2004. Abstract presented at November 2004 Corps of Engineers Annual Anadromous Fish Evaluation Program Research Review. Portland, Oregon.
- Ploskey, G. and six co-authors. 2004. Hydroacoustic evaluation of salmonid fish passage at Bonneville Dam. Abstract presented at November 2004 Corps of Engineers Annual Anadromous Fish Evaluation Program Research Review. Portland, Oregon.
- Power, M.E., W.E. Dietrich and J.C. Finlay. 1996. Dams and downstream aquatic biodiversity: potential food web consequences of hydrologic and geomorphic change. Environmental Management. Vol 20. No. 6 pp. 887-895.
- Sherwood, C.R., D.A. Jay, R.B. Harvey, P. Hamilton and C.A. Simenstad. 1990. Historical changes in the Columbia river estuary. Progr. Oceanogr. 25:299-352.
- Simenstad, C.A., K.L. Fresh and E.O. Salo. 1982. The role of Puget Sound and Washington coastal estuaries in the life history of Pacific salmon: an unappreciated function. In: V.S. Kennedy (editor) Estuarine Comparisons. Academic Press, Toronto.
- Tyus, H.M. 1990. Effects of altered stream flows on fishery resources. Fisheries. Vol: 15. No. 3. 18-20.
- Vannote, R.L., G.W. Minshall and K.W. Cummins (and others). 1980. The river continuum concept. Canadian Journal of Fisheries and Aquatic Sciences. 37:130-137
- Whitney, R.R., L.D. Calvin, M.W. Erho and C.C. Coutant. 1997. Downstream passage for salmon at hydroelectric projects in the Columbia River Basin: development, installation and evaluation. Northwest Power Planning Council. Portland, Oregon.

Ives Island juvenile chum catch through April 1, 2000-2005.



Ives Island juvenile chum catch, 2000-2005.



Technical Management Team Meeting Notes

March 30, 2005

Corps of Engineers NW Division Offices, Portland, OR

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.

Hanford Reach

Russell Langshaw, Grant County PUD, reported on the last week's conditions for emerging chum at Hanford Reach. Emergence began February 28. The average day discharges for March 21st-25th were: 99.5, 108.1, 113.6, 113.9, 101.9, 77.4, and 70. Discharges went outside the band width (set at 20 for those days) on Wednesday and Saturday.

ACTION: Russell will forward the current data to Cindy Henriksen later this week, including the estimated date for end of emergence.

Operations During Low Flow Years

Chum: A graph depicting 2000-05 chum catch numbers was presented by Ron Boyce, ODFW, showing a big increase in numbers this year between March 19th and 25th. The numbers overall are higher than previous years. Chum emergence will likely continue through April and possibly into May. Ron will continue to provide updated information to TMT until the end of emergence.

Start of Bonneville spill: Bonneville is currently operating to maintain an 11.5' tailwater. The BiOp calls for 75 kcfs daytime spill, which is targeted to start on April 10. There is concern, with the low flow year, that gas levels may be a problem for emerging chum. The action agencies requested feedback from the salmon managers on how to proceed. As follow-up from the last TMT meeting, the COE noted that a logger at Multnomah Creek is not available at this time, but monitoring of TDG will continue at Warrendale and Cascade Island. The salmon managers are interested in attaining more precise, real-time measurements.

ACTION: Dave Wills will check with USFWS staff on the possibility of doing real-time measurements at Multnomah Falls.

The salmon managers did some modeling exercises for the first two weeks in April. They are still looking to maintain 11.5' tailwater and target April 10 start of spill – which may require lesser spill volumes. One suggestion was to, if the choice between chum coverage or spill must be made, sequence the beginning of spill higher in the river. The salmon

managers responded that spring migrants are coming out from Bonneville pools faster than up-river, so sequencing does not help.

ACTION: There will be a TMT meeting on April 6 to revisit this issue and make a decision about what the operation will look like this year.

Shape of flow at Priest Rapids through April/May/June: The salmon managers sent a technical memo on March 23 providing guidance to the COE for the latest Q Adjust run. The March 29 run reflects that guidance, and includes: updated runoff volume forecast, refill Grand Coulee to 1285' by June 30, change the John Day pool elevation, draft Snake River pools to MOP, and increase Dworshak outflows to 5 kcfs. The COE noted that this new run is similar to the previously modeled run. A summary sheet shows the likelihood of meeting different flow objectives at Priest Rapids April-June. These are not expected or recommended operations, but a model of what operations could look like. COE modelers requested guidance from the salmon managers on shaping of flows for the spring and summer months at Priest Rapids and Grand Coulee drafts/elevations, as soon as possible.

ACTION: Until the April 6 TMT meeting, the salmon managers will monitor emergence and water supply, and look at this week's STP run. Learning from experience in 2001, there may be a desire to shift some water into May for steelhead. A decision is expected to be made at the 4/6 TMT meeting.

The Dalles Operations

Laurie Ebner, Walla Walla COE, reported on installation of "dogging" devices that is scheduled to begin tomorrow (3/31). A model study will be conducted next week to identify operational flexibility at spill bays 1 and 2. The current plan is to dog open bays 3-6 when spill begins (April 10).

ACTION: If the plan to begin spill on 4/10 changes, TMT will inform Laurie so she can inform the operators. Otherwise, the bays will be dogged off on April 10.

Spring Creek Spill

Dave Wills reported that about 60% of the hatchery fish passed the project during the two-day corner collector operation.

NOTE: TMT members agreed on the need to consider the effects of gas levels at the Bonneville forebay and on emerging chum when implementing spring spill at The Dalles.

Water Management Plan Spring/Summer Update

The spring/summer update includes that Lower Snake operating ranges are targeted to begin April 3 (MOP+1 at Little Goose, Lower Granite, and Ice Harbor; MOP at Lower Monumental). The Ice Harbor RSW test will be implemented from April 4-14th, requiring spill. Testers would like to have the RSW operating range fixed for the duration of the test. Given this, TMT was asked to consider how to proceed with operation ranges in the

Lower Snake this year. The salmon managers agreed with the desire to have a consistent condition for the test at Ice Harbor.

ACTION: As agreed to by the TMT, the action agencies will operate Ice Harbor to MOP+1 on April 4. And, target Lower Granite to operate to MOP+1 on April 4, Little Goose to MOP+1 on April 5, and Lower Monumental to MOP on April 6, unless fish numbers continue to be very low. The salmon managers will contact the COE this Friday (4/1) by 1:00 pm to coordinate. MOP operations will begin at 5:00 pm at each project.

The latest draft WMP spring/summer update (March 30) is on the TMT web page. The April final water supply forecast will be included in the next draft. No additional comments have been received on the update since the last meeting, but continue to be welcome.

Upper Snake Operations

Tony Norris, BOR, reported on available water for flow augmentation in the Lower Snake. The total volume expected is 144 kaf, from the following areas: 78 kaf from Palisades, 48 kaf from pumpers, 17.6 kaf from Oregon natural flows, and 1 kaf from Lemhi.

CRITFC 2005 River Operations Plan

Kyle Martin provided an overview of CRITFC's River Operations Plan for this year. Overall goals are to: establish normative hydrograph, lessen water particles and improve fish travel time, and create normative dam passage conditions.

Objectives included:

- Use the CBFWA process for decision-making (not the Regional Forum);
- No emergency curtailment of spill;
- No additional water withdrawal for drought;
- Continue 2001 water acquisition programs – BPA and BOR;
- Modify flood control rule curves;
- Draw Lower Granite down by 10' in the summer;
- Delay Lake Roosevelt refill;
- Decrease power peaking flow fluctuations (particularly in Hanford Reach);
- Do spring RSW tests at Lower Granite and Ice Harbor, and summer test at Ice Harbor.

The overview also included flow objectives and spill recommendations from CRITFC's perspective.

TMT member comments and questions:

- How could this operation affect 2006? Kyle will share this information with TMT at a later date.
- The CRITFC plan used the Genyses model, which is different from the COE's Q Adjust in that it focuses on power, not flows. Kyle offered that CRITFC staff would be willing to work with the COE in understanding how this plan could be compared

with the WMP. **ACTION:** Kyle will send the spreadsheet with numbers used in the analysis to the COE.

- Some objectives, from a federal perspective, are not legally possible. The CRITFC plan did not integrate legal constraints, but from a strictly technical perspective, instead offered an operation to benefit fish.
- Oregon shared appreciation for CRITFC's efforts in putting together a plan that seeks to make improvements to fish, and encouraged TMT to consider some of the innovative concepts in the Plan.
- How will comments to the Plan be addressed and/or incorporated?

ACTION: CRITFC requested written feedback on the 2005 CRITFC River Operations Plan from the action agencies by April 13.

Graphs/Graphics

The COE would like feedback on the graphs of the Q Adjust model runs that were presented at the 3/23 TMT meeting. The COE is also developing an ESP model put into similar format as STP in terms of monthly scenarios.

ACTION: The COE requested feedback on the graphs by Monday, April 4th.

Status of Operations

Reservoirs – Libby is at elevation 2413', releasing 4 kcfs. The March final water supply forecast is 5.37 MAF. The COE is waiting for feedback from the USFWS about potential sturgeon operations. The Dworshak water supply forecast is 1.42 MAF; the project is at elevation 1577', releasing 1.6 kcfs. Grand Coulee is at 1257.4', targeting 1255' on Friday and Monday (4/1 and 4/4). Hungry Horse is at elevation 3548.2'.

Fish – The Dworshak hatchery is planning to implement the release of spring chinook next Monday, 4/4, evening. Conditions are currently good for this operation. Dworshak flows will increase to ~4 kcfs during the release (4/4 and 4/6).

Power – The system is operating to meet Grand Coulee elevation targets.

Water quality – Laura Hamilton, COE, noted that some monitoring gauges were coming back on line, and were almost done.

Actions from 3/30 TMT Meeting

- Feedback on graphs/graphics – by **Monday, 4/4**
- Coordination with COE re: fish numbers, start of MOP operations – salmon managers, **Friday 4/1**
- Written feedback from action agencies on CRITFC's River Operations Plan for 2005 – **By 4/13**
- Check on availability of USFWS staff to do real-time measurements at Multnomah Falls – Dave Wills
- Coordination on start of spill with operators at The Dalles – TMT

- Current Hanford Reach data to Cindy Henriksen for posting to TMT web page – Russell Langshaw, ASAP

Next TMT Meeting, April 6, 9:00 am

Agenda Items Include:

- Chum update/Operations during low flow years
- Water supply
- Shape/flow at Priest Rapids

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. Hanford Reach Update.

Russell Langshaw said that, currently, the Hanford Reach chinook are at 628 temperature units past the end of spawning. Emergence began February 28. The minimum Vernita Bar flow is 65 kcfs; we've been in the Hanford Reach protection mode for about three weeks now. We're having some difficulties with our flows; we're doing a balloon-tag study in conjunction with our advanced turbine testing. We've had to cancel quite a few of our planned experiments to meet the Hanford Reach minimum flow. Langshaw noted that, over the past week, the flow band has varied between 20 and 40 Kcfs; the band was exceeded on only two days, March 23 and March 26, by less than 5 Kcfs. Daily Priest Rapids discharge varied between 67 Kcfs and 129 Kcfs last week.

When will the weekend constraint go into effect? Paul Wagner asked. That's difficult to forecast, Langshaw replied; we're gaining about 5 temperature units per day, so it will probably be about the third week in April. The weekend constraint will be an average of the past four days' minimum flow, once we reach 800 temperature units past spawning. Cindy LeFleur said her understanding is that the current estimate of the end of emergence is May 14. Langshaw said he will send an email to Henriksen providing the most recent Hanford Reach numbers available, for posting to the TMT homepage.

3. Operations During Low-Flow Years.

Henriksen said that she had posted the most recent chum data from ODFW to the TMT homepage; there were some discrepancies regarding the dates shown in this data. This shows the 2000-2005 chum catch in the Ives Island area, said Ron Boyce; the recent seine catches have really shot up. So far, we're ahead of the last five years for the chum catches for this date. We expect to see catches continue all through April, and perhaps into May, Boyce said. We have also updated the emergence date predictions, he said; the predicted end of emergence is still April 24. Boyce emphasized that this is just an estimate, and there could be considerable variability in the actual date of the end of

emergence. The bottom line is that we're seeing a surprisingly large number of chum in our Ives Island field surveys, Boyce said.

In response to a question, Boyce said the water temperatures recorded so far in 2005 have been no warmer than in previous years; it's too soon to say whether this year's emergence timing is earlier than average. Is there any correlation between redd depth and emergence timing? John Wellschlager asked. We can't answer that question at this point, but we are collecting data that may help answer it after the season, Boyce replied.

Moving on, Henriksen said the current operation at Bonneville is to maintain a minimum 11.5-foot tailwater elevation below that project. Looking forward, the start of the spring spill season at Ice Harbor and the Lower Columbia projects is eminent. We will be spilling 75 Kcfs during the day and up to the gas cap at night at Bonneville, she said. In this low-flow year, we will be maintaining the 11.5-foot tailwater elevation, plus spill, Henriksen said; we wanted to get some feedback from the salmon managers in terms of how to handle that operation, given the fact that it raises depth compensation and TDG concerns for the chum. Wellschlager noted that, during the Spring Creek operation, even that minimal amount of spill caused serious TDG concerns. At 75 Kcfs of spill, more than half of the total river flow will be spilled at Bonneville. Flows have been averaging about 120 Kcfs to maintain the 11.5-foot minimum tailwater elevation. It's doubtful that we can spill 75 kcfs and stay under the gas cap, said David Wills.

Henriksen said that the Corps investigated the possibility of installing a data logger at the Multnomah Creek spawning site, but the funding was not available for that. We will continue to monitor TDG levels at Cascade Island and Warrendale, however, she said. I think we need some more precision, said Boyce. Even with a logger, that wouldn't give us real-time data, Henriksen observed. Wills said he has not yet had the opportunity to discuss real-time monitoring over the spawning grounds with USFWS field personnel, but will do so.

Wills said the salmon managers have discussed spill operations at Bonneville, but don't have a concrete proposal at this point. We would like to continue to monitor emergence numbers, and use April 10 as the planning date for the start of spill. We would like to provide both spill and protection, to the greatest extent possible, for the chum redds. We have discussed various possibilities, in terms of increasing flows during the early part of April, but again, we don't have a concrete proposal at this point, Wills said.

If we're going to have to choose between providing spill and protecting chum, perhaps we could split the baby, starting spill at the upstream projects and sequencing that in day by day, suggested Wellschlager. That would at least give you a few extra days of protection for the chum redds, he said. Margaret Filardo noted that, if recent rain events continue, and tailwater elevations below Bonneville remain well above 11.5 feet, as they are currently, it may be possible to begin spill at Bonneville on April 10. All we can do is continue to monitor the situation; if spill has to start at a lesser volume, then that's what we'll do, she said.

After a few minutes of additional discussion, it was agreed that the TMT will meet to discuss the start of spring spill at Bonneville on April 6.

When will we hit the mid-to-high 90% emergence point for chum? Wellschlager asked. I'll try to provide that, based on historic emergence timing, Boyce replied.

The discussion then turned to yearling and subyearling chinook passage indices at Bonneville; about 900 yearlings and about 4,300 subyearlings have passed Bonneville to date. Boyce noted that most of the yearling chinook are hatchery fish, and the majority of the subyearlings are wild. He added that there are already a significant number of chinook passing Bonneville, so that needs to be taken into account in the spill decision. Boyce added that, given current high flows in the lower river, due to the recent precipitation events, it may make sense to try to store as much water as possible, currently. We're storing as much as we can, Henriksen replied.

Moving on to Priest Rapids operations, Henriksen reminded the group that, at the last TMT meeting, the action agencies had asked the salmon managers for some guidance with respect to optimal Priest Rapids operations during April. We wanted something to model, essentially, and we did receive a memo from the salmon managers, dated March 23. We used that memo to generate a QADJ run, she said. We looked at that model run, as well as the March final water supply forecast, said Wills; we then tried to make a better situation out of a bad situation. What we're looking at is shaving about 5 feet off the Grand Coulee refill, adding more water by manipulating John Day pool, and starting flow augmentation from Dworshak somewhat sooner than usual, in order to increase lower river flows during the critical period in early April.

We did update the water supply forecast, but it isn't that much different than the last time we looked at it, Henriksen said. What the most recent QADJ run shows is a low flow target – 70 Kcfs – at Priest Rapids during April, in order to meet the required flow at Bonneville during the first half of April. We then tried to meet 110 Kcfs at Priest Rapids without drafting Grand Coulee during the second half of April. As you look at this model run, bear in mind that they do not represent a recommended or even an expected operation, she said – it simply reflects the inputs the salmon managers have given us.

Are you looking for input on this today? Silverberg asked. We're always looking for input, Henriksen replied. This shows an average flow of 120 Kcfs at Priest Rapids in May and 113 Kcfs in June, noted Jim Litchfield – if we have a 45-foot hole to fill in Grand Coulee by June 30, those flows don't strike me as realistic. Henriksen replied that this model run assumes a significant amount of flow from the Canadian projects during that period – we have stored 1 MAF for flow augmentation in the Canadian projects, and a portion of that will come out in May and June, she said.

Julie Ammann said any guidance the salmon managers can provide on the optimal shaping of Priest Rapids flows during April, May and June would be helpful, as would input on the elevation to which the salmon managers would like to see Grand Coulee drafted and, ultimately, refilled. The salmon managers will be discussing this information

over the next week, said Boyce. Henriksen added that the Corps is working on an additional product for TMT digestion, an ESP model run that will overlay 44 historic weather years on current streamflow and reservoir elevation data.

After a brief caucus break, Wills said the salmon managers had discussed this issue, and taking all factors into account, in looking at the QADJ run, it looks like this is going in the right direction, in terms of doing most of what we wanted to do. We may want to explore changing the Priest Rapids flows during late April and early May, but it does look as though this operation is taking us in the right direction. We will continue to discuss this issue with the action agencies once the most recent QADJ run is available, Wills said, in particular, the possibility of shifting some of the April flows at Priest Rapids into May. Tony Norris noted that the options to do so may be limited, given the drum gate repair operation at Grand Coulee and the need to refill that project once the freshet begins.

With respect to spill at Bonneville, Wills said that, when the time comes, the salmon managers will be interested in exploring to what extent it will be possible to provide spill while protecting chum. My question is, what's the first priority – spill or protecting chum? Henriksen asked. That's the question, Wagner agreed – we're just going to have to continue to monitor emergence timing, flows and TDG levels. The TMT will discuss that issue at its April 6 meeting, he added. There is certainly a desire to ensure that May flows are as adequate as possible, rather than allowing them to drop drastically, as we did in 2001. Boyce added that, in his view, this discussion should not be limited merely to tradeoffs between one ESU vs. another – it needs to include tradeoffs between all river uses, not just between fish species. Correct, said Litchfield, but the point being made here is that we are working with a finite resource and the goal is to use it wisely through the season.

4. Spring Creek Update.

Wills said the question from the last TMT meeting was to what degree we were successful in passing the Spring Creek fish with the shortened corner collector operation in 2005. If we look at the overall subyearling numbers, it looks as though about 61% of the fish that were released passed Bonneville during the corner collector operation. What about TDG problems? Litchfield asked. That's why we shut down the operation sooner than planned, Wellschlager replied – river flows were low, temperatures were high, and we saw TDG levels of about 107% at the Multnomah Creek spawning site. We were well-protected at the Ives Island site, added Wills, but we just couldn't get the depth compensation we needed at Multnomah Creek. Larry Beck noted that forebay TDG levels at Bonneville, due to upcoming spill at The Dalles, will need to be taken into account in the coming decision about Bonneville spill.

5. Water Management Plan Spring/Summer Update.

Henriksen noted that a decision on this issue needs to be made today, because under the Water Management Plan, the Lower Snake projects need to be at MOP or

MOP+1 on April 3, this Sunday. One thing to consider this year is that, at Ice Harbor, starting April 4, testing of the new RSW will begin. We decided not to do the balloon-tag test during our TMT discussions last week, but Walla Walla District still needs to test the RSW during the day. The researchers would like to have Ice Harbor at its normal operating range – MOP+1 to MOP+2 – during the entire test period.

The question is, do we want to draft all of the pools to MOP or MOP+1 at the same time, on April 3, or do we want to sequence them? Litchfield said. We also have a planning date for spill, noted Larry Beck. Wills agreed that a consistent condition is needed for the Ice Harbor test; that pool is already near MOP, and we would recommend that we get to MOP at Ice Harbor first. After a brief discussion, it was recommended that the pools be drafted in sequence, starting upstream and moving downstream. Ice Harbor and Lower Granite will be drafted to MOP+1 to MOP+2 on April 4; Little Goose to MOP+1 to MOP+2 on April 5, and Lower Monumental to MOP to MOP+1 on April 6. It was further agreed that the drafts of Lower Granite, Little Goose and Lower Monumental will take place during evening hours.

Rudd Turner asked whether the salmon managers would prefer to delay the drafts of the Lower Snake pools until fish begin arriving at Lower Granite in appreciable numbers. After a brief discussion, no changes were made to the above timing, although if the Lower Granite passage indices remain low, the salmon managers will contact the Corps on April 1 to discuss delaying the draft of the Lower Snake pools.

The group also briefly reviewed the March 30 draft of the spring/summer update (attached to today's agenda on the TMT homepage); Henriksen noted that the Corps is waiting to update this document further until the April final water supply forecast is available. Henriksen asked that the TMT provide any comments they may have on the spring/summer update as soon as possible.

6. Upper Snake Operations.

Norris said the current prediction of flow augmentation water from the Upper Snake in 2005 is 144 kaf. They are receiving some precipitation, currently, so these numbers will likely change again, he said, but that's the most recent estimate. The bottom line is that conditions are not good up there this year, he said; 144 kaf is near our all-time low of 90 kaf in 2001.

7. The Dalles Operations.

Laurie Ebner said the construction contract for installing the dogging devices at The Dalles will be let tomorrow; the work is scheduled for completion by April 10. We will provide an update on April 7. We need 48 hours notice on changing the pennant length. This is a heads-up for all of you that we will need to exercise at least one of the gates once the dogging devices are installed, for five to 10 minutes, she said. There is a model study scheduled for next week to identify operational flexibility in Bays 1 and 2 with a fixed gate opening. We cannot have the gates at Bays 1 or 2 open less than 2 feet.

We need to keep the two-foot part of the wire inside the drum. We will have to have refined operations as soon as possible; we will try to look on the April-May flow conditions while they're down there on the model. We will need a quick turnaround from FPOM on the recommended spill patterns. When will that information get to FPOM? Boyce asked. We hope to get information on the six-foot pennant length to FPOM by next Friday; the information on the four- and eight-foot pennant length to FPOM soon thereafter, Ebner replied. Again, you'll get a scheduling update on April 7, Ebner said.

How much operational flexibility will we have if the gates are fixed at a six- or eight-foot opening? Boyce asked. Until we get the information from WES, I can't answer that, Ebner replied – the only flexibility will be in Bays 1 and 2. I would hope that the salmon managers will be consulted regarding which level is selected – six vs. eight feet, said Boyce. We will be monitoring what spill percentage we get, Ebner replied; we will show you how we propose to do that. In addition, with respect to what we propose to do once we understand how we'll operate Bays 1 and 2, we will have information on how much spill is provided, which we will share with the region. That will allow all parties to make a decision, she said. The message today is that we will start the season with six-foot openings in Bays 3-6, and the question for FPOM is, how should we operate Bays 1 and 2 to meet the 40% spill requirement? said Henriksen. The other discussion is, once flows increase due to the freshet, when should we change the openings at Bays 3-6 to eight feet? The contractor will need 48 hours notice before making that change, so we need to decide on the criteria that will guide when that change is made, Henriksen observed.

Wellschlager noted that taking 40% of total river flow as the floor would cause operational concerns for Bonneville – 55 Kcfs needs to go through the powerhouse at night, and about 70 Kcfs during the day, to maintain grid stability. After a few minutes of further discussion, it was agreed that, unless the TMT decides otherwise, the gates will be dogged off at six feet on April 10.

8. Feedback on Graphs/Graphics.

Wills said the salmon managers will provide their input on the Corps' ESP analysis prior to next week's TMT meeting.

9. CRITFC River Operations Plan.

Kyle Martin distributed copies of the 2005 CRITFC River Operations Plan (available via hot-link from today's agenda on the TMT homepage). He noted that, for the past several years, the tribes have submitted a plan outlining their preferred river operations. He noted that the plan goals include establishing a normative hydrograph, reducing water particle and fish travel time, and establishing normative passage conditions at the dams. Moving on, Martin touched on the following major topics:

- The 2005 water supply forecast
- 2001 juvenile salmon in-river system survival rates v. 2000 BiOp targets – we must do better in 2005
- Key plan recommendations – use CBFWA for river operations planning and

decision-making process, BPA appears to be financially solvent, modify flood control rule curves; draw down Lower Granite pool by 10 feet during summer migration, delay refill of Lake Roosevelt until autumn, reduce power peaking flow fluctuations in the river and Hanford Reach etc.

- Flow augmentation over BiOp – 1 MAF in addition to BiOp recommendations from the Upper Snake, Canadian non-treaty storage, Libby, Hungry Horse, Banks Lake and Brownlee
- Provide 24-hour spill for spring and summer migrants at all dams; increase spill volumes and timing
- Flow improvements - spring flow targets for migration peak (graphs)
- Flow improvements – summer (graph)
- Upper Snake River storage (graph)
- Hanford Reach operations (graph)
- Spill operations – initiate spring spill on March 20 etc.

Did you model the impacts of ending 2005 at a lower elevation at the storage reservoirs on 2006 operations? Wellschlager asked. I have that information back at my office, but I don't have it with me today, Martin replied – that's a valid question.

Martin asked that the action agencies provide a written response to the CRITFC 2005 river operations plan within two weeks (by the April 13 TMT meeting). Again, he said, the overall goal of the plan is to make the best of a bad flow situation in 2005.

In order to provide good comments, we will need some additional spreadsheet information showing how CRITFC generated its flow estimates, Henriksen said. Martin suggested that it may make sense for the Corps to take CRITFC's assumptions and run them through its QADJ model, to provide an apples-to-apples comparison.

Do I correctly understand CRITFC to be recommending the dissolution of IT and TMT and replacing that with a government-to-government forum under CBFWA? Litchfield asked. That's correct, Martin replied – the tribes want an equal place at the table. Would that involve all of CBFWA's members? Litchfield asked. That's a detail that still needs to be worked out, but the overall goal is to improve a process that has never really worked for the tribes, Martin replied. That would require a restructuring of CBFWA, because there is currently no operational arm of CBFWA, Wagner observed. Would the tribes be represented by a single person, or would each tribe have a representative? Wellschlager asked. Again, that's a detail that remains to be resolved, Martin replied. Basically, we would like people to start to think about how this process could be improved, he said. In response to another question, Martin said the power impacts of CRITFC's proposal are summarized on Page 19 of the River Operations Plan.

Boyce said Oregon appreciates CRITFC's efforts to provide the best possible conditions for fish; the concepts you've put forward merit further discussion at the TMT table. There are a lot of positives here, Boyce said.

10. Status of Operations.

Henriksen said it has been raining at Libby this week; the reservoir has filled to elevation 2413, and continues to release 4 Kcfs. The March final water supply forecast for Libby was 5.37 MAF, and the expectation is that Libby will supply an 800 kaf sturgeon pulse in 2005. At Dworshak, the March final water supply forecast was 1.42 MAF; the project is now near elevation 1577, 23 feet from full. Inflows increased to 16 Kcfs on Monday; Dworshak continues to release its 1.6 Kcfs minimum outflow. Grand Coulee is at 1257.4 feet, said Norris; it will be at elevation 1255 by Friday. The contractor will begin work on the drum gates on Friday. Hungry Horse is currently at 3548.2 feet, and releasing the Columbia Falls minimum.

Wills said Dworshak Hatchery is planning to release its 2003-brood spring chinook on Monday and Wednesday evenings. In working with the Corps, the two evenings fish are released, Dworshak outflow will be increased to 4 Kcfs to help push the fish downstream.

Wellschlager said there are no power system issues to report at this time; the system is being operated to maintain the 11.5-foot minimum tailwater elevation below Bonneville.

11. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, April 6. Meeting summary prepared by Jeff Kuechle. (meeting went to 12:30)

**TMT Participant List
March 30, 2005**

Name	Affiliation
Ray Gonzales	COE
Ron Boyce	ODFW
Paul Wagner	NOAAF
Tony Norris	USBR
David Wills	USFWS
John Wellschlager	BPA
Donna Silverberg	Facilitator
Jim Litchfield	Montana
Larry Beck	COE
Laura Hamilton	COE

Russ George	WMCI
Tina Lundell	COE
Rudd Turner	COE
Tom Haymaker	PNGC
Tim Heizenrater	PPM
Nic Lane	BPA
Robin Harkless	Facilitation Team
Kevin Nordt	Mid-Cs
Kyle Martin	CRITFC
Lee Corum	PNUCC
Russell Langshaw	Douglas PUD
Todd Cook	PPM
Dan Spear	BPA
Ruth Burris	PGE
Cindy LeFleur	WDFW
Bruce MacKay	Consultant
Dave Statler	NPT
David Benner	FPC
Margaret Filardo	FPC

Assumptions:

- * Streamflows were adjusted to the March Mid-Month Water Supply Forecast for the period of April thru August of 57.9 MAF at The Dalles (62% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are forecasted March 31, 2005 elevations from the March 28th short-term run.
- * Grand Coulee maintains a maximum pool of 1255 ft through April for drum gate maintenance. Coulee tries to meet 70,000 cfs at Priest Rapids in Apr1, 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to at 1285 ft in all years. Summer BiOp drafts are 1282.5 ft in July and 1278 ft in August.
- * Hungry Horse operates to VARQ flood control or minimum flow from Jan - May and meets minimum flow of 3250 cfs at Columbia Falls, targets full in June, and drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool).
- * Dworshak targets elevation 1595.7 ft from Apr 15 - 30, but increases to 5000 cfs if needed to help Bonneville chum flows. The project targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Jan - May, targets full in June with a minimum flow of 18,000 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 15	68	73	65
Apr 30	31	98	110
May	26	120	130
Jun	67	113	90

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	39	85
May	0	53	85
Jun	1	48	73
Jul	0	29	50
Aug 15	0	23	50
Aug 31	0	21	50

Bonneville Meets Flow Objectives of 125 kcfs in Feb - Apr:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Apr 15	53	135
Apr 30	58	151

McNary Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	143	220
May	0	174	220
Jun	0	159	220
Jul	0	156	200
Aug 15	0	114	200
Aug 31	0	112	200

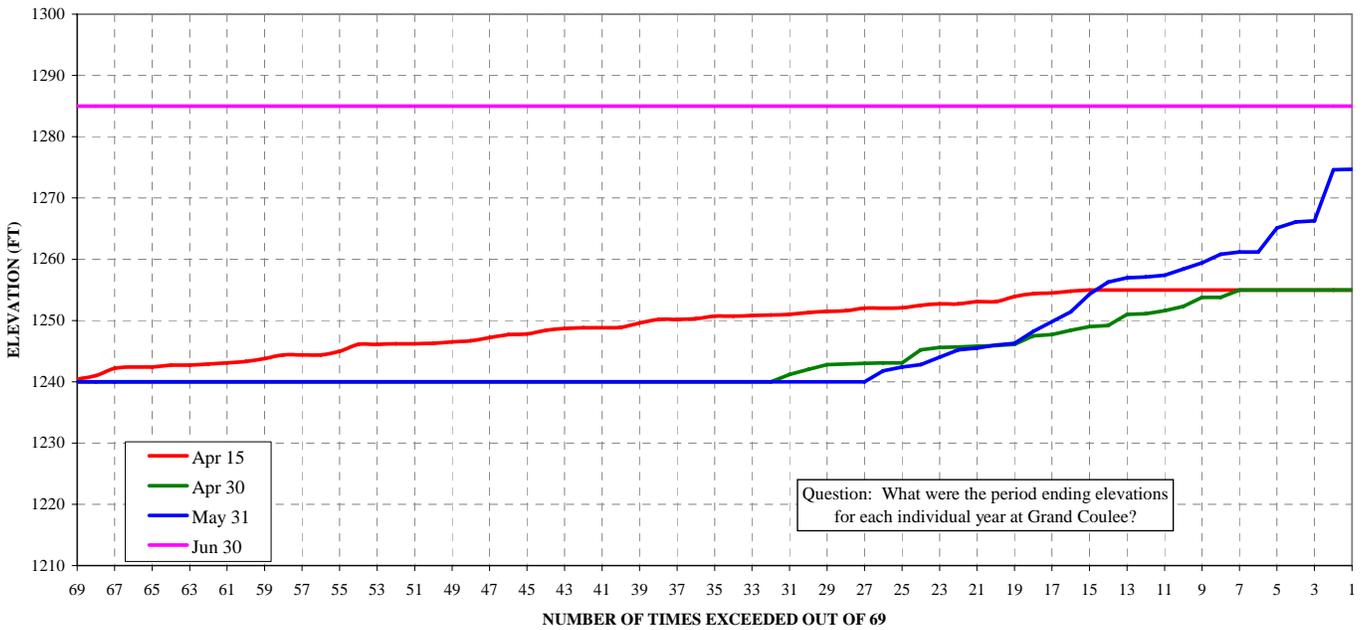
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	31	2456
Hungry Horse	69	3560
Grand Coulee	0	1285
Dworshak	69	1600

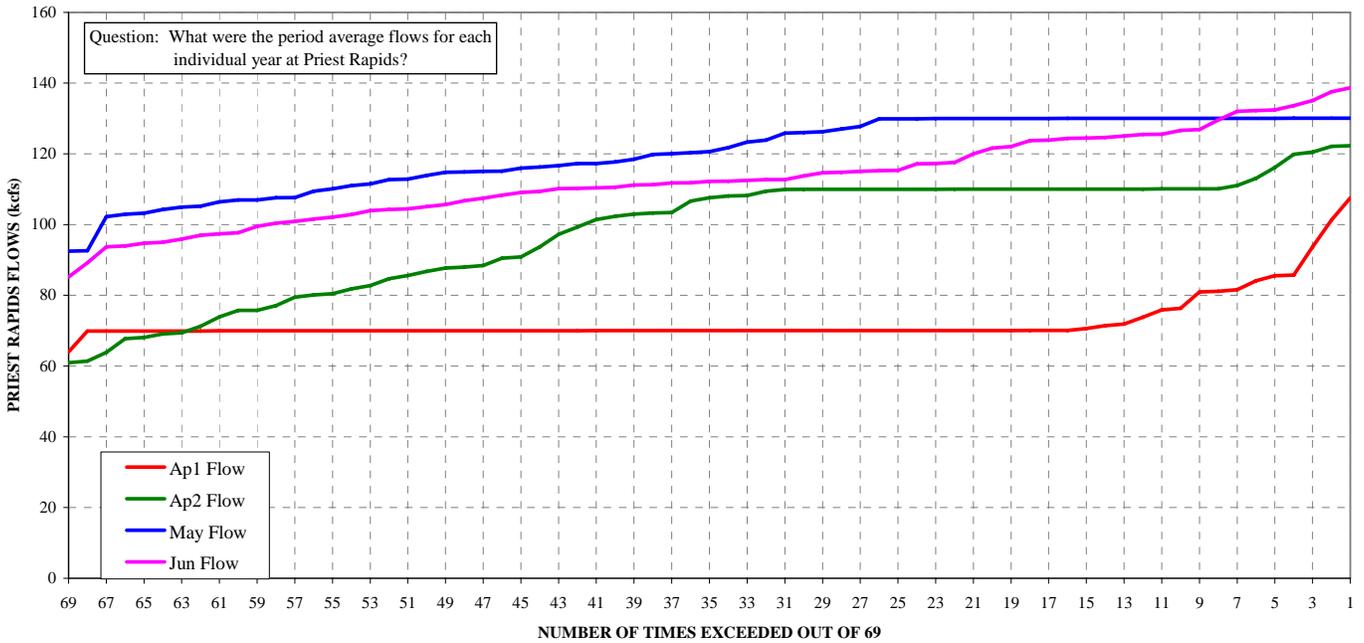
Period Average Outflows (kcfs):

	FEB 1-28	MAR 1-28	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	5.0	18.7	17.6	18.4	15.7
HGH	1.0	0.9	0.5	1.0	6.5	6.8	5.8	5.4	4.2
GCL	101	91	71	96	116	109	132	93	93
PRD	111	100	73	98	120	113	132	93	92
DWR	1.6	1.6	3.9	4.0	6.5	5.1	10.0	10.0	9.4
BRN	10	11	14	14	13	12	9	9	9
LWG	21	22	33	39	53	48	29	23	21
MCN	134	123	116	143	174	159	156	114	112
TDA	140	125	131	148	176	158	156	115	113
BON	138	130	135	151	178	160	158	117	115

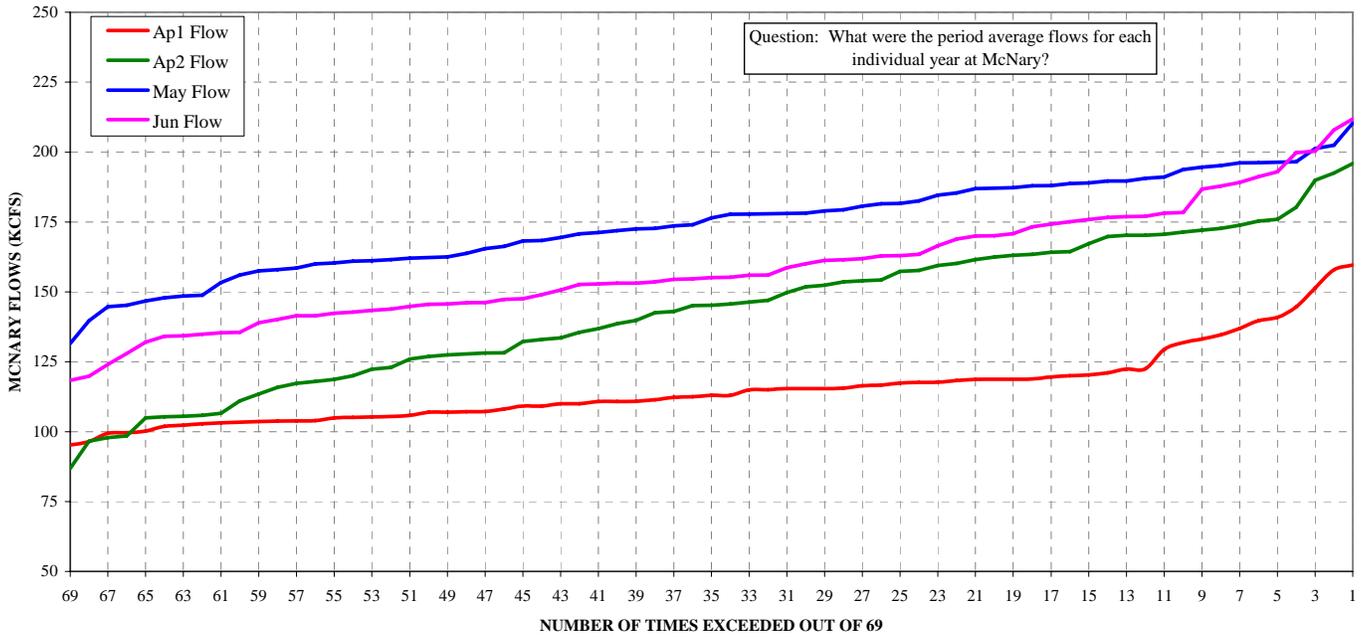
GRAND COULEE LAKE ROOSEVELT ELEVATIONS



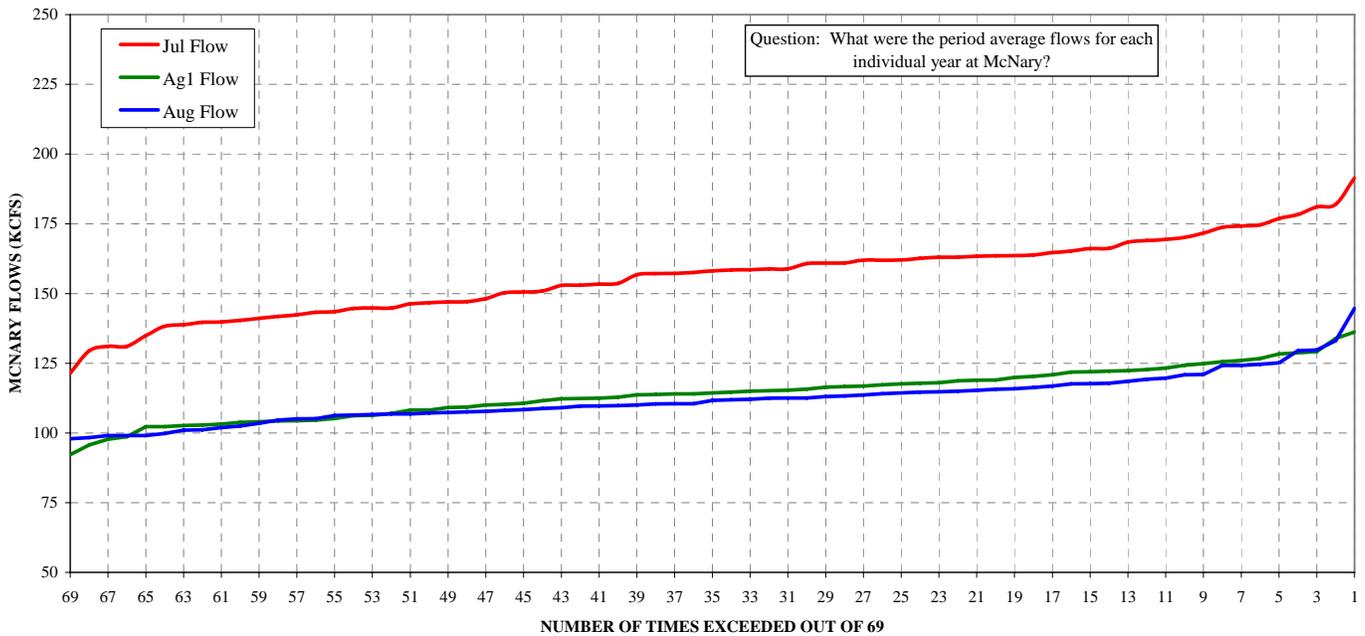
PRIEST RAPIDS APRIL - JUNE FLOWS



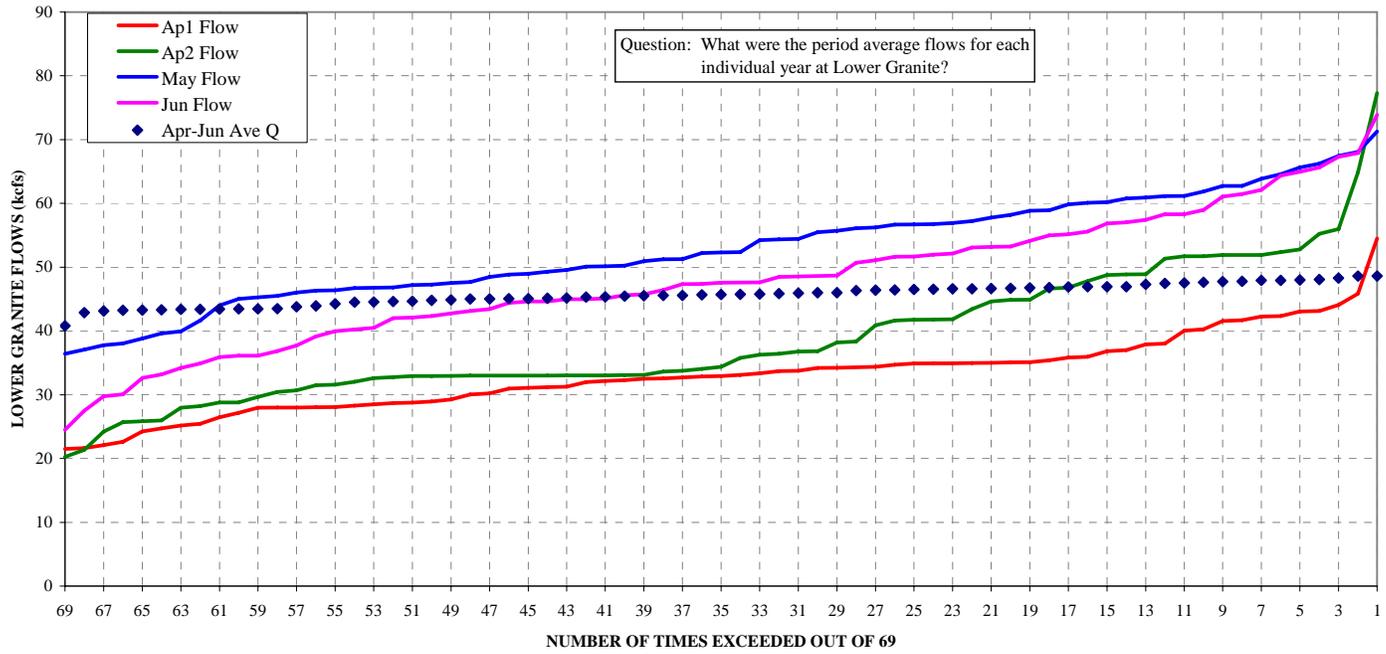
**MCNARY OUTFLOW
APRIL - JUNE AVERAGES**



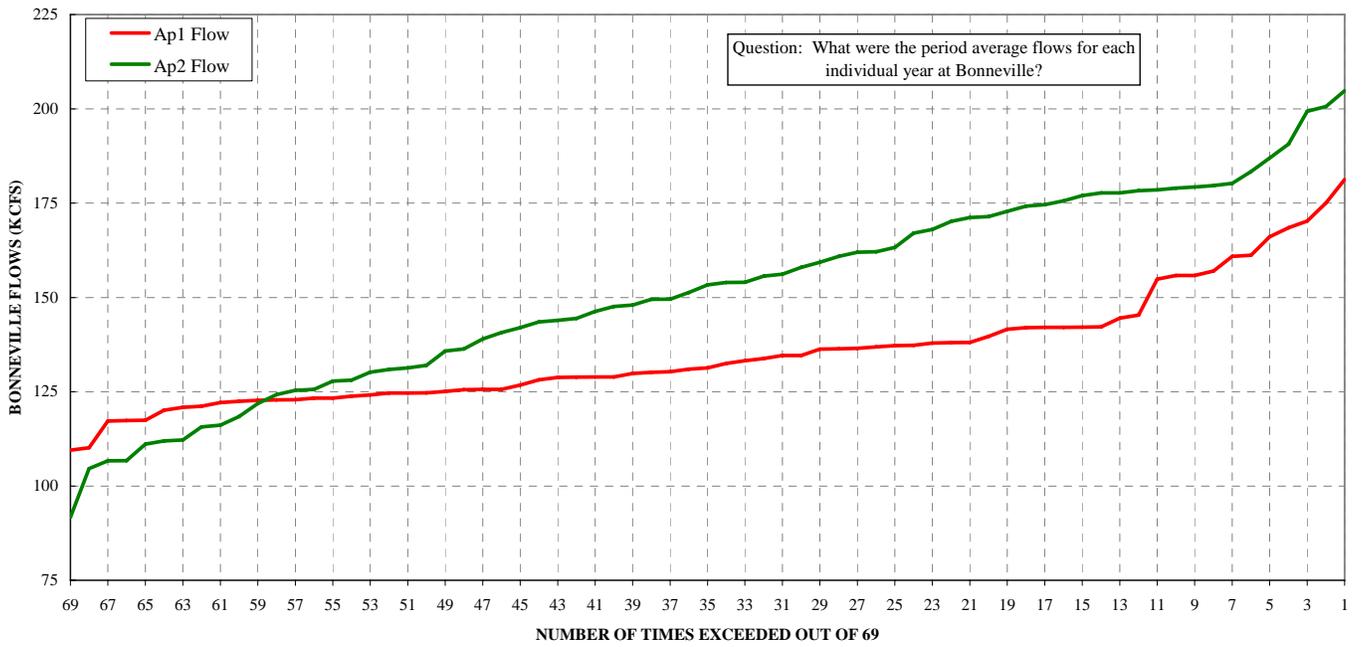
**MCNARY OUTFLOW
JUL-AUG AVERAGES**



**LOWER GRANITE
APRIL - JUNE FLOWS**



**BONNEVILLE OUTFLOW
April Flows**



TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday April 06, 2005 0900 - 1200 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

"Please MUTE your Phone"

*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 update/Operations during low flow years
[\[Link to Fish Passage Center\]](#)
3. Water supply
4. Shape / flow at Priest Rapids
5. [\[SOR #2005-3\]](#) 
6. [\[SOR #2005-4\]](#) 
7. Other
 - Set agenda for next meeting.
[\[Reference Calendar\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 6, 2005

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.

Chum Update/Operations During Low Flow Years

Ron Boyce, Oregon, reported on chum numbers from last week, noting that 146 were caught on 3/29 and 67 were caught on 4/1. The numbers are down from 525 on 3/25; emergence is occurring as expected. Ron reported that Ives Island chum numbers totaled 1,434 to date. Data from 1999-2004 shows that April 23 is the average date for end of emergence; end of emergence was April 16 last year and May 10 in 2002. The salmon managers need another week of data to be able to more clearly see a trend, so do not know yet what a 'significant' downward trend in numbers is yet.

Re: 2005 operations: The salmon managers are concerned about gas levels at chum spawning areas, and plan to continue to monitor those areas next week and then make a recommendation for start of spill at Bonneville (see discussion of SOR 2005-4 below).

Water Supply: The April early bird water supply forecast shows an increase from the March final. Grand Coulee April-September is up from 49.3 MAF (77% of normal) to 52.8 MAF (83% of normal). Lower Granite is up from 9.96 to 11.5 MAF (53%). The Dalles is up from 70.7 to 75.1 MAF (70%). Cindy Henriksen noted that this could be a short-term trend based on recent rain events since snow-pack is low.

Priest Rapids Flow

The action agencies continue to seek input on desired scenarios to be modeled for shaping flows and positioning reservoirs to meet flows. The salmon managers said that last week's Q Adjust was on track, and looked at the STP run made available yesterday. The updated STP shows lower Priest Rapids flows April-June, and a lowered Canadian operation. It still shows a higher elevation in July; this water could be shaped earlier in the season by refilling Grand Coulee later. The action agencies said it would be very helpful to see a set of objectives (in the absence of the ability to meet BiOp objectives) for how to shape flows.

SOR 2005-3

The salmon managers put together SOR 2005-3 relative to MOP operations in the Lower Snake River. The recommended MOP operations were:

- Ice Harbor to MOP+1 on 4/4 pm;
- Lower Granite to MOP+1 on 4/11 pm;

- Little Goose to MOP+1 on 4/12 pm;
- Lower Monumental to MOP on 4/13 pm;
- John Day draft over 3-day period to MIP on 4/15 pm; and
- Operate Grand Coulee as indicated in the 3/30 STP run.

The action agencies responded that, regarding John Day, the project is already near the operating range so a 3-day draft might not be possible; overall the proscriptive details are confusing to the action agencies. The salmon managers responded that the objective was to use water from John Day to relieve pressure from Grand Coulee's inability to draft this year. It was clarified that the flow objectives in the SOR were not a hard constraint for the salmon managers.

ACTION: Ice Harbor was operated to MOP+1 on 4/4 as requested. The action agencies will implement Lower Granite, Little Goose and Lower Monumental to their operating ranges by midnight of the day requested (4/11-4/13). John Day will operate to MIP over a 24-hour period, starting on 4/15 at 5:00 pm and reaching the operating range by 5:00 pm on 4/16. There will be no hard constraints on the flow objectives at Bonneville or draft at Grand Coulee.

SOR 2005-4

The salmon managers presented SOR 2005-4 relative to Ice Harbor and Lower Columbia spill. The recommended spill operations were as follows:

- Spill at Ice Harbor immediately, to BiOp level with bulk spill pattern (without interrupting the RSW test);
- Spill at McNary on 4/10 to BiOp;
- Spill at John Day on 4/10 to BiOp level;
- Spill at The Dalles on 4/11 to BiOp level; and
- Plan to begin spill at Bonneville on 4/15: Monitor flows, gas levels and chum emergence over the next week, and make a recommendation on 4/14 about spill levels at the project.

ACTION: The action agencies will begin spill at Ice Harbor on 4/7 from 6:00pm-6:00am, to BiOp, without interfering with the 10-hour RSW test (the salmon managers supported use of best research conditions for the RSW test). McNary and John Day will operate to UPA spill at 6:00 pm on 4/10. Work on The Dalles was scheduled to begin on 4/10, at which time the gates would be dogged off; Cindy Henriksen said there was a call scheduled to discuss changing this date to 4/11 to coincide with the request for start of spill, and she would report to TMT when more information was available.

(UPDATE: an email from Cindy was sent after the TMT meeting, notifying the group that: I have received word that the contractor will be able to dog off the gates at The Dalles on Monday, April 11 as requested in SOR 2005-4. The work may be complete about 1100 on Monday. The contractor will be exercising four gates at The Dalles on April 7 to test the hydraulic systems. This will mean there will be some spill at the project between 0900 and 1100 on April 7. If you have questions, please call me. More information about the spill patterns after April 11 at various flow will be forwarded when it is available.)

The COE was commended for their efforts in installing fish screens at McNary, given an injury to a worker that occurred at the project last week. All wished him a speedy recovery.

The action agencies will plan to begin spill at Bonneville on 4/15, and wait to hear from the salmon managers on 4/14 about specific recommendations. The action agencies need 1-2 days notice IF the planning date for start of spill at Bonneville changes. TMT was reminded that towboat pilots often request that spill stop at John Day for a short amount of time, for safety reasons.

Other

Dworshak: The project increased flows on 4/4 and 4/6 to full powerhouse (4400 cfs) for the planned hatchery release. The snow pack area near Dworshak was higher than anticipated, requiring the COE to operate to local flood control, targeting elevation 1587.5'. Outflows remain at full powerhouse and the COE plans to continue this operation until April 15 to accommodate the flood control requirement.

Idaho and Oregon directly challenged the COE on the validity of the flood control requirements at Dworshak; Idaho asked if there was a way to save some of the water until closer to 4/15 to support lower river migrating fish. This is not an option for the COE, with the given conditions requiring them to operate to local flood control. The COE is operating as conservatively as possible (normally the project passes inflow at ~8 kcfs; the COE is only moving 4.4 kcfs), and will continue to monitor the area and adjust operations as appropriate.

Paul Wagner, NOAA, noted that the current flows are beneficial to listed steelhead moving through the system.

Lower Granite: TMT was reminded that last year, the raceways at Lower Granite began filling with juvenile fish, and, as there was no barge available to transport them, the fish were spilled through the RSW. This operation is in the Fish Passage Plan, in case it is necessary to implement again. If so, biologists at the project will open the RSW. If it is possible to make notification before the operation, the project will, otherwise, the information will be passed on to TMT after the fact.

Next Meeting, April 13, 9am-noon

Agenda items include:

- Water Supply
- Chum Update
- Water Shaping
- Response to CRITFC's River Operations Plan
- WMP Spring/Summer Update (incl. April final water supply forecast, Q Adjust runs)
- Feedback on COE Graphs
- Review 4/6/05 Notes

Actions from 4/6 Meeting

- Feedback on graphs/graphics – by **Monday, 4/4 (or ASAP!!)**

- Written feedback from action agencies on CRITFC's River Operations Plan for 2005 – **By April 13**
- Current Hanford Reach data to Cindy Henriksen for posting to TMT web page – Russell Langshaw, **by April 13**

1. Greetings and Introductions.

Today's Technical Management Team conference call was chaired by Cindy Henriksen 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 or comments about these notes should contact Henriksen at 503/808-3945.

2. Chum Update/Operations During Low-Flow Years.

Ron Boyce said the numbers for the most recent seine surveys at Ives Island have declined from 592 on March 25 to 146 on March 29 and 67 on April 1. The total catch is 1,434 chum to date, but numbers are still relatively strong. At the Multnomah Creek, Rivershore and I-205 sites, the numbers haven't been updated since April 1. One additional piece of information – with respect to cumulative totals, and when we've hit 95% emergence, over the last six years, on average, we hit the 95% catch of chum on April 23. The range is April 16 in 2004 to May 10 in 2002.

So the indications are that 2005 is an early emergence year? John Wellschlager asked. It's too early to say, Boyce replied. I thought I had heard that several times, said Wellschlager. Early indications are that this could be an early emergence year, Wills replied. What about temperature unit information? Henriksen asked. The predicted end of emergence is still about April 24, Boyce replied; actual seine catches are the most accurate indication of chum emergence timing.

There were two chum-related action items discussed at last week's TMT meeting, said Silverberg – the possibility of doing real-time measurements at Multnomah Creek, and a salmon managers' discussion of the impacts of Bonneville spill on emerging chum. We talked about that at FPAC yesterday, said Boyce; everyone knows we have pretty low tailwater levels, currently, and we're concerned about dissolved gas levels below Bonneville, particularly at the Multnomah Creek site. SOR 2005-4 addresses this issue; our plan, at this point, is to initiate spill at Bonneville on April 15. We'll have crews in place to measure water elevations and watch TDG levels closely prior to the onset of spill at Bonneville. Anyway, we do have a plan, said Boyce.

Seine catches have been declining over the past week or so, said Paul Wagner; seining data over the next few days will indicate whether that is just a downward tick, or an indication of a downward trend, heading toward the end of emergence. How much data would you deem to be significant enough to indicate that emergence is close to the end? Wellschlager asked. We haven't talked about that yet, Boyce replied; if the

numbers continue to decline, that will factor into our decision about when to start spill at Bonneville. Ideally, we would like to start spill at Bonneville as the remaining chum emerge; that will be the crux of the discussion over the next few weeks. I understand, but what time-frame do you consider significant as numbers continue to decline? Wellschlager asked. I would say that 67, down from 592+, is a significant indicator, but we want to continue to monitor the situation, said Boyce.

My recollection is that, in years past, we have set a time-frame over which to observe declining numbers, before making a decision on this issue, said Silverberg. Boyce replied that in past years, field crews have seen a fairly rapid decline after the peak. However, I am not comfortable with specifying criteria on which to base a conclusion that emergence is nearing an end, at this point, he said.

I'm just trying to understand the criteria you guys use, said Wellschlager. Ultimately, that is an action agency decision, said Boyce; we will be involved in those discussions, but I don't think it's very useful to specify an operation at this time. In another week, we'll have another week's worth of data, and will be in a position to make a more informed decision as to whether the emergence is tailing off, or whether this is just a downward tick. It sounds, then, as though the salmon managers would like another seven days of information before they make that call, said Silverberg.

3. Water Supply Update.

The April early-bird forecast is now available, and has increased somewhat in comparison to the March final, said Henriksen. At Grand Coulee, the March final April-September water supply forecast was 49.3 MAF, 77% of normal. The April early-bird is 53.8 MAF. At Lower Granite, the March final forecast was 9.9 MAF, 46% of average, while the April early-bird was 11.5 MAF, 53% of average. The March final forecast at The Dalles was 70.7 MAF, 66% of average, compared to an April early-bird forecast of 75.1 MAF, 70% of average.

4. Shape/Flow at Priest Rapids.

The action agencies are seeking input as to any desired scenarios the salmon managers would like to see modeled at Priest Rapids, the Snake River projects or Bonneville, said Henriksen. We modeled one scenario from Dave Wills two weeks ago, but have received nothing since. We are willing to model multiple scenarios, Henriksen said, to guide our overall operation and position the reservoirs where you would like to see them.

At the end of the last TMT meeting, we were hoping for some guidance from STP as to the late May-early June period, said Wills. The last QADJ run looked like a pretty good track to go on, at that point; we were waiting to hear the next water supply forecast to see whether it might be possible to do something a little different, and it now looks as though that may be possible. The latest STP run is now available, said Julie Ammann.

Henriksen noted that, in recent days, inflows have been declining throughout the system.

What's different in the latest STP run? Boyce asked. It shows lower Priest Rapids flows, Ammann replied – 90-100 Kcfs in the second half of April, 120-130 Kcfs in May, and 110-120 Kcfs in June. That is due to a change in the Canadian operation – there will be less water released from the Canadian projects than we anticipated last time. There is still an increase in July – 120-135 Kcfs. Some of that water could be moved if that's a priority, by drafting Grand Coulee, Henriksen noted. If you delay refill to 1285 until the end of July, rather than the end of June, that could provide more water earlier in the season. Under the current STP run, we would draft Grand Coulee only 1 foot during July. The message is, if there is a desire for higher Priest Rapids flows in June, Grand Coulee will not achieve 1285 by June 30. It could still refill to whatever objective is chosen by the end of July, but we need to know what the salmon managers want to do by some time in May. We could set an objective for Priest Rapids/Grand Coulee, and hope to do better than that, observed Tony Norris. It's best if the salmon managers can give us some targets, and allow us to do the best we can given actual runoff and flows through the system, said Wellschlager.

I think we have those already – they're called BiOp flow targets, noted Russ Kiefer. But if the BiOp flows can't be achieved, what advice do the salmon managers have? said Silverberg. We have been providing recommendations all along, such as doing the Grand Coulee drum gate repairs in the fall, Kiefer replied. I don't recall the salmon managers actually recommending doing the drum gate repairs in the fall, Norris replied. There has been a general concern about doing that work in the spring, but we understand the dam safety concern, said Boyce. We're not ready, at this point, to provide specific operational recommendations; we would like to look at the latest STP run and discuss it among the salmon managers.

We understand, Henriksen replied; if you look at total average seasonal flows, they haven't changed much in recent months. We just want to be sure you're aware that there is a finite amount of water to shape, and are trying to give you as much information as possible so that you can formulate your recommendations. And we will provide them, said Boyce.

5. SOR 2005-3 – Lower Snake and John Day Operations.

On April 1, the action agencies received SOR 2005-3. 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:

- Draft Ice Harbor Pool to MOP+1 on the evening of April 4
- Draft Lower Granite Pool to MOP+1 beginning the evening of April 11
- Draft Little Goose pool to MOP+1 beginning the evening of April 12
- Draft Lower Monumental pool to MOP beginning the evening of April 13
- Draft John Day pool evenly over a three-day period to MIP beginning the evening of April 15.

Wills provided an overview of the SOR and its justification. The full text is available via hot-link from today's agenda on the TMT homepage. He noted that the overall goal of this SOR is to provide the maximum benefit to the maximum number of fish, in terms of flows and, ultimately, depth compensation for the chum redds below Bonneville as spill begins.

With respect to the John Day operation, that would be 262.5-264.0, to start, said Henriksen; we're currently at 264.5, so we're near that operating range. A three-day period is a bit much for a half-foot draft. We may have misunderstood your current operation, said Wills. Can't you just draft to the bottom of the operating range? Dave Benner asked. We may touch 262.5, but we need to maintain the 1.5-foot operating range at the project, Henriksen replied. Whatever is available, in terms of a draft, it was our intent to send that downstream after the Lower Monumental water is released, said Wills. We had thought there was more water that would be drafted from John Day over the requested three-day period. Henriksen clarified that 262.5-264.0 is the entire operating range at John Day.

We thought that we had a volume of water that we could ask to have evacuated over a 3-day period, said Wills; what you're telling us now is that the volume is less than we thought. The concept was to relieve the pressure on Grand Coulee to maintain flows by taking water from the lower river reservoirs, said Wagner – we simply wanted the action agencies to take the volume available from the lower river projects into account as they draft Grand Coulee. If the objective is to provide depth compensation for the chum at the tail end of the emergence, we can do that, but in a low water year, nothing is free – we're using available storage, said Wellschlager. Maintaining 11.5 feet below Bonneville through the end of emergence is possible, but it will have costs down the road. The main objective is to provide better passage conditions through the pools, said Boyce. Norris noted that, contrary to the language in the SOR, what's in the STP run is not a plan – it is one possible operation.

With respect to the specific operations requested in the SOR, Henriksen said Ice Harbor is already at MOP+1; we will plan to draft Lower Granite to MOP+1 by midnight on the evening of April 11. Nic Lane asked whether it would be possible to draft the pools over a 24-hour period, and asked the salmon managers to specify a time by which each pool would be at MOP or MOP+1, because according to Bonneville schedulers, seven hours is too short a period to

achieve the target elevation. It was agreed that Little Goose will be at MOP+1 by midnight April 12; Lower Monumental will be at MOP by midnight on April 13.

As for the John Day operation, we can try to lower the operating range over a three-day period if that would be desirable, said Henriksen. I think you can do it all in one night, Boyce replied. If we begin on the evening of April 15, is 24 hours OK? Henriksen asked. Yes, Wills replied. In that case, John Day will be at its summer operating range by 5 pm on April 16, said Henriksen. To clarify, there is no flow objective at Bonneville, or a specified objective at Grand Coulee? Henriksen asked. The flow objective at Bonneville is 220 Kcfs, Boyce replied – the objectives don't change due to water supply. I think what Cindy was saying is that there is no hard flow constraint at Bonneville associated with this SOR, Silverberg observed.

6. SOR 2005-4 – Ice Harbor and Lower Columbia Spill.

On April 5, the action agencies received SOR 2005-3. 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:

- Ice Harbor Dam: begin spill immediately to the amount specified in the Biological Opinion with the bulk spill pattern
- McNary Dam: begin spill on April 10 to the amount specified in the Biological Opinion
- John Day Dam: begin spill on April 10 to the amount specified in the Biological Opinion
- The Dalles Dam: Begin spill on April 11 to the amount specified in the Biological Opinion.

Wills provided an overview of the SOR and its justification. The full text is available via hot-link from today's agenda on the TMT homepage.

Our goal is to make a final decision on April 14, in anticipation of starting spill at Bonneville on April 15 at some level, said Wills – we want to look at the data on the 14th to see what gas levels are before we add spill from Bonneville.

I talked to scheduling; they will start spill tomorrow at Ice Harbor, said Wellschlager. That's reasonable, said Wills. We will spill up to the gas cap from 6 a.m.-6 p.m., and 45 Kcfs during nighttime hours, with the adjustments for the RSW test, Wellschlager said. Whatever works best for the RSW research team is fine with the salmon managers, said Wills – we want to be sure the money we're putting into the test is worthwhile.

At McNary, John Day and The Dalles, we also plan to start spill at 6 pm on the requested days, said Wellschlager. And what is the plan at John Day? Boyce asked. 60% at night at night until June 20, starting on the 10th, Wellschlager replied. At The Dalles, we have a contractor coming out to dog off Bays 3-6 at a 6-foot opening on April 10, said Henriksen; we will have some flexibility in the operation of Bays 1 and 2. We are investigating whether we can move that back to April 11, she added. I will have more information on Friday as to how Bays 1 and 2 will be used to provide 40% spill. In response to a question, she said Bays 3-6, at a six-foot opening, will provide 42 Kcfs of spill. And you will then use gates 1-2 to try to meet the 40% spill target? Boyce asked. Correct, Henriksen replied, but there are some limitations as to how those gates can be operated – there are no increments down to an opening of 2.5 feet, but we can then operate to half-foot increments after that.

When will you have a decision as to the 10th or the 11th? Boyce asked. By Friday, Henriksen replied – I will inform the salmon managers via email.

Wellschlager said he wanted to thank the Corps for their timely installation of the fish screens at McNary; as some of you may know, there was a serious injury to one of the crew installing those screens last week, when a 300-pound beam fell on his head and ankle. I would add our thanks and condolences, said Wills.

In response to a request, Henriksen said the Corps will be adding an appendix to the Fish Passage Plan showing anticipated spill patterns and quantities at The Dalles as soon as possible. Wellschlager added that the action agencies have no problem waiting until April 14 to hear from the salmon managers regarding the Bonneville spill operation. It's looking as though we will have a recommendation to begin at least some spill at Bonneville on April 15, so from a scheduling standpoint, Bonneville should plan on that, said Boyce. If that changes, please give us a heads-up, as soon as possible, said Wellschlager.

Henriksen noted that there is an ongoing safety issue at The Dalles for towboat passage; at times, it may be necessary to reduce spill for a few minutes to allow barge/towboat passage. Understood, said Wills.

7. Other.

A. Lower Granite/Dworshak Update. I sent an email regarding the increased flow at Dworshak, up to the current full powerhouse capacity of 4.4 Kcfs, to move the fish out from the hatchery downstream, Henriksen said. Working with our counterparts at Walla Walla District, we found that there is a 54% snow-covered area near Dworshak; elevation 1587.5 is the

new April 15 local flood control elevation, in case we get a rain event on top of the snowpack. That is recommended flood control space, based on a design flood and the original spillway design at Dworshak, said Julie Ammann. Dworshak is filling 0.8 feet per day; we're at 1582 feet, currently, Henriksen said, adding that the Corps expects to maintain 4.4 Kcfs outflow through April 15. There is a table of snow-covered area which translates into a required local flood control protection area, and there is a Dworshak-specific flood control page on the web.

Boyce observed that the sudden change in the snow-covered area estimate at Dworshak seems somewhat miraculous to him; in such a low-water year, it seems imprudent to increase Dworshak outflow at this time. Henriksen replied that current Dworshak inflows are in the 9 Kcfs range, so the project is continuing to fill.

You're making this decision based on a satellite photo showing the surface area covered by snow, but that photography doesn't take into account whether the snow is 4 inches deep or four feet deep, Russ Kiefer observed. The snow-covered area was reduced, based on analysis, by the amount that was designated as "dusted" with snow, Ammann replied. Wellschlager noted that nothing causes worse flooding problems than warm rain on top of low-elevation snow. My concern is when you refill Dworshak, said Boyce; if we're trying to maintain Lower Snake flows in the spring, it seems as though you should be storing water in Dworshak now. We have a constraint of 1587.5 feet by April 15, Henriksen replied; we have no choice but to meet that, and will continue to monitor conditions very closely. My concern is that you are releasing water early in the season, when there are few fish migrating, said Kiefer; my recommendation would be that the Corps reduce Dworshak outflow to project minimum right now, while they review the SnoTel information as to how much snow-water equivalent is actually up there on the ground. I don't think there's a whole lot of snow up there, frankly, he said, and find it hard to believe that there is a serious flooding threat in the Clearwater basin this year.

What I'm hearing the Corps saying is that they would normally be passing inflow in 8-9 Kcfs, said Silverberg; instead, they are passing 4.4 Kcfs, I'm concerned about the level of distrust I'm hearing from the salmon managers, that the Corps is hiding the ball on this. The tone is disappointing to me. This is not an optional operation, Wellschlager observed. We have only two units available at Dworshak, currently, we could be spilling, but have chosen a more conservative operation, Henriksen said.

We have talked about early-season storage releases extensively in the past, said Boyce; in 2005, we're facing a near-historical drought condition,

and it is somewhat hard to believe that we are facing a flood situation in the Clearwater basin. I don't know what to do about that, said Silverberg; the Corps is the agency responsible, and I believe they are looking at information that may be different from what you see. Kyle Martin suggested that the Corps wait until the RFC forecast is available before making this decision.

Henriksen reiterated that Dworshak is, in fact, filling – what we're trying to do is to slow that fill so that we meet the April 15 target of 1587.5 feet. That would be the highest Dworshak has been on April 15 in the last four years, by a lot, so I think the action agencies have taken a conservative approach, observed Tom Haymaker. It is good that this is happening during the fish passage season, added Wagner; the steelhead count was 11,000 at Lower Granite yesterday. Silverberg encouraged the salmon managers to further investigate whatever information they consider relevant, and come to Wednesday's TMT meeting prepared to discuss it.

Kiefer reiterated that surface area covered by snow is much more variable than snow-water equivalent. I believe we should be basing our operational decisions on snow-water equivalent, rather than snow-covered area, he said. We may have covered some ground with the recent snow events, but that isn't as accurate as the SnoTel information. Silverberg reiterated that the satellite-observed snow-covered area had been downgraded from a higher percentage to the current 54%, discounting the lightly-dusted areas in the photograph.

Moving on to Lower Granite operations, Henriksen reminded the group that, last year, there were occasions when spill through the RSW occurred at Lower Granite when the raceways became too full of fish, and no barge was available. This is just a reminder that a similar situation could occur this year, and is referenced in the Fish Passage Plan; if it does, we will give the salmon managers as much notice as possible, she said.

7. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, April 13. Meeting summary prepared by Jeff Kuechle.

Wagner
Henriksen
Wills
Wellschlager
Norris
Harkless

Heizenrater
Beck
Adams
George
Hamilton
Hlebechuk
Boyce
Martin
Benner
Nordt
Lane
Kurt Miller, PGE
Haymaker
MacKay
Traeger
R. Beck
Le
Buchko
Kiefer

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday April 13, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cmm.net or call her at (503) 248-4703.*

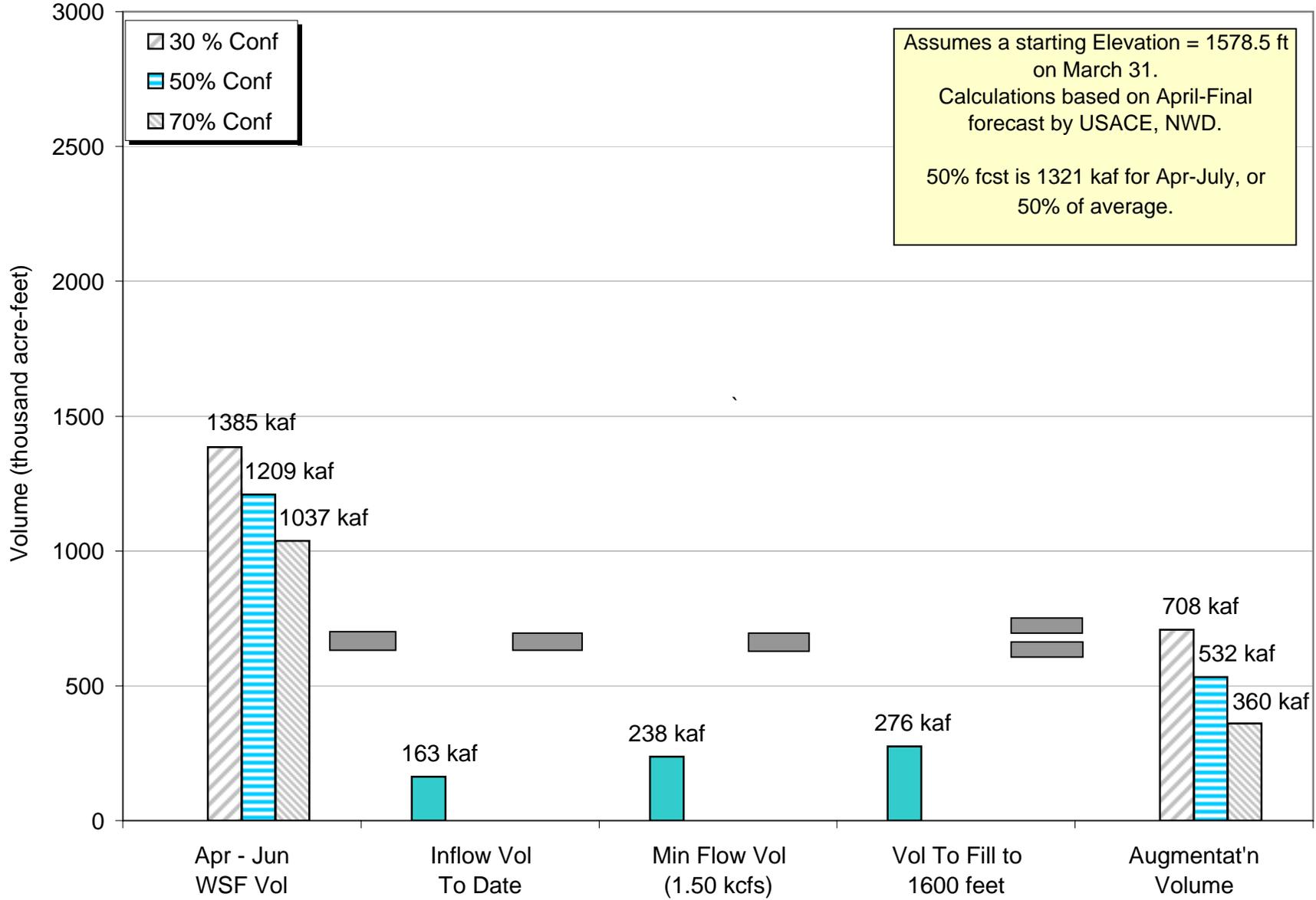
AGENDA

1. Welcome and introductions.
2. April Final Water Supply Forecast
3. Flow Augmentation Volumes at Headwater Reservoirs
 - [Dworshak](#)
 - [Libby](#)
 - [Hungry Horse](#)
4. [QADJUST summary](#) based on April final forecast
[HYSRR/ESP summary](#) based on April final forecast
5. Operations during low flow years
 - a. Chum Update
 - b. Start of Bonneville Spill - [\[SOR #2005-5\]](#) 
 - c. Shape of flow at Priest Rapids through April, May, June
6. CRITFC 2005 River Operation Plan
7. WMP Spring / Summer Update. Corps
8. Status of Operation
 - a. Reservoirs
 - Feedback on Corps graphs
 - Dworshak flood control
 - b. Fish
 - c. Power System
 - d. Water Quality
9. Other
10. Set agenda for next meeting. [\[Reference Calendar\]](#) 

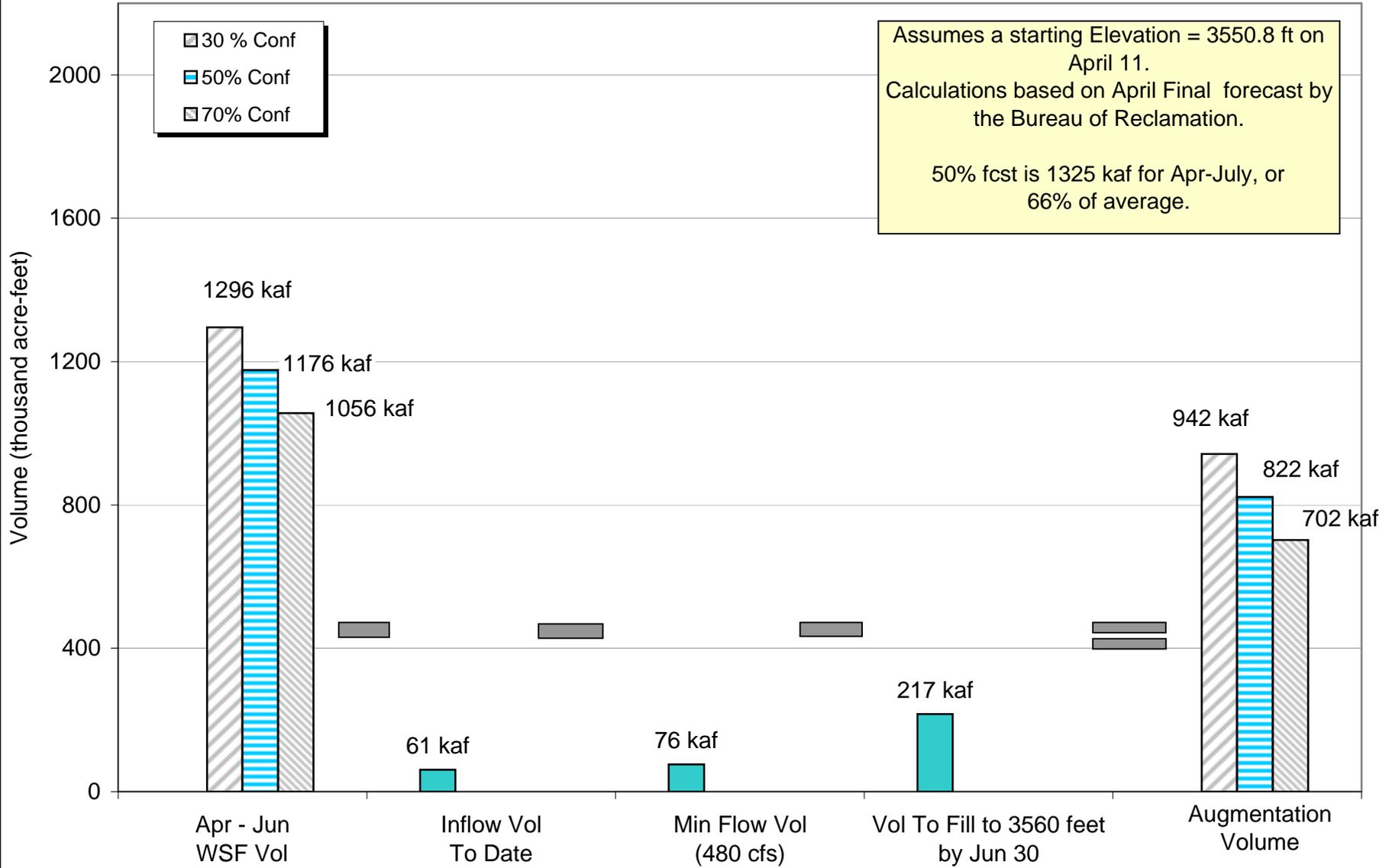
Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Cathy Hlebechuk at (503) 808-3942

Volumes at Dworshak
1 April Through 30 June

Assumes a starting Elevation = 1578.5 ft on March 31.
Calculations based on April-Final forecast by USACE, NWD.
50% fcst is 1321 kaf for Apr-July, or 50% of average.



Volumes at Hungry Horse 1 April Through 30 June



Assumptions:

- * Streamflows were from the 05 Apr ESP run, which uses current basin conditions combined with 44 historical weather patterns (temperatures and precipitation) to produce 44 ESP hydrographs for 2005.
- * Starting elevations are forecasted April 15, 2005 elevations from Apr 11 short-term model runs.
- * Grand Coulee maintains a maximum pool of 1255 ft through April for drum gate maintenance. Coulee tries to meet 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to at 1285 ft in all years. Summer lake targets are 1284.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates April - May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets local flood control requirements due to snow covered area (elevation 1587.5 ft on Apr 15 and 1591.6 on Apr 30). The project targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Apr - May, targets full in June with a minimum flow of 17,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	34	109	110
May	32	127	130
Jun	43	130	90

* Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	1	56	85
May	10	78	85
Jun	5	57	73
Jul	0	32	50
Aug 15	0	28	50
Aug 31	0	27	50

Bonneville Meets Flow Objectives of 125 kcfs in Apr:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)
Apr 30	44	178

McNary Meets the Following Flow Objectives:

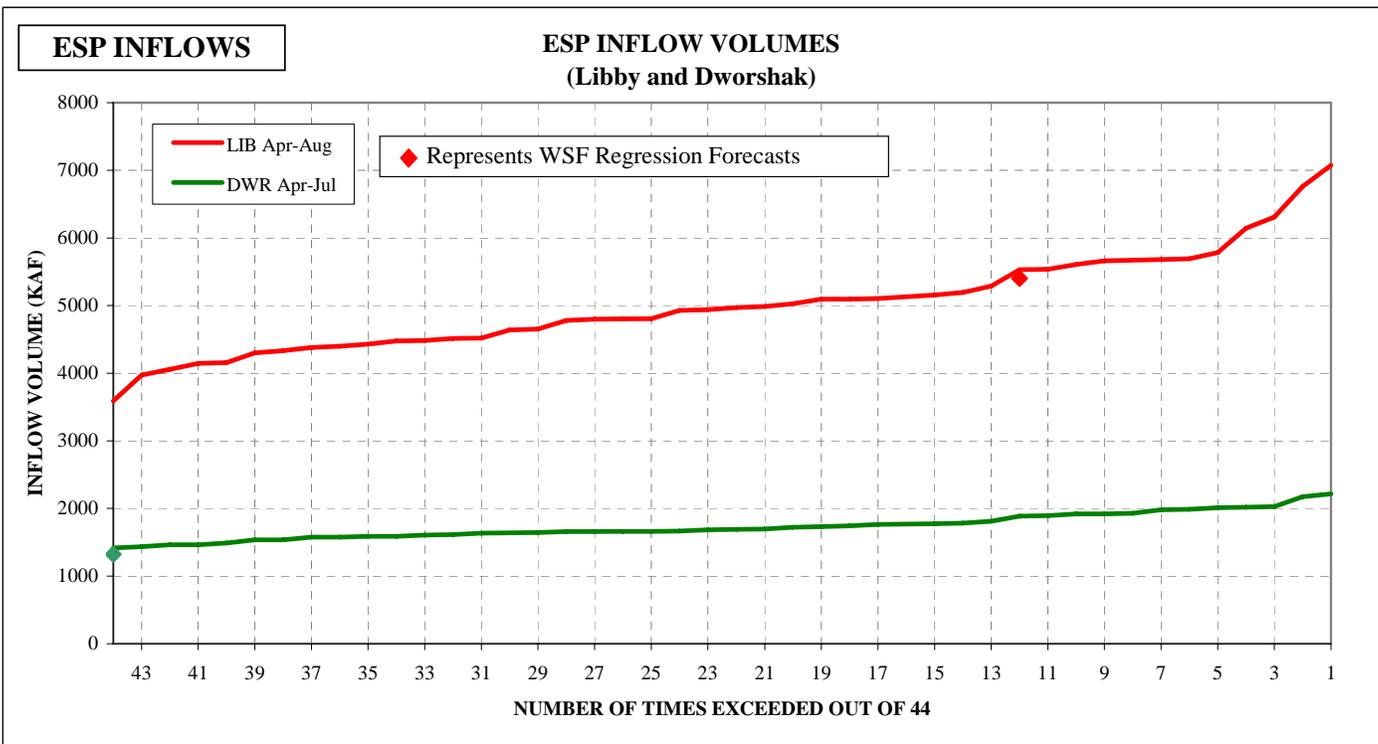
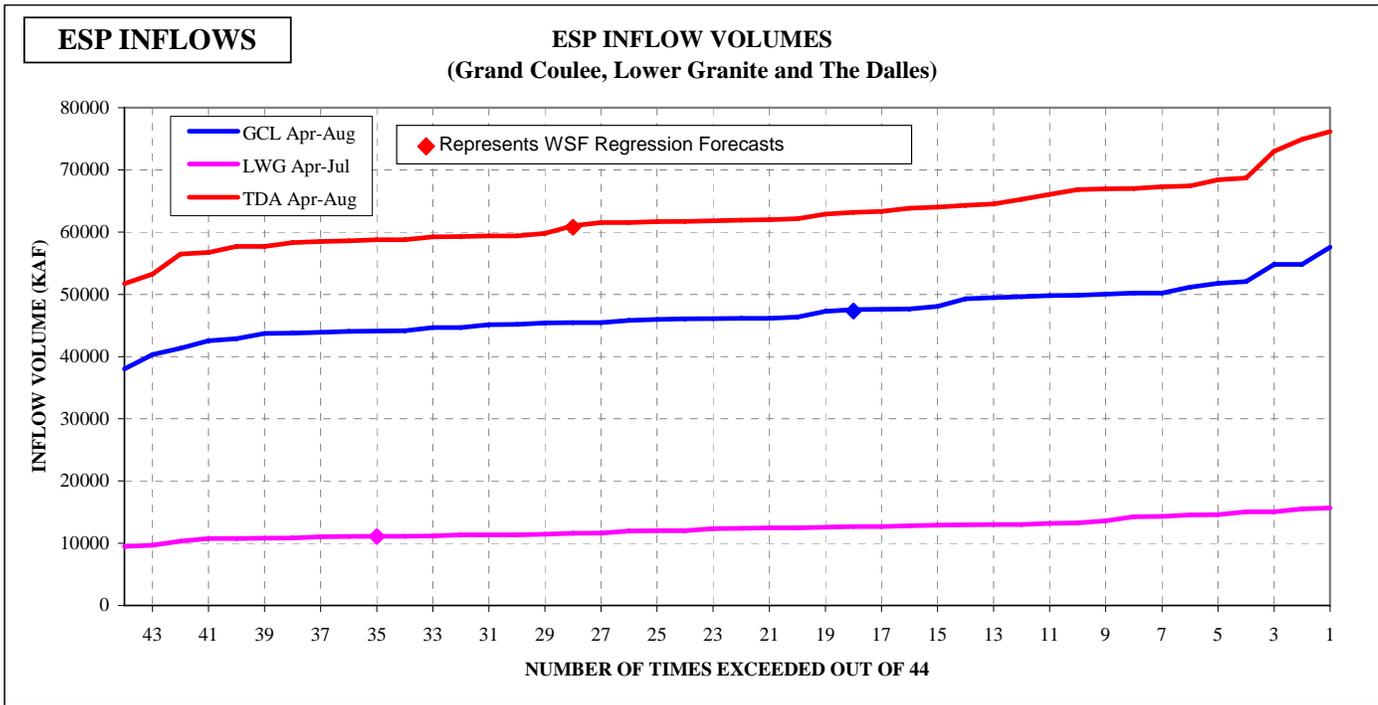
Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	168	220
May	7	205	220
Jun	10	190	220
Jul	3	170	200
Aug 15	0	144	200
Aug 31	0	139	200

Projects Refill by 30 June:

Month	Occurrences out of 44 Years	Average Elevation on 30 Jun for 44 Years
Libby	26	2456
Hungry Horse	44	3560
Grand Coulee	0	1285
Dworshak	44	1600

Period Average Flows (kcfs):

	FEB 1-28	MAR 1-31	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	5.0	20.8	18.3	18.6	16.6
HGH	1.0	0.9	2.1	6.0	5.4	5.1	5.5	5.6	4.4
GCL	101	91	77	100	110	118	129	110	107
PRD	111	100	87	109	127	130	134	113	110
DWR	1.6	1.6	3.6	8.7	9.9	3.8	10.1	10.1	9.2
BRN	10	11	14	14	15	12	10	12	13
LWG	21	22	39	56	78	57	32	28	27
MCN	134	123	130	168	205	190	170	144	139
TDA	140	125	134	175	200	184	167	143	139
BON	138	130	141	178	202	187	169	144	140



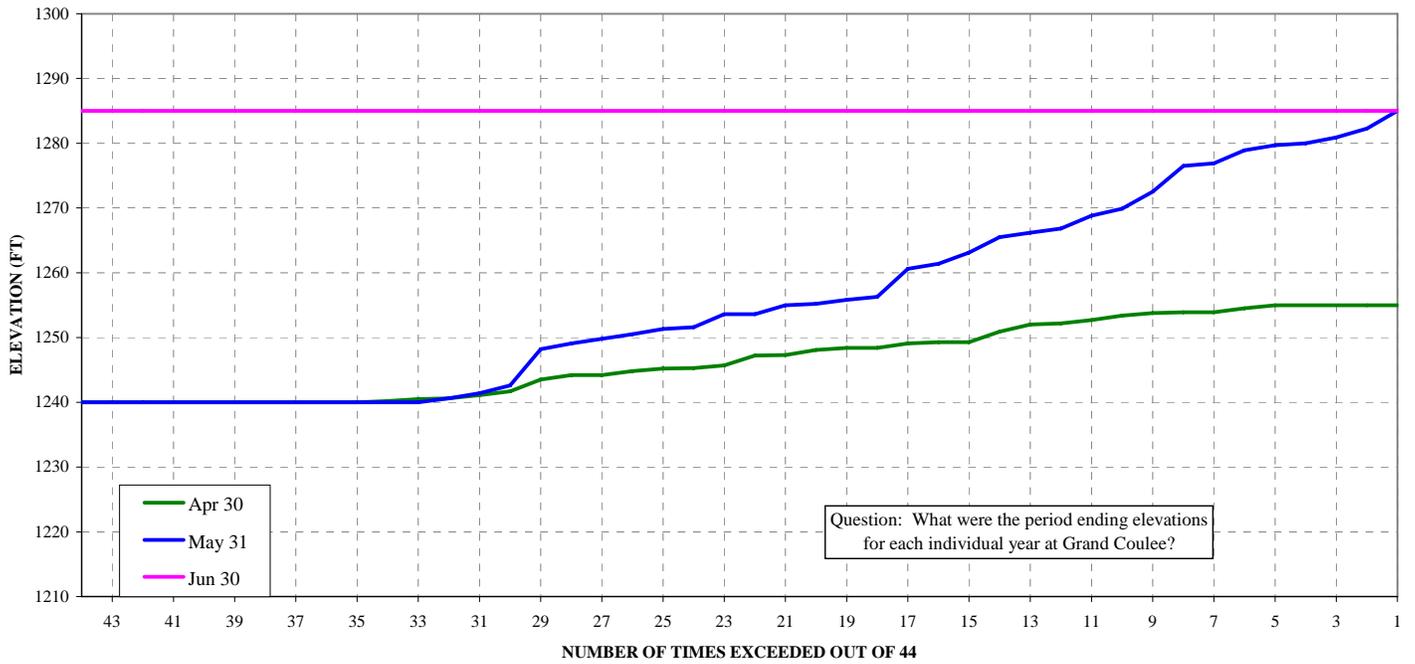
Volume Comparison Table (ESP versus Regression):

Forecast Period	Official WSF (Regression)			ESP Volumes				
	Volume (kaf)	Percent of Average	30 year Average (kaf)	10% Exceedance Probability	30% Exceedance Probability	50% Exceedance Probability	70% Exceedance Probability	90% Exceedance Probability
Grand Coulee	47300	78%	60290	51600	49300	46100	45100	43100
Lower Granite	11100	52%	21550	14600	13000	12400	11400	10800
The Dalles	60800	65%	93090	68100	64300	61900	59400	57700
Libby *	5401	86%	6248	5760	5210	4950	4520	4200
Dworshak *	1321	50%	2645	2000	1780	1690	1630	1500

* Corps Official Forecast

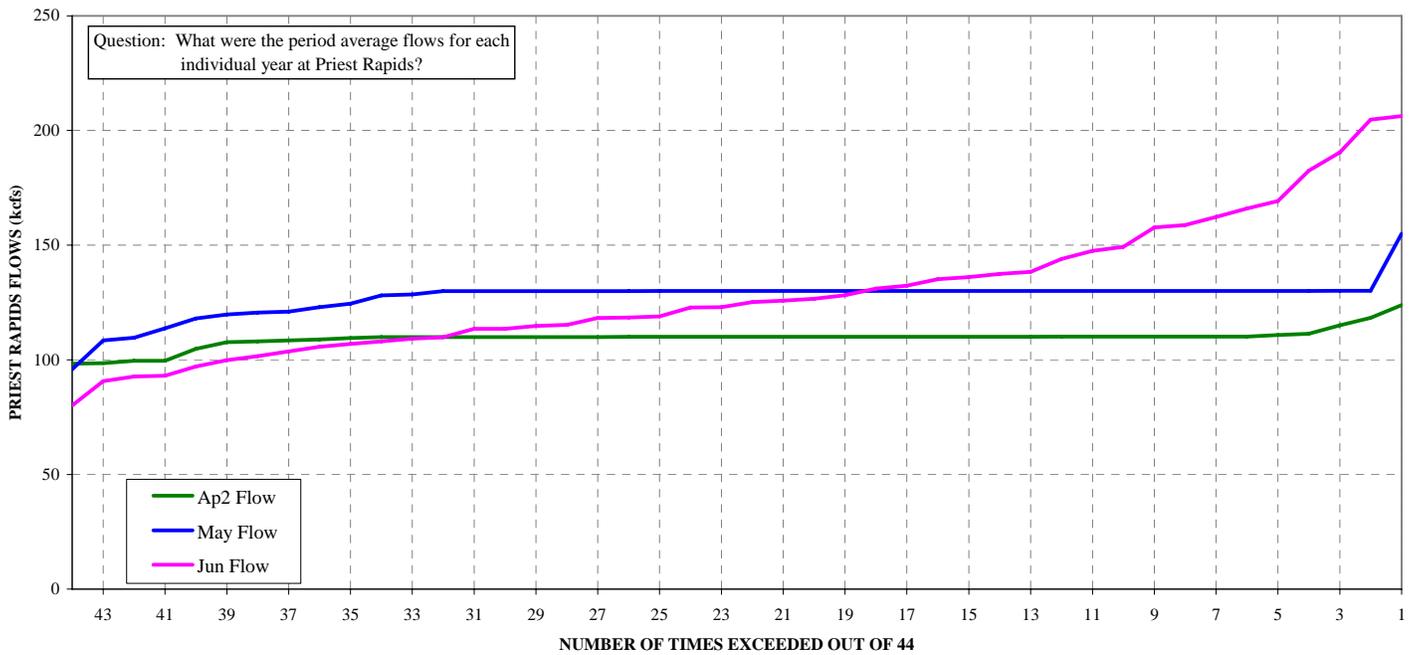
ESP INFLOWS

**GRAND COULEE ESP
LAKE ROOSEVELT ELEVATIONS**



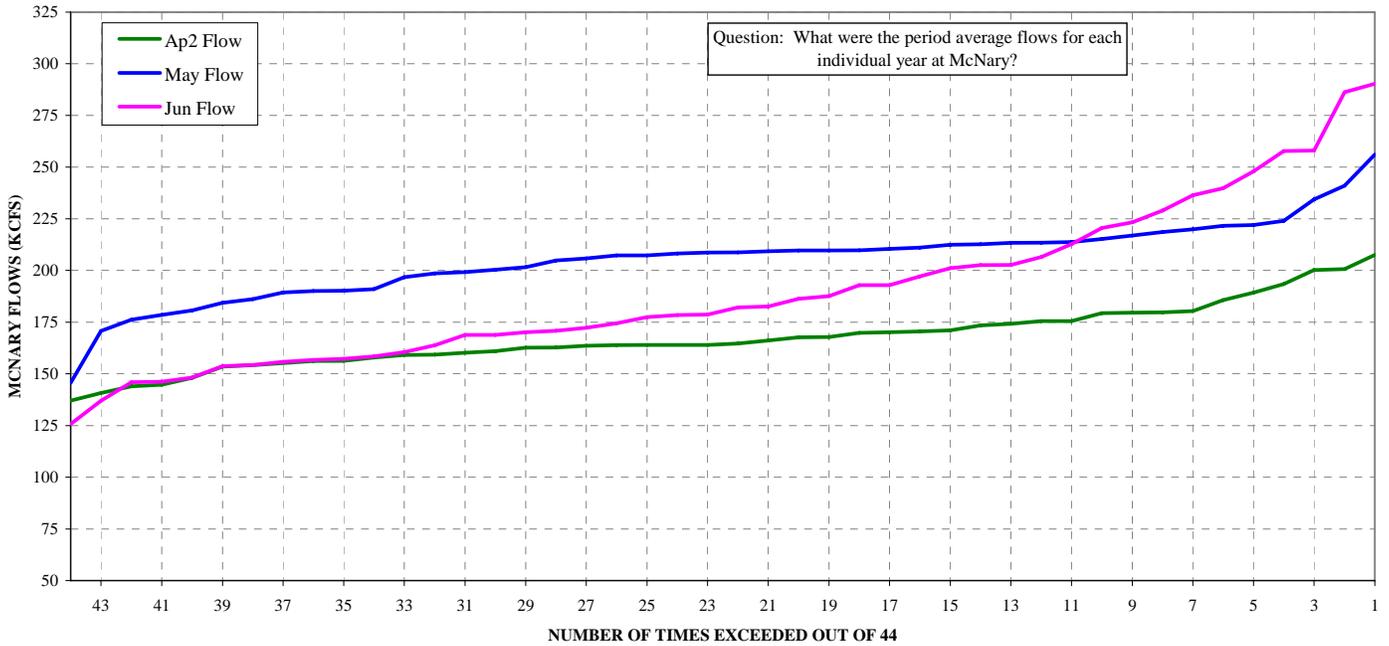
ESP INFLOWS

**PRIEST RAPIDS ESP
APRIL - JUNE FLOWS**



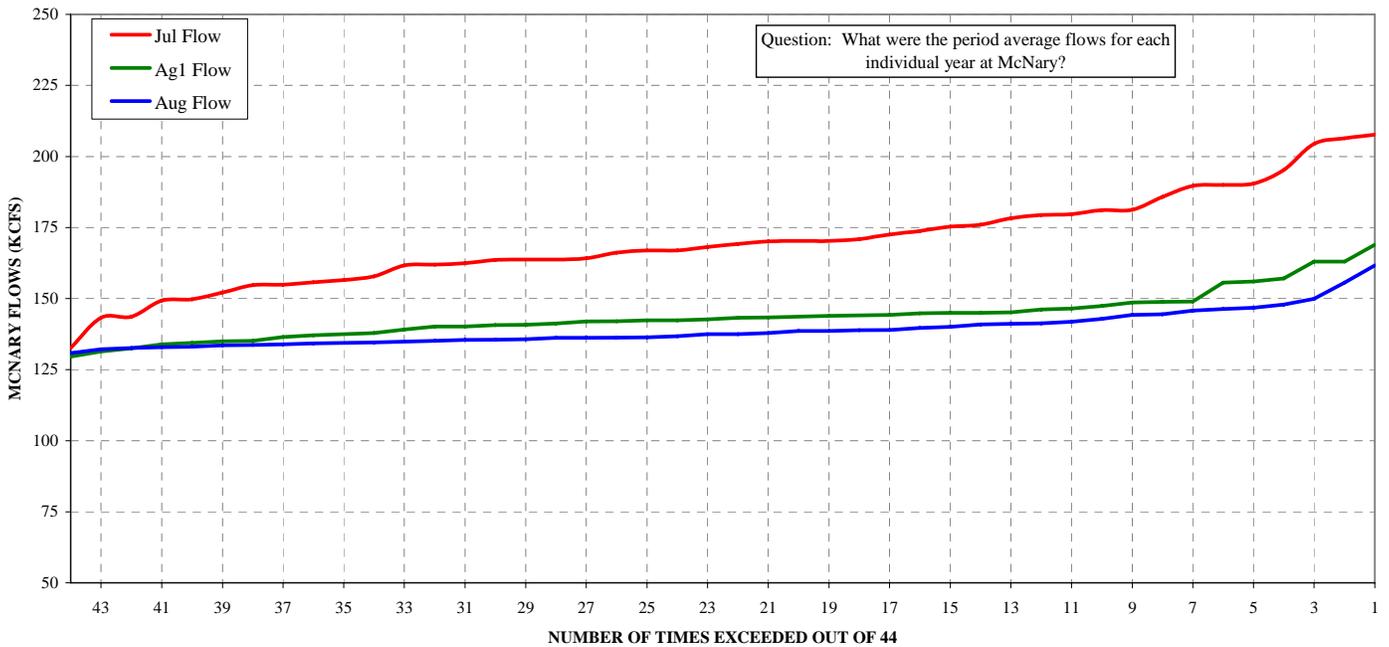
ESP INFLOWS

MCNARY ESP OUTFLOW APRIL - JUNE AVERAGES



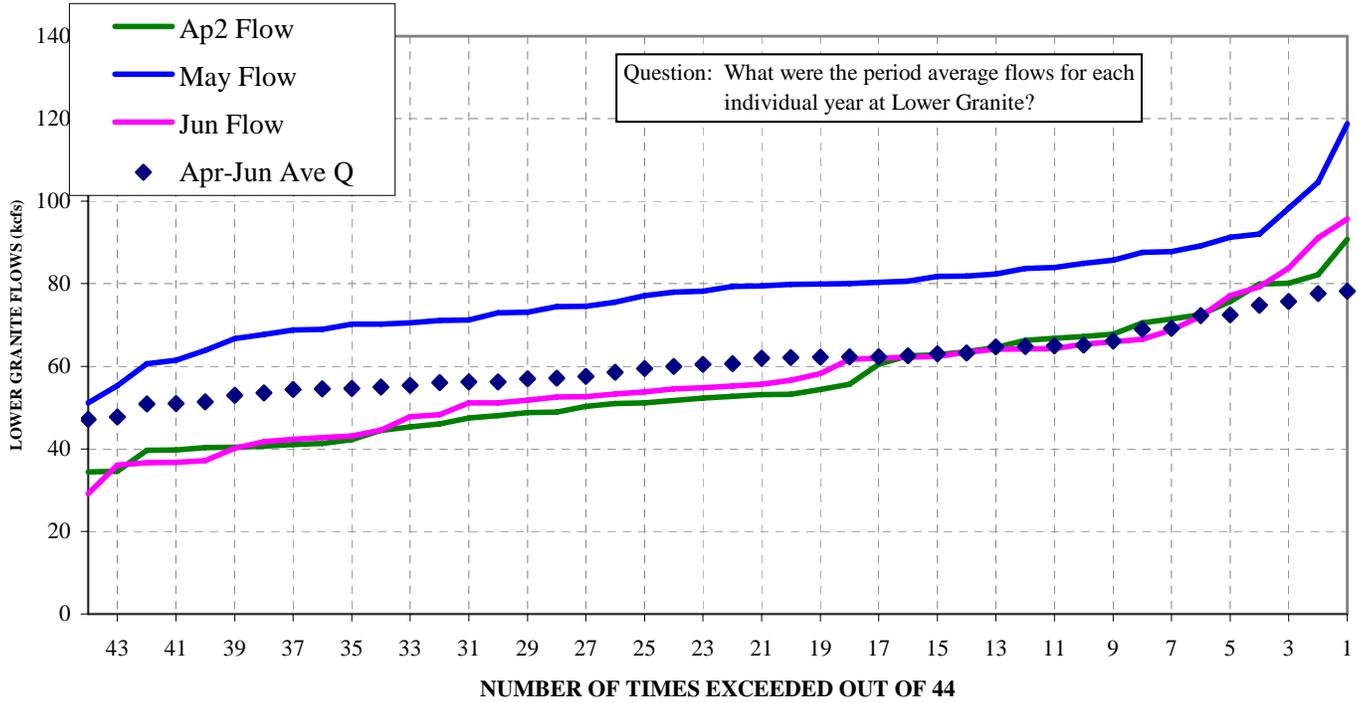
ESP INFLOWS

MCNARY ESP OUTFLOW JUL-AUG AVERAGES



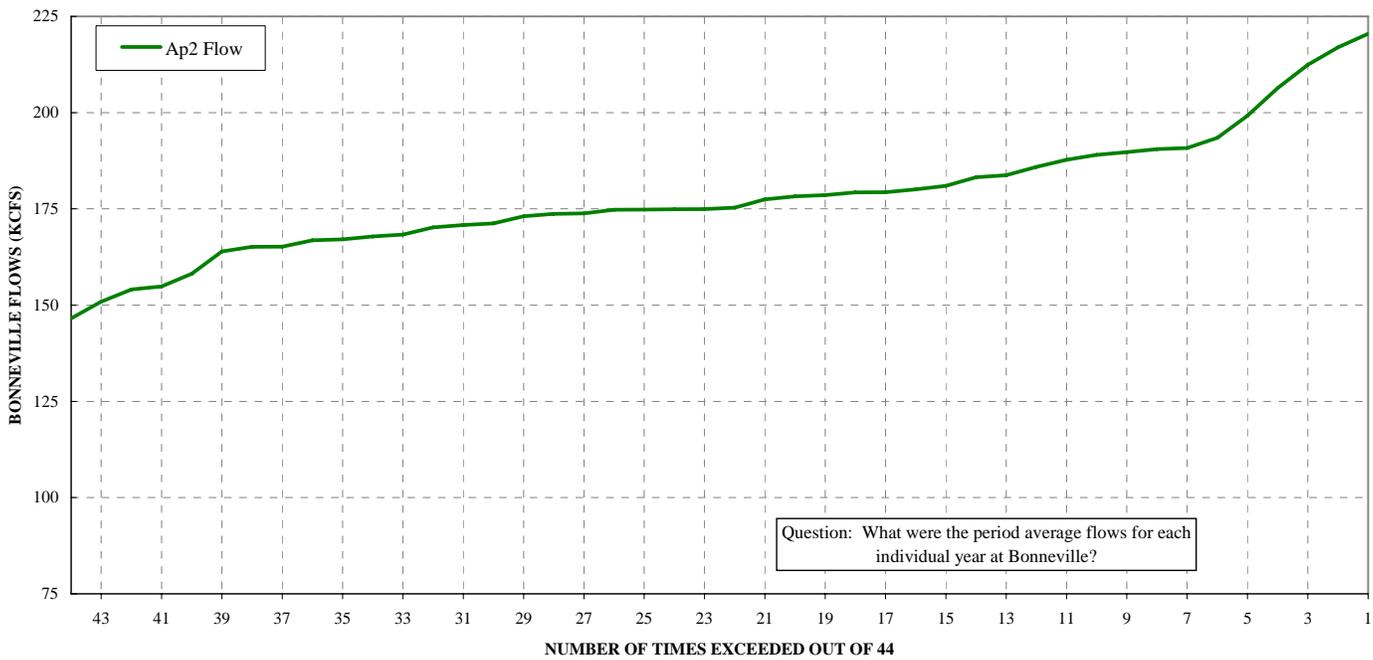
ESP INFLOWS

**LOWER GRANITE ESP
APRIL - JUNE FLOWS**



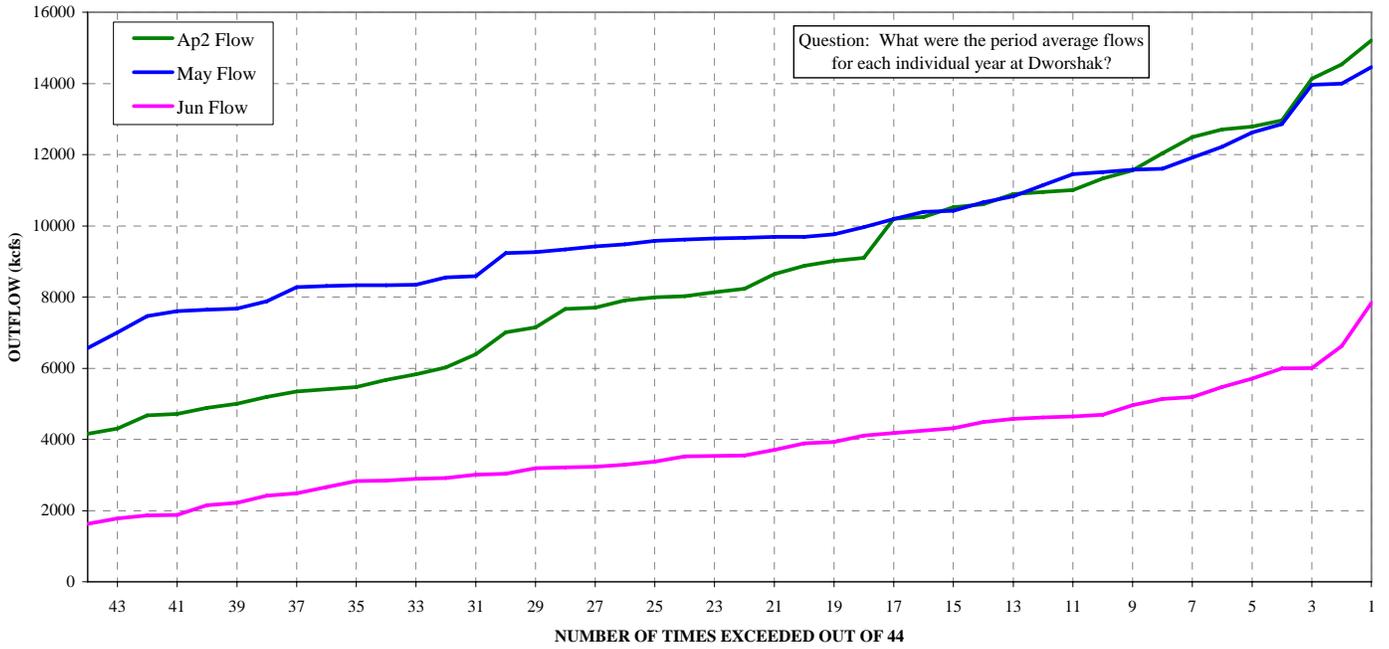
ESP INFLOWS

**BONNEVILLE ESP OUTFLOW
April Flows**

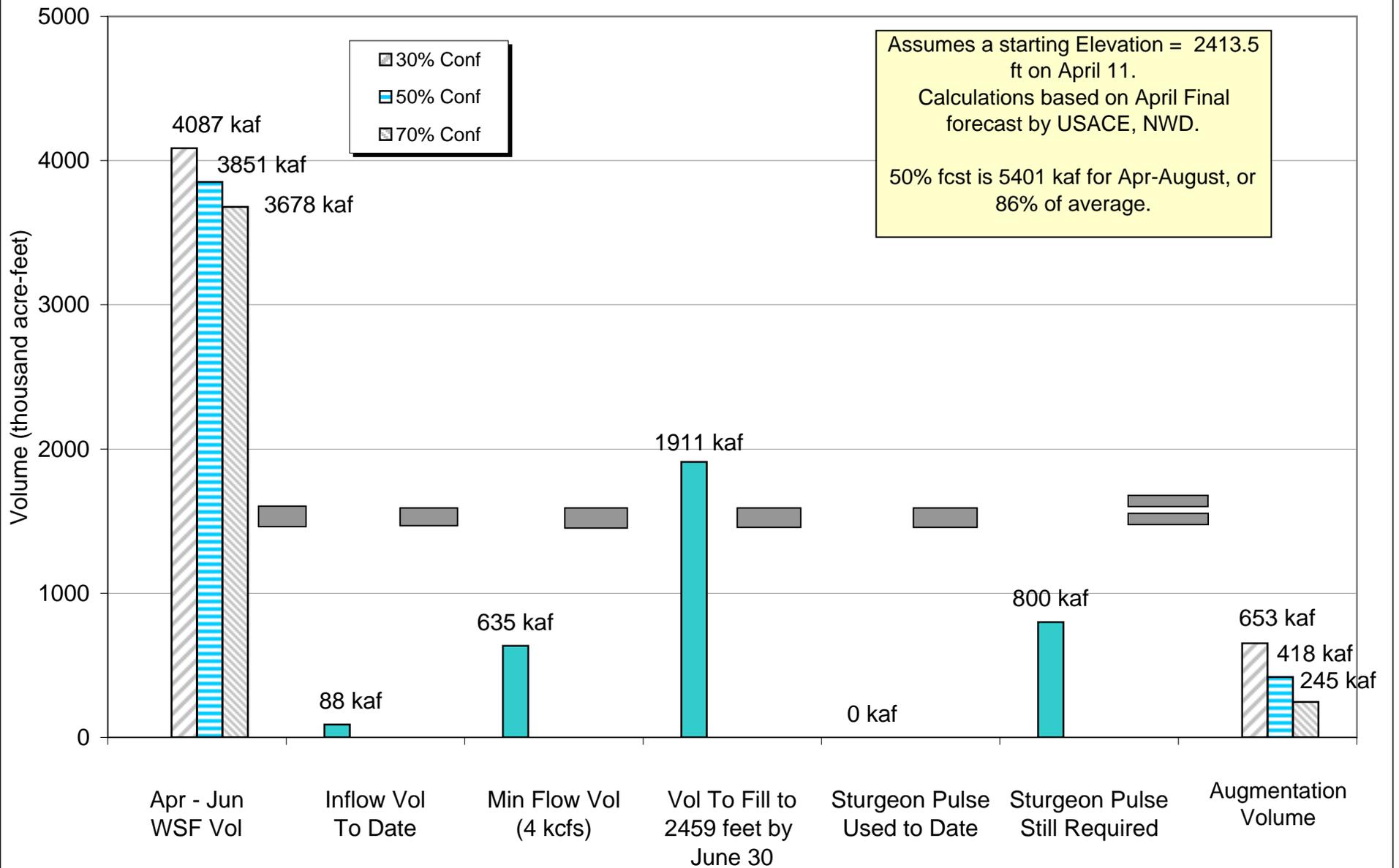


ESP INFLOWS

DWORSHAK ESP OUTFLOWS



Volumes at Libby
1 April Through 30 June



Assumptions:

- * Streamflows were adjusted to the April Final Water Supply Forecast for the period of April thru August of 60.8 MAF at The Dalles (65% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are actual March 31, 2005 elevations.
- * Grand Coulee maintains a maximum pool of 1255 ft through April for drum gate maintenance. Coulee tries to meet 70,000 cfs at Priest Rapids in Apr1, 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to at 1285 ft in all years. Summer lake targets are 1284.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates April - May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets the snow covered area local flood control requirement (elevation 1587.5 ft on Apr 15 and 1591.6 ft on Apr 30). The project targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Apr - May, targets full in June with a minimum flow of 17,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 15	68	74	65
Apr 30	39	102	110
May	26	118	130
Jun	67	113	90

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	1	44	85
May	0	61	85
Jun	6	55	73
Jul	0	31	50
Aug 15	0	25	50
Aug 31	0	22	50

Bonneville Meets Flow Objectives of 125 kcfs in Apr:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Apr 15	53	137
Apr 30	63	166

McNary Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	152	220
May	1	181	220
Jun	2	168	220
Jul	0	151	200
Aug 15	0	123	200
Aug 31	0	118	200

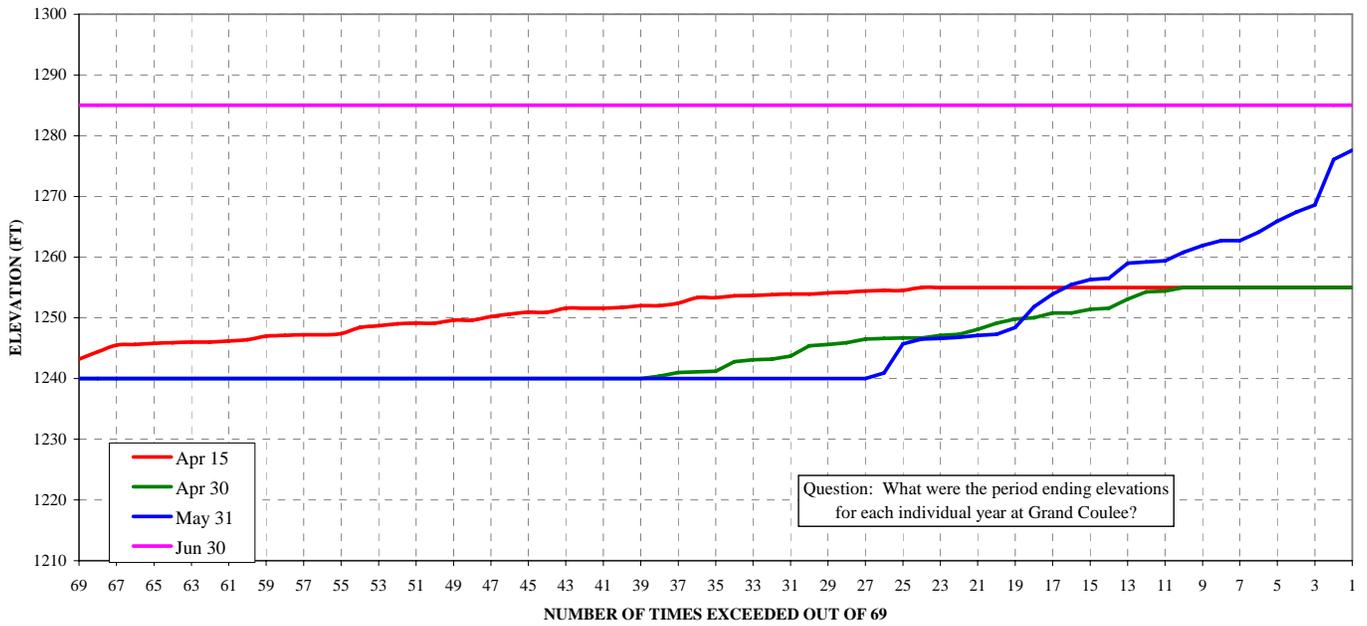
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	65	2459
Hungry Horse	69	3560
Grand Coulee	0	1285
Dworshak	69	1600

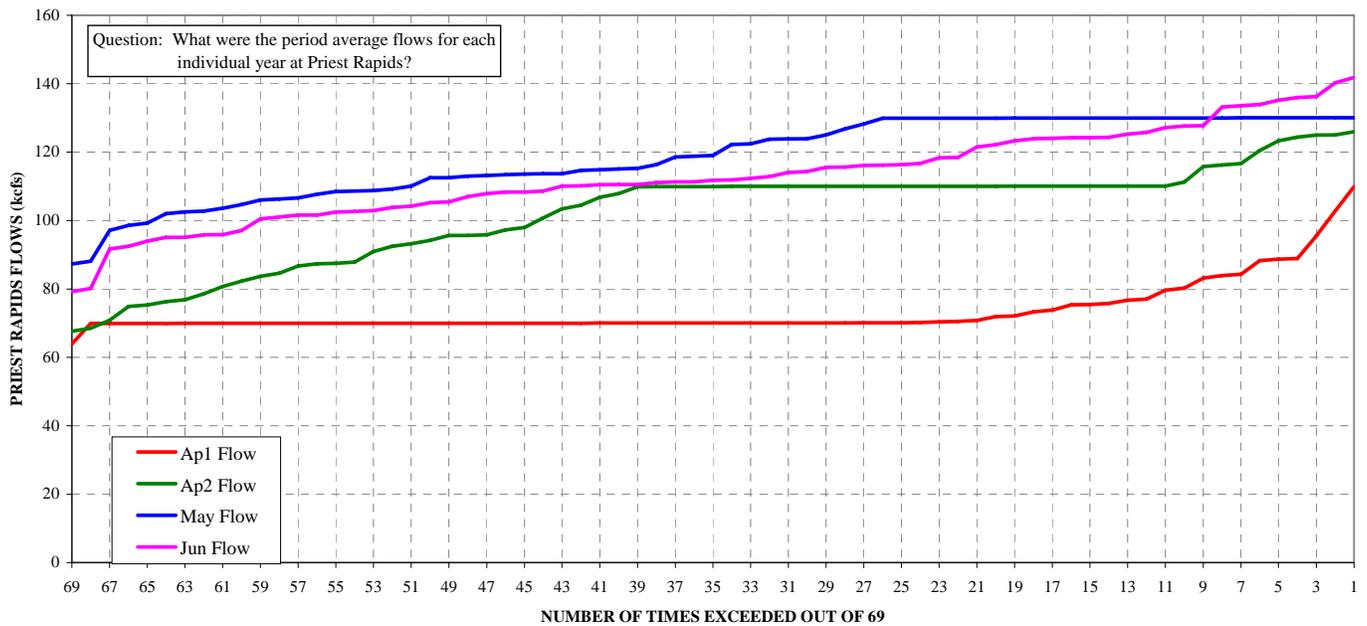
Period Average Outflows (kcfs):

	FEB 1-28	MAR 1-28	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	6.2	22.4	21.4	19.6	16.5
HGH	1.0	0.9	0.5	6.0	5.3	6.5	5.9	5.5	4.2
GCL	101	91	72	100	115	109	122	99	97
PRD	111	100	74	102	118	113	122	99	96
DWR	1.6	1.6	1.8	3.5	6.2	4.9	10	10	9
BRN	10	11	16	15	14	13	9	10	10
LWG	21	22	36	44	61	55	31	25	22
MCN	134	123	121	152	181	168	151	123	118
TDA	140	125	133	162	184	169	151	125	120
BON	138	130	137	166	186	170	153	126	121

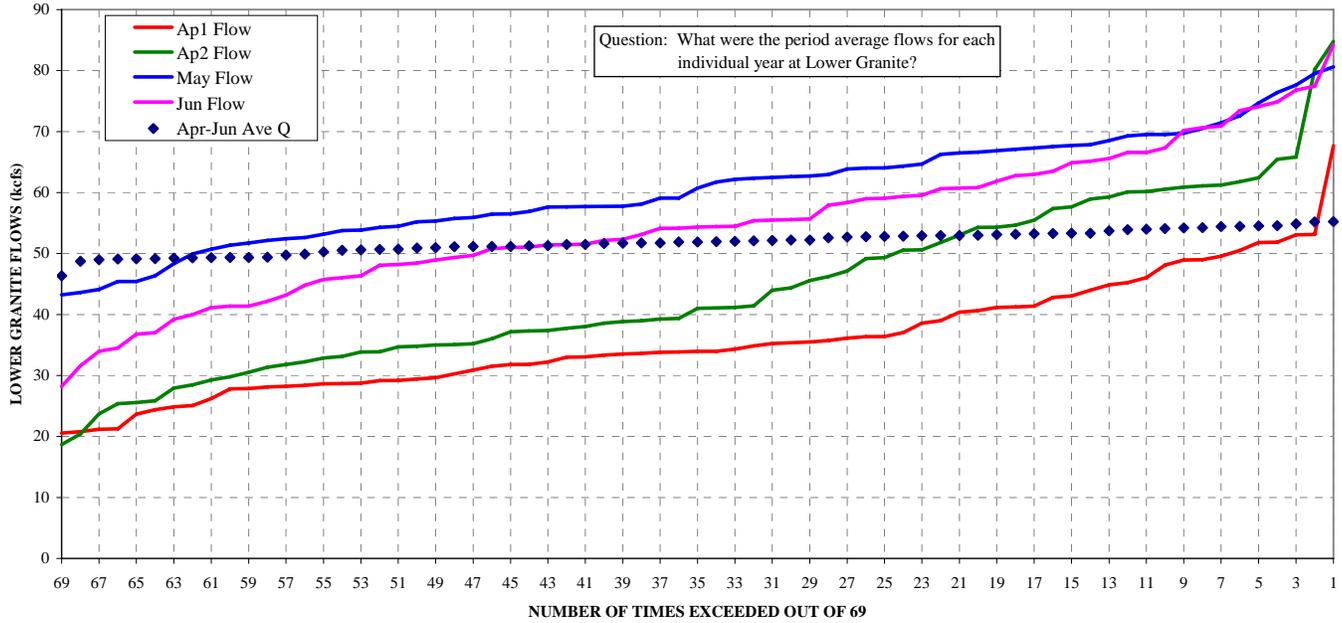
**GRAND COULEE
LAKE ROOSEVELT ELEVATIONS**



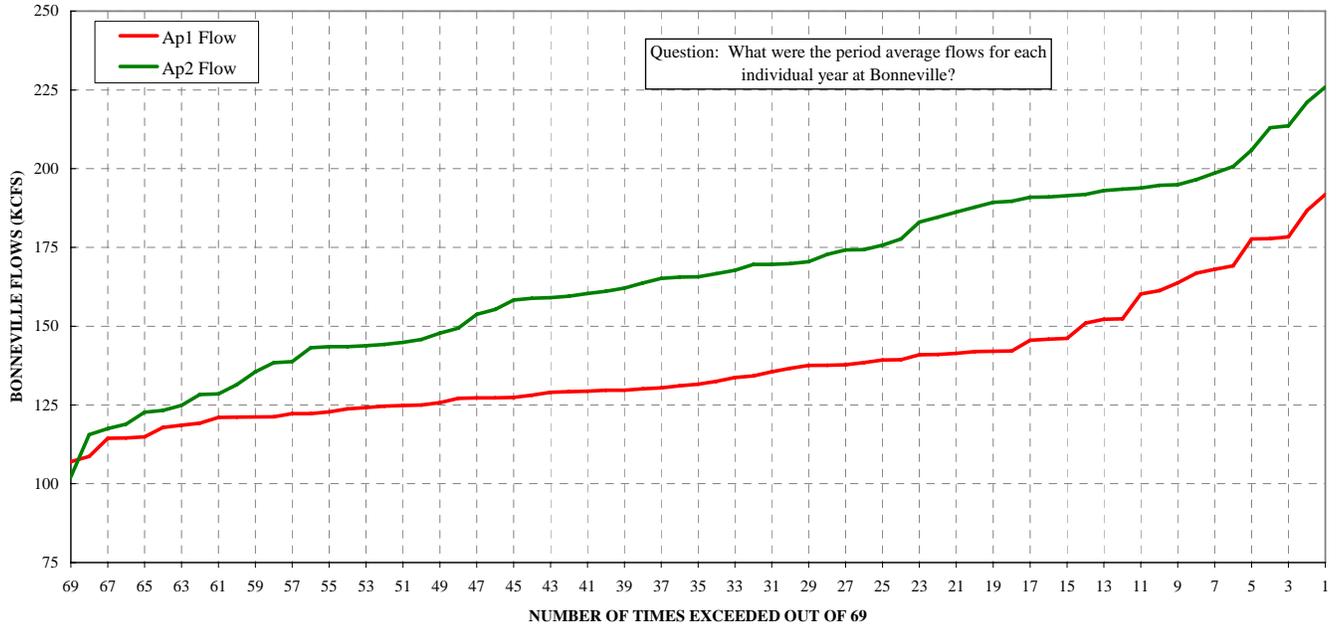
**PRIEST RAPIDS
APRIL - JUNE FLOWS**



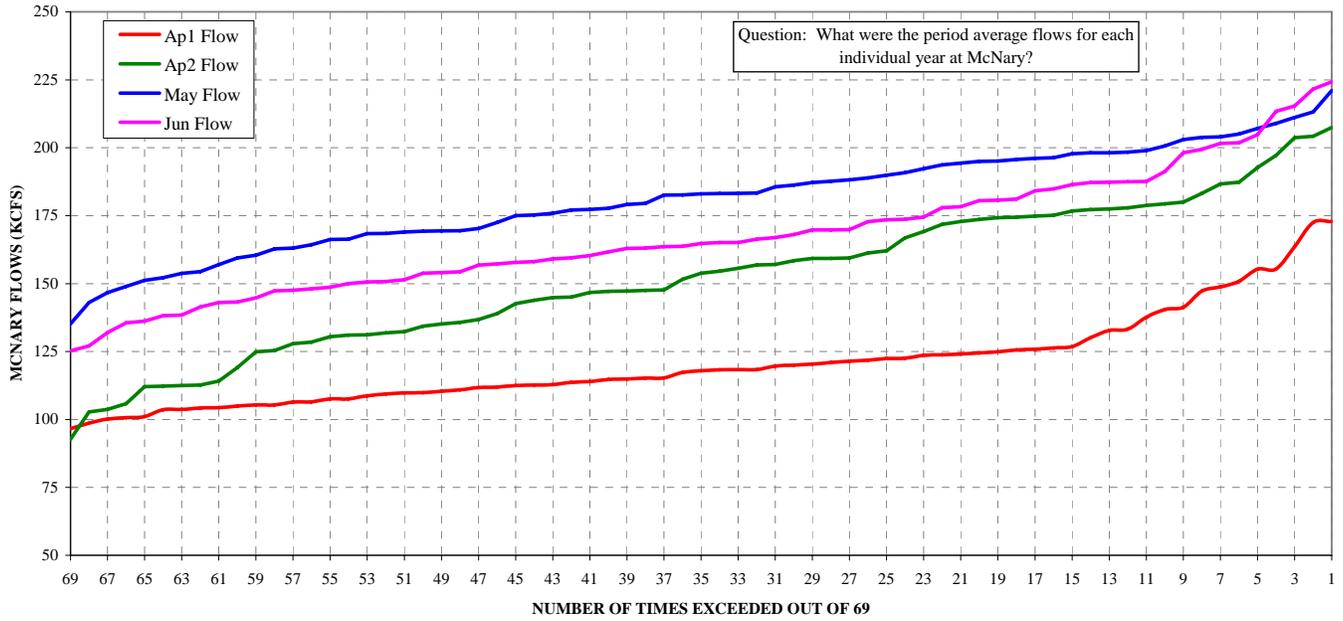
**LOWER GRANITE
APRIL - JUNE FLOWS**



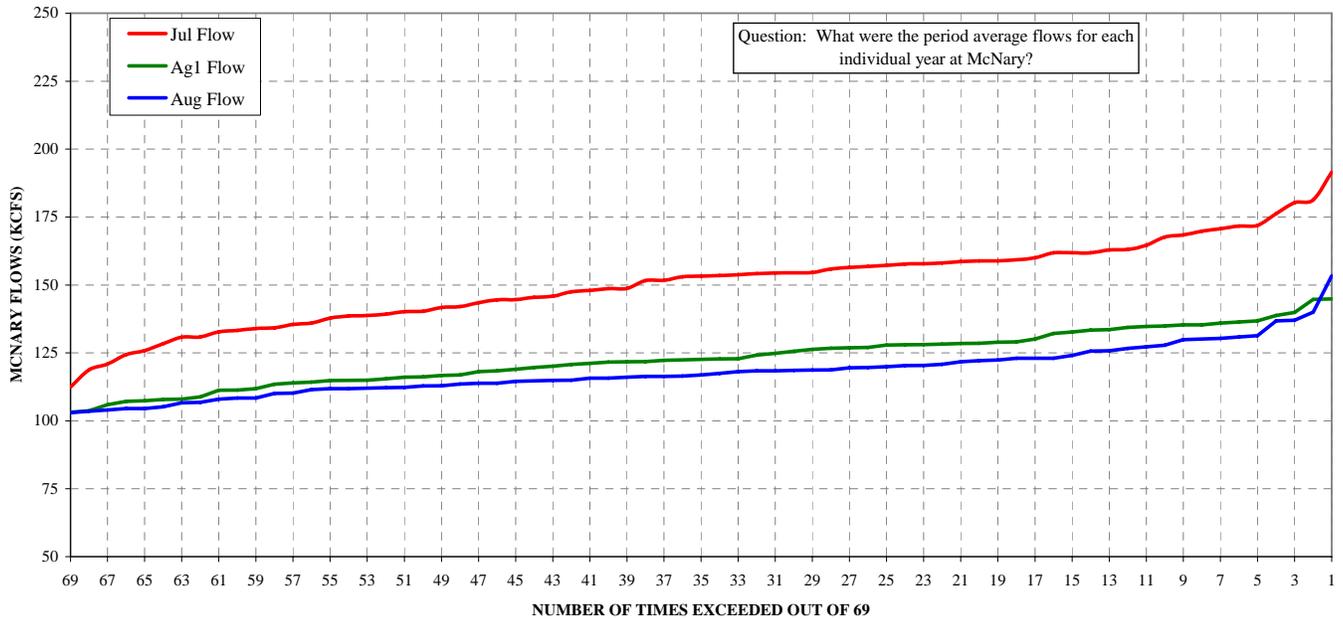
**BONNEVILLE OUTFLOW
April Flows**



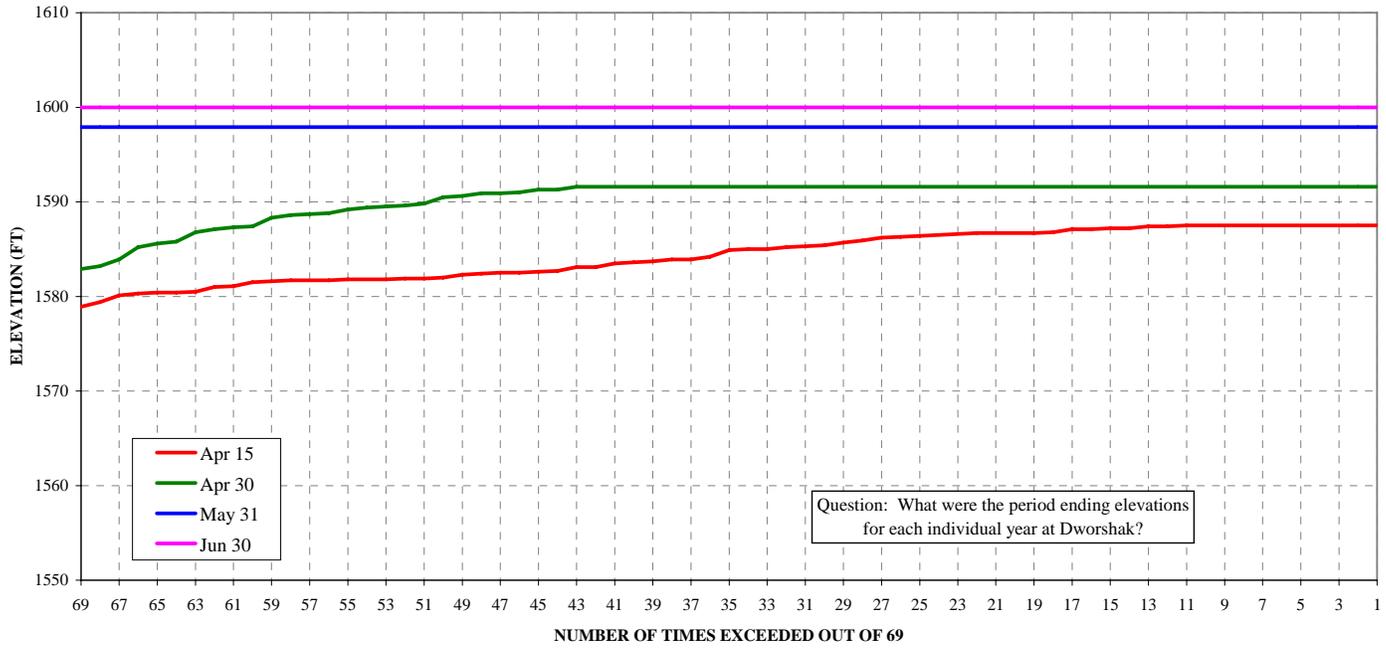
**MCNARY OUTFLOW
APRIL - JUNE AVERAGES**



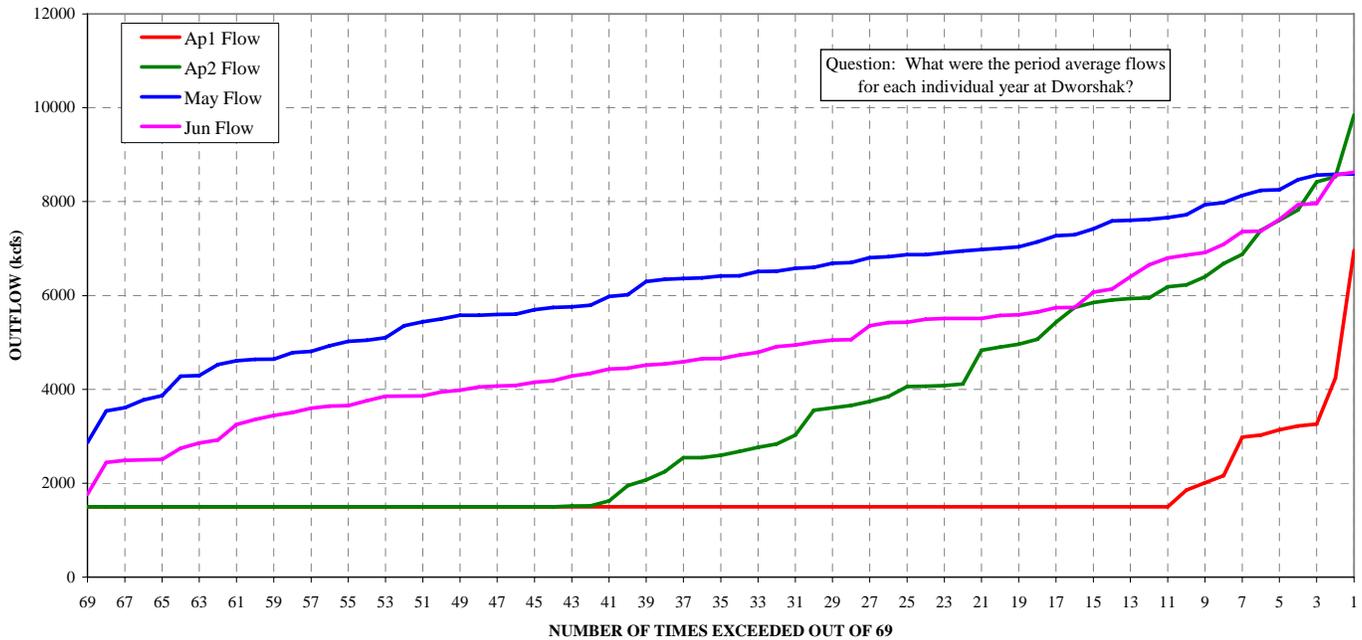
**MCNARY OUTFLOW
JUL-AUG AVERAGES**



DWORSHAK LAKE ELEVATIONS



DWORSHAK OUTFLOWS



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 13, 2005

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.

Comments on 4/16/05 Facilitator Notes

- Under the discussion of Dworshak, change comment about Oregon and Idaho to "directly challenged the COE on the validity of the flood control requirements at Dworshak".
- Under the Dworshak discussion, change to the 'project increased flows to available power house, with 2 units operating.'
- **ACTION**: The facilitation team will make changes to the notes and send the final version out with draft notes from today's meeting.

Hanford Reach

Russell Langshaw, Grant County PUD, reported on operations at Hanford Reach during the week of April 4-10. The week average flow was 87 kcfs. Flows were stable and band constraints were met on all days except 4/4 and 4/6 (4/4 due to increased discharge). The project was up to 723 temperature units as of 4/12, and the project expects to reach 800 tu's next week. This will initiate protection flows, expected around 4/23 or 4/24. End of emergence is expected in mid-May.

April Final Water Supply Forecast

The April final forecast generally shows increases from the March final. Libby remains at 5.4 MAF (86% average), implying a 'tier 1' operation for sturgeon (see 'Flow Augmentation Volumes' discussion for more detail). The Dworshak forecast is 1.32 MAF. The BOR's forecast for Hungry Horse Jan-July is 6.17 MAF (75%). Grand Coulee is up nearly 2 MAF to 52.2 (83%). The Lower Granite forecast is up to 11.1 MAF (52%). The Dalles April-Sept. forecast is 64.6 MAF (65%), and the Jan-July is 73.8 MAF (69%).

Flow Augmentation Volumes

The COE provided handouts of bar chart graphs for Dworshak, Libby, and Hungry Horse using the April final forecast to predict available volumes at the projects for flow augmentation downstream. The April 1-June 30 charts show 532 kaf available at Dworshak, 418 kaf at Libby, and 822 kaf at Hungry Horse.

Oregon noted that it was not clear from their perspective which information for flood control was taken into account for Dworshak operations. The River Forecast Center forecast appears to be slightly above the COE's April final forecast. Cindy Henriksen

clarified that operations at Dworshak were not dependent on the April final forecast, but that snow pack in the Dworshak area, as observed via satellite telemetry and through on the ground data gathering, initiated local flood control operations. (See “Operations During Low Flow Years” for further discussion/clarification on this issue.)

The Libby volume estimate includes a sturgeon pulse operation, based on the April final water supply forecast, requiring 800 kaf. Sturgeon pulse operations information can be found on page 30 of the WMP. Cindy clarified that the ‘inflow’ volume subtracted in the graphs refers to April 1-11 inflows.

Q Adjust/HYSRR-ESP Models

Q Adjust – The model includes the April final forecast, and depicts volumes shaped 69 different ways. Assumptions (objectives) included meeting 70 kcfs at Priest Rapids during the first half of April to accommodate Bonneville minimum flows for chum, and not drafting Grand Coulee below 1240’. As compared to the last Q Adjust model run, refill elevation and timing shifts changed the outcomes slightly.

ESP-HYSRR – This model showed 44 historic sequences of weather, moving forward from April 5, instead of an average single trace perspective. It used the same assumptions used in the Q Adjust model. This model provides bookends for operations with unknown outcomes for water supply. The COE plans to use this new tool exclusively in the future in place of STP.

Next Steps – The COE will update ESP runs as the season continues. It was noted that ESP is more optimistic, and this is because it adds volumes to the forecast in some cases, where as Q Adjust always uses the current forecast and shapes it different ways to provide possible scenarios.

If there are additional questions about the models, contact Cindy Henriksen. It was noted that it takes a full day at the COE to put together data input for the model. The information then goes to the RFC, who runs the model with input from the COE, and this requires an additional 1-2 days to complete.

If there are additional questions about the models, contact Cindy Henriksen. It was noted that it takes several days to prepare ESP HYSRR runs. The models starts with inflow input from the RFC, which can take up to two days to develop, followed by reservoir regulation by the Corps for another one or two days. The Corps input requires assistance from office outside RCC, so those modelers may not always be available to prepare the runs.

ACTION: The COE will put together a handout describing differences between the models (inflows, outcomes, etc.). If questions remain, there might be a separate session/training for TMT members to better understand the models.

Operations During Low Flow Years

Chum update – Total chum numbers are up slightly from the last survey, but the salmon managers are seeing a downward trend. A survey is scheduled for Tuesday, 4/19, after which the salmon managers will confirm the trend. The peak appears to have occurred around March 25. It is not known yet what percentage of the run has passed Bonneville, but the salmon managers' best estimate is around 80-95%. Gas levels at Multnomah Falls were around 102.5% on 4/12, with 1.3' depth compensation over the redds.

Start of Bonneville spill – Based on the above information, salmon managers requested that the action agencies plan to begin spill at 50 kcfs for 24 hours on 4/15. TDG levels, seining catch and passage indices will be monitored to determine next steps. IF there is a change, the salmon managers will notify the action agencies as soon as possible – the action agencies will need some time to make adjustments, unless the request is for no spill at the project. A COE contractor was scheduled to open the B2 corner collector on 4/15, so it will be operated sometime that afternoon, even if spill does not go forward. Oregon expressed appreciation for BPA accommodating the 11.5' tailwater request at Bonneville, with just one day's notice. BPA noted that this is not always possible.

ACTION: The action agencies will plan to begin spill at Bonneville on Friday 4/15, for 24 hours, at 50 kcfs. The salmon managers will notify the action agencies on Thursday morning IF a change in the operation is requested. The action agencies will target BiOp spill on Tuesday 4/19 pm, per recommendation from the salmon managers, unless noted otherwise after FPAC discussions Tuesday morning.

Shape of Priest Rapids Flows – The COE ran the Q Adjust model with Priest Rapids flows at 110 kcfs from April 15-30, 130 kcfs in May, and refilling Grand Coulee in June. The salmon managers recommended that the COE model a scenario in which flows are increased to 90 kcfs now, 110 kcfs when fish arrive (~4/22), and 130 kcfs in May. The salmon managers will wait to gather additional information to make recommendations for June operations. The COE will run the Q Adjust model with the suggested assumptions, including higher flow at the end of June (vs. beginning) to accommodate Hanford Reach/Snake River migrants. The COE may be able to run an additional model later. TMT will revisit this issue at the 4/27 TMT meeting.

CRITFC River Operations Plan

The action agencies will provide a formal written response to the CRITFC River Operations Plan as soon as possible, in the next month. Tony Norris, BOR, offered to sit down with Kyle Martin to talk about his review of the document. He noted that there are some places where the plan poses legal and contractual constraints for the federal agencies.

Water Management Plan Spring/Summer Update

Flood control elevations, runoff data and the Q Adjust models have been updated and included in the latest draft Spring/Summer update, with the new water supply forecast. No comments have been submitted to date. The document will be finalized and posted to the TMT web page this week.

Status of Operations

Reservoirs – Libby inflows have been at 5-6 kcfs. The project is at 2413.5' and filling, continuing to release 4 kcfs. Grand Coulee is at elevation 1253.8'. Hungry Horse is at 3550.8' and ramped up to 7 kcfs outflows on 4/14. Dworshak is at 1585.4', with 8 kcfs in and 4.3 kcfs out. With the third unit available as of today, full powerhouse capacity went to 10 kcfs. Lower Granite flows are at 40 kcfs and McNary flows are at 120 kcfs.

Feedback on graphs – Paul Wagner and Dave Wills provided comments on the COE graphs presented at the March 23 TMT meeting. Additional comments from salmon managers are welcome.

Dworshak flood control – The Walla Walla COE gathered snow cover and local flood control information for Dworshak, based on NRCS data. The NRCS and COE agreed that, based on the data, the snow pack was around 40%, requiring that the project be operated to a local flood control elevation of 1587' by April 15.

Oregon and Idaho responded to last week's discussion, saying it was not clear what information was being used to determine the operation at Dworshak, and noted the discrepancy between the water supply forecasts from RFC and the COE. Flood control risks in play were also unclear.

The COE responded that the April final forecasts were not considered in implementing last week's operation. The 40% snow pack estimate included snow pack comparisons in other areas, and the COE forecasted some runoff by April 15. Power house capacity at Dworshak was limited last week because only 2 units were available; the COE did not spill. Now a third unit is available so the project is able to pass inflow and slow Dworshak refill. Local flood control constraints were the driver: 276 kaf was available in the reservoir, with an expected 1.2 MAF volume in between now and June. 25 kcfs spill could be required during an emergency, which in the past caused structural issues downstream. 25 kcfs would equal about 120% TDG.

Question: How often will satellite images be updated, and where can we find this information on the web? It was suggested that the information might be found on the RFC website.

ACTION: Dworshak local flood control and operations will be revisited and an expert from Walla Walla will present information at the 4/27 TMT meeting about the snow cover analysis, including where to find satellite images on the web and how often the images are updated.

Fish – A hatchery release from Dworshak occurred on 4/4 and 4/6. Lower Granite yearling passage increased to 19,000 on 4/12; increases were seen at Lower Monumental and Little Goose as well. McNary saw 1,200 total yearlings on 4/11; John Day is estimating about 2,500 yearlings per day. Increased numbers of yearlings have been observed at Bonneville, with subyearling numbers on the decline. Coho numbers increased at Bonneville. 11,000 steelhead have passed Lower Granite, and 1,000 have been seen at Bonneville. Sockeye numbers have increased at Lower Granite. A total of

199 adult spring chinook have reached Bonneville, and numbers are increasing. Numbers at this point are low (it was estimated that an average 20,000 historically have reached the project at this time).

ACTION: Larry Beck, COE, will request a presentation from Robert Stansell on is pinniped study at the next TMT meeting. **Note:** Larry confirmed that Robert is available to give a presentation to TMT on 4/27.

Water quality – The COE continues to track TDG at Warrendale for chum redds. They plan to continue monitoring through April. The Dalles spill may cause some increase in TDG at Bonneville in the next few days, until spill at Bonneville begins. The SYSTDG model shows the project at ~108% without spill, which would increase by 3-4% with spill.

Next Meeting, April 27, 9am-noon

Agenda items include:

- Review 4/6, 4/13 Minutes
- Hanford Reach Update
- Water Supply Forecast
- Flow Objectives at Priest Rapids
- Q Adjust, ESP Runs
- Chum Update
- Operations Review
- DWK Local Flood Control Analysis – Walla Walla COE
- Report on Pinniped Research – Robert Stansell

Actions from 4/13 Meeting

- Correct 4/13 facilitator notes, send out to TMT – Facilitation Team
- Written feedback from action agencies on CRITFC's River Operations Plan for 2005 – **By May 11**
- Provide handout describing/summarizing different models – COE
- Coordination about spill at Bonneville – Salmon managers and Action agencies – **4/14 and 4/19 AM**

1. Greetings and Introductions.

The April 13 meeting of the Technical Management Team was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the issues discussed and decisions made at this meeting. Anyone with questions or comments about these minutes should contact Henriksen at 503/808-3945.

2. Hanford Reach Update.

Russell Langshaw said flows were relatively low and stable last week, with bands ranging from 7.4 to 1.1 Kcfs. Average flow at Priest Rapids fell from 129.7 Kcfs on April 5 to 69.1 Kcfs on April 8. The week-average flow was 87 Kcfs. The flow band was 20-30 Kcfs last week; it was exceeded on April 4 and April 6, but met on all the other days. As of yesterday, the fish were at 723 temperature units since the end of spawning; we should reach 800 temperature units by late next week, Langshaw said. How concerned are we with stranding following the flow band exceedence of 37.8 Kcfs on April 4? Russ Kiefer asked. It was an increasing flow band, so it shouldn't be much of a concern, Henriksen replied.

3. April Final Water Supply Forecast.

Henriksen said that, generally, the April final water supply forecast is larger than the March final was. At Libby, the April final forecast is still 5.4 MAF, 86% of average. At Dworshak, the volume decreased to 1.32 MAF, 50% of average. At Hungry Horse, the April final Reclamation forecast is 16.78 MAF, 75% of average, said Tony Norris. At Grand Coulee, the forecast is now 52.2 MAF, up significantly – almost 2 MAF – in comparison to the March final – up to 83% of average. At Lower Granite, said Henriksen, the April final forecast has increased to just over 11 MAF, 52% of average. At The Dalles, the April-September forecast is now 64.6 MAF, 65% of average. The January-July forecast of 73.8 MAF, 61% of average.

4. Flow Augmentation Volumes at Headwater Reservoirs.

Henriksen said this information is available via hot-link from today's agenda on the TMT homepage. Again, she said, this is an estimate of the volume of water available above minimum flow and refill needs for flow augmentation for resident and anadromous fish. At Dworshak, the current available volume is 532 kaf, assuming 50% confidence of refill; at 30% confidence, the volume increases. In response to a question from Ron Boyce, Henriksen said the River Forecast Center's April final forecast for Dworshak is approximately 250 kaf larger than the Corps forecast. Have you tried to reconcile the differences between the two forecasts? Boyce asked. They're different models, and different techniques, Henriksen replied. Norris added that the Corps forecast is more focused and basin-specific than the RFC forecast.

Looking at the two different forecasts last week, and discussing flood control operations, there was some confusion because of the discrepancies, said Boyce. I just wanted you to know I wasn't clear how the recent snowpack and precipitation events have been taken into account in the models, said Boyce. The flood control targets we're operating to now are based on protection, because there is a large snow-covered area in the Dworshak basin, currently, Henriksen replied; those calculations aren't really influenced by the water supply forecast. Boyce requested more details about how the Corps makes operational decisions

based on the satellite snow-covered area imagery. We'll address that under Agenda Item 9, said Henriksen.

Moving on, Henriksen said that, at Libby, assuming 50% confidence of refill, 418 kaf would be available for spring flow augmentation, over and above the planned 800 kaf sturgeon pulse. She reiterated that the current Libby water supply forecast is 5.4 MAF, right at the upper cusp of the Tier 1 sturgeon pulse criteria. If the forecast increases further, the pulse would increase to 1.1 MAF.

At Hungry Horse, assuming a 50% confidence of refill, 822 kaf would be available for spring flow augmentation, Henriksen said. Norris said the plan is to release 7 Kcfs from Hungry Horse through June; Hungry Horse has never been higher than it is, currently, in April, he added. And at Dworshak, you're continuing to release 4.5 Kcfs, and will maintain that through...? Paul Wagner asked. Probably through tomorrow, Henriksen replied.

5. QADJ Summary Based on April Final Forecast.

Henriksen reported that the QADJ model runs have now been updated and are available via hot-link from today's agenda on the TMT homepage. As you're aware, she said, this model initializes based on the March 31 elevation at each project, then shapes the April final water supply forecast for each project in 69 different ways, based on the historic record. According to the most recent QADJ run, Priest Rapids may be increasing flow soon for flow augmentation; and Lower Granite and McNary have virtually no chance of meeting their spring and summer flow objectives. Estimated flows at Lower Granite range between 22 Kcfs in late August and 61 Kcfs in May, compared to seasonal flow objectives of 85, 73 and 50 Kcfs; McNary flows are estimated to range between 118 Kcfs in late August and 181 Kcfs in May, compared to seasonal flow objectives of 220 Kcfs in spring and 200 Kcfs during the summer period.

In response to a question from Boyce, Henriksen said these model runs assume that Bonneville will meet an average flow of 125 Kcfs through the end of April, to protect emerging chum below the project.

Period Average Flow – Kcfs (ESP/HYSRR):

	Apr 16-30	May	June	July	Aug 1-15	Aug 16-31
Libby	4.0	5.0	20.8	18.3	18.6	16.6
HGH	6.0	5.4	5.1	5.5	5.6	4.4
GCL	100	110	118	129	110	107
PRD	109	127	130	134	113	110
DWR	8.7	9.9	3.8	10.1	10.1	9.2

BRN	14	15	12	10	12	13
LWG	56	78	57	32	28	27
MCN	168	205	190	170	144	139
TDA	175	200	184	167	143	139
BON	178	202	187	169	144	140

Moving on to the Corps HYSRR/ESP model work, Henriksen said this model overlays 44 historic weather conditions – temperature and precipitation – on the current reservoir elevation and water supply forecast data. The same project operations are assumed as were assumed in the QADJ run, she said. So you're saying we have 44 different runoff forecasts, 44 different historic weather patterns and 44 different shapes? Boyce asked. Correct, Henriksen replied. How is that relevant to 2005? Boyce asked. I don't know what the future holds, Henriksen replied; this gives me, as a water manager, some idea of what the bookends are. It is a bit mind-boggling, but this is the wave of the future, in terms of modeling tools. As a water manager, it makes me nervous to rely on a single modeling tool. With the STP model, I know that the forecast will not match the actual conditions, she said. What this ESP tool gives me is targets and interim operations I can keep in mind while making operational choices, said Henriksen. I wanted to bring this tool forward because it's a tool the Corps will be moving to exclusively in the future, and I wanted to start to get the TMT used to looking at this information. Think of it as assigning an exceedence probability to your optimism, said Norris. The ESP forecast is certainly more optimistic than the QADJ run on the Lower Snake, Boyce observed.

What's the game plan from here on out? Boyce asked. We will continue to update the HYSRR/ESP runs as future water supply forecasts become available, Henriksen replied. The ESP run is notably more optimistic, said Wagner – any idea why? Because the ESP run factors in potentially large future precipitation, replied Norris – the QADJ run generally assumes normal precipitation or less. The ESP/HYSRR model is influenced by recent precipitation events, Henriksen added.

On the QADJ summary, with respect to refill probabilities, you show Libby refilling in 95% of the years, said Martin – in the ESP run, Libby's probability of refill is only about 50-55%. If you look at the range of Libby's potential inflow, it has to do with the varying volume of precipitation and inflow in the future, based on historic weather data, Julie Ammann replied – they're two different tools. Also, what do you assume for Banks Lake? Kyle Martin asked. We do the same Banks Lake operation every year, Ammann replied – we factored in a 5-foot draft of Banks Lake this year. She added that the April 1-15 period average flows shown in the table are more accurate in the ESP/HYSRR runs than they are in the QADJ runs.

The group devoted a few minutes of discussion to the process through which the ESP runs are created; Ammann described the process. In response to a question, she said it should be possible to re-run the model in about a day if it is re-initialized using up-to-the-minute flow and forecast data. In response to another question, Henriksen said it would be possible to convene a “class” in the ESP model, to give the TMT a better idea of how the actual model runs are generated.

6. Operations During Low-Flow Years.

David Wills said that, in the most recent chum survey (dated April 1), the total number of chum seined was 67; in the two most recent seine surveys (not yet posted to the FPC website), field personnel found 109 and 28 fish, respectively. It does appear that emergence is winding down, said Wills. The peak in Hardy Creek occurred during the week of March 12; they are now thinking of pulling that trap in the next week or so. At Hamilton Springs, where the adult counts were higher, the emergence peak seemed to occur during the latter part of March. Counts have been dropping steadily since then. The peak catch in March was almost 16,000; the count last week was about 4,000, and is expected to drop to about 2,000 next week. Overall, said Wills, emergence appears to be tracking about a week earlier than last year.

Last week the salmon managers said they wanted to look at another week’s worth of data before making a decision about the start of spill at Bonneville, said Silverberg – do you feel comfortable making a decision about that at this point? I think the salmon managers would like to have a chance to discuss this week’s data, and make a decision by the end of the week, Wills replied. In response to another question, Boyce said TDG was measured at 102.7% yesterday at the Multnomah Creek spawning site, well, within the tolerable limit. In other words, said Boyce, it appears that we have some leeway, in terms of TDG, to start spill at Bonneville.

Do you have an estimate of the percentage of the run that has now emerged? Larry Beck asked. We’ll only know that after the season, Boyce replied; historically, the 95% mark has been reached on April 23. There is considerable variation in the 95% date in recent years, said Boyce, but the bottom line is that we will see chum continuing to emerge well into May. Wills said that, in his professional opinion, the 2005 chum emergence is now right around the 95% mark. However, we could see a bump in chum numbers, said Boyce – it’s really premature to say we’ve reached the 95% point in the emergence. In response to a question from Henriksen, Wills said Batelle is monitoring chum temperature units this year. Boyce noted that the third week in April was the most recent estimate of the 95% emergence point based on Batelle’s temperature unit model.

Moving on, the group discussed the start of Bonneville spill. Is April 15 still the target date? Silverberg asked. We would like to lay out a presumptive path to begin 24 hours of 50 Kcfs spill this Friday, said Boyce. We will look at the most recent seine catch, TDG and passage data and make a decision tomorrow, he said. We're set up to start spill on Friday, said Wellschlager, but the more advance notice we have, the better.

Henriksen said there is an issue with the corner collector. We're assuming that, at the same time we start spill, we will open the corner collector; however, the crane needed to open the corner collector needs some work, and we have to have a contractor come out to open the corner collector. The contractor is poised to do that on Friday afternoon, she said, so if the decision is made not to spill on Friday, for whatever reason, we will still have corner collector spill over the weekend. Could he open the corner collector earlier, in the morning? Wagner asked. We were assuming that spill would begin at 6 pm Friday, Henriksen replied; it will take the contractor several hours to set up and test the crane.

The fact that current TDG levels are 102% over the redds, and the limit is 105% without depth compensation, doesn't worry you, as we talk about starting spill? Wellschlager asked. Jim Adams noted that, at Warrendale, TDG levels have been approaching 106% in recent days. We timed this to coincide with a low tide, so this is a worst-case scenario, said Boyce; I wanted to thank the Corps for agreeing to keep the tailwater elevation at 11.5 feet so that we can sample Friday morning. I think we're going to be OK, with respect to TDG, as long as flows are maintained, said Boyce. To summarize, we appreciate the coordination needed to start spill of 50 Kcfs 24 hours a day, with corner collector operation, at 6 pm on Friday, Boyce said. If anything changes, we will let you know by tomorrow morning. In response to a question from Wellschlager, Boyce said the salmon managers would like to see full BiOp spill at Bonneville some time next week; the salmon managers will make a decision on Tuesday morning. Wellschlager said he will plan on full BiOp spill at Bonneville beginning next Tuesday evening, April 19.

Has spill been initiated at the other projects, as we discussed last week? Boyce asked. At Ice Harbor, the RSW test is continuing through April 23, said Henriksen; we have been spilling according to the UPA at night at that project. Spill started at McNary and John Day on Sunday evening. Spill started at The Dalles on Monday; spill has averaged 38.5%-39.9% over the first two days of this operation.

Moving on to the shape of flow at Priest Rapids, Henriksen said that the QADJ runs show flows of 110 Kcfs in the latter part of April and 130 Kcfs in May at Priest Rapids; flows at Priest Rapids would then recede in June to allow Grand Coulee to refill to 1285. We wanted to be sure that met with the salmon managers' expectations, she added. We talked about this yesterday, said Wills, looking at the newest QADJ and ESP runs, I think if we keep to the plan outlined

in the ESP run, these projected flows look all right. Our preference would be to keep the flows at a relatively low level until we see a significant increase in passage at Rock Island some time in May.

That raises an issue for Reclamation, said Norris – the flow you pick for the latter part of April will have an effect on Grand Coulee elevations. At the moment, we're seeing little to no passage at Rock Island, said Wagner – there is no reason to go above 90 Kcfs to 110 Kcfs until the last week in April. How about Earth Day – April 22, he said. It was agreed that the action agencies will increase Priest Rapids outflow to 90 Kcfs now, and prepare to go to 110 Kcfs on April 22. And if it looks like we can do better than refill to 1285, what sort of a threshold would you be looking at in June? Norris asked. We'll have to play that one by ear, Wagner replied – we'll be monitoring the passage situation closely, and will ask you to put the water on the fish. In response to a question from Ammann, Wagner asked the Corps to model flows above 120 Kcfs in June, to show the impacts on Grand Coulee refill. Boyce emphasized that the salmon managers have not yet built a consensus recommendation for Priest Rapids/Grand Coulee operations for spring or summer.

7. CRITFC 2005 River Operations Plan.

Martin reminded the group that, two weeks ago, CRITFC requested formal comments from the action agencies on the River Operations Plan; he asked where the action agencies were in that process. We have reviewed the plan, replied Norris; you will be receiving an official letter from us soon. He said that, in general, he had noted several areas where the River Operation Plan's recommendations collide with the action agencies' legal and operational obligations. I would say that two weeks is a little short in terms of the time-frame for an official written response, due to the necessity of subjecting that letter to inter-agency review, Norris said.

8. WMP Spring/Summer Update.

Since we now have the April final water supply forecast, our final step on the spring/summer update is to incorporate that information in our flood control rule curve calculations etc., Henriksen said. We have not received any additional comments, so our plan is to finalize the update with technical inputs based on the April final forecast. We'll hope to get that out on the homepage by the end of the week, she said.

9. Status of Operation.

Henriksen reported that, currently, Libby inflows are up a little bit, to 5-6 Kcfs. the project has filled about a quarter of a foot to 2413.5 feet, and continues to release minimum outflow. At Grand Coulee, the current elevation is 1253.8,

said Norris; Hungry Horse is at 3550.8 feet, and will begin releasing 7 Kcfs tomorrow. At Dworshak, the current elevation is 1585.4 feet, with 8 Kcfs inflow and 4.3 Kcfs outflow, full powerhouse discharge with the two available units, Henriksen said. The larger Unit 3 is now available, so powerhouse capacity is closer to 10 Kcfs. Flow at Lower Granite has increased to about 40 Kcfs. At McNary, flows have been running about 120 Kcfs; at Bonneville, 125 kcfs. The recent rain events have increased flows in the lower river; we had 149 Kcfs at Bonneville on Monday.

With respect to TMT feedback on the Corps' graphs and visual media, Wagner said he had emailed his two choices to Henriksen. I also received feedback from Dave Wills, and have forwarded that information to our modelers, said Henriksen. One comment was a request that we look at a subset of the 44 historic Dworshak water years that were closest to the conditions we're seeing this year, said Henriksen; unfortunately, the Dworshak data is part of a larger, multi-basin data set, so if we choose very low years at Dworshak, then we would have to choose the same water years for the entire basin model. Then the entire basin model may not meet our expectations. We're continuing to look into that possibility to see what subsets of data may be modeled in the future, however, she said. Silverberg asked that the other salmon managers review the seven graphs (appended to the March 16 agenda on the TMT homepage) and provide any votes or comments they may have to her as soon as possible.

Moving on to Dworshak flood control, Silverberg noted that the TMT had expressed concern about how the Corps was using the snow-covered area estimates to determine flood control operations at Dworshak. We revisited that on Monday, said Henriksen; the NRCS collects that data, and had someone in the field on Monday, and it was snowing. He said that, if he had to guess, he would say that the snow-covered area is now 100%. We agreed to continue to assume a 40% snow-covered area, which puts the April 15 flood control target at 1287.5 feet, she said; again, the third unit is now available, so we can increase Dworshak outflow further if needed. Our concern, of course, is that we could get a rain event on top of this snowpack, causing a large runoff event; bear in mind that the current volume to fill at Dworshak is only about 250 kaf. If a significant rain event was to occur, we could find ourselves in a high flow/forced spill situation, and that's what concerns us, Henriksen said. We're expecting to start using the third unit to start moving more water out of the reservoir some time later today or tomorrow, so that we don't fill too quickly, she added. Wellschlager added that Dworshak is higher, currently, than it has been on this date in any of the four previous years. In response to a question, Ammann said the Corps' plan is not to start drafting Dworshak at this point – if inflow is 8 Kcfs, we're not going to go to 10 Kcfs outflow. We do want to slow the fill at Dworshak, however, she said.

Boyce asked what local flooding risks the Corps is obligated to consider, as well as for more details on the current snow-water equivalent data. Henriksen

said the Corps and NRCS did take the snowpack/snow-water equivalent estimates into account when developing the April 15 flood control target for Dworshak; the overall goal is to avoid spill at the project. Having the third unit online, which gives us nearly 10 Kcfs in powerhouse capacity, helps us there, she said. With respect to local flooding concerns, if we look at the Dworshak flow augmentation bar chart there is 276 kaf available in the reservoir; 1.2 MAF is expected to run off in the basin between now and June. If we were in a serious flood control situation, we may have to spill up to 25 Kcfs. Flow at that level causes bank stability concerns; it can also damage structures on the river, such as bridge abutments. Flows of that magnitude also cause very high TDG levels downstream, she added. We will do that for flood control, if we have to, but we will avoid that situation if we can. Henriksen added that an expert from the Corps' Walla Walla District will be in attendance at the next TMT meeting to discuss the Corps' methodology in developing its flood control elevation targets.

Moving on, Wills said that, with respect to fish, as far as he knows, the Dworshak Hatchery release went well last week. Wagner said that, elsewhere in the system, at Lower Granite, the subyearling chinook passage indices have been steadily increasing, from about 1,000 fish a week ago to more than 19,000 fish yesterday. At McNary, the index is holding steady at about 1,200 fish per day. The yearling chinook numbers are on the rise at Bonneville, but the subyearling numbers have decreased over the past few days, which was somewhat unexpected. Coho and steelhead numbers are increasing at Bonneville; steelhead numbers are also increasing at Lower Granite.

On the adult side, Wagner said only 199 spring chinook have passed Bonneville to date; the 10-year average for this date is closer to 20,000 adults. No one knows why passage is so much lower this year; there are a variety of theories, including the large number of sea lions that have journeyed upriver to Bonneville this year. Cindy LeFleur said that, normally, by this date, about 13% of the spring chinook run has passed Bonneville; the 10-year average daily passage index is about 5,000 adult chinook, compared to the 57 fish that passed the project yesterday. She added that 80% of the 2005 run is composed of 4-year-old fish from the 2002 brood. Larry Beck noted that some California sea lions have taken up residence in the fish ladder at Bonneville and have even been seen in the counting windows; the most recent estimate he has heard is that they are taking 1-2% of the adults passing Bonneville. Wills said Robert Stansell has been tracking marine mammal predation for the Fish and Wildlife Service; Beck said he will invite Stansell to give the TMT a presentation on his research on April 27.

Wellschlager said there are no power system issues to report at this time. Adams said there are no water quality exceedences to report; for the most part, the spilling projects are well below their TDG caps. We will continue to track TDG levels at Warrendale until BiOp spill begins next Tuesday, Adams said; currently, I am looking at the Bonneville tailwater and TDG data and calculating depth

compensation over the chum redds on an hourly basis. Wills said it would be helpful if Adams could continue to do that through the end of April, when all of the chum will have emerged. In response to a question, Laura Hamilton said she expects to see TDG increase by 3-4% once Bonneville starts spilling 50 Kcfs.

10 Next TMT Meeting Date.

The next face-to-face Technical Management Team meeting was set for April 27. Meeting summary prepared by Jeff Kuechle.

**TMT PARTICIPANT LIST
April 13, 2005**

Name	Affiliation
Cindy Henriksen	COE
Tony Norris	USBR
Donna Silverberg	Facilitation Team
John Wellschlager	BPA
Paul Wagner	NOAAF
David Wills	USFWS
Larry Beck	COE
Julie Ammann	COE
Lee Corum	PNUCC
Russ George	WMCI
Kyle Martin	CRITFC
Robin Harkless	Facilitation Team
Ron Boyce	ODFW
Nic Lane	BPA
Ruth Burris	PGE
Jim Adams	COE
Russ Kiefer	IDFG
Laura Hamilton	COE
Cindy LeFleur	WDFW

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday April 27, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cnmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. 4/6, 4/13 Minutes
 - i. [April 06, 2005](#)

 - ii. [April 13, 2005](#)

3. Hanford Reach Update
4. Water Supply Forecast
 - i. [WATER SUPPLY FORECASTS AND OBSERVED RFC & CORPS](#)

 - ii. [Deterioration of April - August Water Supply Forecast at Libby Dam in 2005](#)

5. Flow Objectives at Priest Rapids
6. Q Adjust, ESP Runs
7. Chum Update - [\[Link to Fish Passage Center\]](#)
8. Operations Review
 - a. Chum Update
 - b. Start of Bonneville Spill
 - c. Shape of flow at Priest Rapids through April, May, June
 - d. Reservoirs
 - e. Fish
 - f. Power System
 - g. Water Quality
9. DWK Local Flood Control Analysis . Walla Walla COE
10. Report on Pinniped Research . Robert Stansell
11. Other

12. Set agenda for next meeting - [\[Reference Calendar\]](#) 

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

Updated April-19-2005 @11:50 RG

WATER SUPPLY FORECASTS AND OBSERVED
RFC & CORPS
CORPS OF ENGINEERS FORECAST

WSF MODEL RUN			GRAND COULEE #124365003				LOWER GRANITE #133436001				THE DALLES #141057001				BROWNLEE #132896002			
Date Issued	Date Effective	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	
																		Jan thru Jul
Average (1971-2000)		62.90	100.0	63.99	100.0	30.02	100.0	21.55	100.0	107.30	100.0	98.65	100.0	10.70	100.0	6.99	100.0	
1990	ACTUAL	67.60	107.5	59.30	92.7	20.20	67.3	15.10	70.1	99.80	93.0	82.90	84.0	4.97	46.5	2.85	40.8	
1991	ACTUAL	70.80	112.6	61.60	96.3	20.10	67.0	14.80	68.7	107.10	99.8	87.20	88.4	4.69	43.8	2.62	37.5	
1992	ACTUAL	46.50	73.9	38.80	60.6	14.10	47.0	8.97	41.6	70.40	65.6	53.50	54.2	3.94	36.8	1.79	25.6	
1993	ACTUAL	49.08	78.0	52.68	82.3	26.68	88.9	20.87	96.8	87.97	82.0	85.56	86.7	9.12	85.2	6.70	95.9	
1994	ACTUAL	50.87	80.9	51.88	81.1	15.89	52.9	11.34	52.6	74.97	69.9	70.77	71.7	5.17	48.4	3.25	46.5	
1995	ACTUAL	58.99	93.8	57.31	89.6	29.41	98.0	20.98	97.3	104.04	97.0	91.37	92.6	9.84	92.0	7.26	103.8	
1996	ACTUAL	78.98	125.6	75.61	118.2	42.43	141.4	28.11	130.4	139.31	129.8	116.61	118.2	14.36	134.2	9.03	129.1	
1997	ACTUAL	88.17	140.2	88.51	138.3	49.48	164.8	33.53	155.6	159.00	148.2	141.06	143.0	18.57	173.6	10.91	156.0	
1998	ACTUAL	59.01	93.8	58.74	91.8	31.29	104.2	23.67	109.8	104.05	97.0	95.02	96.3	13.59	127.0	9.98	142.7	
1999	ACTUAL	71.34	113.4	74.62	116.6	36.08	120.2	25.78	119.6	124.08	115.6	115.92	117.5	13.63	127.4	8.84	126.4	
2000	ACTUAL	61.10	97.1	61.41	96.0	24.60	81.9	17.16	79.6	98.01	91.3	89.52	90.7	8.18	76.4	5.02	71.8	
2001	ACTUAL	37.39	59.4	39.83	62.2	14.38	47.9	10.30	47.8	58.19	54.2	56.25	57.0	4.57	42.8	2.87	41.0	
2002	ACTUAL	68.02	108.1	68.23	106.6	23.99	79.9	19.02	88.2	103.75	96.7	98.09	99.4	5.58	52.1	3.77	53.9	
2003	ACTUAL	54.18	86.1	52.74	82.4	23.81	79.3	16.73	77.6	87.69	81.7	77.44	78.5	5.96	55.7	4.06	58.0	
2004	ACTUAL	50.29	79.9	54.41	85.0	20.68	68.9	15.03	69.7	82.95	77.3	80.07	81.2	5.86	54.8	3.75	53.7	
2005	Jan 07	Jan 05	FINAL	57.20	90.9	58.20	91.0	20.70	69.0	14.90	69.1	85.60	79.8	5.24	49.0	3.42	48.9	
2005	Feb 07	Feb 05	FINAL	57.20	90.9	56.70	88.6	18.00	60.0	12.70	58.9	82.40	76.8	4.55	42.5	2.87	41.0	
2005	Mar 09	Mar 05	FINAL	50.50	80.3	48.70	76.1	14.60	48.6	9.96	46.2	70.70	65.9	60.60	61.4	3.52	32.9	
2005	Apr 08	Apr 05	FINAL	52.20	83.0	50.40	78.8	15.70	52.3	11.10	51.5	73.80	68.8	64.60	65.5	4.21	39.4	

WSF MODEL RUN			DWORSHAK #133409501				ROCK ISLAND #124626001				LIBBY #123019330				HUNGRY HORSE #123625001			
Date Issued	Date Effective	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	
																		Jan thru Jul
Average (1971-2000)		3.55	100.0	2.65	100.0	68.91	100.0	69.54	100.0	6.31	100.0	6.25	100.0	2.22	100.0	2.12	100.0	
1990	ACTUAL	3.61	101.8	2.81	106.4	74.70	108.4	65.30	93.9	7.69	121.9	6.94	111.1	2.55	114.7	2.26	106.4	
1991	ACTUAL	3.67	103.5	2.71	102.5	79.70	115.7	68.60	98.6	8.61	136.5	7.72	123.6	2.88	129.5	2.61	122.9	
1992	ACTUAL	2.09	58.9	1.32	49.9	51.60	74.9	42.50	61.1	4.64	73.6	4.04	64.7	1.54	69.2	1.32	62.1	
1993	ACTUAL	2.75	77.6	2.20	83.0	53.64	77.8	57.16	82.2	5.32	84.4	5.48	87.7	1.97	88.5	1.94	91.3	
1994	ACTUAL	1.85	52.2	1.43	54.0	55.16	80.0	55.61	80.0	5.43	86.1	5.22	83.5	1.69	76.1	1.56	73.5	
1995	ACTUAL	3.16	89.0	1.81	68.4	66.36	96.3	63.76	91.7	6.22	98.6	6.30	100.8	2.02	90.9	1.78	84.0	
1996	ACTUAL	4.90	138.1	3.07	116.1	87.63	127.2	82.81	119.1	8.59	136.2	8.35	133.6	2.85	128.0	2.55	120.2	
1997	ACTUAL	5.94	167.3	4.64	175.3	96.49	140.0	96.52	138.8	8.06	127.7	7.85	125.7	3.29	148.0	3.21	151.0	
1998	ACTUAL	2.86	80.5	2.09	79.1	65.68	95.3	64.48	92.7	5.99	94.9	5.84	93.4	1.79	80.4	1.67	78.8	
1999	ACTUAL	4.24	119.5	3.19	120.5	79.62	115.5	82.50	118.6	6.95	110.1	7.13	114.1	2.24	100.6	2.16	101.6	
2000	ACTUAL	3.49	98.3	2.68	101.1	66.93	97.1	66.78	96.0	5.82	92.3	5.50	88.0	2.05	92.0	1.94	91.2	
2001	ACTUAL	1.82	51.4	1.47	55.7	40.08	58.2	42.17	60.6	3.34	53.0	3.17	50.8	1.30	58.5	1.29	60.7	
2002	ACTUAL	4.35	122.6	3.70	139.8	74.83	108.6	74.31	106.9	7.18	113.8	7.10	113.6	2.30	103.5	2.29	107.6	
2003	ACTUAL	3.56	100.5	2.30	87.0	58.54	84.9	56.31	81.0	5.19	82.3	5.08	81.4	1.82	81.7	1.69	79.7	
2004	ACTUAL	3.04	85.7	2.39	90.4	54.91	79.7	58.54	84.2	4.60	72.9	4.68	74.8	1.90	85.5	1.91	89.8	
2005	Jan 07	Jan 05	FINAL	1.91	72.4	62.20	90.3	62.80	90.3	5.84	92.6	5.79	92.6	2.00	89.7	1.91	90.0	
2005	Feb 07	Feb 05	FINAL	1.64	62.1	62.20	90.3	60.90	87.6	5.81	92.1	5.63	90.1	1.82	81.9	2.03	90.0	
2005	Mar 09	Mar 07	FINAL	1.42	53.8	54.70	79.4	51.80	74.5	5.64	89.4	5.37	86.0	1.55	69.5	2.35	90.0	
2005	Apr 06	Apr 06	FINAL	1.32	49.9	56.70	82.3	53.90	77.5	5.72	90.8	5.40	86.4	1.68	75.4	1.19	90.0	

NOTE : WATER YEARS 1971-2000 USED TO COMPUTE PERCENT OF NORMAL - COORDINATED FORECAST BY NWS RIVER FORECAST CENTER

NWS - Statistical Regression Forecasts	
Grand Coulee	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?GCDW
Lower Granite Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LGDW
At The Dalles	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?TDAO
Brownlee Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?BRNI
Libby Dam	USARMY CORPS - Kenneth Soderlind - FINAL http://www.nwd-wc.usace.army.mil/report/libf.htm
Dworshak Dam	http://www.nwd-wc.usace.army.mil/report/dwrf.htm

NWS - Statistical Regression Forecasts	
Dworshak Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?DWRI
Rock Island Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?RISW
Libby Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LYDM
Hungry Horse Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?HHWM
Hungry Horse use USBR FCST information - from 2005 thru current - JA	USBR - Johnny Roache - JROACHE@pn.usbr.gov Columbia Basin Runoff Summary - Northwest River Forecast Center
ACTUAL	https://nwr71.nwd-wc.usace.army.mil/rccweb/RCCLIST/runoff.txt

Updated April-25-2005 @12:05 RG

WATER SUPPLY FORECASTS AND OBSERVED
RFC & CORPS
CORPS OF ENGINEERS FORECAST

WSF MODEL RUN			GRAND COULEE #124365003				LOWER GRANITE #133436001				THE DALLES #141057001				BROWNLEE #132896002			
Date Issued	Date Effective	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	
																		Jan thru Jul
Average (1971-2000)		62.90	100.0	63.99	100.0	30.02	100.0	21.55	100.0	107.30	100.0	98.65	100.0	10.70	100.0	6.99	100.0	
1990	ACTUAL	67.60	107.5	59.30	92.7	20.20	67.3	15.10	70.1	99.80	93.0	82.90	84.0	4.97	46.5	2.85	40.8	
1991	ACTUAL	70.80	112.6	61.60	96.3	20.10	67.0	14.80	68.7	107.10	99.8	87.20	88.4	4.69	43.8	2.62	37.5	
1992	ACTUAL	46.50	73.9	38.80	60.6	14.10	47.0	8.97	41.6	70.40	65.6	53.50	54.2	3.94	36.8	1.79	25.6	
1993	ACTUAL	49.08	78.0	52.68	82.3	26.68	88.9	20.87	96.8	87.97	82.0	85.56	86.7	9.12	85.2	6.70	95.9	
1994	ACTUAL	50.87	80.9	51.88	81.1	15.89	52.9	11.34	52.6	74.97	69.9	70.77	71.7	5.17	48.4	3.25	46.5	
1995	ACTUAL	58.99	93.8	57.31	89.6	29.41	98.0	20.98	97.3	104.04	97.0	91.37	92.6	9.84	92.0	7.26	103.8	
1996	ACTUAL	78.98	125.6	75.61	118.2	42.43	141.4	28.11	130.4	139.31	129.8	116.61	118.2	14.36	134.2	9.03	129.1	
1997	ACTUAL	88.17	140.2	88.51	138.3	49.48	164.8	33.53	155.6	159.00	148.2	141.06	143.0	18.57	173.6	10.91	156.0	
1998	ACTUAL	59.01	93.8	58.74	91.8	31.29	104.2	23.67	109.8	104.05	97.0	95.02	96.3	13.59	127.0	9.98	142.7	
1999	ACTUAL	71.34	113.4	74.62	116.6	36.08	120.2	25.78	119.6	124.08	115.6	115.92	117.5	13.63	127.4	8.84	126.4	
2000	ACTUAL	61.10	97.1	61.41	96.0	24.60	81.9	17.16	79.6	98.01	91.3	89.52	90.7	8.18	76.4	5.02	71.8	
2001	ACTUAL	37.39	59.4	39.83	62.2	14.38	47.9	10.30	47.8	58.19	54.2	56.25	57.0	4.57	42.8	2.87	41.0	
2002	ACTUAL	68.02	108.1	68.23	106.6	23.99	79.9	19.02	88.2	103.75	96.7	98.09	99.4	5.58	52.1	3.77	53.9	
2003	ACTUAL	54.18	86.1	52.74	82.4	23.81	79.3	16.73	77.6	87.69	81.7	77.44	78.5	5.96	55.7	4.06	58.0	
2004	ACTUAL	50.29	79.9	54.41	85.0	20.68	68.9	15.03	69.7	82.95	77.3	80.07	81.2	5.86	54.8	3.75	53.7	
2005	Jan 07	Jan 05	FINAL	57.20	90.9	58.20	91.0	20.70	69.0	14.90	69.1	85.60	79.8	5.24	49.0	3.42	48.9	
2005	Feb 07	Feb 05	FINAL	57.20	90.9	56.70	88.6	18.00	60.0	12.70	58.9	82.40	76.8	4.55	42.5	2.87	41.0	
2005	Mar 09	Mar 05	FINAL	50.50	80.3	48.70	76.1	14.60	48.6	9.96	46.2	70.70	65.9	60.60	61.4	3.52	27.6	
2005	Apr 08	Apr 05	FINAL	52.20	83.0	50.40	78.8	15.70	52.3	11.10	51.5	73.80	68.8	64.60	65.5	4.21	34.5	
2005	Apr 22	Apr 05	MIDMN	53.00	84.3	51.30	80.2	16.20	54.0	11.60	53.8	75.30	70.2	66.10	67.0	4.19	39.2	
2005																		
2005																		
2005																		

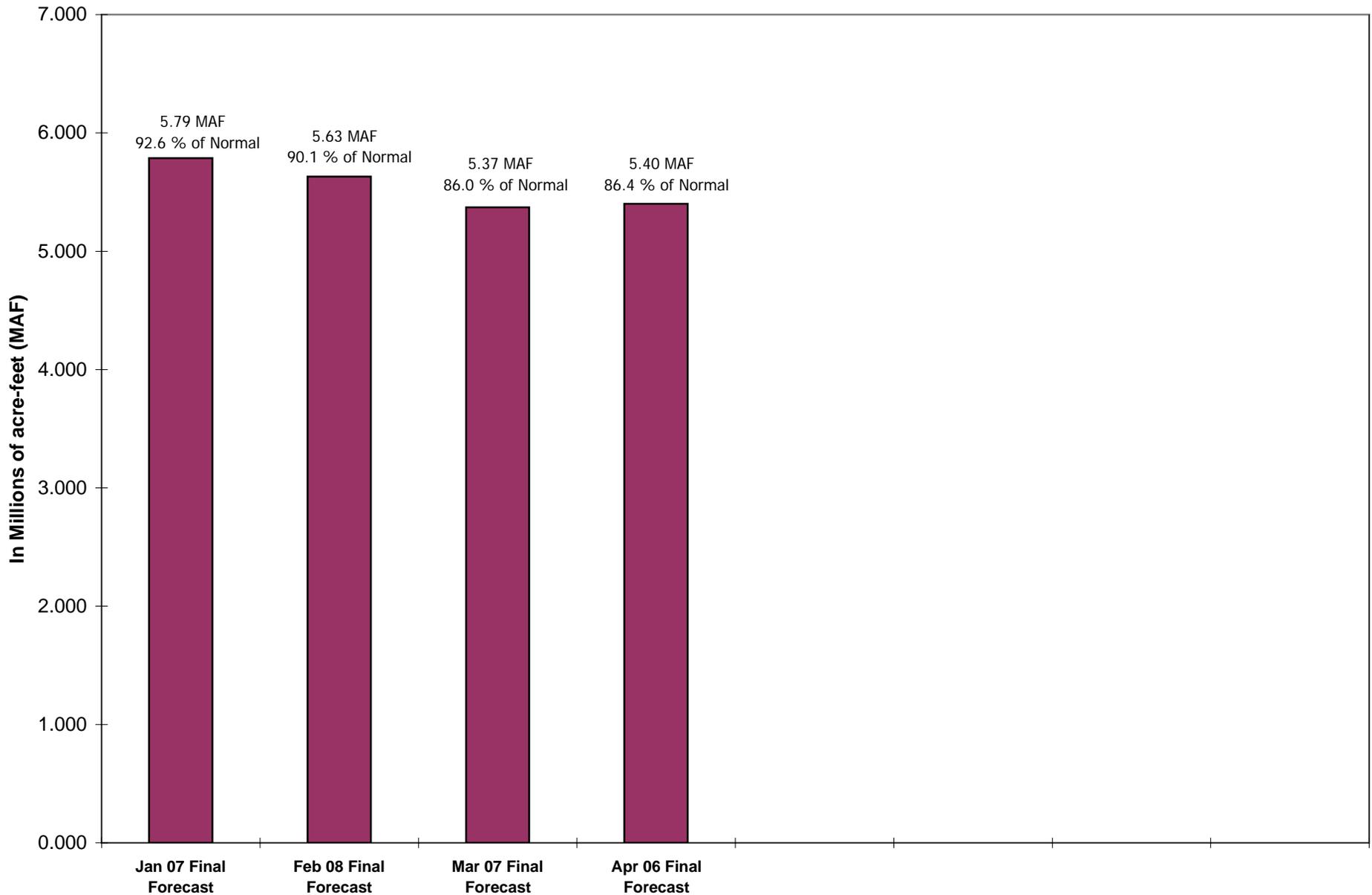
WSF MODEL RUN			DWORSHAK #133409501				ROCK ISLAND #124626001				LIBBY #123019330				HUNGRY HORSE #123625001			
Date Issued	Date Effective	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	
																		Jan thru Jul
Average (1971-2000)		3.55	100.0	2.65	100.0	68.91	100.0	69.54	100.0	6.31	100.0	6.25	100.0	2.22	100.0	2.12	100.0	
1990	ACTUAL	3.61	101.8	2.81	106.4	74.70	108.4	65.30	93.9	7.69	121.9	6.94	111.1	2.55	114.7	2.26	106.4	
1991	ACTUAL	3.67	103.5	2.71	102.5	79.70	115.7	68.60	98.6	8.61	136.5	7.72	123.6	2.88	129.5	2.61	122.9	
1992	ACTUAL	2.09	58.9	1.32	49.9	51.60	74.9	42.50	61.1	4.64	73.6	4.04	64.7	1.54	69.2	1.32	62.1	
1993	ACTUAL	2.75	77.6	2.20	83.0	53.64	77.8	57.16	82.2	5.32	84.4	5.48	87.7	1.97	88.5	1.94	91.3	
1994	ACTUAL	1.85	52.2	1.43	54.0	55.16	80.0	55.61	80.0	5.43	86.1	5.22	83.5	1.69	76.1	1.56	73.5	
1995	ACTUAL	3.16	89.0	1.81	68.4	66.36	96.3	63.76	91.7	6.22	98.6	6.30	100.8	2.02	90.9	1.78	84.0	
1996	ACTUAL	4.90	138.1	3.07	116.1	87.63	127.2	82.81	119.1	8.59	136.2	8.35	133.6	2.85	128.0	2.55	120.2	
1997	ACTUAL	5.94	167.3	4.64	175.3	96.49	140.0	96.52	138.8	8.06	127.7	7.85	125.7	3.29	148.0	3.21	151.0	
1998	ACTUAL	2.86	80.5	2.09	79.1	65.68	95.3	64.48	92.7	5.99	94.9	5.84	93.4	1.79	80.4	1.67	78.8	
1999	ACTUAL	4.24	119.5	3.19	120.5	79.62	115.5	82.50	118.6	6.95	110.1	7.13	114.1	2.24	100.6	2.16	101.6	
2000	ACTUAL	3.49	98.3	2.68	101.1	66.93	97.1	66.78	96.0	5.82	92.3	5.50	88.0	2.05	92.0	1.94	91.2	
2001	ACTUAL	1.82	51.4	1.47	55.7	40.08	58.2	42.17	60.6	3.34	53.0	3.17	50.8	1.30	58.5	1.29	60.7	
2002	ACTUAL	4.35	122.6	3.70	139.8	74.83	108.6	74.31	106.9	7.18	113.8	7.10	113.6	2.30	103.5	2.29	107.7	
2003	ACTUAL	3.56	100.5	2.30	87.0	58.54	84.9	56.31	81.0	5.19	82.3	5.08	81.4	1.82	81.7	1.69	79.6	
2004	ACTUAL	3.04	85.7	2.39	90.4	54.91	79.7	58.54	84.2	4.60	72.9	4.68	74.8	1.90	85.5	1.91	89.8	
2005	Jan 07	Jan 05	FINAL	1.91	72.4	62.20	90.3	62.80	90.3	5.84	92.6	5.79	92.6	2.00	89.7	1.91	90.0	
2005	Feb 07	Feb 05	FINAL	1.64	62.1	62.20	90.3	60.90	87.6	5.81	92.1	5.63	90.1	1.82	81.9	2.03	90.0	
2005	Mar 09	Mar 07	FINAL	1.42	53.8	54.70	79.4	51.80	74.5	5.64	89.4	5.37	86.0	1.55	69.5	2.35	90.0	
2005	Apr 06	Apr 06	FINAL	1.32	49.9	56.70	82.3	53.90	77.5	5.72	90.8	5.40	86.4	1.68	75.4	1.19	90.0	
2005	Apr 22	Apr 05	MIDMN			57.70	83.7	55.00	79.1									
2005																		
2005																		
2005																		
2005																		

NOTE : WATER YEARS 1971-2000 USED TO COMPUTE PERCENT OF NORMAL - COORDINATED FORECAST BY NWS RIVER FORECAST CENTER

NWS - Statistical Regression Forecasts	
Grand Coulee	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?GCDW
Lower Granite Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LGDW
At The Dalles	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?TDAO
Brownlee Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?BRNI
Libby Dam	USARMY CORPS - Kenneth Soderlind - FINAL http://www.nwd-wc.usace.army.mil/report/libf.htm
Dworshak Dam	http://www.nwd-wc.usace.army.mil/report/dwrf.htm

NWS - Statistical Regression Forecasts	
Dworshak Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?DWRI
Rock Island Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?RISW
Libby Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LYDM
Hungry Horse Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?HHWM
	USBR - Johnny Roache - JROACHE@pn.usbr.gov
	Hungry Horse use USBR FCST information - from 2005 thru current - JA
	Columbia Basin Runoff Summary - Northwest River Forecast Center
ACTUAL	https://npr71.nwd-wc.usace.army.mil/rccweb/RCCLIST/runoff.txt

**Deterioration of April - August Water Supply Forecast at Libby Dam in 2005
(6.25 MAF is the avg 1971 - 2000)**



TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday May 04, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cnmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. 4/6, 4/13 Minutes
 - i. [April 06, 2005](#) 
 - ii. [April 13, 2005](#) 
3. Hanford Reach Update
 - i. [Priest Rapids Operations](#) 
4. Q Adjust, ESP Runs
 - i. [\[QADJ versus ESP HYSSR Presentation\]](#)
 - ii. [\[QADJ Model Runs 03-May-05\]](#) 
 - iii. [\[ESP HYSSR 03-May-05\]](#) 
5. DWR ESP inflows
[\[DWR 26AprESP inflows\]](#)  [\[DWR 26AprESP inflows - exceedance\]](#) 
6. DWR available augmentation
[\[Old Augmentation bar graph\]](#)  [\[New Augmentation graph\]](#)  [\[New Augmentation graph using ESP\]](#) 
7. DWR augmentation request -
[\[SOR #2005-09\]](#) 
8. Flow Objectives at Priest Rapids

[\[SOR #2005-10\]](#) 

9. Operations Review

- a. Chum Update - [\[Link to Fish Passage Center\]](#)
- b. Start of Bonneville Spill
- c. Ice Harbor Dam Spill -
[\[SOR #2005-06\]](#) 
- d. Shape of flow at Priest Rapids through April, May, June -
[\[SOR #2005-07\]](#) 
- e. Lower Columbia Flow Shaping -
[\[SOR #2005-08\]](#) 
- f. Reservoirs
- g. Fish
- h. Power System
- i. Water Quality -

[\[TDG Exceedance Types - April 07 to May 02, 2005\]](#)  [\[Spill Information 2005\]](#) 

10. DWR Local Flood Control Analysis.

[\[Snow Covered Area flood control background\]](#) 

11. Water Supply Forecast

- i. [WSF_MIDMN_Jan to Apr - Apr-05-2005](#)



- ii. [Deterioration of April - August Water Supply Forecast at Libby Dam in 2005](#)



12. Final Spring/Summer Update

- o [Final 3 May 2005](#)

13. Flow Augmentation Volumes at Headwater Reservoirs

- o [Dworshak](#)
- o [Libby](#)
- o [Hungry Horse](#)

14. Other

- 15. Set agenda for next meeting - [\[Reference Calendar\]](#) 

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

Snow Covered Area flood control background

Normally the system, local or calculated flood control refill curve criteria dictates the end of month flood control elevation. Starting in April of this year the level 1 snow covered area flood control constraint dictated operations during the REFILL period. The objective is to refill the project in a controlled manner and protect against a probable maximum flood (PMF). Below is the rule curve for this methodology:

Percent of Area Covered by By Accumulated Winter Snowpack	Space Reservation (1,000 AF)	Elevation (FT)
100	700	1558.2
80	540	1568.8
60	385	1578.4
40	230	1587.5
20	80	1595.8
10	0	1600

In November 1966 the Weather Bureau published HMR 43 (“Probable Maximum Precipitation, Northwest States”). The information in HMR 43 was not used in the determination of the Dworshak PMF because the study analysis had been done before HMR 43 was published. This left questions on the validity of the derived PMF. Rather than redoing all of the PMF computations and perhaps needing to redesign the Dworshak spillway, snow covered area criteria was developed to limit the filling rate of Dworshak to assure capability to pass the spillway design flood (220,000 cfs) in the event of a severe rainstorm during the spring snowmelt event. For the purposes of this analysis the snow covered area only includes winter snowpack and does not include late spring snowstorms which would cover a large area without producing substantial runoff.

The probable maximum flood (PMF) inflow for Dworshak was approved by the Office, Chief of Engineers, on 18 December 1968. The size of the Dworshak spillway was based on regulation of the PMF inflow of 411,000 cfs down to a 220,000 cfs release (outlet capacity of 40,000 cfs and spillway capacity of 180,000 cfs).

The snow covered area criteria is listed as a level 1 constraint and should not be violated except during extreme emergencies. This criteria and constraint level does however need to be need weighed against the ability of the snow covered area to produce substantial runoff .

These are the 2 web sites NWW uses to come up with snow covered area estimate. If NOAA is not able to get a satellite picture because of clouds, they run a model to estimate snow covered area percentage. The snow covered area estimates on this web

site change every day. Dworshak Reservoir is the basin used on the SCA site and Clearwater Basin is used on the snotel site.

REMOTE SENSING SCA WEB SITE

http://www.nohrsc.nws.gov/interactive/html/basin.php?rfc=NWRFC&dy=2004&dm=4&dd=28&dh=12&pe=sm_snow&units=0&submit1=Refresh+screen

SNOTEL UPDATE WEBSITE

<ftp://ftp.wcc.nrcs.usda.gov/data/snow/update/id.txt>

In addition to this, Walla Walla District made a helicopter snow flight on April 22 to verify the snow covered area percentage .

***Spring / Summer Update to the 2005
Water Management Plan***

DRAFT 3 May 2005

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Draft Spring / Summer Update to the 2005 Water Management Plan

1. Introduction

The 2005 Spring / Summer update to the Water Management Plan (WMP) updates information on how the Action Agencies plan to operate the Federal Columbia River Power System (FCRPS) reservoirs during the spring and summer seasons.

The *Spring / Summer WMP Update* (S/S Update) is needed because water supply forecasts for the spring and summer time period are not available at the time the water management plan is written. Planned operations in the *S/S Update* are based on the most current water supply forecast which is considered to be the best available forecast of the expected runoff water volume, and thus how the FCRPS will be operated in 2005. The “April Final” water supply forecast is the most current forecast available when the final version of the *S/S Update* is completed.

The *S/S Update* also reports 2005 research operations planned for the FCRPS projects. Research studies are routinely conducted to test the performance of current or new fish passage operations and the effects on a wide range of conditions, including spill survival, tailrace egress, transport benefits and the performance of new passage devices like the Bonneville second powerhouse corner collector. The Studies Review Work Group establishes the research study plan in the spring just prior to the commencement of the spring migration. The *S/S Update* summarizes the project operations that support these research activities.

The *S/S Update* does not repeat all of the information in the WMP, but does provide additional detail and specifies operations based on the current water supply forecast or changes that need to be made in operations because of the availability of current water supply forecasts, flow projections, and other new information.

2.0 Role of Water Supply Forecasts

There are four forecast points that are used to determine BiOp operation of the FCRPS reservoirs. The latest forecasts (April Final) are given below.

Forecast Point	Forecast Period	Forecast Date	Value (MAF)
Lower Granite	April – July	March Final	9.96
Lower Granite	April – July	April Final	11.1 ^A
The Dalles	April – August	March Final	57.2
The Dalles	April – August	April Final	60.8 ^A
Hungry Horse	April – August	February Final	1.60
Hungry Horse	April – August	March Final	1.289 ^{AB}
Libby	April – August	April Final	5.4
Libby	April - August	May or June (usual practice)	^C

All forecasts are from the National Weather Service unless otherwise indicated

A – Value that is used to set operations

B – USBR Forecast C – COE Forecast

3.0 Flow Objectives

Spring

The spring flow objectives for Lower Granite and McNary are established by the April final water supply forecast. The Priest Rapids spring flow objective is fixed (not dependent on the water supply forecast). Based on the April final forecast the spring flow objectives are shown below.

Project	Spring Flow Objective
Lower Granite	85 KCFS
McNary	220 KCFS
Priest Rapids	135 KCFS

Summer

The summer flow objective for Lower Granite Dam is based on the June Final water supply forecast. Based on the latest water supply forecast (April Final) the summer flow objectives are shown below. The McNary summer flow objective is fixed (not dependent on the water supply forecast).

Project	Summer Flow Objective
Lower Granite	50 KCFS
McNary	200 KCFS

Prospects For Meeting Flow Objectives

An analysis of the likelihood of meeting the flow objectives was conducted by using the Corps' QADJ runs of the HYSSR model. This model uses the volume of the current water supply forecast and applies the 69 runoff shapes observed in the historical record to this forecast volume. The likelihood of meeting the flow objectives and refilling the reservoirs by the targeted dates is a function of both the runoff volume and the timeframe in which the snowmelt and stream flows occur. The likelihood of meeting the 2005 spring/summer flow objectives are shown in Appendix A for the latest QADJ run. (Based on the March Final water supply forecast) For this draft update, the QADJ run is linked to the TMT agenda on the web, for the February 16, 2005 meeting. It is located at: <http://www.nwd-wc.usace.army.mil/tmt/agendas/2005/0216.html>

4.0 Storage Project Operations

See Appendix B for Volume Charts for Libby, Dworshak and Hungry Horse. These charts will be added to the update when they become available.

Libby Dam

Sturgeon Pulse

The current water supply forecast of 5.42 MAF for Libby (April – August) puts Libby operations in the 2nd tier of operations for sturgeon called for in the USFWS 2000 Biological Opinion. The 2nd tier sturgeon operation calls for a sturgeon flow volume of 800 KAF and minimum bull trout flows of 7 kcfs in July.

An SOR with specific flow and date recommendations will be submitted to TMT prior to initiating a flow operation for sturgeon.

Hungry Horse Dam

Bull Trout Flows & Ramping Rates

Based on the Bureau of Reclamation April forecast for April – August of 1372 kaf, the minimum outflow from Hungry Horse will be 483 cfs and the minimum flow for Columbia Falls will be 3250 cfs.

Hungry Horse April 10 and June 30 refill objective

Due to minimum flow requirements and winter flood control elevations at Hungry Horse Dam the April 10 refill objective will not likely be achieved. Based on the April final water supply forecast the Bureau of Reclamation expects to achieve the June 30 refill objective of 3560 feet.

Grand Coulee Dam

Grand Coulee April 10 and June 30 refill Objective

Based on the April Final WSF the April 10 refill objective is elevation 1283.3 feet. However, due to the maintenance required on the drum gates Grand Coulee will be held at a maximum elevation of 1255 feet for six weeks starting April 1. After completion of the required work Grand Coulee is not expected to refill to elevation 1290 feet by the first week of July.

Grand Coulee Summer Draft Limit

Based on the April final forecast of April – August runoff volume at the Dalles, the summer draft limit for Grand Coulee is expected to be 1278 feet. The draft limit for this project officially changes from 1280 to 1278 feet when the July final April-to-August runoff volume forecast for The Dalles is less than 92 Maf. The current forecast (April final) calls for a runoff volume of 60.8 MAF during this period.

Dworshak Dam

Summer Draft for Temperature Control

A key operation at Dworshak Dam is to draft cold water from the Dworshak reservoir in July, August, and September to cool water temperatures in the Lower Snake River for the benefit of migrating salmon and steelhead. In-season modeling will be done to provide information to aid in the making the decisions of when and how to draft Dworshak for water temperature control.

5.0 Upper Snake River Flow Augmentation

The Bureau of Reclamation currently estimates that a volume of approximately 144 kaf will be available for flow augmentation in 2005.

6.0 Flood Control Operations

The April 15 and April 30 flood control elevations based on the April final forecast are shown in the following table. The January 31 – March 31 flood control elevations were based on previous forecasts.

Note that April 10th flood control elevations are interpolated, as there is no official method of determining April 10th flood control elevations

Project	Date						
	31-Jan	28-Feb	15-Mar	31-Mar	10-Apr	15-Apr	30-Apr
ARDB	1433.2	1433.4		14338.5.		1438.5	1438.5
LIB	2420.9	2432.1	2441.135.9	2442.0		2442.6	2443.2
DCDB	1839.3	1812.5		1810.2		1810.2	1810.2
HGH	3546.8	3550.9		3555.6	3552.1	3556.7	3557.7
GCL	1290.0	1290.0		1283.3	1283.3	1283.3	1283.3
GCL-shifted	1290.0	1290.0		1281.9	1283.3	1282.8	
BRN	2077.0	2077.0		2077.0		2077.0	2077.0
BRN-shifted	2077.0	2077.0		2077.0		2077.0	
DWR*	1557.4	1571.2		1587.5	1591.7	1597.4	1597.4
DWR-shifted*	1556.3	1571.2		1593.3	1591.8	1599.5	

- *Note DWR also has a local flood control component that is based on the snow covered area of the basin. The April 5th estimates were flood control targets of 1587.5 ft. for 15 April and 1593.7 ft for 30 April. The April 27th estimate for flood control for May 15 was 1597.8 ft. Snow covered area and flood control estimates are re-evaluated weekly.*

Dworshak/Grand Coulee flood control shift

Dworshak/Grand Coulee flood control shift did not occur this year as Dworshak was below it's end of March flood control elevation.

7.0 Minimum Operating Pool

The minimum operating pool (MOP) operation for the Lower Snake projects was scheduled to start April 3rd. The Salmon Managers submitted SOR 2005-3 requesting the Snake and John Day drafts to MOP be delayed because of low numbers of juveniles at Lower Granite. They requested Ice Harbor, Lower Monumental, Little Goose and Lower Granite start MOP operations April 4, April 13, April 12 and April 11, respectively. These are the dates that were implemented. . It was agreed at the March 17, 2004 TMT meeting that because of human health and safety issues associated with navigation concerns Ice Harbor, Little Goose, and Lower Granite would be operated at MOP+1 to MOP+2. TMT may address, on an in-season management basis, navigation or other concerns that may result in adjustments in BiOp MOP operations. The table below shows the agreed upon elevations that were implemented

Project	Lower Range		Upper Range	
	Operation	Elevation	Operation	Elevation
Ice Harbor	MOP+1	438	MOP + 2	439
Lower Monumental	MOP	537	MOP + 1	538
Little Goose	MOP+1	634	MOP + 2	635
Lower Granite	MOP +1	734	MOP + 2	735

At John Day the forebay will be operated within a 1.5-foot range of the minimum level that provides irrigation pumping from April 10th to September 30th. The initial range will be 262.5 and 264.0 feet. The minimum level will be adjusted upward if needed to facilitate irrigation pumping. Actual John Day operations 262.5' – 264' range started April 15, 2005 at the request of the Salmon Managers in SOR 2005-3.

8.0 Hanford Reach

The Vernita Bar protection level flow was set at a level of 65 kcfs based on the November 21 and 28, 2004 redd counts. This year's Vernita Bar protection operation is scheduled to end when the water over the eggs have accumulated 1000 (C degrees) thermal units after the initiation of spawning . This is expected to occur May 13 – 15 . See Appendix C for the Hanford Reach Agreement.

9.0 Spill for Juvenile Fish Passage

Spring Spill Operations – Snake River Dams

The current forecasted spring seasonal average flow for Lower Granite Dam, based on April water supply forecasts, is less than 70 kcfs. This is below the UPA's 70 kcfs trigger level for spill at the lower Snake River collector projects, Lower Monumental, Little Goose, and Lower Granite. No spill for fish passage was initiated at the latter three projects. For planning purposes, Ice Harbor will provide spill for fish passage according to specifications in the 2004 UPA and the 2005 WMP, starting April 3 or as recommended by TMT. Actual operations at Ice Harbor were spill for RSW testing beginning April 4 and spill for fish passage starting at 1800 hours on April 7. The spill for fish passage date was requested in SOR 2005-4 and discussed at the April 6 TMT.

Lower Granite Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur in spring 2005. Spill may occur for short periods of time if it appears the fish facility and barge holding capacity will be exceeded.

Little Goose Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur at Little Goose in spring 2005.

Lower Monumental Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur at Lower Monumental in spring 2005

Ice Harbor Dam

Spill for fish passage will be provided at Ice Harbor according to specifications in the 2004 UPA. In addition, the effect on juvenile fish of operating the new removable spillway weir (RSW) will be tested this spring and summer. Spill patterns and amounts will be varied in the test. (See section 11 for further details). Spill during any non-test periods will be as specified in the UPA (spill limited to 45 kcfs during the day and spill to the gas cap at night). Actual operations at Ice Harbor were spill for RSW testing beginning April 4 and spill for fish passage starting at 1800 hours on April 7. The spill for fish passage date was requested in SOR 2005-4 and discussed at the April 6 TMT.

Summer Spill Operations – Snake River Dams

As specified in the UPA, the summer spill planning dates are June 21-August 31 for Ice Harbor Dam..

Lower Granite Dam, Little Goose Dam, Lower Monumental Dam

As specified in the UPA, no spill and full transport will be conducted at the Snake River transport dams.

Ice Harbor Dam

The UPA specifies summer spill 45 kcfs from 0500 – 1800 hours and 120%/115% gas cap from 1800 – 0500 hours from June 21 – August 31.

Spring and Summer Spill Operations – Lower Columbia River Dams

McNary Dam

Spring spill will begin on or about April 10 and will be conducted as specified in the UPA which calls for night spill (1800 – 0600 hours) to the gas cap. Spring spill will be suspended when river conditions are no longer spring-like (flows <200 kcfs and water temperature reaches 62-degrees F) and transport will be initiated. No summer spill with maximum transportation occurs at McNary Dam. Actual spill started April 10 as requested in SOR 2005-04. Starting April 25, voluntary spill started 24 hr/day for 21 days between April 25 – June 5. During this period 24 hr/day spill will be alternating with 12 hour/day spill for 2 – 4 days at a time. This additional spill is for Walla Walla Corps office to perform research.

John Day Dam

Spill will be provided from April 10 through August 31 (planning dates) for spring and summer migrants as stated in the UPA. From April 10 to June 20, spill discharges will be 60% of instantaneous project flow at project flows up to 300,000 cfs. Above 300,000 cfs

project flow, spill discharges will be 180,000 cfs (up to the hydraulic limit of the powerhouse). Between April 10 and May 14, spill will be 12 hours nightly from 1800 to 0600 hours. Between May 15 and June 20, spill will occur from 1900 to 0600 hours (11 hours total). From June 21 through August 31, spill will be 30% of instantaneous project flow 24-hours per day. Spill will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation. Actual spill started April 10 as requested in SOR 2005-04. . Actual spill amount and hours are as specified in the UPA.

The Dalles Dam

Spill will be 40% of total project outflow, not to exceed the 120% TDG cap. Actual spill started April 11 as requested in SOR 2005-04. Actual spill amount and hours are as specified in the UPA. Spillbays 3-6 were raised and dogged off at 6 foot openings on April 27. Spill through bays 1 and 2 were adjusted with spill patterns provided by Portland District to provide spill as close to 40% of total outflow as possible. Spillbays 3-6 were dogged off at 8 foot openings on April 27 and will continue to be adjusted as flows increase or decrease over a consistent period of time.

Bonneville Dam

Spill will be as specified in the UPA, spill to the TDG cap at night and spill 50 to 75 kcfs (adult fallback limit) during the day. Actual spill started April 15 as requested in SOR 2005-05. SOR 2005-5 requested to start daytime spill level at 50 kcfs and then increase to UPA level of 75 kcfs on April 19. This is what was actually implemented.

10. Water Quality – Spill Priority List

River operations are conducted to meet State Clean Water Act total maximum daily load (TMDL) dissolved gas standards. Also, research operations at a particular dam can be impacted by involuntary spill. Thus spill at research projects is given lower priority in the hope that involuntary spill can be eliminated during research. Starting out in 2005 involuntary spill will occur in the order shown below. The priorities will be modified as needed based on status of fish migration, spill/transport strategies, and studies, and other factors.

1. John Day
2. McNary
3. Bonneville
4. Chief Joseph
5. Lower Granite
6. Little Goose
7. Lower Monumental
8. Wanapum
9. Wells
10. Rocky Reach
11. Rock Island
12. Priest Rapids
13. Ice Harbor
- 5.
14. The Dalles
15. Grand Coulee
- 7.
- 8.
- 14.

200 GAS Cap levels

The range of gas caps during 2004 at the projects is shown below. The flow ranges listed below maintained the gas cap limits at the individual projects during the year.

	Min Kcfs	Max Kcfs
BON	75	180
TDA	70	130
JDA	70	155

MCN	130	185
IHR	70	92
LMN	25	44
LGS	38	43
LWG	20	47

Other Spill Operations

Based on a study conducted by a subgroup of the Regional Forum Water Quality Team, it was determined that joint operations of Chief Joseph and Grand Coulee Dam for power and total dissolved gas production could result in an overall reduction in TDG levels both upstream and downstream of Chief Joseph dam by taking advantage of the larger generation flow capacity of Grand Coulee and the lower average TDG loading below the Chief Joseph spillways (absent deflectors). As a result of this study, and coordination with the Bureau of Reclamation and the Colville Tribe, the joint operation of Grand Coulee and Chief Joseph will be conducted during the 2004 spill season. Operationally, this will be as follows,

- When Lake Roosevelt is below 1260' elevation, spill from the Grand Coulee outlet tubes be avoided by shifting all spill to Chief Joseph for spill discharges up to 70 kcfs. If river conditions require spill releases above 70 kcfs at Chief Joseph, the additional spill should be distributed between Chief Joseph and Grand Coulee in a 2.5 to 1 ratio.
- When Lake Roosevelt TDG is elevated and at or above 1260' elevation, spill over the drum gates at Grand Coulee may be beneficial to the system due to potential degassing. The continuation of monitoring practices and additional investigations of these operational measures on TDG exchange are recommended to further establish efficient and effective joint operations at Grand Coulee and Chief Joseph.

11. 2005 Fish Passage Research

Summaries of 2005 fish passage research studies that have the potential to change project operation are described below. Descriptions will be provided in future draft WMP updates as they become available.

Ice Harbor Dam

This tests for differences in distribution and survival of juveniles when spilling to the gas cap or spilling with RSW. The RSW condition will spill from 25% to 35% of total outflow.

IHR 05 Proposed Treatment Schedule

Date	Block #	Treatment
24-Apr	1	Gas Cap
25-Apr	1	Gas Cap
26-Apr	1	RSW
27-Apr	1	RSW
28-Apr	2	RSW
29-Apr	2	RSW
30-Apr	2	Gas Cap
1-May	2	Gas Cap
2-May	3	Gas Cap
3-May	3	Gas Cap
4-May	3	RSW
5-May	3	RSW
6-May	4	RSW
7-May	4	RSW
8-May	4	Gas Cap
9-May	4	Gas Cap
10-May	5	RSW
11-May	5	RSW
12-May	5	Gas Cap
13-May	5	Gas Cap
14-May	6	RSW
15-May	6	RSW
16-May	6	Gas Cap
17-May	6	Gas Cap
18-May	7	Gas Cap
19-May	7	Gas Cap
20-May	7	RSW
21-May	7	RSW
22-May	8	RSW
23-May	8	RSW
24-May	8	Gas Cap
25-May	8	Gas Cap
26-May	9	Gas Cap

27-May	9 Gas Cap
28-May	9 RSW
29-May	9 RSW

McNary Dam

This study is to better define spill operation for 12 vs. 24 hour and the affect of juvenile distribution and survival.

2005 MCN Proposed Spill Treatment Schedule

Date	Block #	Treatment	Date	Block #	Treatment
23-Apr	1	12-h spill	17-May	7	12-h spill
24-Apr	1	12-h spill	18-May	7	12-h spill
25-Apr	1	24-h spill	19-May	7	24-h spill
26-Apr	1	24-h spill	20-May	7	24-h spill
27-Apr	2	24-h spill	21-May	8	12-h spill
28-Apr	2	24-h spill	22-May	8	12-h spill
29-Apr	2	12-h spill	23-May	8	24-h spill
30-Apr	2	12-h spill	24-May	8	24-h spill
1-May	3	12-h spill	25-May	9	12-h spill
2-May	3	12-h spill	26-May	9	12-h spill
3-May	3	24-h spill	27-May	9	24-h spill
4-May	3	24-h spill	28-May	9	24-h spill
5-May	4	24-h spill	29-May	10	12-h spill
6-May	4	24-h spill	30-May	10	12-h spill
7-May	4	12-h spill	31-May	10	24-h spill
8-May	4	12-h spill	1-Jun	10	24-h spill
9-May	5	24-h spill	2-Jun	11	12-h spill
10-May	5	24-h spill	3-Jun	11	12-h spill
11-May	5	12-h spill	4-Jun	11	24-h spill
12-May	5	12-h spill	5-Jun	11	24-h spill
13-May	6	24-h spill			
14-May	6	24-h spill			
15-May	6	12-h spill			
16-May	6	12-h spill			

12-h spill - current BiOp spill (gas cap, 1800-0600 hours)

24-h spill - 85 kcfs spill 24-hours per day (treatment begins at 0600 hours)

This is McNary's turbine upgrade testing. This is a test of the vertical barrier screens in turbine #4 under two turbine loads to asses the affects of new VBS on juvenile injury and survival.

2005 MCN Proposed Turbine Operation Treatment Schedule

Spring				Summer			
Date	Block	Release day	Treatment	Date	Block	Release day	Treatment
26-Apr	1	x	60 MW	1-Jun	1	x	60 MW
27-Apr	1		60 MW	2-Jun	1		60 MW
28-Apr	1	x	80 MW	3-Jun	1	x	80 MW
29-Apr	1		80 MW	4-Jun	1		80 MW
30-Apr	2	x	60 MW	5-Jun	2	x	60 MW
1-May	2		60 MW	6-Jun	2		60 MW
2-May	2	x	80 MW	7-Jun	2	x	80 MW
3-May	2		80 MW	8-Jun	2		80 MW
4-May	3	x	60 MW	9-Jun	3	x	80 MW
5-May	3		60 MW	10-Jun	3		80 MW
6-May	3	x	80 MW	11-Jun	3	x	60 MW
7-May	3		80 MW	12-Jun	3		60 MW
8-May	4	x	80 MW	13-Jun	4	x	80 MW
9-May	4		80 MW	14-Jun	4		80 MW
10-May	4	x	60 MW	15-Jun	4	x	60 MW
11-May	4		60 MW	16-Jun	4		60 MW
12-May	5	x	80 MW	17-Jun	5	x	60 MW
13-May	5		80 MW	18-Jun	5		60 MW
14-May	5	x	60 MW	19-Jun	5	x	80 MW
15-May	5		60 MW	20-Jun	5		80 MW
16-May	6	x	80 MW	21-Jun	6	x	80 MW
17-May	6		80 MW	22-Jun	6		80 MW
18-May	6	x	60 MW	23-Jun	6	x	60 MW
19-May	6		60 MW	24-Jun	6		60 MW
20-May	7	x	80 MW	25-Jun	7	x	60 MW
21-May	7		80 MW	26-Jun	7		60 MW
22-May	7	x	60 MW	27-Jun	7	x	80 MW
23-May	7		60 MW	28-Jun	7		80 MW
24-May	8	x	60 MW	29-Jun	8	x	60 MW
25-May	8		60 MW	30-Jun	8		60 MW
26-May	8	x	80 MW	1-Jul	8	x	80 MW
27-May	8		80 MW	2-Jul	8		80 MW

The Dalles Dam**Spillwall Post Construction Evaluation.****Bonneville Dam**

Unit Priorities for spring and summer.

3. Research Activities that will Impact Project Operations

Project	2005 Snake River Research Summary Table		
	Research Objectives	Spring Spill Plan	Summer Spill Plan
Lower Granite	Determine approach, passage and survival during a low flow year	Only in case of emergency, (i.e. high bypass system mortality or fish #s exceeding transport capabilities)	N/A
	Determine effectiveness of summer RSW operations for fall Chinook approach, passage and survival. Radio-telemetry and hydroacoustics	N/A	Spill to be provided through RSW 24 hours per day (6-8 kcfs) and some level of training spill between mid-June and late July running for 3 or 4 weeks. .
Little Goose	Determine approach, passage and survival during a low flow year	N/A	N/A
Lower Monumental	Determine survival in Bays 7 vs. 8 during the spring for RSW planning, Radiotelemetry	This study will operate high gate opening spill for 25-day duration from 10:00 AM until 3:00 PM each day beginning May 3. Spill volume roughly 18.7 kcfs. Stops will be: Spillbay 8 – 5 stops, Spillbay 7 – 5 stops, Spillbay 1 - 1 stop.	N/A
	Determine direct injury in Bays 7 vs. 8 during the late spring for RSW planning, Balloon tags	This study will examine fish injury in spillbays 7 and 8 with a gate opening of 5 stops. Study is scheduled to begin mid-May and the duration will be 12-14 days. Specific details are currently being finalized.	
Ice Harbor	Determine approach, survival, passage and egress	See attached Table	

	in a test of RSW versus bulk spill operations during spring and summer		
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Project	2005 Lower Columbia River Research Summary Table		
	Research Objectives	Spring Spill Plan	Summer Spill Plan
Bonneville	Route specific and spill survival	BiOp Spill	
The Dalles	Post-construction evaluation of spillway wall	Bays 3-6, 8 foot gate opening using suspending pennants, bays 1-2 will be variable, based on total river discharge	Bays 3-6, 4 foot gate opening using suspending pennants, bays 1-2 will be variable, based on total river discharge
John Day	N/A	N/A	N/A
McNary		N/A	N/A

Appendix A Qadj Runs.

Summary of April Final 2005 QADJ Model Runs

13-Apr-05

Assumptions:

- * Streamflows were adjusted to the April Final Water Supply Forecast for the period of April thru August of 60.8 MAF at The Dalles (65% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are actual March 31, 2005 elevations.
- * Grand Coulee maintains a maximum pool of 1255 ft through April for drum gate maintenance. Coulee tries to meet 70,000 cfs at Priest Rapids in Apr1, 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to at 1285 ft in all years. Summer lake targets are 1284.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates April - May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets the snow covered area local flood control requirement (elevation 1587.5 ft on Apr 15 and 1591.6 ft on Apr 30). The project targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Apr - May, targets full in June with a minimum flow of 17,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 15	68	74	65
Apr 30	39	102	110
May	26	118	130
Jun	67	113	90

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	1	44	85
May	0	61	85
Jun	6	55	73
Jul	0	31	50
Aug 15	0	25	50
Aug 31	0	22	50

Bonneville Meets Flow Objectives of 125 kcfs in Apr:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)
Apr 15	53	137
Apr 30	63	166

McNary Meets the Following Flow Objectives:

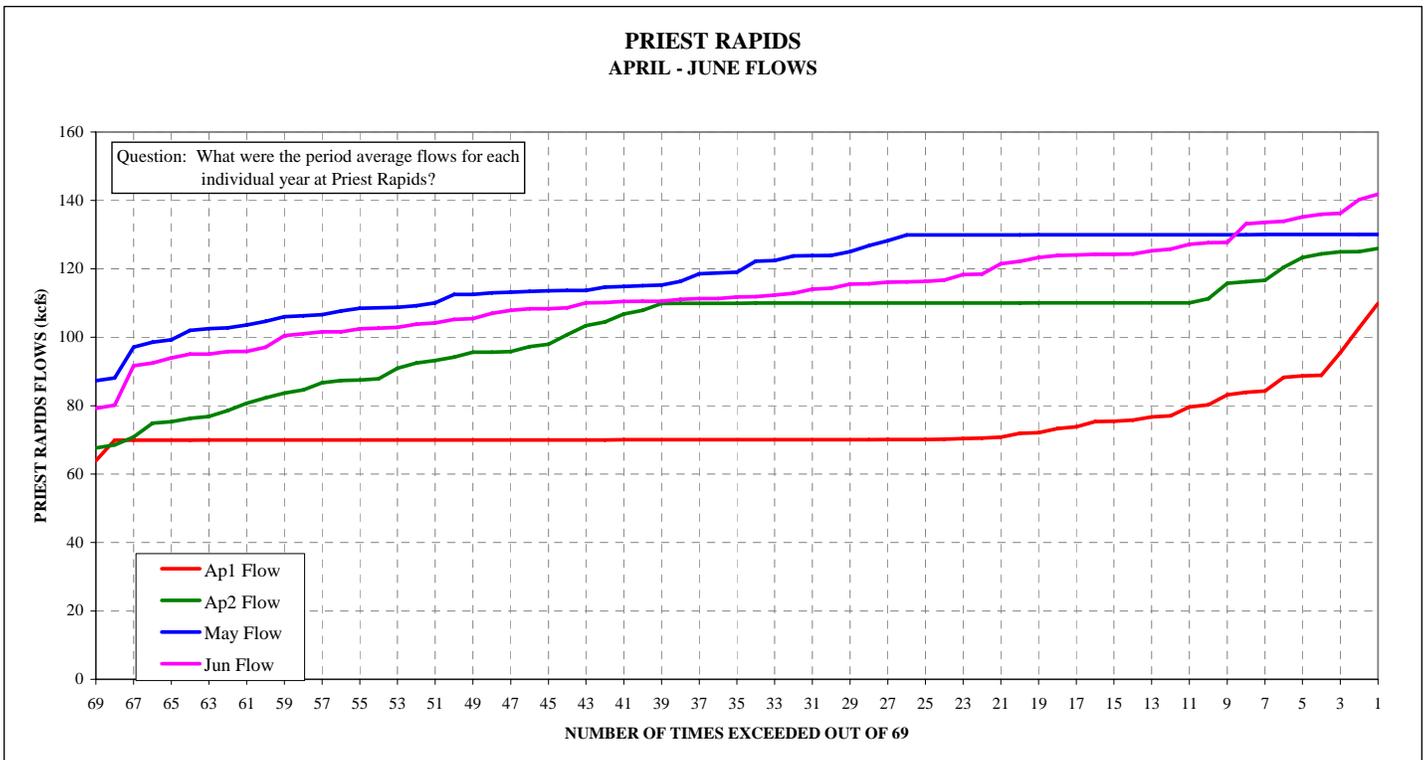
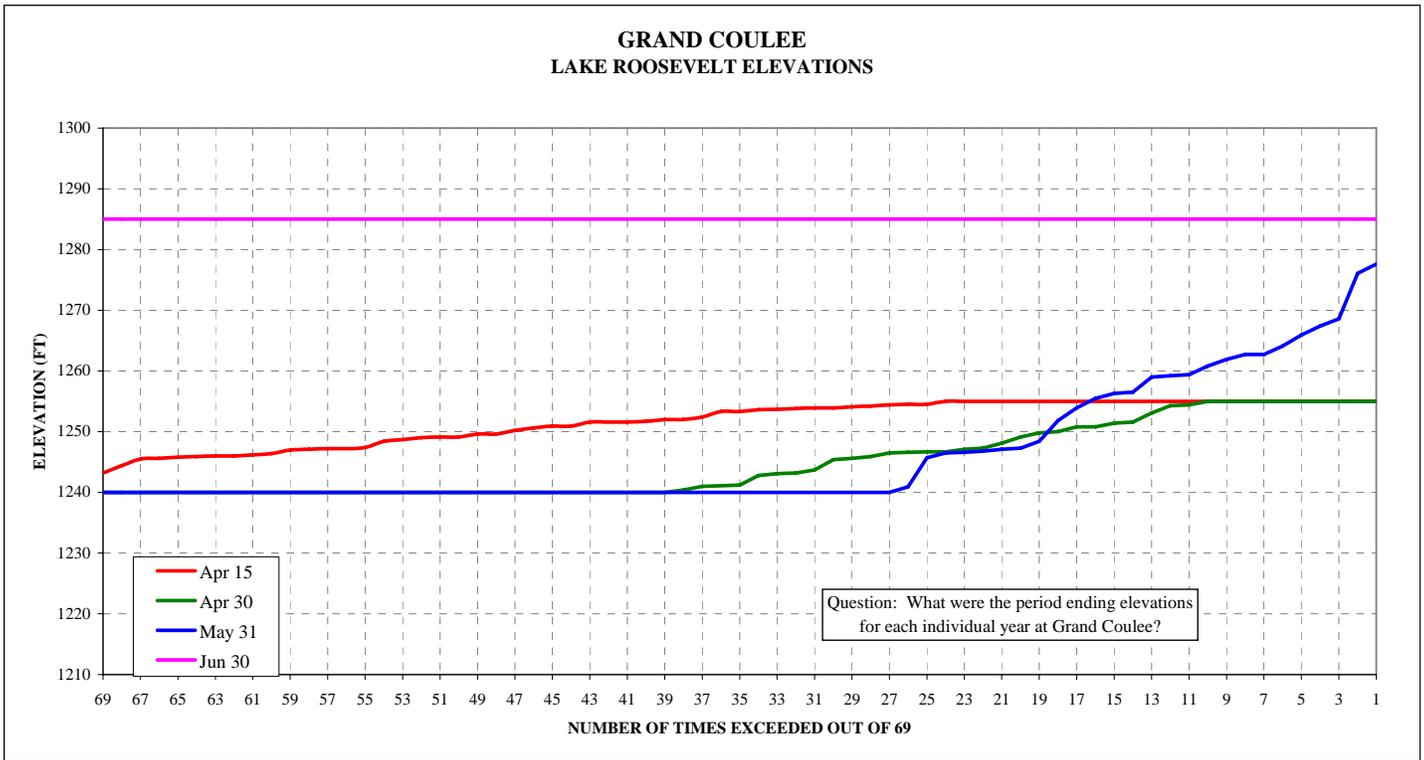
Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	152	220
May	1	181	220
Jun	2	168	220
Jul	0	151	200
Aug 15	0	123	200
Aug 31	0	118	200

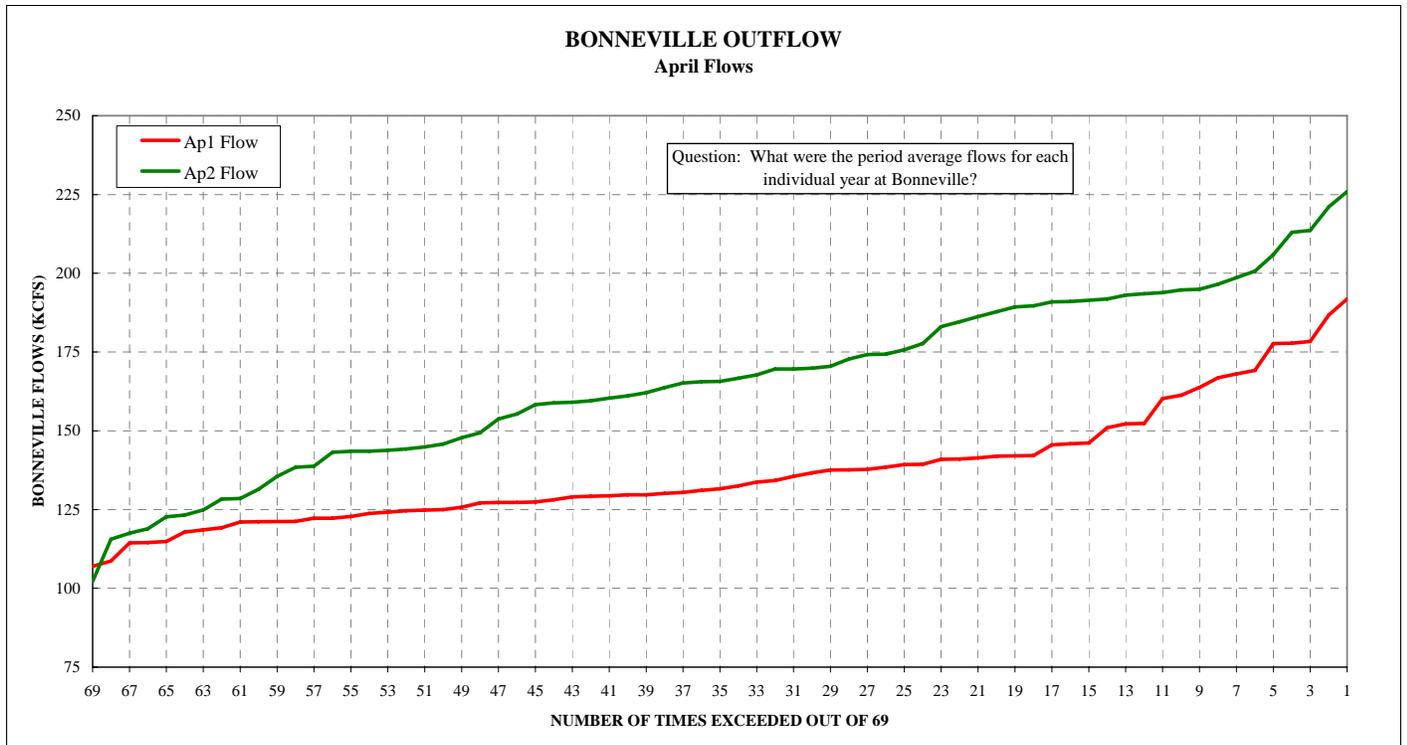
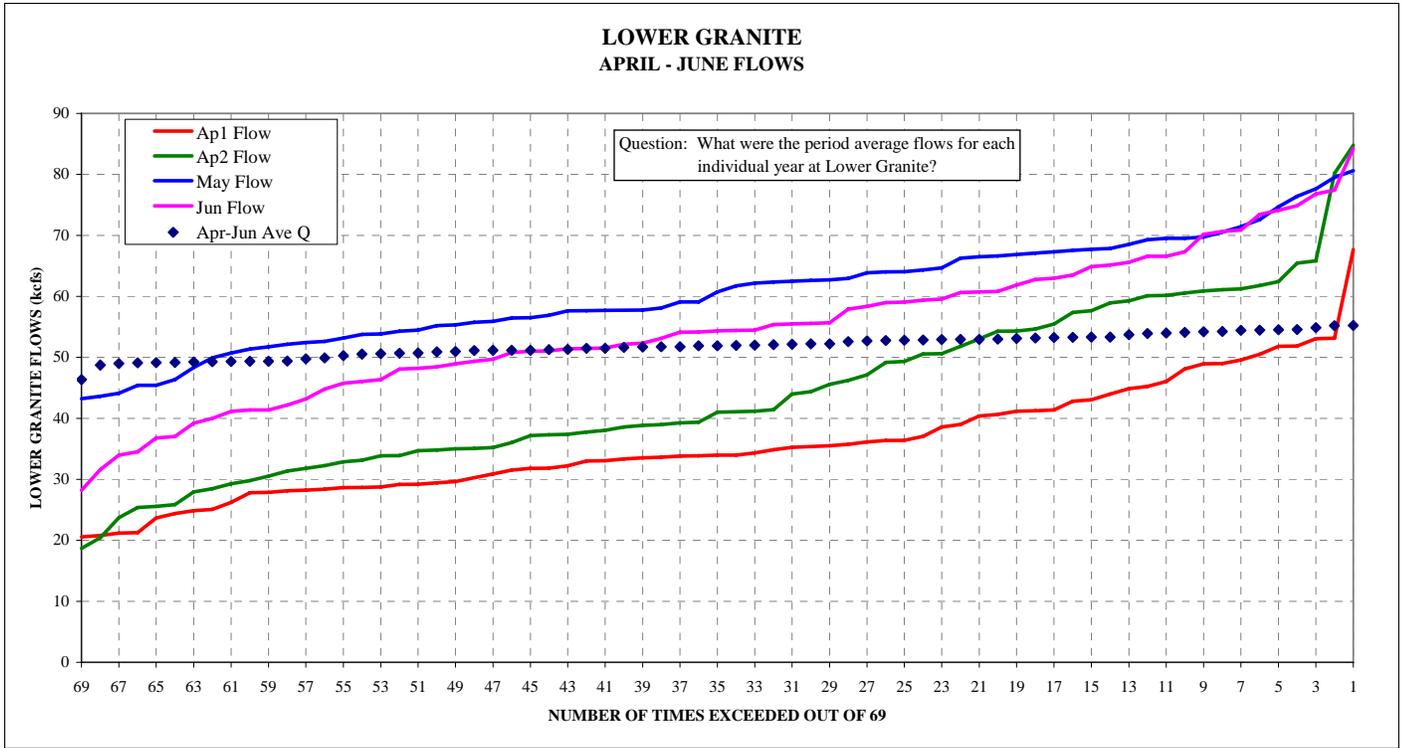
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	65	2459
Hungry Horse	69	3560
Grand Coulee	0	1285
Dworshak	69	1600

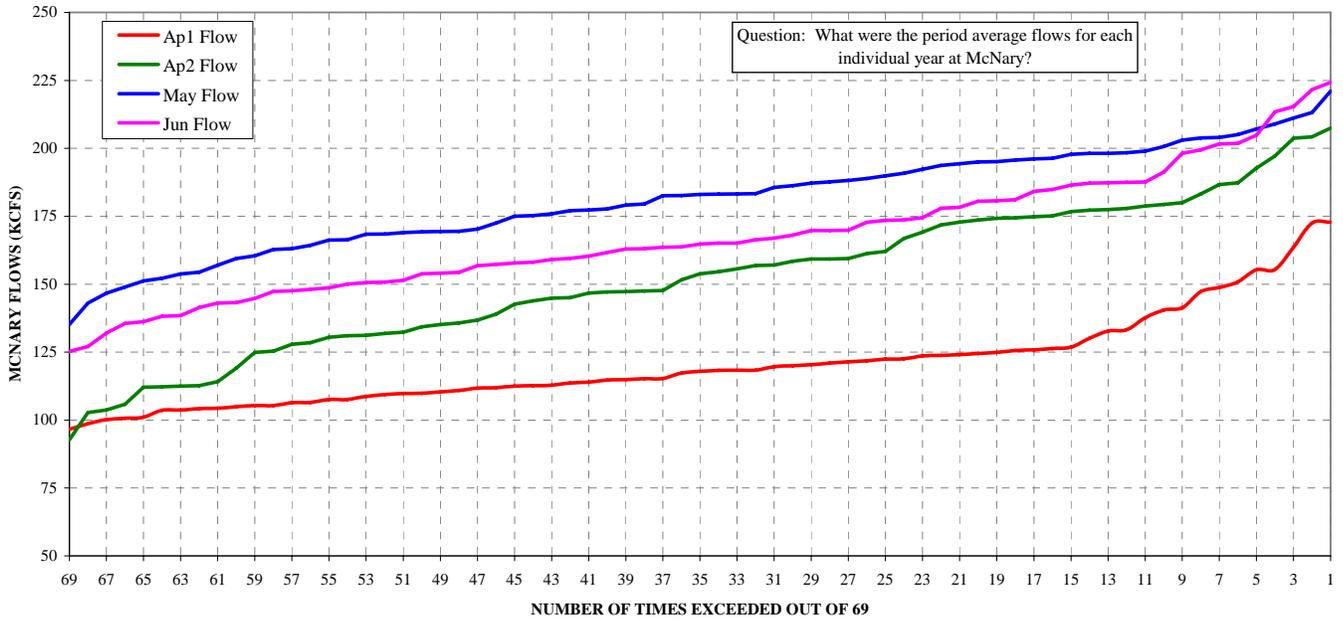
Period Average Outflows (kcfs):

	FEB 1-28	MAR 1-28	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	6.2	22.4	21.4	19.6	16.5
HGH	1.0	0.9	0.5	6.0	5.3	6.5	5.9	5.5	4.2
GCL	101	91	72	100	115	109	122	99	97
PRD	111	100	74	102	118	113	122	99	96
DWR	1.6	1.6	1.8	3.5	6.2	4.9	10	10	9
BRN	10	11	16	15	14	13	9	10	10
LWG	21	22	36	44	61	55	31	25	22
MCN	134	123	121	152	181	168	151	123	118
TDA	140	125	133	162	184	169	151	125	120
BON	138	130	137	166	186	170	153	126	121

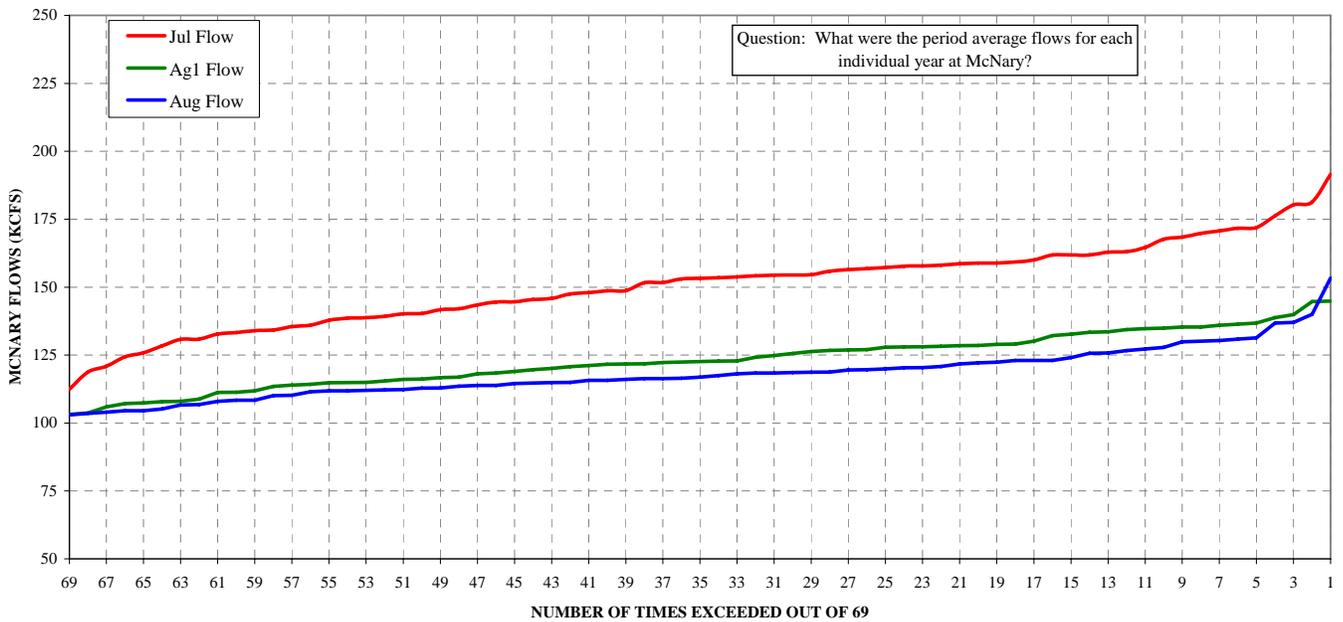




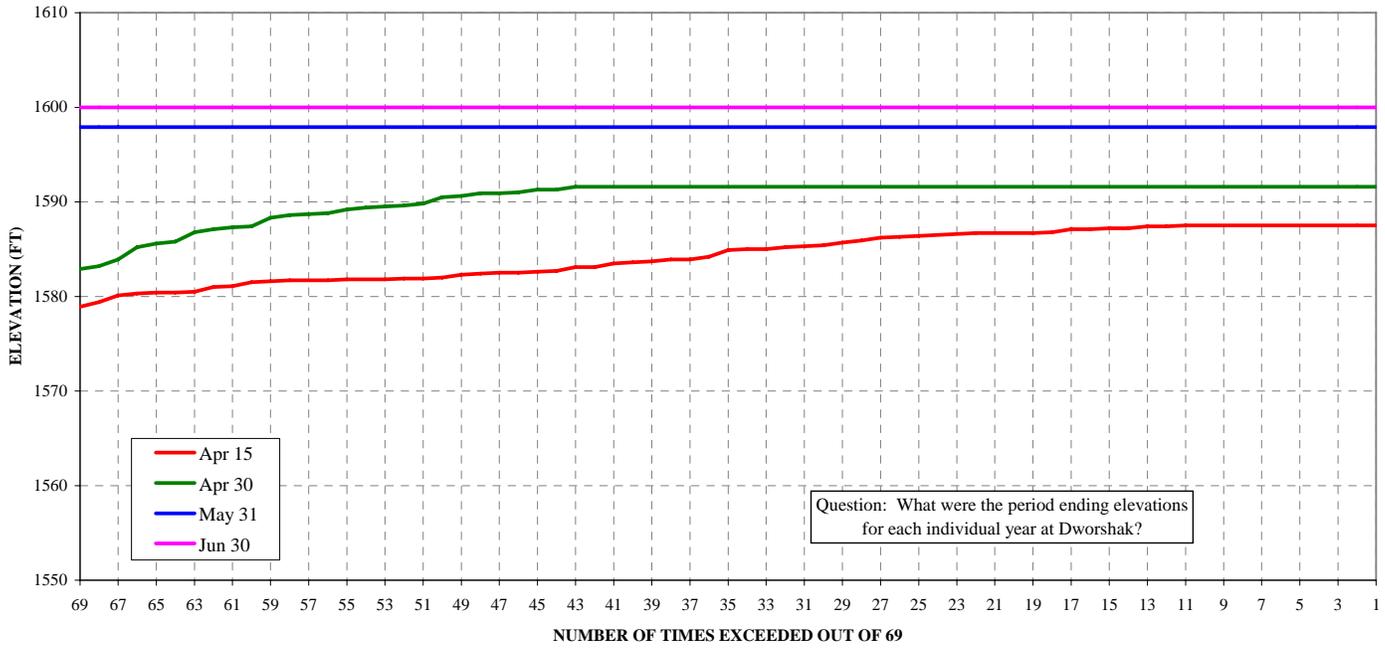
**MCNARY OUTFLOW
APRIL - JUNE AVERAGES**



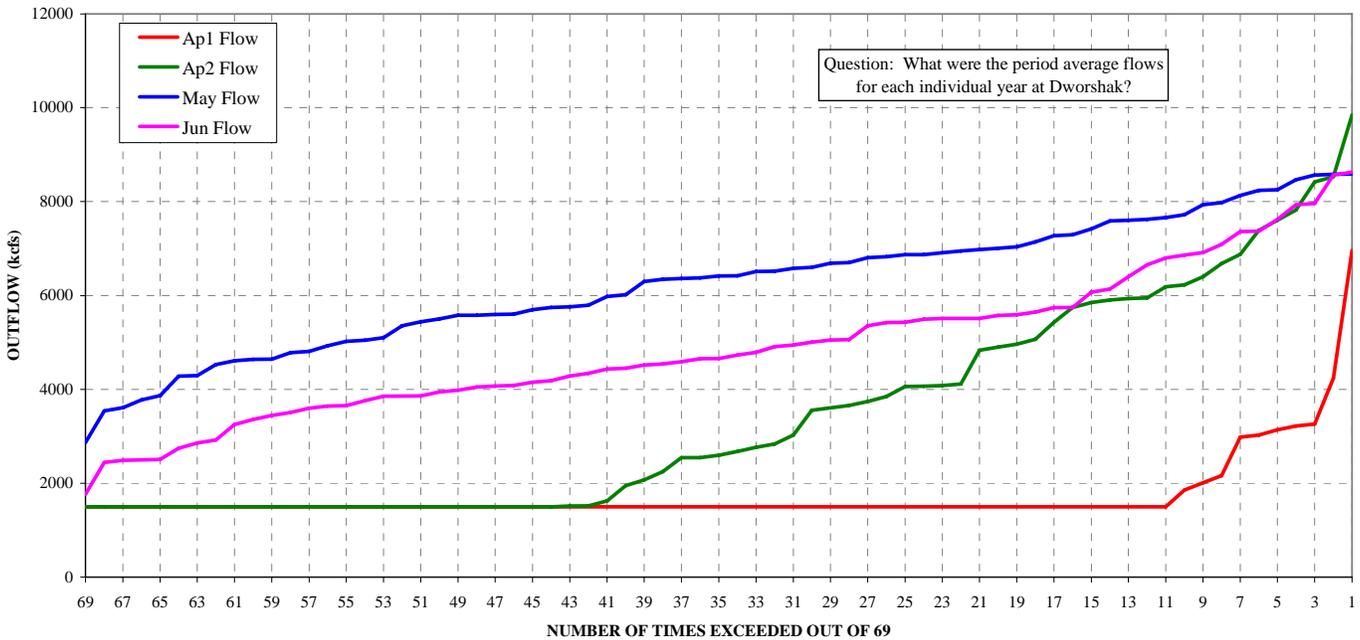
**MCNARY OUTFLOW
JUL-AUG AVERAGES**



**DWORSHAK
LAKE ELEVATIONS**



**DWORSHAK
OUTFLOWS**



Appendix B ESP HYSSR MODEL RUNS.

Summary of 19 Apr 2005 **ESP HYSSR** Model Runs

2-May-05

Assumptions:

- * Streamflows were from the 19 Apr ESP run, which uses current basin conditions combined with 44 historical weather patterns (temperatures and precipitation) to produce 44 ESP hydrographs for 2005.
- * Starting elevations are observed April 15, 2005 elevations.
- * Grand Coulee maintains a maximum pool of 1255 ft through April for drum gate maintenance. Coulee tries to meet 110,000 cfs in Apr2, and 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to at 1285 ft in all years. Summer lake targets are 1284.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates April - May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets local flood control requirements due to snow covered area (elevation 1593.7 on Apr 30). The project targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby operates on minimum flow or VARQ flood control Apr - May, targets full in June with a minimum flow of 17,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	44	110	110
May	28	126	130
Jun	43	122	90

* Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	44	85
May	5	75	85
Jun	4	54	73
Jul	0	29	50
Aug 15	0	26	50
Aug 31	0	25	50

Bonneville Meets Flow Objectives of 125 kcfs in Apr:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)
Apr 30	44	169

McNary Meets the Following Flow Objectives:

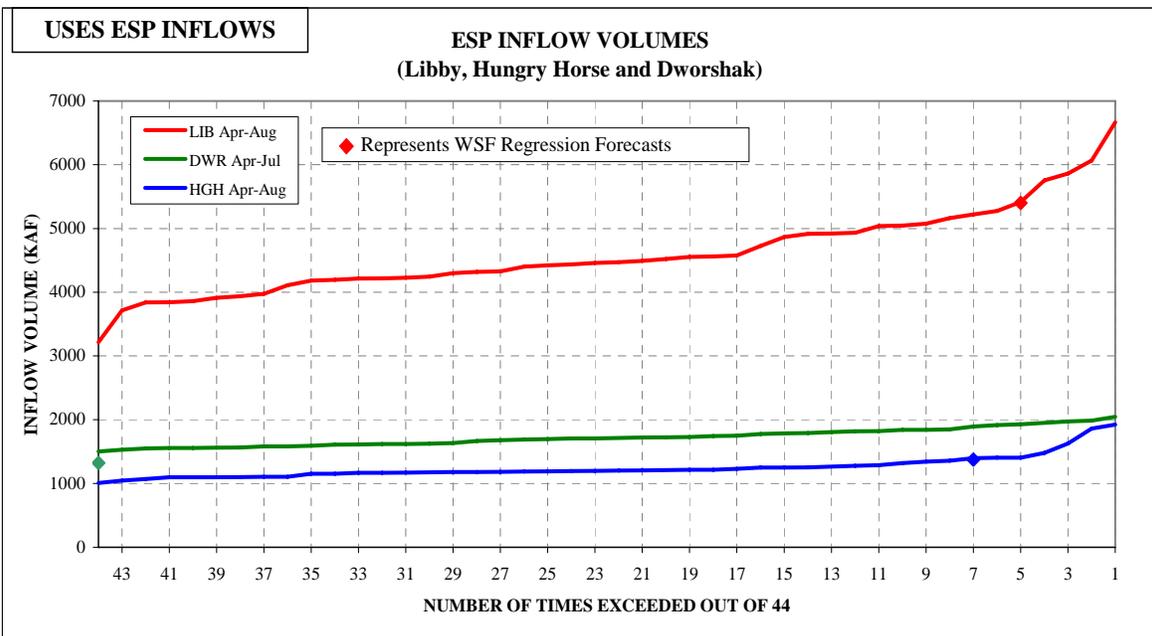
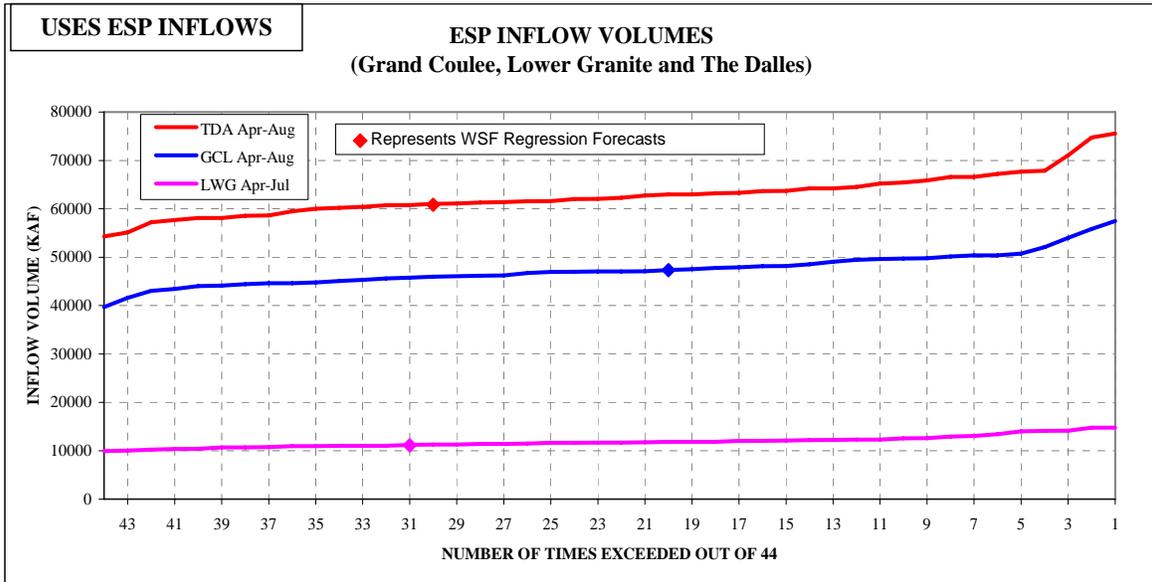
Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
Apr 30	0	159	220
May	4	200	220
Jun	7	179	220
Jul	3	170	200
Aug 15	0	144	200
Aug 31	0	139	200

Projects Refill by 30 June:

Month	Occurrences out of 44 Years	Average Elevation on 30 Jun for 44 Years
Libby	14	2453
Hungry Horse	44	3560
Grand Coulee	0	1285
Dworshak	44	1600

Period Average Flows (kcfs):

	FEB 1-28	MAR 1-31	APR 1-15	APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	4.4	19.0	14.5	17.0	16.7
HGH	1.0	0.9	2.1	6.0	4.4	5.0	5.5	5.6	4.4
GCL	101	91	77	102	110	111	132	112	109
PRD	111	100	87	110	126	122	137	115	112
DWR	1.6	1.6	3.6	6.6	11.1	4.2	10.1	10.1	9.4
BRN	10	11	14	10	12	10	8	10	11
LWG	21	22	39	44	75	54	29	26	25
MCN	134	123	130	159	200	179	170	144	139
TDA	140	125	134	167	195	174	167	142	139
BON	138	130	141	169	197	176	168	144	141

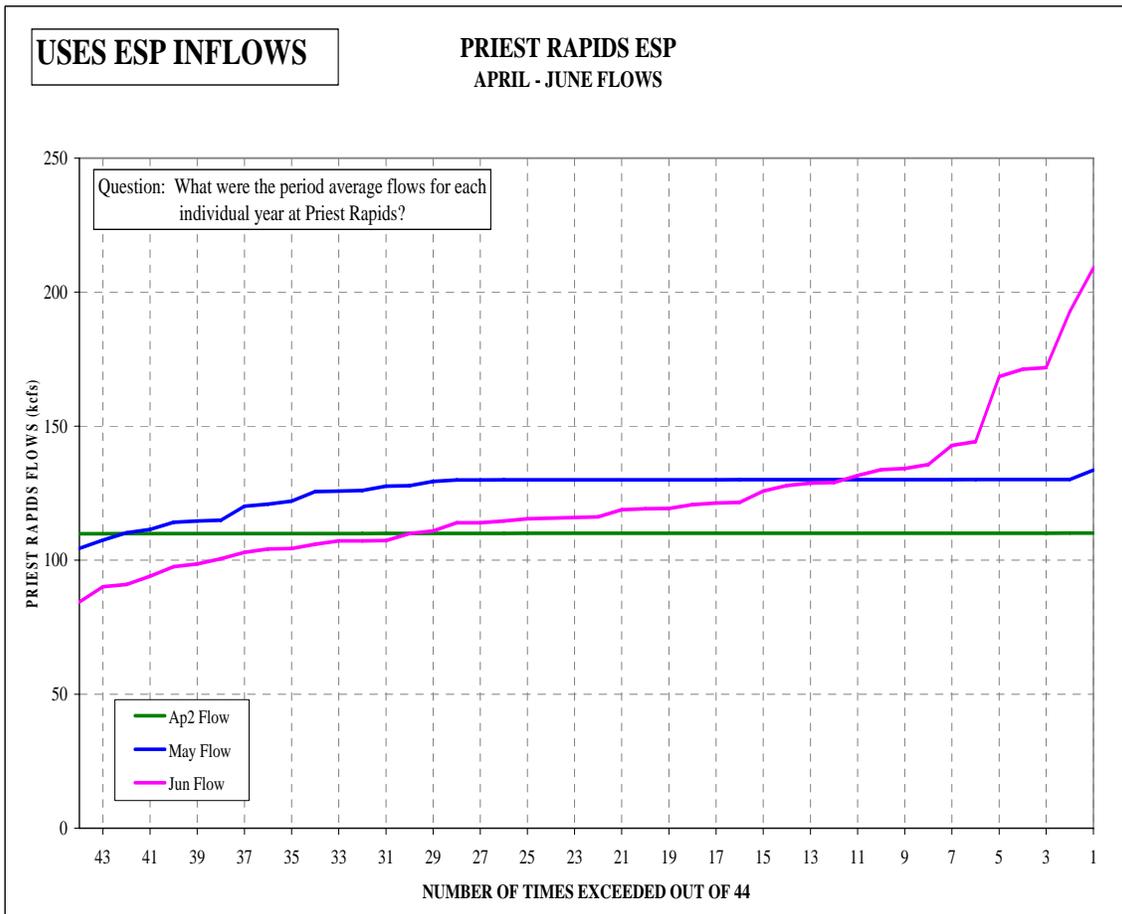
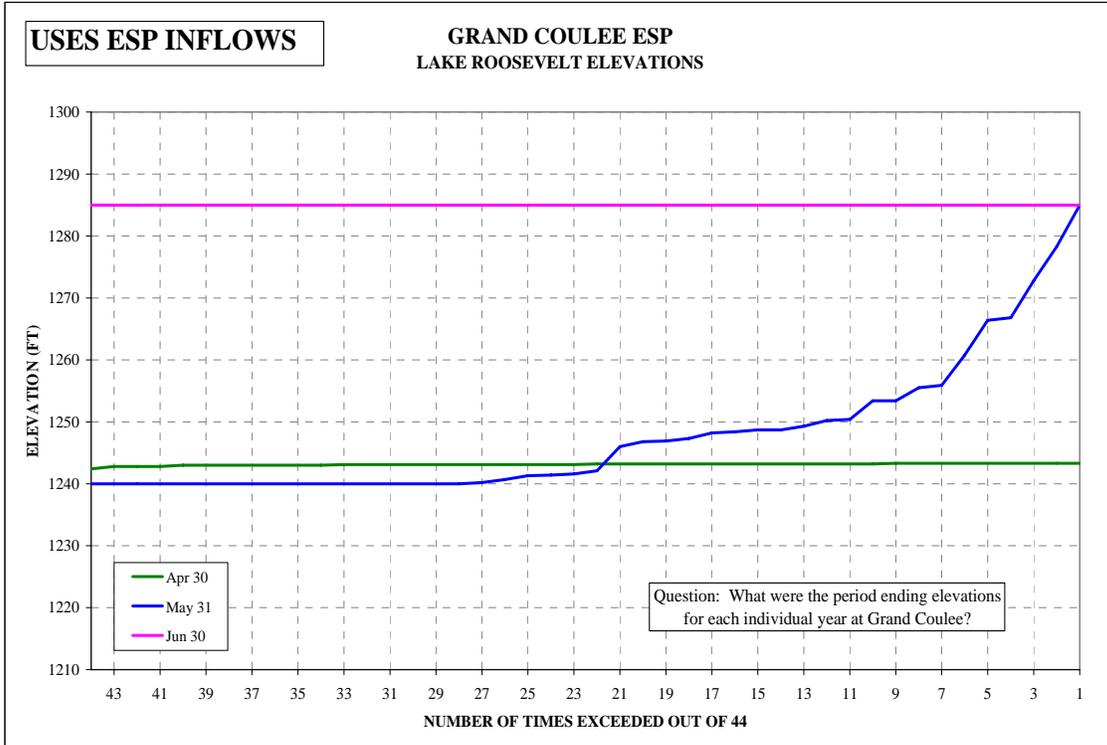


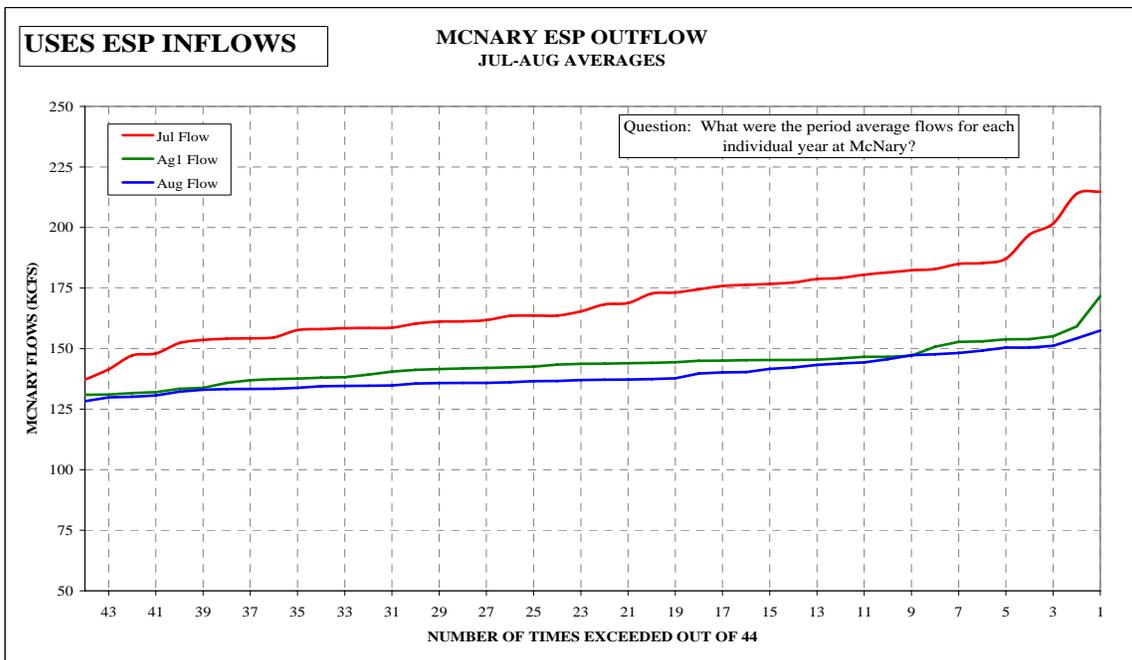
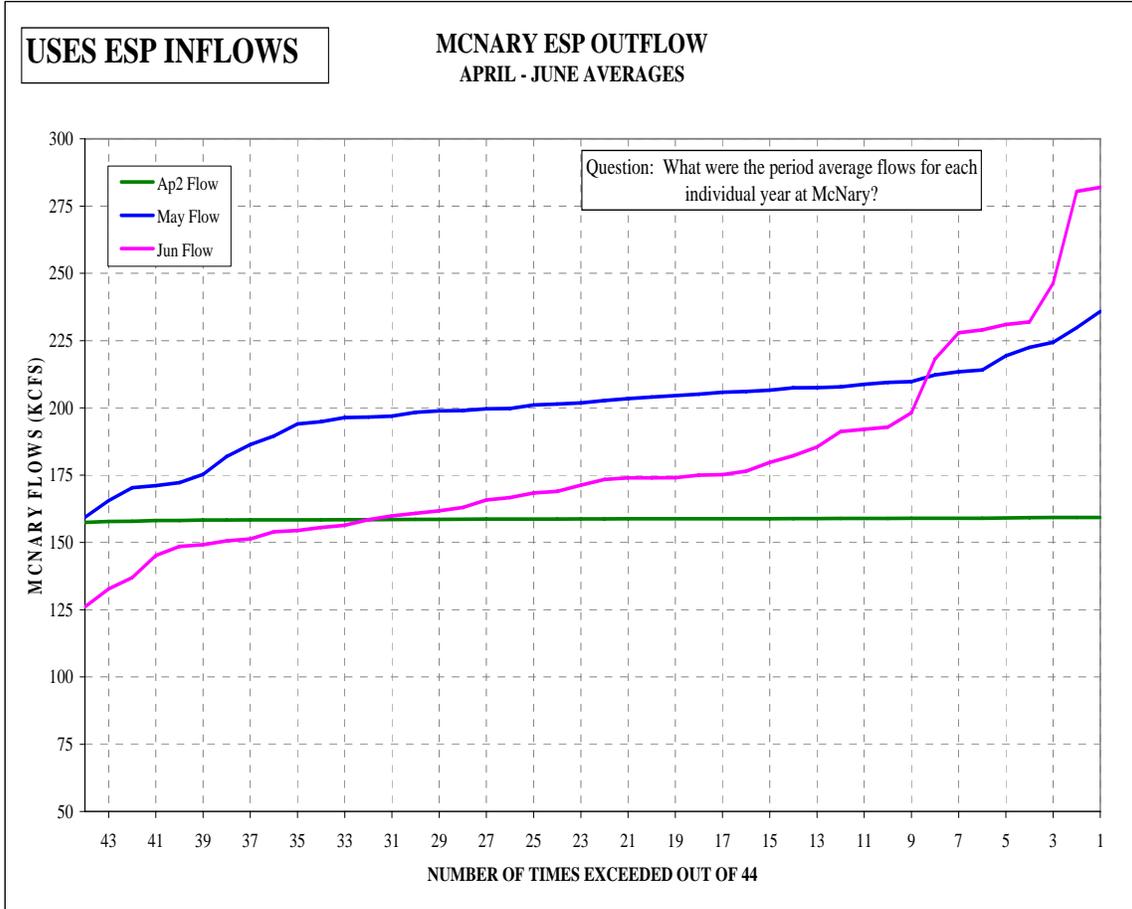
Volume Comparison Table (ESP versus Regression):

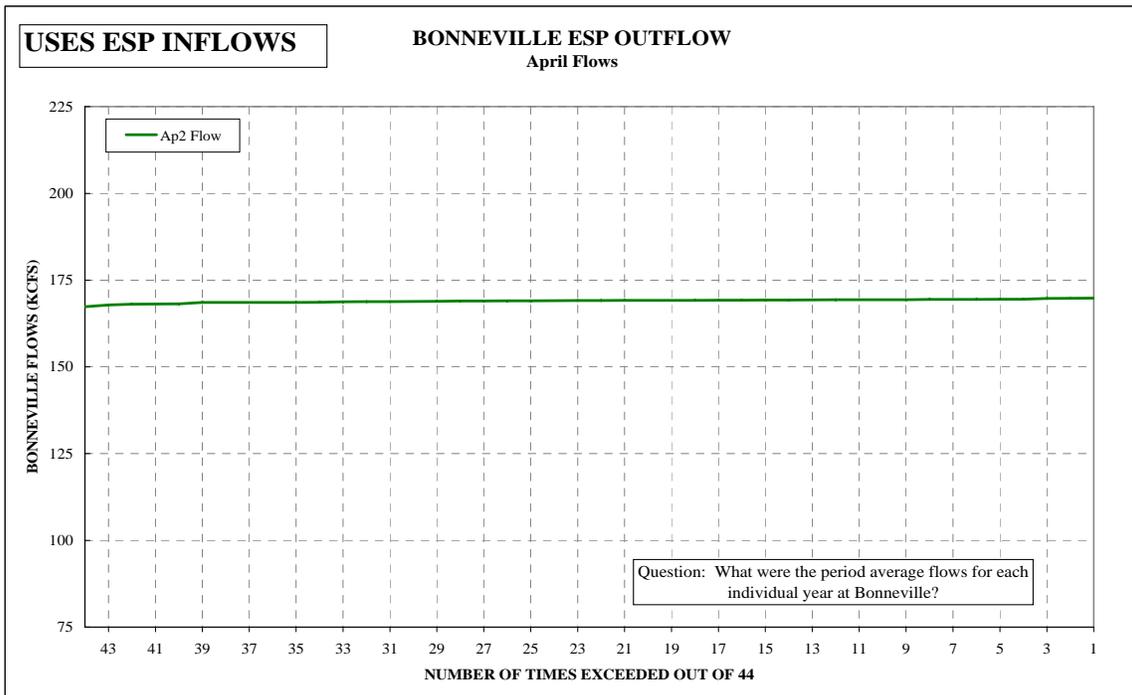
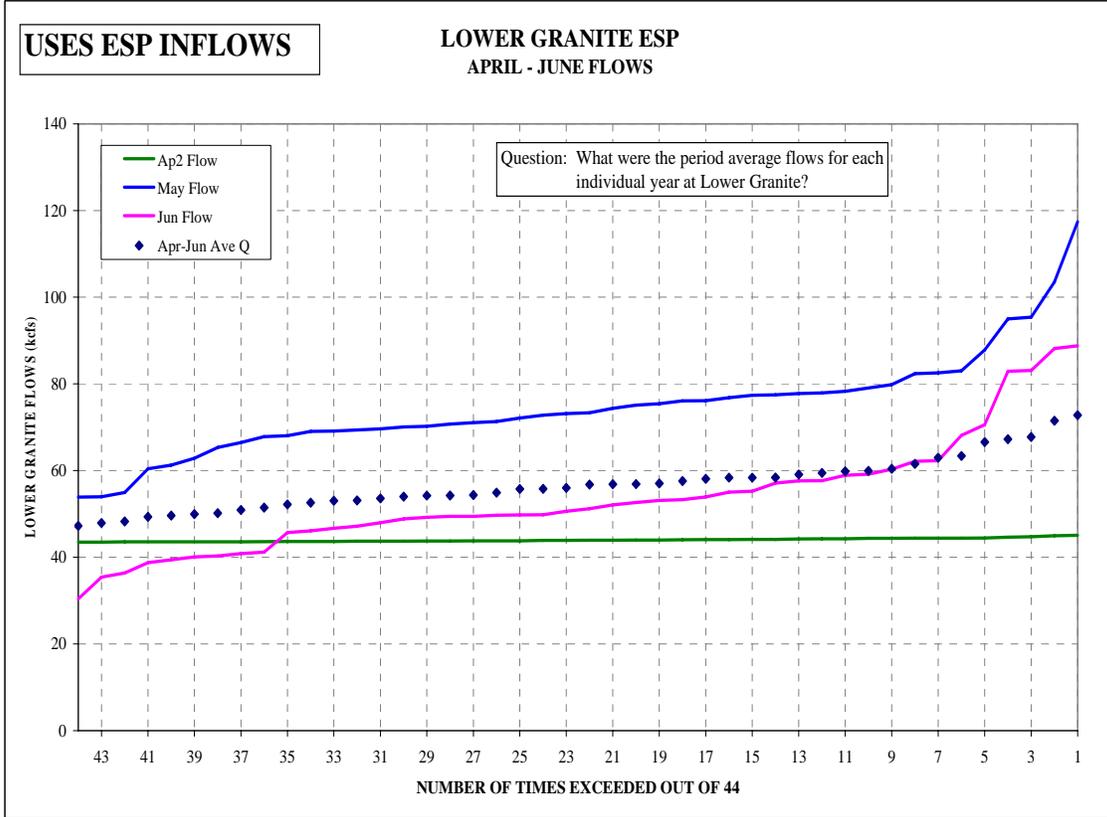
Forecast Period	Official WSF (Regression)			ESP Volumes				
	Volume (kaf)	Percent of Average	30 year Average (kaf)	10% Exceedance Probability	30% Exceedance Probability	50% Exceedance Probability	70% Exceedance Probability	90% Exceedance Probability
Grand Coulee	47300	78%	60290	50600	48600	47000	45800	44000
Lower Granite	11100	52%	21550	13800	12200	11700	11200	10500
The Dalles	60800	65%	93090	67500	64200	62200	60800	58100
Hungry Horse *	1372	66%	2070	1410	1250	1200	1170	1100
Libby **	5401	86%	6248	5260	4890	4460	4220	3870
Dworshak **	1321	50%	2645	1910	1790	1710	1620	1560

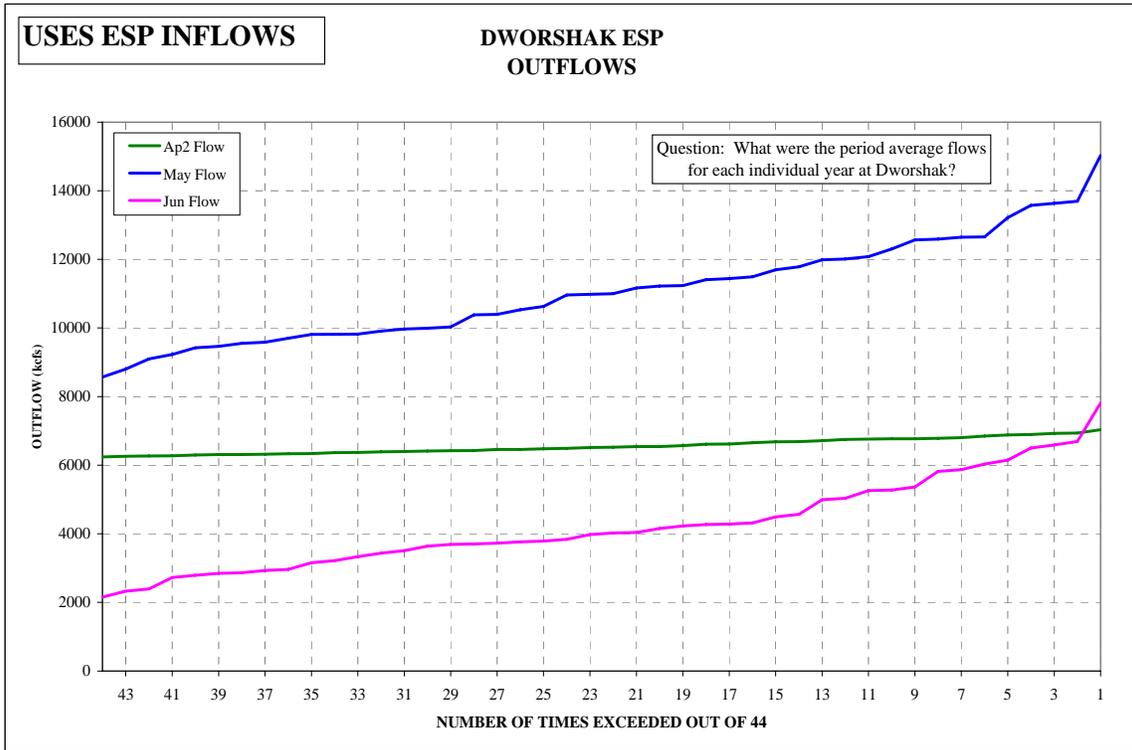
* USBR Official Forecast

** Corps Official Forecast









18

Spring / Summer Update to the 2005 Water Management Plan

FINAL 3 May 2005

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Draft Spring / Summer Update to the 2005 Water Management Plan

1. Introduction

The 2005 Spring / Summer update to the Water Management Plan (WMP) updates information on how the Action Agencies plan to operate the Federal Columbia River Power System (FCRPS) reservoirs during the spring and summer seasons.

The *Spring / Summer WMP Update* (S/S Update) is needed because water supply forecasts for the spring and summer time period are not available at the time the water management plan is written. Planned operations in the *S/S Update* are based on the most current water supply forecast which is considered to be the best available forecast of the expected runoff water volume, and thus how the FCRPS will be operated in 2005. The “April Final” water supply forecast is the most current forecast available when the final version of the *S/S Update* is completed.

The *S/S Update* also reports 2005 research operations planned for the FCRPS projects. Research studies are routinely conducted to test the performance of current or new fish passage operations and the effects on a wide range of conditions, including spill survival, tailrace egress, transport benefits and the performance of new passage devices like the Bonneville second powerhouse corner collector. The Studies Review Work Group establishes the research study plan in the spring just prior to the commencement of the spring migration. The *S/S Update* summarizes the project operations that support these research activities.

The *S/S Update* does not repeat all of the information in the WMP, but does provide additional detail and specifies operations based on the current water supply forecast or changes that need to be made in operations because of the availability of current water supply forecasts, flow projections, and other new information.

2.0 Role of Water Supply Forecasts (WSF)

There are four forecast points that are used to determine BiOp operation of the FCRPS reservoirs. The latest forecasts (April Final) are given below.

Forecast Point	Forecast Period	Forecast Date	Value (MAF)
Lower Granite	April – July	March Final	9.96
Lower Granite	April – July	April Final	11.1 ^A
The Dalles	April – August	March Final	57.2
The Dalles	April – August	April Final	60.8 ^A
Hungry Horse	April – August	February Final	1.60
Hungry Horse	April – August	March Final	1.289 ^{AB}
Libby	April – August	April Final	5.4
Libby	April - August	May or June (usual practice)	^C

All forecasts are from the National Weather Service unless otherwise indicated

A – Value that is used to set operations

B – USBR Forecast C – COE Forecast

3.0 Flow Objectives

Spring

The spring flow objectives for Lower Granite and McNary are established by the April final water supply forecast. The Priest Rapids spring flow objective is fixed (not dependent on the water supply forecast). Based on the April final forecast the spring flow objectives are shown below.

Project	Spring Flow Objective
Lower Granite	85 KCFS
McNary	220 KCFS
Priest Rapids	135 KCFS

Summer

The summer flow objective for Lower Granite Dam is based on the June Final water supply forecast. Based on the latest water supply forecast (April Final) the summer flow objectives are shown below. The McNary summer flow objective is fixed (not dependent on the water supply forecast).

Project	Summer Flow Objective
Lower Granite	50 KCFS
McNary	200 KCFS

Prospects For Meeting Flow Objectives

An analysis of the likelihood of meeting the flow objectives was conducted by using the Corps' QADJ runs of the HYSSR model. This model uses the volume of the current water supply forecast and applies the 69 runoff shapes observed in the historical record to this forecast volume. The likelihood of meeting the flow objectives and refilling the reservoirs by the targeted dates is a function of both the runoff volume and the timeframe in which the snowmelt and stream flows occur. The likelihood of meeting the 2005 spring/summer flow objectives are shown in Appendix A for the latest QADJ run. (Based on the March Final water supply forecast) For this draft update, the QADJ run is linked to the TMT agenda on the web, for the February 16, 2005 meeting. It is located at: <http://www.nwd-wc.usace.army.mil/tmt/agendas/2005/0216.html>

4.0 Storage Project Operations

See Section 12 for latest QADJ model runs, Section 13 for latest ESP HYSSR model runs, Section 14 for volume charts for Libby, Dworshak and Hungry Horse and Section 15 for latest Dworshak ESP graphs. These charts will be added to the update when they become available.

Libby Dam

Sturgeon Pulse

The April final WSF of 5.42 MAF for Libby (April – August) puts Libby operations in the 2nd tier of operations for sturgeon called for in the USFWS 2000 Biological Opinion. The 2nd tier sturgeon operation calls for a sturgeon flow volume of 800 KAF and minimum bull trout flows of 7 kcfs in July.

An SOR with specific flow and date recommendations will be submitted to TMT prior to initiating a flow operation for sturgeon.

Hungry Horse Dam

Bull Trout Flows & Ramping Rates

The March final Bureau of Reclamation WSF for April – August was 1289 kaf. Minimum outflow from Hungry Horse and Columbia Falls are based on the March final forecast. This year they were set at 483 cfs and 3250 cfs, respectively. The April WSF for April – August was 1372 kaf.

Hungry Horse April 10 and refill objective

Due to minimum flow requirements and winter flood control elevations at Hungry Horse Dam the April 10 refill objective of 3556.7 feet was not be achieved. The project was at 3548.5 feet on that date. Based on the April final water supply forecast the Bureau of Reclamation expects to achieve the refill objective of 3560 feet about the first week in July.

Grand Coulee Dam

Grand Coulee April 10 and June 30 refill Objective

Based on the April Final WSF the April 10 refill objective is elevation 1283.3 feet. However, due to the maintenance required on the drum gates Grand Coulee will be held at a maximum elevation of 1255 feet for six weeks starting April 1. After completion of the required work Grand Coulee is not expected to refill to elevation 1290 feet by the first week of July.

Grand Coulee Summer Draft Limit

Based on the April final forecast of April – August runoff volume at the Dalles, the summer draft limit for Grand Coulee is expected to be 1278 feet. The draft limit for this project officially changes from 1280 to 1278 feet when the July final April-to-August runoff volume forecast for The Dalles is less than 92 Maf. The current forecast (April final) calls for a runoff volume of 60.8 MAF during this period.

Dworshak Dam

Summer Draft for Temperature Control

A key operation at Dworshak Dam is to draft cold water from the Dworshak reservoir in July, August, and September to cool water temperatures in the Lower Snake River for the benefit of migrating salmon and steelhead. In-season modeling will be done to provide information to aid in the making the decisions of when and how to draft Dworshak for water temperature control.

5.0 Upper Snake River Flow Augmentation

The Bureau of Reclamation currently estimates that a volume of approximately 144 kaf will be available for flow augmentation in 2005.

6.0 Flood Control Operations

The April 15 and April 30 flood control elevations based on the April final forecast are shown in the following table. The January 31 – March 31 flood control elevations were based on previous forecasts.

Note that April 10th flood control elevations are interpolated, as there is no official method of determining April 10th flood control elevations

Project	Date						
	31-Jan	28-Feb	15-Mar	31-Mar	10-Apr	15-Apr	30-Apr
ARDB	1433.2	1433.4		1438.5		1438.5	1438.5
LIB	2420.9	2432.1	2441.135.9	2442.0		2442.3	2442.7
DCDB	1839.3	1812.5		1810.2		1810.6	1810.6
HGH	3546.8	3550.9		3555.6	3555.6	3555.6	3556.6
GCL	1290.0	1290.0		1283.3	1283.3	1283.3	1283.3
GCL-shifted	1290.0	1290.0		1281.9	1282.5	1282.8	
BRN	2077.0	2077.0		2077.0		2077.0	2077.0
BRN-shifted	2077.0	2077.0		2077.0		2077.0	
DWR*	1557.4	1571.2		1587.5	1587.5	1587.5	1593.7
DWR-shifted*	1556.3	1571.2		1593.3		1600.0	

- *Note the DWR April 15 and April 30 flood control elevations are based on level 1 local flood control using estimated snow covered area of the basin. Snow covered area and flood control estimates are re-evaluated weekly.*

Dworshak/Grand Coulee flood control shift

Dworshak/Grand Coulee flood control shift did not occur this year as Dworshak was below it's end of March flood control elevation.

7.0 Minimum Operating Pool

The minimum operating pool (MOP) operation for the Lower Snake projects planning date was April 3rd. The Salmon Managers submitted SOR 2005-3 requesting the Snake and John Day drafts to MOP be delayed because of low numbers of juveniles at Lower Granite. They requested Ice Harbor, Lower Monumental, Little Goose and Lower Granite start MOP operations April 4, April 13, April 12 and April 11, respectively. These are the dates that were implemented. . It was agreed at the March 17, 2004 TMT meeting that because of human health and safety issues associated with navigation concerns Ice Harbor, Little Goose, and Lower Granite would be operated at MOP+1 to MOP+2. TMT may address, on an in-season management basis, navigation or other concerns that may result in adjustments in BiOp MOP operations. The table below shows the agreed upon elevations that were implemented

Project	Lower Range		Upper Range	
	Operation	Elevation	Operation	Elevation
Ice Harbor	MOP+1	438	MOP + 2	439
Lower Monumental	MOP	537	MOP + 1	538
Little Goose	MOP+1	634	MOP + 2	635
Lower Granite	MOP +1	734	MOP + 2	735

At John Day the forebay will be operated within a 1.5-foot range of the minimum level that provides irrigation pumping from April 10th to September 30th. The initial range will be 262.5 and 264.0 feet. The minimum level will be adjusted upward if needed to facilitate irrigation pumping. Actual John Day operations 262.5' – 264' range started April 15, 2005 at the request of the Salmon Managers in SOR 2005-3.

8.0 Hanford Reach

The Vernita Bar protection level flow was set at a level of 65 kcfs based on the November 21 and 28, 2004 redd counts. This year's Vernita Bar protection operation is scheduled to end when the water over the eggs have accumulated 1000 (C degrees) thermal units after the initiation of spawning . This is expected to occur May 13 – 15 . See Appendix C for the Hanford Reach Agreement.

9.0 Spill for Juvenile Fish Passage

Spring Spill Operations – Snake River Dams

The current forecasted spring seasonal average flow for Lower Granite Dam, based on April water supply forecasts, is less than 70 kcfs. This is below the UPA's 70 kcfs trigger level for spill at the lower Snake River collector projects, Lower Monumental, Little Goose, and Lower Granite. For planning purposes, Ice Harbor will provide spill for fish passage according to specifications in the 2004 UPA and the 2005 WMP, starting April 3 or as recommended by TMT. Actual operations at Ice Harbor were spill for RSW testing beginning April 4 and spill for fish passage starting at 1800 hours on April 7. The spill for fish passage date was requested in SOR 2005-4 and discussed at the April 6 TMT.

Lower Granite Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur in spring 2005. Spill may occur for short periods of time if it appears the fish facility and barge holding capacity will be exceeded.

Little Goose Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur at Little Goose in spring 2005.

Lower Monumental Dam

Based on current projections of spring seasonal flow at Lower Granite, no spill for fish passage will occur at Lower Monumental in spring 2005

Ice Harbor Dam

For planning purposes, spill for fish passage were to be provided at Ice Harbor according to specifications in the 2004 UPA which included starting about April 3. Actual operations at Ice Harbor were spill for RSW testing beginning April 4 and spill for fish passage starting at 1800 hours on April 7. The spill for fish passage date was requested in SOR 2005-4 and discussed at the April 6 TMT. In addition, the effect on juvenile fish of operating the new removable spillway weir (RSW) will be tested this spring and summer. Spill patterns and amounts will be varied in the test. (See section 11 for further details). Spill during any non-test periods will be as specified in the UPA (spill limited to 45 kcfs during the day and spill to the gas cap at night).

Summer Spill Operations – Snake River Dams

As specified in the UPA, the summer spill planning dates are June 21-August 31 for Ice Harbor Dam..

Lower Granite Dam, Little Goose Dam, Lower Monumental Dam

As specified in the UPA, no spill and full transport will be conducted at the Snake River transport dams.

Ice Harbor Dam

The UPA specifies summer spill 45 kcfs from 0500 – 1800 hours and 120%/115% gas cap from 1800 – 0500 hours from June 21 – August 31.

Spring and Summer Spill Operations – Lower Columbia River Dams

McNary Dam

Spring spill will begin on or about April 10 (planning date) and will be conducted as specified in the UPA which calls for night spill (1800 – 0600 hours) to the gas cap. Spring spill will be suspended when river conditions are no longer spring-like (flows <200 kcfs and water temperature reaches 62-degrees F) and transport will be initiated. No summer spill with maximum transportation occurs at McNary Dam. Actual spill started April 10 as requested in SOR 2005-04. Starting April 25, voluntary spill started 24 hr/day for 21 days between April 25 – June 5. During this period 24 hr/day spill will be alternating with 12 hour/day spill for 2 – 4 days at a time. This additional spill is for Walla Walla Corps office to perform research.

John Day Dam

Spill will be provided from April 10 through August 31 (planning dates) for spring and summer migrants as stated in the UPA. From April 10 to June 20, spill discharges will be

60% of instantaneous project flow at project flows up to 300,000 cfs. Above 300,000 cfs project flow, spill discharges will be 180,000 cfs (up to the hydraulic limit of the powerhouse). Between April 10 and May 14, spill will be 12 hours nightly from 1800 to 0600 hours. Between May 15 and June 20, spill will occur from 1900 to 0600 hours (11 hours total). From June 21 through August 31, spill will be 30% of instantaneous project flow 24-hours per day. Spill will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation. Actual spill started April 10 as requested in SOR 2005-04. . Actual spill amount and hours are as specified in the UPA.

The Dalles Dam

Spill will be provided from April 10 through August 31 (planning dates) for spring and summer migrants as stated in the UPA. Per UPA, spill will be 40% of total project outflow, not to exceed the 120% TDG cap. Actual spill started April 11 as requested in SOR 2005-04. Actual spill amount and hours are as specified in the UPA. Spillbays 3-6 were raised and dogged off at 6 foot openings on April 27. Spill through bays 1 and 2 were adjusted with spill patterns provided by Portland District to provide spill as close to 40% of total outflow as possible. Spillbays 3-6 were dogged off at 8 foot openings on April 27 and will continue to be adjusted as flows increase or decrease over a consistent period of time.

Bonneville Dam

Spill will be provided from April 10 through August 31 (planning dates) for spring and summer migrants as stated in the UPA. Spill per UPA is to spill to the TDG cap at night and spill 50 to 75 kcfs (adult fallback limit) during the day. Actual spill started April 15 as requested in SOR 2005-05. SOR 2005-5 also requested to start daytime spill level at 50 kcfs and then increase to UPA level of 75 kcfs on April 19. This is what was actually implemented.

10. Water Quality – Spill Priority List

River operations are conducted to meet State Clean Water Act total maximum daily load (TMDL) dissolved gas standards. Also, research operations at a particular dam can be impacted by involuntary spill. Thus spill at research projects is given lower priority in the hope that involuntary spill can be eliminated during research. Starting out in 2005 involuntary spill will occur in the order shown below. The priorities will be modified as needed based on status of fish migration, spill/transport strategies, and studies, and other factors.

1. John Day
2. McNary
3. Bonneville
4. Chief Joseph
5. Lower Granite
6. Little Goose
7. Lower Monumental
8. Wanapum
9. Wells
10. Rocky Reach
11. Rock Island
12. Priest Rapids
13. Ice Harbor
14. The Dalles
15. Grand Coulee

2004 GAS Cap levels

The range of gas caps during 2004 at the projects is shown below. The flow ranges listed below maintained the gas cap limits at the individual projects during the year.

	Min Kcfs	Max Kcfs
BON	75	180
TDA	70	130
JDA	70	155
MCN	130	185
IHR	70	92
LMN	25	44
LGS	38	43
LWG	20	47

Other Spill Operations

Based on a study conducted by a subgroup of the Regional Forum Water Quality Team, it was determined that joint operations of Chief Joseph and Grand Coulee Dam for power and total dissolved gas production could result in an overall reduction in TDG levels both upstream and downstream of Chief Joseph dam by taking advantage of the larger generation flow capacity of Grand Coulee and the lower average TDG loading below the Chief Joseph spillways (absent deflectors). As a result of this study, and coordination with the Bureau of Reclamation and the Colville Tribe, the joint operation of Grand Coulee and Chief Joseph will be conducted during the 2004 spill season. Operationally, this will be as follows,

- When Lake Roosevelt is below 1260' elevation, spill from the Grand Coulee outlet tubes be avoided by shifting all spill to Chief Joseph for spill discharges up to 70 kcfs. If river conditions require spill releases above 70 kcfs at Chief Joseph, the additional spill should be distributed between Chief Joseph and Grand Coulee in a 2.5 to 1 ratio.
- When Lake Roosevelt TDG is elevated and at or above 1260' elevation, spill over the drum gates at Grand Coulee may be beneficial to the system due to potential degassing. The continuation of monitoring practices and additional investigations of these operational measures on TDG exchange are recommended to further establish efficient and effective joint operations at Grand Coulee and Chief Joseph.

11. 2005 Fish Passage Research

Summaries of 2005 fish passage research studies that have the potential to change project operation are described below. Descriptions will be provided in the spring/summer updates as they become available.

Lower Granite

Research this year at Lower Granite during the summer is meant to determine the effectiveness of summer RSW operations for fall Chinook approach, passage and survival. Radio-telemetry and hydroacoustics will be performed on a blocked study test of bulk spill versus RSW testing given that flows are anticipated to exceed 25kcfs throughout the course of the study. The following schedule is highly speculative:

2005 LGR Proposed Spill Research Schedule				
Date	Block #	Treatment	Volume	Training Spill
06/20/05	1	Bay 1 - RSW	6 - 8 kcfs	?
06/21/05	1	Bay 1 - RSW	6 - 8 kcfs	?
06/22/05	1	Bay 2 - Bulk	6 - 8 kcfs	?
06/23/05	1	Bay 2 - Bulk	6 - 8 kcfs	?
06/24/05	2	Bay 1 - RSW	6 - 8 kcfs	?
06/25/05	2	Bay 1 - RSW	6 - 8 kcfs	?
06/26/05	2	Bay 2 - Bulk	6 - 8 kcfs	?
06/27/05	2	Bay 2 - Bulk	6 - 8 kcfs	?
06/28/05	3	Bay 1 - RSW	6 - 8 kcfs	?
06/29/05	3	Bay 1 - RSW	6 - 8 kcfs	?
06/30/05	3	Bay 2 - Bulk	6 - 8 kcfs	?
07/01/05	3	Bay 2 - Bulk	6 - 8 kcfs	?
07/02/05	4	Bay 1 - RSW	6 - 8 kcfs	?
07/03/05	4	Bay 1 - RSW	6 - 8 kcfs	?
07/04/05	4	Bay 2 - Bulk	6 - 8 kcfs	?
07/05/05	4	Bay 2 - Bulk	6 - 8 kcfs	?
07/06/05	5	Bay 1 - 8kcfs	6 - 8 kcfs	?
07/07/05	5	Bay 1 - 8kcfs	6 - 8 kcfs	?
07/08/05	5	Bay 2 - Bulk	6 - 8 kcfs	?
07/09/05	5	Bay 2 - Bulk	6 - 8 kcfs	?
07/10/05	6	Bay 1 - 8kcfs	6 - 8 kcfs	?
07/11/05	6	Bay 1 - 8kcfs	6 - 8 kcfs	?
07/12/05	6	Bay 2 - Bulk	6 - 8 kcfs	?
07/13/05	6	Bay 2 - Bulk	6 - 8 kcfs	?

Little Goose

None

Lower Monumental

Determine survival in Bays 7 vs. 8 during the spring for RSW planning using a radiotelemetry study. Also, determine direct injury in Bays 7 vs. 8 during the late spring for RSW planning, using balloon tags.

2005 Lower Monumental Proposed Spill Research Schedule					
	Study	Hours of Spill	Bay 1	Bay 7	Bay 8
3-May to 27-May	Radiotelemetry	10:00 - 15:00	1 Stop	5 Stops	5 Stops
28-May to 6-Jun	Balloon Tag	10:00 - 15:00	1 Stop	5 Stops	5 Stops

Ice Harbor Dam

This tests for differences in distribution and survival of juveniles when spilling to the gas cap or spilling with RSW. The RSW condition will spill from 25% to 35% of total outflow.

IHR 05 Proposed Treatment Schedule

Date	Block #	Treatment
24-Apr	1	Gas Cap
25-Apr	1	Gas Cap
26-Apr	1	RSW
27-Apr	1	RSW
28-Apr	2	RSW
29-Apr	2	RSW
30-Apr	2	Gas Cap
1-May	2	Gas Cap
2-May	3	Gas Cap
3-May	3	Gas Cap
4-May	3	RSW
5-May	3	RSW
6-May	4	RSW
7-May	4	RSW
8-May	4	Gas Cap
9-May	4	Gas Cap
10-May	5	RSW
11-May	5	RSW
12-May	5	Gas Cap
13-May	5	Gas Cap
14-May	6	RSW
15-May	6	RSW
16-May	6	Gas Cap
17-May	6	Gas Cap
18-May	7	Gas Cap

19-May	7 Gas Cap
20-May	7 RSW
21-May	7 RSW
22-May	8 RSW
23-May	8 RSW
24-May	8 Gas Cap
25-May	8 Gas Cap
26-May	9 Gas Cap
27-May	9 Gas Cap
28-May	9 RSW
29-May	9 RSW

McNary Dam

This study is to better define spill operation for 12 vs. 24 hour and the affect of juvenile distribution and survival.

2005 MCN Proposed Spill Treatment Schedule

Date	Block #	Treatment	Date	Block #	Treatment
23-Apr	1	12-h spill	17-May	7	12-h spill
24-Apr	1	12-h spill	18-May	7	12-h spill
25-Apr	1	24-h spill	19-May	7	24-h spill
26-Apr	1	24-h spill	20-May	7	24-h spill
27-Apr	2	24-h spill	21-May	8	12-h spill
28-Apr	2	24-h spill	22-May	8	12-h spill
29-Apr	2	12-h spill	23-May	8	24-h spill
30-Apr	2	12-h spill	24-May	8	24-h spill
1-May	3	12-h spill	25-May	9	12-h spill
2-May	3	12-h spill	26-May	9	12-h spill
3-May	3	24-h spill	27-May	9	24-h spill
4-May	3	24-h spill	28-May	9	24-h spill
5-May	4	24-h spill	29-May	10	12-h spill
6-May	4	24-h spill	30-May	10	12-h spill
7-May	4	12-h spill	31-May	10	24-h spill
8-May	4	12-h spill	1-Jun	10	24-h spill
9-May	5	24-h spill	2-Jun	11	12-h spill
10-May	5	24-h spill	3-Jun	11	12-h spill
11-May	5	12-h spill	4-Jun	11	24-h spill
12-May	5	12-h spill	5-Jun	11	24-h spill
13-May	6	24-h spill			
14-May	6	24-h spill			
15-May	6	12-h spill			
16-May	6	12-h spill			

12-h spill - current BiOp spill (gas cap, 1800-0600 hours)

24-h spill - 85 kcfs spill 24-hours per day (treatment begins at 0600 hours)

This is McNary's turbine upgrade testing. This is a test of the vertical barrier screens in turbine #4 under two turbine loads to assess the effects of new VBS on juvenile injury and survival.

2005 MCN Proposed Turbine Operation Treatment Schedule

Spring				Summer			
Date	Block	Release day	Treatment	Date	Block	Release day	Treatment
26-Apr	1	x	60 MW	1-Jun	1	x	60 MW
27-Apr	1		60 MW	2-Jun	1		60 MW
28-Apr	1	x	80 MW	3-Jun	1	x	80 MW
29-Apr	1		80 MW	4-Jun	1		80 MW
30-Apr	2	x	60 MW	5-Jun	2	x	60 MW
1-May	2		60 MW	6-Jun	2		60 MW
2-May	2	x	80 MW	7-Jun	2	x	80 MW
3-May	2		80 MW	8-Jun	2		80 MW
4-May	3	x	60 MW	9-Jun	3	x	80 MW
5-May	3		60 MW	10-Jun	3		80 MW
6-May	3	x	80 MW	11-Jun	3	x	60 MW
7-May	3		80 MW	12-Jun	3		60 MW
8-May	4	x	80 MW	13-Jun	4	x	80 MW
9-May	4		80 MW	14-Jun	4		80 MW
10-May	4	x	60 MW	15-Jun	4	x	60 MW
11-May	4		60 MW	16-Jun	4		60 MW
12-May	5	x	80 MW	17-Jun	5	x	60 MW
13-May	5		80 MW	18-Jun	5		60 MW
14-May	5	x	60 MW	19-Jun	5	x	80 MW
15-May	5		60 MW	20-Jun	5		80 MW
16-May	6	x	80 MW	21-Jun	6	x	80 MW
17-May	6		80 MW	22-Jun	6		80 MW
18-May	6	x	60 MW	23-Jun	6	x	60 MW
19-May	6		60 MW	24-Jun	6		60 MW
20-May	7	x	80 MW	25-Jun	7	x	60 MW
21-May	7		80 MW	26-Jun	7		60 MW
22-May	7	x	60 MW	27-Jun	7	x	80 MW
23-May	7		60 MW	28-Jun	7		80 MW
24-May	8	x	60 MW	29-Jun	8	x	60 MW
25-May	8		60 MW	30-Jun	8		60 MW
26-May	8	x	80 MW	1-Jul	8	x	80 MW
27-May	8		80 MW	2-Jul	8		80 MW

The Dalles Dam

Spillwall Post Construction Evaluation.

Bonneville Dam

Unit Priorities for spring and summer.

3. Research Activities that will Impact Project Operations

Project	2005 Snake River Research Summary Table		
	Research Objectives	Spring Spill Plan	Summer Spill Plan
Lower Granite	Determine approach, passage and survival during a low flow year	Only in case of emergency, (i.e. high bypass system mortality or fish #s exceeding transport capabilities)	N/A
	Determine effectiveness of summer RSW operations for fall Chinook approach, passage and survival. Radio-telemetry and hydroacoustics	N/A	Spill to be provided through RSW 24 hours per day (6-8 kcfs) and some level of training spill between mid-June and late July running for 3 or 4 weeks. .
Little Goose	Determine approach, passage and survival during a low flow year	N/A	N/A
Lower Monumental	Determine survival in Bays 7 vs. 8 during the spring for RSW planning, Radiotelemetry	This study will operate high gate opening spill for 25-day duration from 10:00 AM until 3:00 PM each day beginning May 3. Spill volume roughly 18.7 kcfs. Stops will be: Spillbay 8 – 5 stops, Spillbay 7 – 5 stops, Spillbay 1 - 1 stop.	N/A
	Determine direct injury in Bays 7 vs. 8 during the late spring for RSW planning, Balloon tags	This study will examine fish injury in spillbays 7 and 8 with a gate opening of 5 stops. Study is scheduled to begin mid-May and the duration will be 12-14 days. Specific details are currently being finalized.	
Ice Harbor	Determine approach, survival, passage and egress	See attached Table	

	in a test of RSW versus bulk spill operations during spring and summer		
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Project	2005 Lower Columbia River Research Summary Table		
	Research Objectives	Spring Spill Plan	Summer Spill Plan
Bonneville	Route specific and spill survival	BiOp Spill	
The Dalles	Post-construction evaluation of spillway wall	Bays 3-6, 8 foot gate opening using suspending pennants, bays 1-2 will be variable, based on total river discharge	Bays 3-6, 4 foot gate opening using suspending pennants, bays 1-2 will be variable, based on total river discharge
John Day	N/A	N/A	N/A
McNary		N/A	N/A

12. Latest Q ADJ Model

Summary of May Early Bird 2005 QADJ Model Runs

3-May-05

Assumptions:

- * Streamflows were adjusted to the May Early Bird Water Supply Forecast for the period of May thru August of 51.2 MAF at The Dalles (65% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are actual April 30, 2005 elevations.
- * Grand Coulee tries to meet 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to 1285 ft in all years, and fills above 1285 ft if Priest Rapids flows are above 125,000 cfs. Summer lake targets are 1285.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates in May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby targets full in June while maintaining a minimum flow in May of 10,800 cfs and 10,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	59	133	130
Jun	50	129	125

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	0	61	85
Jun	1	54	73
Jul	0	31	50
Aug 15	0	24	50
Aug 31	0	22	50

McNary Meets the Following Flow Objectives:

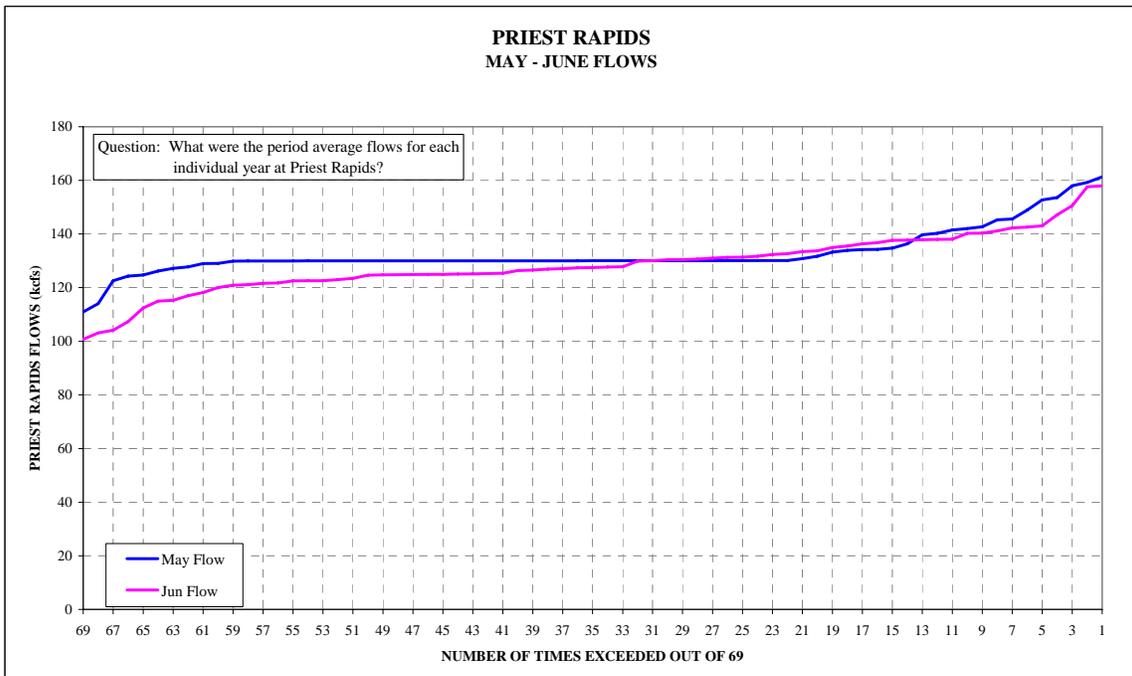
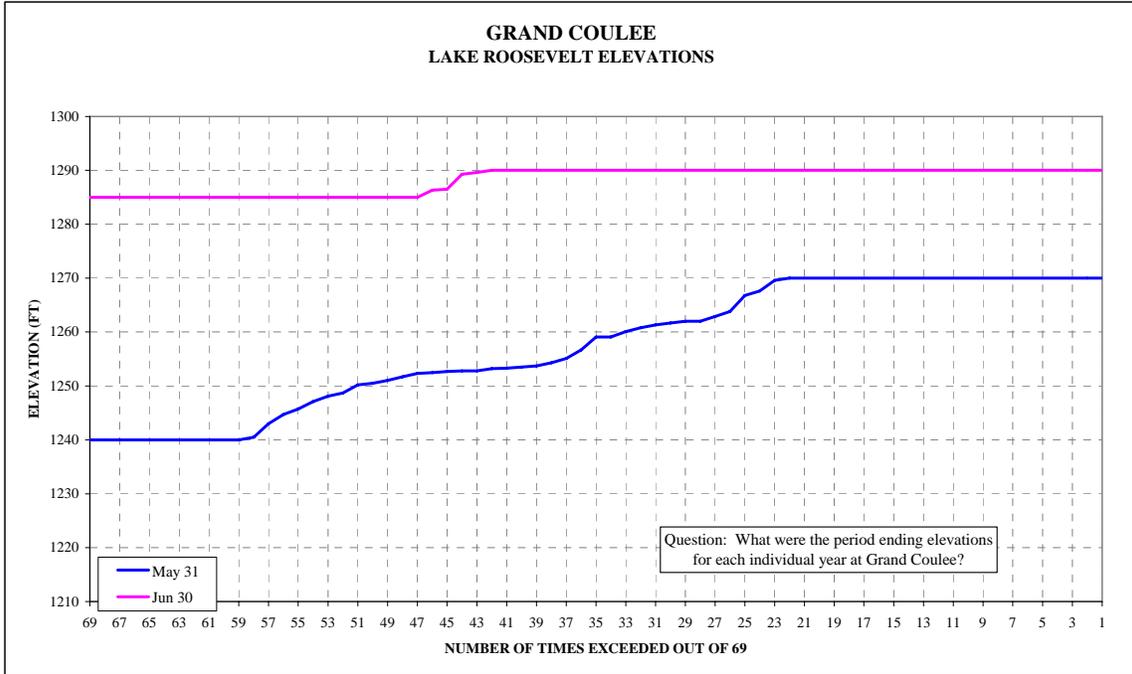
Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	6	191	220
Jun	1	175	220
Jul	0	150	200
Aug 15	0	128	200
Aug 31	0	121	200

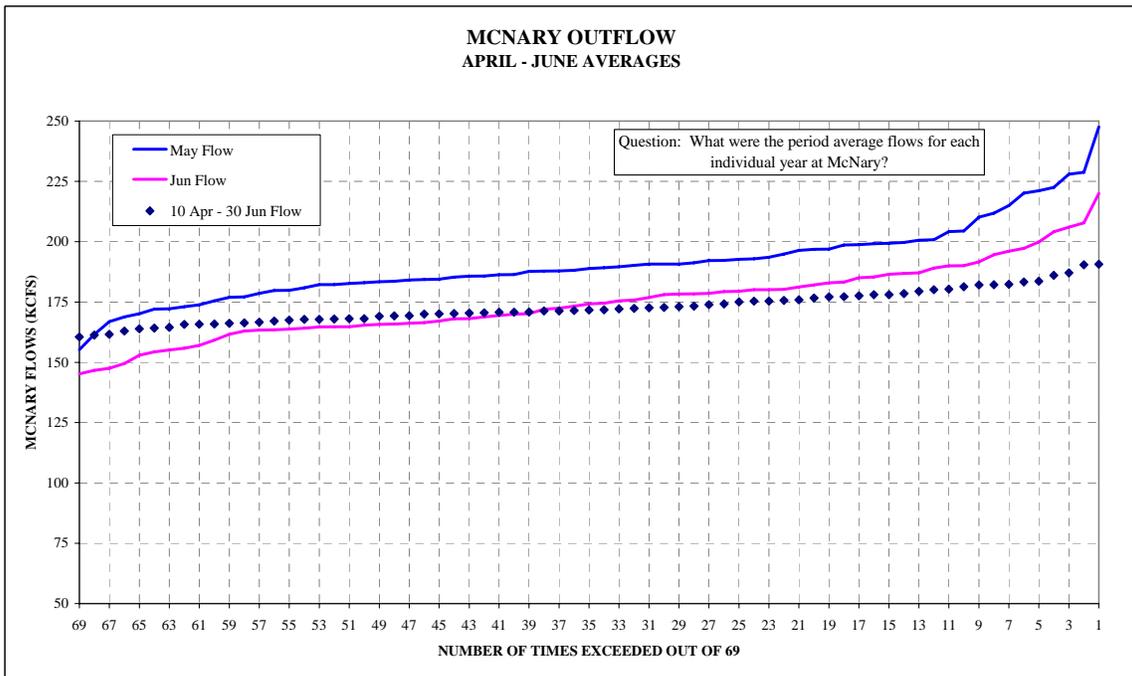
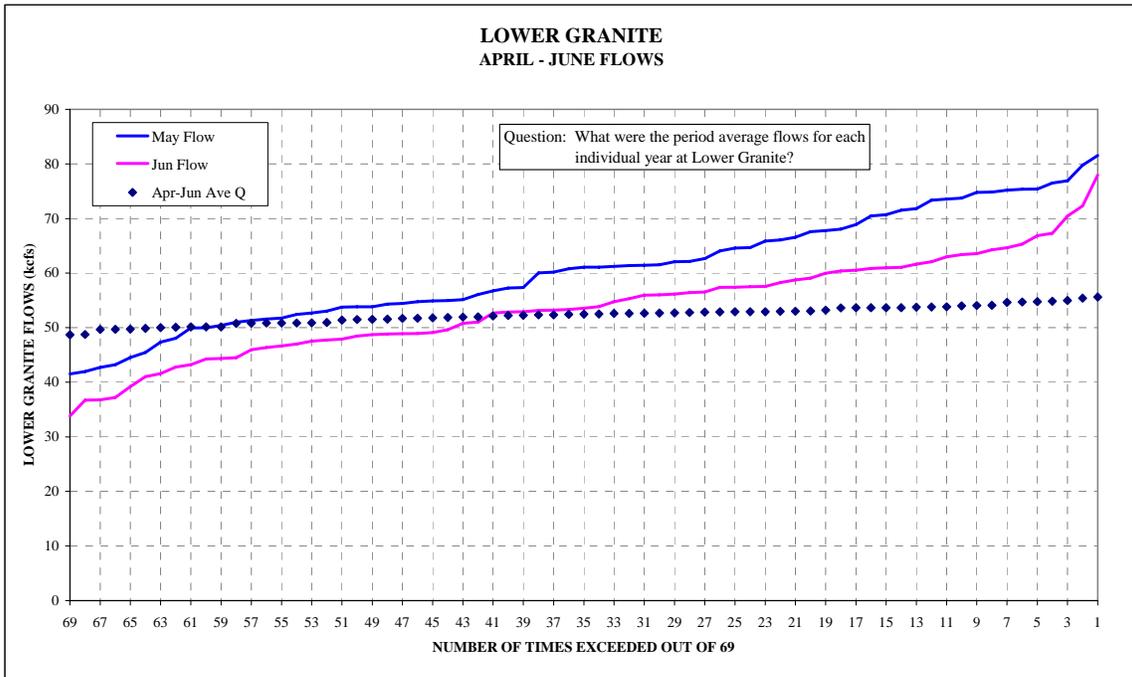
Projects Refill by 30 June:

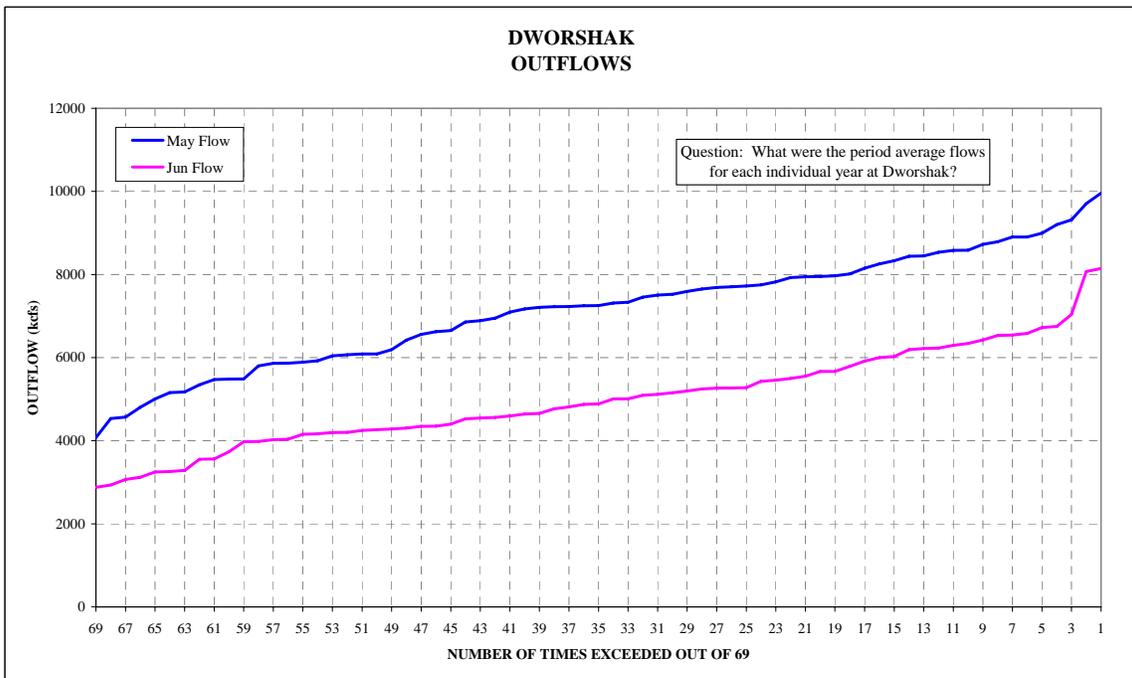
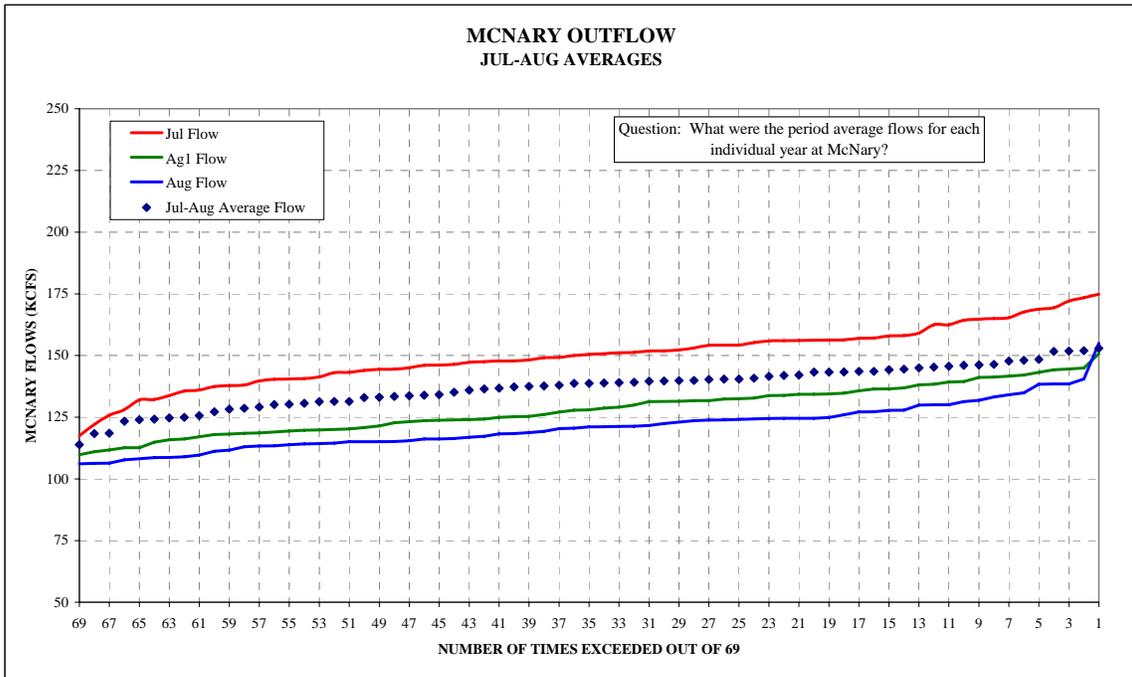
Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	68	2459
Hungry Horse	69	3560
Grand Coulee	44	1288
Dworshak	69	1600

Period Average Outflows (kcfs):

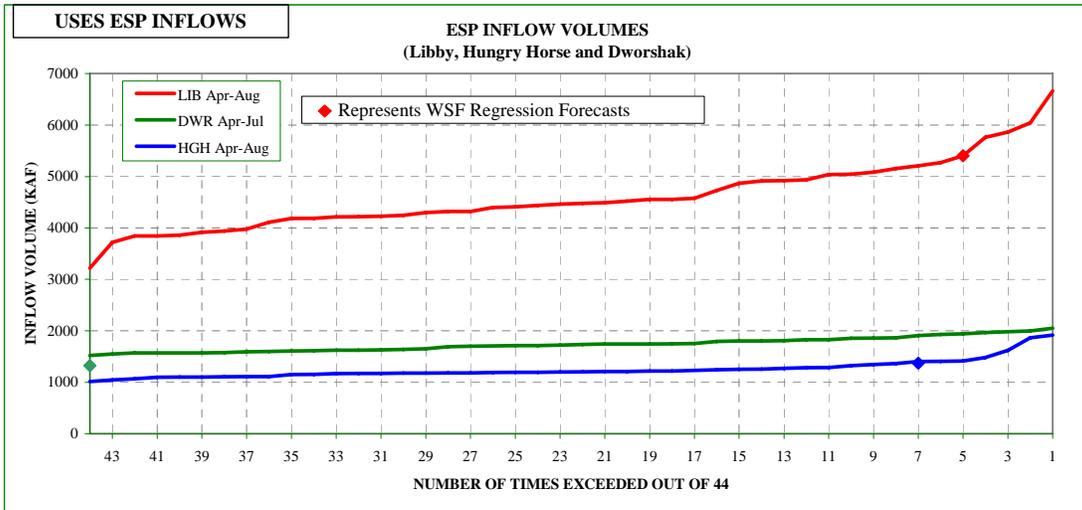
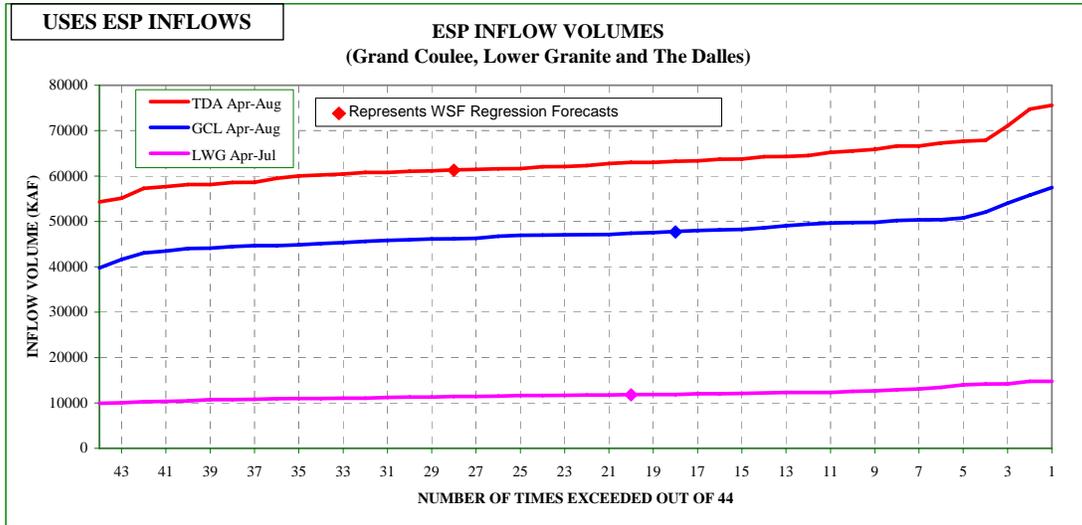
	Obs FEB 1-28	Obs MAR 1-28	Obs APR 1-15	Obs APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	11.2	17.5	21.5	19.6	16.5
HGH	1.0	0.9	2.1	7.2	5.3	5.4	5.8	5.4	4.2
GCL	101	91	76	82	116	108	117	102	98
PRD	111	100	85	95	133	129	126	107	101
DWR	1.6	1.6	3.6	5.4	7.1	5.0	10	10	9
BRN	10	11	13	12	13	11	8	9	9
LWG	21	22	39	45	61	54	31	24	22
MCN	134	123	132	147	191	175	150	128	121
TDA	140	125	136	143	191	168	146	127	121
BON	138	130	143	153	193	169	148	129	122







13. Latest ESP HYSSR Model Runs

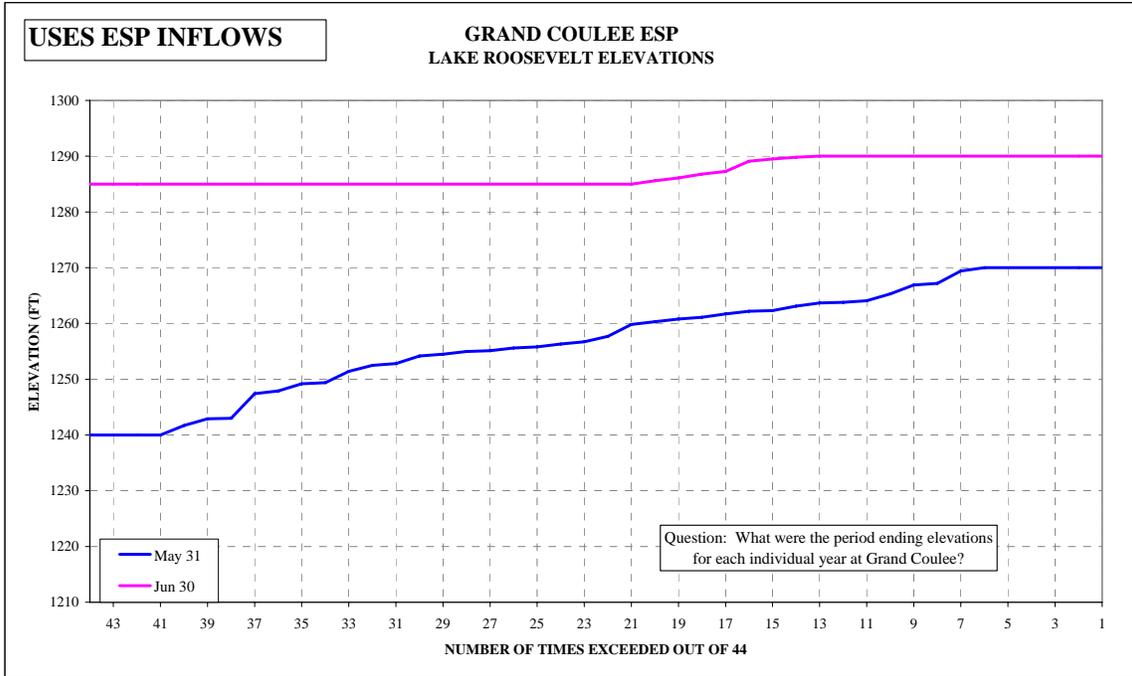


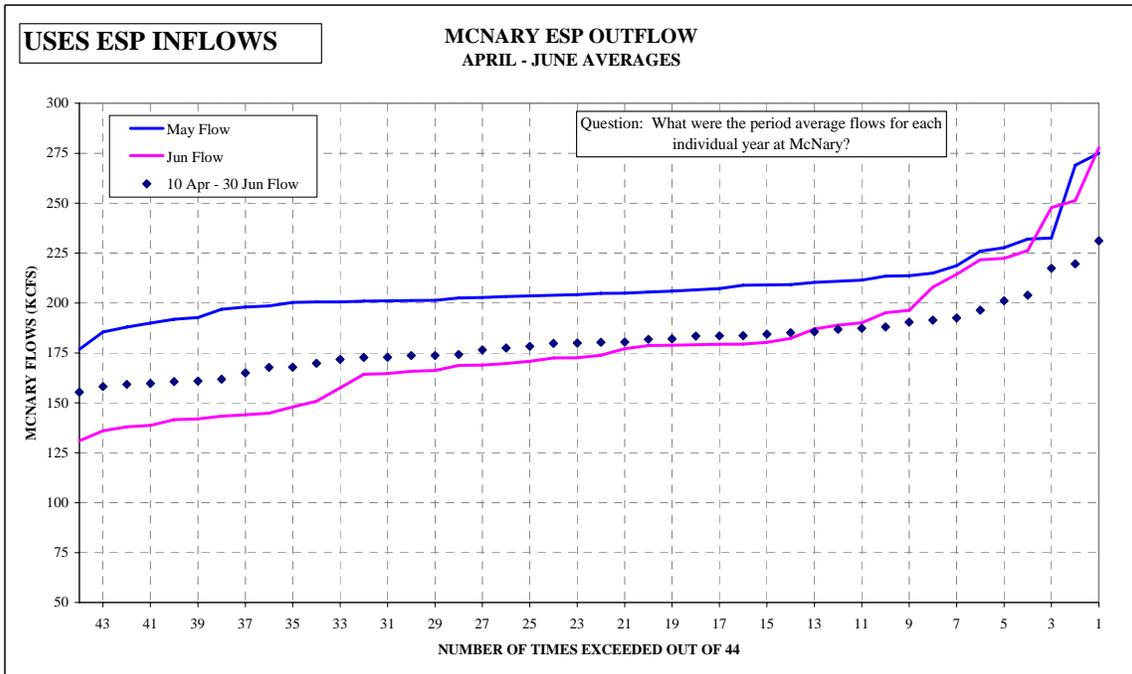
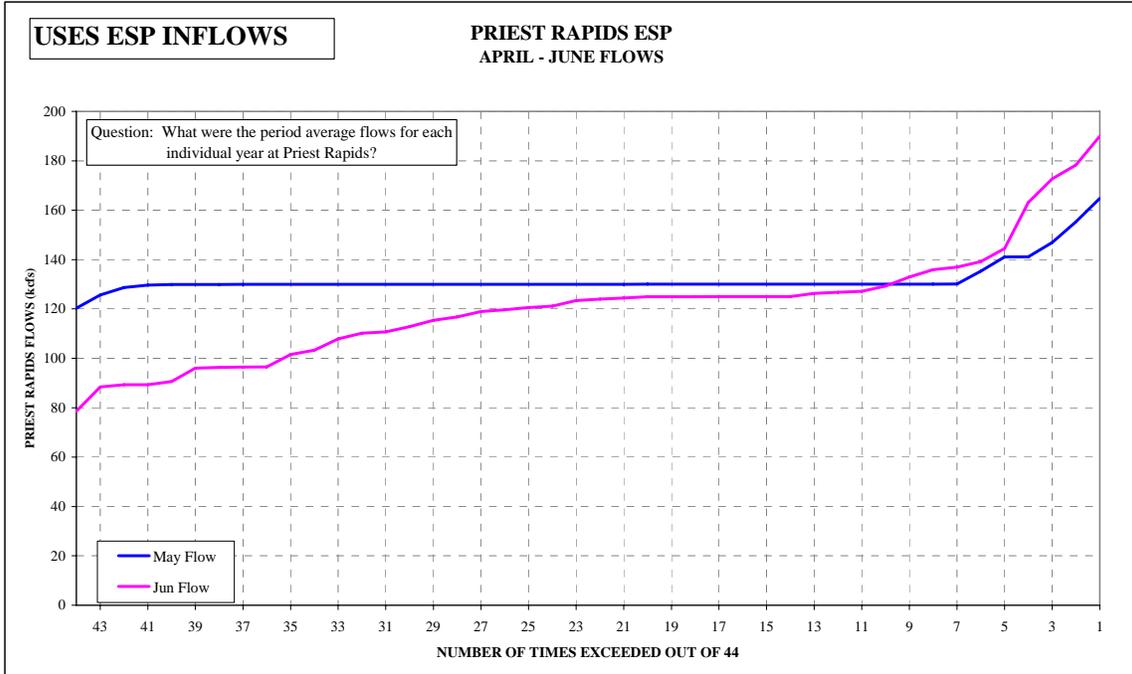
Volume Comparison Table (ESP versus Regression (May Early Bird)):

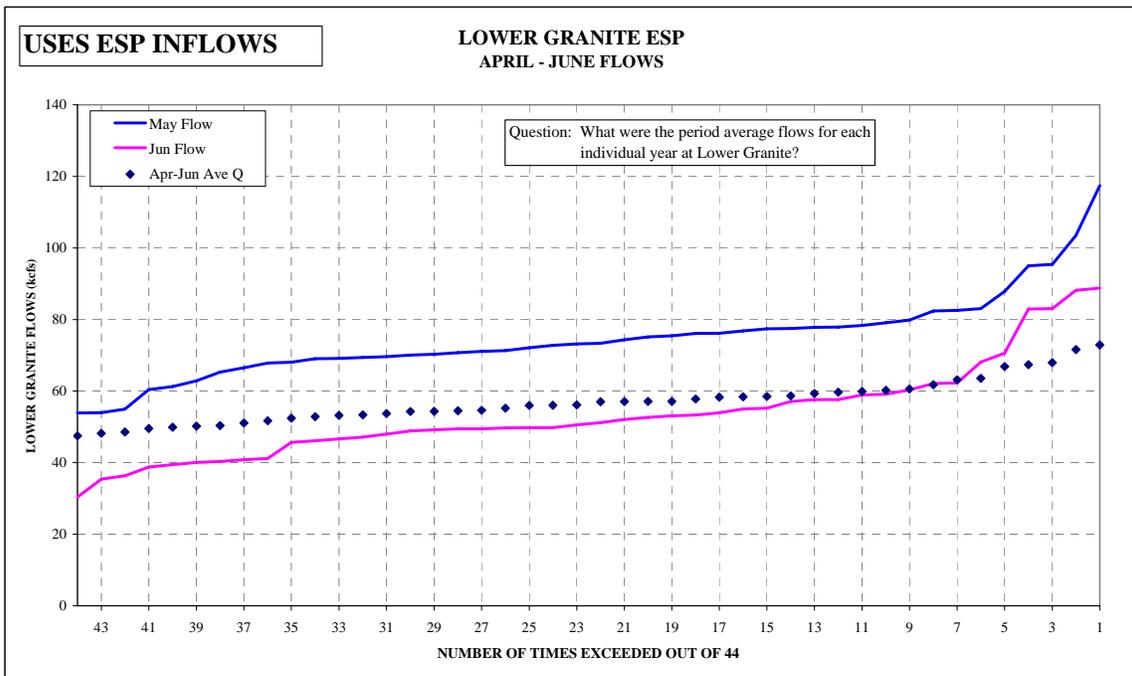
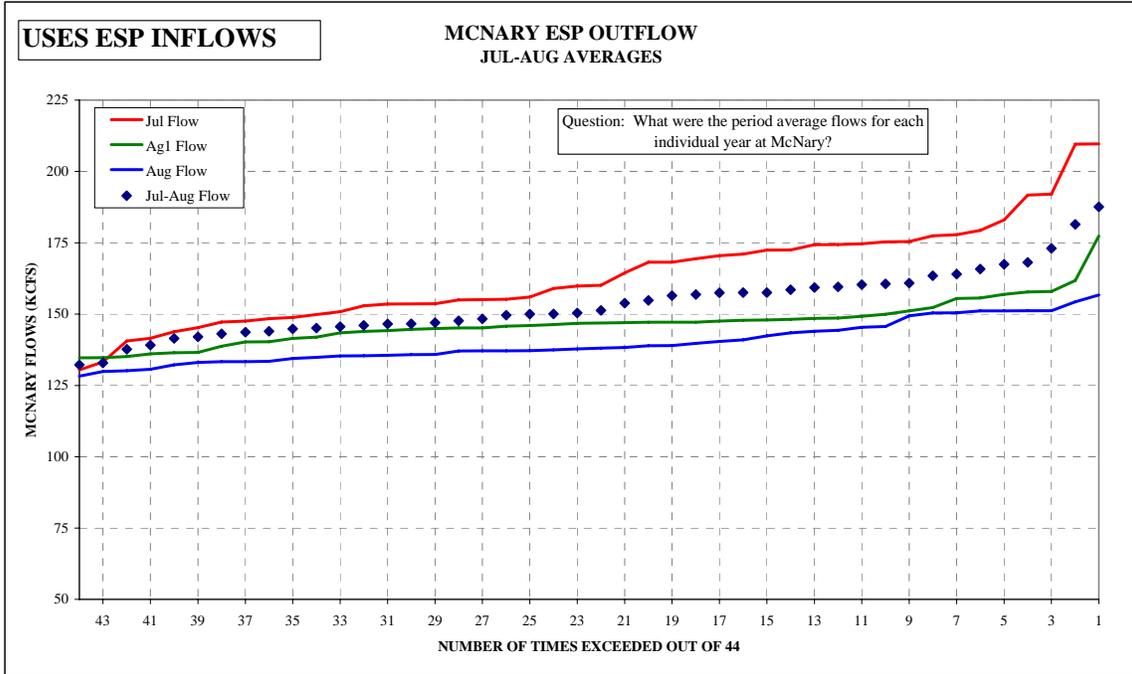
Forecast Period	Official WSF (Regression)			ESP Volumes					
	Volume (kaf)	Percent of Average	30 year Average (kaf)	10% Exceedance Probability	30% Exceedance Probability	50% Exceedance Probability	70% Exceedance Probability	90% Exceedance Probability	
Grand Coulee	Apr-Aug	47700	79%	60290	50600	48600	47000	45800	44000
Lower Granite	Apr-Jul	11800	55%	21550	13800	12200	11700	11200	10500
The Dalles	Apr-Aug	61300	66%	93090	67500	64300	62200	60800	58100
Hungry Horse *	Apr-Aug	1372	66%	2070	1410	1260	1200	1170	1100
Libby **	Apr-Aug	5401	86%	6248	5260	4880	4460	4220	3870
Dworshak **	Apr-Jul	1325	50%	2645	1920	1800	1720	1630	1570

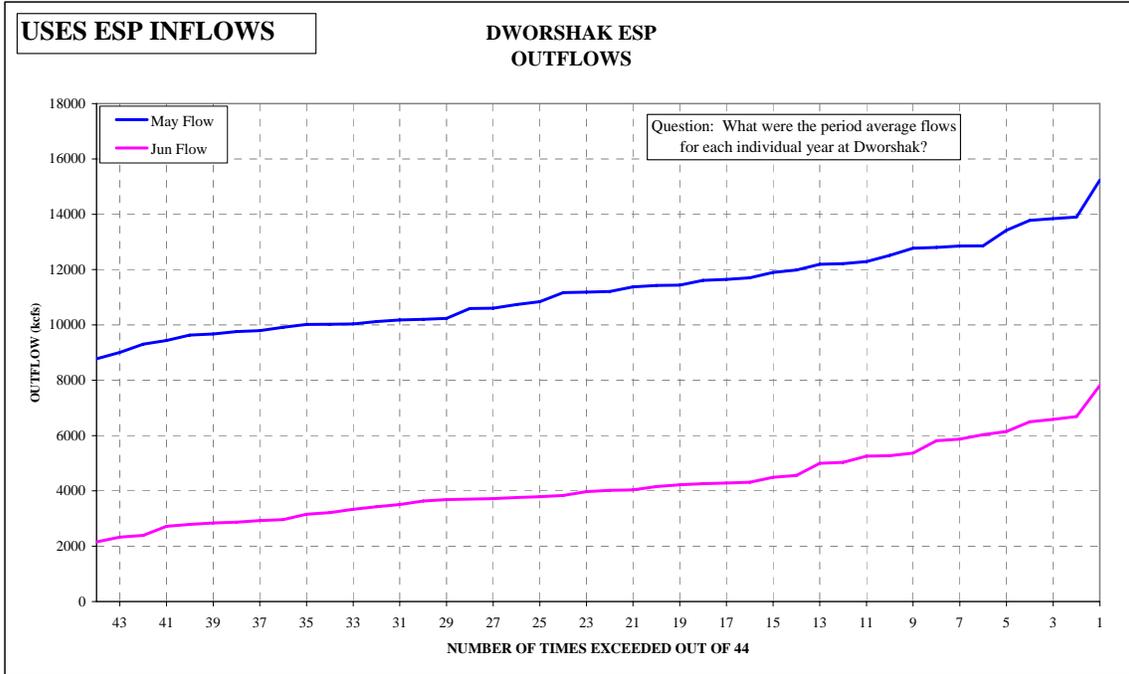
* USBR Official Forecast (April Final)

** Corps Official Forecast (April Final)



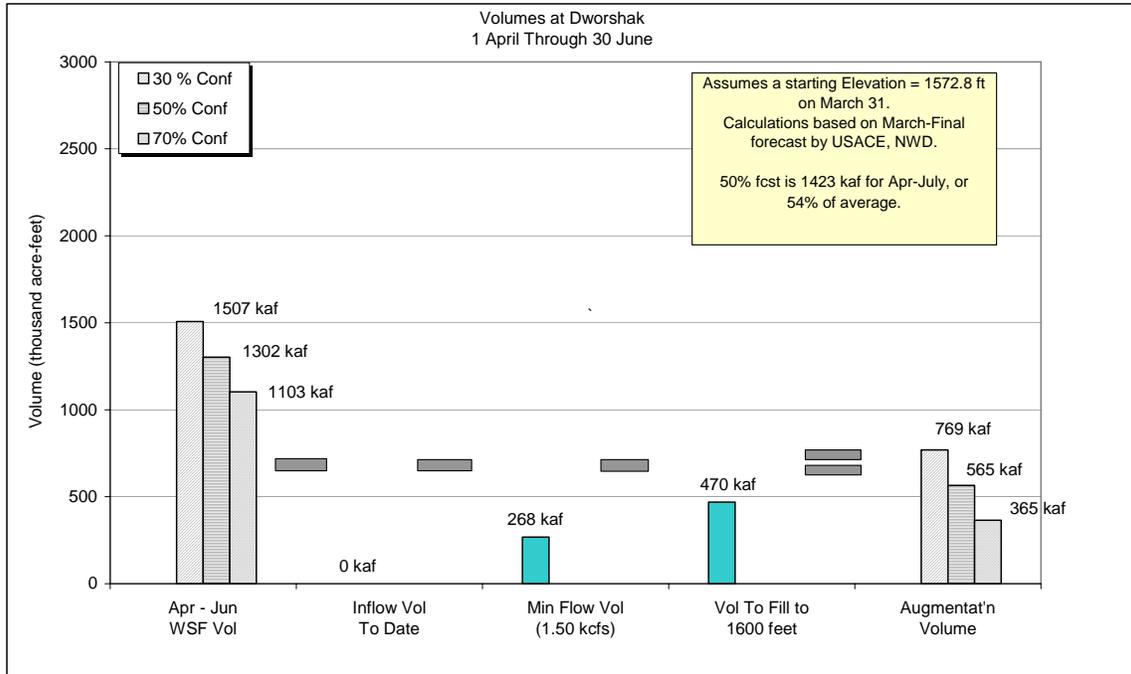




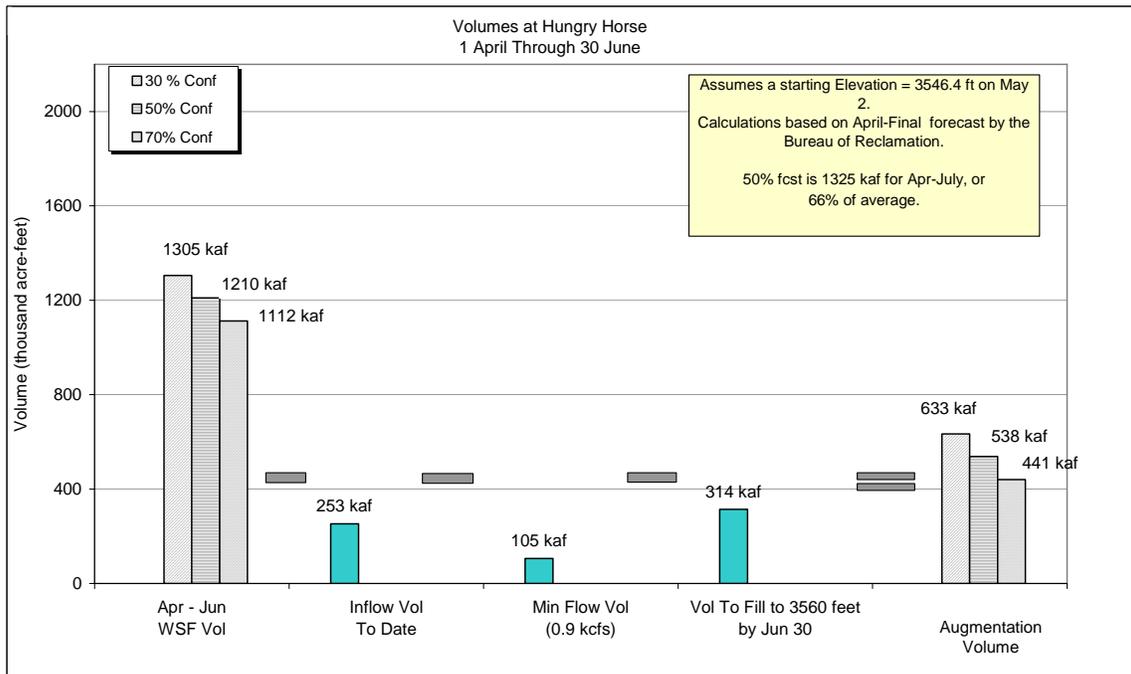


14. Latest Flow Augmentation Graphs

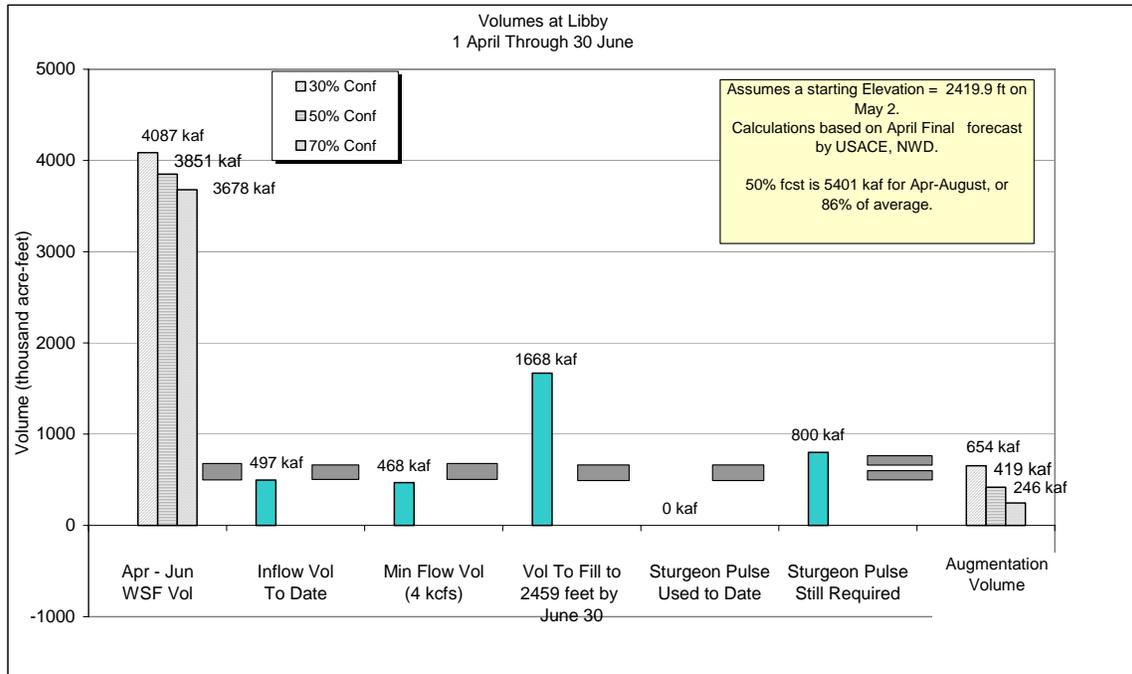
Dworshak



Hungry Horse

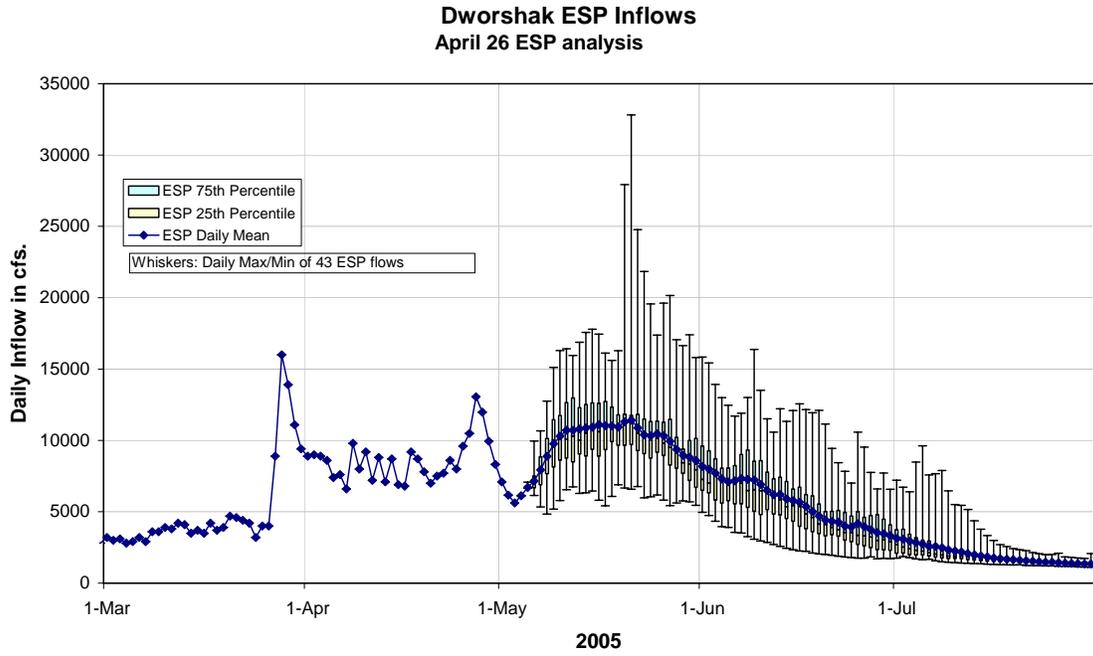


Libby

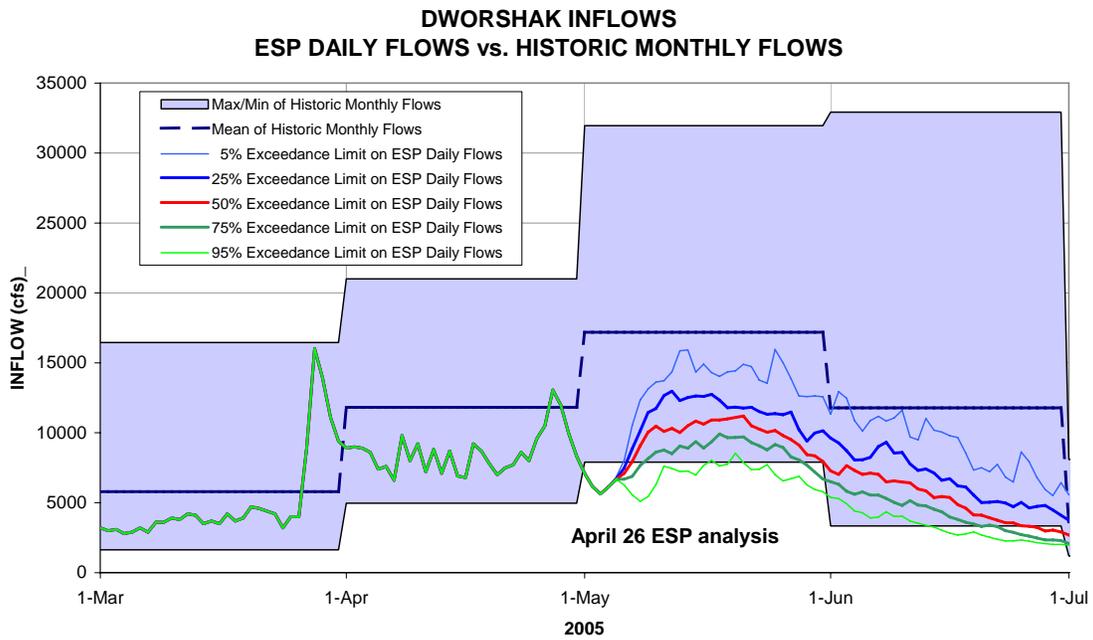


15. Latest DWR ESP Graphs

ESP Inflow

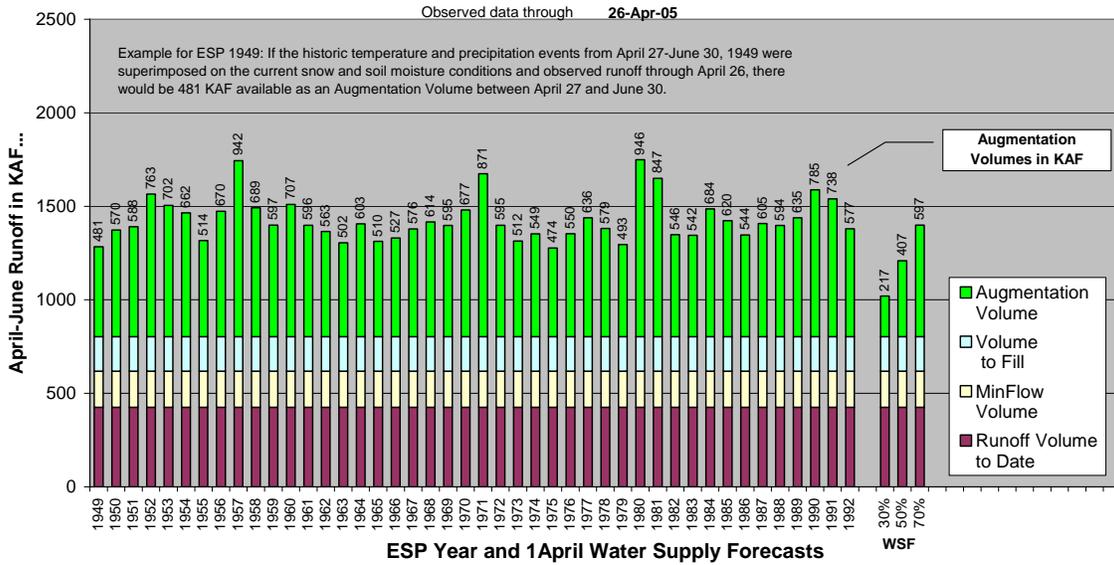


ESP Inflow - Exceedance



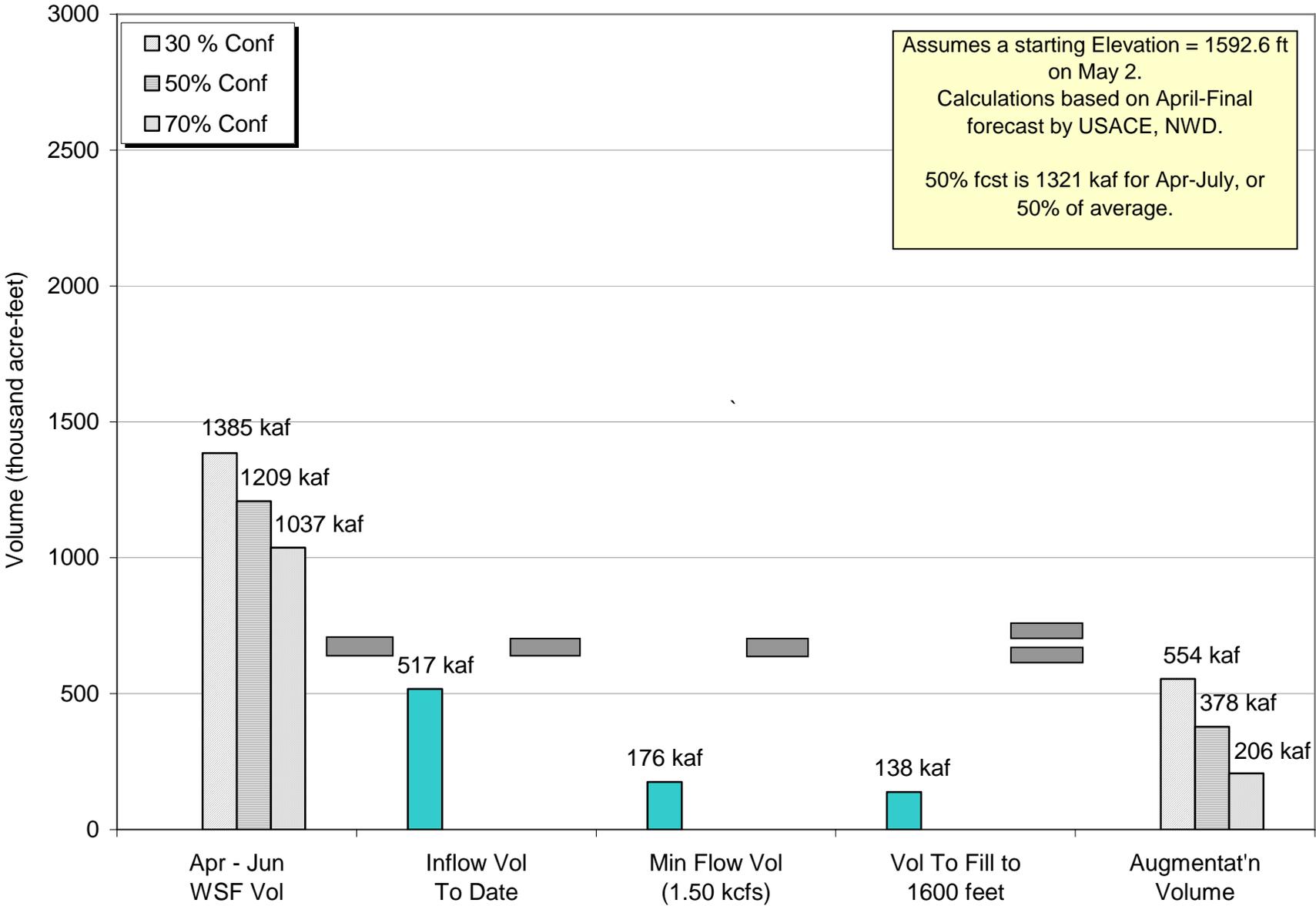
ESP Augmentation Volumes

Dworshak Augmentation Volumes
ESP inflows and 1April Water Supply Forecast

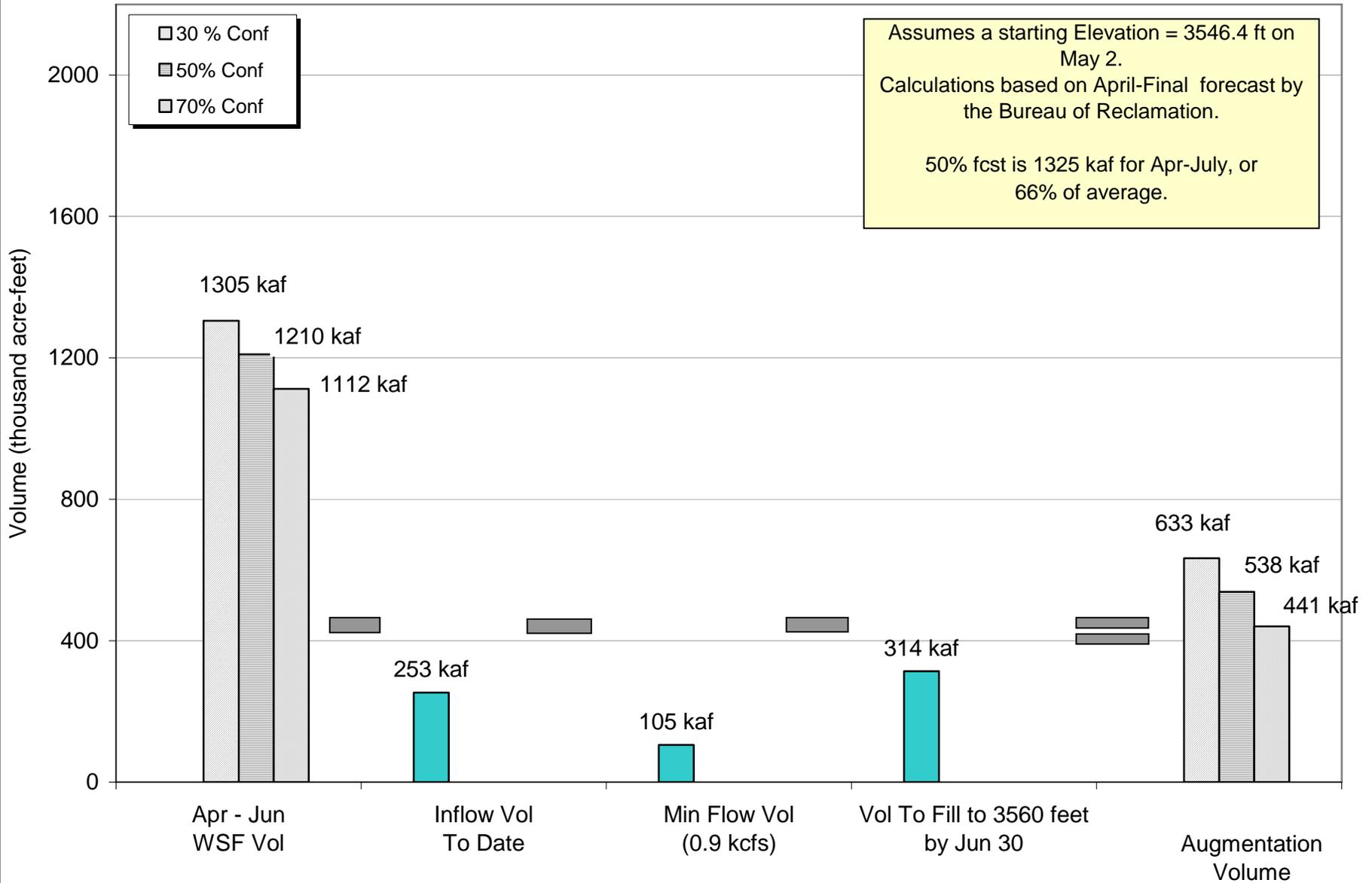


Volumes at Dworshak
1 April Through 30 June

Assumes a starting Elevation = 1592.6 ft on May 2.
Calculations based on April-Final forecast by USACE, NWD.
50% fcst is 1321 kaf for Apr-July, or 50% of average.



Volumes at Hungry Horse 1 April Through 30 June



Assumptions:

- * Streamflows were from the 26 Apr ESP run, which uses current basin conditions combined with 44 historical weather patterns (temperatures and precipitation) to produce 44 ESP hydrographs for 2005.
- * Starting elevations are observed April 30, 2005 elevations.
- * Grand Coulee tries to meet 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to 1285 ft in all years, and fills above 1285 ft if Priest Rapids flows are above 125,000 cfs. Summer lake targets are 1285.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates in May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby targets full in June while maintaining a minimum flow in May of 10,800 cfs and 10,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	41	132	130
Jun	20	121	125

* Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	5	75	85
Jun	4	54	73
Jul	0	29	50
Aug 15	0	26	50
Aug 31	0	25	50

McNary Meets the Following Flow Objectives:

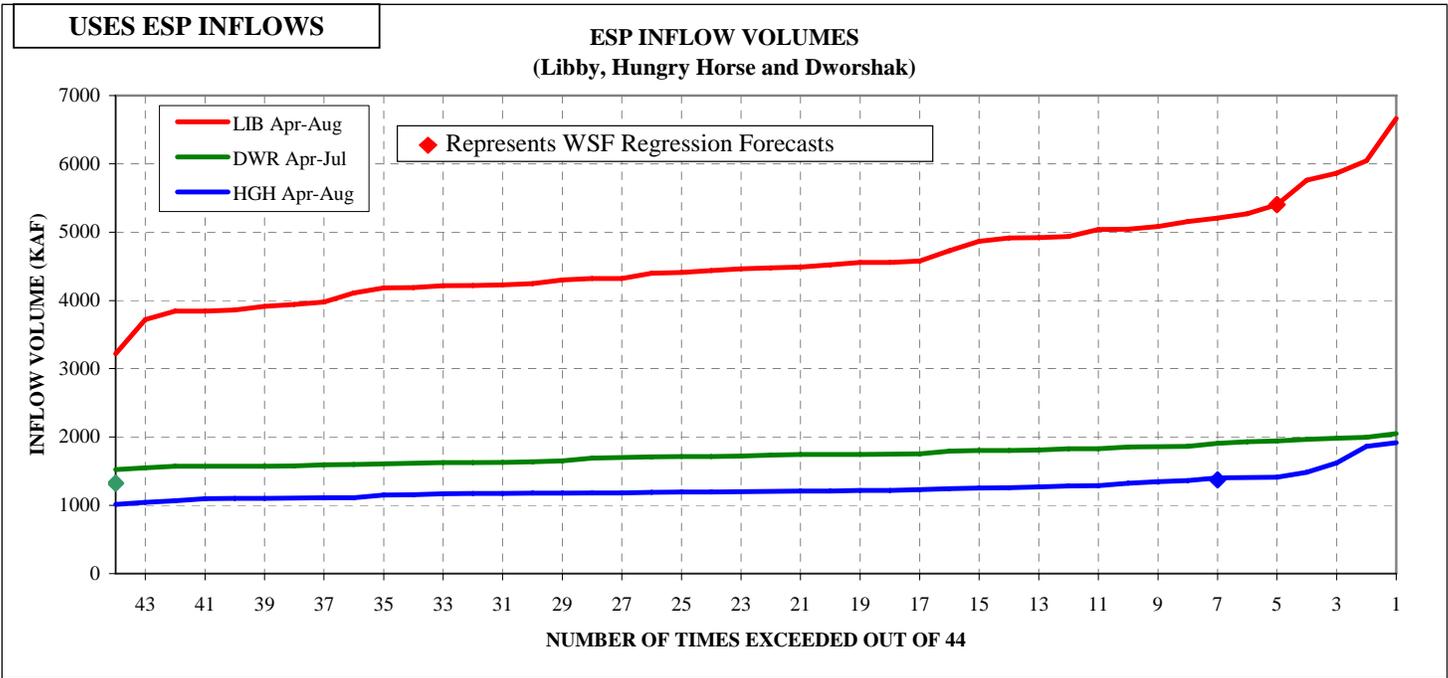
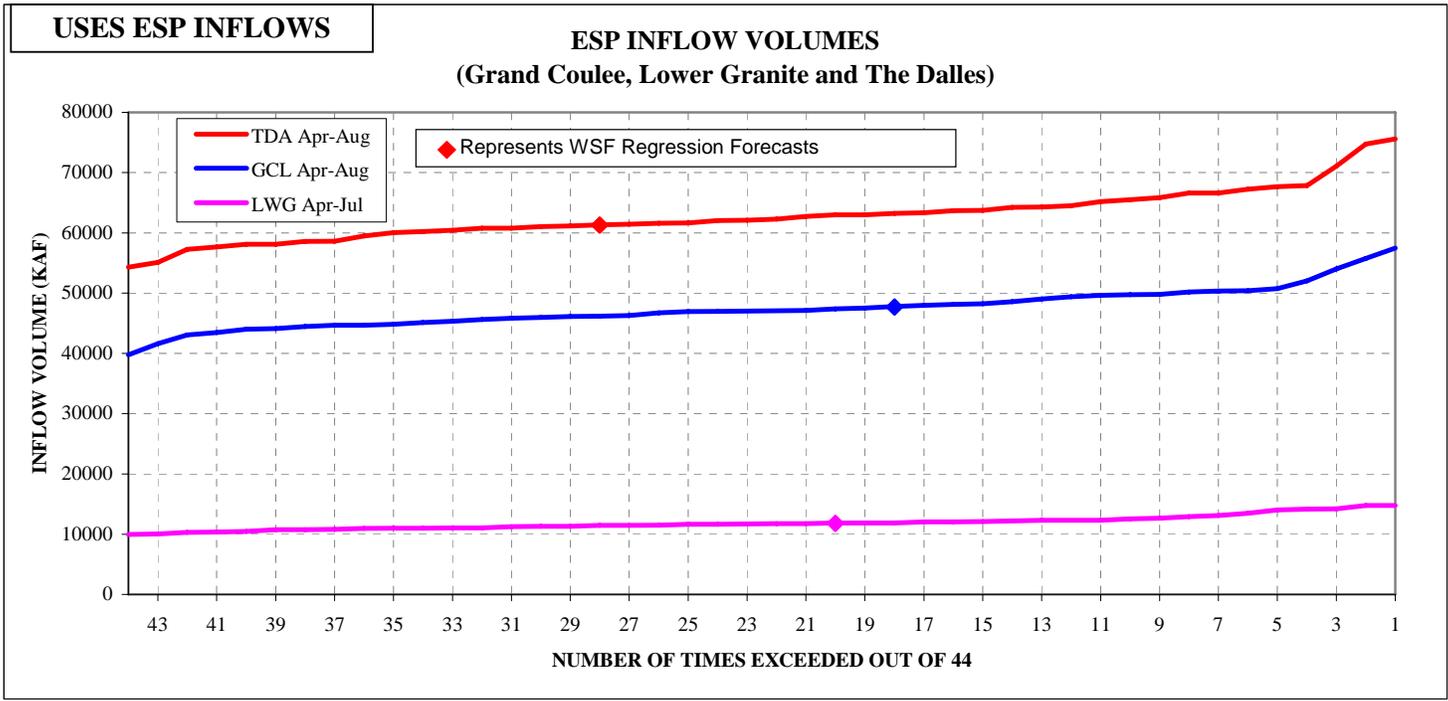
Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	6	208	220
Jun	6	178	220
Jul	2	163	200
Aug 15	0	147	200
Aug 31	0	140	200

Projects Refill by 30 June:

Month	Occurrences out of 44 Years	Average Elevation on 30 Jun for 44 Years
Libby	19	2455
Hungry Horse	44	3560
Grand Coulee	16	1287
Dworshak	44	1600

Period Average Flows (kcfs):

	Obs FEB 1-28	Obs MAR 1-28	Obs APR 1-15	Obs APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	10.8	12.9	15.5	17.2	17.2
HGH	1.0	0.9	2.1	7.2	5.0	4.2	5.5	5.6	4.4
GCL	101	91	76	82	116	109	126	115	110
PRD	111	100	85	95	132	121	131	118	112
DWR	1.6	1.6	3.6	5.4	11.3	4.2	10.1	10.1	9.4
BRN	10	11	13	12	12	10	8	10	11
LWG	21	22	39	45	75	54	29	26	25
MCN	134	123	132	147	208	178	163	147	140
TDA	140	125	136	143	207	172	161	146	140
BON	138	130	143	153	209	174	163	147	141



Volume Comparison Table (ESP versus Regression (May Early Bird)):

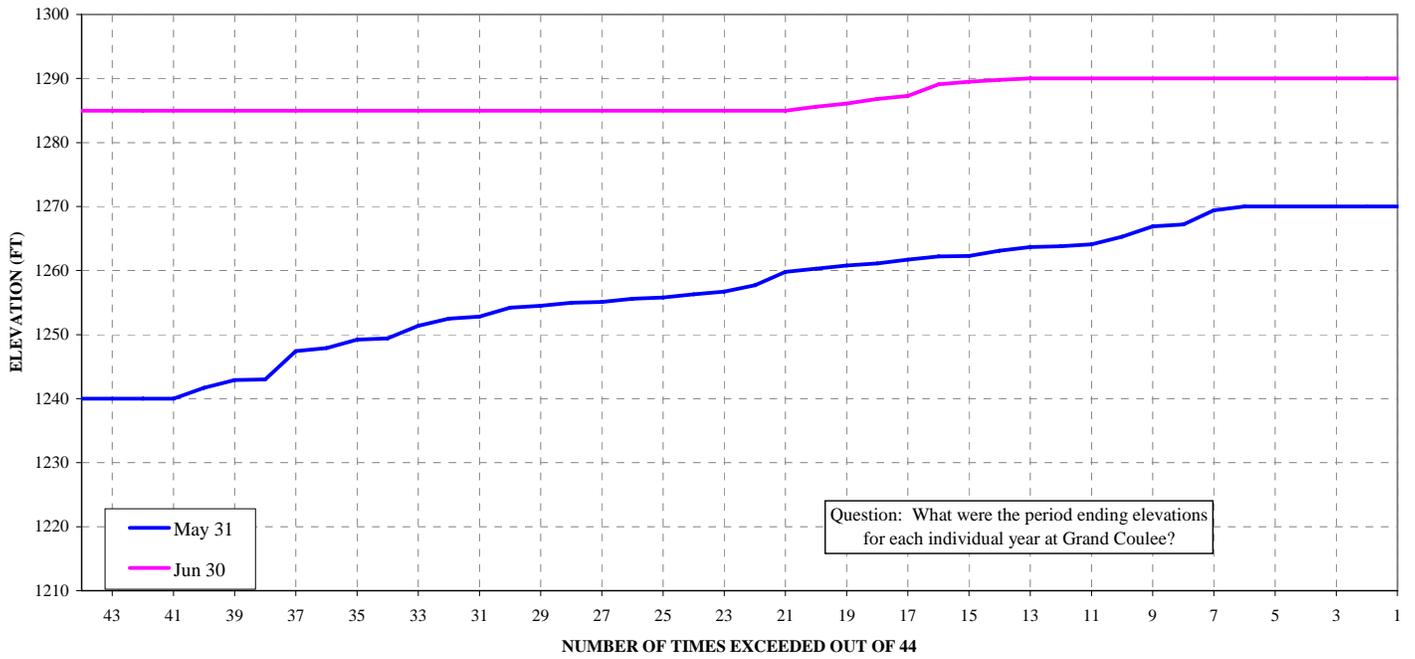
Forecast Period	Official WSF (Regression)			ESP Volumes				
	Volume (kaf)	Percent of Average	30 year Average (kaf)	10% Exceedance Probability	30% Exceedance Probability	50% Exceedance Probability	70% Exceedance Probability	90% Exceedance Probability
Grand Coulee	47700	79%	60290	50600	48600	47000	45800	44000
Lower Granite	11800	55%	21550	13800	12200	11700	11200	10500
The Dalles	61300	66%	93090	67500	64300	62200	60800	58100
Hungry Horse *	1372	66%	2070	1410	1260	1200	1170	1100
Libby **	5401	86%	6248	5260	4880	4460	4220	3870
Dworshak **	1325	50%	2645	1920	1800	1720	1630	1570

* USBR Official Forecast (April Final)

** Corps Official Forecast (April Final)

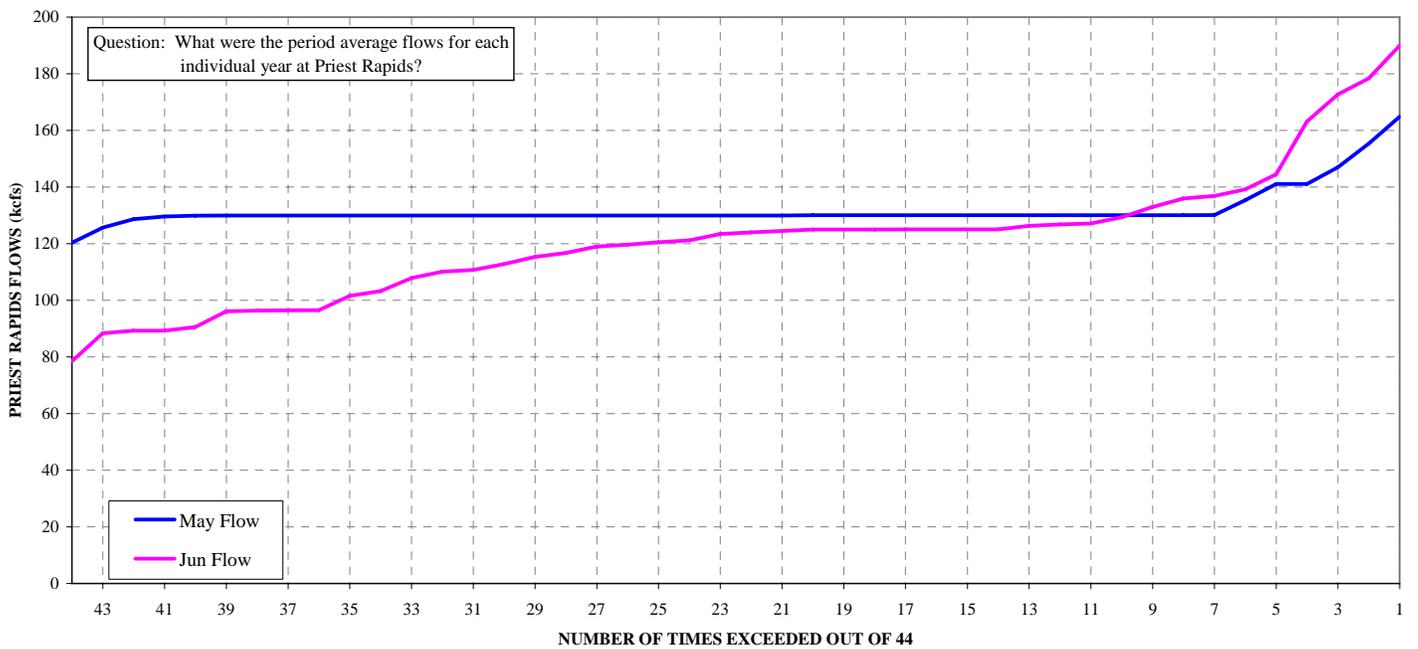
USES ESP INFLOWS

**GRAND COULEE ESP
LAKE ROOSEVELT ELEVATIONS**



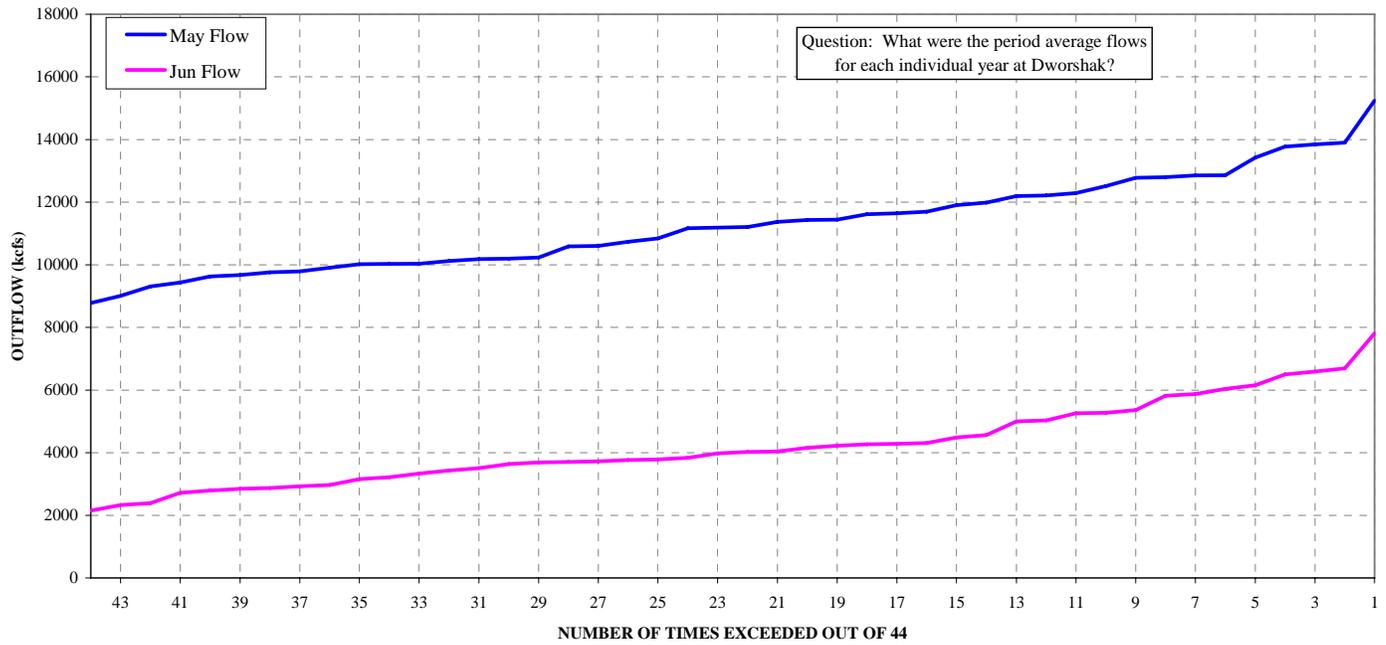
USES ESP INFLOWS

**PRIEST RAPIDS ESP
APRIL - JUNE FLOWS**



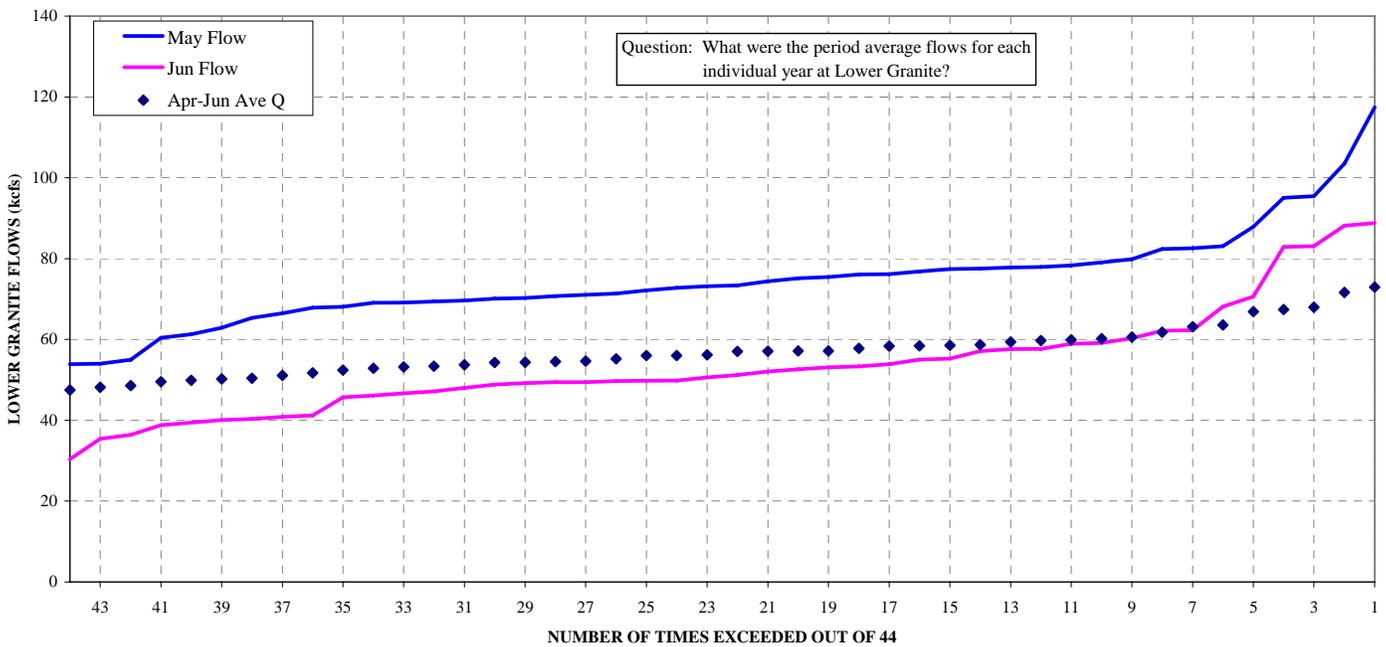
USES ESP INFLOWS

**DWORSHAK ESP
OUTFLOWS**



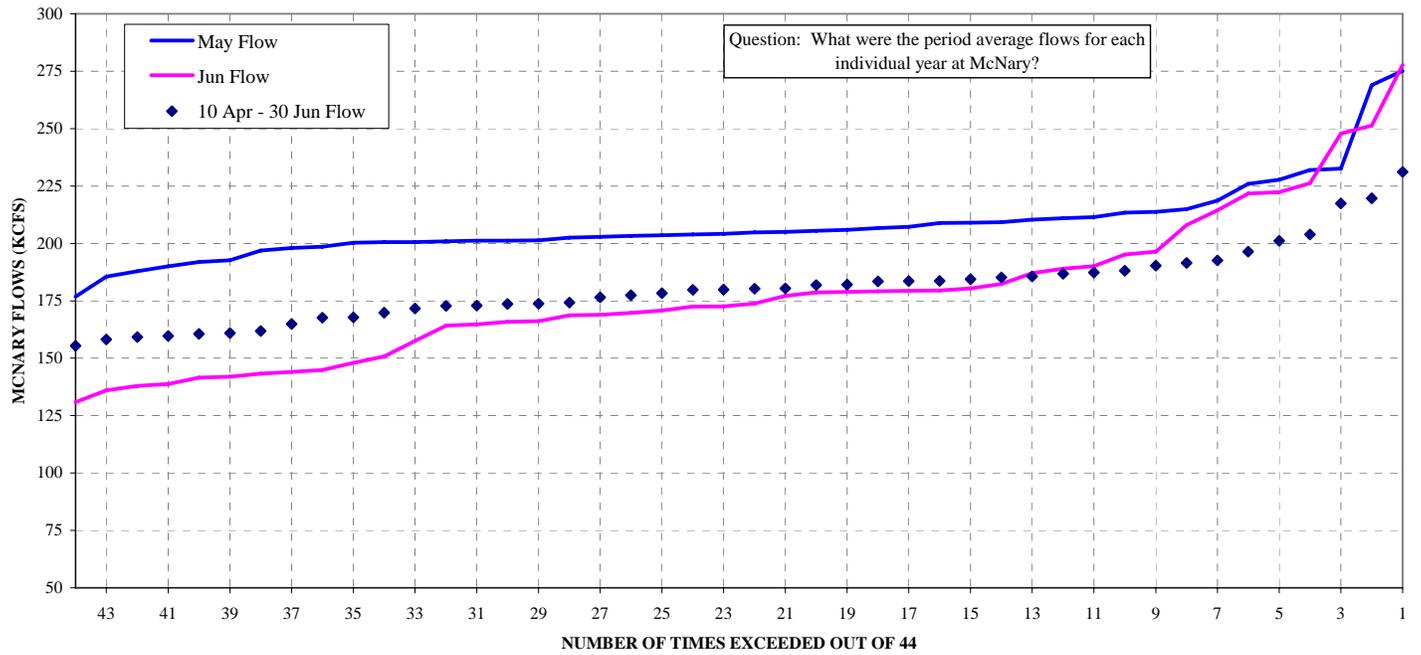
USES ESP INFLOWS

**LOWER GRANITE ESP
APRIL - JUNE FLOWS**



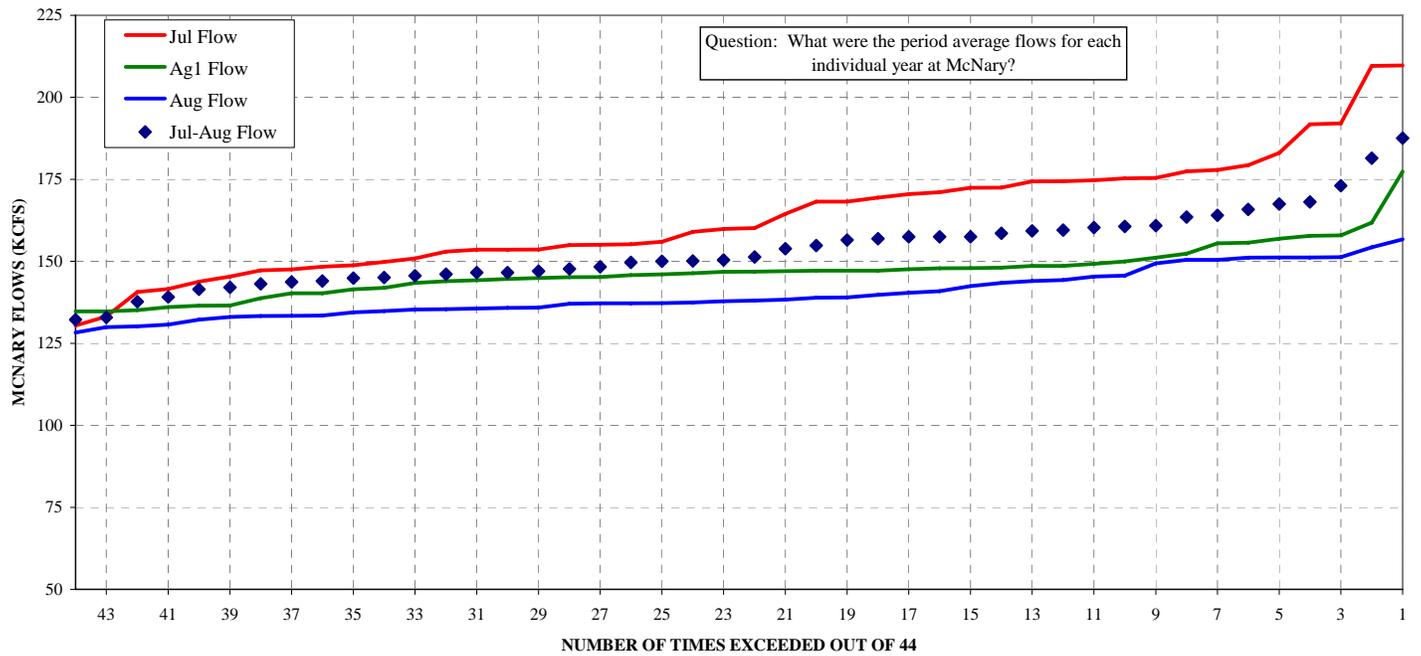
USES ESP INFLOWS

**MCNARY ESP OUTFLOW
APRIL - JUNE AVERAGES**



USES ESP INFLOWS

**MCNARY ESP OUTFLOW
JUL-AUG AVERAGES**



Summary of May Early Bird 2005 QADJ Model Runs

3-May-05

Assumptions:

- * Streamflows were adjusted to the May Early Bird Water Supply Forecast for the period of May thru August of 51.2 MAF at The Dalles (65% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are actual April 30, 2005 elevations.
- * Grand Coulee tries to meet 130,000 cfs in May while not drafting below 1240 ft. In June the project refills to 1285 ft in all years, and fills above 1285 ft if Priest Rapids flows are above 125,000 cfs. Summer lake targets are 1285.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates in May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby targets full in June while maintaining a minimum flow in May of 10,800 cfs and 10,400 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	59	133	130
Jun	50	129	125

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	0	61	85
Jun	1	54	73
Jul	0	31	50
Aug 15	0	24	50
Aug 31	0	22	50

McNary Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	6	191	220
Jun	1	175	220
Jul	0	150	200
Aug 15	0	128	200
Aug 31	0	121	200

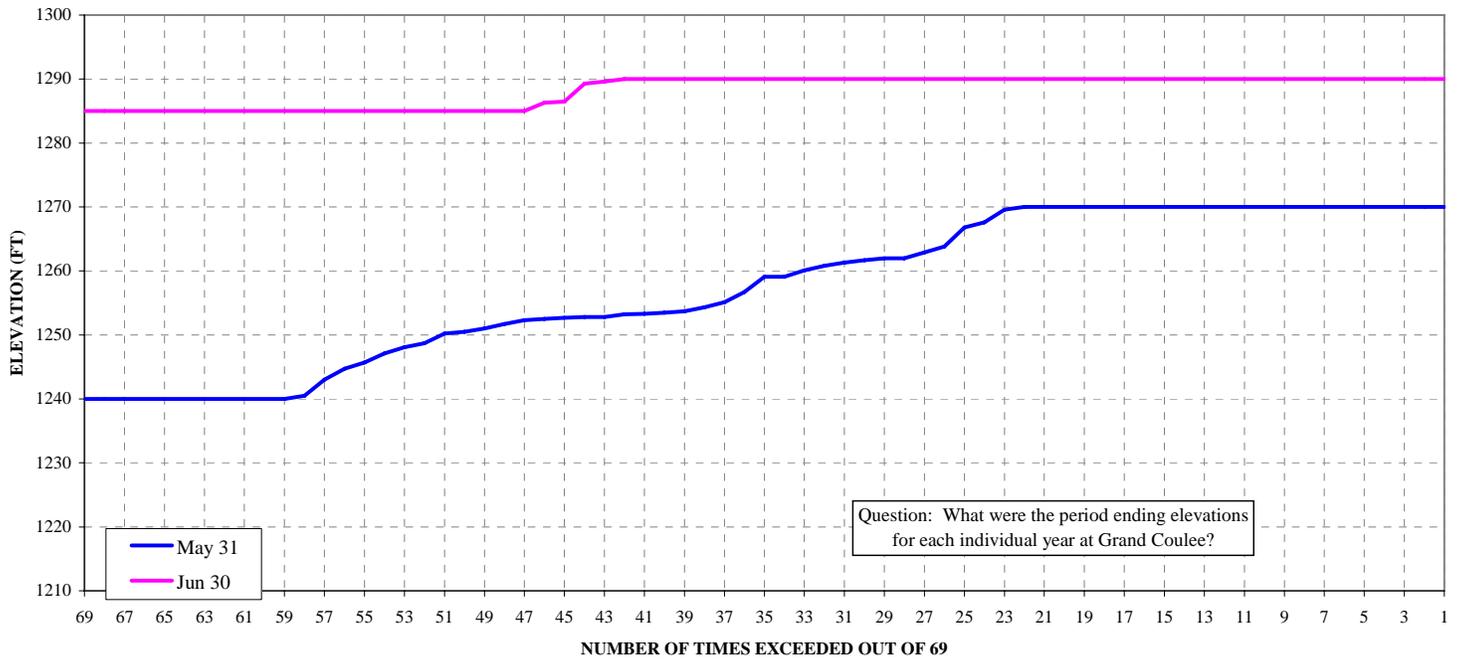
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	68	2459
Hungry Horse	69	3560
Grand Coulee	44	1288
Dworshak	69	1600

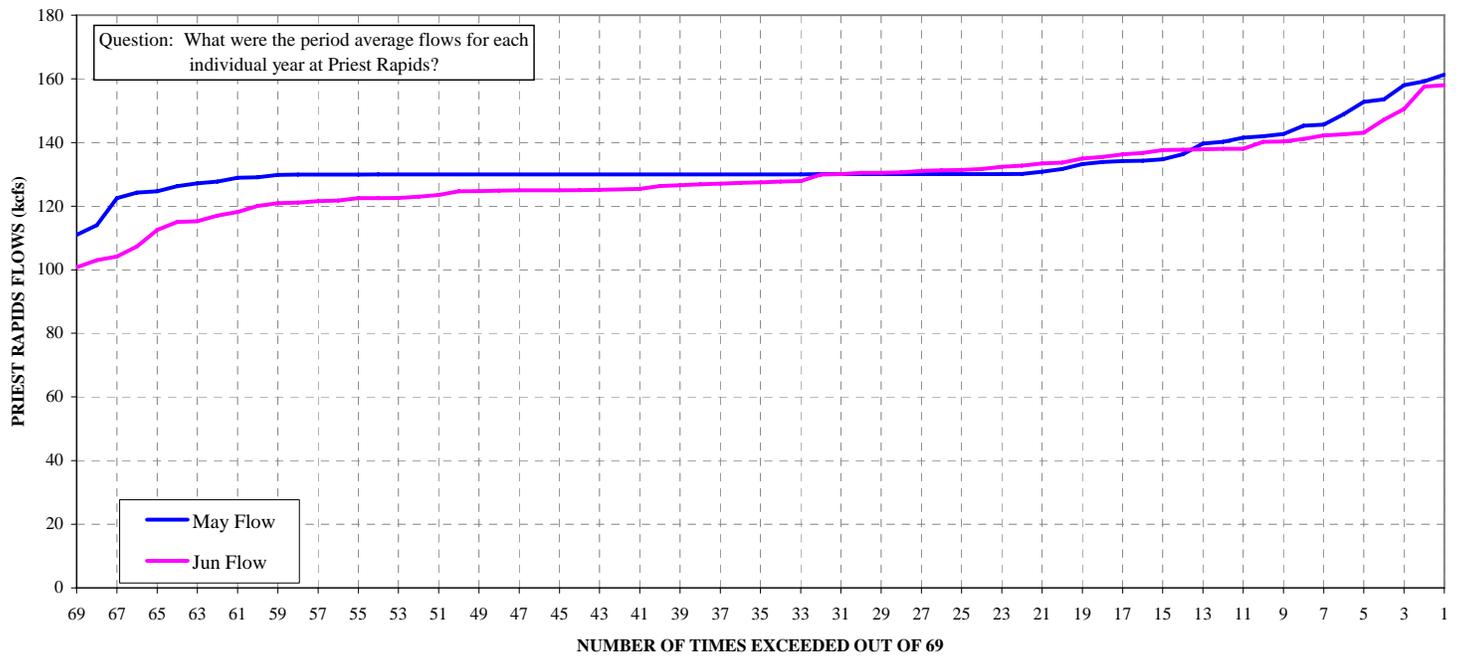
Period Average Outflows (kcfs):

	Obs FEB 1-28	Obs MAR 1-28	Obs APR 1-15	Obs APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	11.2	17.5	21.5	19.6	16.5
HGH	1.0	0.9	2.1	7.2	5.3	5.4	5.8	5.4	4.2
GCL	101	91	76	82	116	108	117	102	98
PRD	111	100	85	95	133	129	126	107	101
DWR	1.6	1.6	3.6	5.4	7.1	5.0	10	10	9
BRN	10	11	13	12	13	11	8	9	9
LWG	21	22	39	45	61	54	31	24	22
MCN	134	123	132	147	191	175	150	128	121
TDA	140	125	136	143	191	168	146	127	121
BON	138	130	143	153	193	169	148	129	122

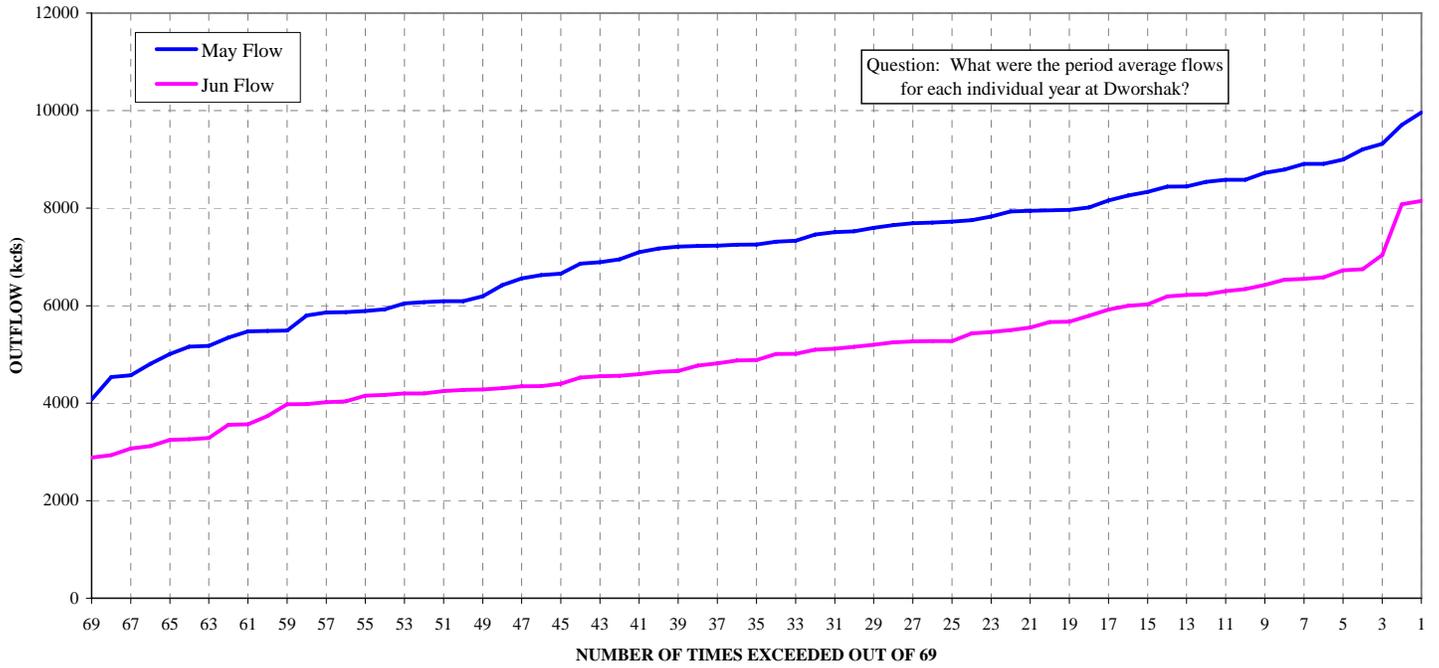
GRAND COULEE LAKE ROOSEVELT ELEVATIONS



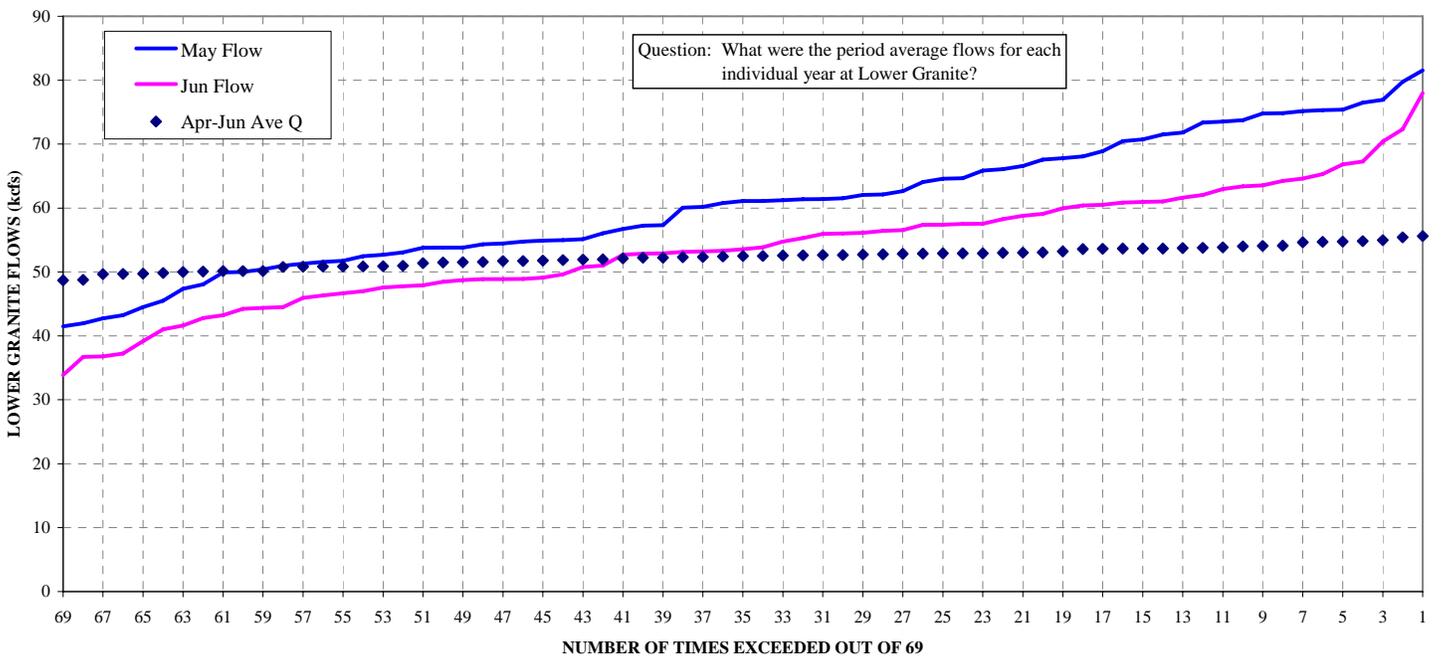
PRIEST RAPIDS MAY - JUNE FLOWS



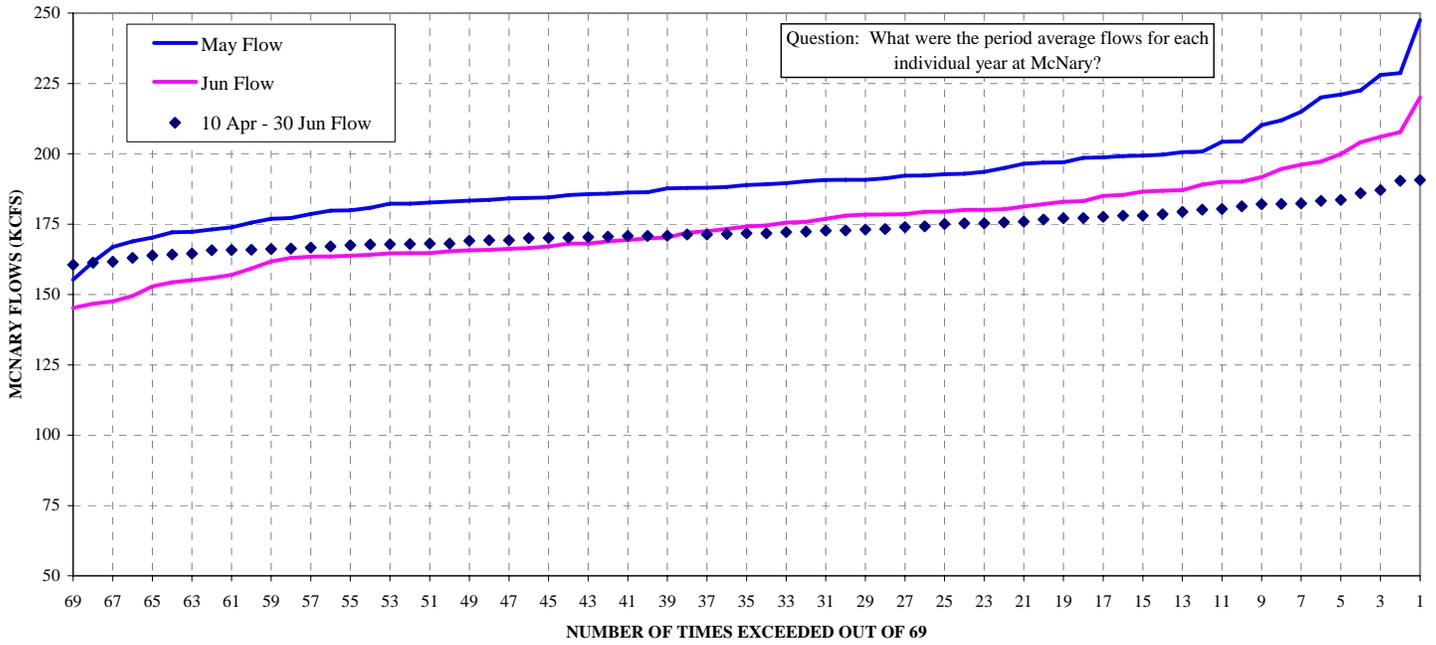
DWORSHAK OUTFLOWS



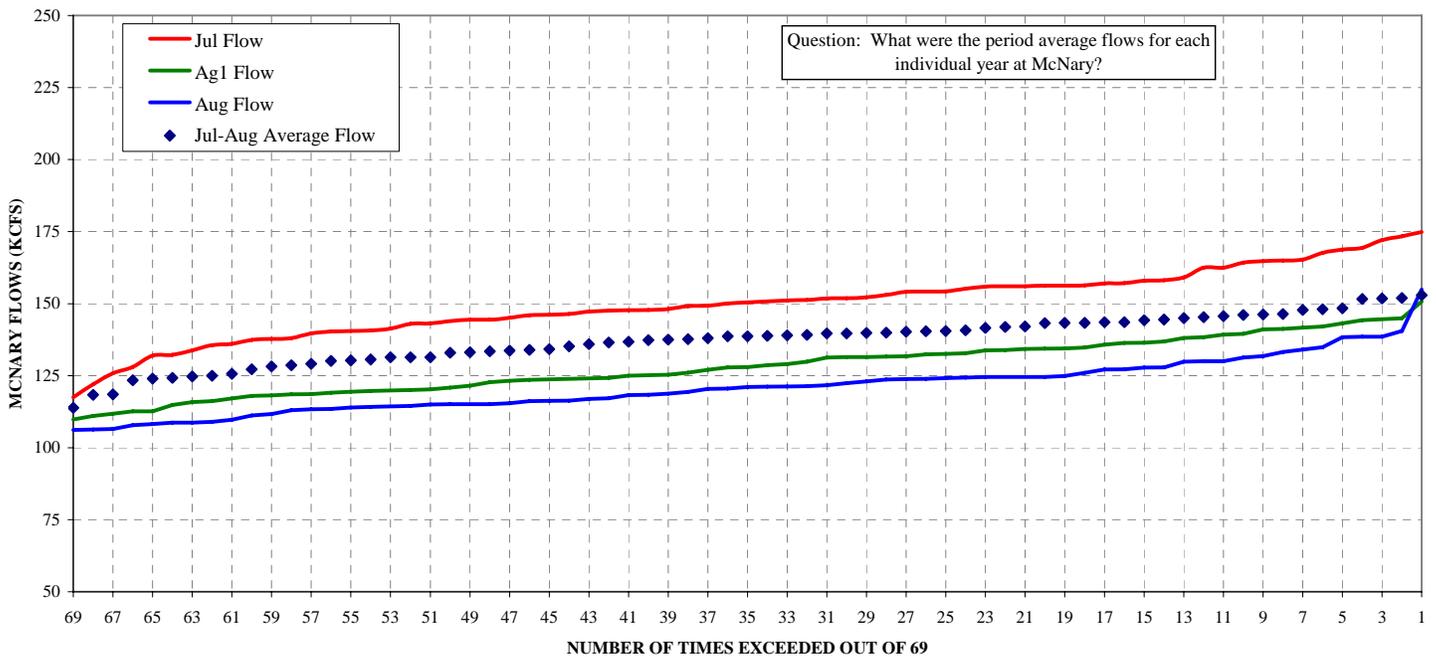
LOWER GRANITE APRIL - JUNE FLOWS



MCNARY OUTFLOW APRIL - JUNE AVERAGES



MCNARY OUTFLOW JUL-AUG AVERAGES



EXCEEDANCE TYPES

April 7 – May 2, 2005

According to the Washington Department of Ecology TDG variance for 2005 spill season, the Corps is required to provide the following information on exceedances of the 120% TDG in tailwater and 115% TDG in forebay water quality standards:

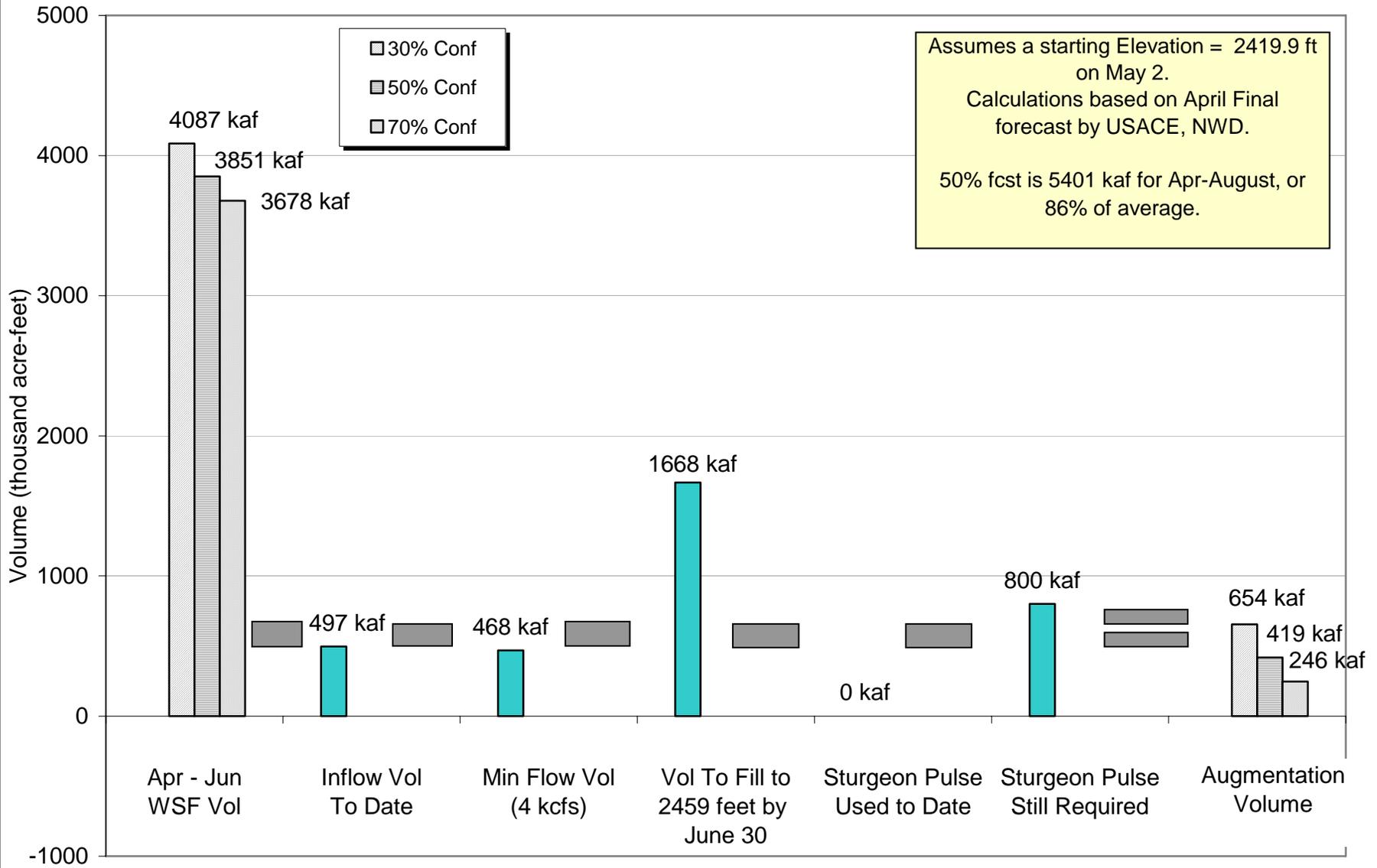
1. Date and times of exceedance
2. Amount of exceedance in percent saturation
3. Explain reason for exceedance
4. Discuss steps taken to fix the problem.

In order to provide the above information, the Corps has developed the following draft list of reasons that exceedances occur. Exceedances are being tracked and the following table is the results for the 2005 spill season from April 7 to May 3, 2005.

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 2005 spill season from April 7 to May 2, 2005.

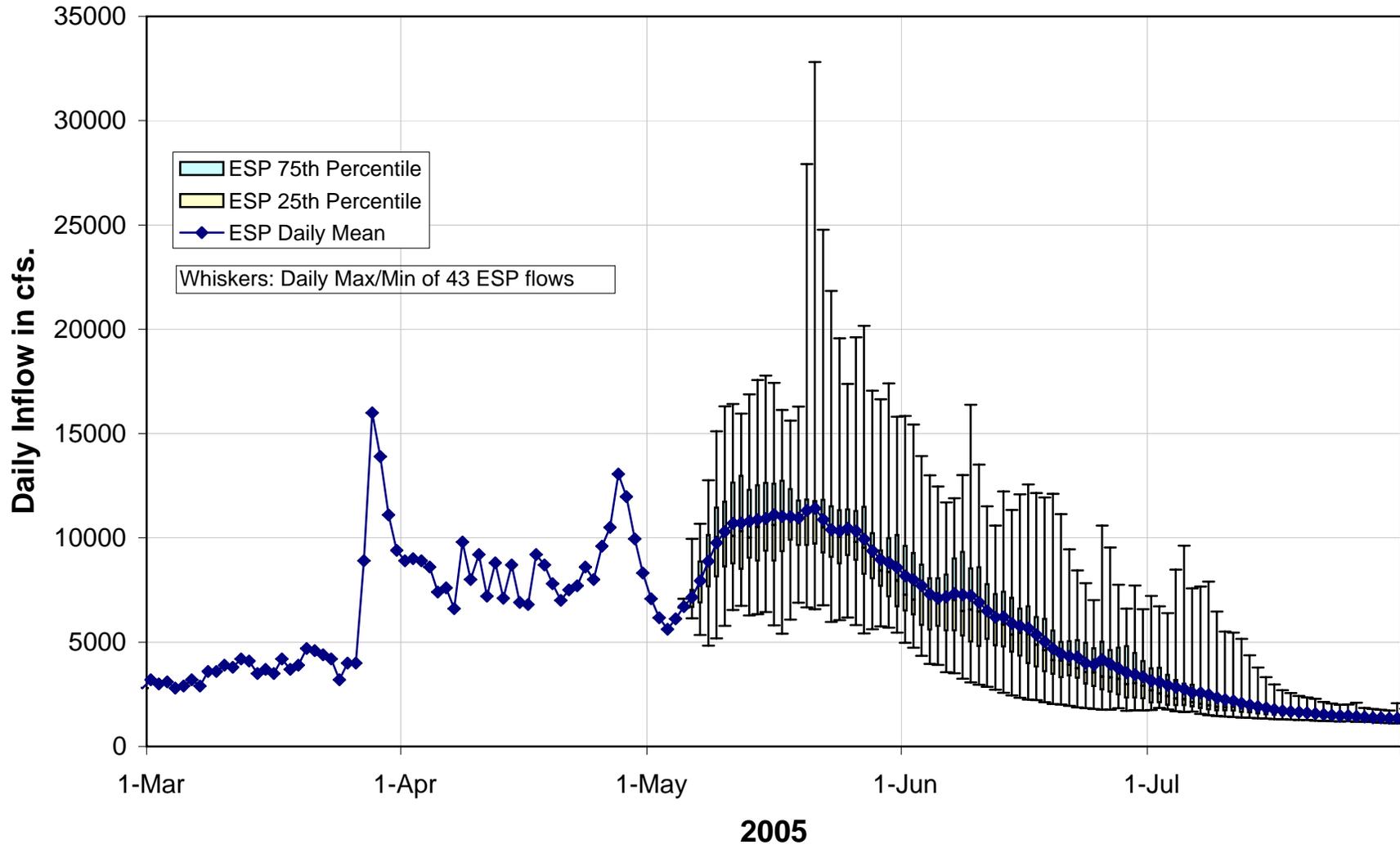
Volumes at Libby 1 April Through 30 June



Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
25-Apr	100.4	77.1	116.6	105.5	39.5	30	N	Increasing flows on Monday
26-Apr	120.7	109.3	145.7	115.5	36.4	30	N	
27-Apr	127.1	121.3	137.9	112.6	16.6	40	Y	
28-Apr	119.5	114.4	125.3	102.5	10.9	40	Y	
29-Apr	99.5	90.0	108.7	98.8	18.7	30	Y	
30-Apr	110.9	105.2	144.7	72				
1-May	107.8	105.5	110.9	84.5	39.5	20	N	
Week	112.3							

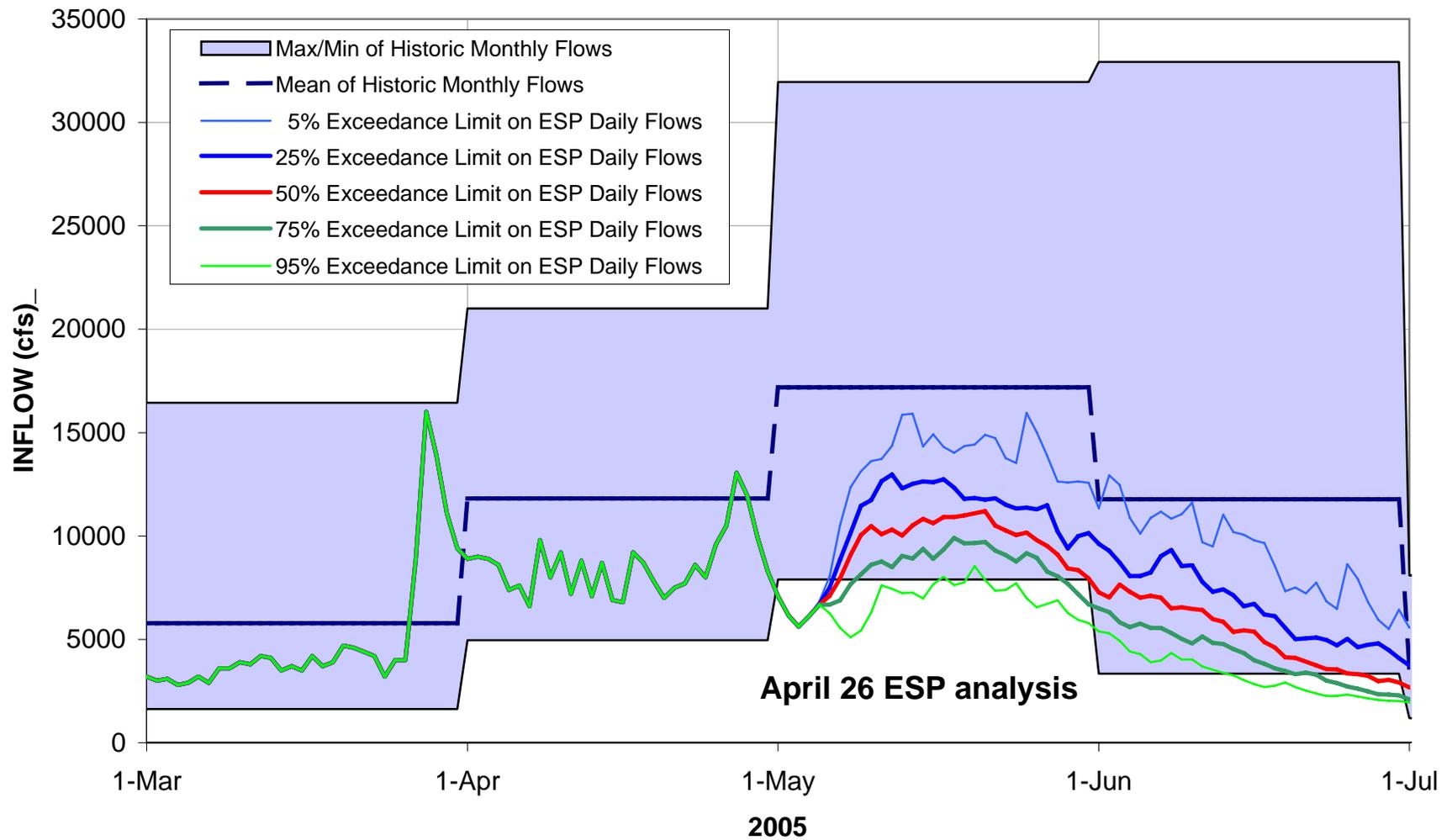
Dworshak ESP Inflows

April 26 ESP analysis

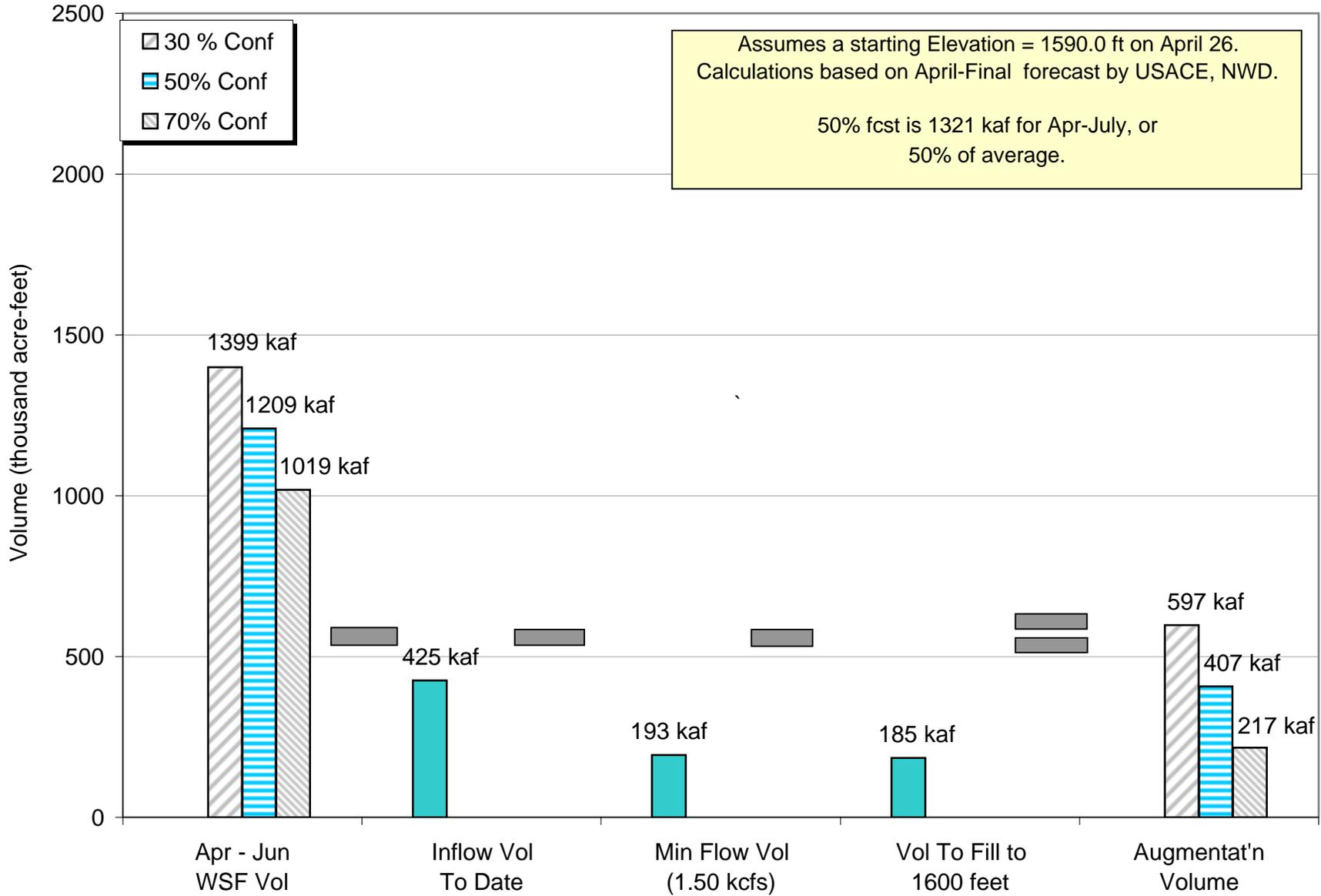


DWORSHAK INFLOWS

ESP DAILY FLOWS vs. HISTORIC MONTHLY FLOWS



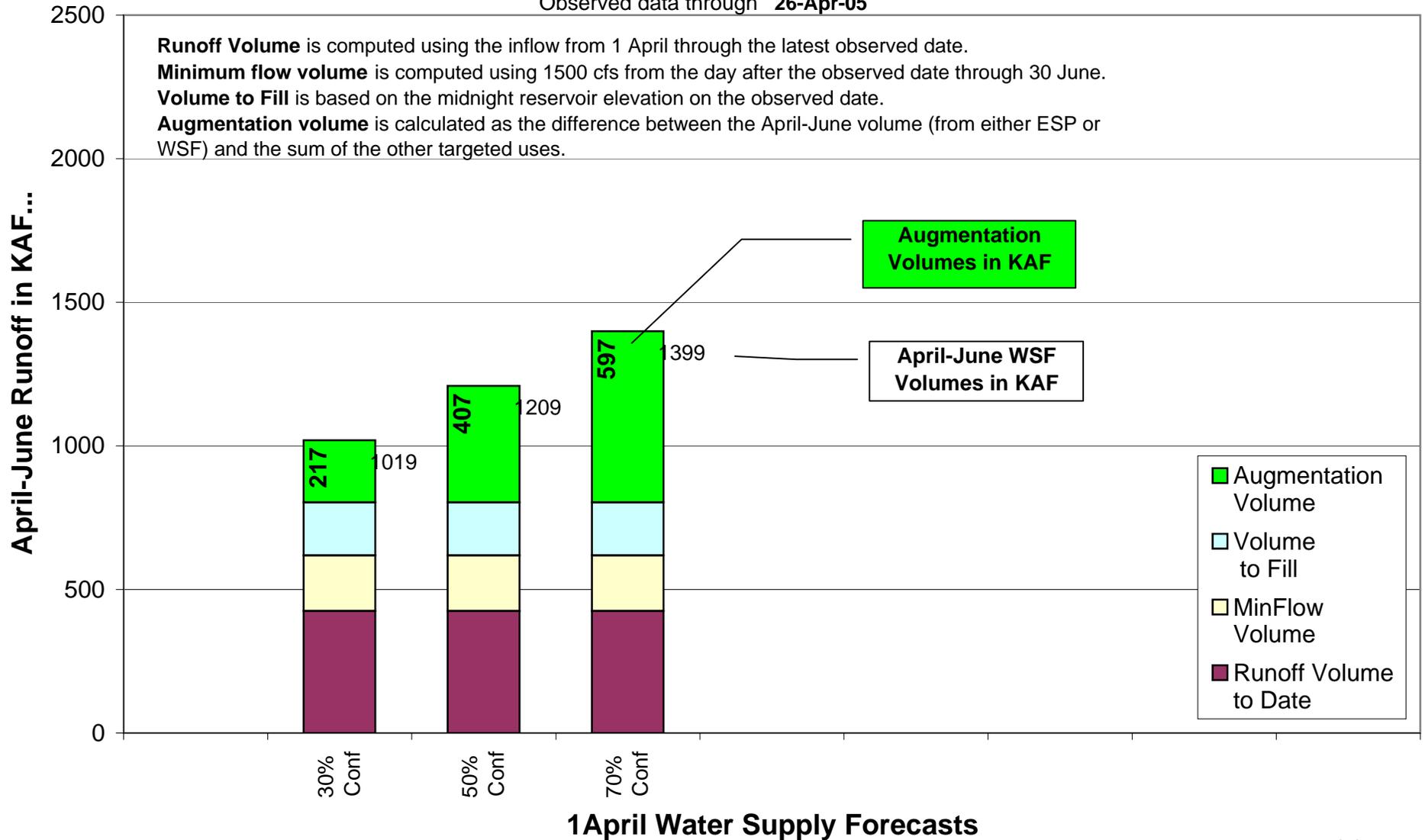
Volumes at Dworshak
1 April Through 30 June



Assumes a starting Elevation = 1590.0 ft on April 26.
Calculations based on April-Final forecast by USACE, NWD.
50% fcst is 1321 kaf for Apr-July, or 50% of average.

Dworshak Augmentation Volumes ESP inflows and 1 April Water Supply Forecast

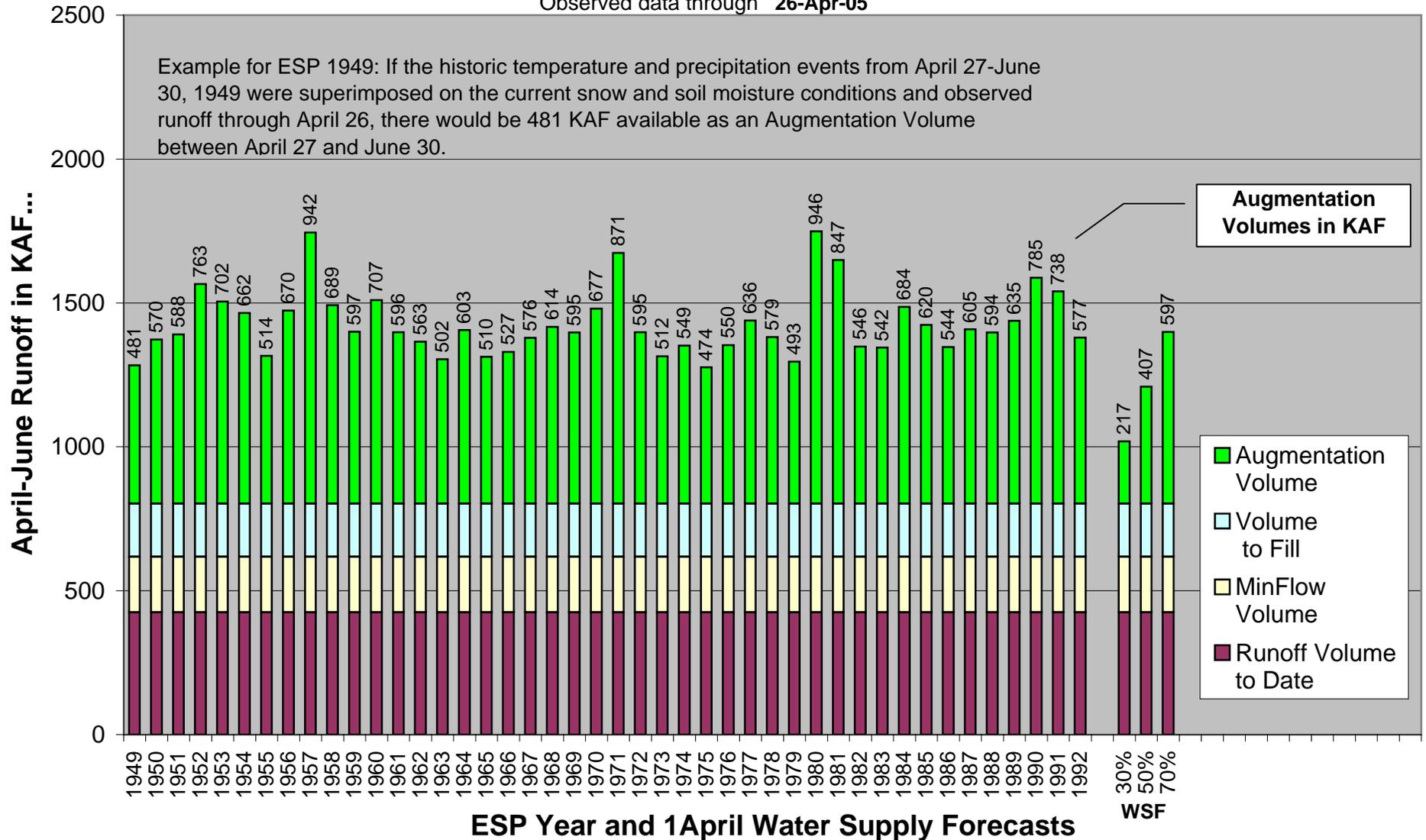
Observed data through 26-Apr-05



Dworshak Augmentation Volumes

ESP inflows and 1April Water Supply Forecast

Observed data through 26-Apr-05



2001 WATER SUPPLY FORECASTS AND OBSERVED

RFC June 2001

*CORPS OF ENGINEERS FORECAST

WSF MODEL RUN	GRAND COULEE				LOWER GRANITE				THE DALLES				BROWNLEE			
	Jan-Jul		Apr-Aug													
	Runoff MAF	% of Normal														
AVERAGE 61-90)	63.2	100	54.5	100	29.7	100	21.6	100	105.9	100	84.8	100	9.81	100	5.79	100
1990 ACTUAL	67.6	107	59.3	109	20.2	68	15.1	70	99.8	94	82.9	98	4.97	51	2.85	49
1991 ACTUAL	70.8	112	61.6	113	20.1	68	14.8	69	107.1	101	87.2	103	4.69	48	2.62	45
1992 ACTUAL	46.5	74	38.8	71	14.1	47	8.97	41	70.4	66	53.5	63	3.94	40	1.79	31
1993 ACTUAL	49.1	78	43.8	80	26.7	90	20.9	96	88.0	83	72.6	86	9.11	93	5.97	103
1994 ACTUAL	50.9	80	44.9	82	15.9	53	11.3	52	75.0	71	61.6	73	5.17	53	2.76	48
1995 ACTUAL	59.0	93	47.8	88	29.4	99	21.0	97	104.0	98	78.3	92	9.84	100	6.59	114
1996 ACTUAL	79.0	125	65.0	119	42.4	143	28.4	130	139.3	132	102.2	121	14.36	146	8.27	143
1997 ACTUAL	88.2	139	76.2	140	49.5	166	33.5	155	159.0	150	123.5	146	18.57	189	9.92	171
1998 ACTUAL	59.0	93	55.7	91	31.3	105	25.0	109	104.0	98	90.1	97	13.59	139	9.98	154
1999 ACTUAL	71.3	113	70.9	116	36.1	121	27.3	119	124.1	117	110.3	118	13.60	139	8.84	137
2000 ACTUAL	61.1	97	57.9	95	24.6	83	18.2	79	98.0	93	84.3	90	8.20	83	5.02	78
2001 JAN FINAL	48.8	77	47.1	77	23.6	79	18.3	80	80.4	76	70.8	76	5.98	61	3.94	61
2001 FEB FINAL	41.2	65	39.8	65	18.8	63	14.8	64	66.4	63	58.9	63	4.93	50	3.18	49
2001 MAR FINAL	37.6	59	36.6	60	16.3	55	13.0	57	58.6	55	52.2	56	4.39	45	2.39	41
2001 APR FINAL	37.5	59	36.8	60	14.1	47	10.7	47	56.1	53	49.6	53	4.07	41	2.11	33
2001 MAY FINAL	37.8	60	37.2	61	14.1	47	10.7	47	56.5	53	50.1	54	4.13	42	2.18	34
2001 JUN FINAL	36.5	58	35.8	59	14.8	50	11.4	50	55.5	52	49.0	53	4.15	42	2.20	34

WSF MODEL RUN	DWRSHAK				ROCK ISLAND				LIBBY				HUNGRY HORSE			
	Jan-Jul		Apr-Aug		Jan-Jul		Apr-Aug		Jan-Jul		Apr-Aug		Jan-Jul		Apr-Aug	
	Runoff MAF	% of normal														
AVERAGE (61-90)	3.55	100	2.70	100	69.1	100	59.7	100	6.40	100	5.78	100	2.27	100	2.05	100
1990 ACTUAL	3.61	102	2.81	104	74.7	108	65.3	109	7.69	120	6.94	120	2.55	112	2.26	110
1991 ACTUAL	3.67	103	2.71	100	79.7	115	68.6	115	8.61	135	7.72	134	2.88	127	2.61	127
1992 ACTUAL	2.09	59	1.32	49	51.6	75	42.5	71	4.64	73	4.04	70	1.54	68	1.32	64
1993 ACTUAL	2.75	78	2.2	81	53.6	78	47.7	80	5.32	83	4.81	83	1.97	87	1.76	86
1994 ACTUAL	1.85	52	1.43	53	55.2	80	48.4	81	5.43	85	4.85	84	1.69	75	1.50	73
1995 ACTUAL	3.16	89	1.81	67	66.4	96	53.8	90	6.22	97	5.59	97	2.02	89	1.67	82
1996 ACTUAL	4.90	138	3.07	114	87.6	127	71.5	120	8.59	134	7.63	132	2.85	125	2.41	118
1997 ACTUAL	5.94	167	4.64	172	96.5	140	83.4	140	8.06	126	7.25	125	3.29	145	3.03	148
1998 ACTUAL	2.86	81	2.17	78	65.7	95	61.2	92	5.99	94	5.84	92	1.79	79	1.64	77
1999 ACTUAL	4.24	120	3.30	118	79.6	115	78.6	118	6.95	109	7.13	112	2.24	99	2.12	100
2000 ACTUAL	3.49	98	2.74	98	66.9	97	63.1	95	5.82	91	5.50	86	2.05	90	1.91	90
2001 JAN FINAL	3.02	85	*2.38	*85	53.8	78	51.7	78	*4.94	*77	*4.76	*75	1.61	71	*1.51	*71
2001 FEB FINAL	2.29	65	*1.85	*66	45.2	65	43.5	65	*4.14	*65	*3.95	*62	1.35	59	*1.27	*60
2001 MAR FINAL	1.91	54	*1.85	*66	41.1	59	39.7	60	*3.58	*56	*3.37	*53	1.32	58	*1.25	*59
2001 APR FINAL	1.75	49	*1.43	*51	40.9	59	39.9	60	*3.48	*54	*3.32	*52	1.28	56	*1.25	*59
2001 MAY FINAL	1.79	50	*1.49	*53	41.3	60	40.3	61	*3.66	*57	*3.51	*55	1.31	58	*1.27	*60
2001 JUN FINAL	1.90	54	*1.57	*56	40.0	58	38.9	58	*3.34	*52	*3.16	*50	1.33	59	*1.27	*60

NOTES: WATER YEARS 1961-90 USED TO COMPUTE PERCENT OF NORMAL
COORDINATED FORECASTS RELEASED BY NWS RIVER FORECAST CENTER

2001 WATER SUPPLY FORECASTS AND OBSERVED

RFC June 2001

*CORPS OF ENGINEERS FORECAST

WSF MODEL RUN	GRAND COULEE				LOWER GRANITE				THE DALLES				BROWNLEE			
	Jan-Jul		Apr-Jul													
	Runoff MAF	% of Normal														
AVERAGE(61-90)	63.2	100	54.5	100	29.7	100	21.6	100	105.9	100	84.8	100	9.81	100	5.79	100
1990 ACTUAL	67.6	107	59.3	109	20.2	68	15.1	70	99.8	94	82.9	98	4.97	51	2.85	49
1991 ACTUAL	70.8	112	61.6	113	20.1	68	14.8	69	107.1	101	87.2	103	4.69	48	2.62	45
1992 ACTUAL	46.5	74	38.8	71	14.1	47	8.97	41	70.4	66	53.5	63	3.94	40	1.79	31
1993 ACTUAL	49.1	78	43.8	80	26.7	90	20.9	96	88.0	83	72.6	86	9.11	93	5.97	103
1994 ACTUAL	50.9	80	44.9	82	15.9	53	11.3	52	75.0	71	61.6	73	5.17	53	2.76	48
1995 ACTUAL	59.0	93	47.8	88	29.4	99	21.0	97	104.0	98	78.3	92	9.84	100	6.59	114
1996 ACTUAL	79.0	125	65.0	119	42.4	143	28.4	130	139.3	132	102.2	121	14.36	146	8.27	143
1997 ACTUAL	88.2	139	76.2	140	49.5	166	33.5	155	159.0	150	123.5	146	18.57	189	9.92	171
1998 ACTUAL	59.0	93	50.3	92	31.3	105	23.7	109	104.0	98	83.1	98	13.59	139	9.24	159
1999 ACTUAL	71.3	113	61.2	112	36.1	121	25.8	119	124.1	117	98.3	116	13.60	139	8.05	139
2000 ACTUAL	61.1	97	52.3	96	24.6	83	17.2	79	98.0	93	77.2	91	8.20	83	4.40	75
2001 JAN FINAL	48.8	77	42.1	77	23.6	79	17.2	79	80.4	76	64.3	76	5.98	61	3.53	61
2001 FEB FINAL	41.2	65	35.6	65	18.8	63	14.0	65	66.4	63	53.6	63	4.93	50	2.85	49
2001 MAR FINAL	37.6	59	32.7	60	16.3	55	12.3	57	58.6	55	47.5	56	4.39	45	2.39	41
2001 APR FINAL	37.5	59	32.9	60	14.1	47	10.0	46	56.1	53	45.1	53	4.07	41	1.89	33
2001 MAY FINAL	37.5	60	33.3	61	14.1	47	10.0	46	56.5	53	45.5	54	4.13	42	1.95	34
2001 JUN FINAL	36.5	58	32.0	59	14.8	50	10.8	50	55.5	52	44.5	53	4.15	42	1.97	34

WSF MODEL RUN	DWRSHAK				ROCK ISLAND				LIBBY				HUNGRY HORSE			
	Jan-Jul		Apr-Jul													
	Runoff MAF	% of normal														
AVERAGE(61-90)	3.55	100	2.70	100	69.1	100	59.7	100	6.40	100	5.78	100	2.27	100	2.05	100
1990 ACTUAL	3.61	102	2.81	104	74.7	108	65.3	109	7.69	120	6.94	120	2.55	112	2.26	110
1991 ACTUAL	3.67	103	2.71	100	79.7	115	68.6	115	8.61	135	7.72	134	2.88	127	2.61	127
1992 ACTUAL	2.09	59	1.32	49	51.6	75	42.5	71	4.64	73	4.04	70	1.54	68	1.32	64
1993 ACTUAL	2.75	78	2.2	81	53.6	78	47.7	80	5.32	83	4.81	83	1.97	87	1.76	86
1994 ACTUAL	1.85	52	1.43	53	55.2	80	48.4	81	5.43	85	4.85	84	1.69	75	1.50	73
1995 ACTUAL	3.16	89	1.81	67	66.4	96	53.8	90	6.22	97	5.59	97	2.02	89	1.67	82
1996 ACTUAL	4.90	138	3.07	114	87.6	127	71.5	120	8.59	134	7.63	132	2.85	125	2.41	118
1997 ACTUAL	5.94	167	4.64	172	96.5	140	83.4	140	8.06	126	7.25	125	3.29	145	3.03	148
1998 ACTUAL	2.86	81	2.06	76	65.7	95	55.7	93	5.99	94	5.35	93	1.79	79	1.58	77
1999 ACTUAL	4.24	120	3.19	118	79.6	115	68.3	114	6.95	109	6.23	108	2.24	99	2.04	99
2000 ACTUAL	3.49	98	2.68	99	66.9	97	57.2	96	5.82	91	5.00	86	2.05	90	1.82	91
2001 JAN FINAL	3.02	85	*2.30	*85	53.8	78	46.4	78	*4.94	*77	*4.32	*75	1.61	71	1.45	71
2001 FEB FINAL	2.29	65	*1.78	*66	45.2	65	39.1	65	*4.14	*65	*3.57	*62	1.35	59	1.24	60
2001 MAR FINAL	1.91	54	*1.81	*67	41.1	59	35.7	60	*3.58	*56	*3.05	*53	1.32	58	1.24	60
2001 APR FINAL	1.75	49	*1.38	*51	40.9	59	35.9	60	*3.48	*54	*3.01	*52	1.28	56	1.22	59
2001 MAY FINAL	1.79	50	*1.40	*52	41.3	60	36.3	61	*3.66	*57	*3.18	*55	1.31	58	1.25	61
2001 JUN FINAL	1.90	54	*1.43	*53	40.0	58	35.0	59	*3.34	*52	*2.87	*50	1.33	59	1.27	62

NOTES: WATER YEARS 1961-90 USED TO COMPUTE PERCENT OF NORMAL
COORDINATED FORECASTS RELEASED BY NWS RIVER FORECAST CENTER

Updated August-03-2004 RG

**WATER SUPPLY FORECASTS AND OBSERVED
RFC & CORPS
CORPS OF ENGINEERS FORECAST**

WSF MODEL RUN		GRAND COULEE #124365003				LOWER GRANITE #133436001				THE DALLES #141057001				BROWNLEE #132896002			
		Jan	Jul	Apr	Sep	Jan	Jul	Apr	Jul	Jan	Jul	Apr	Sep	Jan	Jul	Apr	Aug
		Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal
Average (1971-2000)		62.90	100	63.99	100	30.02	100	21.55	100	107.30	100	98.65	100	10.70	100	6.99	100
1990	ACTUAL	67.60	107	59.30	93	20.20	67	15.10	70	99.80	93	82.90	84	4.97	46	2.85	41
1991	ACTUAL	70.80	113	61.60	96	20.10	67	14.80	69	107.10	100	87.20	88	4.69	44	2.62	37
1992	ACTUAL	46.50	74	38.80	61	14.10	47	8.97	42	70.40	66	53.50	54	3.94	37	1.79	26
1993	ACTUAL	49.08	78	52.68	82	26.68	89	20.87	97	87.97	82	85.56	87	9.12	85	6.70	96
1994	ACTUAL	50.87	81	51.88	81	15.89	53	11.34	53	74.97	70	70.77	72	5.17	48	3.25	46
1995	ACTUAL	58.99	94	57.31	90	29.41	98	20.98	97	104.04	97	91.37	93	9.84	92	7.26	104
1996	ACTUAL	78.98	126	75.61	118	42.43	141	28.11	130	139.31	130	116.61	118	14.36	134	9.03	129
1997	ACTUAL	88.17	140	88.51	138	49.48	165	33.53	156	159.00	148	141.06	143	18.57	174	10.91	156
1998	ACTUAL	59.01	94	58.74	92	31.29	104	23.67	110	104.05	97	95.02	96	13.59	127	9.98	143
1999	ACTUAL	71.34	113	74.62	117	36.08	120	25.78	120	124.08	116	115.92	118	13.63	127	8.84	126
2000	ACTUAL	61.10	97	61.41	96	24.60	82	17.16	80	98.01	91	89.52	91	8.18	76	5.02	72
2001	ACTUAL	37.39	59	39.83	62	14.38	48	10.30	48	58.19	54	56.25	57	4.57	43	2.87	41
2002	ACTUAL	68.02	108	68.23	107	23.99	80	19.02	88	103.75	97	98.09	99	5.58	52	3.77	54
2003	ACTUAL	54.18	86	52.74	82	23.81	79	16.73	78	87.69	82	77.44	78	5.96	56	4.06	58
2004	Jan 12	61.70	98	62.70	98	27.60	92	19.80	92	103.00	96	94.30	96	7.25	68	4.74	68
2004	Feb 09	59.80	95	61.40	96	27.70	92	20.80	97	100.00	93	93.50	95	7.45	70	5.00	72
2004	Mar 05	55.60	88	57.60	90	26.10	87	20.00	93	92.90	87	87.40	89	7.37	69	5.02	72
2004	Apr 07	53.60	85	55.50	87	21.30	71	15.60	72	84.20	78	77.80	79	5.80	54	3.47	50
2004	May 07	52.20	83	53.80	84	18.80	63	13.10	61	79.50	74	72.50	73	5.17	48	2.77	40
2004	Jun 07	53.00	84	54.70	85	21.10	70	15.40	71	85.10	79	78.80	80	5.46	51	3.09	44
2004	Jul 09	52.30	83	53.90	84	20.80	69	15.20	71	83.70	78	77.30	78	5.36	50	2.98	43
2004	Jul 31	50.29	80	43.54	68	20.68	69	15.03	70	82.95	77	65.56	66	5.86	55	3.19	46
2004																	

WSF MODEL RUN		DWORSHAK #133409501				ROCK ISLAND #124626001				LIBBY #123019330				HUNGRY HORSE #123625001			
		Jan	Jul	Apr	Jul	Jan	Jul	Apr	Sep	Jan	Jul	Apr	Aug	Jan	Jul	Apr	Sep
		Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal
Average (1971-2000)		3.55	100	2.65	100	68.91	100	69.54	100	6.31	100	6.25	100	2.22	100	2.12	100
1990	ACTUAL	3.61	102	2.81	106	74.70	108	65.30	94	7.69	122	6.94	111	2.55	115	2.26	106
1991	ACTUAL	3.67	103	2.71	102	79.70	116	68.60	99	8.61	137	7.72	124	2.88	129	2.61	123
1992	ACTUAL	2.09	59	1.32	50	51.60	75	42.50	61	4.64	74	4.04	65	1.54	69	1.32	62
1993	ACTUAL	2.75	78	2.20	83	53.64	78	57.16	82	5.32	84	5.48	88	1.97	88	1.94	91
1994	ACTUAL	1.85	52	1.43	54	55.16	80	55.61	80	5.43	86	5.22	84	1.69	76	1.56	73
1995	ACTUAL	3.16	89	1.81	68	66.36	96	63.76	92	6.22	99	6.30	101	2.02	91	1.78	84
1996	ACTUAL	4.90	138	3.07	116	87.63	127	82.81	119	8.59	136	8.35	134	2.85	128	2.55	120
1997	ACTUAL	5.94	167	4.64	175	96.49	140	96.52	139	8.06	128	7.85	126	3.29	148	3.21	151
1998	ACTUAL	2.86	81	2.09	79	65.68	95	64.48	93	5.99	95	5.84	93	1.79	80	1.67	79
1999	ACTUAL	4.24	120	3.19	120	79.62	116	82.50	119	6.95	110	7.13	114	2.24	101	2.16	102
2000	ACTUAL	3.49	98	2.68	101	66.93	97	66.78	96	5.82	92	5.50	88	2.05	92	1.94	91
2001	ACTUAL	1.82	51	1.47	56	40.08	58	42.17	61	3.34	53	3.17	51	1.30	58	1.29	61
2002	ACTUAL	4.35	123	3.70	140	74.83	109	74.31	107	7.18	114	7.10	114	2.30	103	2.29	108
2003	ACTUAL	3.56	100	2.30	87	58.54	85	56.31	81	5.19	82	5.08	81	1.82	82	1.69	80
2004	Jan 12	3.55	100	2.65	100	68.40	99	69.00	99	5.76	91	5.71	91	2.10	94	2.01	95
2004	Feb 09	3.38	95	2.60	98	66.00	96	67.20	97	5.66	90	5.64	90	2.13	96	2.06	97
2004	Mar 05	3.03	85	2.39	91	61.20	89	62.70	90	5.35	85	5.36	86	1.93	87	1.89	89
2004	Apr 07	2.91	82	2.27	86	58.90	85	60.30	87	5.30	84	5.31	85	1.68	76	1.58	74
2004	May 07	2.70	76	2.01	76	57.30	83	58.50	84	4.98	79	4.95	79	1.81	81	1.71	81
2004	Jun 07	2.96	83	2.31	87	59.40	86	60.90	88	4.51	71	4.43	71	2.02	91	1.94	91
2004	Jul 09	3.05	86	2.40	91	58.00	84	59.20	85	4.58	73	4.52	72	1.92	86	1.83	86
2004	Jul 31	3.04	86	2.39	90	54.91	80	47.33	68	4.60	73	4.09	65	1.90	85	1.70	80
2004																	

NOTE : WATER YEARS 1971-2000 USED TO COMPUTE PERCENT OF NORMAL - COORDINATED FORECAST BY NWS RIVER FORECAST CENTER

<https://npr71.nwd-wc.usace.army.mil/rccweb/RCCLIST/runoff.txt> Columbia Basin Runoff Summary - Monthly Runoff Processor **NOTE : RFC DATA USED <http://137.161.65.209/wsfctst/station/wsfplot/wsfplot.cgi?DWR11>**

http://137.161.65.209/wsfctst/wsfctst_fmt.cgi LYDM8,QCSFAZZ,x, JAN, JUL & APR, AUG **NOTE : RFC DATA USED <http://137.161.65.209/wsfctst/station/wsfplot/wsfplot.cgi?LYDM8>**

G:\RCCWATER SUPPLY FORECAST AND OBSERVED\WSF-JULY-FINAL-August-03-2004.pd

2003 WATER SUPPLY FORECASTS AND OBSERVED

RFC July 2003

***CORPS OF ENGINEERS FORECAST**

WSF MODEL RUN		GRAND COULEE #124365003				LOWER GRANITE #133436001				THE DALLES #141056600				BROWNLEE #132896002			
		Jan	Jul	Apr	Sep	Jan	Jul	Apr	Jul	Jan	Jul	Apr	Sep	Jan	Jul	Apr	Jul
		Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal
AVERAGE (61-90)		63.20	100	54.50	100	29.70	100	21.60	100	105.90	100	84.80	100	9.81	100	5.79	100
1990	ACTUAL	67.60	107	59.30	109	20.20	68	15.10	70	99.80	94	82.90	98	4.97	51	2.85	49
1991	ACTUAL	70.80	112	61.60	113	20.10	68	14.80	69	107.10	101	87.20	103	4.69	48	2.62	45
1992	ACTUAL	46.50	74	38.80	71	14.10	47	8.97	41	70.40	66	53.50	63	3.94	40	1.79	31
1993	ACTUAL	49.10	78	43.80	80	26.70	90	20.90	96	88.00	83	72.60	86	9.11	93	5.97	103
1994	ACTUAL	50.90	80	44.90	82	15.90	53	11.30	52	75.00	71	61.60	73	5.17	53	2.76	48
1995	ACTUAL	59.00	93	47.80	88	29.40	99	21.00	97	104.00	98	78.30	92	9.84	100	6.59	114
1996	ACTUAL	79.00	125	65.00	119	42.40	143	28.40	130	139.30	132	102.20	121	14.36	146	8.27	143
1997	ACTUAL	88.20	139	76.20	140	49.50	166	33.50	155	159.00	150	123.50	146	18.57	189	9.92	171
1998	ACTUAL	59.00	93	55.70	91	31.30	105	25.00	109	104.00	98	90.10	97	13.59	139	9.98	154
1999	ACTUAL	71.30	113	70.90	116	36.10	121	27.30	119	124.10	117	110.30	118	13.60	139	8.84	137
2000	ACTUAL	61.10	97	57.90	95	24.60	83	18.20	79	98.00	93	84.30	90	8.20	83	5.02	78
2001	ACTUAL	37.39	59	39.83	61	14.38	48	11.83	49	58.19	55	56.25	57	4.11	45	3.40	47
2002	ACTUAL	68.02	108	68.23	107	23.99	80	20.91	87	103.75	97	98.10	99	7.58	55	6.72	55
2003 Jan	FINAL	50.30	80	51.20	80	22.00	73	15.80	73	80.50	75	74.00	75	N/A	N/A	3.92	62
2003 Feb	FINAL	48.10	76	48.90	76	20.60	69	14.70	68	75.60	70	69.20	70	N/A	N/A	3.49	55
2003 Mar	FINAL	46.30	74	46.90	73	21.10	70	14.70	68	74.90	70	67.50	68	N/A	N/A	3.10	49
2003 Apr	FINAL	52.90	84	53.00	83	24.20	81	17.10	79	85.30	79	76.80	78	N/A	N/A	3.37	53
2003 May	FINAL	55.50	88	56.00	88	25.60	85	18.50	86	90.20	84	82.40	84	N/A	N/A	3.52	56
2003 June	FINAL	55.60	88	56.20	88	25.10	84	18.10	84	89.30	83	81.40	83	N/A	N/A	3.54	56
2003 July	FINAL	55.90	89	56.50	88	24.80	83	17.70	82	89.30	83	81.40	83	N/A	N/A	3.50	55

WSF MODEL RUN		DWORSHAK #133409501				ROCK ISLAND #124626001				LIBBY #123019330				HUNGRY HORSE #123625001			
		Jan	Jul	Apr	Sep	Jan	Jul	Apr	Sep	Jan	Jul	Apr	Sep	Jan	Jul	Apr	Sep
		Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal
AVERAGE (61-90)		3.55	100	2.70	100	69.10	100	59.70	100	6.40	100	5.78	100	2.27	100	2.05	100
1990	ACTUAL	3.61	102	2.81	104	74.70	108	65.30	109	7.69	120	6.94	120	2.55	112	2.26	110
1991	ACTUAL	3.67	103	2.71	100	79.70	115	68.60	115	8.61	135	7.72	134	2.88	127	2.61	127
1992	ACTUAL	2.09	59	1.32	49	51.60	75	42.50	71	4.64	73	4.04	70	1.54	68	1.32	64
1993	ACTUAL	2.75	78	2.20	81	53.60	78	47.70	80	5.32	83	4.81	83	1.97	87	1.76	86
1994	ACTUAL	1.85	52	1.43	53	55.20	80	48.40	81	5.43	85	4.85	84	1.69	75	1.50	73
1995	ACTUAL	3.16	89	1.81	67	66.40	96	53.80	90	6.22	97	5.59	97	2.02	89	1.67	82
1996	ACTUAL	4.90	138	3.07	114	87.60	127	71.50	120	8.59	134	7.63	132	2.85	125	2.41	118
1997	ACTUAL	5.94	167	4.64	172	96.50	140	83.40	140	8.06	126	7.25	125	3.29	145	3.03	148
1998	ACTUAL	2.86	81	2.17	78	65.70	95	61.20	92	5.99	94	5.84	92	1.79	79	1.64	77
1999	ACTUAL	4.24	120	3.30	118	79.60	115	78.60	118	6.95	109	7.13	112	2.24	99	2.12	100
2000	ACTUAL	3.49	98	2.74	98	66.90	97	63.10	95	5.82	91	5.50	86	2.05	90	1.91	90
2001	ACTUAL	1.82	51	1.58	55	40.08	58	42.17	60	3.34	52	3.37	50	1.30	57	1.29	59
2002	ACTUAL	4.35	123	3.92	140	74.83	109	74.31	107	7.18	114	7.41	112	2.30	103	2.29	108
2003 Jan	FINAL	2.51	71	1.98	71	55.50	81	56.00	81	4.91	78	5.16	78	1.56	70	1.49	70
2003 Feb	FINAL	2.45	69	1.81	65	20.60	69	14.70	68	4.73	75	4.99	75	1.53	69	1.46	69
2003 Mar	FINAL	2.82	80	1.94	69	50.90	74	51.00	73	4.44	70	4.69	71	1.47	66	1.39	65
2003 Apr	FINAL	3.66	103	2.54	91	58.20	84	57.90	83	4.96	79	5.27	79	1.80	81	1.71	81
2003 May	FINAL	3.60	101	2.47	88	61.20	89	61.30	88	5.20	82	5.54	83	1.90	85	1.82	86
2003 June	FINAL	3.57	101	2.44	87	60.90	88	61.00	88	5.10	81	5.42	82	1.92	86	1.84	87
2003 July	FINAL	3.60	101	2.47	88	61.50	89	61.70	89	5.60	89	6.01	91	1.89	85	1.81	85

NOTE : WATER YEARS 1961-90 USED TO COMPUTE PERCENT OF NORMAL
COORDINATED FORECAST RELEASED BY NWS RIVER FORECAST CENTER

Technical Management Team Meeting Notes

May 4, 2005
Corps Reservoir Control Center
Portland, OR

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.

Comments on 4/6/05 and 4/13/05 Facilitator Notes

The following changes were made to the 4/6 notes, and will be posted on the TMT web page:

- Under the discussion of Dworshak, change comment about Oregon and Idaho to “directly challenged the COE on the validity of the flood control requirements at Dworshak”.
- Under the Dworshak discussion, change to the ‘project increased flows to available power house, with 2 units operating.’

Comments on the 4/13 facilitator notes should be sent to the facilitation team no later than 5/11; changes will be made and posted to the TMT web page.

Hanford Reach

Russell Langshaw, Grant County PUD, reported on operations at Hanford Reach during the week of April 25- May 1. The week average flow was 112.3 kcfs. Russell will provide information on why the project did not consistently meet flows at this time. The project reached 800 temperature units on 4/30, and began weekend protection flows. The end of emergence is expected around May 13-15; some protection flows will be provided beyond that date. Russell will send information to Cindy Henriksen to share with TMT, and will give a report at the 5/18 TMT meeting.

Q Adjust/ESP

Julie Ammann, COE, provided an overview of the Q Adjust and ESP models, to highlight the differences between the two models’ objectives, inputs and outputs.

Q Adjust: The inflow used in Q Adjust does not make assumptions about the shape of the inflow; the inflow is generated from a regression equation that includes snow pack, observed rain/runoff, and climate indicators. Q Adjust uses current water supply volumes, shaped 69 different ways

according to monthly historical flow shapes from 1929-1997. The inflow each year matches the historical shape of that year and the 2005 expected water supply forecast. Q Adjust tells us how flows could be shaped with the current water supply forecast.

ESP: Inputs a flow shape with current basin conditions and weather patterns to generate a response. ESP takes current conditions combined with 44 historical weather patterns to produce 44 sets of inflows. ESP tells us how runoff volumes could change with current basin conditions, and how that will impact the modeled operations.

ESP will be the modeling tool for operations in the future, but the COE has no plans to discontinue use of the Q Adjust model.

Q Adjust model runs May 3, 2005: Julie noted that the main drivers for this model run included: Grand Coulee tries to meet 130 kcfs in May while not drafting below 1240'. Refill GCL above 1285' if Priest Rapids flows are above 125 kcfs. Libby operations target full in June and a Tier 2 sturgeon pulse. The model indicated that there may not be as much water supply in June as forecasted, based on the last 10 days of inflow.

Dworshak ESP Inflows

Randy Wortman, COE, provided the new 'whiskers' graph of the April 26-July 31 analysis, which is a day summary of the ESP runs presented earlier. The exceedance graph shows daily flows compared to monthly (historic) flows. TMT commented that these new graphs are helpful.

Dworshak Augmentation

Three graphs of Dworshak augmentation using ESP graphs were presented. They showed 407 kaf available from April 1-June 30 for flow augmentation.

SOR 2005-9

The salmon managers submitted SOR 2005-9, to increase outflows at Dworshak to full power house capacity along with spill to the 110% TDG level in the tailrace for one week, targeting refill of Dworshak by June 30 to push juvenile migrating fish down the river. The SOR notes that further requests will be put forth as new information on fish numbers and water supply are available. In response to a question, the salmon managers said this operation would support wild and hatchery fish.

ACTION: NOAA will find out what the percentages of wild and hatchery fish are migrating, and report to TMT at the 5/18 meeting.

Dworshak outflows were currently at 5.3 kcfs. The action agencies agreed to increase outflows on the afternoon of 5/4 to 7.6 kcfs; then further increase the next morning (5/5 AM) to full powerhouse plus spill, roughly 14 kcfs. BPA supported the operation and noted that it is worth ~\$1 million for one week of spill. BPA understands that this operation is necessary for fish.

SOR 2005-10

The salmon managers submitted SOR 2005-10, to increase flows at Grand Coulee to provide 135 kcfs at Priest Rapids, from May 4 (or as soon as possible) through May 31. Also, do not draft below 1240' and assure refill of Grand Coulee to 1280-1285' by late June. The action agencies had concerns that 1280' is not consistent with BiOp targets and suggested targeting the higher flows a week later. The BOR preferred to target Grand Coulee closer to 1290'. The salmon managers' intent with the request was to strike a balance between both objectives, to provide flows for spring migrants and store water for summer migrating fish, recognizing that both will be to a lesser degree than desired. The salmon managers were confident after looking at the Q Adjust model to move forward with 135 kcfs as soon as possible.

ACTION: TMT members agreed to a compromise given the interests expressed during the discussion. The action agencies will target a week average 125 kcfs for the rest of the week (through May 8); then on Monday operate to reach a weekly average of 135 kcfs, targeting a refill elevation of 1288' at Grand Coulee. TMT will revisit the operation during a conference call on Wednesday, May 11.

Operations Review

Chum – Chum numbers are on the decline but newly emerging frye are still being observed. Emergence is very near completion. Ron Boyce, Oregon, will notify the COE as soon as possible when there is no longer a need to put a tailwater constraint at Bonneville to protect chum; currently there is more than adequate tailwater to protect the fish. **Update:** The following email was sent from the COE to TMT on 5/6: “Yesterday, RCC received word from Ron Boyce that no chum were caught at the Ives island site and therefore the tailwater operation for chum incubation flows has ended.”

Start of Bonneville spill – The action agencies implemented the salmon managers request to start Bonneville spill on 4/15.

Ice Harbor spill – SOR 2005-6 was submitted a request to piggyback the RSW test with the installation of transducers at Ice Harbor on 4/20. The COE will share information on this with TMT as soon as they receive it.

SOR 2005-7 – The request was completed – the COE increased flows at Grand Coulee to begin providing 95-105 kcfs at Priest Rapids on 4/22.

SOR 2005-8 – The request to flatten flows on the Lower Columbia was implemented due to an increase in flows. The salmon managers requested that, in the future, if there is not a TMT meeting scheduled, the action agencies provide feedback via email on their intentions for implementing requests put forward. The group was also reminded that every Wednesday is available for ‘emergency’ TMT meetings, even if a regular meeting is not scheduled.

Reservoirs – Libby is operating at 4 kcfs out, inflows have increased, and elevation is 2420'. The COE is awaiting final input from USFWS on sturgeon operations. Dworshak outflows have increased; the project is at elevation 1259.3' and will draft over the weekend (5/7-8). Grand Coulee is at 1254.2'; drum gate work will not be completed ahead of schedule. Hungry Horse is at 3546' and drafting 6-7 kcfs.

Fish—Lower Granite bypassed fish through the RSW to relieve congestion at the project. Adult return numbers are low; there is still a chance that there will be a late run this year.

Power system – CGS is starting to down-power and begin refueling.

Water quality – There are TDG exceedance issues at Camas/Washougal due to re-calibration of spill gates at Bonneville. There is a SYSTDG training scheduled for 5/12 at 9:00 AM at the COE; the Camas/Washougal issue will be discussed at that time, as well as at the WQT meeting scheduled from 1-4 pm that afternoon. The COE, given feedback from the WQT, is looking to de-activate the Warrendale gauge when chum emergence is completed.

ACTION: Dave Wills, USFWS, will provide chum redd analyses from this year to Jim Adams, COE.

Dworshak Local Flood Control Analysis

Cathy Hlebechuk, COE, provided a handout with information from Walla Walla COE about local flood control at Dworshak. Walla Walla used the 'Remote Sensing SCA' website and 'SNOTEL Update' website, as well as did a helicopter snow flight on 4/22 to verify the snow covered areas percentage at Dworshak. Links to the websites were provided in the handout; it was noted that SNOTEL is updated weekly and provides on the ground data for the area. If there are additional questions/information requests about Dworshak local flood control, contact Cathy Hlebechuk. CRITFC requested information on the probability of a flood event in the area, given the snow cover.

A comment was made that this new information provided a learning experience and supports re-evaluating how we determine flood control. The SCT discussed a system flood control study that the COE is proposing to move forward with, upon approval by the region and Congress.

Water Supply Forecast

The May mid-month January-April water supply forecast is up slightly from the April final. Libby is expecting to do a sturgeon pulse of 8 kcfs according to the forecast. The forecast at Libby has declined since January.

Water Management Plan Spring/Summer Update

The final Spring/Summer update (May 3, 2005) includes the April final water supply forecast and resulting flood control operations; flow targets; and Q Adjust runs, ESP runs and other

graphics. The July final flow objectives may change as the season progresses. A suggestion was made to change Bonneville daytime spill objectives to '75' instead of '50-75' kcfs.

Flow Augmentation Volumes

Flow augmentation volumes at Libby are 419 kaf, and 538 kaf at Hungry Horse.

Studies: This will be an on-going agenda item at future TMT meetings.

- Lower Monumental: Spill survival study at bays 7 and 8;
- Ice Harbor: RSW test;
- McNary: Studies on spill and also turbine test;
- John Day: 60% nighttime spill;
- The Dalles: 40% spill; sluiceway study underway at 8' pendant opening;
- Bonneville: Combined agency harassment of sea lions study today (5/4).

Next TMT Meeting, May 18, 9am-noon

The next face-to-face meeting will be held on Wednesday, May 18. There will be a **conference call** on 5/11 to discuss Dworshak and Priest Rapids operations. An agenda for the 5/18 meeting will be posted to the TMT website prior to the meeting.

Actions from 5/4 Meeting

- Correct 4/13 facilitator notes, send out to TMT – Facilitation Team
- Provide information to TMT about percentages of wild and hatchery spring migrating fish – Paul Wagner
- Provide chum analyses from this year to Jim Adams – Dave Wills

1. Greetings and Introductions.

The May 4 meeting of the Technical Management Team was chaired by Cindy Henriksen and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. TMT Minutes.

No changes were offered to the recent TMT minutes at today's meeting; Silverberg asked that any comments be provided to her or to Robin Harkless by close of business Friday.

3. Hanford Reach Update.

Russell Langshaw reported that, for the week ending May 1, the Priest Rapids flow band constraint ranged between 20 and 40 Kcfs; day-average Priest Rapids discharge ranged between 99.5 and 127.1 Kcfs. The flow bands were exceeded on April 25, April 26 and May 1; on the latter date, actual flows were 39.5 Kcfs, compared to the daily flow band of 20 Kcfs. Weekend protection flows started last weekend, with a band constraint of 20 Kcfs, he said.

Why are you having problems staying within the flow bands on a more consistent basis – isn't the turbine testing done? Paul Wagner asked. Yes, it is – I have asked our operations people for a more detailed explanation of the exceedences, Langshaw replied. My guess is that variable discharge coming into the project, potentially not matching the estimated flows, is to blame. In response to a request from Silverberg, Langshaw said he will provide a more detailed explanation to Henriksen once he hears back from Grant County's operations staff.

You're on the weekend operation now, with a weekend minimum flow? Wagner asked. Yes – we reached 800 temperature units last weekend, which bumps us up to a weekend minimum flow – rather than 65 Kcfs, we have to provide the Monday-Friday average flow of about 105 Kcfs, Langshaw said. And when will the Hanford Reach fish protection operation end? Larry Beck asked. It looks as though we will reach 1,000 temperature units some time on May 13, 14 or 15, Langshaw replied, at which point the 65 Kcfs minimum flow will end. But doesn't the operation continue for another 400 temperature units after that, which takes us to mid-June? Wagner asked. Correct, Langshaw replied.

4. QADJUST, ESP Runs.

Julie Ammann said she had developed a quick presentation on the differences between the QADJ and ESP/HYSSR models. In the simplest terms, ESP and QADJ are outputs from the same model, but start with different assumptions, she explained. Ammann touched on the following major topics:

§ Types of inflow forecasts – inflow hydrographs (have a definite “shape,” generated by a model) and volume forecasts (a single number with no assumptions about the “shape” of the flows, generated from a regression)

§ ESP inflows – current conditions (10-day weather forecast + observed conditions for April 1, 2005) combined with 44 historic weather patterns to produce 44 sets of inflows. Volumes may vary between the 44 years, but are all forecasts for 2005. Inflows only – no operational assumptions. Each hydrograph has a different volume associated with it – wet springs generate a different hydrograph than dry springs. The ESP run is based on current conditions – it assumes no water supply forecast volume as a starting-point. The goal is to generate an estimate of how many times, within the 44-year data set, the spring and summer flow targets will be met at each project.

§ QADJ flows – current water supply forecast volumes, shaped 69 different ways according to monthly historical flow shapes from 1929-1997. The inflow for each year matches the historical shape of that year and the 2005 expected WSF volume.

§ What do QADJ and ESP HYSSR tell us? QADJ tells us, with the current WSF, how flows could be shaped and how that shape will affect our modeled operations. ESP/HYSSR tells us, with current basin conditions, how runoff volume could change through the season, based on historical precipitation patterns.

The beauty of ESP is that it shows a range of conditions, said John Wellschlager – it gives you bookends for your current and future operations. Isn't it true that most of the volume gets laid down before April 1? Margaret Filardo asked. There is considerable variability in what happens, in terms of precipitation and temperature, after April 1, Ammann replied. It's true that we see the most variability in the runs in January and February, when most of the snowpack accumulation period is still in the future. However, there could still be a lot of accumulated precipitation after April 1.

The sense I'm getting is that QADJ is old-school, while ESP is new-school, said Wagner – are you transitioning away from QADJ? I think there are benefits to both, Ammann said. The Corps and the River Forecast Center are really pushing ESP now, but I think we'll continue to use both, she said. We have no plans to drop QADJ, added Henriksen – there is value to both approaches.

Ammann moved on to the most recent QADJ model results. According to QADJ, the current model run shows that refill at Libby, Hungry Horse and Dworshak is a virtual certainty; Grand Coulee refill would occur in 44 of the 69 historic water years. However, there is virtually no chance that Lower Granite or McNary flows will reach the spring and summer BiOp flow targets. Priest Rapids, on the other hand, is virtually certain to achieve its May and June flow objectives of 125-130 Kcfs.

The Corps' "Summary of May Early Bird 2005 QADJ Model Runs" memo also includes the following table showing the most recent estimates of period average outflows (in Kcfs) for 10 projects:

	April 16-30 (obs.)	May	June	July	Aug 1-15	Aug 16-31
LIB	4.0	11.2	17.5	21.5	19.6	16.5
HGH	7.2	5.3	5.4	5.8	5.4	4.2
GCL	82	116	108	117	102	98
PRD	95	133	129	126	107	101
DWR	5.4	7.1	5.0	10	10	9
BRN	12	13	11	8	9	9
LWG	45	61	54	31	24	22
MCN	147	191	175	150	128	121
TDA	143	191	168	146	127	121
BON	153	193	169	148	129	121

Moving on to the current ESP results, Ammann said Grand Coulee refill would occur by June 30 in only 15 of the 44 historic water years, so the ESP results are somewhat less optimistic than the QADJ results, at least for that basin.

Like the QADJ model results, the ESP run includes a table of forecast period flows for each project (in Kcfs):

	April 16-30 (obs)	May	June	July	August 1-15	August 16-31
LIB	4.0	10.8	12.9	15.5	17.2	17.2
HGH	7.2	5.0	4.2	5.5	5.6	4.4
GCL	82	116	109	126	115	110

PRD	95	132	121	131	118	112
DWR	5.4	11.3	4.2	10.1	10.1	9.4
BRN	12	12	10	8	10	11
LWG	45	75	54	29	26	25
MCN	147	208	178	163	147	140
TDA	143	207	172	161	146	140
BON	153	209	174	163	147	141

5. Dworshak ESP Inflows.

Randy Wortman said that, according to the box and whiskers plot of ESP-generated Dworshak inflows, the mean of the daily flows for the 43 historic water years would peak at about 11 Kcfs in mid-May, then gradually tail off to about 2 Kcfs through June and July.

Wortman moved on to a plot showing Dworshak inflows – ESP daily flows vs. historic monthly flows. This shows the monthly average extreme maximum and minimum inflows, as well as the means of the historic monthly flows (inflow over time), he explained. He then touched on the ESP-generated expected flow augmentation volumes at Dworshak, the volume available over that needed to refill the project to elevation 1600 by June 30. At a 50% probability, that volume is now estimated to be 407 kaf; at a 70% probability, the available volume would be 217 kaf.

Wortman then moved on to a graph titled “Dworshak Augmentation Volumes – ESP Inflows and 1 April Water Supply Forecast.” What this shows is that, again, with the expected water supply forecast volume, the flow augmentation available would be 407 kaf between now and June 30, at a 50% confidence, Wortman said. In response to an earlier question, Wortman noted that this graph illustrates the potential variability in post-April 1 precipitation, based on the 44-year historic record. There was general TMT agreement that this set of graphs is an improvement over the old set of graphs. Again, however, this is only showing the forecast volume, and tells us nothing about the shape of the runoff, Wortman added.

6. Dworshak Available Augmentation.

This topic was covered during the previous agenda item.

7. Dworshak Augmentation Request (SOR 2005-9)

On May 3, the action agencies received SOR 2005-9. This SOR, supported by USFWS, IDFG, ODFW, NOAA Fisheries, CRITFC, the Nez Perce Tribe and the Shoshone-Bannock Tribes, requests the following specific operations:

§ Increase outflows at Dworshak Dam to full powerhouse capacity along with spill to the 110% gas cap in the Dworshak tailrace for a period of one week (approximately 14 Kcfs average flow). We estimate this operation will use 174 kaf of water from Dworshak reservoir, above the 1.5 Kcfs minimum outflow.

§ Assure refill of Dworshak reservoir by June 30

§ This request is for the coming week; anticipate new requests as new information based on fish numbers and water supply forecast becomes available.

The reason for this request is a sharp increase in the wild smolt passage indices we've seen in recent days, said David Wills; we propose doing this operation for one week, at which point we'll take another look at the passage index numbers and re-evaluate it. In response to a question from Wellschlager, Russ Kiefer said the salmon managers' feeling is that the wild fish are more responsive to in-river conditions, and know when to go, essentially. Boyce added that both hatchery and wild fish numbers are peaking right now at Lower Granite; it was necessary to spill last week at Lower Granite, to avoid exceeding the barge loading facility capacity. We have some volume available at Dworshak, and we would like to put that water on the fish now, he said.

After a few minutes of discussion, Henriksen said the Corps agrees that there is some volume available at Dworshak. The Corps intends to increase the flow to comply with this SOR, but we don't have an exact schedule yet as to when, exactly, that will happen, she said.

After a brief caucus break, Henriksen said that, at Dworshak, the current outflow is 5.3 Kcfs; this afternoon, we will increase Dworshak outflow to 7.6 Kcfs. We will then increase Dworshak outflow by 6 or 7 am tomorrow to full powerhouse capacity plus spill – about 14 Kcfs. Bonneville supports this, but in the obligation to our ratepayers, I need to note that a week's spill at Dworshak is worth about \$1 million, said Wellschlager.

8. Flow Objectives at Priest Rapids (SOR 2005-10)

On May 3, the action agencies received SOR 2005-10. This SOR, supported by USFWS, IDFG, ODFW, NOAA Fisheries, CRITFC, the Nez Perce Tribe and the Shoshone-Bannock Tribes, requests the following specific operations:

§ Increase flows at Grand Coulee Dam to provide 135 Kcfs at Priest Rapids Dam beginning May 4 and continue through the month of May. Do not draft Grand Coulee below elevation 1240, and assure refill to elevation 1280-1285 feet by late June.

Wills explained that, according to the numbers that were available yesterday, this operation appears doable; this is our suggestion for the Mid-Columbia, he said. I'm a bit surprised to see you asking for 135 Kcfs so soon, said Wellschlager, based on the historic steelhead numbers I've seen – it seems like steelhead numbers don't tend to peak until late May. I'm just a little surprised you don't want to wait until next week, he said. We're also concerned that 1280 would be an acceptable refill target at Grand Coulee, he said – that goes against the BiOp, which we're required to implement. Even elevation 1285 would be pushing it, he added.

Tony Norris noted that, while flows are coming up at Grand Coulee, Reclamation would prefer to target an average flow of 130 Kcfs at Priest Rapids this week, while keeping Grand Coulee elevation closer to 1255. I think we'll have a lot better chance of refilling Grand Coulee by late June if we keep the flow target at Priest Rapids a bit lower, at least for the immediate period, he said. I also thought I had heard that the salmon managers would prefer to avoid a sharp drop-off in Grand Coulee/Priest Rapids outflow in late June, added Wellschlager – that will be more difficult to provide if we bump up Priest Rapids to 135 Kcfs starting tomorrow.

Wagner said that, from the salmon managers' perspective, historic steelhead passage indices, combined with 2005 year-to-date indices, show that passage is now entering "prime time" at Rock Island. The comfort zone increased for me when I saw the most recent QADJ and ESP runs, which showed a May average flow of 132 and 133 Kcfs, respectively, at Priest Rapids, he said. In response to a comment from Boyce, Wellschlager said that, as requested by the salmon managers last week, the action agencies have picked up flows throughout the system. Historically, the peak of the Mid-Columbia steelhead run occurs in May, said Boyce – we're looking forward to when those fish are going to be migrating in significant numbers. We're also concerned with getting the Grand Coulee elevation as high as possible for summer flow augmentation, he said, but based on the most recent forecast numbers, it appears to be

possible to do what we're requesting, and still achieve the 1285 refill target at Grand Coulee we've been targeting all along.

It doesn't appear that we can achieve the 220 Kcfs spring flow target at McNary, while still achieving Grand Coulee refill to 1290 this year, said Russ Kiefer – which objective does NMFS feel is more important? The 2004 BiOp says that a small reduction in spring flows is acceptable as long as refill is achieved, Wagner replied – there is a slight preference for Grand Coulee's importance for summer flow augmentation. That's why we're proposing a week-average target closer to 130 Kcfs for the next week, while keeping Grand Coulee around 1255, said Norris – we think our chances of refill will be significantly higher if we have that flexibility.

After a brief caucus break, Wills said the salmon managers had re-examined the model and fish passage information, and are still comfortable with increasing Priest Rapids outflow to 135 Kcfs at this time, even if it isn't quite possible to refill Grand Coulee to 1290 this year. We feel that's a good compromise, given the water year and the operations to date, he said. In response to a question from Wellschlager, Wills said the salmon managers do not expect the action agencies to increase Grand Coulee outflow to achieve a week-average flow of 135 Kcfs this week – they simply want to increase Priest Rapids outflow to 135 Kcfs as soon as possible.

Kiefer added that the critical period, in terms of providing flow to benefit fish, is the point at which the passage index curve begins to increase steeply – not when peak numbers begin arriving at Rock Island. This is our opportunity to provide maximum biological benefit, in other words, he said. Wellschlager reiterated that the action agencies have increased flows in the past week.

Do you still want to see a week-average flow of 135 Kcfs for this week? Wellschlager asked. We would like to see you get to a day-average flow of 135 Kcfs as soon as possible, and hold it at that level, Boyce replied. Henriksen noted that the Hanford Reach Agreement also comes into play in this equation; the weekend minimum flow is set by the previous weekly flows, she said. As water managers, she said, we're looking at the next Monday-Sunday period. You're saying the most reasonable time to begin this operation, in order to achieve the 135 Kcfs average, is this Monday? Wills asked. Correct, Henriksen replied. And again, said Norris, if we can target 130 Kcfs minimum outflow at Priest Rapids next week, we think that will make a significant difference in Grand Coulee refill – the small reduction we're requesting, compared to the flow requested in your SOR, is going to help us get closer to 1288 by June 30.

The problem is that, as a seasonal average, we're going to be 20-30 Kcfs below the spring seasonal target of 135 Kcfs at Priest Rapids, even if our requested operation is implemented, said Boyce. We understand that, but flow targets aren't always achievable, said Norris – everything that comes into Lake Roosevelt will eventually come out this summer. We would like your support for keeping Lake Roosevelt at 1255 through next week, with a minimum Priest Rapids outflow of 130 Kcfs. That extra 3-4 feet in Lake Roosevelt could make a big difference in summer flows, while the operation we're requesting will produce a relatively small difference in seasonal-average flows at Priest Rapids. We could also implement the salmon managers' requested operation, as requested, for a week, and check in next week to see whether that is causing Grand Coulee to draft, said Wagner.

After a few minutes of further discussion, the salmon managers reiterated that, in their view, the operation proposed in SOR 2005-10 is a reasonable compromise, given the water year, Mid-Columbia flows to date and the impact of the drum gate maintenance operations at Grand Coulee. Ultimately, Norris suggested a compromise: finish the week by targeting a week-average flow of 125 Kcfs at Priest Rapids, and begin targeting 135 Kcfs as a weekly average beginning Monday, May 9. He added that the action agencies would prefer to target refill to elevation 1288, rather than elevation 1285, at Grand Coulee in 2005. After a brief discussion, no salmon manager objections were raised to Norris' proposed operation.

9. Operations Review.

Boyce said that the chum seine catch to date is 1,895; catches have tailed off substantially in the past week. We're still seeing newly-emerging fry, he said, but chum emergence is near completion. We're pleased that tailwater elevations have increased substantially, so TDG from the Bonneville spill is not a concern, he added. Henriksen noted that, based on historic data, the 98% emergence point generally occurs in late April. Historically, we're close to that point, but you always see stragglers well into May, said Boyce. The bottom line is that chum emergence is now near its end-point, he said.

Henriksen noted that, sooner or later, the action agencies would like to lift the 11.5-foot minimum tailwater restriction at Bonneville. If maintaining the tailwater elevation is not a problem, as it doesn't appear to be at this time, I would prefer to extend that protection as long as we're still seeing newly-emerging chum, Boyce replied. Wellschlagler said he is concerned about setting a precedent; it doesn't seem reasonable to keep that restriction in place for just a few stragglers. Still, if flows at Bonneville are 190 Kcfs, what's the problem? Boyce asked. It's a specific constraint at Bonneville, one among a large stack, said Wellschlagler – we'd like to take this one out of the pile. After a few minutes of further discussion, it was agreed that the salmon managers will let the Corps know as soon as possible – perhaps as soon as the end of today's meeting -- when the 11.5-foot tailwater restriction can be removed.

Moving on to the start of spill at Bonneville Dam, Henriksen noted that spill started as per the request from the salmon managers on April 15. Spill was increased to UPA levels – 75 Kcfs during the day, up to the gas cap at night – on April 19. Next, Wills touched on SOR 2005-6, which covered spill operations at Ice Harbor Dam. Henriksen noted that this request primarily covers coordination issues, and a request for timely information by the salmon managers; we're trying to get that information out to the salmon managers as soon as we receive it, she said, so this SOR, too, has been implemented. With respect to SOR 2005-7, said Wills, that is already done.

Moving on to SOR 2005-8, covering flow shaping in the Lower Columbia, Wills said this SOR requests the flattest possible flows in the Lower Columbia to facilitate fish passage. Wellschlagler noted that Mother Nature provided some help, and this SOR has been implemented, or even exceeded. Kiefer said that, in the future, it would be helpful if, when SORs are submitted during the weeks between TMT meetings, the action agencies can keep the salmon managers in the loop, perhaps via email, about the action agencies' response.

With respect to current reservoir operations, Henriksen said Libby is releasing 4 Kcfs; inflows are increasing, and the current elevation is 2420 and increasing. At Dworshak, the current elevation is so high – 1593 feet -- that outflow is being increased. With the increased outflow, the project will not be drafting, but the refill will be slowed. Grand Coulee is at 1254.2 feet and filling very slightly, currently, said Norris; Hungry Horse is releasing about 6 Kcfs and is at 3546 feet, currently. The drum gate work at Grand Coulee is still scheduled for completion by May 14 or 15.

Moving on to fish, Wagner said the smolt outmigration is beginning to peak. Things are picking up at the Columbia River projects as well. Adult passage is still below expectations; we're still hoping for a late run. Counts are running just under 2,000 fish per day at Bonneville, down from 4,000 last week, he said; however, there is often a double peak. That's what we're hoping for this year, he said, although the seasonal projection has been ratcheted downward significantly. Kyle Martin said the tribes' spring ceremonial and subsistence fishery will not meet its targets this year. The total count to date is about 38,000 fish, added Wagner; the optimistic seasonal projection is now 80-100,000 fish, down from a pre-season prediction of 250,000+.

Wellschlagler said there are no power system problems to report at this time; CGS is starting to downpower later this week, for its biennial refueling. With respect to water quality, Jim Adams reported that TDG readings at the Camas/Washougal station have been exceeding the state standard for the past few days; they reached 117% yesterday. In response to a comment from Margaret Filardo, Adams said

the Camas/Washougal gauge is representative of TDG levels in the Bonneville tailrace. Adams added that part of the problem is high TDG levels coming down through the Bonneville forebay from The Dalles. The Warrendale gauge will be pulled as soon as the chum emergence is complete, he added.

10. Dworshak Local Flood Control Analysis.

Cathy Hlebechuk drew the TMT's attention to a handout (available via hot-link from today's agenda on the TMT homepage) describing the Corps' snow-covered area analysis. She noted that, normally, Dworshak's system, local or calculated flood control refill curves guide operations at that project. However, this year, because the pre-season water supply forecast was so low, the Corps went to its snow-covered area/probable maximum flood control constraint to dictate operations during the refill period only. Under this analysis, if 100% of the area around the reservoir is covered by snow, based on satellite data, the Corps is required to reserve 700 kaf of space in Dworshak by April 15 (elevation 1558.2); if 60% of the area is snow-covered, 385 kaf of space is required (elevation 1578.4).

She noted that the Corps did a recent helicopter overflight to verify the satellite imaging data; Sno-Tel sites also provide data on the snow-water equivalent in the area. That was the basis of our concern, said Boyce – that you were relying only on the satellite imaging, without verifying the on-the-ground snow-water equivalent data. Kiefer said that, in Idaho's view, the Corps may need to update the way it calculates flood control at Dworshak, based on snow-covered area, given the fact that the methodology has not been updated since the 1960s. This seems to be awfully dated, Bob Heinith agreed. If the Corps does move out on a system flood control study, that will certainly be a part of that, said Henriksen. Any chance the Corps could do some work on this issue, without waiting for the full system study? Heinith asked. We have been using our ESP model with the National Weather Service data to avoid fill and spill at Dworshak, noted Ammann.

11. Water Supply Forecast.

Henriksen said that, according to the May early-bird forecast, the water supply increased slightly compared to the April final. The main issue of interest is that, at Libby, we're still expecting an 800 kaf sturgeon operation, but the seasonal flow objectives remain at the low end of the scale at Lower Granite and McNary.

Moving on to the deterioration of Libby's April-August water supply forecast, Henriksen noted that the forecast is now 5.4 MAF.

12. Final Spring/Summer Update.

Henriksen said the final spring/summer update has now been posted to the TMT website; it has been updated to reflect the April final water supply forecast, and also includes all of the appendices. The only thing that may change is that we'll be looking at the July final water supply forecast to update our summer flow projections, she said. One comment has been received from Oregon, Henriksen added; this minor change will be added to future editions of the spring/summer update.

13. Flow Augmentation Volumes at Headwater Reservoirs.

Henriksen said that, at Libby, based on the most recent forecast data, a total of 419 kaf of flow augmentation water over and above the volume needed for refill and the sturgeon pulse will be available between now and June 30, assuming a 50% probability of refill (246 kaf assuming a 70% probability). At Hungry Horse, the volume available for flow augmentation is projected to be 538 kaf, assuming 50% probability of refill (441 kaf assuming a 70% probability).

14. Other.

Beck noted that the Lower Monumental balloon-tag survival study through bays 7 and 8 is now underway. Other tests are underway at Ice Harbor, McNary, John Day, The Dalles and Bonneville (combined agency harassment of the sea lions). Henriksen noted that the spill opening at bays 3-6 at The Dalles has now been changed from 6 feet to 8 feet.

15. Next TMT Meeting Date.

The next meeting of the Technical management Team was set for Wednesday, May 18. There will be a TMT conference call at 9 am on May 11. Meeting summary prepared by Jeff Kuechle.

**TMT Participant List
May 4, 2005**

Name	Affiliation
Cindy Henriksen	COE
Ray Gonzales	COE
Paul Wagner	NOAAF
Russ Kiefer	IDFG
Donna Silverberg	Facilitation Team
John Wellschlager	BPA

Tony Norris	USBR
Rudd Turner	COE
Julie Ammann	COE
Larry Beck	COE
Jim Adams	COE
Ron Boyce	ODFW
Tom Haymaker	PNGC
Lee Corum	PNUCC
Russ George	WMCI

Laura Hamilton	COE
Ruth Burris	PGE
Robin Harkless	Facilitation Team
Nic Lane	BPA
Tim Heizenrater	PPM
Dan Spear	BPA
Randy Wortman	COE
Christy Bartlett	BPA
Margaret Filardo	FPC

David Benner	FPC
Kyle Martin	CRITFC
Kevin Nordt	Mic-Cs
Dan Bedbury	EWEB
Russell Langshaw	Grant PUD
Glenn Traeger	Avista
Tom Le	PSE
Bruce MacKay	Consultant
David Wills	USFWS

Barry Espenson	CBB
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TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday May 11, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cmm.net or call her at (503) 248-4703.*

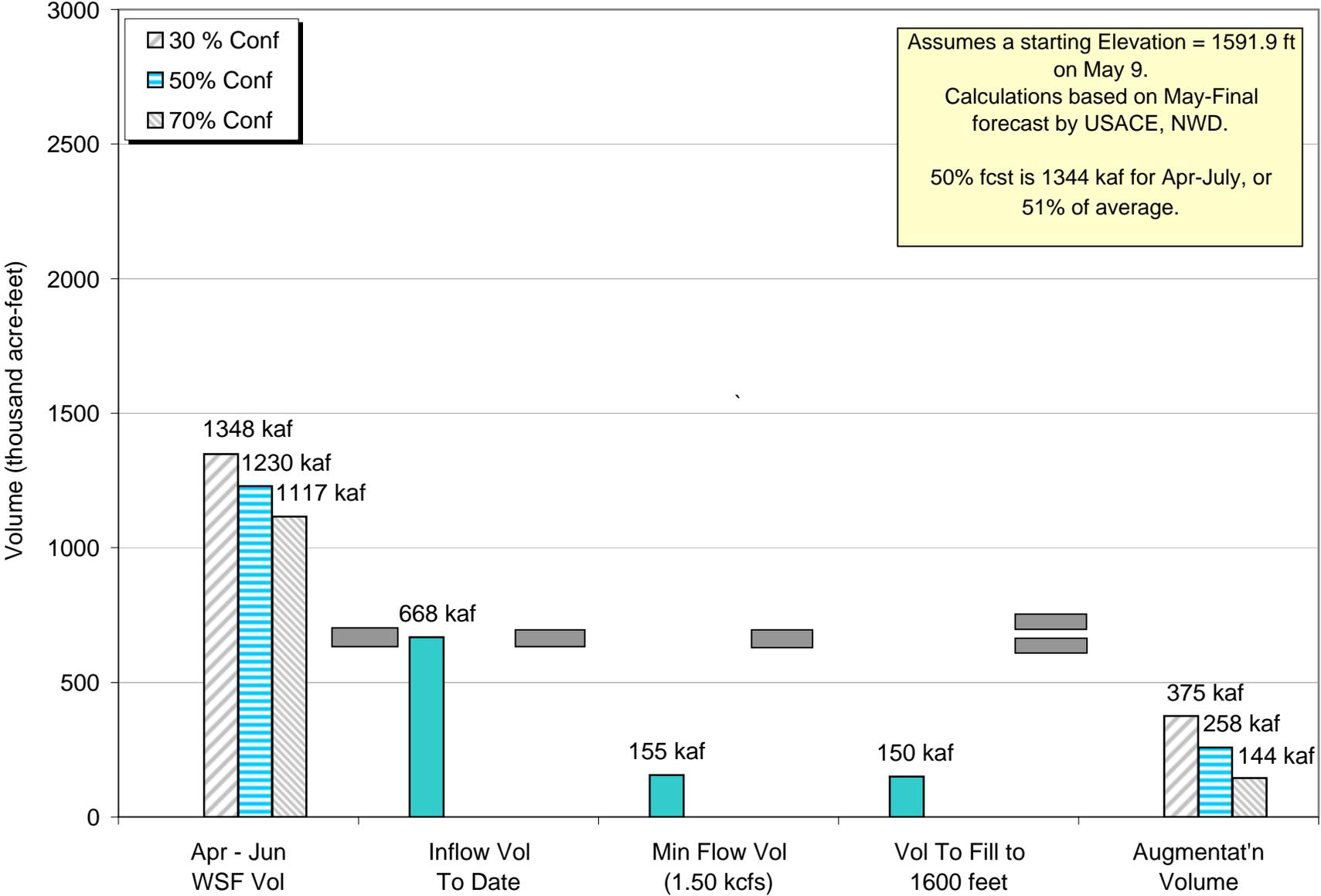
AGENDA

1. Welcome and introductions.
2. DWR Augmentation -
[\[Volumes at Dworshak 1 April Through 30 June\]](#) 
3. Flow Objectives at Priest Rapids -
[\[Spring Dworshak Operations - May 10, 2005 - SOR #2005-11\]](#) 
4. Other
 - o Water Supply Forecast
 - i. [\[WSF Final Jan to May, 2005\]](#) 
 - ii. [\[Deterioration of April - August Water Supply Forecast at Libby Dam in 2005\]](#) 
5. Set agenda for next meeting - [\[Reference Calendar\]](#) 

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

Volumes at Dworshak
1 April Through 30 June

Assumes a starting Elevation = 1591.9 ft on May 9.
Calculations based on May-Final forecast by USACE, NWD.
50% fcst is 1344 kaf for Apr-July, or 51% of average.



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

May 11, 2005

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.

Conference Call May 11, 2005

Volumes at Dworshak

Last week, the action agencies implemented full powerhouse and spill up to 110% at Dworshak; outflows at Lower Granite averaged 62 kcfs from 5/1-5/8. Flows yesterday (5/10) increased to 91 kcfs. The COE presented the projected total flow augmentation volumes through June at Dworshak, which at 50% confidence showed 245 available kaf. Flows at Lower Granite were currently high and the area was expecting a rain event. Brownlee was full; inflows were increasing, and flows were higher out of Hells Canyon.

SOR 2005-11

Based on the water supply forecast and the increase in fish numbers, the salmon managers requested that the operation continue for an additional week – full powerhouse and spill up to 110%; do not drop below 12 kcfs outflow, and ensure Dworshak refill by June 30. The salmon managers did not suggest a specific target flow at Lower Granite relative to this SOR, although it was noted that as defined in the 2004 BiOp, 85-100 kcfs are the target flows. It was also noted that the April-July water supply forecast showed 11.8 MAF, which would result in less than 85 kcfs average flow observed at Lower Granite this year.

BPA responded that flows at Lower Granite would be high without spill from Dworshak with the recent increase in water supply, and the cost of spill to ratepayers would be high; will there be added value to the fish with spill from Dworshak? The salmon managers acknowledged the need to balance between spring and summer migrants, and suggested that with over 900,000 chinook and steelhead passing and the recent increase in inflows, there should not be a cap placed on outflows at this point. The COE asked the salmon managers to consider that if the water supply begins to recede, there may be little to no water available in late-May/June for summer migrants. Also, consider the radio-tag test that is being conducted at Lower Monumental this week, and the impacts from Dworshak operations on the test.

An alternative option was put on the table, to operate to 85 kcfs minimum at Lower Granite (which would support the Lower Monumental test).

The salmon managers expressed confidence that moving forward with the requested operation – 12 kcfs minimum and 110% TDG maximum – would not prohibit Dworshak from refilling by June 30. They acknowledged that, given the water supply forecast, much of the available water for augmentation might be used during this week of operations. They urged the action agencies to put water on the fish now while such large numbers are passing.

The COE proposed the following operation: Pass inflow at 15 kcfs out, while monitoring inflows and managing the project across the week. As needed (as inflow recedes, in order to not draft the reservoir below 1592.1 by next Wednesday, 5/18), reduce outflows to 12 kcfs over the weekend (starting no sooner than 5/13). New information will be provided on Friday AM (5/13), including water supply forecast and projected inflows. The salmon managers raised concern with the 15 kcfs cap, offering that managing to 110% TDG could put the outflows up by ~ 2 kcfs. The COE responded that they have to manage the project on a weekly, not daily basis, and said the 15 kcfs equaled ‘passing inflow’ across the week as requested in the SOR. The COE also projected that the inflows would likely be peaking today and inflows would begin to recede. The salmon managers were not fully satisfied that their objectives in the SOR would be met with this proposed operation, and again expressed concern with the 15 kcfs cap on outflows.

ACTION: The project will continue to operate at 15 kcfs out until Friday morning, 5/13. A TMT conference call has been scheduled to discuss Dworshak operations over the weekend, considering water supply forecast and projected inflows (**SEE May 13 meeting notes**).

Priest Rapids

The action agencies reported that Priest Rapids was operating to a weekly average of 135 kcfs last week, and planned to continue with this operation while staying as close to 1255’ at Grand Coulee as possible. The salmon managers supported this operation. There will be an update and discussion on Priest Rapids operations at the May 18 face-to-face TMT meeting.

1. Greetings and Introductions.

The May 11 Technical Management Team conference call was chaired by Cindy Henriksen and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. Dworshak Augmentation.

The main purpose of today's call is to follow up on last week's Dworshak SOR, said Henriksen; as per the SOR, Dworshak has been releasing full powerhouse capacity plus spill (about 14-15 Kcfs). The average flow at Lower Granite last week was 62 Kcfs; it was 91 Kcfs yesterday. The goal today is to decide on the Dworshak operation for next week, she said. The remaining flow augmentation volume in Dworshak is 258 kaf, based on a 50% most probable forecast, she added.

Prior to today's conference call, the action agencies received another SOR from the salmon managers, said Henriksen; we did have a few questions about it. What do you expect to see, in terms of Lower Granite flows, over the next few days? Ron Boyce asked. Flows are high right now, with rain forecast for today, Henriksen replied. Brownlee is full and passing inflow, and inflows to that project are increasing. Boyce noted that Lower Granite flows are now 96 Kcfs and rising.

Our request was that the action agencies continue to pass inflow at Dworshak, up to the 110% TDG cap, said David Wills; we also ask that the Corps not drop Dworshak outflow below 12 Kcfs, while still assuring Dworshak refill by June 30. We wanted to keep flows up during a strong outmigration period. That was the intent, he said, but when we crafted the SOR, we weren't aware that flows in the Lower Snake were going to be this high. What kind of target flows were you hoping to achieve over the next week at Lower Granite? John Wellschlager asked. We didn't have a particular target flow in mind, Wills replied; we were simply trying to provide the best possible migration conditions during the peak outmigration period. Wellschlager noted that spill is costly for ratepayers; we see the next 10 days as being pretty flow-rich in the Lower Snake. If we could do without that 2-3 Kcfs of spill right now, that would be Bonneville's preference, Wellschlager said. The key question is how much flow augmentation volume is available, and how best to use that available volume to help fish, said Wills – I'm not quite sure how to answer your question directly.

Ron Boyce said the flow targets are pretty well defined; he noted that inflows to Dworshak are running 18 Kcfs right now, so even with spill to the gas cap, the project is filling. We're seeing record numbers of migrants arriving at Lower Granite, he said; if we're ever going to augment flows in the springtime, now is the time.

When you say the flow objectives are well defined, what does that mean? Henriksen asked. They were defined in the 2004 BiOp as 85-100 Kcfs for the spring period at Lower Granite, Boyce replied. That means 85 Kcfs is the lower end, and 100 Kcfs is the higher end. Again, given peak numbers of fish moving down through the system, we need to keep flows going. Henriksen noted that the action agencies have made it clear that the spring seasonal average flow at Lower Granite is likely to be closer to 70 Kcfs, not 85 Kcfs, in 2005. If you use all the water now, the flow at Lower Granite in June will be about 35-40 Kcfs, she

said. If all of the flow augmentation is used now, Dworshak will be at minimum flow from May 20-June 30. I want you to consider that when you think about flow objectives at Lower Granite for the next week, she said.

The thing we're asking you to consider is that the additional spill is very costly; we are going to see rich flows over the next week, said Wellschlager. It's our job to manage flows, and give you our best judgement about how the reservoirs are doing. Our concern is that if we use everything we have now, then things dry up in June, and the weather turns hot, we're not going to be able to front-load the temperature control drafts from Dworshak to cool things down at Lower Granite. It's not your job to manage the reservoirs – that's our job. Still, the fact is that Dworshak is 7 feet from full, and continues to fill even as we release 15 Kcfs, said Boyce. From the perspective of managing water for fish, 85 to 100 Kcfs at Lower Granite is what would be most beneficial at this time.

We still support the SOR, said Boyce; our main concern was that we not draft Dworshak, and were certainly not doing that. If we can decrease Dworshak outflow slightly while still maintaining good flow conditions for fish, that would be a win-win situation. Rich Domingue noted that, assuming that the water supply forecast is reasonably accurate, the request the salmon managers have made would reduce the total available flow augmentation volume from Dworshak by about half – by 140-160 kaf. I just wanted people to be aware of that; of course it all depends on how accurate the forecast is, he said. I can't think of a better time to spend that water, given the fact that we're seeing peak numbers of both hatchery and wild migrants at Lower Granite right now, said Boyce.

Still, it is a gamble, said Domingue. What if we set 12 Kcfs as a maximum outflow from Dworshak? I would have to hear the biological rationale behind that suggestion, said Boyce. Also, if we're going to base this decision on money, we're going to need to talk about the fact that the action agencies are not providing the full 40% spill at The Dalles. That is beyond the scope of our discussion today, Wellschlager replied.

My understanding is that there is only about 140 kaf of storage space available at Dworshak, said Wills. That's true, said Henriksen, but what we're trying to do is balance the needs of fish and reservoir refill. We would prefer to utilize the Dworshak flow augmentation as best we can across the season. There are also concerns about the effects of increased flow on the current test at Lower Monumental, she said – we would prefer to have about 85 Kcfs at Lower Monumental to conduct that test. We would prefer to operate the Lower Snake to about 85 Kcfs through this period, said Wellschlager.

After a caucus break, Wills said the salmon managers had agreed unanimously that they are still on board with their original request and recommendation. The likelihood is that this recommendation will accommodate

fish needs now, while still retaining some water for use later in the spring, he said – we see no reason not to continue with this.

I still don't understand what "this" is, said Henriksen. We were trying to set up a minimum and a maximum, said Wills – obviously you can't exceed the gas cap unless the spill is involuntary. We can't exceed the gas cap except for flood control, Henriksen said – based on the current snow-covered area, the current Dworshak flood control elevation would be about 1593.5 feet. So the maximum, as far as we're concerned, would be to pass inflow up to the gas cap, but don't go below 12 Kcfs discharge over the next week, said Wills. So there is a desire to have flow for fish now, said Henriksen; we expect to have flows in excess of 85 Kcfs at Lower Granite. You want us to pass inflow? Right now, inflow to Dworshak is 18 Kcfs, so you can't pass inflow without exceeding the gas cap, Wills replied. If inflows were to fall to, say 10 Kcfs, we're saying don't go below 12 Kcfs discharge. And you want us to do that even if it causes Dworshak to draft? Henriksen asked. Yes – we feel this is the time to put the water on the fish, Wills replied.

I'm at a loss to understand why 85 Kcfs as a week-average at Lower Granite without spill at Dworshak is insufficient, said Wellschlager – I can't agree to spilling at Dworshak, given the flows in the Lower Snake, currently, and the cost – about half a million dollars a week. Domingue said that, in his view, BPA is assuming that Dworshak will not fill and spill later this month – there is no guarantee of that, given the volume of storage available in Dworshak. There is no guarantee, agreed, but it is highly likely that we would be able to save what we're spilling now, and generate with that water later, rather than having to spill it, Wellschlager replied.

Moving on to the current water supply forecast, Henriksen said that, for the April-July period at Lower Granite, 11.8 MAF is the forecast. That is why we expect that it will not be possible to meet an 85 Kcfs seasonal objective at Lower Granite in 2005, she said. We understand, said Wills, but we're looking at it from the other side of the fence and saying that, while the seasonal forecast is at the low end of the scale, we have a wave of water coming down through the system right now, at the same time we are seeing record numbers of outmigrants at Lower Granite. We would still be interested in knowing why the salmon managers don't feel that a flow of 85 Kcfs at Lower Granite through next week isn't acceptable, said Henriksen. We're trying to maintain the best conditions for fish – that's the only way I can explain it, said Wills. We're not as pessimistic as the action agencies about the impacts of the next week's operation on our ability to augment flows later in the spring, he said.

After a few minutes of additional discussion, Henriksen said her understanding of the SOR is that there is a desire to have flow for fish this week, while there are large numbers of juveniles present in the lower river; the request is to pass inflow up to the 110% TDG cap, with a minimum Dworshak outflow of

12 Kcfs. You understand that, if the weather dries up, that could cause us to draft Dworshak? she asked. Yes, but that is unlikely to occur, based on the weather forecasts I'm seeing, said Kyle Martin. Wellschlager said BPA cannot support the requested operation.

After another caucus break, Henriksen said the action agencies had looked at the inflow situation at Dworshak, and what they plan to do is continue to release 15 Kcfs while monitoring inflow as it begins to recede. We will maintain 12 Kcfs outflow as a minimum for the next week, she said. We are interested in retaining some augmentation water in Dworshak for use in June, she added. And how will you make a decision about when to reduce outflow to 12 Kcfs? Domingue asked. We don't want to draft Dworshak, said Henriksen – if inflows fall below 15 Kcfs, we'll look at reducing Dworshak outflow to 12 Kcfs. We will maintain that minimum 12 Kcfs flow, however, she said.

So are you going to implement the SOR? Cindy LeFleur asked. Well, it's somewhat confusing, because there are three conflicting operations in the SOR, Henriksen replied. Our intention is to pass inflow through next Wednesday by maintaining the 15 Kcfs outflow currently, but may reduce to 12 Kcfs over the weekend if inflows recede. The target elevation for Dworshak reservoir will be slightly above elevation 1592 feet. Will you consider increasing the Dworshak outflow above 15 Kcfs, given the fact that we're not at the 110% TDG standard below Dworshak now? Margaret Filardo asked. That is a new suggestion, Henriksen replied. Actually, the SOR clearly says pass inflow up to the 110% standard, Boyce replied – I don't understand where the confusion lies.

So the action agencies' goal will be to end this operation at or near the current elevation at Dworshak, about 1592 feet? Domingue asked. Correct, Henriksen replied. In response to a question, Filardo said the current discharge volume of 15 Kcfs is producing gas of about 107% below Dworshak – there is room for an increase, she said.

Are there any salmon manager objections to the action agencies' suggested operation? Harkless asked. Let me make sure I understand, said Wills – it sounds as though you're countering with a maximum of 15 Kcfs, and a minimum of 12 Kcfs, as long as Dworshak doesn't drop below its current elevation. Correct, Henriksen replied – I expect the project to pass inflow over the next week. The reservoir may fill slightly over the next few days, but by next week, it is likely that inflows will recede, and we will begin to draft Dworshak slightly if we maintain 12 Kcfs outflow.

Ultimately, Wills, Boyce and Martin said they do not support the action agencies' suggested compromise – the salmon managers would prefer to see the SOR implemented as requested. The SOR says pass inflow, and that's what we've offered, said Henriksen – are you now saying you want to draft Dworshak? The request still stands, as specified, said Boyce – that puts the ball in your

court. But we're going to meet your SOR, Henriksen said. No, Boyce replied – you're not meeting the request to increase Dworshak discharge to the 110% TDG cap.

Henriksen said the action agencies' plan is to pass inflow, releasing 15 Kcfs through the rest of this week, likely dropping outflow to 12 Kcfs over the weekend, and maintaining a minimum outflow of 12 Kcfs through next week, with the goal of finishing the week at Dworshak's current elevation, 1592.1 feet. Norris said that, in his view, what the action agencies are proposing does implement the operation requested in the SOR. We have proposed a fair and reasonable operation that lives up to the intent of the SOR, said Wellschlager; if you don't feel that is fair and reasonable, then elevate the issue.

The group briefly reviewed the current inflow data for Dworshak; Norris noted that inflows increased from 13.6 Kcfs to 18.3 Kcfs between May 9 and May 10, a one-day period. Inflows are likely to fall off just as sharply, Wellschlager observed. Henriksen said that, in her opinion, Dworshak inflows have now peaked, and will begin receding across the day. Wellschlager said BPA's forecasts, too, show Dworshak inflows peaking today, then starting to recede.

After a few minutes of further discussion, it was agreed that the action agencies will implement the operation as Henriksen outlined it, maintaining the current 15 Kcfs outflow from Dworshak for the next few days, and possibly reducing outflow to 12 Kcfs if inflows to the project begin to recede. In response to a question, Henriksen said the Corps will not make the transition from 15 Kcfs to 12 Kcfs before Friday afternoon. It was agreed to schedule a TMT check-in call for 9 am Friday morning to discuss the action agencies' planned operation over the weekend.

3. Flow Objectives at Priest Rapids.

Henriksen said Priest Rapids will release a week-average of 135 Kcfs this week. We're assuming that the salmon managers would like us to maintain that rate of discharge, said Wellschlager. Our expectation is that it shouldn't be a problem to maintain that rate of discharge, Wellschlager added. It was so agreed.

4. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, May 18. Meeting summary prepared by Jeff Kuechle.

TMT Meeting Participants May 11, 2005

Name	Affiliation
------	-------------

Ray Gonzales	COE
Cindy Henriksen	COE
John Wellschlager	BPA
Tony Norris	USBR
Kevin Nordt	Mid-Cs
Robin Harkless	Facilitation Team
Russ George	WMCI
Dan Spear	BPA
Rudd Turner	COE
Tim Heizenrater	PPM
David Wills	USFWS
Kyle Martin	CRITFC
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Glenn Traeger	Avista
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TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

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OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

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TMT CONFERENCE CALL

Friday May 13, 2005 0900 - 1000 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
NEW Conference call line: 1-203-669-7393
Password - 427746

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Please e-mail her at dsilverberg@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. DWR Operation Follow up.
3. [SOR #2005-13](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

May 11, 2005

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.

Conference Call May 13, 2005

Dworshak Update

Cindy Henriksen, COE, reported that Dworshak has been operating to pass inflow, currently 15 kcfs, and not to go below 12 kcfs. The COE plans to continue with this strategy, with outflows at 15 kcfs through the weekend and a further decision on Monday about whether to drop to 12 kcfs, given the most current water supply forecast. From a management perspective, outflows need to be managed to a weekly average, rather than daily, considering downstream projects/operations and the use of a water supply 'forecast'. It was clarified that the weekly average is determined by the Dworshak elevation target – 1592.3' by Wednesday, May 18. The salmon managers stressed the preference for not going below 12 kcfs outflows, even if it would require the project to be drafted slightly below 1592'. Russ Kiefer, Idaho, said that the COE's planned operation works to meet the salmon managers needs. NMFS, WDFW, USFWS and CRITFC also agreed with the operation.

ACTION: Dworshak will continue to pass inflow, 15 kcfs outflow, through the weekend. The action agencies will determine on Monday whether to continue with 15 kcfs or drop outflows to 12 kcfs, given the water supply forecast. Cindy will notify TMT on Monday via email what the Dworshak operation will be until Wednesday, May 18. Dworshak operations will be on the agenda for the 5/18 TMT meeting.

SOR 2005-13

The salmon managers submitted a request that, given the recent increase in migrating juveniles, the COE provide spill at Lower Monumental instead of collection and bypass of excess fish that cannot be barged.

The COE responded that the Fish Passage Plan does not currently have this contingency for Lower Monumental, and suggested that if this request will be applied in the future, it should be included in the plan. The salmon managers agreed. There will be further discussion with TMT about incorporating language into the Fish Passage Plan relative to the above request. Walla Walla experts reported that many fish passed Little Goose on

Wednesday and Thursday (5/11-12), which would likely put them at Lower Monumental tonight and tomorrow (5/13-14). Given this information, the COE proposed to operate Lower Monumental as follows:

Spill ~20 kcfs starting this evening, 5/13, for 24-hours through bays 3 and 7. A radio-tag study at Lower Monumental will require the project to spill through bays 7 and 8 from 10am-1pm tomorrow, 5/14, after which spill through 3 and 7 will continue to complete the 24-hour bulk spill operation. The COE noted that, if necessary, bypass will be implemented as well, citing 95% survival rates through this type of passage.

NMFS and others expressed appreciation to the COE for providing this operation. It was suggested that the cause for the increase in fish numbers is likely due to the low flow year causing slower migration, followed by the recent spurt of rain events that pushed the fish downstream quickly.

Next TMT Meeting, Wednesday, May 18, 9am-noon

Agenda Items include:

- Comments on 5/4, 5/11 Meeting Minutes
- Dworshak Operations Update
- Priest Rapids Operations Update
- Libby SOR from USFWS
- Operations Review

1. Greetings and Introductions.

Today's Technical Management Team conference call was chaired by Cindy Henriksen and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Cindy Henriksen at 503/808-3945.

2. Dworshak Operations.

The purpose of today's call is to check in on the Dworshak operation, said Henriksen; since Wednesday, we have been releasing 15 Kcfs, essentially passing inflow. The reservoir has drafted slightly, which tells us that the inflow peak has indeed passed at Dworshak. We intend to hold 15 Kcfs through the weekend; rain is expected early next week, and we will see how that affects inflows. The intent is to continue to pass inflow through next Wednesday, maintaining a 12 Kcfs minimum outflow from Dworshak.

David Wills said that accords with the salmon managers' desires; however, he said they would prefer to see the action agencies pass daily average inflow through next Wednesday, with 12 Kcfs as a minimum even if inflows drop below 12 Kcfs. Henriksen replied that it is not logistically feasible to manage to a daily inflow forecast; the action agencies would prefer to hold the

Dworshak outflow at 15 Kcfs through the weekend, and revisit that operation on Monday. In short, our intent is to continue to implement the SOR by releasing 15 Kcfs through the weekend, Henriksen said; we will revisit this operation on Monday, May 16, and consider reducing Dworshak outflow to 12 Kcfs at that time.

Wills said the salmon managers would be comfortable maintaining the 15 Kcfs through next Wednesday, even if that means drafting Dworshak by a foot or so. If you trust us, I can guarantee we won't have to go below 12 Kcfs before next Wednesday, said Wellschlager. That sounds reasonable from Idaho's perspective, said Russ Kiefer. Again, I would prefer to continue to keep Dworshak outflow closer to 15 Kcfs through Wednesday, said Wills; apparently the action agencies don't want to go there. Paul Wagner said NMFS is fine with the action agencies' proposal; Cindy LeFleur said Washington is as well, but asked how the weekly average inflow will be calculated. The average inflow yesterday was 13.8 Kcfs, said Henriksen; there is the potential for rain in the Idaho panhandle early next week. I am using the Wednesday-Wednesday period to monitor Dworshak's reservoir elevation. If it is significantly below 1592.3 feet on Monday, we may choose to reduce outflow to 12 Kcfs at that time, she said. Again, our goal is to end Wednesday with an elevation near 1592.3 feet.

Wills said he is willing to accept this scenario; the salmon managers will continue to monitor the situation, and if they have concerns, they will contact the Corps on Monday. No objections were raised to this operation.

3. SOR 2005-13.

This SOR covers operations at Lower Monumental Dam, said Kiefer; he noted that, over the past week or so, it has been necessary to bypass juvenile migrants arriving at Lower Monumental because there was no room on the barge. We believe spillway passage is better for fish than bypass, he said; what this SOR requests is that, when we are unable to safely load the fish at Lower Monumental, we spill, rather than running them through the bypass. It is possible that we won't even need to implement this again this year, but we would request that, if the situation arises again in the future, that spill be provided to move the excess fish past the project in the safest in-river passage.

Henriksen noted that USFWS, Oregon, Idaho, Washington, CRITFC, the Nez Perce Tribe and the Shoshone-Bannock Tribes signed on to this SOR. There are a couple of process-related issues, she said; first, this operation is not referenced in the Fish Passage Plan, and I would ask that in future years, if this operation is desired, that it be included in the FPP. That is a very good suggestion, said Kiefer. Second, said Henriksen, we had some discussions with our experts at Walla Walla about the number of fish moving downstream, the status of the migration and the status of the transport program. We found that there were a lot of fish passing Lower Granite on Thursday; those fish will be

arriving at Lower Monumental today and tomorrow. A barge will arrive at Lower Monumental tonight, and another barge will arrive tomorrow night. We are willing to spill using the bulk spill pattern at 20 Kcfs for 24 hours beginning tonight, to move this last slug of fish through, she said. We do see fish numbers starting to fall at Little Goose from here on out, she said. In response to a question, Henriksen said the radio-tag spillway survival test is ongoing at Lower Monumental's bays 7 and 8; spill for fish passage would occur through bays 3 and 7.

The group devoted a few minutes of discussion to the potential impacts of the SOR operation on the spillway survival study at bays 7 and 8. Paul Wagner said that, given the fact that this is a 24-hour operation, NMFS does not see a big conflict here. Wills agreed. Are we getting more naturally-spawned smolts coming out, have hatchery releases increased, or is this just an artifact of the fact that this is a full-transport year? John Wellschlager asked. We don't see an increase in natural-spawning production, Kiefer replied; we think it is an artifact of the fact that this is a low-flow year, and when flows increase, we see a big slug of fish moving downstream.

With that, today's conference call was adjourned.

**TMT Conference Call Participants
May 13, 2005**

Name	Affiliation
Cindy Henriksen	COE
Cindy LeFleur	WDFW
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
John Wellschlager	BPA
Nic Lane	BPA
Dan Spear	BPA
Russ Kiefer	IDFG
David Wills	USFWS
Rich Domingue	NMFS
Paul Wagner	NMFS

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday May 18, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cnmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Comments on 5/4, 5/11, 5/13 Meeting Minutes.
 - i. [May 04, 2005](#)

 - ii. [May 11, 2005](#)

 - iii. [May 13, 2005](#)

3. Hanford Reach Update.
[\[Priest Rapids Operations - May-04-2005\]](#)  [\[Priest Rapids Operations - May-18-2005\]](#) 
4. Q Adjust, ESP Runs
 - i. [\[QADJ versus ESP HYSSR Presentation\]](#)
 - ii. [\[QADJ Model Runs 17-May-05\]](#)

 - iii. [\[ESP HYSSR 17-May-05\]](#)

5. Flow Augmentation Volumes at Headwater Reservoirs
 - o [Dworshak](#)
 - o [Libby](#)
 - o [Hungry Horse](#)
6. Dworshak Operations Update.
7. Priest Rapids Operations Update
8. Libby SOR from USFWS -
[\[#2005-FWS-1 May-13-2005\]](#) 
9. Spill at the Dalles -

[\[#2005-12 May-17-2005\]](#) 

10. Operations Review

- Reservoirs -
[\[Source: Project Data\]](#)
- Fish -
[\[Source: Fish Passage Center Two-Week Summary of Passage Indices Updateds\]](#)
- Power System
- Water Quality -
[\[Spill Information 2005\]](#) 

11. Final Spring/Summer Update -

[\[Final 03 May 2005\]](#) 

12. Other

13. Set agenda for next meeting -

[\[Reference Calendar\]](#) 

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

Assumptions:

- * Streamflows were from the 17 May ESP run, which uses current basin conditions combined with 44 historical weather patterns (temperatures and precipitation) to produce 44 ESP hydrographs for 2005.
- * Starting elevations are observed April 30, 2005 elevations.
- * Grand Coulee tries to meet 135,000 cfs in May while not drafting below 1240 ft. In June the project refills to 1288 ft in all years, and fills above 1288 ft if Priest Rapids flows are above 130,000 cfs. Summer lake targets are 1285.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates in May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets an upper limit of 1597.9 ft by May 31 **with a minimum outflow of 7.7 kcfs for the month (assumes actual releases through May 16, 12,000 cfs through May 18, and minimum flow of 1,500 cfs for the remainder of the month)**. Dworshak targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby targets full in June while maintaining a minimum flow in May of 11,000 cfs and 10,200 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	44	135	135
Jun	20	129	130

* Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	15	84	85
Jun	7	59	73
Jul	0	32	50
Aug 15	0	29	50
Aug 31	0	29	50

McNary Meets the Following Flow Objectives:

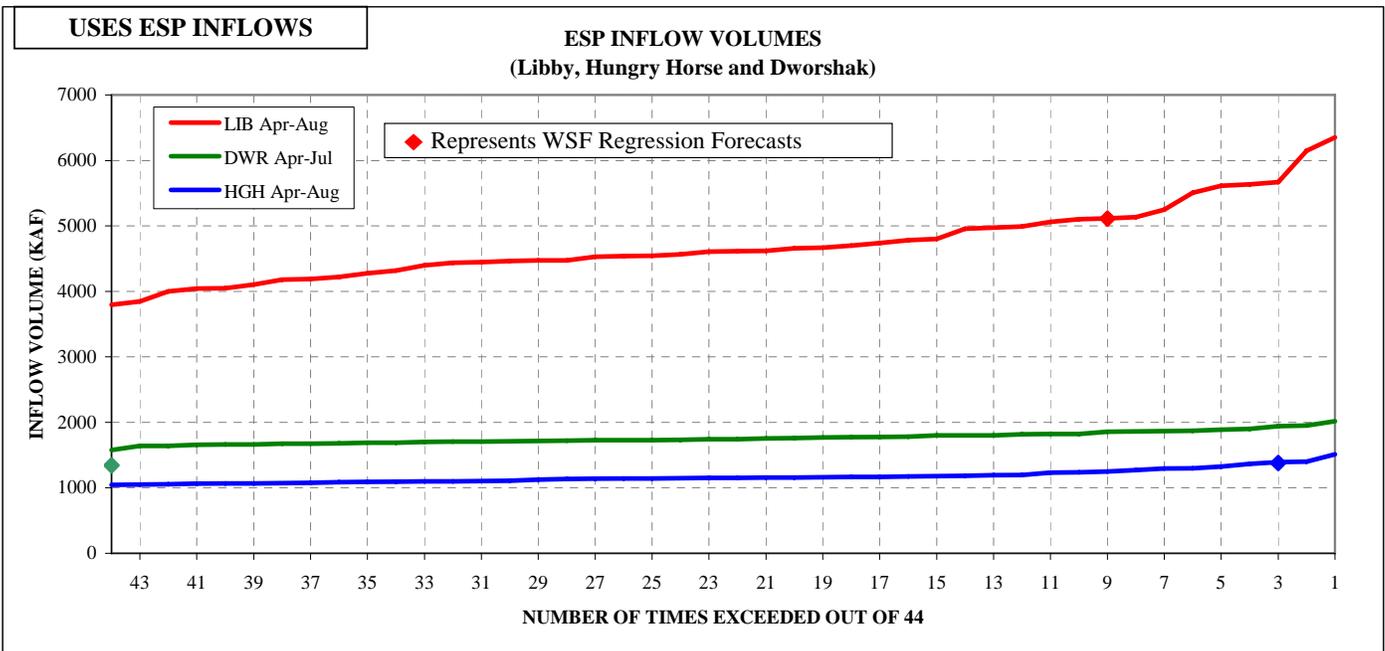
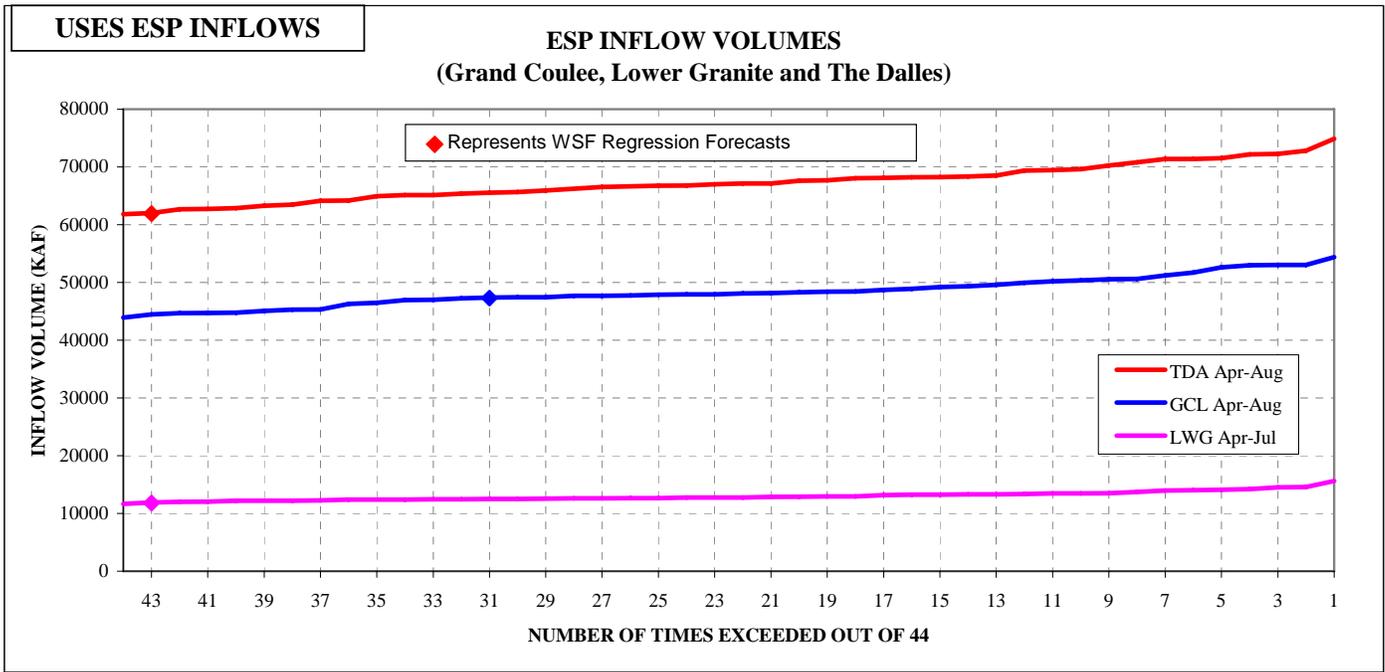
Month	Occurrences out of 44 Years	Average Flow for 44 Years (kcfs)	Flow Objective* (kcfs)
May	44	231	220
Jun	5	192	220
Jul	0	161	200
Aug 15	0	145	200
Aug 31	0	140	200

Projects Refill by 30 June:

Month	Occurrences out of 44 Years	Average Elevation on 30 Jun for 44 Years
Libby	27	2457.1
Hungry Horse	44	3560.0
Grand Coulee	44	1288.8
Dworshak	44	1600.0

Period Average Flows (kcfs):

	Obs FEB 1-28	Obs MAR 1-28	Obs APR 1-15	Obs APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	11.0	13.0	16.3	16.8	15.8
HGH	1.0	0.9	2.1	7.2	4.5	3.3	5.2	5.5	4.4
GCL	101	91	76	82	117	116	120	110	105
PRD	111	100	85	95	135	129	126	113	108
DWR	1.6	1.6	3.6	5.4	10.6	5.5	10.1	10.1	10.3
BRN	10	11	13	12	18	11	8	11	12
LWG	21	22	39	45	84	59	32	29	29
MCN	134	123	132	147	231	192	161	145	140
TDA	140	125	136	143	235	186	159	145	141
BON	138	130	143	153	238	189	161	147	143



Volume Comparison Table (ESP versus Regression (May Final)):

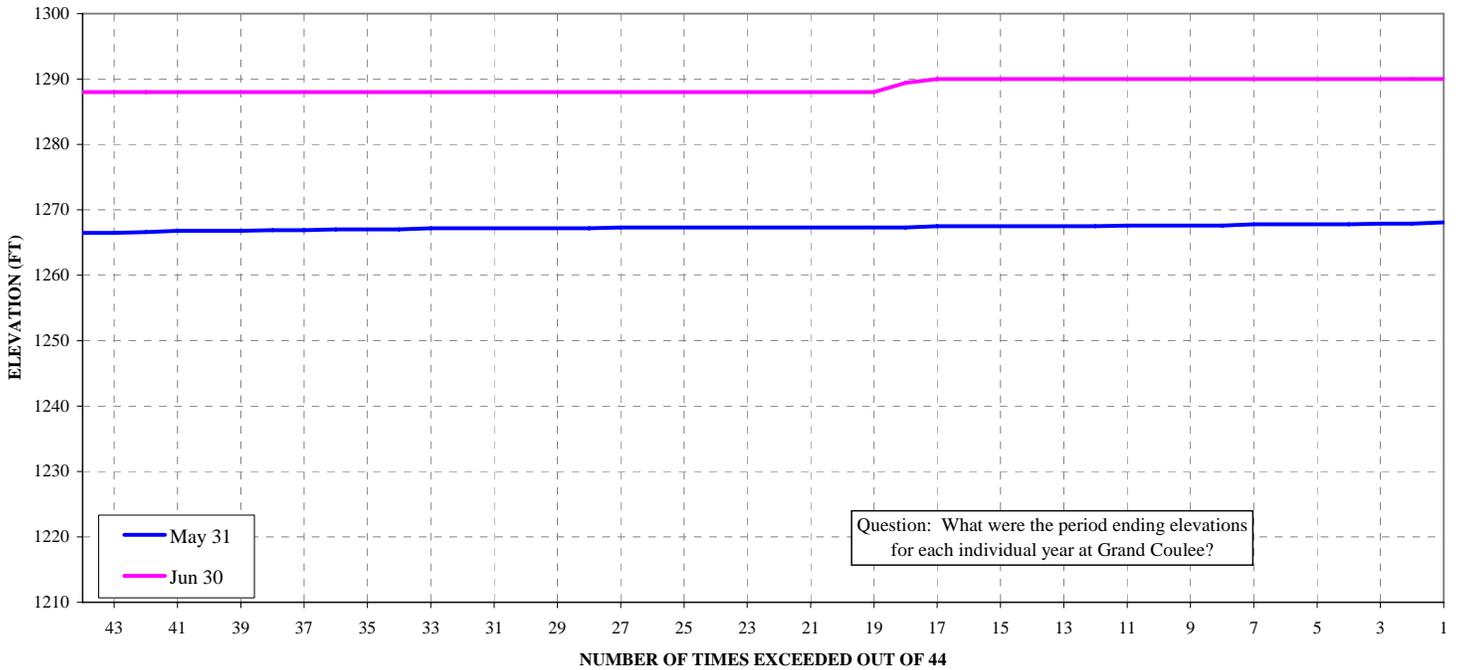
	Forecast Period	Official WSF (Regression)			ESP Volumes				
		Volume (kaf)	Percent of Average	30 year Average (kaf)	10% Exceedance Probability	30% Exceedance Probability	50% Exceedance Probability	70% Exceedance Probability	90% Exceedance Probability
Grand Coulee	Apr-Aug	47300	78%	60290	52300	49400	48000	47400	44900
Lower Granite	Apr-Jul	11800	55%	21550	14100	13300	12800	12500	12200
The Dalles	Apr-Aug	61900	66%	93090	71500	68300	67000	65500	63000
Hungry Horse *	Apr-Aug	1379	67%	2070	1320	1180	1150	1100	1070
Libby **	Apr-Aug	5111	82%	6248	5460	4860	4610	4440	4060
Dworshak **	Apr-Jul	1344	51%	2645	1870	1800	1740	1710	1660

* USBR Official Forecast (April Final)

** Corps Official Forecast (April Final)

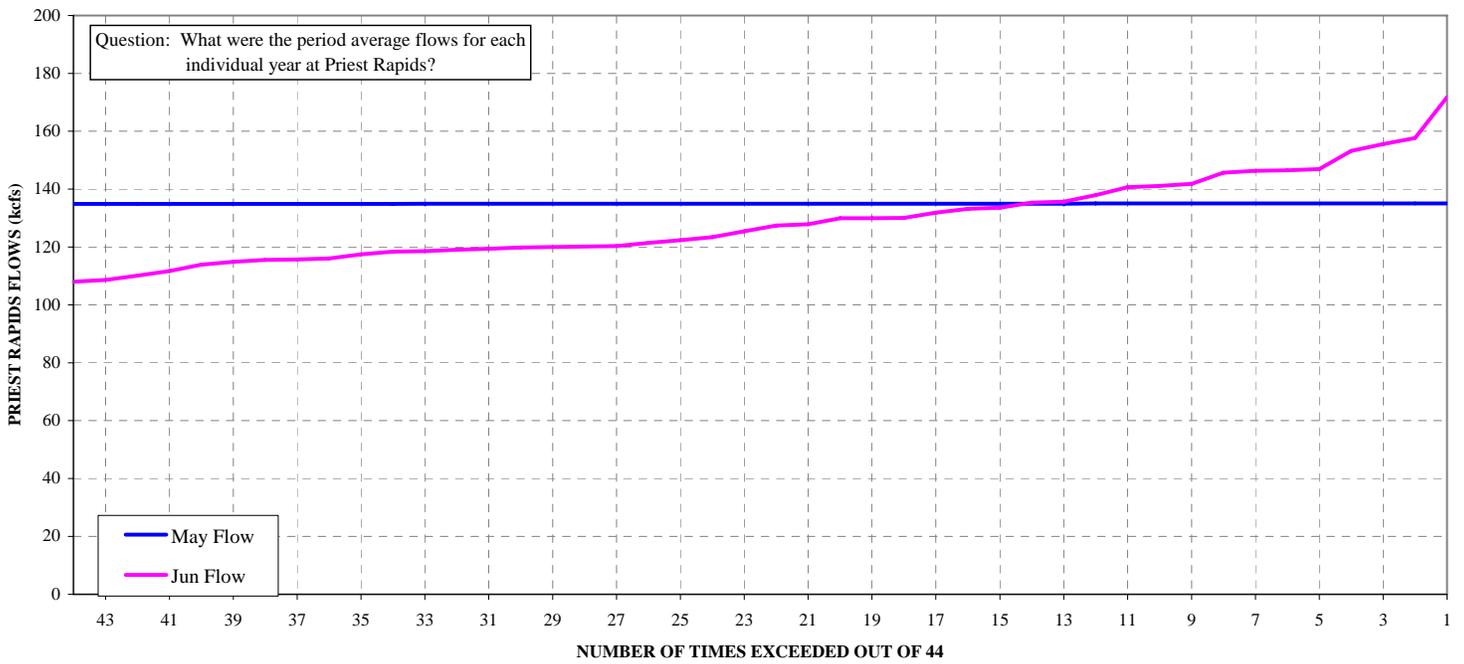
USES ESP INFLOWS

**GRAND COULEE ESP
LAKE ROOSEVELT ELEVATIONS**



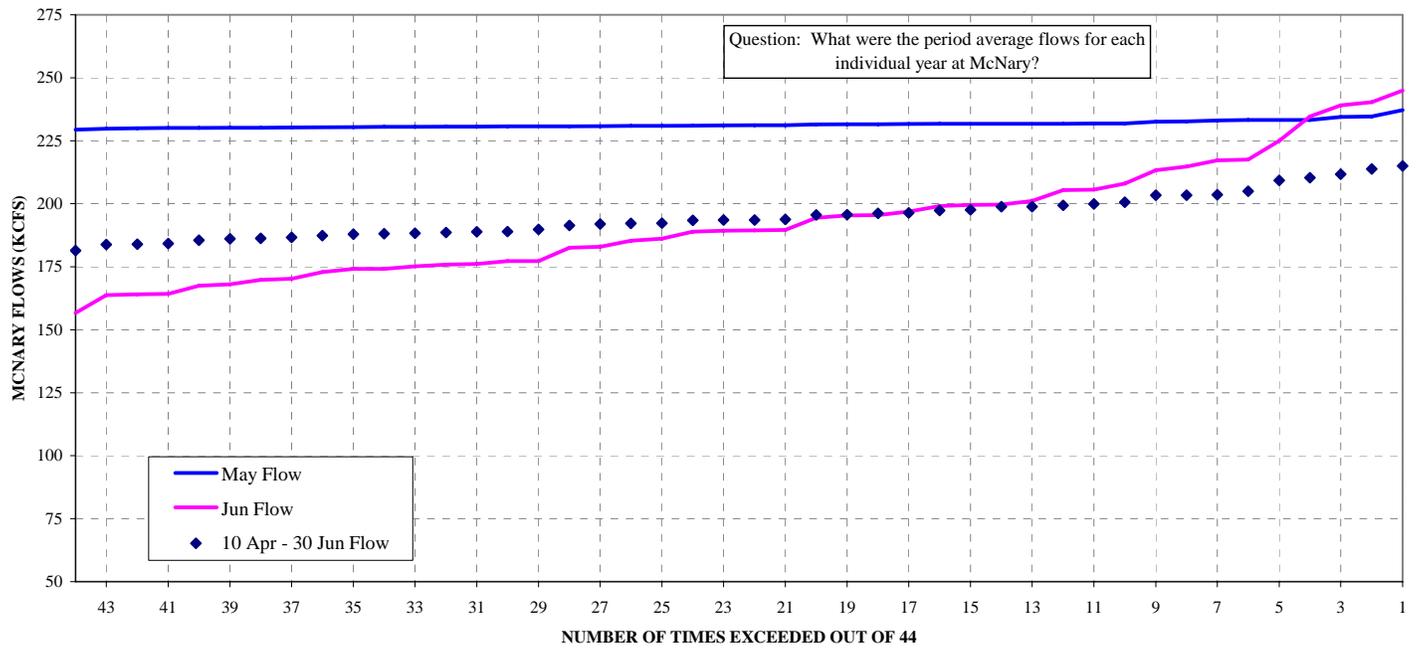
USES ESP INFLOWS

**PRIEST RAPIDS ESP
APRIL - JUNE FLOWS**



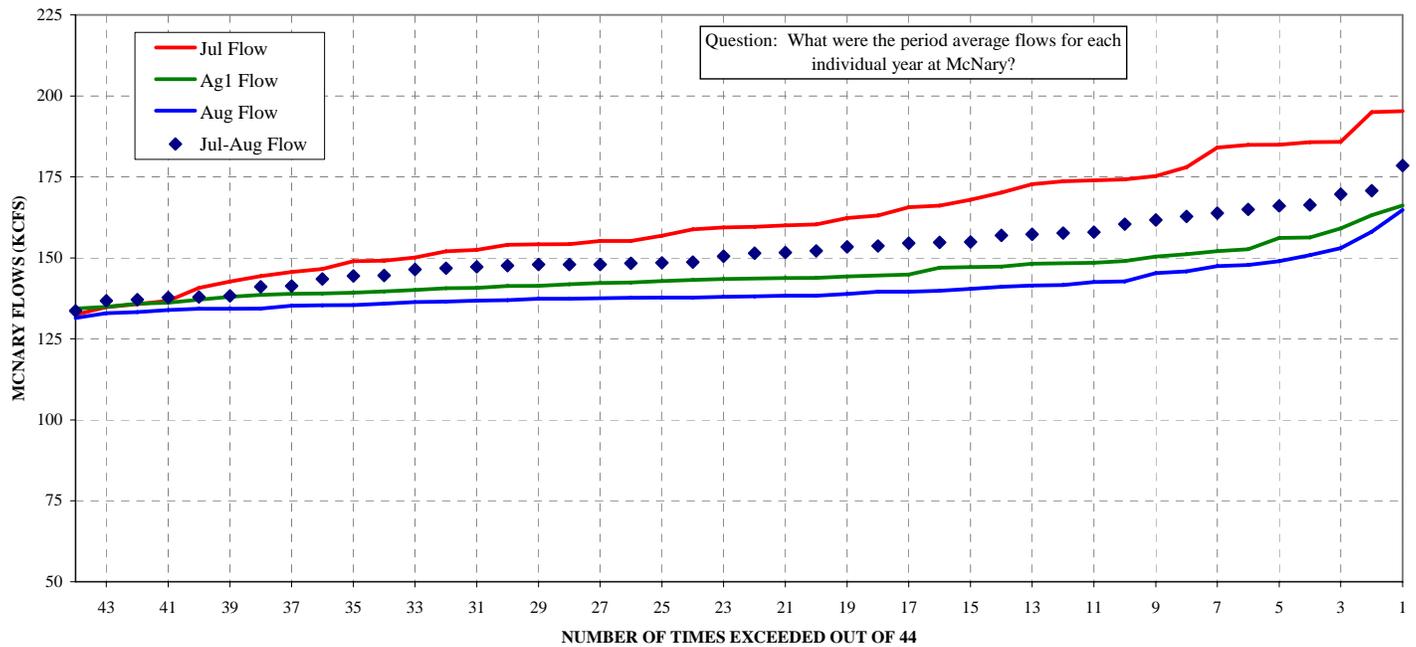
USES ESP INFLOWS

**MCNARY ESP OUTFLOW
APRIL - JUNE AVERAGES**



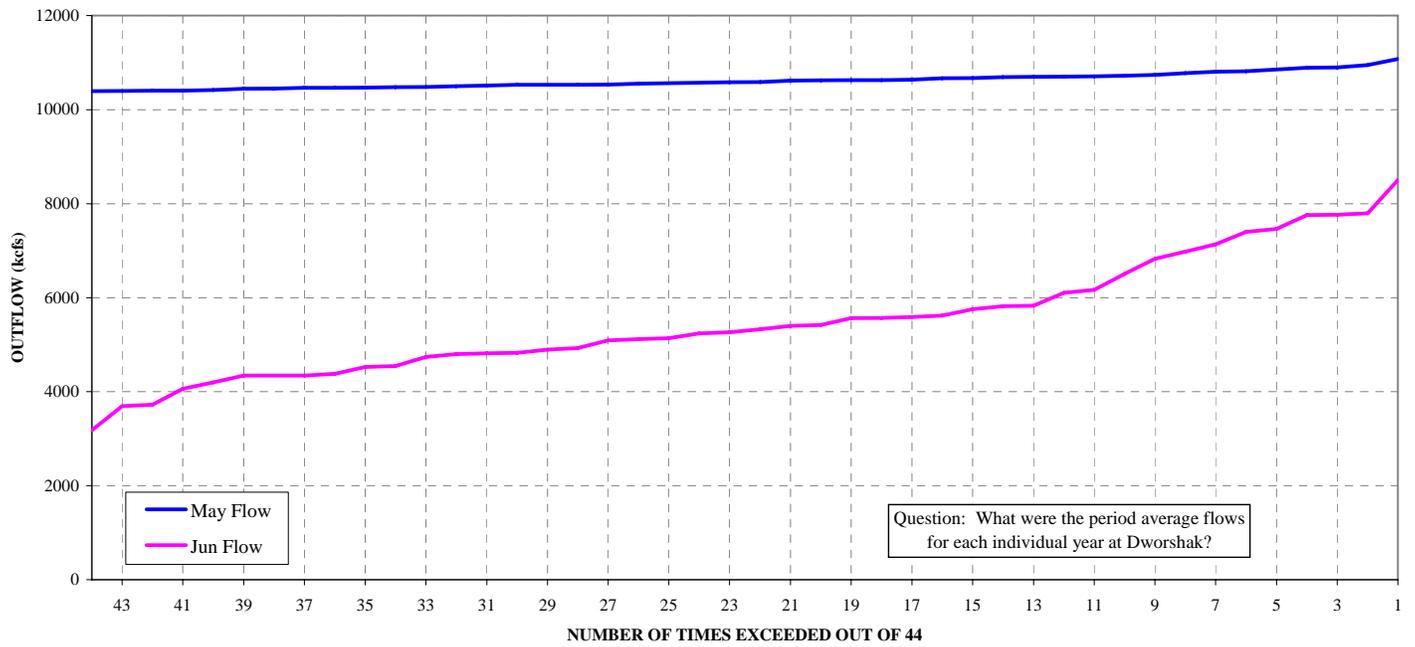
USES ESP INFLOWS

**MCNARY ESP OUTFLOW
JUL-AUG AVERAGES**



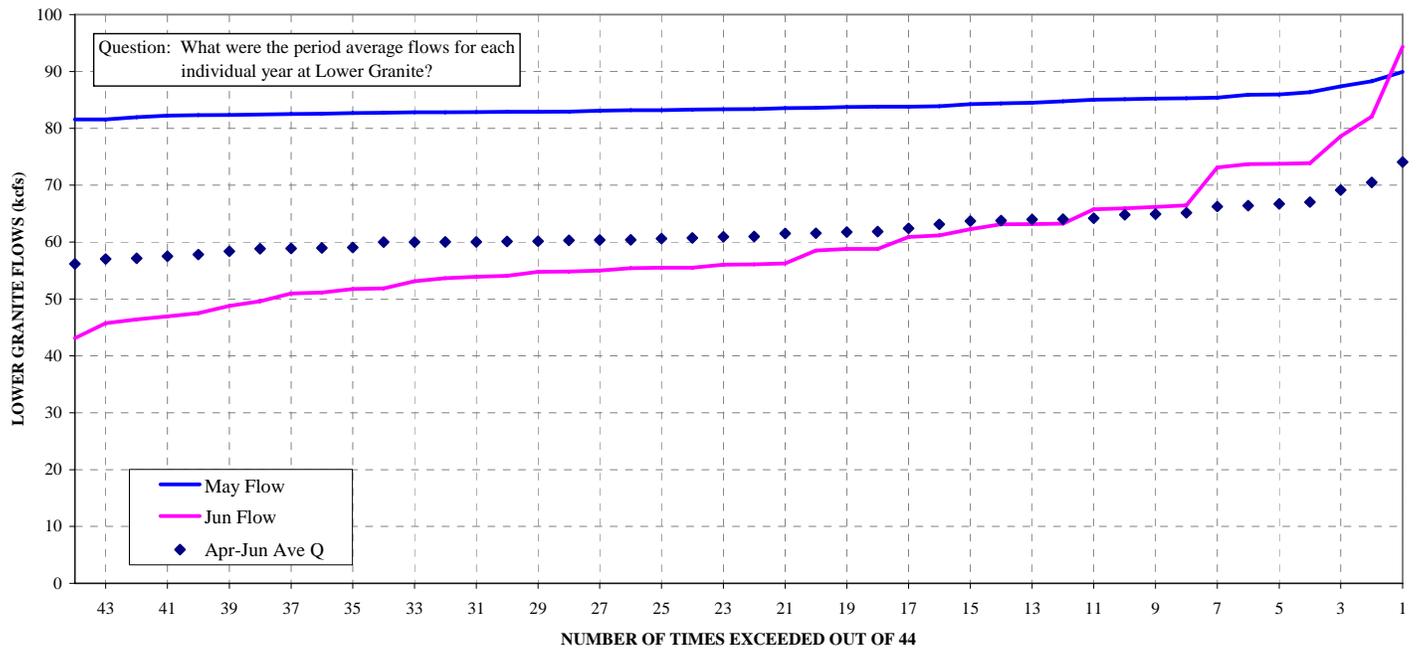
USES ESP INFLOWS

**DWORSHAK ESP
OUTFLOWS**



USES ESP INFLOWS

**LOWER GRANITE ESP
APRIL - JUNE FLOWS**



Assumptions:

- * Streamflows were adjusted to the May Final Water Supply Forecast for the period of May thru August of 51.3 MAF at The Dalles (65% of average) and shaped 69 different ways based on observed historical runoff.
- * Starting elevations are actual April 30, 2005 elevations.
- * Grand Coulee tries to meet 135,000 cfs in May while not drafting below 1240 ft. In June the project refills to 1288 ft in all years, and fills above 1288 ft if Priest Rapids flows are above 130,000 cfs. Summer lake targets are 1285.0 ft in July and 1278 ft in August (per the BiOp).
- * Hungry Horse operates in May for a controlled refill by 30 June and meets minimum flow of 3250 cfs at Columbia Falls. The project drafts to 3540 ft by 31 Aug.
- * Brownlee operates to flood control elevations, which is elevation 2077 ft (or full pool) and drafts some in July - August.
- * Dworshak targets an upper limit of 1597.9 ft by May 31 **with a minimum outflow of 7.7 kcfs for the month (assumes actual releases through May 16, 12,000 cfs through May 18, and minimum flow of 1,500 cfs for the remainder of the month)**. Dworshak targets full in June and drafts to 1534 ft by 31 Aug.
- * Libby targets full in June while maintaining a minimum flow in May of 11,000 cfs and 10,200 cfs out in June for sturgeon, based on a Tier 2 sturgeon pulse. Libby drafts to 2439 ft by 31 Aug, with a minimum bull trout flow of 7,000 cfs.

Results:

Priest Rapids Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	63	140	135
Jun	59	140	130

** Note: Flow objectives listed may be less than what is prescribed in the BiOp but were used for modeling.*

Lower Granite Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	2	66	85
Jun	3	57	73
Jul	0	32	50
Aug 15	0	25	50
Aug 31	0	23	50

McNary Meets the Following Flow Objectives:

Month	Occurrences out of 69 Years	Average Flow for 69 Years (kcfs)	Flow Objective* (kcfs)
May	9	201	220
Jun	2	188	220
Jul	0	156	200
Aug 15	0	132	200
Aug 31	0	124	200

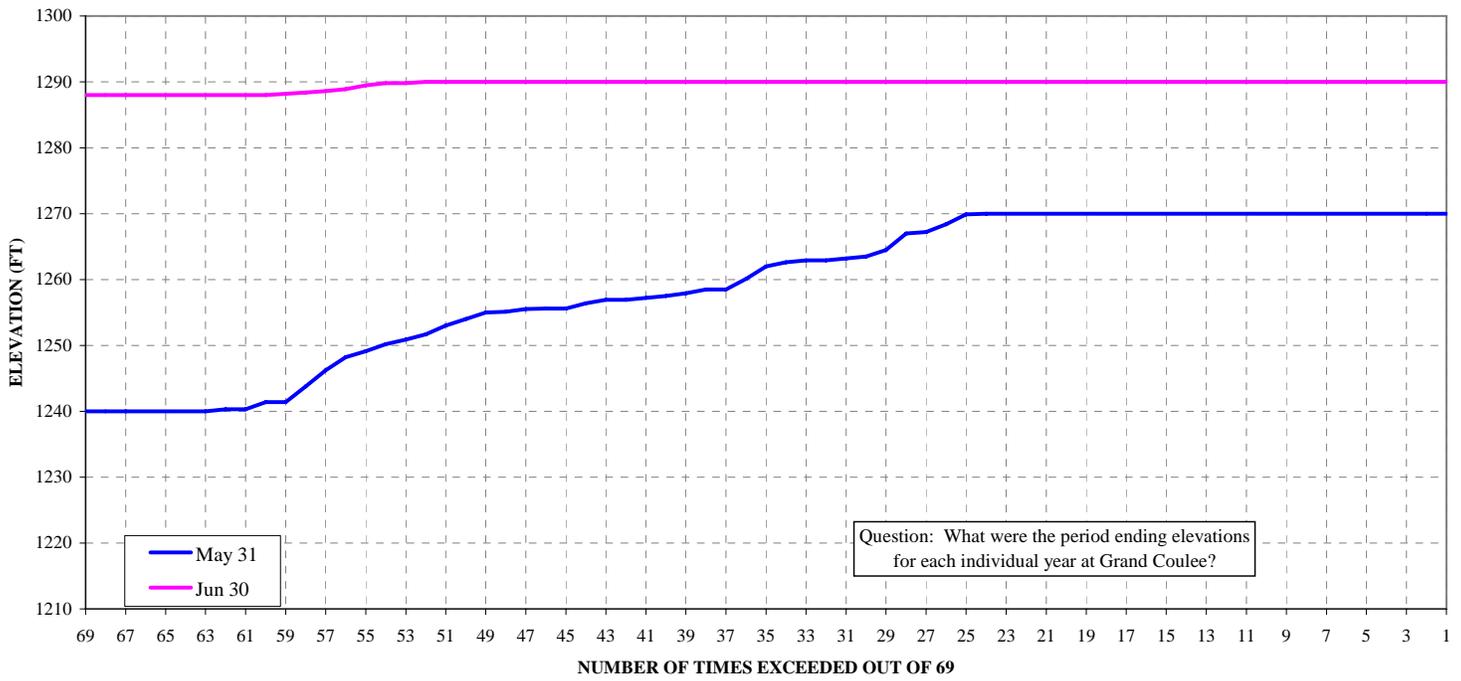
Projects Refill by 30 June:

Month	Occurrences out of 69 Years	Average Elevation on 30 Jun for 69 Years
Libby	60	2458.6
Hungry Horse	69	3560.0
Grand Coulee	69	1289.6
Dworshak	69	1600.0

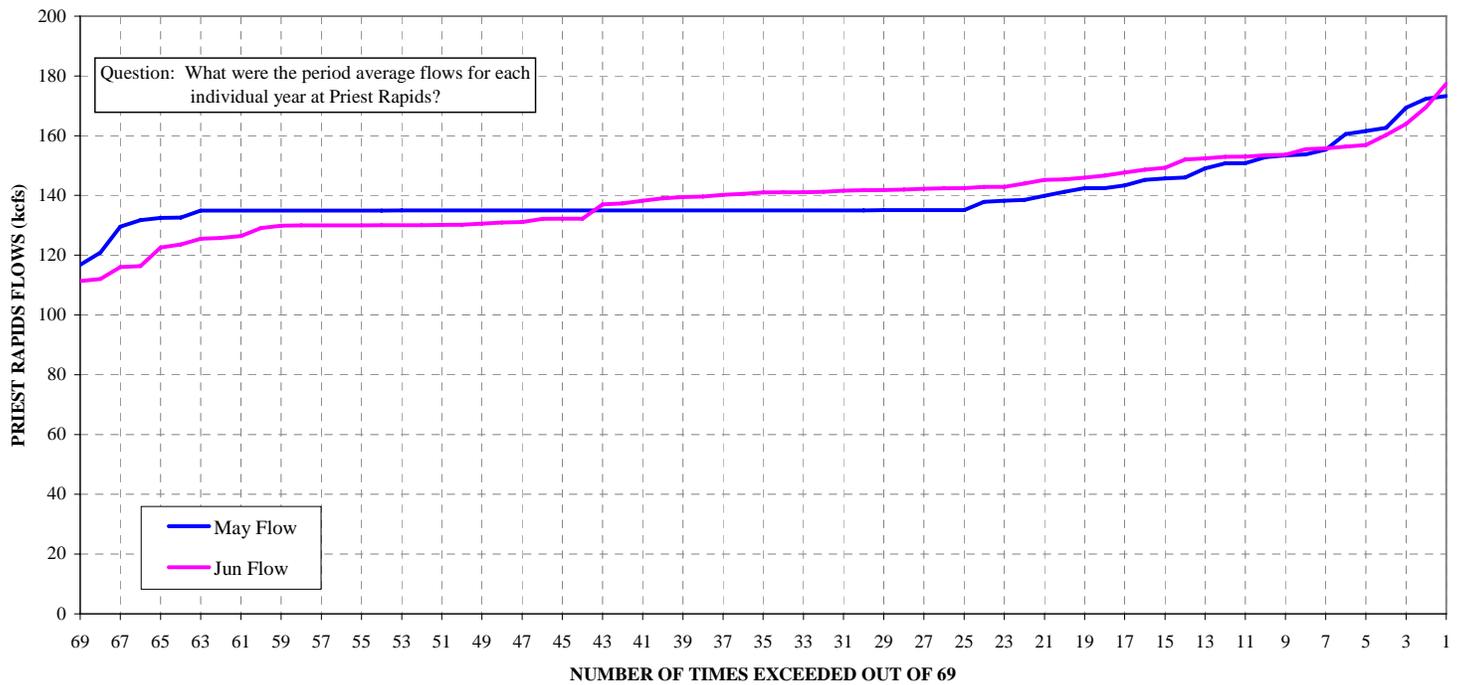
Period Average Outflows (kcfs):

	Obs FEB 1-28	Obs MAR 1-28	Obs APR 1-15	Obs APR 16-30	MAY 1-31	JUN 1-30	JUL 1-31	AUG 1-15	AUG 16-31
LIB	4.0	4.0	4.0	4.0	11.1	14.2	20.2	18.8	16.1
HGH	1.0	0.9	2.1	7.2	4.9	5.8	5.8	5.4	4.2
GCL	101	91	76	82	123	118	120	104	99
PRD	111	100	85	95	140	140	131	110	103
DWR	1.6	1.6	3.6	5.4	8.1	4.3	10	10	9
BRN	10	11	13	12	13	12	9	9	9
LWG	21	22	39	45	66	57	32	25	23
MCN	134	123	132	147	201	188	156	132	124
TDA	140	125	136	143	200	180	152	130	123
BON	138	130	143	153	202	181	154	132	125

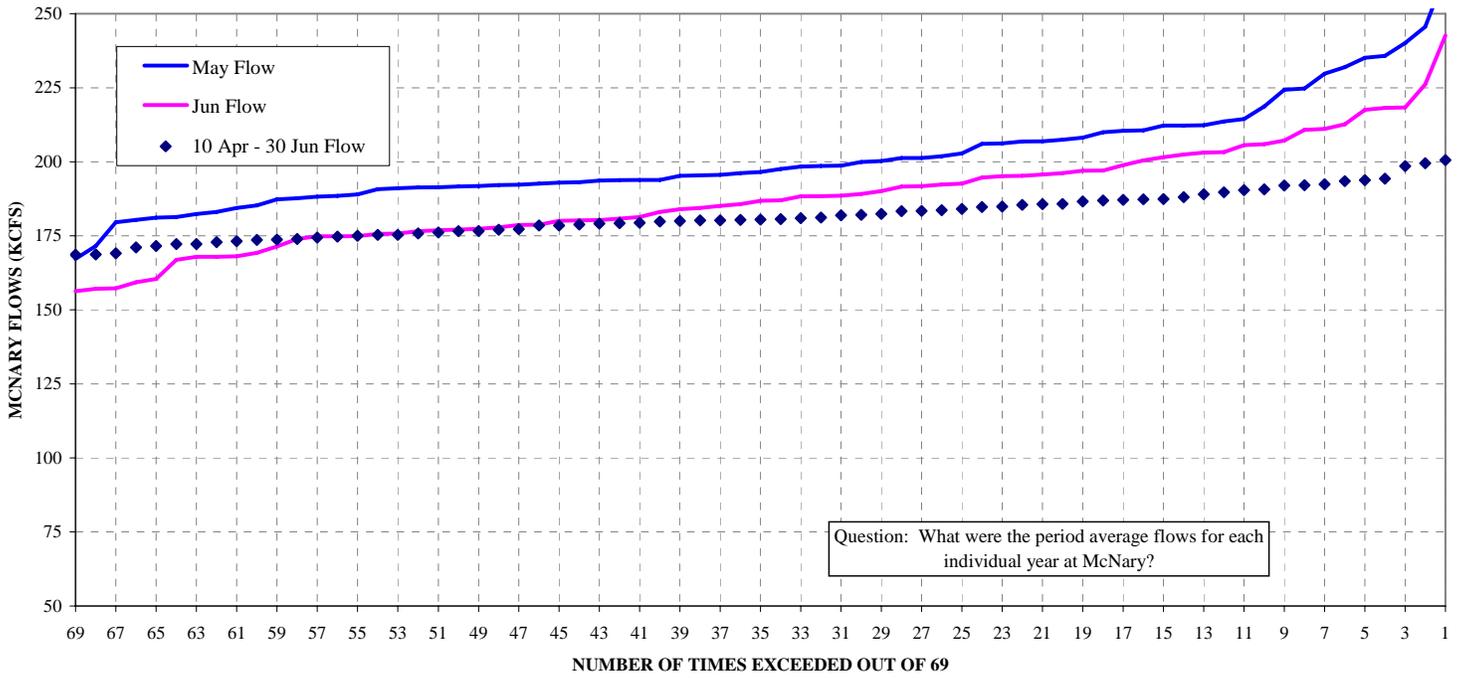
GRAND COULEE LAKE ROOSEVELT ELEVATIONS



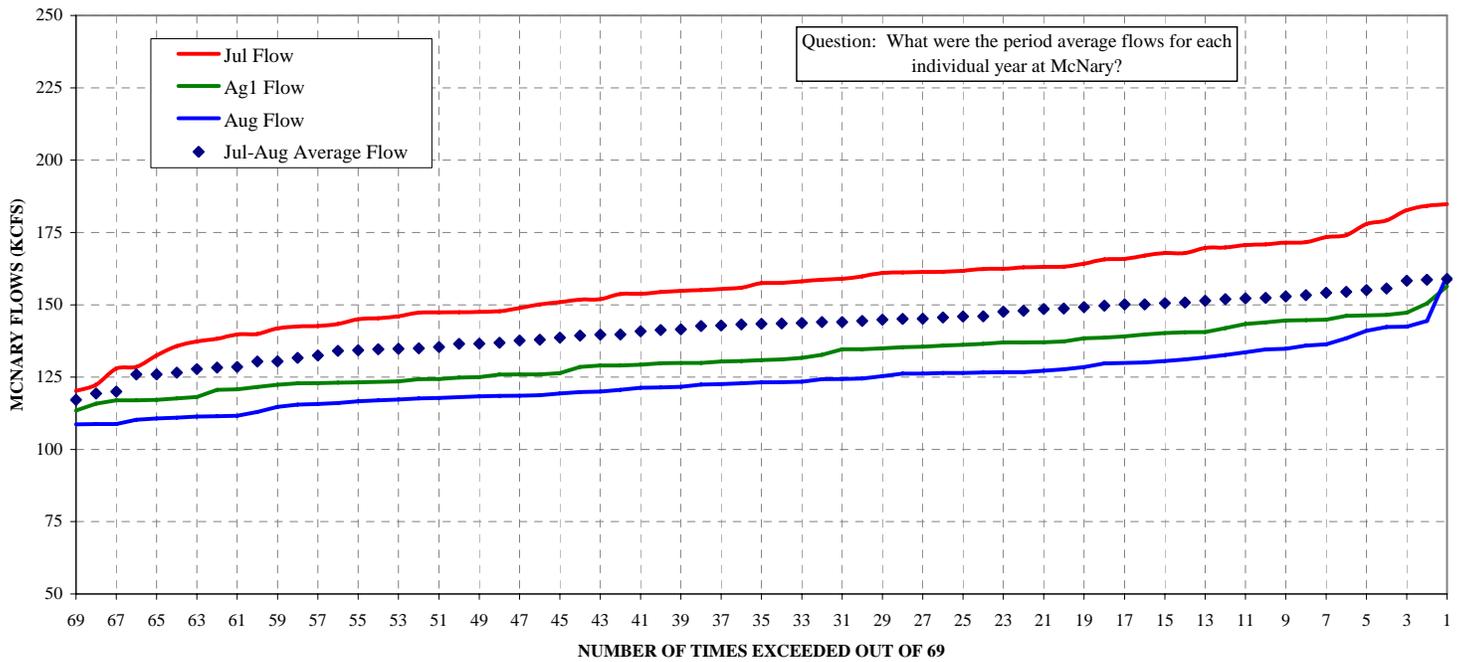
PRIEST RAPIDS MAY - JUNE FLOWS



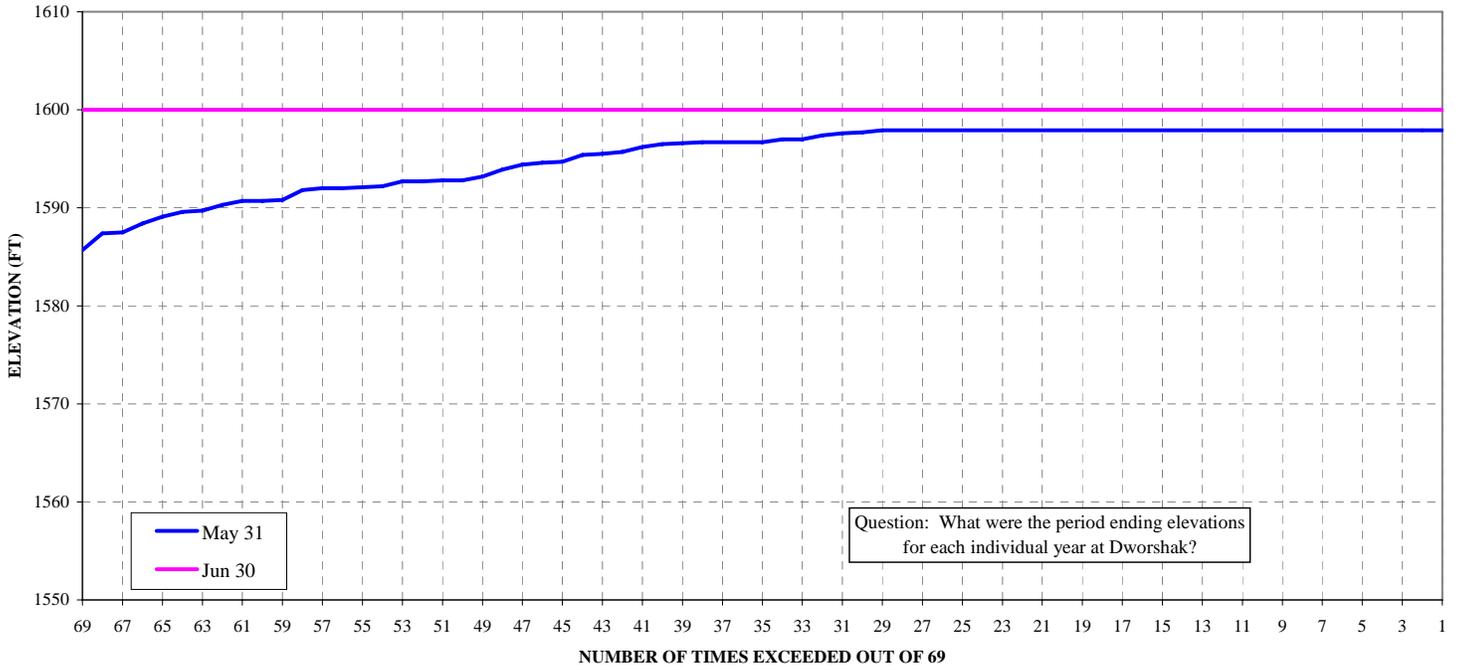
MCNARY OUTFLOW APRIL - JUNE AVERAGES



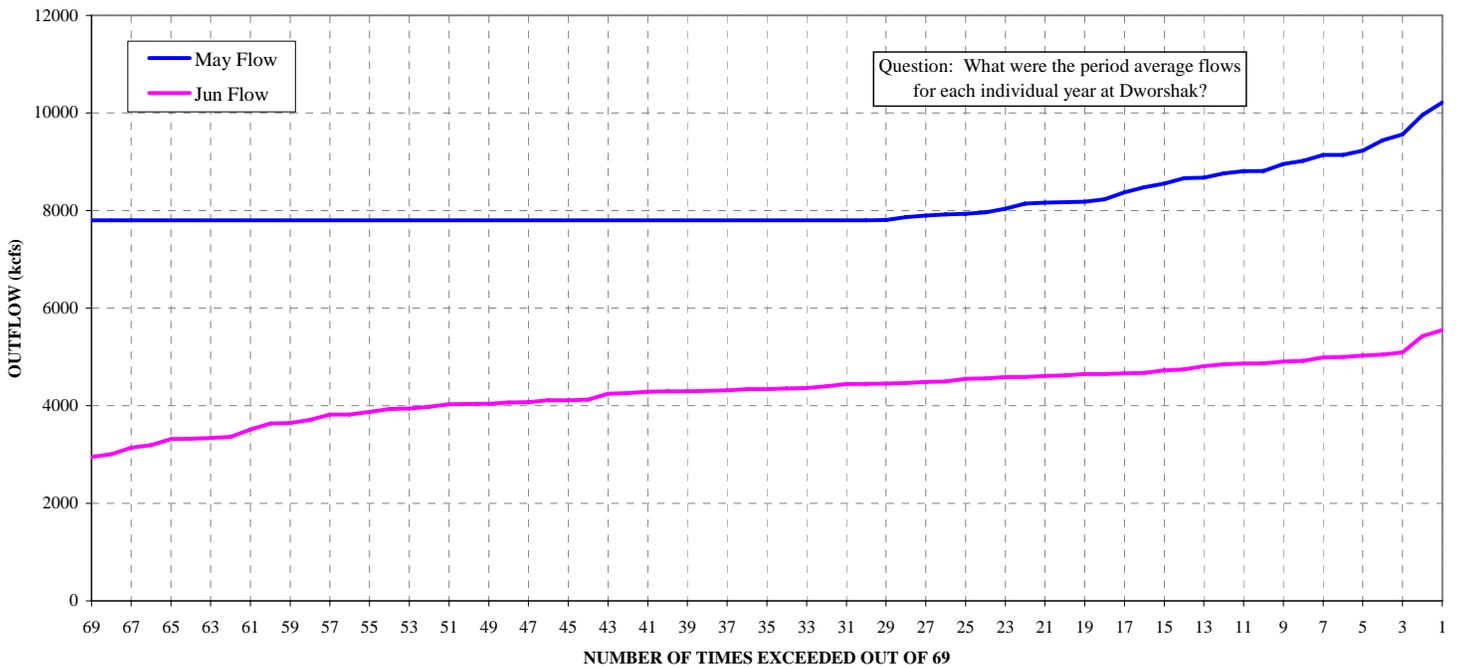
MCNARY OUTFLOW JUL-AUG AVERAGES



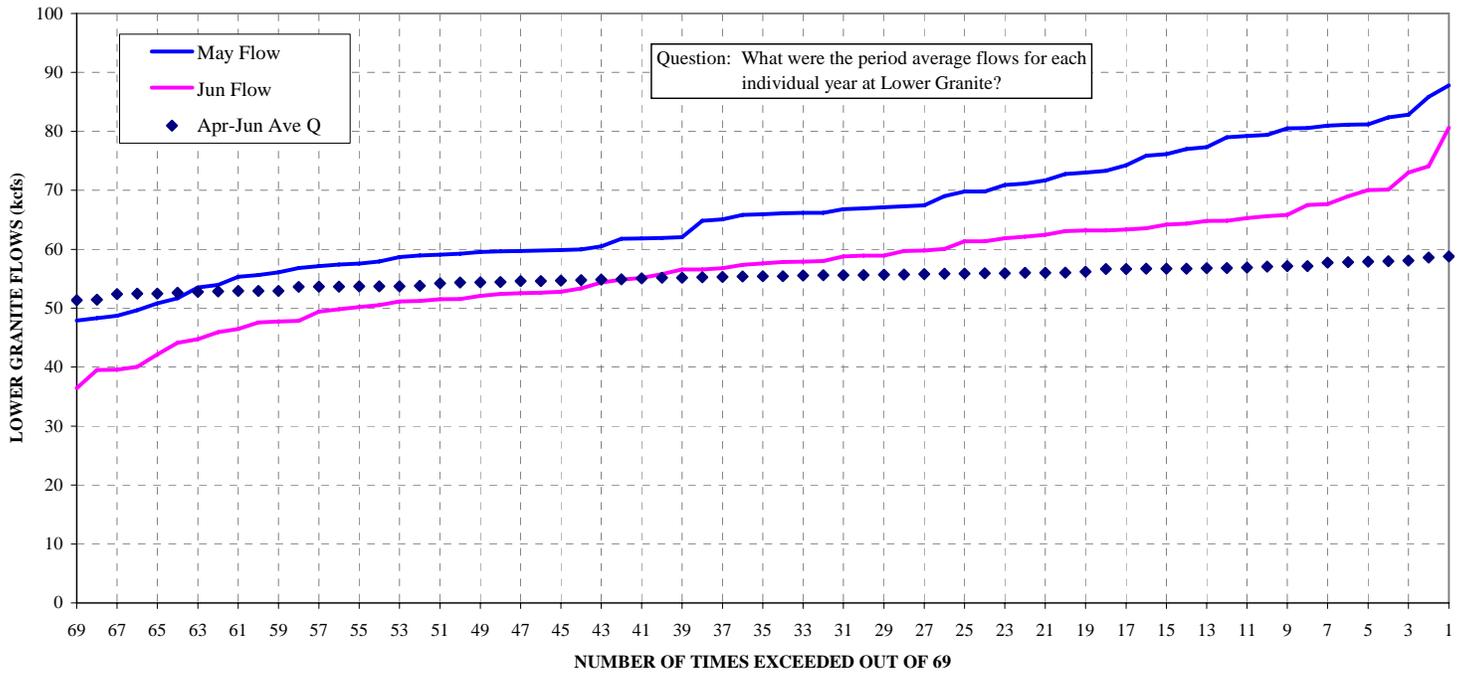
DWORSHAK LAKE ELEVATIONS



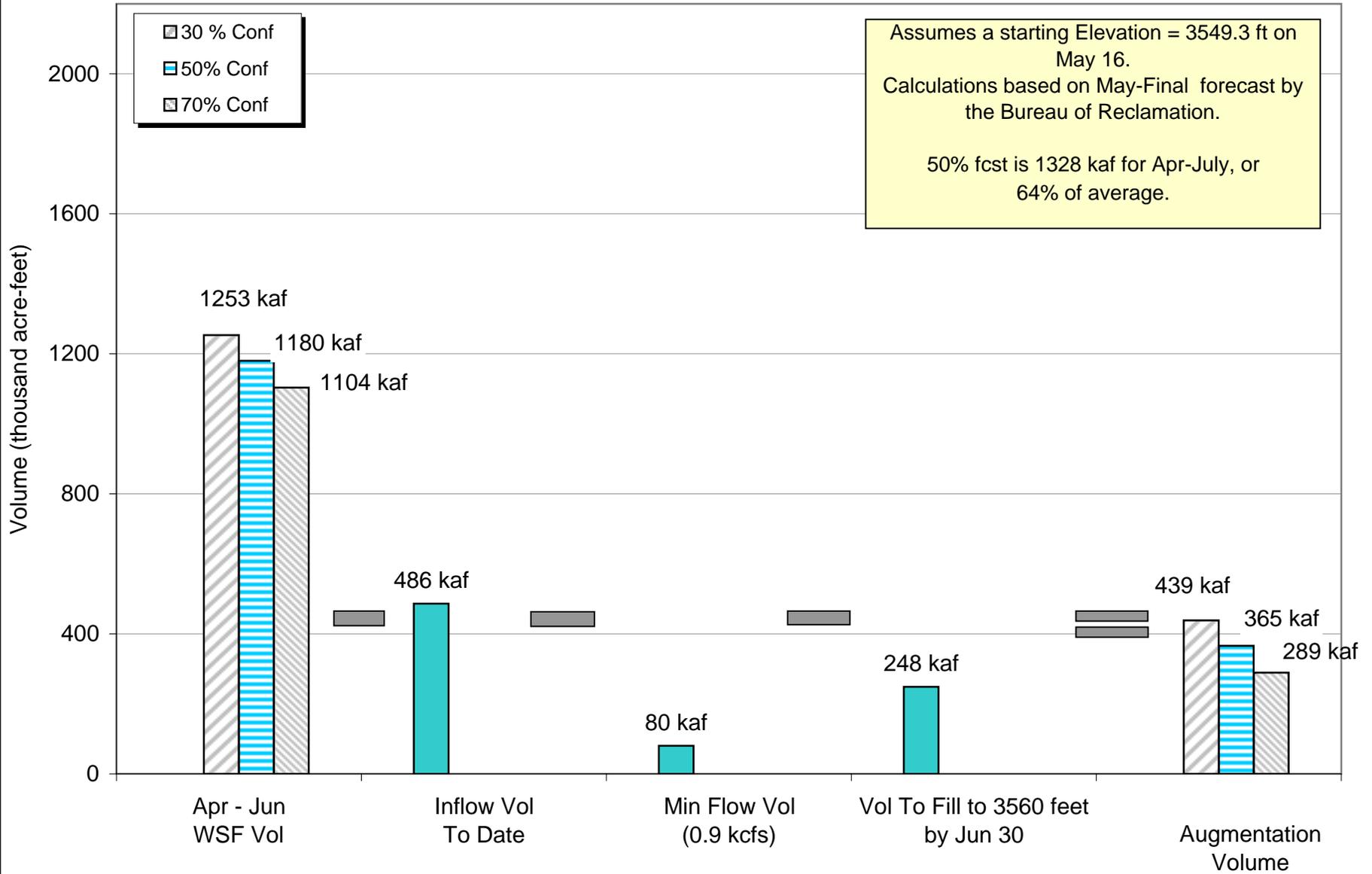
DWORSHAK OUTFLOWS



LOWER GRANITE APRIL - JUNE FLOWS



Volumes at Hungry Horse 1 April Through 30 June



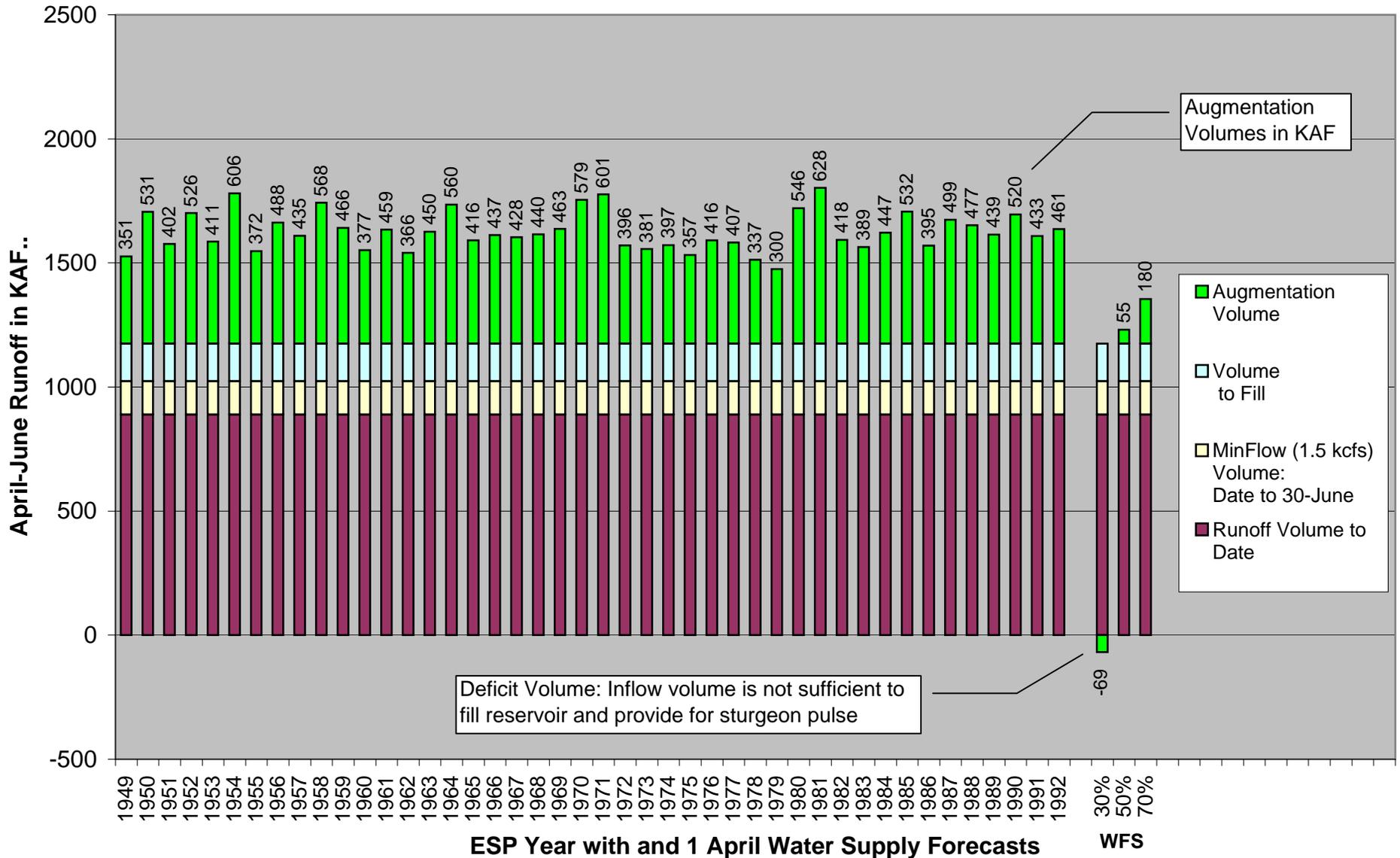
Priest Rapids Operations

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
9-May	142.0	123.8	160.9	125.5	37.1	40	Y	
10-May	154.5	147.9	165.2	142.7	17.3	60	Y	
11-May	150.2	108.4	165.2	154.2	56.8	60	Y	
12-May	139.7	117.7	169.6	132.1	51.9	40	N	(11.9 K) PRD and WAN full so inflows exceeded capacity
13-May	149.9	137.0	169.9	147.4	32.9	60	Y	
14-May	147.4	138.0	164.3	144.2				
15-May	128.1	115.7	147.5	134.8	48.6	40	N	(8.6 K) Operator error
Week	144.5							

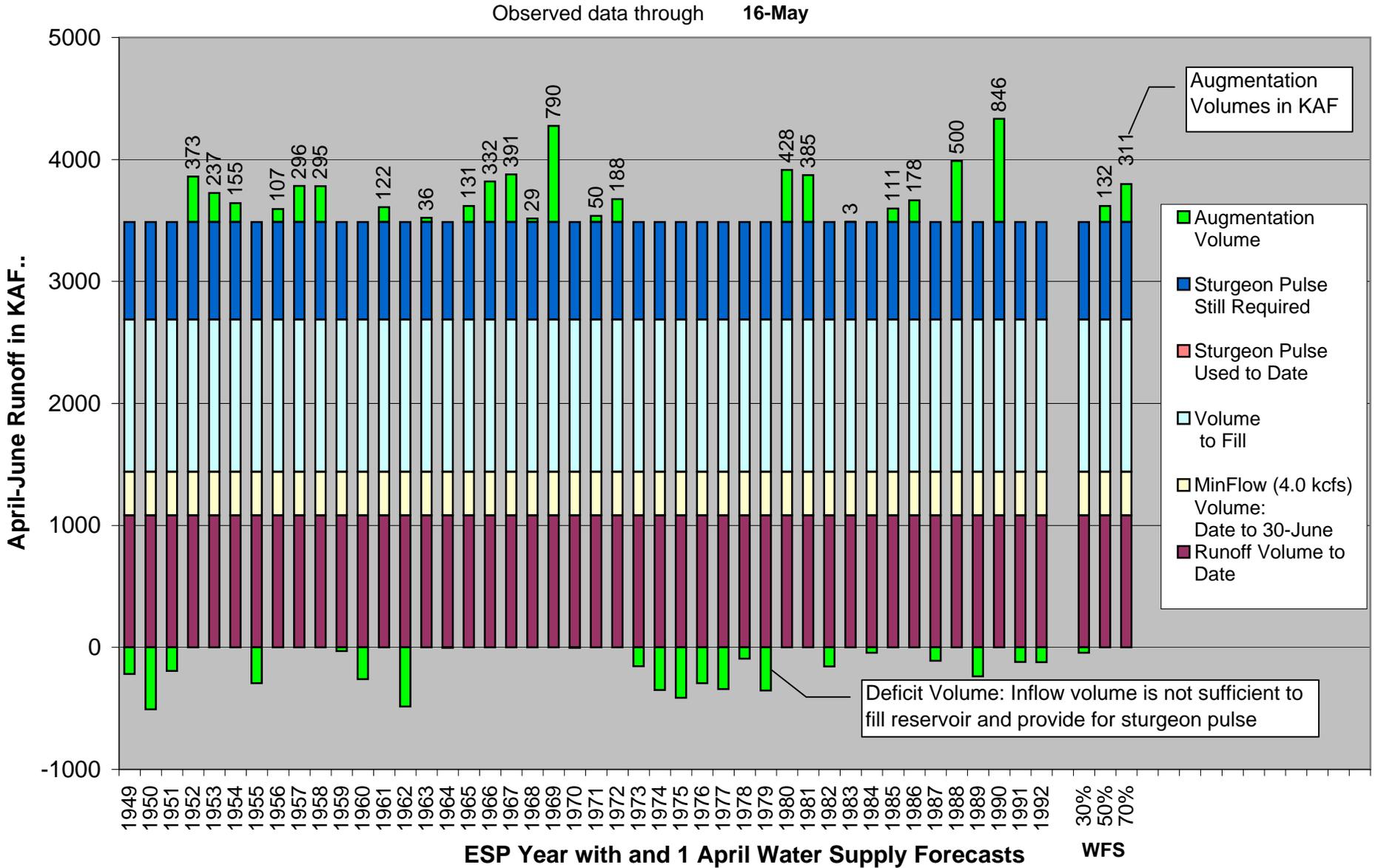
TU's currently at 1038 and weekend protection flows will end on May 23, 2005.

Dworshak Augmentation Volumes ESP inflows and 1 May Water Supply Forecast

Observed data through **16-May**



Libby Augmentation Volumes ESP inflows and 1 May Water Supply Forecast



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 18, 2005

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.

Comments on Notes

In the April 6 discussion of snow covered areas at Dworshak, the facilitator notes were changed, per suggestion from a TMT member, to read “Idaho and Oregon *directly challenged* the COE’s methodology” rather than “*questioned*”. The Oregon and Idaho representatives clarified that their intention was to question, not challenge, the COE’s analysis. They will check the notes and get back to the facilitation team if a further change to the notes is desired.

Hanford Reach Update

Russell Langshaw, Grant County PUD, provided follow-up information from the 5/4 TMT meeting, that the causes for the exceedances on 4/26 and 5/1 were due to Wannapum testing and excess inflows. Russell reported on operations for May 9-15, which showed a weekly average of 144.5 kcfs. Inflows ranged from 125.5 kcfs to 147.4 kcfs. Exceedances occurred on 5/12 due to Priest Rapids and Wannapum inflows, and on 5/15 due to operator error – this prompted the PUD to develop operating protocols for the operation. The minimum weekend flows will be in effect through the upcoming weekend, using a Mon-Thursday average. End of emergence occurred last week. The PUD will operate to stay within the band constraints (but no daily minimum) until 400 temperature units are reached.

Q Adjust/ESP:

The Q Adjust and HYSSR ESP were updated based on the May final water supply forecast.

Q Adjust: Julie Ammann, COE, highlighted changes from the last model run, which included: Priest Rapids meets 135 kcfs flows through May, then 130 kcfs in June; Grand Coulee fills to 1288’; and Dworshak goes to minimum flows May 19-31.

ESP HYSSR: The ESP model included observed precipitation and runoff through May 17. Lower Granite, Grand Coulee and The Dalles showed higher volumes than the official water supply forecast. Libby showed lower, Dworshak showed higher, and Hungry Horse showed lower volumes than predicted with the water supply forecast. Grand Coulee met 1288’ refill in over ½ of the years modeled, and refilled to 1290’ in 1/3 of the years modeled. Priest Rapids meets 135 kcfs in May for all years, with June

showing 110-170 monthly average flows. A question was asked about why Libby showed lower refill with ESP than Q Adjust? The ESP model assumed an 800 kaf sturgeon pulse operation, but has less volume than QADJ. It was clarified that in ESP, Dworshak targets 1598' end of May elevation and remains consistently above minimum flows given the observed water supply in May so far. Q Adjust assumes a lower water supply so does go to minimum flows to meet 1598'. It was further clarified that Dworshak operations up to this point have been driven by flow augmentation, not flood control, operations. The Nez Perce representative offered that the operation has been good so far, and encouraged the COE to continue operating with both objectives (refill and providing augmentation for fish) in mind as the season continues.

Flow Augmentation Volumes

The COE provided graphs of predicted volumes at the following three projects, given the current water supply forecast and model runs discussed above:

Dworshak – The model showed that for May 16-June 30, Dworshak has 55 kaf (50% risk (or most probable), COE's prediction for most likely) volume available for augmentation. At 70% risk, the project has 180 kaf, and at 30% risk, there is no volume left. The probabilities in the graphs refer to runoff, not refill.

Libby – Including the expected sturgeon pulse operation, there is 132 kaf (50%, COE's prediction for most likely), 311 kaf (70%), or no (30%) available water for augmentation at Libby. (This graph is lower than the regression equation.)

Hungry Horse – Showed 365 kaf (50%, COE's prediction for most likely), 439 kaf (70%) or 289 kaf (30%) available water for augmentation. The BOR is operating Hungry Horse at 6 kcfs out, and will try to maintain this outflow for the rest of the season.

Dworshak Operations Update

Dworshak is currently at elevation 1592.5' and reduced outflows to 12 kcfs on Monday (5/16) afternoon. The COE expects inflows to recede over the next few days. Flows at Lower Granite reached 124 kcfs yesterday, 5/17. The salmon managers recommended that the COE operate on a progressive straight line to refill to 1600' at the end of June, as a top priority, and with the objective of providing flows for fish now. The COE responded that this recommended operation may not get Dworshak to full if June flows drop significantly. Nez Perce offered that with the recent rain events, Lower Granite has sufficient flows, so recommended the COE reduce the risk of refill by adding more water in May. The salmon managers agreed that the operation should continue to be monitored and the risk of refill assessed as the season continues. After further discussion, the group agreed to the following:

ACTION: The COE will refill Dworshak by ~2-2.5' per week in May, then about 1-1.5' in June. If Lower Granite flows remain high (100 kcfs), add additional water to Dworshak refill in May. To support the priorities, outflows will reduce to 10 kcfs in the next week. The COE will send an email to TMT specifying the operation over the next two weeks. There will be a check-in on Dworshak operations at the 6/1 TMT meeting.

Update: The COE sent the following email to TMT on 5/18: *As discussed today at TMT, the Corps has made an analysis and determined this operation for Dworshak:*

May 19 12,000 cfs until the evening, then reduce to full load (about 9500 cfs)

May 20 - May 27 continue at this level. Expect to fill about 3' during the week.

Evening of May 27 reduce to about 7300 cfs (1 big and 1 small unit). Continue through May 31

Evening of May 31 reduce to about 5100 cfs (the big unit).

We are attempting to fill more this week (about 3') and about 1' the following week as Lower Granite flows are forecasted to be higher this week.

Priest Rapids Operation Update

The action agencies will target 135 kcfs weekly average flows through May at Priest Rapids; this is a Monday-Sunday operation.

Libby SOR 2005-FWS-1

The USFWS presented an SOR based on the May final volume runoff forecast of 5.189 MAF, which suggests a tier 2 sturgeon pulse operation. More detailed specifications can be found in the SOR, which overall requests operating Libby at 15 kcfs on 5/19, ramping up to 25 kcfs by 5/23, ramping down from 5/28 to 5/30, ramping back up on 5/31, and back down to 15 kcfs and holding from 6/2-6/14 to utilize the minimum tiered volume of 800 kaf. The request was intended to support USGS modeling and female sturgeon collection.

The COE responded that the operation at this point looks feasible to implement while still meeting other system operation objectives.

ACTION: In order to operate to 15 kcfs on 5/19, the COE noted that they would need to exceed ramp rates set out in the USFWS 2000 BiOp; Bob Hallock, USFWS, responded that this exceedance was acceptable. Also, for safety purposes, the COE recommended ramping to 9 kcfs at 5:00 pm today (5/18) and the additional 6 kcfs tomorrow at 6 am to reach 15 kcfs. This also was acceptable to the USFWS. BPA requested that the ramp-down operations occur at night, to which the USFWS responded was not a biologically feasible operation. The COE will proceed with the operation as requested, with the slight change noted above of a two-step ramp to 15 kcfs by 5/19. There will be a check-in on Libby operations at the 6/1 TMT meeting.

Spill at the Dalles: SOR 2005-12

The salmon managers requested that the action agencies provide 40% daytime spill at John Day for the next week in order to adjust for limited spill at The Dalles due to restricted spill gate operations. In essence, the salmon managers requested a 1:1 spill swap at the two projects to benefit high numbers of migrating juvenile steelhead and chinook.

The COE responded that, given earlier discussions about the anticipated limits at The Dalles this year and no previously discussed expectation of a spill exchange, more information was needed about the biological impacts/benefits to fish that would result from the requested operation. The salmon managers said that since there is additional water in the system, chinook and steelhead could benefit from additional daytime spill at John Day. NMFS noted that this operation could be seen as an opportunity to support survival. The COE did not feel this was a technical issue, but a policy discussion was needed about an adjustment and whether the BiOp specifically addresses offset operations such as the one requested in SOR 2005-12. Other TMT members felt the issue was technical, and that it should be resolved, if possible, through the TMT.

ACTION: The COE and NOAA agreed to further discuss the SOR and biological benefits to the requested operation. If necessary, an IT call would be scheduled for tomorrow, 5/19, to further discuss the issue.

UPDATE: TMT Follow-Up Conference Call 5/19

The TMT held a conference call on Thursday, May 19. More detailed notes of the full discussion can be found attached to the 5/19 meeting on the TMT web page. The following is the resulting action that came out of that discussion:

ACTION: Beginning Saturday morning, 5/21, operators will try to reach the objective in the SOR of spill at John Day to 40% daytime, through the weekend. The action agencies will check in on Monday, 5/23, and decide how to proceed with the rest of the 7-day period, given TDG, fish run timing and other monitoring data that becomes available. Cindy Henriksen, COE, will email a notification to TMT about any changes to the operation that are made, and anyone that so desires can request a TMT call.

Operations Review

Reservoirs – Libby is at elevation 2433’ and releasing 4 kcfs. Grand Coulee is at 1250.5’. Hungry Horse is at 3550.5’, with 16 kcfs in and releasing 6 kcfs. Dworshak is 8’ from full. Priest Rapids will continue targeting 135 kcfs this week. Lower Granite exceeded 85 kcfs last week, peaking at 124 kcfs, and is expected to recede in the next week. McNary exceeded 220 kcfs last week. It was noted that upper Snake River flow has improved, and there will be water available for the Payette and other BOR projects. Tony Norris will update TMT on this at the 6/1 meeting.

Fish – Ron Boyce, Oregon, reported that yearling chinook numbers peaked last week; numbers are still strong at Little Goose and downstream. Similarly, steelhead peaked last week. The timing of increased flows was very good for migrating fish this year.

Power system – The CGS is still refueling.

Water quality —There have been TDG exceedances at Lower Monumental and Ice Harbor tailwaters due to higher flows/involuntary spill. Cascade Island is being used to manage spill at Bonneville, and has been slightly above 120% TDG. Albeni Falls has

been spilling 19.5 kcfs and is exceeding the 110% standard, even with spill being spread through all bays.

Spring/Summer Update

There have been some minor updates to the WMP Spring/Summer update, including using the April final water supply forecast consistently throughout the document, and some other minor clarifications. The final is posted on the TMT web page.

Next Meeting, Wednesday, June 1, 9am-noon

Agenda Items include:

- Review of Notes
- Hanford Reach
- Dworshak Operations Update
- Priest Rapids Operations Update
- Libby Operations Update
- John Day Spill Update
- Operations Review
 - BOR projects and available water

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. Hanford Reach Update.

Russell Langshaw said that, at the last TMT meeting, he had agreed to provide an explanation of the flow band exceedences that occurred in late April and early May. He said that the April 26 exceedence was due to the Wanapum testing, which required Grant PUD to release more water from Priest Rapids. The May 1 exceedence was caused by the fact that more water was coming down the system than could be held at Priest Rapids.

Moving on to Hanford Reach fish protection operations, Langshaw said that, for the week ending May 15, average Priest Rapids discharge was 144.5 Kcfs; the band constraint ranged between 40 and 60 Kcfs. The bands were exceeded on May 12 (by 11.9 Kcfs) and May 15 (by 8.6 Kcfs). The reason for the May 12 exceedence was that Priest Rapids and Wanapum reservoirs were full, and inflows exceeded capacity; the reason for the May 15 exceedence was operator error. Weekend protection flows will end on May 23, said Langshaw. He said he will provide a further update at the next TMT meeting.

3. Recent QADJUST Runs.

We have been updating the QADJ runs and ESP/HYSSR runs to reflect the May final water supply forecast, said Henriksen. Julie Ammann reminded the group that the QADJ run shapes the available “cup” of water 69 different ways, based on the historic record. According to the most recent run, Priest Rapids meets its 135 Kcfs flow objective in May in 63 of the 69 years; it meets a June flow of 130 Kcfs in 59 of the 69 years. The May and June flow objectives at Lower Granite and McNary will almost certainly not be met. With respect to refill probability, Libby, Hungry Horse, Dworshak and Grand Coulee are almost certain to refill by June 30 (Grand Coulee to 1289.6). The QADJUST run also includes the following table of period average outflows:

	Observed APR 16- 30	May	June	July	AUG 1-15	AUG 16- 31
Libby	4	11.1	14.2	20.2	18.8	16.1
HGH	7.2	4.9	5.8	5.8	5.4	4.2
GCL	82	123	118	120	104	99
PRD	95	140	140	131	110	103
DWR	5.4	8.1	4.3	10	10	9
BRN	12	13	12	9	9	9
LWG	45	66	57	32	25	23
MCN	147	201	188	156	132	124
TDA	143	200	180	152	130	123
BON	153	202	181	154	132	125

Moving on to the most recent ESP/HYSSR run, Ammann explained that this represents the current starting conditions, plus historical weather patterns from the 44-year historic record. This forecast is somewhat more pessimistic than the QADJ results, said Ammann. According to this model, Priest Rapids will meet its May and June flow of 135 and 130 Kcfs, respectively, in 44 and 20 of the historic years, respectively. The ESP run also shows that Libby would refill in only 27 of the 44 historic scenarios, but Hungry Horse, Dworshak and Grand Coulee are more certain to refill by June 30 (Grand Coulee to 1288.8). The ESP/HYSSR run includes the following table of projected period average outflows:

	Observed APR 16- 30	May	June	July	AUG 1-15	AUG 16- 31
Libby	4	11	13	16.3	16.8	15.8
HGH	7.2	4.5	3.3	5.2	5.5	4.4
GCL	82	117	116	120	110	105
PRD	95	135	129	126	113	108
DWR	5.4	10.6	5.5	10.1	10.1	10.3
BRN	12	18	11	8	11	12
LWG	45	84	59	32	29	29
MCN	147	231	192	161	145	140
TDA	143	235	186	159	145	141
BON	153	238	189	161	147	143

In response to a question from Dave Statler, Ammann said that, if Dworshak inflows are lower than the historic average, Dworshak may have to go to minimum outflow for a couple of weeks in late May. In response to another question, Henriksen said the releases to date from Dworshak have been primarily driven by a desire to augment flow in the Lower Snake, not by precipitation events. We've been lucky so far, said Statler – it may be time to re-examine that operational priority in order to avoid having to go to minimum outflow at Dworshak to ensure refill. It's a balancing act every year, he said, but if we can manage that project so that it refills without having to go to minimum outflow, that would be helpful. And we will discuss Dworshak operations in more detail later in today's agenda, said Silverberg.

Litchfield asked about the discrepancy between the Libby runoff forecasts in the QADJ and ESP runs. Ammann replied that she doesn't have a good answer for that question, but said it has to do with the different assumptions used by the Corps and the National Weather Service.

4. Flow Augmentation Volumes at Headwater Reservoirs.

Henriksen said that, at Dworshak, according to the water supply forecast developed using a regression equation, and the 50% probable forecast, only 55 kaf of available flow augmentation volume remains above minimum flow.

The group discussed the implications of this information. Russ Kiefer noted that, as the action agencies have repeatedly observed, the salmon managers are not reservoir operators; what the salmon managers need is the

action agencies' best estimate of how much flow augmentation volume is available. Henriksen replied that this range – from -69 kaf assuming 70% probable forecast of Dworshak inflow to 55 kaf assuming 50% probable inflow forecast to 160 kaf assuming 30% probable inflow forecast refill – is the best estimate available at this time. It sounds, then, as though there is a real possibility – 30-50% – that Dworshak will not refill in 2005, observed Litchfield. That's correct, Tony Norris replied.

Henriksen said that, at Libby, assuming a 50% probable inflow forecast, the current forecast shows 132 kaf of available flow augmentation volume. If 70% probable inflow forecast is assumed, there is a slight deficit; assuming 30% probable inflow forecast, 311 kaf would be available for refill. She added that this forecast assumes an 800 kaf sturgeon "pulse."

At Hungry Horse, assuming a 50% probable inflow forecast, 365 kaf would be available for flow augmentation; assuming 70% probable inflow forecast, 289 kaf; assuming 30% probable inflow forecast, 439 kaf. Norris noted that, given the current 6 Kcfs discharge from Hungry Horse, some of the available flow augmentation volume is already heading down the hill.

5. Dworshak Operations Update.

Henriksen said that, as of midnight last night, Dworshak was at 1592.5 feet. Dworshak had been releasing 15 Kcfs; that was reduced to 12 Kcfs on Monday afternoon. Warm, dry weather is expected through the weekend, so Dworshak inflows are already beginning to recede – from 12 Kcfs yesterday to 10 Kcfs today, at Canyon Ranger Station. Actual inflow to the project yesterday was 18.6 Kcfs, but it is dropping as well. The volume remaining to fill at Dworshak is about 140 kaf. Yesterday's outflow at Lower Granite was 124 Kcfs; the average for the past week was in excess of 85 Kcfs. Since last Wednesday, there has been rain in the area, which has helped increase Lower Granite outflow.

We need to decide what to do at Lower Granite after today, Henriksen said. After a brief caucus break, Wills said the salmon managers would like to see a progressive straight-line refill to the end of June at Dworshak, based on actual inflows and the water supply forecast. Our preference is not to reach 1598 by the end of May, because that would not be a straight-line refill, he said. We're seven and a half feet from full now, said Kiefer; we would like to see the action agencies refill Dworshak in a straight line, to the best of their ability. That gives us more water in the river now, while inflows are higher, said Wills; what we're trying to avoid is filling the project too soon.

That means a fill of approximately 1 foot per week, Henriksen observed. We are willing to try to manage outflows such that, across the week, we'll have a relatively steady outflow, she said. Ammann noted that June inflows at Dworshak are generally significantly lower than May inflows; if we're four feet from full by

May 31, we may not be able to refill the project, she said. Again, we understand that there may be bumps in the road to straight-line refill, Wills said; to the extent that you can avoid having to go to minimum outflow, that would be preferable. Ammann added that, according to the ESP runs, Dworshak inflow may drop below 2 Kcfs by the end of June, so at that point, it may not even be possible to release minimum outflow without drafting the project. We understand, said Wills – it sounds as though, mechanically, it may be necessary to fill more during May in order to assure refill. I think we'll want to be pretty close to full – within a foot or so – by mid-June, said Ammann.

Given that desire on the part of the salmon managers, we will evaluate Dworshak outflow as inflows begin to recede, and adjust outflow as needed to refill by about 1.5 feet per week through the end of May, and about 1 foot per week in June, Henriksen said. Statler said his preference would be for the Corps to go to full powerhouse discharge now, in order to store more water during May. Kyle Martin added that more precipitation is expected in Idaho over the next week; as long as Mother Nature is cooperating, he said, we should take advantage of increased inflows and fill Dworshak more quickly. Boyce said he would prefer to let the Corps decide how best to refill Dworshak; we will obviously be monitoring the inflow situation, he said, and will revisit the Dworshak operation as needed.

And how will a target fill of 1.5-2 feet per week during May affect Dworshak outflow? John Palensky asked. It will probably be necessary to reduce Dworshak inflow from 12 Kcfs to 10 Kcfs between now and next Wednesday, Henriksen replied; next Wednesday, it may be necessary to reduce outflow further, to 6.5-7.5 Kcfs. Henriksen said she will keep the TMT apprized of the Dworshak operation via email. As long as Lower Granite flows continue to be 100 Kcfs or higher, I don't see any problem with filling Dworshak two feet this week, added Margaret Filardo.

6. Priest Rapids Operations Update.

It was agreed to maintain a week-average flow of 135 Kcfs at Priest Rapids, probably through the end of May.

7. Libby SOR.

On May 13, the action agencies received SOR 2005 FWS-1. This SOR, from the US Fish and Wildlife Service, requests the following specific operations:

- On Thursday, May 19, beginning at 6 am, increase flow from Libby Dam to 15 Kcfs
- On Saturday, May 21, beginning at 6 am, increase Libby outflow to 20 Kcfs
- On Monday, May 25, beginning at 6 am, increase Libby outflow to 25 Kcfs.

- On Saturday, May 28, beginning at 6 am, reduce Libby outflow to 20 Kcfs
- On Sunday, May 29, beginning at 6 am, reduce Libby outflow to 15 Kcfs
- On Tuesday, May 31, beginning at 6 am, increase Libby outflow to 20 Kcfs
- On Thursday, June 2, beginning at 6 am, reduce Libby outflow to 15 Kcfs
- Maintain 15 Kcfs outflow until the 800 kaf sturgeon volume is exhausted, probably on June 14.

Wills provided an overview of the contents at this SOR, the full text of which is available via hot-link from today's agenda on the TMT homepage. Henriksen said that, in order to achieve 15 Kcfs outflow by 6 am tomorrow, it will be necessary to exceed the BiOp ramp rates. That's OK, said Bob Hallock – the ramp-down rate is more important than the ramp-up rate. I would suggest that we do this in two steps, in order to keep tailwater conditions safe, said Henriksen – would it be all right if we go to 9 Kcfs outflow by 5 pm (Mountain time) today, then increase to 15 Kcfs tomorrow morning? That would be acceptable, said Hallock. Ultimately, the action agencies agreed to implement the SOR as requested, with the minor modifications agreed to at today's meeting.

8. Spill at The Dalles.

On May 17, the action agencies received SOR 2005-12. This SOR, supported by USFWS, IDFG, ODFW, WDFW, NMFS, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC, requests the following specific operations in compensation for decreased spill volumes at The Dalles:

- Provide compensation for the spill that is not occurring at The Dalles Dam due to restricted spill gate operations
- The compensation should be in the form of a spill volume equal to what would have been provided if The Dalles Dam were fully operational
- Spill is to be implemented as daytime spill at John Day Dam as 40% of instantaneous flow for the next seven days.

Wills provided an overview of this SOR, the full text of which is available via hot-link from today's agenda on the TMT homepage.

We looked at this SOR, and it raised a lot of questions for us, said Henriksen. You're aware that we discovered, last year, that we would not be able to use all of the spill gates at The Dalles in 2005. We explained to the TMT that we would do the best we could to come as close as possible to 40% spill. Flows have been higher than anticipated in recent days at The Dalles, which has limited our ability to spill 40% of total river flow. However, as we stated previously, our intent was to do the best we could – we did not anticipate providing compensatory spill if we were unable to achieve 40% exactly.

Wills replied that, when the initial discussions of the gate hoist problems at The Dalles took place, the water supply forecast was much pessimistic – at that

time, it appeared that the action agencies would be able to come much closer to the 40% level than they have. We now have more water than was anticipated at that time, he said; this SOR is simply our attempt to take advantage of changing conditions to improve fish passage for in-river migrants. Kiefer added that he had spoken to Gary Fredricks of NMFS, who indicated that 40% spill at The Dalles is the minimum necessary to provide acceptable passage at that project. We appreciate the problems the Corps is dealing with, with the gate hoists, he said; still, we would like to see increased spill at John Day to compensate for the worsened conditions at The Dalles.

It is fortunate that we're having more flow than we anticipated, said Henriksen, but we're not prepared to provide compensation for a situation we discussed before the passage season began. John Palensky replied that, in his view, rather than "compensation," this request is simply an opportunity to provide better passage conditions for fish, given higher-than-expected precipitation. In response to a question from Jim Litchfield, Wills said the intent of this SOR is to provide a 1:1 spill volume ratio – in other words, we are asking the action agencies to spill the equivalent of whatever volume below 40% has been provided at The Dalles so far in 2005, he said.

In trying to meet our overall performance standards for the system as a whole, said Henriksen, I haven't really heard how this may or may not affect our overall system performance. There is not much in this SOR that outlines why this operation is a biological advantage to fish. I must confess that the word "compensation" is troubling; frankly, this doesn't feel like something we would normally make a decision on at TMT. It goes beyond the operations required under the UPA. It is more a policy call, which should probably be elevated to the IT, she said. Palensky agreed that that would be an appropriate action. Wills said the salmon managers had struggled with the word "compensation" as well; the intent was more to take advantage of changing forecasts and river conditions.

Kiefer observed that, in his mind, the spill requested at John Day falls into exactly the same category as the spill that has occurred at the Snake River projects due to overloading of the barge loading facilities. The intent of the UPA and BiOp is to mitigate the impacts of the hydrosystem on fish, he said. At The Dalles, fish passage is being negatively impacted due to a mechanical problem. The UPA anticipates that a certain percentage of the in-river migrants will pass The Dalles via spill, and a certain percentage will pass via the powerhouse. Because of the gate hoist problem, a greater-than-anticipated percentage is passing The Dalles via the powerhouse, and that is a problem for which the action agencies should provide compensation, Kiefer said.

It was agreed that the whole TMT, rather than an individual agency, will elevate this issue to IT for discussion tomorrow. It was further agreed that Silverberg will work with Henriksen, Norris and Kiefer to craft the exact question for IT discussion.

9. Operations Review.

Henriksen said Libby is filling quickly, with 40 Kcfs inflow yesterday. The current elevation is 2433, 36 feet from full. The sturgeon operation will begin this afternoon. Norris said Grand Coulee is at 1258.5, with 160 Kcfs inflow. Hungry Horse is at 3550.5, 9.5 feet from full, with 6 Kcfs outflow. Henriksen said Dworshak is 7.5 feet from full, and will be filling 1.5-2 feet per week through the end of May. At Priest Rapids, the flow target will be 135 Kcfs next week. At Lower Granite, the current flow of 126 Kcfs is expected to begin receding soon. McNary's week-average flow was in excess of 220 Kcfs last week.

Norris noted that the Upper Snake flow augmentation situation is improving; it now appears that the Payette system will fill this year, which should mean a significant improvement over his previous estimate of available volume.

Moving on to fish, Boyce said yearling chinook indices have declined sharply over the past week at Lower Granite – from 591,000 on May 7 to about 12,000 yesterday. Passage indices continue to be high at McNary and Bonneville. With respect to steelhead, Boyce said the indices peaked at Lower Granite last week and have now declined to about 85,000 per day. Steelhead numbers continue to be strong at the Lower Columbia projects.

Nic Lane said the Columbia Generating Station is still refueling, power prices are low because flows are high.

Jim Adams reported that a number of TDG exceedences have occurred over the past week. He said the Cascade Island fixed monitoring site is being used to set spill volumes at Bonneville. Inadvertent spill is occurring at Albeni Falls Dam, producing TDG levels in excess of 120%.

10. Final Spring/Summer Update.

Henriksen said the spring/summer update has been updated to reflect the April final water supply forecast. The updated final version of this document is available via the TMT homepage. In response to a question, Henriksen said comments are still being accepted on the update.

11. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, June 1.

**TMT Participant List
May 18, 2005**

Name	Affiliation
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Cindy Henriksen	COE
Ray Gonzales	COE
Davis Wills	USFWS
Tony Norris	USBR
Nic Lane	BPA
Ron Boyce	ODFW
Russ Kiefer	IDFG
Jim Litchfield	Montana
John Palensky	NMFS
Lee Corum	PNUCC
Margaret Filardo	FPC
Cathy Hlebechuk	COE
Julie Ammann	COE
Kyle Martin	CRITFC
Ruth Burris	PGE
Russ George	WMCI
Robin Harkless	Facilitation Team
Tim Heizenrater	PPM
Tom Le	PSE
Mike Buchko	Powerex
Sue Ireland	Spokane Tribes
Rudd Turner	COE
Russell Langshaw	GPUD
Dave Statler	NPT
Jim Adams	COE
Dan Spear	BPA
Dave Benner	FPC
Tom Haymaker	PNGC

Bob Hallock	USFWS
Donna Silverberg	Facilitation Team

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Thursday May 19, 2005 1500 - 1530 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 203-669-7393

Passcode is: 427746

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cmmv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. [SOR 2005-12](#)
3. [The Dalles Issue Paper](#)

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

From: NMFS
To: Technical Management Team
Subject: Dalles Spill (revised)
Date: May 20, 2005

Problem: Recently, the spill levels at The Dalles Dam have not been meeting the required BIOP 40% level due to spill gate limitations at the project. It is recognized that maintaining a constant 40% spillway discharge given natural flow variability and other hydrologic influences is not always possible. However, considerable variations in either direction from 40% for extended periods of time are considered detrimental to passing juvenile salmon. Overspill causes deteriorating tailrace egress conditions, exposing more spill passed juveniles to predator habitat in the islands and shallow reefs below the project. Underspill causes more fish to be routed to the powerhouse with about 60% of these passing through the turbines which have been shown to have relatively poor passage survival (~80 – 85 % range). For example, reducing spill from 40% to 30% results in an increase in turbine passage of approximately 10% of daily juvenile project passage. Two alternatives were considered to improve the survival of juvenile migrants in the lower Columbia River given the lower anticipated survival due to providing less than 40% spill at The Dalles.

Alternative 1.

Twenty-four hour spill at John Day Dam is one way to offset the effects of underspill at The Dalles Dam. The current BiOp spill program limits nighttime spill to 60% due to degrading outfall and powerhouse tailrace egress conditions. However, additional spill provided during the daytime is possible and has been considered in the past. Studies conducted at John Day in 1999, 2000 and 2002 showed that 24 hour spill with day spill in the 30% range would pass juvenile chinook salmon with high survival. The 24 hour spill condition increased chinook spill passage efficiency, decreased forebay residence time (8 to 10 hours) and slightly increased overall dam passage survival. Unfortunately, while steelhead smaller than about 200 mm (mostly wild fish) passed, larger steelhead did not respond as well to the 24 hour spill condition, with only less than 10% of the daily passage occurring during the daytime hours in 1999. Also, steelhead showed a slightly lower spillway survival during the day in 2002, possibly as a result of the lower numbers of fish encountering the same large number of predators in the tailrace. We believe that if we could get steelhead to pass during the day, their survival levels would be no different than for chinook. Based on observations at John Day, 30% day spill may be at or below the lower threshold needed to pass larger migrants like steelhead (through deep spill gates). If this is true then spill levels in the 40 to 45 % range should be sufficient and would maintain good powerhouse and bypass egress conditions and improve spillway tailrace egress conditions. Minimizing forebay delay has the potential to greatly increase survival of fish arriving at John Day Dam. Twenty-four hour spill has been shown to decrease forebay residence time at several projects including John Day, McNary, Ice Harbor, Lower Monumental and Lower Granite dams. Survival studies conducted at Ice Harbor, and Lower Monumental have shown forebay survival

improvements for fish arriving at the project with spill vs. without spill in the 5 to 15% range.

In summary, 24 hour spill at the 40% or higher level at John Day Dam has the potential to improve survival of arriving juvenile salmonid migrants by reducing forebay delay and increasing spillway passage. This survival improvement would help offset decreased survival as a result of underspill at The Dalles Dam. This offset is positive but not quantifiable given the short duration of the proposed action and the lack of any existing survival study at this project.

Alternative 2.

The alternative of increasing transportation at McNary Dam was also considered as an alternative to provide a survival benefit. The data available on spring transport at McNary Dam are preliminary. Transportation studies at McNary Dam began for spring Chinook in 2002 and for steelhead in 2003. Thus we presently have only two years of preliminary data for spring Chinook and one year of data for steelhead. Given this limited data set, the NOAA *Effects* paper had little discussion of McNary transport. Their discussion was limited to a conclusion that, "Combined with the higher survival to Bonneville Dam for fish left in the river at McNary Dam, a spring transportation program at McNary Dam likely provides only marginal benefits (at best) to Snake River stocks."

- The data currently available for spring Chinook are for juveniles which passed McNary Dam in 2002 and returned as adults after spending two years in the ocean. The transport to inriver (T/I) ratio for these fish is 0.99, indicating no benefit from transportation.
- For steelhead the data set are limited to juveniles which passed McNary Dam in 2003 and returned as adults after spending one year in the ocean. The T/I for these fish is 0.92 indicating no benefit from transportation.
- In summary, the preliminary information available does not suggest transportation from McNary Dam provides a survival benefit.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

May 19, 2005

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.

SOR 2005-12

The COE requested additional data from NMFS, and scheduled a follow-up TMT call after the 5/18 TMT meeting to further discuss the issue from a technical perspective. Specifically, how will daytime spill at John Day provide a system net-benefit from a biological perspective? Gary Fredericks, NMFS, provided a technical paper on two alternatives for providing benefits to fish given the diminished spill levels at The Dalles, including the option laid out in the SOR. What NMFS found, based on data from 1999-2002, was that providing additional daytime spill at John Day would reduce forebay travel time by 8-10 hours to The Dalles. At 30% spill, smaller fish would benefit but larger fish (e.g. hatchery steelhead) would not pass, and 40% would provide the benefit for the larger fish as well. Ice Harbor and Lower Monumental have seen the benefits of this type of operation, which resulted in 5-10% improved survival.

It was noted that TDG levels could increase downstream as a result of the proposed operation, which would require lowering spill caps. TDG at the Bonneville forebay has been around 115%, close to the cap, and this is a concern for the COE. It was also noted that spill to 40% at The Dalles is possible, but would require spilling through bays that all agreed would be biologically detrimental to the fish.

NMFS explored a second alternative, to transport the fish at McNary. However, preliminary data shows no survival benefit to doing this.

Given the discussion about the TDG risks, the salmon managers still preferred to implement the request and continue to monitor with the understanding that a reduction in spill might be necessary to maintain acceptable gas levels at Bonneville. This view was shared by Oregon, Washington, Idaho, NMFS, USFWS, Nez Perce and CRITFC. The salmon managers also acknowledged that it would be difficult to measure a biological benefit from implementing the requested operation.

The action agencies (COE, BPA and BOR) voiced strong opinion that moving forward with the operation does NOT set a precedent for the future, in terms of providing compensation or offsets. The COE agreed to move forward with the proposed operation with the following caveats: The operation would be a one-time, no more than 7-day

period, and would not violate or jeopardize other COE statutory requirements to benefit fish. BPA echoed the COE, adding that there is concern for impacts to rate payers and that it was disconcerting to implement an operation not knowing what the benefits will be. The BOR agreed with the COE and BPA.

The salmon managers shared the interest in this being a one-time only operation, and expressed much appreciation to the action agencies for their efforts to meet the request.

ACTION: Starting Saturday morning, 5/21, operators will try to reach the objective in the SOR of spill at John Day to 40% daytime, through the weekend. The action agencies will check in on Monday, 5/23, and decide how to proceed with the rest of the 7-day period, given TDG, fish run timing and other monitoring data that becomes available. Cindy Henriksen, COE, will email TMT if changes are made, and anyone that so desires can request a TMT call.

1. Greetings and Introductions.

Today's conference call was chaired by Cindy Henriksen and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Please contact Henriksen at 503/808-3945 with any questions or comments about these minutes.

2. Spill at John Day/The Dalles.

Henriksen said that, following yesterday's TMT meeting, she had requested more biological information from the salmon managers before elevating this issue to the IT. What we requested from NOAA Fisheries was a write-up of the biological advantages of an operation similar to the one recommended in SOR 2005-12, Henriksen explained. She noted that the lack of flexibility in operating the spillway at The Dalles in 2005 was an unanticipated development; now, when flows are higher, the salmon managers would like to see additional spill at John Day to provide positive benefits to offset the potential negative impacts of the reduced spill volume at The Dalles. We received that paper just a little while ago, and I have asked Corps biological personnel to review it, she said. In response to a question, Paul Wagner said he has not yet had an opportunity to send this paper to the other TMT members.

Gary Fredricks, who wrote the section of the paper covering The Dalles, provided a brief overview of its contents. We're asking for an increase in John Day daytime spill to about 40%, said Fredricks. What our studies show is that if we provide 24-hour spill at that project, we can reduce forebay residence time by about 8 hours. One of the problems with our studies in the past is that, at 30% daytime spill, we couldn't get the larger, hatchery steelhead smolts to move. We would like to see the higher spill level for a few days to test that hypothesis. We know we can get chinook smolts and smaller, wild steelhead smolts to move with this higher spill level. We will believe we will see a reduction in residence time

and a survival improvement of about 5% for all species at the higher spill level – that’s it in a nutshell, said Fredricks.

Have you considered what the impacts are going to be in terms of increased gas below John Day, and how that will result in reduced spill at the downstream projects? Henriksen asked. I don’t think 40% will cause us to approach the gas cap downstream of John Day, Fredricks replied. Henriksen said that, in the Corps view, there may be a negative impact on spill volumes at the projects downstream of John Day if that project goes to 40% spill. Laura Hamilton directed the TMT members to the “spill” tab on the TMT homepage; that will allow you to track the Bonneville forebay TDG levels, and see how spill upstream affects the TDG levels arriving at Bonneville, she said.

Is there any way to measure the biological effects of increased spill at John Day? another participant asked. No, I don’t think so, Fredricks replied. My point is that, if we increase spill at John Day, it could be that, under certain environmental conditions, we could put more gas in the river, which could impact spill volumes at the projects downstream, Hamilton said. Fredricks reiterated that, given current weather conditions, he is not overly concerned about such a possibility; besides, The Dalles tends to reset TDG levels. In response to a question, Hamilton said spill yesterday at Bonneville ranged between 75 Kcfs during the day, and 125 Kcfs at night.

It’s just like everything else we implement, said Ron Boyce – we can implement it, then monitor the situation and adjust the operation as needed. If we see abnormally high TDG levels at the downstream projects, at least we’ll know what’s causing that. In response to another comment, Wellschlager noted that it is possible to spill up to 40% of river flow at The Dalles, but only by using spill bays that are not preferred by the salmon managers – by using bays 14-18 at the south end of the project. That’s correct, said Fredricks – that would create very poor conditions for fish passage.

What else do we need to talk about? asked Silverberg. Do I understand that the Bonneville forebay is near the gas limit already, which means we couldn’t be spilling any more at The Dalles even if we wanted to? Kim Fodrea asked. Yesterday it was at the gas limit, yes, Laura Hamilton replied – that’s been true in four of the past five days, and my model run today said we’re going to exceed the gas limit tomorrow. That means we wouldn’t be able to raise the spill volume at The Dalles anyway, even if we wanted to.

Was NMFS planning to add some citations to the paper you provided, talking about the biological effects of increased spill and the effects on FPE? asked Rudd Turner. We can do that, Wagner replied. Getting back to the paper, we also looked at all other means of improving survival, including increased transport at McNary, he continued. The preliminary data does not indicate any survival benefit if we were to do so. There is also a permitting issue that may be

a problem. You're saving that, survival-wise, there is no difference between transport and 40% spill? Wellschlager asked. I'm not sure I can answer that question, Wagner replied; the data for yearling chinook from 2002 was that it was a wash. In 2003, we collected steelhead data; the data from that year indicated no benefit, and perhaps a slight detriment, from transporting steelhead.

So any improvement would accrue at John Day? asked another participant. There would be no change at The Dalles? That's correct, Wagner replied. And those benefits would be in the form of reduced forebay residence time, and increased spillway passage? Turner asked. That's correct, Fredricks replied – the fish would be redirected from the powerhouse to the spillway, and there are those who would say that was a benefit, in terms of overall system survival.

Has there been any study of the detrimental impacts of the reduction in spill at The Dalles? Lee Corum asked. The impact is in the form of decreased FPE and greater turbine passage, where mortality is higher than under spill passage, Fredricks replied. Fodrea reiterated that the Corps has said that, at this point, it would not be possible to increase spill at The Dalles because that is limited by forebay TDG levels at Bonneville. In response to a question, Hamilton said her model shows that increasing spill at John Day will increase TDG levels further in the Bonneville forebay.

Henriksen said she is still struggling to quantify the biological detriments of the operation at The Dalles and the biological benefits of the proposed operation at John Day. Wagner replied that NMFS is confident that increased spill at John Day will benefit in-river migrants, but that NMFS cannot quantify the magnitude of the biological impacts of that operation.

The group revisited the topic of the tradeoffs between providing full BiOp spill at The Dalles vs. TDG levels at the Bonneville forebay. Fredricks observed that part of the problem at the Bonneville forebay in 2005 may be due to the spill pattern the Corps has been forced to use at The Dalles this year, with bulk spill through bays 1 and 2. Hamilton did not disagree, but said that TDG levels coming down from the upstream projects may also have an impact.

Tom Lorz said that, from CRITFC's perspective, it makes sense to implement the John Day operation requested in the SOR, monitor TDG levels and back off spill if TDG levels rise to unacceptable levels. In response to a question, Henriksen said flows of 200-250 Kcfs are expected in the Lower Columbia through the weekend. There has been involuntary spill at McNary for more than a week because flows have been exceeding powerhouse capacity, added Hamilton.

The Oregon, Washington, Idaho, Fish and Wildlife Service and CRITFC representatives all said they would prefer to see the SOR implemented, with

adjustments made for gas if problems occur downstream. That puts it in the action agencies' court, said Silverberg – what's your response? Again, I was interested in hearing the biological piece of this, said Henriksen; we've heard that while there is a detriment at The Dalles and a potential benefit at John Day, it will be difficult to measure those effects. We were willing to consider the operation requested in the SOR as a potential way to benefit fish, but not in any way as compensation for 2005 operations at The Dalles. If we do implement this operation, it would be a limited, one-time agreement for the benefit of the fish, she said. So the action agencies are willing to implement the request, with the caveat that this is one time only, and for a limited time? Silverberg asked.

I think Cindy did a good job describing the limitations we would be agreeing to, said Wellschlager; Bonneville has concerns about the impacts of this operation on ratepayers. We also understand that it is difficult to quantify the biological value of this operation – we're being asked to do something unquantifiable. That said, we want to try to be supportive, and I guess we would go along with a limited spill, with the caveat that we will be monitoring conditions very carefully, and we'll talk some more if problems occur, Wellschlager said.

Tony Norris said Reclamation is also concerned about setting any sort of precedent through this operation, but that as long as the Corps and Bonneville are comfortable, Reclamation is willing to concur.

The group discussed the specifics of the operation. Fredricks observed that NMFS would prefer that this not be a do-or-die, 40% or nothing operation; if TDG problems occur, he said, I would prefer to try backing off the daytime spill volume to 30%, rather than stopping the operation altogether. We could also consider backing off nighttime spill volumes, while maintaining 40% spill during the day. After a few minutes of discussion, it was agreed that the action agencies will provide daytime spill at John Day for seven days, beginning either tomorrow or Saturday morning. We'll run the operation through the weekend, said Henriksen, and will revisit the operation on Monday, looking at closely at flow, spill and TDG conditions. Seven days of spill is the maximum we're willing to entertain, she said.

Wellschlager reported that, after conferring with BPA's schedulers, it will not be possible to begin this operation tomorrow. We can start Saturday morning, however, he said. There will be some involuntary spill at John Day tomorrow, however, he added.

It was agreed that the Corps will send out an email on Monday, informing the TMT of the status of the operation, and providing an opportunity for a conference call if the TMT feels one is needed.

Wagner, Kiefer and Wills thanked the action agencies for their willingness to accommodate this operational request. With that, today's conference call was adjourned.

**TMT Conference Call Participants
May 19, 2005**

Name	Affiliation
Cindy Henriksen	COE
Donna Silverberg	Facilitation Team
Robin Harkless	Facilitation Team
Dave Statler	NPT
Nic Lane	BPA
John Wellschlager	BPA
Kim Fodrea	BPA
Ron Boyce	ODFW
Tony Norris	USBR
David Wills	USFWS
Paul Wagner	NMFS
Liz Hamilton	
John Palensky	NMFS
Lee Corum	PNUCC
Cindy LeFleur	WDFW
Dave Benner	FPC
Richelle Beck	D. Rohr & Associates
Tom Lorz	CRITFC

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday May 25, 2005 1030 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

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*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@cnmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Amended Sturgeon Operation -
[\[System Operational Request #2005-FWS-1 Amendment - Bob Hallock\]](#) 
3. [SOR #2005-14 - Spring Spill Operations at John Day Dam](#)
4. Other
5. Set agenda for next meeting -
[\[Reference Calendar\]](#) 

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

TMT Notes
Prepared by the Corps of Engineers

May 25, 2005
10:30 – 11:30

Attendees: Dave Wills, Ron Boyce, Margaret Filardo, Dave Benner, Liz Hamilton, Tom Lorz, Jennifer Miller, Holly Critz, Greg Hoffman, Bob Hallock, Cindy Henriksen, Nic Lane, Paul Wagner, Larry Beck, Karl Kanbergs, Ray Gonzales, Julie Ammann, Rudd Turner, Tony Norris.

Sturgeon Pulse:

Dave Wills provided a summary of why the sturgeon pulse request had been modified. Weather conditions had changed the expected temperatures in the river to make them colder than expected. These colder temperatures affect the sturgeon in river and at the hatchery. The original proposal (SOR #2005-FWS-1) had the project ramping flows down from 25 kcfs to 15 kcfs (over 2 days) and then increasing back up to 20 kcfs for 2 more days. Dave explained that the originally requested reduction over the weekend to 15 kcfs would increase temperatures slightly, only to drop them again when flow was increased back up to 20 kcfs. The new proposal is to go from 25 kcfs to a flat flow of 17 to 18 kcfs this weekend to avoid the temperature fluctuations. After June 2, Libby will go to a flat flow greater than minimum bull trout flows of 7 kcfs and will be determined after discussions with NOAA Fisheries.

Cindy responded that we would need to exceed BiOp ramping rates to drop from 25 to 18 kcfs in one day, but that she and Bob Hallock had agreed to drop Libby flow from 25 to 20 kcfs at 1800 hrs, Friday, May 27 and drop to 18 kcfs at 0600 hrs, 28 May and hold that flow through 0600 hrs on June 2. After June 2, in order to draft the project to 2439 ft by the end of August, the Corps was expecting flows to be between 14 and 18 kcfs depending on the expected residual runoff. The Corps will determine what flat flow is appropriate.

(SOR #2005-14) Spring Spill Operations at John Day Dam.

Dave Wills introduced the latest SOR on John Day spill. He indicated that the current operation was not going as anticipated. He described the goal of the SOR to reshape spill at JDA to increase juvenile passage. The SOR described a minimum of 120 kcfs spill at John Day around the clock and ensure compliance with the 60% nighttime spill and 40% daytime spill. The SOR justifies a spill of greater than 120 kcfs because of potentially lower TDG levels above this threshold (high TDG "dead zone" between 85 and 120 kcfs). The SOR is requesting that these flows continue for the first few weeks of June to benefit fish. Dave would like to see a 90% passage index.

Cindy responded that the Corps and BPA implemented an operation based on the request from last week (SOR #2005-12 Amended) beginning on Friday, May 20. Due to high flows and high TDG in the river, the operation had to be modified Saturday to go to 60% at night and 0 spill during the day. John Day was unable to go to 40% spill, or even

to 30% as it was restricted by the gas cap during the day on Saturday, and since the project had been instructed not to spill less than 30%, spill was dropped to 0 for the day. Cindy sent an email out to the Salmon Managers on Monday explaining the reduction in spill. Cindy reported that spill levels were back to the 40% day and 60% night by Sunday, with gas cap limits of 145 kcfs at night and 85 kcfs during the day.

Dave Benner, Margaret Filardo and Dave Wills suggested that flows at John Day could have been adjusted better to get closer to the 40% and 60% levels from Friday through yesterday.

Cindy reminded everyone that the point of the spill operation was to move out-migrating fish through the John Day pool, and she asked Paul Wagner for an update on overall fish outmigration. Wagner provided an update on juvenile fish passage stating that yearling chinook passage on the Snake River was winding down. Paul pointed out the John Day passage numbers dropped from 50,000 when the project was not spilling during the day, to between 10,000 to 25,000 when John Day started daytime spill. Paul did not know if this was due to the run falling off or project operations. Paul noted a similar pattern for Steelhead at John Day. At McNary, the yearling chinook are tracking pretty closely with the historical runs, although 2005 maybe a week behind them. Historically fish numbers drop off dramatically at the end of May into June. Steelhead migration at McNary is shifted somewhat with the peak migration between 15 -20 May as compared to the historical peak between 07 - 15 May. At Bonneville the steelhead run appears to be shifted 2 weeks later than historical runs. Historically the run ends the first week in June. At Bonneville, yearling Chinook out migration for 2005 is tracking with historical run timing.

After Paul's report on fish, several folks (Dave, Margaret and Ron) summarized that we are still seeing a substantial number of fish in the river and concluded that extending the spill into the second week of June tied in with historical fish passage timing.

Ron Boyce expressed his opinion that adding more spill at John Day (a minimum of 120 kcfs around the clock) would help make up for the 800 kaf of missing spill at The Dalles due to the pendant operation this year. Cindy noted that the Corps is currently complying with the in-place 40% day and 60% nighttime spill operation. Cindy clarified that the operation at John Day last week and this week was not considered "make-up" spill and Dave Wills agreed that there is no accounting for lost spill taking place. Dave Wills clarified that the proposed SOR was crafted because the "minimum" operation at John Day as requested in the Biop and UPA could not be achieved

Cindy then went on to update the TMT group on a new development at The Dalles that is further affecting the Corps ability to spill 40%. The project has a dam safety issue with the stilling basin when river velocities are greater than 20 feet per second (ft/s). Last week gates 1 and 2 were open to 12', while gates 3 through 6 were open to the 8' pendant. With the higher opening at gates 1 and 2 and the high flows, The Dalles reached the 300 hr threshold with velocities greater than 20 ft/s and gates 1 and 2

needed to be lowered to 8' openings. This was scheduled to occur today, May 25 at 1300 hrs. The project will now be spilling 72 kcfs as opposed to the 80 kcfs with the higher opening.

Paul asked Cindy if any additional information on the status of the stilling basin could be gleaned from last year, like acoustic measurements to check the status of the stilling basin. Cindy replied that the Corps could send in divers again but that would require spill to be shut off for 1 day. Also, as a heads up, when river flow drops below 150 kcfs and gates 3-6 need to be dropped from 8' to 6' pendants then we will also need to stop spill for 1 day for the dive inspection.

Cindy asked for comments from NOAA Fisheries on the proposed SOR since they were not signatories to the request.

Paul stated that he wasn't clear if the new SOR would achieve the objectives. The current SOR calls for a flat flow of 120 kcfs minimum, which could result in the project spilling 50% around the clock. He also pointed out that TDG was a concern. Paul felt that the Sunday operation went well even though the project was not always at 40% during the day. Paul also pointed out that NOAA Fisheries agreed to 7 days of daytime spill at John Day and not an open-ended operation like this current SOR requests.

Nic Lane thought that the process on the previous Thursday went well and that discussions ended in a good compromise. BPA is concerned about the John Day spill operation going on indefinitely. Nic also pointed out that holding a flat flow around the clock is difficult, especially during the holiday weekend and that BPA is currently scheduling load through the weekend.

Margaret pointed out again that the Action Agencies did not achieve the goals of the 40 and 60% spill levels, per last week's SOR, except for a few hours over the past several days. Margaret feels that the 80 kcfs daytime gas cap at John Day is the limiting factor. Ron agreed that the region did not meet the objectives of getting additional spill over the weekend.

Liz Hamilton wanted to comment that it seemed inconsistent that the Action Agencies were keeping track of lost dollars relating to spill, but that they will not keep an accounting of spill for the BiOp.

Nic continued the discussion on the SOR stating that BPA would be willing to continue spill through Monday but that BPA was uncomfortable with flattening the flows. Cindy stated that with the news that The Dalles spill would need to be limited even more, and to enhance the biological benefit for fish, the Corps would work with BPA to continue the 60/40% spill levels through Monday. She added that inflows should be dropping off, which will help the Corps meet the 40% daytime spill at John Day.

Wills, Filardo and Benner reiterated their desire for the higher 120 kcfs flow.

Dave Wills commented on the Action Agencies proposed operation that spill at John Day will provide a benefit to fish. He commented that he would like to see the John Day spill continued beyond Monday, May 30 and that he would like to see the Action Agencies do a better job at meeting the 60 and 40% levels.

Nic also suggested that if flows and loads after Monday result in involuntary spill, that John Day could be moved further up the spill priority list. Paul Wagner was going to check with Gary Fredericks to see if NOAA Fisheries was OK with this proposal.

Cindy Henriksen concluded that spill will stop at John Day at the end of Monday unless there is some involuntary spill. She also said that the Corps would continue reviewing the gas caps.

Wills noted that the Salmon Managers will have their weekly discussion Tuesday and that if anything significant develops they will call the Corps.

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday June 01, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

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Please e-mail her at dsilverberg@cmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Review of Notes
3. Hanford Reach
 - [\[Priest Rapids Operations\]](#) 
4. Dworshak Operations Update
 - [\[Dworshak ESP Inflows - Daily Box-Whiskers Plot\]](#) 
 - [\[Dworshak Augmentation Volumes ESP inflows and 1 May Water Supply Forecast\]](#) 
5. Priest Rapids Operations Update
6. Libby Operations Update
 - [\[Libby ESP Inflows - Daily Box-Whiskers Plot\]](#) 
 - [\[Libby Augmentation Volumes ESP inflows and 1 May Water Supply Forecast\]](#) 
7. John Day Spill Update
 - [\[SYSTEM OPERATIONAL REQUEST: #2005-14, May 24, 2005\]](#) 
8. Operations Review
 - a. Reservoirs
 1. BOR projects and available water
 2. [\[WATER SUPPLY FORECASTS AND OBSERVED - Early Bird\]](#) 
 - b. Fish
 - c. Power System
 - d. Water Quality -
 - [\[Spill Information 2005\]](#) 
9. Other
10. Set agenda for next meeting -
 - [\[Reference Calendar\]](#) 

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

Updated May-31-2005 @12:10 RG

WATER SUPPLY FORECASTS AND OBSERVED
RFC & CORPS
CORPS OF ENGINEERS FORECAST

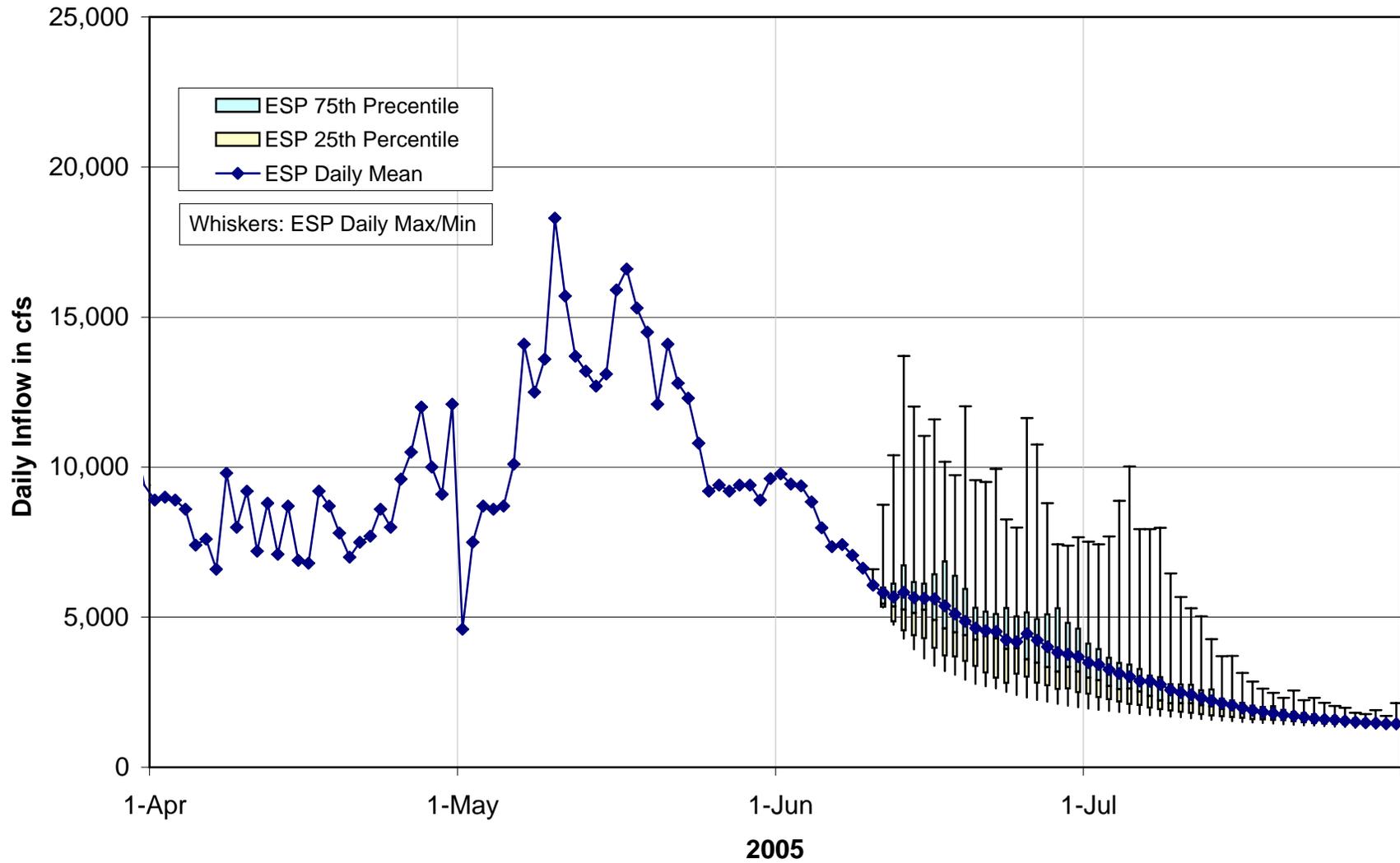
WSF MODEL RUN			GRAND COULEE #124365003				LOWER GRANITE #133436001				THE DALLES #141057001				BROWNLEE #132896002				
Date Issued	Date Effective	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal	Runoff MAF	% of Normal		
																		Jan thru Jul	Apr thru Sep
Average (1971-2000)		62.899	100.0	63.989	100.0	30.016	100.0	21.553	100.0	107.302	100.0	98.649	100.0	10.698	100.0	6.992	100.0		
1990	ACTUAL	67.60	107.5	59.30	92.7	20.20	67.3	15.10	70.1	99.80	93.0	82.90	84.0	4.97	46.5	2.85	40.8		
1991	ACTUAL	70.80	112.6	61.60	96.3	20.10	67.0	14.80	68.7	107.10	99.8	87.20	88.4	4.69	43.8	2.62	37.5		
1992	ACTUAL	46.50	73.9	38.80	60.6	14.10	47.0	8.97	41.6	70.40	65.6	53.50	54.2	3.94	36.8	1.79	25.6		
1993	ACTUAL	49.08	78.0	52.68	82.3	26.68	88.9	20.87	96.8	87.97	82.0	85.56	86.7	9.12	85.2	6.70	95.9		
1994	ACTUAL	50.87	80.9	51.88	81.1	15.89	52.9	11.34	52.6	74.97	69.9	70.77	71.7	5.17	48.4	3.25	46.5		
1995	ACTUAL	58.99	93.8	57.31	89.6	29.41	98.0	20.98	97.3	104.04	97.0	91.37	92.6	9.84	92.0	7.26	103.8		
1996	ACTUAL	78.98	125.6	75.61	118.2	42.43	141.4	28.11	130.4	139.31	129.8	116.61	118.2	14.36	134.2	9.03	129.1		
1997	ACTUAL	88.17	140.2	88.51	138.3	49.48	164.8	33.53	155.6	159.00	148.2	141.06	143.0	18.57	173.6	10.91	156.0		
1998	ACTUAL	59.01	93.8	58.74	91.8	31.29	104.2	23.67	109.8	104.05	97.0	95.02	96.3	13.59	127.0	9.98	142.7		
1999	ACTUAL	71.34	113.4	74.62	116.6	36.08	120.2	25.78	119.6	124.08	115.6	115.92	117.5	13.63	127.4	8.84	126.4		
2000	ACTUAL	61.10	97.1	61.41	96.0	24.60	81.9	17.16	79.6	98.01	91.3	89.52	90.7	8.18	76.4	5.02	71.8		
2001	ACTUAL	37.39	59.4	39.83	62.2	14.38	47.9	10.30	47.8	58.19	54.2	56.25	57.0	4.57	42.8	2.87	41.0		
2002	ACTUAL	68.02	108.1	68.23	106.6	23.99	79.9	19.02	88.2	103.75	96.7	98.09	99.4	5.58	52.1	3.77	53.9		
2003	ACTUAL	54.18	86.1	52.74	82.4	23.81	79.3	16.73	77.6	87.69	81.7	77.44	78.5	5.96	55.7	4.06	58.0		
2004	ACTUAL	50.29	79.9	54.41	85.0	20.68	68.9	15.03	69.7	82.95	77.3	80.07	81.2	5.86	54.8	3.75	53.7		
2005	Jan 07	Jan 05	FINAL	57.20	90.9	58.20	91.0	20.70	69.0	14.90	69.1	85.60	79.8	5.24	49.0	3.42	48.9		
2005	Feb 07	Feb 05	FINAL	57.20	90.9	56.70	88.6	18.00	60.0	12.70	58.9	82.40	76.8	73.30	74.3	4.55	42.5	2.87	41.0
2005	Mar 09	Mar 05	FINAL	50.50	80.3	48.70	76.1	14.60	48.6	9.96	46.2	70.70	65.9	60.60	61.4	3.52	32.9	1.93	27.6
2005	Apr 08	Apr 05	FINAL	52.20	83.0	50.40	78.8	15.70	52.3	11.10	51.5	73.80	68.8	64.60	65.5	4.21	39.4	2.41	34.5
2005	May 06	May 05	FINAL	52.20	83.0	50.40	78.8	16.50	55.0	11.80	54.7	74.70	69.6	65.60	66.5	4.47	41.8	2.70	38.6
2005	May 20	May 05	MIDDMN	53.90	85.7	52.40	81.9	18.60	62.0	14.00	65.0	80.20	74.7	71.90	72.9	5.33	49.8	3.66	52.3
2005	May 27	Jun 05	Early Bird	54.30	86.3	52.80	82.5	19.40	64.6	14.80	68.7	80.90	75.4	72.60	73.6	5.58	52.2	3.93	56.2

NOTE: WATER YEARS 1971-2000 USED TO COMPUTE PERCENT OF NORMAL - COORDINATED FORECAST BY NWS RIVER FORECAST CENTER

NWS - Statistical Regression Forecasts	
Grand Coulee	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?GCDW
Lower Granite Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LGDW
At The Dalles	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?TDAO
Brownlee Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?BRNI
Libby Dam	USARMY CORPS - Kenneth Soderlind - FINAL http://www.nwd-wc.usace.army.mil/report/libf.htm
Dworshak Dam	http://www.nwd-wc.usace.army.mil/report/dwrf.htm

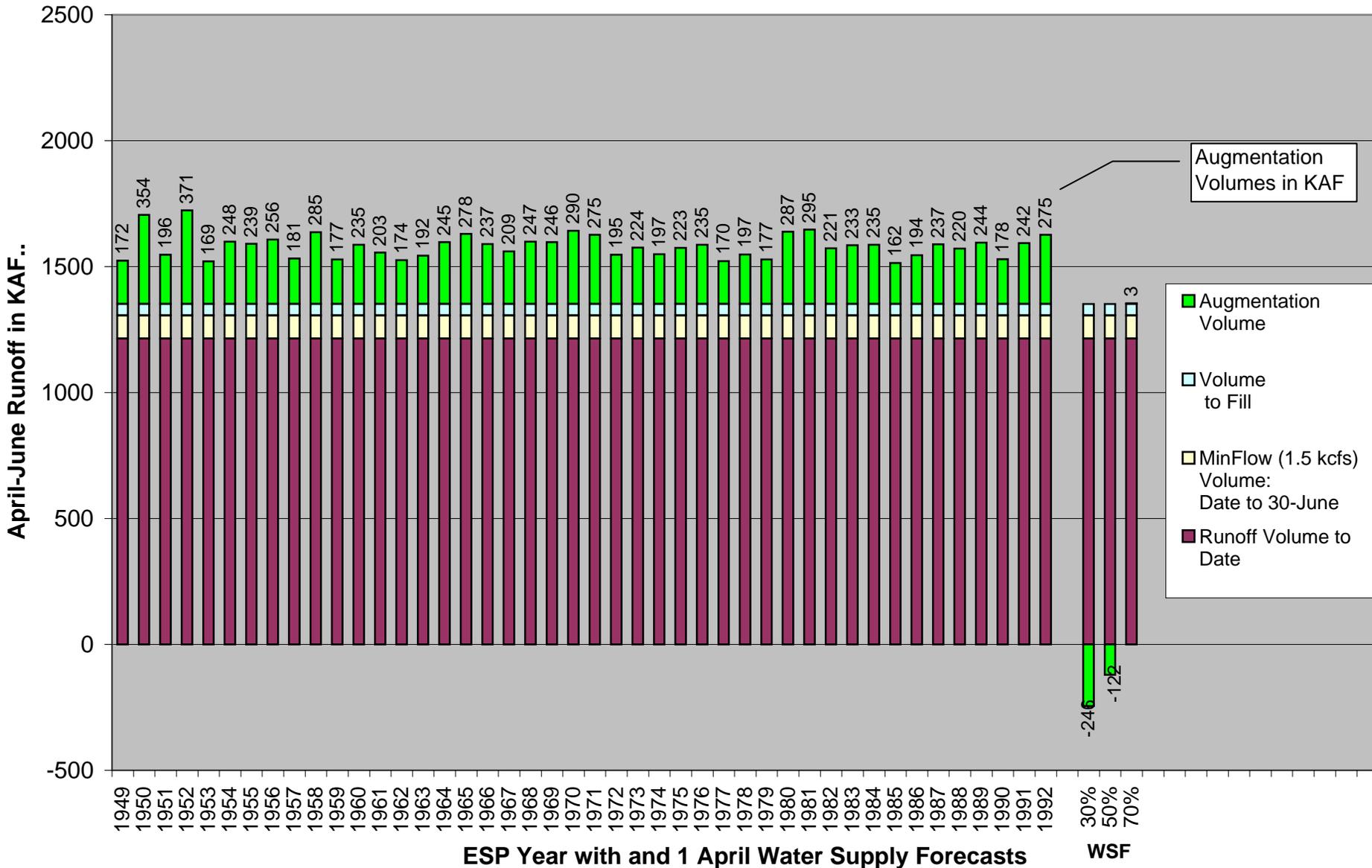
NWS - Statistical Regression Forecasts	
Dworshak Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?DWRI
Rock Island Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?RISW
Libby Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?LYDM
Hungry Horse Dam	http://137.161.65.209/wsfcs/station/wsfplot/wsfplot.cgi?HHWM
Hungry Horse use USBR FCST Information - from 2005 thru current - JA	USBR - Johnny Roache - JROACHE@pn.usbr.gov Columbia Basin Runoff Summary - Northwest River Forecast Center
ACTUAL	https://npr71.nwd-wc.usace.army.mil/rccweb/RCLIST/runoff.txt

Dworshak ESP Inflows - Daily Box-Whiskers Plot

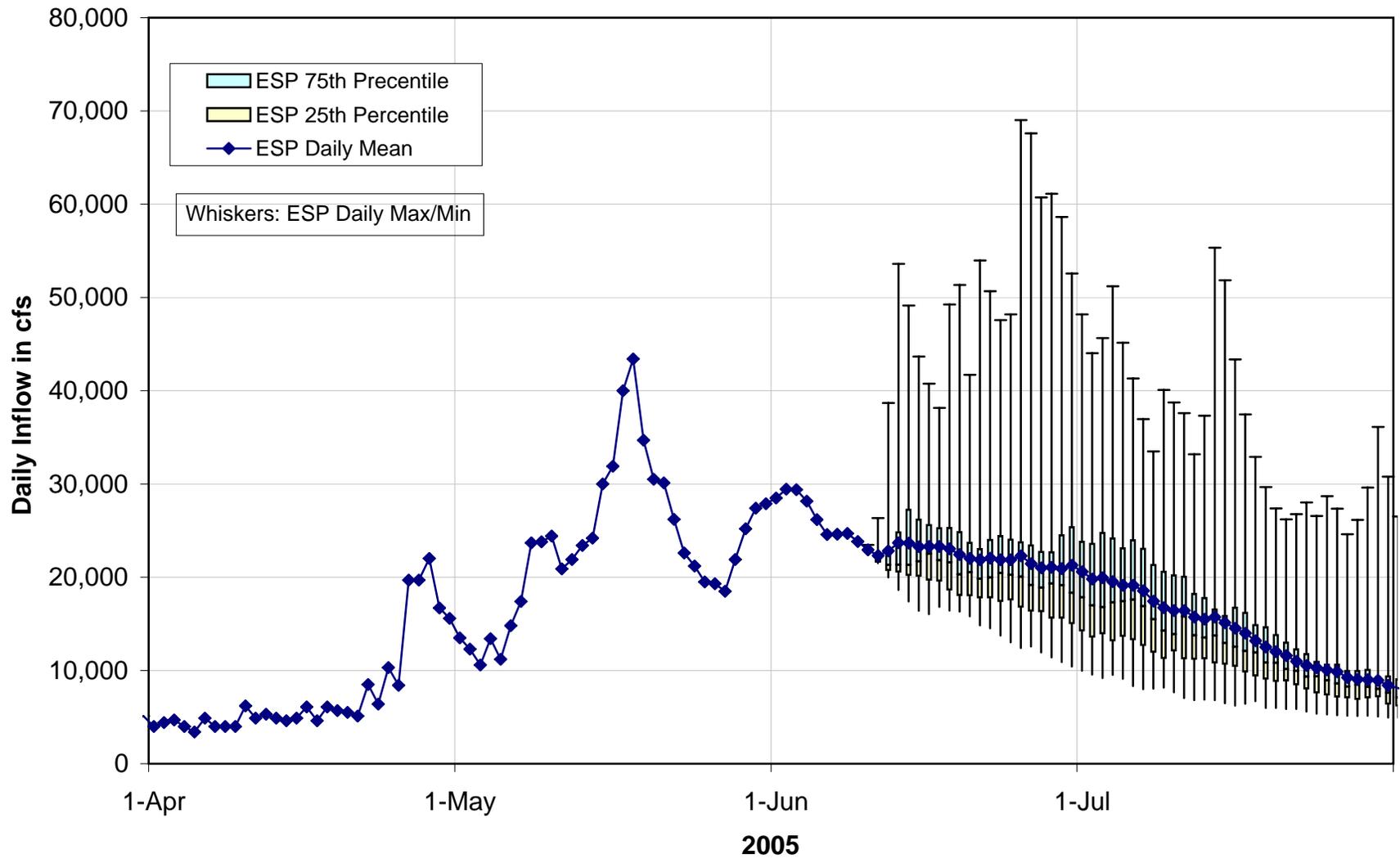


Dworshak Augmentation Volumes ESP inflows and 1 May Water Supply Forecast

Observed data through **30-May**

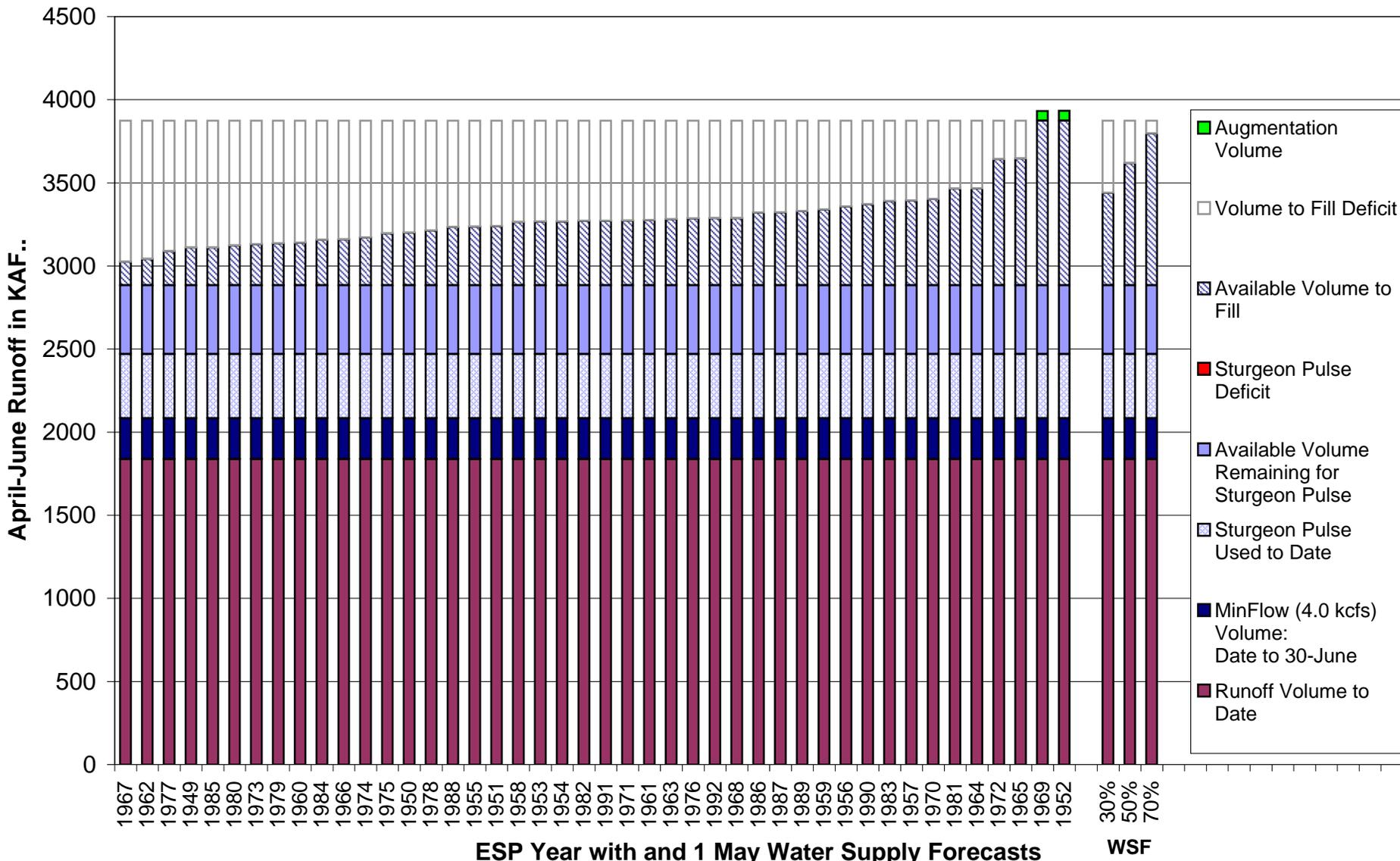


Libby ESP Inflows - Daily Box-Whiskers Plot



Libby Augmentation Volumes ESP inflows and 1 May Water Supply Forecast

Observed data through **30-May**



Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
16-May	132.2	102.5	143.5	132.8	41.0	60	Y	
17-May	126.1	103.5	139.0	128.4	35.5	40	Y	
18-May	136.0	126.2	149.3	126.9	23.1	40	Y	
19-May	141.1	123.2	146.4	131.6	23.2	40	Y	
20-May	133.5	117.9	145.5	127.5	27.6	40	Y	
21-May	124.1	118.0	127.0	102.8				
22-May	124.4	121.3	132.4	107.7	14.4	40	Y	<--End HR Agreement weekend Protection Level Flows, 2400 hours Extra weekend of PLF June 4 & 5

Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
23-May	114.4	102.5	132.7	115	30.2	40	Y	
24-May	118.1	103.6	143.8	130.9	40.2	40	Y	
25-May	141.9	126.8	162.4	136.8	35.6	40	Y	
26-May	162.3	127.4	214.5	170.5	87.1	40	N	BPA exceeded estimates by 33 kcfs
27-May	188.2	150.3	243.4	181.1	93.1	150	Y	
28-May	128.8	102.8	214.7	115.2				
29-May	96.7	87.4	113.1	85.6	127.3	30	N	BPA exceeded estimates by 33 and 28 kcfs during two consecutive days then dropped weekend flows too far for Grant to maintain operational constraints for the weekend

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 1, 2005

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

Notes: 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.

Comments on Notes

There were no comments on the notes at this time.

Hanford Reach Update

Russell Langshaw, Grant County PUD, reported on operations for weeks May 16-22 and May 23-29. No exceedances occurred during the week of May 16. While the Hanford Reach agreement ended May 23, the PUD agreed to provide additional flow after talking with NOAA. Unable to provide protection flows as requested over Memorial Day weekend, the PUD plans to provide protection flows June 4-5. BPA said they could not commit to weekend protection flows, but will do what they can. There will be an update on this at the next TMT meeting.

Dworshak Operations Update:

Cindy Henriksen, COE, reported that inflows receded over Memorial Day weekend, and the snow pack is nearly gone. Outflows are currently at 7.3 kcfs. The COE will likely ramp outflows down for the remainder of June, as was discussed at TMT the past few weeks, depending on in-flows. The reductions will occur, if needed, on Mondays and Fridays. It was noted that current volumes are up somewhat. The salmon managers agreed with the operation and suggested that if there is a great increase in flows, to put additional water on late spring migrants.

Priest Rapids Operations

The action agencies reported that they have been targeting 135 kcfs, and Priest Rapids flows averaged 138.8 kcfs last week. The target this week is 125 kcfs. Inflows to Grand Coulee appear to be dropping so the action agencies would like to reduce the flow target to 120 kcfs or lower next week (prefer 110 kcfs), to assure refill of Grand Coulee and avoid a drop at the end of June. The salmon managers shared an interest in not dropping flows significantly at the end of June, and preferred operating to 120 kcfs next week until an updated forecast and the latest model run and Grand Coulee elevation can be reviewed.

ACTION: The action agencies will begin targeting 120 kcfs at Priest Rapids on Monday, June 6. TMT will have a conference call Wednesday (June 8) morning to look

at the latest model run and use the latest information to inform operations. One question to consider with the model is: What consistent flow would ensure refill of Grand Coulee by the end of June? What scenario would ensure that flow rates do not drop below 100 kcfs at the end of June?

Libby Operations Update

The sturgeon pulse operation at Libby began on May 19 at 1500 hours. Due to colder water temperatures in the river and at the hatchery, the USFWS requested that flows drop to 18 kcfs over Memorial Day weekend and into this week. The COE agreed to meet the request. However, a drowning incident in the Kootenai River over the weekend prompted the COE to reduce flows to 11 kcfs Sunday (5/29) evening through Monday (5/30) at noon to aid in the search. The project went back up to 18 kcfs and will be held through Thursday (6/2) to allow USGS to complete their study. The COE then plans to operate the project to an outflow that can be held steady through August to target elevation 2439', likely ~14.5 kcfs. The COE expressed appreciation to the USFWS for working closely with them through the weekend on this issue. It was noted that other external issues (lightning) have caused some minor changes to the operation, and a line outage on 6/9-6/10 will cause a slight reduction in outflows.

NOAA said they share an interest in flat flows to support fish, and want to avoid spikes. They suggested increasing outflows to about 16 kcfs until the end of June to ensure Grand Coulee refill, then drop to ~12 kcfs in July/August. This could also help avoid the double peak. A concern was raised that this could reduce the likelihood of refilling Libby, and there might be less water available for summer operations. It was clarified that this would be a different shape, NOT a different volume of water.

ACTION: TMT will revisit Libby operations during a conference call on Wednesday, 6/8, and discuss the potential impacts of the different proposed options.

John Day Operations

The Dalles has been spilling at less than the 40% target, so to enhance overall fish passage, the action agencies operated John Day to spill 40% during the day and 60% nighttime beginning on 5/20 as requested by the salmon managers. The gas cap was exceeded so there was no daytime spill on 5/21. A TMT conference call was held on 5/25 to discuss the salmon managers' request to continue day time spill at John Day, suggesting flatter flows out of John Day to promote higher spill during the day. The action agencies agreed to continue the operation (60% night, 40% day spill) through 5/30. The salmon managers were encouraged by the operation, and requested that this continue as long as there is an impact at The Dalles (i.e. a volume for volume spill operation). The action agencies responded that they have completed the request to try to enhance migration during the short period when a lot of fish were passing. The action agencies clarified that they had not agreed to a volume for volume operation, and do not intend to continue daytime spill at John Day. They noted that yesterday (5/31), The Dalles spilled 39.9%, which is .01% short of the 40% target. The salmon managers added that the tail end of migration is important, and the fish would benefit from continued daytime spill at John Day.

Operations Review

Reservoirs—Tony Norris, BOR, reported that the Cascade filled, opening up BOR space and the rental pool. The BOR is expecting additional volume for flow augmentation the Upper Snake but has not yet quantified the amount. Grand Coulee is at elevation 1268.2' and inflows are dropping. Hungry Horse is at 3555', with 3.6 kcfs outflows and inflows dropping. There is less snow pack in the area than previously expected. Libby is 21' from full and filling slightly. Dworshak is at elevation 1597.8'. Priest Rapids flows averaged 132 kcfs in May and 100 kcfs in April; Lower Granite averaged 90 kcfs in May and 42 kcfs in April; and McNary averaged 230 kcfs in May and 135 kcfs in April.

Fish – Juveniles: The juvenile chinook migration is winding down; numbers in the Lower Columbia are still high. Steelhead in the Snake and Lower Columbia are still in the system, indicating a late spring migration. There was a spike in fall chinook subyearling numbers late last week at Lower Granite, indicating an early run of predominantly hatchery summer migrants.

Adults: Fishery managers are counting spring chinook through June 15 this year, with summer counts starting June 16, a change from previous years. The change was made last year to distinguish between listed and non-listed fish counts (Snake River summer and Upper Columbia spring chinook are very similar). The spring run is expected to be 95,000, still far below the forecast. Summer numbers are projected to reach 62,000.

Water quality – Exceedances occurred in the McNary forebay (119.8% on the Oregon side). Few exceedances from the John Day daytime spill operation occurred (just above 120%). A number of exceedances occurred at Lower Monumental due to high flows. Jim Adams, COE, also provided a tally sheet of gas caps at the projects.

Next Meeting, Conference call Wednesday, June 8, 10:00 am

Agenda Items include:

- Priest Rapids Flows
- Libby Flows

Next Face to Face Meeting, Wednesday, June 15, 9am-noon

Agenda items include:

- Sea lion presentation – Bob Stansell
- Hanford Reach review
- Operations Review

1. Greetings and Introductions.

Today's meeting of the Technical Management Team was chaired by Cindy Henriksen and facilitated by Donna Silverberg. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945

2. Review of Notes.

No comments on the recent TMT notes were offered at today's meeting.

3. Hanford Reach Update.

Russell Langshaw said that, for the week ending May 23, the flow band, which varied between 40 and 60 Kcfs, was not exceeded. The Hanford Reach weekend protection flows ended on May 22, although, after talking with NMFS, we decided to add another two days of weekend protection flows, on June 4 and 5, he said. And what was the reasoning for that? Henriksen asked. Logistically, and because of short notice, we just couldn't put it together for Memorial Day weekend, Langshaw replied. John Wellschlager noted that Bonneville was ready to support the Memorial Day weekend protection flows, but the Mid-Cs decided not to implement them. Langshaw replied that his understanding was that there was a disconnect between BPA's upper management and water managers. Wellschlager said that, while BPA will do what they can to provide appropriate flow levels for the coming weekend, they cannot guarantee implementation. We'll have to wait and see what happens, said Silverberg.

For the week ending May 28, the flow band (30-150 Kcfs) was exceeded on May 26 and May 28.

4. Dworshak Operations Update.

The last time we met, we discussed an operation under which Dworshak would fill slowly over May and June; the current elevation is 1597.3 feet, said Henriksen. Over Memorial Day weekend, inflows did not respond to the warm weather, which indicates that the snowpack in the basin is pretty much gone. Current Dworshak outflow is 7.3 Kcfs, she said; our expectation is that, for the remainder of June, we will slowly ramp down outflow, to bring the project up to elevation 1600 by June 30. The gradual flow decreases will likely occur on Monday and Friday, as needed, depending on what the inflows give us, Henriksen said. If we get a significant rain event in the area, we may have to increase outflow, but the snowpack is basically gone.

Looking at the Dworshak available flow augmentation volume graph, said David Wills, this is based on the May final forecast? Correct, Henriksen replied. Julie Ammann noted that the -122 kaf figure shown is likely short of reality; obviously Dworshak is not drafting at the moment, and the project is expected to fill this year. Wills said the salmon managers will generally be satisfied with a gradual refill, although Ron Boyce noted that, if opportunity arises, it would be desirable to put as much water as possible on the fish to benefit the tail end of the outmigration.

5. Priest Rapids Operations Update.

Tony Norris said that, last week, the action agencies targeted an average flow of 135 Kcfs at Priest Rapids; however, Grand Coulee inflows are now on the downward leg, and it's time to reduce the flow target at Priest Rapids. We would like to target 125 Kcfs this week and 120 Kcfs next week at Priest Rapids, he said.

Wellschlager said his preference, at this point, would be to set a target minimum flow at Priest Rapids in order to facilitate Grand Coulee refill. Grand Coulee is currently at elevation 1268.2 feet, with 20 feet yet to fill in June. Our preference would be 110 Kcfs at Priest Rapids next week, said Norris. My understanding was that we could keep Priest Rapids flow at or above 120 Kcfs through the month of June and still achieve the refill target, said Boyce. You may have inferred that from the model runs, but they're only model runs, Norris replied. At this point, we would prefer to reduce Priest Rapids flow to 110 Kcfs next week, in order to avoid a steeper drop-off in flow at the end of June.

In response to a question from Cindy LeFleur, Norris said Grand Coulee inflows are difficult to model. Adding to the difficulty is the fact that the latest forecast for that system is somewhat old. We're just going off the best available information and our experience, he said, but our feeling is that, with inflows dropping, we need to reduce Grand Coulee outflow. Boyce said he would like to avoid early refill at Grand Coulee. Norris replied that, with 20 feet yet to fill in Lake Roosevelt, this is an unlikely eventuality. We update the models every week, said Henriksen, so we'll have better information next week.

So you're willing to maintain 125 Kcfs at Priest Rapids through this Sunday? asked Rich Domingue. Correct, Wellschlager replied. I guess I would like to see a new model run, using the most current information, before we make the decision to drop flow at Priest Rapids, said Boyce. Wellschlager suggested that the action agencies target 110-120 Kcfs at Priest Rapids next week, with the understanding that, once next week's STP run is available, the TMT will meet to fine-tune this operation. It was agreed that the TMT will meet next Wednesday to discuss this operation; it was further agreed that the action agencies will target 120 Kcfs at Priest Rapids next week, at least on Monday and Tuesday, until the TMT has an opportunity to revisit the operation on Wednesday. My main concern is that I don't want to see a big drop-off in Priest Rapids flow on Monday or Tuesday, particularly given the fact that it has been raining, and we may have more water than we think, said Boyce. Understood, Wellschlager replied. And your goal is still to refill Grand Coulee to 1290 by July 4? Cathy Hlebechuk asked. Correct, Norris replied.

6. Libby Operations Update.

Henriksen reported that the 2005 sturgeon pulse began on May 19; the project maintained full powerhouse outflow from May 23 through last Friday, May 27. The plan at that point was to reduce Libby outflow to 15 Kcfs; however, due to concerns about low Libby water temperatures, the Fish and Wildlife Service asked that the Corps maintain 18 Kcfs for a few extra days. That request was granted. Over the weekend, there was a drowning incident below Dworshak, and on Sunday evening (through noon Monday), Libby outflow was reduced to 11 Kcfs to help the local sheriff's department locate the body. Those efforts were ultimately unsuccessful, and Libby outflow was again increased to 18 Kcfs, a rate of flow that will be maintained through Thursday, June 2. After that, we will need to choose a steady outflow to achieve elevation 2439 at Libby by August 31, said Henriksen. That rate of flow will likely be in the 14-15 Kcfs range.

Henriksen noted that, following a lightning strike yesterday, Libby was forced to run speed-no-load (2 Kcfs) for about 20 minutes. Also, on the morning of June 9, discharge will need to be reduced to about 12.5 Kcfs for a scheduled power line maintenance outage. The reduction will last until 2 pm on June 10; after that, outflows will once again increase to 14-15 Kcfs. Henriksen noted that, while the timing may not seem optimal, the line maintenance work in the Flathead Valley is paying significant dividends in terms of smoother Libby operations.

Domingue said that, from NMFS' perspective, it would be preferable to maintain 16 Kcfs outflow from Libby through the month of June, in order to bolster Grand Coulee inflows and ensure that the full Libby draft makes it downstream during the summer period. Henriksen replied that, even at 14 Kcfs outflow, Libby is unlikely to refill in 2005. So your preference would be to front-load the available Libby flow augmentation volume into June? Wellschlager asked. Yes, Domingue replied. I'll need to consult my colleagues at BPA before I can agree to that, said Wellschlager; I'm sure Montana will have an opinion on this as well.

7. John Day Spill Update.

Henriksen said The Dalles, as the TMT is aware, is limited this year in terms of the volume it can spill while spillbays 3 – 6 are operating with fixed openings. That spill volume has been limited to 80 Kcfs. Last week, the Lower Columbia flow exceeded 220 Kcfs, which meant that the 80 Kcfs of available spill was less than the 40% of total river flow called for in the UPA. As a result, the action agencies agreed to provide 40% daytime spill at John Day Dam, beginning May 20. On May 21, we had to reduce daytime spill at John Day to zero, because of TDG concerns downstream. Gas levels receded, and we then restored daytime spill at John Day.

Wills said that, at last Wednesday's TMT conference call, the salmon managers, after reviewing the available flow and outmigration date, requested

that spill continue at John Day, using the flattest possible flows. The Corps, BPA and the Bureau of Reclamation agreed to continue the John Day spill operation through at least May 30, with the understanding that we would revisit it today, he said.

Henriksen said the Corps had agreed to provide 40% spill during the day and 60% spill at night at John Day, through the end of the day on May 30. That operation is now over, she said. Wills said the salmon managers have reviewed this operation, and were somewhat encouraged – we feel it has had biological benefit. However, we would like to see the John Day spill operation continue, if possible, he said – as long as spill at The Dalles remains below 40% of total river flow.

Henriksen noted that the action agencies never agreed to provide a volume-for-volume recompense for the reduced spill volume at The Dalles. She noted that river flows are receding and the outmigration is on the decline. It was an unexpected blessing that flows were as high as they were, she said; however, we're now getting back to spilling 40% at The Dalles, as total river flow recedes. Yesterday, we were spilling 39.9% of total river flow at The Dalles, Laura Hamilton observed. In other words, you don't intend to re-initiate the additional spill operation at John Day? Silverberg asked. That's correct, Henriksen replied – our intention is to provide 60% spill during nighttime hours at John Day, with zero spill during the day.

We understand, said Wills, but would observe that, although the outmigration is on its downward leg, the tail of the run is as important as the beginning and middle. NMFS agrees, said Domingue. In response to a question, Henriksen said the gate opening in Bays 3-6 will soon be reduced to 6 feet. She added that, when this change occurs, there will be one day of zero spill to allow divers to inspect the spillway apron for erosion.

8. Operations Review.

Norris reported that Grand Coulee is at elevation 1262.2; Hungry Horse is at elevation 3555. Inflows are dropping at both projects; again, there was little inflow response to the recent warm weather. Libby is 21 feet from full, said Henriksen; Dworshak was at 1597.8 feet as of midnight last night. The flow at Priest Rapids averaged 132 Kcfs in May. Lower Granite's average flow was just over 92 Kcfs in May. McNary flow averaged 230 Kcfs in May. April flows were significantly lower at all of these projects, so the spring seasonal average will, as expected, be below the UPA target.

From a fish perspective, Wills said chum emergence is now complete. The minimum tailwater elevation requirement at Bonneville was lifted some weeks ago, Henriksen said. Boyce said both combined yearling chinook and steelhead indices are winding down, although the numbers are still significant at both the

lower Snake and lower Columbia projects. Subyearling Snake River fall chinook indices also increased sharply earlier this week, he said; the bottom line is that there are still a significant number of juveniles migrating downstream – there are still quite a few spring migrants, as well as unexpectedly high numbers of summer migrants.

LeFleur said the fishery managers will continue to count spring chinook through June 15, rather than June 1. On June 16, they will switch over, and begin to count summer chinook. The total spring chinook run is now estimated to be 95,000 fish; the summer chinook estimate is 62,000 fish this year. The reason for changing the management period is that we have discovered that Snake River summer chinook are more similar to spring chinook than we thought. LeFleur described some of the physiological and timing differences between listed Snake River and unlisted Upper Columbia summer chinook.

Henriksen noted that the sea lion exclusion devices (SLEDs) have now been installed at Bonneville. Wellschlager said there are no significant power system issues to report, although the Columbia Generating Station refueling is continuing. Jim Adams updated the group on recent water quality exceedences, noting that, for the majority of the additional spill period at John Day, the Corps was able to keep downstream TDG levels within the state standards. High flows and involuntary spill have, as usual for this time of years, made it challenging to maintain acceptable TDG levels.

9. Next TMT Meeting Update.

A TMT conference call was set for Wednesday, May 8. The next face-to-face meeting of the Technical Management Team was set for June 15. Meeting summary prepared by Jeff Kuechle.

TMT Participant List

June1, 2005

Name	Affiliation
Cindy Henrikson	COE
Ray Gonzales	COE
Tony Norris	USBR
Ron Boyce	ODFW
Tom Lorz	CRITFC
Donna Silverberg	Facilitation Team

John Wellschlager	BPA
Cindy LeFleur	WDFW
Russ Langshaw	Grant PUD
Brenda Andersona	BPA
Glenn Traeger	Avista
Bruce NackKay	Consultant
David Benner	FPC
Cathy Hlebechuk	COE
Tom Le	PSE
Julie Ammann	COE
Tom Haymaker	PNGC
Robin Harkless	Facilitation Team
Rudd Turner	COE
Russ George	WMCI
Ruth Burris	PGE
Laura Hamilton	COE
Jim Adams	COE
David Wills	USFWS
Mike Buchko	Powerex

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday June 08, 2005 1000 - 1200 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cmm.net or call her at (503) 248-4703.*

Agenda

1. Welcome and introductions.
2. Review of Notes
3. Priest Rapids Flow
 - [Priest Rapids - Chart](#) 
 - [Grand Coulee - Chart](#) 
4. Libby Flow
5. SOR #2005-15, June 02, 2005
 - [\[SOR: #2005-15 - Actions required at Lower Granite Dam when head differentials across VBS reach 1.5 feet.\]](#) 
 - [\[E-mail Response to SOR #2005-15 June 08-2005\]](#) 
6. Other

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

RESPONSE TO SOR #2005-15

June 08-2005

From: Henriksen, Cynthia A NWD

Sent: Tuesday, June 07, 2005 4:14 PM

To: 'Bill Tweit'; 'Bob Heinith'; 'Bruce Suzumoto'; Hlebechuk, Cathryn L NWD; 'Cindy LeFleur'; 'Dave Statler'; 'Dave Wills'; 'Donna Silverberg'; 'Greg Haller'; 'Howard Schaller'; 'Jeff Kuechle'; 'Jim Litchfield'; 'John Roache'; 'John Wellschlager'; 'Kyle Martin'; Beck, Larry M NWP; 'Lori Postlethwait'; 'Nic Lane'; 'Paul Wagner'; 'Robin Harkless'; 'Ron Boyce'; 'Russ Keifer'; 'Sharon Keifer'; 'Steve Haeseker'; 'Tony Norris'

Subject: Response to SOR#15

All:

I received this response from Dave Hurson late last Friday. Since then the project has operated at reduced loading over the weekend as suggested in Dave's response. All the project operations last week and this weekend have been within criteria per the FPP. The mortalities have reduces this week as well. We can discuss at TMT.

Cindy Henriksen

Chief, Reservoir Control Center

(503) 808-3945

From: Hurson, Dave F NWW

Sent: Friday, June 03, 2005 2:29 PM

To: Hurson, Dave F NWW; Henriksen, Cynthia A NWD; Beck, Larry M NWP; Turner, Rudd A NWD

Cc: Bailey, John C NWW

Subject: RE: SOR#15

Cindy:

The project went out and measured head differentials this morning and they are all within criteria. As far as we can see, they have remained within VBS criteria. They have had some debris and have been raking trashracks. We do have some concern on the mortality we are seeing on subyearling chinook. While it is not really high, we are taking efforts to correct it if we can. The project is operating turbine units 5 and 6 at reduced loading this afternoon as they think that end of the powerhouse has the debris problem. If this improves things, they will keep this loading in affect over the weekend and try raking trashracks again. The interesting point, is fish in the sample are not showing any descaling or other injury problems. So we are working with the state biologists at the project to figure what may be happening. Below are the VBS differential readings from this morning.

DH

Turbine Slot	VBS Diff
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Unit 1 is off

2A	1.4
2B	1.0
2C	0.8

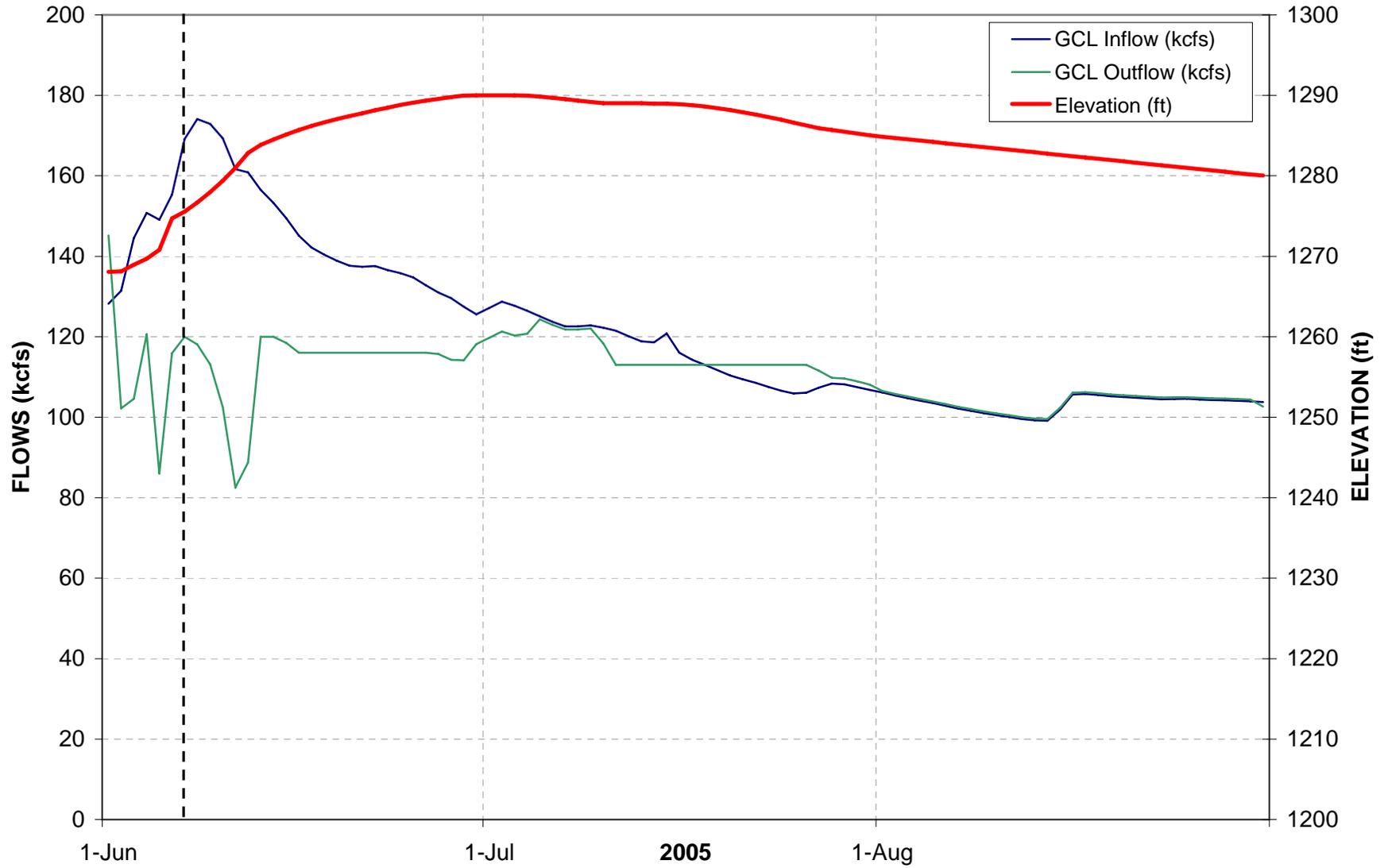
3A	1.2
3B	1.2
3C	0.9

4A	1.0
4B	1.0
4C	1.0

5A	0.8
5B	0.8
5C	0.5

6A	0.8
6B	0.9
6C	0.7

Grand Coulee



Priest Rapids



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

June 8, 2005

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.

Review of Notes

Changes were made to the June 1 facilitator notes per comments, and have been posted to the web. If anyone has additional comments on these notes or the official meeting minutes, please contact Robin Harkless or Cindy Henriksen.

Priest Rapids Flow

As follow-up from last week, Cindy Henriksen, COE, reported that the action agencies began operating Priest Rapids to target a week average flow of 120 kcfs through yesterday (6/7). Today's conference call was convened to discuss operations for the remainder of this week and next week. The most recent STP run shows higher flows in June (about 125 kcfs monthly average) than shown last week, due to precipitation in the upper basin of the Columbia. It is uncertain if and how much rain will continue in the coming weeks.

The salmon managers gave a recommendation to continue operating to a week average of 120 kcfs through next Tuesday, and to revisit operations at the June 15 TMT meeting when updated forecasts are available. The salmon managers noted that fish are still coming down through the Mid-Columbia and this proposed operation would support their passage.

The action agencies agreed to the suggested operation. BPA noted that some flexibility, about a 5 kcfs band, is needed to do the operation, which the salmon managers agreed to.

ACTION: The action agencies will operate Priest Rapids to 120 kcfs weekly average flow through Tuesday, June 14. TMT will revisit this operation at the June 15 TMT meeting.

Libby Flow

Upon completion of the sturgeon pulse operation, the COE has been operating Libby to a steady flow through August; starting June 3, the project went to 14 kcfs. With scattered precipitation and increased inflows, the COE may need to increase outflows later this week. The amount will depend on inflow and precipitation forecasts that will be available later this week. The overall interest and main objective, shared by all, is to avoid fill and spill and to maintain a flat flow. Tony Norris, BOR, noted that Hungry Horse is experiencing fill and spill, but has remained below 110% TDG. Potential transmission limitations next week (TBL work is being done) in the

basin may require the action agencies to seek a balance between Dworshak and Libby operations (e.g. reduce generation at Dworshak).

ACTION: Cindy Henriksen will send an email to TMT about operation decisions at Libby and Dworshak based on forecasts available later this week. TMT will revisit Libby operations on June 15.

SOR 2005-15

The salmon managers developed SOR 2005-15 on June 2 after debris load issues arose at Lower Granite, causing an increase in mortalities and the head differential to be higher than 1.5', which is outside the criteria laid out in the Fish Passage Plan. The salmon managers requested that the action agencies revisit and adhere to the FPP guidelines, and that operators closely monitor debris levels on the screens. The salmon managers put together the SOR because they were concerned with the mortalities and that loading was not reduced.

Cindy Henriksen reported that she gathered information from project operators, who said the head differential remained below 1.5', within the criteria in the FPP. The operators did see a slight increase in mortalities and worked immediately to reduce the problem over the weekend. The project is now back to normal.

The COE requested that, if an issue like this arises in the future, the salmon managers try to work it offline if possible. The salmon managers expressed appreciation for the COE's attention on this.

ACTION: There will be a follow-up report at the June 15 TMT meeting about the cause of the debris load issues. One suggestion was that there were a number of small fish released from the Nez Perce tribal hatchery upstream due to weather events in the area. The salmon managers will look into this and report back to TMT.

Other

There will be discussion of McNary spill/transport at the next TMT meeting. The salmon managers should come prepared to provide substantive input so a decision can be made.

Next Meeting, June 15, 9am-noon

Agenda Items include:

- Review Notes
- Libby Operations
- Priest Rapids Flow
- Follow-up on Lower Granite Debris Load Issues
- McNary Spill/Transport Operations

Technical Management Team Meeting Notes

June 8, 2005

1. Greetings and Introductions.

The June 8 Technical Management Team conference call was chaired by Cindy Henriksen and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these minutes should contact Henriksen at 503/808-3945.

2. Priest Rapids Flow.

Henriksen said this agenda item is a follow-up from last week's TMT meeting; we were trying to reach agreement on flow objectives for this week, and agreed to target 120 Kcfs through today, she said. We agreed to talk about what the flow objective should be for the remainder of this week and next week, she said. The Corps has completed a new STP run; it shows a relatively high flow, about 125 Kcfs, through the remainder of June. It looks like we'll have a little more flow than we thought through the rest of June, she said.,

Are you saying that, because of this rain event, the STP isn't accurate through the end of June? David Wills asked. The STP run is a guideline, Henriksen replied – the message is that this week's run is showing more flow than last week, but may be a little high. On a single-trace run, STP tends to overreact to current conditions, said John Wellschlager – if you're in a wet patch, it tends to skew high; if we're in a dry patch, it tends to skew low. Don't take it as gospel, Wellschlager said. Do you see the current precipitation pattern continuing? asked Paul Wagner. I see scattered showers over the next 10 days; after that, it looks like things are going to dry out, said Kyle Martin. At this time of year, it's difficult to predict uniform precipitation amounts.

We took this information and discussed it this morning, said Wills; our recommendation is to continue to target 120 Kcfs this week, and discuss the latest projections at next Wednesday's TMT meeting with the refill goal in mind. It would be our preference not to back off flows at this point, given fish numbers migrating through the system.

Bonneville doesn't see a problem doing that, but operationally, we see a 5 Kcfs flow band around that, said Wellschalger – it's not an aquarium. We assume that the same operation in place this week will continue through next Wednesday's TMT meeting, said Wills. That shouldn't be a problem, said Tony Norris. It sounds as though

continuing with the target of 120 Kcfs is not a problem for the action agencies, said Harkless.

3. Libby Flow.

We agreed to discuss Libby outflow following the end of the sturgeon operation, said Henriksen; we talked about finding a steady rate of outflow through the end of August that will bring us to the UPA elevation by August 31. We changed the outflow on June 3 to 14 Kcfs. Since then, precipitation events have caused inflows to increase to 40 Kcfs+. We're now exploring increasing the Libby outflow to 20 Kcfs, but are` waiting on new forecasts to see how much we'll need to increase flow. You're worried about filling and spilling? Jim Litchfield asked. Correct, Henriksen replied – the current Libby elevation is 2445 and filling, and we want to keep flows as flat as possible through the end of August. Montana shares that interest, said Litchfield.

We all share that sentiment, said Wills. What's your best guess on Libby outflow for this week? asked Boyce. We may be increasing to 20 Kcfs, or not, Henriksen said. We're bumping up against the same thing at Hungry Horse, added Norris. We're looking at potential generation limitations next week, such that we have to let Dworshak sag somewhat over the weekend, said Henriksen. There will be some TBL work next week from the 13th through the 17th, and if we can get through that, we'll be in good shape, said Wellschlager. Dworshak is now releasing 5.3 Kcfs currently, said Henriksen; we may reduce that next week so that Dworshak fills somewhat more quickly. We'll check in next week, said Wills; it was agreed that Henriksen will send an email describing the Libby, Hungry Horse and Dworshak operations for next week as soon as this operation becomes clear.

4. SOR 2005-15.

On June 2, the action agencies received SOR 2005-15. This SOR, supported by USFWS, IDFG, ODFW, WDFW, NMFS, the Nez Perce Tribe, the Shoshone-Bannock Tribes and CRITFC, requests the following specific operations:

- According to the Fish Passage Plan, page LWG-10, paragraph 8, “When a head differential of 1.5 feet is reached, the respective turbine unit should be operated at a reduced loading, not more than 110 MW... clean VBS as soon as possible” The salmon managers recommend that COE operate to these specifications. We also recommend that the project follow up with video monitoring of the VBS after raking trashracks to ensure that they are clear of debris.

Wills explained that this SOR was developed in response to the fact that juvenile fish facility mortality for subyearling chinook at Lower Granite was 1.1% on June 2; smolt monitoring personnel reported that the mortalities showed high levels of descaling, which is an indicator that fish are likely being injured by high levels of debris in the trash racks or vertical barrier screens.

We weren't sure if this was the best format in which to present this request, but things were happening very quickly, and we wanted to get it out in front of the TMT, said Wills. Henriksen said she had requested information from Walla Walla District, which sent data regarding the head differential (see email). They agreed to decrease Unit 5 and 6 loading, though those units were still within criteria to try to reduce mortality over the weekend. I believe that the other units also reduced load over the weekend; the screens were scrubbed, and I believe the units are now running back at full load. The units were never out of criteria, but the project voluntarily reduced load to avoid mortality. Wellschlager noted that he had heard that a hatchery upstream had been forced to release fish due to a water quality problem; numbers spiked following that release. Wills replied that he had not heard of this problem, and said that, in his view, greater coordination is needed.

Henriksen said the project had called her on Friday to let her know there was a trash problem on the VBS, even before an SOR was received. Wellschlager said he would have preferred that a coordinating telephone call occur prior to the development of an SOR. Wills said that, according to his recollection, such phone calls did occur, between the Fish Passage Center and the operators at Lower Granite. At the time of the incident, the mortality numbers were spiking, and the messages we were getting was that the project was responding by cleaning the trash racks, but did not reduce loading on the units until Friday. We wrote this SOR to remind the action agencies that the Fish Passage Plan includes specific actions that need to be taken when these situations occur. Wills said that, to the best of his knowledge, the project operators did follow the Fish Passage Plan once this situation was brought to their attention. We appreciate their willingness to work with us, he said.

Henriksen said that, in the future, she would prefer to work out such problems off-line – without an SOR. We're willing to try to correct any concerns the salmon managers have, she said, and in this case, we responded as quickly as possible to the salmon managers' concerns. Wellschlager reiterated that he

would like more information about the premature release of undersized fish, which may have exacerbated this problem; Russ Kiefer said his understanding was that it was the Nez Perce Tribal Hatchery that released fish sooner than expected. It was agreed to follow up on this issue at next week's TMT meeting.

5. Next TMT Meeting Date.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, June 15. Meeting summary prepared by Jeff Kuechle.

**TMT Participant List
June 8, 2005**

Name	Affiliation
Cindy Henriksen	COE
Jim Litchfield	Montana
John Wellschlager	BPA
Robin Harkless	Facilitation Team
Paul Wagner	NMFS
David Wills	USFWS
Ron Boyce	ODFW
Tony Norris	USBR
Larry Beck	COE
Ray Gonzales	COE
Laura Hamilton	COE
Nic Lane	BPA
Rudd Turner	COE
Dan Spear	BPA
Russ George	WMCI
Tim Heizenrater	PPM
Kyle Martin	CRITFC
Cindy LeFleur	WDFW
Kevin Nordt	Mid-Cs

Mike Buchko	Powerex
Lee Corum	PNUCC
Ruth Burris	PGE
Richelle Beck	D. Rohr & Assoc.
Glenn Traeger	Avista

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday June 15, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

*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@cmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Review of Notes -
[\[Minutes\]](#) 
3. Hanford Reach review
 - [\[Priest Rapids Operations\]](#) 
4. Priest Rapids Flows
 - [\[Priest Rapids - Chart\]](#) 
5. Sea lion presentation - Bob Stansell
[\[EVALUATION OF PINNIPED PREDATION IN THE BONNEVILLE DAM TAILRACE, 2002-2005\]](#) 
6. Summer Operations as a Result of Recent Court Ruling
7. McNary operations: Spill and Transport
[\[McNary - Chart\]](#) 
8. Dworshak Hydro and Water Temperature modeling - Kyle Martin -
[\[Modeling of Dworshak Summer 2005 Operation- June 15, 2005\]](#) 
9. Follow up to SOR 2005-15 -
[\[June 2, 2005 - #2005-15\]](#) 
10. Operations Review
 - i. Reservoirs
 - a. [\[LIB ESP HYDROGRAPHS - 6/14/2005\]](#)
 - b. [\[Dworshak Augmentation Volumes ESP inflows and 1 June Water Supply Forecast - Observed data through 13-Jun\]](#)
 - c. [\[Grand Coulee - Chart\]](#) 
 - d. [\[Lower Granite - Chart\]](#) 
 - ii. Fish
 1. Fish Migration

- 2. Fisheries Status
 - 1. Treaty
 - 2. Non-Treaty
- iii. Power System
- iv. Water Quality -
[\[Spill Information 2005\]](#) 
- 11. Set agenda for next meeting -
[\[Reference Calendar\]](#) 
- 12. Other

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

EVALUATION OF PINNIPED PREDATION IN THE BONNEVILLE DAM TAILRACE, 2002-2005



US Army Corps
of Engineers®
Portland District

Fisheries Field Unit



National Marine
Fisheries Service



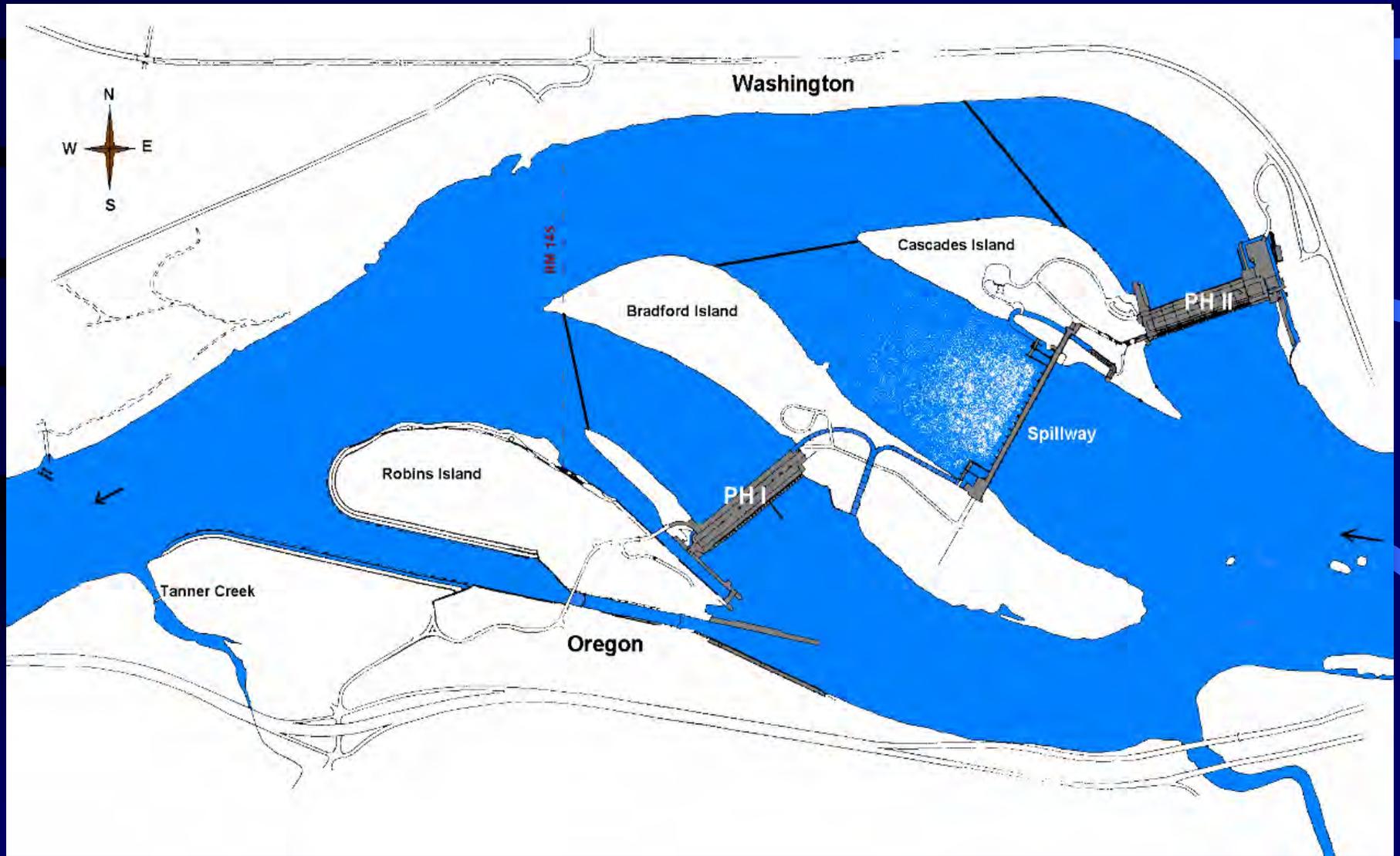
University of Idaho



Bonneville Dam, 144 Miles up the Columbia River



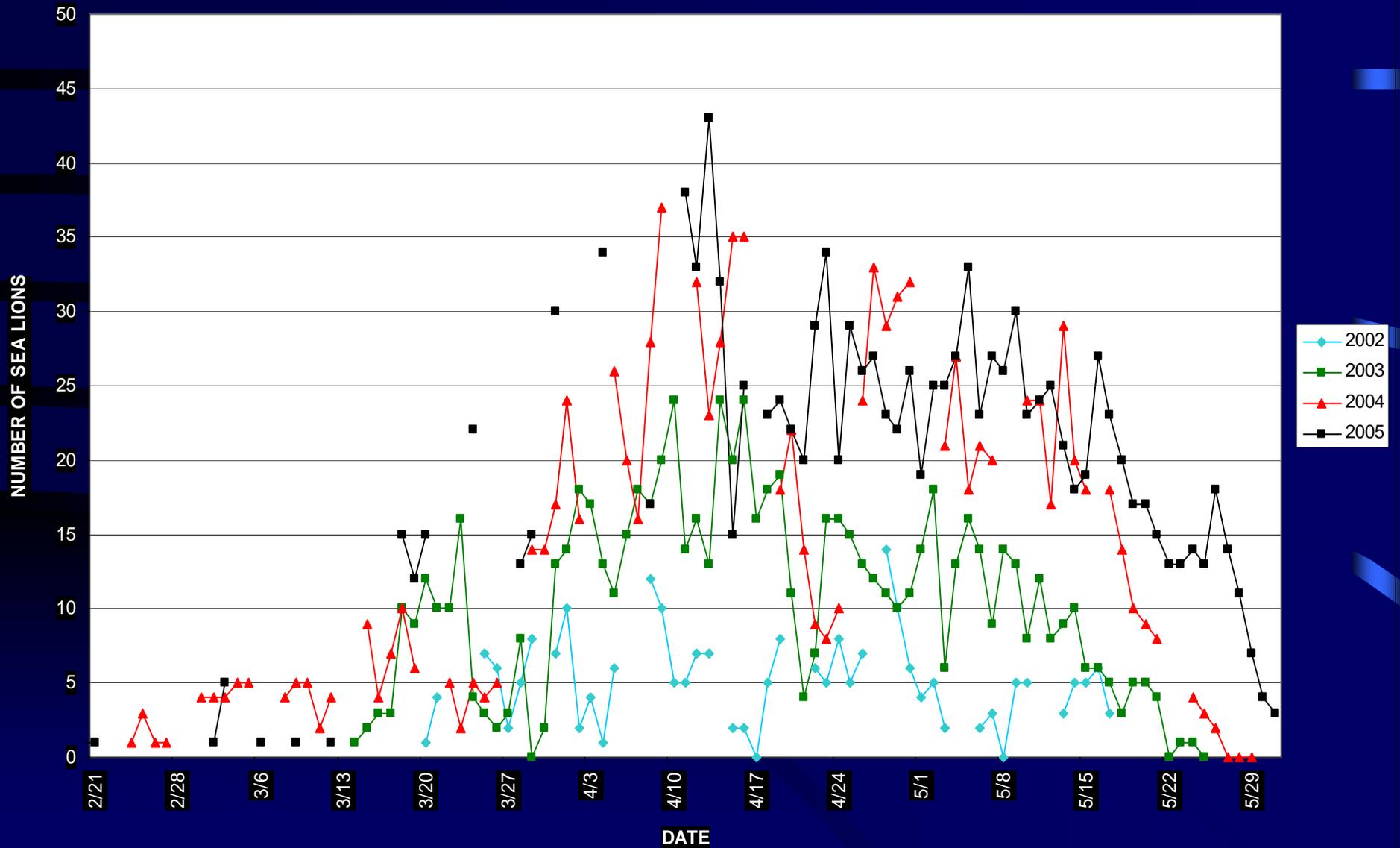
Location for Pinniped Observations, Bonneville Dam, 2002-2005



OBJECTIVES

- Seasonal timing, abundance of Pinnipeds
- Estimate # adult salmonids consumed
- Pinnipeds behavior within/between years

SEASONAL DISTRIBUTION OF PINNIPEDS AT BONNEVILLE, 2002-2005



Number and Percent of Days Pinnipeds Observed Between 1 January and 31 May, Bonneville Dam

- 2002 – 58 days (38.4%)
- 2003 – 71 days (47.0%)
- 2004 – 97 days (63.8%)
- 2005 – 101+ days (66.9%)

Abundance Estimates

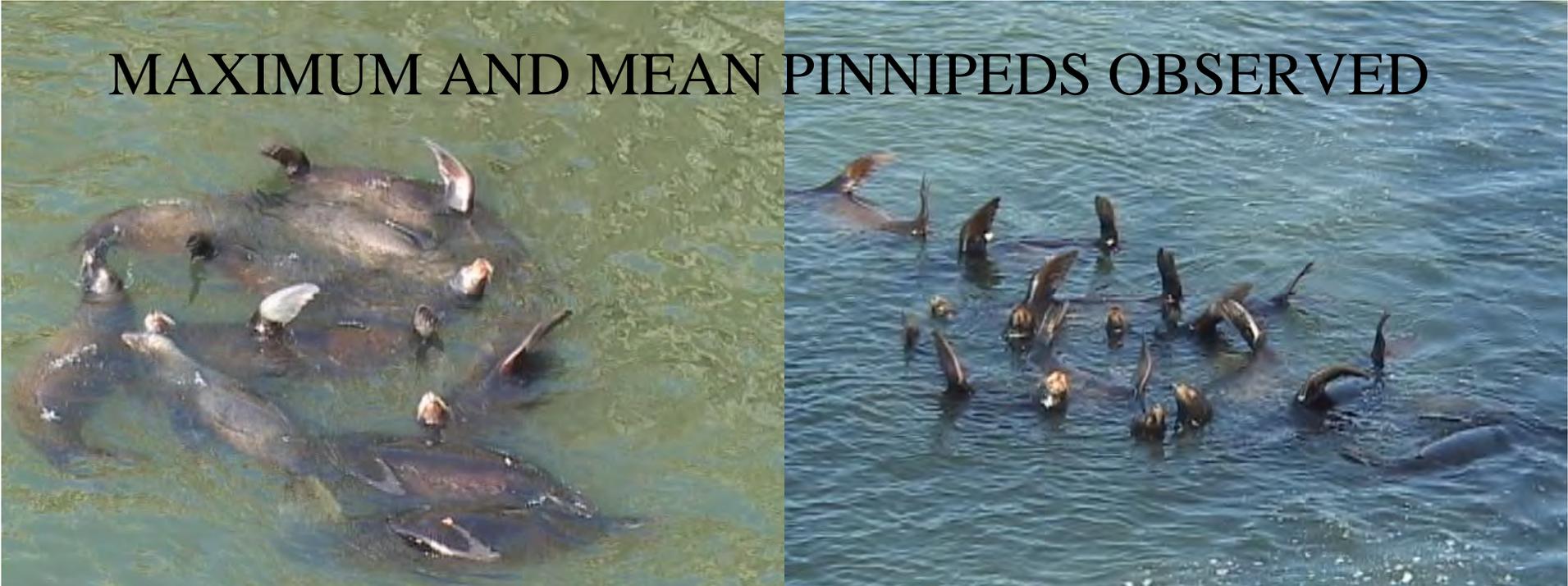


Number of Individual Pinnipeds Observed at Bonneville Dam

	2002	2003	2004	2005
California Sea Lions	30	106	101	80+
Steller's Sea lions	0	3	2	4
Harbor Seals	1	2	2	1
Total Pinnipeds	31	111	105	85+



MAXIMUM AND MEAN PINNIPEDS OBSERVED



Number of Pinnipeds	2002	2003	2004	2005
Maximum Daily Pinnipeds Seen	14	32	37	43
Mean Daily Pinnipeds Seen	5.2	10.7	14.6	21.7

Number of Days Individual Pinnipeds Present

at

Bonneville Dam, 1 January – 31 May

	2002	2003	2004	2005
Mean Days	4.7	6.4	7.5	8.4
Range Days	1 - 14	1 - 25	1 - 31	1 - 39



PREDATION IMPACTS AT BONNEVILLE DAM



Estimate of the Number and Percent of Salmonids Caught by Pinnipeds at Bonneville Dam from 1 January to 31 May

Study Year	Total Hours Observed	Estimate of Salmonids Caught	Total Salmonids Passing Bonneville	Percentage of Salmonids Run Taken by Pinnipeds
2002	734	929	284,733	0.3%
2003	1,440	2,396	217,185	1.1%
2004	553	3,872	186,804	2.0%
2005	1,109	3,052	82,006	3.6%

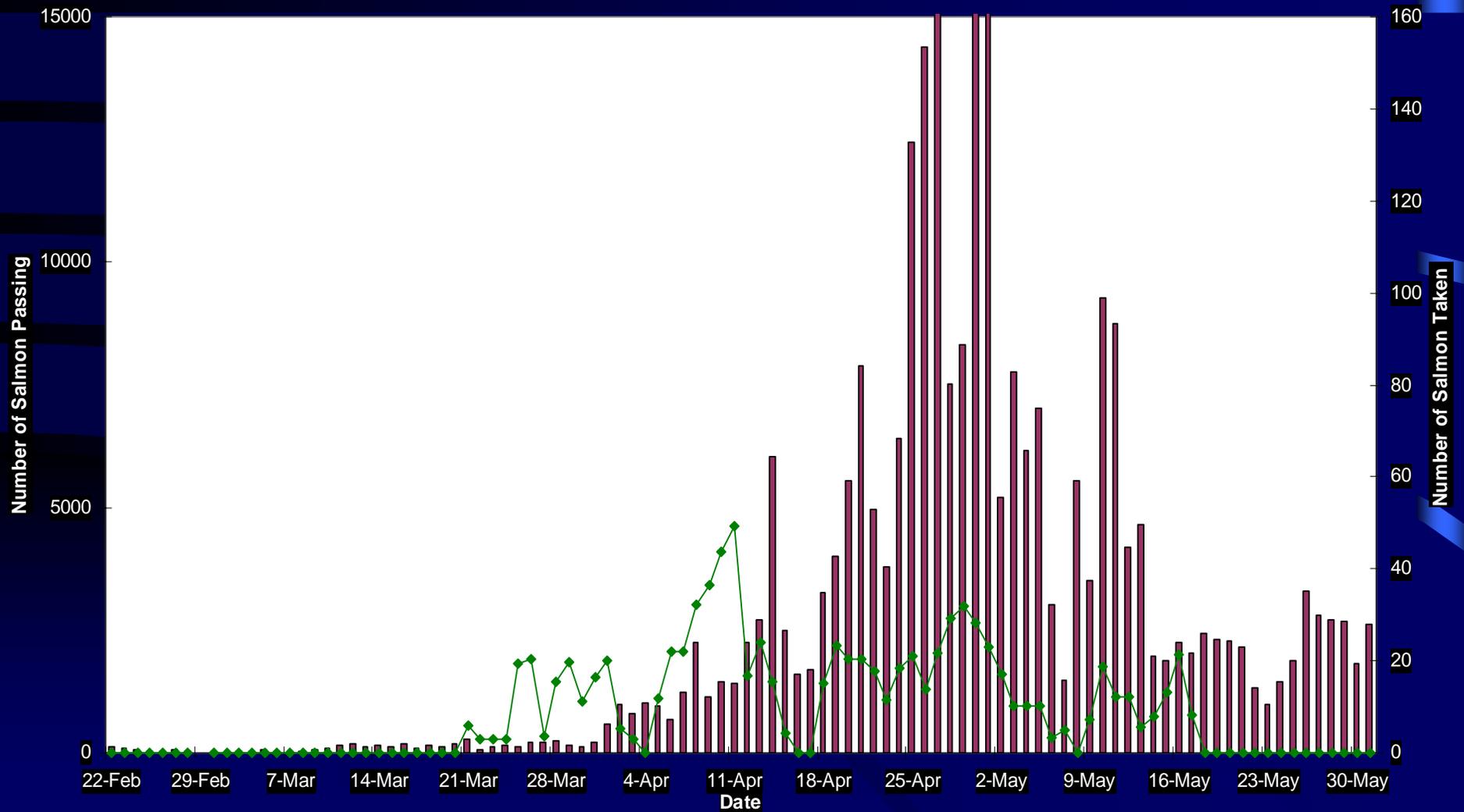
Percent of Salmonids That Were Caught But Escaped

- 2002 – 11.9%
- 2003 – 9.5%
- 2004 – 1.8%
- 2005 – 0.8%

Number of Salmon Passing and Number Taken by Pinnipeds at Bonneville, 2002

2002

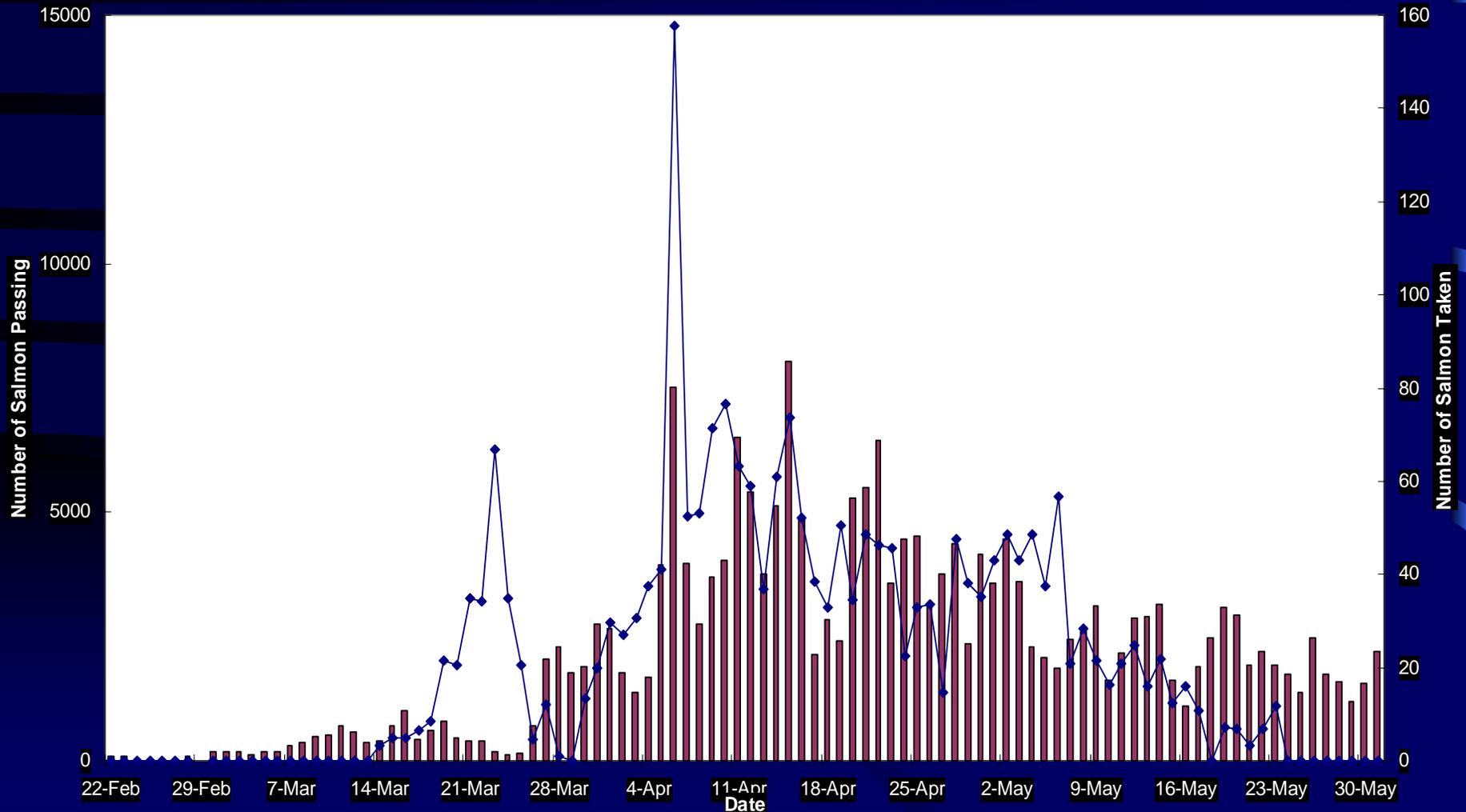
Fish Pass 2002
Fish Take 2002



Number of Salmon Passing and Number Taken by Pinnipeds at Bonneville, 2003

2003

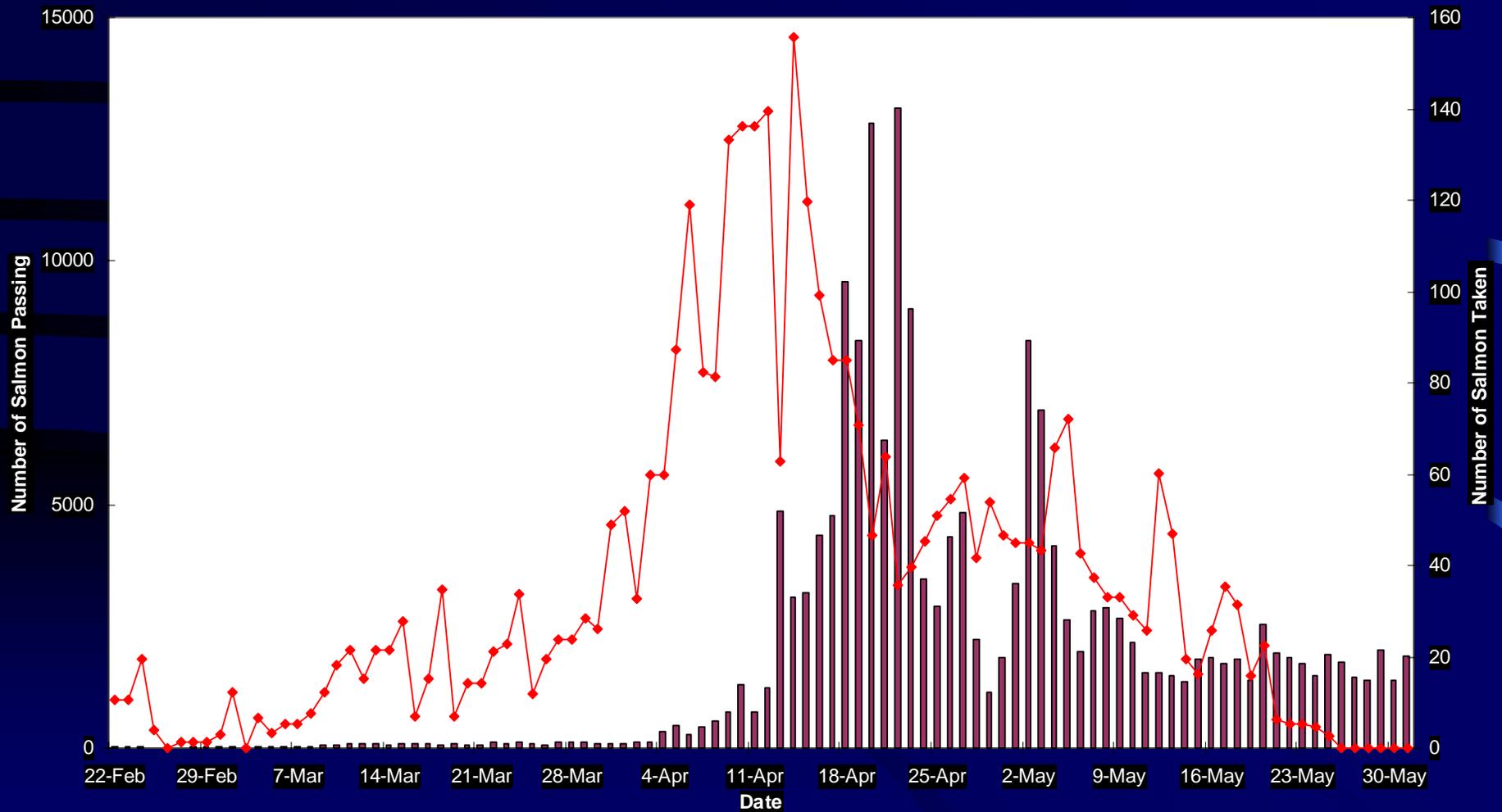
Fish Pass 2003
Fish Take 2003



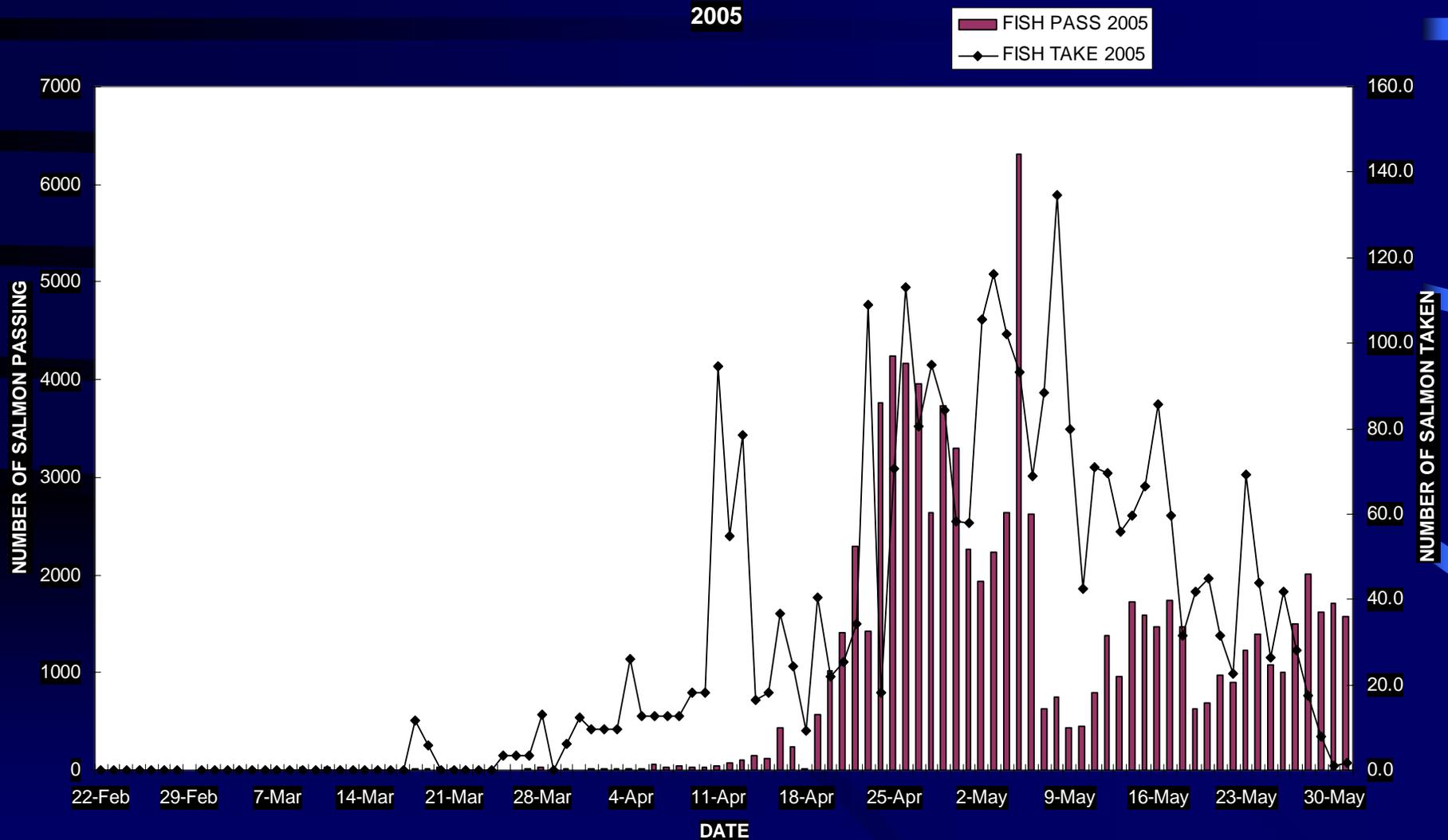
Number of Salmon Passing and Number Taken by Pinnipeds at Bonneville, 2004

2004

Fish Pass 2004
Fish Take 2004



Number of Salmon Passing and Number Taken by Pinnipeds at Bonneville, 2005



Percentage of Salmonids Caught by Pinnipeds, by Location, and Percentage of Salmon Passing ()

Location	2002	2003	2004	2005
PH2	55.8 (68.4%)	56.3 (69.4%)	57.4 (60.9%)	45.0 (57.5%)
PH1	31.1 (31.6%)	38.9 (30.6%)	37.8 (39.1%)	33.2 (42.5%)
Spill	14.1	4.5	5.0	21.8

Salmonid Catch Rate at Bonneville Dam (using expanded estimates and total daylight hours 1 January – 31 May)

Location	2002	2003	2004	2005
PH2	0.23	0.56	0.91	0.57
PH1	0.13	0.39	0.60	0.42
Spill	0.02	0.05	0.08	0.27
Total Project	0.13	0.33	0.53	0.42

Prey Taken by Pinnipeds

- Primary Prey Taken – Spring Chinook
- Lamprey are Next Most Common Prey
 - 2002 – 5.4% 2003 – 11.3% 2004 – 12.2% 2005 – 25.1%
- Shad are Taken When Present in May
 - 2002 – 0.0% 2003 – 3.5% 2004 – 2.0% 2005 – 2.8%
- Steelhead, Smolts, Bass, Sturgeon, Sucker, and Northern Pikeminnow also Observed Taken



Number of Highly Identifiable Pinnipeds That Were Seen to Return to Bonneville in Subsequent Years

	2002	2003	2004	2005
2002	16	12/16 (76%)	11/16 (69%)	
2003		72	36/72 (50%)	
2004				

NEW BEHAVIOR FOR 2004



Eating Fish Near Dam



Entering Fishways



Hauling Out



ENTERED FISHWAYS 2005



MORE HAUL OUT SITES 2005



SEA LIONS ENTERING FISHWAYS

- C404 1ST SEEN IN LOWER PORTION OF WASHINGTON SHORE LADDER IN 2004
- C404 WAS SEEN IN ONE OR BOTH LADDERS AT BONNEVILLE EVERY DAY BETWEEN 3/11/05 AND 3/31/05
- 2 SEA LIONS SEEN IN WASHINGTON SHORE FISH LADDER 3/27 AND 4/4
- TOTAL OF 9-10 DIFFERENT SEA LIONS NOTED ENTERING FISHWAYS, ONLY C404 AND ? SEEN ABOVE OVERFLOW WEIRS

ACTIONS TO KEEP SEA LIONS OUT OF FISHWAYS AT BONNEVILLE DAM, 2005

- HARASSMENT – ABOVE WATER PYROTECHNICS TO CHASE SEA LION OUT OF FISHWAYS, HIGH PRESSURE WATER?
- ACOUSTIC DETERRENTS – 205 dB 15 kHz DEVICES USED AT BALLARD LOCKS, INSTALL IN LOWER PORTION OF WASHINGTON SHORE TO KEEP SEA LIONS OUT
- ENTRANCE EXCLUSION GATES – AS AT WILLAMETTE VALLEY, DESIGN, FABRICATE, AND INSTALL GATES WITH 16” SPACED BARS AT 4 MAIN ENTRANCES



RESULTS 2005 HAZING

- ACTIVE HAZING BEGAN 4/6, INITIAL HAZING EFFECTIVE, LOST EFFECTIVENESS, UP TO 9-10 DIFFERENT SEA LIONS SEEN INTO FISHWAYS
- HIGH PRESSURE WATER NOT EFFECTIVE DUE TO DISTANCE INVOLVED TO WATER/SEA LIONS
- ACOUSTIC DETERRENT INSTALLED 4/21, NO SEA LION SEEN ABOVE THAT AREA SINCE, ALSO NO SIGN OF C404 SINCE
- SLED'S FAST TRACKED, INSTALLED ALL 4 5/30
- NEED TO THANK USGS-COOK AND UofI FOR OBSERVERS ON SHORT NOTICE FOR 2005

RESULTS TAILRACE HAZING

- NOAA/ODFW/WDFW/COE – USED UNDERWATER AND ABOVE WATER PYROTECHNICS AND RUBBER BULLETS 5/5, 5/6, W/BOATS 5/17, 5/18 FROM SHORELINE ONLY
- SEA LIONS CHASED OUT OF TAILRACES INITIALLY, RETURNED WITHIN HOURS OF STOPPING

SUMMARY POINTS

- Pinnipeds Arriving Earlier Each Year
- Individuals Staying for Longer Periods
- Increasing Average Number of Pinnipeds/Day
- Increasing Number of Salmon Taken (#, rate, %)
- Increased Percentage of Lamprey in Diet
- Number of Salmon Escaping Decreasing
- Beginning to Haul Out/Get into Fishways













Modeling of Dworshak Summer 2005 Operations



Kyle Martin

Senior Hydrologist

June 15, 2005

Columbia River Inter-
Tribal Fish Commission

Introduction



- Goals: (1) Model Dworshak flows and elevations from summer operation proposals. (2) Evaluate impacts on Dworshak pool elevation and lower Snake water temperature and flow.
- CRITFC's Hydro spreadsheet: modeled outflows and elevations. Inflows are given by NWRFC.
- EPA's RBM-10 model: water temperature. Assumes (1) 1979, 1994, 1995, and 1998 composite meteorology and tributary inflows, (2) 2000 Dworshak and Brownlee water temperatures, and (3) Dworshak release temperature is 45 degF.

Weather Assumptions



Lewiston air temperature						Dworshak
(degF)	MAY	JUN	JUL	AUG	SEP	April-July Inflow (KaF)
1979	59.15	67.12	76	74.95	68.95	2690
Departure	1.0	1.5	2.3	3.1	5.5	
1994	61.53	66	77.76	75.15	67.42	1386
Departure	3.1	-0.9	3.7	1.5	3.3	
1995	59.82	63.72	74.02	69.94	66.28	1734
Departure	1.4	-3.2	-0.1	-3.8	2.2	
1998	58.87	65.5	78.68	76.39	69.27	2035
Departure	0.5	-1.4	4.6	2.7	5.2	
Average Departure:	1.5	-1.0	2.6	0.9	4.0	1,961
	MAY	JUN	JUL	AUG	SEP	June final WSF (KaF):
2005 departure	2.1	-3.4				1800
Assumption: "PDO-neutral / ENSO-warm / ENSO-neutral"						
Oct. 2004 - May 2005:			PDO = 0.57 (+/- 0.79)		MEI = 0.66 (+/- 0.18)	

Highlights of Proposals

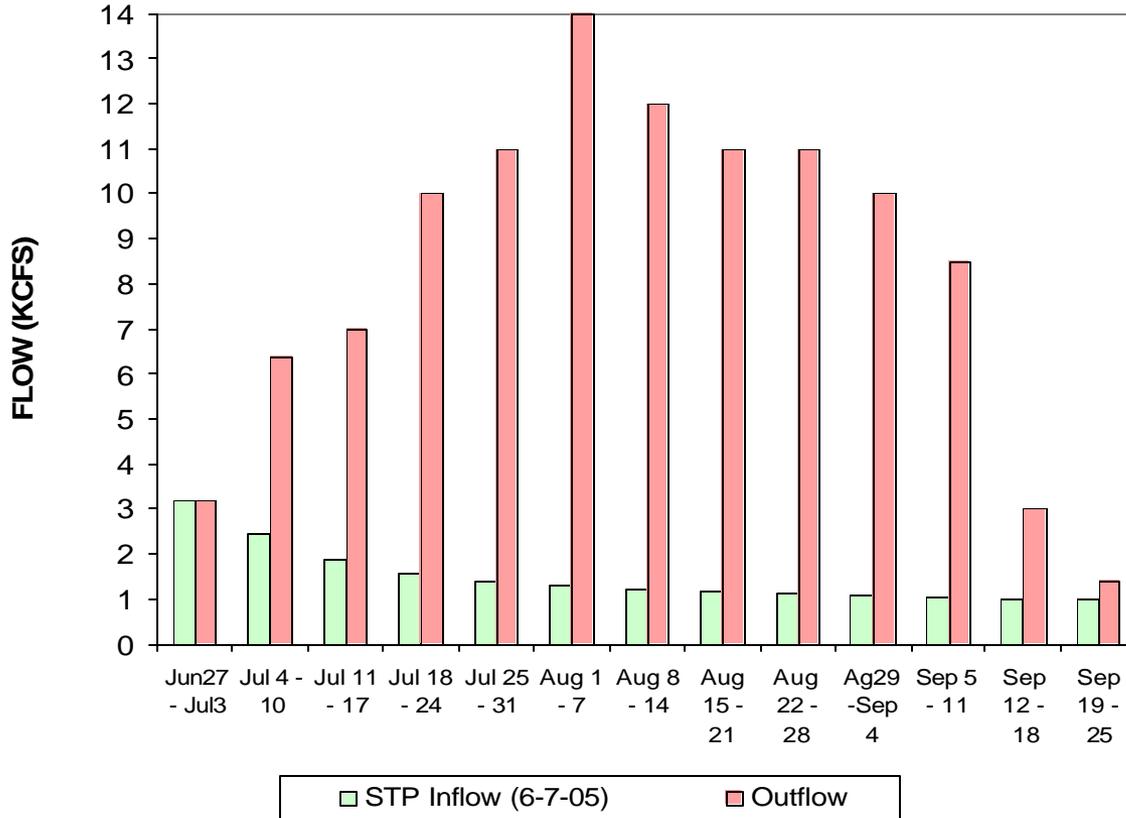


- Nez Perce Tribe - Idaho (NPT-ID) Plan: draft to 1535 ft by Aug. 31, then 1520 feet by Sept. 30.
- TMT-2004 Plan: blend of NPT-ID & BiOp plans.
- 2000 Biological Opinion Plan: draft to 1520 feet by August 31.

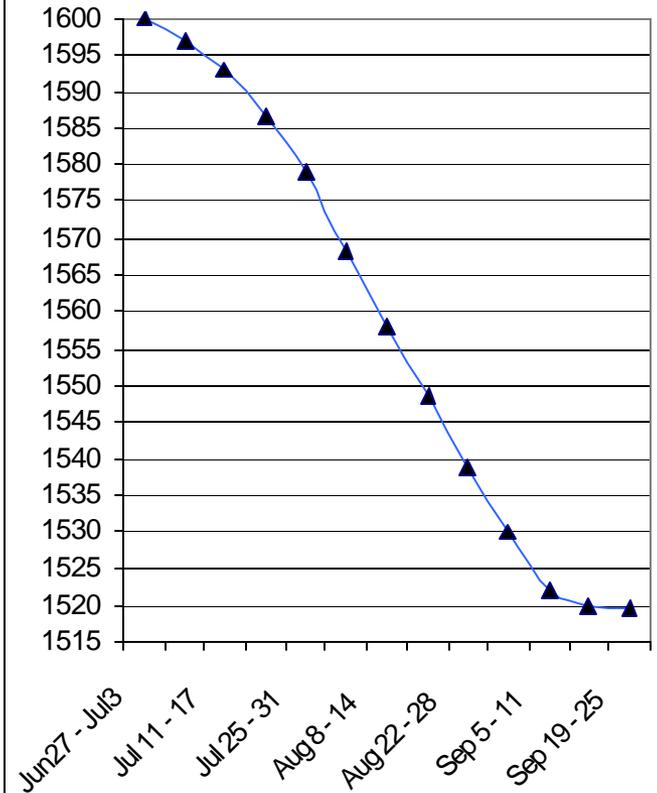
NPT-Idaho Plan



DWORSHAK SEASONAL FLOWS: NEZ PERCE TRIBE-ID. PLAN



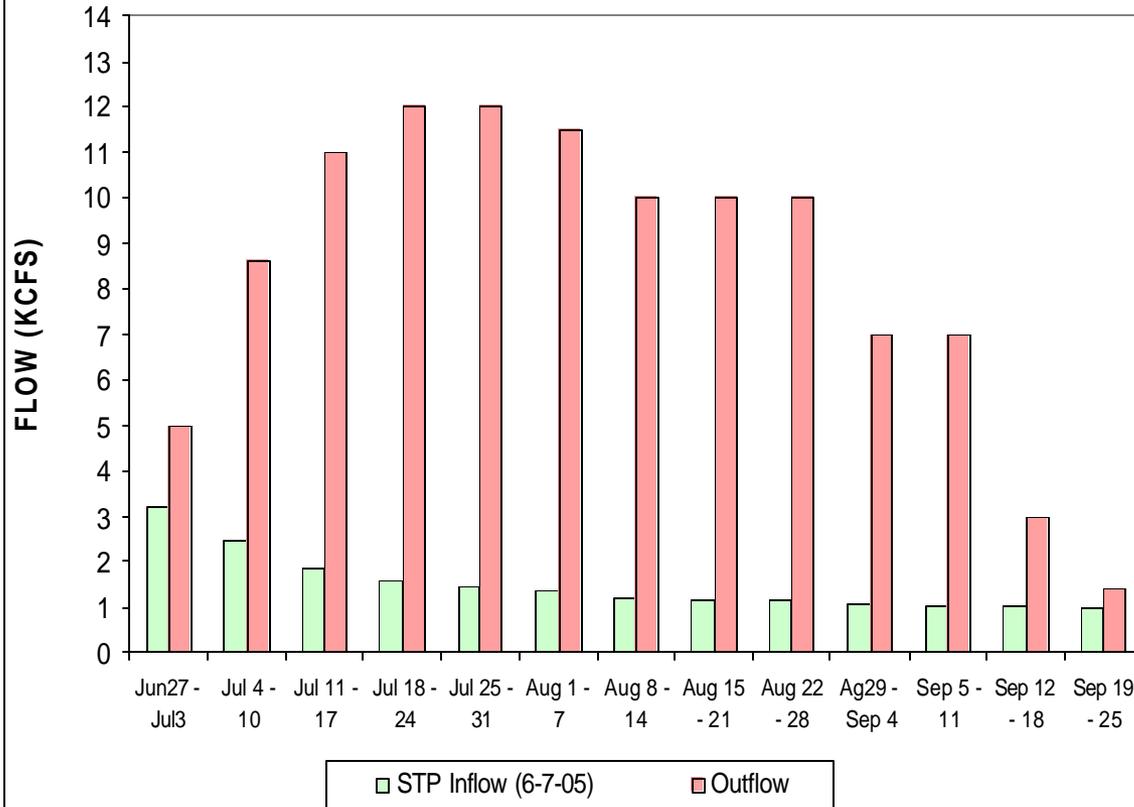
DWORSHAK POOL ELEVATIONS



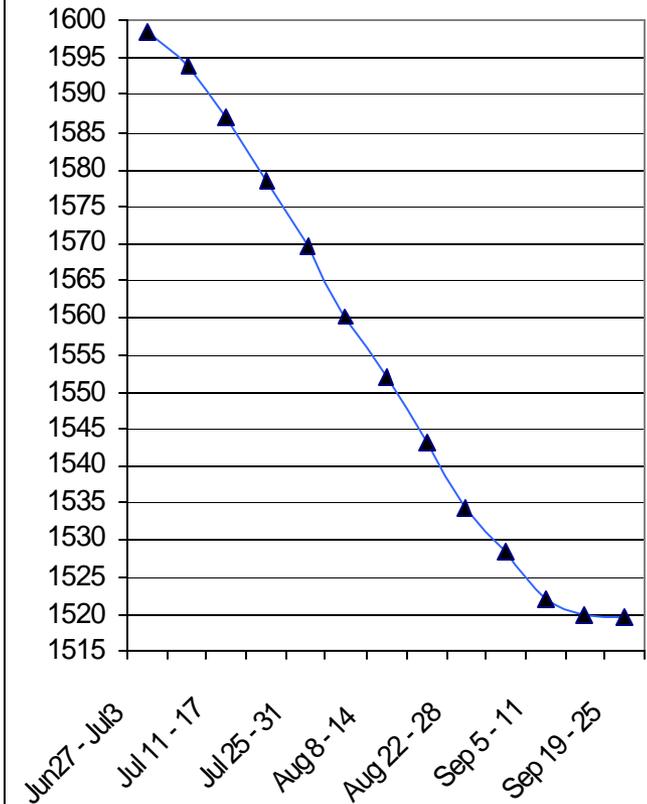
TMT-2004 Plan



DWORSHAK SEASONAL FLOWS: TMT-2004 PLAN



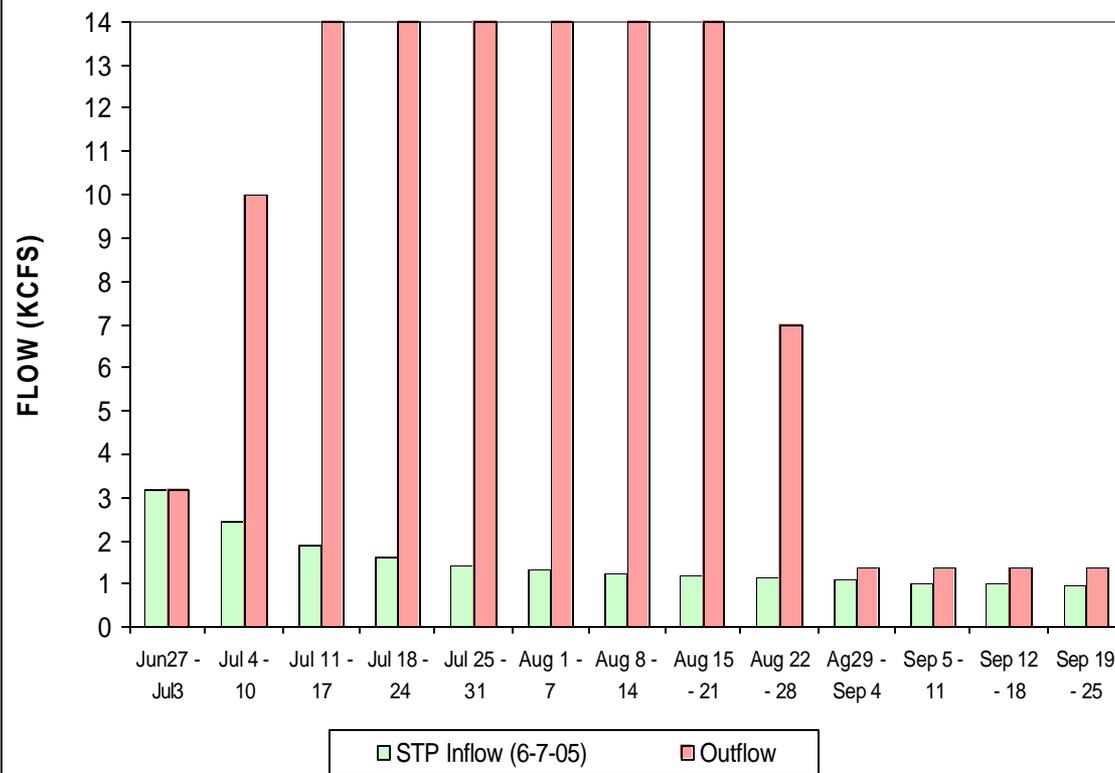
DWORSHAK POOL ELEVATIONS



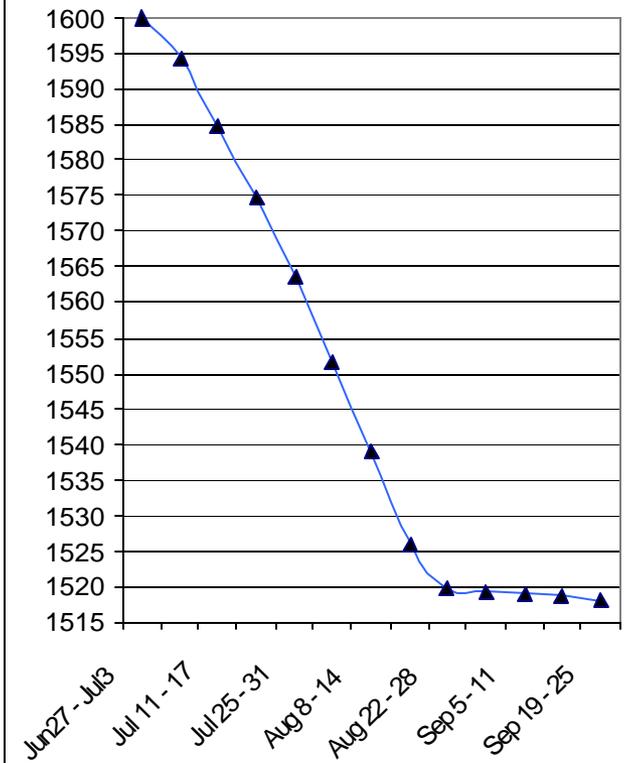
Biological Opinion Plan



DWORSHAK SEASONAL FLOWS: 2000 BIOLOGICAL OPINION



DWORSHAK POOL ELEVATIONS



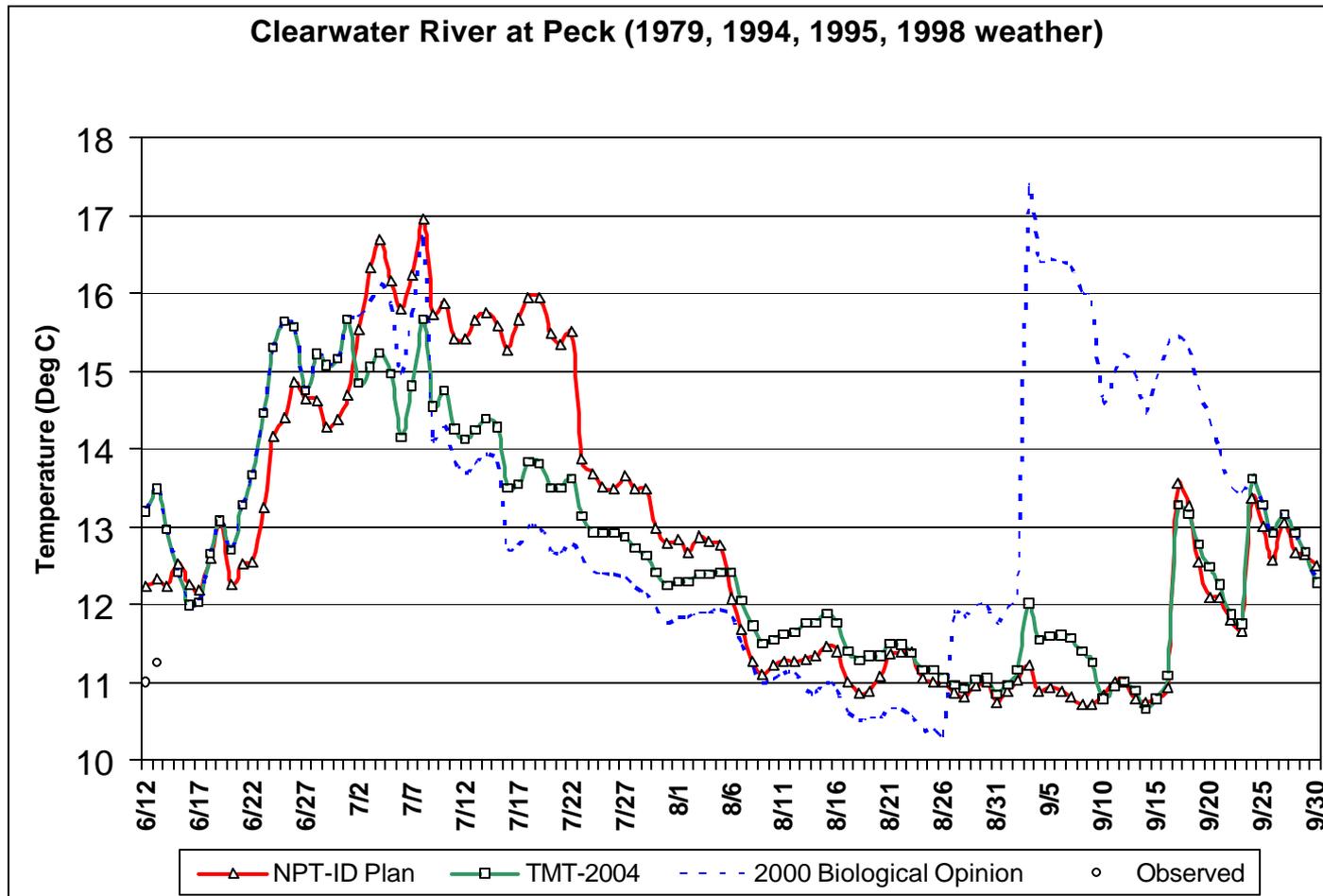
CRITFC Modeling Results



CURRENT (June 7, 2005) CRITFC MODEL FORECAST RESULTS			
Dworshak Outflows (cfs):	NPT-Idaho	TMT-2004	Biological Opinion
July 1-15	6000	8700	10000
July 16-31	10000	11900	14000
August 1-15	12900	10700	14000
August 16-31	10800	9400	8600
September	4600	3800	1400
SEP DWR Augmentation (KaF):	200	157	0
Lower Granite Outflows (cfs):	NPT-Idaho	TMT-2004	Biological Opinion
July 1-15	34500	37200	38500
July 16-31	36800	38600	40800
August 1-15	28000	25800	29100
August 16-31	25400	24000	23100
September	19200	18400	16000
Dworshak at 1570 ft:	6-Aug	31-Jul	27-Jul
EPA: Days > 20 degC at LWG:	NPT-Idaho	TMT-2004	Biological Opinion
July	11	7	0
August 1-15	8	3	0
August 16-31	0	0	0
September	0	0	6

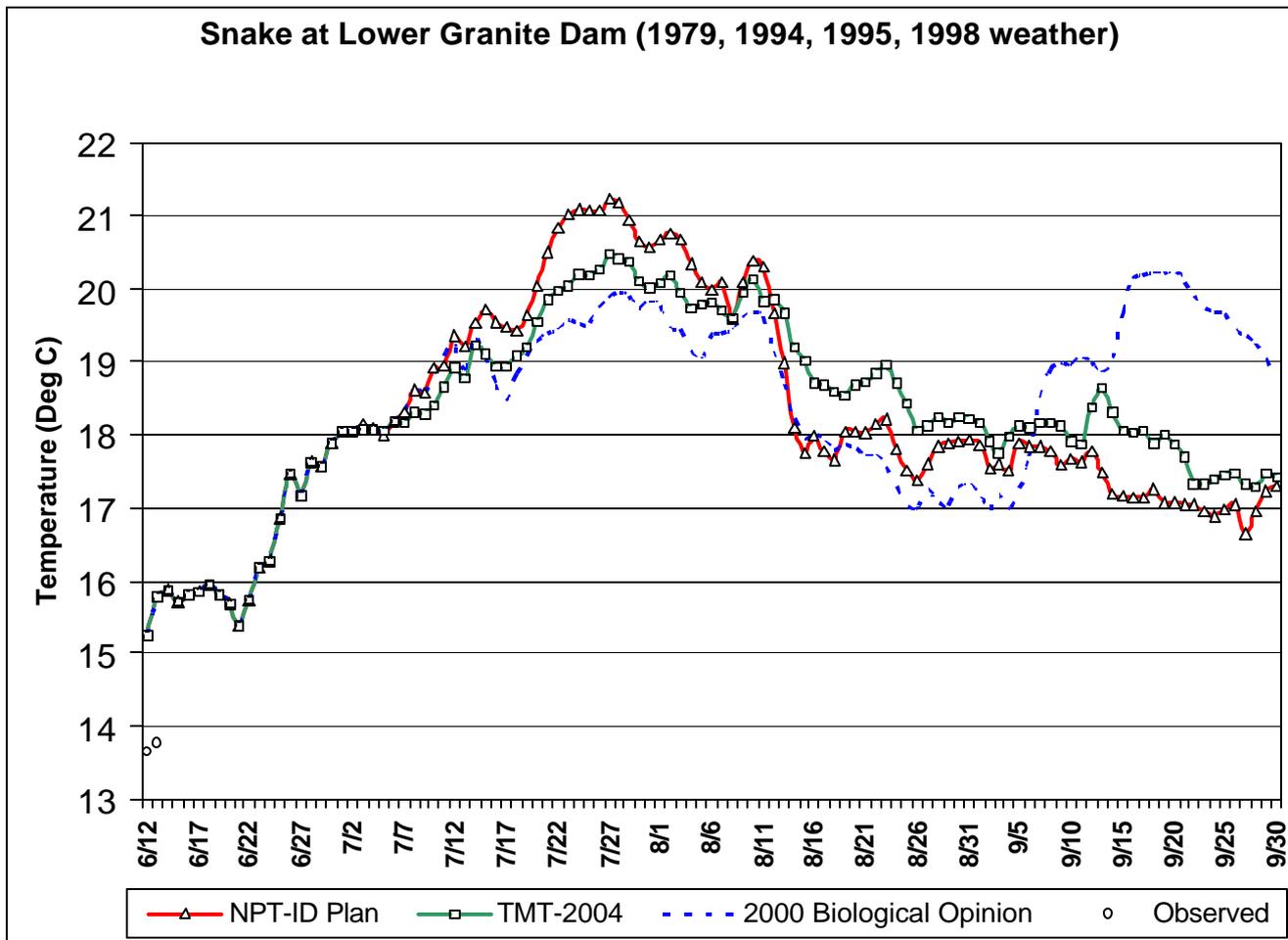
Water Temperature

(Courtesy of Ben Cope, EPA-Seattle)



Water Temperature

(Courtesy of Ben Cope, EPA-Seattle)

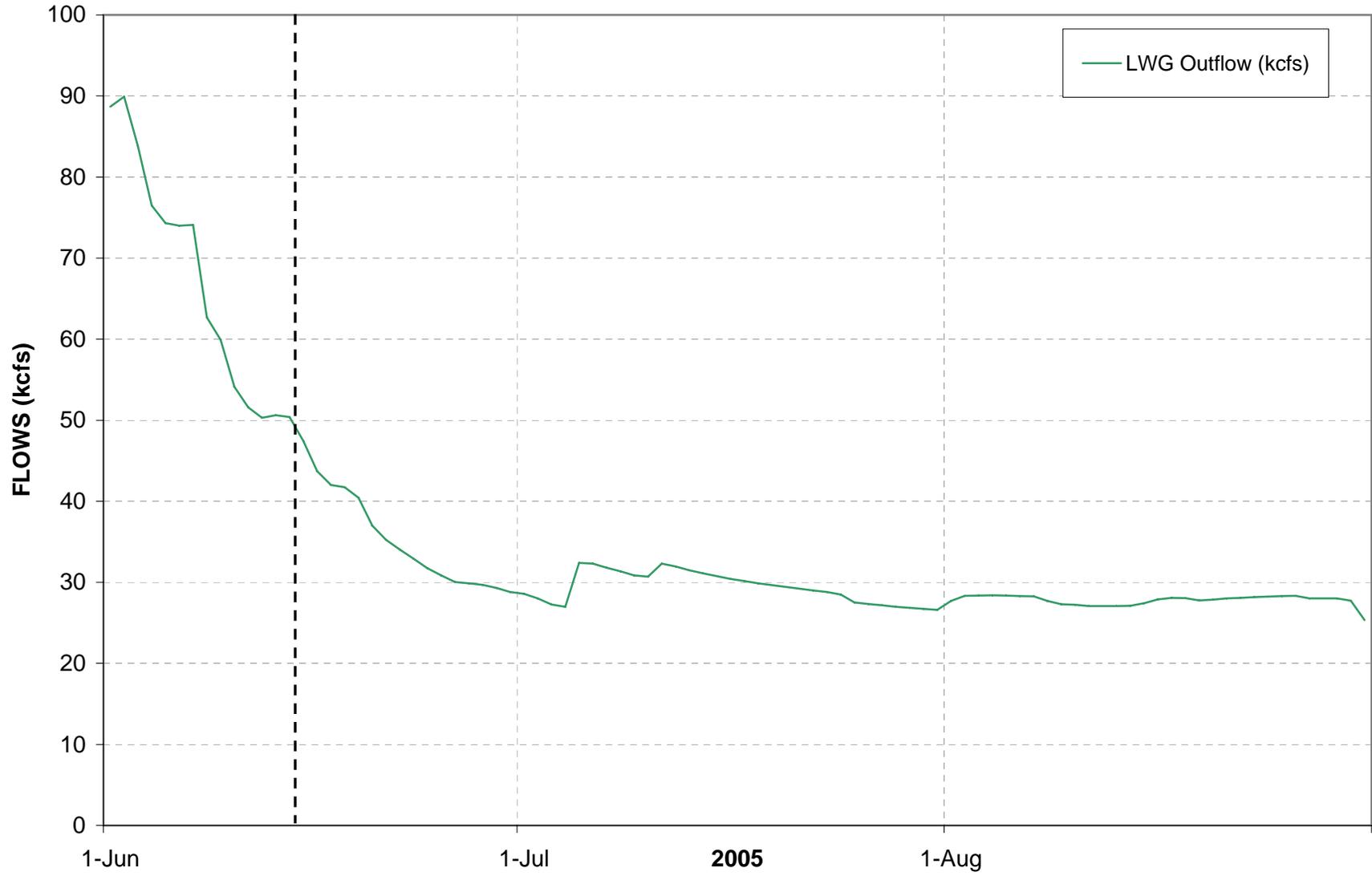


Conclusions

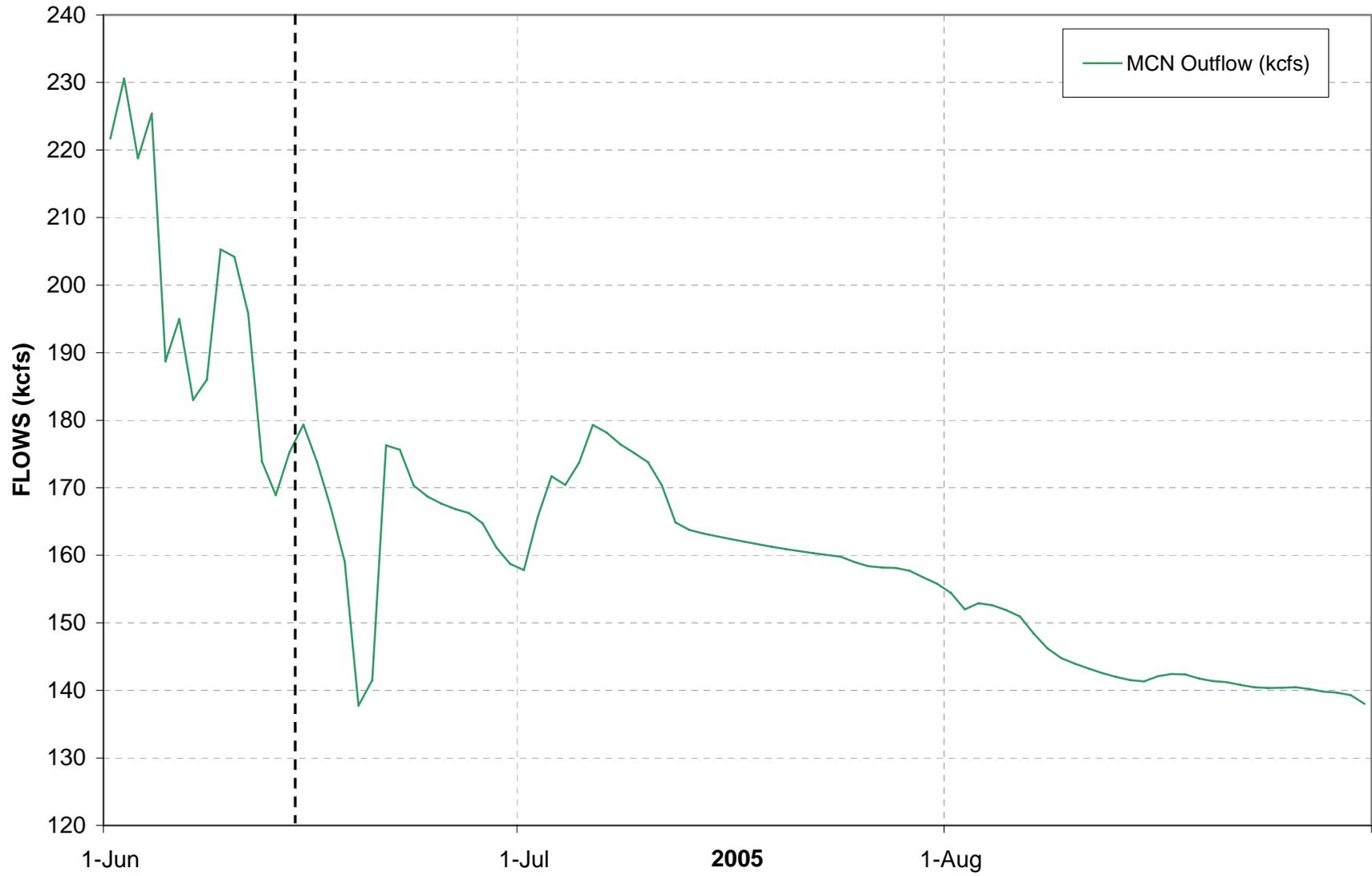


- Biological Opinion Plan: drafts in July will lower lake levels at the fastest rate. High outflows in early July will slow Clearwater juvenile salmon growth. Benefits lower Snake flows in July. Impacts late migrating Clearwater juveniles and adults, especially with high water temperatures in September.
- TMT-2004 Plan: drafts in July will lower lake levels, but not as fast. Modest rises in mid-July flows are followed by a step-wise reduction in August. September has a 157 KaF carryover from summer flows-- not as much as prescribed in the NPT-ID Plan, which calls for a 200 KaF carryover.
- Nez Perce Tribe-Idaho Plan: better timed outflows benefit juvenile and adult salmon while providing cooler water for lower Snake through Sept. Lake levels stay higher, longer.

**STP Output:
Lower Granite**



**STP Output:
McNary**



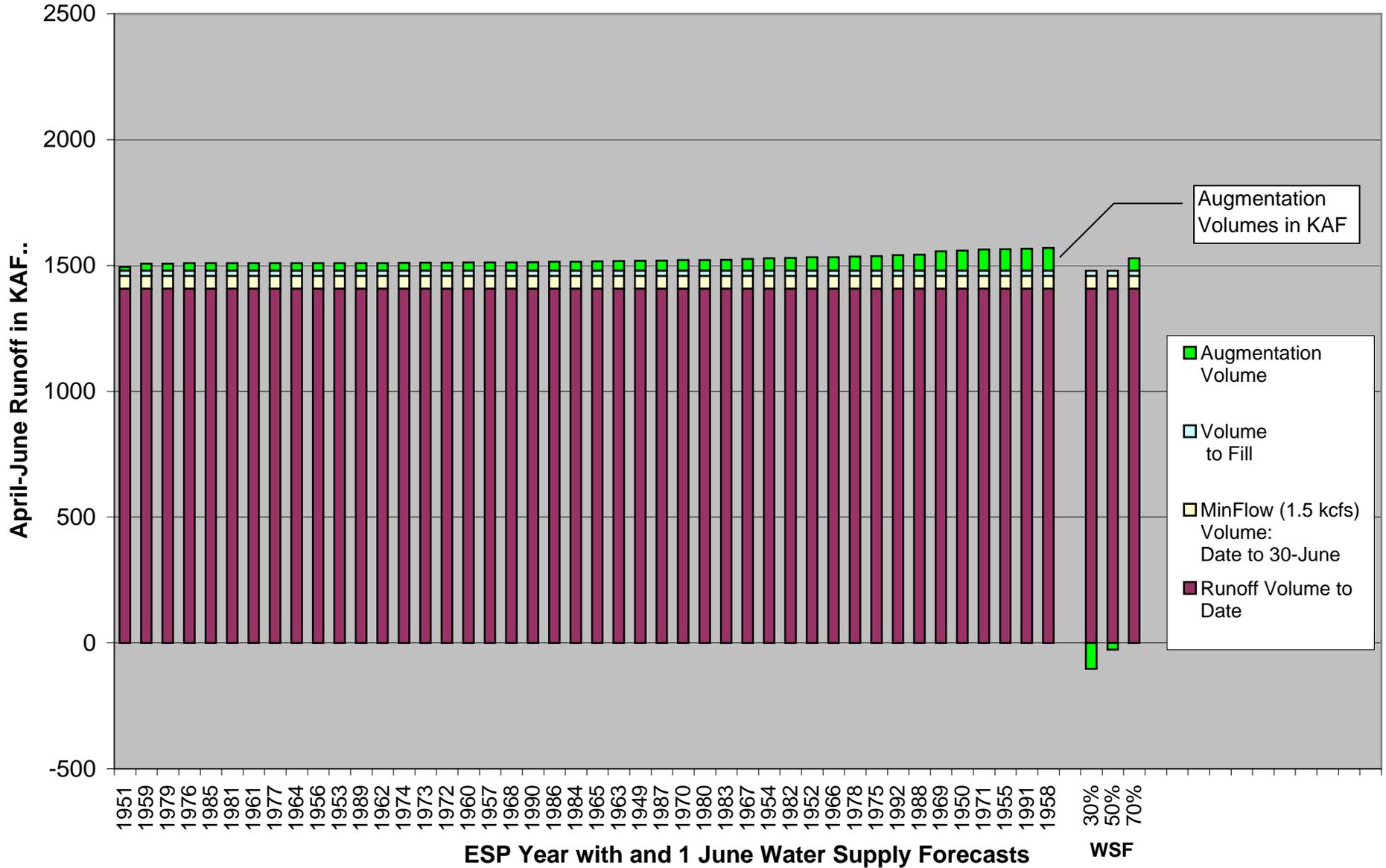
STP Output: Priest Rapids



Priest Rapids Operations					Day's Delta	Band Constraint	Was it Met?	Comments If NO, reason why.
Date	Ave.Q	Min.Q	Max.Q	Prog.Q				
30-May	98.7	95.6	112.4	181.1	127.3	150	N	Three-day weekend --- daily delta = 16.8 Within 5 kcfs (1.2 kcfs)
31-May	144.9	123.3	154.5	109.3	31.2	30	N	
1-Jun	153.7	144.0	159.1	145.7	15.1	60	Y	
2-Jun	121.1	108.7	142.3	132.4	33.6	40	Y	
3-Jun	122.0	106.1	139.9	125.7	33.8	40	Y	
4-Jun	116.9	108.7	135.1	120.2		30	Y	
5-Jun	112.1	106.6	113.9	99.2	28.5	30	Y	
Week A\	124.2				48.2			
6-Jun	100.4	87.8	114	120.2	26.2	40	Y	
7-Jun	109.1	87.5	122.3	109	34.8	30	N	Within 5 kcfs (4.8 kcfs)
8-Jun	139.5	126.6	163.8	127.3	37.2	40	Y	
9-Jun	150.4	135.1	170.2	134.9	35.1	40	Y	
10-Jun	140.2	135.8	147	133.8	11.2	40	Y	
11-Jun	118.3	109.3	139.2	134.9		30	Y	
12-Jun	115.7	110.6	125.0	102.9	29.9	30	Y	
Week A\	124.8				28.9			
13-Jun	130.2	110.7	148	134.9	37.3	40	Y	<--End HR Agreement Juvenile Protection Program, 2400 hours

Dworshak Augmentation Volumes ESP inflows and 1 June Water Supply Forecast

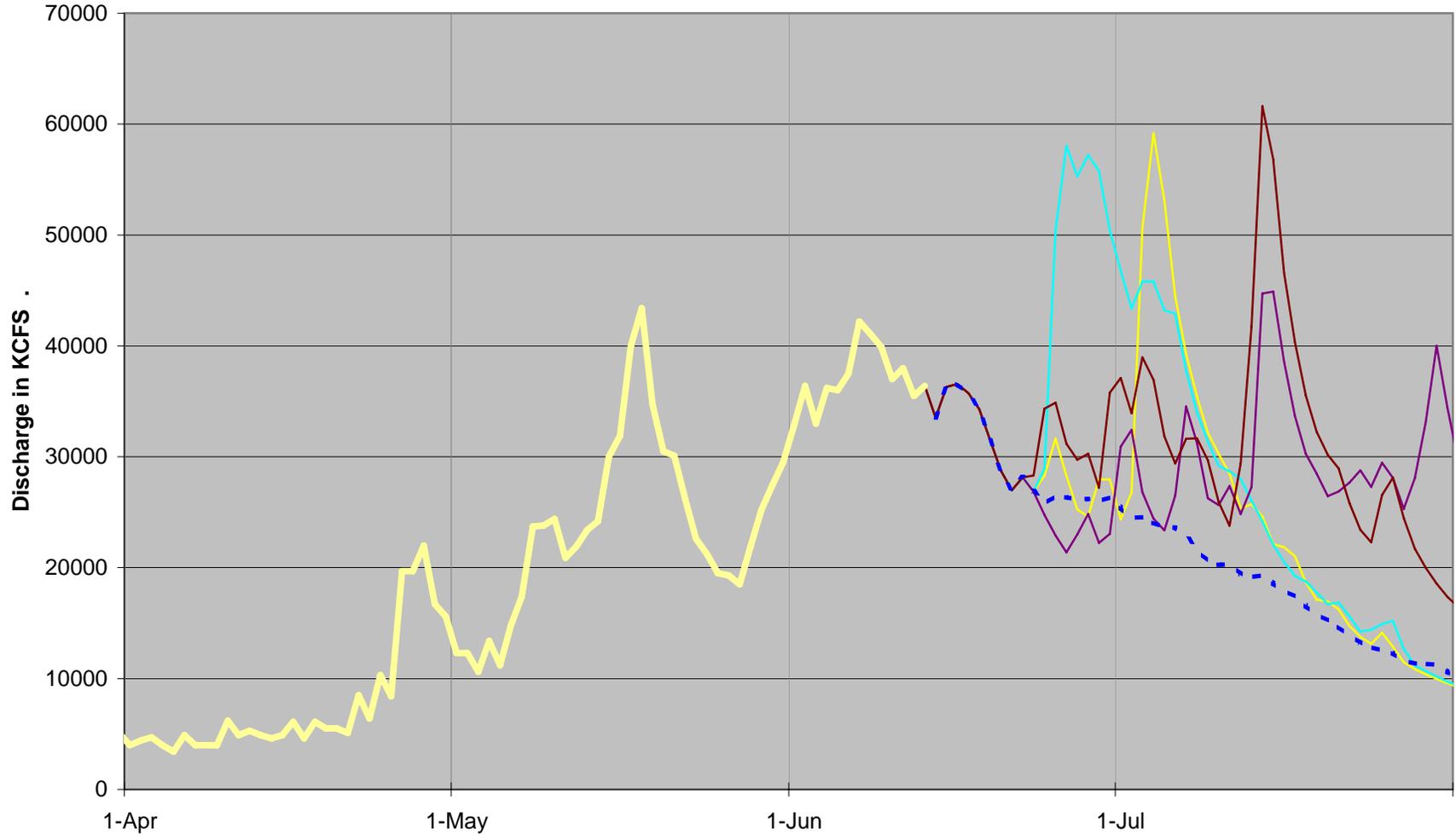
Observed data through **13-Jun**



LIB ESP HYDROGRAPHS

6/14/2005

Trace Selections:



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 15, 2005

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

Notes: 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.

Comments on Notes

There were no comments on the notes at this time.

Hanford Reach Update

Russell Langshaw, Grant County PUD, reported that Hanford Reach operations were completed on June 14. Over the previous two weeks, the target delta was missed over Memorial Day weekend, and then on June 7, due to increasing flows. An additional weekend of protection flows was completed June 4-5, per coordination between the PUD and NOAA. NOAA expressed appreciation for the operation. It was noted that BPA provided over 100 kcfs on May 30 in addition to the 'extra weekend' protection flows.

ACTION: Russell will send a final report on Hanford Reach agreement operations, upon completion, to Cindy Henriksen, COE, to distribute to TMT.

Priest Rapids Flows:

Flows reached an average 124.7 kcfs last week, and there is an expectation that the target 120 kcfs will be maintained through June, while filling Grand Coulee.

Sea Lion Presentation

Bob Stansell, COE, presented a power point on sea lion activities and research at Bonneville Dam from 2002-2005. From an historical perspective, it is not unusual to observe sea lions in the area. Lewis and Clark noted hundreds as far upriver as Celilo Falls. Researchers, during the 2002-present study, looked at timing, numbers, consumed salmon and pinniped behavior, finding that the mammals are arriving earlier and staying longer in the area. In 2005, pinnipeds consumed about 3.6% of the run observed at Bonneville, roughly 3,000 fish. The sea lions appear to start taking fish before the peak of the run, and in 2005, stayed on through the peak. They consume mostly spring chinook, followed by lamprey (which has increased in recent years), and shad. The mammals have been seen eating steelhead, smolts, bass, sucker sturgeon and Northern pikeminnow. Many are 'repeat offenders' that return year after year. New behavior was observed: The pinnipeds are eating near the dam, entering the fishways and "hauling out" on the spill bay. To remedy the pinniped problem in 2005, harassment measures, acoustic deterrents, and entrance exclusion gates were employed. Hazing was initially effective but lost its

effectiveness over time; use of high pressure water was found to be ineffective, and acoustic deterrents may be the best tool that does not appear to adversely affect fish passage. Special thanks were given to the COE, USGS and University of Idaho for their efforts this year.

In early and mid-May, NOAA, ODFW, WDFW and the COE tried harassment efforts in the Bonneville tailrace, which worked initially but the pinnipeds eventually returned. Hazing efforts will likely continue next year.

Next Steps: The COE is involved in internal discussions and will work with NOAA and the states to develop a policy for marine mammal management. The predation on both listed salmon and sturgeon creates a problem needing resolution.

Summer Spill Operations Given Recent Court Decision

The judge's decision on June 10 ordered the COE to implement summer spill at Little Goose, Lower Monumental, Lower Granite, Ice Harbor and McNary; this order is a deviation from the COE's previously anticipated 2005 summer spill operations. The COE is requesting input from the Regional Forum technical teams on how to implement the directed spill. Given the judge's order to "spill up to minimum station service (1% peak efficiency)", the COE has concerns that CWA and state standards may be exceeded. Cindy reported that, per discussions at the WQT on June 14, Washington DOE and Oregon DEQ recommended that the spill operation not exceed the states' TDG standards (120% at the Lower Snake projects). The COE's biggest area of concern, based on SYSTDG modeling, was at Lower Monumental, where the model shows TDG levels reaching 121-125% with 10-15 kcfs spill. The COE recommended an alternative operation that would start in a range (to be determined) that would stay within the TDG standard, and modify the operation up to reach the spill cap. (Because the court ordered operation has never been modeled before, the error band is not available; the model showed that this operation would produce a 12-hour average of 121-125% TDG at Lower Monumental.)

TMT members provided initial input to the COE on a spill pattern at Lower Monumental, which the COE will take into consideration as they draft a summer spill implementation plan to take back to the Plaintiffs:

- Washington – A letter was drafted and distributed to the WQT. It recommends not exceeding state water quality standards, and proposed an incremental spill operation that would ensure that TDG is not exceeded. The standards were developed for biological reasons.
- Oregon – Will wait to comment further after talking with the Oregon WQT representative on water quality standards and upon review of the proposed spill plan from the COE.
- Montana – Stay within state waivers, and agrees with COE's proposed concept for operations.
- CRITFC – No comment yet on how to proceed; do not exceed TDG standards.
- USFWS – Defer to the states (stay within the standards); defer to the states re: implementation of spill.

- NOAA – Stay within the state waivers; no comment on how to implement as yet.
- BPA – Honor the water quality standards, and be conservative with operations.
- BOR – Support staying within the standards.

Also, proposed research at the projects, which may be impacted by the spill operation, is being discussed at SRWG; at this point, the COE offered that some research will likely occur. As far as spill patterns at the other projects, the COE will put in an initial proposal based on the FPP and plan to discuss these further in the future.

ACTION: The COE will put together a draft summer spill implementation plan, considering input from participants at the Regional Forum, and share it with the Plaintiffs in the next few days. Cindy will forward the draft plan to TMT members. This will be on the agenda at the next TMT check-in call on Wednesday, June 22.

McNary Operations – Spill/Transport

The spring to summer operation transition at McNary usually occurs around June 20. At this point, the project is below flow thresholds for ‘spring-like conditions’ and temperature is hovering at the threshold of 62°. Spill will occur on July 1 at McNary as per the judge’s order. The COE requested feedback from TMT on how to proceed from June 20-June 30 in terms of transporting fish at McNary.

NOAA recommended that the fish NOT be collected for transport this week, given the current temperature conditions, and suggested the TMT check-in on the issue next week to make a next step determination. The COE noted that the current flow conditions are well below 200 kcfs, or ‘spring like’. USFWS concurred with NOAA’s recommendation, as did Montana. (Oregon and Washington were no longer on the call during this discussion.) The action agencies agreed to wait, and requested that the salmon managers consider alternative operations. BPA added that if temperatures reach 62° or above, TMT should have a check-in call on Monday, June 20 to discuss how to proceed.

Dworshak Hydro and Water Temperature Modeling

Kyle Martin, CRITFC, provided a handout of initial modeling for summer Dworshak operations based on three scenarios – Nez Perce/Idaho proposal (1535’ by 8/31 and 1520’ by 9/30); TMT 2004 operation (‘blend of Nez Perce/Idaho and BiOp proposal); and 2000 BiOp (1520’ by 8/31). The purpose of the exercise, he said, was to help TMT get ahead of and begin planning for 2005 summer operations. Kyle offered to do additional scenarios for future TMT meetings, per suggestions from the group.

TMT members offered initial comments:

- Not sure if it is useful to run additional models at this point, since we will need to make real-time adjustments.
- Gives an idea of how shaping Dworshak could create cooling throughout the summer. Addressing the temperature rise early before the peak will be helpful.

- Shows when the potential problem times for temperature might be in July and August.
- Suggestion – extend the model through the end of October for fish managers to see what might occur after the summer.

ACTION: Cindy Henriksen, COE, reported that there will be 200 kaf storage from Dworshak for use by the Nez Perce in September. The Snake River Basin Adjudication group looking at how that water might be used. Proposals on this will be available for TMT to discuss at the June 29 TMT meeting.

SOR 2005-15 Follow Up

Cindy Henriksen, COE, reported that a response was sent out in regards to SOR 2005-15 presented at TMT on June 8, saying that the COE operated within the criteria to deal with increasing mortalities at Lower Granite due to debris load issues. Following the SOR (drafted on June 2), decreases in mortality occurred, then another increase in mortalities occurred. There was inquiry into why this was happening. Dave Wills, USFWS, checked with the FPC and smolt monitoring group and reported that there was a release from the Nez Perce tribal hatchery on May 7 due to a local flooding event, and smaller than usual spring chinook subyearlings were passing at the same time.

ACTION: The action agencies requested that, in the future, the salmon managers coordinate on issues like these so that they do not need to be addressed through the TMT. Also, notify the action agencies if there is a change in hatchery releases so that preventative measures can be taken to avoid future problems such as these.

Based on current conditions, the salmon managers suggested that it was acceptable to go back to operating under the Fish Passage Plan at Lower Granite, thus ending the request laid out in SOR 2005-15.

Operations Review

Reservoirs—Inflows are high, reservoirs are reaching full. Libby is at 2450' with 35 kcfs inflows and 24.7 kcfs out. The project may not go below powerhouse capacity until mid-July or later due to limited transmission issues and higher flows. Hungry Horse is at 3558.4' and releasing 3.6 kcfs. Grand Coulee is at 1283.7' and filling.

Snake River volumes are up – Payette and Cascade filled and are releasing above irrigation. At this point, the BOR is expecting 321 kaf for augmentation, and possibly additional volumes (negotiations are ongoing).

Priest Rapids flows are scheduled to stay within a 5 kcfs range. However, flows may increase due to increased water in the system. Dworshak is at 1598.89', with fluctuating outflows due to transmission limitations. Lower Granite flows are at 50 kcfs and receding. McNary average flows were 169 kcfs yesterday (6/14).

Fish – Juveniles: Yearling migration is at the tail end, normal compared to previous years. The subyearling run is very early this year and the numbers are high so far.

Adults: There have been increased chinook counts at Bonneville. The spring run is expected to reach about 100,000 this year (lower than projected). There is hope for a strong summer adult run.

Power system – The CGS is 100% back on line, on schedule.

Water quality – Three exceedances occurred from May 31-June 13. Gas caps have been posted to the TMT web page.

Next Meeting, Conference call Wednesday, June 22, 9:00 am

Agenda Items include:

- Summer Operations check-in
- McNary Spill/Transport
- Dworshak Temperatures

Next Face to Face Meeting, Wednesday, June 29, 9am-noon

Agenda items include:

- Summer Operations check-in
- Dworshak operations
- Libby operations
- System Status
- Temperature/flow and 200 kaf

1. Greetings and Introductions.

The June 15 Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Donna Silverberg, who led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at today's meeting. Anyone with questions or comments about these notes should contact Henriksen at 503/808-3945.

2. Hanford Reach Update.

Russell Langshaw reported that the 2005 Hanford Reach fish protection program ended yesterday, June 14. During the past two weeks, there were a few misses; we slightly exceeded the 30 Kcfs flow band on May 31, and also on June 7. Average flow for the week ending June 5 was 112.1 Kcfs; for the week ending June 12, it was 115.7 Kcfs. As promised, we did do an additional weekend of the protection operation, on June 4 and 5, maintaining a minimum of 108.7 Kcfs at Priest Rapids, Langshaw said. On May 30, Bonneville provided an estimate of 100 Kcfs out of Chief Joseph, but actually provided 102 Kcfs, said John Wellschlagler. Since you've reached the temperature unit thresholds, I take it that this will be your last weekly report for 2005? Henriksen asked. Correct, although I will be providing a final post-season report, Langshaw replied. I'll post it to the TMT website once it's available, said Henriksen.

3. Priest Rapids Flows.

Things are looking good, said Tony Norris – we said we would be at 120 Kcfs at Priest Rapids last week, and actually delivered 124.8 Kcfs. It looks as though we'll be able to maintain 120 Kcfs through the end of June, as Grand Coulee touches full, he added. That works for us, said Paul Wagner.

4. Sea Lion Presentation.

Robert Stansell led this presentation, titled "Evaluation of Pinniped Predation in the Bonneville Dam Tailrace, 2002-2005. Using the overhead projector, he touched on the following topics:

- Bonneville Dam location (map)
- Historic perspective – Lewis and Clark documented the presence of marine mammals, primarily harbor seals, all the way up to Celilo Falls, at the beginning of the 19th century
- Location of pinniped observations, Bonneville Dam, 2002-2005 (map)
- Objectives: seasonal timing, abundance of pinnipeds, estimate number of salmonids consumed
- Seasonal distribution of pinnipeds at Bonneville, 2002-2005 (observations began in February, ended on June 10)
- In 2002, there were 58 days of observations; that increased to 101 days in 2005
- Abundance estimates – increased from 30 in 2002 to 80-90 individuals in 2004 and 2005
- Maximum and mean pinnipeds observed – daily max increased from 14 in 2002 to 43 in 2005; the daily mean increased from 5-6 in 2002 to 21 in 2005
- Number of days individual pinnipeds present – mean days increased from 4.7 in 2002 to 8.4 in 2005; the range of days increased from 1-14 in 2002 to 1-39 in 2005
- Predation impacts at Bonneville Dam – photos of sea lions eating salmon, sturgeon and lamprey
- Estimate of the number and percent of salmonids caught by pinnipeds at Bonneville Dam from January 1-May 31 – 929 fish, or 0.3% of total population in 2002, increased to 3,052 fish, or 3.6% of the total population, in 2005. Stansell emphasized that these numbers are based on actual observations in the Bonneville tailrace only.
- Percent of salmonids that were caught (by pinnipeds) but escaped – decreased from 11.9% in 2002 to 0.8% in 2005
- Number of salmon passing and number taken by pinnipeds at Bonneville, 2002, 2003, 2004 and 2005, by week (graphs) – the take-home message is that the sea lions arrived earlier in 2004 and 2005, and stayed longer
- Percentage of salmonids caught by pinnipeds, by location and percentage

of salmon passing – the majority of fish caught at Powerhouse 2 (45%), but significant numbers (33.2% and 21.8%) caught at Powerhouse 1 and in the spillway, respectively

- Salmonid catch rate at Bonneville Dam (table)
- Prey taken by pinnipeds – primarily spring chinook, followed by lamprey, shad, steelhead, smolts, bass, sturgeon, sucker and Northern pikeminnow. The prey percentage accounted for by lamprey increased from 5.4% in 2002 to 25.1% in 2005.
- Number of highly identifiable pinnipeds that were seen to return to Bonneville in subsequent years – in 2004, 11 of 16 sea lions originally seen in 2002 and 36 of 72 originally seen in 2003
- Entered fishways in 2005, the first time this behavior has been seen
- More haul-out sites in 2005
- Sea lions entering fishways – one individual, C404, entered one or both Bonneville fish ladders every day from March 11 to March 31. A total of 9-10 different sea lions were observed in one or both of the fishways in 2005
- Actions to keep sea lions out of fishways at Bonneville Dam, 2005 – harassment (above-water pyrotechnics, rubber bullets, high-pressure water), acoustic deterrent, entrance exclusion gates.
- Results of 2005 hazing – initial hazing effective, lost effectiveness over time; high-pressure water not effective due to distance to target; acoustic deterrent was effective (installed April 21, no sea lion observed above that area since); sea lion exclusion devices (SLEDs) installed by May 30.
- Results of tailrace hazing (rubber bullets and above-water pyrotechnics) – sea lions chased out of tailrace initially, returned within hours of stopping hazing

Stansell offered the following summary points:

- Pinnipeds arriving earlier each year
- Individuals staying for longer period
- Increasing average number of pinnipeds/day
- Increasing number of salmon taken
- Increased percentage of lamprey in diet
- Number of salmon escaping decreasing

What's the population trend for California sea lions? asked Dave Statler. the total population is 200,000-300,000, as high as it's ever been, and increasing by 10% a year, Stansell replied. In response to another question, Stansell said NOAA has found an effective way to deal with the Ballard Locks sea lion problem. They tried relocating the sea lions to as far away as California, but they just swam back. Eventually, the problem sea lions were taken to Sea World in Orlando. Now they use an acoustic barrier that effectively discourages "naive" animals. Sea lions typically live into their teens, or even into their 20s, he said. Stansell added that, while the California sea lions are a healthy population, their larger relatives, the stellar sea lions, are threatened.

Are there any other plans for the future, in terms of discouraging sea lion predation? Wellschlagler asked. There are obviously some policy-level challenges and issues, replied Rock Peters; the Corps needs to sit down with NMFS and others to work on our options. It's going to take some time, he said.

5. Summer Operations as a Result of the Recent Court Ruling.

Henriksen said that, as the TMT is aware, Judge Redden issued a ruling last week ordering the Corps to spill this summer at the four Lower Snake projects and at McNary. Usually we don't spill at three of the Snake River projects during the summer, but this year, we will, she said. The SRWG met Monday, to discuss the ongoing RSW research at Lower Granite and Ice Harbor. They haven't yet given us their final recommendation, but it will have an effect on the summer spill program, she said. Our default spill pattern at Little Goose and Lower Monumental will be the pattern identified in the Fish Passage Plan, unless FPOM decides there is a better pattern to use, she said. A group will be going to Vicksburg to examine that question using the physical models.

The order from the court was that we spill all river flow above that needed for station service, Henriksen continued; that means we would be operating one unit at each project at the low end of peak efficiency. Those minimum generation requirements are 9.5 Kcfs at Ice Harbor, 11.5 Kcfs at Lower Granite, Little Goose and Lower Monumental, and 50 Kcfs at McNary. The Corps has some concerns that this volume of spill at Lower Monumental will exceed the state TDG standards. At yesterday's Water Quality Team meeting, it was made clear that the regional forum participants do not want to see the state standards exceeded, she said.

For the operation, which will begin Monday, our proposal is to begin fairly conservatively at Lower Monumental, and implement an operation that will bring us gradually up to the 120%/115% state standards without exceeding them, Henriksen said. We will then modify the operation to get as close to the state standards as possible. A meeting with plaintiffs is scheduled for Thursday or Friday, at which we will present our proposal and discuss it, she added. Tom Lorz noted that the plaintiffs have made it clear in their declarations and briefs that they want to see spill up to, but not in excess of, the state water quality standards.

Based on SYSTDG model runs and our experience on the river, given current flow of about 40 Kcfs in the Snake, the spill quantities above the station service minimum probably don't raise red flags for us, except at one project, Henriksen said. We know Lower Monumental generates dissolved gas. The starting quantity of spill at that project will probably be 10-15 Kcfs, about half of total river flow above station service. We'll work up from there, she said – it's easier to work up than down, after an exceedence occurs. So at all projects,

you'll spill as per the court order, with the exception of Lower Monumental? Ron Boyce asked. That's the plan, said Henriksen – we don't want to begin with an immediate exceedance at Lower Monumental. We will check the data every day and make adjustments accordingly, Henriksen added.

What's the model prediction, in terms of tailwater TDG levels, if Lower Monumental spills 10-15 Kfs? Margaret Filardo asked. The model results are based on the bulk pattern at normal operations, Laura Hamilton replied. We have not had field experience with summer spill operations at that project before, so we don't know the percent of predictive error. The model is based on observed data and conditions. If we spill at 10-15 Kcfs, the model predicts a 12-hour average of 120-124%. If we spill total river flow, that percentage increases to 121-125%. Again, however, we don't know the percent of predictive error associated with these model results, said Hamilton.

Based on my discussion with Washington's WQT representative, I had thought this discussion would take place at yesterday's meeting, said Bill Tweit – evidently it did not. Is the Corps' preferred spill alternative the recommendation of the Water Quality Team as well? We didn't discuss model reliability, replied Filardo; the question the Corps asked at that meeting was, should the water quality standards be exceeded? Jim Adams added that both WDOE and ODEQ made it clear at yesterday's meeting that they did not want to see the state TDG standards exceeded during this operation.

I don't see a lot of difference between the model results for spill of 10-15 Kcfs and spill of total river flow above the station service minimum, Tweit observed. The equations in the model are built on a flat flow, not a bulk flow, Hamilton replied. Also, during the summer, we would be spilling 65-80% of the river. We don't have the data to tell us what will happen under those conditions, she said, so we're taking a more conservative approach, in accordance with the guidance from ODEQ and WDOE. Our recommendation is to start at a lower percent of spill – about 50% of total river flow, at least initially, Henriksen added.

It seems to me that the guidance you got from WDOE at yesterday's WQT meeting was to go into the summer spill program incrementally, said Tweit – what I'm not hearing, in your presentation today, is how you think your preferred alternative is responsive to the direction you got from WDOE. I believe the Corps is trying to balance its operation to spill as much as possible while staying within the state water quality standards, said Wellschlager – they're trying to hedge a bit, in laying out the best scientific information they have, currently. I should also make clear that the SYSTDG model is only one of many tools we use to set our daily gas caps, Hamilton said. I think what Laura is saying is that, in-season, the Corps compares the model output to actual data to generate predictive error, observed another participant. That's correct, said Hamilton – sometimes the model predicts high, and sometimes it predicts low. I look at that predictive error daily in-season to calculate the spill caps, she said.

To summarize the Washington recommendation, it sounds as though you would like us to start at a lower spill volume that will get us close to the 120% tailwater TDG limit at Lower Monumental, but will not exceed it, Henriksen said. That's a fair summary, said Tweit. We would also expect the action agencies to use the available data on a daily basis to get us as close as possible to the state TDG standard, he said. Absolutely, Henriksen replied – that is the intent. Will the Corps be developing a written proposal that can be reviewed regionally? Lorz asked. We'll have something on the table tomorrow or Friday, whenever the conversation with the plaintiffs occurs, said Peters.

Does Oregon have any comments? Silverberg asked. We'd like to see the Corps' written proposal before commenting, Boyce replied. CRITFC, too, will provide technical review once a written proposal is available, said Lorz. David Wills said the Fish and Wildlife Service defers to the states, with respect to whether or not to exceed the state water quality standards. If the states agree that this is the best way to implement this operation, I think we would defer to that as well, he added. NMFS supports the concept of staying within the TDG waivers, said Paul Wagner – how we get there remains to be seen. Jim Litchfield said Montana agrees with the concept of structuring the summer spill program to avoid exceeding the state water quality criteria. Bonneville agrees with that concept as well, and with the concept of coming up to the TDG standards gradually, said Wellschlager. Tony Norris said Reclamation, too, supports staying within the water quality standard.

Will the RSW research at Lower Monumental and Ice Harbor go ahead as planned? Litchfield asked. That is still being discussed within SRWG, but some level of research will probably proceed in 2005, Henriksen replied. There is also the question of spill pattern – bulk vs. flat. We will have a starting proposal at tomorrow's meeting, she said. Have you evaluated the impacts of this operation once summer flows begin to recede? Tom Haymaker asked. We'll be evaluating that as the season proceeds, Henriksen replied.

6. McNary Operations.

This was put on our agenda as a result of the upcoming timeline, said Henriksen; normally, around June 20, we switch from a spring operation to a summer operation, which means stopping spill and starting transport, once "springlike" conditions end – total river flow declines under 220 Kcfs, and tailwater temperatures increase to 62 degrees F. Under the court order, McNary, too, is ordered to spill all river flow above the 50 Kcfs project generation minimum, beginning July 1. We would like to hear what the TMT thinks about McNary operations, she said.

The issue with respect to transport is that, normally, once "springlike" conditions are no longer present, all fish collected would be transported, said

Wagner – the question is, when should we begin transport at McNary? The Fish Passage Plan uses the 62-degree criteria to describe “springlike;” the TMT annually has to decide when we get there. I don’t think we’re there yet, said Wagner; conditions still seem to be adequate for the safe passage on in-river fish. I would suggest that we check in next week to see whether the 62-degree criteria has been exceeded, he said. Adams noted that current flows at McNary are about 170 Kcfs, significantly below the 220 Kcfs volume that is the other criteria used to define “springlike” conditions. Again, we feel that conditions are still adequately “springlike” to allow safe in-river passage, Wagner replied.

No TMT objections were raised to Wagner’s suggestion that the commencement of the McNary transport operation be deferred, at least until next week. Bonneville agrees, but if we see tailwater temperatures start to rise, to 62 degrees or above, we feel it would be appropriate to convene an immediate TMT call, said Wellschlager. It was agreed to schedule a TMT check-in call for next Wednesday, June 22.

7. Dworshak Hydro and Water Temperature Modeling.

Kyle Martin led this presentation (hot-linked to today’s agenda on the TMT homepage). He said the intent was to get a head start on the question of how the salmon managers would like to see Dworshak operated in 2005. We looked at three different scenarios, he said. Martin’s presentation touched on the following topics:

- Introduction
- Weather assumptions – mean monthly temperatures and departures, based on the historic record, ENSO and the PDO. According to long-term predictive tools, the summer of 2005 will likely be slightly warmer than normal
- Highlights of proposal: Nez Perce Tribe/Idaho (draft to elevation 1535 by August 31, then to 1520 by September 30); TMT 2004 plan (blend of Nez Perce Tribe/Idaho and BiOp plans); 2000 BiOp plan: draft to elevation 1520 by August 31
- Nez Perce Tribe/Idaho plan – Dworshak seasonal flows and Dworshak elevations, by week (graphs)
- TMT 2004 plan – Dworshak seasonal flows and Dworshak elevations, by week (graphs)
- 2000 BiOp plan – Dworshak seasonal flows and Dworshak elevations, by week (graphs)
- CRITFC modeling results – Dworshak and Lower Granite outflows, by month, and days of water temperatures greater than 20 degrees C at Lower Granite, NPT/ID, TMT 2004 and 2000 BiOp plans. Results: 19 days of temperatures >20 degrees C between July 1 and August 15 under the NPT/ID plan, zero days of exceedence August 16-September 30. TMT 2004 plan: 10 days of temperatures >20 degrees C between July 1 and

August 15; zero days of exceedence thereafter. BiOp 2000 plan: zero days of exceedence for the July 1-August 31 period; 6 days of exceedence during September.

- Water temperatures, June 12-September 30, under the NPT/ID, TMT 2004 and 2000 BiOp plans (graphs)

Martin then offered the following conclusions:

- BiOp plan: drafts in July will lower lake levels at the fastest rate. High outflows in early July will slow Clearwater juvenile salmon growth. Benefits lower Snake River flows during July. Impacts late-migrating Clearwater juveniles and adults, especially with high water temperatures in September.
- TMT 2004 plan: drafts in July will lower lake levels, but not as fast. Modest rises in mid-July flows are followed by a stepwise reduction in August. September has a 157 kaf carryover from summer flows – not as much as prescribed in the NPT/ID plan, which calls for a 200 kaf carryover.
- Nez Perce Tribe/Idaho plan: better-timed outflows benefit juvenile and adult salmon while providing cooler water for the Lower Snake through September. Lake levels stay higher, longer.

Martin emphasized that this is only the beginning of the Dworshak modeling effort; he invited any TMT participants who would like to see different scenarios modeled to contact him directly. Litchfield observed that, given the fairly rigid operational criteria built in to each of these operational scenarios, he doesn't see a great deal of value to this modeling effort. Wellschlager replied that the value he sees is in predicting the temperature response at Lower Granite, given current weather conditions, river flow and Dworshak operations. We've learned that it is more effective to anticipate when temperatures begin to spike, he said, and to stay on top of that situation, rather than trying to cool things down after they've heated up. These results also show that July and the first week of August is likely to be the problem period, said Wagner, and gives us an opportunity to borrow water from the volume reserved for use in September if the temperature problem becomes severe.

I appreciate Kyle's work on this, said Henriksen; it's a good time to begin considering how we want to use Dworshak this year. I would remind the TMT that, under the Snake River Basin Adjudication agreement, 200 kaf of Dworshak storage is reserved for the Nez Perce Tribe for use during September. While that agreement has not yet been signed by the Department of Interior, the intent is to do a dry run this summer, she said, so it's a good time for folks to start thinking about how we want to operate Dworshak, particularly during the late-summer period.

Wagner added that it may make sense for the TMT to start thinking about Dworshak's release temperature; we may want to go to a cooler outflow before the end of June, he said.

8. SOR 2005-15.

On June 2, the action agencies received SOR 2005-15. This SOR, supported by USFWS, IDFG, ODFW, WDFW, NMFS, the Nez Perce Tribe and CRITFC, requests the following specific operations:

- According to the Fish Passage Plan, page LWG-10, paragraph 8, "When a head differential of 1.5' is reached, the respective turbine unit should be operated at a reduced loading, not more than 110 MW... clean VBSs as soon as possible." The salmon managers recommend that the COE operate to these specifications. We also recommend that the project follow up with video monitoring of the VBSs after raking trashracks to ensure that they are clear of debris.

Henriksen said the SOR raises the question of whether or not Lower Granite was operating within the Fish Passage Plan criteria; we checked, and one of the units had a head differential of 1.4 feet. We reduced loading on that unit over the weekend; by the following week, mortality decreased. Late last week, there was another incident of increased mortality.

With respect to upstream hatchery releases, some of the fish involved in last week's mortality incident were quite small, Henriksen said. That's the information we're getting from Lower Granite, added Larry Beck – the fish arriving at the project were much smaller than normal. I spoke with the Fish Passage Center and others, and queried the FPC database, said Wills; one group of subyearling spring chinook, 870,000 fish, from the Nez Perce Tribal Hatchery, had to be released early due to local flooding, and those fish were smaller than normal. None of those fish were PIT-tagged, but other fish released at the same time – 390,000 fall chinook -- were. Some of those tagged fish subsequently showed up at Lower Granite, so obviously some of the smaller spring chinook were arriving at Lower Granite during the period in question, Wills said.

Is there a system in place to warn the project personnel when these types of emergency releases of smaller fish occurs? Wellschlager asked. In this instance, it would have been helpful to the project to have a heads-up. It is reported on the FPC homepage, replied Filardo, but I wouldn't characterize the Nez Perce Tribal release as extraordinary. I think what John is saying is that, with some advance warning, the personnel at Lower Granite could have cleaned the screens and trashracks before those fish arrived, said Norris. Cathy Hlebechuk added that, in the future, it would be helpful if the salmon managers would communicate directly with the Corps if they have concerns about whether or not

a project is in criteria, before putting those concerns in the form of an SOR. It sounds, too, as though the action agencies would like to be notified when emergency releases of smaller hatchery fish occur, said Silverberg. After a few minutes of additional discussion, Wills agreed that there are no current fish mortality problems, and that, in his view, Lower Granite can return to normal operations. It was agreed that notification of early release of fish will occur via email.

9. Operations Review.

Henriksen said reservoirs are generally quite full, and due to continued precipitation, inflows are still quite high. Transmission system limitations are impacting Libby and Dworshak operations; we are running Libby at full powerhouse capacity. Libby is at elevation 2450, currently, with inflows of 35 Kcfs. Inflows will likely not drop below powerhouse capacity until early July, at the soonest. Inflows could be as high as 50 Kcfs by late June, she said, and powerhouse capacity at Libby is about 25 Kcfs.

Hungry Horse is at 3558.4 feet, said Norris; inflows continue to be high at that project as well. The project is releasing 3.6 Kcfs. Grand Coulee is at 1283.7 feet and filling nicely, with 160 Kcfs inflow. There is good news on the Upper Snake; it now looks as though we will have at least 321 kaf to release from the Upper Snake this summer, and that could increase to 400 kaf+. We may even get some water out of the Owyhee system this year, he added.

With respect to the Priest Rapids targets, generally, we can stay pretty reliably within 5 Kcfs of the target, said Wellschlager. However, because all of the reservoirs are full, if we get a significant precipitation event, there is nowhere to put that water, and we will have to increase Priest Rapids outflows.

Litchfield said Montana is still discussing summer operations at Libby and Hungry Horse; Montana is interested in stabilizing September operations to the greatest extent possible. I'll hope to have something concrete for TMT review at our June 29 meeting, he said.

Henriksen said Dworshak is at elevation 1598.9 feet; inflow continues to be in excess of 5 Kcfs. The project is releasing 4.3 Kcfs, currently; again, transmission system limitations are impacting our operational flexibility at Dworshak. The limitation is due to the need to clean insulators on a line in the Flathead Valley; the insulator-cleaning operation is expected to continue for about two more weeks.

Henriksen said Lower Granite flows are about 50 Kcfs and receding, currently; McNary flows were 169 Kcfs yesterday.

Moving on to fish, Wagner said that, according to the most recent fish passage indices, for combined yearling chinook, we're at the tail end of the run, with index numbers falling dramatically at the Lower Snake projects. With respect to subyearlings, about 1.5 million have passed Lower Granite to date, which is a very large number for this time of year. McNary indices, primarily Hanford fish, have been running about 50,000 fish per day. The bulk of that run is yet to come. For combined steelhead, again, we're at the tail end of the outmigration, Wagner said.

With respect to adult passage, Tweit said WDFW is heartened by the increased counts at Bonneville, mostly upper Columbia summer chinook. It looks as though the spring run accounting will end up at about 100,000 fish, far below the pre-season prediction, but better than the worst-case scenario. For spring chinook, the Ice Harbor count continues to be awful, but the Upper Columbia run looks better. Willamette counts continue to be fairly poor as well, so there is some indication that the problem is systemwide. What brood year isn't showing up this year? Beck asked. According to the initial scale data, most of the returning fish were 4s, Tweit replied; that means 5s and 3s were almost totally absent.

Wellschlager said the Columbia Generating Station is now back online. With respect to water quality, Hamilton said there have been only three exceedences in the past two weeks.

10. Next TMT Meeting Date.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, June 29. It was agreed to convene a TMT conference call on June 22.

**TMT Participant List
June 15, 2005**

Name	Affiliation
Cindy Henriksen	COE
John Wellschlager	BPA
Paul Wagner	NMFS
Jim Litchfield	Montana
Ray Gonzales	COE
Tony Norris	USBR
Donna Silverberg	Facilitation Team

Lee Corum	PNUCC
Laura Hamilton	COE
Jim Adams	COE
Margaret Filardo	FPC
Dave Benner	FPC
Larry Beck	COE
Glenn Traeger	Avista
Mike Buchko	Powerex
Robert Stansell	COE
Dave Statler	NPT
Bill Tweit	WDFW
Cathy Hlebechuk	COE
Tom Haymaker	PNGC
Tim Heizenrater	PPM
Dan Spear	BPA
Russ George	WMCI
Ruth Burris	PGE
Robin Harkless	Facilitation Team
Kyle Martin	CRITFC
Martin Hatscher	SCL
Keith Kutchins	SBT
David Wills	USFWS
Steve Haeseker	USFWS
Bob Heinith	CRITFC
Rock Peters	COE
Tom Lorz	CRITFC
Ron Boyce	ODFW

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday June 22, 2005 0900 - 1100 hours

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97208

Conference call line: 503-808-5190

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*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@cmm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions.
2. Summer Operations as a Result of Recent Court Ruling.
3. Dworshak Water Temperature - Kyle Martin
 - [\[Update...model of Dworshak Summer 2005 Operations\]](#) 
4. McNary Spill and Transport.
5. Feedback on Emergency Protocol
 - [\[DRAFT - 06/29/2005\]](#) 
6. Other
 - Set agenda for next meeting - [\[Reference Calendar\]](#) 

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

Update...model of Dworshak Summer 2005 Operations



Kyle Martin

Senior Hydrologist

June 22, 2005

Columbia River Inter-
Tribal Fish Commission

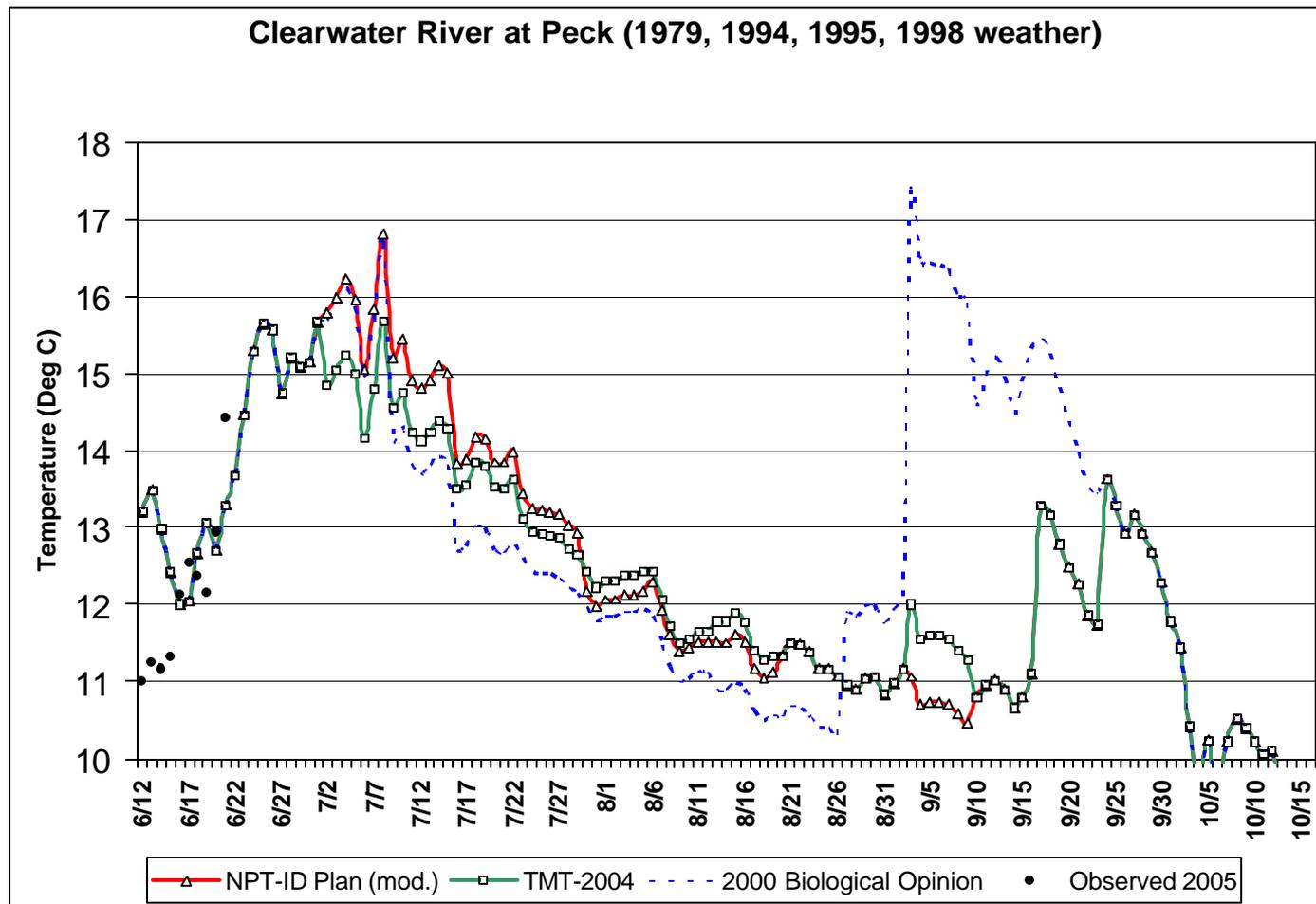
CRITFC Modeling Results



Dworshak Scenarios	NPT-ID	TMT-2004	2000 BiOp	NPT-ID (mod.)
	1	2	3	4
Jun27 - Jul3	3200	5000	3200	3000
Jul 4 - 10	6400	8700	10000	7000
Jul 11 - 17	7000	11000	14000	10000
Jul 18 - 24	10000	12000	14000	11000
Jul 25 - 31	11000	12000	14000	13000
Aug 1 - 7	14000	11500	14000	12000
Aug 8 - 14	12000	10000	14000	11000
Aug 15 - 21	11000	10000	14000	10000
Aug 22 - 28	11000	10000	7000	10000
Ag29 -Sep 4	10000	7000	1400	10000
Sep 5 - 11	8290	7000	1400	7000
Sep 12 - 18	3000	3000	1400	3000
Sep 19 - 25	1400	1400	1400	1400
EPA modeling (LWG):				
Days > 20 degC:	NPT-Idaho	TMT-2004	2000 BiOp	NPT-ID (mod.)
July	11	7	0	11
August 1-15	8	3	0	3
August 16-31	0	0	0	0
September	0	0	6	0
HDD (base 20degC):	13.6	2.5	1.1	5.1

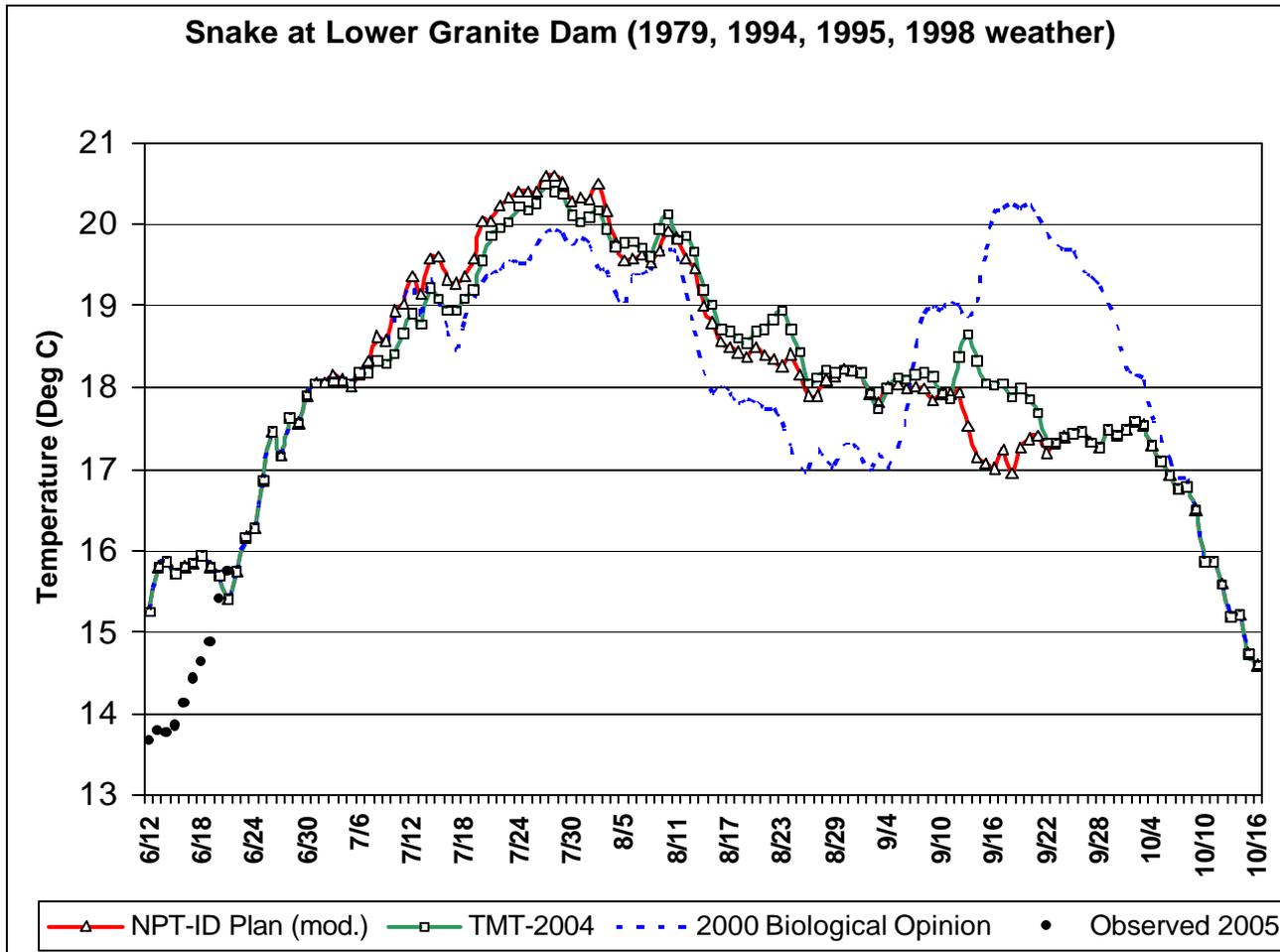
Water Temperature

(Courtesy of Ben Cope, EPA-Seattle)



Water Temperature

(Courtesy of Ben Cope, EPA-Seattle)



DRAFT

Operations to Correct Short Term Transmission Instabilities

The Action Agencies (AA) worked with the plaintiffs to develop a summer spill implementation plan to implement the court order. It is the AA intent to implement the court order as laid out in this plan. However, for short term transmission instability problems, the AA would like input on the biological effects of implementing measures listed below to correct instabilities. This is not a prioritized list.

Request 1 foot more of tailwater at BON (90 Mw's)

Spill at MCN if available during the day

Generate at MCN above minimum powerhouse at night

Increase generation at DWR to 10 kcfs

Increase generation at MCN to operation outside 1%

Reduce spill at BON to 0kcfs (337 Mw)

Reduce spill at JDA to 0 kcfs (225 – 450 Mw's)

Shut spill bays 1 & 2 at TDA's (66 Mw's)

Reduce spill at IHR to 0 kcfs

Reduce spill at LMN to 0 kcfs

Reduce spill at LGS to 0 kcfs

Reduce spill at LWG to 0 kcfs

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

June 22, 2005

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.

Summer Operations as a Result of Recent Court Ruling

The action agencies began summer spill operations at the lower Snake dams at midnight on Sunday, June 19, operating to minimum station service. The COE's water quality experts continued to monitor TDG and made adjustments to operate to spill caps at the projects. Per discussions at the last TMT meeting, Lower Monumental was operated at 12 kcfs initially, and was ramped up to the current 20 kcfs, about 118.5% TDG, on Monday afternoon (6/20). After coordinating via conference call with the Plaintiffs earlier this week, the COE is operating up to two units if needed to adjust to high flows in the system.

Dworshak Water Temperatures

Kyle Martin, CRITFC, presented modeling for a Dworshak operation modified from the Nez Perce/Idaho proposal, per request from the salmon managers after the last TMT meeting. The model shows that moving additional water out of August into July results in the same number of temperature exceedance days, but to a lesser degree. The salmon managers said they had no suggestions at this point for additional modeling, but welcomed any models that the action agencies might want to run.

McNary Transport/Spill

The salmon managers discussed and agreed that because there temperatures are at or above 62° F and flows are less than 220 Kcfs at McNary Dam. The 2004 BiOp and Corps Fish Passage Plan prescribe eliminating voluntary spill and maximizing transportation at McNary Dam under these conditions. Given that spill has been initiated at the Snake River collector projects and will begin at McNary Dam on July 1, the Salmon Managers did not oppose reducing voluntary spill levels and beginning transport at McNary Dam in order to strike more of a balance and spread the risk between in-river and transported fish operations. BPA shared that there will be some involuntary spill during this time, and requested to go to 24-hour average spill instead of 12-hour nighttime to allow BPA to manage load. Researchers at the project recommended that if there is involuntary spill, the operation remain consistent (whether it is 24-or 12-hour spill periods). One initial recommendation from the salmon managers was to follow the operation described in the Fish Passage Plan concerning spill levels greater than 20% being the criteria for 24 hour spill.

ACTION: After talking further with researchers at the project, Cathy Hlebechuk, COE, will send an email to TMT members confirming the researchers preferred shaping for involuntary spill at the project. Oregon noted that the operation should be driven by what is best for the fish.

Operations to Correct Short Term Transmission Instabilities

John Wellschlager, BPA, presented a first-cut draft of a prioritized list for operations should there be sudden transmission instabilities during implementation of the summer spill plan. The action agencies noted that they are committed to the court ordered spill operation and, transmission instabilities have occurred that forced slight, short term deviations from the intended spill operation: Issues at Hatwai required reduced spill briefly (about 10 minutes) at The Dalles; Chief Joseph generation was cut so a second unit was briefly utilized at Little Goose; and The Dalles was operated briefly (about 10 minutes) outside 1% because divers were doing inspections at the project. In the interest of transparency, the action agencies would like feedback from TMT members on what measures to take should there be future instantaneous transmission instabilities that cause short-term deviations from the intended spill operation. Initial comments from the salmon managers included:

- Provide interim steps to reducing spill at the projects rather than going immediately to zero spill.
- Reduce spill at more than one project before going to zero spill at just one project.
- Develop a list for operations until August, then change the priorities for operations after August 1.
- **ACTION:** The salmon managers will review the list, discuss and share further guidance with the action agencies on the prioritization list, as soon as possible. There will be a check-in on this item at the June 29th TMT meeting.

Other Operations Updates

Tony Norris, BOR, reported that there will be 427 kaf available for flow augmentation out of the Snake River; 1.5 kcfs is being released from Milner through July.

Divers at The Dalles inspecting apron erosion at bays 1 and 2 found that the apron is fine, so spill restrictions at the bays will likely be lifted.

Libby is 5' from full, with 37 kcfs inflows and 24 kcfs out. The action agencies are carefully monitoring the project to avoid fill and spill. When inflows recede, the project will go to a flat flow through August; at this point, the estimated flow will be about 18 kcfs.

Next Meeting, June 29, 9am-noon

Agenda Items include:

- Review notes
- Libby operations
- Dworshak temperatures
- Check in on summer spill per the recent court decision

- Feedback from salmon managers on transmission instabilities priority list
- McNary transport operations

TECHNICAL MANAGEMENT TEAM

BOR: Tony Norris / John Roache

BPA: John Wellschlager / Nic Lane

NOAA-F: Paul Wagner

USFWS: David Wills / Steve Haeseker

OR: Ron Boyce

WA: Cindy LeFleur

ID: Russ Kiefer

MT: Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday June 29, 2005 0900 - 1200 hours
1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208
Conference call line: 503-808-5190

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AGENDA

1. Welcome and introductions.
2. Review notes
[\[Minutes\]](#) 
3. Dworshak Water Temperature and Flow.
 - [\[06-27-2005 - Dworshak Forebay Temperatures \(Forebay Elevation = 1599.5 feet\)\]](#) 
4. Libby Operations
 - [\[Libby & Hungry Horse Operations for July through September - DRAFT - SOR #2005-MT-1 - June 29, 2005\]](#) 
 - [\[Libby Summer Operations - SOR #2005-16 - June 28, 2005\]](#) 
5. Status of Summer Operations as a Result of Recent Court Ruling.
6. Feedback on Emergency protocols
 - [\[DRAFT - 06/29/2005\]](#) 
7. McNary Transport Operations
8. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality -
[\[Spill Information 2005\]](#) 
9. Other
 - Set agenda for next meeting -
[\[Reference Calendar\]](#) 

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

DRAFT

List from 2005 Water Management Plan Appendix 1 – Emergency Protocols

This is not a prioritized list.

Request 1 foot more of tailwater at BON (90 Mw's)

Spill at MCN if available during the day

Generate at MCN above minimum powerhouse at night

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Reduce spill at LMN to 0 kcfs

Reduce spill at LGS to 0 kcfs

Reduce spill at LWG to 0 kcfs

6/27/2005

Dworshak Forebay Temperatures (Forebay Elevation = 1599.5 feet)

Time	Depth (meters)															
	0.5	1.5	3	5	10	15	20	25	30	35	40	45	50	60	80	100
0:00	72.1	72.1	69.8	60.3	50.8	48.6	47.3	46.2	45.3	41.4	40.2	39.9	39.8	39.9	40.0	39.8
1:00	71.9	71.9	67.4	59.1	50.7	48.5	47.3	46.3	45.2	41.5	40.3	39.9	39.8	39.9	40.0	39.8
2:00	71.7	71.2	66.9	59.4	50.7	48.5	47.4	46.6	45.5	41.5	40.3	39.9	39.7	39.9	40.0	39.8
3:00	71.6	70.7	66.3	59.6	50.3	48.4	47.3	46.4	45.1	41.3	40.3	40.0	39.8	39.9	40.0	39.9
4:00	71.1	70.4	67.3	60.1	50.1	48.1	47.5	46.4	45.0	41.4	40.4	40.0	39.8	39.9	40.0	39.9
5:00	71.0	70.0	66.4	58.2	50.0	48.0	47.3	46.4	45.2	41.5	40.4	39.9	39.8	39.9	40.0	39.8
6:00	71.2	70.2	66.9	59.0	50.3	48.5	47.6	46.5	45.2	41.5	40.4	40.0	39.8	39.9	40.0	39.8
7:00	71.2	70.3	65.9	58.2	50.7	48.5	47.6	46.5	45.1	41.4	40.3	39.9	39.7	39.9	39.9	39.8
8:00	71.2	69.6	66.0	58.5	50.5	48.3	47.4	46.3	44.7	41.4	40.4	39.9	39.8	39.9	40.0	39.8
9:00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10:00	70.8	70.0	65.1	56.7	50.1	48.3	47.6	46.6	45.2	41.5	40.2	39.9	39.7	39.9	39.9	39.8
11:00	70.8	69.9	66.0	58.2	50.3	48.4	47.6	46.5	45.0	41.7	40.4	39.9	39.8	39.9	40.0	39.9
12:00	70.8	70.4	66.7	57.9	50.3	48.5	47.4	46.4	44.8	41.3	40.2	39.9	39.7	39.9	39.9	39.8
13:00	71.0	69.9	67.1	57.9	50.3	48.3	47.4	46.4	45.0	41.6	40.4	39.9	39.8	39.9	40.0	39.8
14:00	70.8	69.6	66.6	57.8	50.3	48.6	47.5	46.5	45.4	41.6	40.4	39.9	39.8	39.9	40.0	39.8
15:00	70.6	69.4	66.5	58.3	50.5	49.0	47.6	46.6	45.4	41.6	40.5	40.0	39.8	39.9	40.0	39.9
16:00	70.7	70.1	66.8	58.9	50.6	48.7	47.6	46.5	45.0	41.4	40.4	39.9	39.8	39.9	40.0	39.8
17:00	70.9	70.3	66.6	59.1	50.6	49.0	47.7	46.6	45.2	41.3	40.4	39.9	39.8	39.9	40.0	39.9
18:00	71.0	70.4	67.2	59.4	50.7	49.1	47.8	46.7	45.8	41.5	40.4	40.0	39.7	39.9	40.0	39.8
19:00	70.9	70.1	67.2	59.1	50.7	48.8	47.6	46.7	45.6	41.5	40.4	40.0	39.7	39.9	40.0	39.8
20:00	70.6	70.3	67.7	60.3	50.9	49.0	47.6	46.8	45.6	41.5	40.4	40.0	39.8	39.9	40.0	39.9
21:00	70.8	70.3	67.4	60.9	50.8	48.8	47.6	46.6	45.6	41.5	40.4	40.0	39.7	39.9	39.9	39.8
22:00	70.7	70.1	67.8	59.8	50.7	48.7	47.6	46.6	45.6	41.8	40.5	40.1	39.8	39.9	40.0	39.9
23:00	70.6	70.0	68.4	60.0	50.6	48.7	47.6	46.7	45.7	41.8	40.4	40.1	39.8	39.9	40.0	39.9
	1.64	4.92	9.84	16.4	32.8	49.2	65.6	82	98.4	114.8	131.2	147.6	164	196.9	262.5	328.1
	Depth (Feet)															

Elevation: 1598 1595 1590 1583 1567 1550 1534 1518 1501 1485 1468 1452 1436 1403 1337 1271

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 29, 2005

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.

Comments on Notes

Dave Wills, USFWS, will send suggested changes to the June 22 meeting to Cindy Henriksen, COE, and the revised notes will be posted to the web.

Dworshak Temperatures

The COE provided a graph temperature profile of the Dworshak forebay. The project is currently within 1' from full and filling. While there have been preliminary discussions between the COE and Nez Perce about operations in September, the COE requested additional discussion and feedback from the salmon managers for July and August operations. Dave Wills reported that this issue was discussed at FPAC earlier this week. Given current data and the status of the reservoir, the salmon managers recommended the project release 3-5 kcfs through July 4th, and ramp up to 7 kcfs on July 5th. They requested a follow-up TMT call next week to look at current temperature conditions and make further recommendations about how to proceed. The purpose of today's recommendation was to get ahead of rising temperature issues at Lower Granite.

It was clarified that the recommendation for the weekend would be to pass inflow (~3 kcfs). It was also clarified that the current outflow target temperature is 46-47°, which was acceptable to the salmon managers. The Nez Perce Tribe representative agreed with the salmon managers' recommendation, adding that releasing about 7 kcfs through mid-July would be beneficial. The action agencies agreed to implement the salmon managers' proposed operation, and TMT will revisit the issue during a conference call next week (7/6).

Libby Operations

SOR 2005-MT-1: Jim Litchfield, MT, presented this SOR which is based on the NPCC's recommendation put forth in 2003. Jim noted that last year the operation was implemented and provided excellent conditions for biological productivity. Stable flows were maintained through September, and Montana hopes to continue that effort again this year. The specifications are listed in the SOR, pertaining to Libby, Hungry Horse, and Grand Coulee operations, and there is a section on the ISAB findings from a science symposium held last year on the issue following discussions and implementation of the operation. At Libby, the flat flow through September would equal, from the COE's current estimates, about 13.6 kcfs. At Hungry Horse, the request is also for stable flows to 20' from full at the end of September. Finally, Grand Coulee refill would be limited to 1282-1285', with additional flows passed in September. The Grand Coulee piece

would be negotiated for future years, as Jim noted that, through other discussions, Washington has indicated particular concerns with specifying an elevation limit at that project.

Montana also requested that the action agencies explore water swap options with Canada. At this point, the COE has not been in negotiations about Kootenai Lake, and Cindy Henriksen, COE, noted that a Libby/Arrow swap is not likely this year given the conditions.

The COE reported that high inflows are continuing at Libby; the project is being held at full powerhouse and the COE is working to avoid fill and spill. Montana offered support for the current operation and does not suggest moving into the proposed operation while flows remain high. The Kootenai Tribe in Idaho and Salish Tribe in Montana support the Montana proposal and will likely sign on. This operation, with the intent of flat flows, would support implementation of the Kootenai Tribe's nutrient study.

NOAA responded that it needs to analyze the request in the context of this year's conditions, with more spill and more fish in the river. NOAA will run the model and have a rough analysis to report on next week. Montana cautioned that it will be difficult to analyze the operation's impacts on lower river fish without flow survival and other data. The COE will provide NOAA with current flow projections to use in the SIMPASS model. Jim Litchfield will request information from Brian Marotz, MT Fish Wildlife and Parks, on the requested operation's impacts/benefits to bull trout. It was noted (and some TMT members agreed) that the results of the analyses will be difficult to detect, and that the decision might be a policy call.

It was clarified that the Grand Coulee elevation range of 1282-1285' was incorporated to provide flexibility for BPA to operate the project. Another comment was made that in the proposal, 'normative' river should actually read 'flat'. Finally, BPA offered that the Montana proposal should pose no impact on rate payers.

SOR 2005-16: The USFWS and CRITFC presented this SOR, requesting that the action agencies operate Libby to maintain stable outflows while drafting to 2439' by August 31. Dave Wills, USFWS, suggested that this SOR is in line with the COE's previously stated intended operations. This, Dave clarified, is a technical recommendation, not a policy call. The operation is not intended to negatively impact bull trout, though Montana said there are concerns that this operation would potentially be harmful to bull trout, by removing nutrient sources without a flat flow in September. Jim Litchfield expressed frustration, saying that Montana would like to work with the USFWS to meet the needs of the fish, but at this point has not been successful. Dave Statler commented that nutrient deficiencies at Libby and elsewhere should be considered.

This SOR does not address Hungry Horse operations. At this point, the salmon managers were not prepared to comment on Montana's proposed Hungry Horse operations and will look at the proposal further. The action agencies commented that ramp rates are very restrictive at Libby.

ACTION: While some TMT members felt that how to implement Libby operations this year may be a policy decision, the group agreed that it would be important to gather as much useful information as possible, and will meet next Wednesday, July 6, to look at information and further

discuss the operating options. The following action items will be completed to help aid in that discussion:

- The COE will engage in discussions with Canada about the possibility of a water swap through Kootenai.
- NOAA will run a SIMPASS model with current flow projections and current conditions to analyze the Montana proposal and its potential impacts on Fall Chinook.
- Montana will gather information on how the proposed operation would impact/benefit bull trout.
- TMT members will notify their IT representatives that there may be a need for an emergency IT meeting next Thursday, July 7 (the IT changed their regular July meeting date to 7/14). Many thought the need was unlikely given the continuing high flows at Libby.
- The COE will continue to operate Libby to full powerhouse, avoiding fill and spill, while inflows remain high. If a reduction is needed between now and next Wednesday, outflows will drop to about 20 kcfs. Operations will be adjusted if needed based on Libby discussions at the July 6 TMT meeting.

Status of Summer Operations

The COE reported that spill began on June 20 at Lower Granite, Little Goose, and Lower Monumental, and spill changes were made at Ice Harbor. Graphics were provided, showing power generation, spill caps, and tailwater and forebay TDG at each of the projects. The COE's objective at each project is to spill to the gas standard. Adult passage issues at Little Goose have prompted the action agencies to work with the Plaintiffs to find an operation that will help the fish find the ladders and pass the dam. Per those discussions, the COE is operating Little Goose at 50% generation, 50% spill from 5am-9pm, then spilling to the gas cap at night; this operation seems to be working so far. Lower Granite and Ice Harbor are alternating operations for RSW tests as well. Lower Monumental is spilling to the gas cap. McNary spill is set to begin on July 1, with 50 kcfs through the powerhouse and spill to the gas cap. The COE will continue to graph the operations and present them to TMT at future meetings.

Jim Adams, COE, noted that exceedances have been occurring at the forebays, particularly at Lower Monumental and Ice Harbor. The COE expects that gas caps may need to be reduced due to this under-estimation, and will continue to make adjustments day to day. TMT members expressed appreciation for the COE's efforts with summer spill operations this year.

Feedback on Emergency Protocols

As follow-up from last week's TMT meeting, it was clarified that the priority actions list relate to the emergency protocols, finalized in 2004 in Appendix 1 of the WMP. The list presented is specific to this water year and the action agencies would like feedback from the salmon managers so operators can use the list as guidance in the event that a short-term emergency occurs in the system. John Wellschlager, BPA, said that the list will need to be used at some point, and that certain instances will require taking action further down the list.

The salmon managers have had some discussion and will provide more definitive feedback/a revised list before the next TMT meeting. At this point, they suggested that actions should provide tiered reductions in spill at more than one project before reducing spill to zero at one

project. It was clarified that ‘short term’ is less than half a day, and that if a longer-term emergency occurred, TMT would hold an emergency meeting to discuss the issue.

McNary Transport Operations

McNary transport operations began on June 20, with a minimum of 20 kcfs spill for 24 hours and some involuntary spill with the high flows. The project will begin spilling to the gas cap on July 1.

System Operations Review

Reservoirs – Libby is passing inflows, and expected to do so through next weekend. The project is within 2.5’ from full and filling. Grand Coulee is at 1288.2’ and is expected to reach full on Monday, July 4. Hungry Horse is at 3559.7’. The BOR is providing 427 kaf for flow augmentation this year.

ACTION: Tony Norris, BOR, will provide the break-down of the flow augmentation numbers at a future TMT meeting. This will meet the Nez Perce agreement.

Dworshak is at 1599.7’ and passing inflow over the weekend (inflows were 3.7 kcfs on 6/28). Season average flows at Priest Rapids were 119 kcfs, 195 kcfs at McNary, and 66 kcfs at Lower Granite.

Fish – Juveniles: Subyearling numbers decreased just after spill began, as did yearling numbers, so passage is occurring with the spill operation. McNary subyearling numbers are high; subyearling passage is early this year.

Adults: Adult numbers at Little Goose dropped when spill began, and the action agencies are working with the Plaintiffs to resolve this issue through alternative operations. At this point, there is no single factor that is standing out to explain the difference between the low spring chinook adult numbers and average summer chinook adult numbers, which are tracking as expected (62,400 counted).

Power system – CGS will likely be back on line on July 1. This will be the third attempt to get it up and running.

Water quality – The Lower Columbia has seen just one TDG exceedance, at the McNary forebay.

Next Meeting, July 6 Conference Call, 9:00 am: Agenda items include:

- Libby/Hungry Horse Operations
- Dworshak Temperatures/Operations
- Emergency Protocols List

1. Greetings and Introductions.

The June 29 Technical Management Team meeting was chaired by Cindy Henriksen and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these minutes should contact Henriksen at 503/808-5945.

2. Dworshak Water Temperature and Flow.

Henriksen said that, as this is June 29, tomorrow is the refill date for Dworshak; the project is at 1599.6 and filling. Normally, this is the time of year the salmon managers provide their input on Dworshak temperature and flow. We have been discussing this topic with Dave Statler and the SRBA board, but we wanted to give the salmon managers an opportunity to provide us their feedback, she said.

The salmon managers would like to recommend that Dworshak release 3-5 Kcfs through the weekend, increasing to 7 Kcfs on July 5, Wills said; we will then revisit this topic at a conference call next week. We would like to start to get a jump on the water temperature situation; the current Dworshak release temperature of 46-47 degrees F is acceptable. And is passing inflow over the weekend acceptable? John Wellschlager asked. It is currently in the 3 Kcfs+ range. That is acceptable, was the reply.

Statler said that, from the perspective of the Nez Perce Tribe, passing inflow through July 4 is fine, as is bumping up Dworsahak outflow to 7 Kcfs on July 5. We also think a conference call to review the water temperature situation at Lower Granite on July 6 would be appropriate, he said – we don't want to see water temperatures get out of hand early. The action agencies agreed to implement this operation as requested.

Henriksen noted that a graph showing Dworshak reservoir temperatures is available via hot-link from today's agenda on the TMT homepage.

3. Libby Operations.

Jim Litchfield said that, as promised, Montana has submitted an SOR covering Libby and Hungry Horse operations, requesting operations that closely mirror the Council's recommendations. Last year's operation was excellent; Brian Marotz told me it produced the best biological conditions below the project he has ever seen. This SOR is intended to continue that operation, and produce the same conditions this year.

Litchfield then went briefly through the specifications of SOR 2005 MT-1, which include:

Hungry Horse

- maintain minimum flows for bull trout (expected to be 3.25 Kcfs at Columbia Falls and 483 cfs from Hungry Horse)
- Refill by about June 30
- Fill Hungry Horse by June 30. Following refill, USBR will use its hydrologic models to estimate a flat flow that will draft Hungry Horse by 20 feet by September 30
- Attempt to provide even or gradually declining flows at Columbia Falls during the draft (minimize double peak)
- Limit spill to avoid exceeding the Montana state TDG standard (110%)

Libby

- As inflows drop below current turbine capacity and the reservoir approaches full, establish a flat flow using the Corps' hydrologic model. This model is currently projecting that a flat flow of 13.6 Kcfs would draft Libby to elevation 2439, 20 feet from full, by September 30.
- Operate to provide at least minimum bull trout flows from Libby during September.
- Provide even or gradually declining flows through the summer months (no double peak).
- Investigate the possibility of a storage exchange with Canada to reduce summer flows from Libby.

Grand Coulee

- Limit September refill to elevation 1282-1285 feet to assure that additional September flows from Libby and Hungry Horse are passed through Lake Roosevelt.

The overall goal is to produce the most stable possible operating conditions below Libby and Hungry Horse through the summer period, and to avoid a double peak, Litchfield explained. Essentially, we're asking for a repeat of what we did last year, because it resulted in excellent biological conditions in Montana, he said.

You refer to an exchange with Canada, said Paul Wagner – is that a Libby/Arrow swap? That will be up to the action agencies, Litchfield replied – have there been any discussions with Canada? There have been some, Henriksen replied, but a Libby/Arrow swap is unlikely this year, because Arrow is still 20 feet from full. A Libby/Kootenay swap is possible, but unlikely. We're looking at holding Libby at full powerhouse capacity for another week or so, because the project is two feet from full and inflows are still in the 30 Kcfs range due to recent rain events. Outflows could stay as high as 20 Kcfs through July and August, she added. We understand, said Litchfield; our main concern is to maintain a steady flow once you begin to draft the project. He added that he has

heard this morning that both the Kootenai Tribe of Idaho and the Salish-Kootenai Tribe support this SOR and the operations it requests.

Will it be possible to work out an agreement with the Canadian entities to release more flow in July and August, with the understanding that our releases during September will help their refill? Russ Kiefer asked. Last year the Canadians were willing to limit Kootenay Lake refill in September, Litchfield replied – we'll have to see what we can get them to agree to this year. If the action agencies are willing to limit refill at Grand Coulee to 1285, as requested, that will help anadromous fish flows through the summer period, he added.

Ron Boyce said the salmon managers are concerned about the effects of refilling Grand Coulee from 1278 to 1285 during September on downstream flows. Wagner said NMFS has not yet had time to fully analyze Montana's proposed operation; however, they had an opportunity last year to use SIMPASS to look at flows, temperature and the flow-survival relationship through John Day pool, and the operation had a small negative effect last year. We need to re-run that analysis, and will do so next week, he said; perhaps we can revisit Montana's proposed operation at next week's TMT meeting. One other process issue, he said – the BiOp does have some flexibility in terms of changed operations; however, if that different operation results in a negative impact, are there any plans to provide an offset? Litchfield replied that there are considerable uncertainties inherent in the flow/survival relationship, including the influence of the undetected "holdover" Snake River fall chinook that appear to comprise half of the returning adults for that stock. I think you should do the analysis, he said; the SOR is not time-critical today, given the fact that inflows continue to be so high at Libby. We'll try to have the SIMPASS results by next Tuesday, Wagner said.

What do you expect the SIMPASS analysis to show? Cindy LeFleur asked. I expect to see a larger effect, given the fact that there are more in-river migrants in 2005 than there were in 2004, Wagner replied. The model showed a 1.6% reduction in survival due to the Montana operation in 2004; we expect that will increase, said Wagner. Why did you limit your analysis to John Day? Kiefer asked – won't the effects extend all the way downstream? Yes, Wagner replied; however, John Day is the longest pool, and the most free-flowing mainstem reach. If you're going to see a change in velocity, that's where you would see the greatest impact, he explained. In response to a request from Boyce, Henriksen said it would be possible for the Corps to analyze the potential impacts of Montana's requested operation on flows through the lower river. Wagner said NMFS' analysis showed about a 7 Kcfs reduction in lower river flow as a result of the 2004 operations at Libby and Hungry Horse during July and August.

Kiefer asked whether Montana can provide an analysis of the expected benefits of Montana's proposed operation for listed bull trout in Montana; Litchfield replied that this should be possible. Kiefer observed that, essentially,

implementation of SOR 2005 MT-1 is going to be a policy, rather than a technical, decision; in all likelihood, the decision on this issue is going to be bumped to the Implementation Team. Harkless noted that the July IT meeting has been bumped to July 14, so if a faster decision is needed, it might be a good idea for the TMT participants to inform their IT representatives that a conference call may be needed next week. Montana would prefer to have this issue resolved prior to July 14, Litchfield said.

The group devoted a few minutes of discussion to the September refill target at Grand Coulee; Litchfield noted that whatever refill elevation is achieved will primarily result from natural runoff conditions in the basin, more than human operations. Kiefer observed that, while the SOR frequently mentions the creation of “normative” river conditions; in fact, what is being proposed is a flat flow through September, rather than the steadily-receding hydrograph you would see under natural conditions. That’s true, Litchfield replied. In response to a question, Wellschlagler said Montana’s proposed operation is essentially revenue-neutral for Bonneville.

The discussion then turned to SOR 2005-15. This SOR, supported by USFWS and CRITFC, requests the following specific operations:

- Draft Libby Reservoir to elevation 2439 by August 31

Essentially, the salmon managers, after discussing current and projected in-river conditions and the status of the outmigration, we feel that drafting Libby to elevation 2439 by August 31 would be the most beneficial operation, biologically, in 2005, Wills said. So in the best professional judgement of your agency, this recommended operation would have no negative impact on bull trout? Litchfield asked. None that has been communicated to me, Wills replied. That is quite troubling to the State of Montana, said Litchfield, given the fact that the Fish and Wildlife Service is the agency that is tasked to protect the bull trout – we believe the Mainstem Amendment should be implemented.

What information does Montana have that indicates that Montana’s requested operation would be more beneficial for bull trout? Boyce asked. It would be helpful if we could have an informed discussion of the biological pros and cons of the two alternative operations. We have provided that information in the past, Litchfield replied, and can do so again. However, as Russ Kiefer observed, essentially, this is going to boil down to a policy call. In response to a question, Greg Hoffman said the primary benefit of Montana’s requested operation is increased productivity during September. While that assessment is largely intuitive and anecdotal, because the State of Montana didn’t have the funding to measure river productivity during September 2004, to a biologist, the increase in September productivity was obvious. The problem with the operation requested in SOR 2005-15 is that it maintains a flat Libby outflow of 20 Kcfs during July and August, watering up a significant amount of habitat. It would then

abruptly drop Libby outflow to 7 Kcfs on September 1, desiccating much of that wetted perimeter and killing off the aquatic insects the bull trout feed on, Litchfield said.

Does the fact that your SOR does not mention Hungry Horse mean you're OK with Montana's proposed Hungry Horse operation? Litchfield asked. We just saw that proposed operation this morning, Wills replied – we'll need to look more closely at what you propose and talk about it in-house, and with CRITFC.

After a few minutes of further discussion, it was agreed to revisit this topic, and the additional information requested, at next week's TMT conference call. Harkless reiterated that it is likely that an IT conference call will be needed next week; she again encouraged the other TMT participants to give a heads-up to their IT representatives. It may be that this issue can wait until July 14, said Litchfield; however, if inflows drop precipitously, that could be a problem. We don't want to see Libby and Hungry Horse outflows drop sharply, then come up again. In response to a question from Bob Heinith, Henriksen said the Corps will begin to explore an agreement under which the water from Libby would be passed through Kootenay Lake in September.

In the interim, it was agreed that the Corps will continue to operate Libby and Hungry Horse as planned; once inflows begin to recede, the action agencies will reduce outflow to no lower than 17 Kcfs until a decision is made on summer operations at those projects. It was agreed that the TMT will revisit this topic at next week's conference call, which will begin Wednesday morning at 9 am.

4. Status of Summer Operations as a Result of Recent Court Rulings.

Henriksen said the action agencies started spill on June 20 at Lower Granite, Little Goose and Lower Monumental; spill has also begun at Ice Harbor. The Corps provided information on total river flow, spill volumes, and forebay and tailwater TDG levels at each project. There have been issues with adult passage at Little Goose, Henriksen said; adult counts fell significantly after June 20. We have been discussing some changes in operation at Little Goose with the plaintiffs, she said; last night, it was agreed to spill half of the river, and generate with half of the river, from 5 am-9 pm, to reduce the eddy and help the adults find the ladder. The fish counter at Little Goose reported some increase in adult passage at Little Goose, so the 50% spill operation is back in effect today, Henriksen said.

Henriksen added that Lower Monumental continues to spill to the gas cap, while RSW testing is influencing spill operations at Ice Harbor and Lower Granite. She directed the TMT's attention to the hot-link to this item on today's agenda on the TMT homepage, which summarizes hourly flow, spill and TDG information for each project. In response to a question from Litchfield, Henriksen said Judge Redden's order allows some operational flexibility, as long as agreement can be

reached with the plaintiffs; this change in Little Goose operations was coordinated with the plaintiffs and the Department of Justice.

Henriksen added that, beginning Friday morning, July 1, McNary will spill total river flow above the station service generating minimum of 50 Kcfs, up to the TDG waiver limits. Jim Adams briefly reviewed the water quality conditions resulting from the court-ordered summer spill operations, noting that the Corps has been monitoring the TDG data closely, and has had to make a number of adjustments to the spill volumes at the Lower Snake projects to keep them in compliance with the TDG waiver limits. Despite the Corps' best efforts, however, a number of exceedences have occurred. We appreciate the fact that this is a difficult job, and appreciate the good job the Corps is doing, said Kiefer.

In response to a question from Litchfield, Henriksen said the Corps will monitor the adult passage situation at Little Goose today, and if no response is seen, in terms of increased adult passage, then the Corps will coordinate with plaintiffs to change the spill operation at Little Goose again tomorrow.

5. Feedback on Emergency Protocols.

Wellschlager asked whether the other TMT participants had any feedback on the list of emergency response protocols he provided at last week's meeting. Henriksen noted that the reason such lists have been developed in the past have been in response to sudden changes in conditions – reductions in flow, transmission system problems etc. Generally, there are procedures in place to guide how and when emergencies are declared; there is also a spill priority list and an emergency action plan, included as appendices. In other words, the list of emergency protocols has been in existence for several years, Henriksen said; there is no reason, however, why the TMT should not develop a year-specific list of emergency protocols.

I guarantee that there will be times when we need to lean on this over the summer, said Wellschlager. Assuming that we can agree to a sequence of actions, or a prioritized list, our schedulers will do their best to honor the sequence. There could be instances, however, when the schedulers will have to move outside the sequence, and go further down the list, in order to solve a specific problem.

Wills said the salmon managers have had some discussion of the list of emergency protocols, but have not yet reached consensus. If you would like more time to discuss it, by all means take it, said Wellschlager – just bear in mind that this is the list we're using today, and if an emergency arises, this is the list we will use. Understood, said Wills. We'll revisit this issue next Wednesday, said Boyce.

In response to a question, Wellschlager said that, 90% of the time, emergency situations persist for half a day or less. Any more lengthy emergencies will be closely coordinated with the salmon managers, he said. Kiefer reiterated Idaho's recommendation, from last week's meeting, that Bonneville spill not be reduced to zero in response to an emergency – Idaho would prefer to see proportional reductions in spill at several projects, rather than zero spill at Bonneville.

6. McNary Transport Operations.

Henriksen said transport started at McNary on June 20. We have continued to spill 20 Kcfs minimum around the clock at McNary since transport operations began; on Friday, we will begin the court-ordered spill at McNary, spilling the remainder of river flow above the 50 Kcfs station service minimum.

7. Operations Review.

Henriksen said Libby is at elevation 2457, two feet from full and releasing full powerhouse capacity, about 25 Kcfs, with 30 Kcfs inflow. Libby is filling slowly. Norris said Grand Coulee is at 1288.2 feet, and is expected to fill over Fourth of July weekend. At Hungry Horse, the current elevation is 3559.7 feet, creeping up on full; we have reduced discharge slightly, and are preparing to fill and spill. We will be providing 427 kaf of flow augmentation from the Upper Snake system this year, Norris added – we're actually discharging water from Milner already, at 1.5 Kcfs.

Dworshak was at 1599.7 feet as of midnight last night; we will be passing inflow of 3-5 Kcfs through the holiday weekend. For April10-June 22, at Priest Rapids, average flow was 119 Kcfs; at McNary, 195 Kcfs; for the spring period at Lower Granite, it was 66 Kcfs. Do you want to see a 3 Kcfs minimum outflow at Dworshak even if inflows fall below 3 Kcfs? Cathy Hlebechuk asked. That would be our desire, Wills replied.

Moving on to fish status, Wagner said both yearling and subyearling numbers dropped dramatically at Lower Granite, Little Goose and Lower Monumental once spill began; what that means is that fish passage via spill is happening, in a big way. Subyearling indices have continued strongly at McNary, in the 300,000-400,000 range. There are both wild and hatchery fish passing the project, currently, including Snake River, Hanford Reach and Ringgold Hatchery fish. Wagner said cumulative passage at Lower Granite has increased earlier than normal this year; at McNary, things are pretty much on-schedule.

Moving on to adult passage at Little Goose, Wagner said the daily indices prior to June 20 were on the order of 500-600; once spill started, those numbers went down to double digits. You think spill operations are affecting the ladder entrances? Litchfield asked. Correct, was the reply. LeFleur added that the US v.

Oregon technical advisory committee looked at the status of the summer chinook run yesterday, and found that it is tracking very close to the pre-season estimate of 62,400 fish.

Why is that run performing up to expectation, while the spring chinook run was so horrible? Litchfield asked. Good question, LeFleur replied – the two stocks have different life-histories, which may be having an impact. Kiefer noted that a large proportion of the Upper Columbia summer chinook outmigrated as subyearlings in 2002, while the Snake River spring chinook outmigrated as yearlings in 2003 – it is possible that ocean conditions were better in 2002. LeFleur added that the TAC will be investigating what happened to the 2005 spring chinook run later this year. NMFS has concluded that there was no single factor – ocean conditions, marine mammal impacts, forecasting error – that was clearly responsible for the dramatically-reduced 2005 spring run. There are some indications that ocean conditions have changed, but they don't appear to have changed dramatically enough to account for the low 2005 return, said LeFleur. In response to a question, she said smelt also did not show up in the numbers expected this year – we don't really know where the spring chinook go in the ocean, but maybe they go where the smelt go.

Wellschlager said CGS is scheduled to return to the grid on July 1.

Moving on to water quality, Adams said that, since the last TMT meeting, there was a single water quality exceedence reported at McNary.

8. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday morning, July 6. Meeting summary prepared by Jeff Kuechle.

TMT Participant List

June 29, 2005

Name	Affiliation
Cindy Henriksen	COE
Robin Harkless	Facilitation Team
Paul Wagner	NMFS
Dan Bedbury	EWEB
Ron Boyce	ODFW
John Wellschlager	BPA

Jim Litchfield	Montana
David Wills	USFWS
Ray Gonzales	COE
Jim Adams	COE
Tony Norris	USBR
Cindy LeFleur	WDFW
Russ Kiefer	IDFG
Cathy Hlebechuk	COE
Russ George	WMCI
Nic Lane	BPA
Dan Spear	BPA
Laura Hamilton	COE
Dave Statler	NPT
Tim Heizenrater	PPM
Tom Haymaker	PNGC
Lee Corum	PNUCC
Dave Benner	FPC
Margaret Filardo	FPC
Kevin Nordt	Mid-Cs
Greg Hoffman	COE
Jeff Loughley	COE
Lance Elias	PPL
Ruth Burris	PGE
Bruce MacKay	Consultant
Glenn Traeger	AVISTA
Bruce Suzumoto	NWPPCC
Tom Lorz	CRITFC