

TECHNICAL MANAGEMENT TEAM

BOR :	<i>Tony Norris / John Roache</i>	BPA :	<i>Robyn MacKay / Scott Bettin</i>
NOAA-F:	<i>Paul Wagner</i>	USFWS :	<i>David Wills / Steve Haeseker</i>
OR :	<i>Rick Kruger / Ron Boyce</i>	ID :	<i>Russ Kiefer</i>
WA :	<i>Cindy LeFleur</i>	MT :	<i>Jim Litchfield</i>

COE: *Cindy Henriksen / Cathy Hlebechuk*

TMT CONFERENCE CALL

Wednesday July 03, 2006, 0900 - 1000 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@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Dworshak Operation
 - [\[Lower Snake River Temperatures April 03 - June 30, 2006\]](#)
 - [\[Lower Granite Pool - Temperatures June-19 to July 06, 2006\]](#)
3. Other
 - Set agenda for next meeting July 12 [\[Calendar 2006\]](#) 

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

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WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday July 05, 2006, 0900 - 1000 hours

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

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**TECHNICAL MANAGEMENT TEAM
CONFERENCE CALL
July 5, 2006 Meeting**

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

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

Dworshak Operations

TMT held conference calls on Wednesday, July 5, to look at current conditions and forecasts, and continue discussions on Dworshak operations.

Dworshak operations had been at 4.2 kcfs outflows at 43° F over the previous weekend. Around 10:00 am on Tuesday, July 4, the Anatone gauge reached 70°, triggering an increase of outflows from Dworshak to 7.2 kcfs. The current 24-hour rolling average at Anatone, per the July 5 call, was 70.3°, and the Lower Granite tailwater gauge was 69°. The forecasted temperatures at Lewiston for the week were in the 90's with isolated thunderstorms. After some discussion, TMT agreed to the following: Operate Dworshak at full powerhouse and slightly lower temperatures. The caveat put forth was the hatchery's preference to not drop below 43° for longer than a few days. TMT agreed to check in again on Friday to assess current conditions and set up the weekend operation.

Technical Management Team Conference Call

July 5, 2006

1. Greetings and Introductions.

Today's Technical Management Team conference call was 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 Cathy Hlebechuk at 503-808-3942.

2. Dworshak Operational Update.

Jim Adams said he was unable to update the graphs prior to today's meeting – what we have to look at today are the same graphs we had last time. You will recall that, following last Friday's conference call, we agreed to reduce Dworshak outflow from 7.2 Kcfs to 4.2 Kcfs, based on Mike Schneider's model results, and the prediction of more moderate weather, and hold that outflow volume until we saw temperatures of 21 degrees C – about 70 degrees F – on a 24-hour rolling average at the Anatone gauge. Once that criteria is met, we agreed to increase Dworshak outflow to 7.2 Kcfs at 43

degrees C. If we saw 22 degrees C at Anatone, we agreed to increase Dworshak outflow to full powerhouse capacity, Adams said.

With respect to current conditions, we hit 21 degrees C at Anatone at 10 am yesterday, and increased Dworshak outflow to 7.2 Kcfs prior to noon, Adams said. That's how we're operating now. The current 24-hour rolling average at Anatone is 70.3 degrees F. The tailwater at Lower Granite hit 68 degrees about 10 am on July 4. The last reading we have, at 5 am this morning, is 69.0 degrees F, Adams said. What's the weather forecast like? Paul Wagner asked. The low 90s today, Greg Haller replied. Adams added that the weather is expected to cool somewhat in the short run at Lewiston, then get hotter through the weekend – up to 97 degrees F on Sunday. Some thunderstorms are forecast over the next few days, which will create some cloud cover.

David Wills said that, based on the current water temperature situation and the weather forecast, he would recommend increasing Dworshak discharge to full powerhouse capacity, beginning today. Kruger said he was looking at the National Weather Service forecast for Lewiston, which shows temperatures of up to 99 degrees on Sunday. The group briefly discussed what circumstances would cause the TMT to recommend increasing Dworshak discharge above full powerhouse capacity; Wagner replied that, if temperatures in the high 90s were forecast for several consecutive days, NMFS would recommend exceeding full powerhouse capacity from Dworshak.

In response to a question, a Corps participant said Hells Canyon discharge is expected to hold steady at 14-15 Kcfs for the foreseeable future. In response to another question, Adams said operation in the “undershot” mode at Dworshak would reduce the release temperature to 39-40 degrees F. That is an option for the short term if we're behind the temperature curve at the Lower Granite tailwater, said Adams, but in terms of a longer-term operation – say, anything over three days – we would need to do a mixed operation, overshot-undershot – to avoid significantly impacting the growth of the fish at Dworshak National Fish Hatchery. In response to a question, Haller said there are a lot of fish rearing in the Clearwater, currently; according to field surveys, the fish are currently in the 60-90mm size range.

Looking at the temperatures in the mainstem Clearwater, upstream from the confluence with the North Fork, said Dave Statler, they're in the 70-degree range, so it would probably be OK to go to a full powerhouse capacity release at 41 or 42 degrees from Dworshak. Again, if we go to undershot mode, we will see a release temperature of 39-40 degrees F, said Adams. I spoke to personnel at Dworshak National Fish Hatchery this morning, said Wills; they have a hatchery BiOp, and would prefer that the Dworshak release temperature not fall below 43 degrees F. We could consider a short-term operation at a lower release temperature, but anything longer than about three days would be a problem, Wills said. In response to a question, Adams said it might be some time this weekend, and possibly as late as Monday, before the effects of any operational changes at Dworshak made today would be fully seen at the Lower Granite tailrace.

Rich Domingue said that, to him, it makes more sense to talk about increasing Dworshak discharge, rather than lowering the release temperature. We also have a flow issue in the Lower Snake, so Oregon would support that concept as well, said Rick Kruger. That would be more beneficial to the fish in the Clearwater as well, Wills said. I haven't heard any objections to going to full powerhouse capacity today, Litchfield said.

After a few minutes of further discussion, it was agreed to increase Dworshak outflow to full powerhouse capacity, beginning today, with two units in undershot mode and one unit in overshot mode. It was further agreed that the TMT will check in again via conference call this Friday, July 7 at 1 pm, and that the Corps will re-calculate the volume of water available at various temperatures and strata in Dworshak reservoir. Adams noted that, based on the Corps' previous estimates, there is less cold water available in Dworshak Reservoir this summer than there has been in recent years. Wills said he will re-confer with personnel at the hatchery to determine the maximum acceptable duration of operating Dworshak at a release temperature below 43 degrees. It was agreed to make the change in Dworshak outflow temperature as gradual as possible.

3. Start of McNary Transportation.

Bern Klatte said the system is no longer in springlike conditions, in terms of flow and water temperature. The Corps would like to begin transportation at McNary as soon as possible. The current temperature at the project is 65.5 degrees F, well above the 62-degree "springlike" threshold, and flows have been below 220 Kcfs since the first of July. Project personnel can begin collecting fish as early as 7 am tomorrow, Rudd Turner said, adding that spill will continue at McNary at 40 percent of total river flow.

After a brief discussion, no objections were raised to this operation; collection and transport will begin tomorrow morning, July 6.

With that, today's conference call was adjourned.

Technical Management Team Meeting Participants July 5, 2006

Name	Affiliation
Robin Harkless	Facilitation Team
Jim Adams	COE
Rich Domingue	NOAAF
Steve Jewell	COE
Dave Benner	FPC

David Wills	USFWS
Tom Lorz	CRITFC
Russ George	WMCI
Jim Litchfield	Montana
Cindy LeFleur	WDFW
Bern Klatte	COE
Paul Wagner	NOAAF
Rick Kruger	ODFW
Dave Statler	NPT
Laura Hamilton	COE
Rudd Turner	COE
Scott Bettin	BPA
Robin MacKay	BPA

TECHNICAL MANAGEMENT TEAM

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OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Friday July 07, 2006, 1300 - 1400 hours

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

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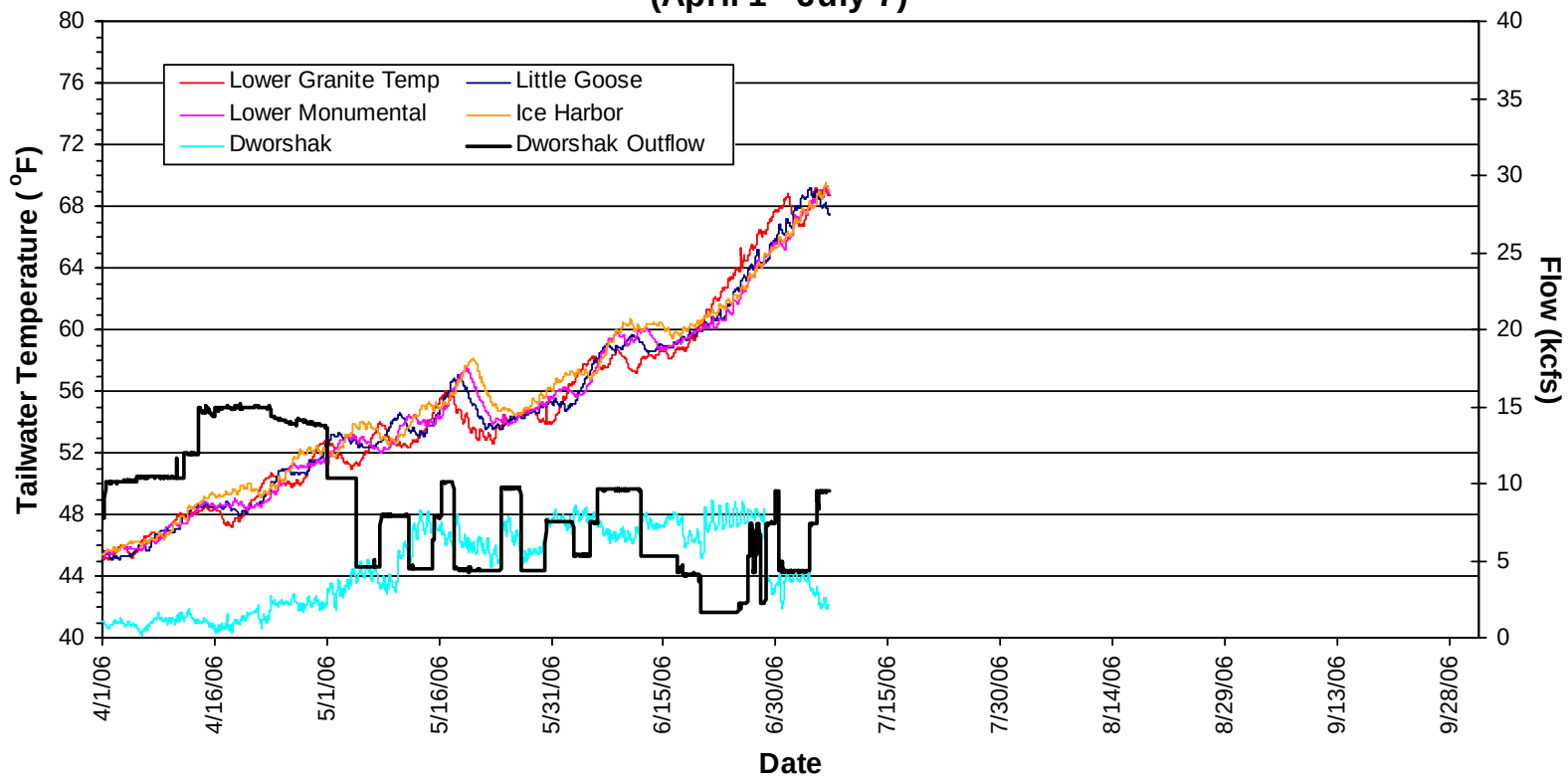
AGENDA

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2. Dworshak Operation
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 - [\[Lower Granite Pool - Temperatures June-19 to July 06, 2006\]](#)
 - [\[CHANGES IN WATER TEMPERATURE OVER TIME DWORSHAK RESERVOIR\]](#)
 - [\[Dworshak Forebay Thermocline 2006\]](#)
3. Other
 - Set agenda for next meeting July 12 [\[Calendar 2006\]](#) 

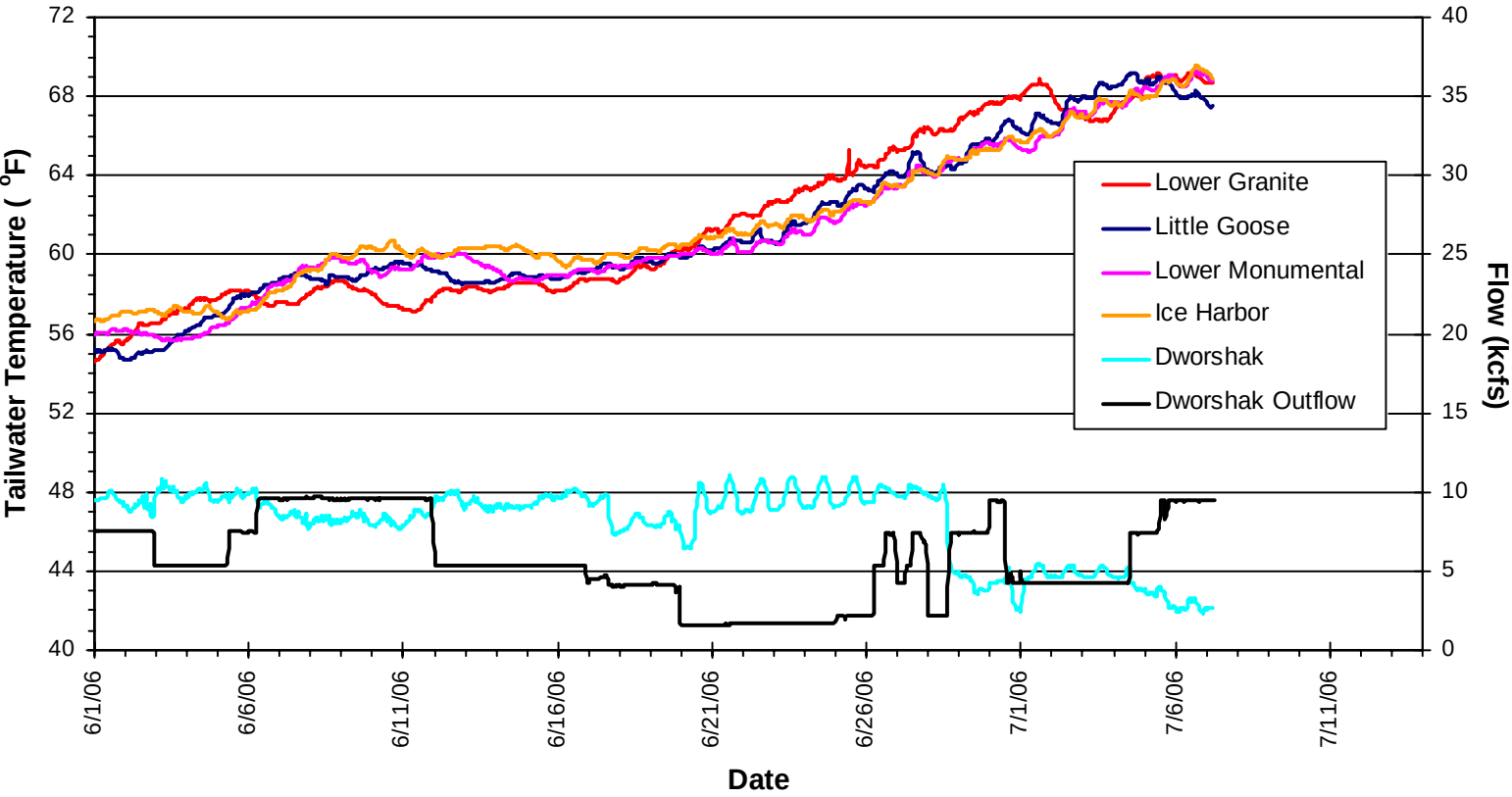
Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945

Lower Snake River Temperatures April 3 - July 7, 2006

Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (April 1 - July 7)

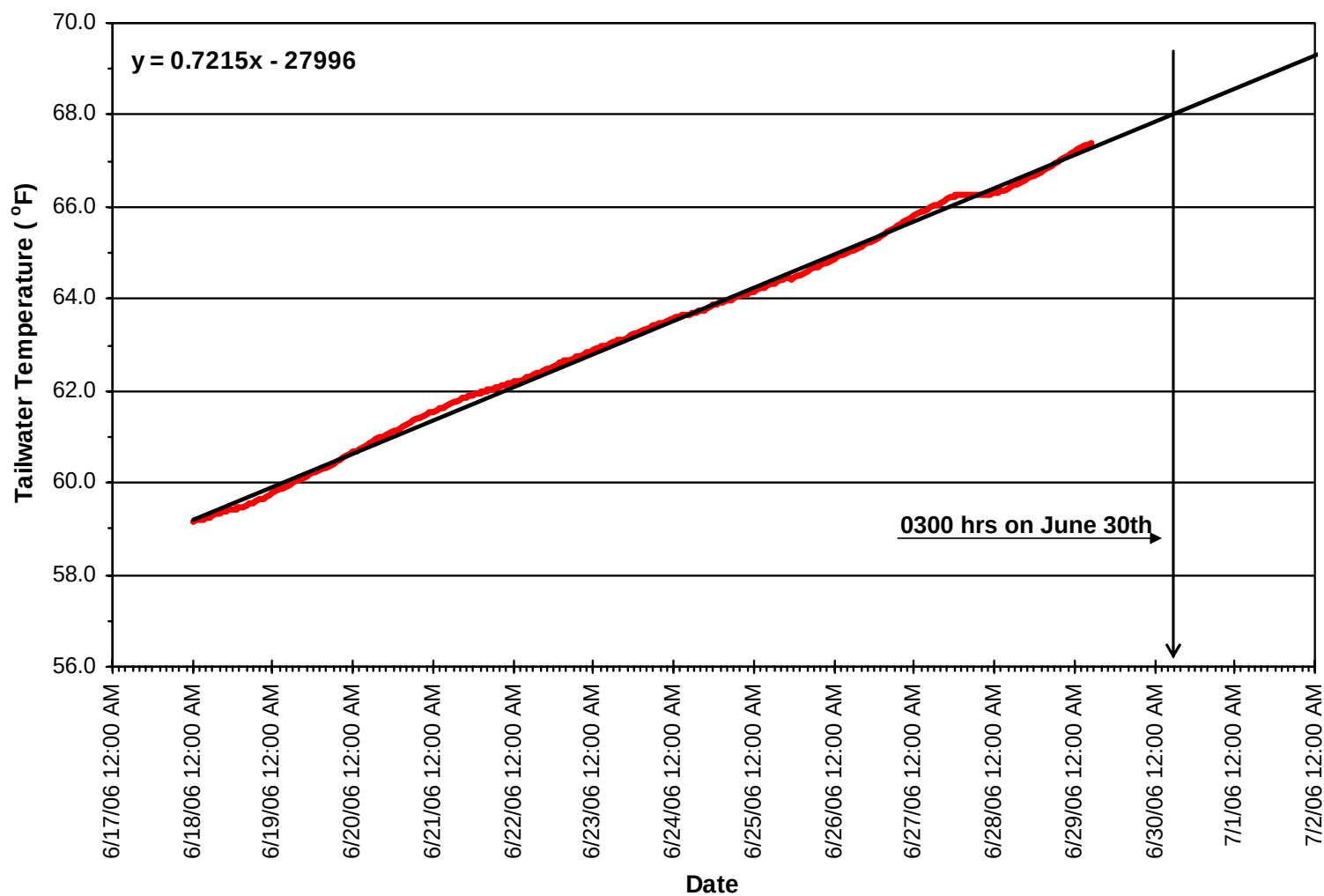


**Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006
(April 1 - July 7)**

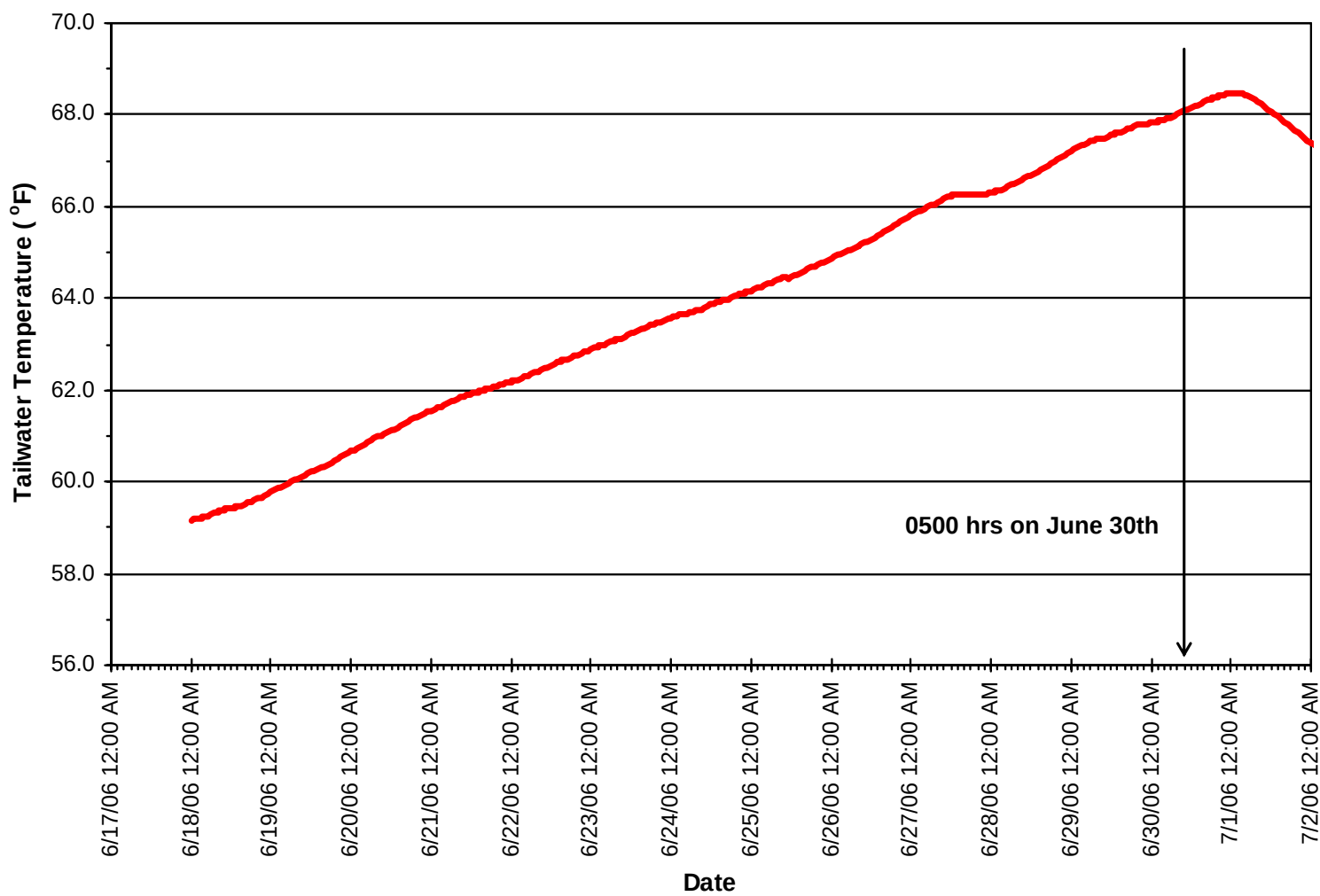


Lower Granite Tailwater Temperature (Rolling 24-Hr Average)

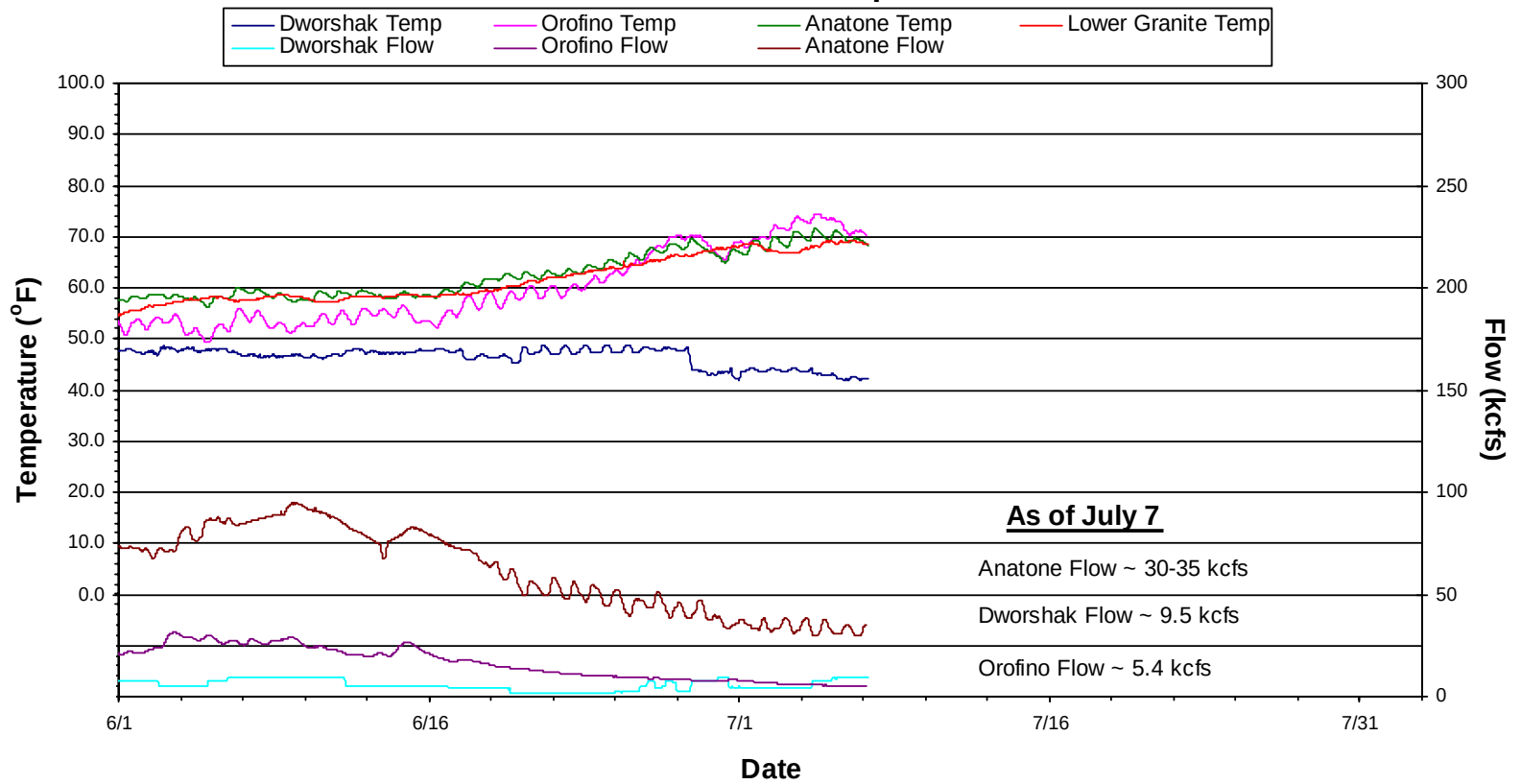
As of June 29, 2006



Lower Granite Tailwater Temperature (Rolling 24-Hr Average)

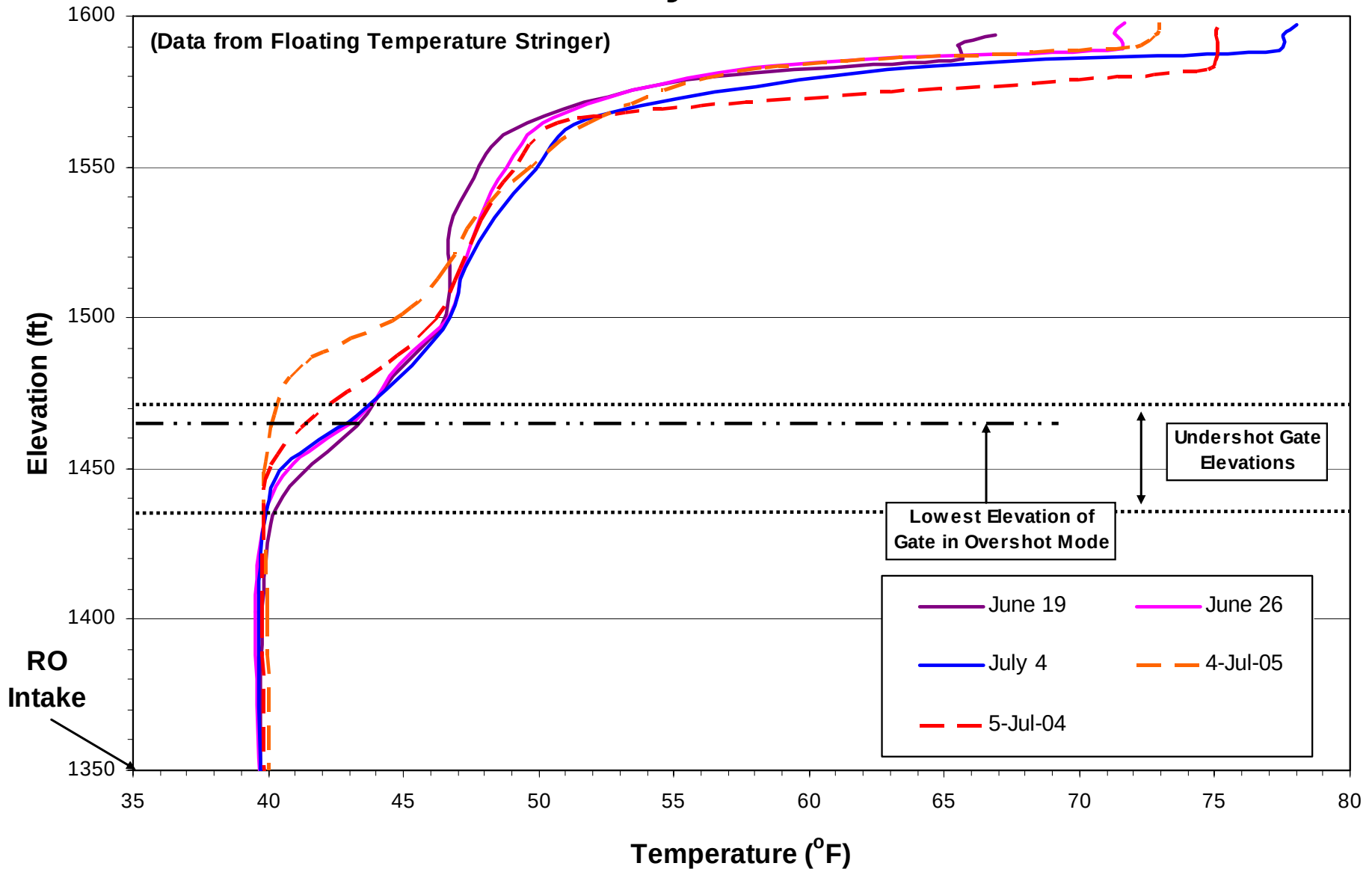


Lower Granite Inflows and Temperatures in 2006



Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

July 7, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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

Dworshak Operations

TMT held conference calls on Friday, July 7, to look at current conditions and forecasts, and continue discussions on Dworshak operations.

Friday, July 7: Jim Adams, COE, reported that the COE operated Dworshak at full powerhouse with one small unit in overshot mode on July 5 for several hours with no change in temperature. They switched all units to undershot mode and temperatures dropped to around 42-42.5°. Lower Granite was currently (July 7) at 68.9° and temperatures at Anatone and Orofino had dropped slightly. The COE noted that the impacts from the Dworshak operation implemented on Wednesday (July 5) would not be observed at Lower Granite until sometime over the weekend (July 8 or 9). Local weather conditions had tempered some since the July 4th weekend. The forecast called for increasing temperatures through the July 7-9 weekend and moderating temperatures by next Wednesday (July 12). Dave Statler, Nez Perce, added that the Clearwater at Spalding was running 15.4 kcfs at 55.2°, and Anatone was running 30.2 kcfs at 68°. Weekend operation recommendations were discussed.

NOAA raised concerns that operations so far had not kept temperatures down at Lower Granite, and recommended bumping flows up slightly over the weekend, recognizing the need to try and maintain enough flow through the season. The Nez Perce suggested continuing the current operation through the weekend and having a TMT check in on Monday to discuss the results of Wednesday's operation. Idaho expressed concern and an interest in reserving enough cool water for later in the season, and Oregon reiterated its interest in maintaining temperatures and flows. The USFWS suggested that going below 43° for longer than a few days would be detrimental to the hatchery fish, and asked TMT to be mindful of the trade-offs.

TMT participants agreed to the following: Through the weekend, operate Dworshak at full powerhouse plus 2 kcfs through the RO's (regulatory outlets), with one small unit in overshot mode to maintain (and not go below as a soft constraint) 43°, and not exceed 109% TDG. TMT agreed to check in on Monday, July 10 to determine whether the operations set forth on Wednesday had an effect on Lower Granite. If so, TMT participants agreed to consider dropping flows back down to full powerhouse to support

the interest of saving water for later in the season. If no impact is observed at Lower Granite, the COE would continue its 12 kcfs operation at Dworshak, which would likely show its impact at Lower Granite by Wednesday, July 12.

A face to face TMT meeting is scheduled for Wednesday, July 12. Dworshak operations will be on the agenda. The TMT call on Monday will be held at 8:00 am. Please regularly check the TMT web page for details and any scheduling changes.

Technical Management Team Conference Call Notes

July 7, 2006

1. Greetings and Introductions.

Today's Technical Management Team conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Dworshak Operations.

The group reviewed the current water temperature situation in the Snake and Clearwater Rivers; it was noted that the temperature in the Lower Granite tailrace is still about 69 degrees F. Water temperatures have begun to fall at the monitoring stations upstream of Dworshak, but the bottom line is that the effects of the change we made on Wednesday, increasing Dworshak outflow to full powerhouse capacity with three units in undershot mode, have not yet reached Lower Granite, Jim Adams said. However, that cold water is making its way down through the system, and should reach Lower Granite by tomorrow afternoon at the latest. Adams noted that number of additional informational items, including the latest temperature readings and model runs, are available via hot-link from today's agenda on the TMT homepage.

The discussion then turned to the current weather forecast in the Lewiston and Orofino areas; it was noted that daytime temperatures in the mid-to-high 90s to low 100s are forecast through next Wednesday. In other words, there isn't a lot of cooling on the way until late next week. Adams added that the temperatures in Dworshak pool are somewhat warmer in 2006 than they have been in other recent years; previously we've been able to draw 40-degree water through the powerhouse, but this year, the coldest water we can reach is about 43 degrees, he said.

What does the TMT want to do? Adams asked. Dave Statler suggested that the Corps maintain the current operation, with Dworshak releasing full powerhouse capacity, with a TMT check-in call early next week. Paul Wagner expressed a preference for a more aggressive operation, with Dworshak outflow increased to 12 Kcfs, beginning later today.

In response to a question, Howard Burge of the Dworshak National Hatchery said the juvenile fish at the facility are not being fed right now due to cold water temperatures coming downstream from Dworshak. We're off feed entirely, he said, which means we're not getting any growth, and every day we run 42-43 degrees out of Dworshak is going to make it more difficult to meet our size-at-release criteria.

Rudd Turner said that, according to the most recent STP run, it will be possible to maintain 12 Kcfs from Dworshak from July 12 through August 7, at which point it will be necessary to reduce outflow to full powerhouse capacity. Then, on August 25, Dworshak outflow would be reduced further, to about 8 Kcfs. He noted that the long-term weather forecast for the basin shows above-average temperatures over the next six weeks. Rich Domingue said it was probably a mistake, in his view, to reduce Dworshak outflow to 4.2 Kcfs over the weekend; he said he is reluctant to opt for a more conservative approach now.

The group devoted a few minutes of discussion to the preferred Dworshak operation over the next few days. Ultimately, it was agreed to increase Dworshak outflow to 12 Kcfs, using the regulating outlets (ROs) and putting one of the smaller Dworshak generating units into overshot mode to target a release temperature of 43 degrees F., to help alleviate some of the Dworshak National Fish Hatchery temperature concerns. It was agreed that this operation will begin later this afternoon. That's with the understanding that we will not exceed 109% TDG downstream from Dworshak, Adams said; if we creep up on that criteria, it may be necessary to reduce outflow through the regulating outlets. It was further agreed to re-convene the TMT via conference call on Monday to check in on this operation; if temperature conditions allow, once the cold water currently on its way downstream from Dworshak arrives at Lower granite, the TMT will seriously consider the possibility of reducing Dworshak outflow back down to full powerhouse capacity for most of next week.

The conference call was scheduled for 8 am Monday morning. With that, today's conference call was adjourned.

TMT Meeting Participants
July 7, 2006

Name	Affiliation
Robin Harkless	Facilitation Team

Jim Adams	COE
Cathy Hlebechuk	COE
David Wills	USFWS
Robin MacKay	BPA
Paul Wagner	NOAAF
Rich Domingue	NOAAF
Rick Kruger	ODFW
Dave Statler	NPT
Greg Haller	NPT
Howard Burge	Dworshak NFH

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COE: *Cindy Henriksen / Cathy Hlebechuk*

TMT CONFERENCE CALL

Monday July 10, 2006, 0800 - 0900 hours

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

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COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 10, 2006 CONFERENCE CALL

Dworshak Operations

Monday check in on Dworshak operations. Salmon Managers requested Corps to maintain 11.2 kcfs and revisit the operation at the regular TMT meeting on July 12.

TECHNICAL MANAGEMENT TEAM

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OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday July 12, 2006, 10:30 - 12:00 Note New Time

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190 or 503-808-5199 (passcode 2580)

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2. [\[Review Minutes 2006\]](#)
3. Libby and Hungry Horse Operations
 - [\[ESP INFLOWS USED STARTING 7/11/06\]](#)
4. Dworshak Operations
 - [\[Volumes at Dworshak 1 Jul Through 31 August\]](#)
 - [\[Lower Snake River Temperatures TMT Update 12 July 2006\]](#)
 - [\[LSnk water temps - EPA model data - Kyle Dittmer\]](#)
5. Treaty Fishing SOR's
 - [\[SYSTEM OPERATIONAL REQUEST: 2006-C3\]](#)
 - [\[SYSTEM OPERATIONAL REQUEST: 2006-C4\]](#)
6. Chum Spawning Population Estimates - Oregon
 - [\[Estimated number of chum salmon spawning in the Ives / Pierce island area, 1998-2005\]](#)
7. Marine Mammal Permitting Process Update - Oregon and Washington
8. Salmon managers - update to emergency action list?
 - [\[2006 Water Management Plan - Appendix 1 Emergency Protocols - Draft March 20, 2006\]](#)
9. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - John Day T-1 outage
 - Powerhouse Outages
 - [\[Doble Testing Schedule for Snake River, 2006 - Donald Faulkner, Corps\]](#)
 - Water Quality

- [\[Spill Information 2006\]](#)

10. Other

- Set agenda for next meeting July 26 [\[Calendar 2006\]](#) 

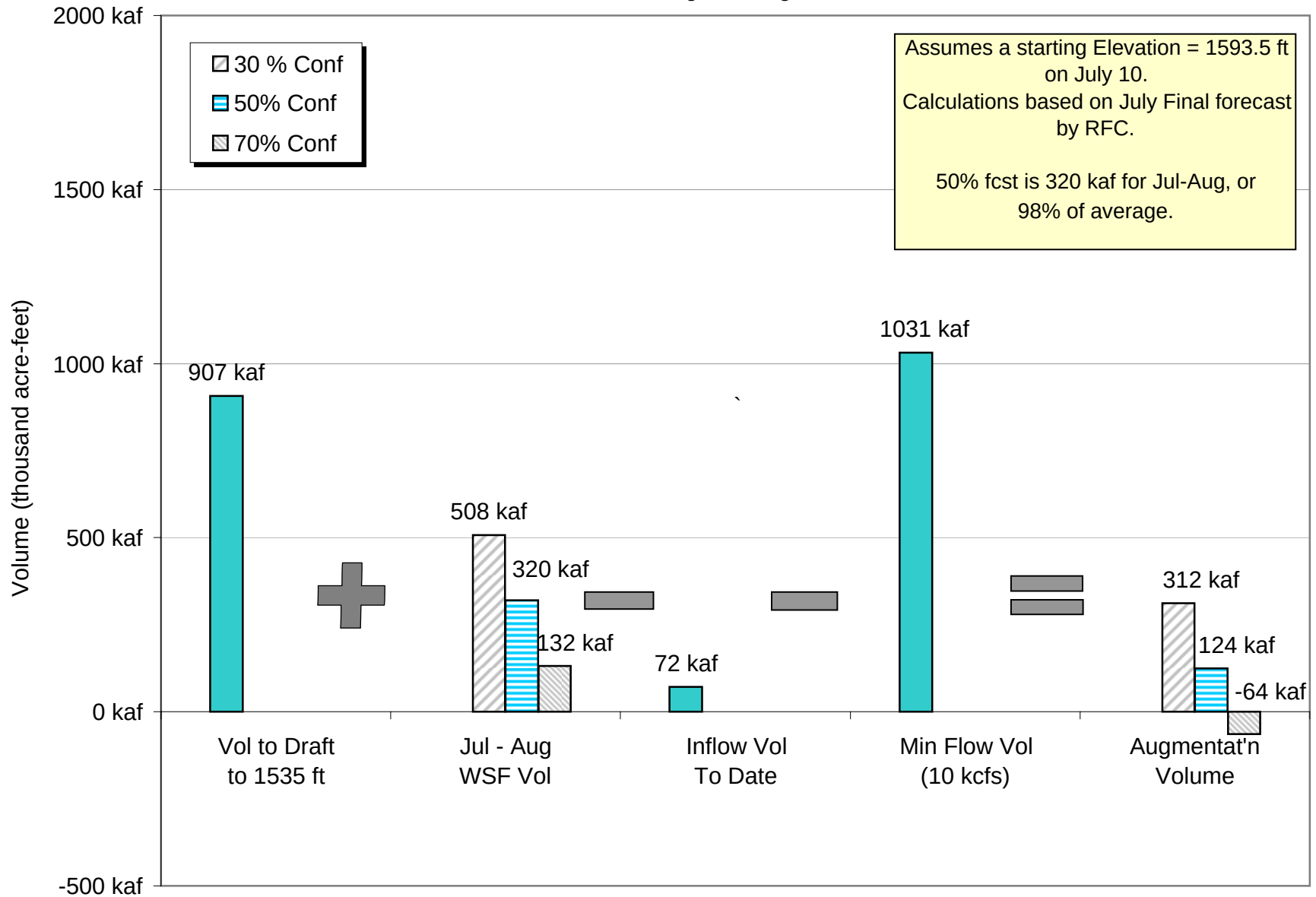
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Doble Testing Schedule for Snake River, 2006

At the beginning and end of each outage, there will be a few hours in which the entire powerhouse is shut down for switching. During times of full powerhouse outages, one unit will be run at speed no load for station service.

Plant	Units effected	Dates	Work details
Little Goose	5 & 6	26 – 30 June	T-2, damage found Outage extended To at least 27 July
Little Goose	1-6	21 – 25 Aug (daily)	T-1, units 5 -6 will be available at night
Lower Monumental	5 – 6	17 – 20 July	T-2 doble test
Lower Monumental	1 – 4	24 – 28 July	T-1 doble & bus testing, entire PH out during first 2 days (daylight hrs)
Lower Granite	1 – 6	28 Aug – 2 Sept	Entire powerhouse out during all these Days
Ice Harbor	5 – 6	11 – 14 Sept	T-5 & T-6

Volumes at Dworshak
1 Jul Through 31 August

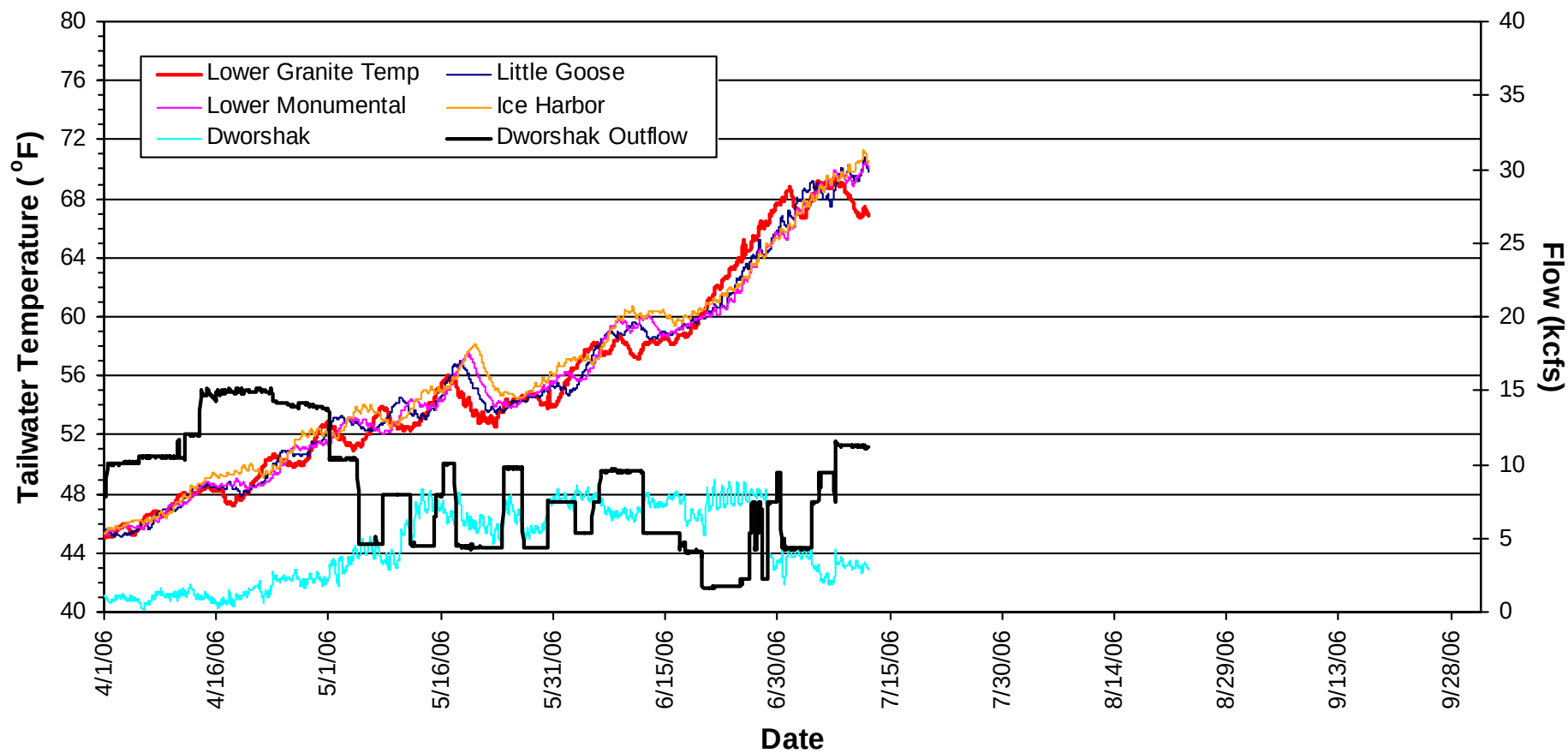


Lower Snake River Temperatures

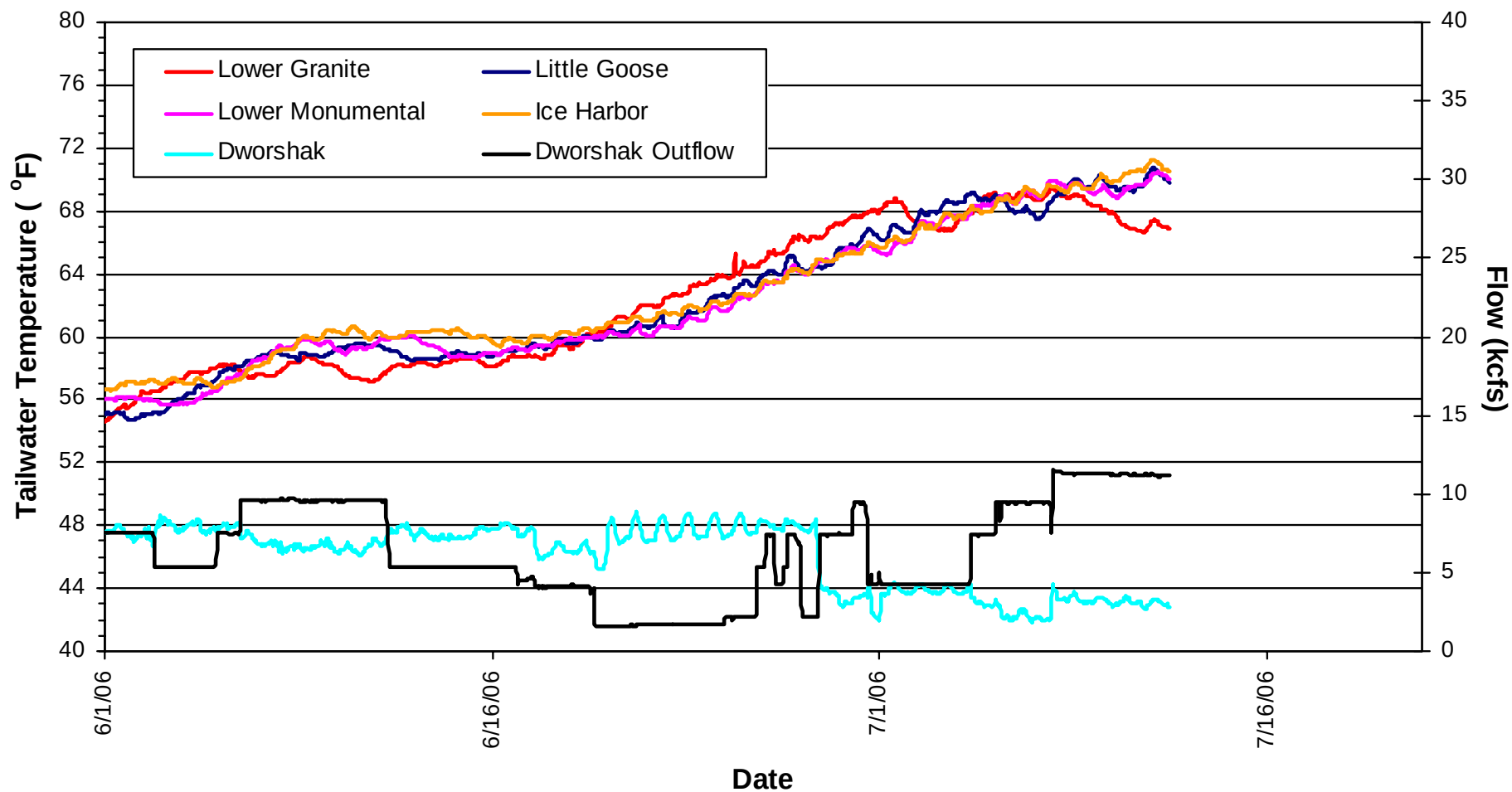
TMT Update

12 July 2006

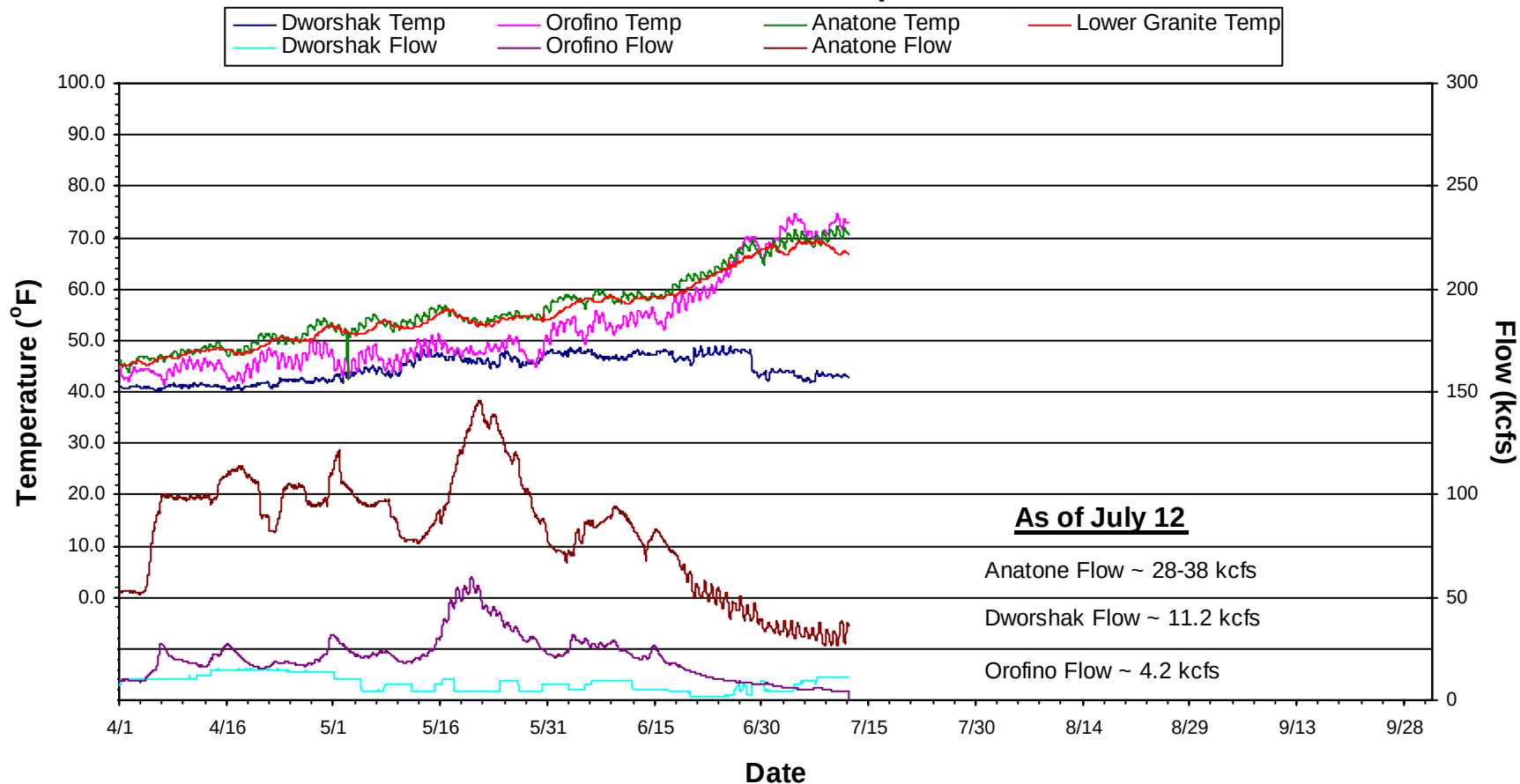
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (April 1 - July 7)



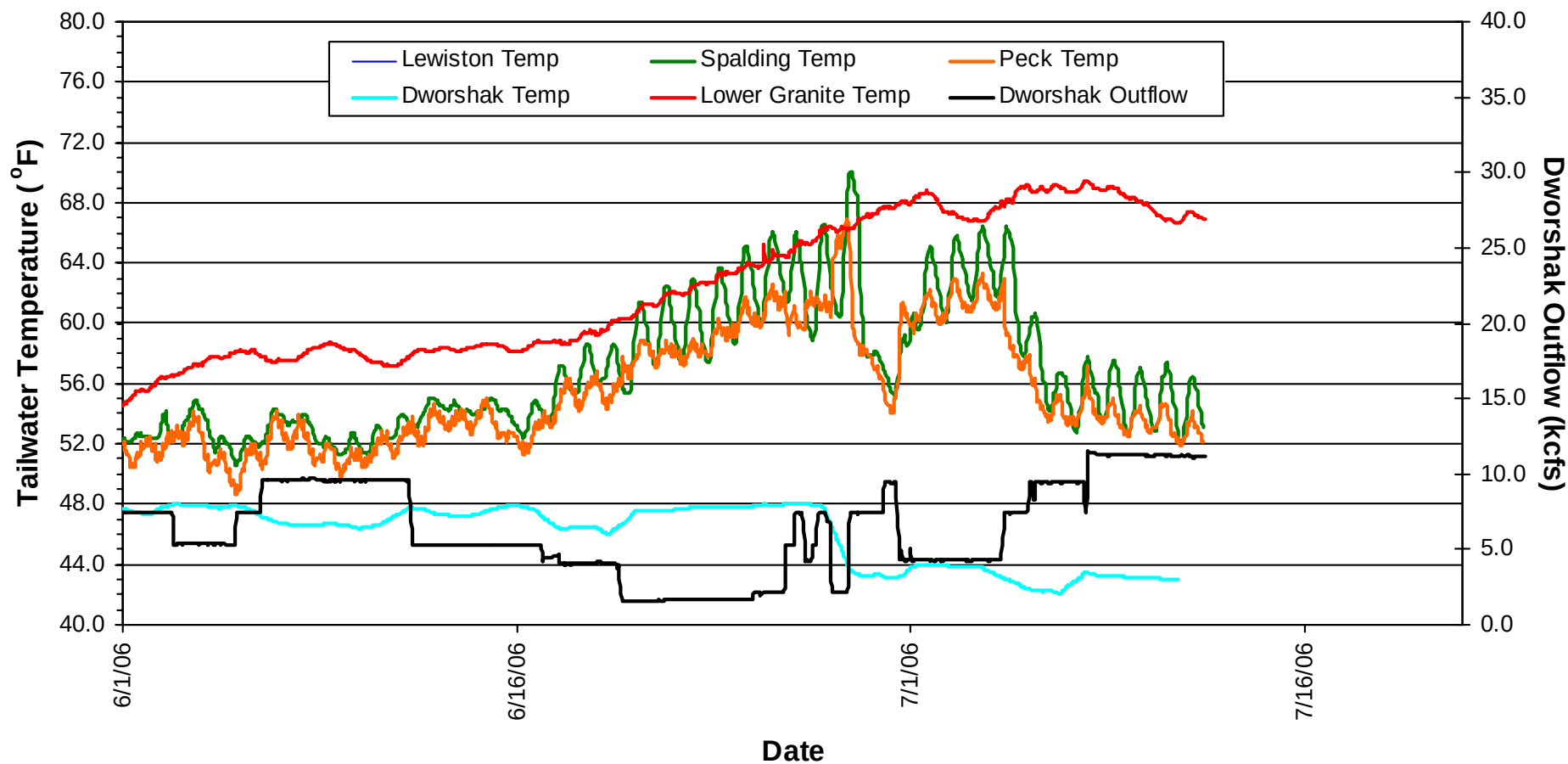
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - July 12)



Lower Granite Inflows and Temperatures in 2006

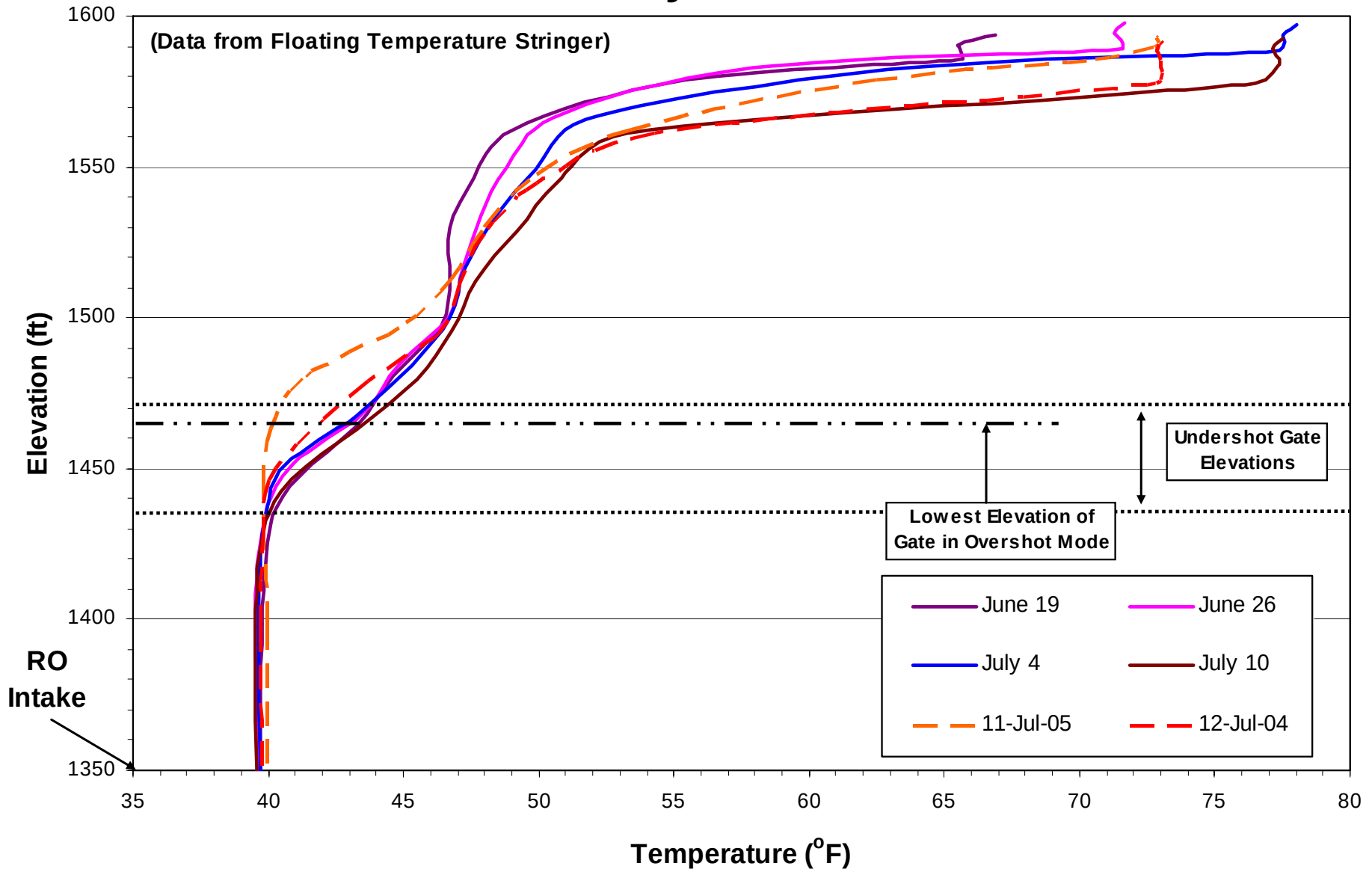


Dworshak Outflows and Clearwater River Temperatures in 2006

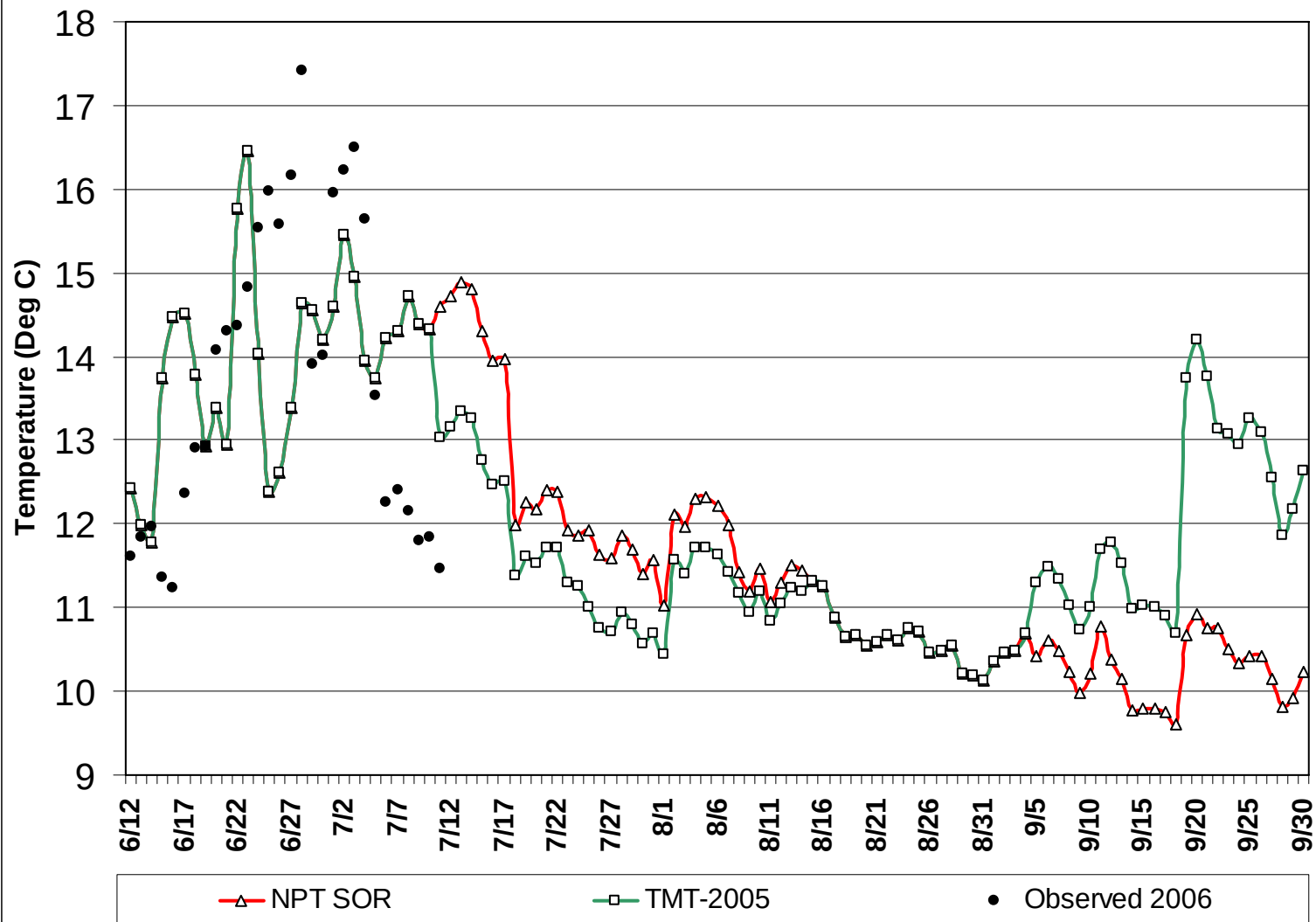


Dworshak Forebay Thermocline 2006

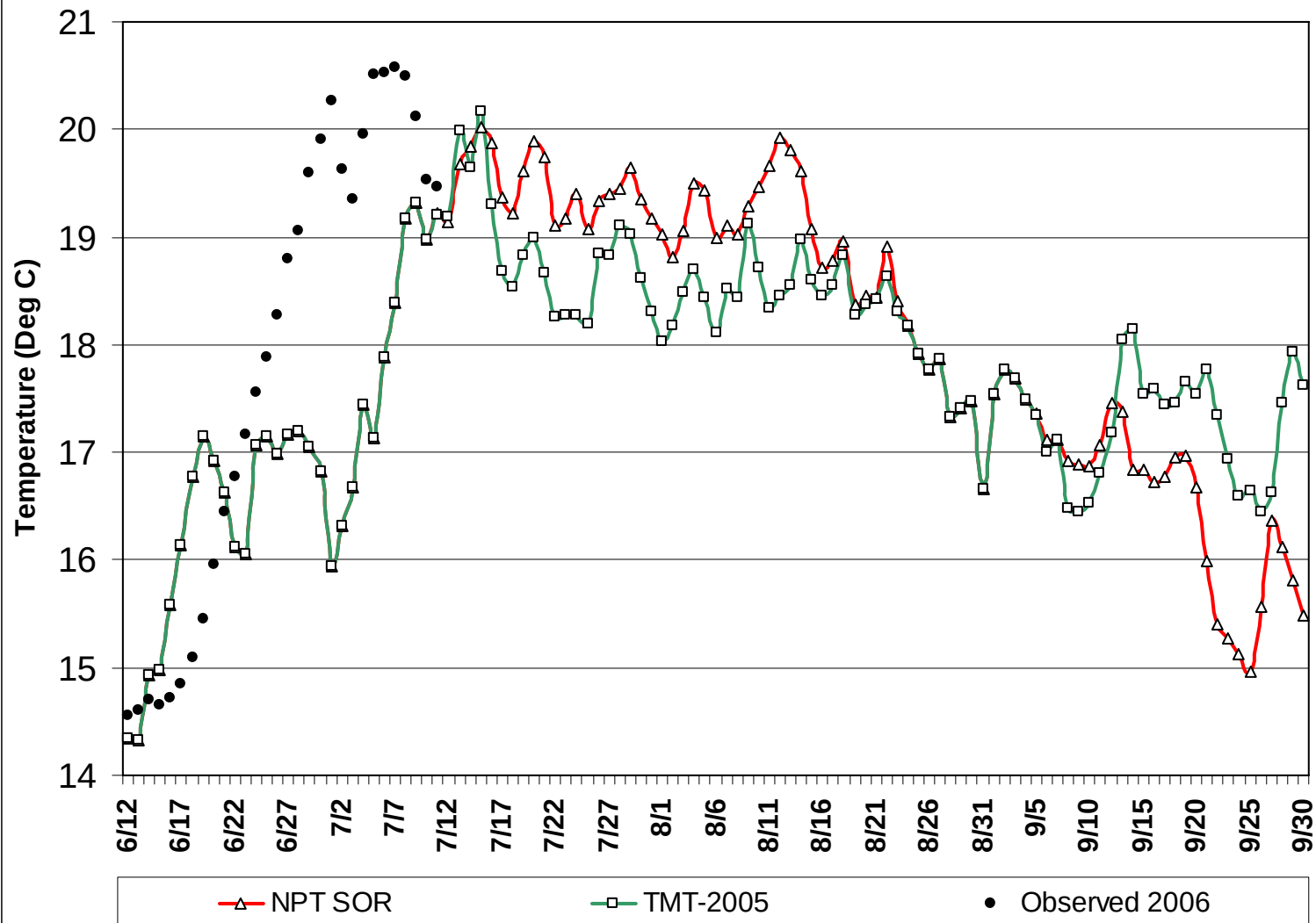
(Data from Floating Temperature Stringer)



Clearwater River at Peck (1975, 1985, 1990, 1991 weather)



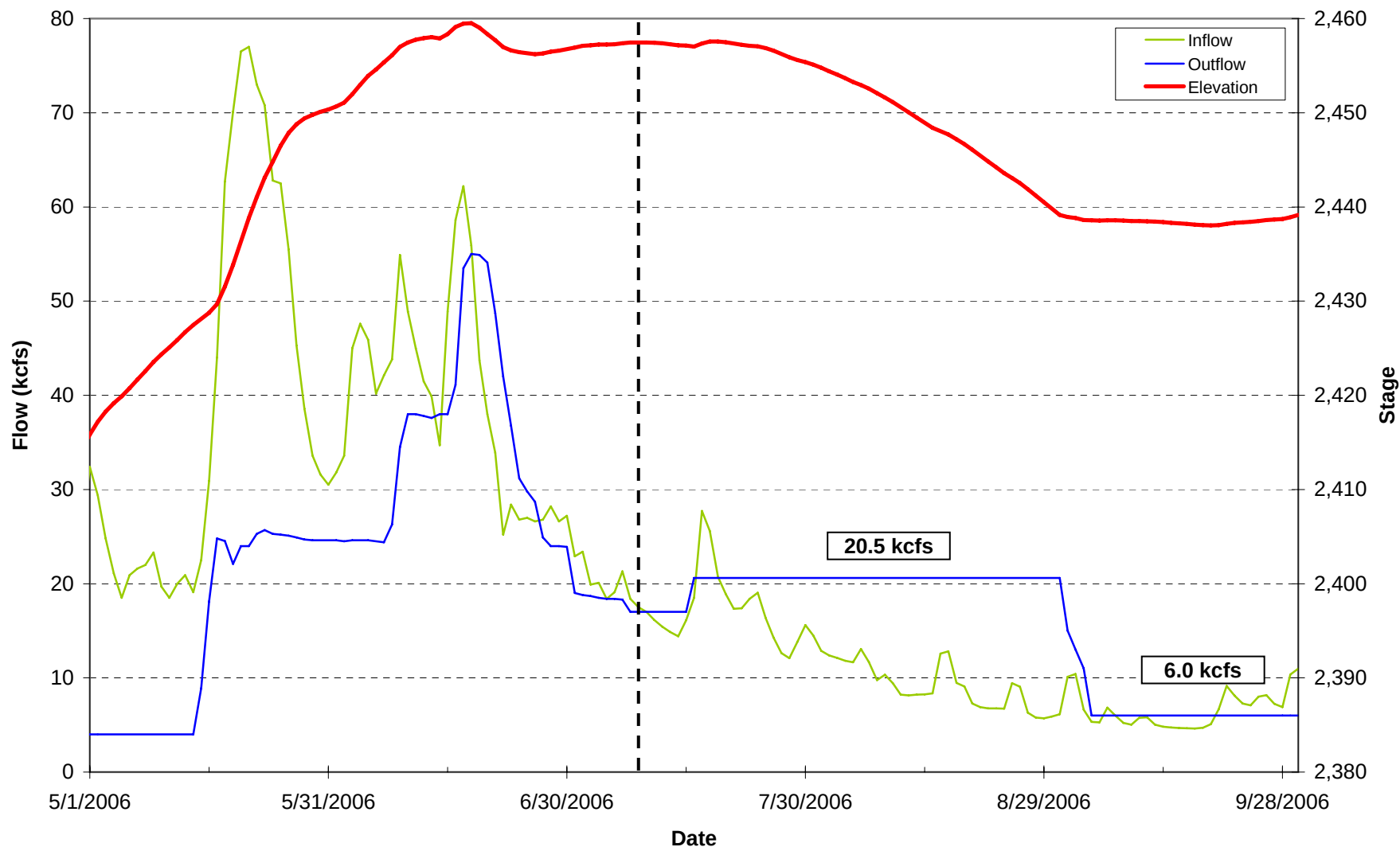
Snake at Lower Granite Dam (1975, 1985, 1990, 1991 weather)



ESP INFLOWS USED STARTING 7/11/06

APR-AUG VOLUME=7.028 MAF

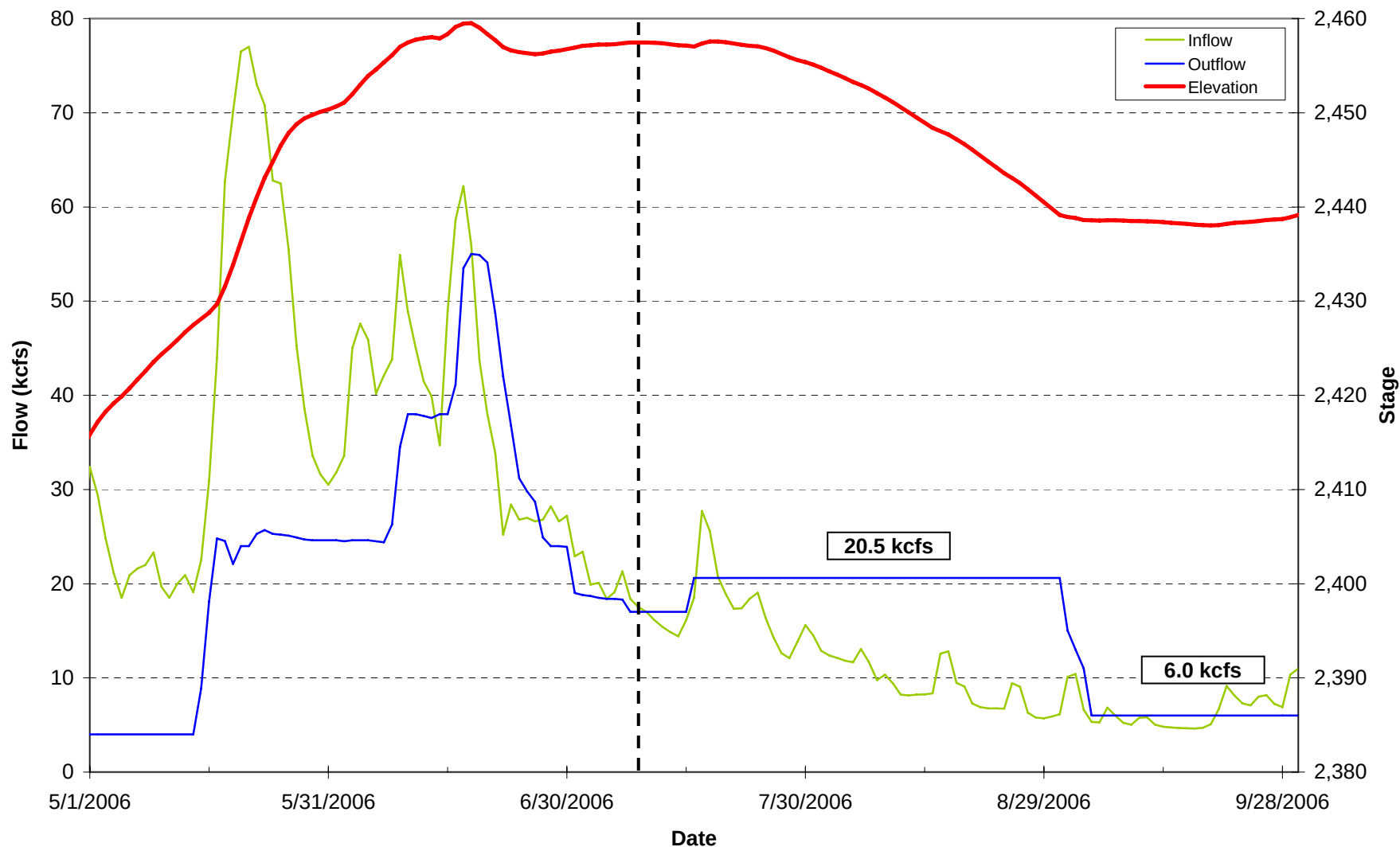
Libby 2439' End of August



ESP INFLOWS USED STARTING 7/11/06

APR-AUG VOLUME=7.028 MAF

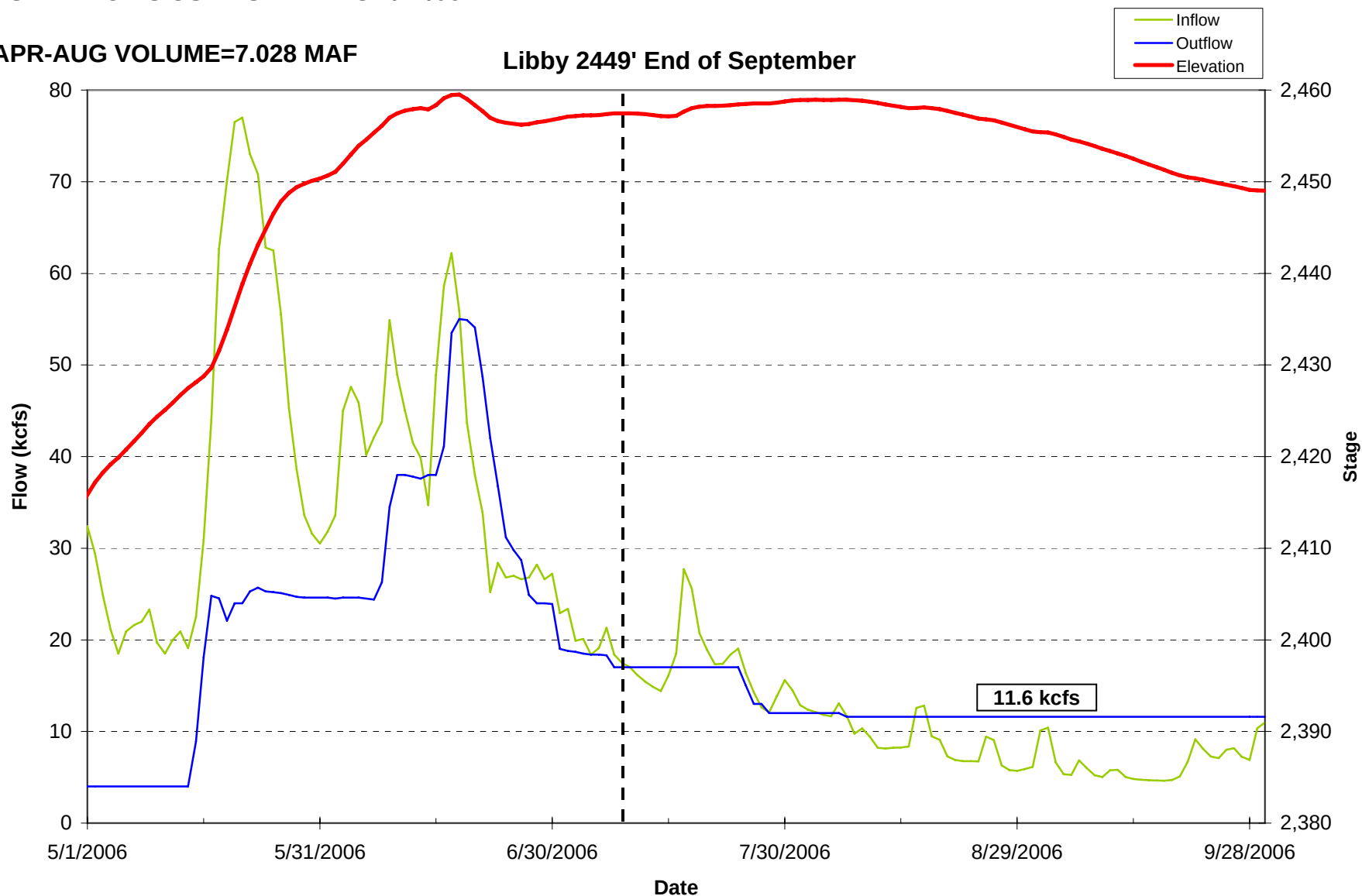
Libby 2439' End of August



ESP INFLOWS USED STARTING 7/11/06

APR-AUG VOLUME=7.028 MAF

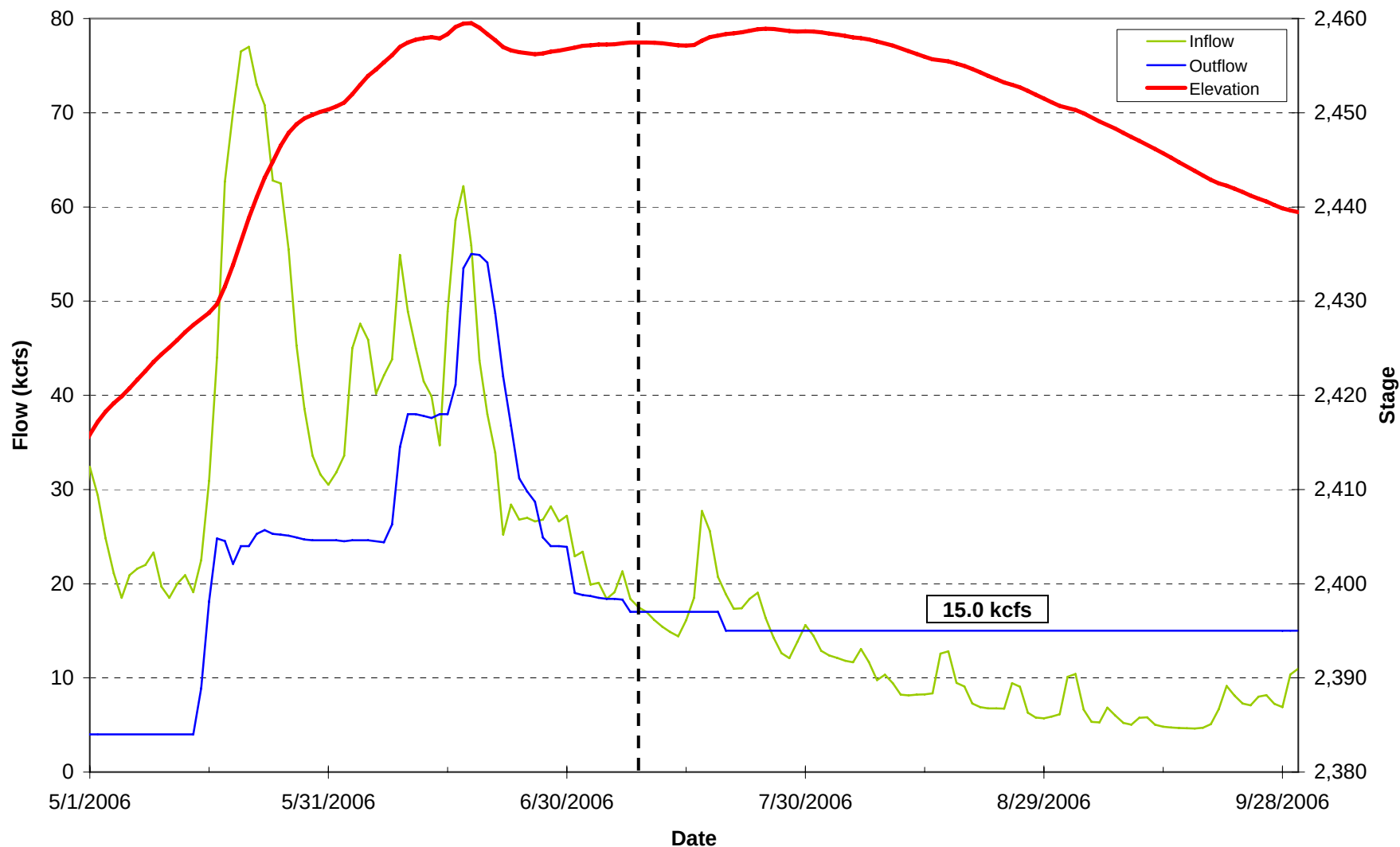
Libby 2449' End of September



ESP INFLOWS USED STARTING 7/11/06

APR-AUG VOLUME=7.028 MAF

Libby 2439' End of September - Step Down



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 12, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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

Libby/Hungry Horse Operations

During the July 6 IT meeting, the Montana SOR for Libby/Hungry Horse operations was discussed. While regional consensus was not reached to implement the request, the IT representatives requested that TMT continue discussing alternative or modified operation proposals that would, from a technical perspective, meet or get close to the various regional interests. During today's meeting, NOAA brought forth a proposed operation based on current forecasts and a desire to try to meet the interests of the full region: 15 kcfs out of Libby through August, putting Libby at a ~10' draft at the end of August, and shape September outflows to reach an elevation of 2439' at the end of September. Similarly, operate Hungry Horse to a 10' draft by the end of August. Paul Wagner, NOAA, noted that this proposed operation would be within TMT's purview to recommend, as a slight modification to the BiOp AND the Montana proposal. Additionally, he noted that storage water in Canada is available this year. BPA will release 600 kaf of the Canadian storage water in August, which is equal to about 15' at Libby. While the storage water is not a trade off specifically for the Montana proposal, it does provide a unique opportunity this year. If technical consensus was reached on the operation, the action agencies and NOAA would need to check with their legal representatives and put something in writing to the judge for approval.

The COE offered that the best loading operation at Libby (which is undergoing oil changes) would be 13.8 kcfs (3 units) now, and as the head goes down, discharge would increase. The project could also partially load 4 units. Libby was currently operating at 17 kcfs out, which NOAA recommended the COE maintain until agreement was reached for a new operation (15 kcfs or otherwise).

TMT members responded:

- Montana: Not the most optimal operation but could support it this year. Will provide a benefit to resident fish. Would like to plan a ramp-down operation for September, soon. Suggest around 9-10 kcfs.
- Idaho: The proposed operation would create a balance for resident and other fish. Given current conditions, this is a reasonable adaptive management approach, and the recommendation is acceptable. Suggest developing more defined September

operations soon. Suggest, per Montana's technical guidance, a gradual ramp-down on a weekly basis.

- Oregon: From a technical perspective, this proposed operation is not flow neutral. Whether to interpret storage water from Canada as providing 'flow neutral' conditions is a policy call.
- USFWS: Shares Oregon's flow neutral concerns AND has concerns for Kootenai fish. Agrees with flat flows as an objective, and with the increase in the current water supply, the proposal is acceptable (though the optimum would be BiOp operations).
- BOR: The ultimate decision rests with the Judge. Needs approval in order to implement. Would provide technical information to the legal process to support the decision. Relative to Libby/Hungry Horse operations, would oppose a restrictive operation at Grand Coulee in September.
- BPA: Supports the proposed operation.
- CRITFC: Given the information presented today, the proposed operation is not volume-neutral. CRITFC does not support. (The operation would be volume-neutral only if the Canadian storage water is 'credited', but not enough information was available today to make that determination.)
- COE: If consensus is reached would need to run it through the legal process.

Next Steps:

- Oregon, CRITFC and others requested additional information about the Canadian storage water and the proposed operation's likely impacts on McNary flows. A subgroup of Jim Litchfield, Rick Kruger, Bob Heinith, Scott Bettin, Cathy Hlebechuk and Paul Wagner were scheduled to meet on **Friday, July 14 at 2:00 pm** to look at the information and develop a written proposal that includes NOAA's suggested operation and likely impacts on flow at McNary.
- The action agencies and NOAA will check with their legal representatives on whether the proposed operation would be feasible to implement this year, from a legal perspective. The proposal from the TMT subgroup will be presented during an IT call on **Tuesday, July 18 at 1:00 pm**, at which IT members will be asked to make a policy call on the following question: Is the proposed operation 'flow neutral' considering the Canadian storage water and current water supply forecast, and should it be pursued through the legal process to be implemented this year?
- TMT will have a conference call on **Wednesday, July 19 at 9:00 am** to discuss the IT discussion and future operations for Libby and Hungry Horse.
- The COE will continue operating Libby at 17 kcfs until a determination is made to implement an alternative operation. The COE expressed interest in maintaining stable flows out of Libby, from an operational perspective.

Dworshak Operations

Dworshak was currently operating at full load and 1.7 kcfs through the RO's, with 11.2 kcfs total outflow. Water temperatures were at 43 degrees. The changes made on July 7th showed influence at Lower Granite, with current temperatures at 67 degrees. Anatone temperatures were near 71 degrees, a moderation from what was seen the week prior. Orofino temperature is around 72 degrees, with 2kcfs out. Clearwater temperatures were still slightly warmer than in previous years.

Weather is expected to be cooler this week. Volume graph shows with the 50% forecast, about 124 kcfs flow augmentation available above 10 kcfs through the end of August. This assumes the project is drafted to 1535' the end of August, equal to about 31 ksf days at 2k.

NOAA recommended that the COE maintain the current operation and all continue to monitor conditions. TMT supported this recommendation. It was noted that work will be done on unit one at Dworshak this Friday so there would be some potential restrictions in adjusting for temperatures, but the COE did not expect this to be an issue.

SOR's for Treaty Fishing

Kyle Dittmer, CRITFC, updated TMT on the recent SOR's submitted for treaty fishing, on July 3-6, 10-13, 17-20, and 24-27, requesting pool operations at 1' for traditional fishing season. The COE agreed to operate Bonneville at 1.5' as a hard constant and 1' as a soft constraint. August fishing will likely occur in the 3rd or 4th week. Hlebechuk noted the SOR submitted June 23 requested a fishing period of July 5 – 7. On Friday, June 30 at 1600 hours, the Corps was faxed a compact notice the fishing period had changed to July 3 – 6. She said because of the late notice the high pool for the July 3 -4 period was set up as a “preferred” operation rather than a “hard” constraint. CRITFC was informed of this. In actuality, the Bonneville forebay was able to be maintained in the top 1.5' feet as

Chum Population Estimates

Rick Kruger, ODFW, provided graphs for '98 -'05 chum timing and peak estimates of spawning with confidence intervals, using the best available data. The information was shared per request from BPA, who noted that this can be a difficult operation to implement. A suggestion was made to cross reference actual flows with the information on the graphs.

Marine Mammal Permitting Process Update

Rick Kruger reported that the states are pursuing Section 120 in the Marine Mammal Protection Act to address sea lions and are asking for feedback from NOAA. If there are concerns, NOAA will convene a task force to discuss and report back to NOAA. Overall, the process would be lengthy, costly and uncertain.

Water Management Plan - Emergency Protocols

Russ Kiefer, IDFG, shared that the salmon managers reviewed the emergency protocols and recommend using the current list and notify all ASAP if/when an emergency does occur with details on: the problem, the duration, the constraint to implementing the BiOp, and the options on how to address (in the event there are other options.) The salmon managers did not plan to provide a protocol list for summer operations this year.

Operations Review

Reservoirs: Line repairs at Dworshak have been completed. Spring averages at McNary were 325 kcfs, Lower Granite averaged 125 kcfs, and Priest Rapids averaged 191 kcfs.

Fish: The adult summer migration has increased.

Power: John Day T-1 transformer might be back up by the end of this month. Doble testing is underway and on the horizon. LGS: units 5-6 out currently, LoMo and Lower Granite are up next. Don Faulkner, COE, will post the schedule on the TMT web page.

Water quality: TDG exceedances at Lower Granite are invalid – no exceedances occurred in July.

TMT Conference Call: Wednesday, July 19, 9am-noon

Agenda Items include:

- Dworshak Operations
- Libby/Hungry Horse Operations

Technical Management Team Meeting Notes

July 12, 2006

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Libby and Hungry Horse Operations.

This is a continuation from other recent TMT and IT discussions, Harkless said; one of the outcomes of the IT meeting was a request that the TMT discuss various operational alternatives that might better meet the needs of the parties of concern. Paul Wagner said he had put forward a potential operation for consideration; essentially it called for a flat 15 Kcfs flow out of Libby through the end of August. I have made a number of trips to the Libby area and heard from numerous people that they were unhappy with our current operation, Wagner said; I told them I would propose this operation at TMT, and have done so. At the time, 15 Kcfs seemed to be a reduction of about 2 Kcfs below what was planned. It now looks as though 20 Kcfs will be required to achieve elevation 2439 by August 31, Wagner said. Another consideration was the spill that occurred at Libby in 2006; in the interest of trying to aid the recovery of the fish that were affected by spill operations, this more modest rate of outflow seemed like one way to mitigate for those biological effects.

The net effect would be a 10-foot draft of Libby by August 31, to 2449 by August 31, Wagner said. It is within TMT's purview to recommend such a

reduced draft, if consensus can be reached. At Hungry Horse, the operation would be similar – a 10-foot draft by August 31. the Montana proposal is a 10-foot draft by September 30. In other words, this is a compromise between what Montana is requesting and what is allowed under the BiOp.

The group devoted a few minutes of discussion to Wagner's suggested operation; Hlebechuk noted that 15 Kcfs is not a good loading for Libby – three full units release about 13.8 Kcfs, so we would either need to release somewhat more or somewhat less than what is being requested, she said. I would probably recommend that project discharge be held at the current rate of outflow, 17 Kcfs, if we're able to reach consensus at this table, Wagner said. In response to a question from Jim Litchfield, Hlebechuk said 18 Kcfs would be better, but 17 Kcfs would be an acceptable loading.

Greg Hoffman said staff at the dam would prefer to have three units running, rather than four, to allow planned oil change maintenance work to proceed. The work is scheduled to continue through the end of August. Scott Bettin suggested that it might be possible to run 15 Kcfs through three units once the head drops at the project. Bettin noted that a volume of non-treaty water equivalent of 15 feet in Libby will be released in August – about 600 kaf, so at least some extra water will be released in August this year.

That water will provide a significant biological benefit for migrating Snake River fall chinook, Litchfield observed. He added that, from Montana's perspective, Wagner's suggested compromise operation, while sub-optimal, would be acceptable, because it would meet at least some of the biological goals outlined in the SOR. It was noted, however, that if the TMT recommends this change, it will need to be vetted through the court. In response to another question, Bettin said that, based on negotiations to date, he cannot promise that any water released from Libby during September will not be held by the Canadians in Kootenay Lake.

The group devoted a few minutes a few minutes of discussion to this information. It was observed that 2006 presents a unique opportunity to conduct this change in operations, due to the water supply situation and the availability of a substantial volume of Canadian storage. Russ Kiefer said Idaho would likely be comfortable with NOAA's proposed compromise operation, but would like more specificity as to the September operation of the Montana projects. Typically, we would prefer to see a gradual rampdown through September, starting at 15 Kcfs and ramping down in equal weekly steps to end September at 9 Kcfs or 10 Kcfs, Litchfield replied. That sounds reasonable to us, Kiefer said.

Hlebechuk said the Corps would like to see TMT reach consensus on this issue, then have Corps legal staff vet it. Rick Kruger said Oregon is not comfortable with NOAA's proposed operation because it is not flow-neutral, because the Canadian water would have been delivered anyway. David Wills

said USFWS agrees somewhat with Oregon's perspective, but also has concerns about conditions in the Kootenai below Libby. The bottom line is that, given the recent increase in the water supply forecast, and the need to optimize conditions for resident fish in Montana, if the Corps chooses to implement the compromise operation, I don't think the Fish and Wildlife Service would object, he said.

Tony Norris said Reclamation believes this decision rests with Judge Redden. We certainly couldn't adopt and implement this proposal without getting Judge Redden's approval first, he said. Moving forward with a strong consensus would definitely be a plus, he said. Bettin said Bonneville strongly supports the proposed compromise operation, and looks forward to its expeditious passage through IT and the court process.

Bob Heinith said that, from CRITFC's perspective, they were looking for something that would be volume-neutral. The Canadian storage helps, but still falls far short of a volume-neutral operation. Therefore, CRITFC cannot support the proposed compromise operation. Wagner noted that a 20-foot draft of Libby and Hungry Horse is equivalent to 1.3 MAF, so the 500 kaf of Canadian storage would fall far short of volume neutrality. But with the increase in runoff volume, we're a lot closer, said Wagner – with the Canadian storage, while I can't say there would be no significant difference in August flows at McNary, the difference wouldn't be great.

Ultimately, Bettin suggested that, in light of the concerns expressed today, it may make sense to take this issue back to IT, providing them with a complete package outlining the details of the proposed operation and seeking the IT's policy blessing. Norris added one caveat: that Reclamation will be reluctant to commit to any operation that significantly restricts the operation of Grand Coulee during September – in particular – any operation that would preclude Reclamation from using at least a portion of the Canadian non-treaty water to refill Grand Coulee toward its September kokanee elevation. It was agreed to delegate a small TMT subgroup to further flesh out this proposal, and its expected impacts to flows at McNary, before it is brought to IT for policy resolution next week. In the interim, it was agreed to hold Libby outflow at 17 Kcfs.

Ultimately, the TMT agreed to revisit this issue at its next meeting.

3. Dworshak Operations.

The TMT has had a number of conference calls to discuss Dworshak operations in the last few weeks, Harkless said. Dworshak is currently releasing full load and spilling about 1.7 Kcfs through the regulating outlets, for a total outflow of 11.2 Kcfs, with a release temperature of 43 degrees F., Jim Adams said. The current water temperature in the Lower Granite tailrace is about 67 degrees, he added. In other words, the effects of the Dworshak operational

change we made last Friday have finally reached Lower Granite, Adams said. Temperatures coming out of Anatone are pushing 71 degrees, currently, definitely lower than what we saw last week. Orofino water temperatures are about 72 degrees, currently, Adams added, but there is only 4-5 Kcfs running past that station, currently. Temperatures in the Clearwater, at Lewiston, Spaulding and Peck are all down here.

The group devoted a few minutes of discussion to the current Dworshak operation. Kyle Dittmer noted that more hot weather is expected next week in the Lewiston area by Sunday and Monday, with air temperatures of 100 degrees+ range. Hlebechuk noted that, using the 50 percent forecast, the Corp estimates that there is enough flow augmentation volume available at Dworshak to provide approximately 31 days of 2 Kcfs spill at Dworshak above full powerhouse operation. In response to a question, it was noted that the current average flow at Lower Granite is about 44 Kcfs.

Ultimately, the TMT recommended no changes to the current Dworshak operation; it was agreed that the project will continue to release full powerhouse capacity, plus 1.7 Kcfs spill through the regulating outlets. It was further agreed to revisit the Dworshak operation at next week's TMT conference call.

4. Treaty Fishing SORs.

Dittmer said CRITFC has submitted two SORs, running through the end of July, covering four fishing periods. As usual, the tribes are asking for full, stable pools at the Zone 6 projects during the treaty fishing periods. As always, the Corps will impose a hard constraint of 1.5 feet at Bonneville, and the other two projects will be used for load shaping, Hlebechuk replied. More than likely, treaty fishing will resume either the second or third week in August, Dittmer added.

5. Chum Spawning Population Estimates.

Kruger provided a series of graphs showing the 2005 chum spawning population estimates, noting that it is intended to display only the relevant scale of the magnitude of recent chum runs. The take-home message is that the current chum population is low; 2002 was an extreme anomaly, said Kruger. Run timing has also been highly variable, so the numbers for 2005 weren't very tight. In response to a question, Kruger said he has already reported on the age structure of the 2005 spawning year.

6. Marine Mammal Permitting Process Update.

Kruger said the Washington and Oregon commissions have directed their staffs to pursue a Section 120 Exception, said Kruger; they have received a briefing from NMFS as to what will be involved. Filling out the applications will take a lot of effort, but if it is decided to pursue the exception, a task force will be

assembled to prepare that application. The entire process could take 2-4 years; NOAA would have to prepare an EIS, another lengthy process, and lethal take is, in all likelihood, not the answer, given the number of animals involved, so why bother? We understand that this is a lengthy, sensitive and uncertain process, said Harkless; please keep us informed as appropriate.

7. Salmon Managers' Updates to Emergency Action List.

Kiefer said FPAC discussed this topic at yesterday's meeting; our recommendation to the action agencies, if an emergency occurs, is that they begin by operating off the current list, but contact us as soon as possible to explain the problem, its likely duration, the BiOp operations it would impact, and any potential alternative actions. Because we're currently under the remand, we decided that trying to re-do the summer emergency list at this time wouldn't be the best use of everyone's time, at this point.

8. Operations Review.

Hlebechuk said the line repairs at Dworshak are now complete. Spring flows averaged 325 Kcfs at McNary, 125 Kcfs at Lower Granite and 191 Kcfs at Priest Rapids. On the fish front, Wagner said the adult summer chinook run continues to be strong. Adams noted that there were no water quality exceedences to report during the month of July.

The Corps reported that the John Day T1 outage repairs are going well, and could be complete by the end of July. Another participant noted that Doble testing is planned at various FCRPS projects is planned for the coming weeks; the Corps said they will provide further updates once the testing dates are available.

9. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, July 26. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Meeting Participants July 12, 2006

Name	Affiliation
Greg Haller	NPT
Kyle Dittmer	CRITFC
Tony Norris	USBR

Robin Harkless	Facilitation Team
Jim Litchfield	Montana
Cathy Hlebechuk	COE
Russ Kiefer	IDFG
Paul Wagner	NOAAF
Scott Bettin	BPA
Jim Adams	COE
David Wills	USFWS
Rick Kruger	ODFW
Russ George	WMCI
Randy Wortmann	COE
Rudd Turner	COE
Bern Klatte	COE
Barry Espensen	CBB
Bob Heinith	CRITFC
Kevin Nordt	Mid-Cs
Mark Burge	USFWS
Vern Cook	COE
Mark Bagdovitz	USFWS
Greg Hoffman	COE
Bruce MacKay	Consultant
Richelle Beck	D. Rohr & Associates
Tom Le	PSE
Ruth Burris	PGE
Mike Buchko	Powerex
Dan Spear	BPA

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday July 19, 2006, 09:00 - 11:00

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

AGENDA

1. Welcome and introductions
2. [\[Review Minutes 2006\]](#)
3. Navigation problem below Lower Granite
 - [\[Lower Granite TW, QR and Little Goose Forebay\]](#) 
 - [\[LGS/LWG July 1 - 18\]](#) 
4. Libby and Hungry Horse Summer Operations.
 - [\[TMT Flow Effects - July 17, 2006\]](#) 
5. Dworshak Operations
 - [\[Volumes at Dworshak 01 Jul Through 31 August\]](#) 
 - [\[Dworshak Forebay Thermocline 2006\]](#) 
 - [\[Clearwater River at Peck \(1975, 1985, 1990, 1991 weather\) & Snake at Lower Granite Dam \(1975, 1985, 1990, 1991 weather\) & Air Temperature forecast \(NOAA / NWS MRF model\) - Kyle Dittmer\]](#) 
 - [\[Lower Snake River Temperatures - TMT Update - 19 July 2006\]](#) 
 - [\[CEQUAL W2 Modeling\]](#) 
6. Spill Patterns for LWG and LGS
 - [\[Request to change spill patterns at LGS and LWG from NOAA Fisheries - Bill Hevlin\]](#) 
7. Other
 - Set agenda for next meeting July 26 [\[Calendar 2006\]](#) 

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

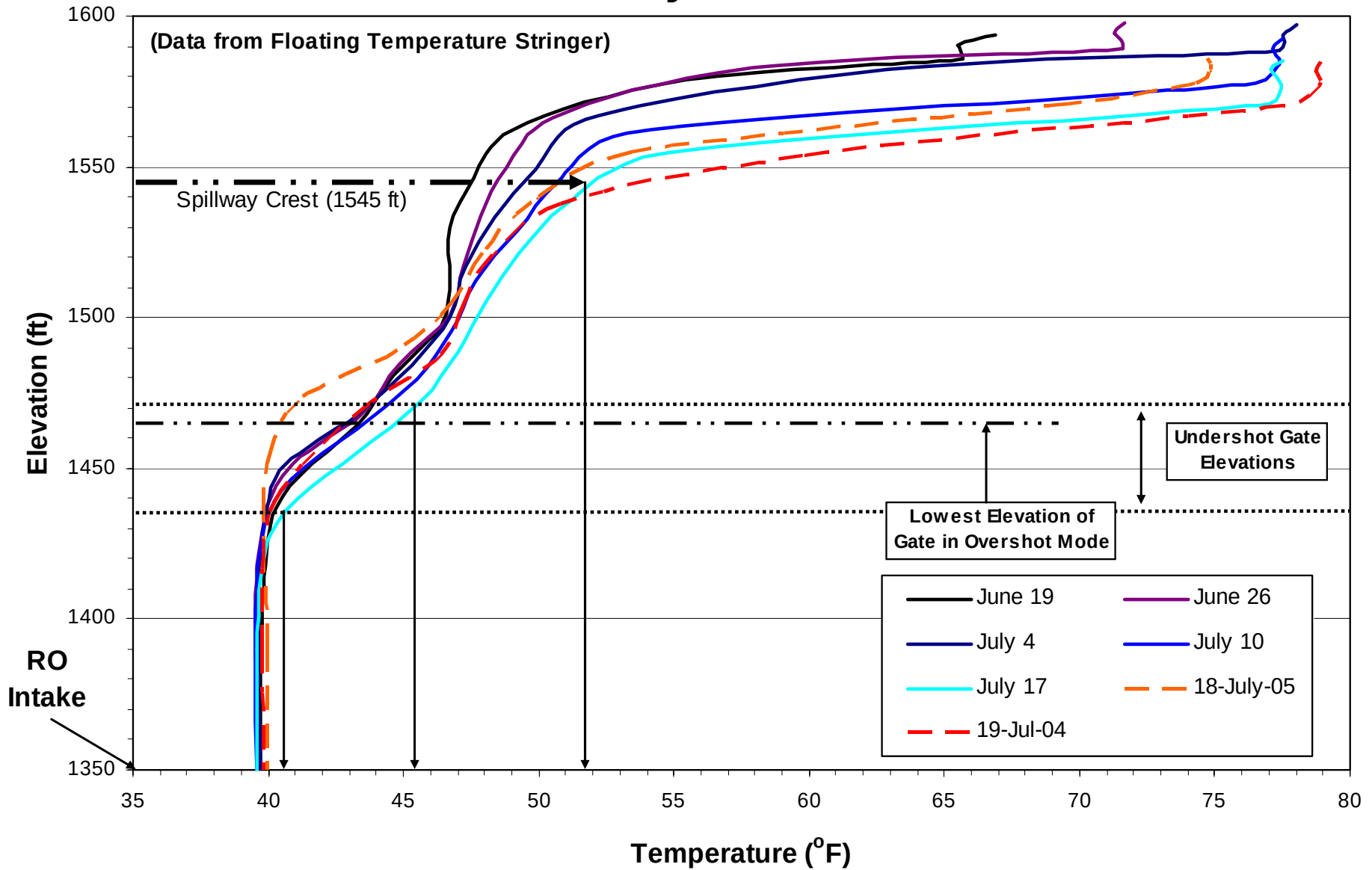
Request to change spill patterns at LGS and LWG from NOAA Fisheries
Bill Hevlin

At Little Goose both patterns are experimental, so neither pattern is standard. I think the bulk pattern is safer and more efficient for fish passage than the modified uniform, this supposition is based on results at LoMo and Ice, because we don't have the data from Goose yet.

At Granite, there is the standard pattern, that being all the training spill is spread across the spillway with one stop openings. The alternative is to open bay 3, 4 stops, and spread the remaining training spill across the spillway. The tailrace looked okay with this "bulk" pattern in the model and the advantage is that it offers another larger opening spillbay for safe fish passage. The test this summer should tell us whether it is a better pattern. The spill volumes should stay the same no matter which pattern is used, hence I don't think it should be a matter with the court, though it may matter with CRITFC or the states in FPAC.

Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer)

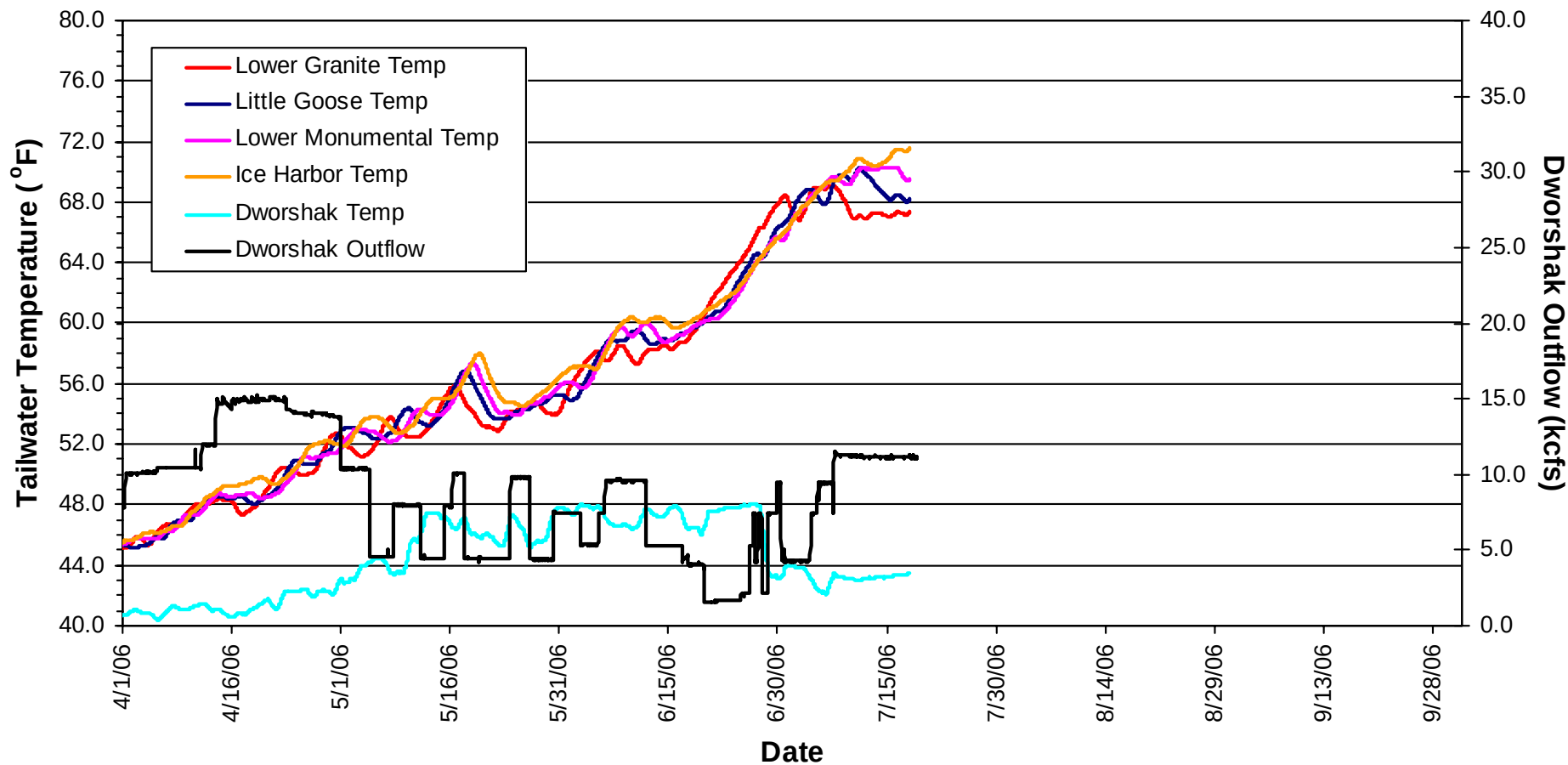


Lower Snake River Temperatures

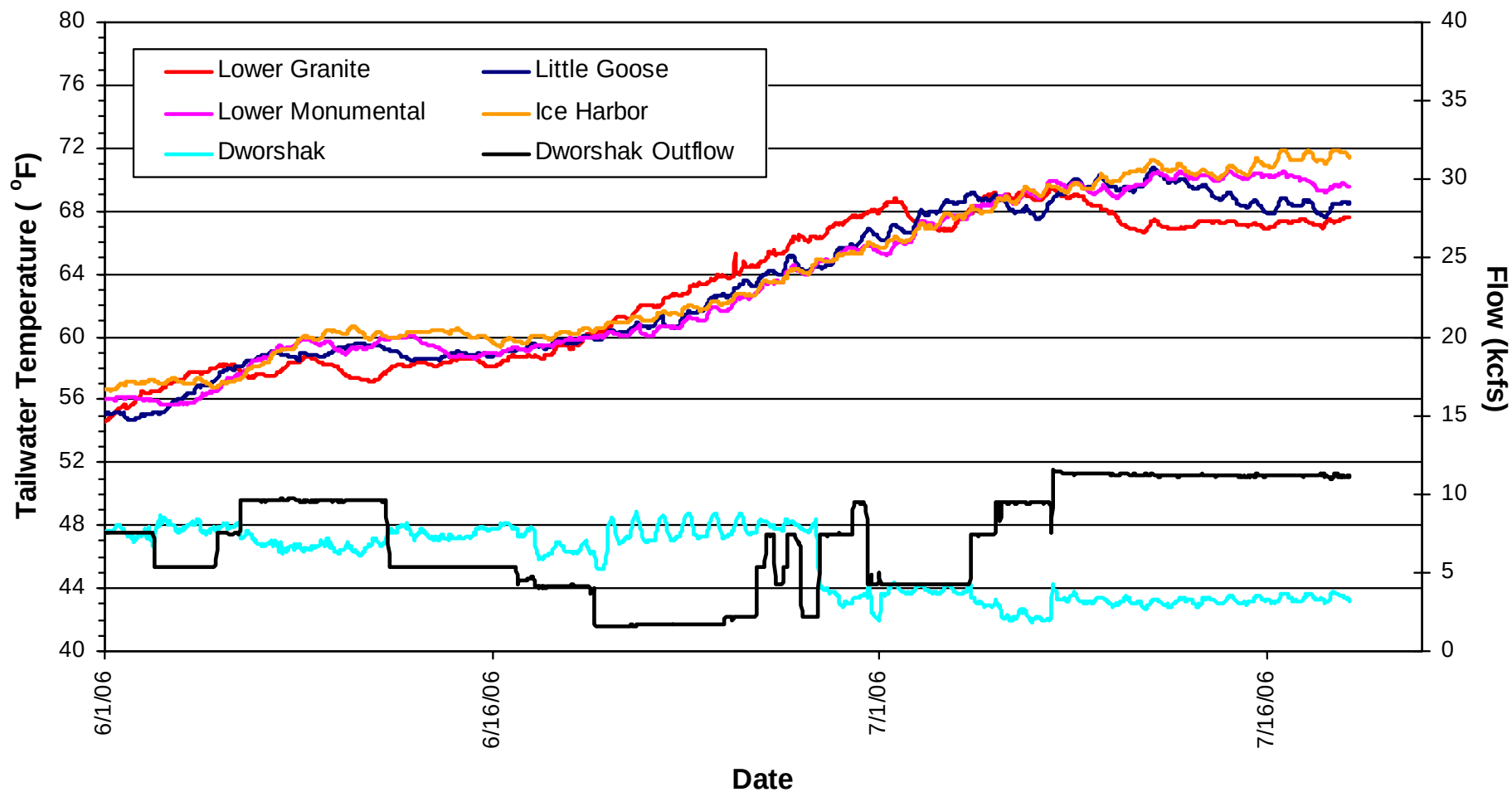
TMT Update

19 July 2006

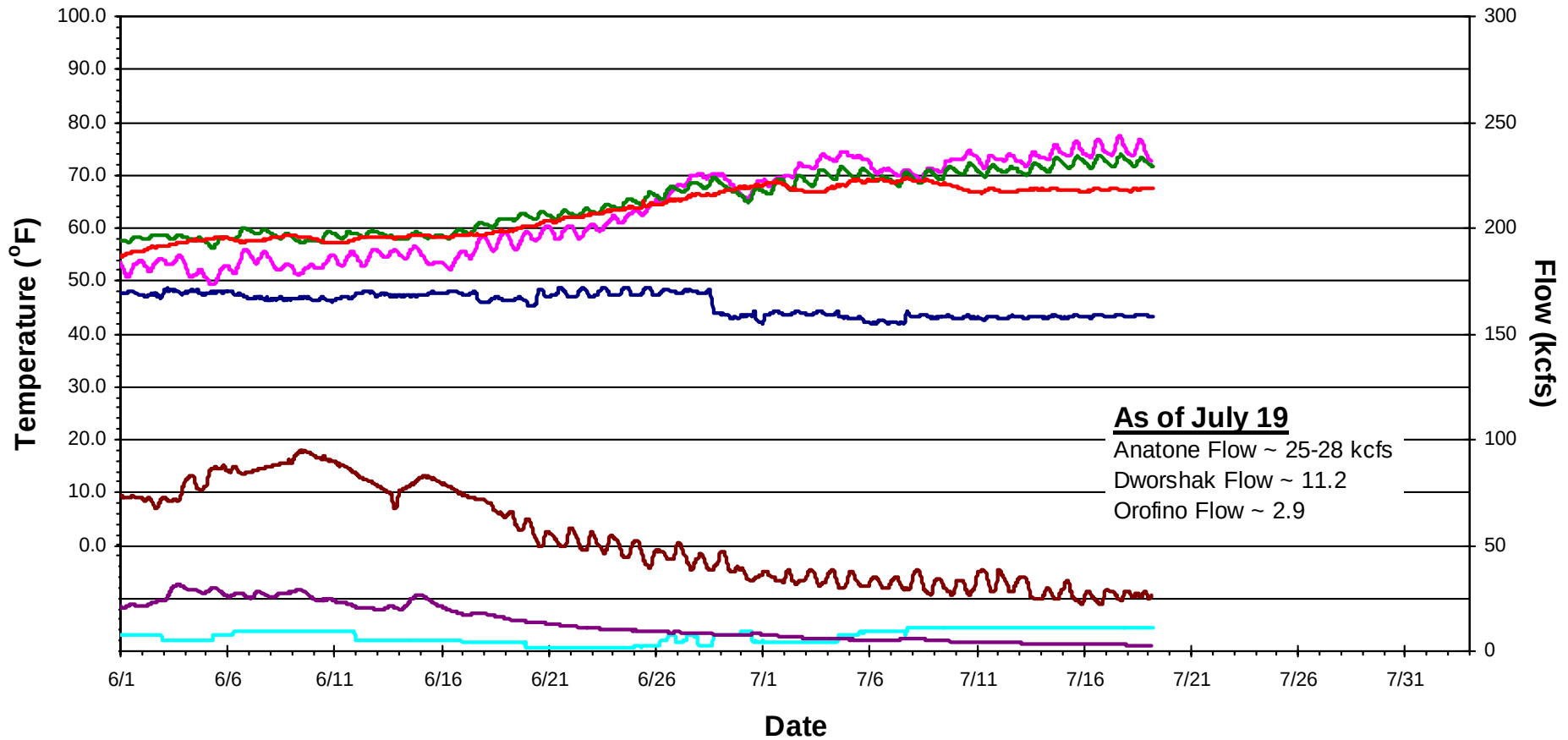
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (Rolling 24-Hr Average)



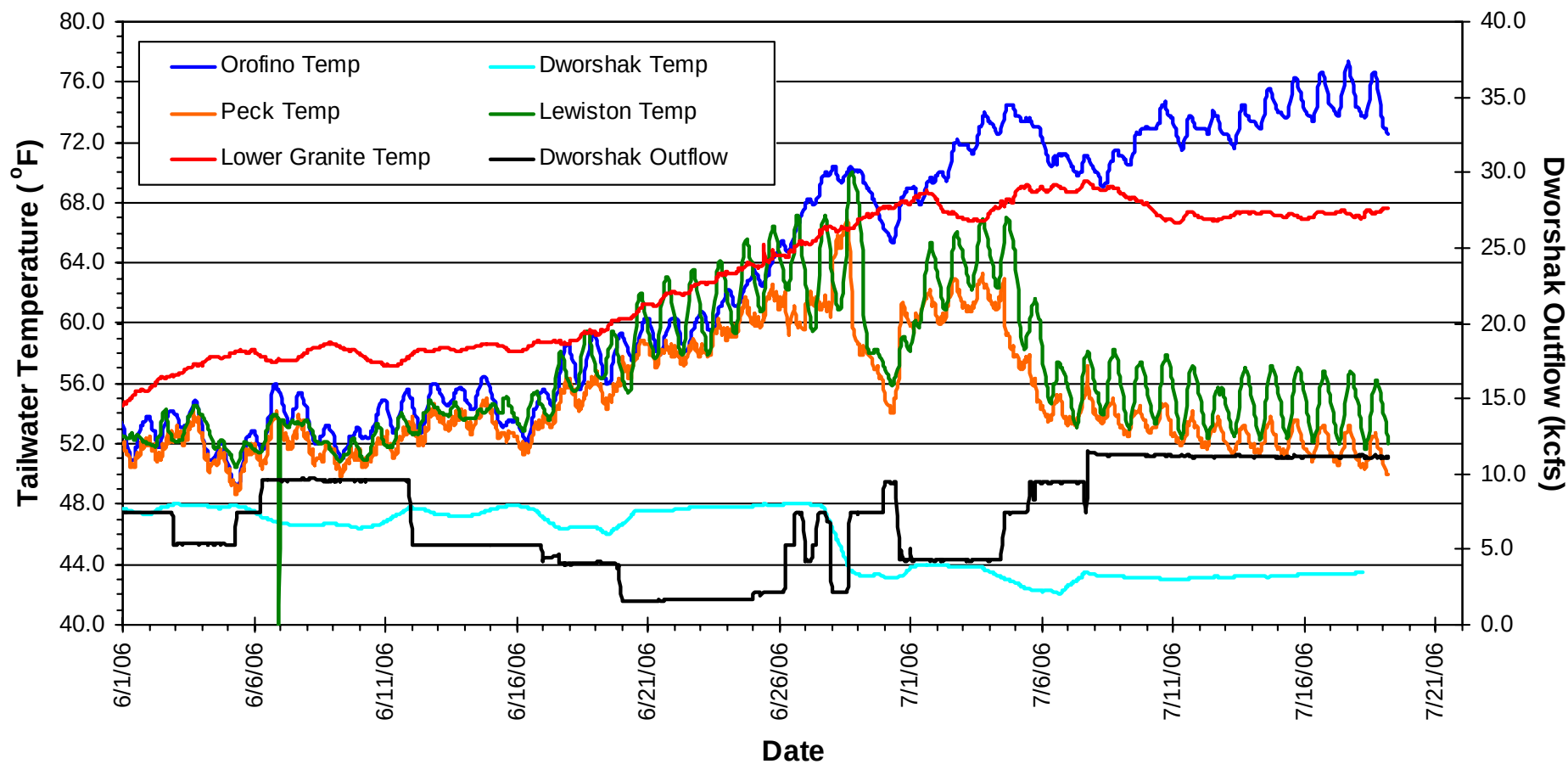
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - July 19)



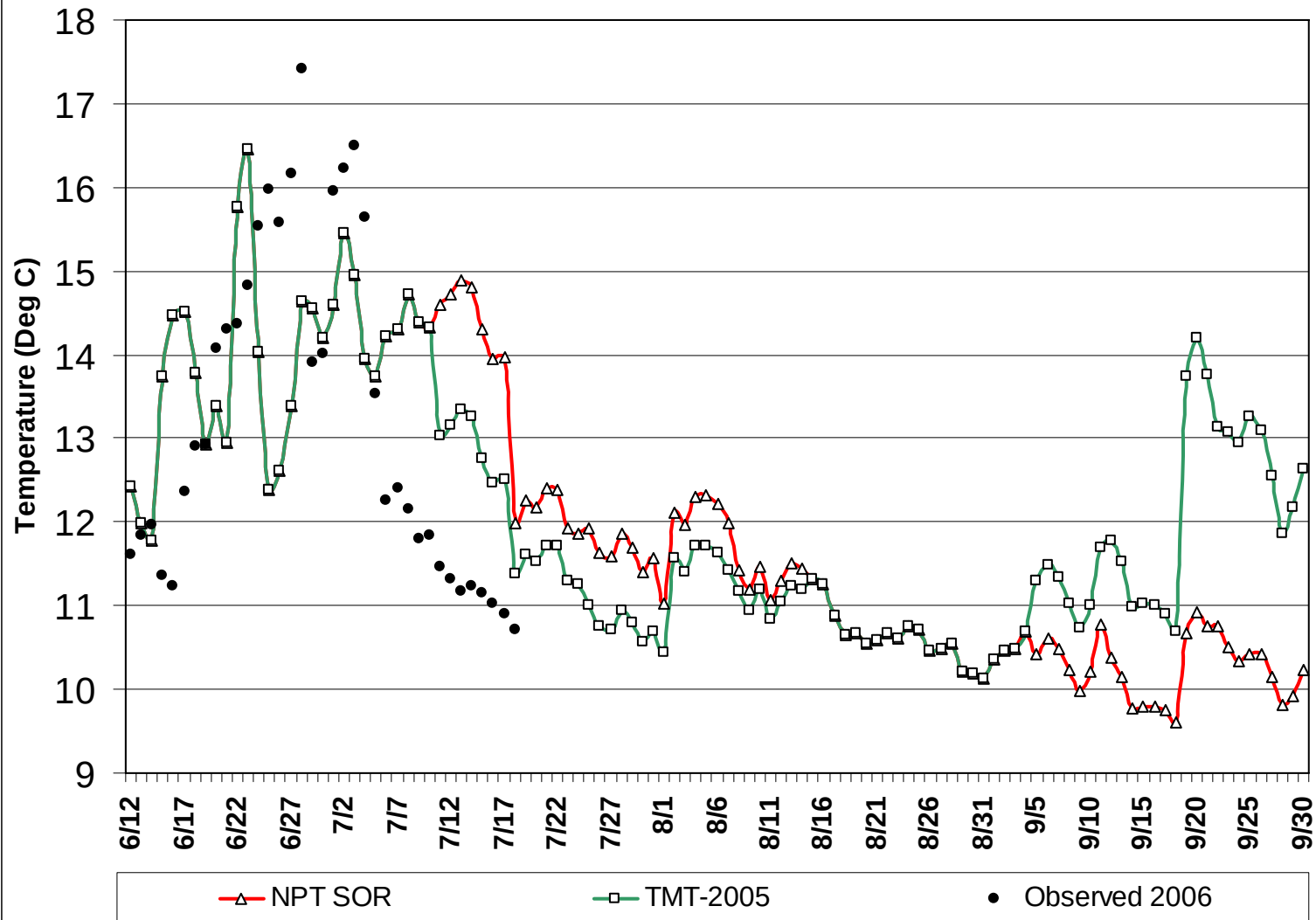
Lower Granite Inflows and Temperatures in 2006



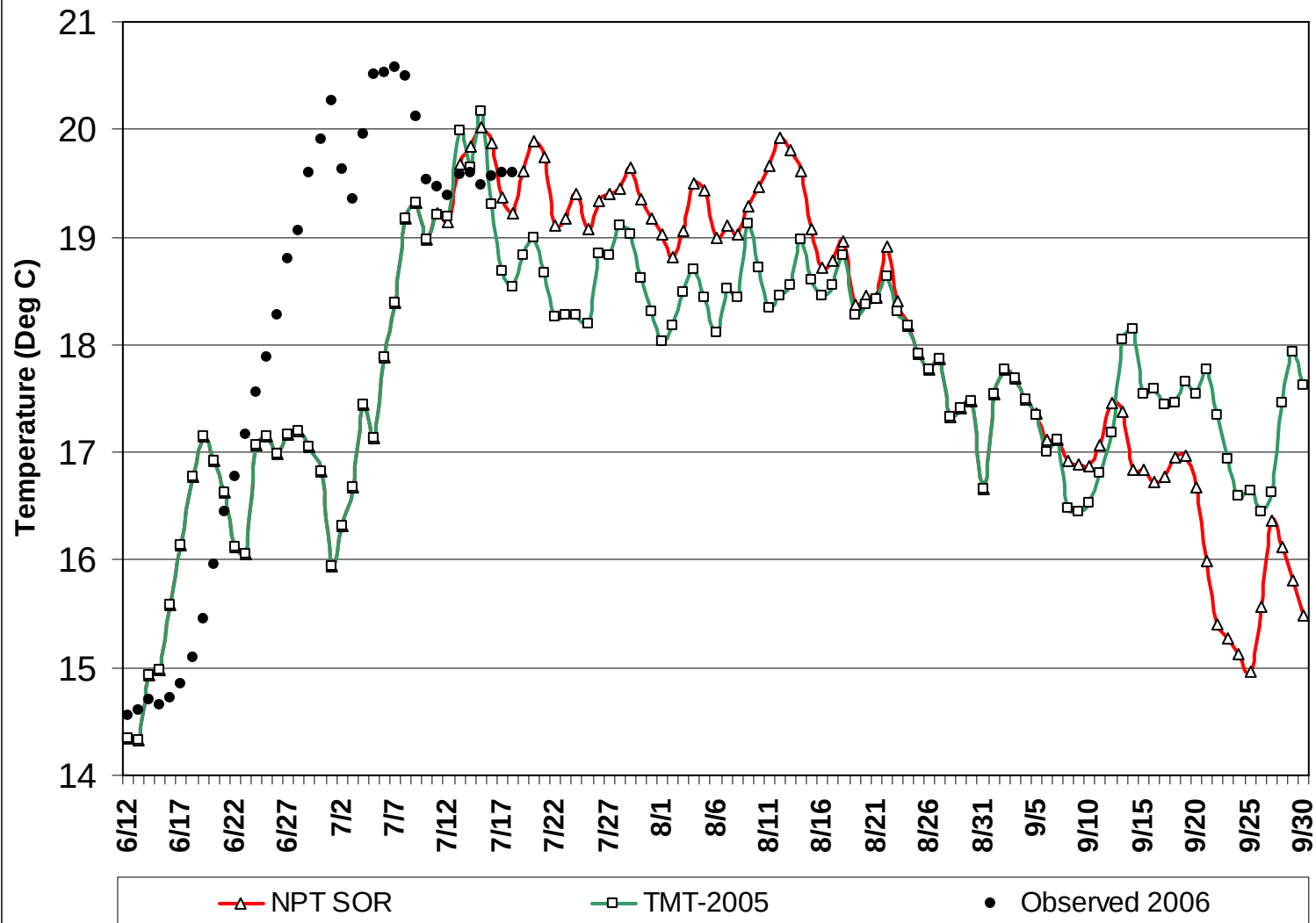
Dworshak Outflows and Clearwater River Temperatures in 2006



Clearwater River at Peck (1975, 1985, 1990, 1991 weather)

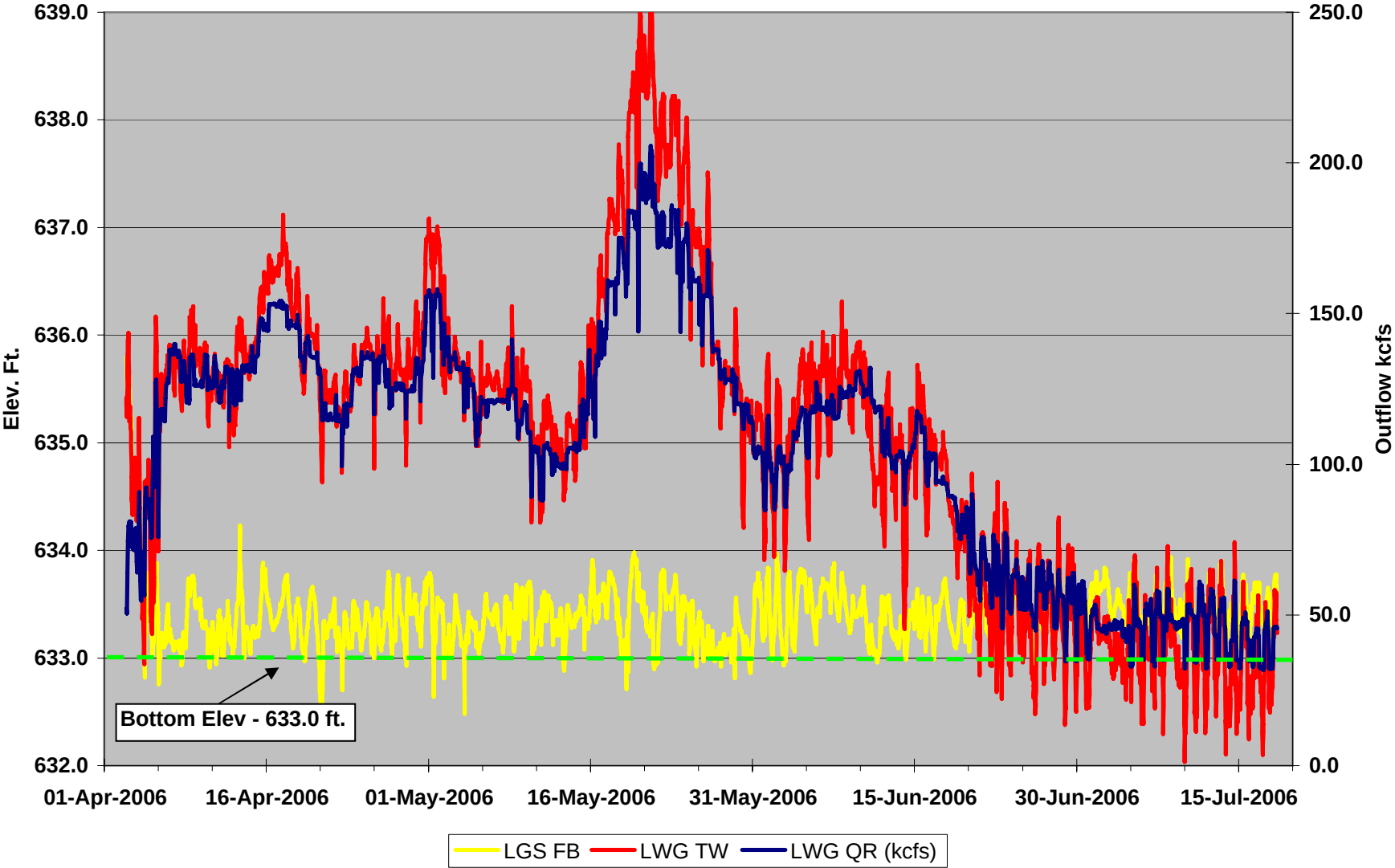


Snake at Lower Granite Dam (1975, 1985, 1990, 1991 weather)

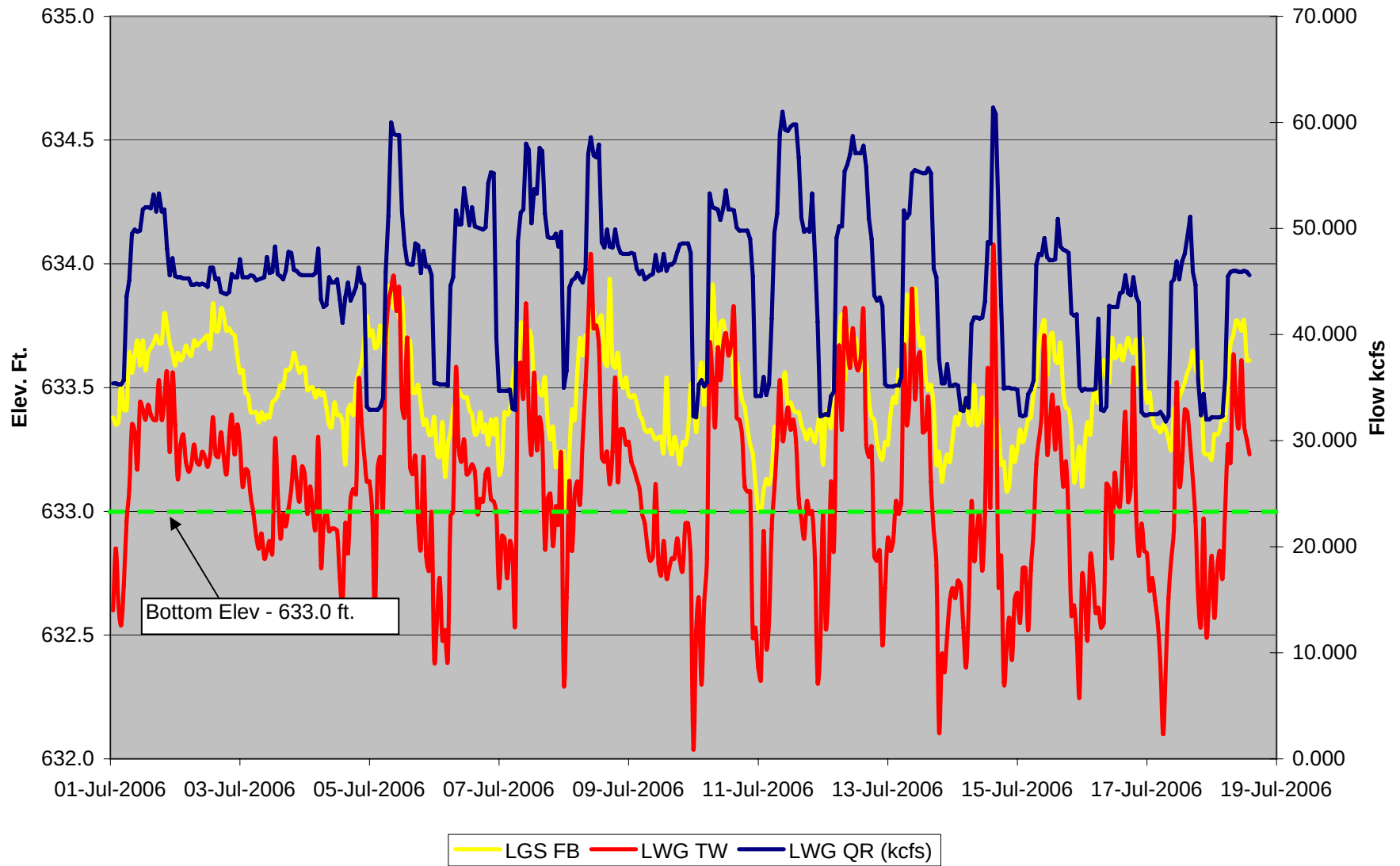


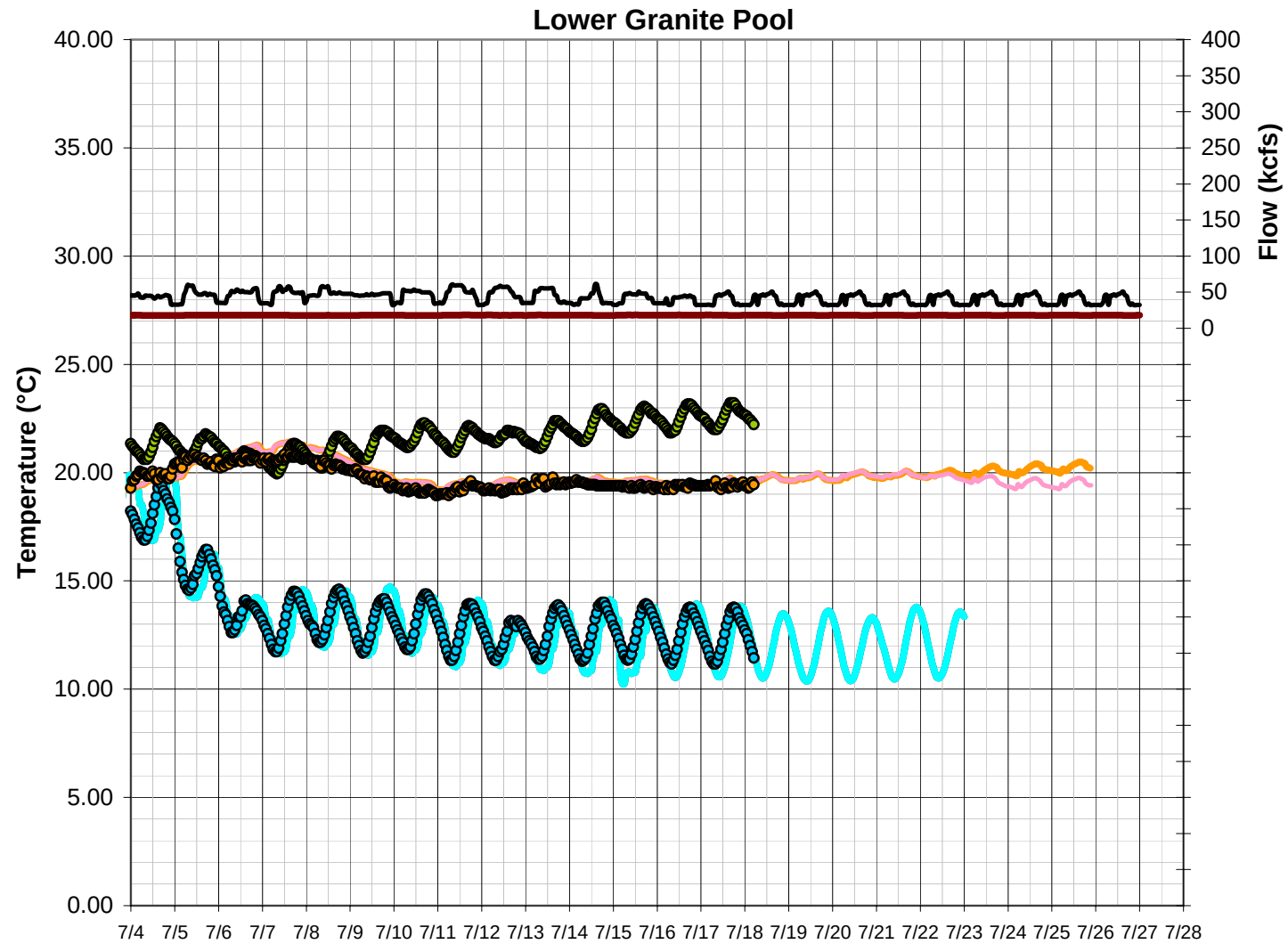
Air Temperature forecast (NOAA / NWS MRF model)		
Lewiston	Tmin	Tmax
19-Jul		94
20-Jul	62	98
21-Jul	64	106
22-Jul	67	107
23-Jul	69	105
24-Jul	67	102
25-Jul	65	94
26-Jul	63	95
"normals"	60	90

Lower Granite TW, QR and Little Goose Forebay

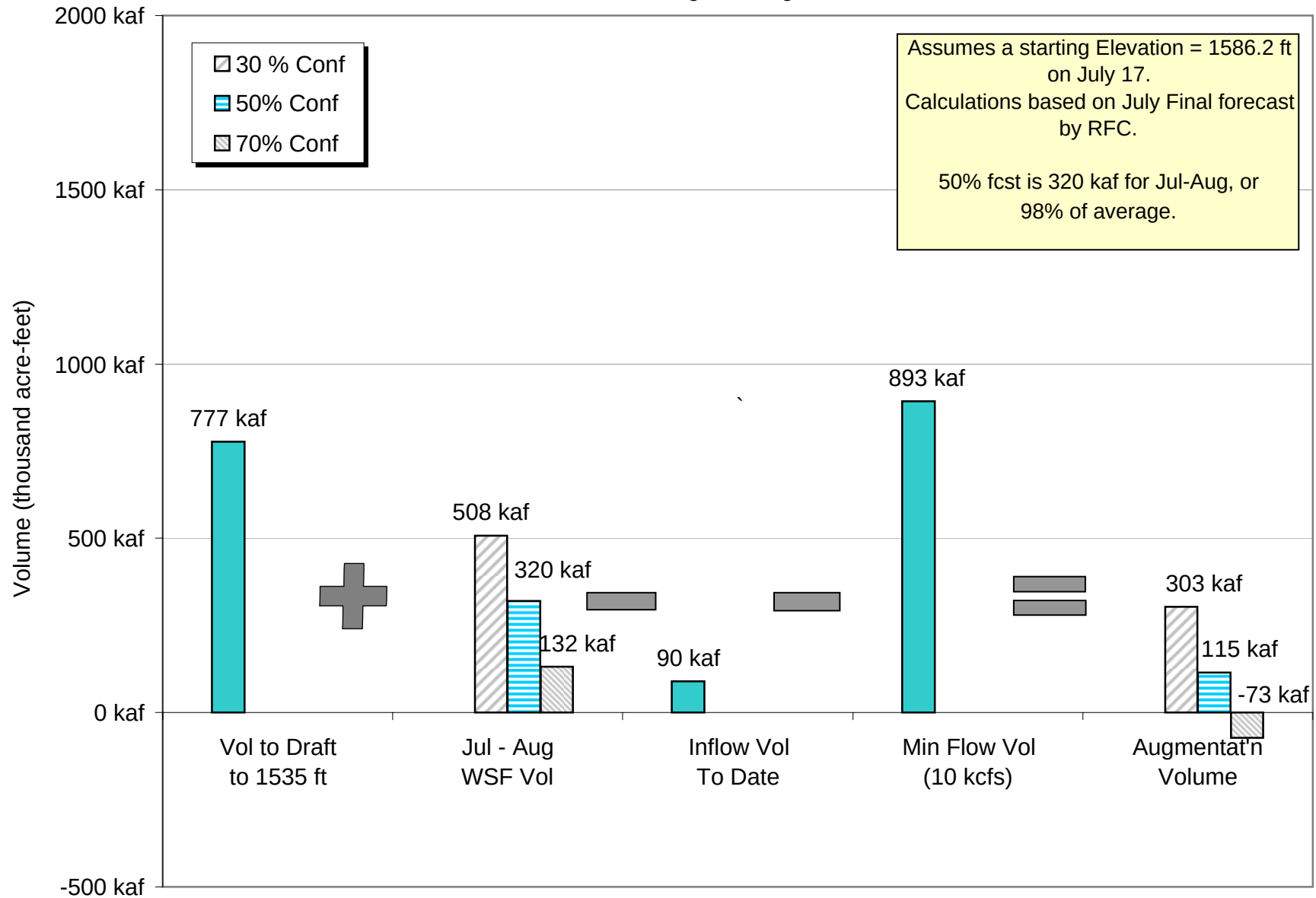


LGS/LWG July 1 - 18





Volumes at Dworshak 1 Jul Through 31 August



To: TMT
Subject: Flow Effects
Date: July 17, 2006

The TMT subgroup met July 14, 2006 to quantify the effects of implementing the latest compromise proposal for operation of the Montana projects. Of particular interest were the details of the summer operation of the Canadian projects, per the 2006 Summer Storage Agreement between BPA and BCH. Of consideration, is whether or not releases of this water may be considered as an offset to any reduced flow impacts caused by the proposed compromise.

The operation as proposed at TMT consisted of the following project operations:

- Discharge a steady flow of 15 kcfs from Libby through August 31. No particular reservoir elevation is targeted.
- Discharge a steady flow of 3 kcfs from Hungry Horse through August 31. It is believed that this will result in a 10 ft. draft.

It is difficult to precisely quantify the effects of the MT flow reductions on McNary flows. This is largely due to uncertainty surrounding the forecasts of the required inflows and outflows needed to achieve the 20 ft. drafts.

Project	Expected average outflow to draft 20 ft by August 31	Change in outflow due to the new proposal
Libby	15 to 20 kcfs	0 to 5 kcfs
Hungry Horse	4 to 6 kcfs	1 to 3 kcfs
		Total: 1 to 8 kcfs

Thus, the potential flow reduction from implementing the proposed compromise operation would be to reduce McNary discharge by 1 to 8 kcfs per day once the operation begins.

Assuming this operation started the last week in July it would be in affect for approximately 5 weeks (35 day period). To express this range in total kcfs days results in a reduction in the range of 35 to 280 ksfd.

This year, due to the unusually high and uncontrollable runoff in late May and June, BPA entered into a unique storage agreement with BC Hydro, the 2006 Summer Storage Agreement. The agreement was to store additional water (above the 1 maf flow augmentation) as possible, in Canadian reservoirs for release during the summer period. Any water stored was to be shared equally by BPA and BCH although the release requirements were slightly different. This agreement was coordinated with the Fishery Agencies and Tribes in May of this year.

The total amount stored under this agreement was 673.6 ksfd. Thus each party has 336.8 ksfd of water for release. BPA must release all 336.8 ksfd between July 28 (and no later than July 31) and Sept 1. BCH must release half, 168.4 ksfd, between July 28 (no later than July 31) and Sept 1. BCH's remaining 168.4 ksfd must be released by Sept 22.

Thus the volume to be released between July 28 and Aug 31 is just over 1 maf.

Account holder	August release volume
BPA	336.8 ksfd
B.C. Hydro	168.4 ksfd
Total	505.2 ksfd

In some previous years, a Libby/Treaty swap has been implemented which was viewed as being flow neutral (replacing Libby water with a like amount of water from Treaty). BCH has expressly declined such an agreement for this year. Canada is already expecting low reservoir elevations by the end of summer. Therefore, they have declined any arrangements that would further drawdown their reservoirs such as a Libby/Treaty Swap.

To summarize, the Canadian storage agreement, unique to this year, will increase August volume by at least 505 ksfd compared to a Treaty only operation. The effect of implementing the proposed compromise operation at Libby and Hungry Horse would reduce discharge volume from the projects by 35 to 280 ksfd.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

July 19, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Lower Granite Navigation Problem

Cathy Hlebechuk, COE, reported that the tailwater at Lower Granite was dropping below the minimum elevation 633' needed to maintain a 14' minimum depth for safe barge passage. It was noted that this is a health and safety concern. The COE recommended making a change in operations to MOP +1 at Little Goose in order to have elevation clearance needed (i.e. for barges.) The COE planned to refill Little Goose beginning on July 24th, concurrent with double testing at the project, and continue with MOP+1 at Little Goose until the Lower Granite tail water is consistently above 663-663.5'. A question was asked about whether there were alternative operations/means of addressing this recurring problem, which BPA responded that there was not. TMT did not object to this operation.

Libby / Hungry Horse Operations

UPDATE: A TMT subgroup sent out a memo from their meeting on Friday, July 14th for discussion during an IT call held July 18. The memo recommended maintaining 15 kcfs flows at Libby through August 31. Similarly, a flat flow of 3 kcfs was recommended for Hungry Horse which was believed would draft the project 10' by August 31. This recommended operation received no objection from IT, and was subsequently sent to various federal legal counsel for review and submission to the court process. The operation would start as early as July 24th. The plan for outflow, as clarified by Hlebechuk, will be 3 units (at approximately 14 kcfs) until the head goes down, at which time flows will be increased to 15 kcfs.

Russ Kiefer, IDFG, expressed concern that an operation plan for September was not addressed in the memo – and recalled that there was a proposal from Montana during the 7/12 TMT meeting to implement a gradual, weekly ramp down in September to bring flows at Libby down from 15 to 9 kcfs by September 30, which Idaho supported as a caveat to supporting the proposed August operations. While general agreement for this proposed operation was expressed, September operations will be further discussed and recommended during the July 26 TMT meeting since Montana was not present for today's TMT call.

Dworshak Operations

Cathy Hlebechuk, COE, shared a graph of projected volumes at Dworshak to reach 1535' by the end of September, showing that volume flexibility may become an issue. Temperatures were expected to be very high over the weekend. Ice Harbor temperatures were continuing to rise, and were currently between 72-73.5 degrees. Temperatures at the Lower Granite tailwater were just below 68 degrees. Little Goose was at 72 degrees, and Anatone was also at 72 degrees.

The COE ran scenarios of operations at Dworshak to look at flow and temperatures, which projected that spilling an additional 4.5 kcfs through the RO's (which would put temperatures around 42 degrees and TDG at 109%) would bring temperatures at Lower Granite down to below 68 degrees. The current operation scenario showed temperatures at Lower Granite exceeding 68 degrees. The COE recommended operating Dworshak at full powerhouse plus 4.5 kcfs through the RO's, and continuing to closely monitor TDG and the hatchery.

A question was raised about the impact of going to 14.1 kcfs: How much volume can be afforded without forcing flows below 10 kcfs between now and August 31? Hlebechuk, using a 50% forecast, responded that the project could hold at 14.1 kcfs for 14 days, and then maintain 10 kcfs through August. NOAA offered that it is critical to get the temperatures down now and that doing so would likely allow the system to maintain temperatures with less flow in late August.

With no objections raised from TMT, the COE planned to operate the project as recommended above. A check-in TMT call will take place Monday, July 24, at 9 a.m.. TMT will check in again at the 7/26 TMT meeting.

Spill Patterns for Lower Granite and Little Goose

NOAA made a request to move from a flat to a bulk spill pattern to support better egress conditions. FPAC discussed this and did not object to the proposed change. It was noted that this would be a shaping change, rather than a volume change. With respect to the Spill Implementation Plan submitted to the court, this change will be reported before possible implementation on July 21.

Next Meeting, July 26, 9am-noon

A face to face TMT meeting is scheduled for Wednesday, July 26. Please regularly check the TMT web page for agendas and any scheduling.

Technical Management Team Conference Call Notes

July 19, 2006

1. Greetings and Introductions.

Today's Technical Management Team conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Navigation Problems Below Lower Granite.

Hlebechuk said there is a navigation problem below Lower Granite. We're unable to maintain the 15-foot navigation channel like we're supposed to, she said – the pool elevation needs to be at least 633 to maintain that. We need to change the operating range of the project to MOP+1 to ensure adequate depth over the downstream sill of the navigation lock.

We need to have at least 15 feet of depth over the sill, said Steve Voss; the reason we're having trouble maintaining that depth is because of the fact that this is the first year in a long time we've actually been operating at MOP, rather than MOP+1. If the tailwater elevation falls below 633, as it frequently has this summer, there is no clearance over the sill, and tow-boats may not be able to enter – if they bottom out on the concrete, then you've got a big problem. The problems occur when flows are low, Hlebechuk added.

Is there a change in operations that could prevent this problem from happening? Rick Kruger asked. Could you ramp up and down more slowly, for example, to avoid a depression in flows? I don't think that would make much difference, said Robyn MacKay – we need to fill the pool by about six inches to prevent this from happening. As we go forward through the season, Snake River flows will be dropping even more, Paul Wagner noted – it sounds as though this is a health and safety issue. Hlebechuk noted that Little Goose pool will be filling over a two-day period to accommodate double testing at Lower Monumental next week. How does that affect flows with respect to this issue? Kruger asked. Because the Lower Monumental powerhouse will be shut down, and we'll need to fill Little Goose pool to reduce flows at Lower Monumental while units are out of service during the double testing – it would be an opportunity to fill Little Goose pool at the same time, Hlebechuk replied.

Six inches at Lower Granite is a lot of water, said Kruger -- I still don't understand why ramping up and down more slowly wouldn't help alleviate these problems. Look at the July graph attached to this item on today's agenda, Hlebechuk suggested. Starting on July 2 and going through July 5, you'll see a fairly flat line for Lower Granite discharge. The yellow line is Little Goose forebay, the red line is Lower Granite forebay. You can see even when Lower Granite flows are stable, the problem persists – the real problem is Little Goose operations. In other words, even when Lower Granite discharge is stable, we still have a problem.

It sounds as though we need to reduce the sill height in the Lower Granite navigation lock, Kruger suggested. That would be a major undertaking, Voss said. I've inspected similar facilities, and it's not going to be possible to do that, said Tony Norris.

We'll continue to monitor the tailwater, Hlebechuk said. We will adjust the Little Goose elevation lower if it is possible to do so and maintain tailwater above 633, she added.

3. Libby and Hungry Horse Summer Operations.

Most of you have seen the memo from the TMT technical subgroup, which was distributed by email, Hlebechuk said. At yesterday's IT meeting, there was no objection to the compromise operation NMFS had proposed. The operation is now being vetted through the legal process; if there is no further objection, the soonest it could be implemented is this Monday. If it is implemented, the Corps would plan to run three units at full load at Libby, yielding a discharge of about 14 Kcfs initially, increasing to about 15 Kcfs as head at the project is reduced. At Hungry Horse, we will be ramping down to the flat flow rate that will evacuate the agreed-upon volume – about 3 Kcfs, Tony Norris added.

In response to a question, MacKay noted that while there is general agreement that flows from Libby and Hungry Horse will be gradually ramped down in September, there is no specific agreement as to how, or at what rate, that will occur. Russ Kiefer said his understanding was that Jim Litchfield had specifically proposed that Libby outflow be gradually ramped down, in weekly increments, to 9 Kcfs. That was not specifically discussed at the TMT subgroup meeting, said MacKay. That's a concern, because I think we agreed, at TMT that this was all a package, and I think September operations need to be included, Kiefer said. Various participants, including David Wills, said they agree with Kiefer's recollection. We agree in principal to what you're saying; we just need to iron out the details, Scott Bettin said.

After a few minutes of discussion, it was agreed to discuss September operations at the Montana projects at next week's TMT meeting.

4. Dworshak Operations.

Hlebechuk said there is a link on today's TMT agenda includes the most recent CEQUAL-2 runs, showing the volume of flow augmentation water available above 10 Kcfs outflow at Dworshak – one at 30% confidence, one at 50% confidence and one at 70% confidence. At 70% confidence, we're already in the negative, so we need to be prudent in how we use the remaining volume in Dworshak, she said. This is the volume remaining before we achieve elevation 1535 on August 31, Hlebechuk added; the remaining 15 feet, for use in September, has already been set aside.

There isn't a lot of flexibility to operate above 10 Kcfs, Dave Statler observed. Kyle Dittmer noted that air temperatures of up to 107 degrees are expected in the Lewiston area this weekend. Jim Adams reviewed the current water temperature situation at the Lower Snake projects, noting that all of these numbers are available via hot-link from today's agenda on the TMT homepage. The bottom line is that we're at about 67 degrees in the Lower Granite tailwater, Adams said; outflow temperatures at Peck and Anatone are pretty warm right now, about 72 degrees.

Adams said he had discussed the details of the Dworshak operation at yesterday's FPAC meeting, which included several options involving the regulating outlets and flow over the spillway. Our estimate is that spillway flow would produce water in the 60-degree range, which would increase the total outflow temperature at Dworshak to 46 or 47 degrees, he said. After consultation with Mike Schneider, we believe we could increase the flow of 40-degree water from the ROs to about 4.5 Kcfs without violating the TDG standard downstream of Dworshak, Adams said; that would probably be a better option, in terms of cooling the river. According to our modeling, increasing RO flow to 4.5 Kcfs will enable us to keep Lower Granite tailrace temperatures below 68 degrees. If we continue doing what we're doing now, however, we will exceed the 68-degree standard at the Lower Granite tailwater by this weekend. If we increase flows out of the ROs today, that additional cool water will hit Lower Granite tailrace on Sunday, in the middle of the hot spell. In response to a question from Cindy LeFleur, Adams said this will increase Dworshak outflow to 14.1 Kcfs at about 42 degrees F.

Howard Burge of the Fish and Wildlife Service said that, if the Dworshak outflow temperature is decreased to 42 degrees, there may be an impact at Dworshak National Fish Hatchery. We're right at the critical temperature right now, he said – the real question is how long this operation would continue. If it's a week, it shouldn't be a problem; if it continues for a month, that will severely impact fish growth. We may still be able to target a release temperature of closer to 43 degrees by keeping one of the units in overshot mode, if the TMT so desires, Adams said – that would impact the temperature we get in the Lower Granite tailrace only slightly.

If we increase Dworshak outflow now, does that mean we'll have to reduce Dworshak outflow to below full powerhouse capacity between now and August 31, if we're to meet the 1535 target elevation on August 31? Statler asked. If so, given the likely hot weather we'll be seeing later in July and August, we may want to think about that very carefully. According to our modeling, using the 50 percent forecast, we could maintain 14 Kcfs outflow from Dworshak for 14 days, and still release full powerhouse capacity through the end of August, Hlebechuk replied. That sounds a bit optimistic to me, but we can revisit this operation next week, said Statler.

After a few minutes of discussion, it was agreed to increase Dworshak outflow up to the gas cap, or 14.1 Kcfs, whichever comes first, beginning later today. It was agreed to check in on this topic at 9 am Monday.

5. Spill Patterns for Lower Granite and Little Goose

Bern Klatte said Bill Hevlin has requested that the spill patterns at Little Goose and Lower Granite be changed from a flat to a bulk pattern, to provide better fish egress conditions. FPAC discussed this yesterday, said Wagner; people were willing to accept that change going forward. He noted that there has been an ongoing test, beginning June 16, testing the flat vs. bulk spill patterns, and Bill's view was that, based on the results of that test, the bulk spill pattern was providing better conditions for fish. This won't change the volume provided, Klatte added – it only changes how it's delivered. I believe there is a spill pattern for these projects specified in the implementation plan we submitted to the court, Adams observed. We'll check with our legal folks, but it's a pretty minor change, Klatte said. Certainly the plan envisions this kind of in-season management flexibility, Wagner added. Kruger said he supports this change. No TMT objections were raised to this change in operations; it will be implemented as soon as it can be coordinated with the other parties and Corps legal staff, probably by the end of this week.

6. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, July 26. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Conference Call Participants July 19, 2006

Name	Affiliation
Robin Harkless	Facilitation Team
Rick Kruger	ODFW
Tony Norris	USBR
Robyn MacKay	BPA
Barry Espensen	CBB
Kyle Dittmer	CRITFC
Cindy LeFleur	WDFW
David Wills	USFWS
Paul Wagner	NOAAF

Cathy Hlebechuk	COE
Steve Boss	COE
Howard Burge	USFWS
Dave Benner	FPC
Bern Klatte	COE
Dave Statler	NPT
Russ George	WMCI
Jim Adams	COE
Scott Bettin	BPA

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Friday July 21, 2006 09:00 - 10:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5191

**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. [\[Review Minutes 2006\]](#)
3. Dworshak Operations
4. Other

- Set agenda for next meeting July 26 [\[Calendar 2006\]](#) 

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

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Monday July 24, 2006 09:00 - 10:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5191 or (503-808-5199 pass code 2580)

**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
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Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Dworshak Operations
 - [\[Volumes at Dworshak 01 Jul Through 31 August\]](#) 
 - [\[Lower Snake River Temperatures - TMT Update - 24 July 2006\]](#) 
3. Libby and Hungry Horse Operations
4. MCN Spill
5. Other
 - Set agenda for next meeting July 26 [\[Calendar 2006\]](#) 

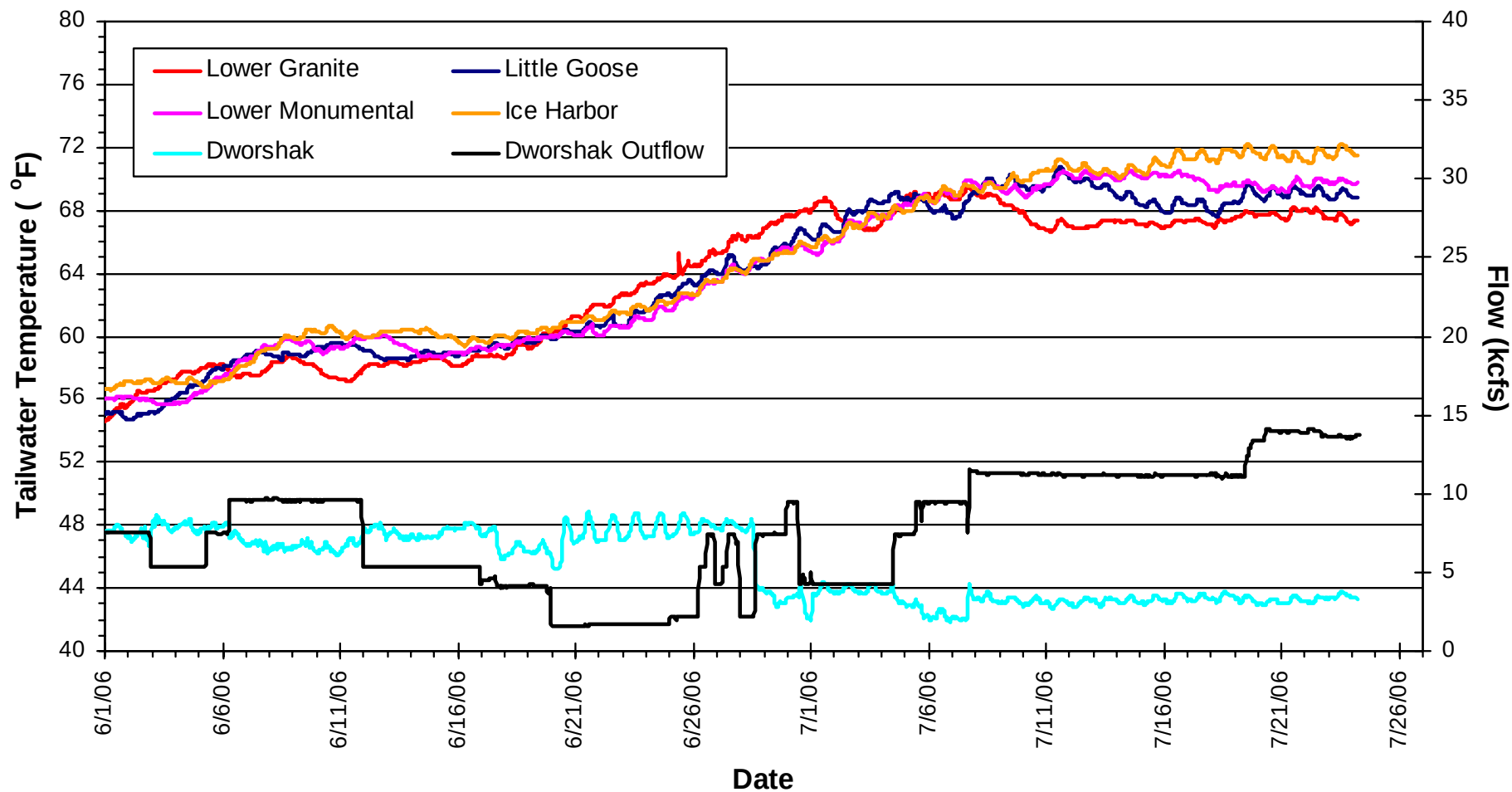
Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, or Cindy Henriksen at (503) 808-3945

Lower Snake River Temperatures

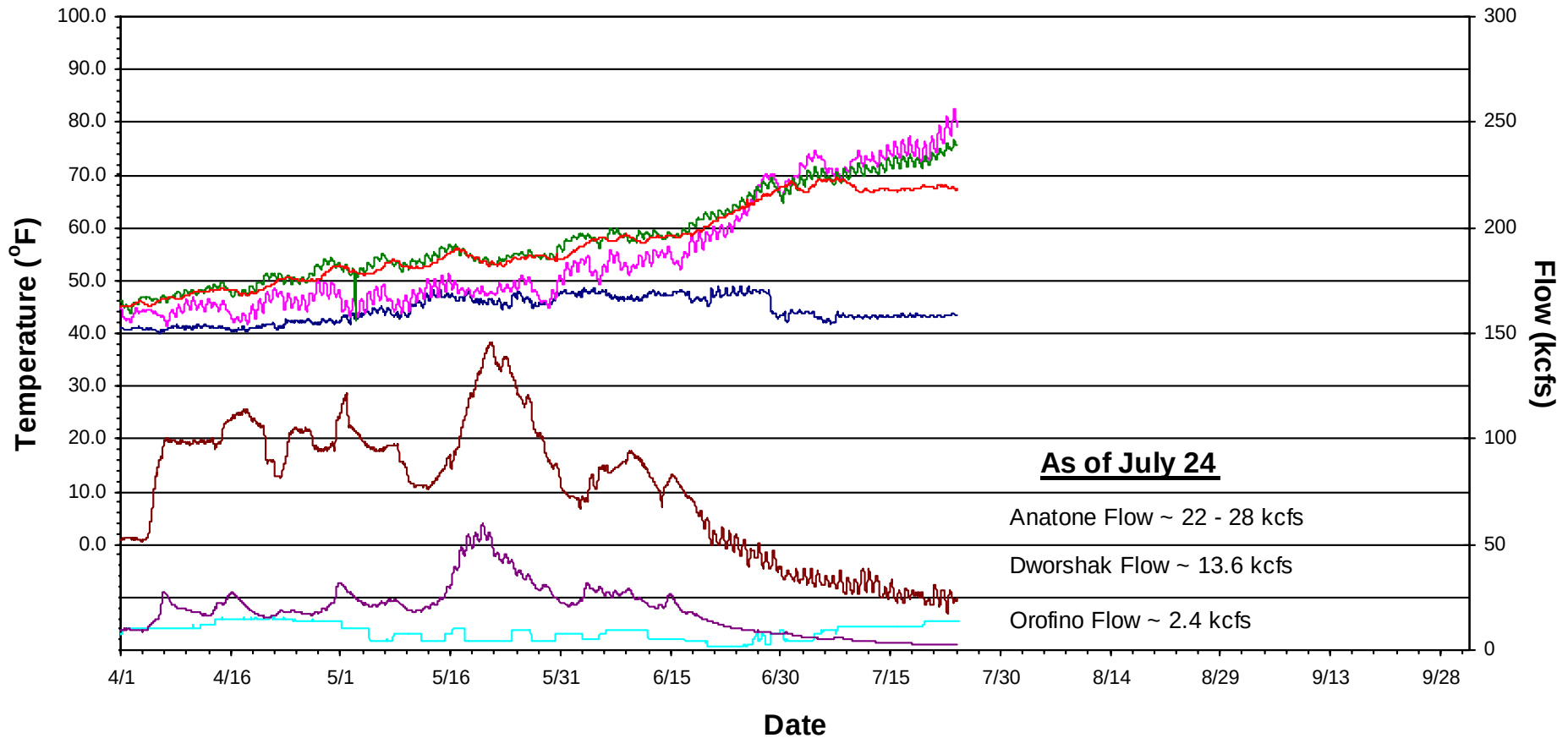
TMT Update

24 July 2006

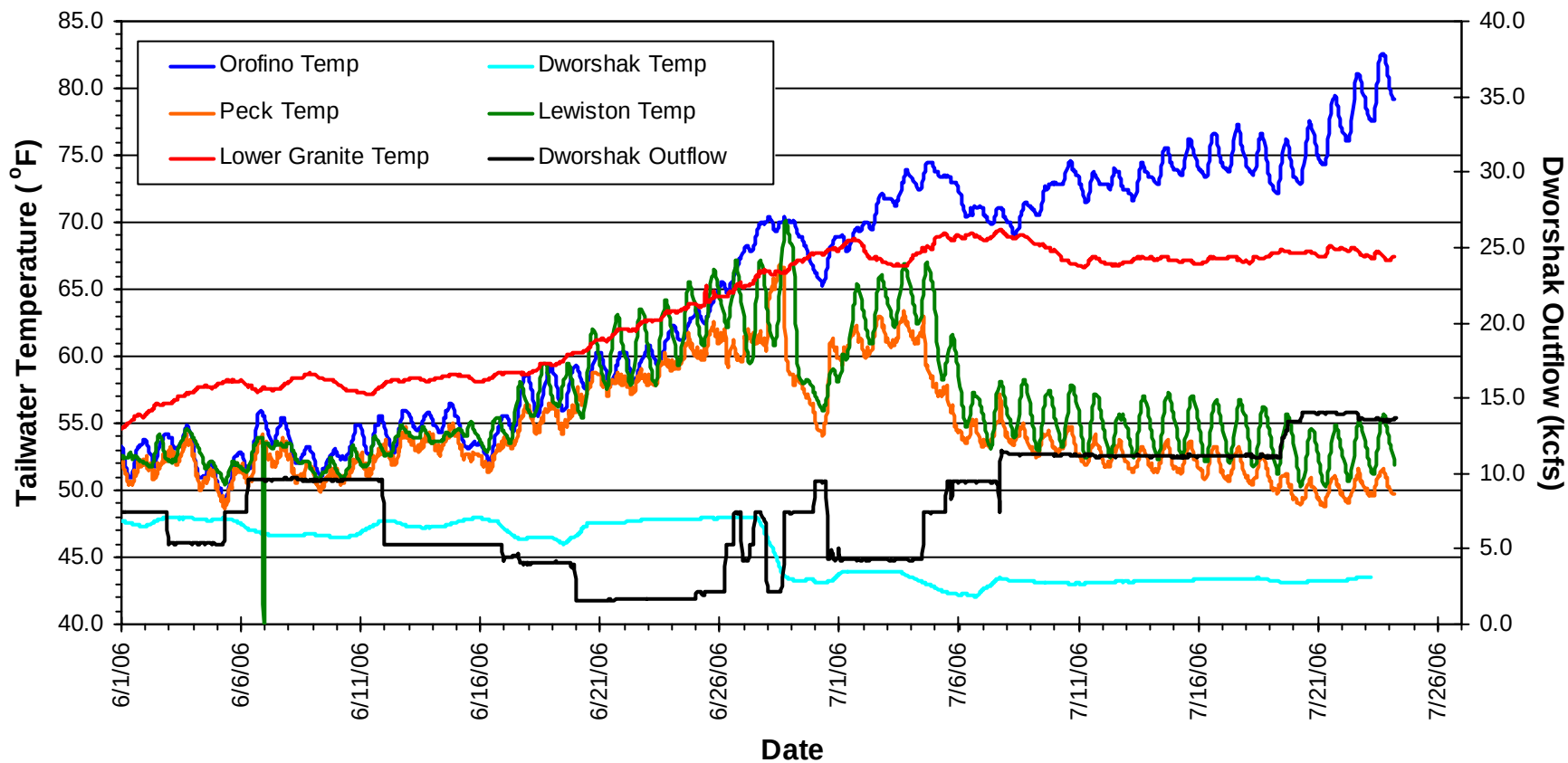
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - July 24)



Lower Granite Inflows and Temperatures in 2006

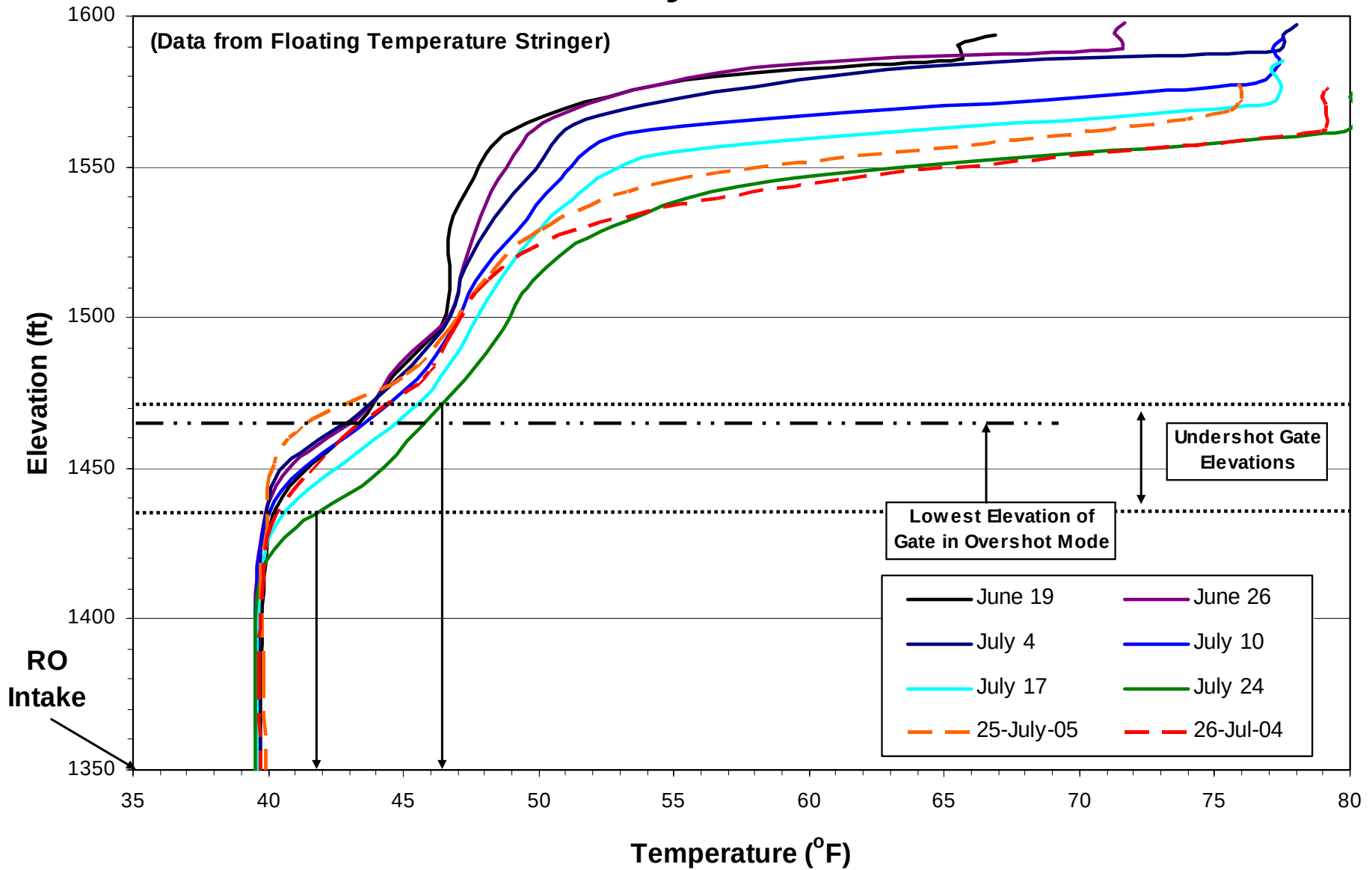


Dworshak Outflows and Clearwater River Temperatures in 2006

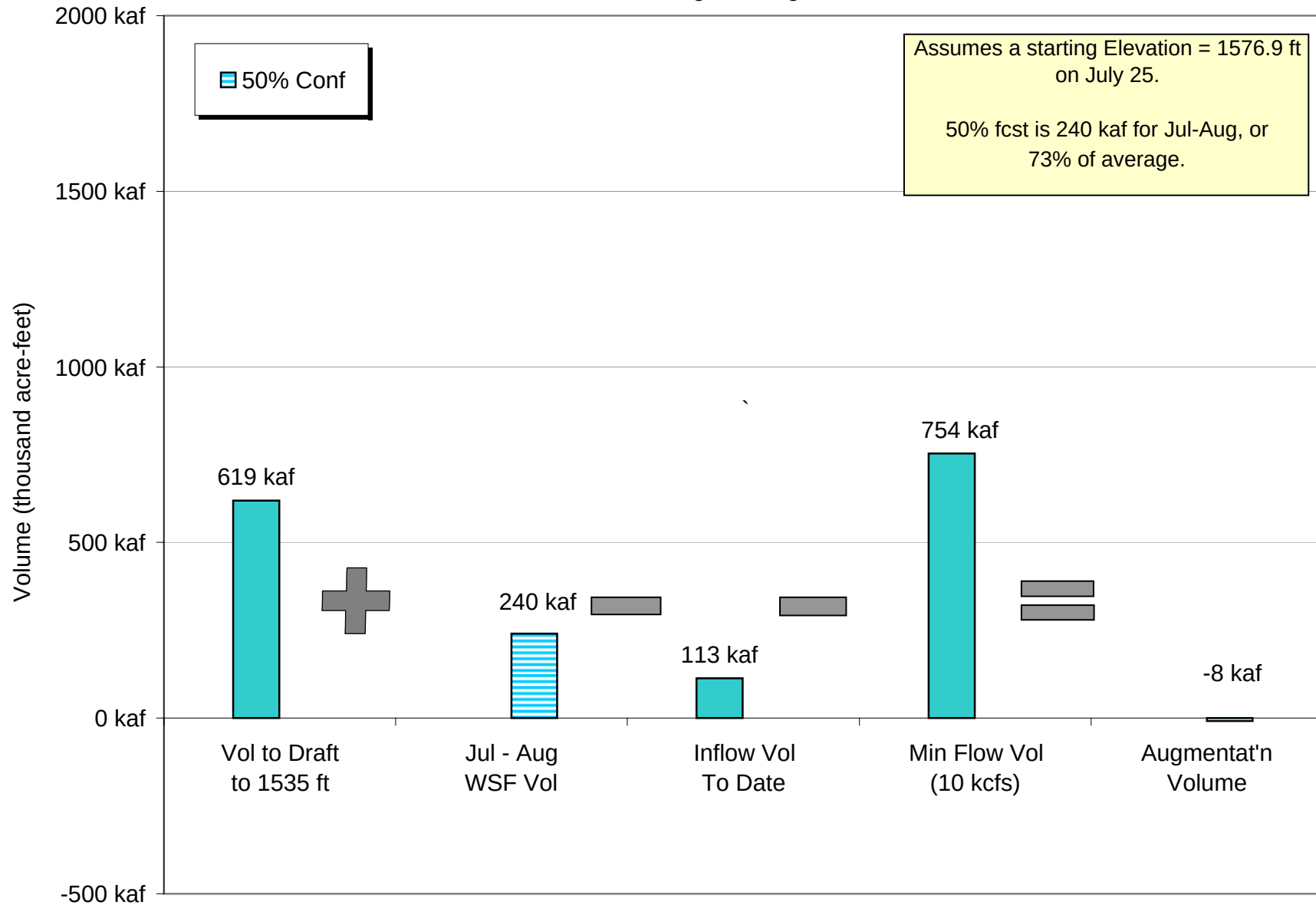


Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer)



Volumes at Dworshak
1 Jul Through 31 August



TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT EMERGENCY CALL

Monday July 24, 2006 12:00 - 13:00

**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. Power Situation - BPA
 - [\[Emergency Protocols\]](#) 
3. Other
 - Set agenda for next meeting July 26 [\[Calendar 2006\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

July 24, 2006 Meeting

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.

McNary Spill

BPA requested that spill at McNary for today and tomorrow (July 24-25) go to 40% (normally 60%), and swap to spill 60% at the project on Friday and Saturday (normally 40%). The pattern change was requested upon completion of a spill test at the project, and to address acute temperature/load issues in the region. TMT members did not object to the straight swap.

Libby / Hungry Horse Operations

Cathy Hlebechuk, COE, reported that Libby would be operated down to 3 units starting Tuesday evening, July 25, to about 14.5 kcfs through the end of August. Tony Norris, BOR, reported that he would notify TMT when the BOR's official position was known for Hungry Horse operations this summer. If targeting a 10' draw by the end of August, flows would be around 1 kcfs. If releasing 3 kcfs, the elevation would likely draw down to about 15' by the end of August. There will be an update on this at the July 26 TMT meeting.

Dworshak Operations

Jim Adams, COE, reported that Dworshak had been operating at 13.6 kcfs outflows (full powerhouse plus 3.9 kcfs through the RO's). Lower Granite tailwater temperatures have remained just below 68°. Orofino temperatures were around 80° with a flow rate of 2.4 kcfs; Anatone temperatures were around 76°, and flows were around 22-28 kcfs. Temperatures were running high in the area but expected to moderate some in the coming week. The COE posted an updated/revised volume graph for Dworshak, forecasting with 50% confidence that with the current operation, flows would need to drop below 10 kcfs before August 31 to have any remaining volume for flow augmentation.

The COE suggested that Dworshak could operate all units in undershot mode and effectively reduce temperatures by about 1°, to around 42-42.5°. NOAA recommended, given the updated flow augmentation forecast, reducing project discharge to 12 kcfs with all units in undershot mode and revisiting the operation during the TMT meeting on Wednesday, July 25.

Dave Statler, Nez Perce, noted that during this challenging year, there has been success in arresting temperatures, and that while the Nez Perce interest is in maintaining flows through the summer (by reducing outflows to 10 kcfs as soon as possible), did not object to the short term proposed operation. USFWS offered that while reducing temperatures out of Dworshak below 43° was not optimum for the hatchery, did not object to the recommendation as a short term balanced approach. Other participating TMT members agreed to the recommendation as a reasonable approach. BPA and COE coordinated and planned to have the operation change implemented by late Monday evening, July 24. It was noted that the temperature impact from the changed operation would likely not yet be observed at Lower Granite by Wednesday's TMT meeting.

Next Meeting, July 26, 9am-noon

A face to face TMT meeting is scheduled for Wednesday, July 26. Please regularly check the TMT web page for agendas and any scheduling changes.

Technical Management Team Conference Call

July 24, 2006

1. Greetings and Introductions.

Today's TMT conference call was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. 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 Hlebechuk at 503-808-3942.

2. Check-In on Dworshak and Lower Granite Temperature Situation.

The tailwater temperatures at Lower Granite have, except for a short excursion, remained below 68 degrees F., said Jim Adams; Dworshak is releasing 13.6 Kcfs, with 3.9 Kcfs through the regulating outlets. Daytime flows past Anatone have been 22-28 Kcfs at 76 degrees; flows past Orofino have been as high as 82 degrees at about 2.4 Kcfs. Basically, we're holding our own, temperature-wise, at Lower Granite, Adams said. I don't see lot of opportunity to reduce Dworshak discharge at this point, Paul Wagner said. There isn't much moderation in sight, in terms of air temperatures, Adams said.

The Corps noted that they have updated the available flow augmentation volumes at Dworshak; the NWS forecast was 320 kaf available for flow augmentation in July and August. We did a reality check last week, and according to our model runs, we only have about 240 kaf available from Dworshak, Hlebechuk said. That means we're going to need to reduce outflow

below 10 Kcfs at some point if we're not going to be below elevation 1535 by August 31, Hlebechuk said. Even if we would have reduced Dworshak outflow to 10 Kcfs last Friday, we would be half a foot below the 1535 target elevation on August 31, she explained; every day we maintain this higher rate of Dworshak outflow puts us farther into the hole.

In looking at the Dworshak thermocline, we're about 3 degrees warmer this year than we have been in previous years in Dworshak, Adams said; the bottom line is that although the Dworshak release temperature is still holding at about 43.5 degrees F., we're running out of cold water. We might be able to achieve 1-degree drop in temperature by dropping the unit that is currently in overshot mode into undershot mode, Adams added; it won't make that much difference in overall release temperature.

After a brief discussion, it was agreed to reduce Dworshak discharge to 12 Kcfs, immediately, while dropping the unit that is currently in overshot mode into undershot mode, to produce a slightly lower discharge temperature. At Bonneville's request, it was agreed to accomplish the unit changeover later tonight, during light-load hours. It was agreed that the TMT will revisit this operation during Wednesday's meeting.

3. McNary Spill Operations.

As most of you are aware, under the current spill program, McNary is doing two alternating days of 60% spill and two days of 40% spill, said MacKay. We were hoping to spill 40% the next two days, then swap to deliver the 60% spill over the following two days, given the extreme hot weather in the region. Basically, we would do 40% spill today and tomorrow, and provide 60% spill the following four days, MacKay explained; this would give us the flexibility to generate more over the short term, when loads are extremely high. Temperatures are supposed to be moderating, but yesterday was supposed to be cooler, and it really wasn't.

After a brief discussion, no TMT objections were raised to this change in McNary spill operations; it was agreed that McNary will spill 40% of total river flow today and tomorrow, followed by 60% spill on Wednesday, Thursday, Friday and Saturday.

4. Libby/Hungry Horse Operations.

The Libby operation was discussed by the Corps' policy people last week, and the decision was to reduce Libby outflow to three units beginning tomorrow night, Hlebechuk said; this will produce about 14 Kcfs discharge initially. At Hungry Horse, I'm still waiting to hear Reclamation's final decision, said Tony Norris; I should know the answer by the end of the day. We will need to drop down to about 1 Kcfs in order to meet the 10-foot draft by August 31, although

we would need to increase flows later in order to meet the Columbia Falls minimum, Norris said; if we release 3 Kcfs, we'll be about 15 feet from full by August 31. I'll relay Reclamation's final decision at Wednesday's TMT meeting, he said.

5. California Temperature Situation.

California temperatures are breaking records, said MacKay; we have set our system up to deal with this hot spell to the greatest extent possible. Should California get in trouble, we may need to declare a power system emergency, and call a supplemental TMT meeting on very short notice, she said – I just wanted the TMT to be aware of the situation in California.

With that, today's conference call was adjourned. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Meeting Participants July 24, 2006

Name	Affiliation
Robin Harkless	Facilitation Team
Jim Adams	COE
Scott Bettin	BPA
Paul Wagner	NOAAF
Tony Norris	USBR
Margaret Filardo	FPC
David Wills	USFWS
Cindy LeFleur	WDFW
Bruce MacKay	Consultant
Russ Kiefer	IDFG
Dave Statler	NPT

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

July 24, 2006 - Call @ 12 p.m.

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Power Situation - California and NW Utilities

Steve Oliver, BPA, clarified that the purpose of this TMT call was to update TMT that California had experienced a “system peak” of 49 kW on Friday, July 21 – and as of 10 a.m. Monday July 24th was operating under a Stage 1 emergency level. Oliver noted that the expectation was to reach 52 kW / stage 2 level by 1 p.m., and that flexibility would be needed to help California as well as NW utilities to meet the needs of their regions. Steve also noted that no actions had been taken that impacted fish operations, but that Lower Columbia resources may be needed if the system went to a Stage 3 level.

A Stage 3 level would translate into rolling blackouts as well as concerns for public health and safety; to avoid this, a letter to BPA would be required stating that all possible curtailments had been put into effect and that support was needed to help prevent a stage 3. Emergency procedures state that if a stage 3 level was reached, TMT would be contacted and an email notice would be sent to the COE and plaintiffs. Robin McKay, BPA, reported on actions already taken: a 2' draft at Grand Coulee, changes in spill (to 40% at McNary), a change in Bonneville tailwater, and filling Banks Lake. McKay added that all “Group 1” actions had already been implemented, and that using Lower Snake reserves might worsen the situation, due to cut plain restrictions. Libby operations were not expected to change other than bringing the project down to 15k by evening of Tuesday, July 25th as previously recommended through TMT. Oliver added that temperatures were expected to go back down to one degree above normal by Thursday July 27th.

Steve Hickock, Deputy Administrator for BPA, commented that actions taken thus far have supported generation – but the main concerns were transfer issues across the cut plain. Only if transfers were maxed out would there be a need to use Lower Columbia projects. If a Stage 3 situation does occur, Hickock will send an email to the COE and the TMT will be promptly notified. It was noted too that any changes to the planned operations at Libby / Hungry Horse (i.e. an increase in outflow) would require written notification of emergency status.

Technical Management Team Unscheduled Conference Call

July 24, 2006

1. Greetings and Introductions.

The July 24 TMT unscheduled conference call was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting.

2. California Power System Emergency.

Steve Oliver of BPA generation supply said this is an unscheduled call, not an emergency call. The purpose is to update you on the current power system situation, he said. Our system is set up very well today – we have moved water into the lower system, and filled Banks Lake, to give us the flexibility to meet peak loads. There are some other issues occurring in the Pacific Northwest, and some serious issues in California, he said.

We have been in regular contact with Cal ISO since last Friday, Oliver continued; they are setting system peak demand records of up to 52,000 MW, which was their six-year expectation in terms of peaks. They declared a stage 1 emergency on Saturday because they were eating into their reserves, Oliver said. They declared another stage 1 emergency at 10 am today and will declare a stage 2 emergency at 1 pm. They are concerned about whether they can meet anticipated demand, Oliver said. We are doing whatever we can do to support California through this extraordinary situation, Oliver said, as I anticipate other parties are doing.

Basically, California is in dire straits for this afternoon, in terms of peaks, Oliver said. There is also a Colstrip unit outage that is ongoing in the Northwest, a potentially serious problem. Again, we have set up the system to meet a variety of needs, including our own, without impacting fish operations. There are a number of power plants here that are above the cutplanes, and there are concerns that constraints across those cutplanes could impact the transmission system. We could see curtailments or redispatch occur in the upper part of the cutplanes, which means generation would have to pick up in the lower river.

If California goes to stage 3 – rolling blackouts – that becomes a human health and safety issue, Oliver said. We have told Cal ISO that they will have to provide us a letter saying that, without support from BPA, that they will have to implement rolling blackouts, a human health and safety issue, and that they have exhausted all other sources of available power. At that point, we would need to implement the emergency protocols in the 2006 Water Management Plan, Oliver said. We're hoping there is no need to touch any fish operations, he said; we're hoping that if that does become necessary, it will affect only one or two of the lowest-priority items on the list for a matter of a few hours. The bottom line is that we don't want to take anyone by surprise, Oliver said; we wanted to make sure everyone is fully up to speed on what is occurring at this point in time.

In response to a question, a BPA legal representative said that, if the letter from California is received, BPA will notify the court and the plaintiffs in the lawsuit by email that an emergency has occurred.

Have any group 1 actions been taken? Dave Statler asked. We have talked to Reclamation about a 2-foot draft at Grand Coulee, MacKay replied; we have notified the tribes that we will be holding the Bonneville tailwater at its current level; we have filled Banks Lake, we have postponed some planned outages, and as we discussed at TMT today, we've switched our 60% spill days at McNary to later in the week. In short, the system is set up to meet load, and now it's all up to the factors that are beyond our control, such as the weather and California loads, Oliver said. We will also be using all available transmission system flexibility to ensure that no problems occur, he added.

In response to another question, Oliver said BPA's priority will be to meet Northwest emergencies first, before the California emergency, if a Northwest emergency occurs. We have a responsibility to protect public health and safety, he said; again, we would attempt to address any Northwest emergencies first, and any California emergency second. We would then move into the group 3 list as necessary to remedy the situation. Basically, I wanted you to know we could be in a position of having to declare an emergency later this afternoon or this evening, Oliver said.

In response to another question, Oliver said Alberta is also maxed out, currently. However, there is every incentive out there for power marketers to supply California to the greatest extent possible during this period, said Oliver.

In response to another question, MacKay said all of the group 1 actions that can be implemented have been implemented, with the possible exception of the crane work at McNary – we haven't been able to track that one down yet, she said. I have a call into the project but have not yet heard back from them, Jim Adams replied.

MacKay went briefly through the full list of group 1 actions, then moved on to group 2 – going outside 1 percent, restricting intertie capacity, exceeding the draft limit at Grand Coulee, buying energy and restricting exports. We're encouraging California to buy whatever they can, from wherever they can, Oliver said. MacKay noted that the current plan at Libby is not to reduce outflow to three units until late tomorrow night. In response to another question, MacKay said that, if cutplane issues occur, additional generation from the projects above McNary will not help the situation.

In response to a question, a Bonneville engineer explained that cutplane issues are a limit to the amount of power that can flow over that portion of the system at any given time. If that limit is exceeded, generation has to be reduced in that part of the system, or a system reliability concern is created.

BPA's Steve Hickock reiterated that the system has been set up to allow for maximum generation and transmission system flexibility. We need to avoid the cutplane issues in the northern part of the system, he said; if they occur, we would have to reduce spill at the lower river projects if there was no other way to keep California from having to implement rolling blackouts, a major health and safety issue. We are also having to provide more support to the Northwest region due in part to some unusual actions that have been undertaken by some of the utilities here. California has now gone to a stage 2 emergency, Hickock said, which means they could be only an instant away from stage 3, rolling blackouts. Again, we're doing everything we can to help out during this California emergency without impacting operations for fish, Hickock said.

Is McNary above or below the cutplane? Wagner asked. It's below, MacKay replied. If California goes to stage 3, but we can sustain maximum intertie transfers, then we won't be taking any actions that affect fish operations, Hickok said. That's our hope at this point – we're hoping for the best but preparing for the worst, he said.

If a stage 3 emergency is declared in California, Hickock said he will notify the Corps, which will then notify the TMT via email. It was noted that any changes to the planned Libby and Hungry Horse operations will require written notification of the emergency status.

With that, today's conference call was adjourned. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday July 26, 2006 09:00 - 12:00

**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**

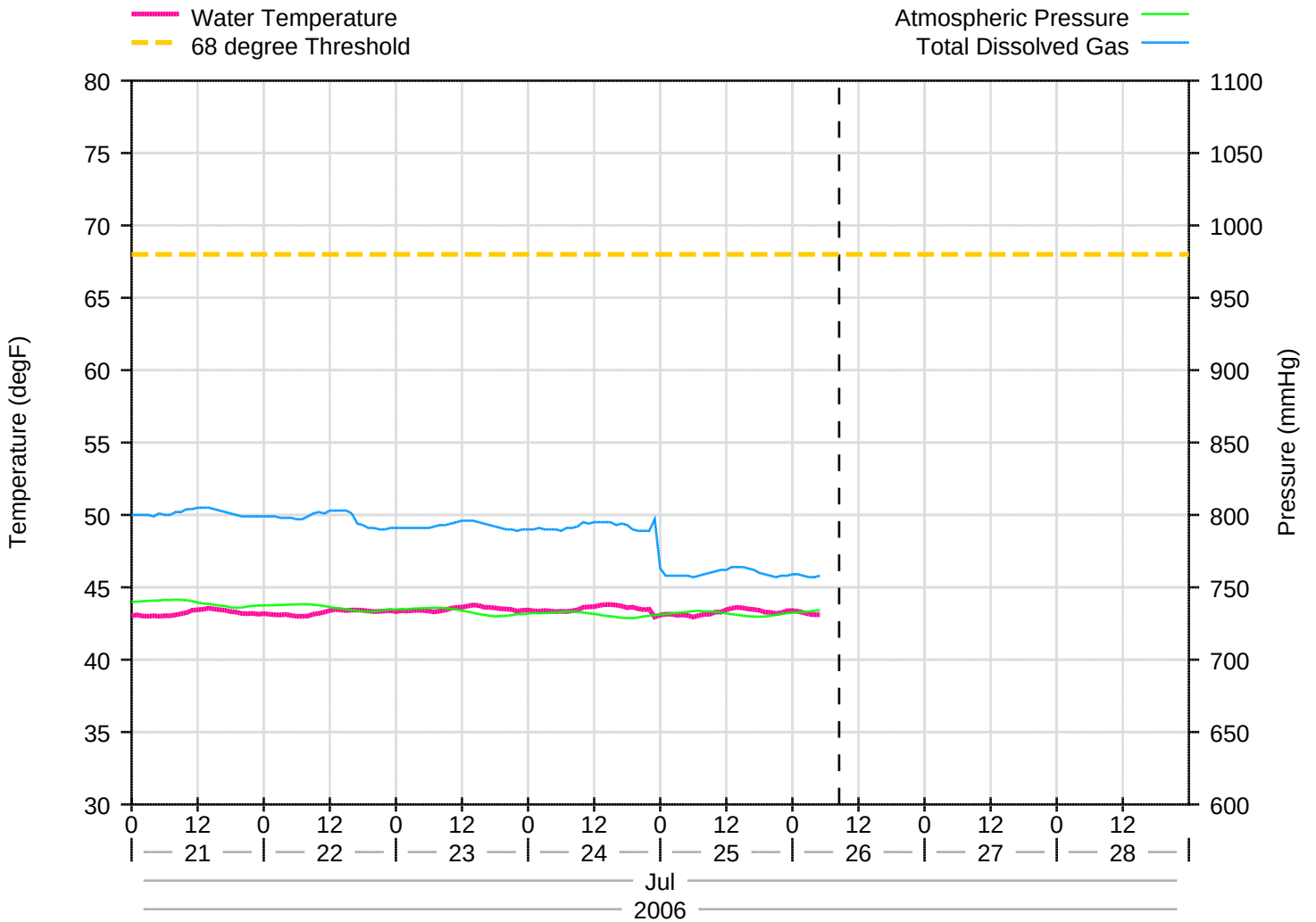
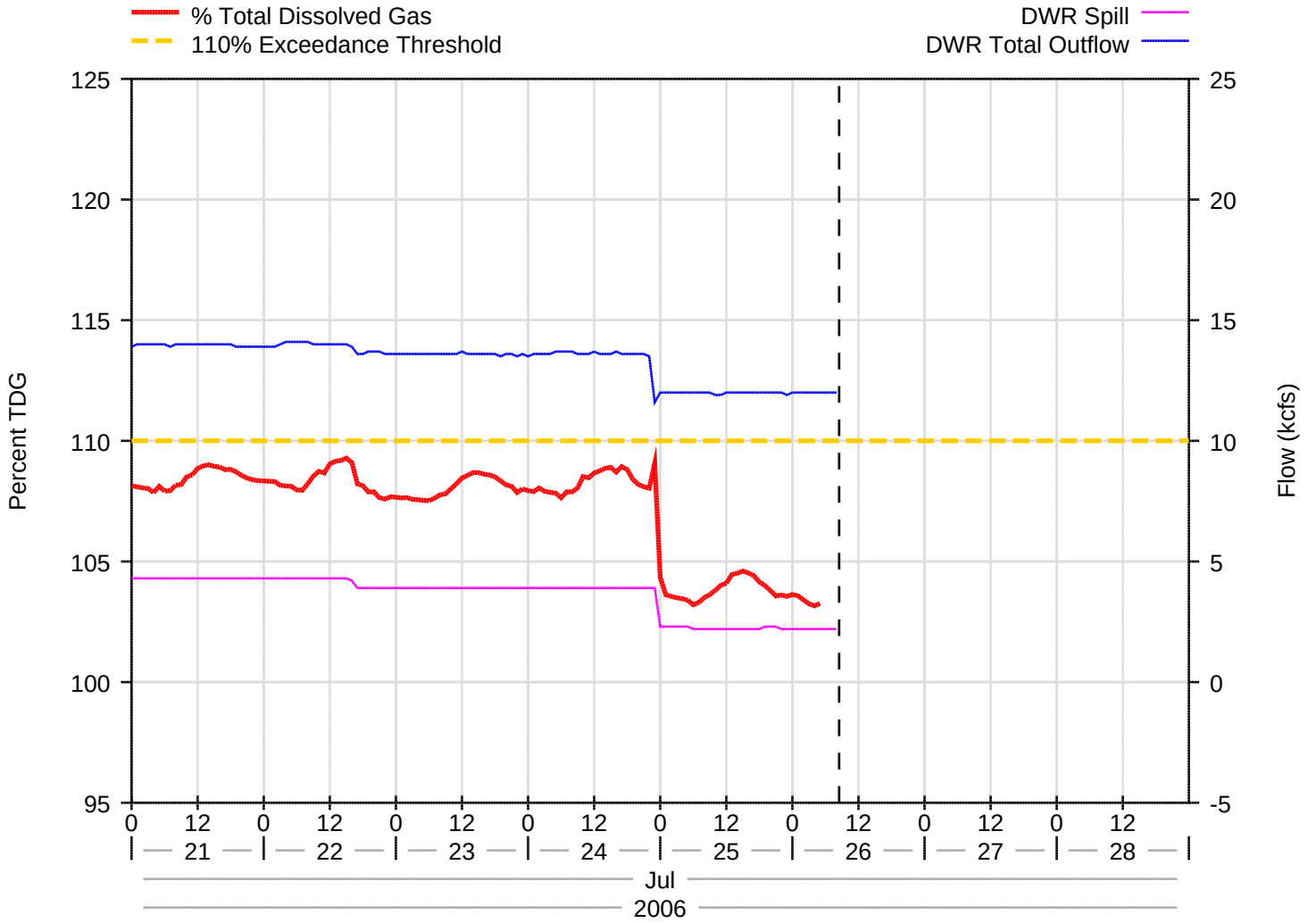
*All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed.
Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

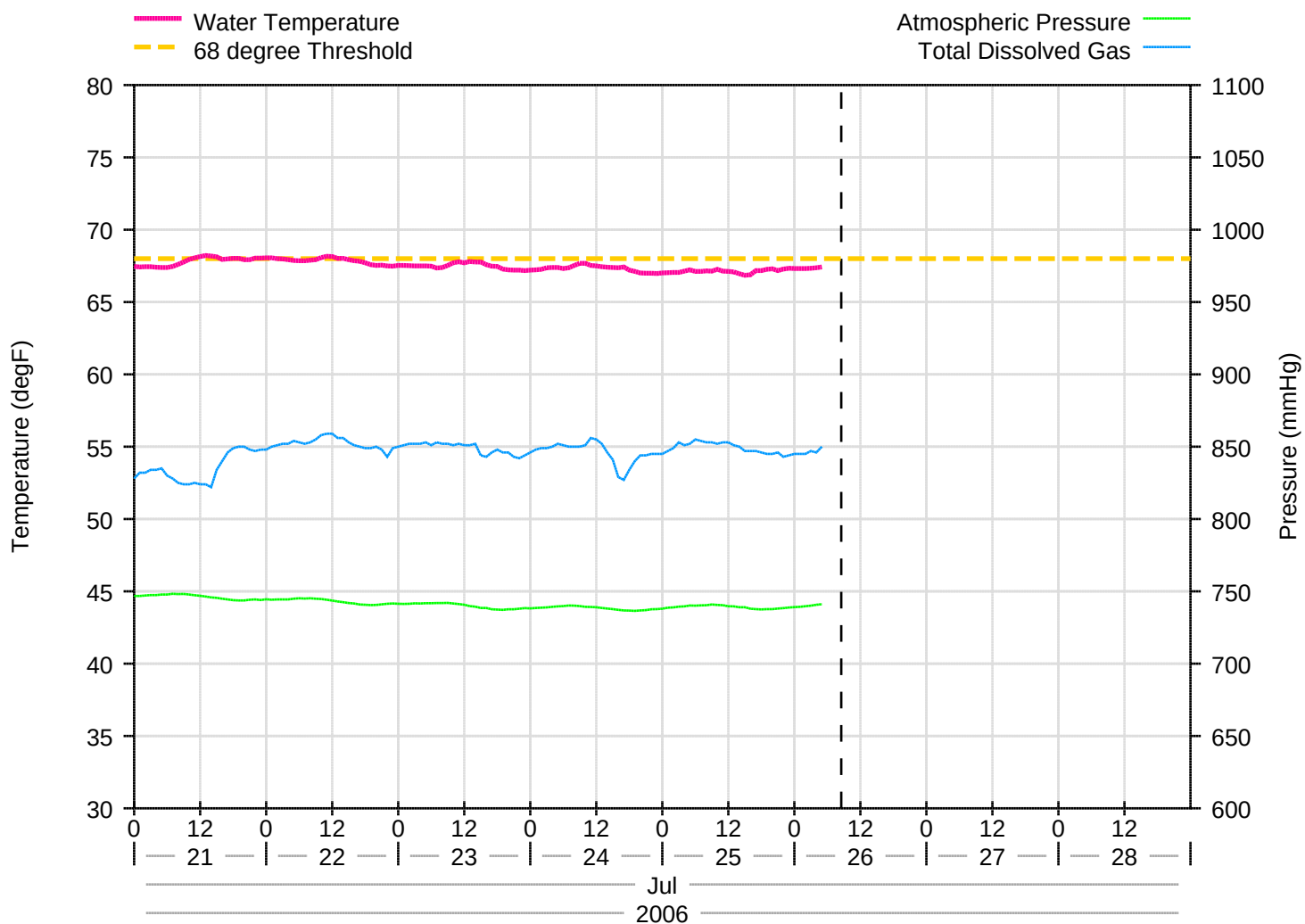
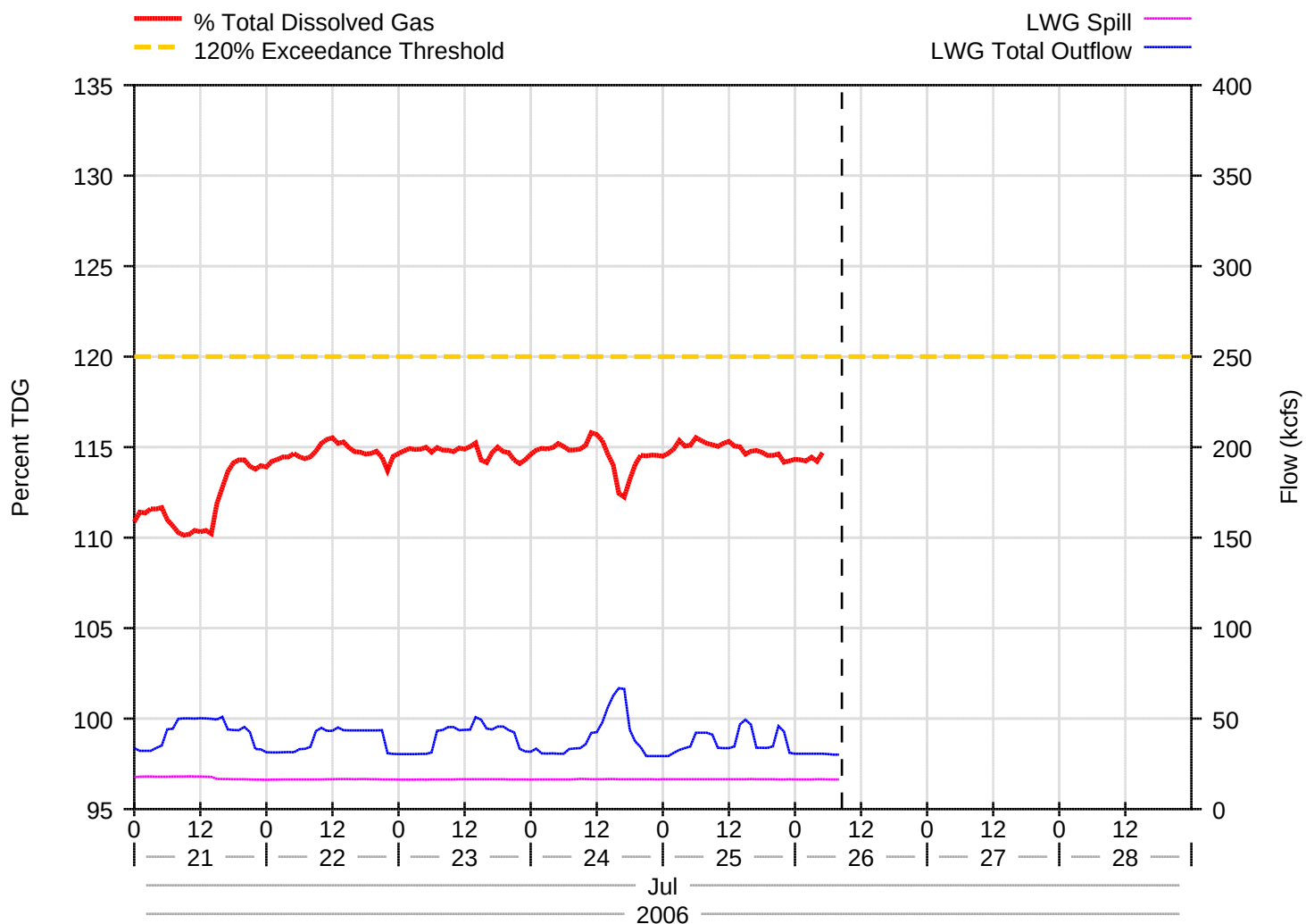
1. Welcome and introductions
2. Libby and Hungry Horse Operations
 - [\[Libby Flat Flow through August](#)
[\(a.\)STP \(7/25/06\) INFLOWS USED STARTING 7/26/06 - APR-AUG VOLUME=6.643 MAF](#)
[\(b.\)10 KCFS INFLOW USED STARTING 7/26/06 - APR-AUG VOLUME=6.852 MAF\]](#)
3. Dworshak Operations
 - [\[Volumes at Dworshak 01 Jul Through 31 August\]](#)
 - [\[Dworshak Tailwater temperatures\]](#)
 - [\[Lower Granite Tailwater temperatures\]](#)
4. Filling into John Day for emergency
5. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Powerhouse Outages
 - [\[Doble Testing Schedule for Snake River, 2006 - Donald Faulkner, Corps\]](#)
 - Water Quality
 - [\[Spill Information 2006\]](#)
6. Other
 - Set agenda for next meeting August 02 [\[Calendar 2006\]](#) 

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

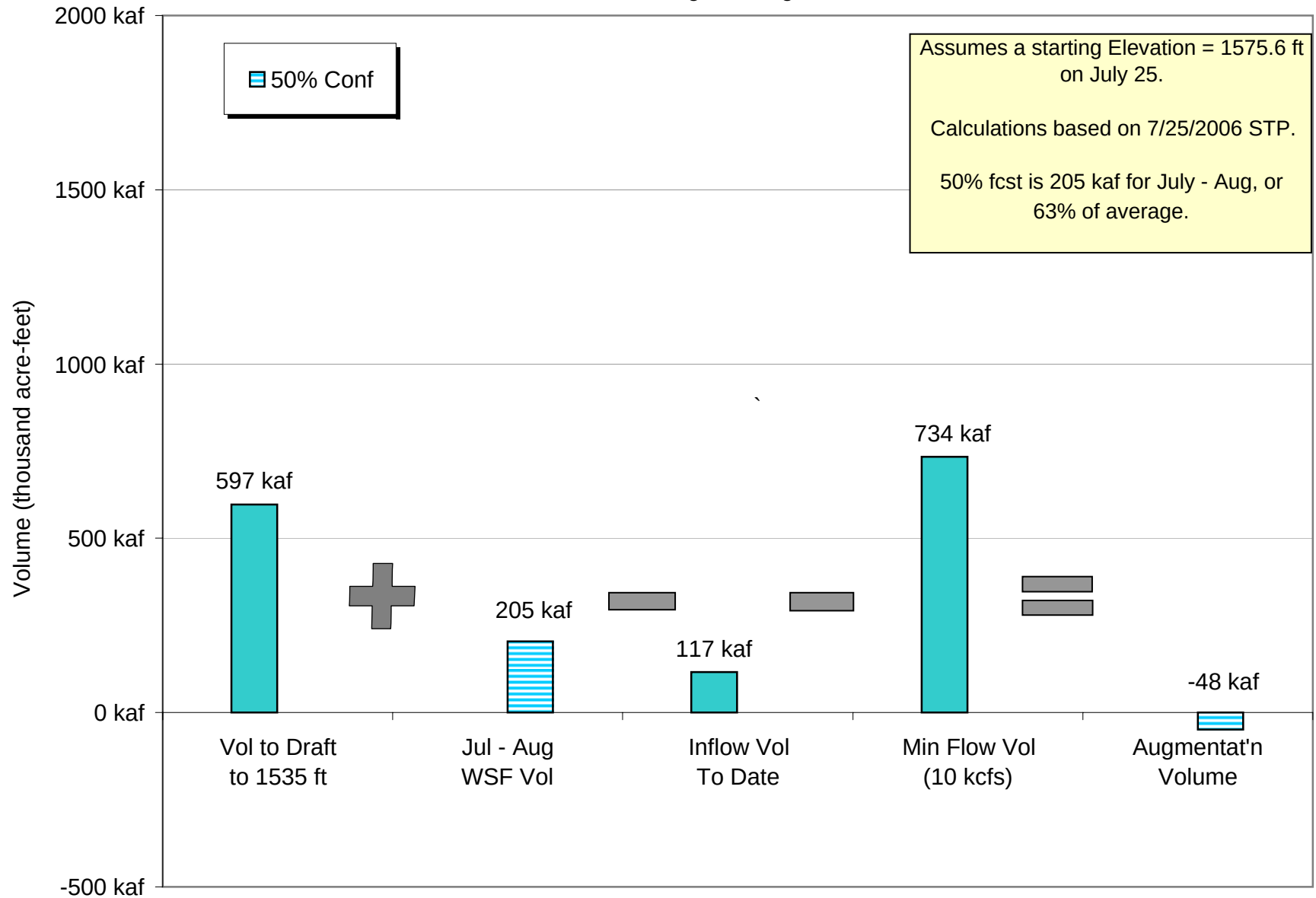
Dworshak Tailwater Water Quality



Lower Granite Tailwater Water Quality

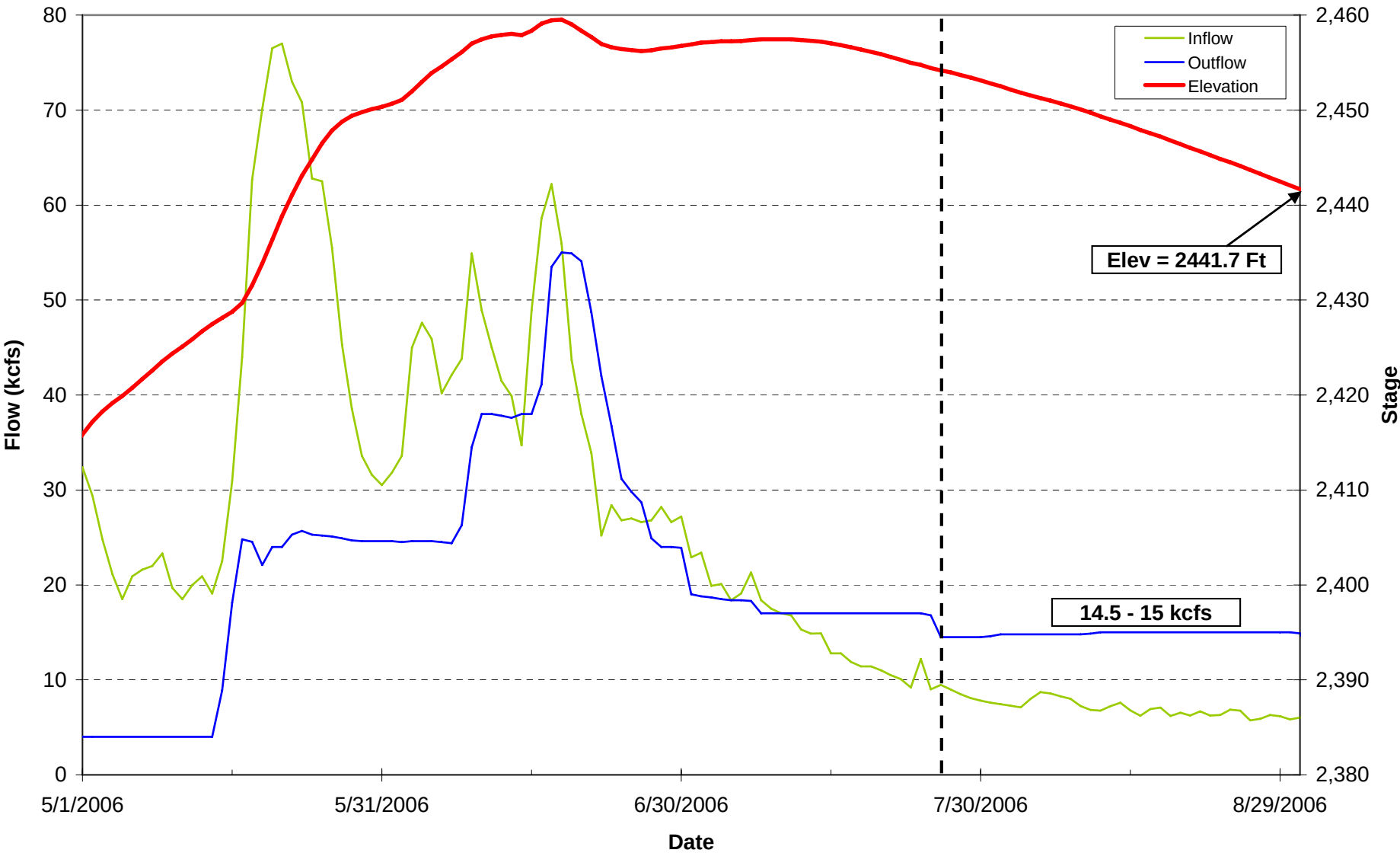


Volumes at Dworshak
1 Jul Through 31 August



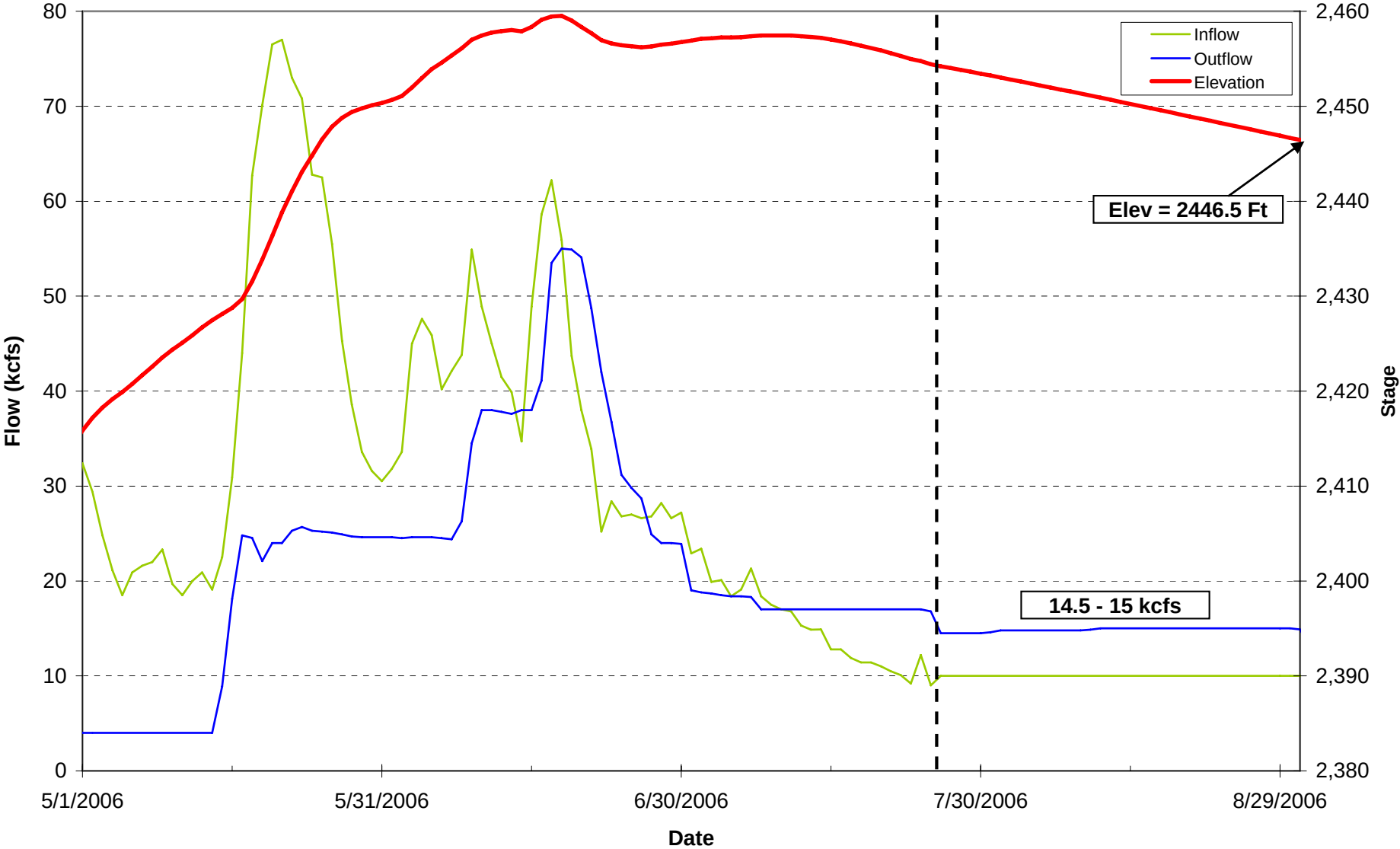
STP (7/25/06) INFLOWS USED STARTING 7/26/06

Libby
APR-AUG VOLUME=6.643 MAF
Flat Flow through August



10 KCFS INFLOW USED STARTING 7/26/06

Libby
APR-AUG VOLUME=6.852 MAF
Flat Flow through August



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 26, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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

Libby/Hungry Horse Operations

Cathy Hlebechuk, COE, reported that as of the evening of July 25th, per recommendation, operations flows at Libby were reduced to 14-14.5 kcfs. The STP volume for April through August was 6.64 MAF. At 14-15 kcfs and with an updated volume forecast, Libby end of August elevation was projected to be at 2446.5'. It was recalled that a gradual ramp down (to 9-10k) was the general recommended operation for September – with a desire to make accommodations for the influence on reservoir elevations and inflows. John Roache, BOR, reported that Hungry Horse was ramping down 3 kcfs and was expected to hold until the end of August – with the expected end of August elevation to be around 13'. Robin MacKay, BPA, and others expressed an interest for TMT to plan operations for September soon, as a need for continual decline through October is expected. Others expressed a desire to include Montana in those discussions; Montana was not present for today's meeting.

Next Steps: Continued discussion on developing operations for September will be discussed at the August 9 TMT meeting.

Dworshak Operations

Cathy Hlebechuk, COE, reported that Dworshak discharges on July 25th were reduced to 12 kcfs, with all three units in undershot mode, per the TMT conference call. Laura Hamilton, COE, reported that TDG levels were not a problem, and that temperature releases had been maintained at 43 degrees since June 28th. Lower Granite temperatures were hovering around 67 degrees. It was suggested that air temperatures should be added to the graphs, and that this highlights the impressive hold of water temperatures even with the record high heat. Anatone was at 76 degrees and releasing 22 kcfs. Kyle Dittmer, CRITFC, reported that although temperatures were currently 10-12 degrees above normal, there was a strong likelihood that temperatures would be normalizing by July 31st or August 1st in the region. STP volume graphs showed that holding Dworshak at 10k result in a negative for augmentation flow at the end of August. Two proposals were expressed: operate to 10 kcfs as soon as possible OR maintain 12 kcfs over the next four days and check back in via a TMT conference call on Monday, July 31st.

A salmon manager Caucus was held, during which a suggestion was made to maintain 12 kcfs until midnight on Friday, then go to 11 kcfs over the weekend and have a FPAC/TMT check in on Monday, July 31, at 11 a.m.

ACTION: The COE planned to stay at 12 kcfs through Friday, then go to full powerhouse at midnight. FPAC will meet at 10 a.m. on Monday, July 31st and determine whether to propose a change in operations; if so, a TMT call would be scheduled for 11 am. If there is no call, operations will stay at full powerhouse.

UPDATE: CONFERENCE CALL JULY 31: TMT held a conference call on Monday, July 31, to discuss current conditions, review COE modeling and discuss Dworshak operations. Per an SOR submitted to the COE on Friday, July 28 from the salmon managers, the COE operated Dworshak over the weekend at 12 kcfs. Mike Schneider, COE, shared operation scenarios at varying flow levels out of Dworshak, projecting temperatures and volumes for the month of August. The COE noted that cooler temperatures were expected in the Lewiston River this week, and that an uncertainty remained about the amount of flow that would be coming out of the Hells Canyon projects.

During an FPAC call earlier on July 31, the salmon managers developed a short-term recommendation to operate Dworshak at full powerhouse as soon as reasonably possible, and target 43 degree water out of the project if possible. The COE responded that the project could go to full powerhouse quickly, and that in all undershot mode, the project would release water of about 45 degrees.

ACTION: Per request, Mike Schneider planned to do additional modeling to show what the system would look like for the rest of August if the project reduced to 7.5 kcfs on Tuesday, August 1, and what it would like with a reduction to 7.5 kcfs on Friday, August 4. TMT members could check the web page and, if the model results prompted the salmon managers to recommend a different operation than full powerhouse, a TMT conference call will be held on Wednesday, August 2 at 9:00am. The COE planned to operate the project at full powerhouse until a different operation was recommended.

Nez Perce SOR

Greg Haller, Nez Perce, proposed raising SOR 2006-NP-1 to IT for policy review. Haller noted that they were looking to have support from IT on the general framework within the SOR as well as policy around BPA cost savings share for conservation enforcement. (A more detailed memo with specific questions was sent to IT from Nez Perce.)

ACTION/Next Steps: IT reps were notified that this issue will be discussed at IT on August 3.

Emergency Protocols / John Day Fill

Robin MacKay, BPA, addressed the potential to add detail to the actions listed in Groups 1 and 2 to ensure clarity and to allow more flexibility in the event an immediate action needed to be taken. The COE noted that actions that increase flows or operate outside of

MOP are ones that potentially require teletypes, and requested that a better coordination and communication system be put in place to notify TMT and the action agencies of any changes in operations.

Next Steps: Discussion on making changes to actions in Groups 1 and 2 will continue at the next TMT Process Meeting.

Operations Review

Reservoirs: Hungry Horse elevation was 3553.4', Libby elevation was at 2554.4', Dworshak was at 1575.6', Grand Coulee was at 1285.9'. McNary daily flow averages were between 162-186 kcfs. An end of July target for Grand Coulee had not yet been specified by the BOR.

Fish: The summer Chinook run was winding down, with an end of the month prediction of 78,600, and the Sockeye prediction was 37,000. August 1 will mark the beginning of the Fall run from a fisheries perspective, with a forecast of 474,000 compared to last year's 560,000. Commercial fishing seasons were to be set on July 27th; Cindy LeFleur, WA, offered that a one page summary could be found posted on the ODFW web page. Juvenile numbers were down to less than 1,000 at all Lower Snake projects and on the Lower River were around the 10,000-20,000 range.

Power: John Day transformer T-1 is back in service, with one unit out for its "six year mark" overhaul. The scheduled outages for Lower Snake project double testing was posted to the TMT web page.

Water quality: Temperature continues to be the main concern in the system; all current temperature data was available on the website under "Operation Spill Information."

Next TMT Face to Face Meeting, August 9, 9:00-noon

Agenda Items include:

- Dworshak Operations
- Libby/Hungry Horse Operations
- Summer Fisheries Review
- Emergency Protocols
- Operations Review

Technical Management Team Conference Call

July 26, 2006

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3542.

2. Libby and Hungry Horse Operations.

The modified Libby operation was approved by the policy people last Friday, Hlebechuk said, and the project reduced outflow to about 14.5 Kcfs last night. There are a couple of graphs on the web, the first showing an April-August STP volume of 6.64 MAF. According to this forecast, Libby would end up at elevation 2441.7 on August 31 if we hold this rate of discharge through the end of August, she said. Another forecast is slightly higher; it shows a slightly higher volume of 6.852 MAF and an August 31 Libby elevation of 2446.5.

In terms of the September operation, our anticipation is that we will ramp down gradually through the end of September 30, Hlebechuk said; we should probably wait until closer to the end of August before trying to specify a particular rampdown rate. For now, however, Libby will be doing a three-unit operation, with actual outflow increasing toward 15 Kcfs as head at the project drops. I think what Montana proposed was an average Libby outflow of 9-10 Kcfs through September, but we understand that some adjustments may be necessary once we see where the project elevation is on August 31, said Paul Wagner. It was agreed to revisit the September Libby operation at the August 8 TMT meeting.

Moving on to Hungry Horse operations, John Roche said Reclamation has begun ramping down Hungry Horse outflow, from 5.2 Kcfs to 3.8 Kcfs last night. We will ramp down to 3 Kcfs tonight, and will hold that through the end of August, which should leave the project 13-14 feet from full by August 31. In September, we will ramp down further to about 2 Kcfs outflow from Hungry Horse, he said.

3. Dworshak Operations.

Dworshak was ramped down to 12 Kcfs on Monday, with all three units in undershot mode, plus just over 2 Kcfs spill through the regulating outlets, Hlebechuk said. Laura Hamilton briefed the group on the current water quality situation, noting that TDG isn't an issue at this point. With respect to water temperatures, we have been releasing a constant 43 degrees from Dworshak since June 28, she said. At the Lower Granite tailrace, we are just hovering at about 67 degrees, just below the 68-degree threshold. During July, the average temperature has been 67.7 degrees, although it has cooled somewhat in recent days. Scott Bettin noted that the thermal loading from air temperatures and from Hells Canyon outflow has been incredible this year; it is a major accomplishment that we have been able to maintain water temperatures below 68 degrees in the Lower Granite tailrace, he said. Dave Statler noted that water temperatures at the Anatone gauge exceeded 76 degrees last week. Kyle Dittmer said clouds and cooler temperatures are expected in the Lewiston area over the next few days, which should help moderate the situation somewhat.

As we explained on Monday, according to the current forecast, we're going to have to reduce Dworshak outflow to below 10 Kcfs as soon as we can or we will miss the 1535-foot August 31 elevation target at that project, Hlebechuk said. The Corps would prefer to reduce Dworshak discharge to 10 Kcfs or below as soon as possible. The group devoted a few minutes of discussion to the question of when Dworshak outflow should be reduced, and to what volume. Russ Kiefer recommended against reducing Dworshak outflow now, because although air temperatures in the Lewiston region are now moderating, they are still well above average. Rick Kruger said Oregon agrees with that assessment. Could you release 10 Kcfs from Dworshak, but lower the release temperature through greater use of the regulating outlets? David Wills asked. Yes, that would be physically possible, but the flow out of the ROs is spill, which produces more TDG, and we're not sure what the exact release temperature would be, Hamilton replied.

What's happening with the juvenile outmigration right now? Statler asked. We're on the back end of the migration, Wagner replied; numbers are declining at the projects, and the Clearwater fish are mostly rearing in the reservoirs at this point. It was noted that the flow augmentation deficit, at this point, is about 46 kaf below the 1535-foot August 31 target elevation; every day above 10 Kcfs discharge from Dworshak from here on out will worsen that deficit.

Following a caucus break, Wills said there was a considerable diversity of opinion among the salmon managers about what to do next, in terms of the Dworshak operation. After much discussion, he said, we have decided to be as conservative as possible while still saving at least a little water. We recommend that you maintain 12 Kcfs through midnight Friday, then drop down to 11 Kcfs over the weekend. On Monday morning, the salmon managers will caucus again, look at the data, then check in via conference call on Monday afternoon, to see whether it would be possible to reduce Dworshak outflow further. The assumption is that, as flows recede in the Snake through August, it should be possible to proportionally reduce Dworshak outflow, Wills said. Haller said the Nez Perce cannot support that recommendation, because it will unacceptably erode the remaining flow augmentation volume available from Dworshak between now and August 31.

Ultimately, Hlebechuk said the Corps would be willing to maintain the current 12 Kcfs discharge from Dworshak through midnight Friday, at which point they will reduce Dworshak discharge to full powerhouse discharge, about 9.6 Kcfs. FPAC can then review the data on Monday morning, followed by a likely TMT call to discuss Dworshak operations on Monday at 11 am. No TMT objections were raised to this course of action.

Haller noted that the Nez Perce SOR on Dworshak operations, submitted in late June, did not receive full TMT concurrence. I would like to elevate that

issue to the IT, he said, so that the SOR can receive policy review. We believe we are implementing the Nez Perce SOR right now, he said; perhaps we can schedule an IT meeting for August 3. We would like to be sure that the framework of the recommendation we submitted enjoys IT policy support, Haller explained.

4. Filling Into John Day for Emergency.

This is something we may need to add to the list of emergency actions and protocols, said MacKay. These actions are grouped into three categories. The system worked really well through this week's events, but we should probably review these emergency actions, given expected warm temperatures through the end of summer. BPA would like to add filling John Day pool to the list, probably under Group 1 or Group 2, MacKay said.

The salmon managers discussed this the other day; our consensus was that it would be acceptable to go to a two-foot operating range at John Day as a Group 2 action, Wills said. Hlebechuk noted that the Corps would need advance notice from BPA so they could coordinate this action with TMT. Some of the Group 2 actions require a teletype, she said, so again, we would need some advance notice.

MacKay noted that Group 1 actions can be implemented at BPA's discretion, without consultation with TMT. My concern is the lag time associated with some of the Group 2 actions, she said – I would like to get some of those items set up so that they are available more immediately. I would like to review some of the Group 2 and Group 3 actions, so that we can build the comfort level among the salmon managers and get them implemented more quickly if they prove necessary, MacKay said. One good example was switching the 60%/40% spill days at John Day, which we coordinated with TMT on Monday – that was very helpful.

Rick Kruger said Oregon is concerned about the increase in fish travel time if John Day pool is filled; Wagner replied that the increase in travel time would likely be small and temporary. Wills noted that his understanding is that the Group 2 actions can be implemented at the action agencies' discretion, without consultation with TMT, in the hopes that the Group 3 actions will not become necessary. Hlebechuk said this is not the Corps' interpretation of the emergency protocols; they believe at least some coordination with TMT is needed for some Group 2 actions.

Hlebechuk said increased flows at some projects, operating some projects outside 1% and violating flood control are some of the Group 2 actions that would require a teletype and some advance coordination. After a few minutes of discussion, Wagner said he agrees in principal with the need for greater action agency operational flexibility in implementing Group 2 emergency actions. All

we're after is some TMT agreement on these actions ahead of time, if they prove necessary, so that we can implement them immediately, if they prove necessary, MacKay said. That way, the Corps can simply issue the necessary teletypes, without coordinating each action individually with TMT, she added.

Ultimately, various TMT members, including Wills, Wagner and Kiefer, said they were comfortable with the implementation of all Group 1 and Group 2 actions without prior coordination with, and approval from, TMT, if time is of the essence. If that can keep us from going to the Group 3 actions, that would be preferable, Kiefer said. It was emphasized, however, that the action agencies need to notify the TMT membership when operational changes are implemented, and coordinate those changes with TMT if time allows.

However, it was agreed that the TMT process group will have further discussions on the issue of what level of notification and coordination is appropriate for the Group 1 and 2 actions.

MacKay thanked the TMT for their willingness to work with the action agencies to avert a Stage 3 emergency earlier this week, in the face of record high loads up and down the West Coast

5. Operations Review.

Roche said Hungry Horse is at 3553.4 feet and drafting slowly; the project discharge is being stepped down to 3 Kcfs. The expected project elevation is about 3546 by the end of August. Libby was at 2454.4 feet at midnight last night, 4.6 feet from full. 1576 feet at Dworshak last night. At McNary, the average flow has been 162-186 Kcfs over the past week. The current Grand Coulee elevation is 1285.9 feet; there is no elevation target specified at Grand Coulee for July 31. Would you go below 1280 on August 31 for any reason? Hlebechuk asked. We don't want to, but if, for example, a power emergency occurred, we would consider it, Roche replied.

Moving on to fish, LeFleur said the adult summer chinook run is winding down. the run size was just downgraded to 78,600, less than the earlier forecast but up from a pre-season forecast of 49,000. On August 1, we officially move into fall chinook management season, she said. We will be setting commercial fishing seasons tomorrow at a Compact meeting, she said. The pre-season forecast at the river mouth is 474,000, down from 560,000 in 2005. The upriver bright run is forecast to be about 250,000; the Spring Creek return is forecast at about 52,000.

With respect to juveniles, Wagner said the passage indices at all of the Lower Snake projects have fallen below 1,000 – we're a couple of weeks past the run peak. At the Lower Columbia projects, the indices have fallen to the 10,000-20,000 range.

The action agencies said there are no significant power system problems to report at this time.

6. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, August 9. Meeting summary prepared by Jeff Kuechle, BPA contractor.

**TMT Meeting Participants
July 26, 2006**

Name	Affiliation
Robin Harkless	Facilitation Team
Robin MacKay	BPA
Cathy Hlebechuk	COE
Greg Haller	NPT
Kevin Nordt	Mid-Cs
Shane Scott	NWRP
Russ Kiefer	IDFG
Cindy LeFleur	WDFW
John Roche	Reclamation
Paul Wagner	NOAAF
Doug Faulkner	COE
Rick Kruger	ODFW
David Wills	USFWS
Kyle Dittmer	CRITFC
Dan Spear	BPA
Dave Statler	NPT
Russ George	WMCI
Scott Bettin	BPA
Laura Hamilton	COE
Barry Espensen	CBB
John Coffey	SnoPUD

Margaret Filardo	FPC
Dave Benner	FPC
Ruth Burris	PGE
Rudd Turner	COE
Glenn Traeger	Avista
Bruce MacKay	Consultant
Richelle Beck	D. Rohr & Associates
Bern Klatte	COE

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Monday July 31, 2006 11:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

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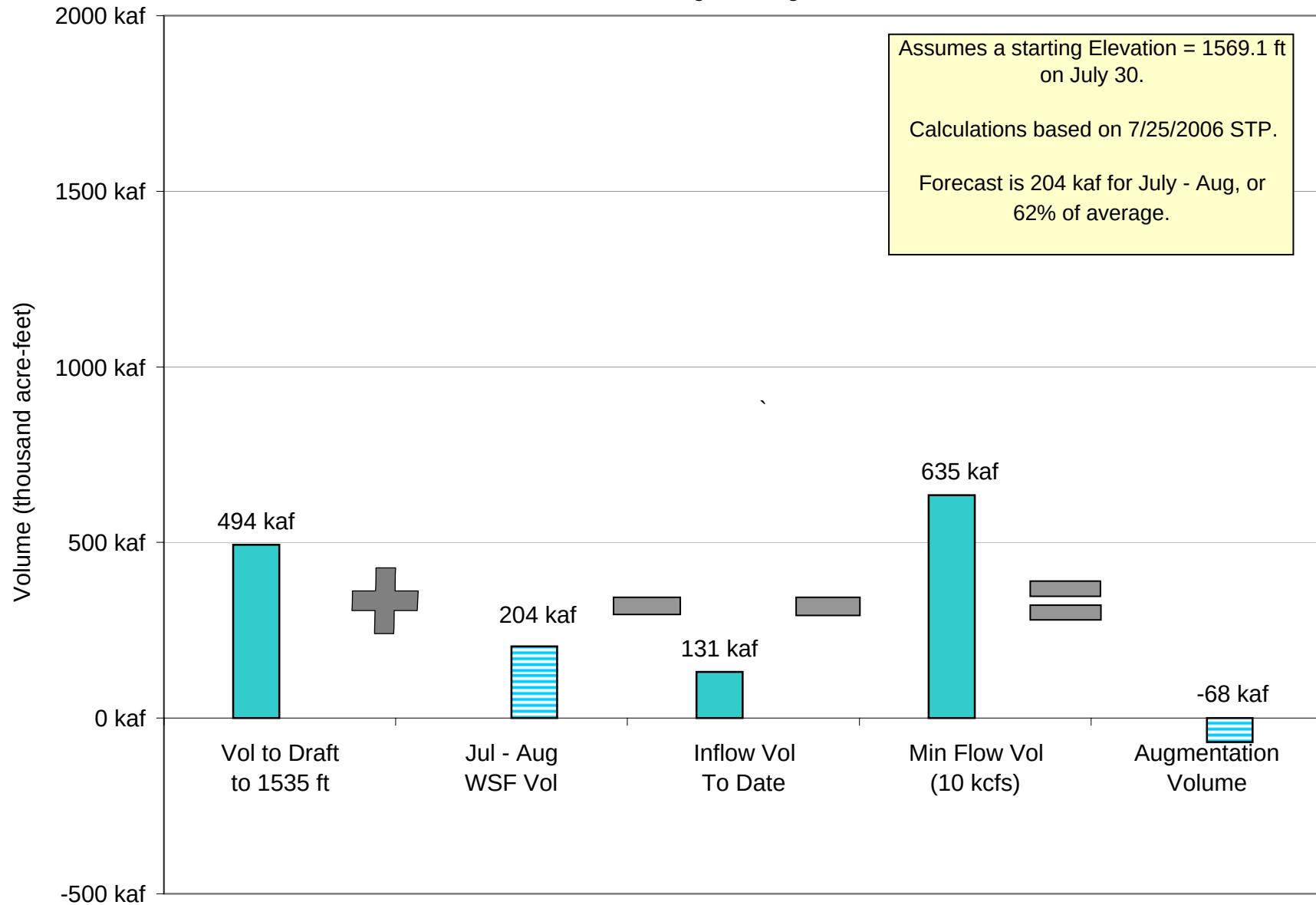
*All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed.
Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Dworshak Operations
 - [\[7/25 STP forecast\]](#) 
 - [\[SOR #2006-06 - Dworshak Flow\]](#) 
 - [\[Lower Granite Dam - Chart 1 July\]](#) 
 - [\[Lower Granite Dam - Chart 2 August\]](#) 
3. Other
 - Set agenda for next meeting [\[Calendar 2006\]](#) 

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

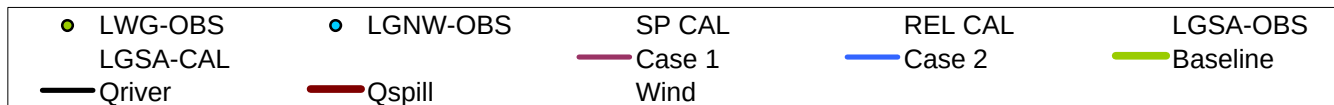
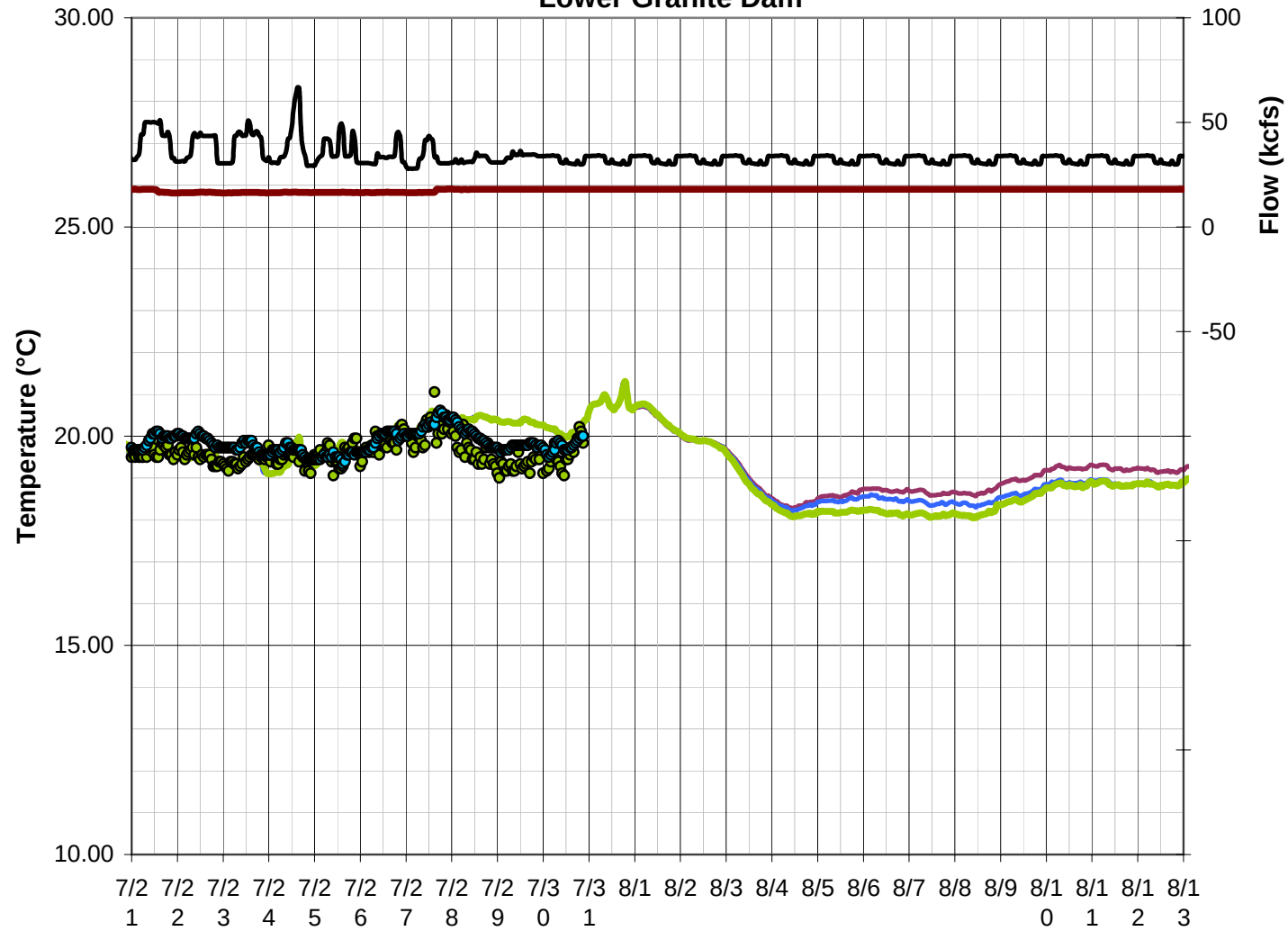
Volumes at Dworshak
1 Jul Through 31 August



Lower Granite Dam

☐ ALL
☐ MAR
☐ APR
☐ MAY
☐ JUN
☒ JUL
☐ AUG
☐ SEP

Start Date
 End Date

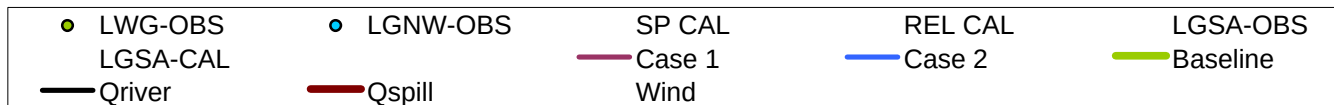
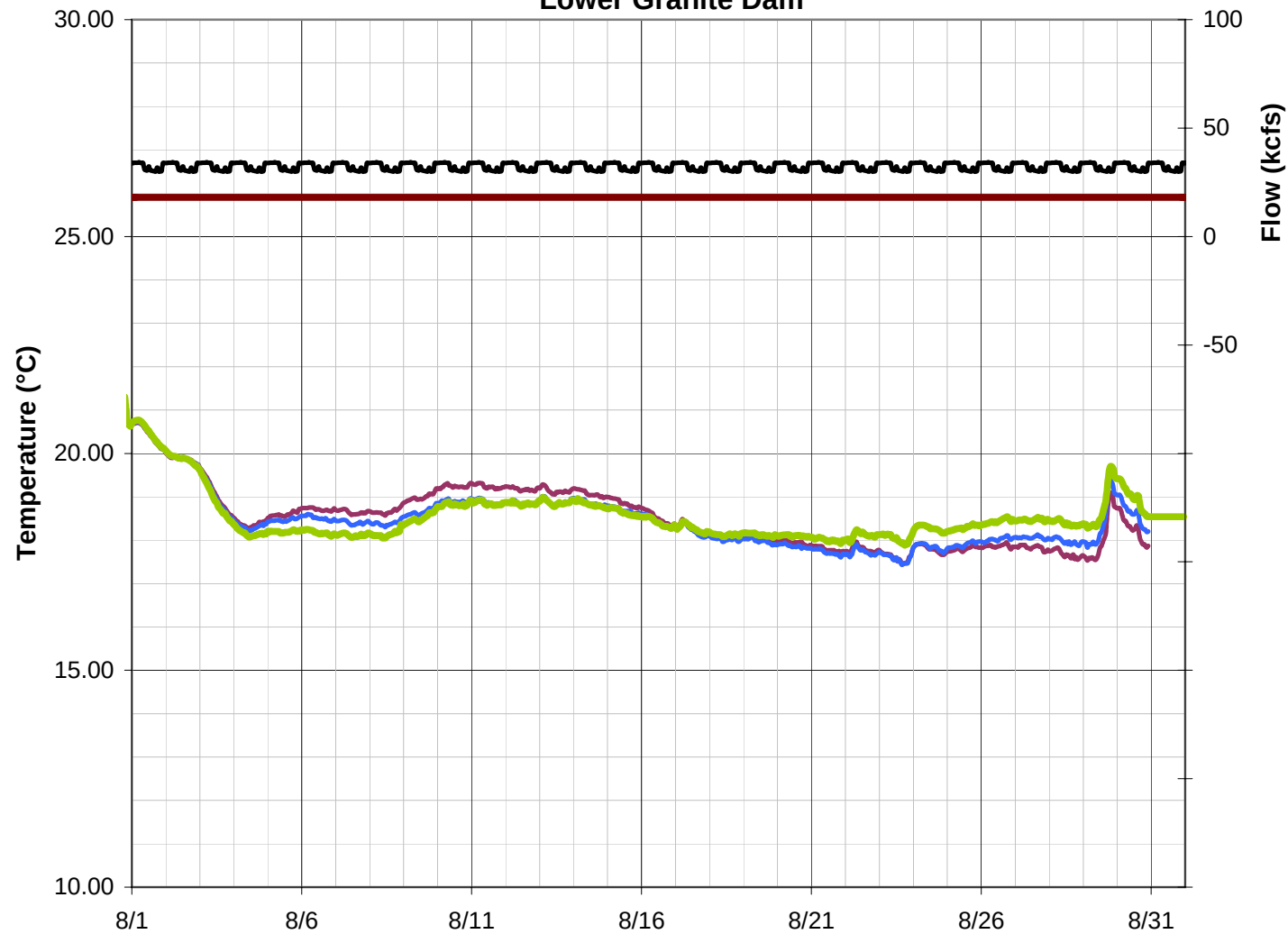


Lower Granite Dam

☐ ALL
 ☐ MAR
 ☐ APR
 ☐ MAY
 ☐ JUN
 ☐ JUL
 ☒ AUG
 ☐ SEP

Start Date

 End Date



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 31, 2006 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

TMT held a conference call on Monday, July 31, to discuss current conditions, review COE modeling and discuss Dworshak operations. Per an SOR submitted to the COE on Friday, July 28 from the salmon managers, the COE operated Dworshak over the weekend at 12 kcfs. Mike Schneider, COE, shared operation scenarios at varying flow levels out of Dworshak, projecting temperatures and volumes for the month of August. The COE noted that cooler temperatures were expected in the Lewiston River this week, and that an uncertainty remained about the amount of flow that would be coming out of the Hells Canyon projects.

During an FPAC call earlier on July 31, the salmon managers developed a short-term recommendation to operate Dworshak at full powerhouse as soon as reasonably possible, and target 43 degree water out of the project if possible. The COE responded that the project could go to full powerhouse quickly, and that in all undershot mode, the project would release water of about 45 degrees.

ACTION: Per request, Mike Schneider planned to do additional modeling to show what the system would look like for the rest of August if the project reduced to 7.5 kcfs on Tuesday, August 1, and what it would like with a reduction to 7.5 kcfs on Friday, August 4. TMT members could check the web page and, if the model results prompted the salmon managers to recommend a different operation than full powerhouse, a TMT conference call will be held on Wednesday, August 2 at 9:00am. The COE planned to operate the project at full powerhouse until a different operation was recommended.

Technical Management Team Meeting Notes

July 31, 2006

1. Greetings and Introductions.

The July 31 Technical Management Team conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-5190.

2. Dworshak Operations.

Harkless noted that there are four items hot-linked to today's agenda on the TMT homepage: the most recent STP volume forecast, SOR 2006-06, submitted last Friday by the salmon managers, and two different charts showing the results of recent modeling work for water temperatures at Lower Granite Dam.

Hlebechuk noted that SOR 2006-6 was submitted on Friday; the request was that Dworshak outflow not be reduced on Friday night as planned. The Corps therefore kept Dworshak outflows at 12 Kcfs through the weekend, she said. If you look at the STP volume forecast, which shows the remaining Dworshak volume available for flow augmentation, if we maintain 10 Kcfs outflow through the end of August, we would have a deficit of 68 kaf below elevation 1535 on August 31, which means we would need to reduce Dworshak outflow to about 7.2 Kcfs about August 17 if we want to hit elevation 1535 on August 31 she said.

Mike Schneider said he had modeled two different flow and temperature conditions this morning; he noted that the cold front that has moved into the Lewiston area had provided significant cooling effects. The first scenario is a baseline operation, showing the effects of the current operation, he explained – what might happen if we continue to release 12 Kcfs from Dworshak through Thursday, followed by a reduction to full powerhouse capacity. We would then back off again later in the month to hit the 1535 target at the end of August, he said. The second scenario shows what might happen if we reduce Dworshak outflow to full powerhouse capacity tomorrow morning, Schneider said.

It takes awhile for the temperature effects to hit Lower Granite once outflow from Dworshak is changed, he continued – about four or five days. Under the latter scenario, we see the largest increase in temperatures at Lower Granite, although they do moderate later in August. The forecast shows that we're going

to warm up a little, then air temperatures are forecast to cool off somewhat, which will help us maintain water temperatures below 68 degrees in the Lower Granite tailrace, he said.

Did you model a scenario under which Dworshak outflow would immediately be reduced to 7.5 Kcfs? Scott Bettin asked. I didn't model that alternative, Schneider replied – that would certainly produce water temperatures that are warmer than what we see in scenario 1, but I'm not sure how much warmer. Given the fact that quite a bit of natural cooling is forecast to occur over the next week, Schneider said, it may be possible to reduce Dworshak outflow to 7.5 Kcfs and still keep temperatures in the Lower Granite tailrace below 68 degrees. The wild card is the operation and outflow temperatures at Hells Canyon, he said.

The group devoted a few minutes of discussion to Schneider's model results, offering a few minor clarifying questions and comments. Russ Kiefer said FPAC discussed the Dworshak operation this morning; FPAC's recommendation is to reduce Dworshak outflow to full powerhouse capacity as soon as reasonably possible, still targeting a 43-degree release temperature. We're recommending that Dworshak go to full powerhouse capacity later today if possible, Kiefer said.

Jim Adams noted that the Dworshak release temperature will likely increase slightly, to about 45-46 degrees, once the flow from the regulating outlets is shut off, and outflow is coming only from the three generating units in undershot mode. We're aware of that, but we think that will still allow us to meet the temperature target at Lower Granite, Kiefer replied. In response to a question from Hlebechuk, Kiefer said ODFW was the only salmon management agency that was not represented during this morning's FPAC discussion. Kiefer also noted that this is a short-term recommendation only, and the salmon managers' expectation is that this operation will be modified further in response to changing weather and water quality conditions. Our hope is that it will be possible to reduce Dworshak outflow even further as soon as possible, Kiefer said. It was agreed that Schneider will model a scenario under which Dworshak outflow would be reduced to 7.5 Kcfs tomorrow.

After a few minutes of further discussion, it was agreed that the Corps will reduce Dworshak outflow to full powerhouse capacity later today, with all three units in undershot mode. It was further agreed that the TMT membership will closely monitor the weather and water quality situation at Lower Granite, with the goal of reducing Dworshak outflow further, to 7.5 Kcfs, as soon as possible. Schneider said he will model the effects of a 7.5 Kcfs operation at Dworshak; the results will be posted to the TMT homepage within 24 hours. A check-in TMT conference call was tentatively scheduled for 9 am Wednesday, August 2.

Is there an updated water temperature profile for Dworshak reservoir? David Wills asked. It's on the TMT website, under "Documents" and "Operations,"

Laura Hamilton replied. The temperature around the turbine intakes, 35 feet down, is about 41 degrees, while the temperature closer to the surface is about 47 degrees, Adams added. I'm expecting the Dworshak temperature to start going up pretty rapidly, and fairly soon, he said.

3. Question for IT Resolution.

Greg Haller said the questions the Nez Perce would like the Implementation Team to resolve are, first, whether the IT supports the general framework of the Nez Perce SOR, and second, does the IT support the concept of revenue-sharing to support the Tribal Enforcement Program.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, August 9. With that, today's conference call was adjourned. Meeting summary prepared by Jeff Kuechle, BPA contractor.

Technical Management Team Meeting Participants July 31, 2006

Name	Affiliation
Russ Kiefer	IDFG
Robin Harkless	Facilitation Team
Cathy Hlebechuk	COE
Greg Haller	NPT
Scott Bettin	BPA
Dan Spear	BPA
Paul Wagner	NOAAF
David Wills	USFWS
Jim Adams	COE
Howard Burge	USFWS
John Roche	USBR
David Benner	FPC
Barry Espensen	CBB
Mike Schneider	COE
Bern Klatte	COE
Laura Hamilton	COE

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

IF MEETING IS CALLED

Wednesday August 02, 2006 09:00 - 12:00

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

AGENDA

1. Welcome and introductions
2. Dworshak Reservoir
 - [\[Dworshak & Lower Granite CE-QUAL-W2 Water Temperature Model Runs:\]](#) 
3. Other
 - Set agenda for next meeting [\[Calendar 2006\]](#) 

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

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Thursday August 03, 2006 11:00 - 12:00 NOTE NEW TIME

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

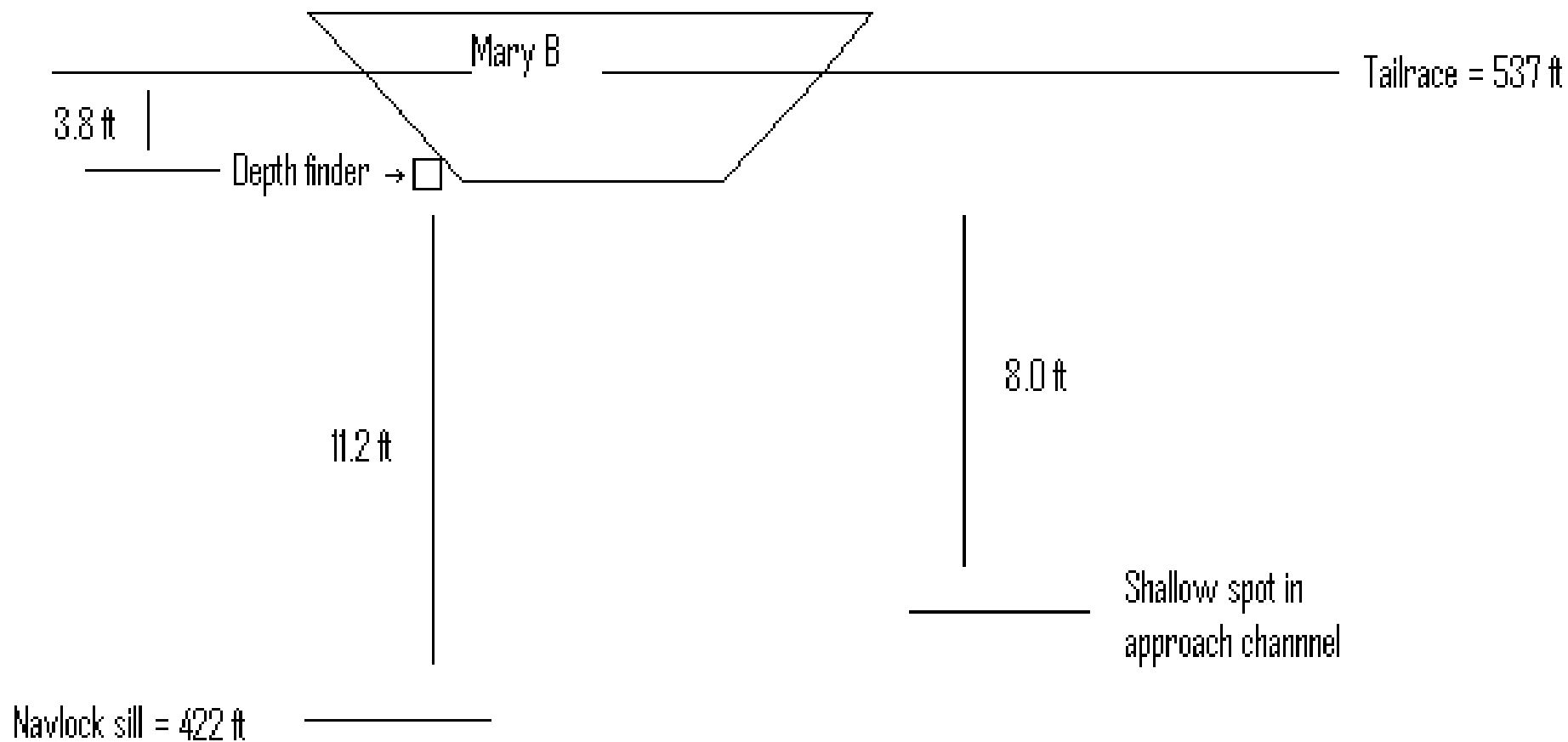
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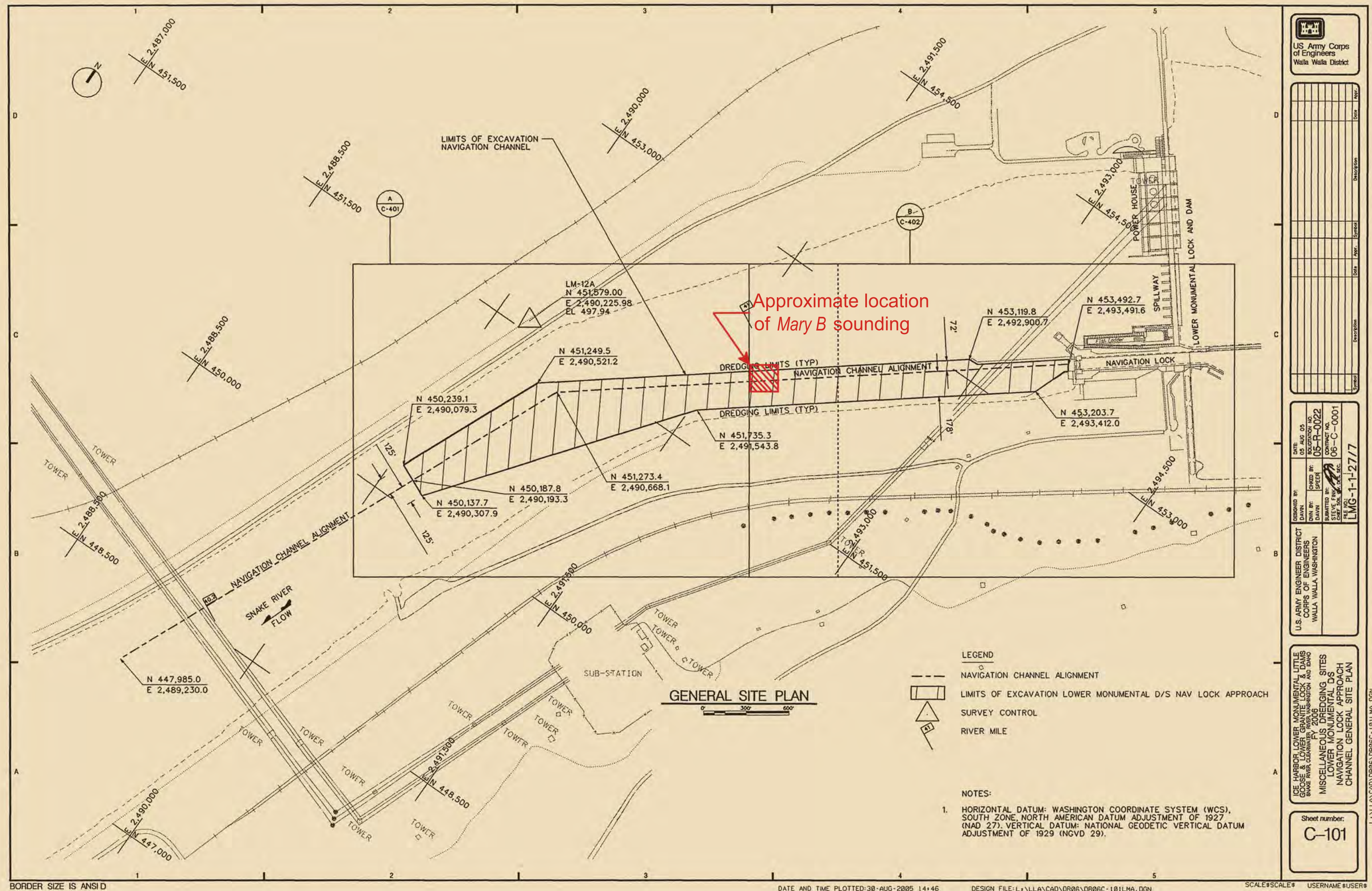
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Please e-mail her at dsilverberg@cnmw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Navigation problem in Lower Monumental tailwater.
 - [\[Mary B depth finding results\]](#) 
 - [\[Mary B sounding\]](#) 
3. Other
 - Set agenda for next meeting [\[Calendar 2006\]](#) 

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





COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

August 3, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Navigation Problem in Lower Monumental Tailwater

Cindy Henriksen, COE, clarified the purpose for the unscheduled call: depth and navigation issues downstream from the Lower Monumental Dam have created issues for one of the barges. While in the navigation channel, the a barge was grounded during its move from upstream to down. Another tow, the Mary B, took soundings as it passed the area. The Mary B soundings showed the navigation lock sill had a depth of 11.2', with an assumed relative depth of 15'. The graphs on the website showed that the shallow spot at Ice Harbor had a relative depth of only 8'. Rich Hilt, Lower Monumental, helped clarify that there had been some dredging in the area, and the diagram on the website was shown demonstrating the current tailrace of 437.

COE proposed going to zero generation from midnight to 4 a.m. Friday to raise Ice Harbor pool by 1'. This would shift the current operation from a 437-438 to a 438-439 range. Henriksen noted that this would not cause a rise in gas levels. Paul Wagner, NOAA, expressed that more data to back up the necessity for the change in operations would have been helpful – it was suggested that the survey at Ice Harbor scheduled for later in August, could provide the desired data and be conducted sooner rather than later in the month.

NOAA accepted the proposed plan for resolving the navigational hazard. Russ Kiefer, ID; Kyle Dittmer, CRITFC; Cindy LeFleur, Washington; Tony Norris, Reclamation; and Dave Wills, USFWS; added that the proposal sounded like a reasonable solution. Scott Bettin, BPA, said that their only caveat to the proposal was if monitoring shows a need to adjust operations, the action agencies will do so. Oregon and Montana representatives were not on the TMT call. [Editors note: Ron Boyce of Oregon was contacted immediately following the call and did not object to the proposed operational solution.]

Next steps: COE will go to zero generation at midnight, and maintain for four hours. TMT will look forward to seeing the results of the Ice Harbor survey, and will stay in contact via email between now and the next meeting.

Next Meeting, August 9th OR 16th, 9am-noon

A face to face TMT meeting is scheduled to take place on either August 9th or 16th. Please regularly check the TMT web page for agendas and any scheduling changes.

Technical Management Team Conference Call

August 3, 2006

1. Greetings and Introductions.

The August 3 Technical Management Team conference call was chaired by Cindy Henriksen and facilitated by Robyn 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 Cindy Henriksen at 503-808-3945.

2. Navigation Issue at Lower Monumental.

Henriksen said the purpose of this call is to discuss navigation issues in the Lower Monumental tailrace. Earlier this week, a barge was moving downstream out of the navigation lock and ran aground shortly downstream. The barge was in the navigation channel. Depth soundings were taken shortly after the grounding, and are attached to today's agenda on the TMT website. The sounding taken by a second barge found is that there is a shallow spot – about 11.2 feet – in the channel. That raises some concerns about both approach and departure from the lock near the downstream sill, Henriksen said.

Rich Hilt of the Corps said he had sent out an email on this incident, which included the soundings taken by the vessel *Mary B*. he noted that the actual depth of the shallow spot is 11.8 feet. How accurate is that measurement? Paul Wagner asked. It's based on a depth sounding, not a hydrographic survey, but we do have an issue at this location downstream of Lower Monumental dam, Hilt replied.

This area was not dredged this past winter? David Wills asked. I can't say definitively, but there was dredging in that area, said Hilt. We need to look further at that area, but again, it's clear we have an issue at this time.

We brought this to your attention because there is concern about this navigation hazard, Henriksen said; it is more of a concern this time of year than it would be at other times of the year. The Corps will be doing further soundings, but in the interim, we would like to recommend raising Ice Harbor pool by one foot. We don't know that this will completely resolve the issue, but we certainly don't want to have any further navigation issues, she said.

How would the one foot be filled, and over what time-frame? Wagner asked. The Corps' desire would be to do this as quickly as possible, Henriksen replied; I asked BPA if it would be feasible to go to zero generation at Ice Harbor from midnight to 4 am tonight. That would fill the project by almost a foot, she said; spill would continue. Would TDG be a concern if you do that? Russ Kiefer asked. We might see a small rise in TDG, but the project is only spilling 15 Kcfs, currently, Henriksen replied. There isn't much dilution with powerhouse water at the gauge, so I wouldn't expect to see much of an increase in TDG, Jim Adams added. It may be necessary to go to zero generation at Ice Harbor for a period tomorrow night as well, to finish filling the pool, Bettin noted.

After a few minutes of further discussion, it was agreed that this is primarily an issue for BPA. No TMT objections were raised to the Corps' proposed operation, because this is a safety issue. Wagner requested that the Corps accomplish the necessary survey work as soon as possible, to establish the degree of the hazard that exists. Perhaps it would be possible to mark the shallow area to warn vessels away, while maintaining MOP at Ice Harbor, he suggested.

It was agreed to revisit this topic at the next scheduled TMT meeting; the Corps will notify the TMT by email of any new developments.

**TMT Conference Call Participants
August 3, 2006**

Name	Affiliation
Cindy Henriksen	COE
Robin Harkless	Facilitation Team
Rich Hilt	COE
Dave Statler	NPT
Tony Norris	USBR
Cindy LeFleur	WDFW
Russ Kiefer	IDFG
David Wills	USFWS
Paul Wagner	NOAAF
Shane Scott	NWRP
Kyle Dittmer	CRITFC
Scott Bettin	BPA

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday August 09, 2006 09:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

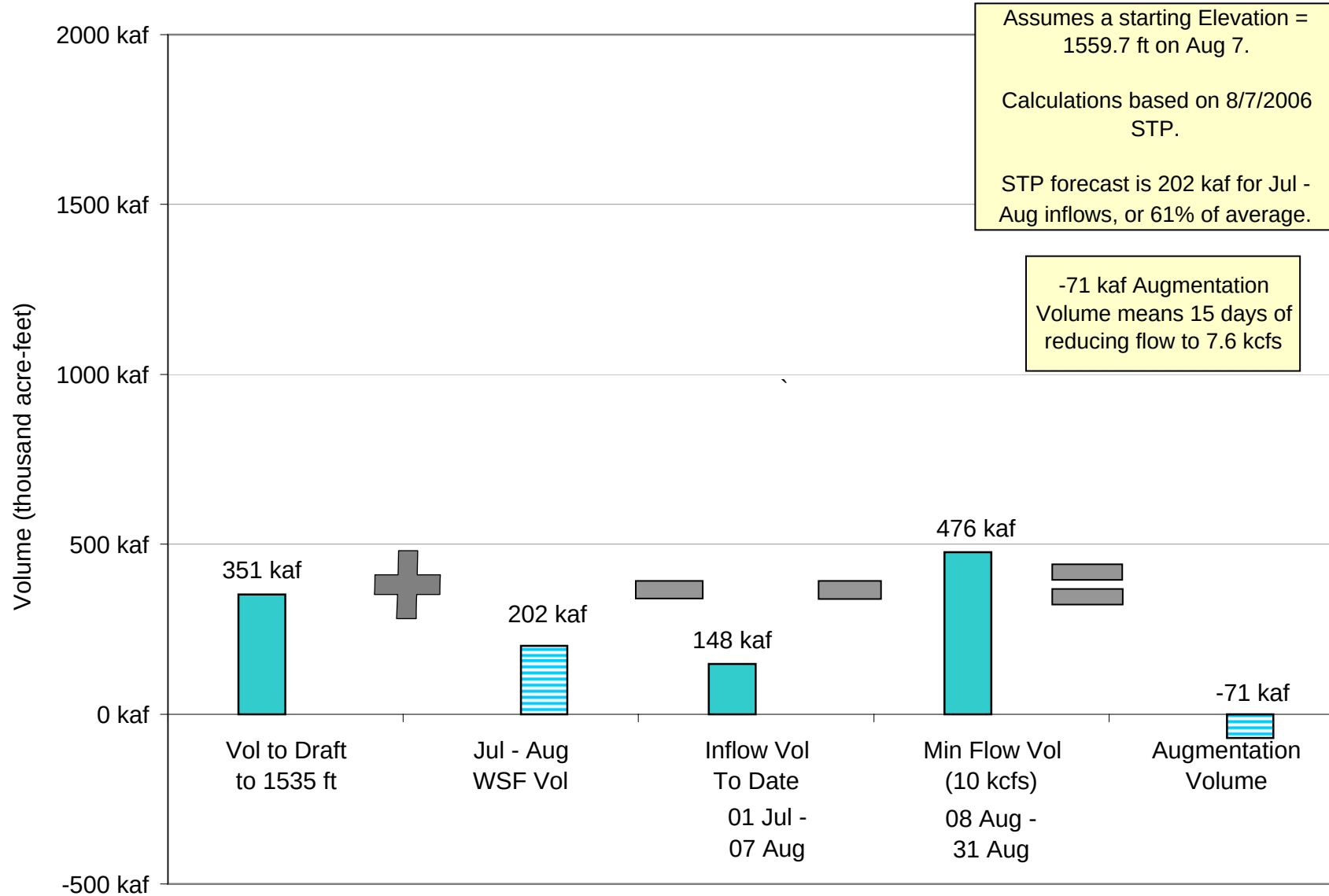
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Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. [\[Review Minutes 2006\]](#)
3. Navigation problem in Lower Monumental tailwater
 - [\[2006-NAV-02 - Lower Monumental Spillway Operations for April through August 2006\]](#) 
4. Lower Snake operation during low flow period
5. Dworshak operation
 - [\[Estimated - Volumes at Dworshak - 01 Jul Through 31 August - Corps\]](#) 
 - [\[Lower Snake Temperature Management - 08-Aug-2006 - Corps\]](#) 
 - [\[Lower Snake Temperature Management - 09-Aug-2006 - Corps\]](#) 
 - [\[LSnk water temps - EPA model data - Kyle Dittmer\]](#) 
 - [\[Lower Snake River Temperatures - TMT Update - 09 August 2006 - Corps\]](#) 
6. Review of Summer Treaty Fishing - Kyle Dittmer
 - [\[Summary of Pool Operations - 2006 Summer Treaty Fishery - August 9, 2006\]](#) 
7. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Spill Information 2006\]](#)
8. Other
 - Set agenda for next meeting August 16, 2006 - [\[Calendar 2006\]](#) 

Estimated
Volumes at Dworshak
1 Jul Through 31 August

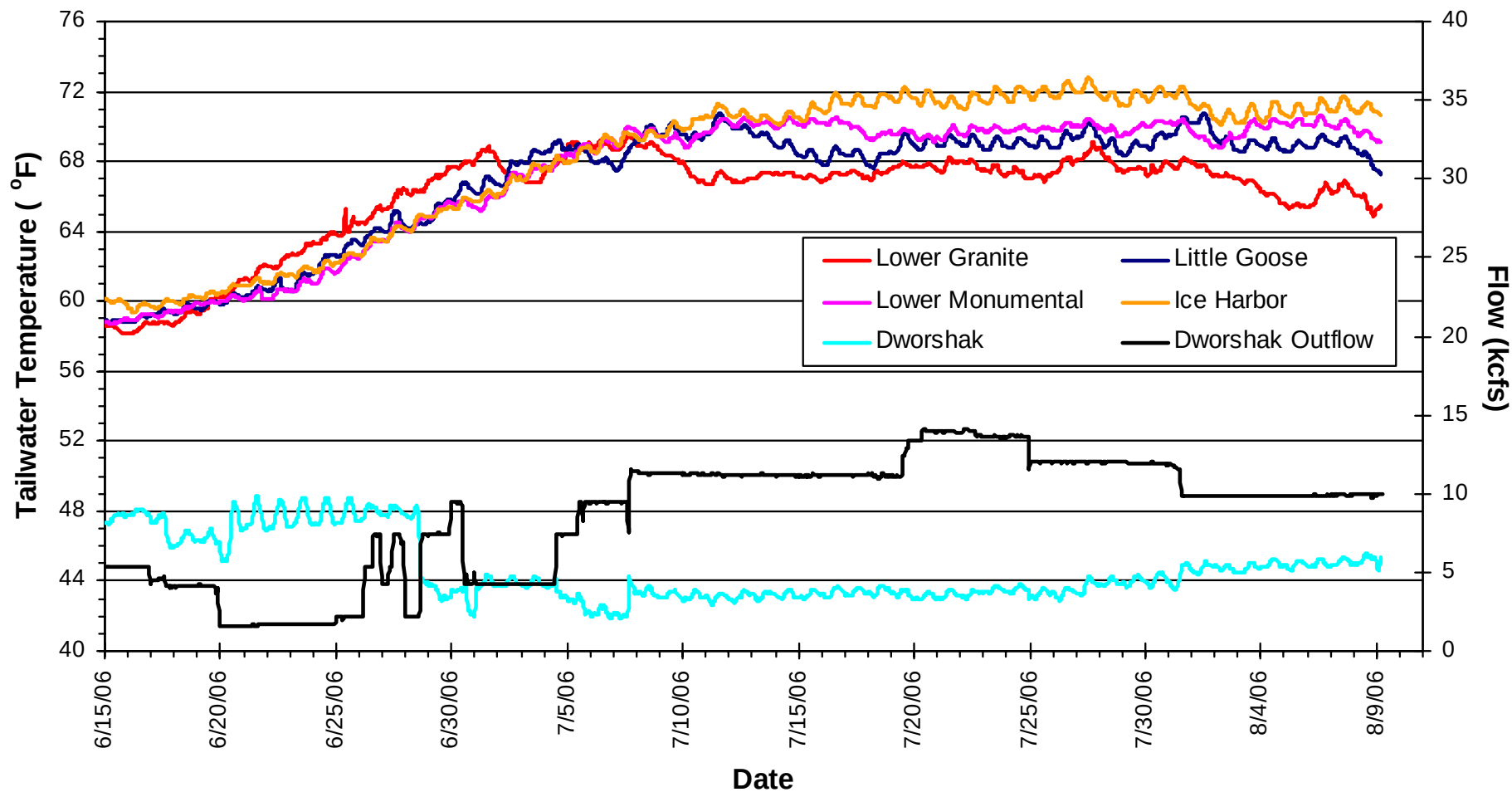


Lower Snake River Temperatures

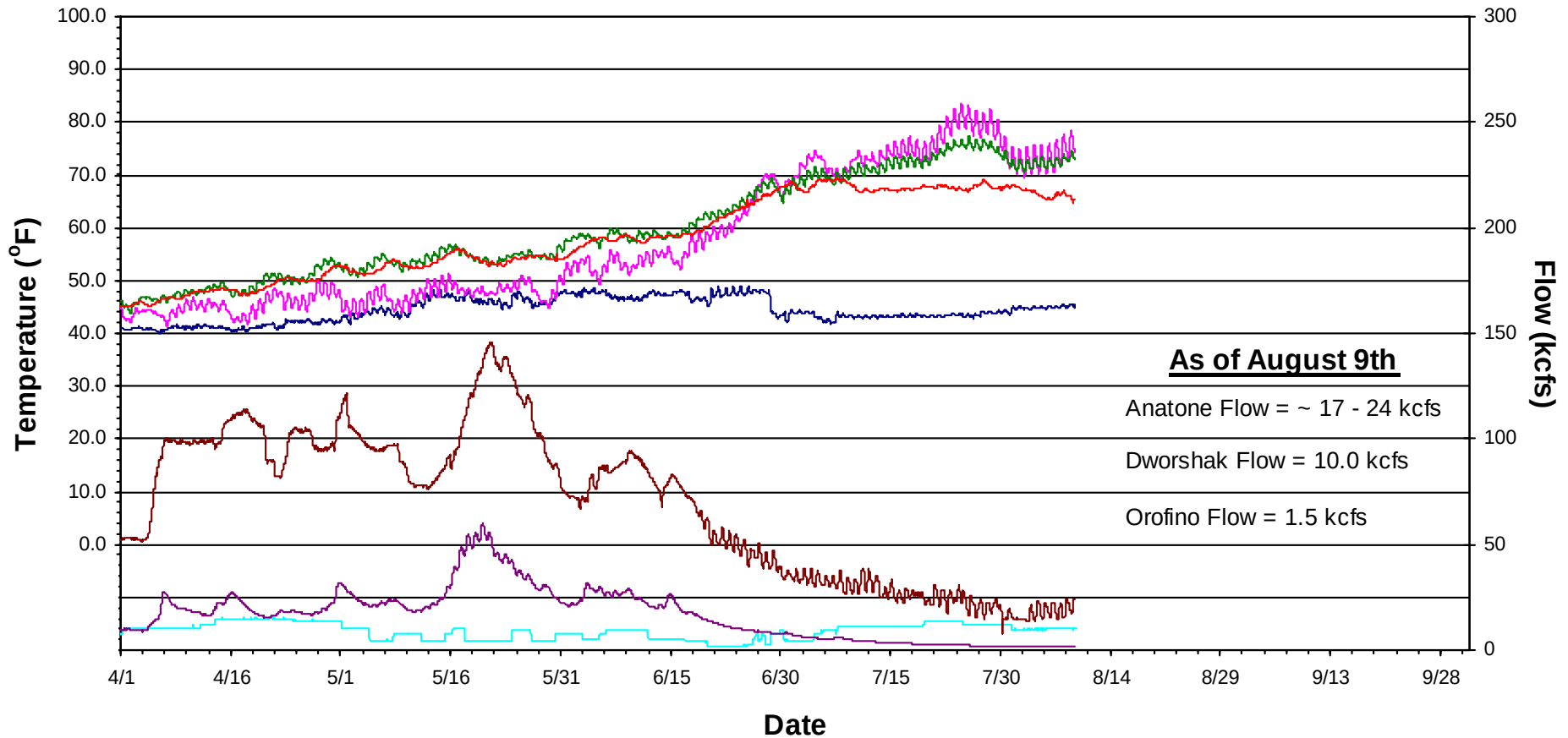
TMT Update

9 August 2006

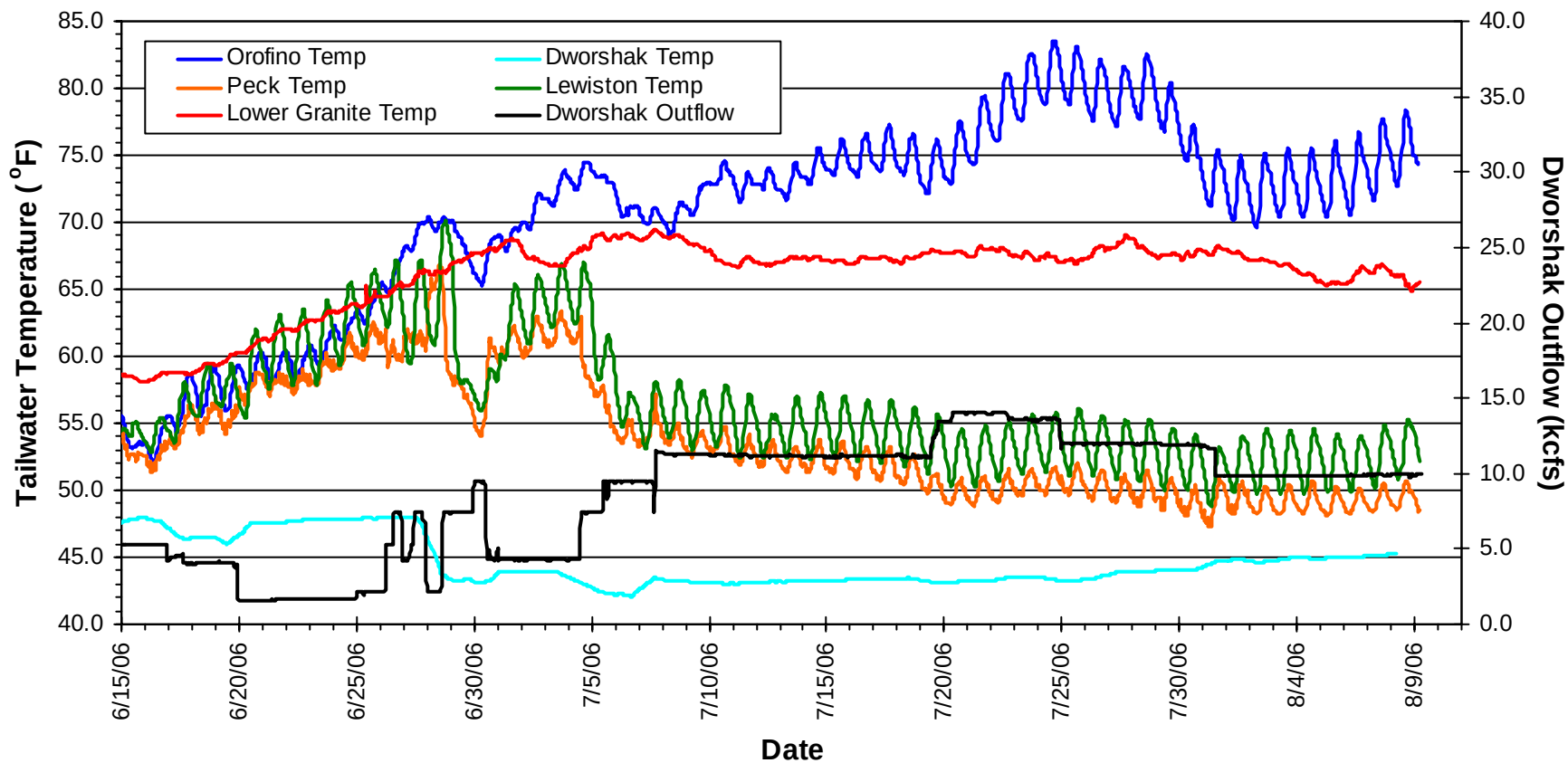
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - August 9)



Lower Granite Inflows and Temperatures in 2006

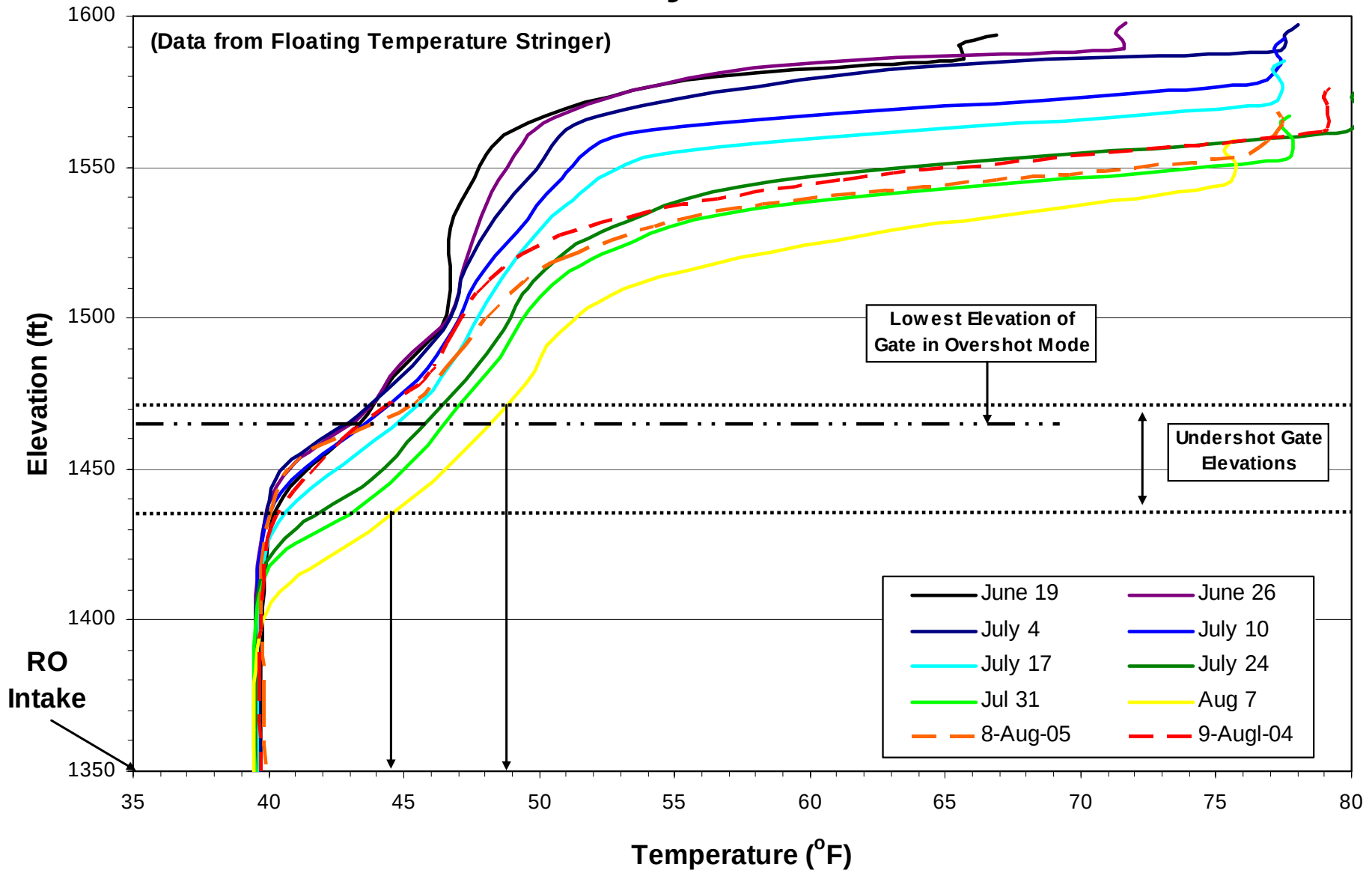


Dworshak Outflows and Clearwater River Temperatures in 2006

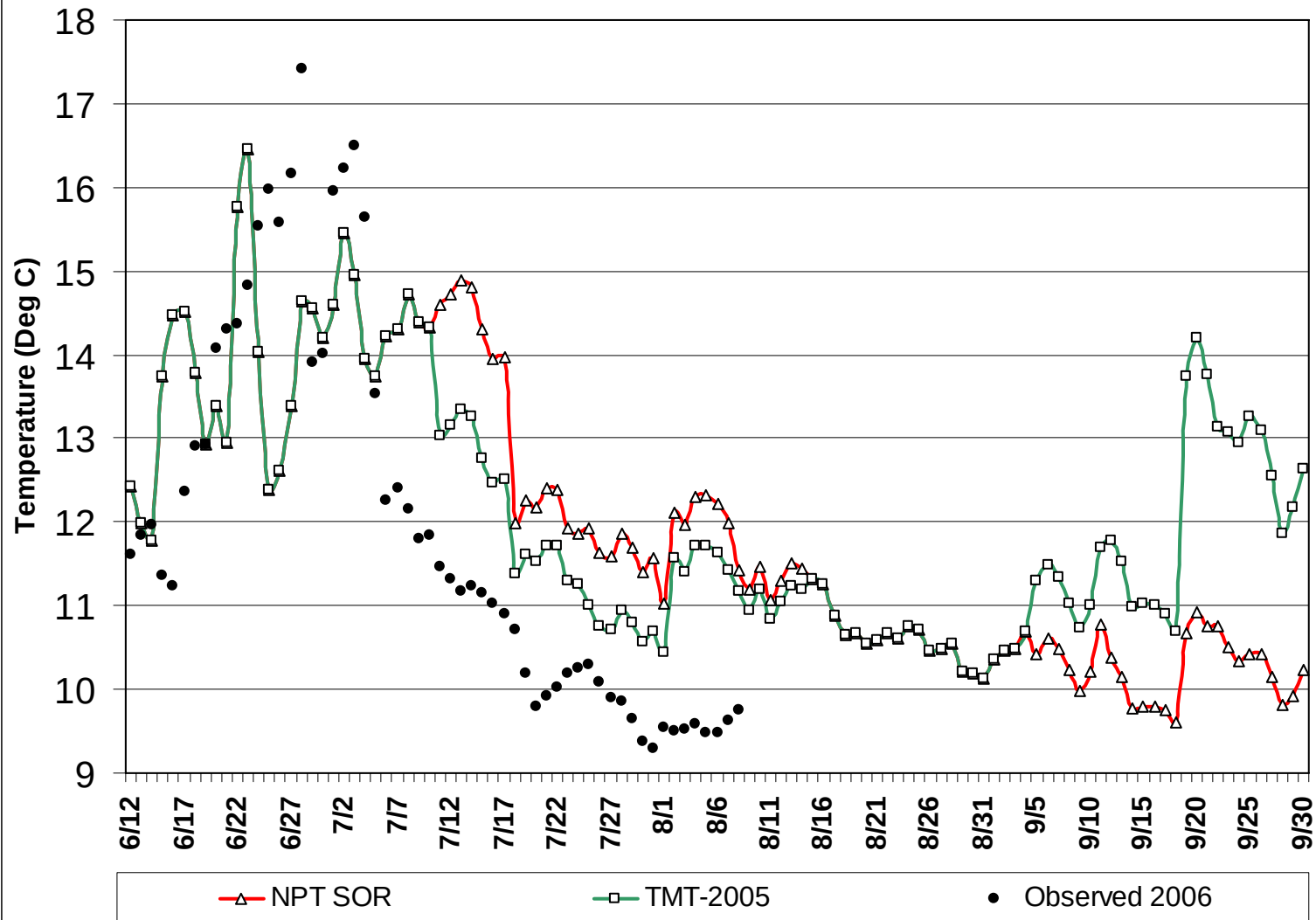


Dworshak Forebay Thermocline 2006

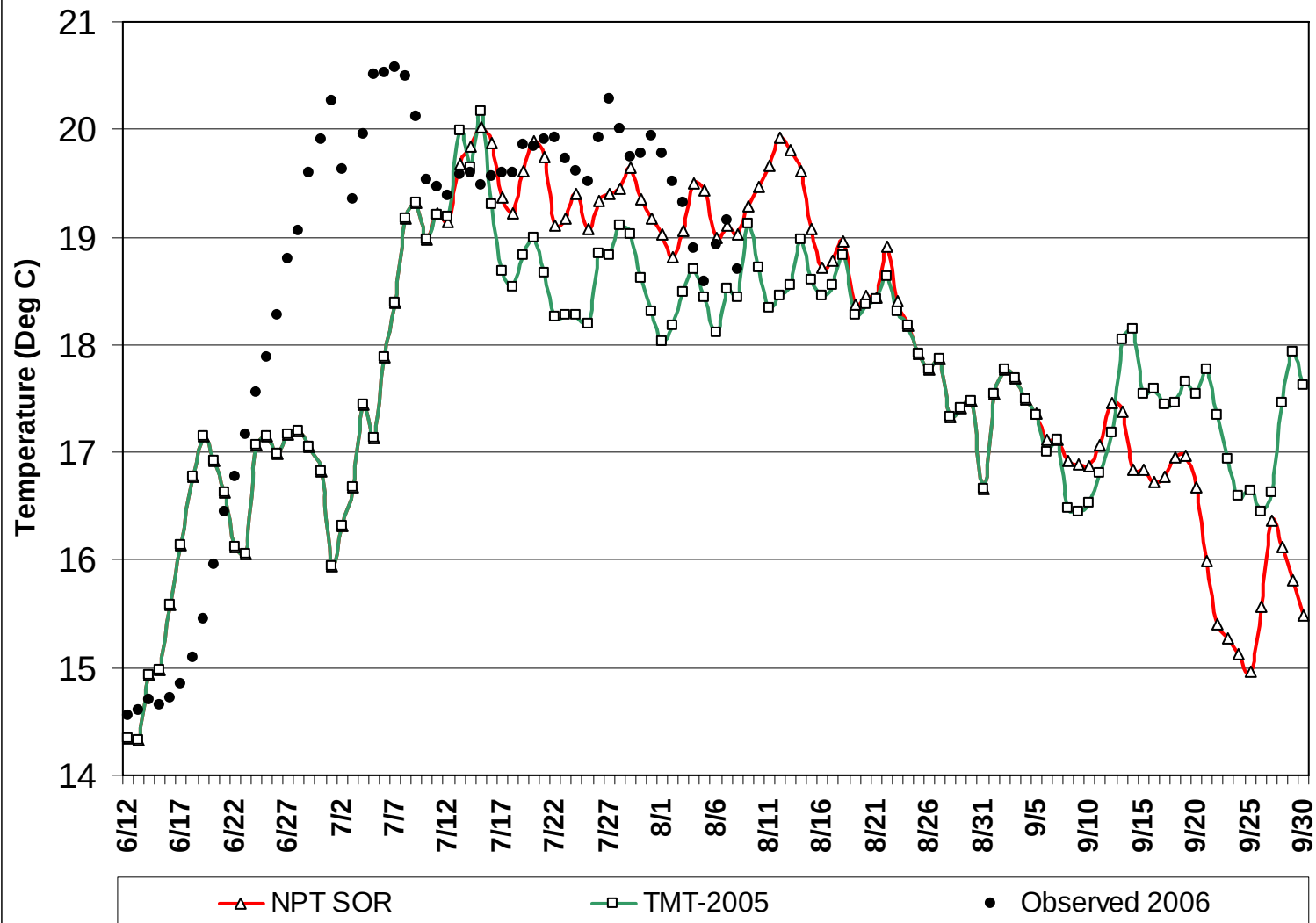
(Data from Floating Temperature Stringer)



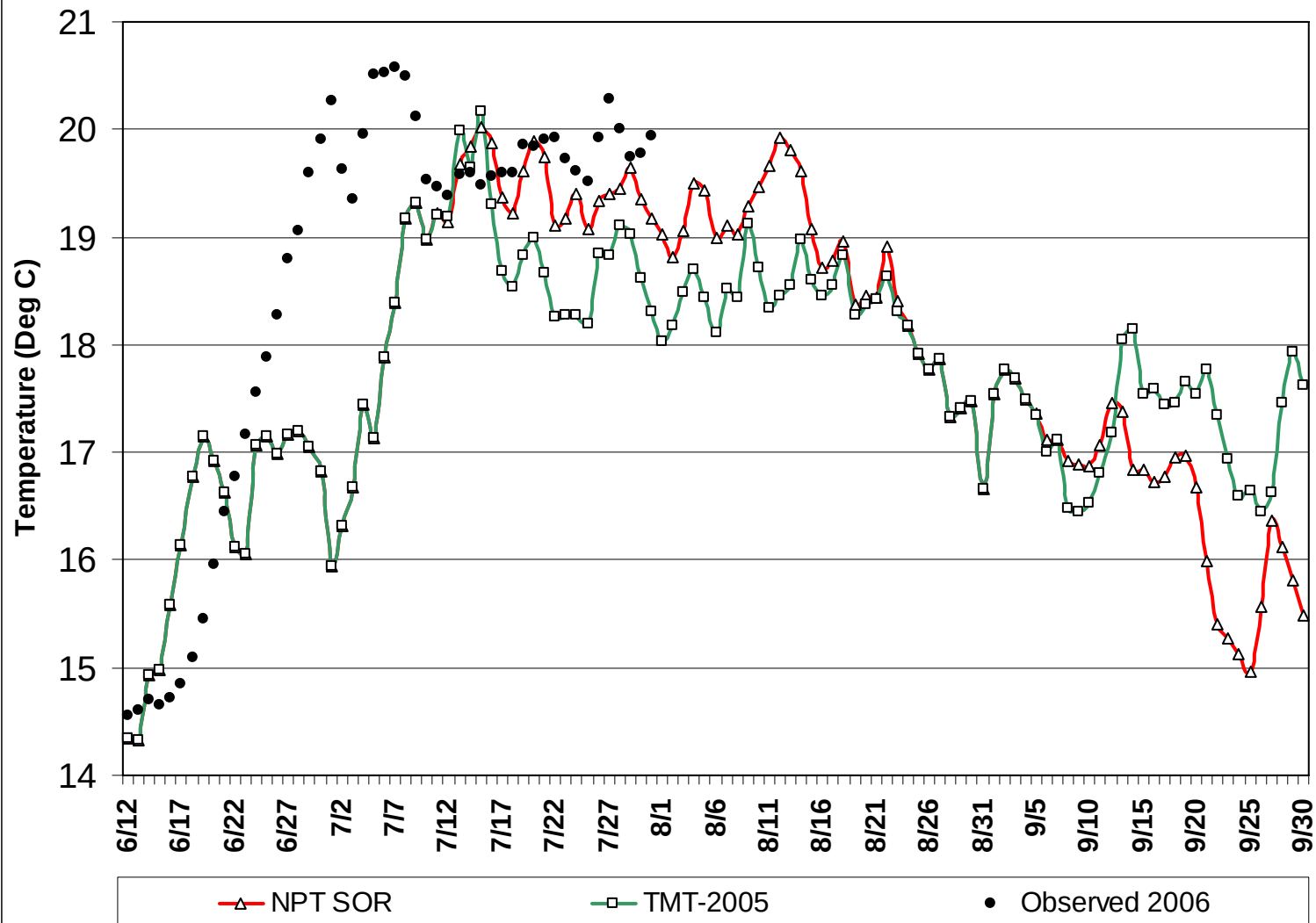
Clearwater River at Peck (1975, 1985, 1990, 1991 weather)



Snake at Lower Granite Dam (1975, 1985, 1990, 1991 weather)



Snake at Lower Granite Dam (1975, 1985, 1990, 1991 weather)





COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232

Telephone (503) 238-0667

Fax (503) 235-4228

www.critfc.org

TO: Technical Management Team (TMT)
 FROM: Kyle Dittmer, *Hydrologist - Meteorologist*, CRITFC Hydro Program
 DATE: August 9, 2006
 SUBJECT: Summary of Pool Operations – 2006 Summer Treaty Fishery

CRITFC submitted four System Operation Requests (2006-C1, C2, C3, and C4) via the NMFS' TMT forum to support 2006 summer treaty fishing. CRITFC requested two criteria: (1) one-foot elevation bands and (2) stable pool elevations during each week of treaty fishing. Criterion #1 asked to operate the pools as a hard constraint within a one-foot elevation range for all of the Zone 6 pools (i.e. Bonneville, The Dalles, and John Day). The Corps committed to a hard constraint of a 1.5-foot range, or 1-foot as a soft constraint, as they have done so since 1996, but only for the Bonneville pool.¹ The table summarizes the hourly compliance of CRITFC's 1-foot elevation band criteria and the Corps' 1.5-foot criteria during the 2006 and 2005 treaty fisheries.

2006	Bonneville Pool	The Dalles Pool	John Day pool
1 foot range (CRITFC):			
JUNE 20 - JUNE 22	89%	82%	100%
JUNE 27 - JUNE 29	93%	49%	100%
JULY 3 - JULY 7	97%	77%	100%
JULY 10 - JULY 13	98%	76%	98%
JULY 17 - JULY 20	86%	44%	95%
JULY 24 - JULY 27	92%	42%	100%
Average:	93%	62%	99%
2005 average:	78%	75%	89%
1.5 foot range (COE):			
JUNE 20 - JUNE 22	100%	98%	100%
JUNE 27 - JUNE 29	100%	59%	100%
JULY 3 - JULY 7	100%	86%	100%
JULY 10 - JULY 13	100%	87%	100%
JULY 17 - JULY 20	100%	80%	100%
JULY 24 - JULY 27	100%	81%	100%
Average:	100%	82%	100%
2005 average:	95%	85%	97%

Pool elevation data is a good objective measure as to the absolute pool fluctuations (Criterion #2) as shown in Figures 1 through 18. There were improvements to Bonneville pool operations in 2006 (0.3 – 0.9 foot swings compared to 0.4 – 2.4 foot swings in summer 2005). The Dalles pool saw 1.3 – 2.5 foot swings (compared to 0.8 – 2.5 foot swings in summer 2005). John Day pool saw 0.3 – 0.8 foot swings (compared to 0.5 – 1.3 foot swings in summer 2005).

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

¹ CRITFC's member tribes are currently engaged in policy discussions with the Corps NWD commanders regarding providing appropriate pool operations for all of Zone 6 during the treaty fisheries.

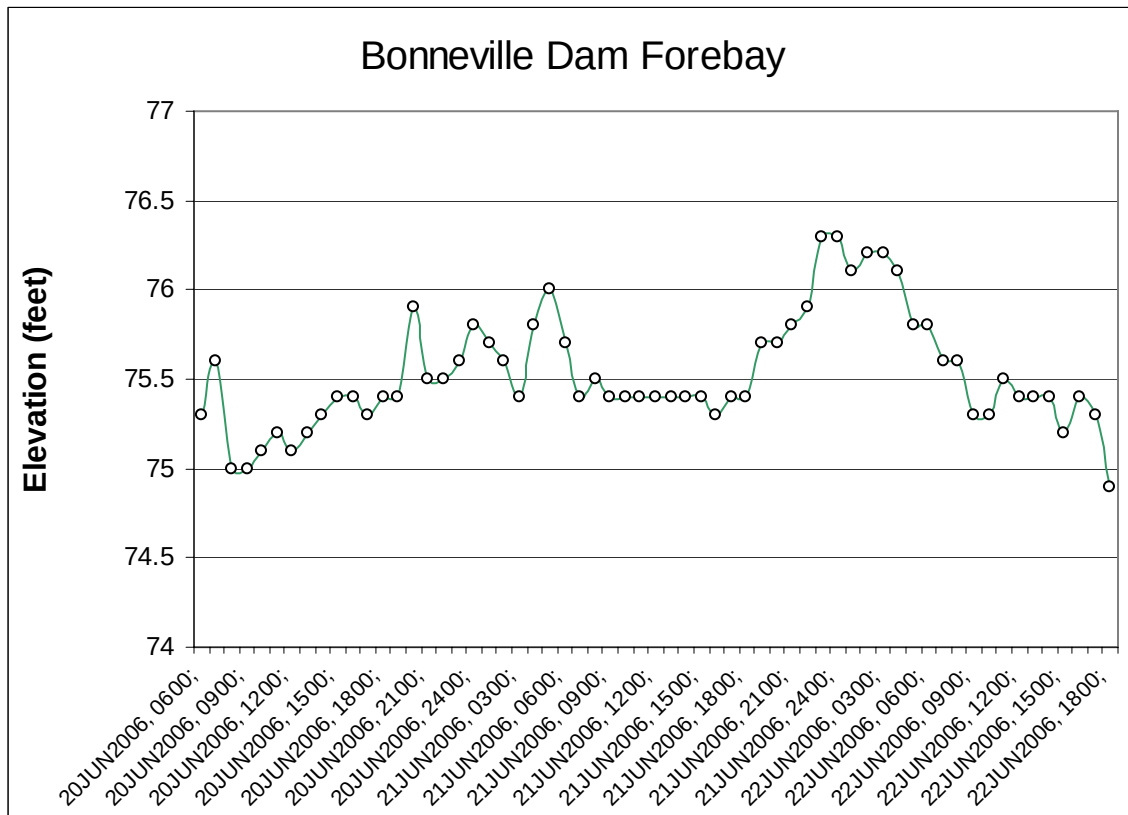


Figure 1. Observed BON pool elevations during June 20-22, 2006 summer treaty fishing.

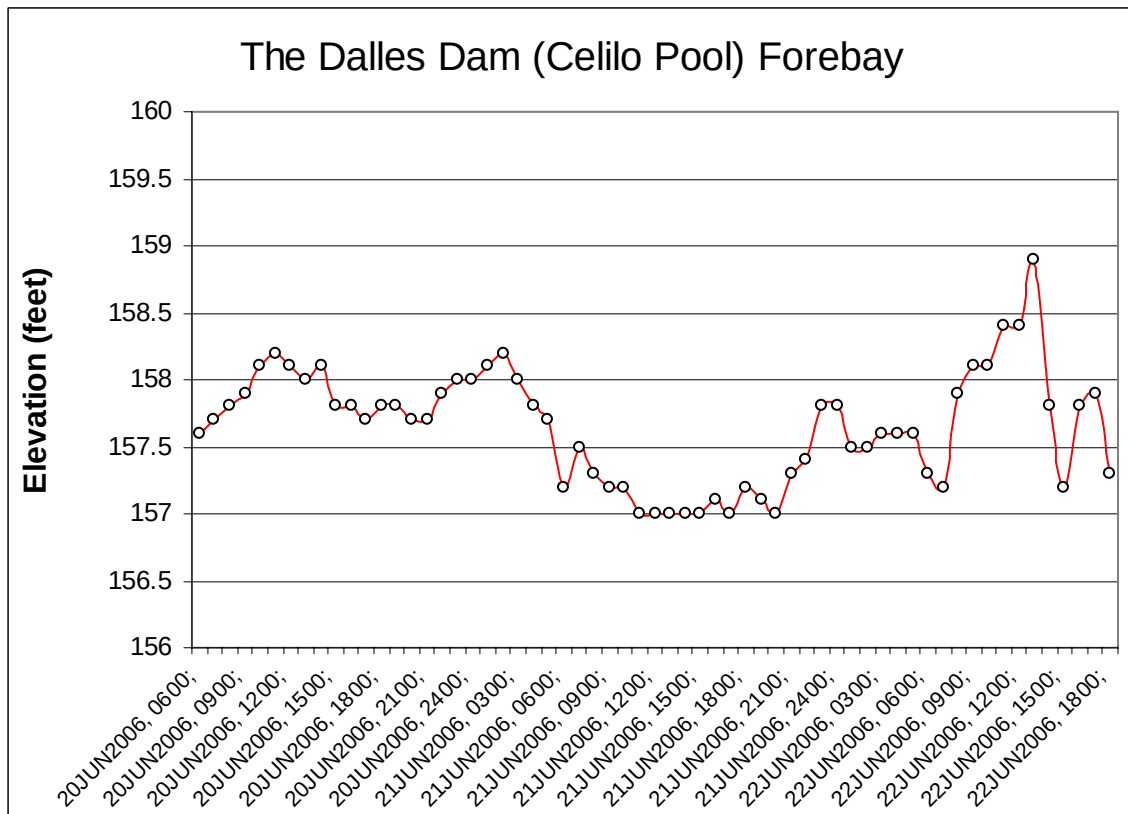


Figure 2. Observed TDA pool elevations during June 20-22, 2006 summer treaty fishing.

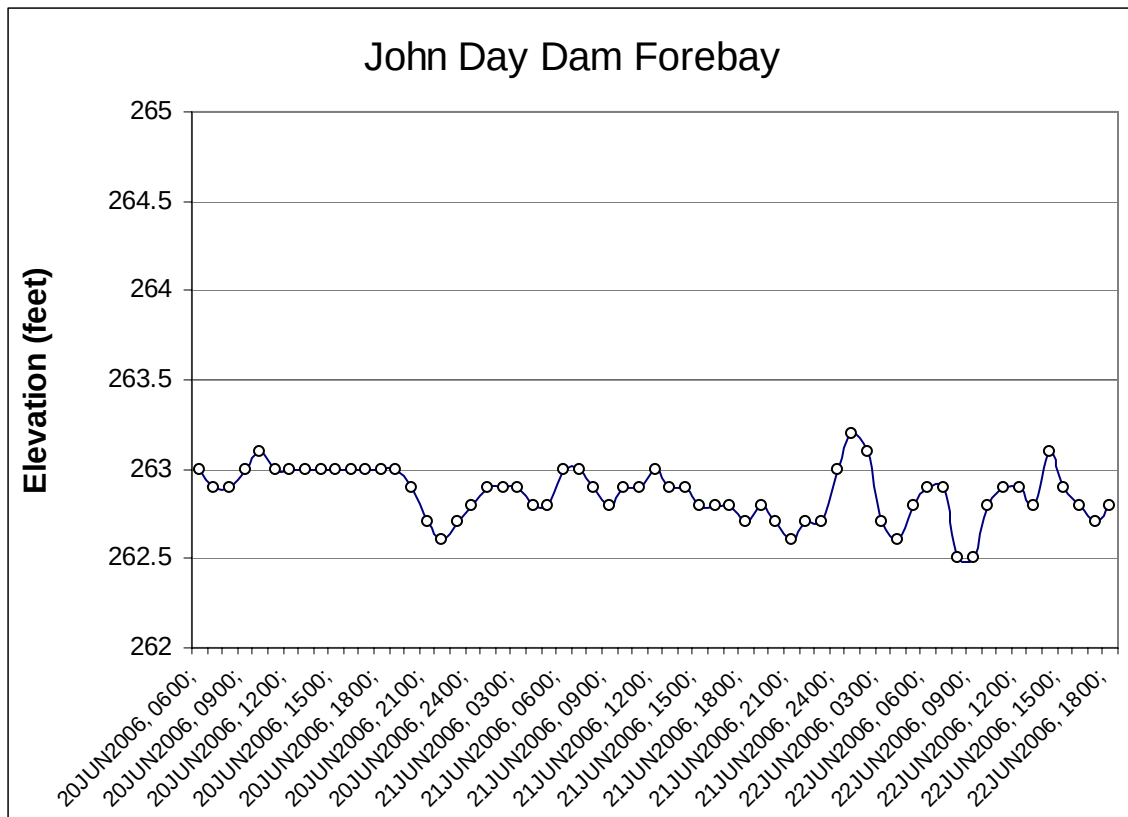


Figure 3. Observed JDA pool elevations during June 20-22, 2006 summer treaty fishing.

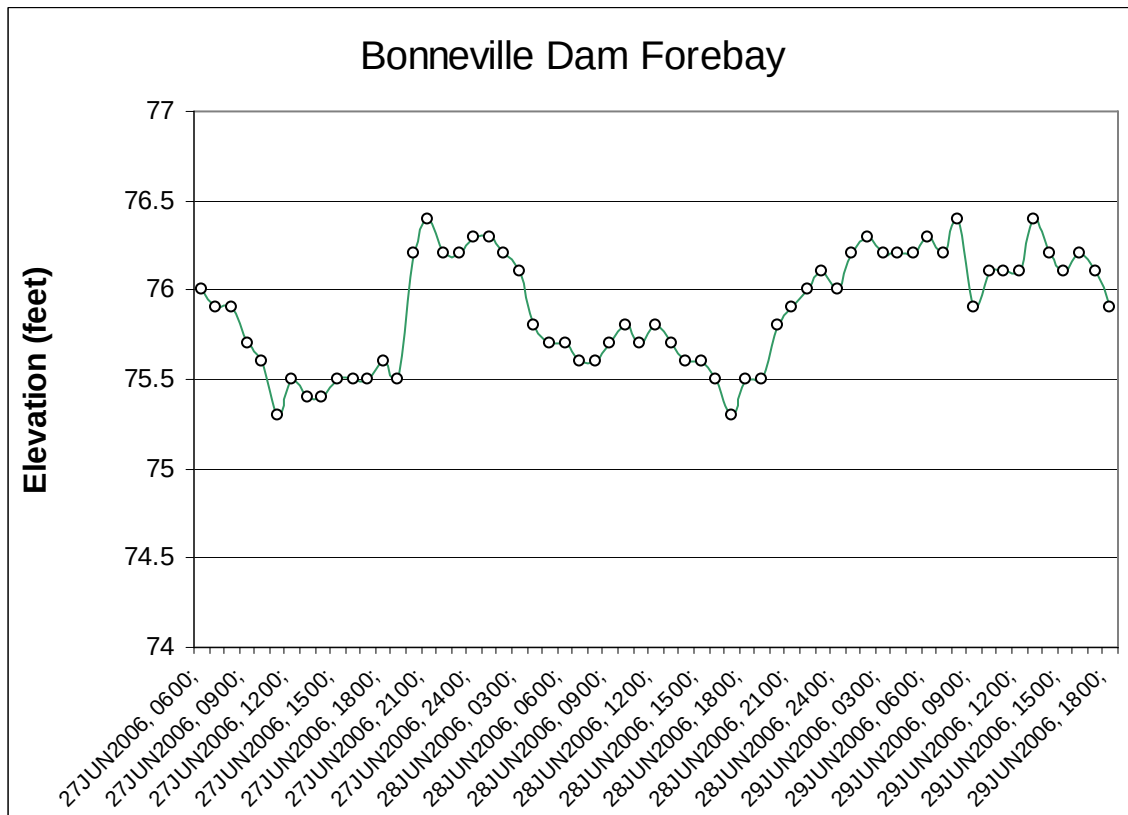


Figure 4. Observed BON pool elevations during June 27-29, 2006 summer treaty fishing.

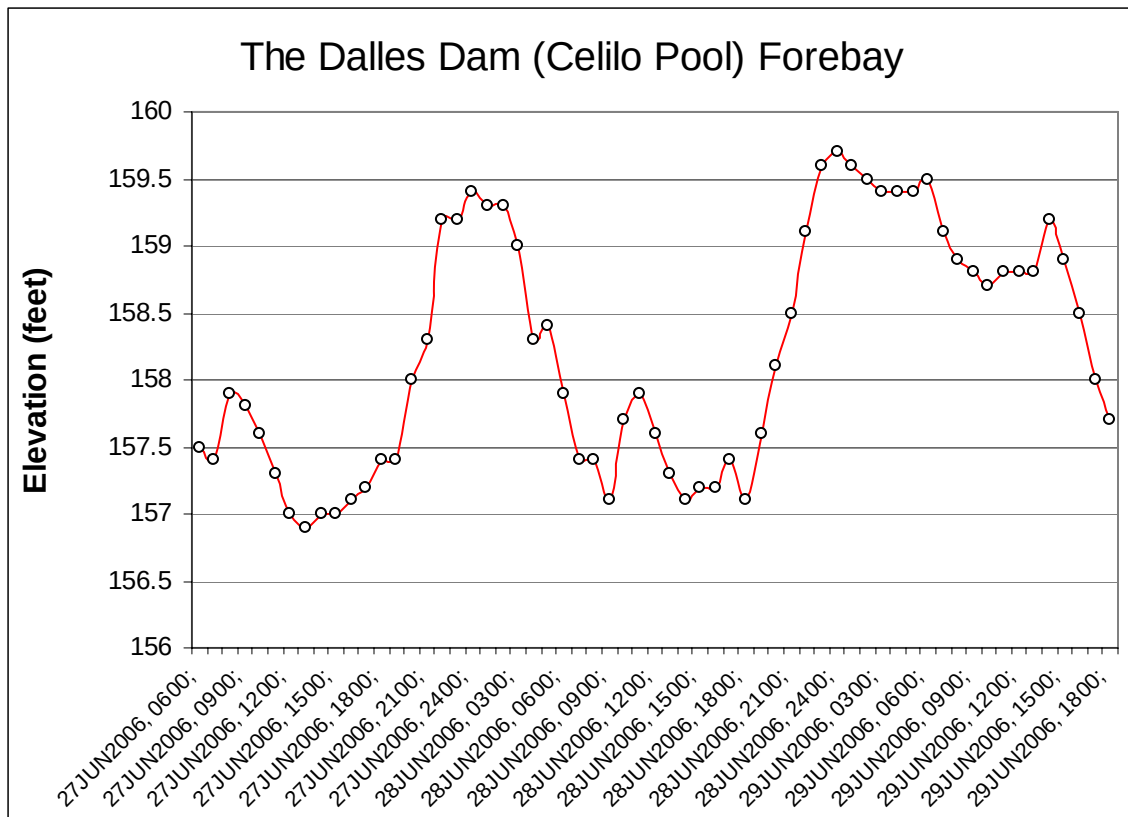


Figure 5. Observed TDA pool elevations during June 27-29, 2006 summer treaty fishing.

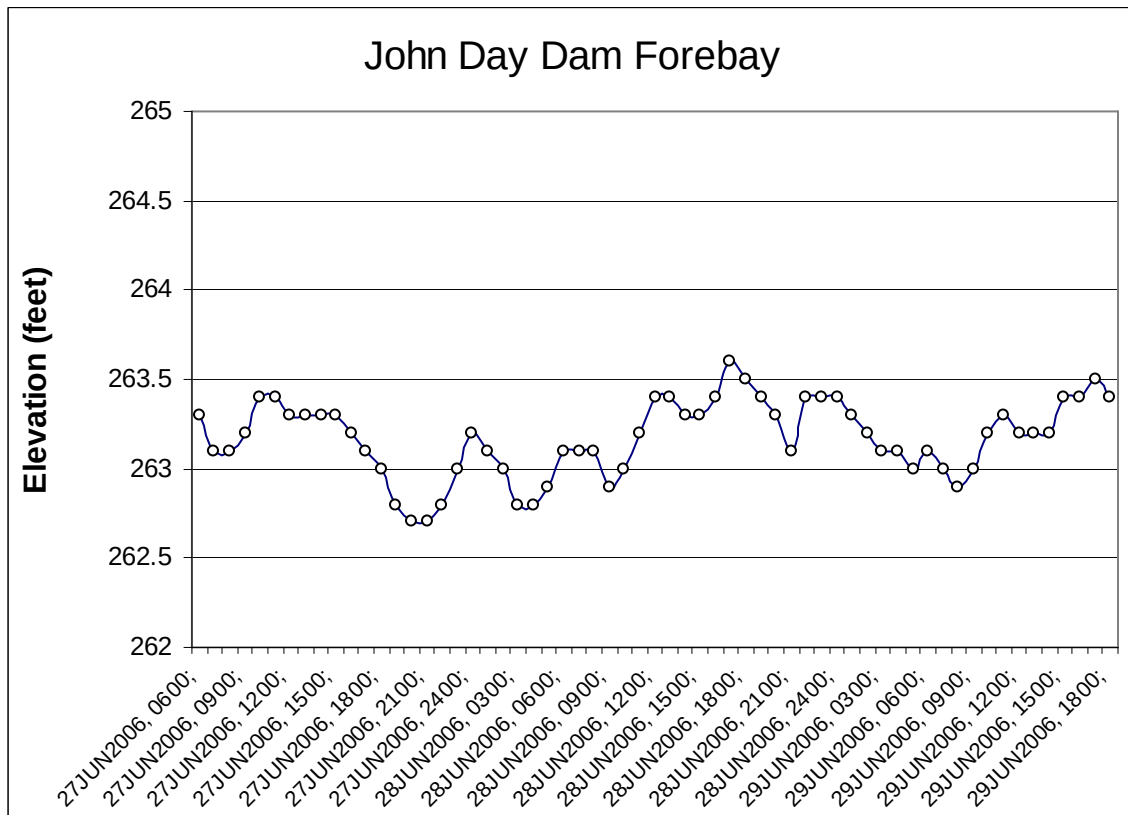


Figure 6. Observed JDA pool elevations during June 27-29, 2006 summer treaty fishing.

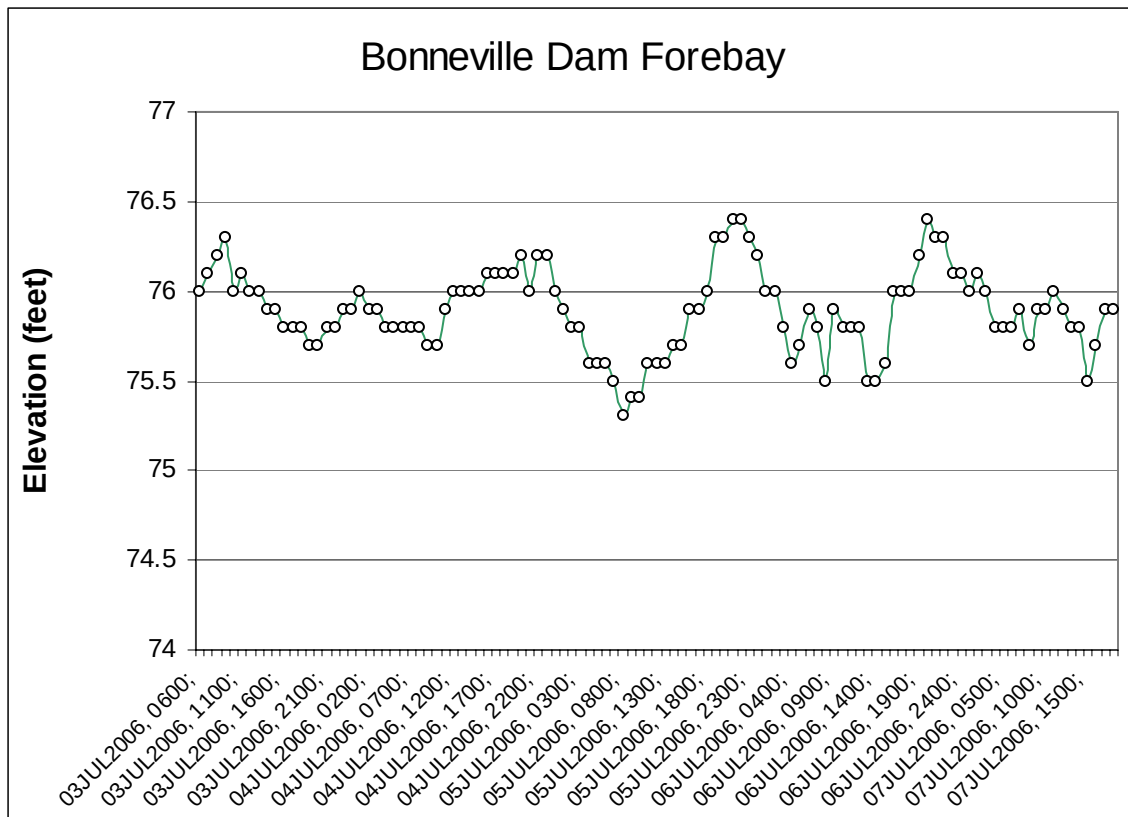


Figure 7. Observed BON pool elevations during July 3-7, 2006 summer treaty fishing.

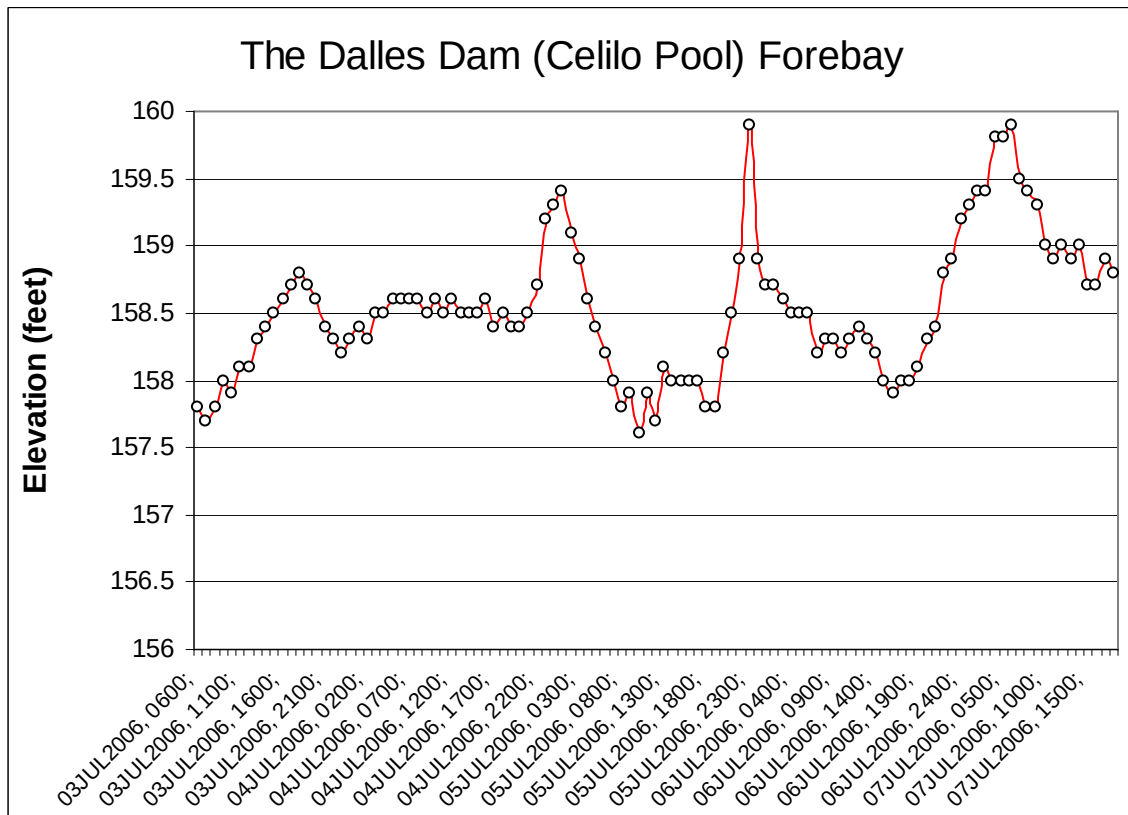


Figure 8. Observed TDA pool elevations during July 3-7, 2006 summer treaty fishing.

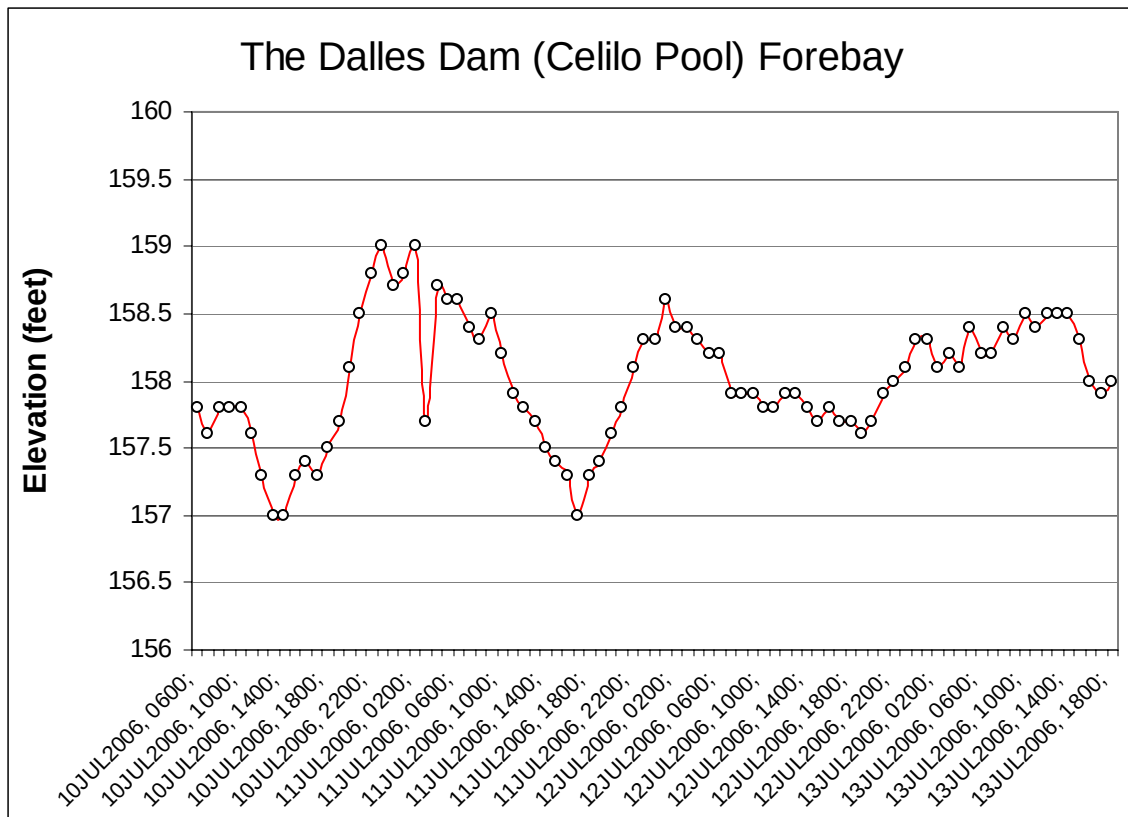


Figure 11. Observed TDA pool elevations during July 10-13, 2006 summer treaty fishing.

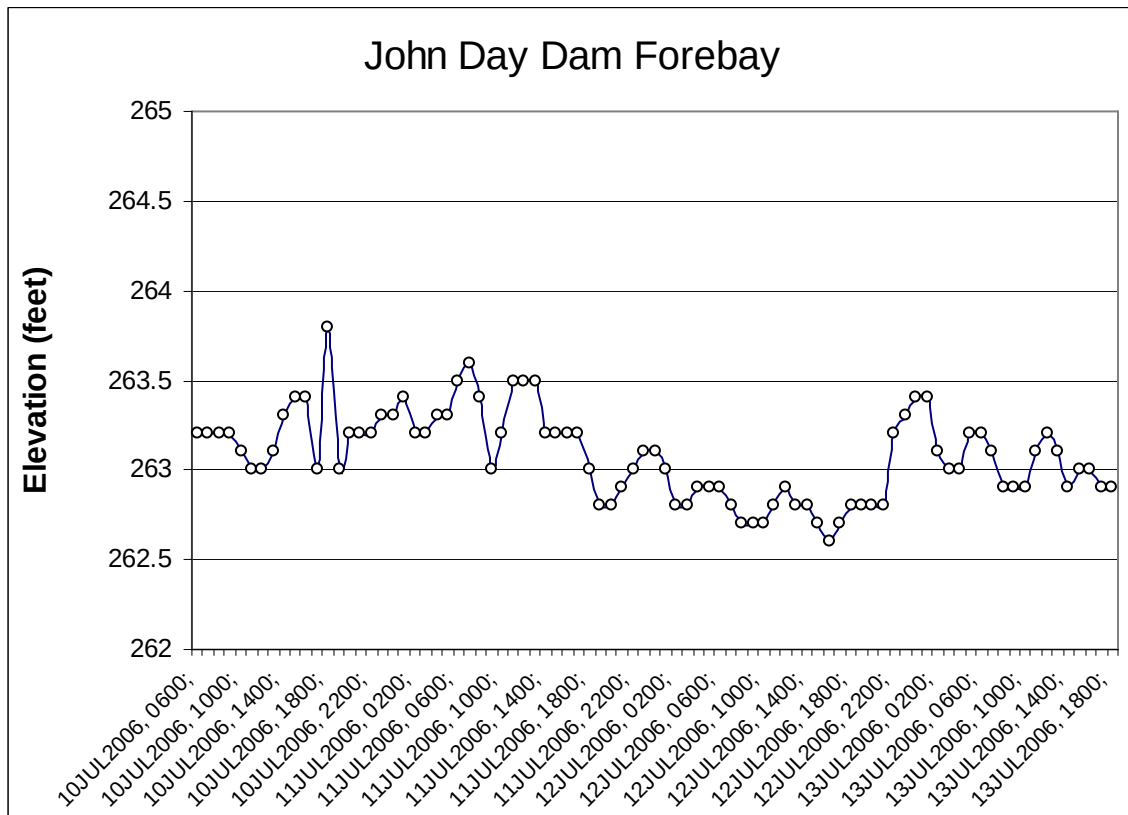


Figure 12. Observed JDA pool elevations during July 10-13, 2006 summer treaty fishing.

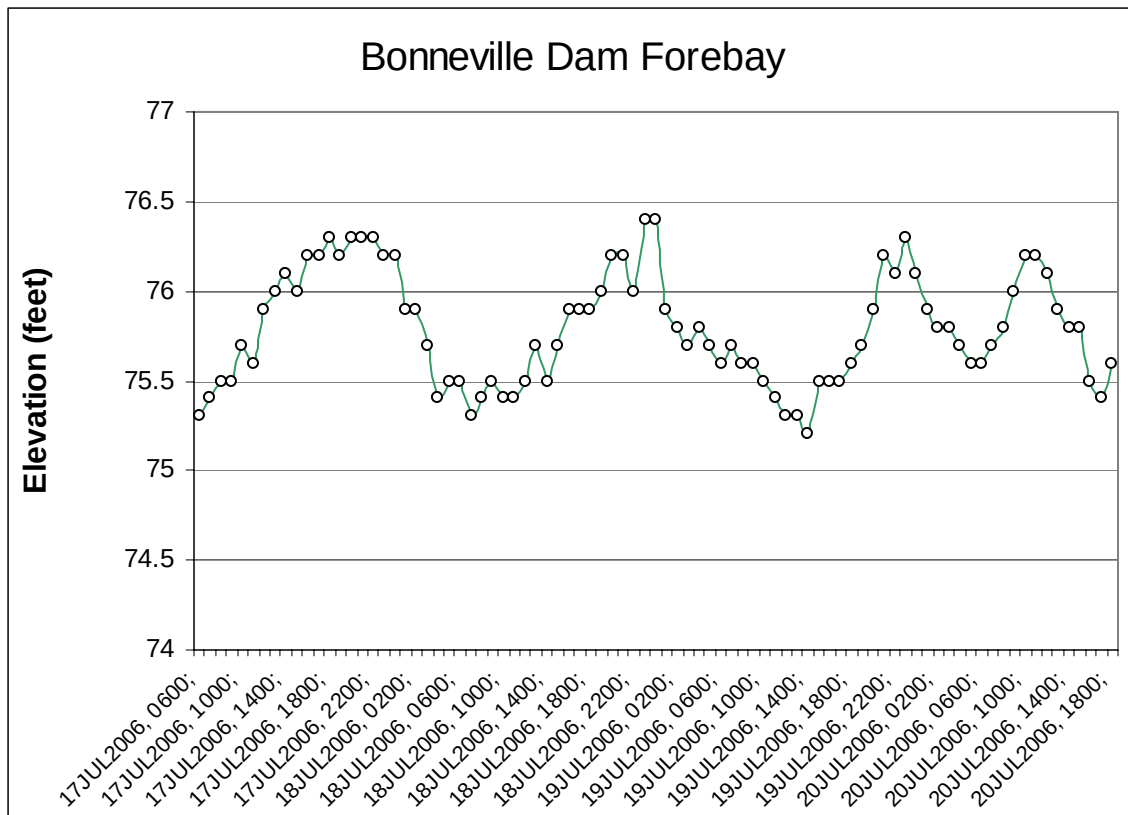


Figure 13. Observed BON pool elevations during July 17-20, 2006 summer treaty fishing.

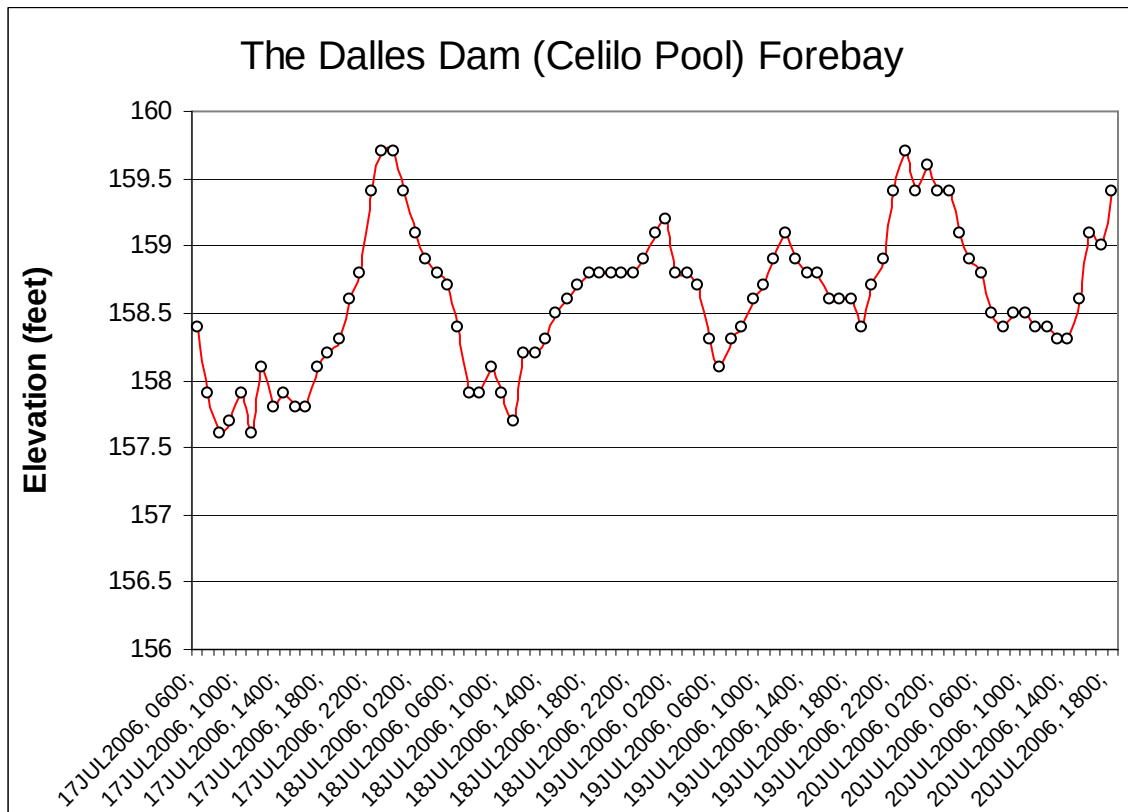


Figure 14. Observed TDA pool elevations during July 17-20, 2006 summer treaty fishing.

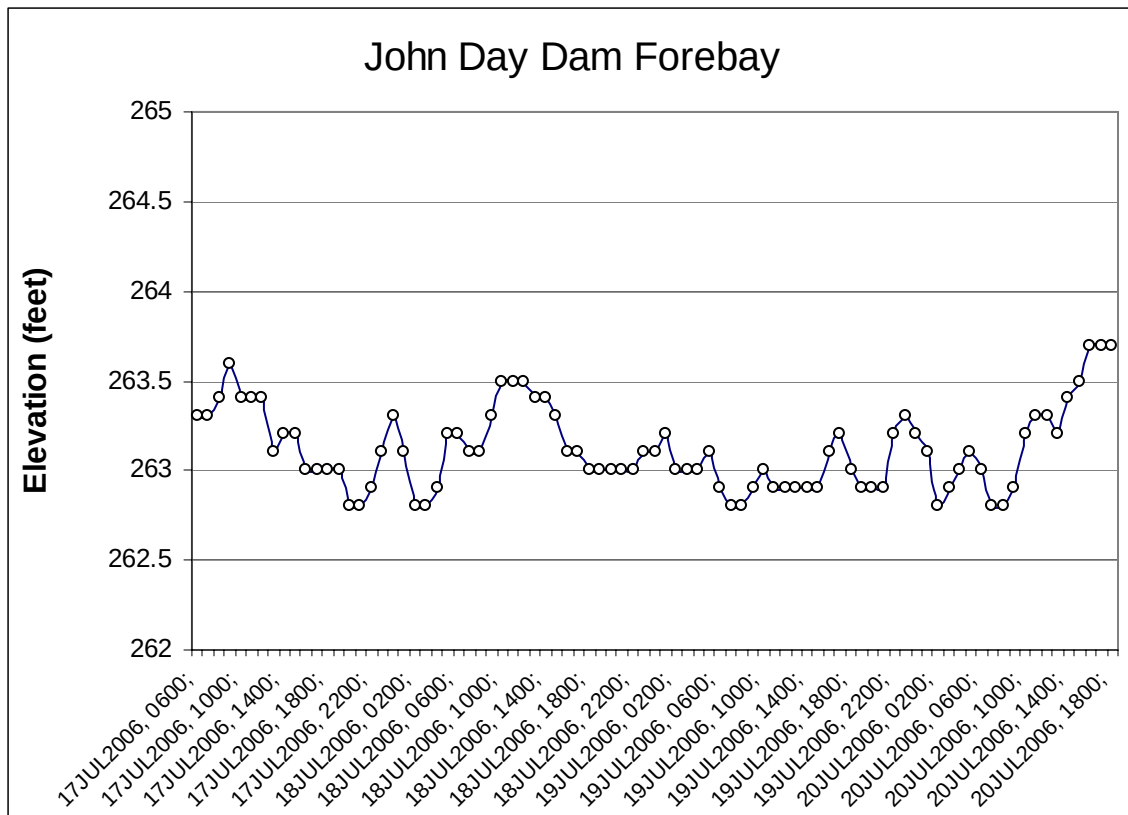


Figure 15. Observed JDA pool elevations during July 17-20, 2006 summer treaty fishing.

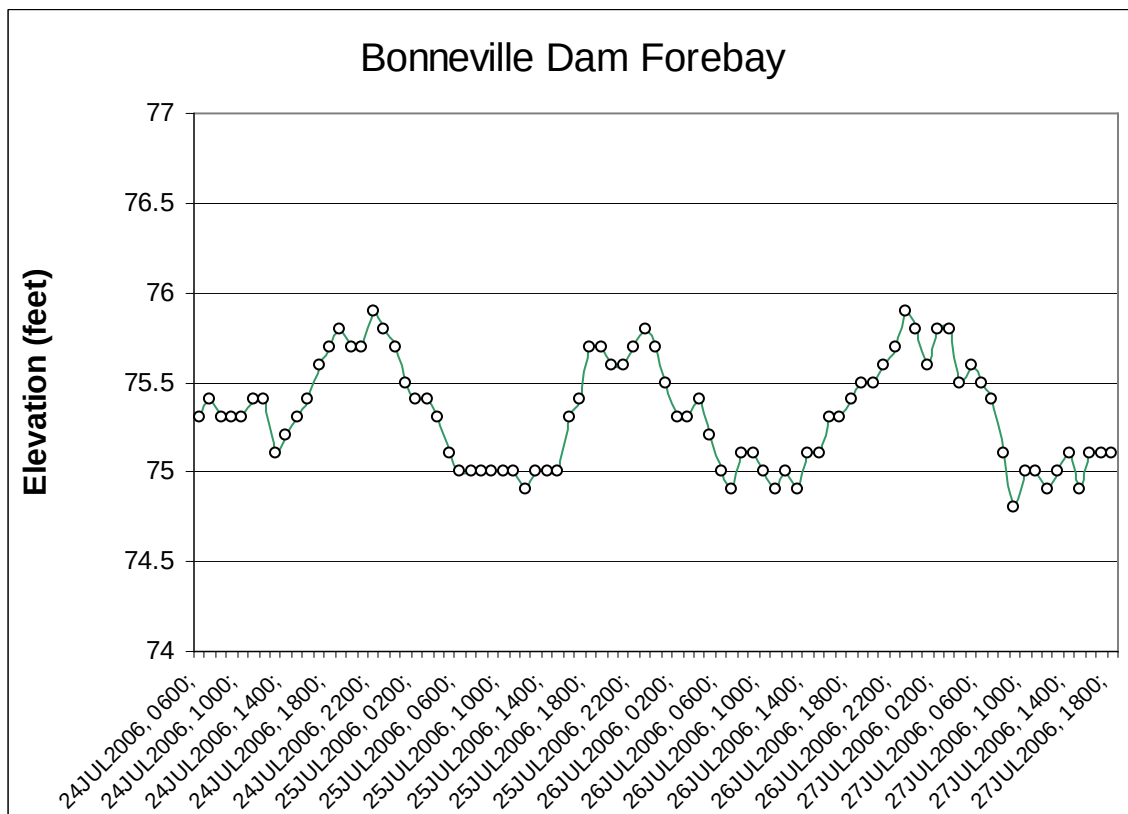


Figure 16. Observed BON pool elevations during July 24-27, 2006 summer treaty fishing.

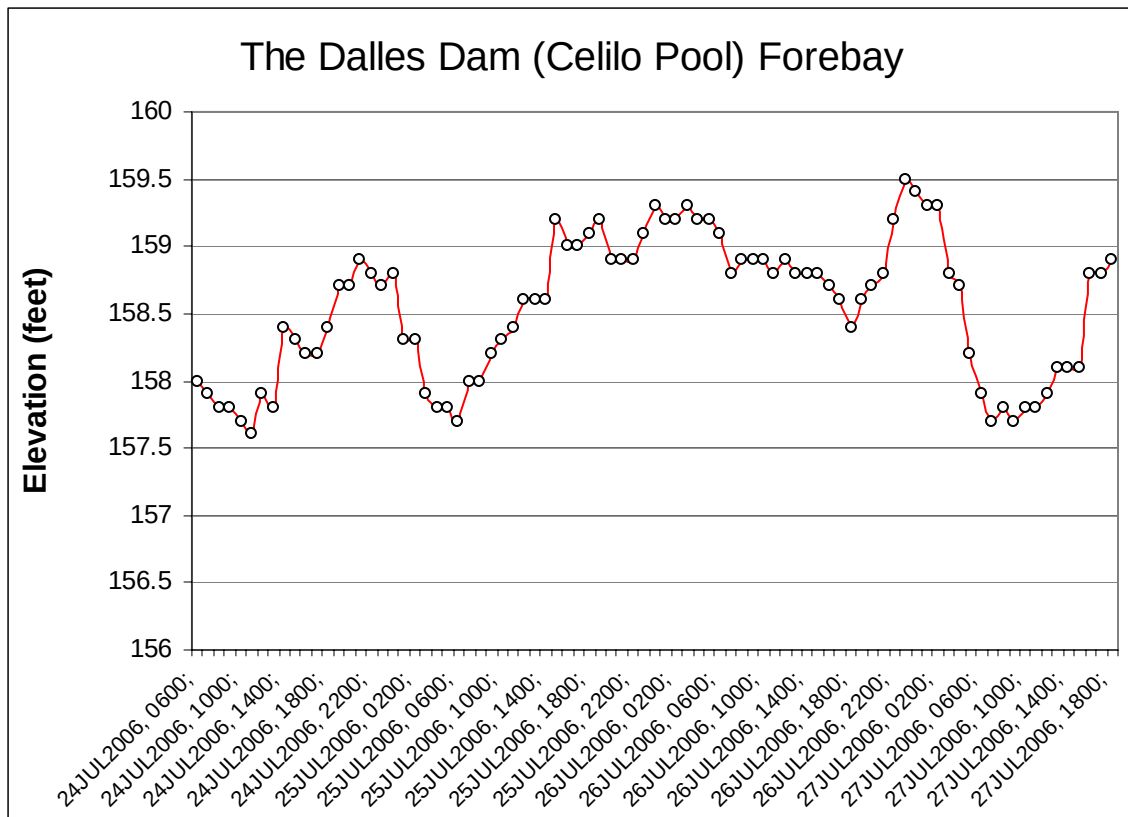


Figure 17. Observed TDA pool elevations during July 24-27, 2006 summer treaty fishing.

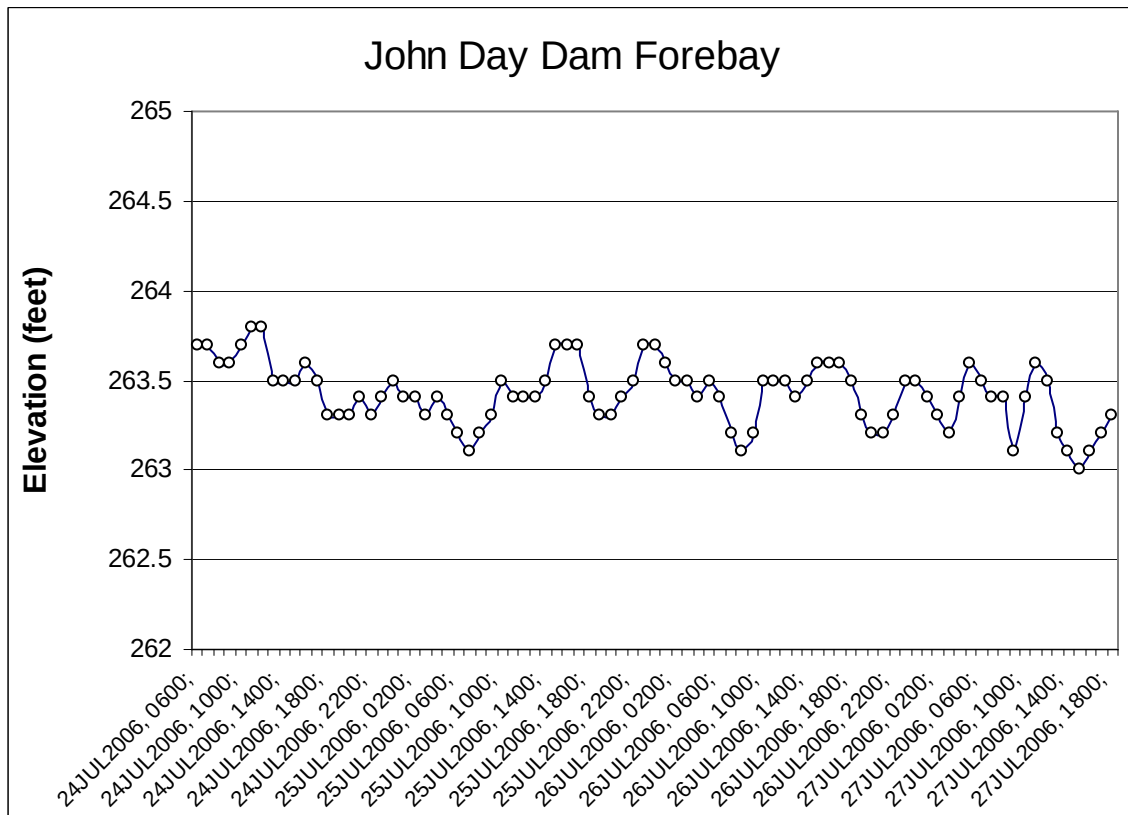


Figure 18. Observed JDA pool elevations during July 24-27, 2006 summer treaty fishing.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 9, 2006 Meeting

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.

SOR-2006-NAV-02

John Piggott, Columbia River Towboat Association, submitted an SOR for consideration by the TMT for a change in spill operations at Lower Monumental. The bulk spill pattern at the project this year has caused an eddy effect around the guide wall along the approach to the project (tailwater) and has caused navigation problems for loaded barges passing up and down. The Towboat Association requested that spill be modified to zero if needed for the period of time it takes to navigate through the eddy to the lock or if traveling upstream, to navigate from the lock through the eddy. John estimated about 10 lockages per week for a 20-minute time period each. Rich Hilt, Chief Operator at Lower Monumental, noted that an additional eddy further downstream has added an extra navigation challenge.

TMT members asked questions and offered suggestions for addressing the navigation issue:

- During the presentation, it was suggested that empty barges did not experience the same problems as loaded barges – would there be a benefit to light loading the barges for safer navigation? It was estimated that reducing the load by a 1’ draft would lose about 10% of a barge’s capacity, and from a cost-effective standpoint, would not be a viable option.
- When did the problem begin? It began in early July but the cause was unknown until more recently when navigators began seeing a pattern of issues at the project.
- What is the cause for the eddy? As best as the project operators and towboaters can tell, the spill pattern is causing the eddy, not the volume or pool level.
- Has anything been done thus far to alleviate the problem? No, not operationally.
- A suggestion was offered to look for alternative spill pattern options that could meet both fish and navigation safety needs.
- How deep is the eddy problem? It is uncertain how deep the problem is, and it could change with water level fluctuations.
- Would it be feasible to coordinate the passage of the towboats at the same time as fish barges through Lower Monumental? The fish barges pass less frequently and so there is a possibility that some of the boats could be coordinated but it would not be a full solution to the problem.

After further discussion, TMT members that were present (note that Oregon, USFWS and Montana were not present for the discussion) did not object to implementing the SOR and supported the COE to work with salmon managers and others, through FPOM, to explore alternative spill patterns that would better support navigation safety and fish migration (for both near- and long term planning.) An FPOM meeting was scheduled for August 10. CRITFC noted that they would not support the SOR without first exploring alternative options, including 'light loading' the barges and alternative spill patterns at Lower Monumental. BPA did not object to the SOR, but noted that this would require a deviation from court-ordered spill and therefore would require additional legal coordination.

Action and Next Steps:

The COE planned to implement the SOR if needed, while exploring through FPOM options for different spill patterns to address the navigation safety issue and support fish migration, for both near and long term operations. The towboats will make a request to project operators as an issue arises, and the operator will keep track of how often the spill change occurs and report to TMT. The COE planned to send an official teletype on the planned operation this week, after further coordination with its attorneys and the court, and the FPOM discussion. TMT will receive feedback on the FPOM discussions and outcomes at the TMT meeting on Wednesday, August 16.

Lower Snake Operation During Low Flow Period

FPAC met and discussed operations during low flow periods when spill and generation cannot be maintained. The COE requested FPAC to discuss their preference for operations, either ponding water or 24-hour spill. FPAC recommended that the COE continue operating as it has been: When flows are below 30 kcfs go to a minimum 1 turbine unit generation for 24-hours/day and adjust spill if the top or bottom of the pool is reached (at Lower Granite, Lower Monumental and Ice Harbor). At Little Goose, spill 30% using 1 unit minimum generation and the rest spill.

Dworshak Operations

TMT reviewed current conditions and looked at two modeling scenarios submitted by the COE's Mike Schneider depicting potential outcomes for operating the project: 1) At full powerhouse until August 15 and reducing to 7.5 kcfs through the end of August, or 2) Going to 7.5 kcfs today (8/9) and maintaining for 15 days, then increasing flows to 10 kcfs for the remainder of August. Hells Canyon flow projections were the primary unknown factor and it was noted that the assumption made in the scenarios underestimated the actual flow that came down over the past week. Weather was forecasted to remain moderate over the next few days with no extreme weather patterns predicted for the next two weeks.

During an FPAC meeting, a consensus was reached to recommend maintaining full powerhouse out of Dworshak until there is a need to drop to 7.5 kcfs in order to meet a 1535' elevation target by the end of August, with the caveat that if extreme weather hits, the issue would be revisited. Idaho added that there was also value in adjusting flows out of Dworshak per the flows coming down from Hells Canyon.

ACTION: The COE will maintain full powerhouse at Dworshak until August 16 unless the salmon managers provide an alternative recommendation between now and then. If The salmon managers will continue to monitor conditions and if so desired (if significant changes in the weather or flows from Hells Canyon occur), will offer a recommendation for different operations for the COE to consider. TMT will revisit Dworshak operations at the August 16 meeting.

Review Summer Treaty Fishing

Kyle Dittmer, CRITFC, reported that four SOR's were submitted this year, with 6 weeks of summer treaty fishing. As in the past, the requests were for the COE to maintain a 1' pool elevation and stable pools during treaty fishing. As in the past, the COE commits to a 1.5' operation at Bonneville only. Overall, the fishing was good. Kyle noted using CRITFC's maintained a 1' range at Bonneville an average of 93% of the time, at The Dalles 62% of the time, and at John Day 99% of the time – John Day is the most important project for tribal fishing. The COE committed to a 1.5' hard and 1' soft constraint at Bonneville and this constraint was achieved 100% of the time. Improvements were made by the COE in stabilizing flows, and to date, there had been no reports of any lost nets or other problems. Kyle commended the COE for its precise operations this year, and added that it has proven helpful for CRITFC to give the COE enough lead time to put operations in place. Autumn treaty fishing is likely to start in August/September for about 5 weeks, similar to last year. Kyle will update TMT at the August 16 meeting on plans for the Autumn fishery.

Operations Review

Reservoirs: Hungry Horse elevation was 3550.9' and Grand Coulee was at 1283.3'. Banks Lake was at elevation 1568'. Libby elevation was at 2450' and operating 14 kcfs out. The expected end of August elevation at Libby is around 2444'. Dworshak was operating at full powerhouse and at elevation 1558.5'. McNary daily flow averages were around 140 kcfs. Lower Granite flows were around 30 kcfs.

Fish: Cindy LeFleur, WDFW, will provide adult fall migration information at a TMT meeting later in August, as the run is yet very early. Final spring migration numbers are posted on both the WDFW and ODFW websites and the summer finals will be out soon.

Power: Nothing to report at this time.

Water quality: A TDG exceedance occurred at the Camas/Washougal gauge (BON) on August 6 – TDG reached 115.7%.

Next TMT Face to Face Meeting, August 16, 9:00-noon

Agenda Items include:

- Dworshak Operations
- Libby/Hungry Horse Operations
- Lower Monumental Navigation and Operations Update
- Autumn Treaty Fishery

- Operations Review

Technical Management Team Meeting Notes

August 9, 2006

1. Greetings and Introductions.

The August 9 TMT meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Navigation Problem in Lower Monumental Tailwater.

SOR 2006-Nav-02 was submitted prior to this meeting. This SOR requests the cessation of spill during the period (approximately 20 minutes) that vessels are passing the lock at Lower Monumental. The issue is that, with the spill pattern in use at Lower Monumental this summer, an eddy is being created along the guide wall near the approach to the lower basin, and is sending the tows toward the wall, said John Piggott. It is 180 degrees to what the tow boaters have been experiencing at Lower Monumental over the years, he said; it is only the deeper, loaded barges that are affected. It's a real problem for the boat operators, he said; the upward-bound tows are having to try to navigate around the wall, and the downward-bound tows are being pushed toward the wall, then toward a shoal area in the middle of the river. Tidewater brings petroleum barges up there, and many of them are still single-skin barges, so if one of them was to run aground, that could cause a serious spill problem, he said. The only thing that seems to help is the cessation of spill, Piggott explained – flat spill doesn't help.

How long would spill have to cease? asked Kyle Dittmer. Roughly 20 minutes per barge, Piggott replied, for Tidewater, Shaver and Boss vessels. There are approximately four lockages for each of those companies per week, he added. In response to another question, Piggott said that, as river flow drops, there is always a loss of maneuvering room and control, but the real problem, in his opinion, is the spill pattern at Lower Monumental this year. There is also an eddy further downstream pushing these barges in toward the shore, added Rich Hill of the Corps.

Russ Kiefer asked if it might be possible to develop a spill pattern that would be more conducive to navigation, but would still meet fish needs. It may have to do with the fact that there is only one unit operating right now; most of the spill is coming out of gates 6 and 8, said Hill. That concentrated bulk spill is

better for fish, but creates the worst eddying conditions for navigation. I can't confirm that going to a flat spill pattern doesn't help, he added. I heard one Foss report that they had requested and received a flat pattern, but it had no effect, Piggott replied. Would it be worthwhile to test that further, try flattening the spill, and if that doesn't work, then we could cease spill while the barges are passing the project? Hlebechuk suggested. We could try that, Piggott replied. It might be better for fish just to shut spill off for a short time, Rich added.

After a few minutes of discussion, the TMT recommended that SOR 2006-Nav-2 be implemented for now, but that the salmon managers will discuss a possible alternative spill pattern with the Corps personnel at Lower Monumental, to see whether it might be possible to meet the needs of both navigators and fish. CRITFC would suggest that the tow boaters consider lighter loading, said Dittmer – that may not solve the whole problem, but it might help. Shane Scott noted that there is an FPOM meeting tomorrow at which many of the key personnel on this issue will be present. Rich Domingue asked that, if possible, lockages be limited to 10 per week during this period.

Robin MacKay expressed frustration that this SOR was endorsed by the salmon managers with little debate, but when BPA had requested a few hours' cessation of spill for a West Coast power emergency, they encountered significantly more resistance. It seems as though we're being held to a different standard, she said. I would reply that there were an enormous number of fish in the river during that time, Domingue replied. However, Bonneville is required to document everything in writing, and any actions they take that might affect fish receive very heavy scrutiny and debate, Tony Norris observed. I suggest that we take this issue up at the next TMT process meeting, Cindy LeFleur said; it was so agreed.

CRITFC opposes this SOR, because we believe lighter loading and more efficient spill patterns could resolve this problem, said Dittmer – to us, this is more an economic issue than a safety issue. We are willing to work with others to develop an alternative spill pattern to see if both needs can be met, however, Dittmer added.

It was agreed that FPOM will discuss the alternative spill pattern issue, if not for 2006, at least for future years. Hlebechuk said she will discuss CRITFC's concerns with the Corps' legal staff; this change will also have to be vetted through Judge Redden. In response to a question, Piggott said lighter loading of the barges would not solve this problem.

A couple of other questions, said Hlebechuk – with respect to the cost-effectiveness of light-loading, at how far could you reduce your draft and still break even? That's hard to calculate, because it depends on the mix of products in the tow, Piggott replied. A reasonable estimate would be, if we reduced draft by 1 foot, we would lose 10% of our capacity, which would put us very close to

the break-even point. Also, do we know how far below the surface the eddy or undertow problem extends? Hlebechuk asked. No, we do not, was the reply, but it would have to be down 14-15 feet if we're not going to have an issue, because of the depth of the barges. Would it make a difference if a different turbine was operating? Hlebechuk asked. That might be worth a try, in terms of eliminating or at least moderating the eddy, replied a Corps Lower Monumental representative – we could switch generation to, say, unit 6. However, I would hate to involve a loaded barge and tug in that research, he added. Perhaps FPOM could discuss that alternative tomorrow, Hlebechuk suggested. In the interim, until we hear back on the operational alternatives, the Corps plans to implement the towboat association's SOR.

3. Lower Snake Operation During Low-Flow Period.

FPAC met Tuesday and discussed operations during this low-flow period, when we can't maintain both minimum generation and the spill volumes specified in the implementation plan, Hlebechuk said. What we eventually agreed to is that the Corps seems to have a good plan in place, currently, when flows drop below the level where we can provide both minimum generation and the required spill volumes, said Kiefer; they want to pond water to provide more spill during nighttime hours. We will discuss this further, but at this point, they have a good plan in place. We're going to recommend that the Corps maintain that course of action, he said.

So at Ice Harbor, Lower Granite and Lower Monumental, we will run one unit at minimum generation 24 hours a day, said Hlebechuk. If we approach the top of the pool, we will spill more, and if we approach the bottom of the pool, we will cut back on spill, she said. The minimum generation requirement at Ice Harbor is 9.5 Kcfs; it is 11.5 Kcfs at the other Lower Snake projects.

4. Dworshak Operation.

Hlebechuk and Jim Adams provided an overview of the documents hot-linked to this item on today's agenda; Hlebechuk noted that, if Dworshak continues to release full powerhouse capacity between now and August 31, there will be a deficit of about 71 kaf below the planned end-of-August elevation of 1535 feet. To make up that shortfall, she said, we will need to go to 7.2 Kcfs outflow from Dworshak for about 15 days between now and the end of the month. Adams noted that water temperatures are declining at all of the Lower Snake projects; we're in a natural cooling trend at the moment, he said, although temperatures coming out of Anatone and Orofino are still in the low to mid-70-degree range. The Dworshak release temperature continues in the 46-degree range, which is as cold as we can make it, Adams said.

Dittmer said the 14-day weather forecast shows no upcoming temperature extremes, although once the current cooler conditions end, air temperatures are

expected to warm up to the mid-90s in the Lewiston area. Next, Adams directed the group's attention to recent model results from Mike Schneider. Schneider said he had looked at various Dworshak operations, with the goal of reducing Dworshak outflow to a two-unit operation; the question is, when is the optimum time to do that? he said. He provided a brief overview of his modeling results; the scenarios included a base case, under which the current operation would continue, and a scenario under which Dworshak outflow would be reduced to 7.2 Kcfs at noon today. He noted that these results are heavily dependent on the volume coming out of the Hells Canyon complex; in recent days, Idaho Power has been releasing significantly more volume from Hells Canyon than what is assumed in these model runs.

The bottom line is that, according to these model runs, if we back off Dworshak flow today, we would be about a degree warmer at the Lower Granite tailrace than if we continue with the current operation, but we should still be able to keep water temperatures below the 68-degree standard, at least for the next 5-6 days, Schneider said – that would give us greater flexibility, in terms of the volume of cold water available from Dworshak, to handle any warming events later in August. Schneider said, however, that he would recommend, based on these results, that Dworshak continue to release full powerhouse capacity until Idaho Power reduces Hells Canyon outflow.

The group devoted a few minutes of discussion to Schneider's model results and to the Dworshak operation. Kiefer said FPAC was able to reach a consensus recommendation at yesterday's meeting; the salmon managers would prefer to maintain full powerhouse releases from Dworshak until August 16, when it will be necessary to reduce outflow to two units in order to meet the 1535 elevation target at Dworshak by August 31. That consensus recommendation included participation from the Nez Perce Tribe, he added; no Nez Perce representative participated in today's TMT call. Kiefer added that, as a State of Idaho representative, rather than in his role as FPAC chair, that he sees some value in adjusting Dworshak outflow to match what is occurring at the Hells Canyon complex.

Ultimately, the TMT recommended that the Corps continue to release full powerhouse capacity from Dworshak for the next week; this operation will be revisited at the August 16 TMT meeting. In the interim, if Idaho Power reduces Hells Canyon outflow significantly, or if weather conditions change, the Corps invited the salmon managers to submit an alternative operational recommendation. That works, said Kiefer, adding that the salmon managers appreciate Schneider's modeling efforts. If the salmon managers would like Mike to model any additional scenarios, please let us know as soon as possible, Adams added.

5. Review of Summer Treaty Fishing.

Dittmer said CRITFC has submitted four SORs covering six weeks of summer treating fishing; these SORs requested a stable, one-foot operating range at the Zone 6 pools during the periods of the treaty fishery. As usually, the COE committed to a 1.5' operating range only at Bonneville. Using CRITFC's 1' criteria at Bonneville pool, compliance was 93%, up from 2005 compliance; at The Dalles, it was 62%, down from 2005 compliance; at John Day pool, 99% compliance, significantly up from 2005 compliance. Using the COE 1.5' criteria at Bonneville, compliance was 100% of the time. We checked with the Hood River law enforcement office to see whether any nets were lost, Dittmer said; there were no problems reported, so kudos to the action agencies. In terms of the autumn treaty fishery, we're anticipating that will begin some time in the third week of August, so you should be getting an SOR from us late next week. We're anticipating a similar season to last year, perhaps four or five weeks in all, he said.

6. Operations Review.

The Corps reported that Libby is at elevation 2450.8 feet and releasing 14 Kcfs; they anticipate that the project will be around elevation 2444 feet on August 31. Dworshak is releasing full powerhouse capacity and is at elevation 1558.5 feet. Flows at McNary have averaged 140-150 Kcfs over the past week; at Lower Granite, about 30 Kcfs. Reclamation said Grand Coulee is at 1283.3 feet; Hungry Horse is at 3550.9, while Banks Lake is at 1563 feet.

LeFleur said it is very early in the adult fall chinook migration. We're in the middle of the summer steelhead run, and numbers are increasing past Bonneville, currently. I'll have a further update on fall chinook adults later in August, she said. MacKay said there are no power system problems to report. With respect to water quality, there was one TDG exceedence at Camas/Washougal on August 6, Adams said.

7. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, August 16. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Meeting Participants August 9, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Robin Harkless	Facilitation Team
Shane Scott	NWRP

Russ George	WMCI
Tom Le	PSE
Cindy LeFleur	WDFW
Mike Buchko	Powerex
Glenn Traeger	Avista
John Piggott	Towboaters Assoc.
Robin MacKay	BPA
Rich Domingue	NOAAF
Tony Norris	USBR
Rudd Turner	COE
Jim Adams	COE

TECHNICAL MANAGEMENT TEAM

BOR :	<i>Tony Norris / John Roache</i>	BPA :	<i>Robyn MacKay / Scott Bettin</i>
NOAA-F:	<i>Paul Wagner</i>	USFWS :	<i>David Wills / Steve Haeseker</i>
OR :	<i>Rick Kruger / Ron Boyce</i>	ID :	<i>Russ Kiefer</i>
WA :	<i>Cindy LeFleur</i>	MT :	<i>Jim Litchfield</i>

COE: *Cindy Henriksen / Cathy Hlebechuk*

TMT MEETING

Wednesday August 16, 2006 09:00 - 12:00 NOTE NEW TIME

**NOTE: DIFFERENT LOCATION
FOR THIS MEETING ONLY**

NOAA Fisheries

Mt. St. Helens Room, 10th floor (check in on 11th floor first)

1201 N.E. Lloyd Blvd

Portland, Oregon 97208

Conference call line: 503-808-5190 or 503-808-5199 (passcode 2580)

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

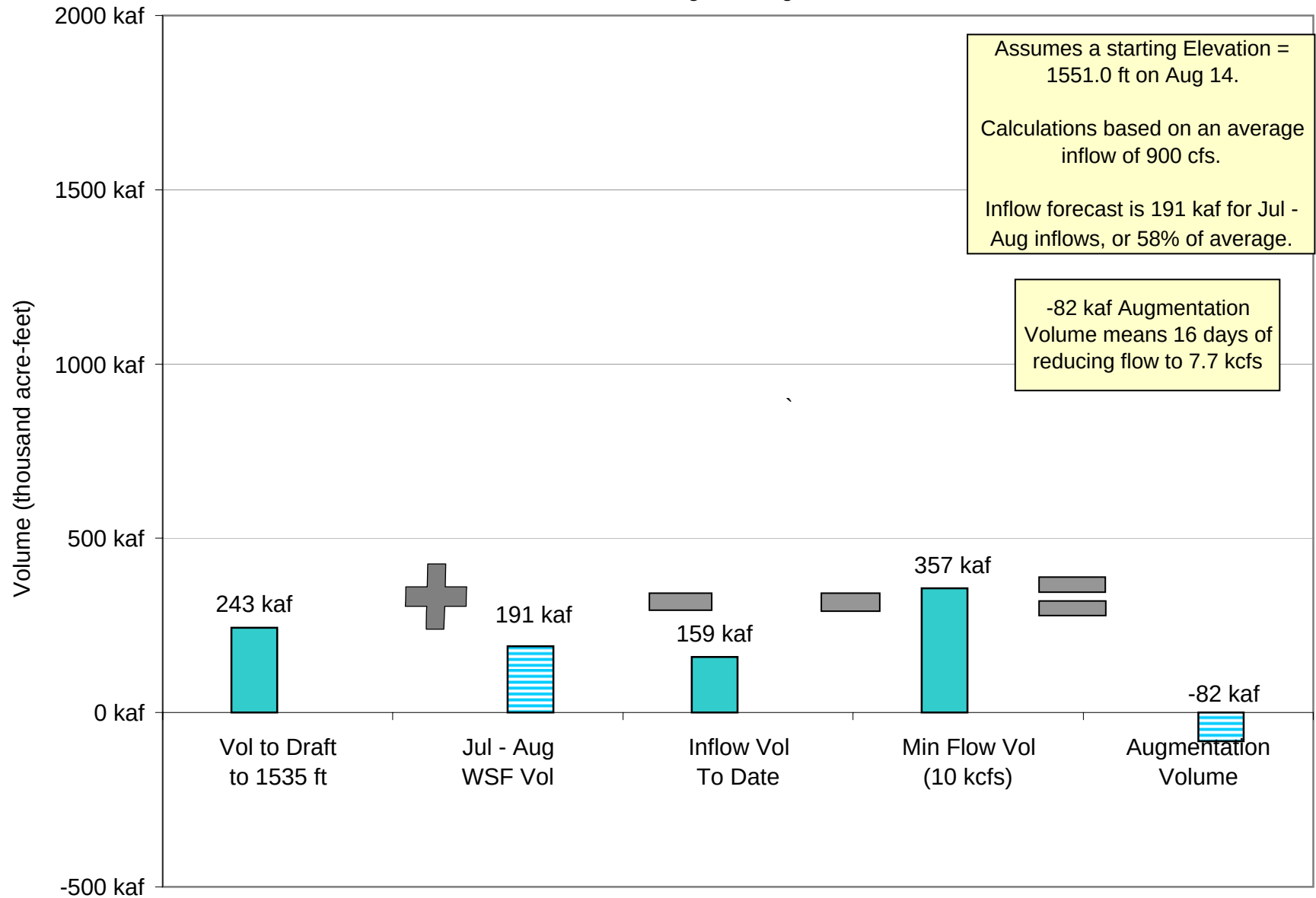
Please MUTE your Phone

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

AGENDA

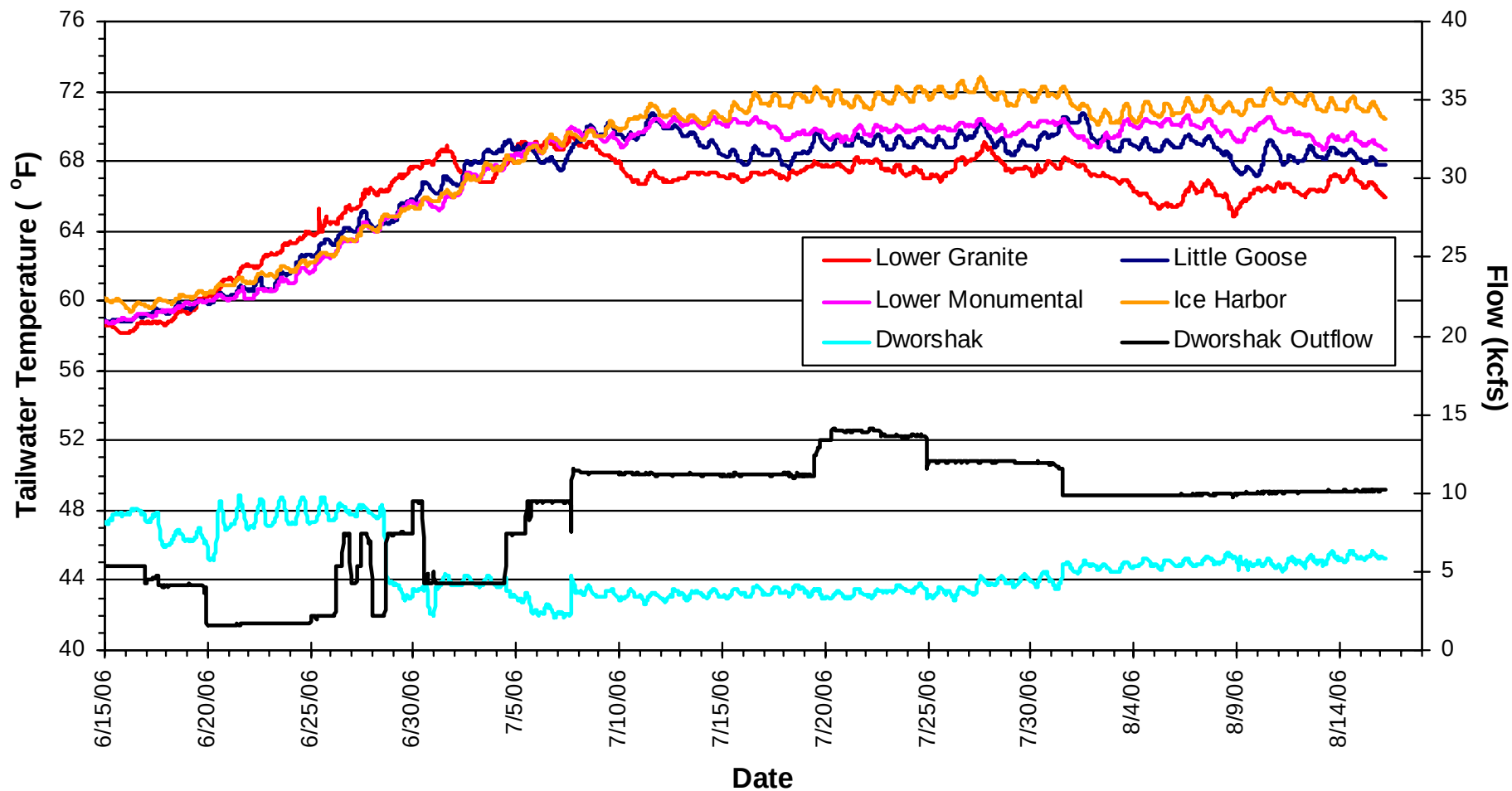
1. Welcome and introductions
2. [\[Review Minutes 2006\]](#)
3. Lower Monumental Navigation Issue
4. Libby and Hungry Horse September Operations
 - [\[Libby - September Operation - Start at 14 kcfs and September Operation - Start at 15 kcfs\]](#) 
5. Dworshak Operations
 - [\[Volumes at Dworshak 01 Jul Through 31 August\]](#) 
 - [\[Lower Snake River Temperatures - TMT Update - 16 August 2006\]](#) 
 - [\[Dworshak Fixed Water Temperature String Table & Dworshak Floating Water Temperature String Thermocline & Dworshak & Lower Granite CE-QUAL-W2 Water Temperature Model Runs\]](#) 
6. Treaty Fishing SOR's
7. End of MOP at Little Goose, Lower Monumental and Ice Harbor
8. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Spill Information 2006\]](#)
9. Other

Volumes at Dworshak
1 Jul Through 31 August

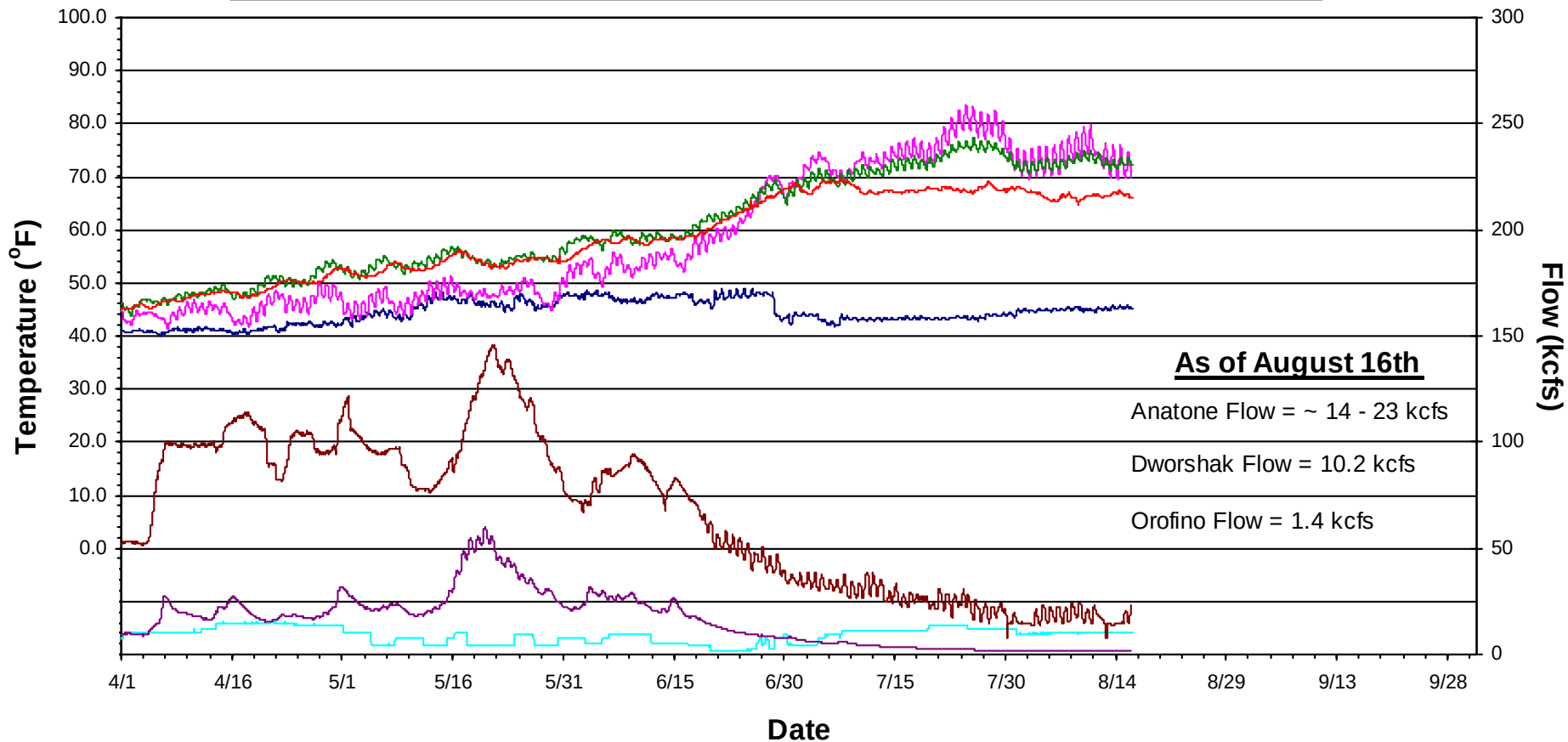
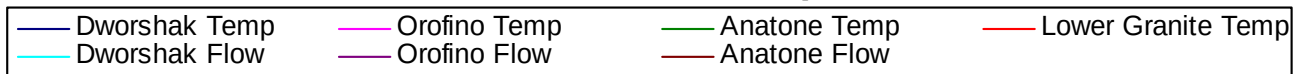


**Lower Snake River Temperatures
TMT Update
16 August 2006**

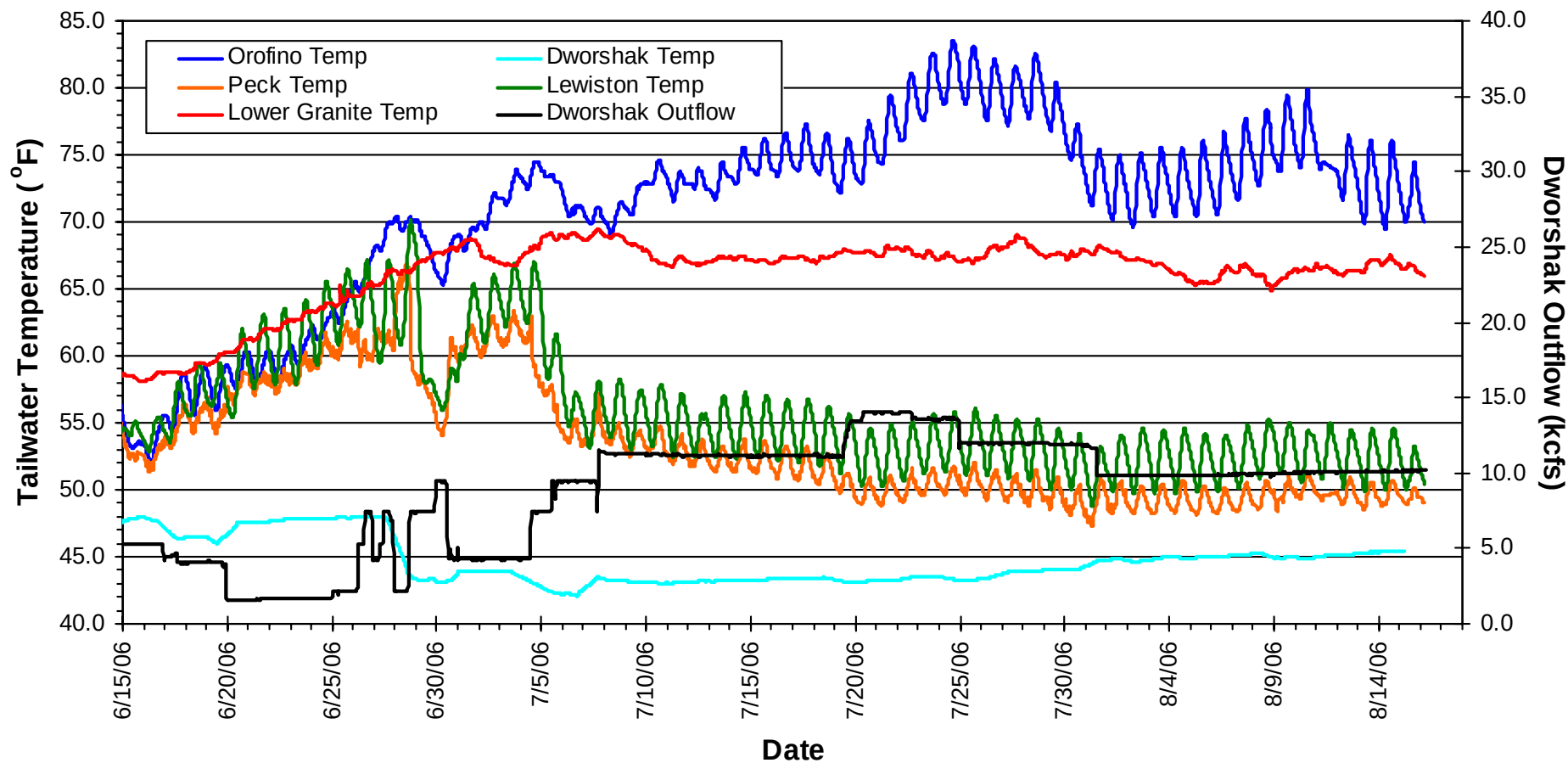
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - August 16)



Lower Granite Inflows and Temperatures in 2006



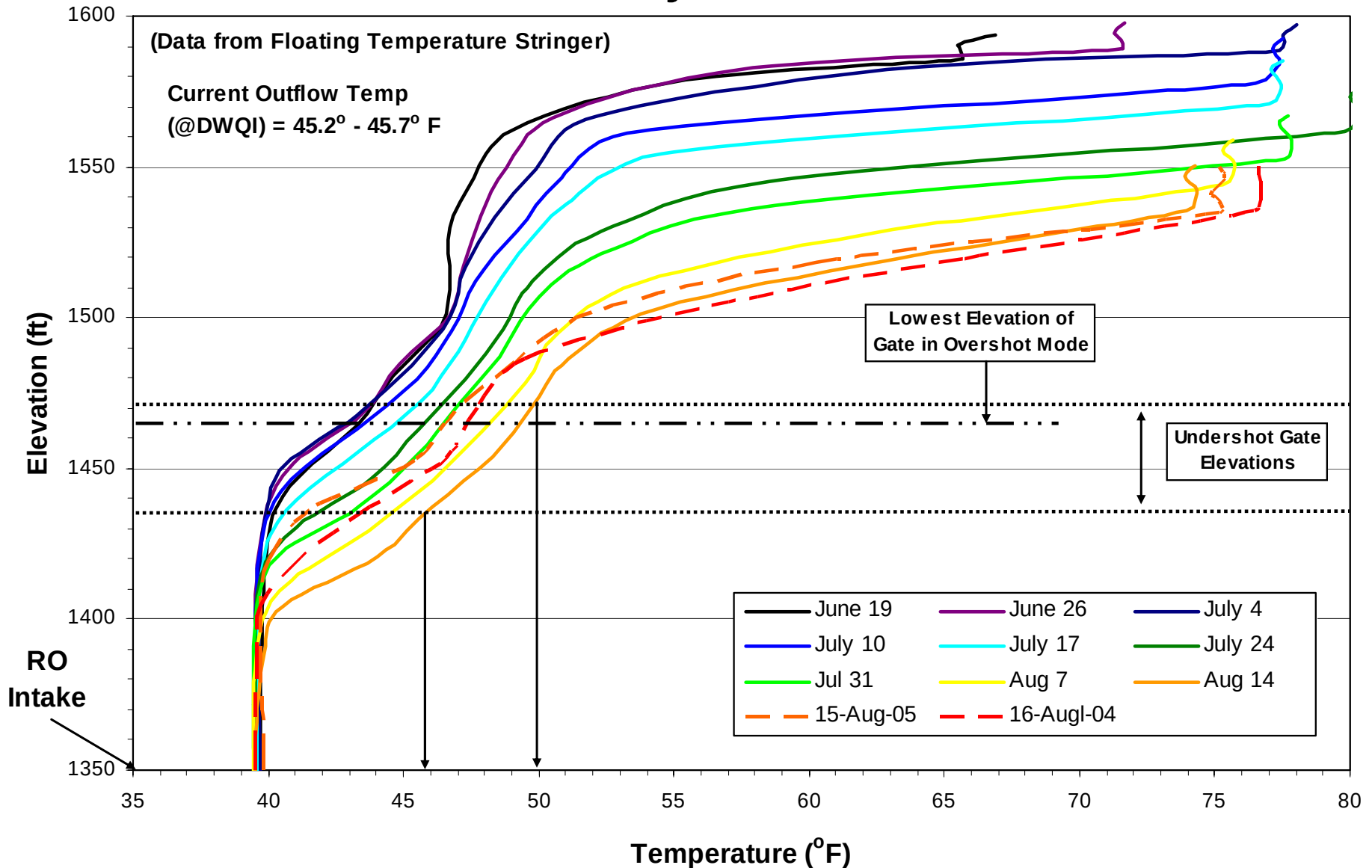
Dworshak Outflows and Clearwater River Temperatures in 2006



Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer)

Current Outflow Temp
(@DWQI) = 45.2° - 45.7° F



STP (8/15/06) INFLOWS USED STARTING 8/16/06

APR-AUG VOLUME= 6.615 MAF **Libby**
September Operation - Start at 14 kcfs

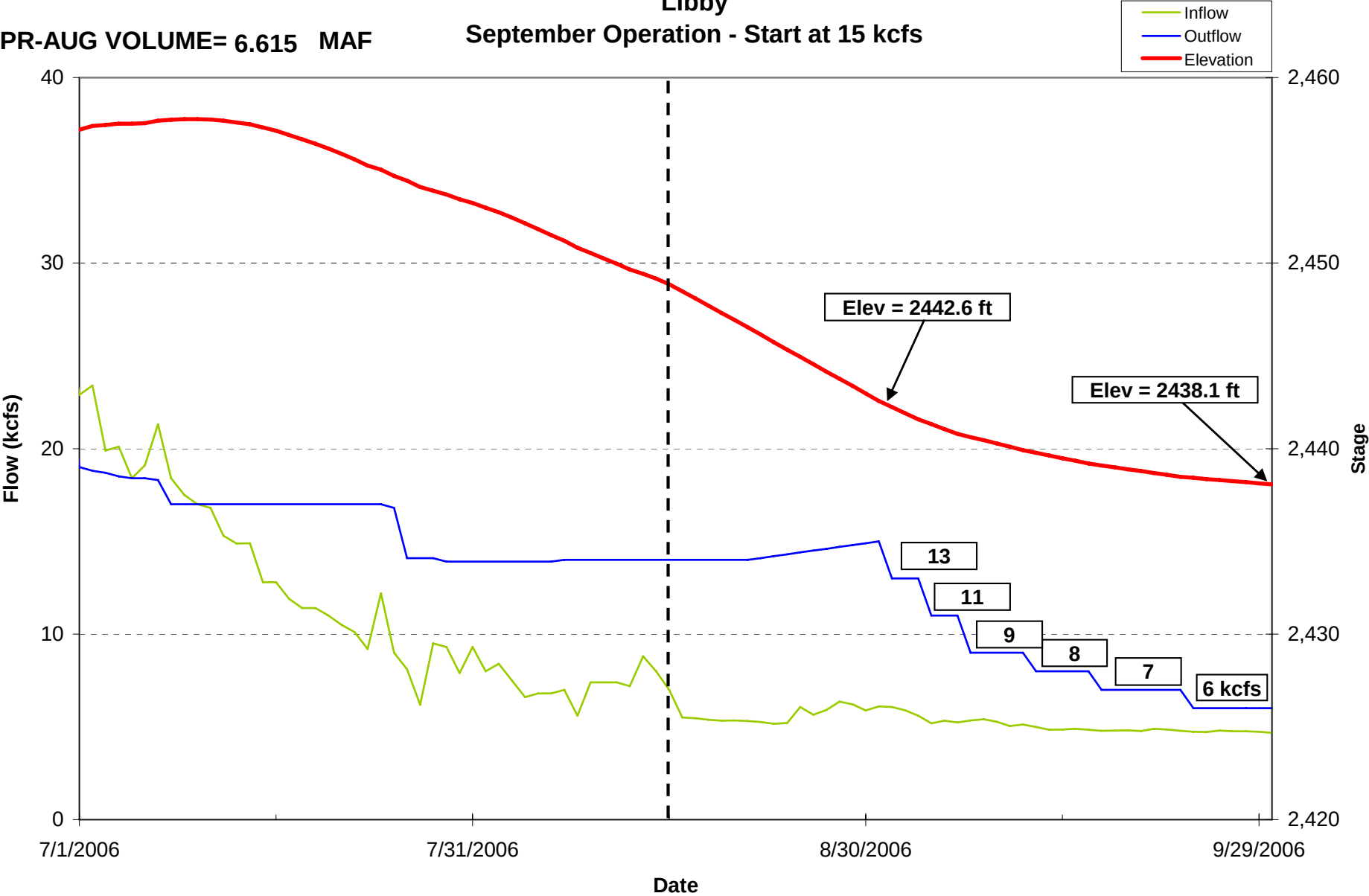


STP (8/15/06) INFLOWS USED STARTING 8/16/06

APR-AUG VOLUME= 6.615 MAF

September Operation - Start at 15 kcfs

Libby



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 16, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Lower Monumental Navigation Issue

Cathy Hlebechuk, COE, reported on the past week's navigation activities through Lower Monumental. Of the 12 barges that passed through, 6 did not request any change in spill, 3 requested zero spill, and 3 requested the alternative spill pattern that was developed at FPOM. Hlebechuk noted that up until Tuesday evening (8/15), the alternative spill pattern worked well; however, a recent drop in flows may pose a challenge to implementing this spill pattern. Hlebechuk suggested there might also be a need for extended time at zero spill (more than 20 minutes.) John Pigott, Tow Boaters Association, offered that from the Towboater's perspective, FPOM provided a good solution (to avoid going to zero spill) and he hoped all agencies would work with the COE to develop a modified option for flat spill out of 4 bays at the project. Pickett said that there seemed to be a similar eddy issue at Ice Harbor and hoped a modified spill pattern could be developed there as well.

ACTION/Next Steps:

- An FPOM conference call was convened to discuss spill pattern options immediately following the TMT meeting. A representative of TMT will update Hlebechuk with the results of the call and recommended operations will be shared with TMT.
- The COE plans to do a survey at Lower Monumental navigation lock entrance on August 21 which will require stopping spill for one 8 hour day. The salmon managers recommended waiting until the end of spill season to do the survey.

Dworshak Operations

Jim Adams, COE, reported that the latest STP model showed volumes of 191 kaf for July –August, and that operating at full load for the remaining 16 days in August would result in -82 kaf for flow augmentation at the end of August. The Dworshak elevation was 1551'. Adams noted a slight cooling trend, with water temperatures between 67-72 degrees in the Lower Snake and 66.5-67.5 degrees at Lower Granite. Dworshak outflows were 10.2 kcfs at 45 degrees; Anatone and Orofino temperatures were 70-75 degrees, with Anatone outflows at 14-23 kcfs and Orofino at 1.4 kcfs. Per discussions with the fish managers Mike Schneider, COE, ran an operating scenario based on August 14th

conditions, reducing flows to 7.7 kcfs on Tuesday evening (8/15), which predicted an increase in temperatures at Lower Granite around August 24th, but not expected to exceed 68 degrees. However, when Jim Adams, COE, discussed the model results with FPAC, he noted that two assumptions in the model runs were likely to not be met. Specifically, that Hells Canyon outflows were likely to be higher than modeled and the Lewiston climate forecasts had increased temperatures from what was modeled. Russ Keifer, ID, reported that Greg Haller, Nez Perce Tribe, recommended staying at full power house until the evening of August 22nd, then dropping to 7.7 kcfs for the remainder of August. This recommendation was unanimously supported by all FPAC members present. The COE was asked to do a model run for this option, to forecast when elevation would hit 1535'. (The estimated date was August 28th.) Greg Haller presented this information to the Dworshak Operations Board which developed a draft plan for the 200 kaf reserved per the Dworshak agreement. Dave Statler, Nez Perce Tribe, reiterated that with the uncertainty of temperatures, operations should hold, and that the specifics on how to manage the 200 kaf would be worked out by the Dworshak Operations Board.

Action/Next Steps: The COE will implement the recommended Dworshak operation, and will notify Greg Haller in the event that the Dworshak elevation forecast shows reaching 1535' before the currently predicted date of August 28th. TMT will discuss Dworshak operations at their next face to face meeting on August 30, and might have a conference call at 9 a.m. on Wednesday August 23rd to check in.

Libby/Hungry Horse

The week's STP graph showed a potential scenario for end of August flows at Libby: if flows were held at 14 kcfs, and then followed ramp down rates in the USFWS BiOp, elevations would be at 2442.8' at end of August and 2438.8' by the end of September. The COE offered operation scenarios depicting a slower ramp down at lower flow levels. Models for this operation showed an elevation of 2442.6' at the end of August and 2438.1' at the end of September. Brian Marotz, MT, offered that a slower ramp down with lower flows was favorable from a biological perspective. Russ Keifer, ID, suggested that there be further discussion of this and other operating proposals at the August 22nd FPAC meeting and then at the next TMT. Marotz will join the FPAC discussion next week.

Action/Next Steps: The salmon managers and BPA will share Libby September operation proposals by Wednesday, August 23rd. The Corps will post these on the agenda and they will be discussed at TMT on August 30th.

Tony Norris, BOR, said that no change in operations was anticipated at Hungry Horse, which was currently operating at 3 kcfs out. The expected end of August elevation is 3446'.

Treaty Fishing SOR's

Tom Lorz, CRITFC, reported that the Commission would be meeting on August 17th and that Autumn treaty fishing proposals would be lined out then. He noted the likely proposed start date would be August 21st, and that the season will likely be three weeks in duration.

Action/Next Steps: Lorz or Kyle Dittmer, CRITFC, will notify the COE when the proposal is finalized; COE noted that there may be difficulty in reaching the 75' elevation early in the week because of low flows in the river; Dave Statler, Nez Perce, noted that as much stability as possible was preferred.

End of MOP at Lower Granite, Lower Monumental, Ice Harbor

Paul Wagner, NOAA, and Russ Keifer, ID, reported that there was no recommendation from FPAC for an exact end date for a lift on MOP operations. The salmon managers did recommend that Ice Harbor be the first to have restrictions lifted.

Action/Next Steps: FPAC will have a recommendation for the Action Agencies on an exact date for lifting MOP at each project at the August 30th TMT meeting.

Operations Review

Reservoirs: Libby was at 2449.15', with 14k outflows and 7-8k inflows. Dworshak was at elevation 1551' and operating outflows at full powerhouse. Lower Granite outflows were 25-26k; week average outflows at McNary were 135k; and Hells Canyon flows were 9-16k. Grand Coulee elevation was 1283', and Banks Lake was at 1567' with elevation expected to be at 1565' by the end of August. Hungry Horse was at 3549.6' and discharging 3k.

Fish: Cindy LeFleur, WDFW, reported that the fall migration count is underway and changes in counts were expected everywhere over the next two weeks. Commercial fishing was picking up slightly. Bonneville counts were predicted overall slightly lower than last year (474,000 vs. last year's total of 561,000.) Paul Wagner, NOAA, reported that juveniles were nearing the end of their passage season, with less than 1,000 at Bonneville recently. Russ Keifer, ID, noted that there was an ongoing effort to provide more exact data to reflect spill efficiencies in the juvenile counts.

Power: Nothing to report at this time.

Water quality: Jim Adams, COE, reported that there had been a few TDG exceedances at night at Camas/Washougal over the past week.

Updated Emergency Protocols List

Russ Keifer, ID, provided a revised 'Group 3' Emergency Protocols list per consensus at FPAC, clarifying that the list was just for the end of the 2006 summer season. John Day spill reduction was moved to the bottom of the list, e.g.. It was also suggested that action 1 (request a tailwater violation at Bonneville) in Group 3 be moved to Group 2, as a 'pre-emergency' action. Cathy Hlebechuk, COE, said that she would insert the revisions into the Emergency Protocols Appendix and post it on the TMT website.

Next TMT Face-to-Face Meeting, August 30th, 9:00-noon

Agenda Items include:

- Lower Monumental / Ice Harbor Spill Patterns for Navigation (Update)
- Libby / Hungry Horse Operations for September
- Dworshak Operations / Boards' Plan for Distribution of 200 kaf
- Operations Review

Technical Management Team Meeting Notes

August 16, 2006

1. Greetings and Introductions.

The August 16 TMT meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Lower Monumental Navigation Issue.

To recap, said Hlebechuk, since last Wednesday, when we agreed to implement the towboaters' request to stop spill at Lower Monumental during barge passage, there have been 12 lockages. Three of those towboats requested spill pattern 1, developed by FPOM, three requested no spill, and six requested no change to the spill operation. One problem is that river flows have dropped so far that spill is down to 8 or 9 stops, which is making passage more difficult; we have asked FPOM to develop a new barge-friendly spill pattern involving stops 7, 8 and 9. For the no spill operation, it now appears that 30 to 40 minutes is needed to ensure safe passage, rather than the 20 minutes we hoped would be the case, Hlebechuk said.

John Pigott said some boats passed Lower Monumental last night, but he has not heard whether they encountered any problems. Prior to that, the boats that passed using Spill Pattern 1 passed the project with no problems – the eddy was significantly reduced, and they felt that, as long as that pattern can be implemented, there was no need to stop spill. All we want is for the eddy issue to go away, he said; we're not crazy about stopping spill, and feel that FPOM came up with a good solution. The only problem now is the falling river, so we're hoping FPOM can come up with another spill pattern that can replicate Pattern 1 at lower flows, said Pigott.

I had heard that there may be some navigation issues below Ice Harbor, Hlebechuk said. There are similar eddy problems below Ice Harbor, and they're

experimenting with a similar spill pattern to Spill Pattern 1 at that project, Pigott replied. Since we have had success with the modified spill pattern at Lower Monumental, we would like to ask FPOM to consider a modified spill pattern for Ice Harbor as well, he said. We can ask FPOM to look at that, said Hlebechuk.

With respect to Lower Monumental navigation, said Hlebechuk, on August 2, a tug scraped bottom. We raised the Little Goose pool in response, and one of the other boats did soundings, discovering spots where the depth was less than 11.8 feet. We agreed to take more comprehensive soundings as soon as possible; the soonest that can happen is next week. It now looks as though August 28 is going to be the soonest we can get that information. We also didn't know we would have to stop spill to do the survey, and I wanted to get the salmon managers' opinion about that. We discussed that at yesterday's FPAC meeting, and agreed that the Corps should wait until after spill season is over to do the survey, Russ Kiefer replied.

3. Libby and Hungry Horse September Operations.

Hlebechuk said the Corps has developed a possible scenario for rampdown from the current 14 Kcfs outflow at Libby beginning September 1; she directed the group's attention to this scenario, available via hot-link from today's agenda on the TMT homepage. Hlebechuk noted that Libby is expected to be at about elevation 2443 on August 31, and about 2439 at the end of September. Following the ramp rates in the BiOp, we would ramp down gradually, she said, but would ramp down faster if flows are higher. She noted that Jeff Regh, operations chief at Libby, says that 5 or 7 Kcfs would be a better loading for the units at Libby than 6 Kcfs.

The group devoted a few minutes of discussion to the Corps' rampdown scenario; ultimately, it was agreed that the Salmon Managers and BPA would provide September ramp down recommendations by August 30. The Corps will post these scenarios and they will be discussed at the group's next TMT meeting on August 30.

4. Dworshak Operations.

The group reviewed the most recent flow augmentation volume figures for Dworshak, which showed a deficit of 82 kaf below the August 31 elevation target of 1535 if the project releases full load through the end of August. We will need to reduce Dworshak outflow to 7.2 Kcfs for 16 days in order to make up that shortfall, she said. Jim Adams said there is a cooling trend at the moment; with 10.1 Kcfs outflow at 45 degrees F from Dworshak, water temperatures in the Lower Snake are holding at between 67 and 72 degrees F. Temperatures at Anatone and Orofino are in the low-to-mid 70s, so they have cooled significantly. Hells Canyon is continuing to follow load, which is complicating our forecasting somewhat, he said.

Adams discussed the current thermocline information for Dworshak, noting that temperatures near the surface of the reservoir are approximately in-line with what has been seen in previous years, but temperatures deeper in the reservoir are significantly warmer than the temperatures seen in recent years – about 46 degrees F. We may be seeing some lingering effects from drafting the deeper, colder water in previous years, in other words, Adams said.

Adams provided an overview of Mike Schneider's recent modeling work, noting that it is based on the weather conditions as known on Monday. Schneider modeled one scenario under which Dworshak outflow would be reduced to 7.5 Kcfs at 10 pm last night; it shows a jump in water temperature on August 24, but that jump is not expected to result in any exceedences of the 20-degree C water temperature standard. Idaho Power has now increased the outflow from Hells Canyon, however, and air temperatures are expected to be higher than what was forecast on Monday. Schneider re-modeled this scenario based on this new information; this latest run shows that temperatures in the Lower Granite forebay would likely touch about 68.2 degrees on August 24, if we immediately reduce Dworshak outflow to 7.5 Kcfs, Adams said.

Kiefer said FPAC had discussed this issue at yesterday's meeting; he said Greg Haller of the Nez Perce Tribe had put forth a proposal, which ultimately was endorsed by the other salmon managers: stay at full powerhouse capacity for another week, through 10 pm on August 22. At that time, we would reduce Dworshak outflow to one big unit and one small unit, Kiefer said. If that operation is implemented, Dworshak would reach elevation 1535 on about August 28, and would end August at about elevation 1531.6 feet, said Paul Koski, about 40 kaf below the elevation target.

The group devoted a few minutes of discussion to this information. Ultimately, Hlebechuk said the Corps' planned operation is to continue to release full load from Dworshak until 10 pm on August 22, at which point Dworshak outflow will be reduced to one large unit and one small unit. That operation will continue until further notice, she said. We will notify Greg Haller if Dworshak approaches elevation 1535 sooner than August 28, Hlebechuk added. In response to a question, Dave Statler said the Nez Perce Tribal Board met yesterday and approved this operation, even though it will shift a portion of the 200 kaf of Dworshak water reserved for use in September into August. It was agreed that the TMT will re-convene via conference call (if needed) next Wednesday, August 23, to check in on this operation. In response to a question, Tony Norris said Hungry Horse will be at about elevation 3446 on August 31; outflow will then be ramped down over 5 or 6 days to the Columbia Falls minimum.

5. Treaty Fishing SORs.

Lorz said he is not sure whether the Compact has agreed to the fall treaty fishery, but it is proposed to start on Monday, August 21. Cindy LeFleur said the Compact will meet tomorrow; it is likely that three weeks of fishing will be proposed. It was agreed that either Lorz or Kyle Dittmer will contact the Corps with an operational request by the end of this week.

Hlebechuk said forebay elevation is an issue at Bonneville; with the low flows and the project trying to spill as much as possible at night, it may be difficult to reach elevation 75 on Monday and Tuesday. It shouldn't be an issue, she said, but we wanted CRITFC to be aware that it could be. After a brief discussion, it was agreed that the Corps would specify its usual 1.5-foot range (75-76.5 feet) at Bonneville during the treaty fishery. Lorz said he would let Hlebechuk know if 75 feet is not obtained by the start of the Treaty fishing period if CRITFC preferred operating in a 1.5' operating range with the lowest elevation being the elevation at the start of the period .

6. End of MOP at Little Goose, Lower Monumental and Ice Harbor.

With temperatures cooling, it is time to lift the MOP restriction, said Scott Bettin. We discussed this at FPAC yesterday, but didn't discuss the dates on which we would fill the three projects above MOP, said Paul Wagner. This operation traditionally takes place when we change over from the juvenile outmigration to the adult migration, said Kiefer. Traditionally that occurs at the end of August, said Bettin, although flows are so low that there is no burning desire to fill the pools at this time, from a power perspective – by the end of the month would likely be OK. Part of our desire is to get the adult ladders back into criteria, which is a problem at MOP, Kiefer observed; we are concerned that more than 50 endangered adult sockeye have been counted at Ice Harbor, but only 15 have reached Lower Monumental to date. After a brief discussion, it was agreed that the salmon managers will provide the dates by which the MOP restriction will be lifted by next week at the latest.

7. Operations Review.

The Corps reported that Libby was at elevation 2449 feet last night, with outflows of 14 and inflows of 7 Kcfs. Dworshak is currently at elevation 1551, releasing 10.1 Kcfs, with inflows as low as 0.6 Kcfs in recent days. Lower Granite is releasing 25-26 Kcfs flows have averaged 28.4 over the last 7 days; at McNary, 135 Kcfs. Hells Canyon has been releasing 11-13 Kcfs over the last three days. Reclamation reported that Grand Coulee is currently at elevation 1283; Banks Lake at elevation 1567. Hungry Horse is currently at elevation 3549.6 feet. BPA said there are no power system issues to report at this time.

LeFleur said there isn't much happening at the moment, with respect to the adult fall chinook migration. That should change in the next two weeks, she said – everything should start moving upward. A commercial fishery started on

August 2, but fishing has been slow so far. The pre-season estimate is 474,000 adult fall chinook to the mouth of the Columbia, about 100,000 less than 2005. Wagner said smolt numbers are decreasing; we are nearing the traditional end of the smolt passage season. Juvenile fall chinook indices at Lower Granite, Little Goose and Lower Monumental have now fallen below 100 fish per day; at Bonneville, below 1,000 fish per day. In response to a question, Wagner said these numbers are not adjusted for spill efficiency; at Lower Granite, for example, these numbers can probably be multiplied by a factor of 4 or 5.

Adams said there is little to report, from a water quality standpoint, although there have been a few TDG exceedences; flows continue to be low.

8. Emergency Protocols.

FPAC discussed the emergency protocols yesterday, said Kiefer; we made one seasonal adjustment to the emergency protocols list. Like everyone at this table, we hope that there will be no need to implement any of the measures on the list, but just in case, we have updated the list, he said. It was agreed that the revised emergency protocols list will be posted to the TMT homepage.

9. Next TMT Meeting Date.

The next meeting of the Technical Management Team, a conference call, was set for Wednesday, August 23. The group's next face-to-face meeting was set for Wednesday, August 30. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Meeting Participants August 16, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Robin Harkless	Facilitation Team
Tony Norris	Reclamation
Paul Wagner	NOAAF
Russ Kiefer	IDFG
Brian Merotz	Montana
Margaret Filardo	TMT
Scott Bettin	BPA
David Wills	USFWS
Dan Spear	BPA

Tom Lorz	CRITFC
Dave Statler	NPT
Rudd Turner	CE
John Pigott	Columba River Towboat Association
Rob Wall	COE
Steve Ridour	COE
John Coffee	COE
Bill Crampton	CBB
Glenn Traeger	AVISTA
Tom Le	PSE
Richelle Beck	D. Rohr & Associates
Paul Koskie	COE
Cindy LeFleur	WDFW
Laura Hamilton	COE

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday August 30, 2006 09:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190 or 503-808-5199 (passcode 2580)

**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. [\[Review Minutes 2006\]](#)
3. Bonneville Unit 8 Rehab
4. Lower Monumental/Ice Harbor spill patterns for navigation
5. Libby September Operations
 - [\[Libby Dam - Ramp Up Rates\]](#) 
6. Dworshak Operations
 - [\[Lower Snake River Temperatures - TMT Update - 30 August 2006\]](#) 
 - [\[2006 Operational Plan for Use of 200 KAF of Stored Water In Dworshak Reservoir by the Nez Perce Tribe\]](#) 
 - [\[Dworshak September Operations\]](#) 
 - [\[2006 Operational Plan for the use of 200 KAF for the use by the Nez Perce Tribe\]](#) 
7. Treaty Fishing SOR's
 - [\[SYSTEM OPERATIONAL REQUEST: 2006 C-5\]](#) 
8. End of MOP at Little Goose, Lower Monumental and Ice Harbor
9. End of Spill
10. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Spill Information 2006\]](#)
11. Other

2006 Operational Plan for Use of 200 KAF of Stored Water In Dworshak Reservoir by the Nez Perce Tribe

I. Background

This 2006 Operational Plan for the use of 200 KAF (thousand acre-feet) of water stored in Dworshak Reservoir (the 2006 Plan) for the use by the Nez Perce Tribe (Tribe) is based on the Agreement between the United States, through the United States Army Corps of Engineers (the Corps), and the Tribe for water use in Dworshak Reservoir (Agreement), and that Agreement's underlying Memorandum of Agreement (MOA) between the Tribe, the Corps, the National Oceanic and Atmospheric Administration National Marine Fisheries Service, the Bonneville Power Administration and the State of Idaho (the Parties). The Parties have designated representatives to fulfill the purposes of the MOA (the Board), and the Board, through the consensus of its representatives, has developed this 2006 Plan.

All recitals, terms and conditions of the Agreement and the MOA are understood as describing and applying to this 2006 Plan.

II. Considerations

The 2006 Plan is based on consideration of the following factors:

- Projected summer (July through September) water temperature and flow conditions for the Snake River at Lower Granite Dam.
- Growth rate of rearing juvenile fall Chinook in the Clearwater River.
- Migration status of juvenile fall Chinook in the Clearwater and Snake rivers.
- Migration status of adult steelhead and fall Chinook.
- Cultural resources in and around the Dworshak Reservoir.
- Summer recreational uses of Dworshak Reservoir.

A. Projected summer water temperature and flow conditions in the Lower Snake River at Lower Granite Dam.

Based on the latest (July 10, 2006) information from NOAA's Northwest River Forecast Center's April through July water supply forecast, projected inflows at the Snake at Lower Granite are expected to be 116% of normal.

B. Growth rate of rearing juvenile fall Chinook in the Clearwater River.

Clearwater juvenile fall chinook rear in the lower Clearwater River throughout July, August and early September. Seining by The Nez Perce Tribe's Department of Fisheries Resource Management, Research Division sampling effort produced fish in various sizes,

documenting that these fish are still rearing. A large volume of cold water released from Dworshak in early July delays the growth and migration of these fish.

C. Migration status of juvenile fall Chinook in the Clearwater and Snake rivers.

During 2006, the Nez Perce Tribal Fisheries Research staff used beach seines, fyke nets, and rotary screw traps to capture fall Chinook subyearlings in the lower Clearwater River. Beach seining occurred from 12 June through 3 August along the lower Clearwater shoreline areas below the mouth of the North Fork Clearwater River down to Rkm 4.5. Permanent systematic seining sites were sampled 4-5d/week when flows allowed. During fluctuating flows, grab sites or any sites seineable were the sampling protocol used during these times. Two 2.4 m diameter rotary screw traps were also deployed along the north and south shorelines at Rkm 20 off the railroad bridge abutments near Spalding from 1 June through 1 August. All sampling ceased the first week in August when catch was near zero. Origin (hatchery vs. natural) of unmarked (adipose clip) and untagged (coded wire or PIT tag) fish was determined based primarily on size and body shape. All natural fall Chinook were measured to the nearest 1.0 mm fork length and weighed to the nearest 0.1 gm. A random sub-sample of 195 natural fish (non-lethal upper caudal fin clip) was collected for genetic analyses. PIT tags were implanted into natural fall Chinook salmon 60-mm fork length and longer. Tagged fish were released at the collection site after a 15-min recovery period.

A total of 1,552 chinook salmon subyearlings were PIT tagged in 2006 and flagged as wild (natural origin).. Staff observed a large school of fall chinook feeding near the surface by the concrete wall at the Flying J boat ramp in Lewiston around the end of July. The USFWS have also observed many fall Chinook schooled up in the pool area above the mouth of the Clearwater River. The USFWS have also caught some fall chinook subyearlings on fly rods in the pool area to recapture surrogates released at Big Canyon Creek and have also PIT tagged some wild fish. Nez Perce and USGS staff tried trawling in the pool area on 9 August but jet boats were not effective in pulling the large trawl, consequently no fish were caught. The Tribe believes most of the natural fall Chinook are still holding in the lower 5 km of the Clearwater River or just downstream of its mouth. Of the wild fall chinook PIT tagged, only 63 (4.1%) have been detected up until 13 August emigrating through the hydrosystem.

Based on information from the USFWS, Clearwater River juvenile fall Chinook, and to a lesser extent Snake River juvenile fall chinook, tend to over-winter in the lower Snake reservoirs and migrate as yearlings the following spring. Fish survive through the summer and fall and migrate as yearlings have higher SAR(s) (Lower Granite to Lower Granite) than fall Chinook that migrate as subyearlings. September releases from Dworshak Reservoir cool the lower Snake River and aid both actively migrating subyearlings and those that over-winter in the reservoirs.

D. Migration Status of adult steelhead and fall Chinook

Adult summer steelhead are currently migrating in the Snake River and are passing Lower Granite Dam in ever-increasing numbers. If temperatures in the tailrace of Lower Granite Dam exceed 70 deg. F (21.1 deg. C), the steelhead migration slows considerably and even ceases. This phenomenon persists through September if flow augmentation/temperature control releases end by August 31.

Fall Chinook have entered the Columbia and Snake rivers. Late August/September flow releases from Dworshak helps cool the migratory corridor, and prevent or minimize delayed migration.

E. Cultural resources in and around the Dworshak Project

Numerous documented impacts occur to important cultural resources in and around the Dworshak Reservoir as a result of project operations. September releases prevent exposure of cultural sites during peak uses of the reservoir in July.

F. Summer recreational uses of the Reservoir.

Releasing up to 200 KAF in September means the reservoir maintains higher elevation during the peak usage month of July. A fuller pool in July is viewed by recreational users as desirable.

III. Timing of Stored Water Releases.

Based on the above considerations, the Board calls for the following 2006 operation

A. On about August 27, Dworshak will be drafted to, but no lower than, elevation 1535 feet above National Geodetic Vertical Datum.

B. On the date Dworshak reaches elevation 1535, continue expected operations which will be approximately 7.6 kcfs.

C. Maintain 7.6 kcfs until about September 6.

D. On the evening of September 6 or early morning September 7 project outflows will be reduced to about 5.4 kcfs.

E. Maintain outflow near 5.4 kcfs until the reservoir reaches elevation 1521 feet, then reduce to outflow near 2.4 kcfs as an intermediate flow for 1 – 3 days.

F. Maintain minimum outflow near 1.4 kcfs until the reservoir reaches elevation 1520 feet.

IV Implementation

The Board directs that this 2006 Plan be implemented consistent with the Agreement and the MOA. The Tribe will call on the Corps pursuant to the Agreement to provide water releases as set forth in this 2006 Plan. The Tribe's representative to the Board, as the Board's chairman, will also notify other Columbia River Basin salmon managers of the 2006 Plan pursuant to the MOA.

Any Party may call for the Board to reconvene after the adoption of the Plan for the purpose of amending the Plan due to substantially changed conditions. The Board may only amend the Plan by the unanimous written consent of the Parties.

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documenting that these fish are still rearing. A large volume of cold water released from Dworshak in early July delays the growth and migration of these fish.

C. Migration status of juvenile fall Chinook in the Clearwater and Snake rivers.

During 2006, the Nez Perce Tribal Fisheries Research staff used beach seines, fyke nets, and rotary screw traps to capture fall Chinook subyearlings in the lower Clearwater River. Beach seining occurred from 12 June through 3 August along the lower Clearwater shoreline areas below the mouth of the North Fork Clearwater River down to Rkm 4.5. Permanent systematic seining sites were sampled 4-5d/week when flows allowed. During fluctuating flows, grab sites or any sites seineable were the sampling protocol used during these times. Two 2.4 m diameter rotary screw traps were also deployed along the north and south shorelines at Rkm 20 off the railroad bridge abutments near Spalding from 1 June through 1 August. All sampling ceased the first week in August when catch was near zero. Origin (hatchery vs. natural) of unmarked (adipose clip) and untagged (coded wire or PIT tag) fish was determined based primarily on size and body shape. All natural fall Chinook were measured to the nearest 1.0 mm fork length and weighed to the nearest 0.1 gm. A random sub-sample of 195 natural fish (non-lethal upper caudal fin clip) was collected for genetic analyses. PIT tags were implanted into natural fall Chinook salmon 60-mm fork length and longer. Tagged fish were released at the collection site after a 15-min recovery period.

A total of 1,552 chinook salmon subyearlings were PIT tagged in 2006 and flagged as wild (natural origin).. Staff observed a large school of fall chinook feeding near the surface by the concrete wall at the Flying J boat ramp in Lewiston around the end of July. The USFWS have also observed many fall Chinook schooled up in the pool area above the mouth of the Clearwater River. The USFWS have also caught some fall chinook subyearlings on fly rods in the pool area to recapture surrogates released at Big Canyon Creek and have also PIT tagged some wild fish. Nez Perce and USGS staff tried trawling in the pool area on 9 August but jet boats were not effective in pulling the large trawl, consequently no fish were caught. The Tribe believes most of the natural fall Chinook are still holding in the lower 5 km of the Clearwater River or just downstream of its mouth. Of the wild fall chinook PIT tagged, only 63 (4.1%) have been detected up until 13 August emigrating through the hydrosystem.

Based on information from the USFWS, Clearwater River juvenile fall Chinook, and to a lesser extent Snake River juvenile fall chinook, tend to over-winter in the lower Snake reservoirs and migrate as yearlings the following spring. Fish survive through the summer and fall and migrate as yearlings have higher SAR(s) (Lower Granite to Lower Granite) than fall Chinook that migrate as subyearlings. September releases from Dworshak Reservoir cool the lower Snake River and aid both actively migrating subyearlings and those that over-winter in the reservoirs.

D. Migration Status of adult steelhead and fall Chinook

Adult summer steelhead are currently migrating in the Snake River and are passing Lower Granite Dam in ever-increasing numbers. If temperatures in the tailrace of Lower Granite Dam exceed 70 deg. F (21.1 deg. C), the steelhead migration slows considerably and even ceases. This phenomenon persists through September if flow augmentation/temperature control releases end by August 31.

Fall Chinook have entered the Columbia and Snake rivers. Late August/September flow releases from Dworshak helps cool the migratory corridor, and prevent or minimize delayed migration.

E. Cultural resources in and around the Dworshak Project

Numerous documented impacts occur to important cultural resources in and around the Dworshak Reservoir as a result of project operations. September releases prevent exposure of cultural sites during peak uses of the reservoir in July.

F. Summer recreational uses of the Reservoir.

Releasing up to 200 KAF in September means the reservoir maintains higher elevation during the peak usage month of July. A fuller pool in July is viewed by recreational users as desirable.

III. Timing of Stored Water Releases.

Based on the above considerations, the Board calls for the following 2006 operation

A. On about August 27, Dworshak will be drafted to, but no lower than, elevation 1535 feet above National Geodetic Vertical Datum.

B. On the date Dworshak reaches elevation 1535, continue expected operations which will be approximately 7.6 kcfs.

C. Maintain 7.6 kcfs until about September 6.

D. On the evening of September 6 or early morning September 7 project outflows will be reduced to about 5.4 kcfs.

E. Maintain outflow near 5.4 kcfs until the reservoir reaches elevation 1521 feet, then reduce to outflow near 2.4 kcfs as an intermediate flow for 1 – 3 days.

F. Maintain minimum outflow near 1.4 kcfs until the reservoir reaches elevation 1520 feet.

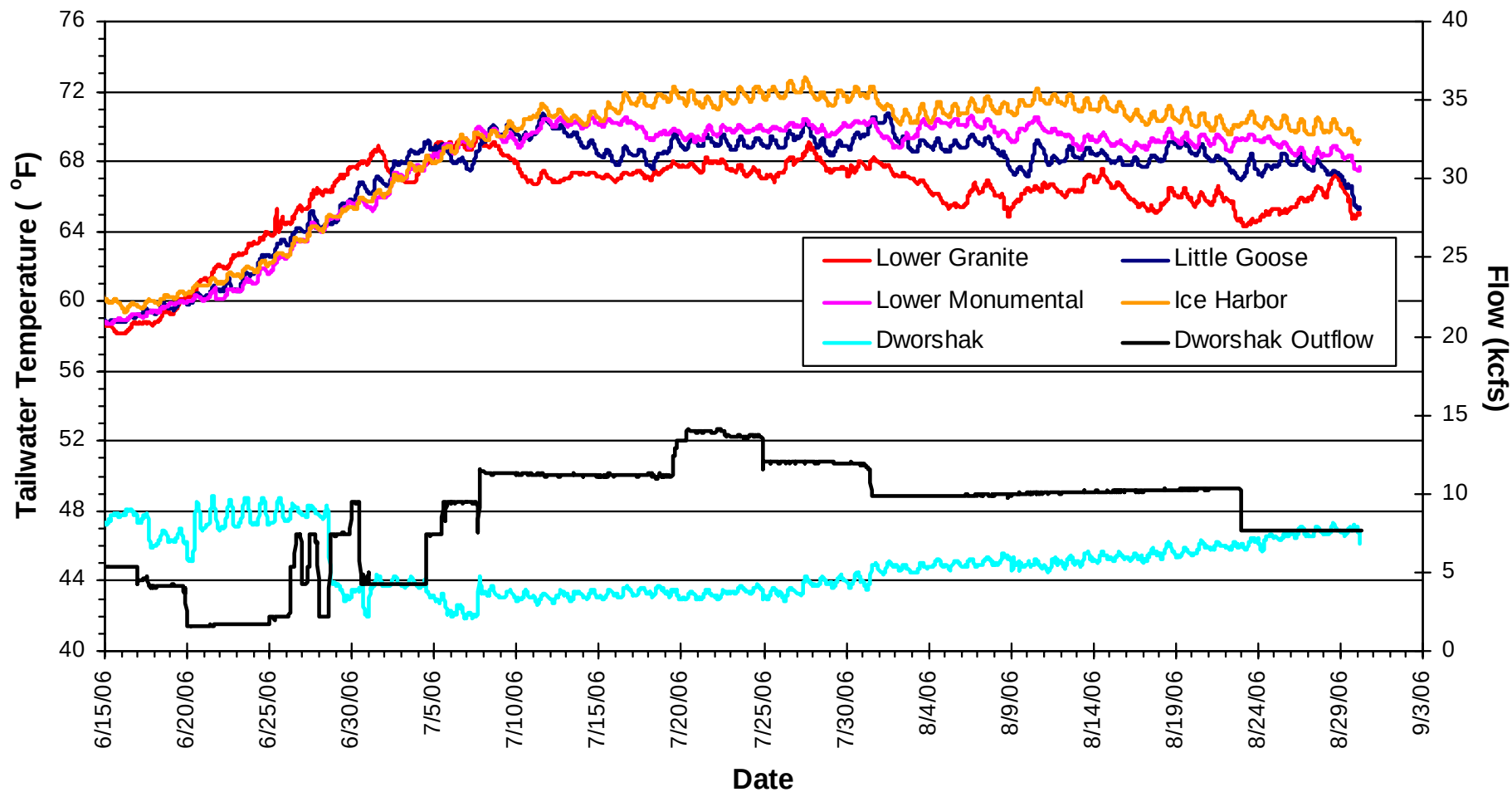
IV Implementation

The Board directs that this 2006 Plan be implemented consistent with the Agreement and the MOA. The Tribe will call on the Corps pursuant to the Agreement to provide water releases as set forth in this 2006 Plan. The Tribe's representative to the Board, as the Board's chairman, will also notify other Columbia River Basin salmon managers of the 2006 Plan pursuant to the MOA.

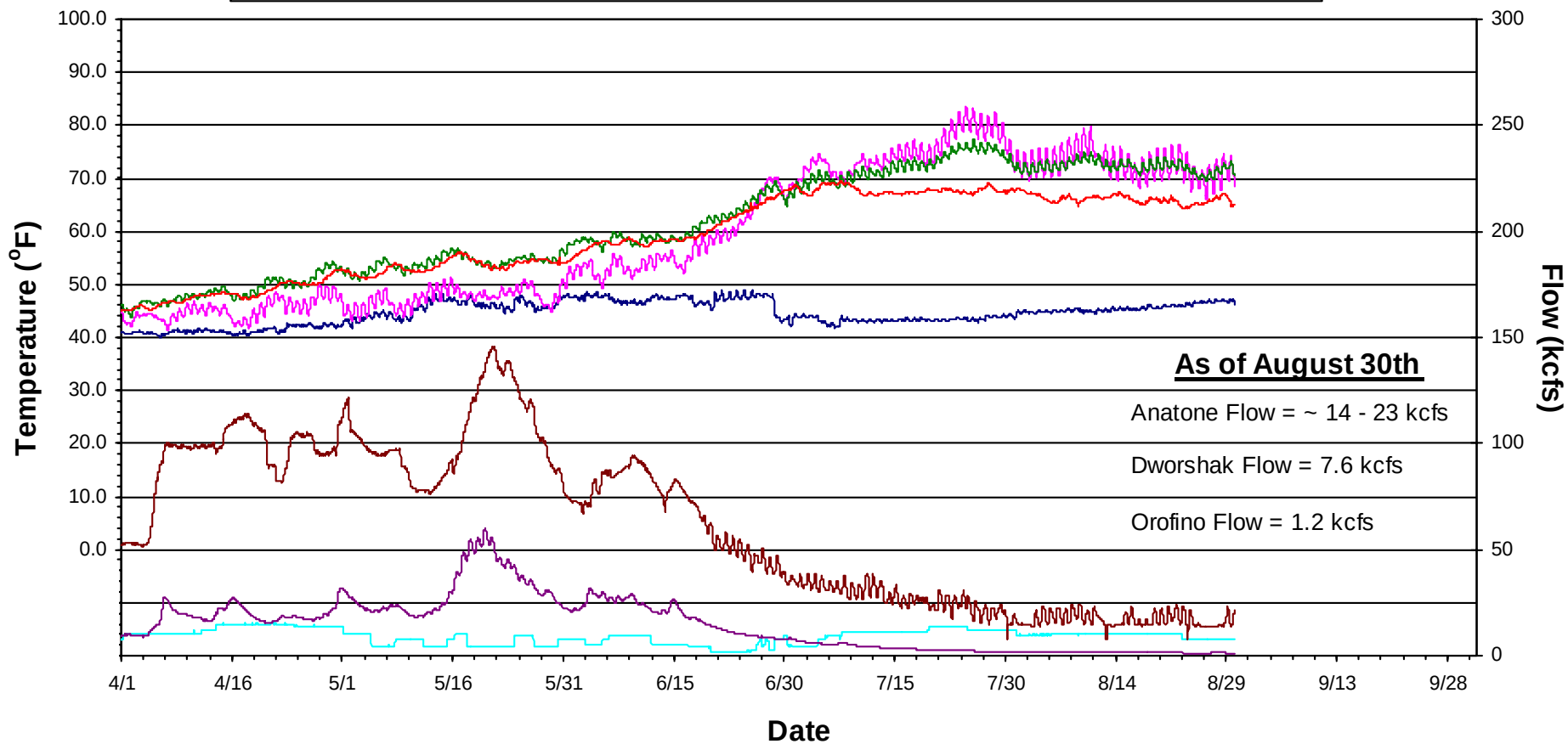
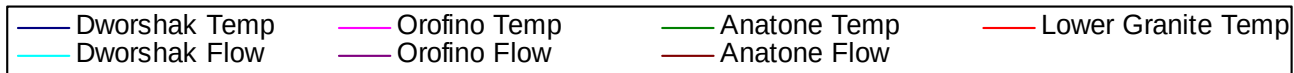
Any Party may call for the Board to reconvene after the adoption of the Plan for the purpose of amending the Plan due to substantially changed conditions. The Board may only amend the Plan by the unanimous written consent of the Parties.

**Lower Snake River Temperatures
TMT Update
30 August 2006**

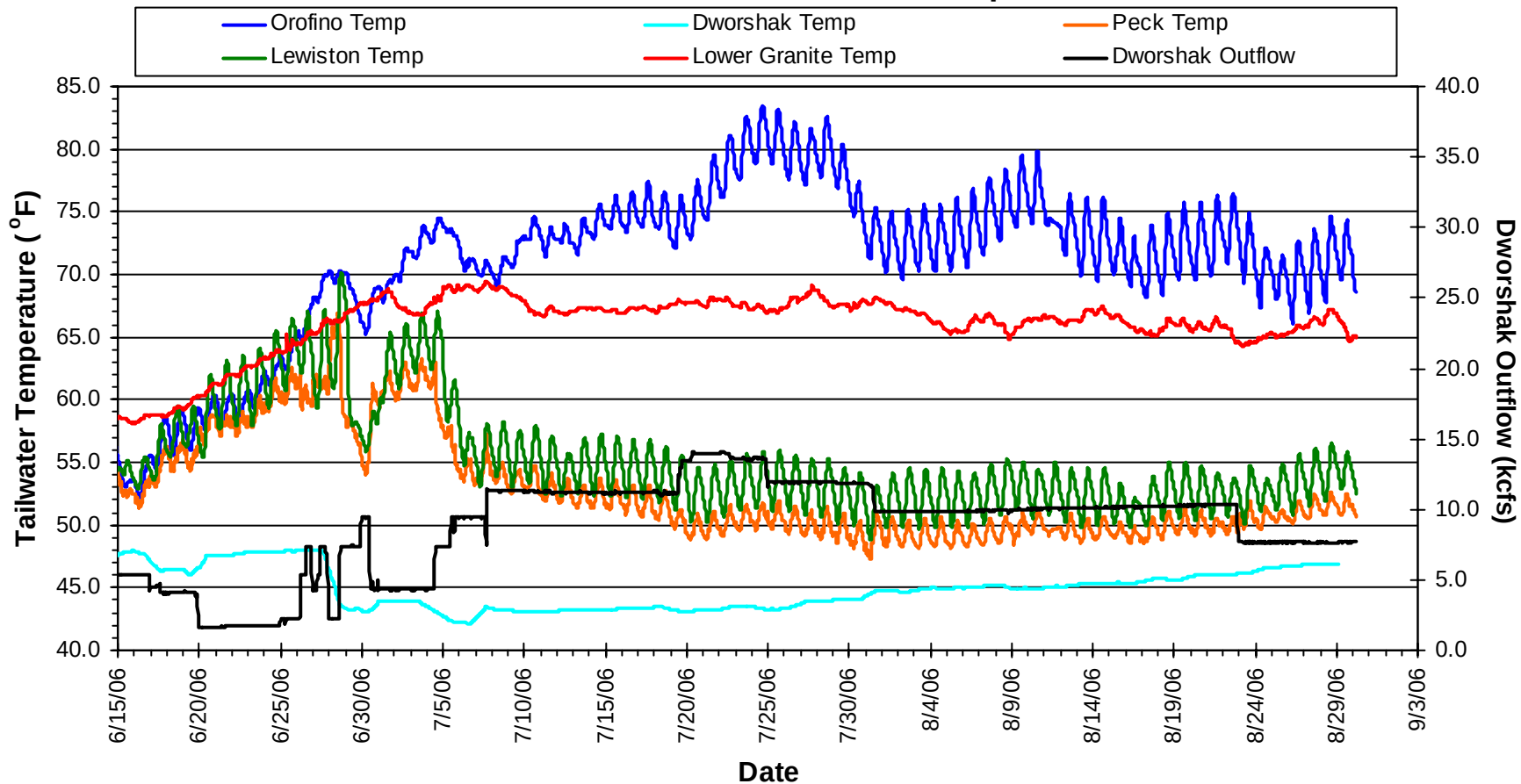
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 1 - August 16)



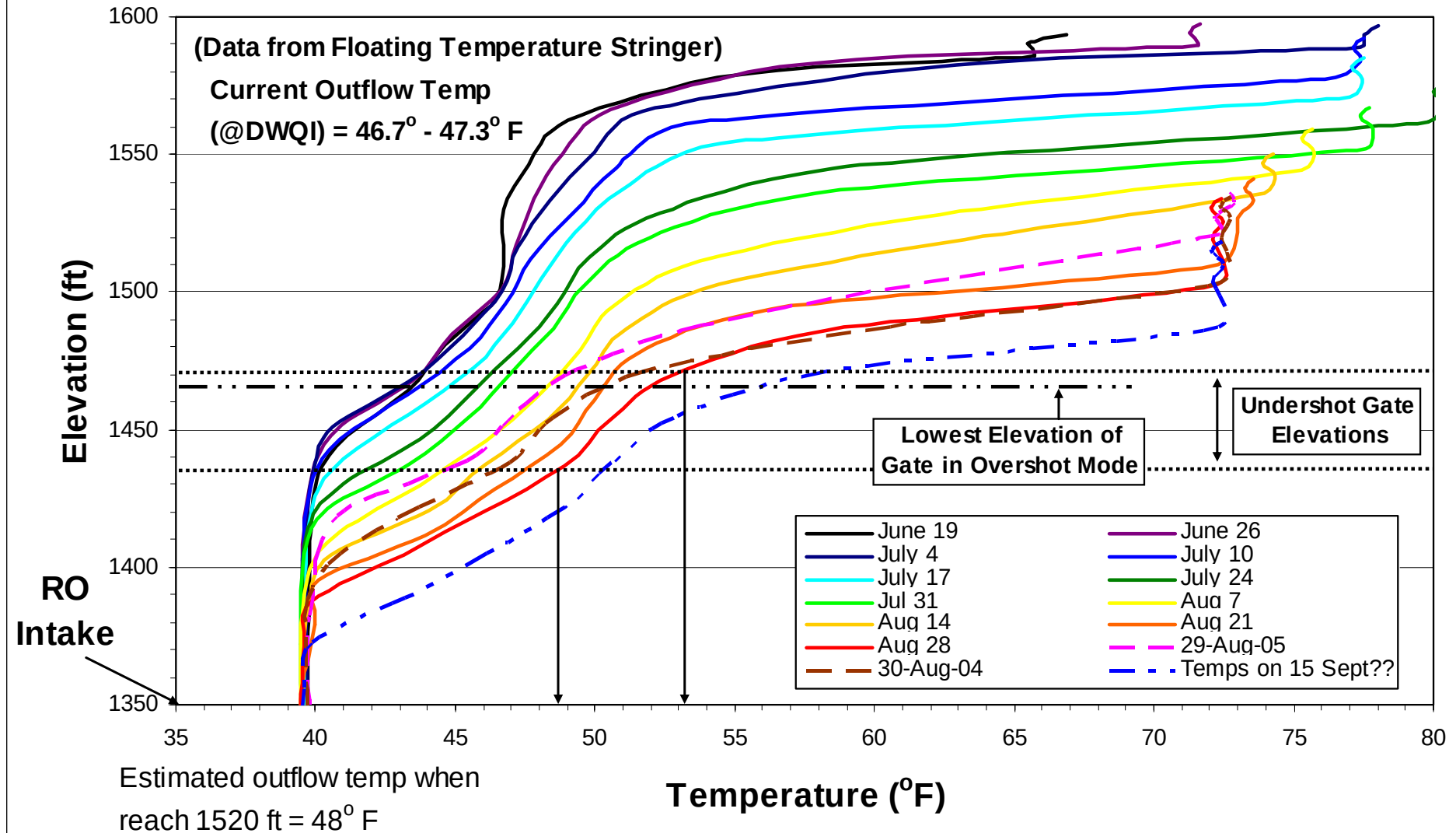
Lower Granite Inflows and Temperatures in 2006



Dworshak Outflows and Clearwater River Temperatures in 2006



Dworshak Forebay Thermocline 2006



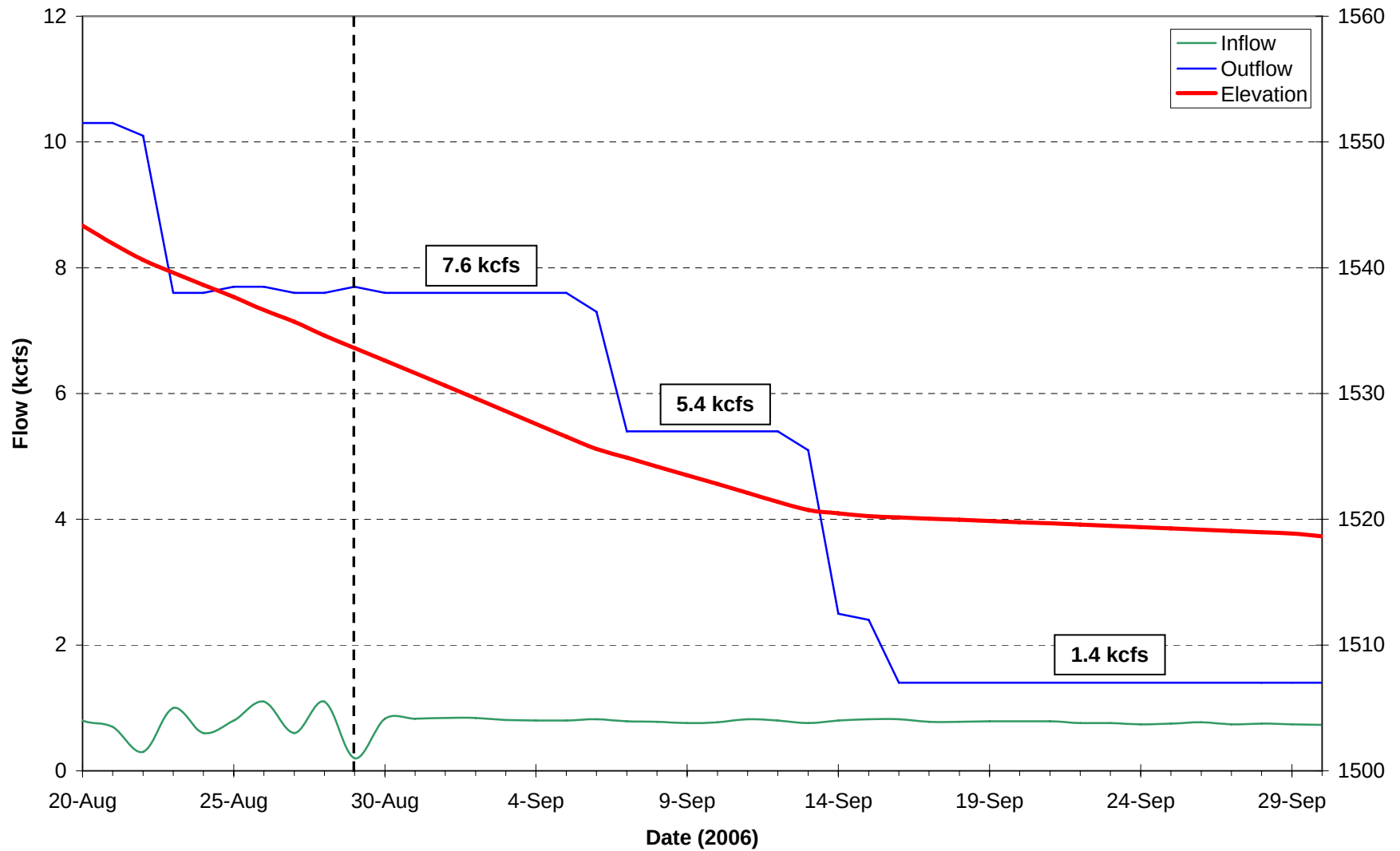
Daily and hourly maximum ramp up rates for Libby Dam
(as measured by daily flows, not daily averages, restricted by hourly rates)

Ramp Up Rates - Libby Dam			
Flow Range	Ramp Up Unit (Daily Max)	Ramp Up (Hourly Max)	Ramp Up (Hourly Max)
		1 Oct - 30 Apr	1 May - 30 Sep
4,000 - 6,000 cfs	Limit ramp up to one unit per day (5,000 cfs per day)	2,000 cfs	2,500 cfs
6,001 - 9,000 cfs	Limit ramp up to one unit per day (5,000 cfs per day)	2,000 cfs	2,500 cfs
9,001 - 16,000 cfs	Limit ramp up to two units per day (10,000 cfs per day)	3,500 cfs	2,500 cfs
> 16,000 cfs	Limit ramp up to two units per day (10,000 cfs per day)	7,000 cfs	5,000 cfs

Daily and hourly maximum ramp down rates for Libby Dam
(as measured by daily flows, not daily averages, restricted by hourly rates)

Ramp Down Rates - Libby Dam				
Flow Range	Ramp Down Unit (Daily Max)		Ramp Down (Hourly Max)	Ramp Down (Hourly Max)
			1 Oct - 30 Apr	1 May - 30 Sep
4,000 - 6,000 cfs	Limit ramp down to 1,000 cfs per day	Limit ramp down to 500 cfs per day	500 cfs	500 cfs
6,001 - 9,000 cfs	Limit ramp down to 2,500 cfs per day	Limit ramp down to 1,000 cfs per day	500 cfs	500 cfs
9,001 - 16,000 cfs	Limit ramp down to one unit per day	Limit ramp down to 2,000 cfs per day	1,000 cfs	1,000 cfs
> 16,000 cfs	Limit ramp down to one unit per day (5,000 cfs per day)		3,500 cfs	3,500 cfs

Dworshak September Operations



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 30, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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

Bonneville Unit 8 Rehab

Bernard Klatte, COE, reported on a request from Portland District COE for testing/rehab work on unit 8 at Bonneville, which had also been coordinated through FDRWG. Klatte said that NOAA, OR, and others at FDRWG had supported the request, and that there was a proposed start time of 2 p.m. today (8/30.) Klatte and Cathy Hlebechuk, COE, also noted that the operation could require up to 12 kcfs for 4 hours which would result in a maximum of 4 kcfs less spill at night. Russ Kiefer, ID, inquired as to why the rehab couldn't be done after spill season; Klatte offered that it was likely a contractor availability issue, and offered to share more information about this after the TMT meeting.

ACTION: The COE planned to coordinate with schedulers at BPA as quickly as possible, and then issue a teletype.

Lower Monumental / Ice Harbor Spill for Navigation

Cathy Hlebechuk, COE, stated that an alternate Lower Monumental spill pattern for lower spill amounts had been developed and was available for implementation with regards to safe navigation on August 11th. From August 8th until August 29th, 40 boats passed through the channel, of which 5 requested no spill and 4 requested a spill pattern change. Hlebechuk added that the alternative spill pattern set up at Ice Harbor was not needed as river flows had dropped so spill amounts were low and tows were able to navigate safely with the spill pattern in the 2006 Fish Passage Implementation Plan. She thanked FPOM for their efforts in quickly developing alternative patterns to meet the various objectives for fish and safety at the projects.

Dworshak Operations

Jim Adams, COE, reported that the Dworshak forebay was at elevation 1532.3-.5', expecting to reach 1531' by midnight on 8/31. Temperatures at Lower Granite were holding steady between 66-67 degrees, the Little Goose tailwater temperature was just below 68 degrees, and Lower Monumental had recently dropped below 68 degrees as well. Outflows at Dworshak were at 7.6 kcfs, with temperatures between 46.5 and 47.5 degrees. Anatone outflows were between 14-23 kcfs, with temperatures in the low 70's. Orofino outflows were 1.2 kcfs, with temperatures also in the low 70's. Jim shared a

graph projecting thermocline temperatures at Dworshak at elevation 1520'. Using this graph, Jim predicted outflow temperatures of 48 degrees when the project reduces to minimum outflows when the pool elevation reaches 1520 feet. Operations are expected to continue with outflows at 7.6 until September 6, and then begin ramping down to 5.4 kcfs until the Dworshak elevation reaches 1521'. Flow will then be reduced to 2.4 kcfs for 1 or 2 days, then to minimum outflows to reach elevation 1520'. COE graphs on the TMT website predicted elevations will reach 1520' by September 15 or 16. It was noted that the expected volume for flow augmentation in September, per the Dworshak Board agreement, was around 160 kaf.

Libby/Hungry Horse September Operations

For September operations at Libby, Jim Litchfield, MT, recommended ramping Libby down to 9 kcfs (using the ramp rates posted to today's agenda) and holding flat through the month of September as much as possible, to provide good biological conditions in the reservoir and also support balance with needs of the river. Montana did not object to BPA using some flexibility over a short time (48 hours) if there was a need to increase flows for power needs. Russ Kiefer, ID, agreed that Montana's proposed operation for flat flows through September would support the thriving nutrient enhancement program on the Kootenai River. Hlebechuk, COE, added that the minimum flow rate for October is 4 kcfs, which may call for a gradual ramp down during the last week of September.

ACTION: With no objection from TMT, the COE planned to begin ramping down Libby flows from 14 kcfs on 8/31 at 10 p.m using the BiOp ramp rates. Ramp down will continue until a flow rate of 9 kcfs is reached. More details on the specific operation will be coordinated between COE, MT and BPA, and TMT will check in on Libby operations at the September 13 TMT meeting. Hungry Horse will begin ramping down starting Friday, to meet the Columbia Falls minimum.

Treaty Fishing SOR's

Kyle Dittmer, CRITFC, shared CRITFC's request for autumn treaty fishing operations: for Bonneville, John Day and Ice Harbor, hold the pools within 1' elevation for the weeks of August 21-24th, August 28th- September 1st, and September 5-9th. The COE agreed to a 1' soft / 1.5' hard constraints at Bonneville only, per Ted Strong/Colonel Mogren 1998 meeting. (NOTE: Gil net locations were shared via email following the TMT meeting.)

End of MOP at Lower Granite, Lower Monumental, Ice Harbor

Russ Kiefer, ID, reported on the FPAC recommendation to lift MOP operations at all three Lower Snake projects. He requested filling Ice Harbor first and moving up the system as appropriate.

End of Spill

Cathy Hlebechuk, COE, reminded the group that 0001 hours on September 1 will begin the end of spill. The B2 corner collector will stop at 1500 hours on August 31st, due to the time / staff required for shut down and per the Fish Passage Plan.

Operations Review

Reservoirs: Grand Coulee was at 1280.5' and expected to reach 1280' on September 1. Banks Lake was at 1565.2' and expected to be at 1565' by August 31. Hungry Horse was at 3546' and ramping down at a rate of 1k per day in order to meet Columbia Falls minimum by September 1. Libby elevation was at 2433.9', with 14 kcfs outflows and inflows of 6 kcfs. Dworshak was at 1533.6'. Lower Granite flows were in the 22-28 kcfs range. Hells Canyon flows were in the 9-15 kcfs range, and McNary was averaging 120-160 kcfs.

Fish: Cindy LeFleur, WDFW, reported that the fall migration count was picking up slightly. As of August 30, the numbers were slightly behind the forecast. Paul Wagner, NOAA, reported that the juvenile migration was ending, with Lower Snake numbers dropping below 100, and Lower Columbia counts at 1,000 or less.

Power: Nothing to report at this time.

Water quality: Jim Adams, COE, reported that there had been 5 slight TDG exceedances at Camas/Washougal over the past 2 weeks.

NOTE: Jim Adams, COE, announced that the COE's Draft Monitoring Plan would be out soon, with hopes to finalize it by the end of November. Few if any changes were expected from 2006.

Next TMT Face-to-Face Meeting, August 30th, 9:00-noon

Agenda Items include:

- Libby / Hungry Horse Operations Check-In
- Treaty Fishing Update
- Adult Migration Report
- Chum Presentation – Ken Tiffan, USGS
- Albeni Falls/Lake Pend Oreille Operations
- Draft 2007 Water Management Plan (?)
- Operations Review

Technical Management Team Meeting Notes

August 30, 2006

1. Greetings and Introductions.

The August 30 meeting of the technical Management Team was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Bonneville Unit 8 Rehab.

Yesterday we got a call about the Unit 8 rehab from Bonneville, said Bern Klatte; apparently it fell through the cracks at Portland District. We coordinated this operation through FPOM; it will require a four-hour test, under a variety of operating conditions. They would like the test to be performed today, Klatte said; the contractors are here, and we would like to start the rehab test at 2 pm today, and run it for four hours.

Some of the issues associated with this test include turning on unit 8 itself, Klatte said; if there are any juveniles in the area, they might be attracted. Adults are another concern. We need to coordinate this through the TMT process so we can send out a teletype and proceed, he said. Total river flow is 120 Kcfs at Bonneville, with 75 Kcfs spill and 33 Kcfs generation. In response to a question, Klatte said there would be no impact on the treaty fishery. Hlebechuk noted that during the test, the project will need to release an additional 12 Kcfs through Unit 8; this will mean a 4 Kcfs reduction in spill during nighttime hours tonight. Klatte noted that this test has been coordinated through and approved by Rick Kruger at ODFW. The test would continue for a maximum of 5 hours.

It sounds as though there would be no impact to the gillnet fishery, but spill would be reduced by 4 Kcfs for 12 hours tonight, if the test runs for four hours as scheduled, said Harkless. It has been coordinated through NOAA, Oregon and FFDRWG; does anyone else have any input on this test? The Service has no problem with it, said David Wills. Why wasn't this scheduled next week, after the spill season ends? Russ Kiefer asked. I think it had to do with the contractor's schedule, Klatte replied.

3. Lower Monumental/Ice Harbor Spill Patterns for Navigation.

Hlebechuk said spill patterns were developed after the last TMT meeting to facilitate navigation through Ice Harbor and Lower Monumental. Flow in the river had dropped, and we needed spill patterns that would work for a lower number of stops, she explained. The good news is, so far, at Lower Monumental, 40 boats have passed since the last TMT meeting; 31 requested no change in operations, only 5 requested no spill, and 4 requested the new spill pattern. At Ice Harbor, they ended up not needing to utilize any of the new spill patterns. Ice Harbor pool was dropped to MOP last Thursday, she added. Overall, the operation went well, and we appreciate FPOM getting together and developing those spill patterns so quickly, Hlebechuk said.

4. Libby September Operations.

Jim Litchfield said he has discussed the Libby operation with Bruce Measure and Brian Merotz; Brian's recommendation, which we would like to see implemented, is to ramp down from the current 14 Kcfs to 9 Kcfs, and hold that outflow volume through the end of September, he said. This will optimize biological conditions in the river below Libby, he said. Perhaps we can ramp down to 9 Kcfs, and revisit that operation at the September 13 TMT meeting, Litchfield said.

I also know there is some interest, on Bonneville's part, in having the flexibility to increase Libby outflow in response to power demand during September, he continued. Brian's response is that an increase, of a limited duration, would be fine, but that any decrease below 9 Kcfs should be avoided if at all possible. How quickly were you proposing that we ramp down to 9 Kcfs? Hlebechuk asked. We're proposing that you follow the ramp rates attached to today's agenda, Litchfield replied, adding that, if the minimum outflow from Libby in October is 4 Kcfs, Montana would advocate a more gradual rampdown from 9 Kcfs to 4 Kcfs toward the end of September.

After a brief discussion, no TMT objections were raised to Montana's proposed September operation at Libby. Hlebechuk said Libby will be ramped down by 2 Kcfs per day, beginning at 10 pm Friday, September 1.

5. Dworshak Operations.

Jim Adams said the current Dworshak elevation is 1532.3 feet; we expect to hit 1531 by tomorrow at midnight. Temperatures in the Lower Granite tailrace are holding in the 66-67-degree range; the whole system is starting to cool down. Dworshak is releasing 7.6 Kcfs at 46.5-47.5 degrees F. Temperatures out of Orofino are in the mid- to low 70s; out of Anatone, they're about the same.

With respect to the thermocline in Dworshak Reservoir, Adams said two units – one large and one small – are currently running in undershot mode. Release temperatures are running about two degrees cooler than forecast, which has led me to re-draw the thermocline, Adams said. My prediction is that we will see a release temperature of about 48 degrees in September, when we reach elevation 1520 at Dworshak and shift to minimum outflows, Adams said. That looks good to me, said Paul Wagner.

The plan is to continue the current operation into September, Adams continued. It looks like we'll need to drop down to 5.4 Kcfs – one large unit – on about September 6 or 7, said Greg Haller. With respect to the operational plan developed by the Dworshak Board, Haller said that plan is based on a number of considerations – temperature conditions, the status of the juveniles rearing in the Clearwater, cultural resources, summer recreation and the status of the juvenile and adult migrations. We expect to maintain 7.6 Kcfs outflow until about September 6 or 7, then drop down to one large unit until we reach elevation

1521, at which point we will reduce outflow to one small unit, about 2.2 Kcfs, for two or three days until elevation 1520 is achieved, Haller said. After that, Dworshak will go to minimum outflow, about 1.4 Kcfs. It looks like we'll hit elevation 1520 by about September 15 or 16, Adams observed.

We'll plan to reduce Dworshak outflow to 5.4 Kcfs at 10 pm on September 6, Hlebechuk said. In response to a question from Kyle Dittmer, Hlebechuk said about 160 kaf of cool Dworshak water will be available for use after September 1 this year, less than the planned 200 kaf. Haller noted that the Nez Perce Tribe had approved the use of that extra 40 kaf during August because of the need to begin Dworshak augmentation earlier than expected in 2006.

6. Treaty Fishing SORs.

Dittmer said CRITFC submitted an SOR covering a two-week treaty fishery beginning August 21 and ending August 31; this SOR requests that Bonneville, The Dalles and John Day pools be held within a one-foot operating range. Hlebechuk said the Corps will maintain the Bonneville pools within 1.5 feet above whatever elevation is attained at the beginning of the fishery. She said there would be a one foot soft constraint at the top of the 1.5' hard constraint range. And why can't you achieve a one-foot band? Dittmer asked. Ted Strong and Col. Mogren discussed that in 1998, and agreed on the 1.5-foot band, only at Bonneville, Hlebechuk said – to operate the lower river projects for power flexibility, we need more than a one-foot range. So it's more of a power constraint? Dittmer asked. I would need to review the specific wording of the agreement, Hlebechuk replied.

7. End of MOP at Little Goose, Lower Monumental and Ice Harbor.

Kiefer said FPAC has been discussing this operation for several weeks and has developed a consensus recommendation. The spill operation will be ending this weekend, at a time when the power demand is usually lower. Our recommendation, to facilitate adult migration, is that refill above MOP begin at Ice Harbor and move upstream, starting September 1. We will give the action agencies some additional flexibility, in terms of timing, this year, and recommend that this be done on a weekly basis, Kiefer said. It sounds, then, as though we will begin to refill the pools on September 1 as power scheduling allows, MacKay said. No objections were raised to this characterization. The Corps noted that Ice Harbor pool needs to be refilled for a special operation by September 6. That sounds very reasonable, said MacKay.

8. End of Spill.

Hlebechuk said the action agencies just wanted to remind everyone that the spill program will end at 12:01 am on September 1, and at 3 pm August 31 at the Bonneville corner collector. Why is that different, just out of curiosity? Kiefer

asked. The corner collector gate is manually operated, and I suspect that the crews didn't want to be out there at midnight, Wills replied. That's in the Fish Passage Plan, Klatte added – it's because of the time and staffing requirements needed to shut the corner collector down.

9. Operations Review.

Reclamation reported that the current Grand Coulee elevation is just over 1280 feet; the project is expected to reach elevation 1280 exactly on August 31. The current elevation at Banks Lake is 1565; it will be at 1280.0 some time between now and August 31. Grand Coulee will begin to refill this weekend, as will Banks Lake. Hungry Horse is at elevation 3546 feet, and will be ramped down by 1 Kcfs per day to achieve the Columbia Falls minimum flow by this Friday. The Corps reported that Libby is at 2339.9 feet, with 14 Kcfs outflow and 6 Kcfs inflow. The current elevation is at 1533.6 at Dworshak; the project hit 1535 on August 28. Lower Granite outflows have been 22-28 Kcfs over the last week; McNary flows, 120-160 Kcfs over the past week.

On the fish front, LeFleur said adult fall chinook numbers are increasing at Bonneville; we're starting to get into the heart of the migration now. The numbers continue to lag slightly behind the pre-season forecast. Wagner said that, with respect to juveniles, the migration period is almost over. Passage indices at Lower Granite, Little Goose and lower Monumental have declined to less than 100; at the Lower Columbia projects, less than 1,000.

No power system issues were reported at today's meeting. On the water quality front, Adams said there have been five slight TDG exceedences at Camas/Washougal in the past two weeks.

10. Next TMT Meeting.

The next meeting of the Technical Management Team was set for Wednesday, September 13. Meeting summary prepared by Jeff Kuechle, BPA contractor.

**TMT Meeting Participants
August 30, 2006**

Name	Affiliation
Russ Kiefer	IDFG
Robin Harkless	Facilitation Team
Jim Adams	COE
Robin MacKay	BPA

Paul Wagner	NOAAF
Cindy LeFleur	WDFW
David Wills	USFWS
Tony Norris	USBR
Cathy Hlebechuk	COE
Ruth Burris	PGE
Bern Klatte	COE
Russ George	WMCI
Tom Haymaker	PNGC
Dan Spear	BPA
Kyle Dittmer	CRITFC
Margaret Filardo	FPC
Bruce MacKay	Consultant
Tom Le	PSE
Richelle Beck	D. Rohr & Associates
Greg Haller	NPT
Jeff Laufle	COE - NWS
Jim Yost	Idaho Governor's Office

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday September 13, 2006 09:00 - 12:00

**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. [\[Review Minutes 2006\]](#)
3. Chum 2005-06 study results - Ken Tiffan, USGS
 - [\[Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows, 2005\]](#) 
 - [\[Power point Version\]](#)
4. Libby Operations
 - [\[LIBBY Elevations \(Based on outflows of 9 kcfs until 30 Sep\)\]](#)
5. Dworshak Operations
6. Albeni Falls Fall/Winter operation
 - [\[DRAFT SYSTEM OPERATIONAL REQUEST #2006 - USFWS/IDFG - 1\]](#)
7. Adult Migration (Cindy Lefleur)
 - [\[Bright Adults over Bonneville & Tule Adults over Bonneville - 2006\]](#)
8. Treaty Fishing (Kyle Dittmer)
 - [\[SYSTEM OPERATIONAL REQUEST: 2006 C-6 - September 7, 2006\]](#) 
 - [\[Fall Commercial Gillnet Fishing Period Adopted: 9/11-15\]](#) 
9. End of MOP at Lower Granite
10. 2007 Water Management Plan
 - [\[2007 Water Management Plan - Draft September 13, 2006\]](#) 
11. 2007 Fall/Winter Update
 - [\[DRAFT SEPTEMBER 13, 2006 - Fall / Winter Update to the 2007 Water Management Plan\]](#) 
12. Operations Review
 - Reservoirs
 - Fish

- Power System
- Water Quality
 - [\[Spill Information 2006\]](#)

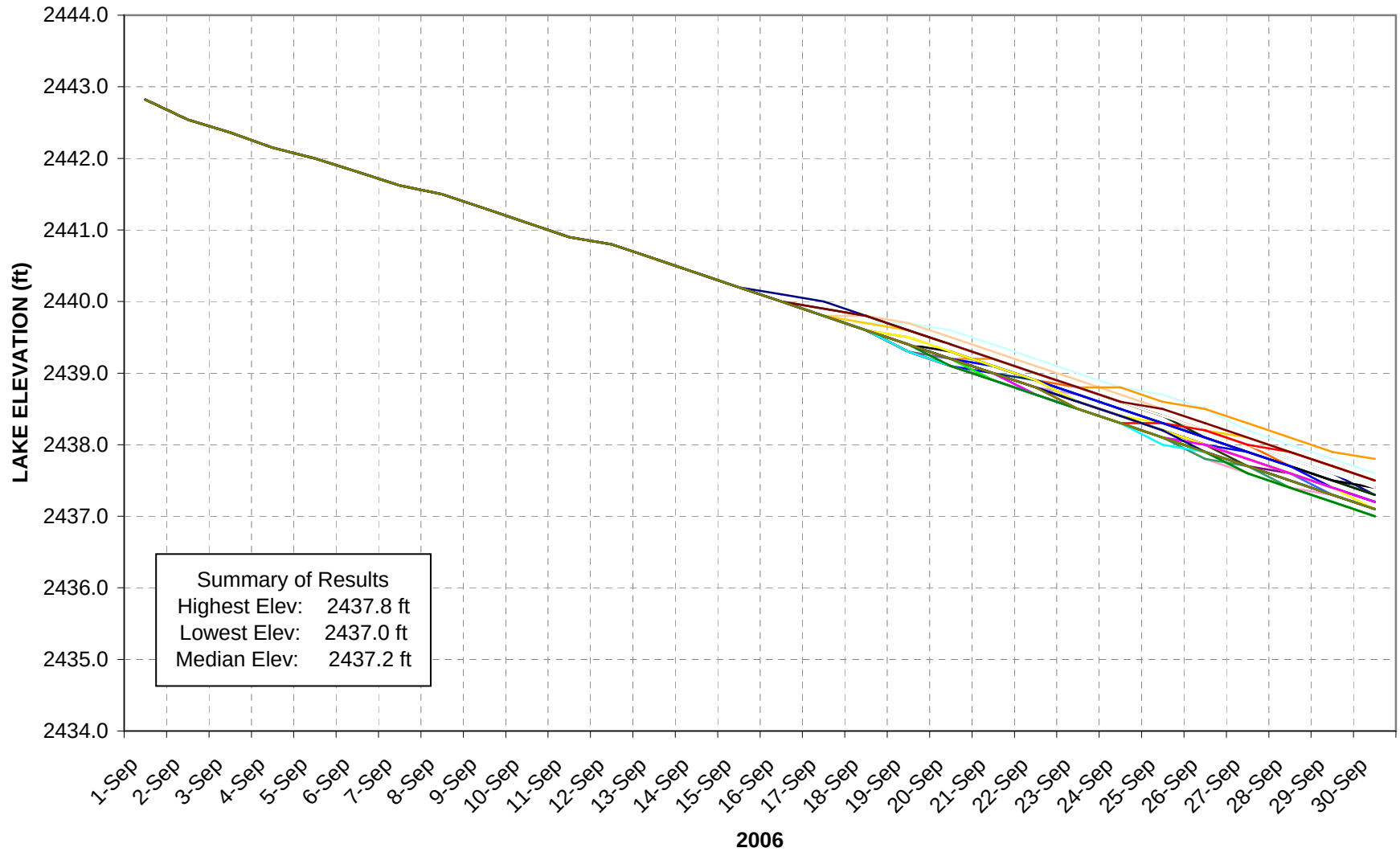
13. Other

- Set agenda for next meeting September 27, 2006 - [\[Calendar 2006\]](#) 

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

ESP Inflows from 05 Sep 2006

LIBBY Elevations (Based on outflows of 9 kcfs until 30 Sep)



**Fall Commercial Gillnet Fishing Period Adopted;
9/11-15**

**Scaffold Fishery Sales Continue
Thursday, September 7, 2006**

Today, the Compact states of Oregon and Washington concurred with the tribal regulations for the following Zone 6 fall commercial fishing period:

COMMERCIAL GILLNET SEASON

AREA: All of Zone 6

DATES: 6:00 AM Monday September 11 through 6:00 PM Friday, September 15.

GEAR: There will be an 8 inch minimum mesh size restriction.

ALLOWABLE SALES: Chinook, steelhead, coho, walleye, shad, and carp may be sold or retained for subsistence. Sturgeon may not be sold, but sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence.

SANCTUARIES: All standard river mouth and dam sanctuaries shall remain in effect. The standard Spring Creek Hatchery sanctuary will be in effect until escapement needs are met at Spring Creek Hatchery.

Scaffold Fishery:

The scaffold fishery remains open for subsistence use all year. Sales of fish caught in the scaffold/hook and line fishery continue until further notice. Allowable gears include hoopnet, dipnet, and hook and line. Allowable species are Chinook, steelhead, coho, walleye, shad, and carp. Sturgeon may not be sold. Sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence purposes.

Sales are also allowed for fish caught in overlapping portions regularly scheduled Yakama Nation subsistence fisheries in the Big White Salmon River and the Klickitat River. Please contact the Yakama Fisheries Office (509-865-6262) for exact times and dates.

If you have any fishing enforcement problems or need assistance or information, day or night, contact the Columbia River Inter-Tribal Fisheries Enforcement Office, 4270 Westcliff Drive, Hood River, Oregon. Phone: (541)-386-6363 or toll-free (800)-487-FISH (3474). **Please consult your tribal Fish and Wildlife Committee for additional details on tribal regulations. PLEASE WEAR YOUR LIFE JACKETS FOR SAFETY.**

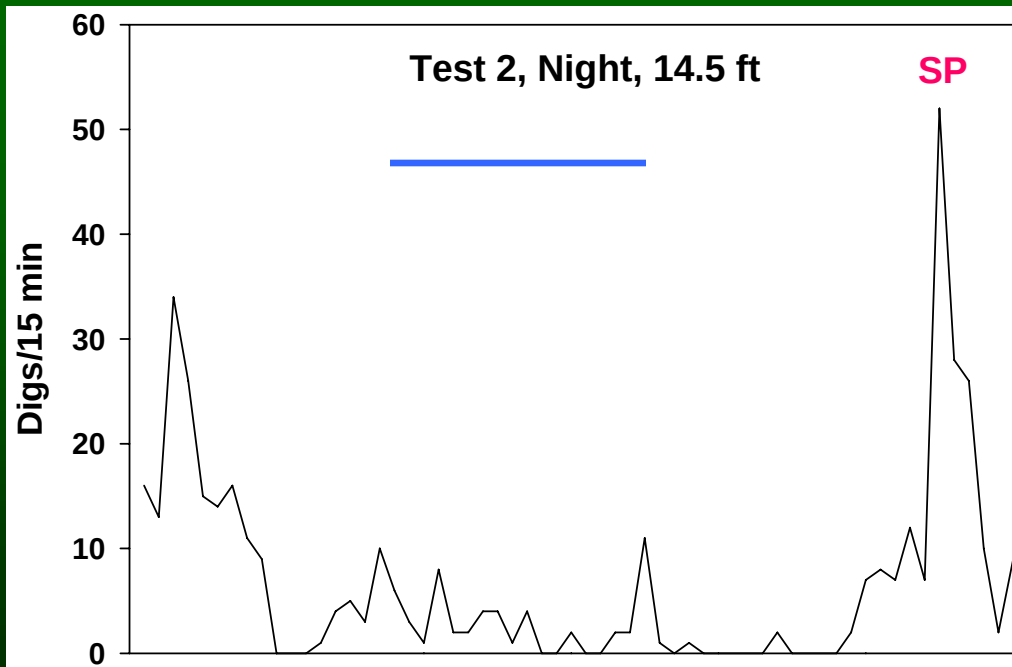
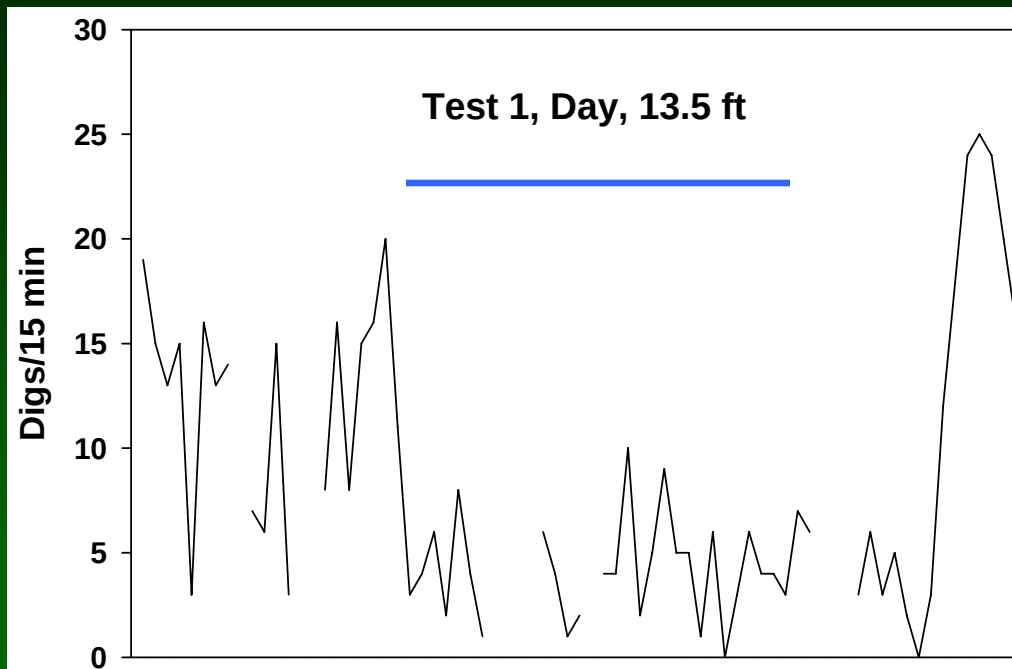
Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows, 2005

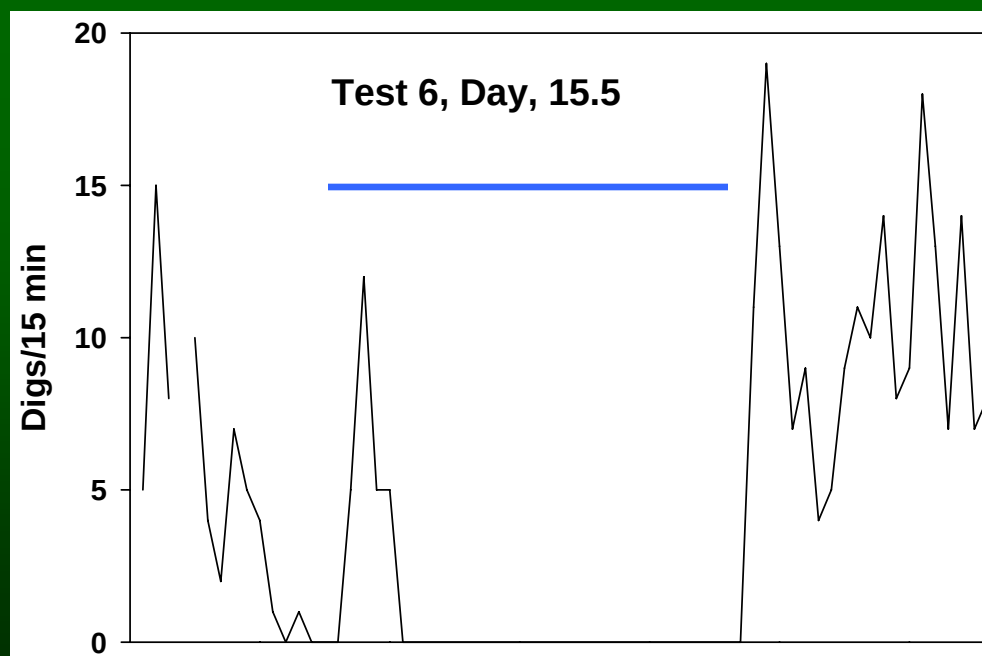
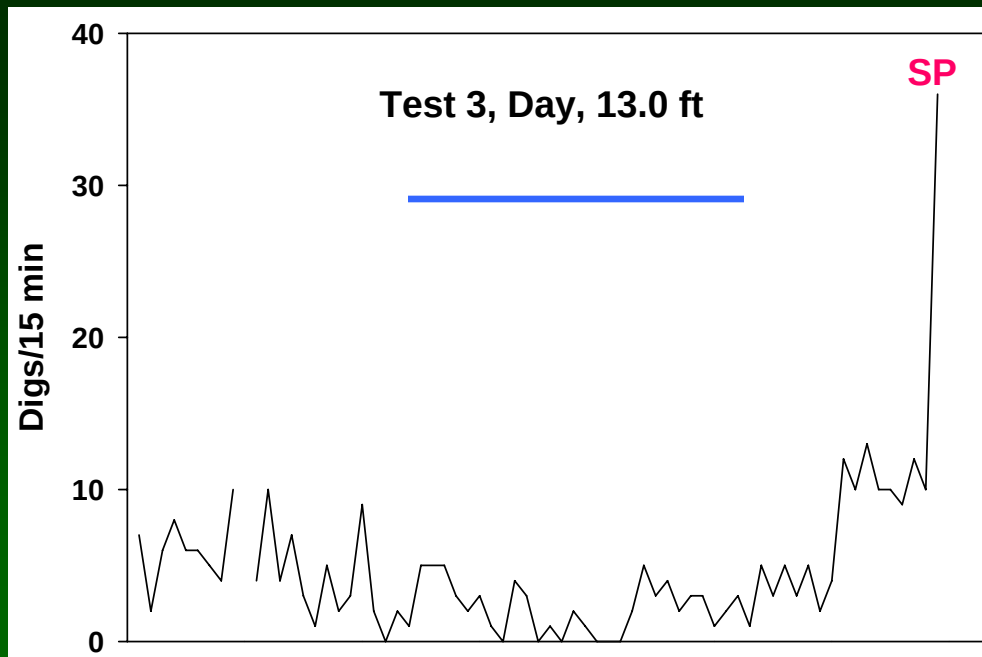


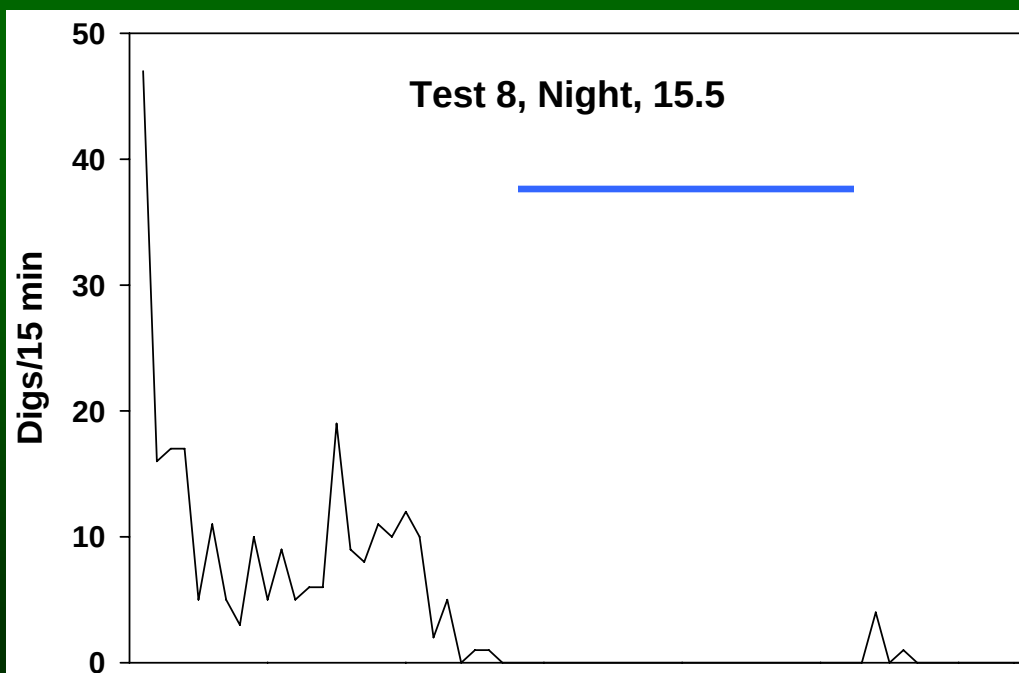
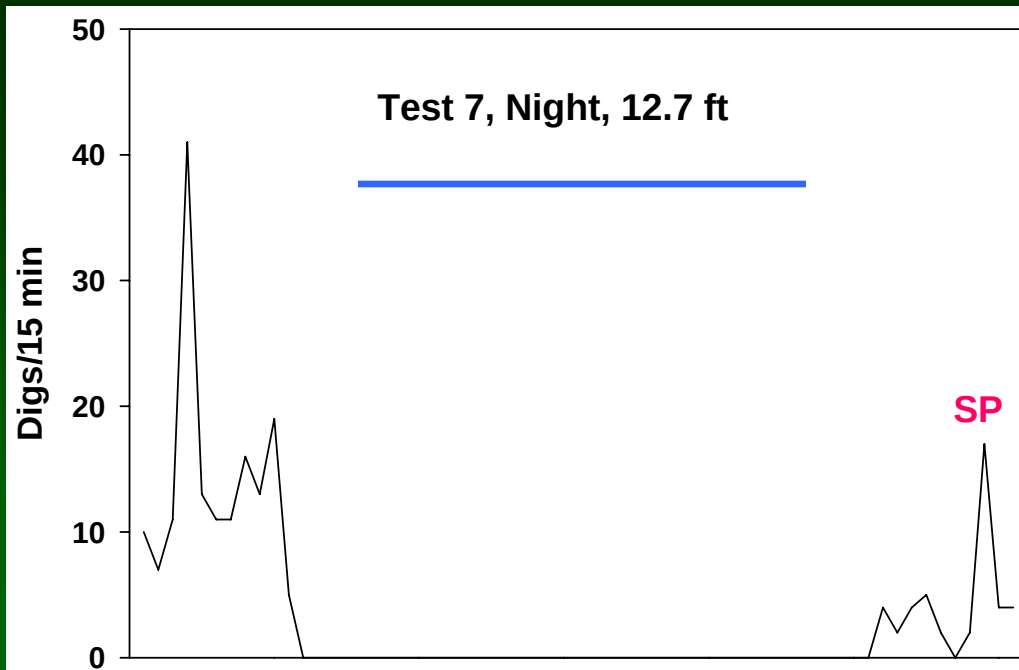
Kenneth Tiffan
U.S. Geological Survey
Western Fisheries Research Center
Cook, Washington

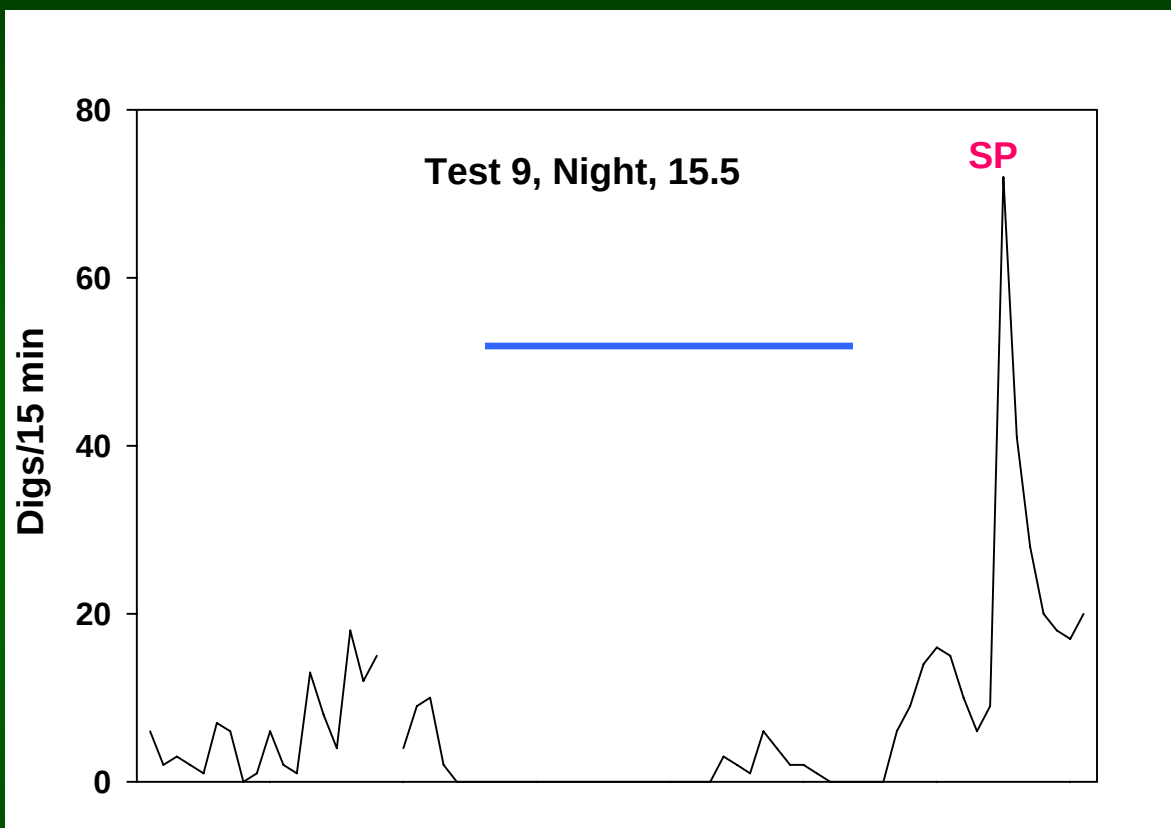
Summary of Test flows in 2005

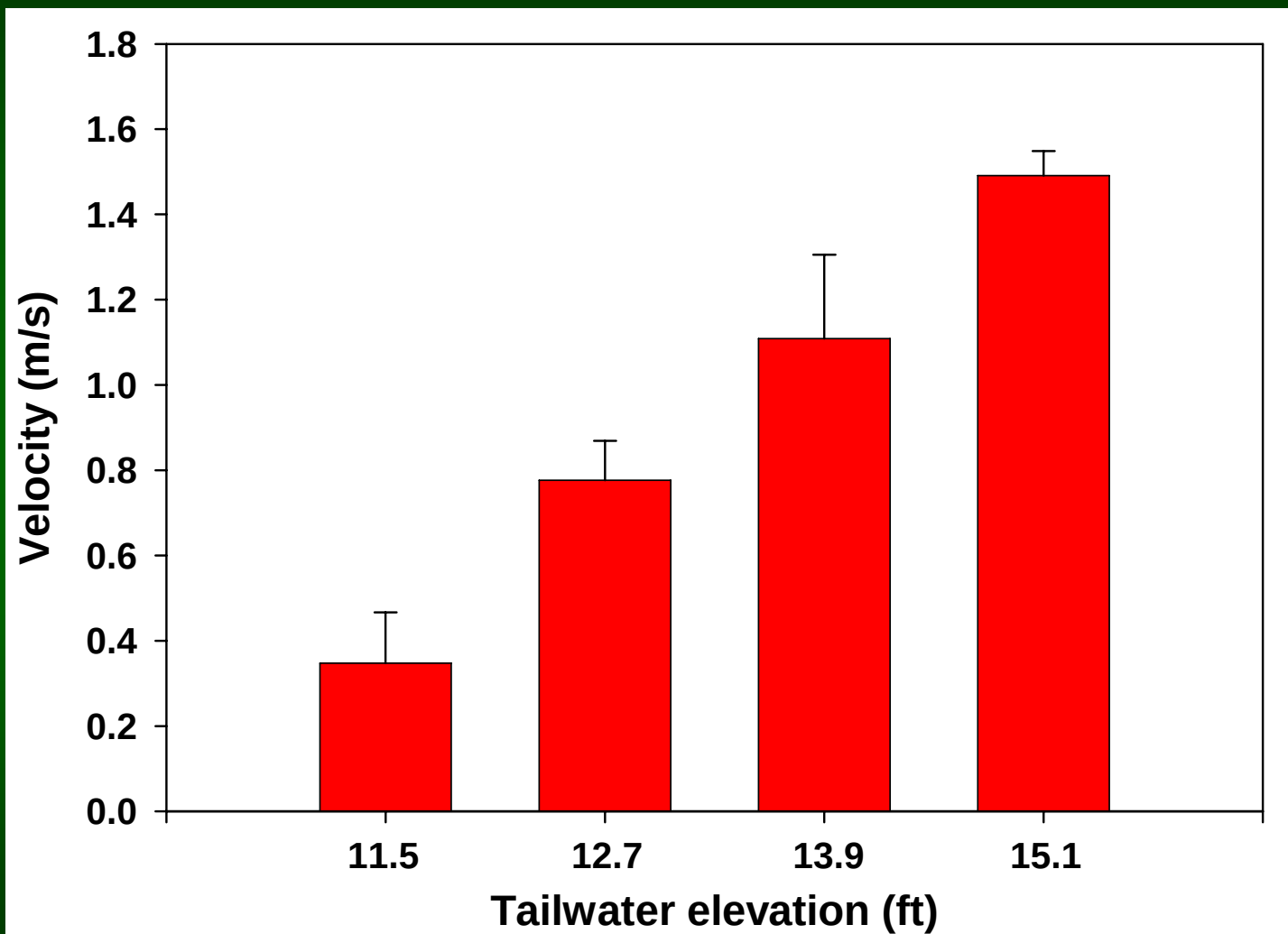
Test	Date	Type	Requested elevation	Actual elevation
1	11/16	Day	13.5	13.5
2	11/17	Night	15.5	14.5
3	11/19	Day	13.5	13.0
4	11/21	Night	13.5	13.5
5	11/22	Cancelled		
6	11/26	Day	15.5	15.5
7	12/1	Night	13.5	12.7
8	12/2	Night	15.5	15.5
9	12/6	Night	15.5	15.5
10	12/8	Night	13.5	13.5

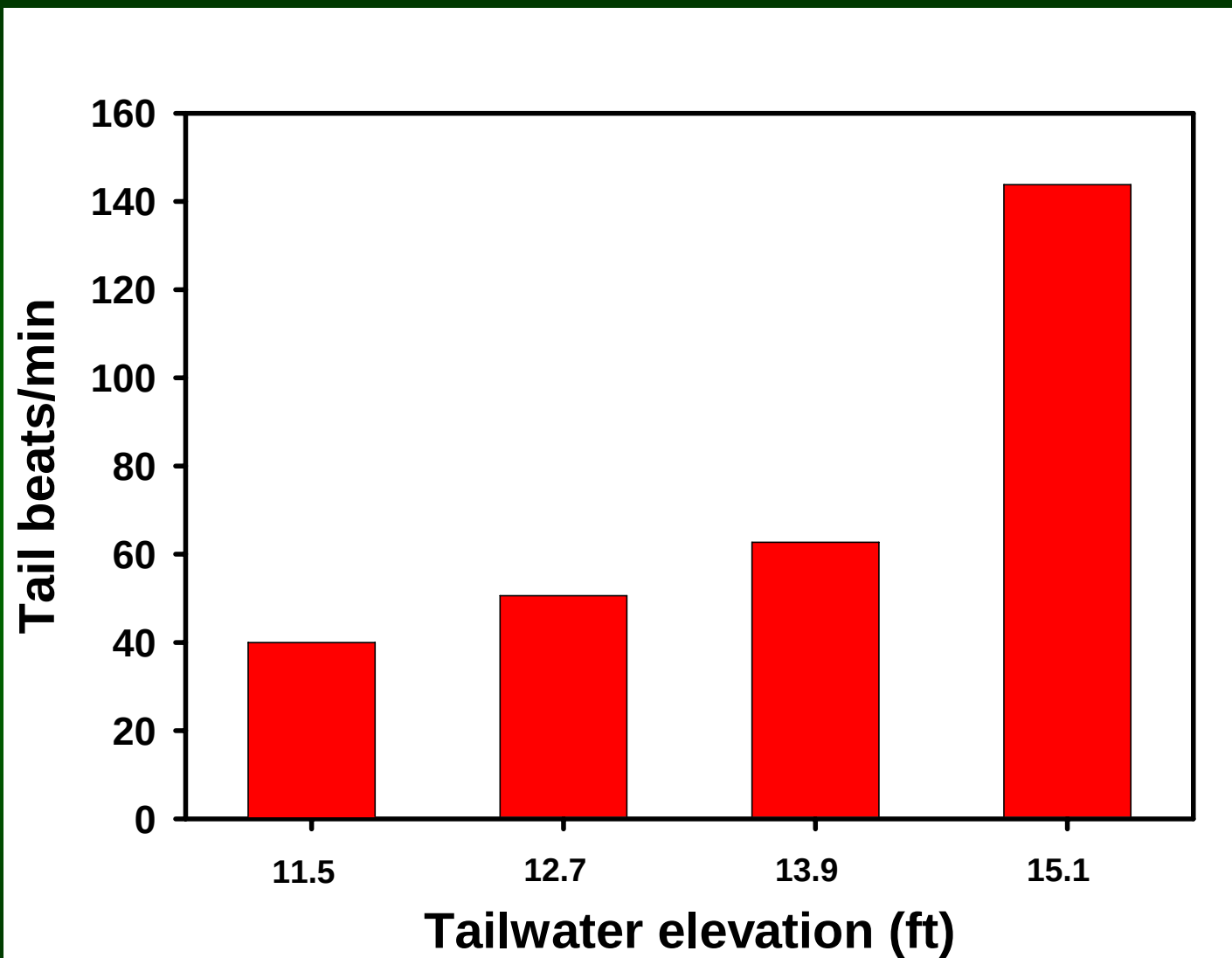






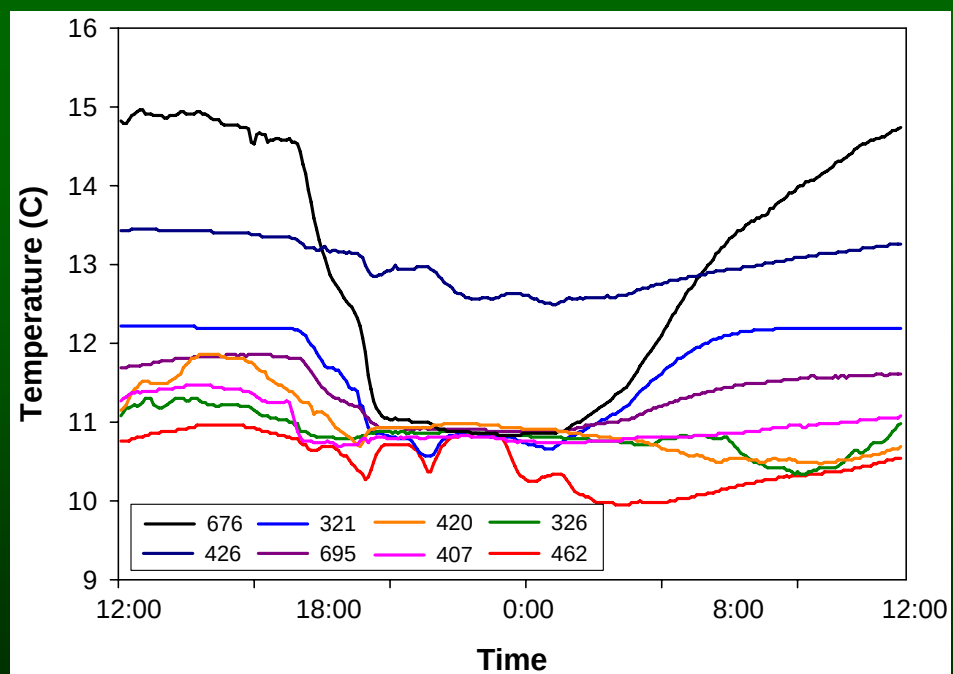
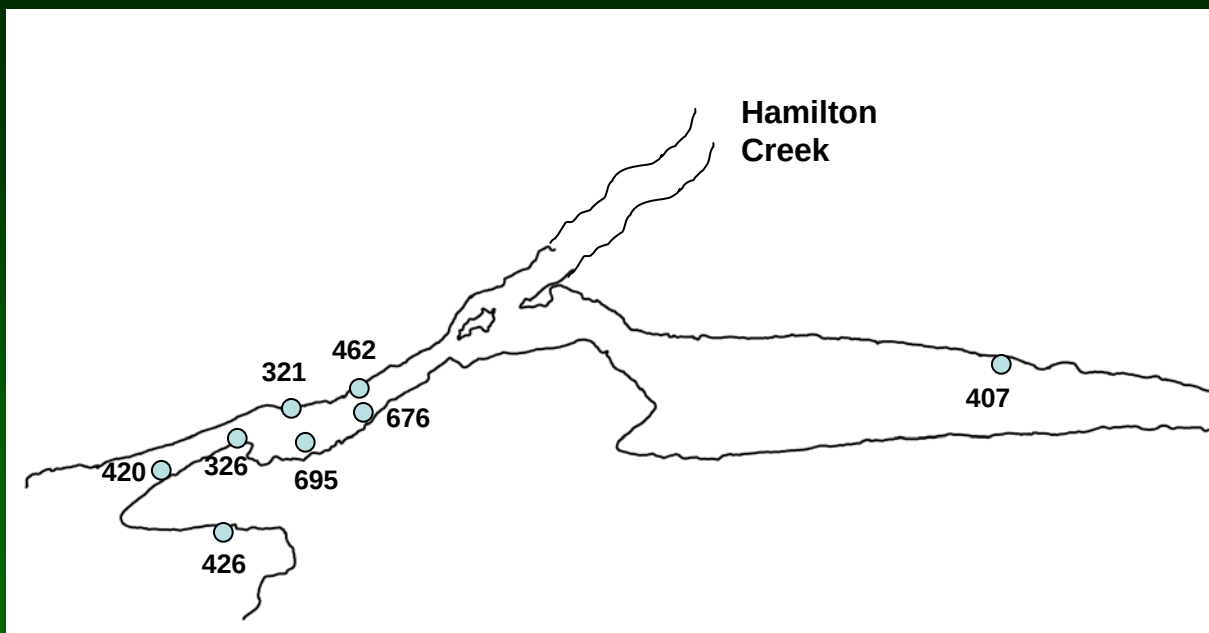






No fish, spawning activity, or redds were found at higher riverbed elevations during flow tests in 2005, however, fish abundance was relatively low





Conclusions:

- 1. Some fish were displaced from their redds at a tailwater elevation of 15.5 ft.**
- 2. Fish returned to their redds after flows returned to base levels.**
- 3. Four of the eight pairs of chum salmon observed spawned following a flow test.**
- 4. No redds were found at higher riverbed elevations, but fish numbers were down in 2005.**
- 5. Some consequences of elevated flows we evaluated are short-term interruption in spawning activity, increased velocities and swimming activity, potential depression of thermal cues used for redd site selection, and temperature variation experienced by incubating eggs and fry.**
- 6. Analysis of acoustic telemetry data is ongoing.**

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

September 13, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Presentation: Behavior of Chum Spawners '05-'06

Ken Tiffan, USGS, reported on findings from the BPA-funded study of the 2005-2006 chum spawning season near Ives Island. Tiffan stated that the goals of the study included a complete record of each tagged fish, how often fish were digging, courtship behavior and, ultimately whether fish would successfully spawn, given various flow events. Tiffan noted that while the sample sizes were small, the duration of the tests (8 hrs. usually from 8 am – 4pm) were longer than tests done in 2004. Observations included variable digging for any given pair (consistently, digging reduced during flow testing and then returned during ‘normal’ flows). Temperature was also studied and is being analyzed. Tiffan said that thermal cues may need to be in place longer to see if variations in temperatures have any effect on redd site selection.

Conclusions: Some fish were displaced from their redds at tailwater elevations of 15.5', but then returned after flows decreased. Four of the eight pairs of chum spawned following flow tests. No fish entered newly inundated areas to spawn, nor were redds found at higher riverbed elevations (perhaps due to the low abundance of fish in 2005). Elevated flows contributed to short-term interruptions in spawning. Swimming activity increased with increased velocity.

Ken noted that funding is in place to continue studies this year. While he hopes to duplicate the test from 2005 to get a better sample size and more conclusive information, he remained open to suggestions from TMT members on how to shape the test this year.

Next Steps: USFWS noted that there are studies on spawning trends planned for Multnomah Falls and other areas. TMT members will continue discussion of potential '06 -'07 chum studies at the 9/27 TMT meeting and share feedback with Ken.

Libby / Hungry Horse Operations Check-In

Cathy Hlebechuk, COE, reported that Libby elevation was at 2440.6', with outflows at 9 kcfs. ESP inflow analyses depicting Libby releases continuing at 9 kcfs through September showed a very small expected elevation range, of 2437.8' - 2437'. Robin MacKay, BPA, noted that Bonneville will likely request ramping down to 6 kcfs at the end of September. As ramp rates between 9-6 kcfs for September are 1 kcfs per day, the

ramp down will likely begin on the evening of September 27th. The action agencies noted the continued need for flexibility with respect to power needs, and agreed to check status again at the TMT meeting on 9/27.

Dworshak Operations

Cathy Hlebechuk, COE, reported that Dworshak elevation was at 1520.5' as of the evening of 9/12. As per the Dworshak Operations Board's plan for September hold at 7.4 kcfs (one big unit / one small), and then dropped to 4.5 kcfs on 9/6. The Board requested flows drop to one small unit (2.4 kcfs) when the reservoir elevation reached about 1521', then dropped to minimum flow when the project reached 1520'. As of 9/13, flows were down to 2.4 kcfs. At 2200 hrs on 9/13, the COE planned to drop to minimum flows (1.3-1.6 kcfs).

Adult Migration Update

Cindy LeFleur, WDFW, gave an update on the adult migration: through 9/11, numbers were below the forecast, with the brights count over Bonneville at 142,000 (vs. predicted 187,000) and the tule count at 23,000 (vs. predicted 33,000.) LeFleur noted that the forecast would be updated the afternoon of 9/13, and that the numbers would likely result in a downgrade, which would impact fisheries. LeFleur will update TMT on adult migration status at the 9/27 meeting.

Lake Pend Oreille Fall/Winter Operation / Draft SOR #2006 C-6

Russ Kiefer, ID, shared a draft SOR with TMT members, per request from the action agencies to see a draft proposal as soon as possible. Kiefer said that the annual Lake Pend Oreille SOR's intent are to continue testing the beta version of the 'decision tree' in hopes of finding areas for improvement and to bring confidence and support for use of this tool as a guide for future operations. With female kokanee abundance numbers below target levels and an expected dry fall season, the SOR requests a drawdown to minimum lake levels. The SOR also requests keeping the lake full as long as is reasonably possible, to test the concept of impacting lake trout spawning, provide better synchronicity between flow augmentation provided and salmon spawning below Bonneville Dam, and provide increased flows when power markets are likely better. The SOR proposes that the lake be held at full pool as long as reasonable possible, hopefully at least October 7th, and target November 20th for reaching the winter elevation of 2051', with flexibility built in on both ends of the operation to correspond with actual conditions.

A question was raised about the impact of spill if necessary to meet the objectives in the SOR. Kiefer said that the preference is to avoid spill if possible, and to comply with water quality standards. The COE noted that there will be a continued need for flexibility with regard to precipitation, unit outages and the needs of fish and power. Idaho acknowledged this flexibility need. Kiefer added that studies will be done on lake trout redds which should aid in making informed recommendations for next year. Per the USFWS bull trout BiOp, a long term lake level management plan is expected to be in place by the end of 2007.

While the SOR was at this time still a draft, participating TMT members shared their responses. The COE, NOAA, BPA, BOR, USFWS, Oregon and Washington voiced their support for the draft SOR. Rick Kruger, ODFW, added that from Oregon's perspective, holding the lake up as long as possible would provide the most benefit for chum. Jim Yost, Idaho, thanked the action agencies for their support, and commended the folks who worked to put the proposed operation together.

Action/Next Steps: Russ will send a final version of the SOR to the COE for distribution to TMT and posting on the web. The final draft will include NOAA's sign-off and language about the action agencies' need for operating flexibility with regards to unit outages.

Treaty Fishing SOR's

Kyle Dittmer, CRITFC, reported on the latest Autumn treaty request for fishing 9/11-15. He noted CRITFC's concern regarding the Net Flight Survey results: as of 9/6, the John Day elevations were 1' below the desired elevation. Dittmer reiterated the requested hard constraint of 1' from full at John Day, The Dalles and Bonneville pools, as well as the desire to keep fluctuation to a minimum. COE agreed to operate Bonneville within the 1.5' range as a hard constraint (1' soft). CRITFC will submit a final autumn treaty SOR at the TMT meeting on 9/27.

End of MOP at Lower Granite

Paul Wagner, NOAA, reported that Lower Granite was cooling but not quite at the range for recommending end of MOP (~65 degrees). The current range was 66-67 degrees. Anatone was in the range of 68-70 degrees. Given the natural cooling trend occurring, the recommendation will likely be to end MOP the first week in October. All will continue to monitor temperatures and there will be a check in on this at the 9/27 TMT meeting.

End of Transport at McNary

There was a request from the project to stop transport at McNary because of the low number of juvenile salmonids and the high number of shad being collected at the project, Wagner said. In other words, there are very few juvenile salmon moving through the system now, and transport conditions are far from optimal. We discussed this at yesterday's FPAC meeting, and the consensus of the group was that we should go to bypass at McNary, and stop transport at this time.

Scott Dunmeyer noted that stopping transport at McNary could impact the ongoing fall Chinook research program – was that discussed at FPAC? Scott Dunmeyer said full-flow bypass at McNary should allow for PIT-tag detection. In other words, that should be OK for the fall Chinook transport study, he said. Marvin Shutters agreed. We also understand that transport is being ended at Lower Monumental, he said. Typically that happens at the end of September, Wagner replied – we did not discuss ending transport at Lower Monumental at yesterday's FPAC meeting.

Shutters asked that, if possible, the TMT delay making a decision on the end of transportation at McNary for a few more days, to allow the Corps to consider the full

impact of ending transportation at McNary on the fall Chinook transport study. After a brief discussion, it was agreed to give the Corps one more day to analyze this proposed change in operation; unless the Corps produces compelling information suggesting that it would be unwise to cease McNary transport at this time, McNary transport will stop on Friday, September 15. It was agreed to notify the TMT membership via email once a final decision is made.

Action: Cathy Hlebechuk will communicate via email by 9/15 as to the results of the off-line discussion and resulting operation, and there will be a check in on Lower Monumental at the 9/27 TMT meeting.

2007 Water Management Plan

Bernard Klatte, COE, reported that the first draft 2007 WMP and Fall/Winter Updates have been posted to the TMT website. No changes from the 2006 draft have been made at this point, and the action agencies requested that TMT members review and submit changes, additions, etc. based on expected 2007 operations, before the September 27 TMT meeting.

ACTION: Bernard will email the draft WMP in 'Word' to TMT members, who will track changes on the document and send them back to Bernard by September 26. Individual comments will be posted to the TMT web page as they come in. TMT will discuss comments to the WMP at the next meeting.

Operations Review

Reservoirs: Grand Coulee was at elevation 1282.1'. Hungry Horse was at 3544.35' and releasing 2.8 kcfs to meet Columbia Falls minimums. Libby was at elevation 2440.6' and releasing 9 kcfs. Dworshak was at 1520.5', planning to drop to 1.4 kcfs this evening (9/13). McNary average flows have been 80-111 kcfs. Flip lips are being installed at Chief Joseph and an RSW is being installed at Lower Monumental.

Fish: Paul Wagner, NOAA, reported that juvenile numbers were below 100 at all the projects and that full transport has been ongoing, slated to end soon. The adult Fall Chinook migration appears to have peaked, at about 14,000, on 9/9. Numbers dropped to 5,000-6,000 over the last few days. Overall numbers are lower than last year. Steelhead numbers are higher than last year, with 273,000 total for the year (70,000 wild).

Power: Nothing to report at this time.

Water quality: Linked to the agenda is a summary of 2006 water quality exceedances.

Next TMT Face-to-Face Meeting, September 27th, 9:00-noon

Agenda Items include:

- 2006 -'07 Chum Studies
- Libby / Hungry Horse Operations Check-In
- Treaty Fishing SOR
- Adult Migration Update

- Albeni Falls/Lake Pend Oreille Operations
- End of MOP at Lower Granite
- End of Transportation at Lower Monumental
- Draft 2007 Water Management Plan/Comments Review
- Operations Review

Technical Management Team Meeting Notes

September 13, 2006

1. ***Greetings and Introductions.***

Today's Technical Management Team meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. ***2005-2006 Chum Study Results.***

Ken Tiffan led this presentation, noting that this study was funded by BPA. We were looking at behavioral effects on chum salmon in the Ives Island area in response to elevated flows, he explained, noting that the data he will be presenting and his conclusions are based on very small sample sizes.

Tiffan explained that, as part of the study, USGS requested higher flow and elevation levels for two-hour and longer periods, beginning in 2004. We're pretty pleased with the test conditions we've been able to obtain so far, he said; we had an acoustic array deployed and tagged fish with acoustic transmitters. We're still analyzing that data, he said, but I do have some behavioral data to show you today – how often fish dig, courtship behavior, spawning events. Ultimately, what we were interested in is, what effect do we have on actual spawning in response to these flow events?

Tiffan went through his presentation, touching on the following major topics:

- Digs per 15-minute interval, over time (8 hours) for individual spawning pairs (graphs)
- Temperature data (graphs)
- Conclusions: fish are displaced at elevation 15.5 feet, but the fish do return to their redd sites, and did spawn successfully. Didn't find redds at higher river elevations. Only looked at Ives Island area; no conclusions can be drawn about I-205 or Multnomah.

- Consequences of higher flows: depressed thermal clues, increased energy cost, (see presentation)

We're still analyzing the data, said Tiffan, so these conclusions probably aren't complete. If flows were to be maintained to create a tailwater elevation of 13.5 feet for, say, two weeks, we might see some redds deposited at higher elevations. Any thoughts about daytime vs. nighttime spawning? Paul Wagner asked. We haven't seen any difference between day and night, Tiffan replied – once the fish select a mate and a redd site and spawning begins, they go at it until they're done. We don't know about diel differences in terms of the timing of mate selection, however, Tiffan added.

Are you planning to repeat this work in 2006? David Wills asked. That's up to you guys, Tiffan replied – I would like to continue this work, and there may be an opportunity to double our sample size. We'd like to stay with an 8-hour test, and evaluate the 13.5-foot tailwater elevation, to see whether fish will enter the newly-inundated areas. It would certainly be nice to have a few more data points, Tiffan said. Do you have a plan of study? Hlebechuk asked. We do, but it needs to be fleshed out, Tiffan replied – I could propose that we do the same thing in 2006 that we did in 2005, if you're willing to provide the flows we need. After a brief discussion, it was agreed that the TMT members will consider the desirability of a 2006 test and will discuss it further the next TMT meeting. Wills said he is, at least initially, supportive of such a test. Tiffan said he will need the TMT's feedback by the end of October if a 2006 test is to start in a timely fashion.

3. *Libby Operations.*

Hlebechuk said Libby is currently at elevation 2440.6 feet, releasing 9 Kcfs. The last time we talked, we discussed maintaining that flow volume and revisiting the Libby operation at today's meeting, to see whether a reduction in outflow to something closer to the 6 Kcfs minimum outflow is desired, Hlebechuk said. She provided the most recent ESP runs, showing expected end-of-September elevations at Libby under various operational scenarios. Bonneville will probably be requesting that Libby outflow be stepped down to 6 Kcfs during the last week in September, and that outflow be held to minimum in October, said Robin MacKay. Hlebechuk noted that the ramp rate is 1 Kcfs per day, which means the rampdown from 9 Kcfs would need to take place over three days, beginning on September 28. Is that acceptable to the TMT? Hlebechuk asked.

After a brief discussion, MacKay said BPA doesn't need a decision today; that's the plan, at this point, she said, but we can revisit it later in the month. It was agreed to discuss this topic again at the September 27 TMT meeting. In the interim, Libby will continue to release 9 Kcfs, with the flexibility to increase flow above 9 Kcfs if power needs change. In response to a question, MacKay said Bonneville has discussed this plan with Montana.

4. *Dworshak Operations.*

Dworshak reached elevation 1520.5 feet last night at midnight, said Hlebechuk. The Dworshak Operations Board – Paul Wagner, Bill Graham from Idaho, Greg Haller and Cindy Henriksen – came up with a plan for September operations. The request was to hold 2 units – 7.6 Kcfs – until September 6, then go to one large unit (4.4 Kcfs) until elevation 1521 was reached. Project outflow was then reduced to one small unit (2.8 Kcfs) until elevation 1520 is reached,. Dworshak outflow will be reduced to minimum (1.3 Kcfs) beginning tonight at 10 pm.

5. *Adult Fall Chinook Returns.*

Cindy LeFleur said the compact is meeting again today to downgrade the fall Chinook forecast, particularly for upriver brights. Is it common for the forecast to be downgraded? Wagner asked. It happens in some years, LeFleur replied. [see presentation on-line]. We'll get a further report in two weeks, said Harkless

6. *SOR for Lake Pend Oreille Winter Operations.*

Russ Kiefer noted that this is a draft SOR; we should have a final SOR soon, he said. We wanted to give you our thinking, however, so the action agencies can begin planning for operations later this fall and winter. As you know, we have a draft decision tree for Lake Pend Oreille winter operations, he said; we have been trying out different operations for the past several years to test our confidence in that decision tree.

The SOR requests keeping the lake full as long as is reasonably possible, to test the concept of impacting lake trout spawning, provide better synchronicity between flow augmentation provided and salmon spawning below Bonneville Dam, and provide increased flows when power markets are likely better. The SOR proposes that the lake be held at full pool as long as reasonable possible, hopefully at least October 7th, and target November 20th for reaching the winter elevation of 2051', with flexibility built in on both ends of the operation to correspond with actual conditions.

One of the critical factors for the request of 2051' is the estimated adult kokanee spawner abundance, Kiefer said. The bad news is that female kokanee abundance is below the threshold this year – only 17,000 – so the available spawning substrate at the lower level will be adequate. We are very concerned about the persistence of kokanee in that lake, he said, because you will recall that Albeni Falls used to support a kokanee harvest of more than 1 million adult fish. The lake is also home to listed bull trout, he said, so

we're concerned about a potential shift to lake trout as the dominant species if the kokanee population is lost.

IDFG is determined to rebuild the kokanee population in Lake Pend Oreille, Kiefer said, but we're in trouble this year. Lake drawdown is intended to allow wave action to clean the spawning gravel, which provides better conditions for egg-to-fry survival, Kiefer explained. The decision tree strongly recommends that we go to the lower drawdown level, elevation 2051, in 2006, he said.

Another thing the SOR request is... [see SOR]. Kiefer noted that the drawdown operation has benefits for both power production and flow augmentation for chum. Rick Kruger said Oregon supports the drawdown operation requested in the SOR. Wagner said NOAA Fisheries also supports the SOR. LeFleur said WDFW does as well. MacKay said Bonneville has no problem with this SOR. Tony Norris said Reclamation has no objections to the SOR.

The group discussed the details of IDFG's kokanee enhancement and lake trout suppression programs; it was noted that lake trout are an exotic species, introduced to Lake Pend Oreille by the old "fish trains" in 1925. Dave Statler said that, in his view, if the techniques used in 2006 are successful, the situation is critical enough that IDFG might want to consider more aggressive action over the next few years to get the lake trout population under control and to enhance kokanee spawning success. The group also discussed the membership and function of the Idaho Lakes Commission, created by the Idaho Governor's office to make recommendations about lake operations, environmental concerns and water quality issues in the north Idaho lakes basins. The group was created by the Legislature and its members are appointed by the Governor to represent a broad range of local interests.

In response to a question, Kiefer said the goal is for IDFG to submit a final Albeni Falls/Lake Pend Oreille SOR within a week. Hlebechuk said it is the Corps' intent to implement this SOR as requested. She said she will email the final SOR to the TMT membership once it is received.

Update: Russ Kiefer submitted the final SOR on Friday, September 15. Russ Kiefer, Susan Martin (USFWS), Paul Wagner (NMFS) and Ford Elsaesser (Pend Oreille/Priest Lakes Commission) also signed on as submitting the SOR. As per discussion at TMT meeting September 13, the Corps agreed to implement the plan, barring unforeseen precipitation.

7. *Treaty Fishing.*

Kyle Dittmer said CRITFC submitted SOR 2006-CRITFC-6, requesting a treaty fishery to run through September 15. The SOR requests that

Bonneville, The Dalles and John Day pool be held within a one-foot operating range during the fishery. Dittmer said one more treaty fishing SOR may be forthcoming. He said a net flyover determined that there are 32, 24 and 44 percent of the nets in Bonneville, The Dalles and John Day pools, respectively.

Dittmer expressed concern that compliance with the requested operation dropped to 59 percent within John Day pool over the past week, down from 93 percent compliance with the requested one-foot band during previous treaty fishing periods. Hlebechuk replied that Col. Mogren agreed to implement a 1.5-foot operating range within Bonneville pool only; that is the operation the Corps has agreed to. Dittmer replied that, in CRITFC's view, the operation requested in the SOR should be the official operation. CRITFC would like to see the pools held as full as possible and within a one-foot operating range. Hlebechuk said that, as usual, the Corps' direction, since 1998, is to operate Bonneville pool within a 1.5-foot range during the treaty fishing season. Normal operations at The Dalles and John Day are as follows: The Dalles is operated within a three-foot range, while John Day is operated within a 1.5-foot range through the end of September. Unless we hear otherwise, that is the plan, she said. After October 1, John Day pool will be operated within a 2.5-foot range, Hlebechuk added.

8. *End of MOP at Lower Granite.*

Wagner said the normal plan, under the BiOp, is to reduce Lower Granite to MOP once natural cooling occurs. However, cooling has not really occurred yet -- temperatures at Anatone are still in the 68-70 degree range, while temperatures in the Lower Granite tailrace are still about 66 degrees. He said NOAA Fisheries would prefer to see Lower Granite tailrace temperatures of 65 degrees or less before the project is drafted to MOP. He suggested that it would probably make sense to revisit this issue at the September 27 TMT meeting. I'll put it on the agenda, Harkless said.

9. *McNary Transport.*

There was a request from the project to stop transport at McNary because of the low number of juvenile salmonids and the high number of shad being collected at the project, Wagner said. In other words, there are very few juvenile salmon moving through the system now, and transport conditions are far from optimal. The Salmon Managers discussed this, and the consensus of the group was that we should go to bypass at McNary, and stop transport at this time.

Scott Dunmeyer noted that stopping transport at McNary could impact the ongoing fall Chinook research program -- was that discussed at FPAC? Scott Dunmeyer said full-flow bypass at McNary should allow for PIT-tag detection.

In other words, that should be OK for the fall Chinook transport study, he said. Marvin Shutters agreed. We also understand that transport is being ended at Lower Monumental, he said. Typically that happens at the end of September, Wagner replied – we did not discuss ending transport at Lower Monumental at yesterday's FPAC meeting.

Shutters asked that, if possible, the TMT delay making a decision on the end of transportation at McNary for a few more days, to allow the Corps to consider the full impact of ending transportation at McNary on the fall Chinook transport study. After a brief discussion, it was agreed to give the Corps one more day to analyze this proposed change in operation; unless the Corps produces compelling information suggesting that it would be unwise to cease McNary transport at this time, McNary transport will stop on Friday, September 15. It was agreed to notify the TMT membership via email once a final decision is made.

10. *Operations Review.*

Reclamation reported that Grand Coulee is at 1282.1 feet, currently; Hungry Horse, 3544.35, discharging 2.8 Kcfs to meet the Columbia Falls minimum flow. The Corps reported that the current Libby elevation is 2440.6 with 9 Kcfs outflow. Dworshak was at elevation 1520.5 feet last night; outflow was reduced to 4.4 Kcfs last night, and will be reduced further to 1.4 Kcfs tonight. Over the past several days, the average flow at Lower Granite has been 21-27 Kcfs; at McNary, 80-120 Kcfs. Flip-lip installation has begun at Chief Joseph, an operation that will be ongoing for the next couple of years.

Moving on to fish, Wagner said juvenile numbers have fallen well below 100 fish per day in recent days throughout the system. The juvenile migration has now ended, in terms of the passage indices, he said. The spill program has now ended. With respect to adults, he said, fall Chinook passage peaked at 14,000 on September 9 and have since decreased to about 5,000 fish per day past Bonneville. We'll see if the rain stirs them up, he said. Steelhead numbers have been very steady, with 270,000 steelhead for the year, including 70,000 wild steelhead, and about 4,000 fish per day passing Bonneville, currently. A total of 69,000 fall Chinook have passed Bonneville to date, compared to just under 270,000 last year. Steelhead are up from 242,000 for this date last year, so the 2006 steelhead run is slightly better than the 2005 run.

Bonneville said there are no power system issues to be reported at today's meeting. Laura Hamilton went briefly through recent water quality information, noting that exceedence times for the entire 2006 season are now listed on the TMT homepage. Hamilton added that every station in the Lower Columbia continues to report water temperatures in excess of 68 degrees, although natural cooling is expected to begin soon.

11. 2007 Water Management Plan.

The goal for today's meeting was to give the action agencies a chance to briefly describe any changes from the 2006 plan, Harkless said. Norris said few changes have been made so far; if there are things we do every year that need to be memorialized in this document that are not currently memorialized, or there are sections that need to be rewritten, perhaps you can let us know prior to the next TMT meeting, he said. Hlebechuk said the target date to finalize the Water Management Plan is the end of September, so any comments received prior to that date would be very helpful. It was so agreed. It was further agreed that Bern Klatte will email the draft 2007 WMP directly to the TMT membership.

12. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, September 27. [3 hours]

TMT Meeting Participants
September 13, 2006

Name	Affiliation
Rudd Turner	COE
Robyn MacKay	BPA
Paul Wagner	NOAAF
Tony Norris	USBR
Cathy Hlebechuk	COE
Richelle Beck	D. Rohr & Associates
Laura Hamilton	COE
Robin Harkless	Facilitation Team
Russ Kiefer	IDFG
David Wills	USFWS
Don Faulkner	COE
Rick Kruger	ODFW
Jim Adams	COE
Matt Howard	USBR
Russ George	WMCI
Dan Spear	BPA
Kyle Dittmer	CRITFC
Jim Yost	Idaho Governor's Office
Dave Statler	NPT
Greg Hoffman	COE
Margaret Filardo	FPC
Glenn Traeger	Avista
John Wasch	Bear Energy
Tom Le	PSE

Cindy LeFleur	WDFW

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday September 27, 2006 09:00 - 12:00

**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. [\[Review Minutes 2006\]](#)
3. Adult Migration (Cindy Lefleur)
 - [\[Slideshow - Powerpoint\]](#)
4. Lake Pend Oreille research work on lake trout spawning
 - [\[Slideshow - Powerpoint\]](#)
5. Albeni Falls Fall/Winter operation
6. Chum 2006-07 research ideas
 - [\[Determining the influence of high flows of the spawning behavior of chum salmon at Ives Island, 2006\]](#)
- 
7. Lower Granite-end of MOP
8. McNary, Lower Monumental, Little Goose and Lower Granite - end of transportation
9. Water Management Plan
 - [\[2007\]](#)
10. Treaty Fishing (Kyle Dittmer)
 - [\[SYSTEM OPERATIONAL REQUEST: 2006 C-7 - September 14, 2006\]](#) 
 - [\[Fall Commercial Gillnet Fishing Period Adopted 9/18-22 and 9/25-29\]](#) 
11. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - [\[Dworshak Outage\]](#)
 - Water Quality

- [\[Spill Information 2006\]](#)
- [\[Daily Water Temperature Reports\]](#)
- [\[Daily Water Temperature and Water Temperature Strings\]](#)

12. Other

- Set agenda for next meeting October 25, 2006 - [\[Calendar 2006\]](#) 

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

Determining the influence of high flows of the spawning behavior of chum salmon at Ives Island, 2006

BPA Project 1999003 (Ken Tiffan; U.S. Geological Survey)

This document is a plan for proposed experimental flows from Bonneville Dam to examine the effects of elevated flows on chum salmon spawning behavior at Ives Island. This study is being funded by BPA under project 1999003 and will take place during from November 1 through mid December, 2006.

Background and rationale

In 2005, we conducted experimental flow tests by increasing tailwater elevations from either 11.5 ft to 13.5 ft or from 11.5 ft to 15.5 ft for a period of 8 hours. We measured movement responses of spawning chum salmon with acoustic telemetry and with a DIDSON acoustic camera. Acoustic telemetry data, when analyses are completed, will allow us to determine how far fish moved away from their redds and where they went during elevated flows. The DIDSON enabled us to measure more detailed behavioral changes in spawning behavior and success during flow test, but sample sizes were low. We request experimental flow tests again in 2006 to increase our sample size of fish observed with the DIDSON so we can be more confident of our conclusions. In addition, we will evaluate the incidence of spawning at higher riverbed elevation under different chum escapement in 2006. We plan to increase our sample size of fish observed by using a second DIDSON camera. The coordination of its use will determine the total number of tests requested, which will not exceed 10. For discussion purposes, assume there will be five tests at 13.5 ft and five tests at 15.5 ft. These tests can be scheduled during the day or night, however other ongoing work in the area limits daytime tests to occur only on Wednesdays or the weekend. The most convenient nights for testing are Tuesday or Thursday nights.

Table 1. Proposed ramp rates and times for 2006 flow tests.

Target tailwater	Time	Tailwater elevation
Daytime		
13.5 ft	07:00	Increase from 11.5 to 13.5 ft
	08:00 – 16:00	13.5 ft
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From: Hlebechuk, Cathryn L NWD
Sent: Wednesday, September 27, 2006 1:19 PM
To: Gonzales, Raymond NWD
Subject: please post on TMT 9/27 agenda

Please link to power system agenda item. Thanks.

Subject: Dworshak outage

As discussed at TMT today, 2 daily outages are scheduled which take all 3 units out of service and the project will spill through one of the regulating outlets to maintain the required minimum 1000 cfs. Most likely tdg will exceed 110% but there is always a chance it may not. Jim Adams has coordinated the spill with the State of Idaho and Nez Perce.

The first outage is scheduled for October 10 from 0500 to 1700 hours. 115 KV line outage, breaker replacement.

The second outage is schedule about November 14 from 0500 to 1700 hours. 500 kV line outage and XJ-7 open.

Cathy
503/808-3942

Fall Commercial Gillnet Fishing Period Adopted
9/18-22 and 9/25-29
Scaffold Fishery Sales Continue
Thursday, September 14, 2006

Today, the Compact states of Oregon and Washington concurred with the tribal regulations for the following Zone 6 fall commercial fishing periods:

COMMERCIAL GILLNET SEASONS

AREA: All of Zone 6

DATES: 6:00 AM Monday September 18 through 6:00 PM Friday, September 22. (4.5 days)

6:00 AM Monday September 25 through 6:00 PM Friday, September 29. (4.5 days)

GEAR: There will be an 8 inch minimum mesh size restriction.

ALLOWABLE SALES: Chinook, steelhead, coho, walleye, shad, and carp may be sold or retained for subsistence. Sturgeon may not be sold, but sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence.

SANCTUARIES: All standard river mouth and dam sanctuaries shall remain in effect. The standard Spring Creek Hatchery sanctuary will be in effect.

Scaffold Fishery:

The scaffold fishery remains open for subsistence use all year. Sales of fish caught in the scaffold/hook and line fishery continue until further notice. Allowable gears include hoopnet, dipnet, and hook and line. Allowable species are Chinook, steelhead, coho, walleye, shad, and carp. Sockeye may not be sold but may be retained for subsistence. Sturgeon may not be sold. Sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence purposes.

Sales are also allowed for fish caught in overlapping portions regularly scheduled Yakama Nation subsistence fisheries in the Big White Salmon River and the Klickitat River. Please contact the Yakama Fisheries Office (509-865-6262) for exact times and dates.

If you have any fishing enforcement problems or need assistance or information, day or night, contact the Columbia River Inter-Tribal Fisheries Enforcement Office, 4270 Westcliff Drive, Hood River, Oregon. Phone: (541)-386-6363 or toll-free (800)-487-FISH (3474). **Please consult your tribal Fish and Wildlife Committee for additional details on tribal regulations. PLEASE WEAR YOUR LIFE JACKETS FOR SAFETY.**

Determining the influence of high flows of the spawning behavior of chum salmon at Ives Island, 2006

BPA Project 1999003 (Ken Tiffan; U.S. Geological Survey)

This document is a plan for proposed experimental flows from Bonneville Dam to examine the effects of elevated flows on chum salmon spawning behavior at Ives Island. This study is being funded by BPA under project 1999003 and will take place during from November 1 through mid December, 2006.

Background and rationale

In 2005, we conducted experimental flow tests by increasing tailwater elevations from either 11.5 ft to 13.5 ft or from 11.5 ft to 15.5 ft for a period of 8 hours. We measured movement responses of spawning chum salmon with acoustic telemetry and with a DIDSON acoustic camera. Acoustic telemetry data, when analyses are completed, will allow us to determine how far fish moved away from their redds and where they went during elevated flows. The DIDSON enabled us to measure more detailed behavioral changes in spawning behavior and success during flow test, but sample sizes were low. We request experimental flow tests again in 2006 to increase our sample size of fish observed with the DIDSON so we can be more confident of our conclusions. In addition, we will evaluate the incidence of spawning at higher riverbed elevation under different chum escapement in 2006. We plan to increase our sample size of fish observed by using a second DIDSON camera. The coordination of its use will determine the total number of tests requested, which will not exceed 10. For discussion purposes, assume there will be five tests at 13.5 ft and five tests at 15.5 ft. These tests can be scheduled during the day or night, however other ongoing work in the area limits daytime tests to occur only on Wednesdays or the weekend. The most convenient nights for testing are Tuesday or Thursday nights.

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COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

September 27, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Adult Migration Update

Cindy LeFleur, WDFW, gave an update on the adult migration: through 9/25, numbers were still below the forecast, with the brights count over Bonneville at 219,000 (vs. predicted 263,000) and the tule count at 30,700 (vs. predicted 45,000.) The revised in-season forecast for upriver brights was 208,300, mid-Columbia brights at 64,500 and Bonneville Pool Hatchery at 34,700. LeFleur said the migration season will be winding down and that she will give an update on the adult migration counts at the next TMT meeting.

Lake Pend Oreille

Cathy Hlebechuk, COE, reminded the group that the delay in dropping the pool elevation at Lake Pend Oreille, proposed by IDFG at the 9/13 meeting, was fully accepted by TMT members. Melo Maiolie, IDFG, shared power point slides showing Lake Pend Oreille shoreline survey areas. Surveys for spawning will likely continue through the 1st week of October. Melo noted that these surveys are a qualitative look at trout spawning, and should provide more information on movement, depth and placement.

Next Steps: Maiolie will coordinate with Russ Kiefer, ID, on an update to TMT in late October or early November, and may also present at the TMT Year End Review Meeting on December 6th.

Albeni Falls Operations

Cathy Hlebechuk, COE, reported that the final Albeni Falls SOR was posted to the TMT web page on 9/15. Hlebechuk added that the Pend Oreille PUD and Box County Dam will do spill bay work next week, and requested that the COE maintain outflows at or below 28 kcfs until 10/15. Kyle Dittmer, CRITFC, said that dry weather is expected for the next two weeks, which will support the operation.

2006 -'07 Chum Research

Dave Wills, USFWS, showed Ken Tiffan's (USGS) proposed 2006-'07 chum study . The Corps will post it on the 9/27 agenda. Also, COE developed a statement of work

that estimates a \$140,000 cost for doing an unsteady flow analysis, and is in the process of determining where funding for the study may exist. Tony Norris, BOR, requested a copy of the proposal and agreed to see if there may be a cost-share opportunity.

Action/Next Steps: Wills will send a copy of the USGS scope to Norris, and the action agencies will review Ken's chum study proposal, to look for any 'red flags.'

End of MOP at Lower Granite

Cathy Hlebechuk, COE, said that the salmon managers reported significant cooling at Lower Granite (63.4-63.5 degrees), which signaled support for the end of MOP. The teletype was issued on 9/22, and the project is currently filling at night, as requested. John Day's minimum elevation for irrigation will end 9/30, and will operate at a range of 262.5 - 265'. Transport at McNary ended on 9/14, Lower Monumental is scheduled to end on 9/30, and Lower Granite and Little Goose will end on 10/31. Paul Wagner, NOAA, added that the Fall Chinook study was not expected to be impacted by end of transport at Lower Monumental.

2007 Water Management Plan

As of 9/27, NOAA had submitted changes to the draft WMP. TMT members are requested to review the draft and submit edits, additions, etc. based on expected 2007 operations, and submit them to Bernard Klatte, COE, as soon as possible.

ACTION: TMT members will review the document and send a "track changes" version to Klatte. All comments and a revised draft of the WMP will be posted on the TMT web page, for discussion at the next meeting.

Treaty Fishing SOR's

Kyle Dittmer, CRITFC, reported on the latest autumn treaty SOR, which requested hard constraints of 1' from full at John Day (range of 264.5 – 263.5), The Dalles (159.5 – 158.5) and Bonneville (76.5 – 75.5) pools. Dittmer said the net flight survey showed nets 43% at John Day, 25% at The Dalles, and 33-35% at Bonneville, and that there would likely be one more week of fishing, from 6 a.m. on 9/25 to 6 p.m. on 9/29.

Operations Review

Reservoirs: Grand Coulee was at elevation 1286.5'. Hungry Horse was at 3542' and releasing at 2.5 kcfs to meet Columbia Falls minimums. Libby was at elevation 2438' and will ramp down to a release rate of 6 kcfs on 9/29, and 4.4 kcfs on 10/1. Dworshak elevation was at 1519.8', releasing 1.5 kcfs. Lower Granite was in the range of 18.5-22 kcfs, and McNary average flows have been in the range of 64-110 kcfs. Don Faulkner, COE, said that Dworshak unit outages are scheduled for 10/10 and 11/14, to support available generation.

(NOTE: Hlebechuk sent out an email to TMT following the meeting that stated: "As discussed at TMT today, 2 daily outages are scheduled which take all 3 units out of service and the project will spill through one of the regulating outlets to maintain the

required minimum 1000 cfs. Most likely tdg will exceed 110% but there is always a chance it may not. Jim Adams has coordinated the spill with the State of Idaho and Nez Perce. The first outage is scheduled for October 10 from 0500 to 1700 hours. 115 KV line outage, breaker replacement. The second outage is schedule about November 14 from 0500 to 1700 hours. 500 kV line outage and XJ-7 open.”)

Fish: Paul Wagner, NOAA, reported that sub yearling numbers saw a slight increase at Lower Granite, and that adult passage numbers at Bonneville are down to 3-4,000 per day. Shad numbers are at a total of 3-4 million. Steelhead numbers have dropped to under 1500 per day, but overall are still above 2005 numbers (310,244 vs. 280, 860 last year.) Fall and Spring Chinook numbers are lower than the ten year average, with Fall Chinook at 254,000 (vs. 330,000) and Spring Chinook at 96,456 (vs. 151,682.)

Power: Nothing to report at this time.

Water quality: Laura Hamilton, COE, reported that the action agency is transitioning to winter monitoring: removal of forebay gauges and Cascade Island began the week of 9/17. The COE's year-end water quality monitoring review will be held on 10/23.

Next TMT Face-to-Face Meeting, October 25th, 9:00-noon

Agenda Items include:

- Treaty Fishing SOR
- End of Adult Migration
- Draft 2007 Water Management Plan/Comments Review
- Operations Review

Technical Management Team Meeting Notes

September 27, 2006

1. Greetings and Introductions.

Today's Technical Management Team meeting was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. 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 Hlebechuk at 503-808-3942.

2. Adult Migration Update.

Cindy LeFleur led this presentation, touching on the following major topics:

- 2006 upriver bright adults passing Bonneville Dam: the pre-season prediction was 263,000, while the actual count through September 25 is 219,000. There has been a late surge of fish, LeFleur said, but the count is lagging behind the pre-season estimate by about 44,000. There was a commercial fishery downstream of Bonneville, which may help explain some of the discrepancy
- The pre-season tule (downriver or Spring Creek Hatchery component) forecast was 45,000; the actual count to date 31,000. This run is nearly over, but Spring Creek Hatchery has reached its escapement goal.
- Changes to the forecast based on actual counts: upriver bright forecast at river mouth vs. revised estimate. Bonneville pool hatchery: 35,000, down from 52,000. All fall chinook runs are about 20,000 below the pre-season estimates.

The pre-season estimate at Bonneville assumed some sort of reduction due to fishing between the mouth of the Columbia and the dam? Paul Wagner asked. Correct, LeFleur replied. In response to a question from Harkless, LeFleur said she will provide a further update at the October 11 TMT meeting.

3. Lake Pend Oreille Research on Trout Spawning.

Milo Maiolie of IDFG briefed the TMT on IDFG's lake trout spawning survey work in Lake Pend Oreille. We are trying to minimize the population of lake trout in Lake Pend Oreille, he explained; one of the reasons for drawing down the lake during the fall and winter is that IDFG hopes to expose lake trout eggs so that they don't hatch successfully. Maiolie touched on the following topic areas:

- Survey areas within the lake – last week and this week (maps).
- Lake trout are broadcast spawners – do not make redds. The survey looks for concentrations of fish, rather than redds.
- Next week's survey areas (map).
- Once the lake level recedes, IDFG personnel will begin turning over rocks to look for lake trout eggs. The survey will continue in 2007, when IDFG plans to sonic-tag lake trout so they can locate them within the lake. 2006 survey work will go through at least the first week in October. In past years, we have sampled females and found that they were pretty much out of eggs by the first week in October, Mioli said.

You'll be generating a mathematical assumption about the number of eggs killed? one participant asked. This year's work is more of a qualitative assessment of whether or not this strategy will result in lake trout eggs being left high and dry, Maiolie replied – we won't really know the effects of this operation on the year-class for another five years. It was agreed that IDFG will provide a further update on the 2006 research at the TMT's year-end review meeting in December.

4. Albeni Falls Winter Operation.

We sent out an email on September 15, once we had received the final SOR covering Albeni Falls winter operations, Hlebechuk said; as you will recall, we basically approved the lower lake level for this winter at the September 13 TMT meeting. That SOR is being implemented, she said, although we have been requested to hold flows no greater than 28 Kcfs through October 15 to accommodate some maintenance work at Box Canyon Dam.

5. 2006-'07 Chum Research Ideas.

This is basically a check-in to see whether the salmon managers would like to see anything different in the 2006-'07 chum research, Harkless said. We have discussed it, David Wills replied, and we have developed a memo outlining our research proposal, which is essentially a repeat of last year's work. It was agreed that the Corps will post this plan to the TMT September 27 agenda. I would ask the action agencies to look at it and let us know if there is anything that raises a concern, Wills said. We will do so, and will try to be as flexible as possible, said Robin MacKay.

Another research item that would be nice to finish up is the Corps' unsteady state flow model, said Wagner. I discussed that with Dennis Schwartz yesterday, said Wills; he has been tasked with trying to make that happen if possible. The Corps has developed a scope of work, and it looks like it will cost about \$140,000 to finish the model. Right now, they're in the process of trying to determine an appropriate funding source, Wills said – there may be opportunities to share the cost with the Fish and Wildlife Service. There is certainly support at the technical level for this work, he added.

6. Lower Granite – End of MOP.

Hlebechuk said MOP ended at Lower Granite on September 22, because significant cooling had occurred in the Lower Granite forebay. The TMT was notified by email. The project is filling at night only, as requested, but is not quite full. John Day will end it's 1 ½ foot above the elevation required for irrigation on September 30 – after that date, it will operate at 262.5-265 feet.

7. End of Transportation at McNary, Lower Monumental, Little Goose and Lower Granite.

McNary transport ended September 14, said Hlebechuk; the Fish Passage Plan says McNary and Lower Monumental will end transport on September 30, unless there are operational or biological reasons to end it sooner. McNary transport was stopped on September 14 due to large numbers of shad, and

Lower Monumental transport will end September 30. Little Goose and Lower Granite will end transport on October 31, as per the FPP, Hlebechuk said.

8. 2007 Water Management Plan.

The draft plan was posted on the TMT homepage last week, Harkless said; the Corps would like everyone to look at it and provide any comments they may have as soon as possible.

9. Treaty Fishing.

Kyle Ditter said CRITFC submitted a treaty fishing SOR covering the period September 25-29, requesting a one-foot operating range at Bonneville, the Dalles and John Day. Net flight survey results from last week showed 35% of the nets in Bonneville pool, 22% in The Dalles pool and 43% in John Day pool. There will likely be one more week of treaty fishing, next Tuesday-Friday. CRITFC will send over a new SOR later this afternoon, he said. Hlebechuk replied that the Corps will implement a hard constraint of a 1.5-foot operating range at Bonneville with a soft constraint of one foot. The other two projects are not constrained by the treaty fishing operation per the 1998 agreement between Col. Mogren and Ted Strong. Fish sales are continuing in Cascade Locks and elsewhere.

10. Operations Review.

The Corps reported that Libby will be ramping down to 6 Kcfs by September 29, following the BiOp ramp rates, starting tonight. It will ramp down to 4.4 Kcfs the night of October 1. Dworshak is at elevation 1519.8, releasing 1.5 Kcfs, minimum outflow. Over the past week, Lower Granite flow has averaged 18.5 Kcfs-22 Kcfs; at McNary, 64-110 Kcfs. There is an upcoming outage at Dworshak; there will be two days – October 10 and November 14 – when no generation will be available. During this period, Dworshak will spill minimum flow, which may cause some exceedences of the 110% TDG standard. They are changing breakers at Dworshak.

Wagner reported that the juvenile outmigration continues, with most of the action in subyearlings. We heard about the adult migration earlier in this meeting, he said; the counts picked up to 10,000 fish per day for awhile, but are now trending downward. Adult steelhead passage is also trending downward, to about 1,500 fish per day at Bonneville. There are copious numbers of shad passing Bonneville, currently. About 254,000 adult fall chinook have passed Bonneville to date, down from about 370,000 in 2005; the majority of the fish this year are four-year-olds. We weren't expected to have a stellar run in 2006, and we haven't, Wagner said. We've seen 310,000 adult steelhead, including 26% wild fish, in 2006, higher than both last year's count and the 10-year average.

BPA said there are no power system problems to report. The Corps said there are no water quality problems to report; the system is transitioning to its winter monitoring program. The 2006 monitoring results will be presented at a meeting on October 23.

11. Next TMT Meeting Date.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, October 11. Meeting summary prepared by Jeff Kuechle. BPA contractor.

Name	Affiliation
Robin Harkless	Facilitation Team
Tony Norris	USBR
Robyn MacKay	BPA
Lynn Melder	COE
Cindy LeFleur	WDFW
Paul Wagner	NOAAF
Cathy Hlebechuk	COE
Ray Gonzales	COE
Tom Haymaker	PNGC
Randy Wortmann	COE
Scott Boyd	COE
Dan Spear	BPA
Kyle Dittmer	CRITFC
Milo Mioli	IDFG
Jeff Loughley	USBR
Russ George	WMCI
Bruce MacKay	Consultant
Tom Le	PSE
Margaret Filardo	FPC

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday October 11, 2006 09:00 - 12:00

**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. 2006 Burbot SOR
 - [\[Winter Temperature Operation of Libby Dam for burbot - October 13, 2006\]](#) 
3. Other
 - Set agenda for next meeting October 25, 2006 - [\[Calendar 2006\]](#) 

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

U.S. Fish and Wildlife Service
SYSTEM OPERATIONAL REQUEST: #2006-FWS-

DRAFT

TO:	Colonel (P) Gregg Martin	COE-NWD
	Jim Barton	COE-NWD-NP-Water Management
	Cindy Henriksen	COE-NWD-NP-WM-RCC
	Rudd Turner	COE-NWD-CM-F Fish Management
	Col. Debra Lewis	COE-Seattle District
	Steven Wright	BPA-Administrator
	Greg Delwiche	BPA- KE-4
	Mick Shea	Project manager- Libby Dam

FROM: Susan Martin, Supervisor, Upper Columbia Fish and Wildlife Office, U.S. Fish and Wildlife Service, on behalf of the Kootenai Valley Resource Initiative – Burbot Recovery sub-committee.

DATE: 10/--/06

SUBJECT: Winter Temperature Operation of Libby Dam for burbot

SPECIFICATIONS:

U.S. Fish and Wildlife Service staff and others, as members of the Kootenai Valley Resource Initiative (KVRI) burbot sub-committee, request that the Corps of Engineers use the selective withdrawal system at Libby Dam to release the coolest water possible in November and December, 2006 before temperature stratification limits the temperature control capability. The purpose of this operation is to provide in cooler river temperatures downstream of Bonners Ferry, and also to determine how radio-tagged burbot in the Kootenai River respond to these temperatures. This will likely result in November and December temperatures slightly cooler than the existing selective withdrawal temperature rule curve (Figure 1). This deviation from the temperature rule curve has been coordinated with Montana Fish, Wildlife & Parks (MFWP). MFWP asked that the selective withdrawal gates be removed incrementally to assure that daily temperature change remains within 2 degrees F per day; gates should be removed systematically during the last 2 weeks of October (17th through 31st) to slowly lower river temperature to the minimum by November 1 (on average, a span of about 5 degrees C, or 9 degrees F; Figure 1).

JUSTIFICATION:

The request is designed to cool the river (Bonners Ferry vicinity) during the burbot migration period (November to mid-December) and to the extent possible during spawning season (Dec 15 – end of Feb), when temperatures of 1 to 4° C are preferable. Burbot spawning migrations may be affected by water temperature conditions much earlier in the winter/late autumn (Paragamian 2005, pers. comm.), particularly when combined with higher flows.

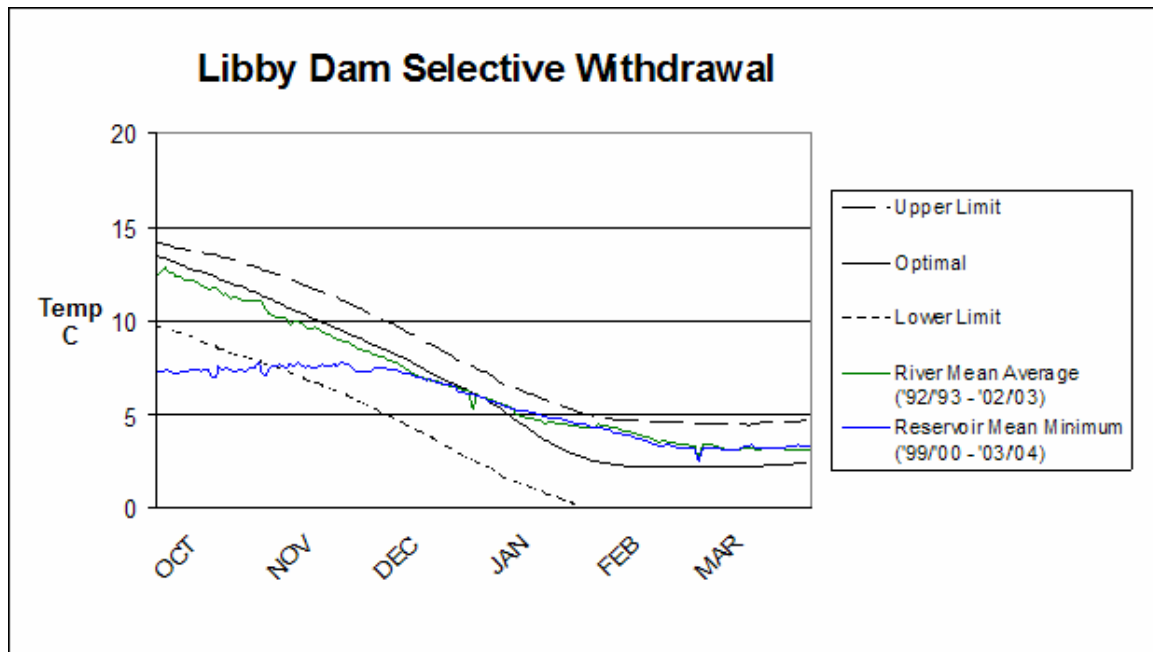


Figure 1. Selective withdrawal temperature guidelines for the Kootenai River below Libby Dam. The mean average release temperature was within the guidelines for the period displayed, with means slightly less than optimal early in the winter, and slightly higher than optimal later in the winter. There is water much cooler than optimal available for release during the early winter period until the reservoir becomes isothermic about mid-December.

Prior to Libby Dam, winter water temperature both below the current Libby Dam site and near Bonners Ferry was substantially cooler than post-Dam temperatures. The Kootenai River gradually warmed slightly as it flowed downstream, whereas current conditions allow atmospheric cooling of the river, though still not to pre-dam levels (Figure 2). The committee would like to continue to investigate the possibility of influencing ambient river temperatures during the late fall and early winter migration period, as there is water available for release during this time that is substantially cooler than previous, post-dam release temperatures, and also cooler than the minimum temperature specified by the selective withdrawal temperature curve (Figure 1).

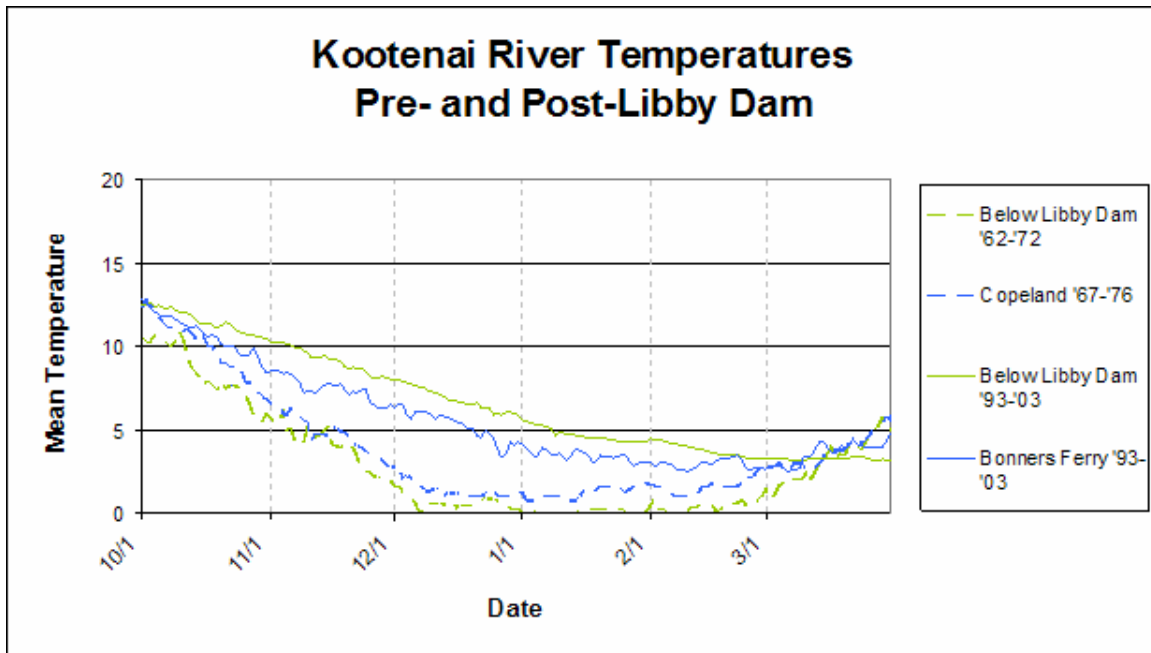


Figure 2. The thermograph in the Kootenai River before and after installation of Libby Dam is reversed to the point of the now-warmer river cooling with ambient air conditions as it reaches the Bonners Ferry vicinity, rather than warming.

The committee will continue to review future forecasts and may issue additional SOR's related to flow should this season's conditions warrant. The committee is also pursuing methods for reintroducing burbot into the Kootenai River, and anticipates that in future years flow requests may be made to enhance spawning conditions for these fish, should they survive and persist. The committee hopes that results of seasonal temperature experiments carried out in the interim would enable the Action Agencies to implement discharge-related SOR's in future years, with less regard to seasonal conditions, should population numbers increase to a point where temperature and flow optimization would benefit the resultant migratory spawning population.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

October 11, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Winter Temperature Operations for Libby Dam for burbot

Bob Hallock, USFWS, presented a draft SOR for temperature operations at Libby Dam to support burbot; the Libby selective withdrawal system would be used to cool temperatures, with a proposed start date of October 17th. Hallock said there are few burbot in the Kootenai Lake or river area,. Spawning information relative to temperature would be gathered, and the drop in temperature will likely improve conditions for the fish. Hallock noted that the proposed SOR would have no effect on flows or other operations – and that the potential for temperatures dropping below the temperature band agreed upon in 1983 had been discussed and coordinated with Montana Fish and Wildlife and parks. As such, temperatures will be dropped at a rate of no more than two degrees per day. TMT members requested that Vaughn Paragamian, IDFG, provide a description of how the burbot have responded to temperature manipulation in previous years, for inclusion in the final version of the SOR. TMT members raised no objections to the draft SOR.

Action/Next Steps: Russ Kiefer, ID, will contact Paragamian and forward the requested information on to Cathy Hlebechuk, COE, for posting of the final SOR on the TMT website by early next week..

Operations Update

- Cathy Hlebechuk, COE, reported that work at Dworshak on 10/10 had not been completed and would need to be finished. Units 1 and 2 will go offline on 10/12, from 1600-2330 hours. Flows will increase to 2500 cfs during that time, then return to minimum rates.
- Hlebechuk also reported that Albeni Falls elevation was at 2062'.

Next Meeting, October 25th, 9am-noon

A face to face TMT meeting is scheduled to take place on October 25th. Agenda items will include updates on chum, Albeni Falls Operations, and Priest Rapids; Autumn Treaty Fishing review, and revisions to the Water Management Plan. Please regularly check the TMT web page for agendas and any scheduling changes.

Technical Management Team Meeting Notes

October 11, 2006

1. Greetings and Introductions.

The October 11 TMT conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. 2006 Burbot SOR.

Bob Hallock went briefly through the draft 2006 burbot SOR, which requests the following specific operations:

- The Kootenai Valley Resource Initiative burbot subcommittee requests that the Corps of Engineers use the selective withdrawal system at Libby Dam to release the coolest water possible in November and December, 2006 before temperature stratification limits the temperature control capability. The purpose of this operation is to provide cooler in-river conditions downstream of Bonners Ferry and also to determine how radio-tagged burbot in the Kootenai River respond to these temperatures.

Have there been many fish tagged so far this year? Cathy Hlebechuk asked. I don't have the details, but I can find out, Hallock said. It would be helpful to have that tagging information for the record, said Hlebechuk. We can do that, Hallock replied – I'll talk to Vaughan Paragamian. The biggest hurdle for the program is, where do we get some more fish? he said. The year before last, I believe Vaughan was only able to catch 16 or 17 fish. Any information Vaughan can provide on the biological significance of the response by fish to the temperature manipulations we did last year would be very useful, said Russ Kiefer.

It sounds as though the temperature control involves moving the selector gates, Hlebechuk said. It sounds OK to the Corps, but I would like to discuss it with Greg Hoffman when he returns to the office tomorrow. I would also like to get the information from Vaughan, she said. It sounds fine to me, said Paul Wagner. I don't have a problem with it, said Robyn MacKay. Tony Norris said Reclamation has no problem with the requested operation, a sentiment echoed by Kiefer of Idaho and Jim Litchfield of Montana. Kiefer noted that, according to a

report he received from Paragamian, a total of only seven burbot were tagged last year. Kiefer agreed to discuss the tagging information with Paragamian, and to report back to Hlebechuk.

It was agreed that Susan Martin will sign the final burbot SOR. Once you get that to me, we will post it, and replace the draft SOR with the final SOR, Hlebechuk said. We will include your summary of past years' research as part of the justification for the final SOR, Hallock said.

Moving on, Hlebechuk said that, yesterday at Dworshak, units 1 and 2 were supposed to be out of service to allow work on the line, and flow was supposed to be increased to 3.5 Kcfs 0500 – 1700 hours today, but the flows were only held from 0500 – 1000 hours as the contractor had technical difficulties and was unable to complete the work. Flows were then reduced to the Dworshak minimum, 1.4 Kcfs. Thursday night, from 4 p.m. to 10:30 p.m., flows will again be increased to 3.5 Kcfs, then back down to minimum, so the contractor can complete that work, Hlebechuk said.

Albeni Falls discharge was increased on October 7, Hlebechuk continued; the project drafted quickly, and the elevation is currently just under 2061 feet. Also, we're still waiting for TMT comments on the 2007 Water Management Plan, Hlebechuk said. We'll put that on the agenda for October 25, Harkless said.

Will there be any more treaty fishing SORs in 2006? Hlebechuk asked. No – we're done for the season, Dittmer replied.

3. Next TMT Meeting Date.

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

**TMT Participant List
October 11, 2006**

Name	Affiliation
Cathy Hlebechuk	COE
Robin Harkless	Facilitation Team
Robyn MacKay	BPA
Jim Litchfield	Montana
Tony Norris	USBR
Russ Kiefer	IDFG

Paul Wagner	NOAAF
Jim Adams	COE
Russ George	WMCI
Tom Le	PSE
Mike Buchko	Powerex
Tim Heizenrater	Cascade Energy
Bob Hallock	USFWS
Jeff Loughley	COE
Kyle Dittmer	CRITFC
Bern Klatte	COE

TECHNICAL MANAGEMENT TEAM

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ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday October 25, 2006 09:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

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AGENDA

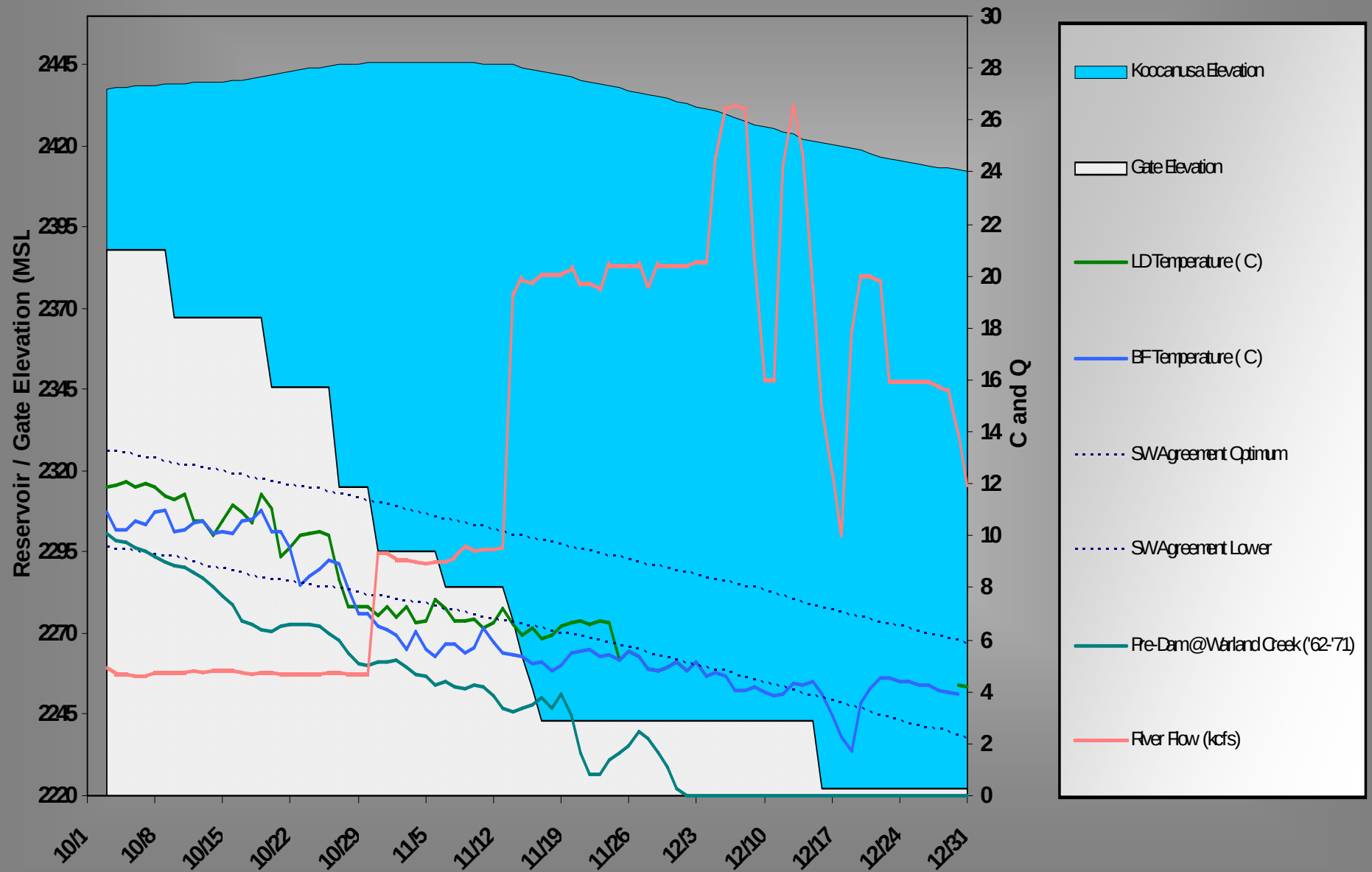
1. Welcome and introductions
2. [\[Review Minutes 2006\]](#)
3. Fall/Winter 2006 Vernita Bar operations - Russell Langshaw, Grant Co
 - [\[Vernita Bar Redd Survey, October 15, 2006\]](#) 
 - [\[Vernita Bar Redd Survey, October 22, 2006\]](#) 
 - [\[Priest Rapids Dam 2006 experimental spawning operations\]](#) 
4. Impacts to fishery downstream of Libby Dam as result of June operation
 - [\[Table 1\]](#) 
 - [\[GAS BUBBLE TRAUMA IN KOOTENAI RIVER FISH DOWNSTREAM OF LIBBY DAM DURING THE SPILL OF 2006\]](#) 
 - [\[Spill Monitoring below Libby Dam\]](#) 
5. Lake Pend Oreille lake trout research - Russ Kiefer
 - [\[Survey boat with underwater spotlights\]](#) 
6. Treaty Fishing (Kyle Dittmer)
 - [\[Summary of Pool Operations - 2006 Autumn Treaty Fishery\]](#) 
 - [\[SYSTEM OPERATIONAL REQUEST: 2006 C-8 - September 27, 2006\]](#) 
 - [\[Fall Commercial Gillnet Fishing Period Adopted 10/3-10/6\]](#) 
7. Final USFWS Burbot SOR
 - [\[SYSTEM OPERATIONAL REQUEST: 2006-FWS-1 - October 13, 2006\]](#) 
 - [\[Koocanusa Reservoir\]](#) 
 - [\[Kootenai River and Koocanusa Reservoir Temperatures 2005 Burbot SOR \(3 October - 31 December\) & Kootenai River and Koocanusa Reservoir Temperatures 2006 Burbot SOR \(2 October - 31 December\)\]](#)



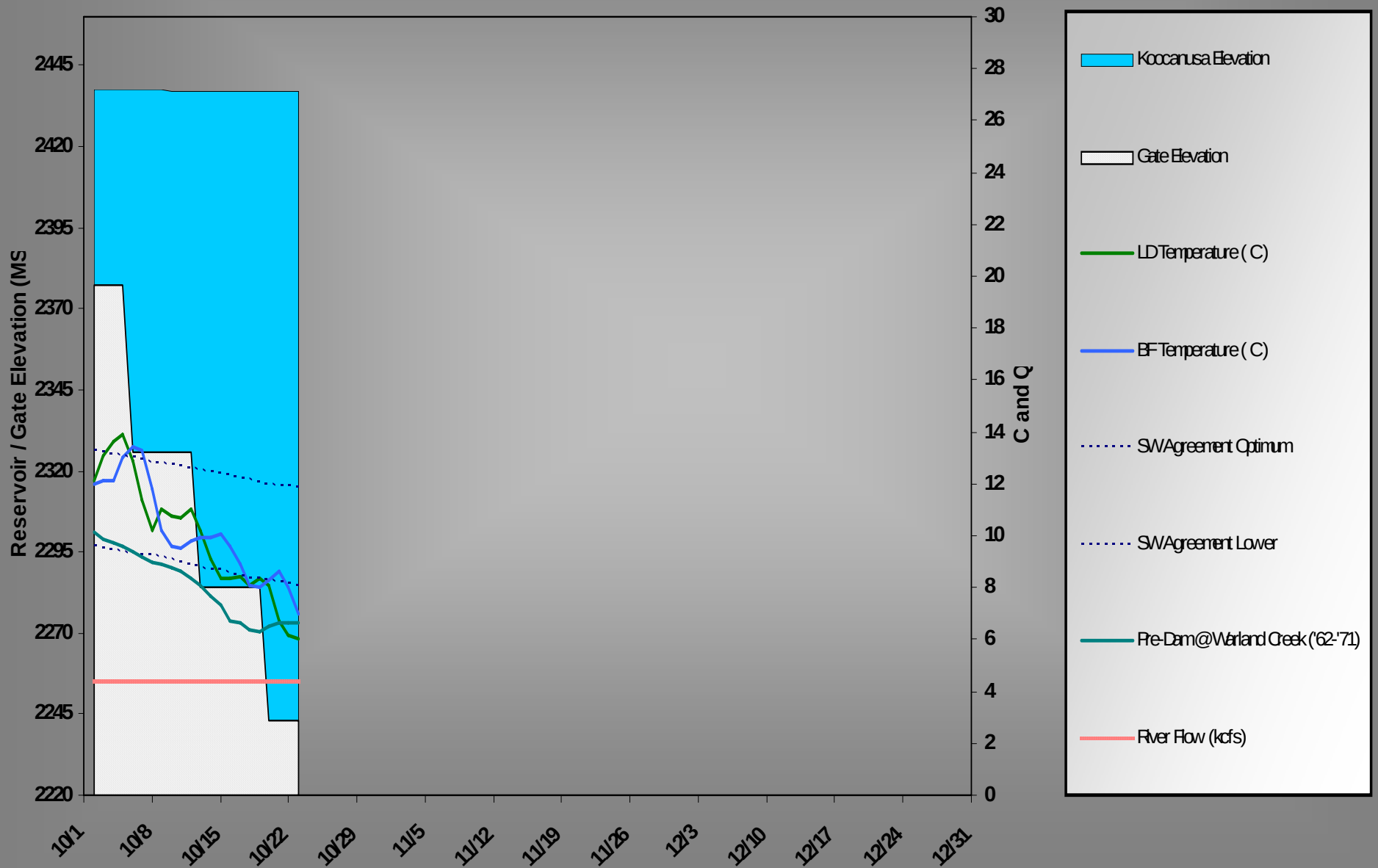
8. Chum Salmon
9. Water Management Plan
 - [\[2007\]](#) 
10. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Dworshak Floating Water Temperature String Thermocline\]](#)
 - [\[Spill Information 2006\]](#)
 - [\[Daily Water Temperature and Water Temperature Strings\]](#)
11. Other
 - Set agenda for next meeting - [\[Calendar 2006\]](#) 

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

Kootenai River and Kootenai Reservoir Temperatures 2005 Burbot SCR (3 October - 31 December)



Kootenai River and Kootenai Reservoir Temperatures 2006 Burbot SCR (2 October - 31 December)



**GAS BUBBLE TRAUMA IN KOOTENAI RIVER FISH
DOWNSTREAM OF LIBBY DAM DURING THE SPILL OF 2006**

DRAFT REPORT
October 2006

By:

Brian Marotz, Ryan Sylvester, Jim Dunnigan, Tom Ostrowski
Jay DeShazer, John Wachsmuth, Monty Benner, Mike Hensler and Neil Benson

Montana Fish, Wildlife and Parks
Region One, Libby Area Office and Kalispell HQ

Funded by:
Bonneville Power Administration
Division of Fish and Wildlife
P.O. Box 3621
Portland, OR 97208
Cecilia K Brown, Project Manager

October 2006

Introduction

In June 2006, the surface elevation of Koocanusa Reservoir in northwestern Montana approached full pool elevation (2459 ft msl) and inflows to the reservoir remained in excess of Libby Dam turbine discharge capacity (approx. 24 kcfs when surface elevation approaches full pool). As a result, the US Army Corps of Engineers (USACE) began routing excess water through the spillways on Thursday, June 08 (Figure 1). By 5:00 PM on June 8, spill caused gas supersaturation in the Kootenai River to exceed Montana's gas saturation standard of 110 percent gas supersaturation for 19 days. By 6:00 PM gas exceeded 124 percent supersaturation through June 16 when spill increased and gas saturation increased to 130 percent saturation (peaked at 131.48 percent) (Figure 2). Gas saturation gradually declined below 110 percent by 7 AM on June 27. Only one gas satumeter was available at the US Geological Survey Station until June 14 when three additional satumeters were installed on the D. Thompson Bridge and one was installed approximately 8 miles downstream of Libby Dam (near the site where old bridge piers were removed; Figure 3). Gas hugs the left bank downstream of Libby Dam for roughly 5 to 8 miles until turbulence distributes supersaturated water across the river. Based on results from spill monitoring during 2002, supersaturated water remains unabated downstream to Kootenai Falls, about 28 miles downstream of Libby dam.

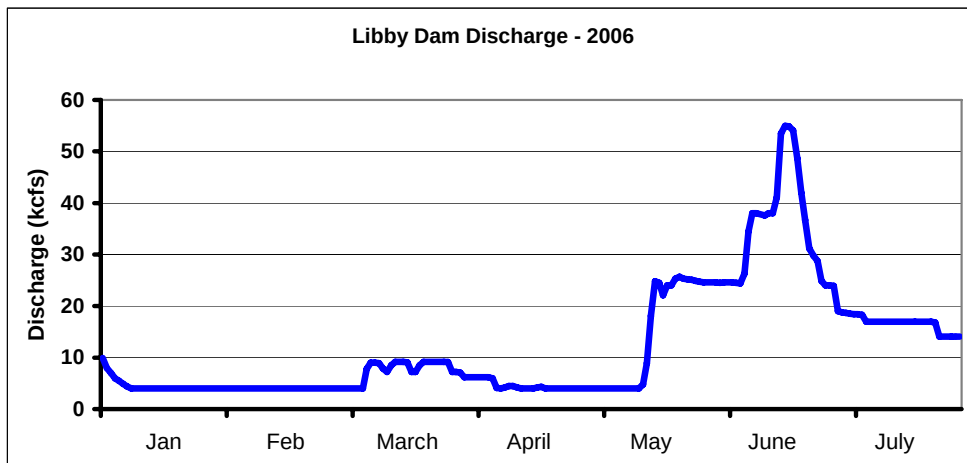


Figure 1. Discharge from Libby Dam into the Kootenai River from January 1, 2006 through July 31, 2006. Maximum capacity through the turbines was approximately 24,000 cubic feet per second during June when the spillway released additional water. Discharge peaked at 54.9 kcfs on June 19th when nearly 31 kcfs was released through the spillway. The spillway was opened from June 8th through June 27th.

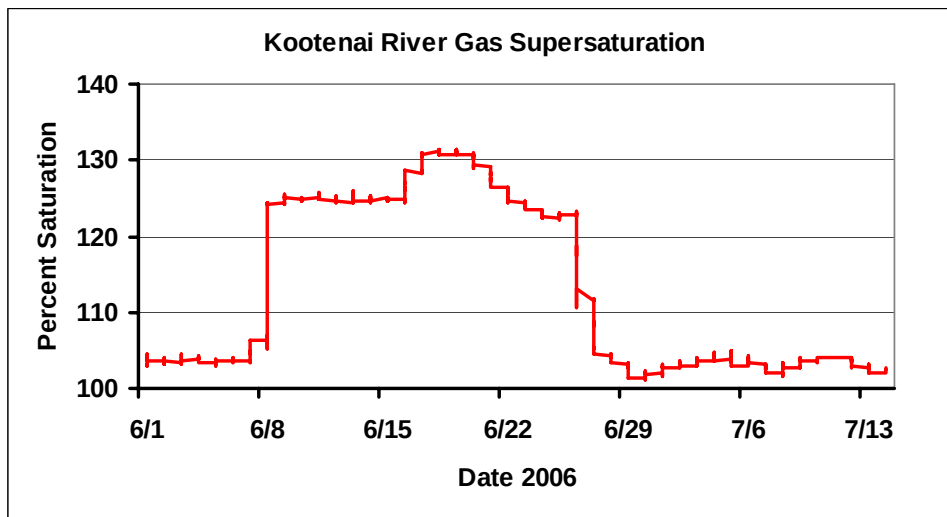


Figure 2. Percent gas supersaturation in the Kootenai River downstream of Libby Dam 2006 as measured at the USGS gauging station. Montana's water quality standard is 110 percent supersaturation.

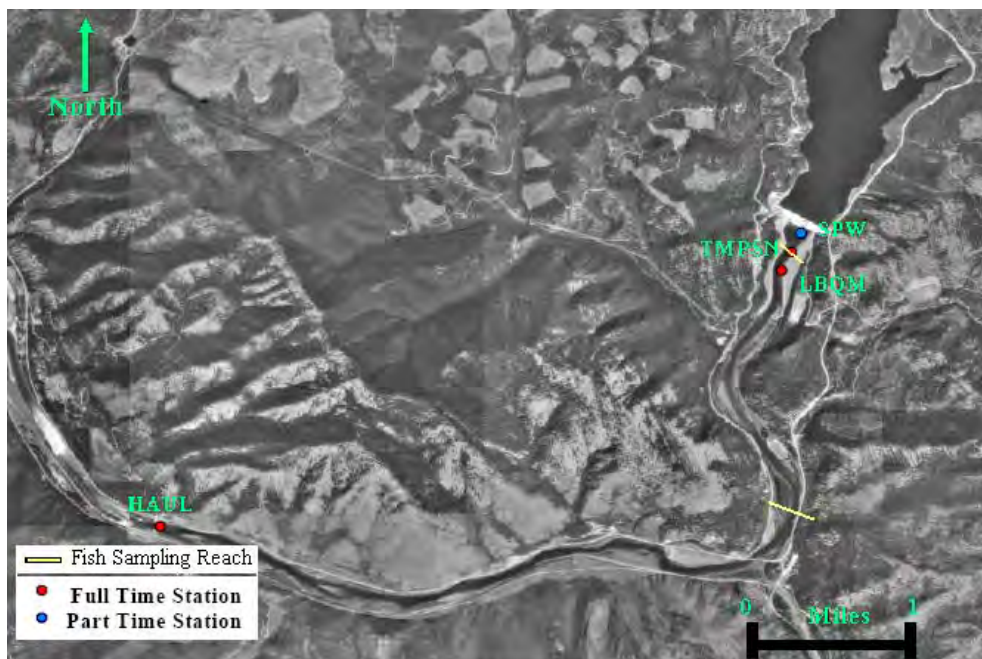


Figure 3. Location of gas saturation readings recorded during the spill event at Libby Dam in June 2006.

Methods

Electrofishing

Montana Fish, Wildlife & Parks (MFWP) used boat-mounted electrofishing apparatus to capture fish in the Kootenai River from the David Thompson Bridge (river mile; RM 221.6) downstream to Dunn Creek (RM 219.8). Electrofishing was conducted at night using a jet boat-mounted Coffelt model Mark 22 electrofishing unit, with an electrical output ranging from 200-300 volts at 5-8 amps. Sampling occurred after dark on June 12, 15, 19 and 22. The location of the spillway near the left downstream bank causes a gradient of gas saturation across the river channel in the sampling reach, so personnel examined fish captured along the left and right bank separately. Captured fish were anesthetized using an aqueous solution of MS-222. Investigators examined fish for marks, tags, injuries and gas emboli in fins, eyes and external tissues using techniques described by Dunnigan (2003), then recorded anatomical features that exhibited symptoms. During the 2006 spill, GBT was observed in rainbow trout (*Oncorhynchus mykiss*), westslope cutthroat trout (*O. clarki lewisi*), kokanee (*O. nerka*), bull trout (*Salvelinus confluentus*) and Mountain whitefish (*Prosopium williamsoni*). Our reported number of fish with GBT may have been under-estimated because we did not include fish with split fins unless gas bubbles or localized hemorrhaging was also present. Fin splits may be caused by necrosis of the fin tissue between the fin rays resulting from previous injury caused by GBT that had begun to heal (Dunnigan 2003) or may have resulted from physical injury.

Nonlinear regression was used to quantify the potential exposure of fish to super saturated water (days of spill) and relate that exposure to symptoms observed in free-swimming fish that were captured by electrofishing. The percentage of fish showing symptoms of GBT on each sampling night was used as the response variable in the nonlinear regression. In addition, the gas exposure models used by Dunnigan (2003) were also used to assess the impacts of spill on fishes below Libby Dam. The first index was cumulative hourly spill discharge (CSpill) a particular group of fish was exposed to, and was calculated using the following equation.

$$CSpill_j = \sum_i (HSD)$$

Where Cspill_j = The cumulative hourly spill discharge for fish group j at time of examination, and HSD (Hourly Spill Discharge) = the sum of i hourly spill discharge measurements (kcfs) that fish group j was exposed to until examination. For example, if a fish were exposed to 5 kcfs spill for 10 hours, the cumulative hourly spill discharge would be 50. The second index of exposure (CSpWtd) was similar to the previous index, but differed in that it utilized a weighting factor based on the proportion of the spill discharge relative to total discharge. We calculated cumulative spill weighted discharge (CSpWtd_j) for fish group j using the following equation.

$$CspWtd_j = \sum_i (HSD) * (HSD/TD)$$

Where HSD (Hourly Spill Discharge) is the hourly spill (kcfs), and TD is the total discharge at Libby Dam (kcfs) for the i^{th} hourly periods. For example, if a fish were exposed to 5,000 cfs spill with a total discharge of 10,000 cfs for 10 hours, the cumulative spill weighted discharge would be 25.

Electrofishing surveys will be repeated during fall 2006 to assess changes in fish abundance by length category and species relative abundance and recaptured PIT tagged fishes (i.e., during the spill) can be assessed for healing of previous injuries / trauma from the spill and growth can be assessed.

PIT tagging

Passive Integrated Transponder (PIT) tags were injected in an effort to recapture fish for further examination for secondary infections or latent mortality and to determine if high discharges displaced fish downstream. PIT tags were implanted in muscle tissue posterior to the dorsal fin, adjacent to the vertebra, in all trout ≥ 300 mm total length using a 12 gauge hypodermic needle. PIT tag models TX1411GL and TX1411SGL from Texas Instruments were used. Prior to injecting tags in each specimen, each tag and needle were sterilized by immersion in Isopropyl alcohol. Once inserted, the tags were read with a Destron Fearing 2001F-ISO portable transceiver and the individual tag number was recorded in the reader, on the data sheet, and on the corresponding scale envelope if applicable. Tagged fish were also marked with an adipose fin clip.

Comment [bm1]: Correct? Ryan, please add details on the type of tag and equipment used.

Gas Bubble Trauma in Kootenai River Fish

After four days of spill on Monday night June 12, 2006, 26 percent of rainbow trout on the downstream left bank had GBT. Six percent of the rainbow trout on the right bank, where gas saturation is lower, had GBT symptoms. Initially, GBT was mainly observed in the fins. Only a few specimens had bubbles in the eyes and gills. Since only 4 bull trout were captured that night, all on the right bank (low gas), no evidence of gas bubble trauma (GBT) was observed in bull trout examined. The frequency of GBT in bull trout increased as spill continued. Thirty-six percent of the whitefish on the left bank and 19 percent on the right bank had GBT. One hundred percent of kokanee captured on the left bank and 20 percent on the right bank had GBT. Dead and dying kokanee were observed; all had physical trauma (scrapes, lacerations, lost body parts etc.), indicating that the fish had passed through the spillway from Koocanusa Reservoir. Remarkably, most of the kokanee had survived passage over the spillway and two kokanee yearclasses; (young of the year (YOY) and age 1+, about 4-5 inches long were observed in the Kootenai River during electrofishing surveys. We discontinued sampling kokanee after the first night and focused on fish species that inhabit the Kootenai River.

Inflow to Koocanusa Reservoir was 39,900 cfs on June 13 and surface elevation was 2457.44 ft, or 1.6 ft from full. As of 10:00 AM on June 14, the National Weather Service River Forecast Center updated their forecast for inflows to the reservoir. Kootenai River stage at Bonners Ferry was 1762.24 feet, 1.76 feet below flood stage (1764 ft). The river was expected to crest at elevation 1764.2 feet during the evening of 15 June. More precipitation was predicted to increase inflows to Libby Reservoir on Wednesday and into Thursday to a peak of near 49,000 cfs and remain at this level through Friday, when inflows were predicted to recede. Based on this forecast, outflow from Libby Dam was expected to remain at 38,000 cfs through the week. In actuality, inflows continued to increase and spill increased to 31,000 cfs in excess of turbine capacity (24 kcfs).

As of Thursday night June 15, after seven days of spill, GBT was evident as bubbles in fins and eyes, external tissue hemorrhages and split fins. Symptoms were common on both sides of the river (at lower spill volumes, supersaturated water flows along the left bank for about 5-8 miles before mixing across). Rainbow trout GBT increased to 68 percent on the left bank and 65 percent on the right bank. Mountain whitefish GBT increased to 62 percent on the left bank and 55 percent on the right bank. GBT symptoms were generally more severe in mountain whitefish specimens. Only 5 bull trout were captured and two had GBT (40 percent incidence).

As of Monday night June 19, 2006, after 11 days of spill, all 16 bull trout captured had GBT. Symptoms included multiple hemorrhages on the ventral surface of the body that appeared as random pinpricks, as well as bubbles in fins, eyes, dermis on the operculum and split fins. Rainbow trout GBT was observed in 67 percent on the left bank and 86 percent on the right bank (an overall slight increase since the night of June 15). Mountain whitefish GBT symptoms increased to 86 percent on the left bank and 80 percent on the right bank. Observation of symptoms and TDG levels recorded by satrometers suggested that supersaturated water may have become more consistent on both sides of the river at higher spill volumes. Gas levels (TDG %) on the left bank were higher than the mid channel and right bank, with approximate mean daily TDG values of 132, 225 and 107% at the highest spill discharge of 31 kcfs (Figure 12). Gas was supersaturated nearly 8 miles downstream of the dam, indicating that mixing of water had occurred (Figure 13). Gas levels (i.e., TDG) were 10-15% higher 8 miles downstream than TMPSN3 satrometer values.

As of Thursday night June 22, after 14 days of spill, all 12 bull trout examined had GBT. Ninety-five percent of the rainbow trout on the left bank and 91 percent on the right bank had GBT. Symptoms were observed in 85 percent of the mountain whitefish captured on the left bank and 79 percent on the right bank.

Long-term exposure to gas causes a greater frequency of GBT symptoms with increasing levels of gas supersaturation and repeated exposure as fish utilize shallow river margins. Roughly half of the fish in the sampling reach had GBT symptoms after the first week of spill and the severity of GBT increased over time. Results were used to develop relationships between the duration of spill and the frequency of GBT observed in each species (Figures 4-7 and 8-11). Symptoms in bull trout affected half of the population

by the 8th day of spill. After June 19th, the 11th day of spill onward, 100 percent of bull trout examined had GBT. Hemorrhaging on the ventral body surface increased when gas saturation approached 131 percent, then apparently reduced when dissolved gas concentrations reduced toward 124 percent on June 22. It remains uncertain if survivors may have increased susceptibility to secondary complications from external lesions (e.g. split fins, hemorrhaging, abrasions). Weitkamp (1976) found fungal infections were responsible for delayed mortality of juvenile chinook that had survived GBT lesions and hemorrhages near the base of the caudal fin.

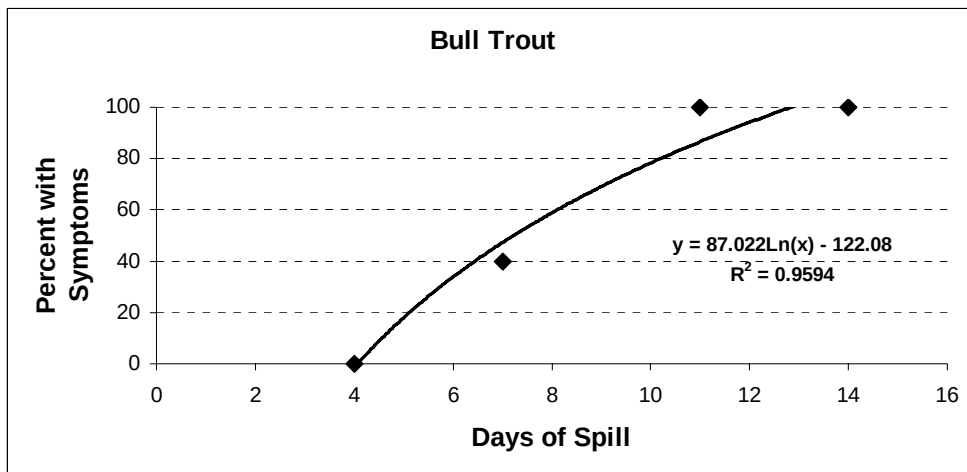


Figure 4. Relationship between the number of days spilled and percentage of bull trout impacted by gas bubble trauma observed during twice-weekly electrofishing surveys, 2006.

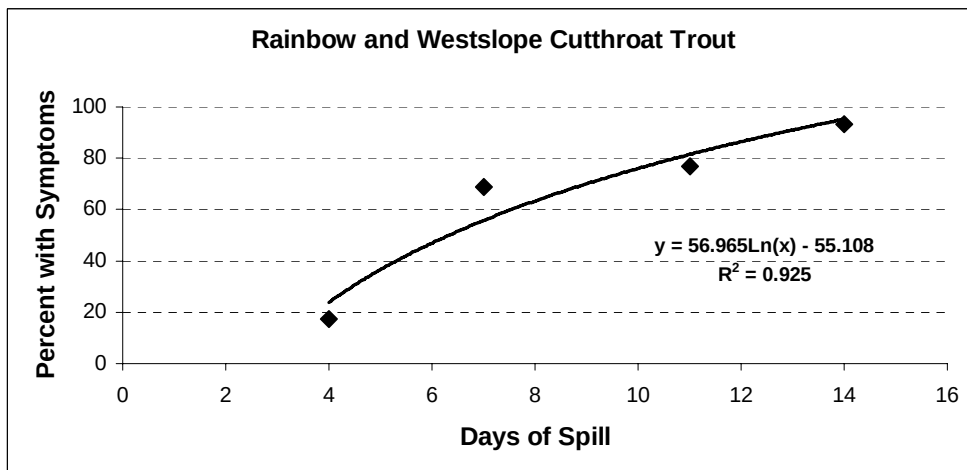


Figure 5. Relationship between the number of days spilled and percentage of rainbow trout and westslope cutthroat trout (data were pooled) impacted by gas bubble trauma observed during twice-weekly electrofishing surveys, 2006.

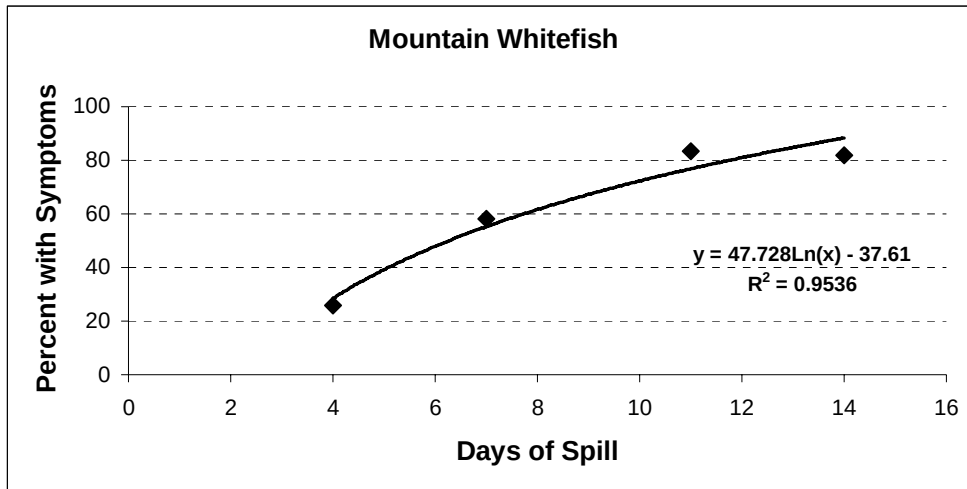


Figure 6. Relationship between the number of days spilled and percentage of mountain whitefish impacted by gas bubble trauma observed during twice-weekly electrofishing surveys, 2006.

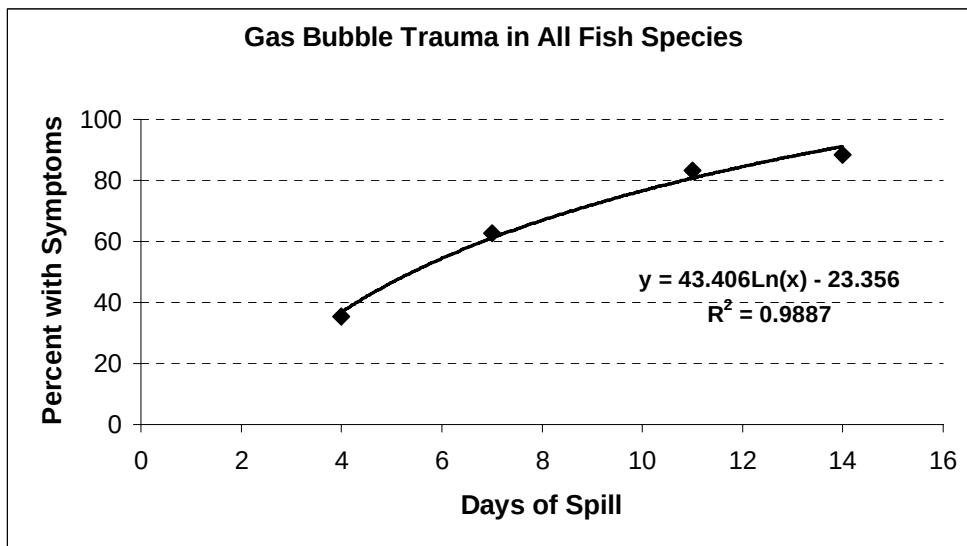


Figure 7. Relationship between the number of days spilled and percentage of fish (all species combined) impacted by gas bubble trauma observed during twice-weekly electrofishing surveys, 2006.

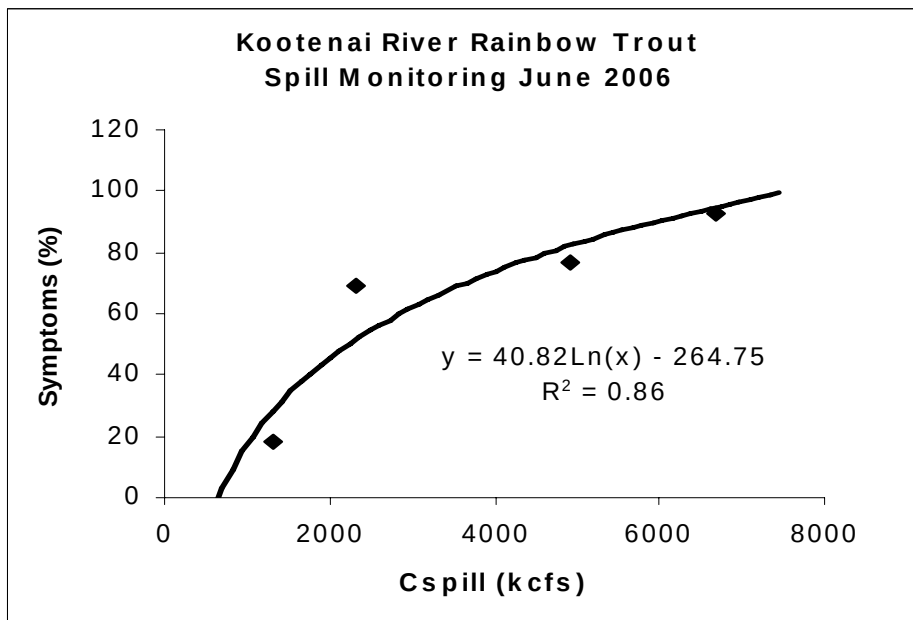
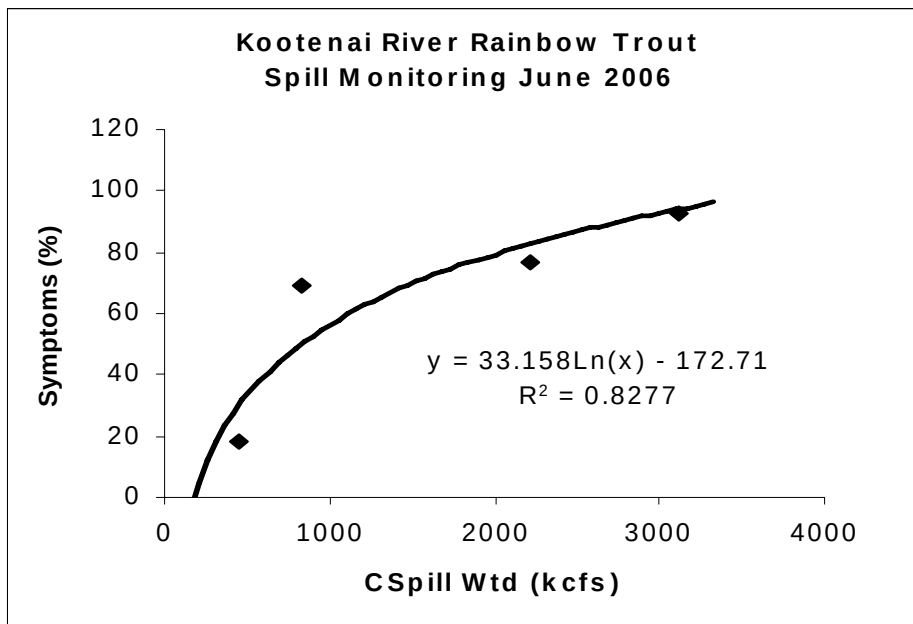


Figure 8. Comparison of spill exposure indexes (CSpill and CSpillWtd, from Dunnigan 2003) in relation to the percent of rainbow trout with gas bubble trauma.

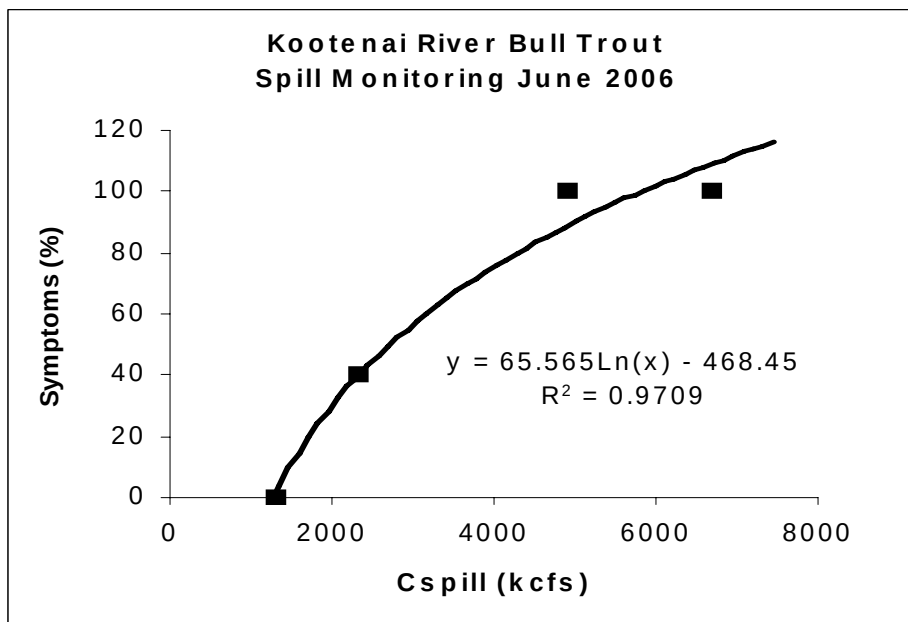
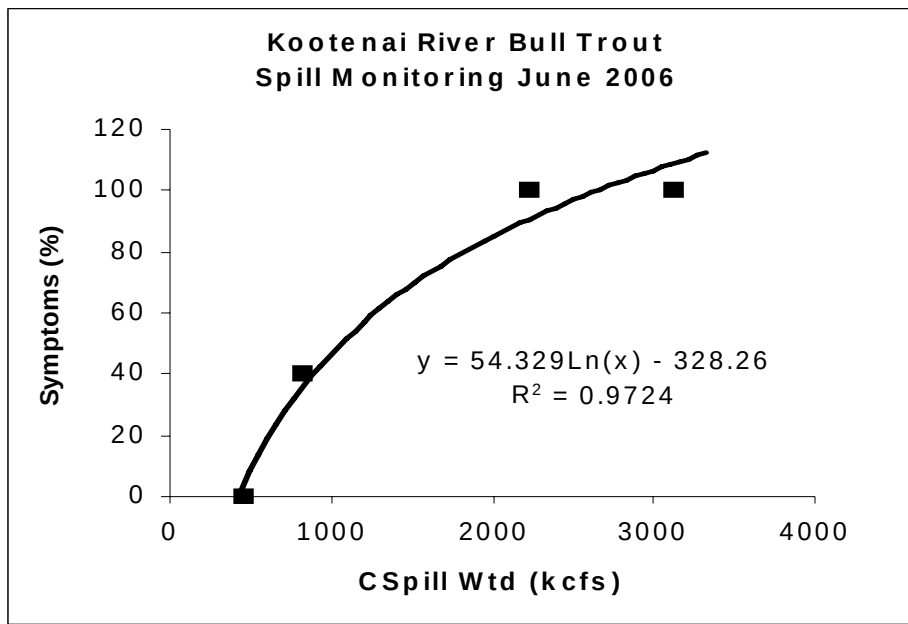


Figure 9. Comparison of spill exposure indexes (Cspill and Cspill WTD, from Dunnigan 2003) in relation to the percent of bull trout with gas bubble trauma.

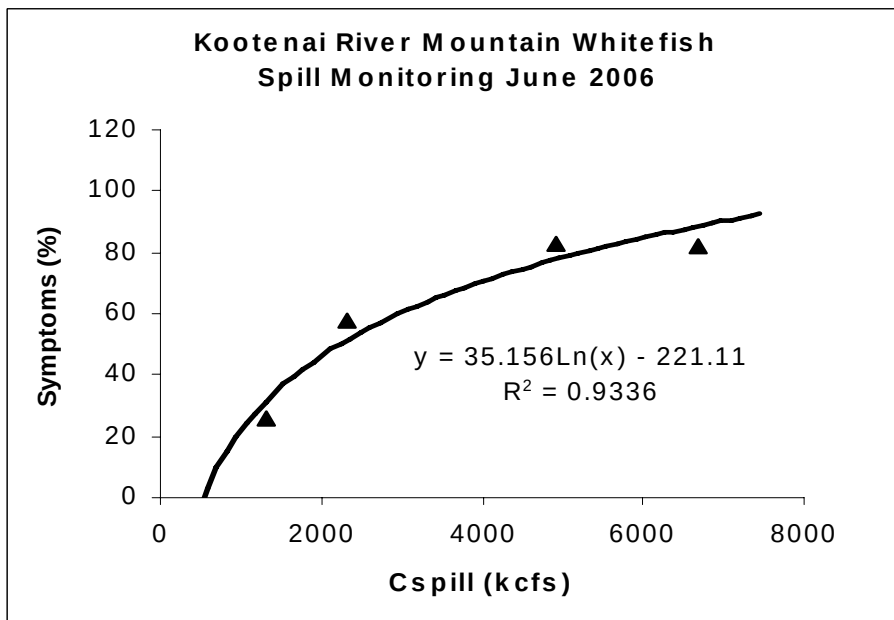
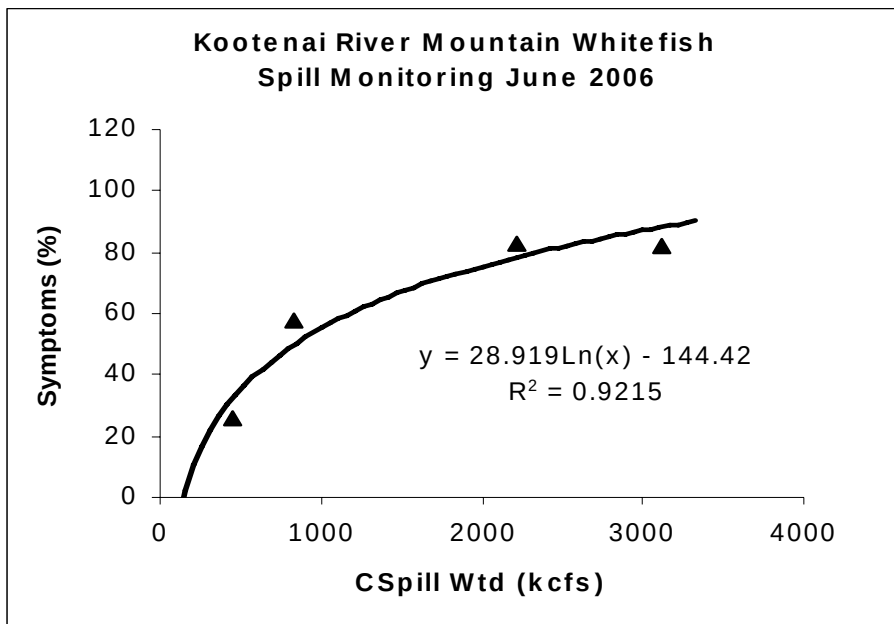


Figure 10. Comparison of spill exposure indexes (Cspill and Cspill WTD, from Dunnigan 2003) in relation to the percent of mountain whitefish with gas bubble trauma.

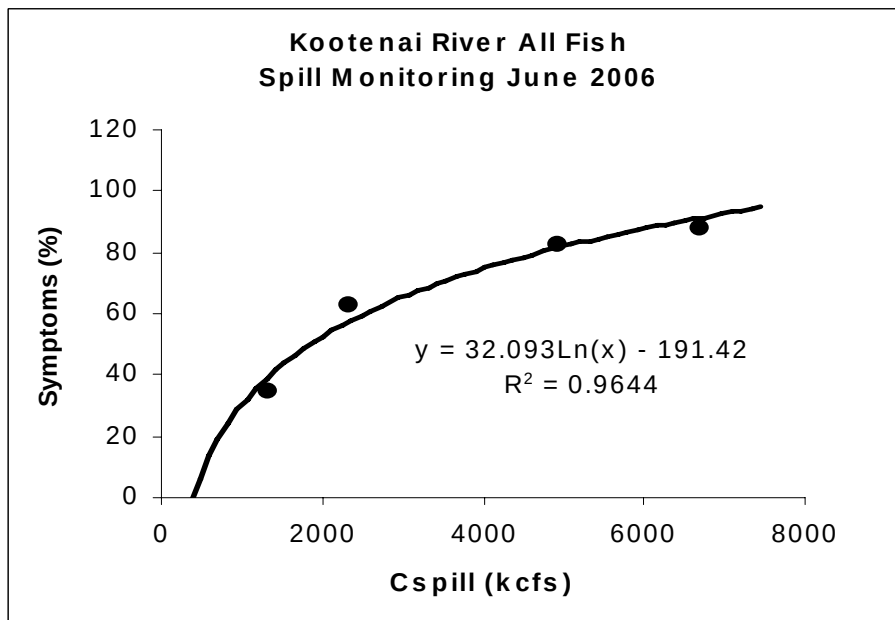
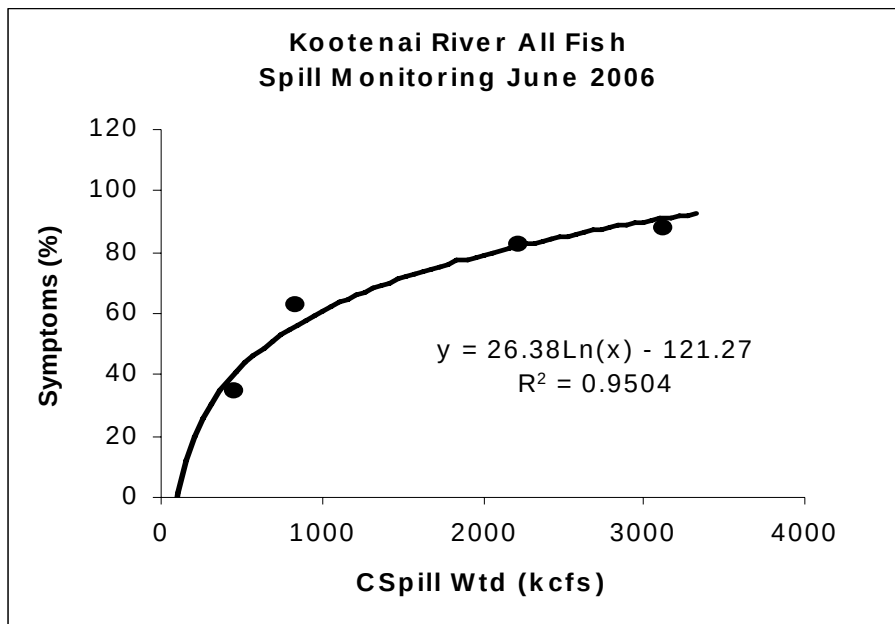


Figure 11. Comparison of spill exposure indexes (Cspill and Cspill WTD, from Dunnigan 2003) in relation to the percent of all fishes with gas bubble trauma.

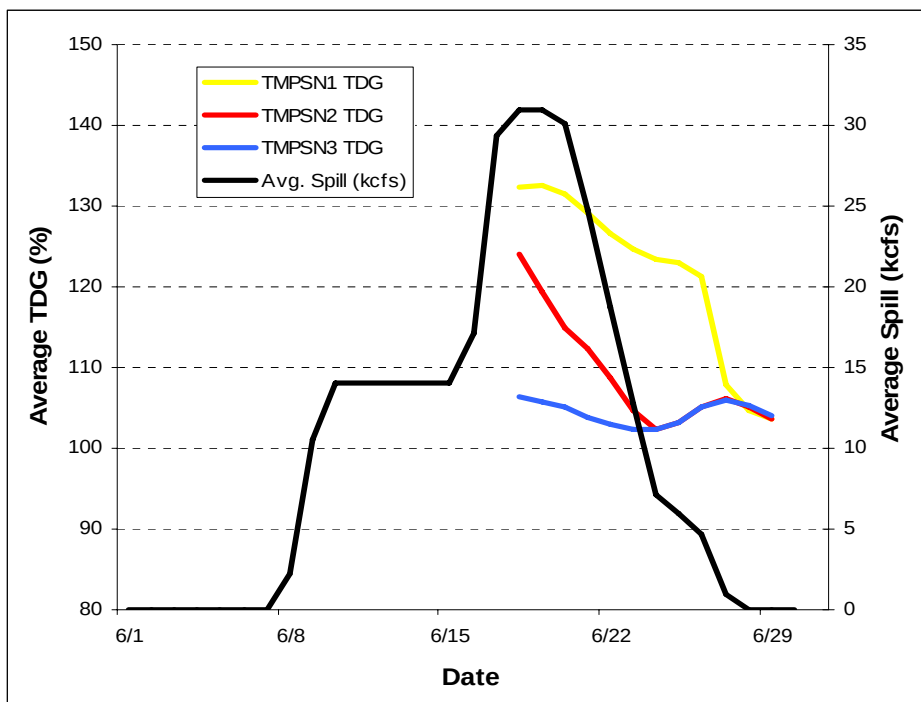


Figure 12. Comparison of gas levels (total dissolved gas; TDG; %) from 3 satumeters located at the David Thompson Bridge located just below Libby Dam. TMPSN1 was located near the left bank, TMPSN2 in the middle of the river, and TMPSN3 was located near the right bank looking downstream.

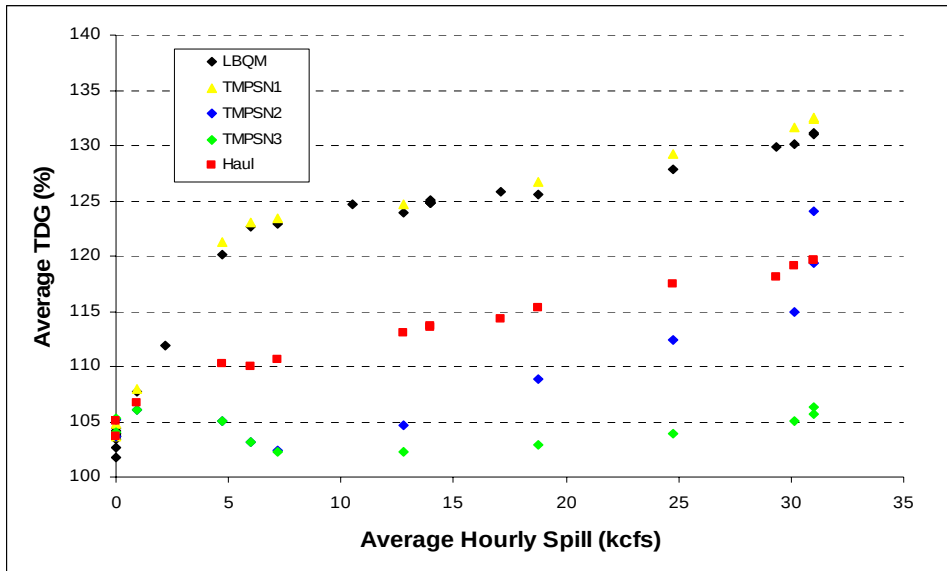


Figure 13. All TDG levels recorded by satumeters located in the Kootenai River in June 2006. Location of LBQM is right below Libby Dam, location of Haul is located approximately 8 miles downstream of Libby Dam, and TMPSN1, 2, and 3, were located on the David Thompson Bridge downstream of Libby Dam.

**Fall Commercial Gillnet Fishing Period Adopted
10/3-10/6**

**Scaffold Fishery Sales Continue
Wednesday, September 27, 2006**

Today, the Compact states of Oregon and Washington concurred with the tribal regulations for the following Zone 6 fall commercial fishing period:

COMMERCIAL GILLNET SEASON

AREA: All of Zone 6

DATES: 6:00 AM Tuesday, October 3 through 6:00 PM Friday, October 6. (3.5 days)

GEAR: There will be an 8 inch minimum mesh size restriction.

ALLOWABLE SALES: Chinook, steelhead, coho, walleye, shad, and carp may be sold or retained for subsistence. Sturgeon may not be sold, but sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence.

SANCTUARIES: All standard river mouth and dam sanctuaries shall remain in effect. The standard Spring Creek Hatchery sanctuary will be in effect.

Scaffold Fishery:

The scaffold fishery remains open for subsistence use all year. Sales of fish caught in the scaffold/hook and line fishery continue until further notice. Allowable gears include hoopnet, dipnet, and hook and line. Allowable species are Chinook, steelhead, coho, walleye, shad, and carp. Sockeye may not be sold but may be retained for subsistence. Sturgeon may not be sold. Sturgeon between four and five feet total length in The Dalles and John Day Pools and between 45"-60" in the Bonneville Pool may be kept for subsistence purposes.

Sales are also allowed for fish caught in overlapping portions regularly scheduled Yakama Nation subsistence fisheries in the Big White Salmon River and the Klickitat River as well as the weekly Drano Lake fishery. Please contact the Yakama Fisheries Office (509-865-6262) for exact times and dates.

If you have any fishing enforcement problems or need assistance or information, day or night, contact the Columbia River Inter-Tribal Fisheries Enforcement Office, 4270 Westcliff Drive, Hood River, Oregon. Phone: (541)-386-6363 or toll-free (800)-487-FISH (3474). **Please consult your tribal Fish and Wildlife Committee for additional details on tribal regulations. PLEASE WEAR YOUR LIFE JACKETS FOR SAFETY.**



COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232

Telephone (503) 238-0667

Fax (503) 235-4228

www.critfc.org

TO: Technical Management Team (TMT)
 FROM: Kyle Dittmer, *Hydrologist - Meteorologist*, CRITFC Hydro Program
 DATE: October 25, 2006
 SUBJECT: Summary of Pool Operations – 2006 Autumn Treaty Fishery

CRITFC submitted four System Operation Requests (2006-C5, C6, C7, and C8) via the NMFS' TMT forum to support 2006 autumn treaty fishing. CRITFC requested two criteria: (1) one-foot elevation bands and (2) stable pool elevations during each week of treaty fishing. Criterion #1 asked to operate the pools as a hard constraint within a one-foot elevation range for all of the Zone 6 pools (i.e. Bonneville, The Dalles, and John Day). The Corps committed to a hard constraint of a 1.5-foot range, or 1-foot as a soft constraint, as they have done so since 1996, but only for the Bonneville pool.¹ The table summarizes the hourly compliance of CRITFC's 1-foot elevation band criteria and the Corps' 1.5-foot criteria during the 2006 and 2005 treaty fisheries.

2006	Bonneville Pool	The Dalles Pool	John Day pool
1 foot range (CRITFC):	76.5 – 75.5 feet	159.5 – 158.5 feet	264.5 – 263.5 feet
AUG 21 - AUG 24	84%	72%	93%
AUG 28 - SEP 1	91%	69%	90%
SEP 5 - SEP 9	87%	83%	59%
SEP 11 - SEP 15	96%	79%	16%
SEP 18 - SEP 22	100%	94%	51%
SEP 25 - SEP 29	98%	96%	12%
OCT 3 - OCT 6	100%	93%	100%
average:	94%	84%	60%
2005 average:	100%	82%	70%
1.5 foot range (COE):	76.5 – 75 feet	159.5 – 158 feet	264.5 – 263 feet
AUG 21 - AUG 24	93%	79%	100%
AUG 28 - SEP 1	97%	89%	100%
SEP 5 - SEP 9	100%	97%	100%
SEP 11 - SEP 15	100%	86%	100%
SEP 18 - SEP 22	100%	100%	100%
SEP 25 - SEP 29	100%	100%	79%
OCT 3 - OCT 6	100%	100%	100%
average:	99%	93%	97%
2005 average:	100%	94%	100%

Pool elevation data is a good objective measure as to the absolute pool fluctuations (Criterion #2) as shown in Figures 1 through 21. Bonneville pool operations saw 0.3 to 1.0 foot swings compared to 0.3 – 0.9 foot swings in autumn 2005). The Dalles pool saw 0.5 – 2.2 foot swings (compared to 1.3 – 2.5 foot swings in autumn 2005). John Day pool saw 0.2 – 0.7 foot swings (compared to 0.3 – 0.8 foot swings in autumn 2005).

¹ CRITFC's member tribes are currently engaged in policy discussions with the Corps NWD commanders regarding providing appropriate pool operations for all of Zone 6 during the treaty fisheries.

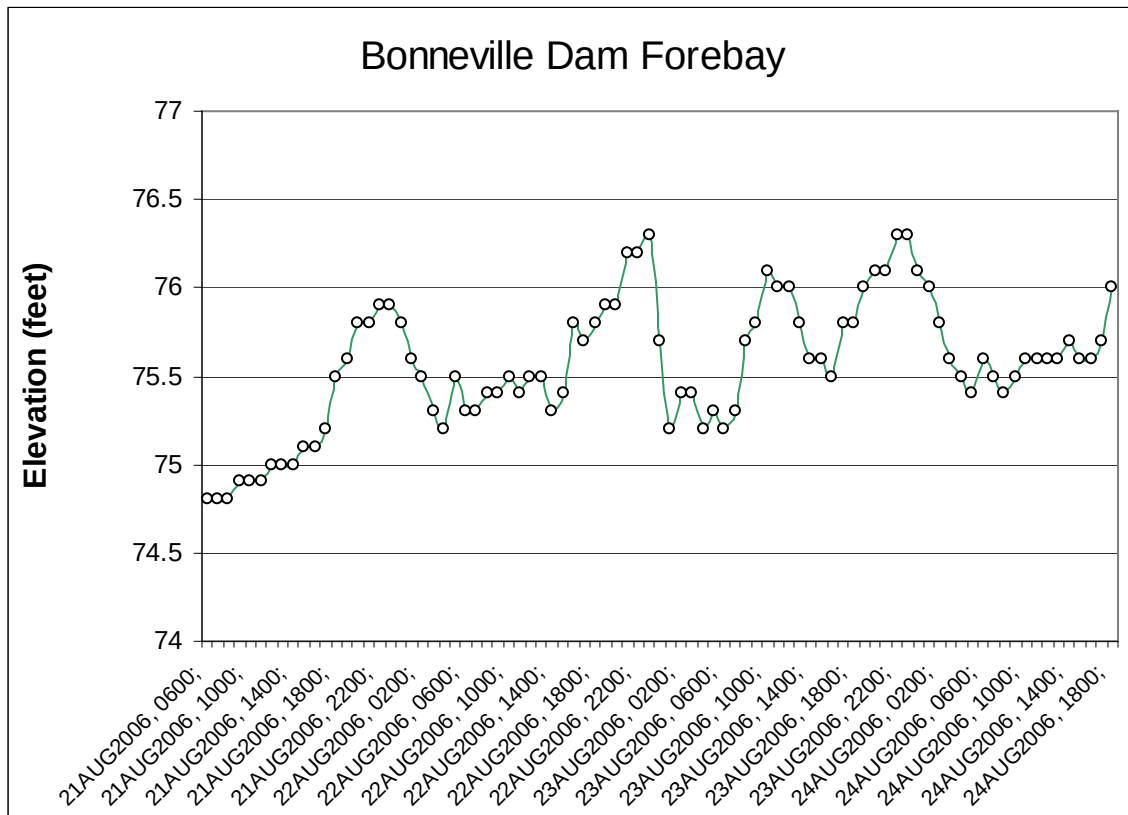


Figure 1. Observed BON pool elevations during August 21-24, 2006 autumn treaty fishing.

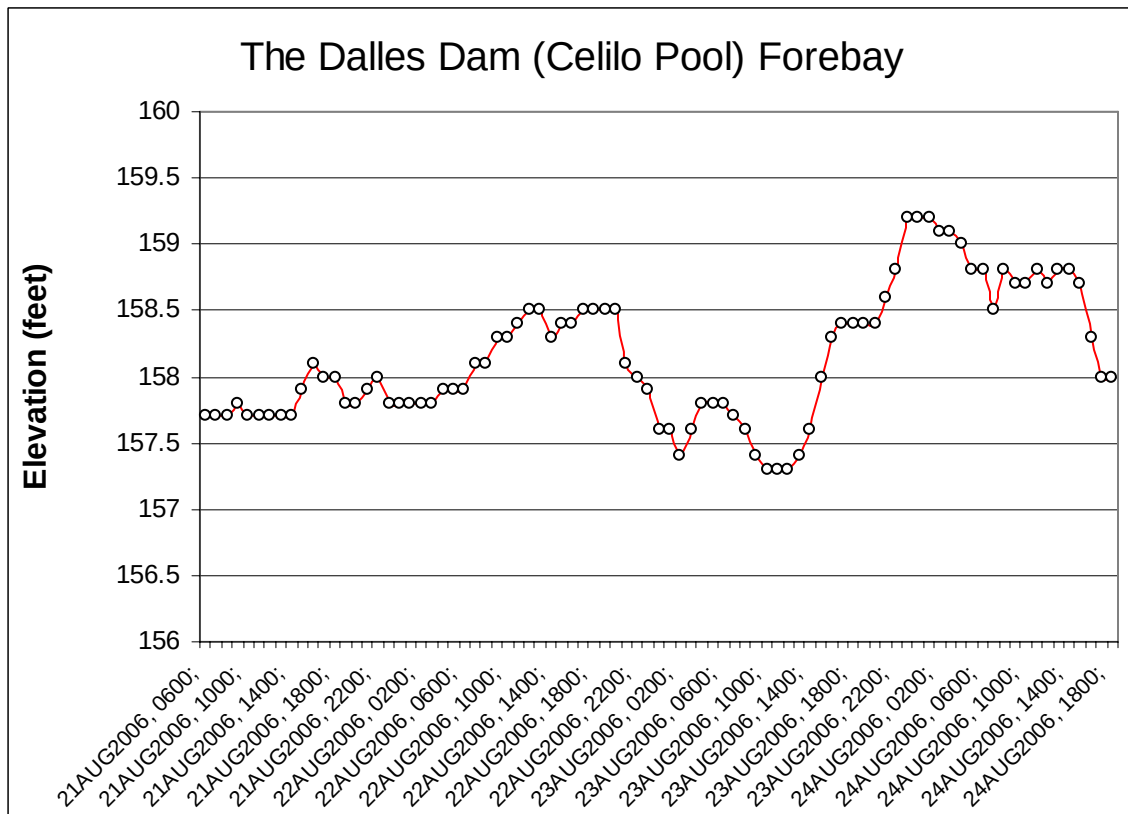


Figure 2. Observed TDA pool elevations during August 21-24, 2006 autumn treaty fishing.

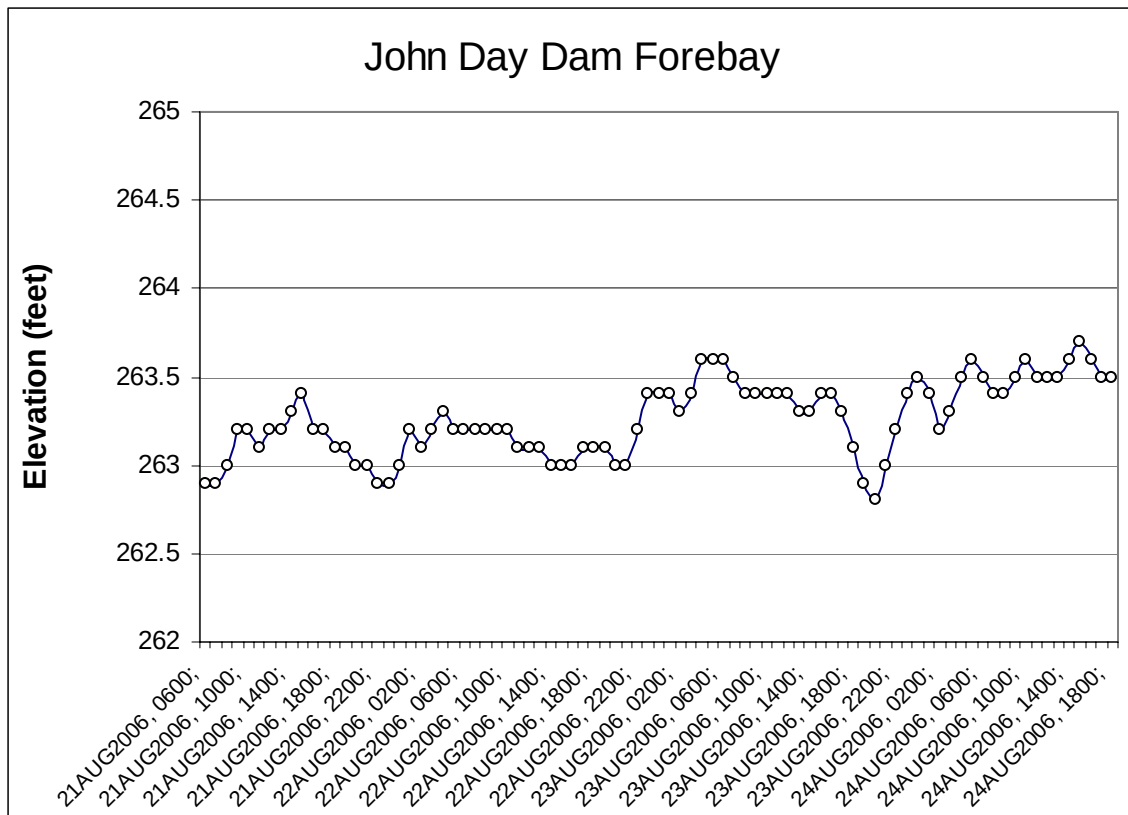


Figure 3. Observed JDA pool elevations during August 21-24, 2006 autumn treaty fishing.

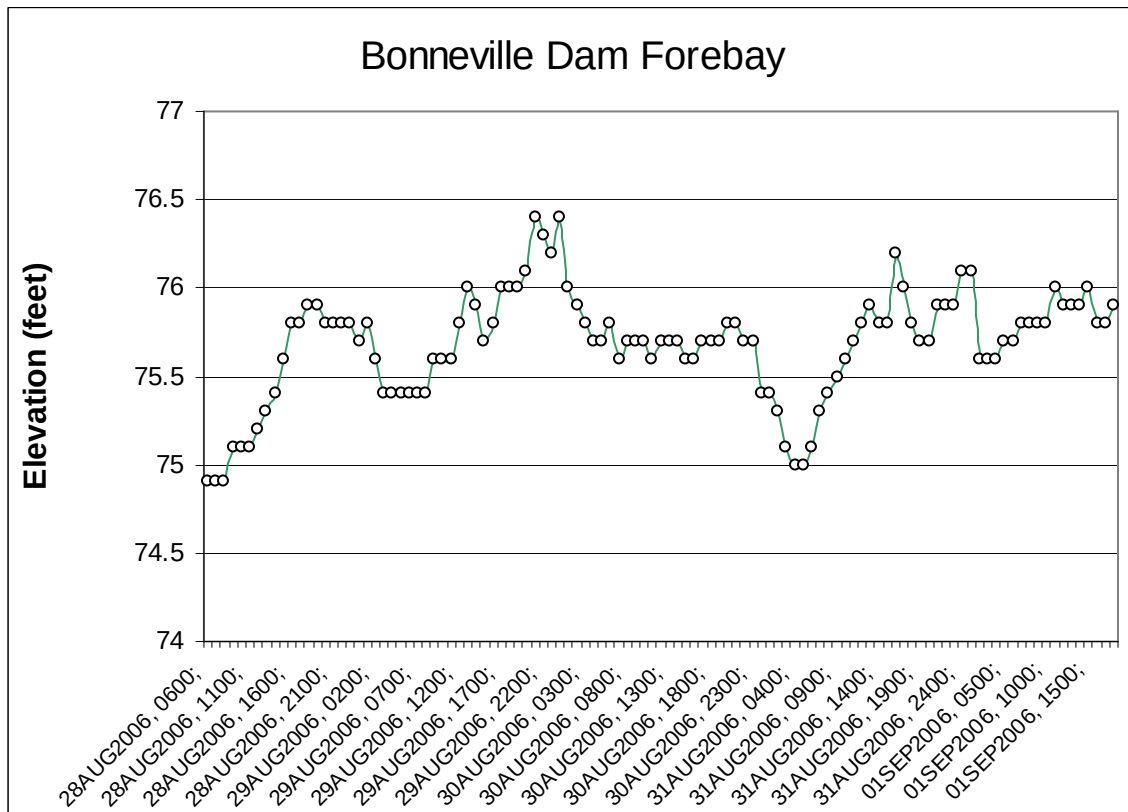


Figure 4. Observed BON pool elevations during August 28-Sept. 1, 2006 autumn treaty fishing.

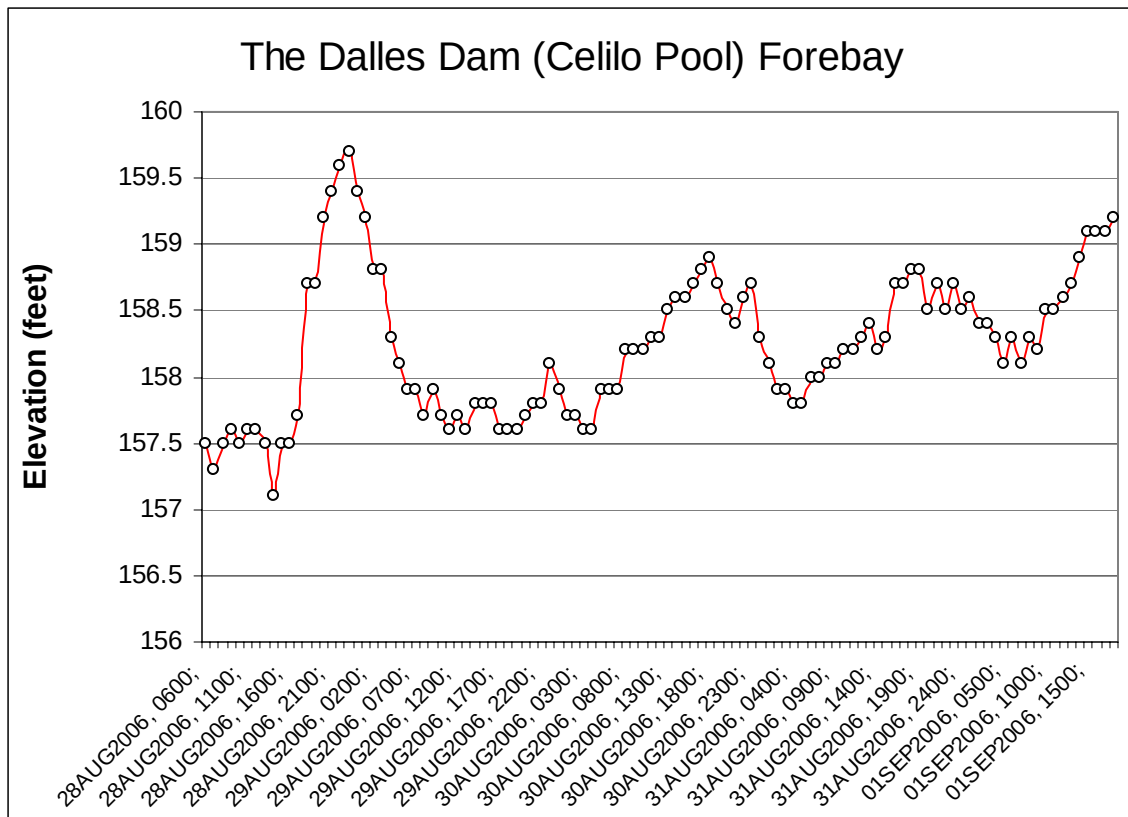


Figure 5. Observed TDA pool elevations during August 28-Sept. 1, 2006 autumn treaty fishing.

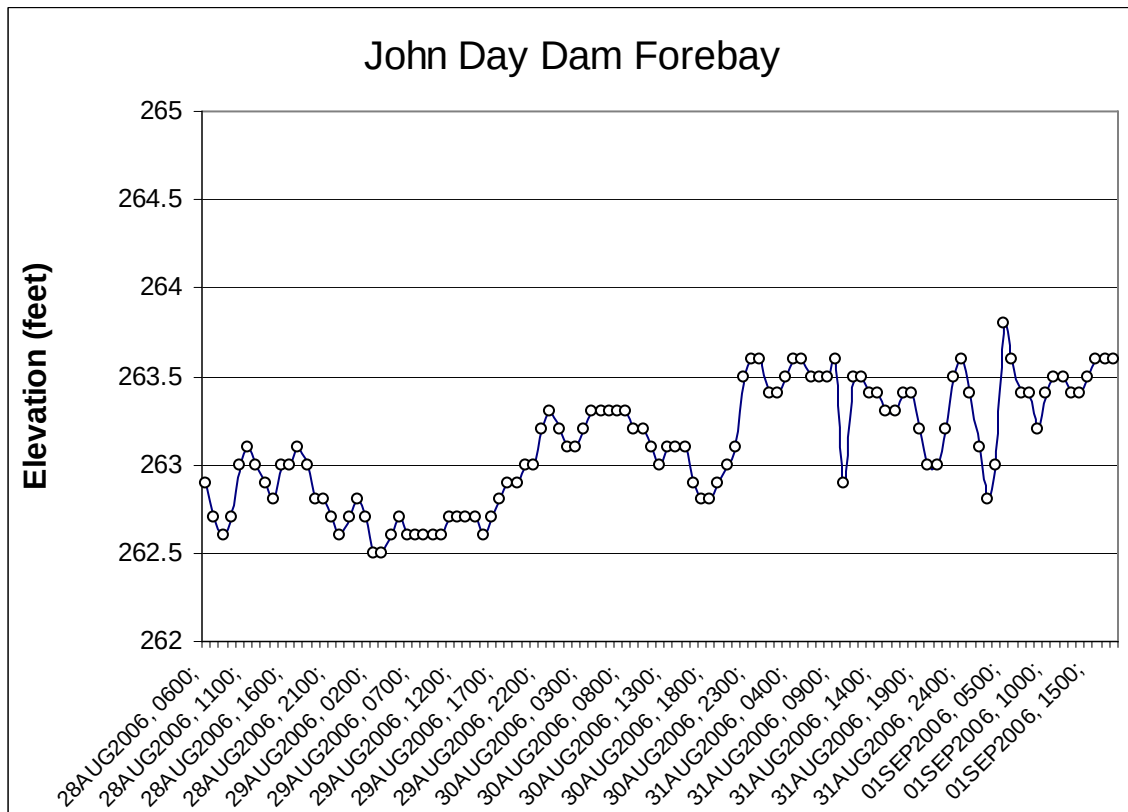


Figure 6. Observed JDA pool elevations during August 28-Sept. 1, 2006 autumn treaty fishing.

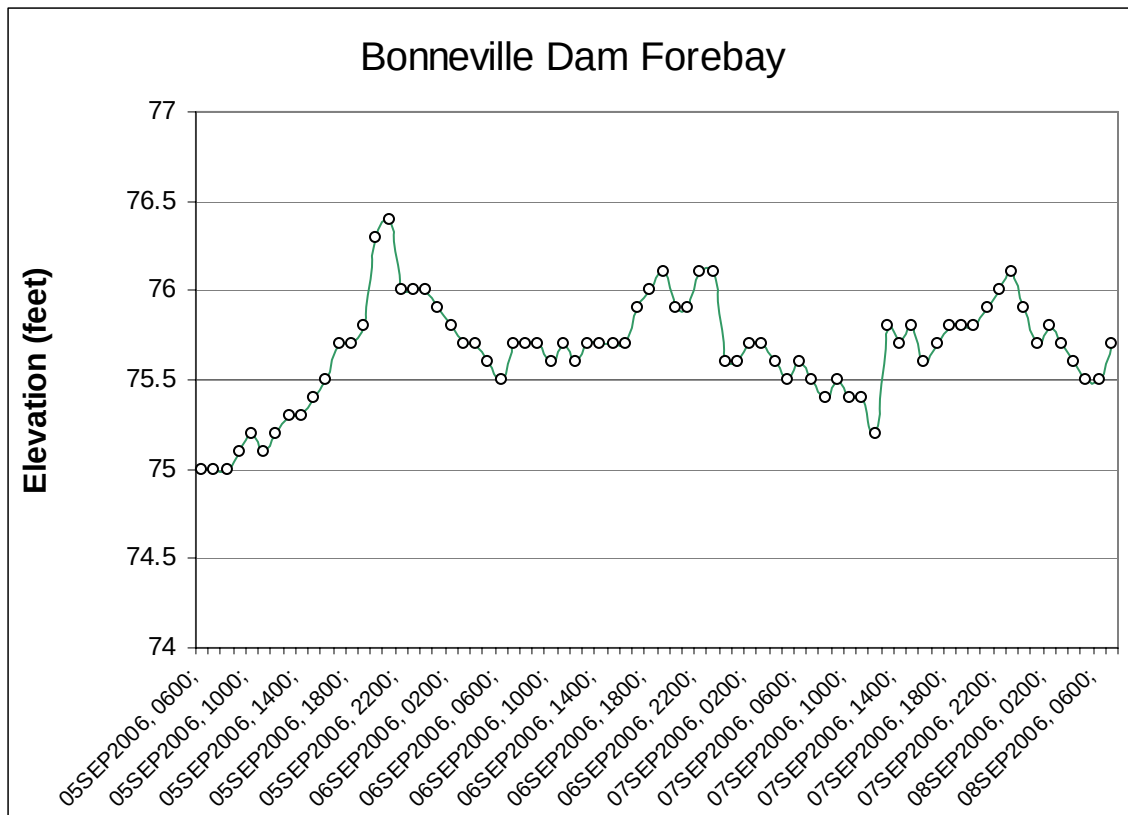


Figure 7. Observed BON pool elevations during September 5-9, 2006 autumn treaty fishing.

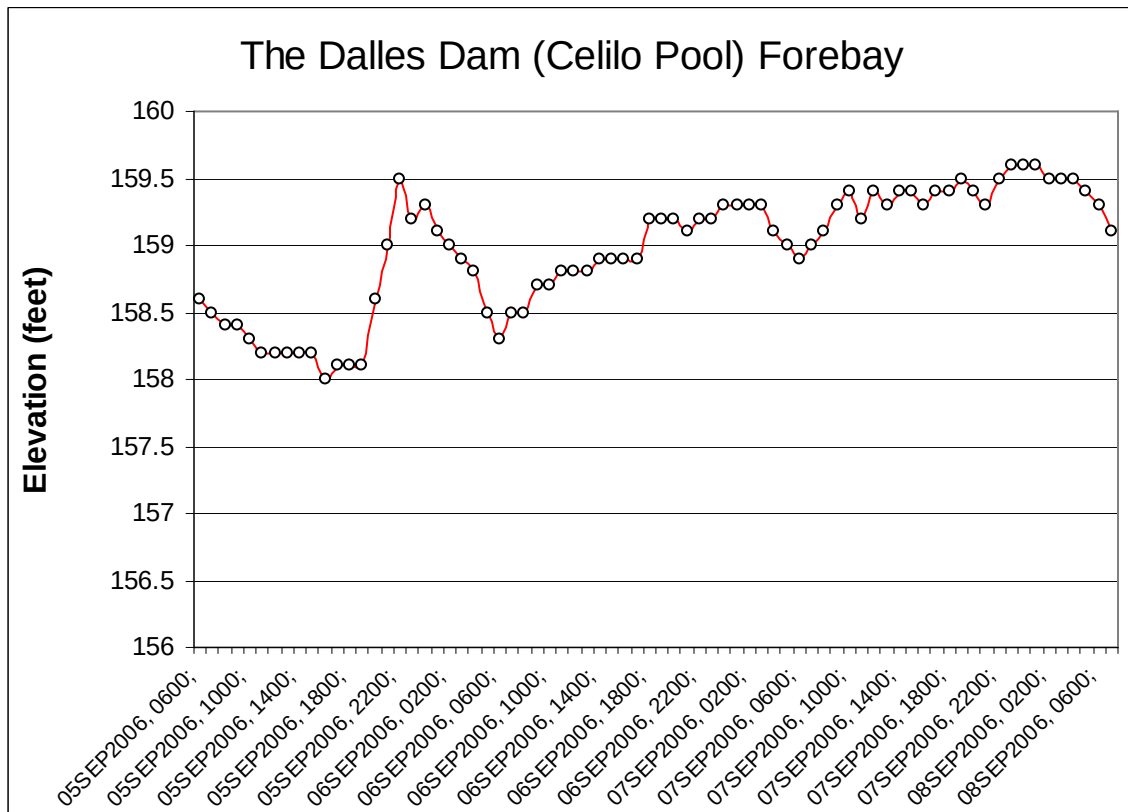


Figure 8. Observed TDA pool elevations during September 5-9, 2006 autumn treaty fishing.

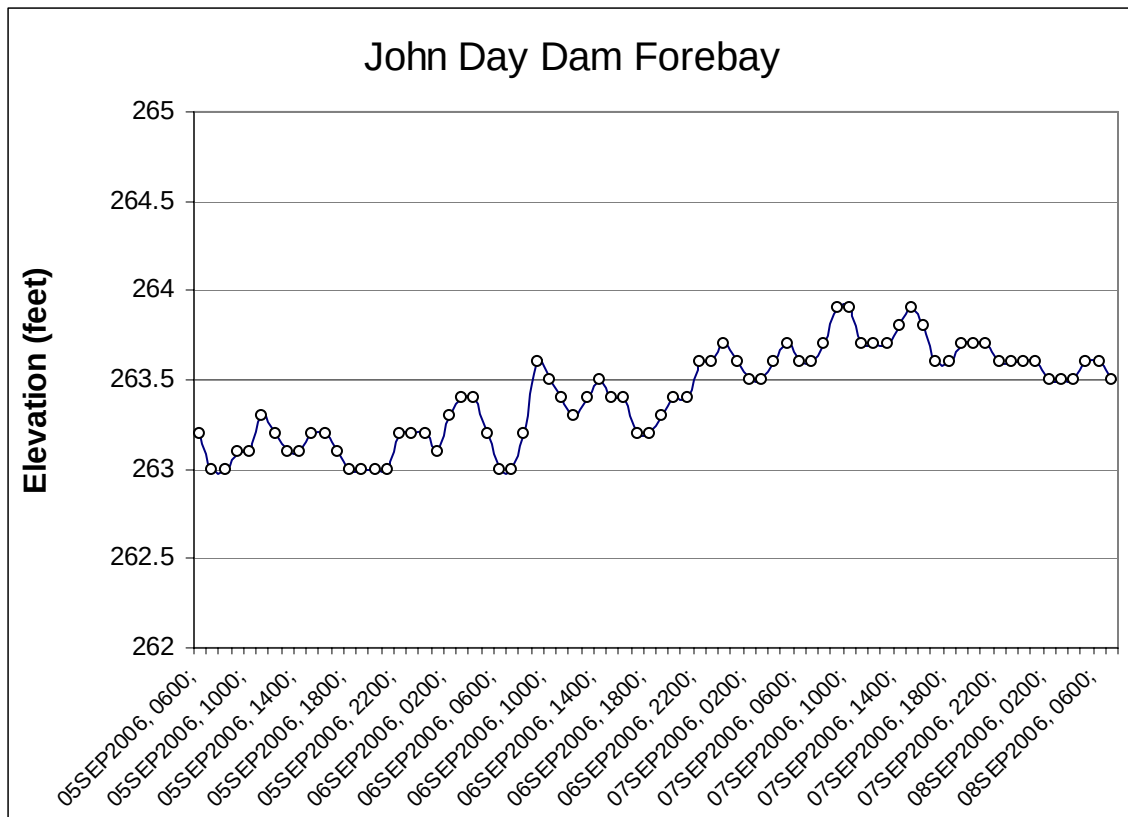


Figure 9. Observed JDA pool elevations during September 5-9, 2006 autumn treaty fishing.

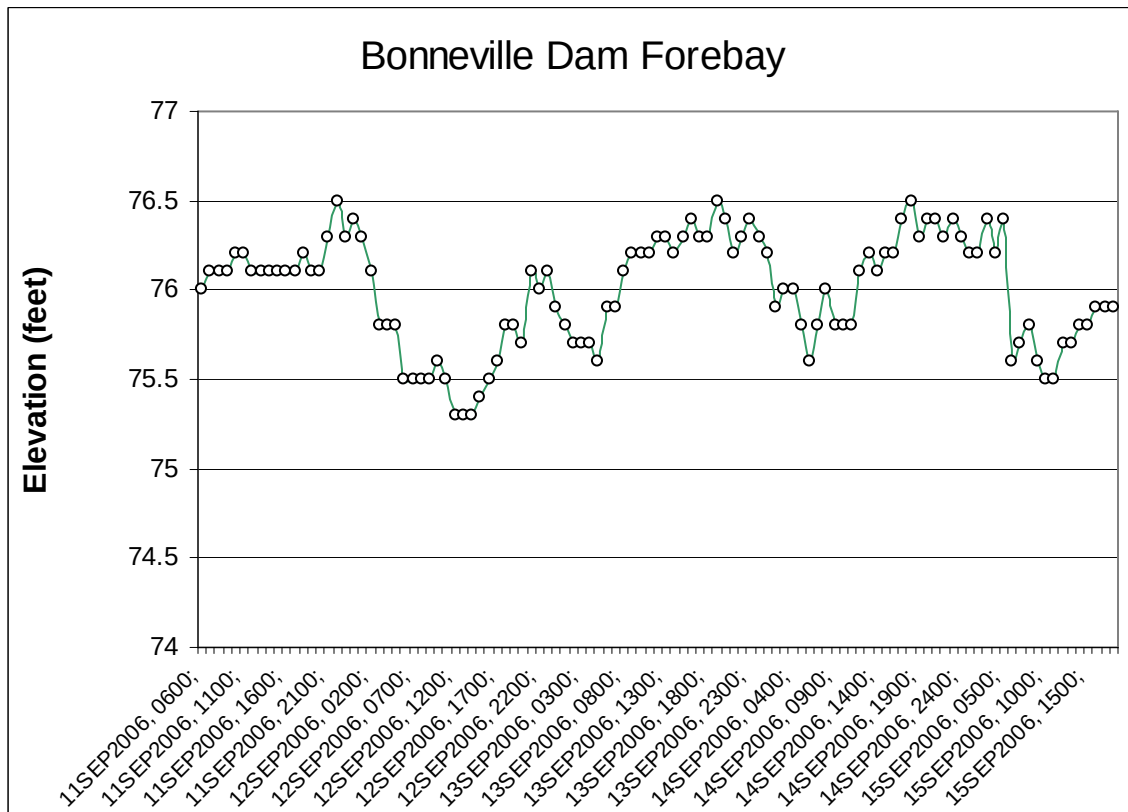


Figure 10. Observed BON pool elevations during September 11-15, 2006 autumn treaty fishing.

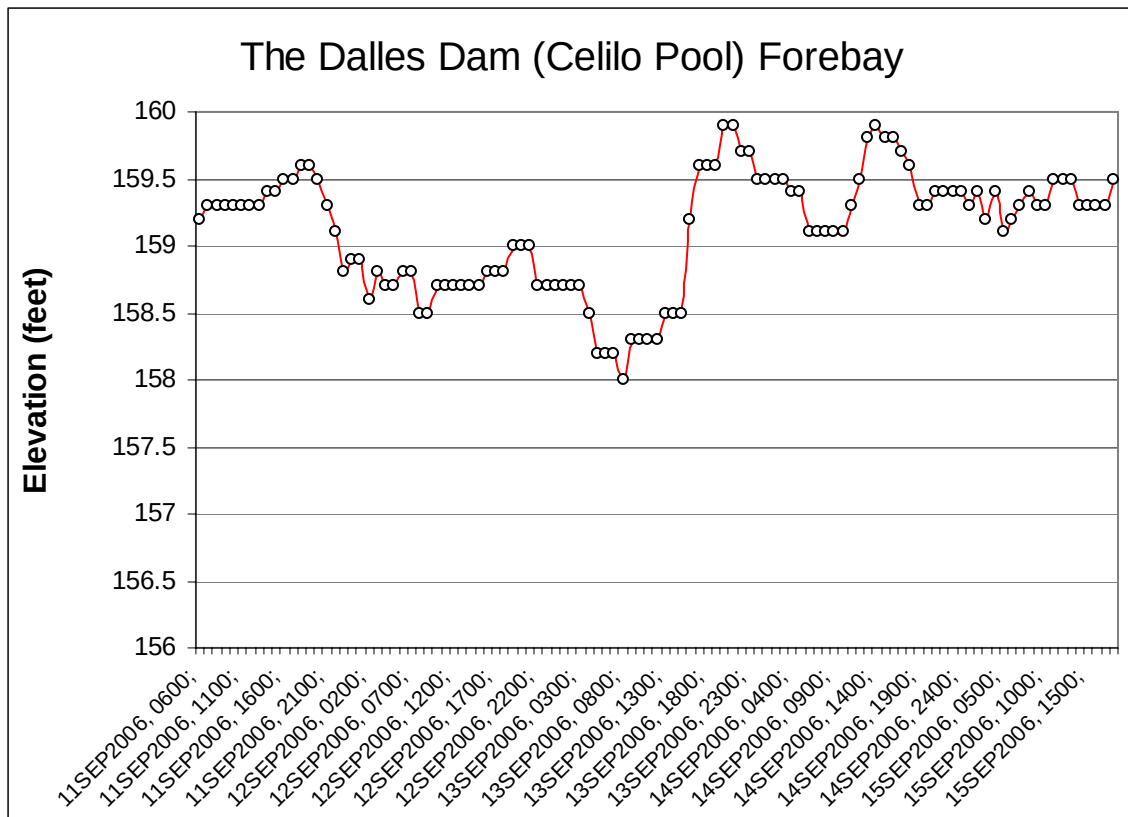


Figure 11. Observed TDA pool elevations during September 11-15, 2006 autumn treaty fishing.

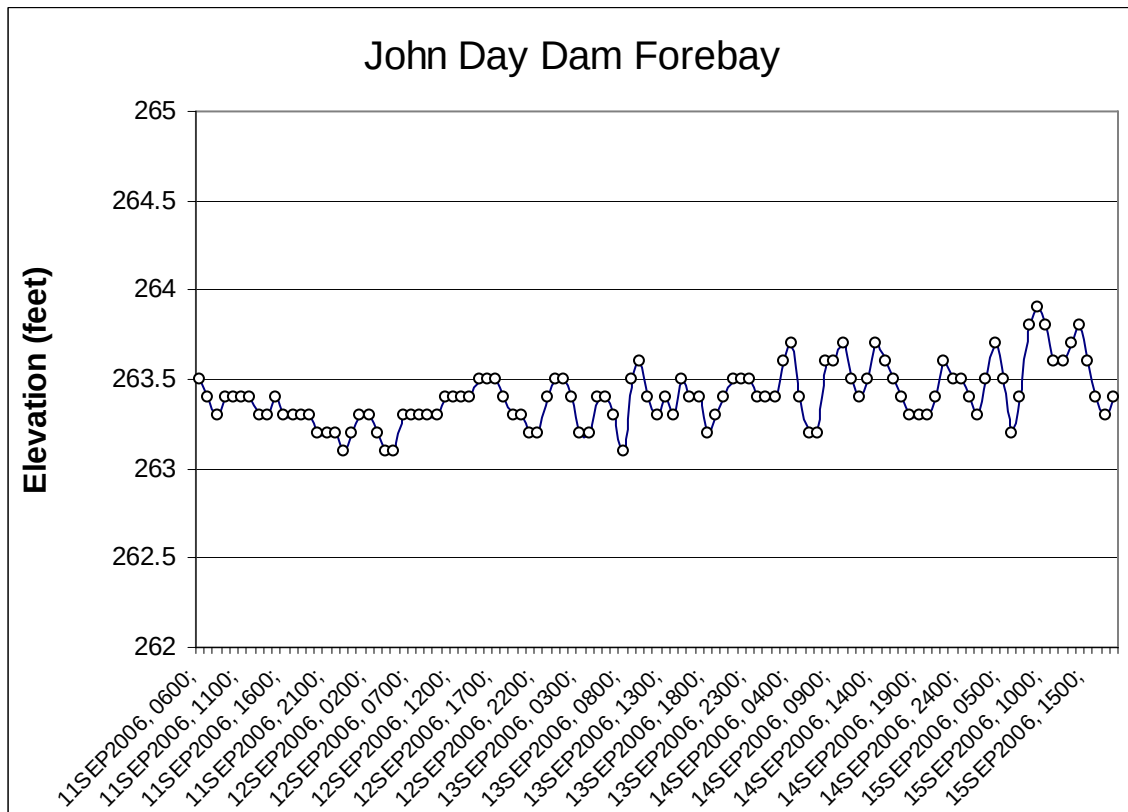


Figure 12. Observed JDA pool elevations during September 11-15, 2006 autumn treaty fishing.

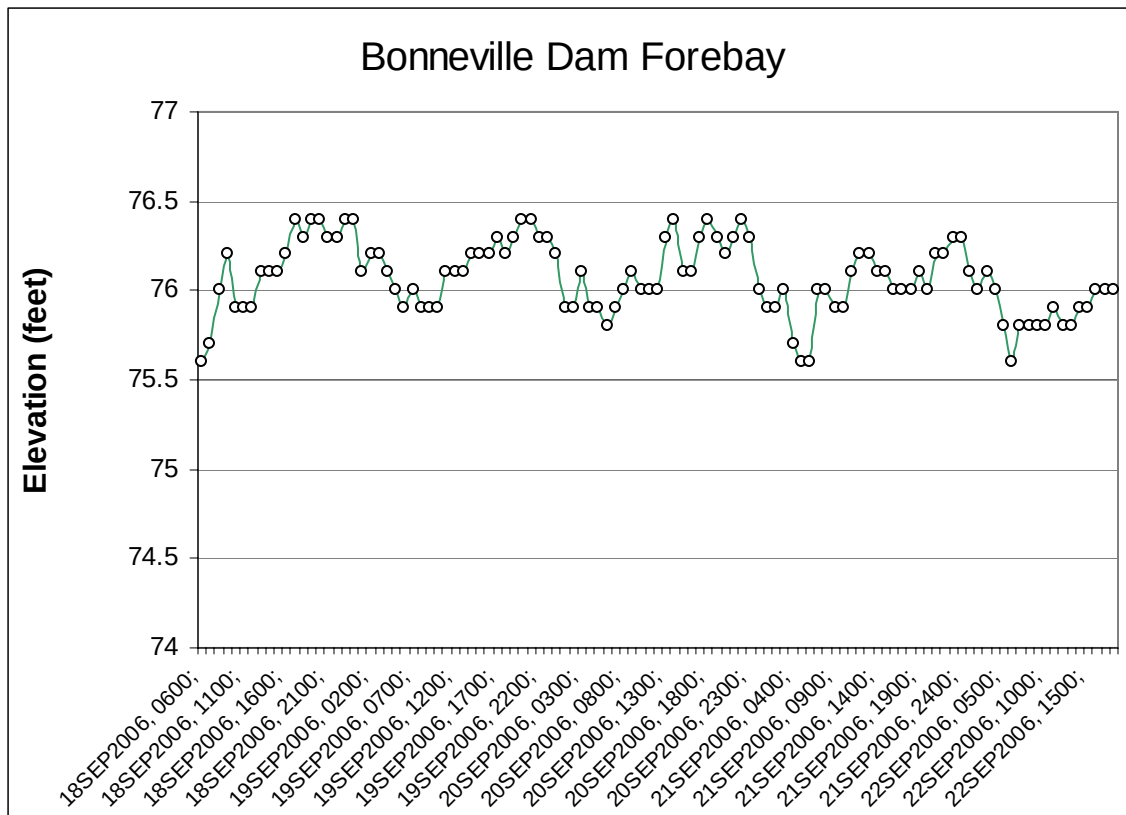


Figure 13. Observed BON pool elevations during September 18-22, 2006 autumn treaty fishing.

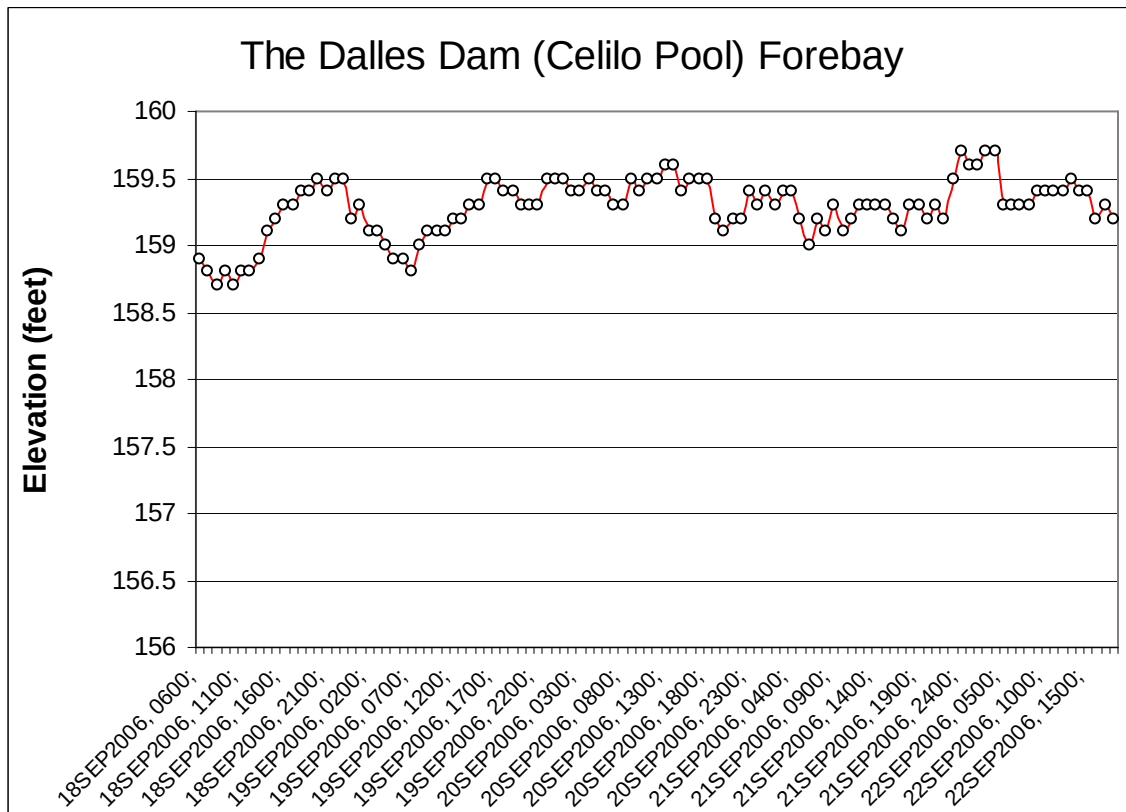


Figure 14. Observed TDA pool elevations during September 18-22, 2006 autumn treaty fishing.

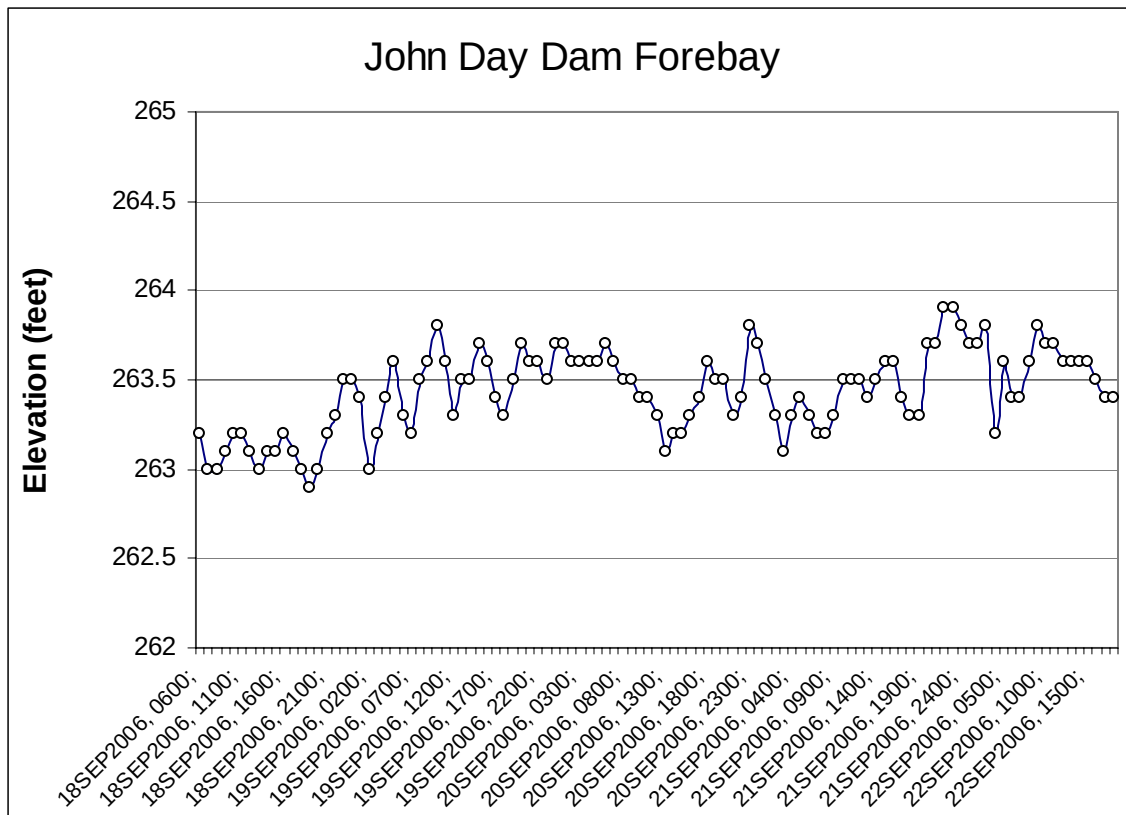


Figure 15. Observed JDA pool elevations during September 18-22, 2006 autumn treaty fishing.

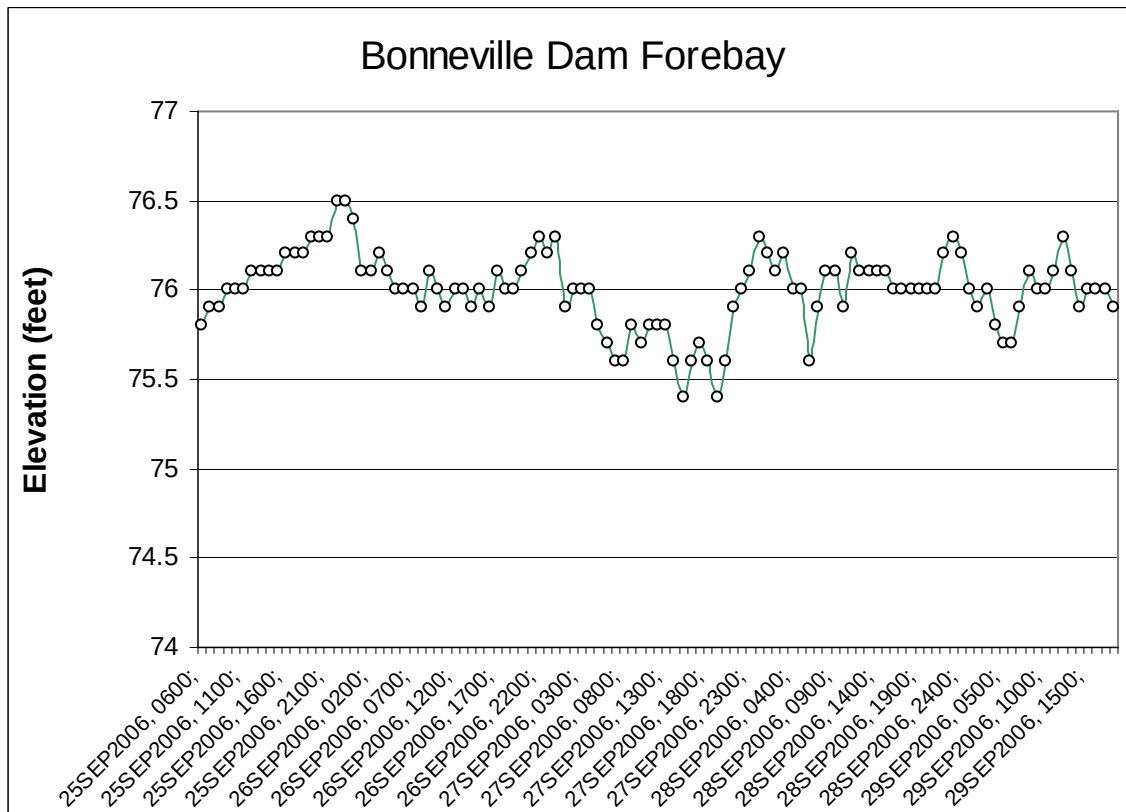


Figure 16. Observed BON pool elevations during September 25-29, 2006 autumn treaty fishing.

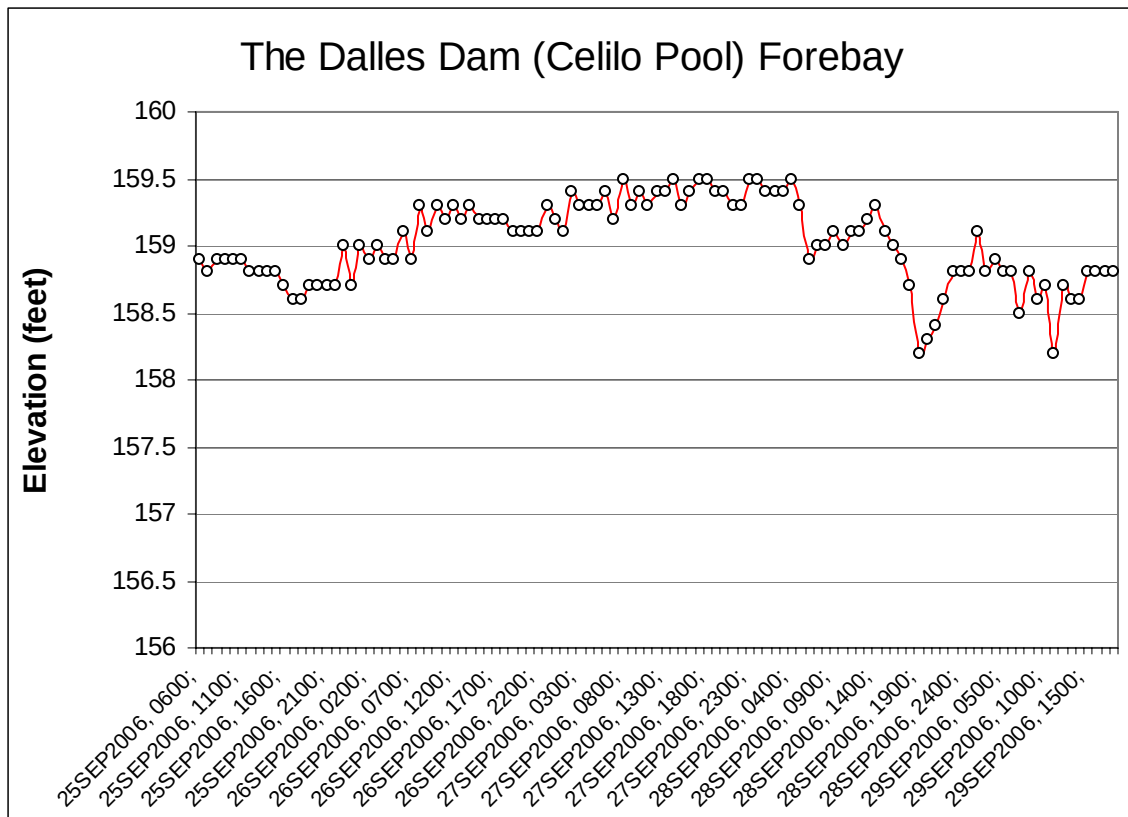


Figure 17. Observed TDA pool elevations during September 25-29, 2006 autumn treaty fishing.

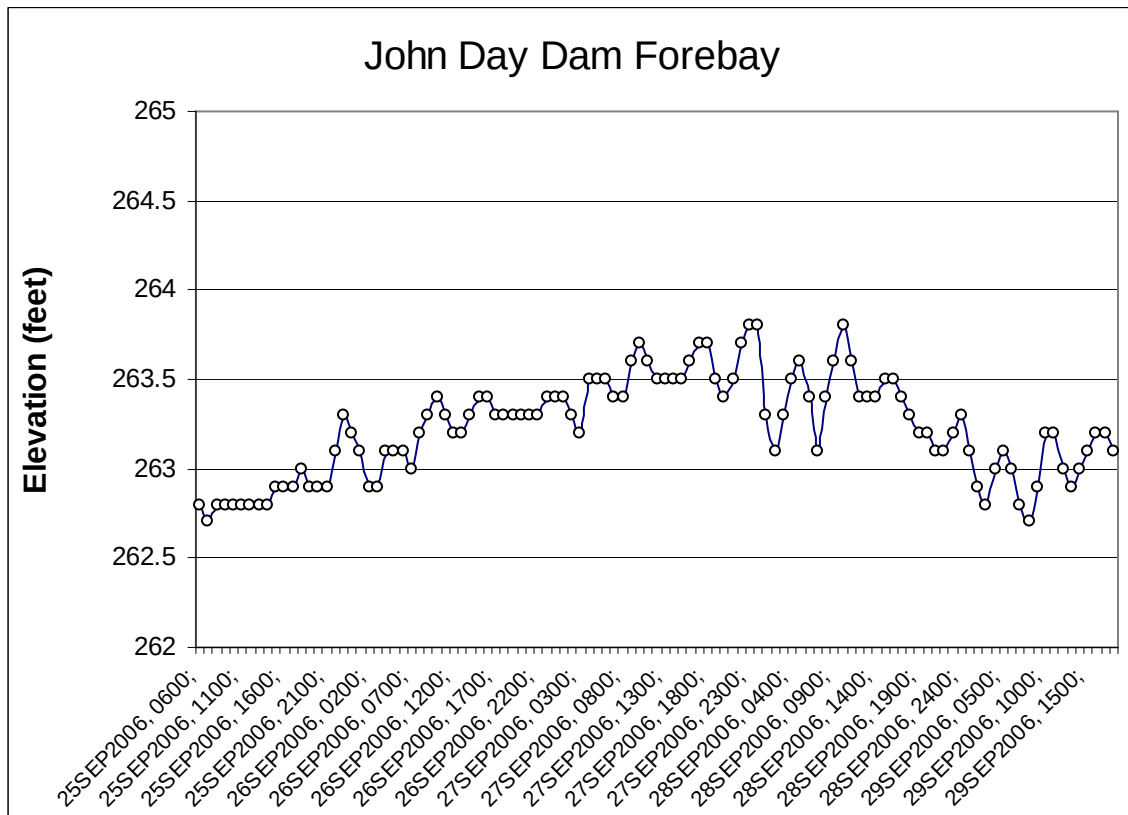


Figure 18. Observed JDA pool elevations during September 25-29, 2006 autumn treaty fishing.

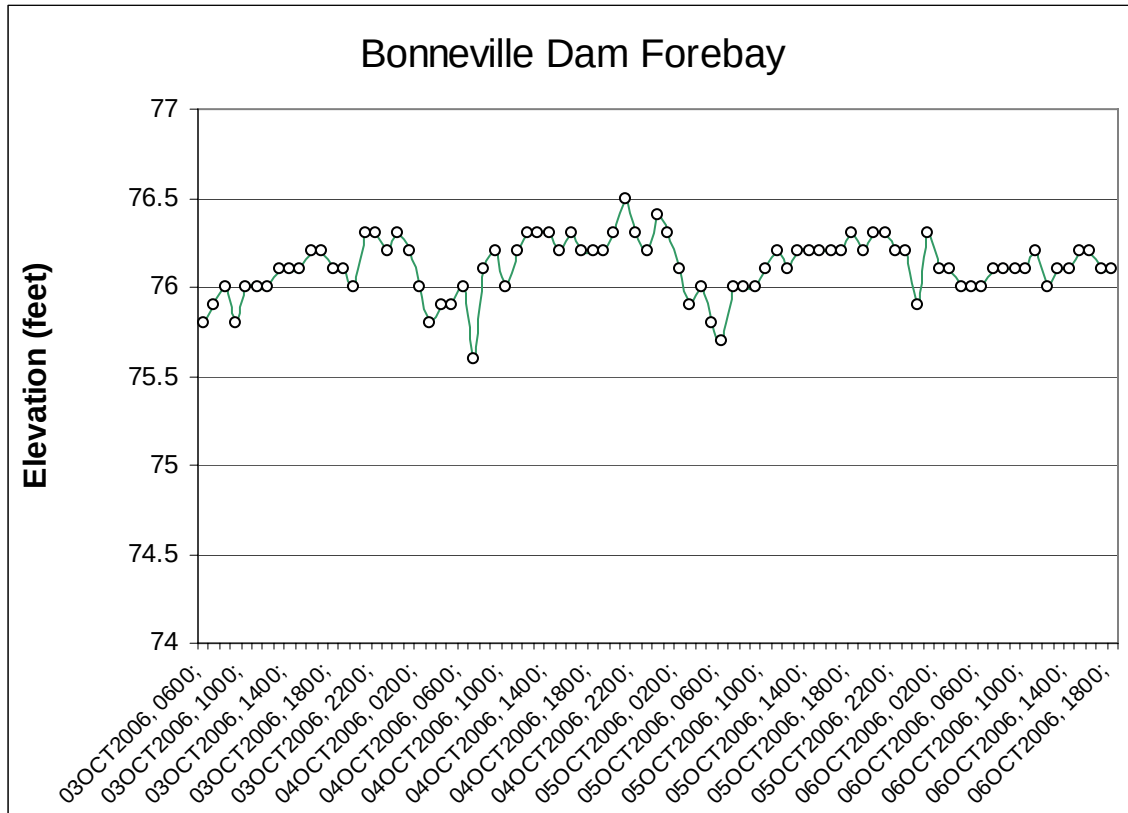


Figure 19. Observed BON pool elevations during October 3-6, 2006 autumn treaty fishing.

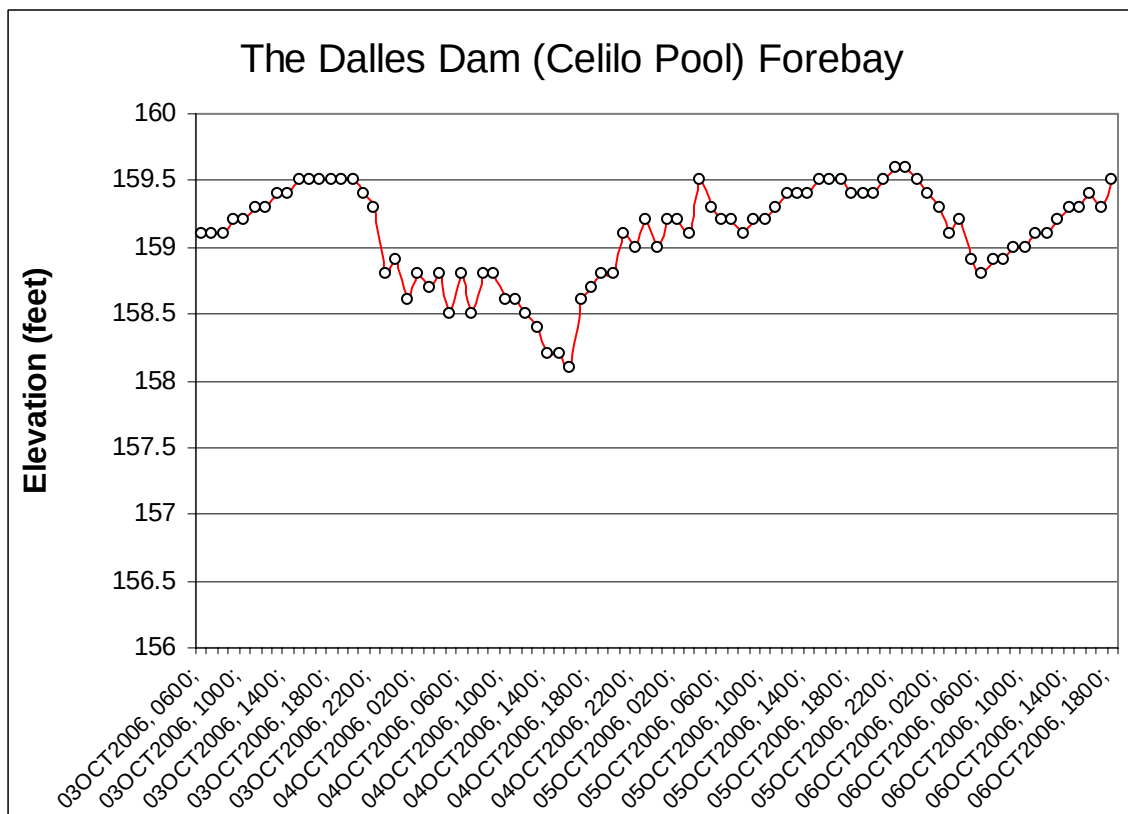


Figure 20. Observed TDA pool elevations during October 3-6, 2006 autumn treaty fishing.

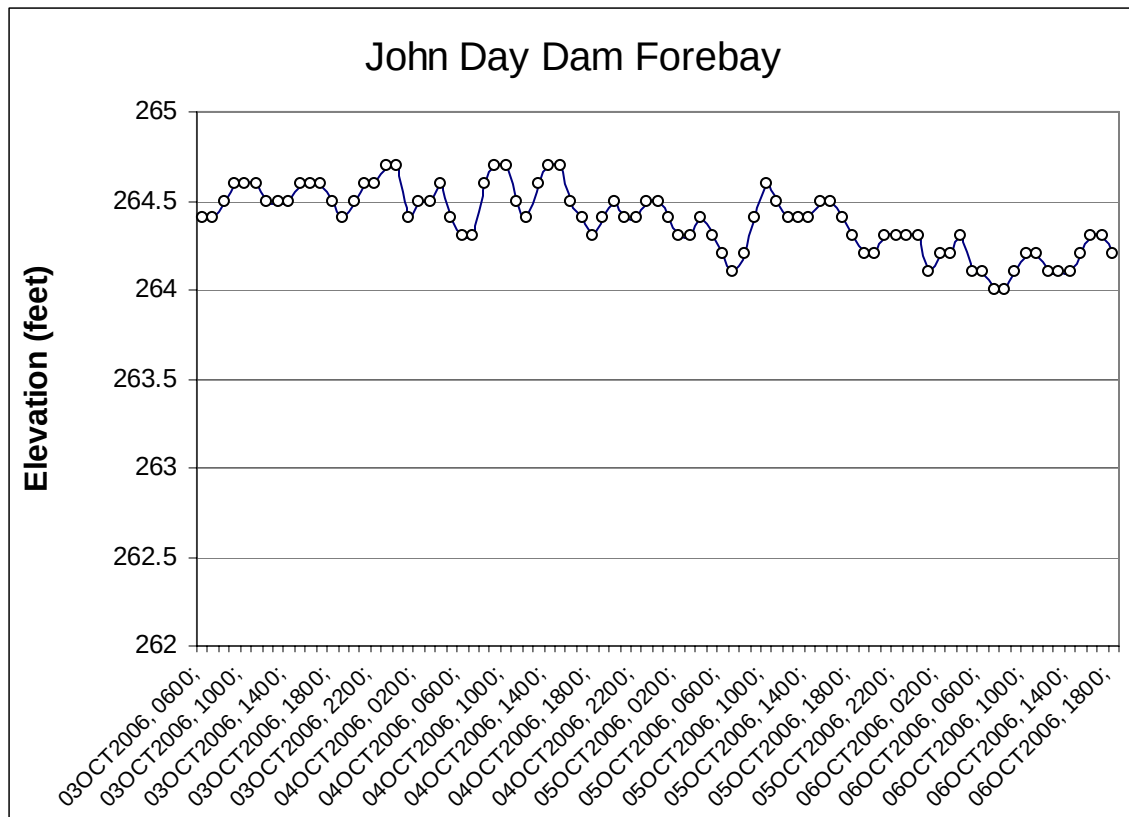


Figure 21. Observed JDA pool elevations during October 3-6, 2006 autumn treaty fishing.

Spill Monitoring below Libby Dam

Montana Fish, Wildlife & Parks

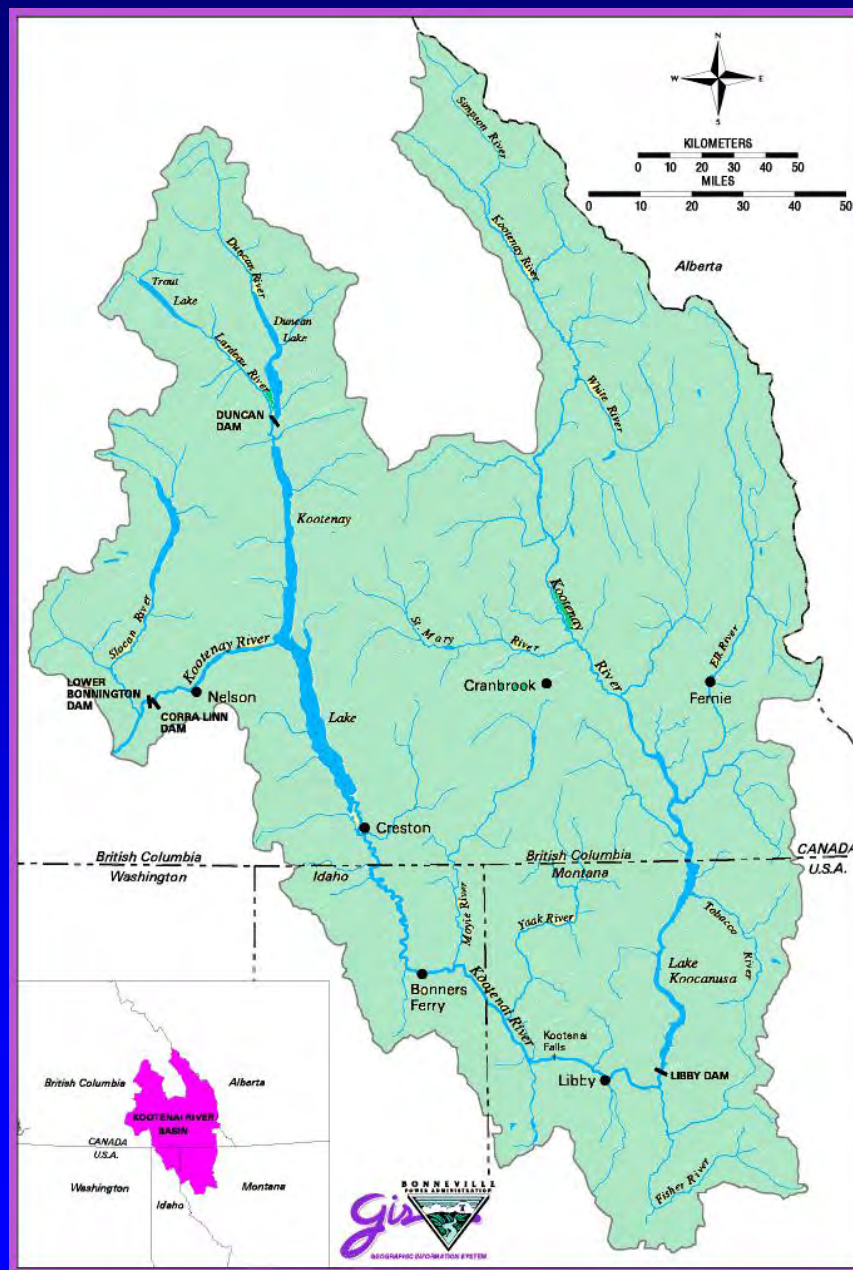
funded by

Bonneville Power Administration



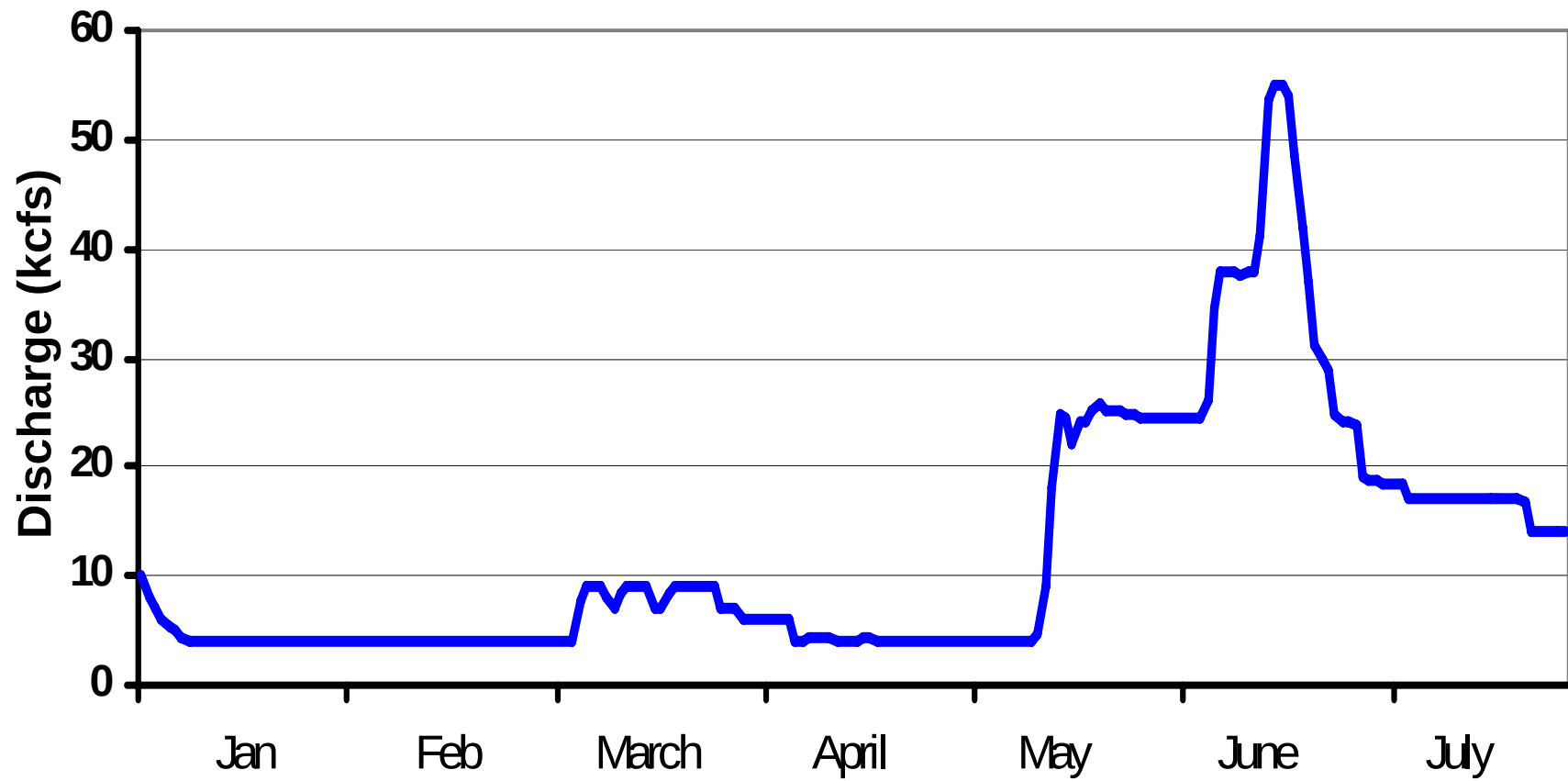
Fisheries Crew
Ryan Sylvester
Tom Ostrowski
Jay DeShazer
Jim Dunnigan
Monty Benner
Neil Benson
Mike Hensler
John Wachsmuth
Brian Marotz



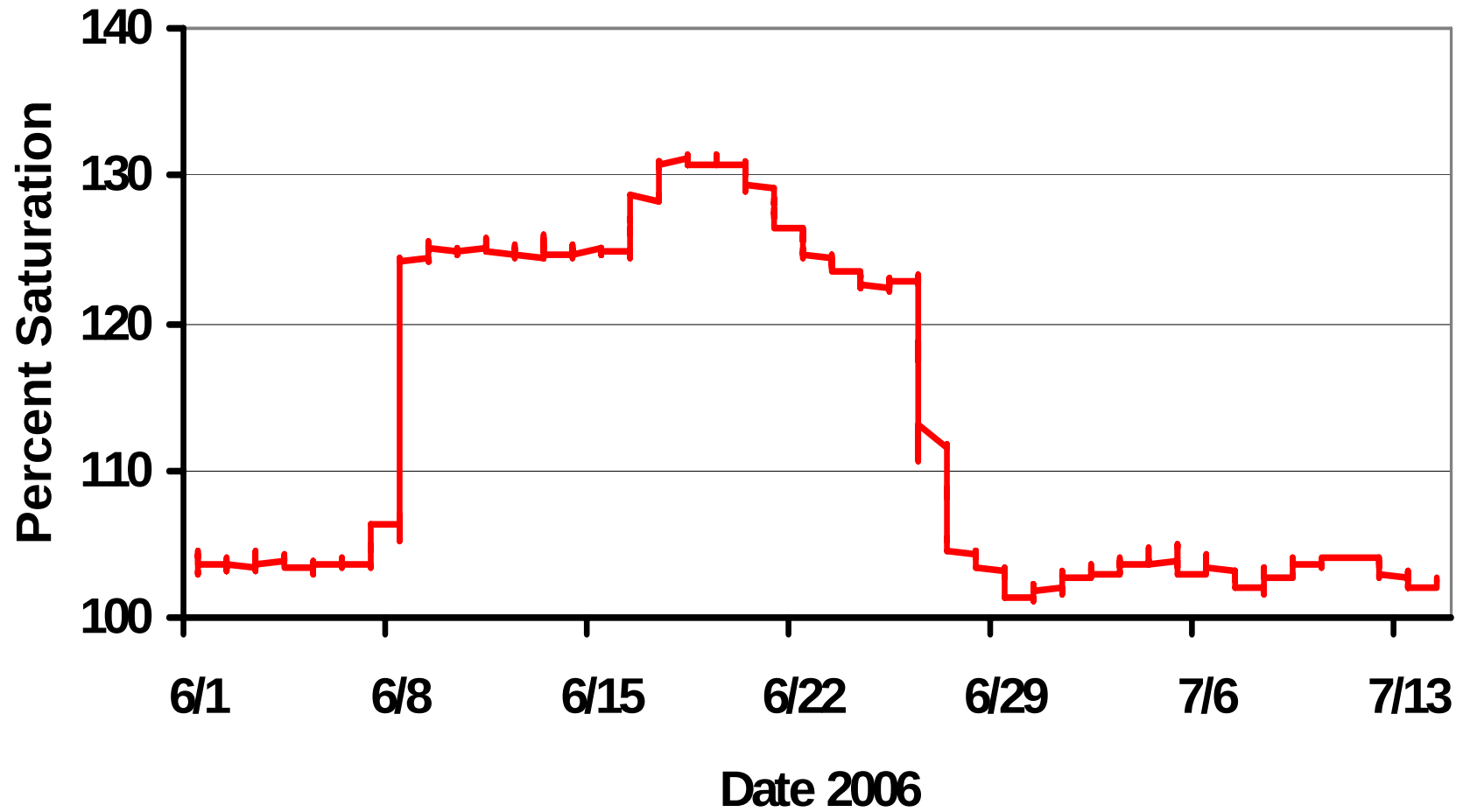




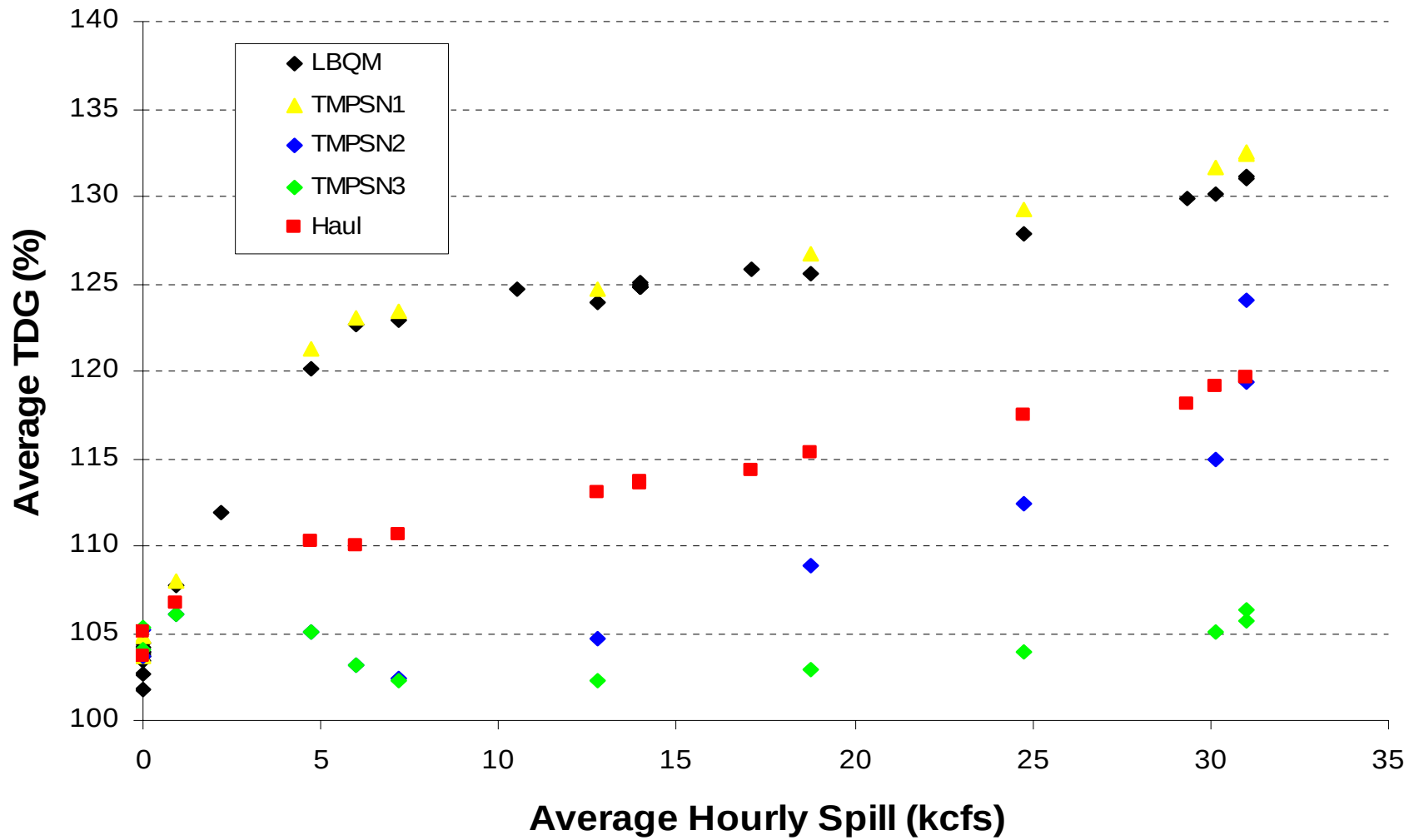
Libby Dam Discharge - 2006

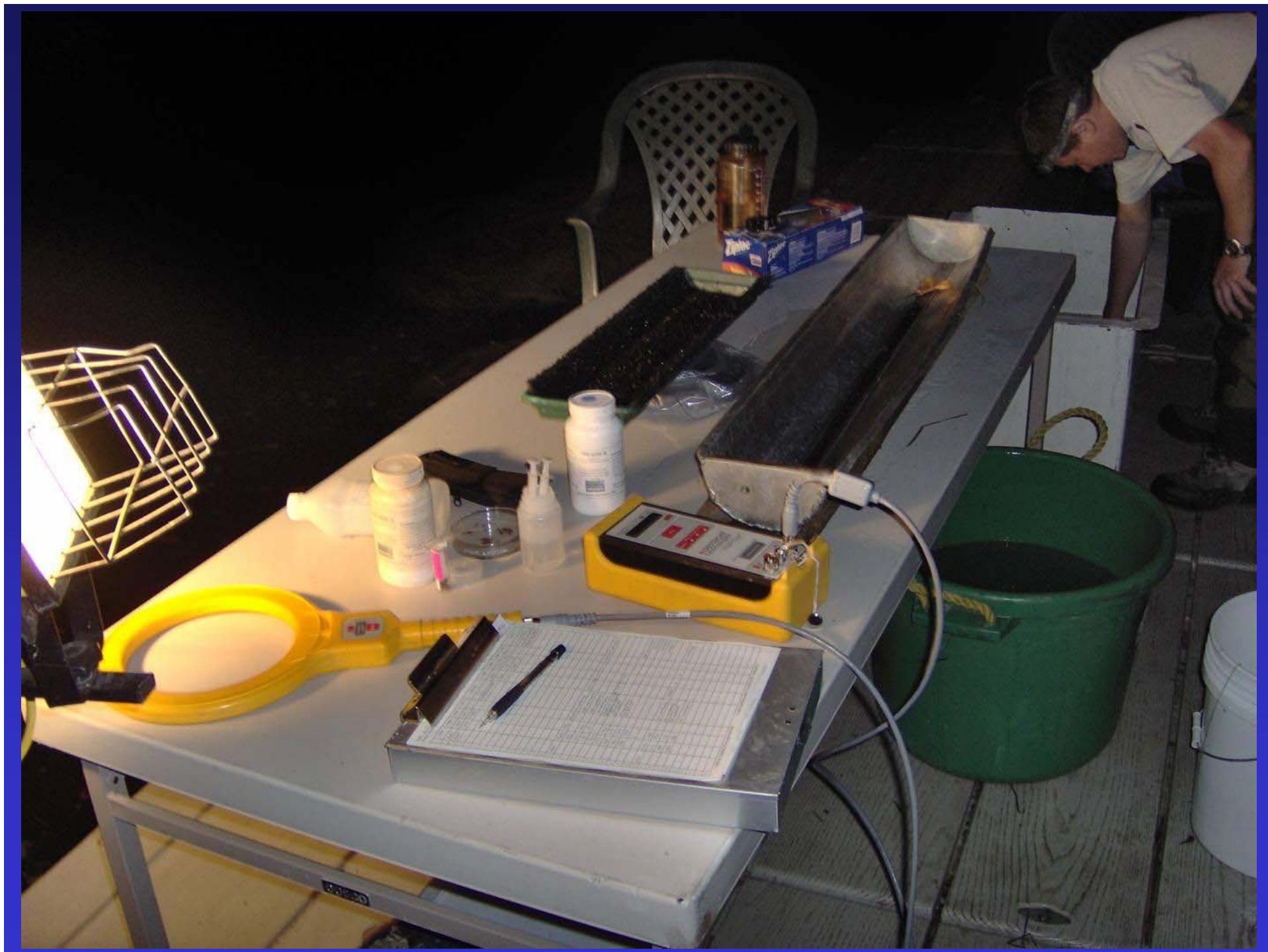


Kootenai River Gas Supersaturation









Example of Gas Bubbles in Fins

Bubbles Also Observed in Eyes and Under Skin,
Resulting in Split Fins and External Hemorrhages





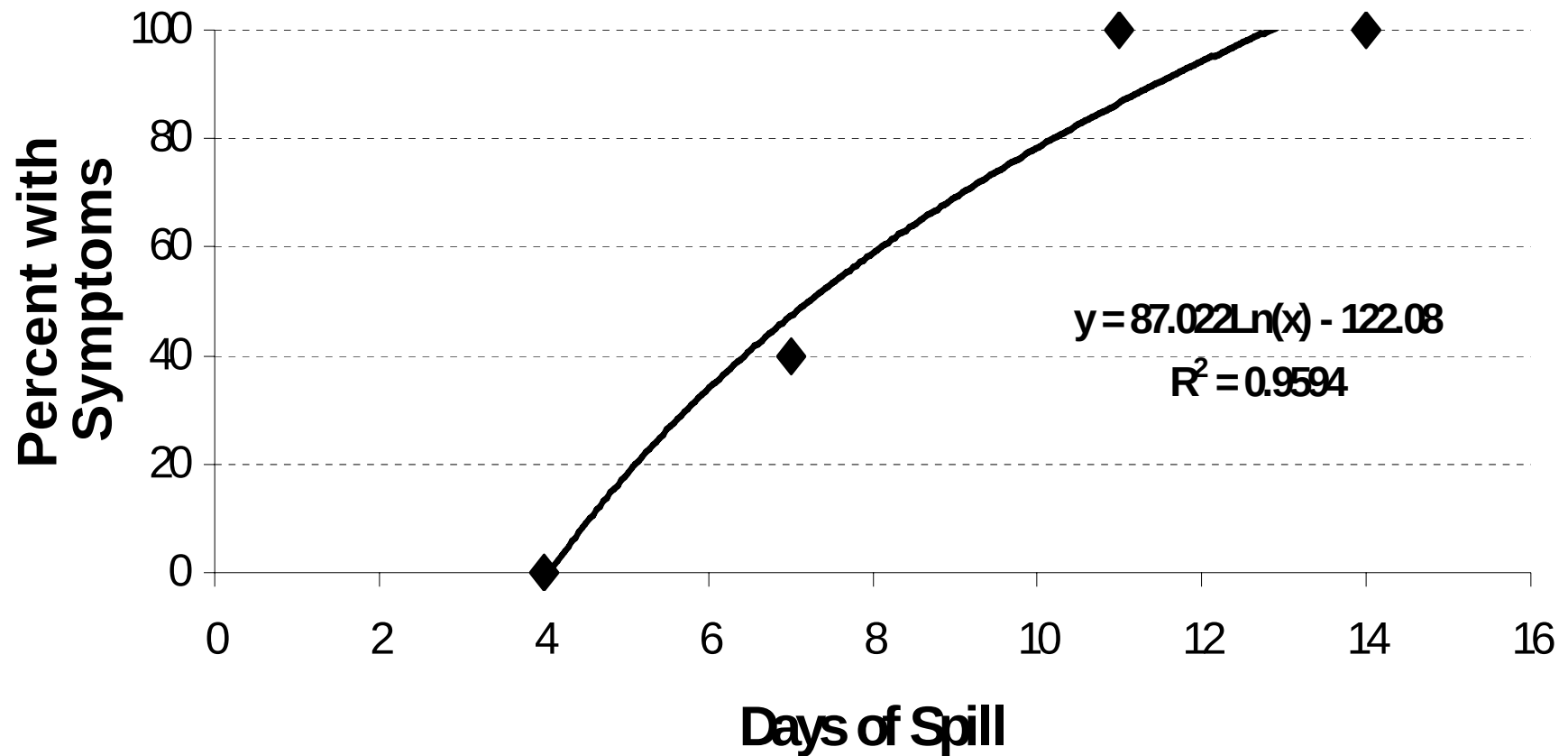
Post Spawning Injury Exacerbated by Gas Bubble Trauma



**Post Spawning Injury and GBT Increase Susceptibility to
Secondary Infection and Perhaps Latent Mortality**

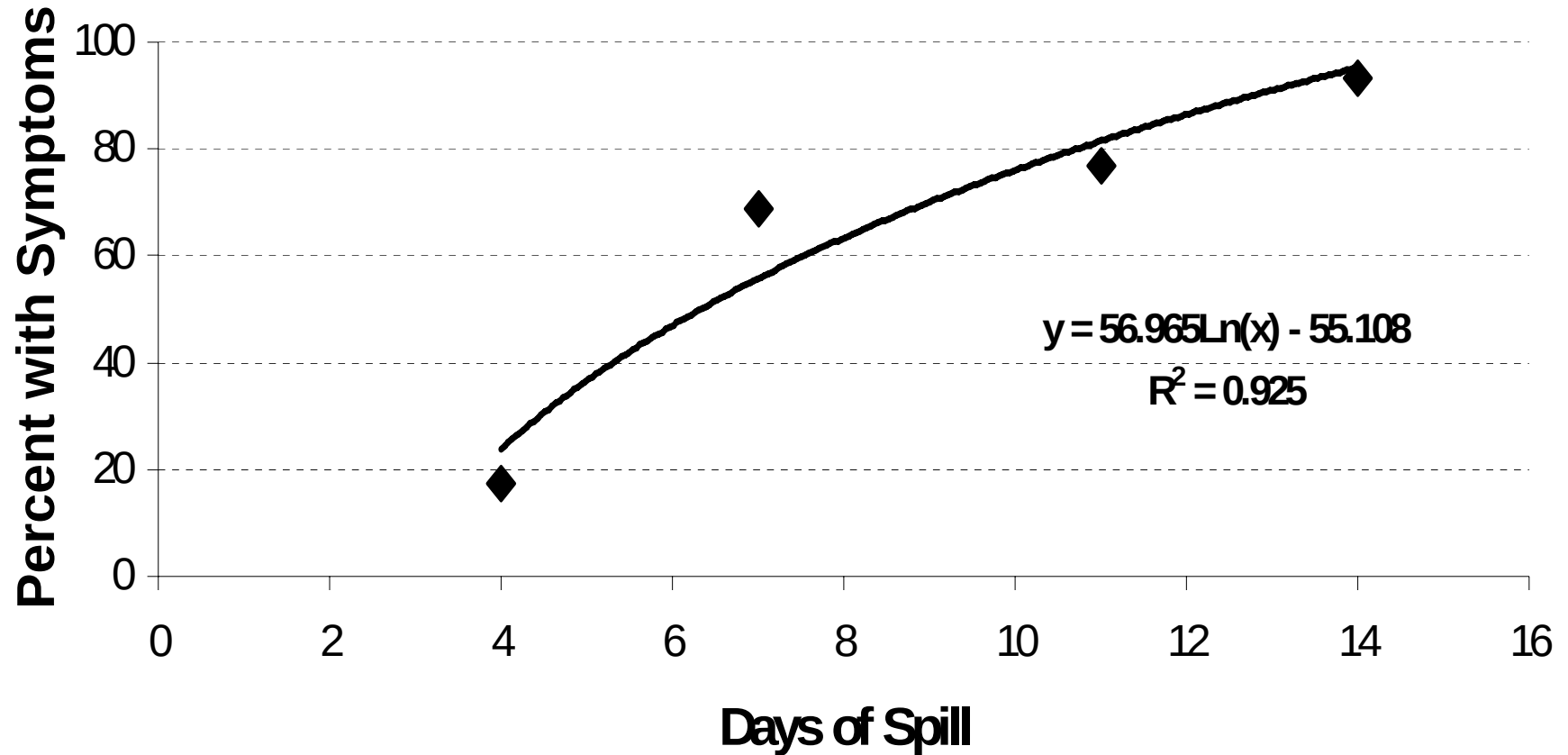
Incidence of Gas Bubble Trauma

Bull Trout



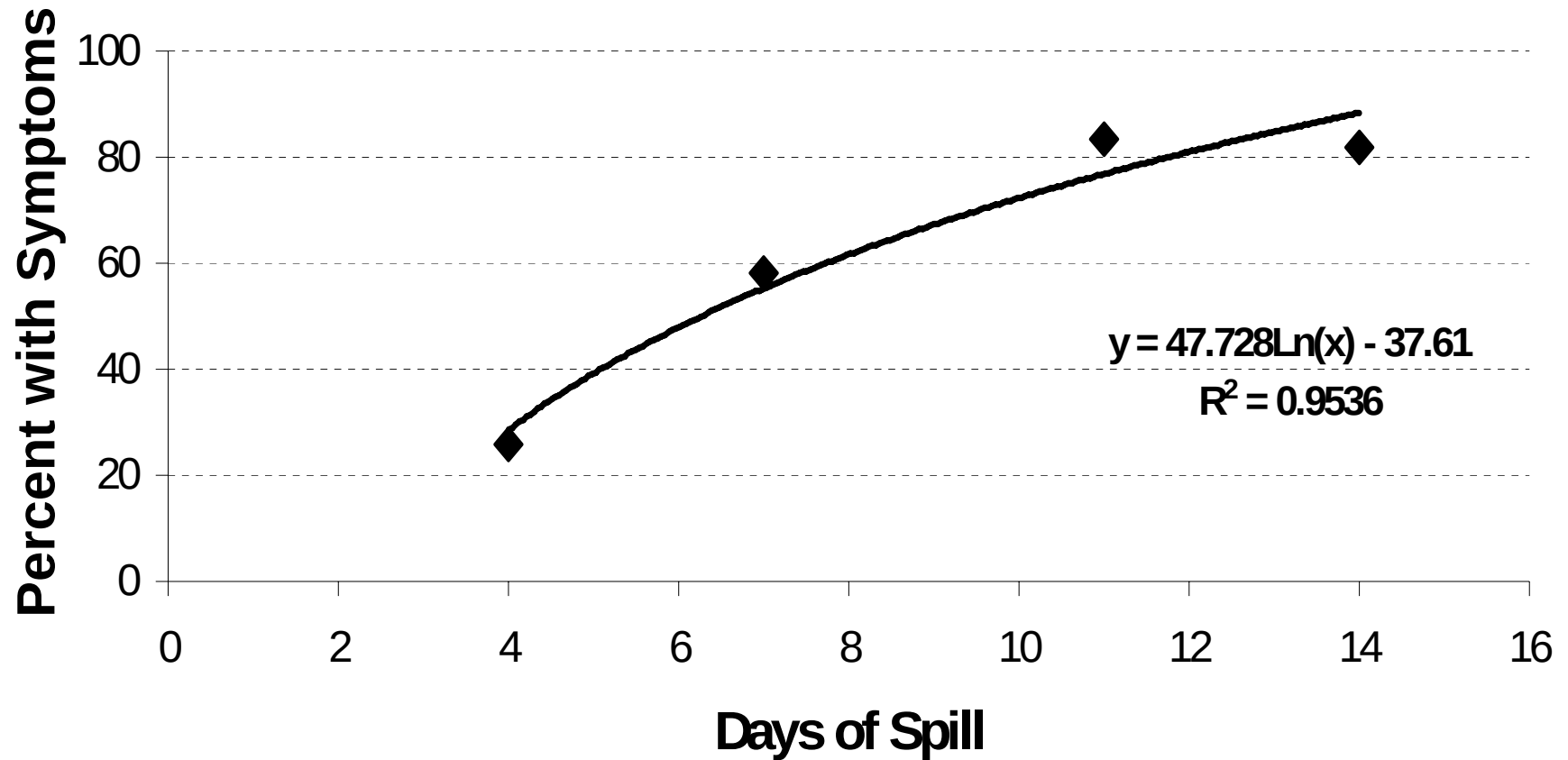
Incidence of Gas Bubble Trauma

Rainbow and Westslope Cutthroat Trout



Incidence of Gas Bubble Trauma

Mountain Whitefish



- **Depth Compensation Apparently Reduced GBT Symptoms**
- **Repeated Exposures Are Additive**
- **Direct Mortalities Were Not Quantified; Few Were Documented**
- **Post-Spill Monitoring of Fish Populations Will Be Completed Next Spring**

Figure 1. Survey boat rigged with 4 underwater spotlights (two on each pole). Pole on starboard side is raised so that one light is visible.



Figure . Shoreline areas of Lake Pend Oreille searched for spawning lake trout during 2006.

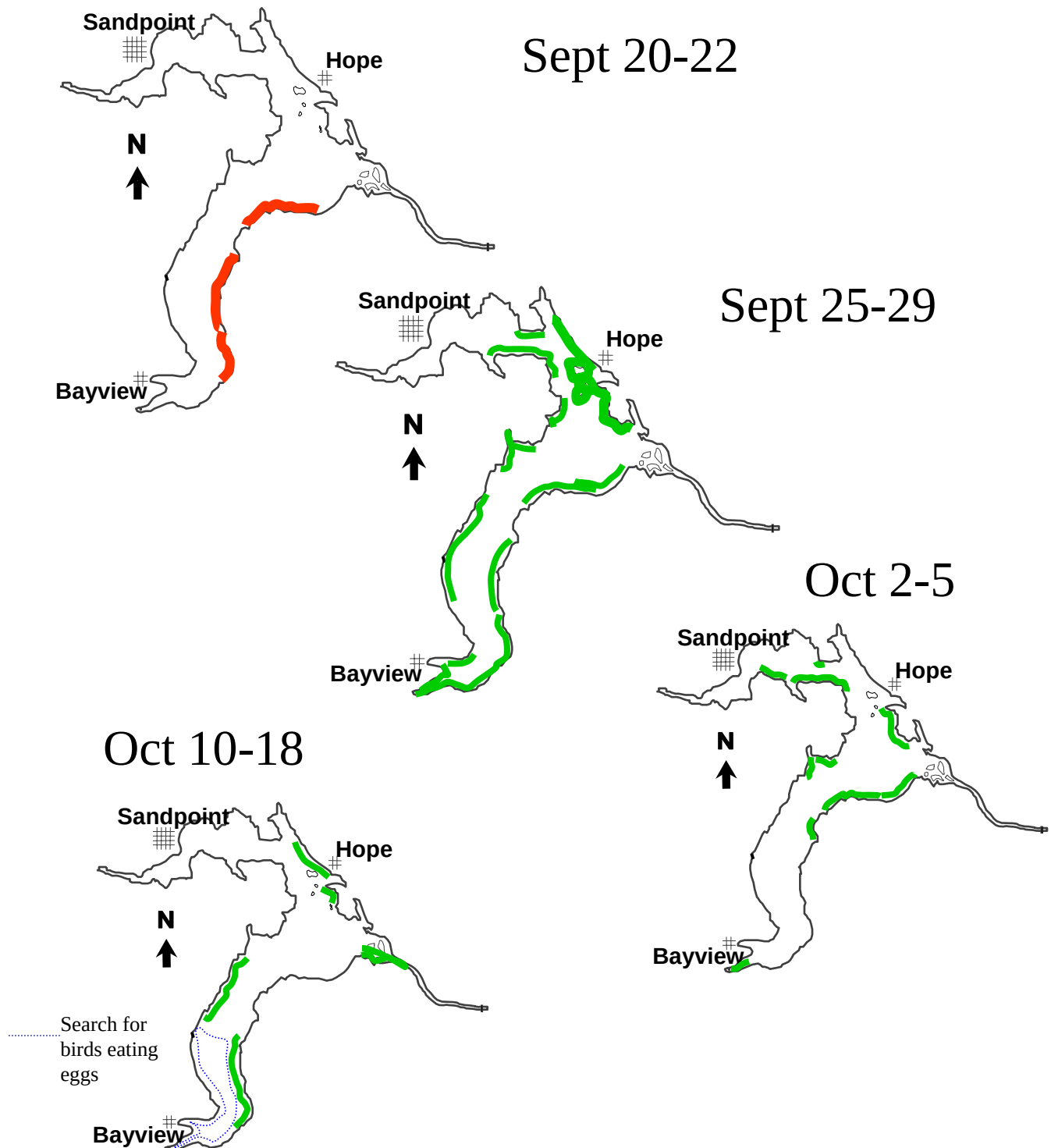
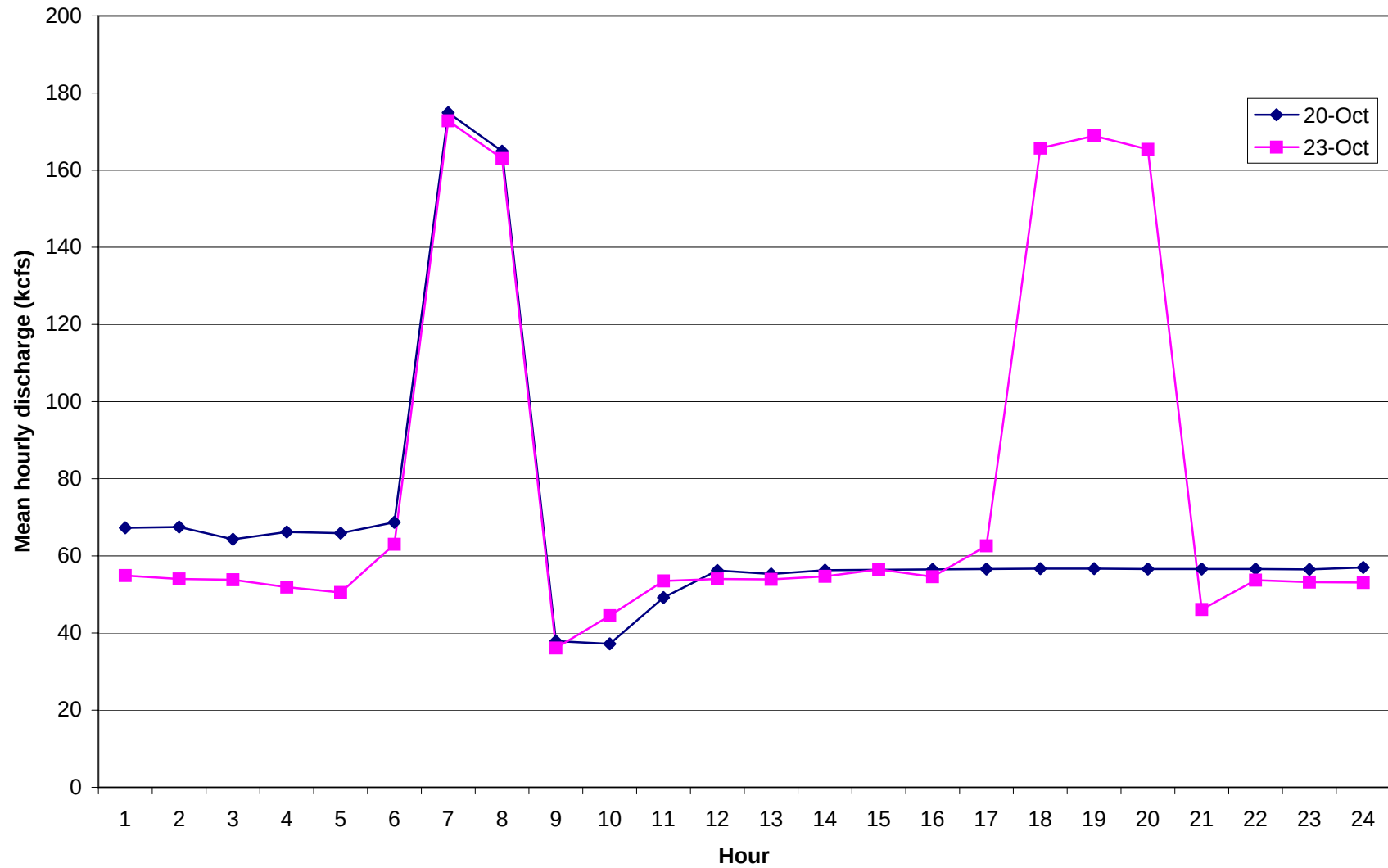


Table 1. Percent of fishes with symptoms of gas bubble trauma during the spill event below Libby Dam in June 2006. Species abbreviations are as follows: BT = bull trout; KOK = kokanee; MWF = mountain whitefish ;RBT = rainbow trout; and WCT = westslope cutthroat trout. Additional species monitored for the grand total include northern pikeminnow, coarsescale and finescale suckers, and peamouth.

Date	Days of Spill	Bank	BT	KOK	MWF	RBT	WCT	Grand Total
6/12/2006	4	L	0		36	26		52
6/15/2006	7	L	33		62	71		65
6/19/2006	11	L	100		86	67	100	80
6/22/2006	14	L	100		85	95	100	92
6/12/2006	4	R	0		19	6		13
6/15/2006	7	R	50		55	67		60
6/19/2006	11	R	100		80	86		86
6/22/2006	14	R	100		79	91		85
6/12/2006	4	Total	0		26	18		35
6/15/2006	7	Total	40		58	69		63
6/19/2006	11	Total	100		83	77	100	83
6/22/2006	14	Total	100		82	93	100	88

Priest Rapids Dam 2006 experimental spawning operations



[illegible]

MEMORANDUM

October 16, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, October 15, 2006

Discussion: On Sunday, October 15, 2006 the first Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 40 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	0	0	0	0	0	0	0
A – AB	0	0	0	0	0	0	0
AB – B	0	0	0	0	0	0	0
Below B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of spawning has not occurred for either zone below or above the 50 kcfs elevation.

No redds were counted during last year's October 16 redd count.

The next redd count will occur on October 22, 2006 and will require a USGS gauging station flow of about 36 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Bill Berry
Steve Brown
Gary Donabauer
Russ George
Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott
Paul Wagner
FWWQ Team

Jeff Atkinson
Scott Bettin
Bob Clubb
Lance Elias
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller
Rudd Turner
Dawn Woodward
PRD Operators

Larry Beck
Shane Bickford
Dennis Dauble
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton
Bill Tweit
Power Dispatch
WAN Operators

MEMORANDUM

October 22, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, October 22, 2006

Discussion: On Sunday, October 22, 2006 the second Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 37 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	0	0	0	0	0	0	0
A – AB	0	0	0	0	0	0	0
AB – B	0	0	0	0	0	0	0
Below B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of spawning has not occurred for either zone below or above the 50 kcfs elevation.

During last year's October 23 redd count, one redd was counted between the 36-50 kcfs elevations and none above.

The next redd count will occur on October 29, 2006 and will require a USGS gauging station flow of about 36 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Bill Berry
Steve Brown
Gary Donabauer
Russ George
Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott
Paul Wagner
FWWQ Team
NR Records

Jeff Atkinson
Scott Bettin
Bob Clubb
Lance Elias
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller
Rudd Turner
Dawn Woodward
PRD Operators

Larry Beck
Shane Bickford
Dennis Dauble
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton
Bill Tweit
Power Dispatch
WAN Operators

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

October 25, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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

Vernita Bar Operations

Russell Langshaw, Grant County PUD, reported that ground surveys thus far had shown no redds yet, and that Fall chinook were just beginning to spawn. A study design has been developed for this year that operates Priest Rapids in a series of short sharp peaks, the specifics of the operation to be determined by projected river flows. As in the past, if 31 redds are seen above 70 kcfs, the project will operate to reverse load following. Russell shared a slide ‘example’ of what the operation might look like this year during the study.

ACTION: Several questions were raised about the study and who has been involved in the study design. Russell will share this information with Cathy Hlebechuk to pass along to the TMT. He will attend the next TMT meeting to provide updates on information gathered from the study, which began on 10/16.

Impacts from June Libby Operations

Brian Marotz, Montana Parks, Fish and Game, provided a power point presentation of gas bubble trauma detected in bull trout and other Kootenai River fish this year. His power point can be found attached to today’s agenda.

The Fish Passage Center suggested that in the past, they have also looked at *severity* of gas bubble trauma to glean additional insights to TDG effects on fish. This could be done for the fish already sampled.

Next Steps: There was some discussion about decisions made during the year that might have impacted the condition of the fish in Brian’s study; there will be a fuller discussion of his study and report as well as the COE’s “After Action” report (which will be presented on November 6 in Bonners Ferry) during the TMT Year End Review in December.

Lake Pend Oreille Lake Trout Research

Russ Kiefer, IDFG, reported on sampled lake trout from Lake Pend Oreille in 2006. His slides can be found linked to today’s agenda. Idaho hopes to continue working with TMT to develop a decision tree for Lake Pend Oreille operations in the future that will guide decisions to ultimately provide win-win-win results: for resident kokanee, chum, and power interests. This year’s survey suggests that the lake trout spawned much deeper than researchers had anticipated.

Treaty Fishing

Kyle Dittmer, CRITFC, shared a review of this year's Autumn treaty fishing, showing that the COE met CRITFC's requests for a 1' operating range 94% of the time at Bonneville, 84% of the time at The Dalles, and 60% of the time at John Day. The COE's hard constraint of a 1.5' range at Bonneville was met 99% of the time. Ultimately, there have been no reports of any gill net problems this year, indicating a successful fishery. Kyle added that improvements in communication between CRITFC and the COE have led to more successful operations and fishing for the tribes.

Final Burbot SOR

As follow up from the 10/11 TMT meeting, the final USFWS SOR for burbot/Libby operations was posted on the TMT web page. It included additional language in the justification section, per COE suggestions at the 10/11 TMT meeting, but no changes to the specifics of the operation were made. Cathy Hlebechuk, COE, shared information on which selector gates at Libby had been removed based on the request. The table was linked to today's agenda. Cathy welcomed anyone to call her with additional questions about the operation.

Next Steps: It was suggested that the TMT Year End Review include a discussion on WY 2005 burbot operations and how they affected the request for this year's burbot operation.

Chum

A TMT conference call will be held on 11/1 to discuss chum: numbers, operation start date, etc. Rick Kruger, ODFW, shared information on past year's operations and chum numbers, noting that in the last five years, the earliest spawning initiation date was November 4. The COE requested that the salmon managers develop an SOR for chum operations before the 11/1 meeting, if possible. The salmon managers were reminded to consider Ken Tiffan's research as well as the weather conditions up to this point when developing their recommendations.

2007 WMP

Russ Kiefer reported that his written draft comments on the WMP are undergoing internal review and will be sent to the COE as soon as possible. CRITFC noted they are planning to submit comments as well. A 2007 WMP Update will be added to the 11/8 TMT agenda.

Operations Review

Reservoirs: Grand Coulee was at elevation 1286.4' and passing inflow. Hungry Horse was at 3536.52' with lower than normal inflows, and drafting to meet Columbia Falls minimums. Libby was at elevation 2436.7' and releasing 4.4 kcfs. Dworshak elevation was at 1518', releasing 1.5 kcfs. Albeni Falls was at 2056.1' and averaging 28 kcfs outflows. Lower Granite was in the range of 15-19 kcfs flows, and McNary average flows have been in the range of 75-100 kcfs.

Fish: Adults – Cindy LeFleur, WDFW, reported that upper chinook adult numbers have been strong and that most are currently or just ending their spawning. Spring Creek hatchery numbers are not as strong this year, and jack numbers are low. Upriver bright numbers are strong.

Juvenile numbers saw a slight increase at Lower Granite but fewer numbers at Little Goose, indicating that more of these fish are over-wintering vs. migrating to the ocean. Spring Creek juvenile numbers were decreasing.

Power: Nothing to report at this time.

Water quality: Jim Adams, COE, reported that operators at Dworshak had scheduled to switch the project to overshot mode around October 31, as in past years. Current temperatures were around 49 degrees. The USFWS commented that generally, 52 degrees is the 'threshold' for the hatchery, and requested the project remain as is for as long as possible, if the COE does not need to switch to overshot mode from an operational perspective.

ACTION: Dave Wills and Jim Adams will coordinate with the hatchery and Dworshak operators to determine the best operation. They will update TMT on the result of that coordination at the 11/1 TMT conference call.

Other: BPA noted that Lower Granite MOP restriction was lifted on 9/22 and had instructions (per Salmon Managers) to only fill at night. The project is currently operating within 1' of full and BPA made a request to lift the restriction of only filling at night. TMT members agreed to check with their respective agencies on this and give the COE a response by the end of this week, before the COE issues a teletype. **Update:** Russ Kiefer notified Cathy Hlebechuk the Salmon managers had no problems with Lower Granite filling at night. The Corps issued a teletype as such, and Cathy emailed TMT on 10/27 of the lifting of the restriction.

TMT Schedule

11/1 Conference Call agenda:

- Chum operations
- Dworshak operation update

11/8 Face to Face meeting agenda:

- Vernita Bar Update
- Chum Operations
- Draft 2007 Water Management Plan/Comments Review
- Burbot Update
- Operations Review

Technical Management Team Meeting Notes

October 25, 2006

1. Greetings and Introductions.

The October 25 Technical Management Team meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Fall/Winter 2006 Vernita Bar Operations.

Russ Langshaw of Grant PUD said he has posted the results of the last two redd count ground surveys for Vernita Bar online; no redds have been found to date on the ground, but 45 redds have been seen in the reach in aerial surveys. Last year at this time, we had found one redd, so this is not out of the timing range of recent years, Langshaw said.

I have also provided examples of the flow regimes we're implementing this fall, Langshaw said; we were directed to experiment with flows during the 2005 and 2006 spawning season. This year's operation calls for short sharp peaks with a low, steady base flow; we have tagged some fish and will be tracking their response to changes in flow. The graph posted on the web shows what we did over two of the days; on October 20, mean inflows – Rock Island discharge – were around 65 Kcfs, so we had a single peak that started at 6 am up to 175 Kcfs, which lasted a couple of hours. We then dropped back down to a base flow of about 55 Kcfs the rest of the day, he said. On October 23, we had mean inflows of about 76 Kcfs, so we needed two peaks to pass all the water – one from 6 am-9 am up to 175 Kcfs, then back down to 55 Kcfs until 5 pm, at which time a second peak was initiated, lasting until 8 pm. In other words, our base inflow will dictate the number, duration and size of the peaks, Langshaw said. So far, there are very few fish and no spawning activity on the bar – we have only tagged two fish to date, and as soon as the fish start coming in, we'll have more to report.

In response to a question, Langshaw said Grant PUD is trying to plan this operation on a weekly basis, but operations will be modified daily as needed. Is there a study design posted anywhere? David Wills asked. I don't believe it is posted, but we worked with all interested parties, including CRITFC and American Rivers, to develop the study design, Langshaw said.

The group devoted a few minutes of discussion to the potential effects of these short, sharp flow increases on spawning fish; Bill Hevlin said he is astounded that people would agree to this operation without knowing its effects on the spawning population. We know that the redd site selection process is quick – within 4 hours, Langshaw said – we wanted to limit the impact of these high flows by keeping them to less than four hours. We also found, last year, that these fish don't move very much, even when flows peak. In other words, we don't think these flows will blow the fish downstream, based on last year's tracking data, he said. Given the number of questions

that have been raised, it might be a good idea to pass the study design along to Cathy Hlebechuk so it can be posted to the TMT website, Harkless suggested. I will do so, and will be providing further information at upcoming TMT meetings, said Langshaw. In response to another question, Langshaw said the 2006 Vernita Bar study started on October 16.

3. Impacts to Fishery Downstream of Libby Dam As a Result of June Operation.

Brian Marotz led this presentation, touching on the following major topics:

- Flow pattern downstream of Libby – spillway flow hugs the left bank (looking downstream); full mixing occurs 7-8 miles downstream. At Kootenai Falls, 35 miles downstream, the narrow stretch of the river increases the water velocity and tends to reset gas levels to 116%.
- 2006 Libby Dam hydrograph – any flow above 24 Kcfs is spill, and spill occurred in 2006 from June 8-June 27, due to lack of storage capacity in the reservoir. Gas exceeded the 110% standard from June 8-27 – TDG levels peaked at 132%, and were consistently in the 122-125% range.
- Sampling started on day 4 of the spill; 35% of the fish sampled had signs of GBT on day 4. Gas bubble trauma is additive; field personnel saw gas bubbles in fins, in the vitreous humors of the eye, and in the dermis of fish sampled, which raises the specter of secondary fungal or bacterial infection. By next year, we'll have a better idea of the effects of the 2006 operation at the population level, Marotz said.
- 2006 sampling areas
- By day 7 of spill, all bull trout sampled showed signs of GBT.
- Photos of fish sampled in 2006, showing examples of GBT
- About two weeks into spill, all species sampled were at or near 100% signs of GBT – cutthroat trout, bull trout, rainbow trout and mountain whitefish. Depth compensation reduced signs of GBT, but as fish came to the surface – particularly trout species – signs became additive, with some fish hemorrhaging through the dermis.
- Some dead fish – cutthroat, bull trout, rainbow trout and whitefish – were found, although the numbers were difficult to quantify.

I will provide a further update once we finalize the data from the 2006 survey, Marotz said. In response to a question from Hlebechuk, Marotz said bull and rainbow trout can spawn many times before they succumb to old age. And how many fish did you sample for signs of GBT? Cindy LeFleur asked. We were attempting to get 30 fish from each bank and each species every night, but were not always able to achieve that, Marotz replied. A total of 412 fish were sampled for signs of GBT over the four sampling days.

The discussion turned to the operations that preceded the spill event at Libby. Could all of this have been avoided if the Corps had begun to release the water for

white sturgeon earlier? Kyle Dittmer asked. Yes, Marotz replied. I would remind everyone that there were several factors involved in the decision about when to begin the sturgeon release, Hlebechuk said – prior to mid-May all forecasts were pointing towards a normal water year. There was no indication the project would fill and spill. We got an incredible amount of runoff starting in mid-May due to warm temperatures and rain on snow. Then, in June heavy precipitation continued. In addition, the sturgeon recovery team recommended that the release not begin sooner than May 16 as they preferred warmer river water. In other words, she said, it's easy to second-guess the operation now, but we need to keep in mind the conditions we faced at the time. The Corps expected to release 10 Kcfs above turbine capacity during the sturgeon migration, Marotz observed; the Kootenai Tribe was concerned about that, and asked that the Corps release turbine capacity only. There were times during May that the Corps couldn't have released turbine capacity because of high inflows downstream – Bonners Ferry would have exceeded flood stage. The timing of the releases that occurred in 2006 were not very beneficial for sturgeon spawning, Marotz said – it came too late.

The group briefly discussed the 2006 VARQ operation; it was agreed to postpone substantive discussion of this topic until after the release of the Corps' After Action Review.

4. Lake Pend Oreille Lake Trout Research.

Kiefer updated the group on IDFG's efforts to look at the impacts of this year's Lake Pend Oreille operation on the lake trout species. IDFG field personnel have been conducting night surveys in the shallows of the lake, he explained; figure 2 shows, to date, the shoreline areas we have sampled for adult lake trout spawning. Our hope is that this year's operation will impact recruitment, he explained. To date, we have seen only a few single adults, which leads us to the conclusion that the lake trout spawn deeper. We will soon switch to an operation in which we look for birds feeding on lake trout eggs. The bottom line, said Kiefer, is that we don't feel that we have impacted lake trout spawning through this year's operation at Lake Pend Oreille; we would like to work with the TMT to improve the decision tree governing Lake Pend Oreille/Albeni Falls operations in the future, he said. The sooner USFWS/NOAA can tell us what lake elevation they want to maintain in the winter the better, said Hlebechuk – if you could tell us by mid-September, that would be ideal. Early notification will make it easier for us to determine how long the lake can be held high.

5. 2006 Treaty Fishing Summary.

Dittmer led this presentation, touching on the following major topics:

- Summer treaty fishing summary – seven weeks of fishing, total, during the summer period; during the fishery, the tribes ask that the three zone 6 pools – Bonneville, The Dalles and John Day – be held within a one-foot operating range. The Corps annually agrees to operate Bonneville Dam within a 1.5-foot range.
- 2006 compliance with CRITFC's requested elevations: 94% at Bonneville (down 6% from 2005), 84% at The Dalles (up 2% from 2005), 60% at John Day (down 10% from last year).
- 2006 compliance with Strong/Mogren 1 ½' Bonneville operation was 99%.
- No major incidents of net loss were reported in 2006.

It would help if you could also give us information about the Corps' compliance with what they agreed to do, Kiefer said. I can provide that, Dittmer replied. Hlebechuk noted that the operation the Corps agreed to implement during the treaty fishery is dictated by the 1998 agreement between Ted Strong of CRITFC and Col. Mogren. She added that CRITFC's requested treaty fishing operating range at John Day is outside the operating range specified in the BiOp. Dittmer said CRITFC is in the process of re-examining the 1998 agreement. You may want to change the summer operating range at John Day to 262.5-264 feet for next year, Hlebechuk said – that is the range we're required to operate the project under the BiOp.

It sounds as though, overall, the 2006 operation was pretty successful, Harkless said. Yes – no major problems to report, and the fishing was good, Dittmer replied.

6. Final USFWS Burbot SOR.

The reason for this agenda item is to acknowledge that the final burbot SOR has been submitted, said Wills; the only real change is that the justification section was expanded. The specifications of the SOR did not change, he said. Implementation has now begun, Wills added.

Hlebechuk provided an overview of the operation that is being implemented as a result of this SOR, noting that the SOR requests the lowest possible water temperatures out of Libby. We're using the selector gates for units 1-5 to draw water from the bottom of the reservoir, she explained. Hlebechuk also provided a brief review of the temperatures achieved during previous years' burbot operations. She invited anyone with questions about this operation to contact her or Greg Hoffman directly. It was agreed to get a further update on this topic at the TMT's year-end review.

7. Chum Salmon.

Rick Kruger said ODFS' chum spawning surveys have now begun, but no chum have been seen to date. Historically the date of first sighting of chum below Bonneville has ranged from October 28-November 9. In the majority of those years, the first sighting has taken place in the first week of November, he said; the first redds are typically seen between November 4 and November 12. In other words, he said, we should definitely begin providing chum spawning flows by the first week in November – we need to be sure the fish can access the spawning areas as soon as they arrive. The only thing is, we need to be cautious about using up all of our available water from Grand Coulee, said Robin MacKay – we have had a dry fall, and once we bring flows up to whatever spawning level we pick, we will likely start drafting Grand Coulee. We may want to wait until there are more than a few chum spawners before we initiate this operation, she said. In response to a request from Hlebechuk, Kiefer said the salmon managers will provide an SOR covering the 2006 chum operation. In all likelihood, it will be similar to the 2005 SOR, which requested a baseline Bonneville tailwater elevation of 11.5 feet.

A TMT conference call to check in on the status of chum spawning was scheduled for November 1.

8. 2007 Water Management Plan.

Bern Klatte said that, to date, he has received comments only from NOAA Fisheries. Kiefer said he has written comments, but they are currently undergoing IDFG policy review. Wills and Dittmer said the Fish and Wildlife Service and CRITFC, respectively, are also planning to submit comments.

9. Operations Review.

Reclamation said Grand Coulee is at 1286.4 feet and passing inflow, essentially full for this time of year. The current Hungry Horse elevation is 3536.5 feet; the project is operating to meet the Columbia Falls minimum – precipitation in the basin has been extremely low so far this fall. The Corps reported that Libby is at elevation 2436.7 feet, with 4.4 Kcfs outflow. The current Dworshak elevation is 1518; the project is releasing minimum outflow, 1.4 Kcfs. Albeni Falls is releasing 28 Kcfs and is expected to draft to elevation 2051 by mid-November. Flows at Lower Granite have average 15-19 Kcfs over the past week; at McNary, 75-100 Kcfs at McNary.

LeFleur said the tail end of the upriver chinook run has been strong; most of the adult fish are either spawning or getting ready to spawn. The Spring Creek Hatchery run was not very strong this year; the jack run was also pretty poor, which doesn't bode well for that stock for next year. The upriver bright run was strong in 2006. On the juvenile side, we are seeing higher subyearling passage at Lower Granite, but that drops off sharply by the time you get down to Little Goose – in other words, the fish are moving a little bit, but we're not seeing a lot

of directed ocean migration – we have significant numbers of subyearlings overwintering in the river system, a common pattern for this time of year.

MacKay said there are no power system problems to report at this time. Jim Adams said there are a few water quality issues to report; the operators at Dworshak would like to switch the units back to overshot mood. He provided information on the current Dworshak thermocline. After a brief discussion, the salmon managers said they would prefer to hold off on switching to overshot mode, at least until after October 31.

10. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, November 8. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
October 25, 2006

Name	Affiliation
Robin Harkless	Facilitation Team
Brian Marotz	Montana
Russ Kiefer	IDFG
David Wills	USFWS
Robin MacKay	BPA
Cathy Hlebechuk	COE
Tony Norris	USBR
Rick Kruger	ODFW
Cindy LeFleur	WDFW
Tim Heizenrater	PET
Jim Adams	COE
Kyle Dittmer	CRITFC
Margaret Filardo	FPC
Barry Espensen	CBB
Mike Buchko	Powerex
Russ Langshaw	Grant PUD

Rudd Turner	COE
Ruth Burris	PGE
Bruce MacKay	Consultant
Rodney Cook	PPM
Jeff Loughley	COE
Tom Le	PSE
Scott Bettin	BPA
Bill Hevlin	NOAAF
Bern Klatte	COE

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Wednesday November 01, 2006 09:00 - 12:00

**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. Chum Status
3. [SOR #2006-07 - October 31, 2006 - Tailwater elevation at Bonneville Dam to protect natural spawning of chum and fall Chinook salmon at the Ives/Pierce Island Complex, Multnomah Falls, and partly influence the I-205 seeps.](#)
4. Dworshak-Selector gate operation over or under shot?
5. Other
 - Set agenda for next meeting November 08, 2006 - [\[Calendar 2006\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM CONFERENCE CALL

November 1, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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 Selector Gate – Over/Under Shot Mode

Jim Adams, COE, presented on Dworshak operations: the temperatures at depths of 9' to 20' were in the range of 54-55 degrees, and depths of 20' to 25' would bring temperatures down to 51.5 degrees. Adams also noted the planned outage on 11/13, and testing of unit 3 on 11/14, which will draft the reservoir, last for 6-8 hours and likely drop temperatures 10 degrees. Howard Burge, USFWS, said that from a hatchery perspective, waiting to switch the project into overshot mode until further cooling in the reservoir (~52 degrees) occurs would be preferred. Adams suggested waiting to position the gates at Dworshak for either over/undershot mode until after the 11/13-14 special operations.

Action/Next Steps: Jim Adams, COE, and Howard Burge, USFWS, will connect via phone on Friday, 11/10, with a potential follow-up call on Monday, 11/13, to check status of the temperatures in the reservoir and make a decision about whether to operate Dworshak at under or overshot mode. The COE will issue a teletype.

Update: Chum Status

Russ Kiefer, ID, reported that spawn surveys to-date had sighted 12-15 live Fall Chinook, 5 Fall Chinook redds, 30-35 Coho, but no chum. Another spawning survey was planned for 11/2.

SOR #2006-7

Russ Kiefer, IDFG, and Ron Boyce, ODFW, presented the salmon managers' request for an 11.5' tailwater elevation at Bonneville, with a start date of 11/3. Cathy Hlebechuk noted that there is a timing conflict: scheduled installation of sea lion exclusion device (SLAD) brackets, which will require a tailrace elevation of 10' or less on 11/6. TMT members weighed in on how to proceed with respect to the SOR and the need for the scheduled installation:

OR: Implement the SOR as soon as possible on 11/3, see if there is a way to complete the installation by 11/3, and see what the results from the spawning survey on 11/2 are.

BOR: Wait for results from the spawning survey, and the installation of the exclusion devices, and then implement the SOR.

WA: Wait until survey and installation are completed to begin the chum operation.

ID: Okay with implementing the SOR as soon as installation is completed, with a caveat of delaying the installation if the 11/2 surveys sighted chum.

BPA: Interested in setting up the system to provide a good chum operation, particularly when the

bulk of the chum are spawning. Depending on flow conditions and results from the 11/2 survey, implement the SOR after the exclusion device is installed.

COE: Offered to check on whether the installation work could be scheduled or completed sooner than 11/6. Cathy Hlebechuk suggested TMT have a conference call on the morning of 11/3 to share information about the results of the 11/2 chum survey, possible change to SLAD bracket installation work, and when BPA thinks they can set up the river to do the chum operation.

NOAA: *(no NOAA representative was present on the call)*

Action/Next Steps: TMT members agreed to have a conference call at 9 a.m. on 11/3, to hear an update on the SLAD installation schedule, the 11/2 chum survey, and the prognosis for setting up the river to implement the chum operation.

Technical Management Team Conference Call Notes

November 1, 2006

1. Greetings and Introductions.

The November 1 TMT conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Chum Status.

To date, the spawning ground survey personnel have seen 15 live fall chinook, about 25 coho and no chum on the spawning grounds at Ives Island, said Russ Kiefer, with 5 fall chinook redds. A total of 14 chum have been counted over Bonneville to date, and one chum over The Dalles, said Cindy LeFleur. Chum have been seen in the Grays River system since October 17, LeFleur added. First chum observation and spawning is pretty much like clockwork around November 3-4-5 every year, noted Ron Boyce. That would mean that they should start to show up this weekend, he added.

3. Dworshak Selector Gate Operation – Over- or Undershot Mode?

Jim Adams said the Corps is still trying to decide when to shift the Dworshak selector gates into overshot mode. The highest temperature in the reservoir is 55 degrees, down to about 20 meters in depth. My guess is that if we go to overshot mode now, we would end up with a discharge temperature of 54-55 degrees, Adams said. We are still planning to do the full outage at Dworshak for 12 hours beginning at 7 am on November 13, he added – during that time, we will be releasing only 1 Kcfs through the ROs at about 4 degrees C, or 39 degrees F.

The question is, when do we want to go to overshoot mode at Dworshak? Adams said – there's no real urgency to the decision, but this is the time of year we normally do that. One other piece of information – on November 14, we will need to test unit 3, and run it at full load – 5.1 Kcfs – for 6-8 hours.

Howard Burge said 54-55 degrees F is not a great temperature for rearing fish – the hatchery would prefer that undershot mode operation continue for the time being, to provide cooler water for the hatchery. We can leave this decision until after the shutdown and test are concluded on November 14, Adams replied. We would hate to see you switch to overshoot mode before then, given the fact that you'll be releasing 39-degree water for 12 hours, said Burge – higher temperatures now will make that shock even more severe. After a brief discussion, no TMT objections were raised to continuing undershot mode operation at Dworshak until after the shutdown and test are concluded. Adams said he will discuss this operation with Burge on November 10 and November 13 (if needed), at which time a decision will be made as to whether to operate in undershot or overshoot mode during the unit test.

4. 2006 Chum SOR – Bonneville Tailwater Elevations.

At today's meeting, the salmon managers presented SOR 2006-7, covering Bonneville tailwater elevations to protect chum spawning in 2006-07. We are sensitive to the timing of this operation, Kiefer said, but are cognizant that the chum almost always show up in the first week of November and begin to establish redds almost immediately. The SOR requests the following specific operations:

- Provide a minimum instantaneous tailwater elevation of 11.5 feet at Bonneville Dam when chum are present (as required by the 2004 FCRPS Biological Opinion) but not later than November 3, 2006, and continue until further notice. On average, it is anticipated that daily average flow for this operation will not exceed 125 Kcfs. The request is similar to what has been requested the last several years.

One complication is that project personnel are installing brackets for the Sea Lion Acoustic Deterrents (SLADS), which means that, this Monday, they will need a tailwater elevation of 10 feet or less for about four hours, Hlebechuk said. Boyce asked whether the Corps could have divers install the brackets at a later date this winter. Hlebechuk said she would look into the possibility of rescheduling the work. Tuesday would be a perfect day for Bonneville to start the chum operation, added Robin MacKay. Why couldn't the brackets have been installed this summer or fall? Boyce asked. I first heard about this earlier this week, Hlebechuk replied – you would have to talk to the project manager about the timing. I know there were some problems with the manufacturing process, she added.

I think we're right in the biological ballpark if we start the operation on November

7, MacKay said – there are areas where the fish can spawn around the fringes. Would it be a problem to start the operation on November 3, go down to a 10-foot elevation for four hours on Monday, then back up to 11.5 feet? LeFleur asked. That would not be Bonneville's preference, MacKay said – we would prefer to conserve water over the weekend. Kiefer said he would not advocate raising flows, then dropping them, then raising them again, even if the drop is for four hours only. If we have to do the work, in my recommendation, as a biologist, would be to wait until after the bracket work is completed before setting up conditions for chum, Kiefer said. Boyce disagreed, saying he would prefer to move forward with the chum operation as recommended.

After a few minutes of discussion, MacKay noted that Bonneville is concerned that this may be shaping up to be an El Niño water year, and it would be their preference to hold as much water in Grand Coulee until chum are known to be present. Hlebechuk reiterated that the BiOp says the operation will begin once the chum are present, and they are not present yet. Tony Norris said Reclamation's perspective is that it would be more prudent to begin the chum operation next Tuesday, once chum are known to be present.

Harkless asked whether it would be possible to begin the chum operation on Monday, rather than Tuesday, as soon as the bracket installation work is done – currently, that work is scheduled to be finished at 11:30 am on Monday. That would be possible, Hlebechuk said, assuming that no problems are encountered. Hlebechuk apologized to the other TMT members for the short notice on the bracket installation work.

There was general agreement that, rather than waiting until Tuesday, it would be preferable to begin the chum operation on Monday, November 6, as soon as the bracket installation work is completed. Boyce reiterated that Oregon would prefer to begin the chum operation as scheduled on Friday, November 3. In response to a question from Boyce about delaying the bracket installation work, Hlebechuk said she could see if the Corps could get a contract in place for divers to do the bracket installation underwater at a later date.

Kiefer said IDFG's recommendation would be to set the requested operation up on Friday; if chum are seen on the Ives Island spawning grounds during tomorrow's survey, then the chum operation would begin on November 3. The Corps could then take the necessary time to get a dive contract in place so that the bracket installation could be completed underwater at some point between now and next spring. In response to a question, Boyce said Oregon recommends implementation of the SOR operation on November 3 no matter what the results of tomorrow's spawning ground survey. MacKay said Bonneville's preference would be to begin the chum operation once the bracket installation work is completed on Monday. Hlebechuk said the Corps is very concerned about starting the operation before chum are present and would like to gather information before making a decision on a start date.

Ultimately, it was agreed that the TMT will re-convene via conference call Friday morning whether or not chum are observed on the Ives Island spawning grounds during tomorrow's survey. It was agreed that Hlebechuk will check on the feasibility of postponing Monday's bracket installation until later in the season, when it can be accomplished underwater by divers and Mackay will check to see when the river could be set up to start the chum operation.

5. Next TMT Meeting Date.

A TMT conference call was scheduled for Friday, November 3 at 9 am. The next face-to-face meeting of the Technical Management Team was set for Wednesday, November 8. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
November 1, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Kyle Dittmer	CRITFC
Tony Norris	USBR
Russ Kiefer	IDFG
Robin MacKay	BPA
Howard Burge	USFWS
Cindy LeFleur	WDFW
Ron Boyce	ODFW
Margaret Finalrdo	FPC
Robin Harkless	Facilitation Team
Jim Gaspard	BC Hydro
Tom Le	PSE
Shane Scott	NWRP
Hanna Miles	SnoPUD
Tim Heizenrater	Cascade Energy
Ruth Burris	PGE
Jim Adams	COE

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Friday November 03, 2006 15:30 - 16:30

**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. Chum
 - [SOR #2006-07 - October 31, 2006 - Tailwater elevation at Bonneville Dam to protect natural spawning of chum and fall Chinook salmon at the Ives/Pierce Island Complex, Multnomah Falls, and partly influence the I-205 seeps.](#)
 - Nov 2 survey results
 - Schedule for sea lion acoustical deterrent bracket installation
 - Setting up river to start chum operation
3. Other
 - Set agenda for next meeting November 08, 2006 - [\[Calendar 2006\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

November 3, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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 Status

Emails from Ron Boyce, ODFW, and Cathy Hlebechuk, COE, following the 11/1 conference call said that the survey results would not be available until the afternoon of 11/3 and that the exclusion devices would have their installation completed by the afternoon of 11/3, assuming tailwater elevations are low enough. The TMT conference call was rescheduled for 3:30 on 11/3.

During that call, Wayne Vandernaald (ODFW chum survey leader) reported that 3 chum were seined in Section 2 and 3 below Hamilton Island but none were observed in the Ives Island complex. Hlebechuk reported the Seal Lion Acoustic Deterrents (SLAD) installation work was re-scheduled and could be completed by the afternoon of 11/3. Given this, the salmon managers requested that the chum operation begin as soon as possible. BPA proposed a start date of Tuesday, 11/7 at 7 a.m., and said with the precip forecasted to move in over the weekend, the operation might start sooner than Tuesday if local inflows increase.

**** Update: the forecasted precip caused local inflows go increase over the weekend and the operation started 0700 hours Monday, 11/6. The following email was sent out from the COE on 11/5 specifying the operation:

11.3' – 11.7' between 0700 – 1900 hours

Minimum 11.3' all hours

Tailwater will be measured 0.9 miles downstream from the first powerhouse, 50 feet upstream from Tanner Creek and at R.M. 144.5. This is the project tailwater as opposed to the powerhouse tailwater.

Technical Management Team Conference Call Notes

November 3, 2006

1. Greetings and Introductions.

The November 3 Technical Management Team conference call was chaired by Cathy Hlebechuk and facilitated by Robin Harkless. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made during this call. Anyone with questions or comments about these notes should contact Hlebechuk at 503-808-5942.

2. Chum Survey Results and Start of Chum Operation.

Wayne Vandernaald of ODFW said today's chum survey found no chum in the Ives Island complex. However, we met the Washington crew at the Ives Island site, and they told us they had caught, tagged and released three chum just below Hamilton Creek earlier in the day. The other thing is that, since Friday is a holiday next week, the crews will be going out to Ives Island on Monday and Thursday, Vandernaald said – we'll provide further updates, and as soon as we see chum, we'll let you know. In response to a question from Hlebechuk, Vandernaald said crews had attempted to conduct a survey in the I-205 area yesterday, but conditions were too rough.

Hlebechuk reported the SLAD bracket installation was ongoing and would be completed that afternoon.

And what were Bonneville tailwaters yesterday and today? Cindy LeFleur asked. Tailwater elevations were 10 to 11.5 feet, Hlebechuk replied. There have been two special operations, holding tailwater elevations down during the day at Bonneville, Scott Bettin added – they were installing the trap at Duncan Creek, and installing the brackets for the Sea Lion Exclusion Devices in the dam.

It looks like Tuesday at 7 am will be a good starting-time for the chum operation, said Bettin. If it rains more than expected, then an earlier start date will be in order. We would prefer to wait for fish, but with heavy precipitation expected, that will set up the river nicely for the start of the chum operation. Most likely, we'll be seeing more fish by then as well. I would note that we did see chum yesterday, so fish are present on the spawning grounds, LeFleur said. In response to another question, Hlebechuk said she has no reason to believe the brackets for the SLADS will not be installed by later this afternoon.

Paul Wagner said that, based on previous years' operations, starting the chum operation on Tuesday would be acceptable to NOAA Fisheries. LeFleur said the SOR requested that the chum operation today – since we have confirmed chum are now present on the spawning grounds, and the bracket installation work will be completed today, why wouldn't the chum operation begin today?

In response to a question, Kiefer described the background for this SOR and the timing it requests – essentially, that November 4 has been, in recent years, the average date of the first observation of chum on the Ives Island spawning grounds. He said the State of Idaho would like to see the chum operation begin as soon as the river can be set up for it. If that's today, that would be great, he said, but if it's early next week, that would be acceptable to us as well. After a few minutes of further discussion, no TMT disagreements were raised to the action agencies' proposal that the 2006 chum operation begin no later than 7 a.m. Tuesday, November 7. If the operation can be started sooner – by Saturday, for example – it will.

With that, today's conference call was adjourned.

TMT Participant List
November 3, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Scott Bettin	BPA
Dan Spear	BPA
Tom Le	PSE
Robin Harkless	Facilitation Team
Paul Wagner	NOAAF
Bern Klatte	COE
Rudd Turner	COE
Wayne Vandernaald	ODFW
Russ Kiefer	IDFG
Cindy LeFleur	WDFW
Tom Haymaker	PNGC

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday November 08, 2006 09:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

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Please MUTE your Phone**

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Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. [\[Review Minutes 2006\]](#)
3. Fall/Winter 2006 Vernita Bar operations - Russell Langshaw, Grant Co -
Russell will present the latest redd count information and the study plan for the 2006 Vernita Bar operation
 - [\[Vernita Bar Redd Survey, October 29, 2006\]](#)
 - [\[Vernita Bar Redd Survey, November 05, 2006\]](#)
 - [\[PRD hydrograph 10/31-11/6/06\]](#)
4. Chum Salmon Operation
 - [\[MEMORANDUM FOR THE RECORD - FROM: CATHY HLEBECHUK - NOVEMBER 7, 2006\]](#)
5. Lake Pend Oreille lake trout research update
6. Water Management Plan
7. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Spill Information 2006\]](#)
 - [\[Daily Water Temperature and Water Temperature Strings\]](#)
8. Other
 - Set agenda for next meeting - [\[Calendar 2006\]](#) 

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

MEMORANDUM FOR THE RECORD
FROM: CATHY HLEBECHUK
NOVEMBER 7, 2006

DUE TO HEAVY PRECIPITATION, SYSTEM CONDITIONS ARE SUCH THAT THE 11.3' – 11.7' BONNEVILLE TAILWATER ELEVATIONS ARE NOT POSSIBLE AT THIS TIME. IN AN EMERGENCY CALL WITH SALMON MANAGERS, IT WAS DECIDED TO OPERATE AS FOLLOWS UNTIL TMT TOMORROW:

MAINTAIN A TAILWATER OF 13' OR HIGHER 24 HOURS/DAY AND IF POSSIBLE, PROVIDE PULSES OF WATER 4 – 6 HOURS IN LENGTH TO CREATE UNDESIREABLE SPAWNING CONDITIONS FOR CHUM IN THE IVES/HAMILTON AREA.

THERE ARE DEBRIS PROBLEMS AT BONNEVILLE 2ND POWERHOUSE (VBS/STS). FOR THIS OPERATION THE FIRST POWERHOUSE WILL BE THE FIRST PRIORITY POWERHOUSE DUE TO PROBLEMS AT PH2 MENTIONED ABOVE.

AT ALL TIMES PROJECT THE PROJECT WILL OPERATE WITHIN PROJECT LIMITS I.E. TAILWATER LIMITS, MINIMUM FLOW, FOREBAY LIMITS, ETC.

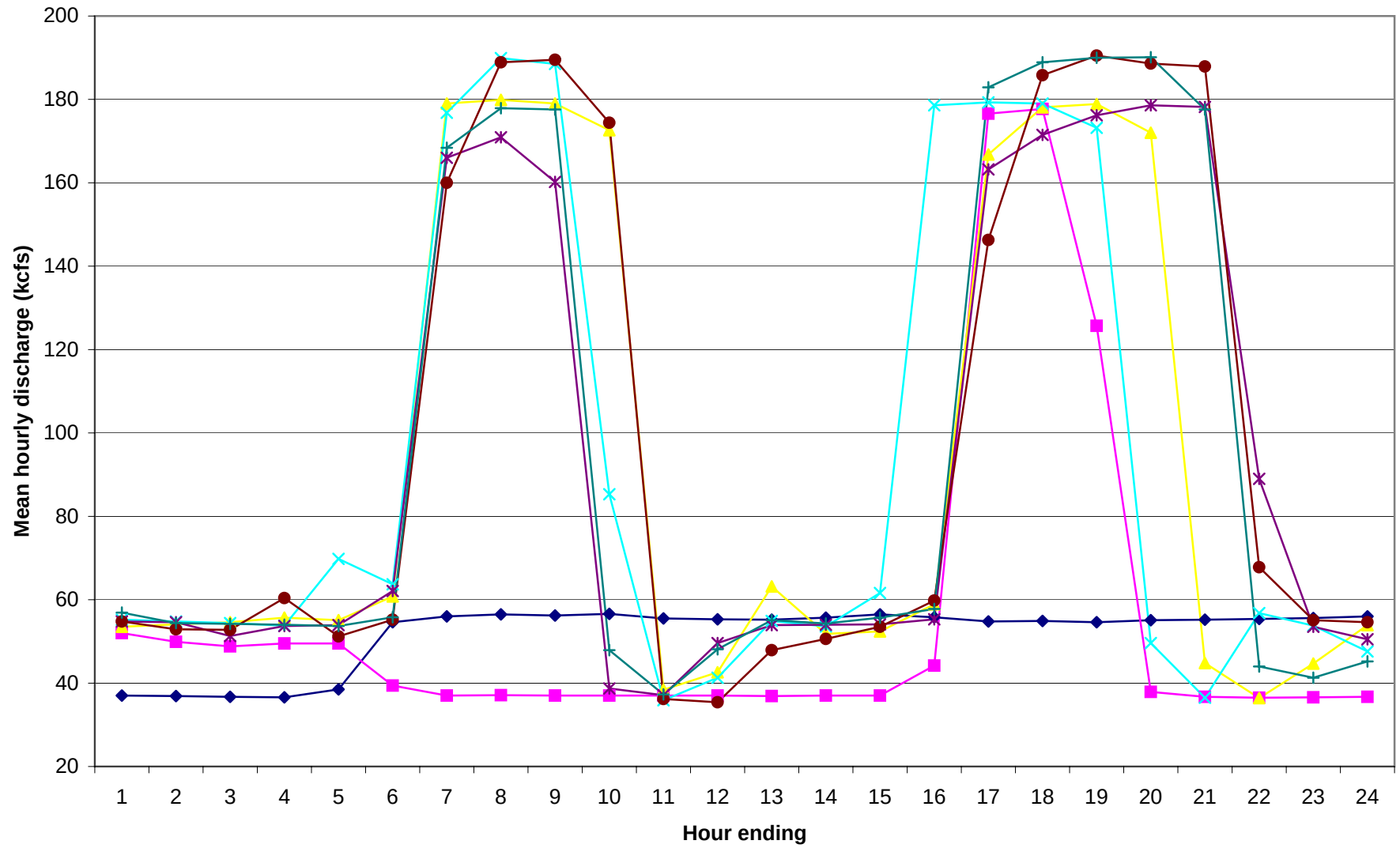
CATHY HLEBECHUK
HYDRAULIC ENGINEER
503/808-3942

Don Faulkner - Updated Nov-09-2006

Upcoming major outages on the Snake River/End of 1% Season

Start Date	End Date	Capacity Day/Night	Plant	Units	Reason
Nov-14-2006	Dec-09-2006	620	LMN	5-6	LMN units 5-6, breaker replacement
Dec-04-2006	Dec-08-2006	0	LWG	1-6	LWG units 1-6, TBL line outage for CVT replacements
Nov-27-2006	Dec-03-2006	0/310	LGS	1-4	LGS doble/relay/dive outage-- 1-4 continuous, 5-6 daily
Dec-09-2006	Dec-24-2006	465/620	LMN	3-4	LMN units 3-4, breaker replacement
Dec-26-2006	Jan-12-2007	465/620	LMN	1-2	LMN units 1-2, breaker replacement
Jan-10-2007	Jan-31-2007	310	LGS	1-4	LGS units 1-4, fire protection
Jan-31-2007	Feb-10-2007	620	LGS	5-6	LGS units 5-6, fire protection

PRD hydrograph 10/31-11/6/06



MEMORANDUM

November 5, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 5, 2006

Discussion: On Sunday, November 5, 2006 the fourth Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation at Vernita Bar. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 38 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	16	5	3	1	0	0	25
A – AB	11	3	2	1	2	0	19
AB – B	22	4	8	0	1	0	35
Below B	12	7	5	1	0	0	25
C	4	0	0	0	0	0	4
Totals	65	19	18	3	3	0	108

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the initiation of spawning within the Vernita Bar index area has been set to be November 1, 2006 for both zones, 36 kcfs - 50 kcfs and the zone above the 50 kcfs elevation. Five or more redds are required to determine the initiation of spawning for a zone.

During last year's November 6 redd count; no redd count occurred between the 36–50 kcfs flow elevations, 58 redds were counted between 50-55 kcfs, 39 between 55-60 kcfs, 22 between 60-65 kcfs, 10 between 65-70 and 21 redd above the 70 kcfs elevation.

WDFW and Grant County PUD agreed that the initiation of spawning in water deeper than 36 kcfs would be set to be on October 25, 2006. This was based on significantly on more than 5 redds observed in deep water off Vernita Bar during the October 29 ground count.

The next redd count will occur on November 12, 2006 and will require a USGS gauging station flow of about 45 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Scott Bettin
Bob Clubb
Lance Elias
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller

Jeff Atkinson
Shane Bickford
Dennis Dauble
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton

Bill Berry
Steve Brown
Gary Donabauer
Russ George
Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott

Rudd Turner
Dawn Woodward
PRD Operators

Bill Tweit
Power Dispatch
WAN Operators

Paul Wagner
FWWQ Team
NR Records

MEMORANDUM

October 29, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, October 29, 2006

Discussion: On Sunday, October 29, 2006 the third Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 38 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	0	0	0	0	0	0	0
A – AB	0	0	0	0	0	0	0
AB – B	4	0	0	0	0	0	4
Below B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
Totals	4	0	0	0	0	0	4

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the initiation of spawning has not occurred for either zone below or above the 50 kcfs elevation. Five or more redds are required to determine the initiation of spawning for a zone.

During last year's October 30 redd count; 57 redds were counted between the 36–50 kcfs flow elevations, 8 redds between 50-55 kcfs, 3 between 55-60 kcfs, 0 between 60-65 kcfs, 1 between 65-70 and 1 redd above the 70 kcfs elevation.

The next redd count will occur on November 5, 2006 and will require a USGS gauging station flow of about 36 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Scott Bettin
Bob Clubb
Lance Elias
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller
Rudd Turner
Dawn Woodward
PRD Operators

Jeff Atkinson
Shane Bickford
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Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott
Paul Wagner
FWWQ Team
NR Records

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

November 8, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

2006 Fall/Winter Operations at Vernita Bar

Russell Langshaw, Grant County PUD, reported that the chum study plan would be posted on the TMT website by or on 11/9. A 10/29 survey counted 4 redds in the 36 – 50 kcfs range, and an 11/5 survey counted 108 redds between 36 – 70 kcfs, indicating spawning began on 11/1; 3 redds were found above 65kcfs. As of 11/8, 55 fish had been tagged. The study operations included some spill, and graphs for 10/31 – 11/6 showed four-hour flow peaks occurring twice a day, typically between 0600-1100 hrs and 1600-2200 hrs.

Action/Next Steps: Langshaw said that the next survey would be conducted on 11/12, and a follow-up will be on the next TMT agenda on 11/22.

Chum Salmon Operations

Cathy Hlebechuk, COE, posted a memo on the agenda for the 11/8 TMT meeting regarding an emergency call held with the Salmon Managers on 11/7, during which a minimum of 13' tailwater elevation, with pulses when possible, was agreed to for chum. Dave Wills, USFWS, relayed a recommendation from OR following the 11/7 call: flat flows, at least during the day, to support the implementation of the SOR and minimize spawning disturbance. A question was raised by OR as to whether John Day storage could be used to mitigate the high flows, to which the COE replied the storage is to be reserved for flood control. Recommendations from the other Salmon Managers stood as discussed at FPAC, and they agreed to have further conversation as the week continued.

Action/Next Steps: Chum monitoring will continue, and there will be a TMT conference call on 11/15, to continue discussions.

Lake Pend Oreille Research

Russ Kiefer, ID, said that there was no new information from research, but that it appeared as though the requested Albeni Falls winter elevation of 2051' would be reached by 11/20. Kiefer also noted that as of 11/8, there was no indication of the operation positively affecting lake trout spawning; monitoring for eggs and birds preying on eggs along the shoreline will continue for another couple of weeks. Kiefer said that it was not clear when and where spawning was happening, and hoped that tagging and acoustic

spawning could be used to help identify this in the future. TMT members thanked the survey crews for their efforts at Lake Pend Oreille.

Next Steps: A research wrap-up will be on the agenda for the TMT meeting on 11/22.

Note – Update

At approximately 2:20 pm on 11/8, Cathy Hlebechuk sent out the following email:
“Due to increased flows in the Pend Oreille River (Columbia Falls went from 3500 cfs to 34000 cfs in 3 days) Albeni Falls will start spilling about 5 kcfs this afternoon. Total outflow will be about 33 kcfs. Goal is to reach 2051’ – 2051.5’ range by 20 November.”

2007 Water Management Plan

Russ Kiefer, ID, said that draft comments from ID were under internal review and will be sent to the COE the week of 11/13.

Action: TMT members will be reminded at the next meeting to review the draft and submit edits, additions, etc. based on expected 2007 operations, and submit them to Bernard Klatte, COE, no later than 12/15.

Operations Review

Reservoirs: Grand Coulee was at 1287.8', Hungry Horse was filling a bit and was at 3535.9', Libby was filling and was at 2435.5', with inflows at 19k and outflows of 8.8kcfs; Albeni Falls was at 2052.4', with a potential need for spill in order to reach the 2051' elevation by 11/20, and Dworshak was at 1523.2' with inflows of 27 kcfs and outflows at 1.5kcfs. Lower Granite inflows were at 60kcfs, and outflows at Orofino were at 1.8kcfs. Columbia Falls was at 35kcfs, Sandy was at 40kcfs, and Bonneville was at 220kcfs and climbing.

Fish: Juvenile sampling ended 10/31; at Lower Granite, 176 was the high and 110 was the low, and Little Goose numbers had a high of approximately 50. Adult migration was nearly done; Fall Chinook counts at McNary were 89,000, Ice Harbor counts were 10,000, and Priest Rapids counts were 18,000.

Power: Nothing to report at this time.

Water quality: Dworshak was currently operating one unit at 1.5kcfs in undershot mode, with temperatures approximately 48° and one unit at 1.5k. An outage is scheduled for 11/13, from 0500 – 2000 hrs., which will likely drop temperatures to 40°. The COE and USFWS will coordinate on 11/13 to discuss what to do during or after the special operations at the project.

Action/Next Steps: A Dworshak update will be sent as an email or teletype, be part of the 11/15 conference call, and/or be on the agenda for the 11/22 TMT meeting.

An FYI Announcement: Dave Wills, USFWS, said that the AFEP 2006 Research Review will be held at the Portland World Trade Center on 11/13-16. RSVP information can be found on the COE Walla Walla district website.

Upcoming Snake River Outages

Bernard Klatte and Don Faulkner, COE, reported on the outages planned at Lower Monumental, Lower Granite, and Little Goose. Klatte and Faulkner noted the numerous revisions to the dates/schedule for the outages.

Action: Faulkner will send a summary with date/schedule revisions to TMT members and will also post to the TMT website as a link under “Documents/Operations.”

11/15 Conference Call

Agenda items include:

- Chum Operations update
- Dworshak under/overshot mode update

Next TMT Face-to-Face Meeting, November 22nd, 9:00-noon

Agenda Items include:

- Fall/Winter Operations at Vernita Bar
- Chum Operations
- Lake Pend Oreille Research wrap-up
- 2007 WMP – reminder to submit comments by 12/15
- Operations Review

Technical Management Team Meeting Notes

November 8, 2006

1. Greetings and Introductions.

The October 8 TMT meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Fall/Winter 2006 Vernita Bar Operations.

Russ Langshaw said the 2006 study plan will be posted by tomorrow. He reported that 55 fish have been tagged so far; another 20 will be tagged in the next week. There have been two spawning surveys since the last meeting: October 29 (4 redds counted in the 36-50 Kcfs range, numerous redds below 36 Kcfs, compared to 62 redds counted on

October 30 last year), and November 5 (108 redds counted). That triggered the initiation of spawning, officially on November 1. So far, the experimental operation seems to be working well – we’ve only seen 3 redds above 65 Kcfs, he said. You’ll do another survey this Sunday? Scott Bettin asked. Yes – flows will be 45 Kcfs, Langshaw replied. In response to a request from Hlebechuk, Langshaw said he will email the study plan directly to the TMT membership.

Moving on to last week’s operation, Langshaw said a graph detailing the operation is attached to today’s agenda on the TMT homepage via hot-link. We’re creating two peaks daily, one in early morning, one in late afternoon, he said; as you can see, the duration of the second peak depends on how much water we have. In response to a question, Greg Lang said turbine capacity at Priest Rapids is about 165 Kcfs, so anything above that volume is being spilled.

3. Chum Salmon Operation.

Hlebechuk said she had attached a memo to today’s agenda on the TMT homepage via hot-link, describing the current chum operation. The agreed-upon operation between the AA and the Salmon Managers during the current high flows was to maintain a minimum tailwater elevation of 13 feet. In the winter PH2 is the priority powerhouse; however, because of debris problems at PH2 it was changed to PH1 as discussed with the Salmon Managers, she said. Please refer to Hlebechuk’s memo for full details of the current operation. The current tailwater elevation is 19-20 feet, with outflows in the 220 Kcfs range, she said. The group reviewed yesterday’s Bonneville tailwater elevations; Bettin noted that there will be one big pulse later today. Turbine capacity at Bonneville is 180 Kcfs, and river flows are still in the 220 Kcfs range, he added. The project started spilling this morning at 2 am, Hlebechuk said. Fortunately we have plenty of tailwater depth compensation, Bettin observed. In response to a question, Hlebechuk said Grand Coulee is pretty much full now.

What’s the prognosis for flows? David Wills asked. Flows will continue to rise over the next couple of days, Bettin replied. It’s like a python trying to swallow an elephant at the moment, said Robin MacKay. The high flows are expected to preclude implementation of the tailwater elevations specified in the SOR for some weeks, Bettin added. I have been asked to deliver a message from Oregon, said Wills – upon further reflection, Oregon does not support the fluctuating flow program we tentatively came to agreement on at yesterday’s FPAC meeting, he said – they support implementation of the SOR, with flat flows, rather than fluctuating flows, to avoid disturbing the spawning area. They ask that, if possible, storage space at John Day be used to provide lower flows. The John Day storage is reserved for flood control and cannot be used for this fish operation, Hlebechuk replied. In response to a question, Wills said ODFW is the only salmon management agency that supports implementation of the SOR operation at this point.

The group reviewed the National Weather Service 10-day weather outlook. Basically, what this shows is that, Wednesday and Thursday, we’re expected to get up to another inch of rain, said Hlebechuk, with even larger amounts of precipitation through

the weekend. We really don't see a break until next Tuesday, said Adams – in other words, flows are going to continue to be high for the foreseeable future.

What are the salmon managers recommending as a group? Hlebechuk asked. Yesterday the group was comfortable with the fluctuating flow approach, Wills replied – it was later in the day that Oregon changed its position. The rest of the salmon managers have not changed their positions. We will have further discussion of this issue later this week, he said, and if we have an alternative recommendation, we'll let you know. At this point, however, it's kind of a moot point. We'll stay the course, then, Hlebechuk said, and operate according to yesterday's FPAC recommendation as soon as flows begin to recede somewhat.

In response to a question, Cindy LeFleur reported that the most recent chum spawning survey on Monday found one dead chum, although wind and turbid water made an accurate survey difficult. Basically, until the Bonneville tailwater is back in shape, survey conditions will continue to be difficult, Bettin observed.

4. Lake Pend Oreille Lake Trout Research Update.

Russ Kiefer said he has no new information to report on the lake trout research program at today's meeting. It looks as though we are on track to reach the requested Albeni Falls elevation of 2051 feet by November 20. Hopefully that will produce good spawning conditions for kokanee, he said; our field personnel will continue to look for birds feeding on lake trout eggs for the next week or so. Please thank the crews for all their efforts, said Bettin – I know they have spent a tremendous amount of time in the field. I'll pass that on, said Kiefer.

5. 2007 Water Management Plan.

Bern Klatte said he is still waiting for comments on the 2007 WMP; we haven't received many so far, he said. Kiefer said he had sent draft comments in for internal IDFG review and has now gotten them back, with a few edits – I should be able to get those to the Corps by next week, he said. And when do you need to put out the final version of the WMP? Wills asked. The BiOp says we're supposed to have it done by September, Hlebechuk said. Good – that gives us 10 months, said Wills. After a brief discussion, it was agreed that December 15 will be the deadline for comments on the 2007 WMP.

6. Upcoming Major Outages on Snake River/End of 1% Operation.

Klatte said Bonneville's Transmission Business Line needs to take Lower Granite powerhouse offline some time in the next couple of months, as well as Lower Monumental and Little Goose powerhouse. The TBL needs to do some work on the lines, he explained. When the powerhouses are off, the projects will run at speed-no-load. I talked to Bill Hevlin, and he recommended that we put off the outages until as late in

December as possible, Klatte said. The dates chosen were from 7 am December 4 through 5 pm December 8 at Lower Granite.

Don Faulkner clarified that the Little Goose Doble testing, diving to install trash rack transducers and relay testing will actually begin November 27, with 36 hours of zero powerhouse operation followed by a two-unit operation during nighttime hours through December 3. At Lower Granite, the outage will be a full powerhouse outage around the clock from December 4-8. The project will release 5 Kcfs through speed-no-load. At Lower Monumental, an outage for breaker replacement will take place, but the dates have not yet been finalized. Units 1-4 will have to be out for several consecutive weeks; during the outage, two units will be operation. Once the work is complete on Units 1-4, Units 5-6 will be out of service. At Little Goose, an additional outage has been scheduled for fire suppression upgrade work for four weeks beginning January 10 through February 10; we'll do Units 1-4 first, followed by Units 5-6, he explained. At Wills' request, Faulkner said he will summarize the planned outages in writing and will post this memo to the TMT homepage under "Operations".

Moving on, Faulkner said the official end of 1% operation was November 1. There is no reporting requirement associated with the end of that operation, he said – it's in the Fish Passage Plan. We just wanted to make sure everyone was aware that this has occurred, he said – we'll try to keep the system within 1% whenever possible, but we now have the flexibility to operate outside 1% when necessary.

7. Operations Review.

Reclamation reported that Grand Coulee is currently at 1287.8 feet. Hungry Horse is currently at 3535.9 feet and filling slightly. The project is releasing 900 cfs, with flows of 35 Kcfs at Columbia Falls. The Corps said Libby is filling; the current elevation is 2434.5 feet. Inflows have increased from 4 Kcfs to 19 Kcfs. Albeni Falls is now at elevation 2052.5 feet, releasing 26 Kcfs. Lower Granite outflow has increased from 16 Kcfs a few days ago to 60 Kcfs, currently. Bonneville was at 150 Kcfs inflow yesterday; inflows to the project are currently 220 Kcfs. Salem was at 10 Kcfs in early November; it was at 60 Kcfs yesterday and climbing. Portland Harbor was at 6 feet a couple of days ago and is at 11 feet, currently. Flows in the Sandy and Hood Rivers are at 40 Kcfs, Bettin added; to put that into perspective, last week, flows in the Sandy were 600 cfs.

Moving on to fish, Paul Wagner said subyearling passage has decreased to the double to low triple digits at Lower Granite and Little Goose – that's it for the season, which stops on October 31, he said. LeFleur said there is little to say about adults – the migration is pretty much done at this point. About 89,000 fall chinook have passed McNary to date; the adult fall chinook count past Ice Harbor is 10,000. There were no power system issues reported at today's meeting.

Adams said Dworshak is releasing project minimum – 1.5 Kcfs – and operating in undershot mode, with a release temperature of about 48 degrees. At Peck, the river temperature is currently about 50 degrees F. The planned project outage at Dworshak is

still scheduled for this Monday, he added; I will discuss which mode the project should operate in – overshot or undershot – once normal operations resume with the salmon managers early next week.

8. Next TMT Meeting Date.

The next Technical Management Team meeting was set for Wednesday, November 22. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Meeting Participants
November 8, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Cindy LeFleur	WDFW
Robin MacKay	BPA
Russ Kiefer	IDFG
Paul Wagner	NOAAF
Tony Norris	USBR
Margaret Filardo	FPC
Ken Tiffan	USGS
Russ Langshaw	Grant PUD
Greg Lange	COE
Russ George	WMCI
Scott Bettin	BPA
Tim Heizenrater	Cascade Energy
David Wills	USFWS
Jim Adams	COE

TECHNICAL MANAGEMENT TEAM

BOR :	<i>Tony Norris / John Roache</i>	BPA :	<i>Robyn MacKay / Scott Bettin</i>
NOAA-F:	<i>Paul Wagner</i>	USFWS :	<i>David Wills / Steve Haeseker</i>
OR :	<i>Rick Kruger / Ron Boyce</i>	ID :	<i>Russ Kiefer</i>
WA :	<i>Cindy LeFleur</i>	MT :	<i>Jim Litchfield</i>

COE: *Cindy Henriksen / Cathy Hlebechuk*

TMT CONFERENCE CALL

Wednesday November 15, 2006 09:00 - 12:00

**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. Chum Update/Prognosis
 - [\[Ives Island Spawning Ground Survey Results, 2006 - 11/14/2006 ODFW/WDFW Update\]](#) 
 - [\[SOR #2006-7 - October 31, 2006\]](#)
3. Albeni Falls/ Lake Pend Oreille update
 - [\[Kokanee are already spawning in Lake Pend Oreille in significant numbers - Power Point Slide\]](#)
4. Dworshak - selector gate operation over or undershot?
5. Other
 - Set agenda for next meeting - November 22, 2006 [\[Calendar 2006\]](#) 

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

Ives Island Spawning Ground Survey Results, 2006.

11/14/06

11/14/2006 ODFW/WDFW Update

Date	<u>Fall Chinook</u>				<u>Chum</u>				<u>Coho</u>			
	Lives	Redds	New redds	Deads	Lives	Redds	New redds	Deads	Lives	Redds	New redds	Deads
10/3/2006	0	0	0	0	0	0	0	0	2	0	0	0
10/6/2006	1	0	0	1	0	0	0	0	6	0	0	1
10/10/2006	5	0	0	0	0	0	0	0	4	0	0	0
10/12/2006	2	0	0	0	0	0	0	0	10	0	0	0
10/17/2006	1	1	1	2	0	0	0	0	2	0	0	0
10/20/2006	2	2	1	1	0	0	0	0	5	0	0	2
10/24/2006	0	1	0	0	0	0	0	0	2	0	0	0
10/27/2006	2	2	0	3	0	0	0	0	1	0	0	2
10/31/2006	33	0	0	0	0	0	0	0	2	0	0	1
11/3/2006	71	36	0	3	0	0	0	0	40	5	0	3
11/6/2006	2	0	0	3	0	0	0	1	0	0	0	4
11/09/2006*	0	0	0	1	0	0	0	0	0	0	0	0
11/14/2006	213	5	5	6	10	22	22	0	1	0	0	0

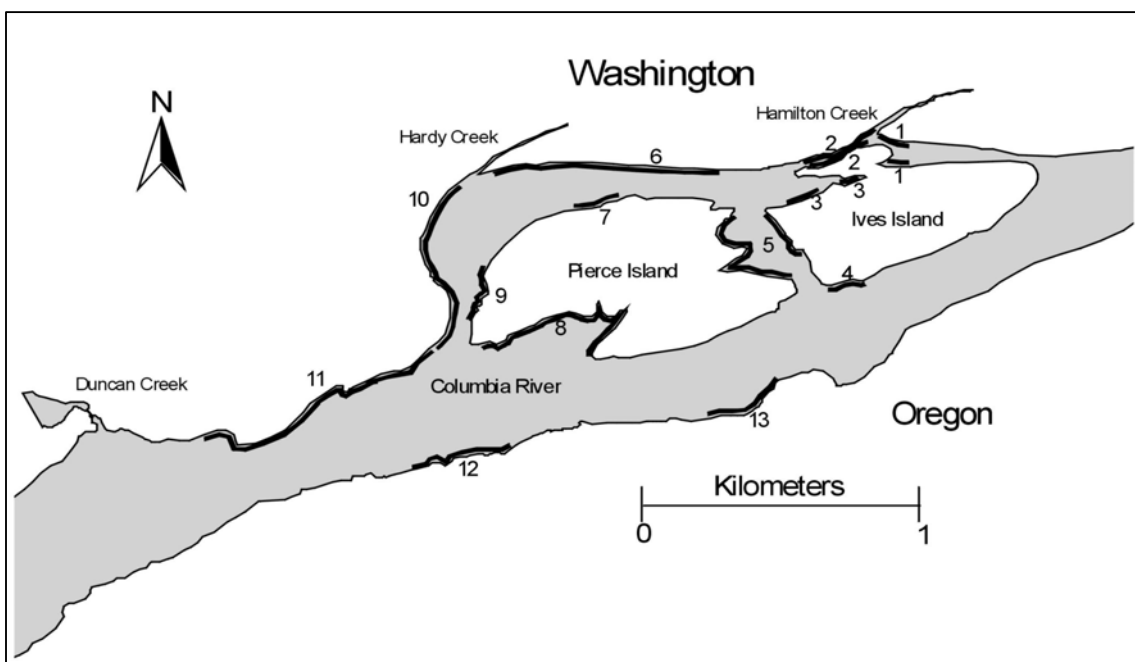
*Very muddy, secci disk reading 2"

Details: Locations of fish & redds on latest survey*:

		Lives	Redds	New redds	Deads
Section 1:	CHF	153	3	3	0
	Chum	4	2	2	0
	Coho	0	0	0	0
Section 2:	CHF	54	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 3:	CHF	0	2	2	0
	Chum	6	20	20	0
	Coho	0	0	0	0
Section 4:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 5:	CHF	4	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 6:	CHF	0	0	0	1
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 7:	CHF	1	0	0	5
	Chum	0	0	0	0
	Coho	0	0	0	0

		Lives	Redds	New redds	Deads
Section 8:	CHF	1	0	0	0
	Chum	0	0	0	0
	Coho	1	0	0	0
Section 9:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 10:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 11:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 12:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 13:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0

* no entries in rows means no survey completed in section.



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

November 15, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Albeni Falls / Lake Pend Oreille

Russ Kiefer, IDFG, reported that 1700 adult Kokane had been counted and were spawning in Lake Pend Oreille earlier and at shallower elevations than expected. IDFG requested that the COE maintain the lake's elevation within a range of 2052.3' – 2052.8', to avoid de-watering eggs in the area. IDFG recognized that it may be difficult for the COE to hit/maintain the target, given the challenges of going off freeflow (releasing as much water as possible from the project with no generation) and transitioning to a generation only operation, and clarified that the objective is to hold the lake within a .5' range and as close to the current elevation as possible.

Action/Next Steps: The COE will hold Lake Pend Oreille as steady as possible, and as close to a 2052.3' – 2052.8' range, through the peak spawning period which ends 12/31, and then shift to a range of 1' starting 1/1.

Chum Update

Rick Kruger, ODFW, reported on results from the chum spawning posted on the TMT website. As of 11/14, 22 new redds had been counted. Cathy Hlebechuk, COE, said that the current operation is a minimum tailwater of 13' around the clock and that flows were starting to recede. TMT members discussed what elevation range and time periods for those ranges would be best for all interests, for the near term. Interests expressed were: holding a steady elevation as long as possible during the day, and maintaining a steady operation longer-term for chum throughout their spawning period. All agreed to a short-term operation of maintaining a 12' – 12.5' range as long as possible between the hours of 7 a.m. – 5 p.m..

Action/Next Steps: An email was sent out to TMT by Hlebechuk following the conference call:

Short summary of [11/15] TMT conference call: The river flows are coming down and hopefully will continue to do so barring any significant rain events. Salmon Managers recommended holding tailwater 12' – 12.5' starting at 0700 hours in the morning and remaining in this range as long as possible, preferably until 1700 hours. This operation is currently in effect. TMT agreed a check in was in order after the chum survey. Conference call is set for Friday, Nov 17 at 1530 hours (3 p.m.). Call in number 503/808-5190.

Dworshak Under/Overshot Mode

Laura Hamilton, COE, reported that Dworshak was currently operating in undershot mode and temperature was at 47°. Hamilton asked TMT members to clarify what temperature was desirable. Dave Wills, USFWS, noted that in his prior phone conversation with Jim Adams, COE, a shift to overshot mode would likely increase temperatures to 53-54°. Wills stated that as such, from the hatchery's perspective, maintaining undershot mode and a temperature of 47° was desired. Robin MacKay, BPA, noted that the big unit is out at Dworshak, which may pose a challenge to making a switch to overshot mode.

Action/Next Steps: TMT will receive a Dworshak update at the 11/17 conference call.

Next TMT Conference Call, November 17th, 3:30 p.m.

Agenda Items Include:

- Chum Operations Update including 11/17 survey results
- Dworshak selector gate update

Technical Management Team Conference Call Notes

November 15, 2007

1. Greetings and Introductions.

The November 15 Technical Management Team conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Chum Update.

The most recent survey results are hot-linked to today's agenda on the TMT homepage. Rick Kruger said 22 new chum redds were found yesterday – 2 in section 1, upstream of Hamilton Creek, and 20 in section 3, between Hamilton Creek channel and Ives Island. Seven of the new redds are above the 12.5-foot elevation, he said. There was some standing and flowing water keeping those redds wetted, he added. Water visibility was 30 inches, compared to 2 inches last week, Kruger added.

Hlebechuk said the current operation is a minimum tailwater depth of 13 feet around the clock. Bonneville inflows are receding, and we hope to be able to start doing a lower tailwater elevation soon, though likely not for the full 12-hour period. Inflows to Bonneville have been in the 140-160 Kcfs range, she added. If

inflows stay at 160 Kcfs, we will be able to hold a 12.5-foot tailwater for six hours with current Willamette River and tidal backwater affects; if they're 140 Kcfs, we can hold the 12.5-foot tailwater elevation for just over 11 hours. Currently we need to discharge about 90 Kcfs to hold a 12.5-foot tailwater; we need to release 180 Kcfs (full powerhouse) at night, producing a tailwater depth of 17 feet, the rest of the time. As the Willamette River and local flows recede the project will gradually increase outflows to maintain a 12 – 12.5 foot tailwater.

Holding a given elevation for just six hours is a problem, said Kruger – whatever tailwater elevation is chosen, we need to hold it throughout the entire daylight period, because six hours is not enough time for these fish to spawn successfully. Paul Wagner noted that, based on last year's study, Ken Tiffan found that the chum generally maintained their position, even at higher flows. True, said Tiffan, but higher flows correlated with a decrease in spawning activity – the fish would try to stick with their redd for as long as possible, but they weren't usually able to complete their redd when flows were high. In response to another question, Tiffan noted that, while elevations have been high, velocities have been relatively low due to a backwater effect.

What do the salmon managers recommend at today's meeting? Hlebechuk asked. Should we set up an interim operation until the next TMT meeting? If we have 150 Kcfs coming in, we could set up an operation during daylight hours that would produce a tailwater depth of 12.5 feet for 8 hours, then go to a 17-foot depth for the other 16 hours, she said. Once inflows hit 140 Kcfs, again, we think we can hold the 12.5-foot depth for about 11 hours out of the day, said Hlebechuk, and we may well be at 140 Kcfs soon, because local flows are falling off. It all depends on what happens with the rain for the next few days.

Wagner said that, from his perspective, he is concerned because the long-term forecasts for Dworshak and Libby are 85 and 90 percent of average, respectively. Short-term, we have abundance, he said, and I would support adopting a 12-foot tailwater depth for now. If you look at historic spawning data, we're getting into the peak timing of chum spawning, said Wills. It begins now and could last for several weeks. I would hate to see us initiate a bunch of spawning at high elevations, then not be able to support those redds later. The Fish and Wildlife Service's preference would be to establish a tailwater depth no higher than 12 feet at this point, during daylight hours. Robin MacKay said that, based on the current flow data, it would be possible to maintain a 12-12.5-foot tailwater depth starting at 7 a.m. and lasting as long as possible, at this point. Wagner said his preference would be to start at 7 or 8 a.m. and maintain this until 5 p.m. if possible. This would provide adequate coverage of the spawning areas for now.

Ultimately, it was agreed that the action agencies will maintain a target tailwater depth of 12-12.5 feet, beginning at 7 a.m., for as long as possible during daylight hours; the group will continue to watch the flow situation at Bonneville in

the hopes that the hours of 12-12.5-foot tailwater elevation can be extended as flows continue to drop. MacKay clarified that for BPA this is a short-term operation, and will be maintained only as long as it takes to get past the current flow/precipitation situation in the basin – after that, the tailwater elevation at Bonneville will be going down. Tony Norris said Reclamation agrees with BPA's assessment. Kiefer said he will need to wait and see what upcoming surveys show in terms of redd depth, before agreeing with MacKay's statement. Hlebechuk noted that, with Grand Coulee full, the Corps/RFC model is predicting continued high flows, in the 140 Kcfs range, through the end of December. Robyn MacKay said BPA models are showing lower flows than that.

It was agreed that it would be prudent to convene a TMT conference call this Friday, November 17, to check in on this operation.

3. Albeni Falls Update.

Kiefer said he had received an email yesterday from researchers at Lake Pend Oreille saying they had been seeing a lot more kokanee spawners than expected, earlier expected. The kokanee are spawning in pretty shallow depths, he said. Once I saw the photos, I contacted the other TMT representatives, and IDFG policy folks, and what we're going to request is that the Corps maintain the current Albeni Falls elevation, Kiefer said. We're expecting to see a high number of eggs per female due to good feeding conditions, he said, so we don't want to jeopardize those shallow redds. I believe the current elevation is about 2052.3 feet, he said, so we're requesting that the action agencies hold the winter elevation at Albeni Falls at a range of 2052.3-2052.8 feet. My understanding is that they have gone to a free flow (spill only), he said, which may make it a little difficult to hit that elevation range exactly as flows recede and the project returns to a generating operation, Kiefer said. We understand that that is a difficult operation, and appreciate the operators' skill in maintaining it.

Mike Deegan, Albeni Falls operator, confirmed that the current elevation at Albeni Falls is just under 2052.3 feet. Kiefer said the researchers have counted 1,700 adult kokanee to date, more than expected. In response to a question, Kiefer said the original SOR requested an Albeni Falls elevation of 2051 by November 20. In most years, very little kokanee spawning is seen before that date, Kiefer explained – the goal of the lower lake elevation, again, was to detrimentally impact the earlier lake trout spawning by desiccating eggs deposited higher on the shoreline. In response to a question, Hlebechuk said the purpose of the current free flow operation at Albeni Falls is to get more water out than is possible when the project is generating, because of the recent precipitation events in the basin. I believe we will be on free-flow at Albeni Falls for a few more days, said Jeff Laufle, Seattle District Corps of Engineers biologist.

Hlebechuk said the Corps will do its best to maintain a stable elevation at Albeni Falls, but with the rain coming in, it may be difficult to hold the project to such a narrow elevation range. Is 2052-2052.5 feet a reasonable elevation, or do you want us to stick as closely as we can to the 2052.3-2052.8 range rather than trying to hold you to specific elevation targets, I would prefer to describe the biological objectives we're trying to achieve, said Kiefer – if we can set 2052 as the bottom elevation, I don't think that will have a detrimental biological impact.

After a few minutes of further discussion, Kiefer said once the elevation is stabilized, even at 2052, as long as the action agencies can hold an operating range of 0.5 feet, that is acceptable to Idaho. Ultimately, Hlebechuk said the Corps will attempt to maintain an operating range of 2052.3-2052.8 feet, realizing that it may be necessary to go outside that range as things settle out. Once the system settles down, we will set a minimum elevation and operate withing half a foot until the beginning of January, Hlebechuk said. That would be acceptable, said Kiefer.

4. Dworshak Update.

Laura Hamilton asked the TMT what release temperature they would prefer to see from Dworshak at this point in the season. Wills said he had discussed this question with Jim Adams; the bottom line is that the salmon managers would prefer to see Dworshak operate in undershot mode from here on out, to produce a release temperature of about 47 degrees F, rather than the 53 degrees F. we would see in overshot mode. My understanding is that the project is now operating in undershot mode, and that is fine for now, said Wills – we can revisit this in a couple of weeks.

5. Next TMT Meeting Date.

The next face to face meeting of the Technical Management Team was set for Wednesday, November 22. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
November 15, 2006

Name	Affiliation
Laura Hamilton	COE
Rick Kruger	ODFW
Robin Harkless	Facilitation Team
David Wills	USFWS
Bern Klatte	COE

Robyn MacKay	BPA
Cathy Hlebechuk	COE
Paul Wagner	NOAAF
Tony Norris	USBR
Tim Heizenrater	Cascade Energy
Mike Deegan	COE
Ken Tiffan	USGS
Russ Kiefer	IDFG
Scott Bettin	BPA
Margaret Filardo	FPC

TECHNICAL MANAGEMENT TEAM

BOR : Tony Norris / John Roache

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT CONFERENCE CALL

Friday November 17, 2006 15:30 - 16:30

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

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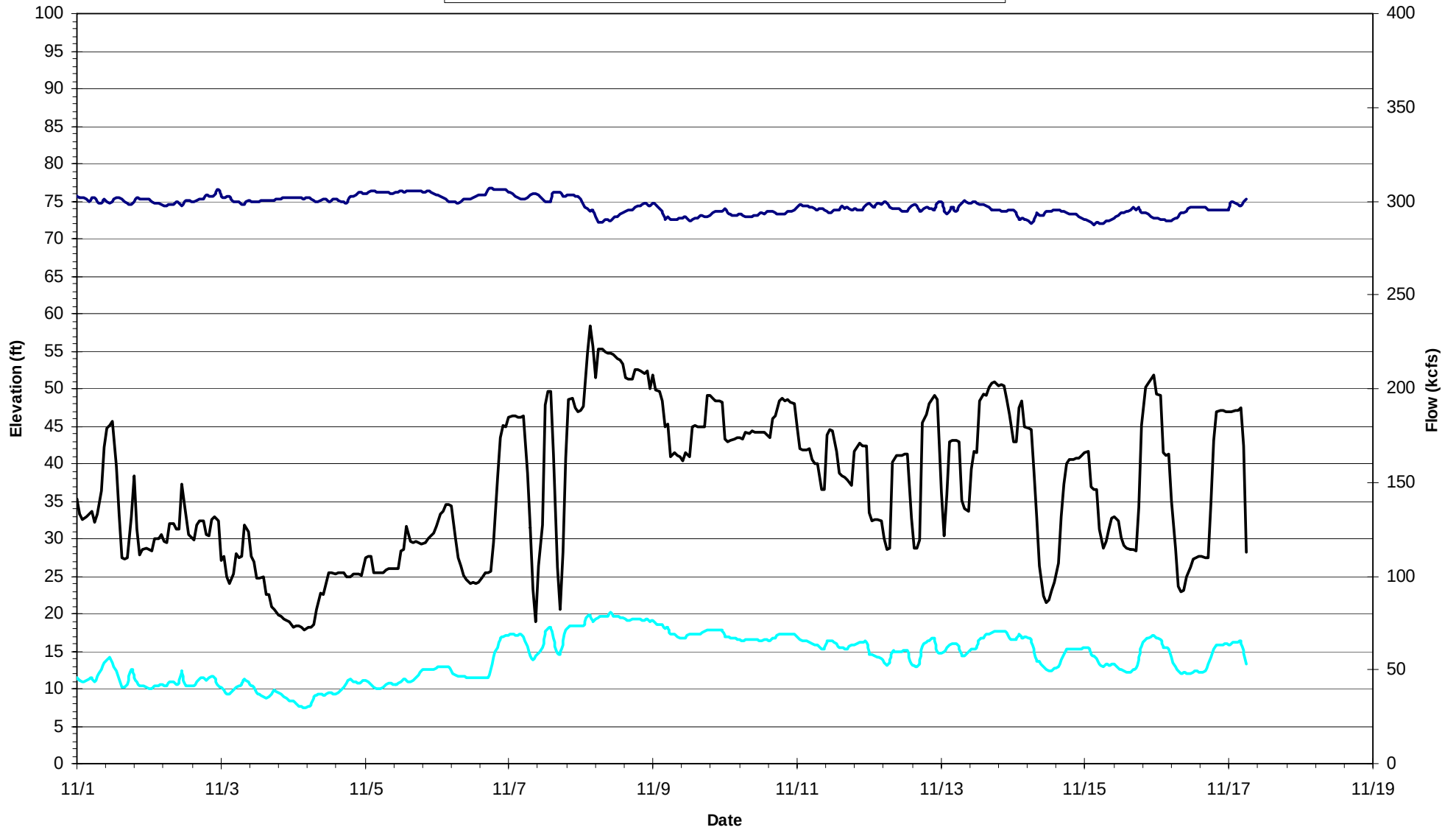
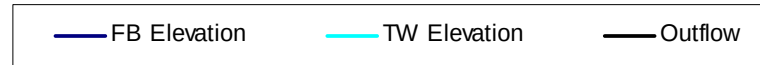
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Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Chum survey / recommended operation
 - [\[SOR #2006-7 - October 31, 2006\]](#) 
 - [\[Bonneville Operations Nov 1-17\]](#) 
 - [\[Fish Passage Center Ives Island Spawning Ground Survey Results\]](#) 
3. Other
 - Set agenda for next meeting - [\[Calendar 2006\]](#) 

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

BON Operations (Nov 1-Nov 17)



Date	<u>Fall Chinook</u>				<u>Chum</u>				<u>Coho</u>			
	Lives	Redds	New redds	Deads	Lives	Redds	New redds	Deads	Lives	Redds	New redds	Deads
10/3/2006	0	0	0	0	0	0	0	0	2	0	0	0
10/6/2006	1	0	0	1	0	0	0	0	6	0	0	1
10/10/2006	5	0	0	0	0	0	0	0	4	0	0	0
10/12/2006	2	0	0	0	0	0	0	0	10	0	0	0
10/17/2006	1	1	1	2	0	0	0	0	2	0	0	0
10/20/2006	2	2	1	1	0	0	0	0	5	0	0	2
10/24/2006	0	1	0	0	0	0	0	0	2	0	0	0
10/27/2006	2	2	0	3	0	0	0	0	1	0	0	2
10/31/2006	33	0	0	0	0	0	0	0	2	0	0	1
11/3/2006	71	36	0	3	0	0	0	0	40	5	0	3
11/6/2006	2	0	0	3	0	0	0	1	0	0	0	4
11/09/2006*	0	0	0	1	0	0	0	0	0	0	0	0
11/14/2006	213	5	5	6	10	22	22	0	1	0	0	0
11/17/2006	506	340	0	46	49	85	0	2	0	0	0	1

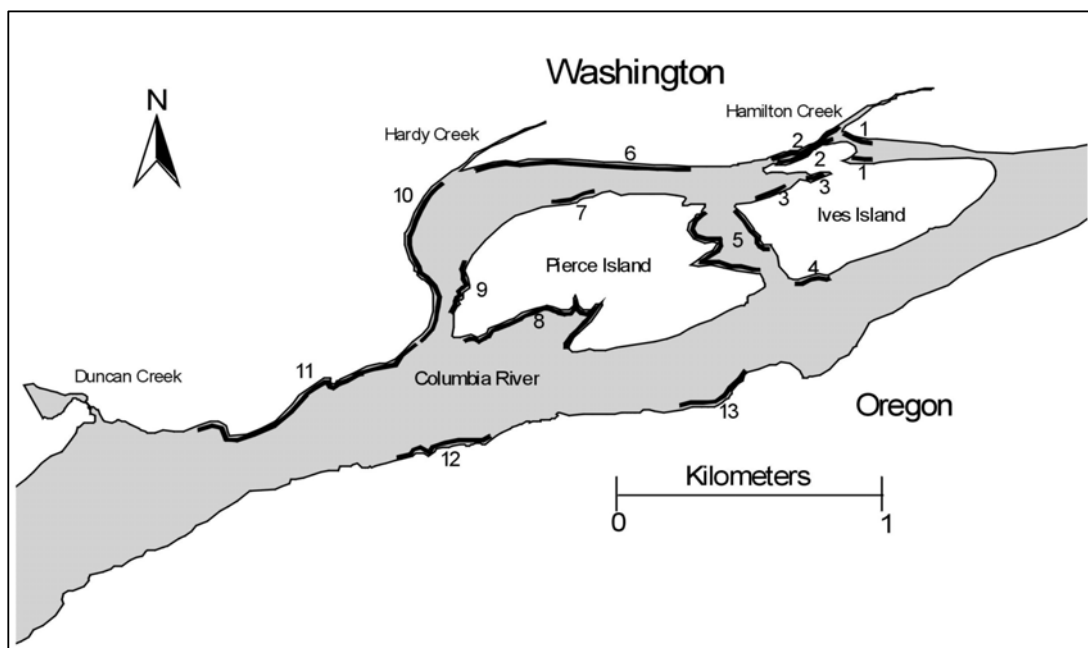
*Very muddy, secci disk reading 2"

Details: Locations of fish & redds on latest survey*:

		Lives	Redds	New redds	Deads
Section 1:	CHF	347	237	0	12
	Chum	9	2	0	1
	Coho	0	0	0	0
Section 2:	CHF	112	62	0	14
	Chum	12	12	0	0
	Coho	0	0	0	0
Section 3 :	CHF	0	0	0	4
	Chum	28	71	0	1
	Coho	0	0	0	0
Section 4 :	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 5 :	CHF	46	41	0	1
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 6 :	CHF	0	0	0	6
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 7 :	CHF	0	0	0	5
	Chum	0	0	0	0
	Coho	0	0	0	0

		Lives	Redds	New redds	Deads
Section 8:	CHF	0	0	0	2
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 9:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 10:	CHF	1	0	0	1
	Chum	0	0	0	0
	Coho	0	0	0	1
Section 11:	CHF	0	0	0	1
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 12:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 13:	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0

* no entries in rows means no survey completed in section.



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

November 17, 2006 Meetings

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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

As of 11/17, 71 chums were sighted in section 3, with half of those sighted above the 12' water line. The COE reported that elevations on 11/15 were in the 12.1' – 12.3' range and on 11/16 were in the 12' – 12.3' range. TMT members noted that the spawning was at an unusually high elevation this year, and expressed interest in a pulse “as high as possible for as short of a time as possible” night time (not before 1900, with pulse centered around midnight). Pulse is to be above a 13.5' elevation, and the rest of the time a target elevation of 12' around the clock, or as constant as possible. The COE clarified that the elevation range would be 11.8' - 12.3'.

Next Steps: TMT will have an update on chum at the meeting on 11/22, when new GPS information will be available.

Dworshak Update

Jim Adams, COE, reported that as of 11/17, Dworshak was going to overshot mode, and that a temperature change would be likely.

Next TMT Face-to-Face Meeting, November 22nd, 9:00-noon

Agenda Items Include:

- Fall/Winter Operations at Vernita Bar
- Chum Operations Update
- Lake Pend Oreille Research wrap-up
- 2007 WMP – reminder to submit comments by 12/15!
- Operations Review

Technical Management Team Conference Call Notes

November 17, 2007

1. Greetings and Introductions.

The November 17 Technical Management Team conference call was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Chum Update.

The most recent survey results are hot-linked to today's agenda on the TMT homepage. Rick Kruger said this morning's survey found a total of 49 live chum, 85 redds and two dead chum, as well as 506 live fall chinook, 340 redds and 46 dead chinook. The majority of the chinook were found in section 1; the majority of the chum were found in sections 2 and 3 on the north side of Ives Island. A total of 28 live chum and 71 redds were located in section 3. About half of the chum redds in section 3 were located above the 12-foot elevation level.

The group devoted a few minutes of discussion to this information; one participant noted that the chum are spawning at unusually high elevations this year. The salmon managers reiterated their recommendation that the action agencies keep the nighttime high-flow period as short as possible, and maintain a target tailwater elevation as close as possible to 12 feet for as long as possible during the day. They requested a daytime range of 11.8 – 12.3 feet starting at 7 a.m. and ending at 7 p.m. if possible. The salmon managers also requested the project provide a pulse with a minimum tailwater of 13.5 feet at night. They requested the pulse be as high as possible for as short of a time as opposed to a low pulse for a long time. They requested the pulse start no sooner than 7 p.m. and be centered around midnight if possible. The action agencies agreed to implement the requested operation. A further chum update will be provided at the November 22 TMT meeting.

3. Other.

Jim Adams reported that Dworshak will be going to overshot mode later today; this is expected to result in a discharge temperature of 52-53 degrees F.

4. Next TMT Meeting Date.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, November 22. Meeting summary prepared by Jeff Kuechle.

TMT Participant List
November 17, 2006

Name	Affiliation
Robin MacKay	BPA
Rick Kruger	ODFW
Robin Harkless	Facilitation Team
David Wills	USFWS
Cindy Lefleur	WDFW
Cathy Hlebechuk	COE
Paul Wagner	NOAAF
Tony Norris	USBR
Jim Adams	COE
Erin Halton	Facilitation Team
Russ Kiefer	IDFG
Scott Bettin	BPA
Margaret Filardo	FPC

TECHNICAL MANAGEMENT TEAM

BOR :	Tony Norris / John Roache	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday November 22, 2006 09:00 - 12:00

**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. [\[Review Minutes 2006\]](#)
3. Fall/Winter 2006 Vernita Bar operations - Russell Langshaw, Grant Co -
Russell will present the latest redd count information and the study plan for the 2006 Vernita Bar operation
 - [\[Vernita Bar Redd Survey, November 12, 2006\]](#) 
 - [\[Vernita Bar Redd Survey, November 19, 2006\]](#) 
4. Chum Salmon Operation
5. Lake Pend Oreille lake trout research wrap up
6. Snake River Zero Nighttime Flow
 - [\[Ice Harbor - Lower Monumental - Little Goose - Lower Granite Spreadsheet\]](#)
7. Water Management Plan
8. [\[Year End Review agenda\]](#)
9. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
 - [\[Spill Information 2006\]](#)
 - [\[Daily Water Temperature and Water Temperature Strings\]](#)
10. Other
 - Set agenda for next meeting - [\[Calendar 2006\]](#) 

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

MEMORANDUM

November 12, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 12, 2006

Discussion: On Sunday, November 12, 2006 the fifth Vernita Bar ground redd count was conducted to assist in the evaluation of special Hanford Reach fish spawning flows. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 48 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	<u>Number Of Redds</u>
Above A	--	12	5	1	0	0	18
A – AB	--	11	4	0	0	0	15
AB – B	--	14	6	3	3	1	27
Below B	--	17	12	4	1	2	36
C	--	7	1	0	0	0	8
Totals	--	61	28	8	4	3	104

No redd counts were taken within the 36-50 kcfs elevations.

Initiation of spawning for the zone below 36 kcfs is October 25, for the zones between 36 – 50 kcfs and above 50 kcfs is November 1, 2006.

During last year's November 13 redd count; no redd count occurred between the 36–50 kcfs flow elevations, 145 redds were counted between 50-55 kcfs, 97 between 55-60 kcfs, 80 between 60-65 kcfs, 39 between 65-70 and 50 redd above the 70 kcfs elevation.

The next redd count will occur on November 19, 2006 at which time the 2006-2007 Critical Flow Elevation will be determined. This determination may be postponed to November 26 if the Monitoring Team concludes that significant spawning is still occurring. Required USGS gauging station flow will be 50 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Scott Bettin
Bob Clubb
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton
Bill Tweit
Power Dispatch
WAN Operators

Jeff Atkinson
Shane Bickford
Dennis Dauble
Russ George
Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott
Paul Wagner
FWWQ Team
NR Records

Bill Berry
Steve Brown
Gary Donabauer
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller
Rudd Turner
Dawn Woodward
PRD Operators

MEMORANDUM

November 19, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 19, 2006

Discussion: On Sunday, November 19, 2006 the sixth Vernita Bar ground redd count was conducted to determine the 2006-2007 Critical Flow Elevation for the Hanford Reach. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 50 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	<u>----- Redd Count by Flow Level (kcfs) -----</u>						<u>Total</u>
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	<u>Number</u>
Above A	--	19	19	10	0	0	48
A – AB	--	15	12	6	6	4	43
AB – B	--	21	15	5	8	6	55
Below B	--	19	17	9	8	9	62
C	--	5	3	5	2	0	15
Totals	--	79	66	35	24	19	223

No redd counts were taken within the 36-50 kcfs elevations.

Based on the survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the 2006–2007 Critical Flow Elevation is set at the 70 kcfs flow elevation (the agreement states in C6b, “If 31 or more redds are located above the 65 kcfs elevation, the Critical Flow Elevation will be the 70 kcfs elevation”). There were 43 redds identified above the 65 kcfs elevation.

During last year’s November 20 redd count; no redd count occurred between the 36–60 kcfs flow elevations, 74 between 60-65 kcfs, 38 between 65-70 and 60 redd above the 70 kcfs elevation.

During this year’s survey the monitoring team observed that fish spawning had not concluded and agreed that a supplemental redd survey was in order for the following Sunday (November 26 starting at 10 a.m.) to identify the end of spawning. Requested USGS gauging station flow will be 50 kcfs. Grant County PUD will continue pulsed flows until November 27.

The Initiation of spawning date for the zone below 36 kcfs is October 25, for the zones between 36 – 50 kcfs and above 50 kcfs that date was previously set as November 1, 2006.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Scott Bettin
Bob Clubb
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton

Jeff Atkinson
Shane Bickford
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Bill Tweit
Power Dispatch
WAN Operators

Paul Wagner
FWWQ Team
NR Records

Dawn Woodward
PRD Operators

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

November 22, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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.

Snake River Outages

Don Faulkner, COE, discussed some outages at Lower Monumental, Lower Granite, and Little Goose. Faulkner also reported that a ground fault in Unit 3 at Dworshak needs to be disassembled, which will likely take months to fix and could cause loss of turbine capacity; Cathy Hlebechuk, COE, noted that the capacity of the two small units is 4400 cfs. Faulkner added that the COE will have a better sense of how long the repair will take by mid-December.

Action: Unit 3 status will be on the agenda for an upcoming TMT meeting: either on 12/6 or 12/22.

2006 Fall/Winter Operations at Vernita Bar

A survey conducted on 11/12 counted 0 redds in the 36-50 kcfs flow band range, 61 redds in the 50-55 kcfs range, 28 redds in the 55-60 kcfs range, 8 redds in the 60-65 kcfs range, 4 redds in the 65-70 kcfs range, and 3 redds above 70 kcfs. A survey on 11/19 counted 0 redds in the 36-50 kcfs flow band range, 79 redds in the 50-55 kcfs range, 66 redds in the 55-60 kcfs range, 35 redds in the 60-65 kcfs range, 24 redds in the 65-70 kcfs range, and 19 redds counted above 70 kcfs. Paul Wagner, NOAA, noted 70 kcfs is the protection level this year, as per the flow protection agreement (posted on the Vernita Bar website).

Action/Next Steps: Scott Bettin, BPA, will send the Grant County PUD Vernita Bar Study Plan to the COE for posting on the TMT website. The next survey count is scheduled for 11/26, and a final count / update will be on the 12/6 TMT agenda.

Chum Salmon Operations

Cathy Hlebechuk, COE, recapped operations discussed during the 11/17 TMT conference call and said that an 11/20 call from Russ Kiefer requested two pulses due to the high flows: at 1830 on 11/20 and 0630 on 11/21. Ron Boyce, OR, reported on the most recent counts: 85 new redds were counted on 11/17, and 78 new redds were counted on 11/21, with 60 of the 78 in section 3, near the Ives Island cross. Boyce said that FPAC will identify redd locations at Ives Island, making special note of the viability of those redds above an 11.5' elevation. Paul Wagner, NOAA, observed that the attempts to limit chum spawning to particular elevations/locations has

been a challenge because of the higher flow levels this year, and that, from his perspective, maintaining steady operations was best for supporting viability and numbers of redds during this peak spawning period. Hlebechuk acknowledged the Bonneville operators' and BPA schedulers success in holding close to the requested 12' elevation, and Robyn MacKay, BPA, added that giving operators as much notice as possible of any change in operations would help them continue to be successful in holding to desired elevation ranges. Boyce noted that the next survey would be on either 11/28 or 11/29, and suggested that he could make a call directly to Hlebechuk the afternoon of 11/29 to schedule a 11/30 conference call if it looked like an operational would be recommended. Until then the operation stands: tail waters holding between 11.8'-12.3', with two night pulses around 1800 and 0600 hours. If only one pulse is needed, it will be centered around midnight.

Action/Next Steps: If survey results prompt a change in recommended operations, Ron Boyce will call Cathy Hlebechuk the afternoon of 11/29 and request a TMT conference call the morning of 11/30. TMT members agreed to this. Otherwise, chum operations will remain the same and will be discussed at the 12/6 TMT meeting.

Lake Pend Oreille Research

Russ Kiefer, ID, commended the COE on remaining in the requested 2052.3' – 2052.8' range while transitioning from free flow to generation only. He recapped his update on the 11/15 conference call: on 11/14, the lake's elevation hit 2052.3', with many Kokane spawning in shallow areas. ID requested that the COE continue to hold the lake 2052.3' – 2052.8' through December 31 to protect the eggs.

Snake River Zero Night Flow

Paul Wagner, NOAA, reported that there were 586-593 fish per day passing Lower Granite Dam and close to 1,000 passing each day at The Dalles. Wagner referred to the spreadsheet linked to the TMT agenda for 2005 vs. 2006 numbers comparisons and suggested checking status again at the next TMT meeting before making any official recommendations, because of the high numbers of fish still passing.

Action/Next Steps: Snake River zero nighttime flows will be on the agenda for the 12/6 meeting.

2007 Water Management Plan

Russ Kiefer, ID, said that ID had one change to review and would then send comments on the WMP to Bernard Klatte, COE.

Action: TMT members are reminded to review the draft WMP and submit edits, comments, etc. based on 2007 expectations to Bernard Klatte, COE, by no later than 12/15.

Operations Review

Reservoirs: Grand Coulee was at 1286.8'; Hungry Horse filled a bit and was at 3539.7'; and Libby was filling and was at 2435.25', with outflows at 13kcfs (and an end of December target elevation of 2411'.) Albeni Falls was at 2052.67', and Dworshak was at 1533.4' and had filled 16'

in the previous 10 days. Columbia Falls was at 65kcfs, and Bonneville inflows were at 135kcfs on 11/21 and had been between 115-208kcfs over the previous two weeks.

Fish: (See chum status) Pictures of Hamilton Springs / Hardy Creek were posted on the FPC website under spawning data.

Power: Nothing to report at this time.

Water quality: Dworshak was currently operating in overshot mode, with temperatures at approximately 50.5° and dropping slowly.

Special Announcements

- Tony Norris has accepted a position at BPA and will be replaced as BOR TMT representative by John Roache. Good luck, Tony!
- Paul Wagner has been named the new chair of FPAC – Congratulations, Paul!

Placeholder for possible TMT Conference Call: 9 a.m. on 11/30. Check the TMT website for the latest updates.

Next TMT Face-to-Face Meeting, December 6th, 9:00-noon

Agenda Items include:

- Dworshak Outages Update
- Fall/Winter Operations at Vernita Bar
- Chum Operations Update
- Snake River Zero Night Flow
- 2007 WMP – reminder to submit comments by 12/15
- Operations Review

Technical Management Team Meeting Notes

November 22, 2006

1. Greetings and Introductions.

The November 22 meeting of the Technical Management Team was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. Unit Outages.

Don Faulkner reported that Dworshak's big unit – unit 3 – is still out of service. Two small units are still available. That is not an issue now, but it will be an issue next year. We're not sure what's wrong. The unit will need to be disassembled before an accurate diagnosis can be made, Faulkner said. Project personnel have found a serious ground fault, and the prognosis is unknown, he said.

Lower Monumental is working on its breakers, currently; Lower Granite is scheduled to begin breaker work in early December. Project personnel have developed a plan that allows them to do two units at a time, so all four units will not have to be taken out of service at once.

In response to a question from Ron Boyce, Faulkner reiterated that the Corps does not know what is wrong with the big unit at Dworshak. They think the problem is serious, but they won't know for sure until they pull the rotor. It appears that something has been rubbing for some time – there is metal dust and small chunks of metal everywhere inside the unit. All indications are that it is a major fault and will be down for several months, Faulkner said.

They will have this repaired by spring, won't they? Tony Norris asked. There's a good chance it will be repaired by next April, Faulkner said. As long as it's back on line by the time flows come up again in the spring, there should be no impact, Boyce said. One problem is that they haven't been able to do any major maintenance on those units for several years because we're told we can't take them out of service, Faulkner said – either we can do the scheduled maintenance, or we have lengthy outages like this one. In response to another question, Faulkner said he will provide a further update as soon as he knows more. In response to another question, Hlebechuk said the capacity of the two smaller units at Dworshak is 4.4 Kcfs; a further 2 Kcfs of spill will bring the project up to the 110% TDG standard.

3. Fall/Winter Vernita Bar Update.

The group reviewed the most recent survey results from Vernita Bar. The first survey, conducted on November 12, found a total of 104 fall chinook redds in the 50- to above-70 flow range. The November 19 survey found a total of 223 redds within the 50- above 70 Kcfs flow range. This calls for a flow protection range of 70 Kcfs for the season, said Wagner; that flow will have to be maintained until emergence occurs, the highest protection range called for under the agreement. Fish were still actively spawning when they did this count, prompting the biologists to order one final survey for this Sunday, November 26.

How long will the 70 Kcfs be required? Hlebechuk asked. Through the end of emergence in May or early June, Wagner replied. The next protection period will be determined by the number of temperature units accrued from when spawning was first documented, Wagner explained – that's when the flow bands become effective.

Harkless said she is still trying to get the 2006-07 study plan from Grant County PUD; it will be posted to the TMT website as soon as possible.

4. Chum Salmon Operation.

Hlebechuk reported until Monday November 20, the Bonneville tailwater operation had followed the plan agreed to on the November 17 conference call. The operation agreed to was to operate between 11.8 and 12.3 feet for as many hours as possible, beginning at 7 am and provide a minimum 13.5 foot pulse daily around midnight. On Monday, Russ Kiefer called and requested a second pulse starting Monday night. The second pulse was implemented starting Monday night, Hlebechuk said.

Boyce said the most recent chum survey was conducted yesterday; field personnel observed 78 new chum redds, down from the 85 observed on Friday. 60 of the 78 redds were located in Section 3, off Ives Island. A total of 314 new chinook redds were observed, down from 340 on Friday. I requested that, during today's survey, field personnel map all of the redds with GPS, with particular attention to the redds located above the 11.5-foot elevation, Boyce said. We'll have those results early next week, he said – we'll keep people posted. We will also be looking at egg viability in the higher-elevation redds, said Boyce. With this information, we should be able to determine if high tailwater elevations are needed for the higher elevation redds.

It appears that our attempts to limit spawning to the area watered up by an 11.5-foot tailwater elevation have failed, said Paul Wagner; the question is, how many redds will we wind up with this year, particularly at the higher elevations? In the interim, we would like to continue to rewater the redds at night to keep them viable. It appears that the chum took advantage of the higher nighttime tailwater elevations during the period when we had high flows due to the precipitation events in the basin, he said.

A word of caution, said Boyce – the pulsing operation may or may not be successful. It's something we'll need to monitor, because there is some uncertainty. Flat flows are the best for chum spawning, when you can do them; the quicker we can get down to a flat flow that can be maintained through incubation, the better for the chum. However, you're not suggesting that we do that now, Cindy LeFleur observed. That's correct, said Boyce. We're probably getting pretty close to the point where we can maintain a flat flow, said Robin MacKay. We'll get better information on the elevation of and viability of the higher-elevation chum redds by next week, and go from there, Boyce said.

We can probably go back to targeting between 11.5 and 12 feet, with an 11.5-foot minimum, by this weekend, MacKay said. I wouldn't do that until we have more information on the higher-elevation redds, Boyce replied. In other words, no change to the current operation until we can meet again and talk about the operation, said LeFleur – two pulses at night if possible. In response to a question from Hlebechuk, Wagner

said that, if only one pulse is possible, he would prefer to see it occur around midnight, to discourage more higher-elevation spawning. If we have enough water to do two pulses to a minimum of 13.5 feet , we'll do two, said MacKay. If we can only do one, we'll do it around midnight. Boyce suggested that it would be beneficial to convene a TMT conference call next Thursday or Friday, once the more detailed survey results from next Tuesday or Wednesday are available. After a few minutes of discussion, Boyce said that, if the information warrants a TMT call, he will so inform Hlebechuk. No TMT objections were raised to the current Bonneville operation until survey/viability information is available.

To recap, the current operation is to operate the Bonneville tailwater between 11.8 and 12.3 feet for as many hours as possible, beginning at 7 a.m. and provide 2 pulses, one several hours before dawn and one several hours after dusk, Hlebechuk stated. If two pulses are not possible, she said, we will strive to center the pulse around midnight. She further clarified the requested minimum elevation for a pulse of 13.5' with a minimum duration of 20 minutes. Chum research will cause a deviation to the current operation.

5. Lake Pend Oreille Lake Trout Research Wrap-Up.

Kiefer said the only new information is that IDFG would like a smooth transition from free flow to full generation at Albeni Falls. The kokanee that have been observed are large and are putting a large number of eggs in the gravel, he said. Kiefer reiterated that IDFG has requested that the Corps maintain a winter elevation of about 2052.3, rather than 2051, as was originally requested, to protect the kokanee redds that have already been deposited at a shallow depth. The requested range was 2052.3 to 2052.8 feet, Hlebechuk said; we were unsure that we would be able to maintain that range because Albeni Falls was on free-flow, but as it turns out, we were able to maintain it.

6. Snake River Zero Nighttime Flow.

Wagner said that, typically, at this time of year, the movement of adults slows to a low level. This year, however, the migration is continuing longer than normal; we're still seeing 500 to 600 adults per day passing Lower Granite. The salmon managers would prefer to wait to go to zero nighttime flow for now, and to revisit the operation at the December 6 TMT meeting. The action agencies have no problem with that, said MacKay.

7. 2007 Water Management Plan.

This is just a reminder that anyone who wishes to submit comments on the 2007 Water Management Plan to Bern Klatter must do so by December 15, Harkless said. Kiefer said IDFG's comments will be submitted very soon. One announcement from FPAC, said Kiefer: we have selected a new chairperson, Paul Wagner. Norris announced that this will be his last TMT meeting as a Reclamation representative; he has taken a job with BPA. John Roche is the new TMT representative for Reclamation, with Mary Mellima as alternate.

8. Operations Review.

Reclamation reported that Grand Coulee is at 1286.8 feet and operating to meet the requirements of the river. Hungry Horse is at 3539.7 feet; natural flows are keeping Columbia Falls high. The Corps reported for planning purposes, Libby is targeting elevation 2411 on December 31, releasing 13 Kcfs. The current Albeni Falls outflow is 24 Kcfs, the current elevation is 2052.7 feet. Dworshak has filled 16 feet in the last 19 days, to elevation 1533.4 feet as of midnight last night. Bonneville inflow has ranged from 115 to 208 Kcfs in the past 7 days. Wagner reported that the main fish action continues to be in chum. The Hamilton and Hardy Creek surveys are being posted on the Fish Passage Center website, said Wills; we're seeing good numbers of chum as well as coho.

There are no power system problems to report, said MacKay. On the water quality front, Adams said the only thing to report is the Dworshak operation; overshot mode is producing a release temperature of 50.5 degrees F and falling. We picked a good time to make the transition, Adams said.

9. Next TMT Meeting Date.

The next face-to-face meeting of the Technical Management Team was set for Wednesday, December 6. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
November 22, 2006

Name	Affiliation

Cathy Hlebechuk	COE
Robin Harkless	Facilitation Team
Tony Norris	USBR
Jim Adams	COE
Russ George	WMCI
Paul Wagner	NOAAF
Kyle Dittmer	CRITFC
Erin Halton	Facilitation Team
Ron Boyce	ODFW
David Wills	USFWS
Shane Scott	Contractor
Cindy LeFleur	WDFW
Scott Bettin	BPA
Robin MacKay	BPA
Don Faulkner	COE
Bern Klatte	CE
Russ Kiefer	IDFG
John Roche	USBR
Rudd Turner	COE
Dan Bedbury	EWEB
Margaret Filardo	FPC
Mike Buchko	Powerex
Richelle Beck	D. Rohr & Associate
Tom Le	PSE

TECHNICAL MANAGEMENT TEAM

BOR : John Roache / Mary Mellema

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

TMT MEETING

Wednesday December 06, 2006 09:00 - 12:00

**1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208**

Conference call line: 503-808-5190

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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. [\[Review Minutes\]](#)
3. Fall/Winter 2006 Vernita Bar operations - Russell Langshaw, Grant Co -
Russell will present the latest redd count information and the study plan for the 2006 Vernita Bar operation
 - [\[Vernita Bar Redd Survey, November 26, 2006\]](#) 
 - [\[2006 Hanford Reach Agreement Spawning Experiment Final Study Plan\]](#) 
4. Chum Salmon Operation
 - [\[2006 Chum Redd Calculations\]](#) 
 - [\[Chum redd elevations based on survey conducted 12-1-06, NMFS, ODFW, BPA, Corps\]](#) 
 - [\[Ives Island Chum Spawning - Redd Surveys and Dewatered Redds - Power Point Slide\]](#)
 - [\[Ives Island Spawning Ground Survey Results, 2006 - 12/1/2006 ODFW/WDFW Update\]](#)
5. Snake River Zero Nighttime Flow
6. Dworshak Unit 3 update
7. Libby forecast
 - [\[Columbia Basin - Libby Volume Inflow Forecast\]](#) 
8. Water Management Plan
9. Year End Review agenda
 - [\[Annual Review of Lessons Learned: 2006 - Wednesday December 13, 2006\]](#) 
 - [\[Directions To TMT Year End Review Location\]](#) 
10. Operations Review
 - Reservoirs
 - Fish
 - Power System

- Water Quality
 - [\[Spill Information 2006\]](#)
 - [\[Daily Water Temperature and Water Temperature Strings\]](#)
- 11. Other
 - Set agenda for next meeting - [\[Calendar 2006\]](#) 

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

Distribution and Elevation calculations for 177 Chum redds mapped during the 2006 Spawning Season through November 22, 2006.

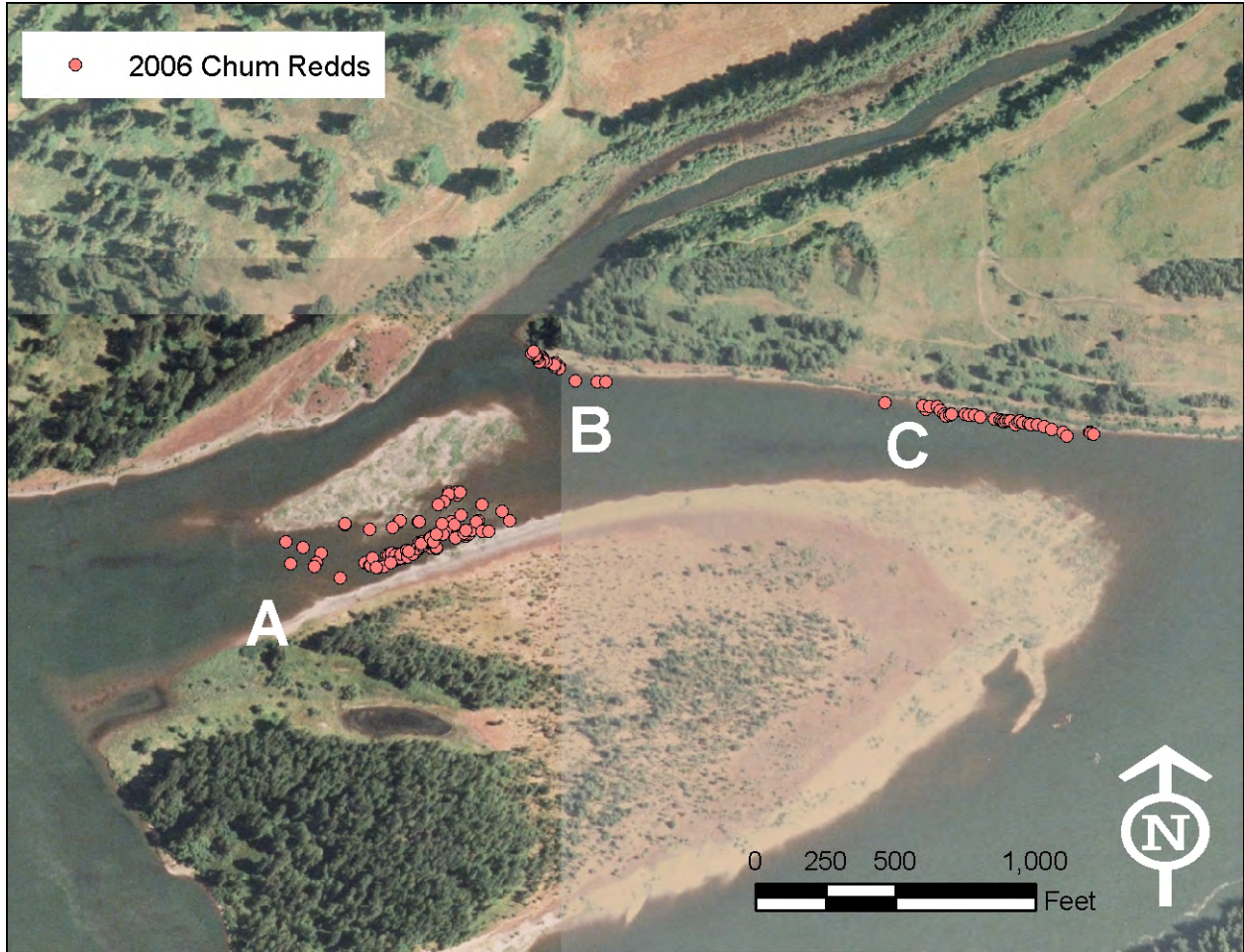


Figure 1. General distribution of 177 chum redds excavated in the Ives Island complex below Bonneville Dam and mapped with GPS by ODFW/WDFW survey crews.

Table 1. Computed redd elevations for all 177 Redds by the area indicated in Figure 1

Redd Elevations							
Area A					B	Area C	
8.33	9.63	9.90	10.33	11.20	8.20	8.33	9.56
8.68	9.64	9.91	10.37	11.22	8.59	8.86	9.57
8.84	9.65	9.94	10.41	11.29	8.62	8.87	9.88
8.88	9.67	9.94	10.44	11.32	8.75	8.95	9.88
9.32	9.68	9.97	10.50	11.32	8.92	9.01	9.92
9.33	9.68	9.99	10.51	11.35	8.97	9.04	9.93
9.36	9.69	10.00	10.51	11.37	9.09	9.08	10.05
9.44	9.69	10.04	10.54	11.39	9.12	9.09	10.17
9.45	9.69	10.05	10.56	11.42	9.13	9.13	10.27
9.45	9.69	10.08	10.58	11.43	9.55	9.15	10.41
9.46	9.69	10.08	10.63	11.47	9.55	9.17	10.44
9.47	9.70	10.09	10.68	11.71	9.58	9.18	10.45
9.47	9.71	10.10	10.69	11.72	9.64	9.27	10.51
9.48	9.71	10.17	10.71	11.75	9.82	9.28	11.05
9.49	9.74	10.17	10.74	11.78	9.85	9.37	11.41
9.50	9.74	10.19	10.75	11.80	9.86	9.42	11.63
9.55	9.76	10.19	10.76	11.87	9.88	9.43	
9.56	9.77	10.20	10.76	11.93	10.31	9.44	
9.56	9.78	10.20	10.84	11.96	10.69	9.52	
9.58	9.78	10.21	10.96	11.99			
9.58	9.80	10.21	10.96	12.19			
9.60	9.84	10.24	10.99	12.23			
9.63	9.85	10.27	11.06	12.43			
9.63	9.86	10.30	11.08				
9.63	9.87	10.30	11.18				

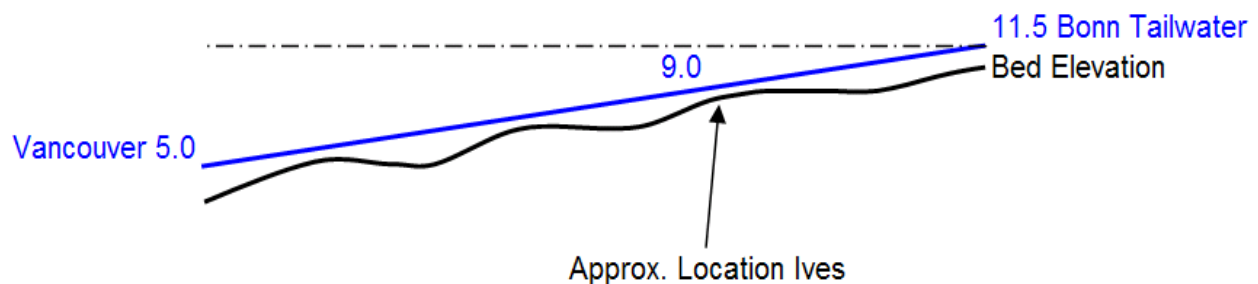


Figure 2. Graphic describing the relationship between the Bonneville tailwater and the chum spawning locations. Water flows downhill, it does not follow the dashed line in the figure above, which if it did would make managing by just redd bed elevations a snap! What we require is the relationship between the Bonneville tailwater and the water surface elevations over the redd spawning areas. Note that the redd elevations computed in Table 1 cannot be used solely as a bases for management.

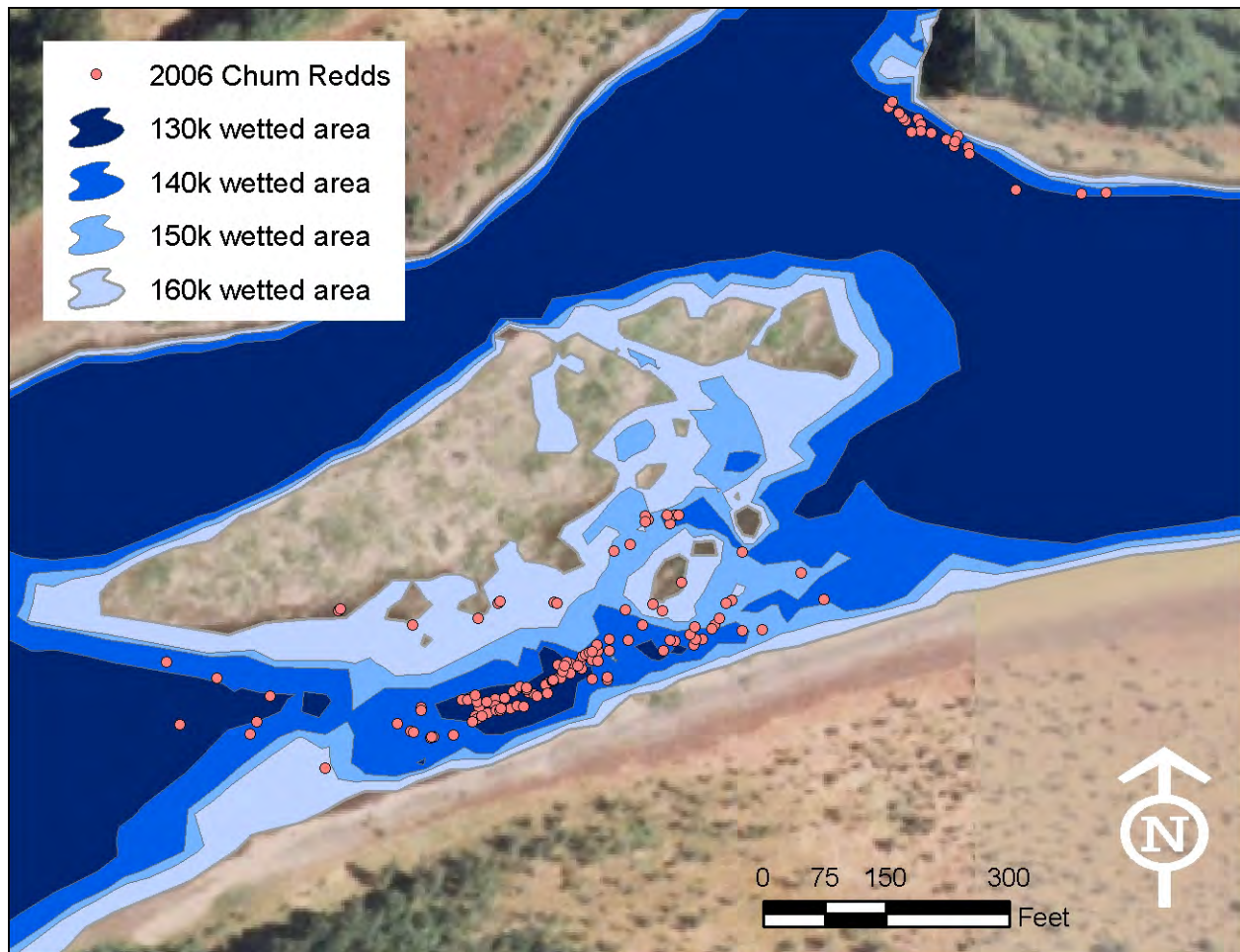


Figure 3. Distribution of chum redds superimposed on wetted are plots of steady state discharge simulations (flow bands) ranging from 130 to 160 kcfs at 10 kcfs intervals.

Table 2. Distribution of 177 chum redds vs. flow band.

<i>Flow Band</i>	<i>Redds</i>
130	85
140	62
150	15
160	12
170	3

177

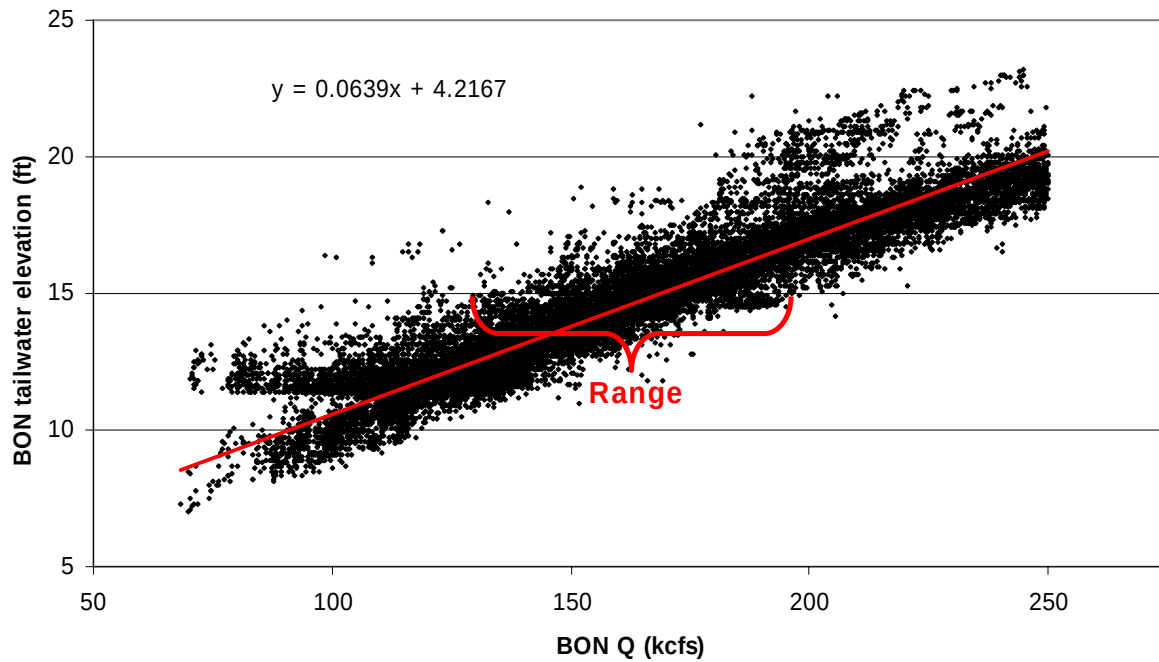


Figure 4. Stage discharge relationship between the USGS Bonneville tailwater gage and Bonneville Discharge using data from 2000 – 2006.

Table 3. This table is based on the relationship of the data in Figure 4 and describes the range of scenarios and problematic nature of managing flows/tailwaters for the Ives Island chum.

elevation	Avg Q (kcfs) necessary	Range	
		min Q	max Q
11.5	114	71	151
12.0	122	71	165
12.5	130	71	160
13.0	137	89	162
13.5	145	103	172
14.0	153	90	173
14.5	161	98	195
15.0	169	119	207
15.5	177	145	211
16.0	184	148	214

Chum redd elevations based on survey conducted 12-1-06, NMFS, ODFW, BPA, Corps
 NMFS - Wagner
 ODFW - Kruger
 BPA - Clements, Bettin
 Corps - Klatte, Bowers

89.012 =elev. Corr. True datum

Redd	Elevation, Arb. Datum	Elevation MSL	WSL, Arb. Datum	WSL, Corrected	Perched above water	MSL corrected to Tanner Creek gage
1	98.52	9.508	98.37	9.358	0.15	12.0
2	98.37	9.358		9.358	0	11.9
3	98.34	9.328		9.358	-0.03	11.8
4	98.5	9.488		9.358	0.13	12.0
5	98.59	9.578		9.358	0.22	12.1
6	98.65	9.638		9.358	0.28	12.1
7	98.64	9.628		9.358	0.27	12.1
8	98.9	9.888		9.358	0.53	12.4
9	98.81	9.798		9.358	0.44	12.3
10	98.98	9.968		9.358	0.61	12.5
11	99.28	10.268		9.358	0.91	12.8
12	99.09	10.078		9.358	0.72	12.6
13	99.37	10.358		9.358	1	12.9
14	98.69	9.678		9.358	0.32	12.2
15	100.18	11.168		9.358	1.81	13.7
16	100.06	11.048		9.358	1.69	13.5
17	100.24	11.228		9.358	1.87	13.7
18	99.49	10.478		9.358	1.12	13.0
19	99.35	10.338		9.358	0.98	12.8
20	99.33	10.318		9.358	0.96	12.8
21	99.46	10.448		9.358	1.09	12.9
22	99.25	10.238		9.358	0.88	12.7
23	99.38	10.368		9.358	1.01	12.9
24	99.8	10.788		9.358	1.43	13.3
25	99.26	10.248		9.358	0.89	12.7
26	98.65	9.638		9.358	0.28	12.1
27	98.63	9.618		9.358	0.26	12.1
28	99.17	10.158		9.358	0.8	12.7
29	98.83	9.818		9.358	0.46	12.3
30	99.04	10.028		9.358	0.67	12.5
31	98.94	9.928		9.358	0.57	12.4
32	99.01	9.998		9.358	0.64	12.5
33			97.915			
34				Average perch height	0.7175	
35						
36						
37						
38						
39						

INTERSTATE 205 NORTHBOUND
FROM PORTLAND INTERNATIONAL AIRPORT

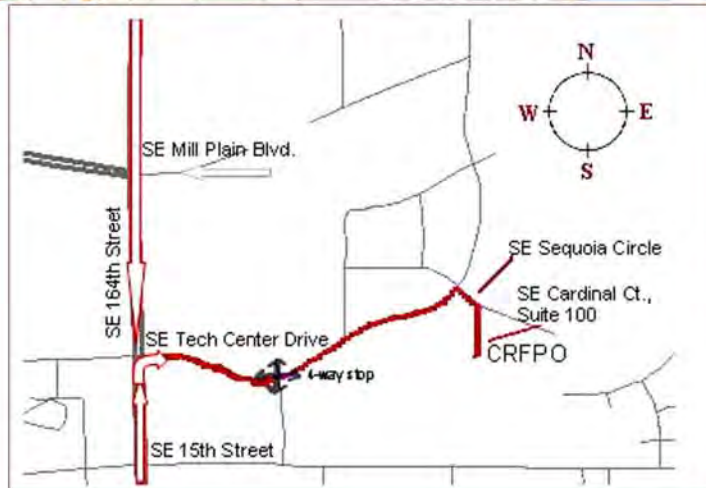
- Depart Portland International Airport (PDX) via Airport Way
- Turn left onto I-205 - towards Seattle
- Travel NORTH on I-205, crossing the Columbia River – Welcome to Washington!
- Maneuver into right lane for IMMEDIATE exit after crossing river at EXIT 27- HWY 14
- Travel approx. 2 miles EAST on HWY 14 towards Camas
- Exit HWY 14 at SE 164th - EXIT 8, use either exit lane - both will allow you to turn left at light and travel uphill. Continue approximately 1½ miles and turn right at stop light at SE Tech Center Drive.
- Proceed for approximately ¼ mile to 4-way stop...continue forward after stop ●.
- Turn right onto SE Sequoia Circle and right again onto SE Cardinal Court, CRFPO is on the left at the end of the cul-de-sac, the entrance and parking is directly ahead (west side of bldg.).

INTERSTATE 5 / INTERSTATE 205 SOUTHBOUND
FROM SEATTLE / TACOMA

- Depart Seattle / Tacoma and travel SOUTH on INTERSTATE 5 (I-5) - approx. 160 miles
- From I-5 take I-205 Exit (EXIT 7) and travel SOUTH towards Portland/Salem
- Exit onto Highway 14 (EXIT 27) and head EAST towards Camas
- Exit HWY 14 at SE 164th - EXIT 8, use either exit lane - both will allow you to turn left at light and travel uphill. Continue approximately 1½ miles and turn right at stop light at SE Tech Center Drive.
- Proceed for approximately ¼ mile to 4-way stop...continue forward after stop ●.
- Turn right onto SE Sequoia Circle and right again onto SE Cardinal Court, CRFPO is on the left at the end of the cul-de-sac, the entrance and parking is directly ahead (west side of bldg.).

INTERSTATE 5 NORTHBOUND
FROM DOWNTOWN PORTLAND, OREGON

- Travel I-5 NORTH across the Columbia River bridge and take EXIT 1A at right north end of bridge to Hwy 14 East, travel approximately 8.3 miles.
- Exit HWY 14 at SE 164th - EXIT 8, use either exit lane - both will allow you to turn left at light and travel uphill. Continue approximately 1½ miles and turn right at stop light at SE Tech Center Drive.
- Proceed for approximately ¼ mile to 4-way stop...continue forward after stop ●.
- Turn right onto SE Sequoia Circle and right again onto SE Cardinal Court, CRFPO is on the left at the end of the cul-de-sac, the entrance and parking is directly ahead (west side of bldg.).



Columbia River Fisheries Program Office
1211 SE Cardinal Court, Suite 100
Vancouver, WA 98683
360-604-2500

PRELIMINARY DATA

Date	Fall Chinook					Chum					Coho				
	Lives	Redds	Observe	GPS'd	Redds	Lives	Redds	Observe	GPS'd	Redds	Lives	Redds	Observe	GPS'd	Redds
10/3/2006	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
10/6/2006	1	0	0	1	0	0	0	0	0	0	6	0	0	1	1
10/10/2006	5	0	0	0	0	0	0	0	0	0	4	0	0	0	0
10/12/2006	2	0	0	0	0	0	0	0	0	0	10	0	0	0	0
10/17/2006	1	1	0	2	0	0	0	0	0	0	2	0	0	0	0
10/20/2006	2	2	0	1	0	0	0	0	0	0	5	0	0	2	2
10/24/2006	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0
10/27/2006	2	2	0	3	0	0	0	0	0	0	1	0	0	2	2
10/31/2006	33	0	0	0	0	0	0	0	0	0	2	0	0	1	1
11/3/2006	71	36	0	3	0	0	0	0	0	0	40	5	0	3	3
11/6/2006	2	0	0	3	0	0	0	0	1	1	0	0	0	4	4
11/09/2006*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
11/14/2006	213	5	17	6	10	22	60	0	1	0	0	0	0	0	0
11/17/2006	506	340	113	46	49	85	7	2	0	0	0	0	1	1	1
11/21/2006	847	314	146	165	59	78	110	16	0	0	0	1	1	1	1
11/28/2006	229	66	0	357	40	7	0	16	0	0	0	2	2	2	2
12/1/2006	37	75	18	74	77	112	6	13	0	0	0	0	0	0	0

*Very muddy, secci disk reading 2"

Details: Locations of fish & redds on latest survey*:

		Lives	RO	GPS'd	Deads
Section 1:	CHF	11	33	0	12
	Chum	53	28	0	3
	Coho	0	0	0	0
Section 2:	CHF	14	23	0	30
	Chum	11	17	0	4
	Coho	0	0	0	0
Section 3 :	CHF	0	0	0	16
	Chum	0	61	0	3
	Coho	0	0	0	0
Section 4 :	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0
Section 5 :	CHF	11	19	0	0
	Chum	13	6	0	0
	Coho	0	0	0	0
Section 6 :	CHF	0	0	0	16
	Chum	0	0	0	3
	Coho	0	0	0	0
Section 7 :	CHF	0	0	0	0
	Chum	0	0	0	0
	Coho	0	0	0	0

	Lives	RO	GPS'd	Deads
Section CHF	1	0	0	0
Section Chum	0	0	0	0
Section Coho	0	0	0	0
Section CHF	0	0	0	0
Section Chum	0	0	0	0
Section Coho	0	0	0	0
Section CHF	0	0	0	0
Section Chum	0	0	0	0
Section Coho	0	0	0	0
Section CHF	0	0	0	0
Section Chum	0	0	0	0
Section Coho	0	0	0	0
Section CHF	0	0	0	0
Section Chum	0	0	0	0
Section Coho	0	0	0	0

* no entries in rows means no survey completed in section.



2006 Hanford Reach Agreement Spawning Experiment

Final Study Plan

Prepared by

David Duvall

and

Russell Langshaw

With statistical analysis by
Columbia Basin Research

Public Utility District No. 2 of Grant County
P.O. Box 878
Ephrata, WA 98823

November 2006

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1.0 Introduction

The following is the final study plan by the Public Utility District of Grant County (Grant PUD) for the 2006 Hanford Reach Agreement Spawning Experiment. As per the Hanford Reach Fall Chinook Protection Program (HRFCPP), an evaluation of discharge alternatives was conducted in 2005. Normal load following was evaluated, which was a reversal of traditional Reverse Load Factor operations (RLF) under the Vernita Bar Agreement. RLF is defined as higher flows at night with lower flows during the day (Lukas 2003). Using hydroacoustic telemetry, fall Chinook salmon (*Oncorhynchus tshawytscha*) were captured, tagged, and released to examine spawning behavior and changing flow conditions. Underwater video and DIDSON technology were also used to measure redd digging rates which was used to compare daytime and nighttime spawning activity. As per the HRFCPP, Grant PUD will continue experimental testing during the 2006 fall Chinook spawning period. This study plan was developed after reviewing the 2005 results, and discussions with mid-Columbia operators, agencies, and tribes. The objective of this project is to better balance resources by increasing river operation flexibility while reducing fall Chinook spawning at higher elevations on Vernita Bar. One method for testing the successfulness of this experiment is to determine the number of redds constructed above the 65 kcfs elevation throughout the spawning period. As during previous years, Vernita Bar redd surveys will be conducted by the Monitoring Team (Lukas 2003).

There will be four hypotheses tested during this project and specific statistical analyses for testing these hypotheses will be presented in different sections throughout the study plan. The hypotheses are: 1. Adult fish activity (movement of fish positions determined by hydroacoustic tracking) during peak discharge is greater than fish activity during non-peak discharge. 2. Fish position on Vernita Bar is higher during peak flow than during non-peak flow. 3. There is an inverse relationship between increasing water velocity and redd production. 4. The number of redds constructed above 65 kcfs elevation in 2006 will be less than or equal to the mean number of redds constructed above 65kcfs elevation under RLF operation (calculated from annual Vernita Bar redd surveys).

2.0 2005 Results

One objective of the study during 2005 was to determine if any nighttime spawning activity occurred, and compare nighttime spawning frequencies with daytime spawning frequencies (expressed in digs per minute). Fall Chinook dug redds both day and night (Figure 1.) but overall, there was a higher rate during the day (0.314) than at night (0.172). The mean spawning rate was greater during daylight hours but the difference between daytime and nighttime hours was not statistically significant ($P=0.1498$) (Duvall 2006).

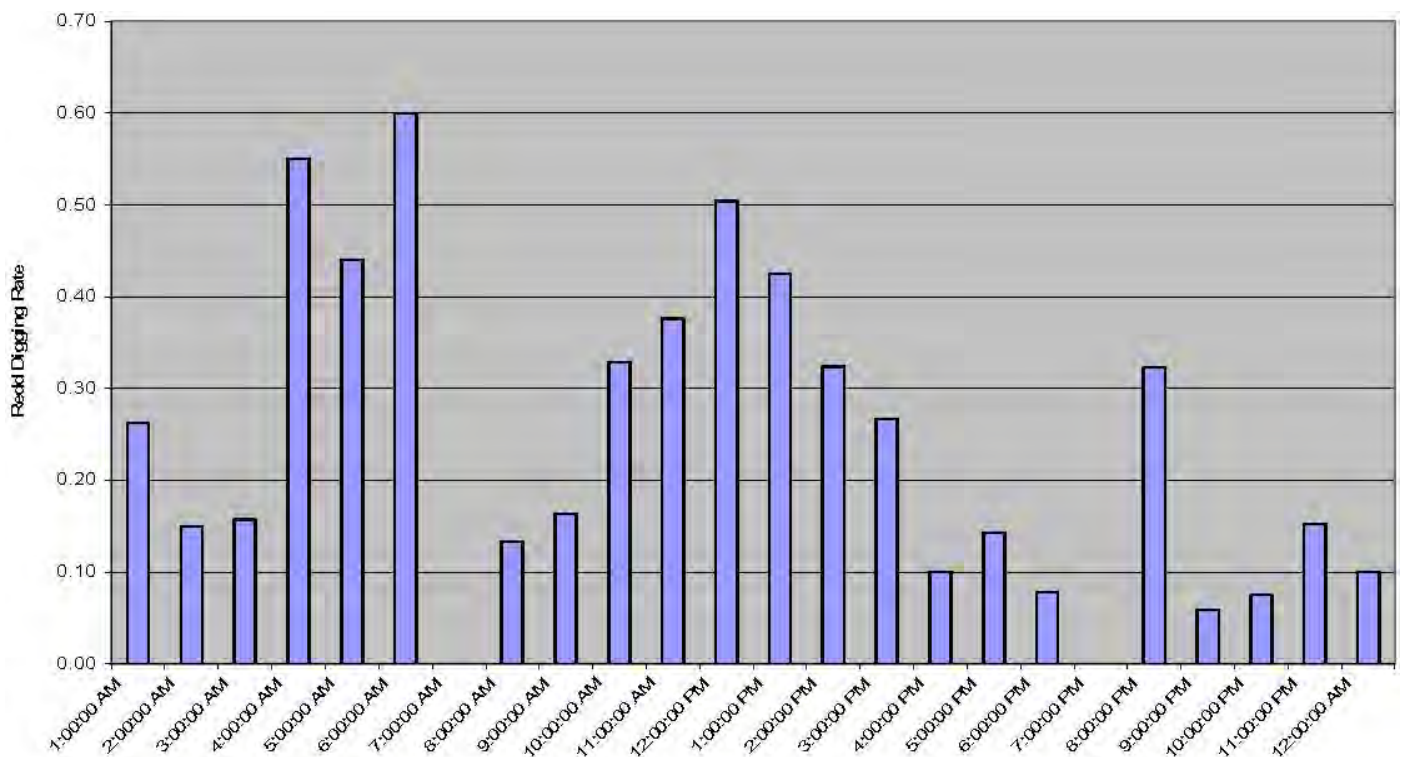


Figure 1. Mean number of redd digs per minute reported by hour. Data were compiled from 15 minute samples systematically selected from all recorded DIDSON files. Technical difficulties resulted in no data collection during 0700 hours.

Redd counts were conducted on Vernita Bar by the Monitoring Team in 2005, per language within the HRFCCP. The November 6th redd survey found a total of 31 redds above 65 kcfs elevation, which met the maximum number of redds above that elevation allowed for the experiment. The experimental flow regime was discontinued the following Monday and RLF operation resumed, while hydroacoustic, DIDSON, and video data collection continued. The 31 redds counted on

November 6th represented 32% of the total redds observed above 65 kcfs elevation (Table 1). Redds counted after experiment flows were discontinued represented 59% and 9% of the 98 total redds constructed above 65 kcfs on Vernita Bar.

Table 1. Official counts taken from Vernita Bar redd surveys in 2005

DATE	Flow intervals (kcfs)						TOTAL
	36 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70+	
Oct. 9	0	0	0	0	0	0	0
Oct. 16	0	0	0	0	0	0	0
Oct. 23	1	0	0	0	0	0	1
Oct. 30	57	8	3	0	1	1	70
Nov. 6	--	58	39	22	10	21	150
Nov. 13	--	145	97	80	39	50	411
Nov. 20	--	--	--	74	38	60	172

Another objective was to measure redd site fidelity of Chinook by evaluating movements in relation to changes in river discharge or flow. Although the quality and quantity of tracking data collected was not sufficient enough to fully test this hypothesis, the following tendencies were found:

1. There tends to be more movement towards the bar when flows increase than when they decrease.
2. There tends to be more fish positioned closer to the bar when flows are high than when flows are low.

The tracking data also suggested that individual responses differed to changes in discharge. Data from tag code 3070 showed the fish elected to remain in one general location (possible redd) over a nineteen day period. During that time, the fish was exposed to a wide range of fluctuating discharge. In another example on November 11th the river flow decreased from 156.8 kcfs to 103.7 kcfs in one hour. During this 53.1 kcfs decrease in discharge, the fish with tag code 3440 moved approximately 4 m towards Vernita Bar, while the fish with tag code 3050 shifted approximately 3 m away from the bar.

3.0 Discussion

Results from the DIDSON data provide a clear picture of spawning activity and digging rates, while providing data that suggests extensive nighttime spawning behavior. Grant PUD is confident with the evaluation and results of day versus night spawning activity and feels it is not necessary to further evaluate this objective. Although the fish with tag code 3070 suggested some evidence of redd site fidelity, tracking data were insufficient to fully evaluate site fidelity and responses to changes in discharge. Therefore in order to continue the 2005 objective of evaluating redd site selection and fidelity, Grant PUD proposes to expand the experiment through increased numbers of hydrophones, increased tag numbers, and improved capture and tagging methods and locations.

Grant PUD proposes to modify river operations during the 2006 experiment. The alternative flow experiment ended premature in 2005 because 31 redds were counted above the 65 kcfs elevation (criteria of HRF CPP). It appears discharge may have been kept high for too long each day (due in part to river conditions during 2005). Therefore, in 2006 Grant PUD will attempt to increase peak heights and decrease peak durations.

The percentage of redds that were constructed above the 65 kcfs elevation were higher after the experiment was discontinued than during the experiment. Questions to consider after reviewing the results of the 2005 Vernita Bar redd surveys are; did the flow/discharge experiment cause the fish to select locations higher on Vernita Bar in preparation for spawning? Would the fish have elected to spawn there under normal RLF conditions, or was it based on higher spawning activity because of an increase in spawner abundance later in the season? Also the apparent inconsistency in behavior of the two fish (examples from the previous section) could be the result of an inadequate data set or it could be related to a biological cue exhibited by each fish.

4.0 2006 Methods

4.1 Fish Capture

The objective is to capture, examine, select, and tag enough fish throughout the spawning period to provide sufficient statistical power to test the hypotheses. The fish should be in pre-spawn condition, captured prior to selecting a location to begin redd construction. One potential reason for

limited tracking data in 2005 was the capture location of the fish that were tagged. Rather than use a side channel exposed during low flow, Grant PUD proposes using a tangle net fished adjacent to Vernita Bar, immediately downstream of the hydroacoustic array. This will be the primary capture method and location. Locations further downstream have been suggested and will be considered if an adequate tagging station can be established. Taking these measures should increase the number of tagged fish that that will remain on Vernita Bar to spawn.

A tangle net measuring approximately 100 m in length and 5 m in depth with a mesh size of approximately 12 cm will be used. Nets similar to this have been successfully used in the lower Columbia River during spring Chinook harvest seasons (Vander Haegen 2004). The Washington Department of Fish and Wildlife has also used them for research purposes (Ashbrook et al. 2005). Tangle nets allow the release of unwanted bycatch much easier than traditional gill nets. The use of beach seines in 2005 resulted in minimal bycatch with no bull trout or summer steelhead captured. Based on results in 2005 and the time of year, bycatch is expected to be minimal with tangle nets as well.

4.2 Fish Tagging

In order to increase our understanding of fish movement and behavior in relation to changes in river flow, Grant PUD proposes similar data collection methods but different river operations. Seventy-five fish will be selected to receive tags in 2006. Tags will be Hydroacoustic Technology, Inc. (HTI) model 795F (9 mm x 21 mm and weigh 2.2 g in air). Tagging methods will be similar to those used last year (Duvall 2005) with the exception of using smaller tags in order to reduce potential impacts to behavior of the fish. Since a recreational fishery will run concurrent for a portion of the study, warning signs will be posted at high-use boat ramps for public notification of the experiment, indicating marked fish should be released. The hydrophone array will be in a similar location as 2005; however, the number of antennas will be increased from eight to 15. There will be three different transects of five hydrophones each, distributed at different elevations on Vernita Bar. The hydrophones will be approximately 75 m apart, thereby increasing the detection range from 36,000 m² in 2005 to 84,375 m² in 2006. This modification should increase the amount of tracking data collected. The hydrophones will be connected to one HTI 290 receiver

on the left-bank shoreline of Vernita Bar. Buoys will be attached to the equipment to aid in retrieval.

4.3 Tracking and Monitoring

Grant PUD will conduct boat-based mobile tracking from the Vernita Bridge to PRD to help identify tagged fish that were not detected within the hydrophone array. Redd counts on Vernita Bar will be conducted by the Monitoring Team, per the HRF CPP. The survey area will be at the same location where previous redd counts have occurred. To reduce the chance of acoustic tag data loss, site visits will be done daily by Grant PUD staff to ensure the equipment is running properly. Finally, per the HRF CPP, up to five aerial flights will be conducted on Vernita Bar and throughout the Hanford Reach to monitor redd distribution.

4.4 River Operation

The objective for river operation during this experiment is to provide conditions for maximum spawning in areas where protection can be maintained during Incubation and Emergence Periods (Lukas 2003). To achieve this objective, Grant PUD is proposing to provide consecutive hours of low, flat, flow (base flow approximately 55-60 kcfs for 16-20 hours) from PRD. Providing base flow for a majority of the day requires one or two short periods of relatively high discharge. Depending upon river conditions this fall, four different operational alternatives may be used during the experiment. Mean daily inflows to PRD will be projected each week and will dictate which alternative will be used during that week. However, conditions may require modifications of operations on a daily basis. Real-time conditions will dictate exact river operations but they will occur within following the general guidelines, hereafter called River Operational Alternatives:

1. PRD mean daily discharge of less than 70 kcfs - One single peak of water (of up to 190 kcfs) each day starting around the 0600 hour. The peak will last approximately 2.5 hours after which flows will be rapidly reduced (to 36 kcfs) until the United States Geological Survey (USGS) gauging station downstream of PRD measures approximately 55 kcfs. The river will then be stabilized until the peak on the following day (Figure 2).

2. PRD mean daily discharge of 70 to 85 kcfs - Two peaks (of up to 190 kcfs) each day with one occurring during morning hours and an additional afternoon spike. The peaks will last approximately 2.5 hours after which flows will be rapidly reduced (to 36 kcfs) until the USGS gauging station downstream of PRD measures approximately 60 kcfs. The river will then be stabilized until the next peak (Figure 2).

3. PRD mean daily discharge of 85 to 105 kcfs - Two peaks (of up to 190 kcfs) each day with one occurring during morning hours and an additional afternoon peak. The peaks will last approximately 2.5 hours after which flows will be rapidly reduced (to 36 kcfs) until the USGS gauging station downstream of PRD measures approximately 65 kcfs. River conditions will dictate how much the duration of each peak is increased. Priority will be to extend the duration of the afternoon peak. The river will then be stabilized until the next peak (Figure 2).

4. PRD mean daily discharge of greater than 105 kcfs - Should the three previous options fail, or discharge is expected to exceed 105 kcfs for an extended duration, the experiment would be discontinued, reverting back to RLF (Figure 2). If 31 redds are counted above 65 kcfs (criteria of the HRF CPP), Alternatives 1, 2, and 3 would be discontinued and Alternative 4 (RLF) would be used for the remainder of the spawning season.

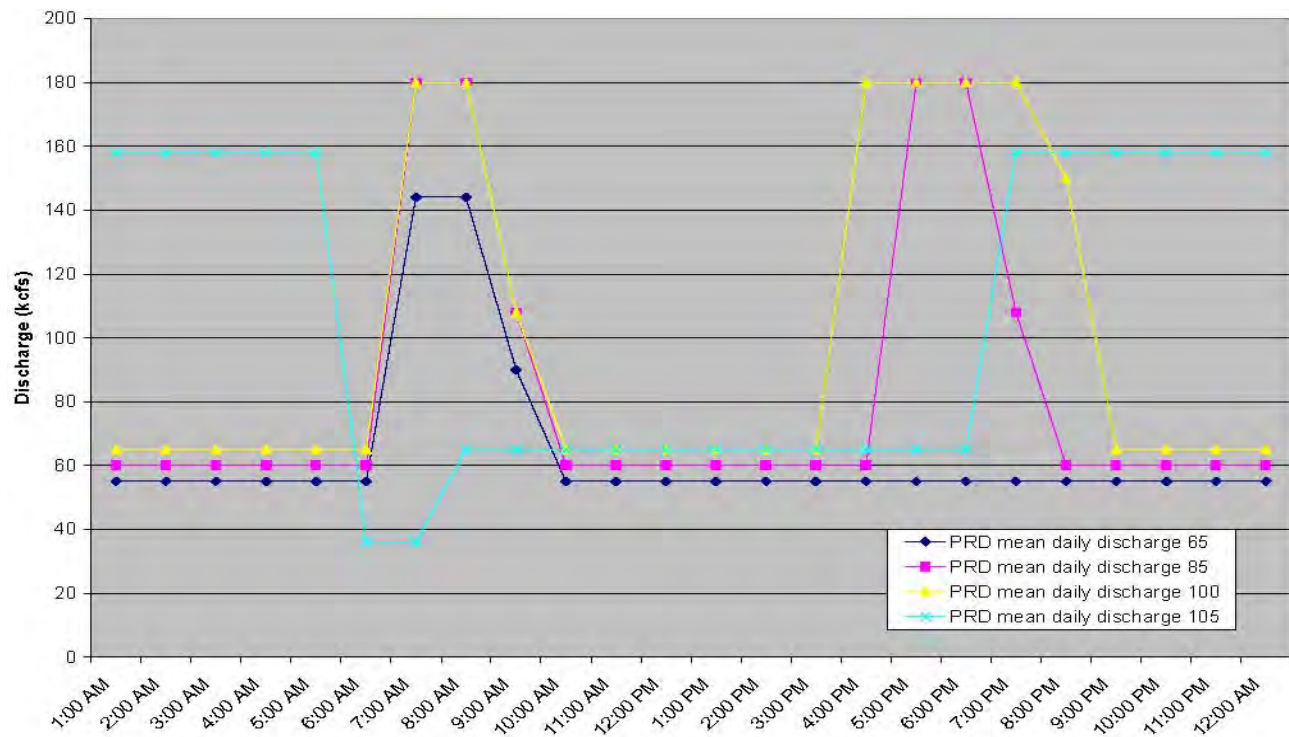


Figure 2. Four examples of the Priest Rapids Dam 24-hour hydrograph under each of the proposed operational scenarios. Alternative one is a single peak each day during a week with projected mean daily discharge of 65 kcfs. Alternative two is two peaks each day during a week with projected mean daily discharge of 85 kcfs. Alternative three is two peaks each day during a week with projected mean daily discharge of 100 kcfs. Alternative four is traditional Reverse Load Factoring during a week with projected mean daily discharge of 105 kcfs.

4.5 Additional Pre-Spawn River Operation Testing

To further evaluate changes in discharge on fish movement and site fidelity, Grant PUD proposes to capture, tag, and release approximately 25 fish (of the 75 total fish) before the initiation of spawning (Lukas 2003). The initiation of spawning typically occurs before the third week of October. Beginning October 16th, increases in discharge to the daily peak will be stepped in one of three different flow differentials (40, 80, or 120 kcfs, Appendix A, October 16-21, 2006). Flows will be rapidly increased from the base flow to the selected differential. For example, if 40 kcfs is the selected differential and the base flow is 55 kcfs then discharged will be rapidly increased to 95 kcfs. Flows will be maintained at that level for one hour and then rapidly increased to the maximum daily peak. Differentials will be systematically tested for six days; however, current river

conditions may dictate which differential will be used. Depending upon results from the first six days, additional evaluations may occur later in the spawning period. The purpose of this experimental testing is to examine relationships between the magnitude of increasing discharge and changes in fish location on Vernita Bar. In addition to this particular experiment, these 25 tagged fish should provide additional tracking information throughout the remainder of the experiment as explained in Section 4.4. This test will be conducted regardless of how many fish are released from the previous day's tagging effort.

4.6 Fish Position

The fish position data (X and Y coordinates with associated date and time for each) collected from the hydroacoustic array tracks will be placed into one of five different Flow Event Categories which are: increasing peak flow, stable peak flow, decreasing peak flow, non-peak day flow, and non-peak night flow. The switch from day to night will be at the time of official sunset. The corresponding discharge from PRD and/or USGS will then be matched with the fish position coordinates to evaluate behavioral patterns. If possible, more precise discharge and/or velocity data will be modeled for these comparisons.

4.6.1 Relationship Between Fish Position and River Operational Alternatives During Base Flow

Using the acoustic tag tracking data, the relationship between fish position and River Operational Alternatives will be examined. The number of tagged fish present along the Vernita Bar (i.e., elevation intervals, 36-50, 50-55, 55-60, 60-65, and 65-70 kcfs, hereto referred as Elevation Intervals) will be recorded during non-peak flow periods. Chi-square tests of homogeneity will be used to compare spatial distributions using an $R \times C$ table of the form:

		River Operational Alternatives			
		#1	#2	#3	#4
Elevation Intervals	36-50				
	50-55				
	55-60				
	60-65				
	65-70				

4.6.2 Relationship Between Fish Position and Flow Peaks

For River Operational Alternatives 1, 2, and 3, one or two flow peaks will occur each day. Fish position will be compared during the Flow Event Categories to assess whether the change in river flow affected fish distributions at Vernita Bar. For any one peak flow condition, a test of homogeneity can be used to assess whether fish positions were distributed the same over the course of the event, using an $R \times C$ table of the form:

		<u>Flow Event Categories</u>				
		Increasing Peak Flow	Peak Flow	Decreasing Peak Flow	Non-Peak Day Flow	Non-Peak Night Flow
Elevation Intervals	36-50					
	50-55					
	55-60					

4.6.3 Relationship Between Change in Flow and Change in Fish Position

Using the acoustic tag tracking information, the change in fish position will be examined in relation to a change in flow over that time period. The null hypothesis is that there is no relationship between the direction of fish movement (i.e., fish moving towards or away from Vernita Bar) and change in flow (i.e., flows increasing or decreasing). To test the null hypothesis, a 2×2 contingency table test of homogeneity of the following form will be used :

	Flow Increase	Flow Decrease
Movement Away from Bar		
Movement Towards Bar		

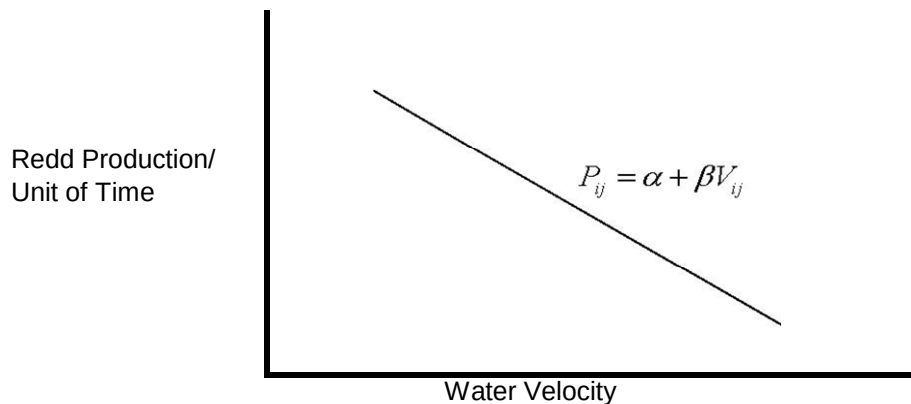
4.7 River Velocity

In an effort to better understand the relationship between river velocity and redd construction on Vernita Bar, previously modeled velocity data will be used. The objective is to record when specific redds are constructed so that a range of suitable discharge and velocity can be attributed to the timing of redd construction. At season's end, redd counts in each Elevation Interval will be

calculated. Using the velocity modeling data, a corresponding range of discharge and velocity will be placed with each redd within the five Elevations Intervals.

4.7.1 The Relationship Between Redd Production and Water Velocity

At each of the five Elevation Intervals, river velocity measurements will be calculated using a validated model. Redd surveys will be conducted daily throughout the spawning period to mark redds and determine the number of new redds constructed on a daily basis for each Elevation Interval. Redds will be marked by Grant PUD staff using GPS technology and/or physical marks from either boat or shore. Using the velocity model, all redds created above the base flow from one day to the next will have a range of velocity and corresponding flow assigned to the construction period. In addition to redd marking, the collection of corresponding tracking data from acoustic tags will be needed to strengthen the statistical analysis. To examine the relationship between redd production and water velocity, linear regression curves will be produced for each Elevation Interval in the following form:



5.0 Conclusion

The proposed study will mark the second consecutive year that Grant PUD has conducted a spawning experiment based on the Hanford Reach Agreement. Grant PUD has held several meetings with operators, agencies and tribes to discuss the results of the 2005 experiment. Many ideas and suggestions gathered at these meetings have been incorporated in the 2006 study proposal. The hypotheses to be tested are:

1. There is an increase in fish position movement (movement of fish positions determined by hydroacoustic tracking) during peak flow than fish position movement during non-peak flow.
2. Fish position on Vernita Bar is higher during peak flow than during non-peak flow.
3. There is an inverse relationship between increasing water velocity and redd production
4. The mean number of redds constructed above the 65 kcfs elevation in 2006 will be less than or equal to the mean number of redds constructed at the same elevation taken from all previous Vernita Bar redd surveys under RLF operation.

Some of the proposed statistical analyses will be subject to the collection of the appropriate data. If such data are not collected, then the results of such specific statistical tests will not be calculated. Great care will be used when defining the terms to be use and when determining the collection and placement of data for statistical testing. Finally, it is imperative that sufficient data is collected so that statistical tests can be performed that will lead to conclusions that will benefit overall management of fall Chinook salmon in the Hanford Reach.

6.0 Literature cited

Ashbrook, C.E., K.W. Yi, and J. Aterburn. 2005. Tangle Nets and Gill Nets as a Live Capture Selective Method to Collect Fall Chinook Salmon Broodstock in the Okanogan River: 2004.

Duvall, D. 2005. Diel Spawning Behavior and Redd Site Fidelity by Fall Chinook Salmon at Vernita Bar, Columbia River. Public Utility District No. 2 of Grant County. Ephrata, Washington.

Duvall, D. 2006. 2005 Hanford Reach agreement spawning experiment. Public Utility District No. 2 of Grant County. Ephrata, Washington.

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Vander Haegen, G.E., C.E. Ashbrook, K.W. Yi, and J.F. Dixon. 2004. Survival of spring Chinook salmon captured and released in a selective commercial fishery using gill nets and tangle nets. Fisheries Bulletin 68: 123-133.

Appendix A Hanford Reach Agreement Spawning Experiment 2006 Timeline

Date	Day	Activity	Daytime Flow
10/13/2006	Friday	Install and test acoustic array	50 kcfs
10/14/2006	Saturday	Install and test acoustic array	36 kcfs
10/15/2006	Sunday	Tag 25 fish-Vernita Bar count	36 kcfs
10/16/2006	Monday	Start flow regime, first block, first day	Base+flow differential, 40, 80, 120 kcfs
10/17/2006	Tuesday	First block, second day	Base+flow differential, 40, 80, 120 kcfs
10/18/2006	Wednesday	Second block, first day	Base+flow differential, 40, 80, 120 kcfs
10/19/2006	Thursday	Second block, second day	Base+flow differential, 40, 80, 120 kcfs
10/20/2006	Friday	Third block, first day	Base+flow differential, 40, 80, 120 kcfs
10/21/2006	Saturday	Third block, second day	Base+flow differential, 40, 80, 120 kcfs
10/22/2006	Sunday	Tag fish, Vernita Bar count	36 kcfs
10/23/2006	Monday	Start of one or two peak discharge	Base flow + 1 or 2 spikes
10/24/2006	Tuesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/25/2006	Wednesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/26/2006	Thursday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/27/2006	Friday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/28/2006	Saturday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/29/2006	Sunday	Tag fish, Vernita Bar count	36 kcfs
10/30/2006	Monday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
10/31/2006	Tuesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/1/2006	Wednesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/2/2006	Thursday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/3/2006	Friday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/4/2006	Saturday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/5/2006	Sunday	Tag fish, Vernita Bar count	36 kcfs
11/6/2006	Monday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/7/2006	Tuesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/8/2006	Wednesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/9/2006	Thursday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/10/2006	Friday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/11/2006	Saturday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/12/2006	Sunday	Redd count, if needed	36 kcfs
11/13/2006	Monday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/14/2006	Tuesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/15/2006	Wednesday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/16/2006	Thursday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/17/2006	Friday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/18/2006	Saturday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/19/2006	Sunday	Redd count, if needed	36 kcfs
11/20/2006	Monday	Continuing 1 or 2 peak discharge	Base flow + 1 or 2 spikes
11/21/2006	Tuesday	Remove hydroacoustic equipment	low flow
11/22/2006	Wednesday	Remove hydroacoustic equipment	low flow
11/26/2006	Sunday	Redd count, if needed	36 kcfs

MEMORANDUM

November 26, 2006

TO: Interested Parties

FROM: Chris Carlson, Senior Fisheries Biologist

SUBJECT: Vernita Bar Redd Survey, November 26, 2006

Discussion: On Sunday, November 26, 2006 the seventh Vernita Bar ground redd count was conducted to document additional spawning after the usual end of spawning date (the weekend before Thanksgiving) and confirm the 70 kcfs Critical Flow Elevation for the Hanford Reach. The monitoring team representatives consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Observing the ground count was Bill Twit (WDFW). Flows from Priest Rapids Dam at Vernita Bar were about 50 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	<u>Redd Count by Flow Level (kcfs)</u>						<u>Total Number Of Redds</u>
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	--	--	--	--	--	--	--
A – AB	--	--	16	8	6	--	30
AB – B	--	--	24	13	7	--	44
Below B	--	--	--	--	--	--	--
C	--	--	--	--	--	--	--
Totals	--	--	40	21	13	--	74

No redd counts were taken within the 36-55 kcfs elevations and transects Above A, Below B and C. Redd counts above 70 kcfs were not possible due to snow accumulation.

The redd count data above indicates there was significant spawning activity from the previous week's survey (74 vs. 52 redds, respectively). The Monitoring Team observed no significant spawning activity during the survey. Based on the information above and in accordance with the Hanford Reach Fall Chinook Protection Program Agreement, the monitoring team agreed that November 26, 2006 will be used as the end of fish spawning and the Critical Flow Elevation will remain at the 70 kcfs flow elevation .

A supplemental redd survey was not required last year and no other surveys are required for this year.

Set previously was the Initiation of Spawning date for the zone below 36 kcfs as October 25, and for the zones between 36 – 50 kcfs and above 50 kcfs to be November 1, 2006.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin
Scott Bettin
Bob Clubb
Gary Garnant
Kelly Harlan
Leon Hoepner
Joe Lukas
Greg Patton
Bill Tweit

Jeff Atkinson
Shane Bickford
Dennis Dauble
Russ George
Bob Heinith
Paul Hoffarth
Geoffrey McMichael
Shane Scott
Paul Wagner

Bill Berry
Steve Brown
Gary Donabauer
Chuck Goligoski
Cathy Hlebechuk
Rick Klinge
Robert Mueller
Rudd Turner
Dawn Woodward

Power Dispatch
WAN Operators

FWWQ Team
NR Records

PRD Operators

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 6, 2006 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

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 Salmon Operations

Rick Kruger, OR, and Joe Skalicky, USFWS, presented the power point documents linked to the 12/6 agenda on the TMT website. Kruger reported that the 12/1 Ives Island ground survey indicated that spawning had hit its peak; a count of 340 on 11/17 was the highest number of live fish observed on any given day this season. Kruger said that the overall counts for this year are lower than recent years, and that year-to-year comparisons are available on the FPC website. The USFWS elevation distribution modeling observed that a 13' tailwater would protect 83% of redds observed in the Ives island areas 2 & 3. Skalicky added that it was difficult to use the current model to look at dewatered redds and suggested that for future studies, an appropriate water surface elevation model be developed. He also noted the difficulty in translating the Tanner Creek elevation gauge to actual elevations of redds. Paul Wagner, NOAA, said that FPAC had discussed a recommended operation for supporting chum and achieving multiple objectives: a tail water target of 12.5', with an operating range of 12.3' – 12.8'. If needed, two brief night pulses around 1800 and 0600 hours. If only one pulse is needed, it should be centered around midnight. The Action Agencies agreed to the proposed operation.

Action/Next Steps: TMT members suggested that more explanation of data in the survey reports would be helpful. Rick Kruger agreed to add language that helps describe what the data represents. TMT will continue to monitor conditions and revisit chum operations on a 12/20 conference call.

Upcoming Snake River Outages

Don Faulkner, COE, said that Dworshak Unit 3 had passed its test on 12/5 and would be available for service 12/15.

Snake River Zero Night Flow

Paul Wagner, NOAA, said that daily fish counts at Lower Granite were discontinued as of 11/21 with video counts being the only ones taken. Wagner requested that zero nighttime flow be deferred to coincide with the scheduled fish ladder outage at Lower Granite on 12/15. BPA supported this proposal.

Action/Next Steps: A teletype will be issued to allow the operational flexibility to be available beginning at 2200 hrs on 12/15.

Libby Forecast

Cathy Hlebechuk, COE, said that the forecast would be posted to the TMT website and that she would also email it to TMT members on 12/7.

2007 Water Management Plan

Dave Wills, USFWS, and Paul Wagner, NOAA, said that they would likely be sending comments on the WMP.

Action: TMT members are reminded to review the draft WMP and submit edits, comments, etc. based on 2007 expectations to Bernard Klatte, COE, by no later than 12/15.

2006 Fall/Winter Operations at Vernita Bar

Russell Langshaw, Grant Co. PUD, reported on the survey conducted on 11/26: 13 redds were counted above the 65 kcfs flow band range, with a total count of 74 redds. A final, more thorough count on 12/3 counted 37 redds above the 65 kcfs flow band range. The 2006 Vernita Bar study plan was posted as a link on the 12/6 agenda on the TMT website.

Action/Next Steps: Russell Langshaw said that the data analysis would be available in early 2007, and suggested that he make another presentation to TMT at that time. The 500 TU threshold is anticipated to be reached on 12/24. At that point post hatching operations will commence.

Operations Review

Reservoirs: Dworshak was at 1539' and had filled .7' in the previous 7 days. Grand Coulee was at 1284' and drafting slowly to meet target elevations for chum; Hungry Horse was at 3540.7', filling slowly with outflows of 1kcfs; and Libby was at 2428.4', with outflows at 22kcfs (and an end of December target elevation of 2411'.) Albeni Falls was at 2452.67', with outflows of 17kcfs; Lower Granite had outflows of 20kcfs, McNary had outflows of 130 kcfs, and Bonneville outflows were at 150 kcfs.

Fish: (See chum status)

Power: Nothing to report at this time.

Water quality: Jim Adams, COE, said that Lower Granite was operating with one unit on speed/no load, and spill at 10kcfs through 12/8. TDG levels at Lower Granite were between 112-116%.

Next TMT – Likely a Conference Call, December 20th, 9:00-noon

Agenda Items include:

- Chum Operations Update
- Operations Review

January TMT Schedule:

- 1/3/07 tentative conference call
(1/10/07 is a FFDRWG meeting date)
- 1/17/07 face-to-face TMT meeting
- 1/31/07 face-to-face TMT meeting
- Also, Dave Wills, USFWS, will forward information about the site visit to see the construction of the Lower Monumental RSW in Oregon City. (~ 1/9/07)

Technical Management Team Meeting Notes

December 6, 2006

1. *Greetings and Introductions.*

The December 6 TMT meeting was chaired by Cathy Hlebechuk 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 Hlebechuk at 503-808-3942.

2. *Hanford Reach Update.*

Russell Langshaw said the last official redd survey was conducted on November 26; weather conditions were poor, so a full count was not conducted. Field personnel found 13 redds above 65 Kcfs, and a total number of 64. It was essentially a worthless count, because of the field conditions, Langshaw said. We did a supplemental redd count for redds above 65 Kcfs last Sunday, and found 63 redds above that elevation, he added. Langshaw noted that the 2007 study plan is now available; he said he had distributed it to the TMT membership via email, and it will be discussed during next week's year-end review. We're at about 400 temperature units since the initiation of spawning, he added, so we expect the fish to begin to hatch about December 24.

3. *Chum Operations.*

Rick Kruger updated the group on the most recent chum spawning survey results, including GPS redd location data and an analysis of tailwater elevations and GPS locations. We've been posting the chum survey data bi-weekly, he said; we had the highest number of live fish and redds counted to date in the season in last Friday's survey, including both old and new redds – 77 live fish and 112 redds. As of Friday, we had 177 GS-located chum redds, Kruger said. If we went

strictly by the number of redds to date, we would be in the second-lowest chum year to date. However, given the number of live fish we're seeing on the spawning grounds, we expect to see more redds deposited – fled personnel saw 170 live chum in the channel on Friday.

David Wills noted that the surveys for the Hamilton and Hardy Creek areas are now up to date on the Fish Passage Center website. The available data includes counts to date for the last four years, live fish only – the area is too small to count redds. In response to a question, Kruger said chum and redds are also being counted in the Multnomah Creek and I-205 bridge areas this year, but that data has not yet been posted to the FPC website. The 2006 Hamilton and Hardy Creek counts are similar to the counts to date for the last few years, Wills noted.

Kruger showed a series of photographs taken during some of the recent spawning ground surveys, illustrating how the surveys are conducted. Joe Skalicki then provided an overview of the GPS redd survey analysis (attached via hot-link from today's agenda on the TMT homepage). The redds have been broken out into three groups for analysis, he said. There was some interest in calculating the explicit elevations of each of the 177 redds, accurate to within a couple of feet, he said. We did recently re-survey the area to make sure the bathymetric survey we have is still accurate, he added; some areas may have changed elevation slightly in the last few years. And you got pretty good resolution? Wills asked. Yes, Skalicki replied – we have an accurate representation of the river as a whole. The hydrodynamic model we used to predict habitat for both chum and chinook is River 2D.

The bottom line is that you can't necessarily relate the GPS redd information directly to tailwater elevation information, Skalicki said – you can't just look at the tailwater elevation. The tidal and backwater effects that play on Ives Island also affect the Tanner Creek gauge, Paul Wagner observed.

The group devoted a few minutes of discussion to this information. The takeaway message is that you can't necessarily assume that these redds are going to be covered at an 11.5-foot Bonneville tailwater elevation, Wills said – there are a number of other factors that impact the actual elevation of the water over the redds at Ives Island, including tidal and backwater effects that have nothing to do with the Bonneville tailwater depth. Still, it seems apparent to me that the 2.5-foot correction puts you in the ballpark, in terms of confidence in the amount of redd coverage you'll see at a given tailwater depth, Wagner said.

How does all of this relate to the Tanner Creek elevation? Hlebechuk asked. That's the \$64,000 question, Skalicki agreed. The average flow needed to maintain a 13.5-foot tailwater depth is 137 Kcfs, but you can see that the actual range of flows at which that elevation is delivered can vary between 89 and 160+ Kcfs, Skalicki said – we need a water surface elevation model, that takes tidal

and backwater effects into account, to get an accurate picture of what's really going on in the river. We're investigating a funding source for the model development, Wills added; it's going to cost \$150,000-\$200,000. Dennis Schwartz is taking the lead on that effort, he added.

After a few minutes of additional discussion, it was noted that, based on the most recent information available, a flow of 140 Kcfs will protect about 83 percent of the redds deposited to date. A flow of 130 Kcfs, yielding a tailwater elevation of 13 feet, will dewater an additional 62 redds, Skaliicki said – in my opinion, that is an unacceptable impact. And how do the model results compare to the land survey Dave, Rick, Scott and Vern did? Hlebechuk asked. I think they compare pretty well, Kruger replied.

In response to a question, Hlebechuk said the current operation is to maintain an 11.8-12.3-foot Bonneville tailwater elevation, with two pulses at night for a minimum of 20 minutes.

The salmon managers discussed this information extensively at yesterday's FPAC meeting, said Wagner. Where we ultimately landed was a target tailwater elevation of 12.5 feet, with a range of 12.3-12.8 feet, continuing the current re-watering regime at night, he said. We still have fish spawning at this point, and don't want to see any more spawning at higher elevations. We feel this will give us adequate, though not ideal, coverage, at an elevation that it should be possible to maintain through emergence and also allow Grand Coulee to refill to URC by April 10, Wagner said. In response to a question, Wagner said this is a short-term recommendation for now, but will likely become the long-term operation. After a few minutes of additional discussion, Roche said that, in Reclamation's opinion, the 12.3-12.8-foot operating range sounds like a good operation. Scott Bettin said BPA supports this operation as well; the change will be made in the next 24 hours.

I just want to be sure that everyone understands that, even at a 12.5-foot Bonneville tailwater elevation, a significant number of chum redds could be lost, Skaliicki said. We do understand that this decision puts those redds at a higher risk, Wagner replied – again, we discussed this at length at yesterday's FPAC meeting, and this was the compromise operation we were able to agree to. FPAC also considered sustaining incubation flows and Grand Coulee refill to URC.

4. Snake River Zero Nighttime Flow.

We talked about this several weeks ago, said Wagner; at the time, there were still a high number of steelhead passing the projects. Since then, they have discontinued the daily counts, so we have no hard data to go on, he said. The salmon managers recommend that the zero nighttime flow operation be deferred at the Snake River projects until December 15. Cathy Hlebechuk said the Corps

was fine with the operation since the water control manuals state zero flow could occur 1 Dec – 28 Feb when few fish are passing. She said some projects may have powerhouse heating problems in very cold weather and the operator and BPA Realtime schedule would coordinate in those cases. She said the Corps deferred the starting date to BPA. Bettin said BPA had no problem with that.

5. Dworshak Unit 3 Update.

Unit 3 passed the test this week, said Don Faulkner, so it should be back in service by the end of next week – so far, it doesn't look like there is a major problem. They would like to take it out of service for several weeks next fall to give it a thorough cleaning, however, Faulkner added.

6. Libby Forecast.

The Libby forecast will be available tomorrow, Hlebechuk reported.

7. 2007 Water Management Plan.

Bern Klatte said the Corps is still awaiting comments on the 2007 WMP; comments are due by next Friday, December 15. It was noted that the Fish and Wildlife Service is planning to provide comments. We haven't really discussed the fall/winter update yet, Hlebechuk added, but should probably do so at the next TMT meeting.

8. Year-End Review Agenda.

Harkless said the most recent draft of the TMT year-end review agenda has been emailed to the TMT membership.

9. Operations Review.

Reclamation said the current Hungry Horse elevation is 3540.7, with 1 Kcfs outflow because the mainstem flows are so high. Inflows remain high, so the project is filling. At Grand Coulee, the current elevation is 1284; the project is drafting slowly to maintain the chum operation. Libby is 31 feet from full and releasing 22 Kcfs. The December 31 target elevation at that project is still 2411. Albeni Falls is releasing 17 Kcfs, operating within the agreed-upon winter operating range. Dworshak is currently at elevation 1539 and filling slowly. The average flow at Lower Granite is about 20 Kcfs, currently; at Bonneville, 150 Kcfs. The 2007 Libby operation is being considered. The Corps has not made a decision yet whether to implement VARQ or standard flood control in 2007. The Corps is receiving input from the states, tribes, the Fish and Wildlife Service, NOAA and the action agencies for consideration in the decision. The discussion is at the executive level, and the Corps is expected to make a decision soon.

Wagner said the only fish-related information has to do with chum, which have already been discussed. There are no power system problems to report, said Bettin.

10. Next TMT Meeting Date.

The next face-to-face TMT meeting is the year-end review scheduled for next Wednesday, December 13. It was agreed to schedule a TMT conference call for December 20.

TMT Meeting Participants
December 6, 2006

Name	Affiliation
Cathy Hlebechuk	COE
Robin Harkless	Facilitation Team
Cindy Henriksen	COE
Rudd Turner	COE
Paul Wagner	NOAAF
Rick Kruger	ODFW
Robin MacKay	BPA
Dan Spear	BPA
Cindy LeFleur	WDFW
John Roche	Reclamation
David Wills	USFWS
Scott Bettin	BPA
Jim Adams	COE
Joe Skalicki	ODFW
Tony Norris	Reclamation

TECHNICAL MANAGEMENT TEAM

BOR : John Roache / Mary Mellema

BPA : Robyn MacKay / Scott Bettin

NOAA-F: Paul Wagner

USFWS : David Wills / Steve Haeseker

OR : Rick Kruger / Ron Boyce

ID : Russ Kiefer

WA : Cindy LeFleur

MT : Jim Litchfield

COE: Cindy Henriksen / Cathy Hlebechuk

COLUMBIA RIVER REGIONAL FORUM

Technical Management Team

Year End Review: 2006

Wednesday December 13, 2006

09:00am - 3:30pm

USFWS Columbia River Fisheries Program Office

1211 SE Cardinal Court, Suite 100

Vancouver, WA

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

Purpose: To provide an opportunity for TMT members and other interested parties to step out of the regular meeting format and review the management decisions and operations of the 2006 season in order to learn lessons that can enhance choices and decision making for 2007.

AGENDA

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942 or Robin Harkless at (503) 248-4703

1. **9:00 Welcome and introductions** - Donna Silverberg, facilitator
2. **9:30 Mainstem Review:** What were the water, weather and fish conditions that existed throughout the year? How were operations affected by those conditions? How effective were the proposed actions (SORs) at achieving desired results? What changes might be necessary to enhance results in the future? How did this year compare to others?

(NOTE: A break will be taken around 10:15)

- 2006 Water and Runoff Patterns - Comparison to Previous Years, project operations - Cathy Hlebechuk, COE
[\[2006 Runoff Review\]](#)

- [\[Temperature/TDG Level Variations - Jim Adams, COE PPS\] \[PDF\]](#) 
 - [\[Adult Fish Runs/Fisheries Review - Cindy LeFleur, WDFW\] \[PDF\]](#) 
 - [\[Fish Passage - Jerry McCann, Fish Passage Center\] \[PDF\]](#) 
 - [\[Summary 2006 Weather\] \[SUMMARY 14TH ANNUAL WINTER WEATHER MEETING FORECASTS - Kyle Dittmer, CRITFC\]](#) 
 - MT's 2006 VARQ Operation - Brian Marotz, MT and Cindy Henriksen, COE
[\[Libby AAR\] \[SOR 2006-08\]](#)
 - Q&A and Lessons Learned from the 2006 Mainstem Review
3. **11:30 (?) Lunch Break**
4. **12:30 Snake River Review:** What were the water, weather and fish conditions that existed throughout the summer/fall? How were operations affected by those conditions? How effective were the proposed actions (SORs) at achieving desired results? What changes might be necessary to enhance results in the future? How did this year compare to others?
- Surface Passage Studies - Lower Snake River - Tim Wik, Walla Walla Corps
[\[Hydroacoustic LWG\] \[Passage Behavior IHR\] \[Evaluation Passage IHR\] \[IHR Radio Tagged\] \[Spring Conditions\]](#) `
 - [\[Snake River Navigation Operations - Rob Wall, Walla Walla Corps\]](#)  [\[Tug Information\]](#) 
 - [\[Fish Conditions: Spring/Summer Migrants, Survival Rates & Timing - Bill Muir, NMFS Science Center PPS\] \[PDF\]](#) 
 - Fall Chinook Survival Study Results - Billy Connor, USFWS
 - Water Temperature Modeling:
[\[RBM-10 - Ben Cope, EPA\]](#) 
[\[CE-QUAL-W2 - Mike Schneider, COE\]](#) 
 - Q&A and Lessons learned from the 2006 Snake River Review
5. **2:00 2006 Study Information:** What was learned through the 2006 studies that should be transferred into management actions for 2007? How does what was learned this year merge with past years? What does that tell us?
- [\[Surface Passage Studies - Lower Columbia River - Brad Eppard, Portland District COE\] \[PDF\]](#) 
 - [\[SLED Research Results - Robert Stansell, COE\] \[PDF\]](#) 
 - [\[John Day T-1 Outage - Dave Clugston, COE PPS\] \[PDF\]](#) 
 - Vernita Bar Preliminary Study Information - Russell Langshaw, Grant County PUD
 - Q&A and Lessons learned from 2006 Study Information
6. **3:00 Other Lessons Learned?** Given the review of conditions, decisions and actions throughout the day, what are the overarching lessons that could impact future work of the TMT?
7. [\[Directions TO TMT Year End Review Location\]](#) 

NOTE: Lunch will be brought in for all participating in or attending the meeting. A \$6 contribution is requested.

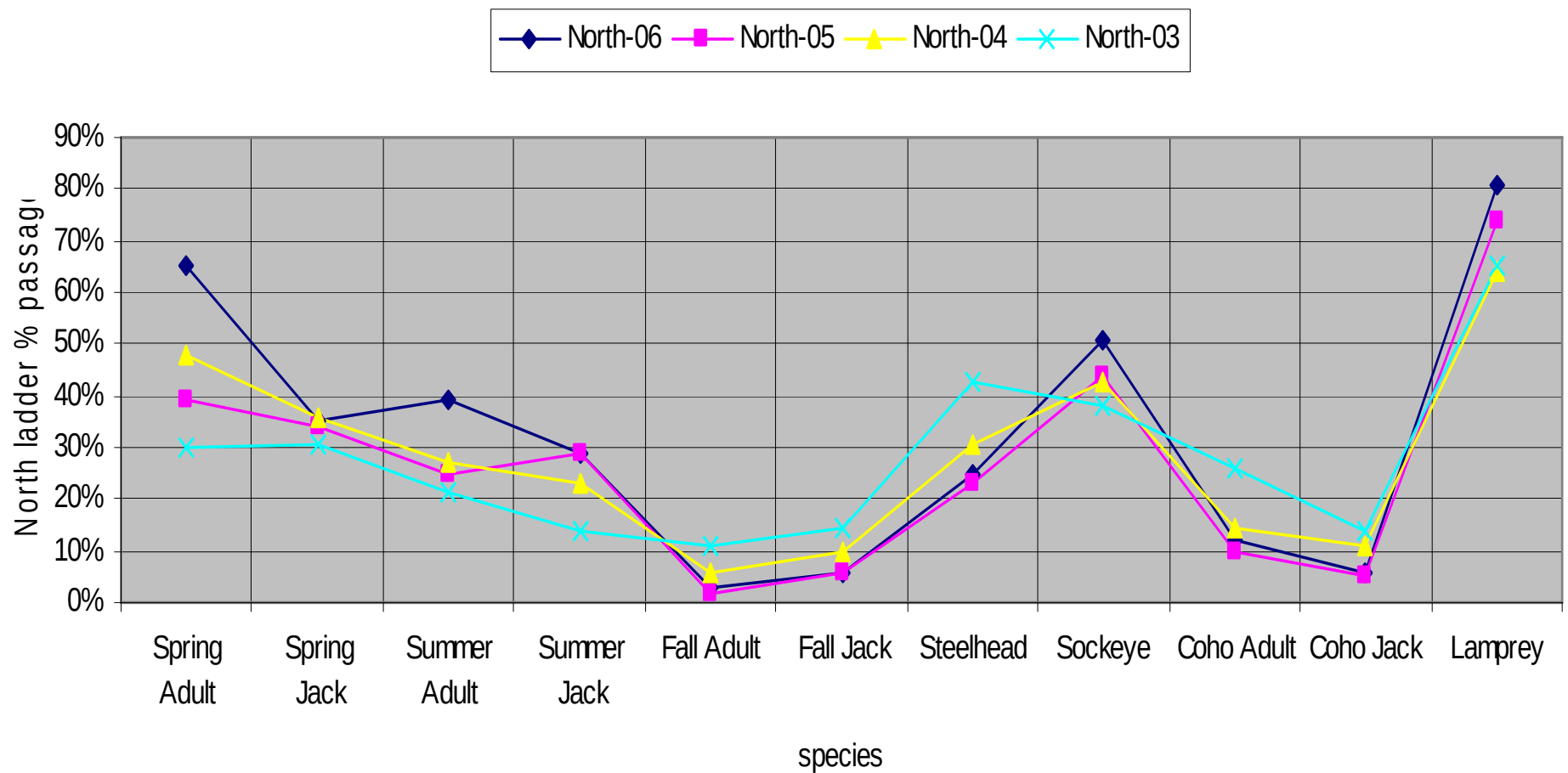
**RSVP date is December 8th. RSVP required to guarantee enough food for everyone!
Thank you in advance for participating**

JDA T-1 Outage & Hi flow/spill effects at Lower Columbia River Dams: 2006

- **JDA T-1 outage and fish passage.**
- **TDA ladder usage.**
- **BON fallback, reascension, and effects on escapement.**

2006 JDA North Ladder Passage: Counts

John Day Dam



PNNL ITAP Report Results

Table 3. Estimates (and 95% confidence intervals) of the mean daily proportion of fish using the south ladder of John Day Dam (April 1 through June 22) from logistic regression model including only the “year” variable.

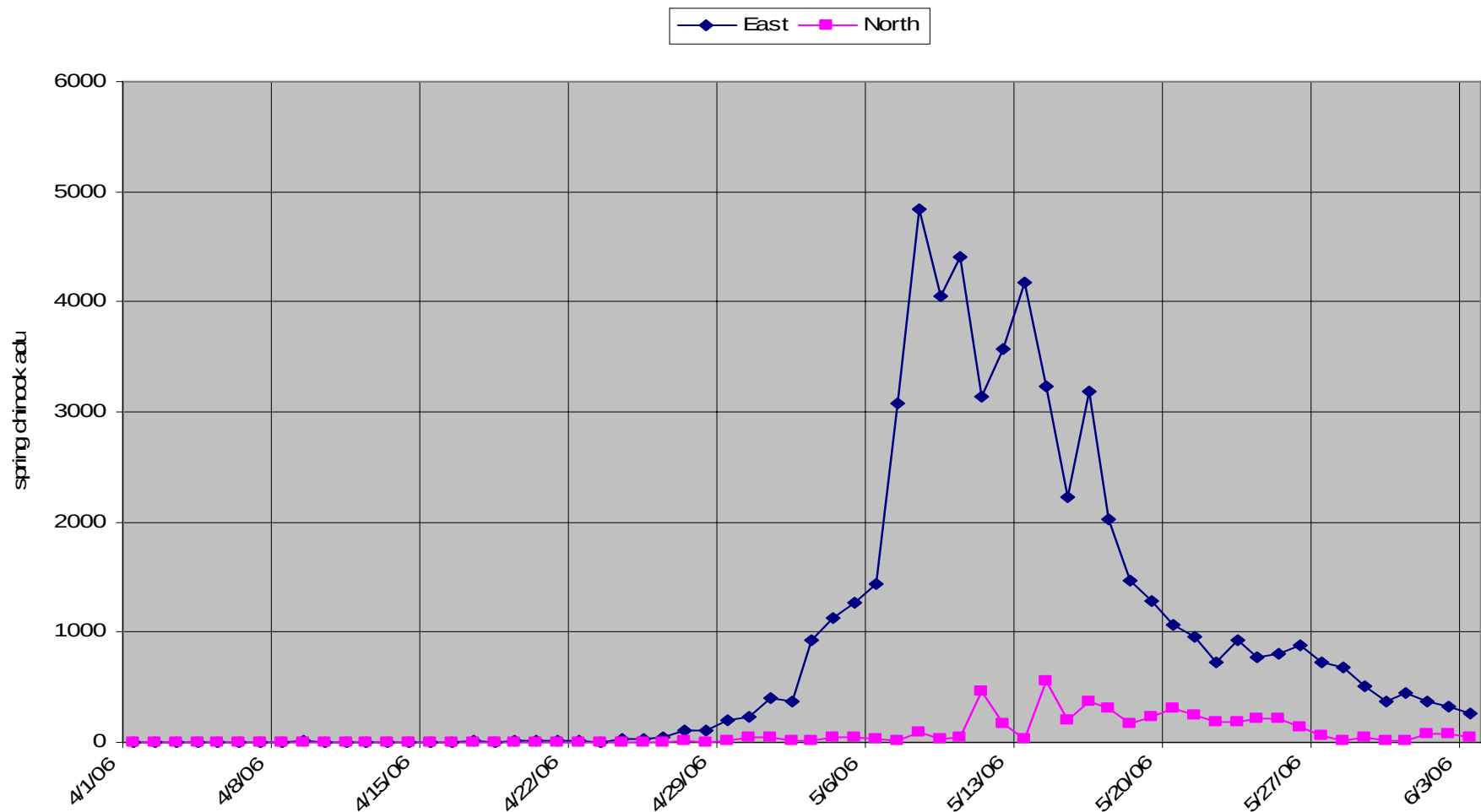
	Chinook Adults	Chinook Jacks	Steelhead Hatchery	Steelhead Wild
2003	0.73 (0.70 - 0.76)	0.74 (0.71 - 0.77)	0.59 (0.53 - 0.65)	0.49 (0.43 - 0.55)
2004	0.57 (0.54 - 0.60)	0.71 (0.67 - 0.74)	0.59 (0.54 - 0.64)	0.46 (0.41 - 0.51)
2005	0.68 (0.64 - 0.72)	0.71 (0.66 - 0.77)	0.60 (0.54 - 0.65)	0.52 (0.46 - 0.59)
2006	0.50 (0.45 - 0.54)	0.68 (0.61 - 0.74)	0.46 (0.41 - 0.52)	0.33 (0.27 - 0.39)

JDA T-1 Outage and Sp Ch Passage

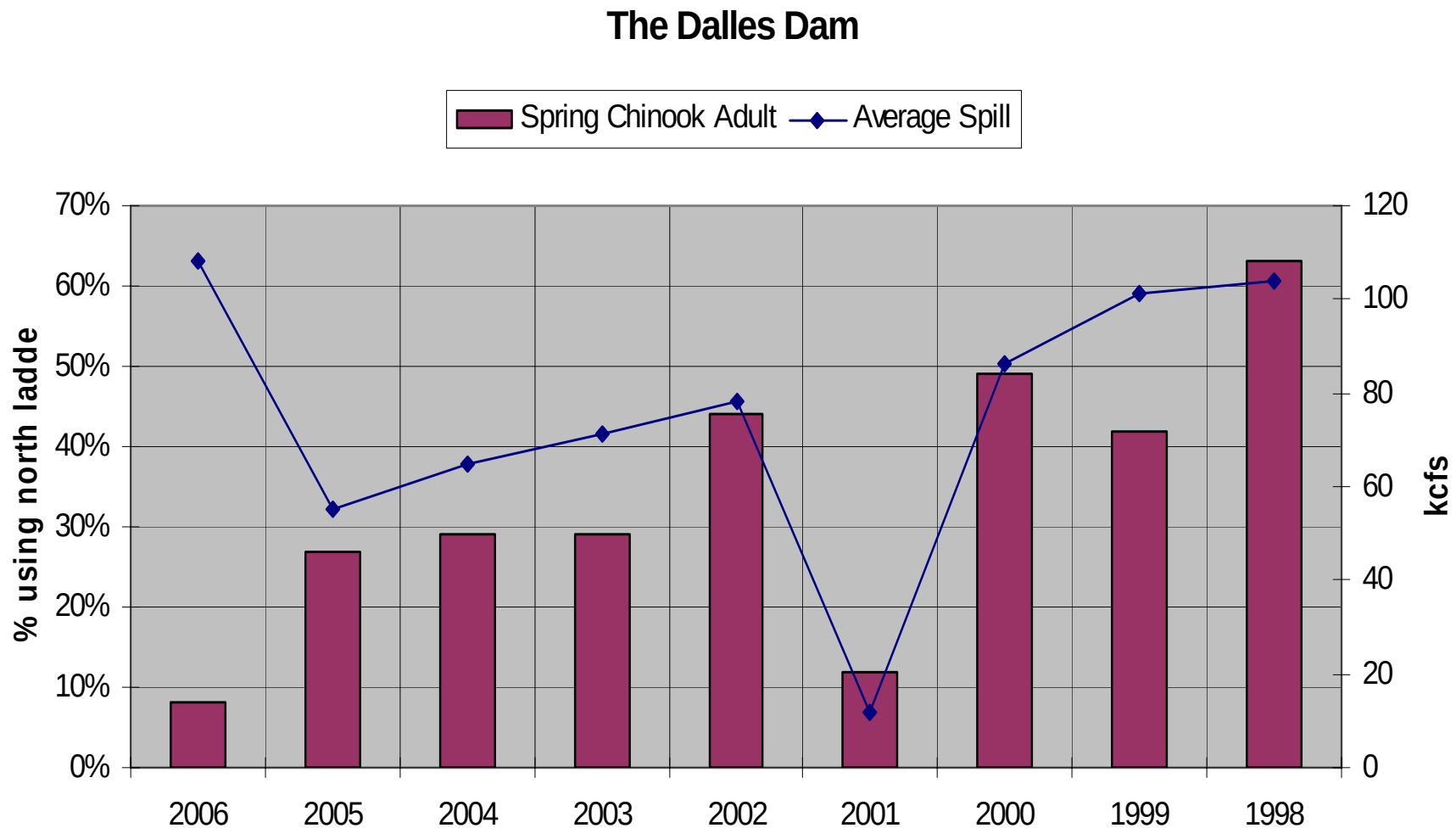
- Significant reduction in % south ladder passage but still had considerable use.
 - Much of variance not explained by outage (flow, spill, temp effects also may be involved).
- RT Sp Ch median passage time via north ladder nearly twice as fast as south ladder (12.7 vs. 23.8 hrs)
- Overall median (17.0 hrs) passage time in low-mid range of historic passage times.
- 50 % of Sp Ch first approached dam at OGs (may have followed edge of eddy to center of dam).

2006 Spring Chinook Passage by Ladder: TDA

The Dalles - 2006



Spring Chinook TDA North Ladder Passage: 1998-2006

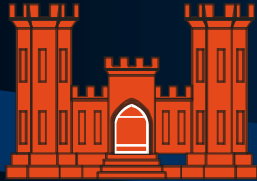


2006 TDA Spring Hi Flow/Spill Results

- High mean Sp spill around 110 kcfs.
- Significant drop in Sp Ch N ladder use from 25-30% (03-05) to 7%.
 - Effect likely related to new Juvenile spill pattern concentrating spill to N end.
- No apparent effect on passage times from BON exit to TDA exit or JDA exit.
- TDA will be wired up for 2007 SP CH RT fish passage evaluation.

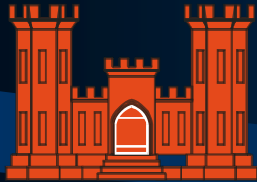
2006 BON Hi Flow/Spill: Effects on Fallback, Reascension, and Escapement (RT study)

- Nearly **14 % Fallback** (88% BI exit):
 - Highest % since 1996 with B2 priority.
- **Less than 50 % reascension** rate:
 - Lowest ever, previous low 65%, mean around 75%).
- If above is representative, hydro-system **escapement was reduced 7 %** at BON.
 - DART unadjusted escapement estimate of **69 %** for all SR SP Ch lowest ever (79.3% mean 00-05)
- No effects found on passage of Sp Ch related to Sea Lion deterrents during block test.



Technical Management Team 2006 Year End Review

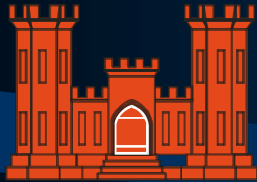
Water Quality



Fixed Monitoring Stations



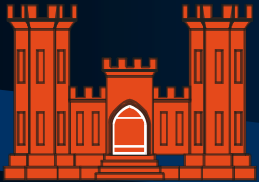
- Corps operated a total of 28 FMS's
 - ⇒ Portland District: 8 Stations
 - ⇒ Walla Walla District: 15 Stations
 - ⇒ Seattle District: 5 Stations
- Bureau of Reclamation Operated 4 FMS's
- Mid-C PUD's Operated 10 FMS's
- Removed Station for 2006
 - ⇒ Removed McNary Forebay (Oregon Side) in April.
- Data can be obtained at "Dataquery"
 - ⇒ <http://www.nwd-wc.usace.army.mil/perl/dataquery.pl>



Total Dissolved Gas



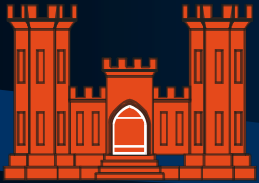
Project	Start of Spill	End of Spill	Days of Spill
Lower Granite	3 April	31 August	151 Days
Little Goose	3 April	31 August	151 Days
Lower Monumental	3 April	31 August	151 days
Ice Harbor	3 April	31 August	151 days
McNary	10 April	31 August	144 days
John Day	10 April	31 August	144 days
The Dalles	10 April	31 August	144 days
Bonneville	10 April	31 August	144 days



Snake River Spill Operations



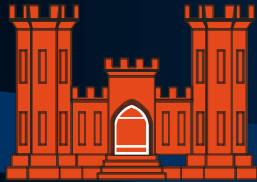
Project	Spring (April 3 - June 20)	Summer (June 21 - August 31)
Lower Granite	20 kcfs (RSW with training spill)	18 kcfs (RSW with training spill)
Little Goose	To the spill cap up to 30% of project outflow.	To the spill cap up to 30% of project outflow.
Lower Monumental	To the spill cap up to 40 kcfs.	To the spill cap up to 17 kcfs.
Ice Harbor	Daytime(0500-1800): 45 kcfs Nighttime(1800-0500): To the spill cap.	Alternate between 30% of outflow 24 hrs per day and 45 kcfs Daytime/To the spill cap at night.



Columbia River Spill Operations



Project	Spring (April 10 - June 30)	Summer (July 1 - August 31)
McNary	<u>4/10-4/22</u> : 0 kcfs daytime/To the spill cap at night. <u>4/23-6/19</u> : Alternate between 40% of outflow, 24 hrs per day and 0 kcfs daytime/To the spill cap at night.	Alternate between 40% and 60% of outflow (up to the spill cap), 24 hrs per day. (6/20-8/31)
John Day	0 kcfs daytime (0600-1800)/To the spill cap up to 60% of outflow at night.	To the spill cap up to 30% of outflow, 24 hrs per day.
The Dalles	To the spill cap up to 40% of outflow, 24 hrs per day.	To the spill cap up to 40% of outflow, 24 hrs per day.
Bonneville	To the spill cap up to 100 kcfs.	75 kcfs daytime/To the spill cap at night.



Total Dissolved Gas



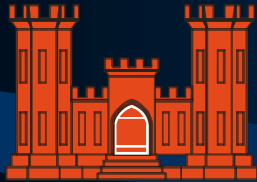
Comparison of Exceedences with Previous Years

TDG Exceedences from High 12-hr Average in 24 hours

Year	Gauge-Days in Spill Season ^H	Gauge-Days of BiOp Spill in Spill Season	Number of Days Exceeded	Percent of Days Exceeding TDG Standard	
				All Spill	BiOp Spill
2006	2504 ^I	2504 ^I	575	23.0%	23.0%
2005	2639	2124	69	2.6%	3.2%
2004	2639	1591	71	2.7%	4.5%
2003	2639	1936	243	9.2%	12.6%
2002	2639	2039	490	18.6%	24.0%
2001	2639	398	13	0.5%	3.3%
Ave.	--	--	245	9.5%	8.2

^H Spill Season begins on April 3rd (Snake) and April 10th (Columbia) and ends on August 31st.

^I Based on 17 TDG gauges (removed MCN Forebay (Oregon Side) in 2006). All other years based on 18 TDG gauges.



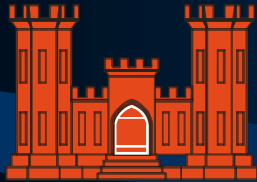
Total Dissolved Gas



AVERAGE HIGH 12 HR %TDG EXCEEDANCES AT FMS FROM 1999 - 2006

	2006	2005	2004	2003	2002	2001	2000	1999	Totals
Water Quality Gages	Qty.	Qty.	Qty.	Qty.	Qty.	Qty.	Qty.	Qty.	Qty.
Lower Granite Forebay *	0	0	0	0	0	5	2	0	7
Lower Granite Tailwater	28	0	0	15	17	0	4	15	79
Little Goose Forebay *	24	0	3	10	17	0	2	39	95
Little Goose Tailwater	19	0	0	6	6	0	9	6	46
Lower Monumental Forebay *	56	6	1	19	49	0	28	44	203
Lower Monumental Tailwater	29	7	1	10	6	0	12	26	91
Ice Harbor Forebay *	51	3	4	35	24	0	34	44	195
Ice Harbor Tailwater	22	3	2	4	6	0	4	12	53
McNary Forebay - Wa. *	31	8	10	24	43	1	14	22	153
McNary Forebay - Or.	--	11	23	32	45	5	22	19	157
McNary Tailwater	32	1	7	12	31	0	17	50	150
John Day Forebay	20	2	0	10	11	0	1	8	52
John Day Tailwater	38	3	0	0	29	0	12	43	125
The Dalles Forebay	40	6	5	11	18	0	5	1	86
The Dalles Tailwater	10	0	0	4	11	0	5	5	35
Bonneville Forebay	51	3	1	17	30	0	14	19	135
Cascade Island	61	0	---	---	---	---	---	---	61
Warrendale	--	---	0	1	19	0	6	2	28
Camas/Washougal	63	16	14	33	65	2	58	51	302
Total Number of Exceedances	575	69	71	243	427	13	249	406	2053

* New Forebay gages set at 15 m depth. Previous gage set at 5 m depth (Beginning 2005).

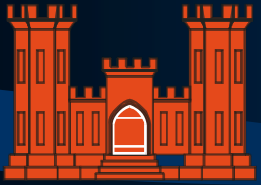


Total Dissolved Gas



TYPES OF EXCEEDANCES FOR 2003 - 2006 SPILL SEASONS

4 Year Totals	2006	2005	2004	2003	TYPE #	DEFINITION
389	306	11	4	68	1	Exceedance due to high runoff flows and flood control efforts.
0	0	0	0	0	2	Exceedance due to Intertie line outages.
45	45	0	0	0	3	Exceedance due to unit outages during repair or maintenance.
109	106	3	0	0	4	Exceedance due to BPA inability to handle load so water was spilled.
1	0	0	0	1	5	Exceedance due to a break down in communication. Teletype went out but no change occurred or Project operator interpreted teletype differently than what was intended.
223	69	32	16	106	6	Exceedance due to uncertainties when using best professional judgment to apply the spill guidance criteria (travel time; degassing; water temperature effects; spill patterns).
62	29	15	0	18	7	Exceedance due to high TDG levels coming from the Mid Columbia River Dam (see Pasco FMS readings).
3	0	0	3	0	8	Exceedance due to high TDG levels coming from the Snake River projects (see Ice Harbor Dam FMS readings).
0	0	0	0	0	9	Exceedance due to a load rejection. The powerhouse was not working and the river was spilled.
15	1	1	6	7	10	Exceedance due to lack of information: the FMS gage malfunctioning and we had no information at the time of making spill change decisions.
9	0	0	0	9	11	Exceedance due to mechanical problems (gate was stuck open, passing debris etc.).
55	3	7	25	20	12	Exceedance due to sharp rise in water temperature (a 3 degree F. or greater change in a day).
43	3	0	7	33	13	Exceedance due to bulk spill pattern being used which generated more TDG than expected.
13	13	0	0	0	14	Exceedance due to non-functioning of flow deflectors during tailwater elevation above 19 ft and especially above 26 ft.
10	0	0	10	0	12/7	Exceedance due to combination of exceedance type 12 and 7.
402	575	69	71	262		Totals

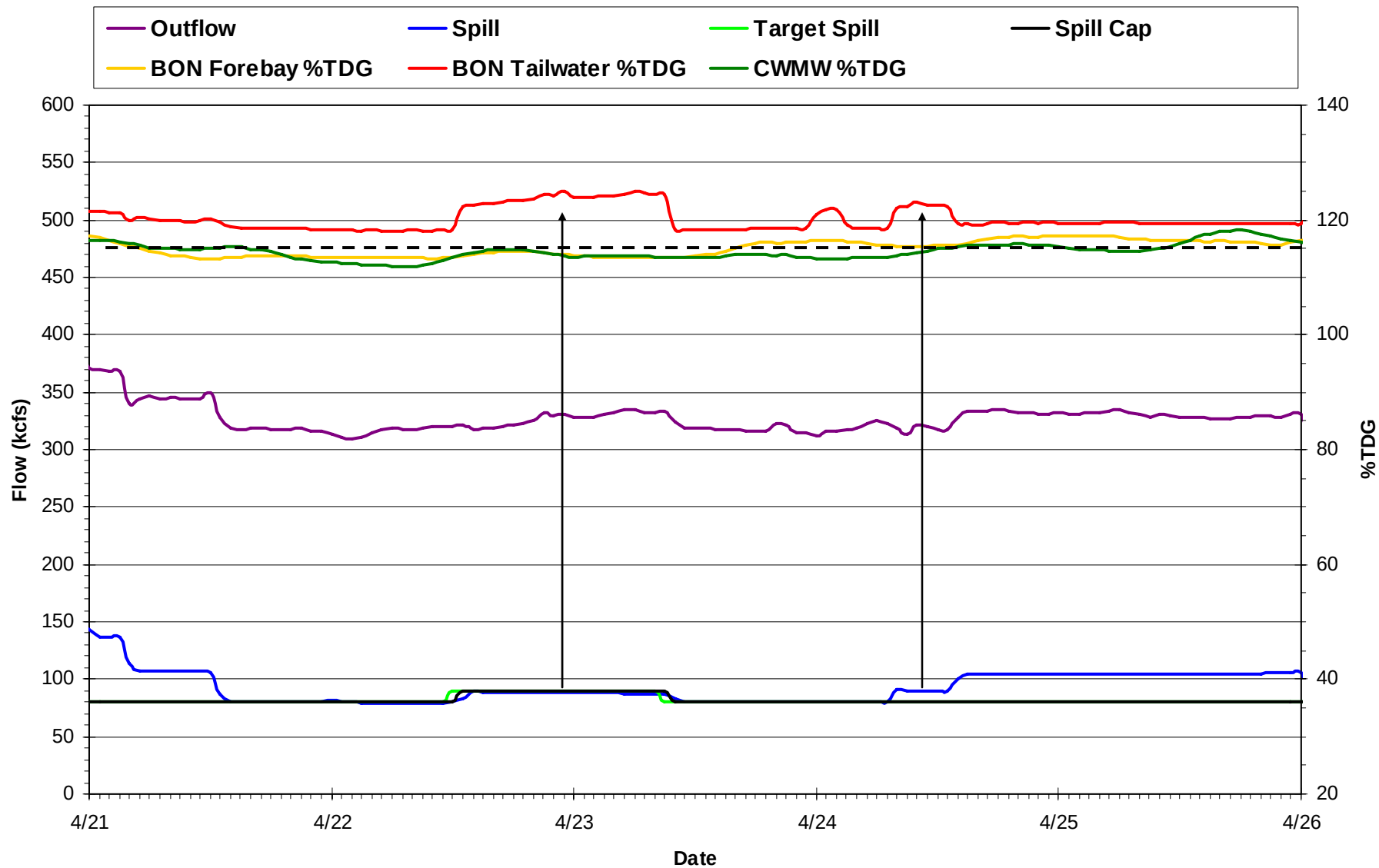


Bonneville Spill Patterns



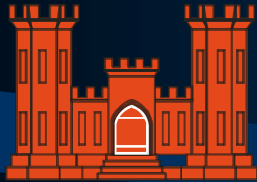
- New spill patterns developed for spill flows less than 100 kcfs.
 - Increased spill at outer spill bays (1-3 & 16-19).
 - Resulted in high TDG levels at CCIW.
 - CCIW likely overestimated net TDG production in spillway channel.
- Resulted in avoiding spill caps that would result in spill between 85 and 100 kcfs.
- High tailwaters exacerbated this problem.

2006 Spring Spill - Bonneville Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



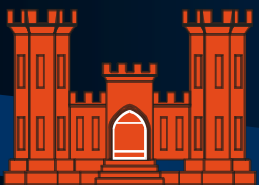
Dworshak Summer Operations



Lower Granite Dam Tailwater



Dworshak Dam

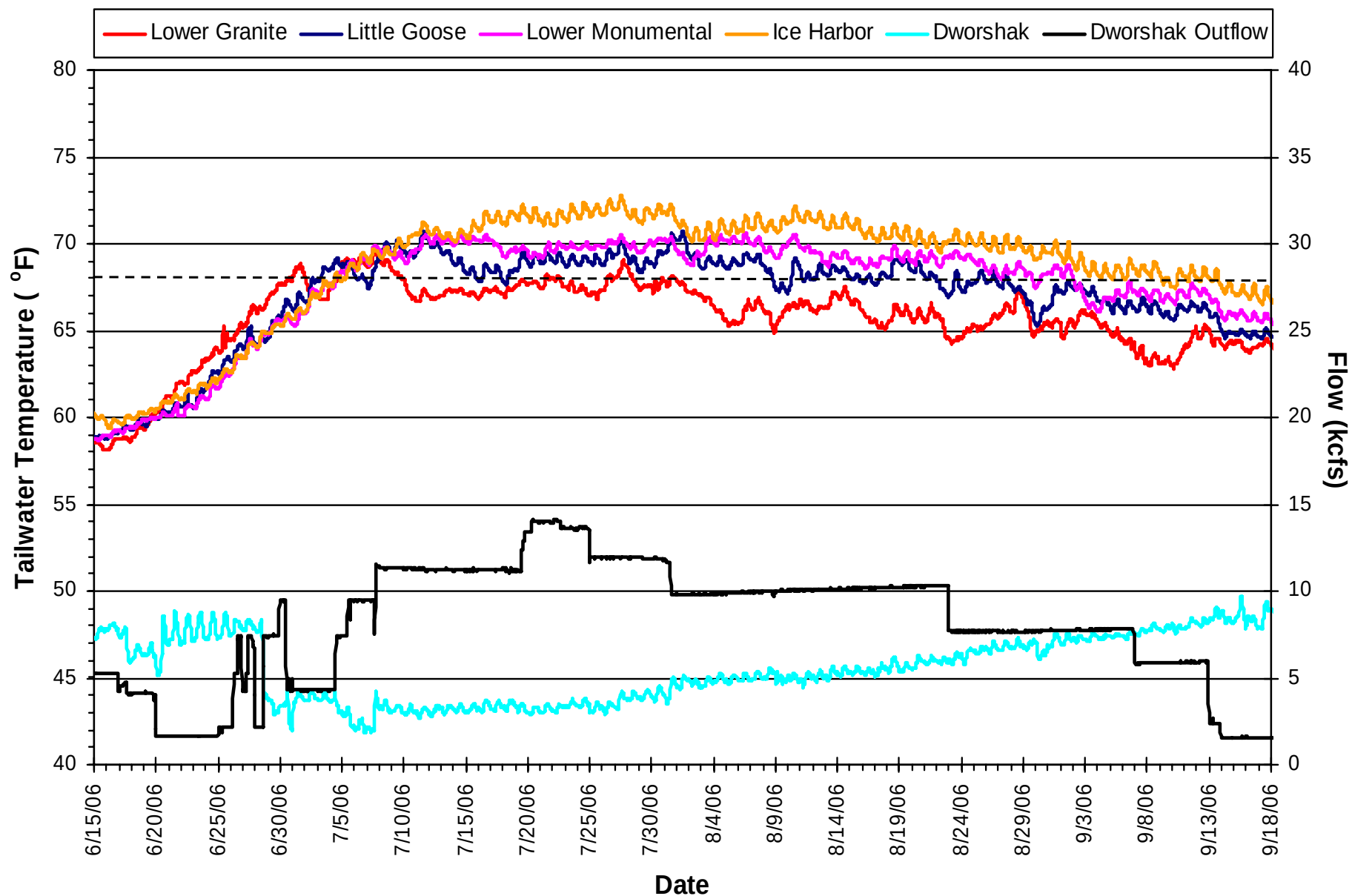


Dworshak Summer Operations

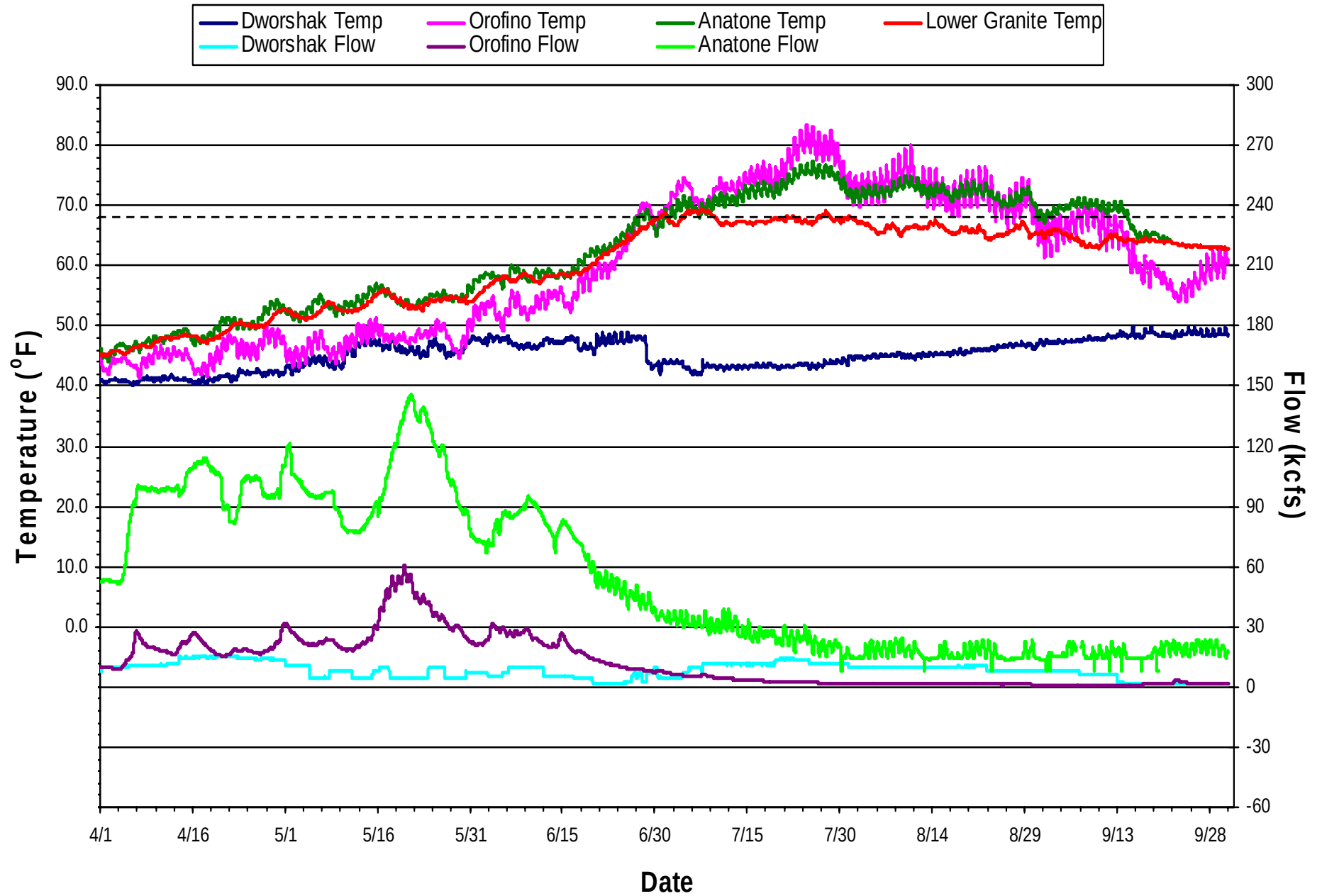


Operation Start		Operation End		Outflow (kcfs)	Outflow Target Temperature (°F)	Selector Gate Position		
Date	Time (hrs)	Date	Time (hrs)			Small Unit	Small Unit	Big Unit
28 June	1600	29 June	2200	7.3 – 7.5	42.5 – 43.5	O	--	U
29 June	2200	30 June	1100	9.3 – 9.5	42.5 – 43.5	O	U	U
30 June	1100	4 July	1200	4.2 – 4.3	42.5 – 43.5	O	U	--
4 July	1200	5 July	1100	7.4	42.5 – 43.5	O	--	U
5 July	1100	7 July	1600	9.4 – 9.5	42.5 – 43.5	O	U	U
7 July	1600	July 19	1200	11.2 – 11.4	42.5 – 43.5	O	U	U
19 July	1200	24 July	2100	13.6 – 14.0	42.5-43.5	O	U	U
24 July	2100	31 July	1100	11.9 – 12.0	Lowest Possible	U	U	U
31 July	1100	22 Aug	2200	9.8 – 10.3	Lowest Possible	U	U	U
22 Aug	2200	6 Sep	2200	7.7 – 7.8	Lowest Possible	--	U	U
6 Sep	2200	12 Sep	2200	5.9 – 6.0	Lowest Possible	--	--	U
12 Sep	2200	13 Sep	2200	2.4	Lowest Possible	U	--	--
13 Sep	2200	End of Season		1.5	Lowest Possible	U	--	--

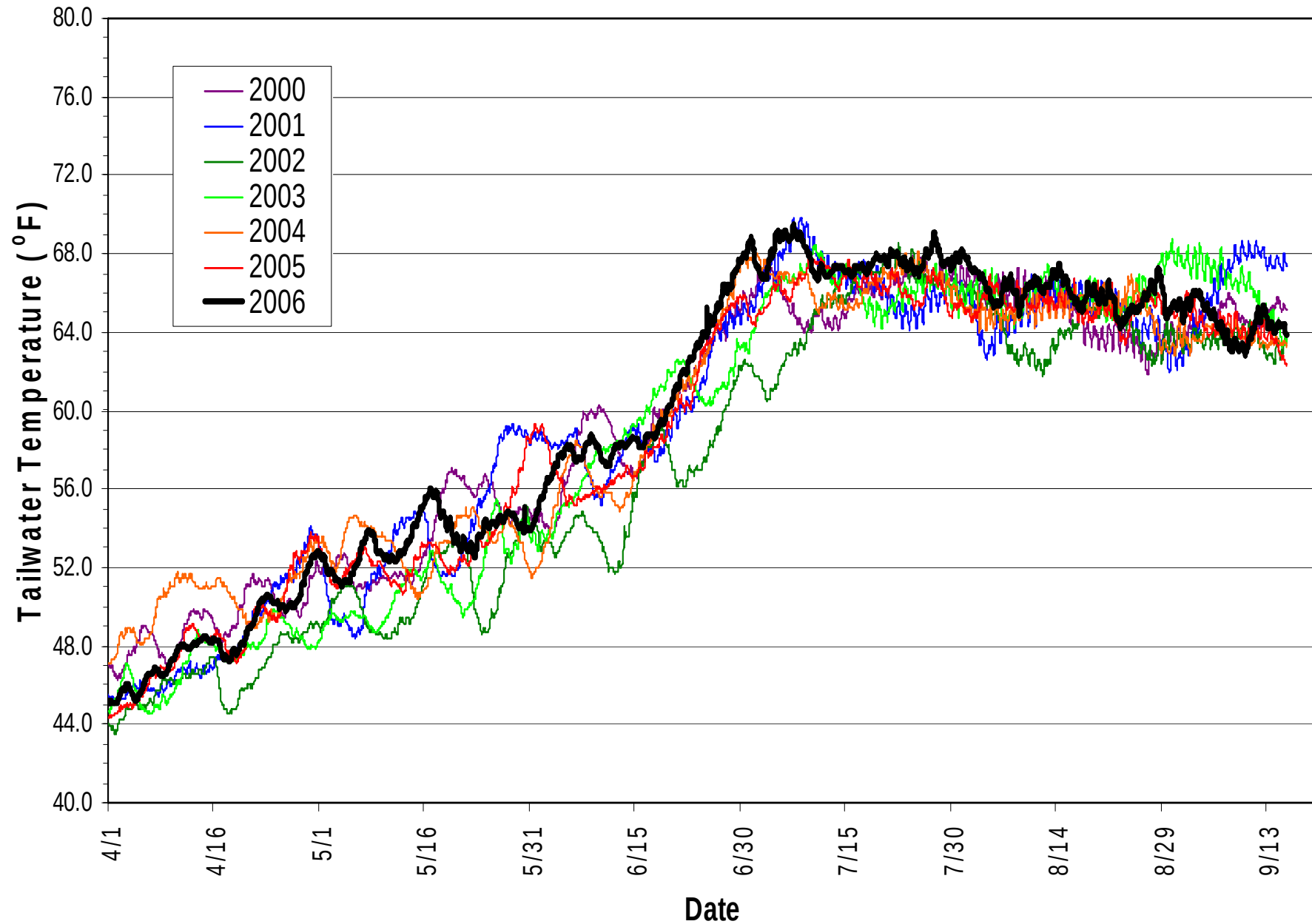
Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2006 (June 15th - September 18th)

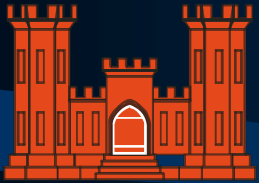


Lower Granite Inflows and Temperatures in 2006



Lower Granite Tailwater Temperatures 2000-2006





Dworshak Summer Operations



Lower Granite Tailwater FMS Temperature Analysis

Year	Hours of Exceedance	Cumulative Magnitude of Exceedance (°F)
2006	223	131
2005	0	0
2004	7	1
2003	63	8
2002	17	2
2001	172	68
2000	0	0
1999	23	4
1998	981	956
1997	137	31
1996	526	341
1995	593	201

12-Year Statistics

Hours of Exceedance	
Range:	Average:
High: 981 hrs (1998)	12-Yr Ave: 249 hrs
Low: 0 hrs (2000, 2005)	1995-1999: 452 hrs
	2000-2005: 80

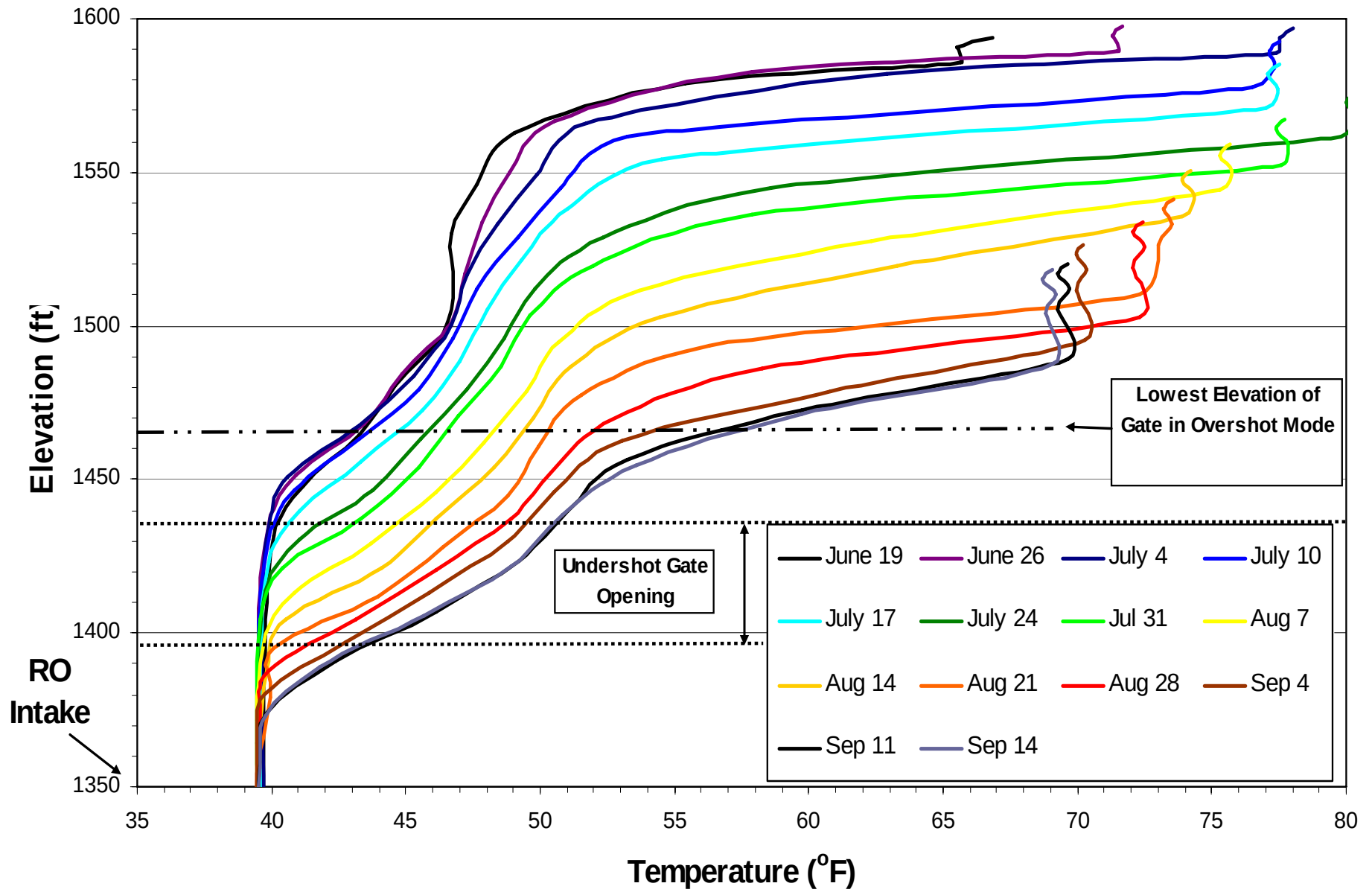
Cumulative Magnitude of Exceedance	
Range:	Average:
High: 1,721 deg-hrs (1998)	12-Yr Ave: 303 deg-hrs
Low: 0 deg-hrs (2000, 2005)	1995-1999: 552 deg-hrs
	2000-2005: 46 deg-hrs

Cumulative Magnitude of Exceedance

$\sum$ (# hours temp exceeds 68 °F standard) x (Number of degrees above 68 °F standard)

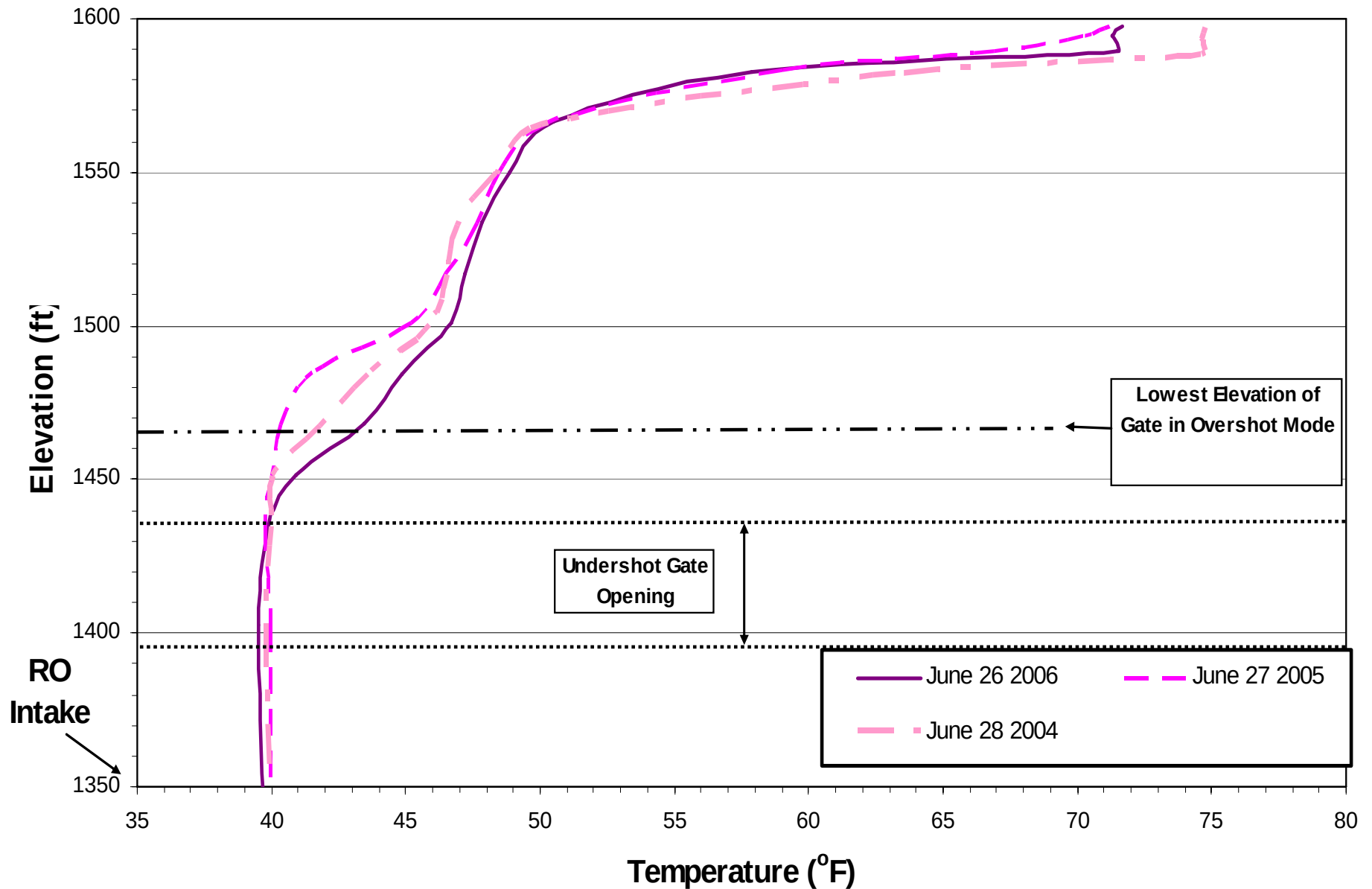
Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer DWR_S1)



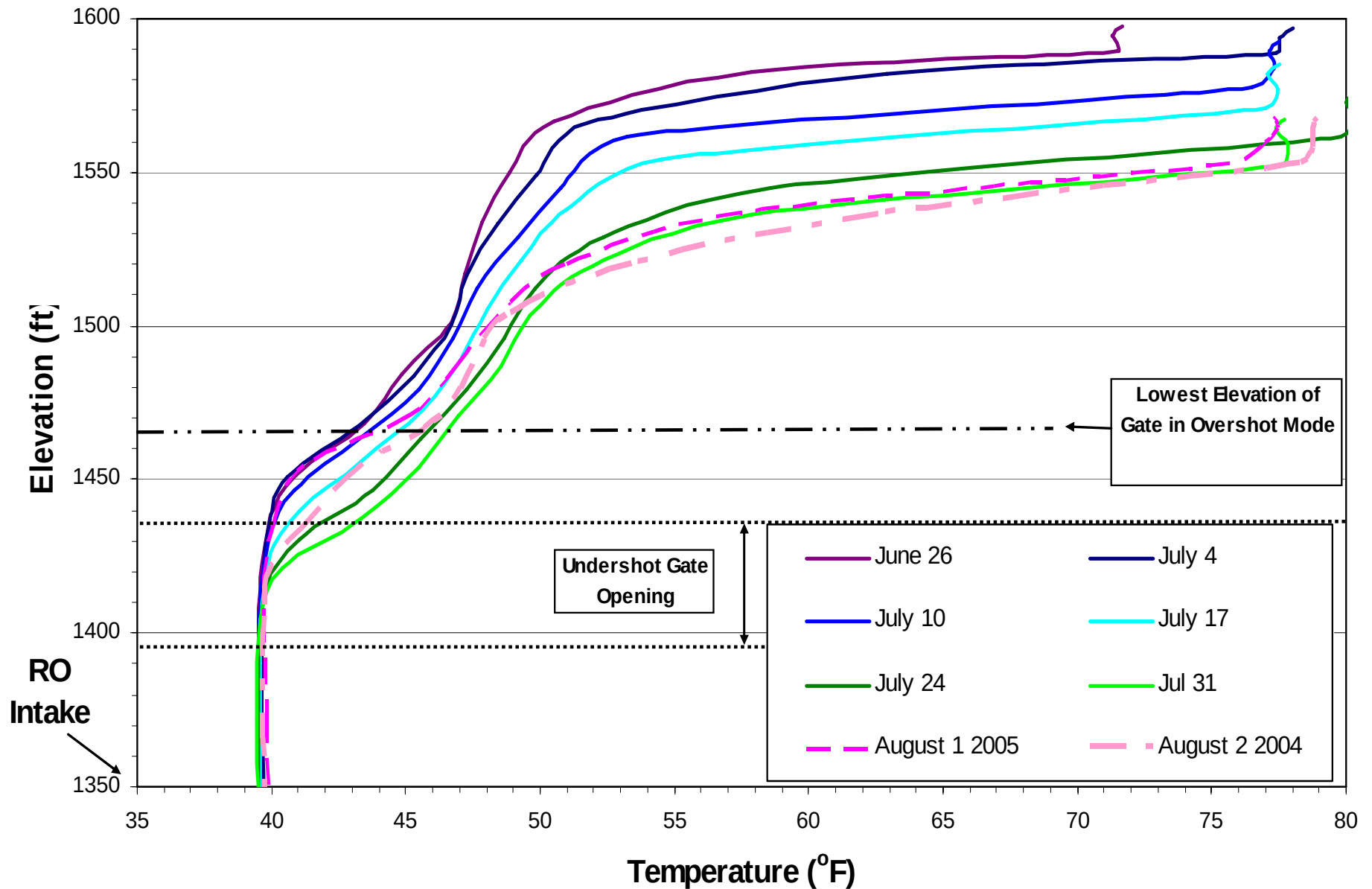
Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer DWR_S1)



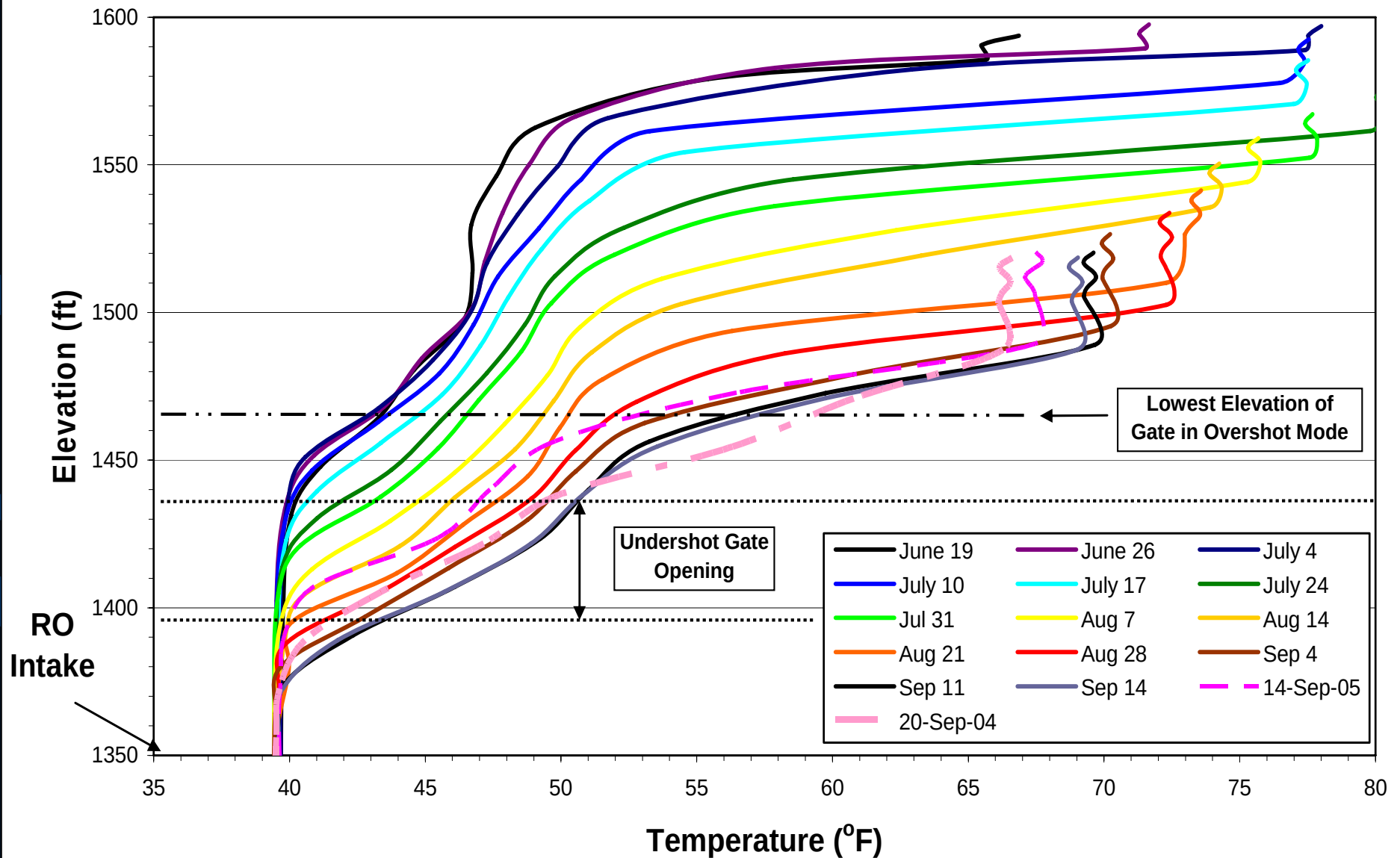
Dworshak Forebay Thermocline 2006

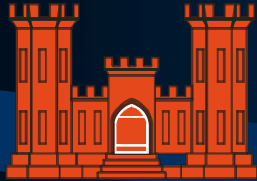
(Data from Floating Temperature Stringer DWR_S1)



Dworshak Forebay Thermocline 2006

(Data from Floating Temperature Stringer DWR_S1)





Technical Management Team 2006 Year End Review

Water Quality

Individual Project Operations



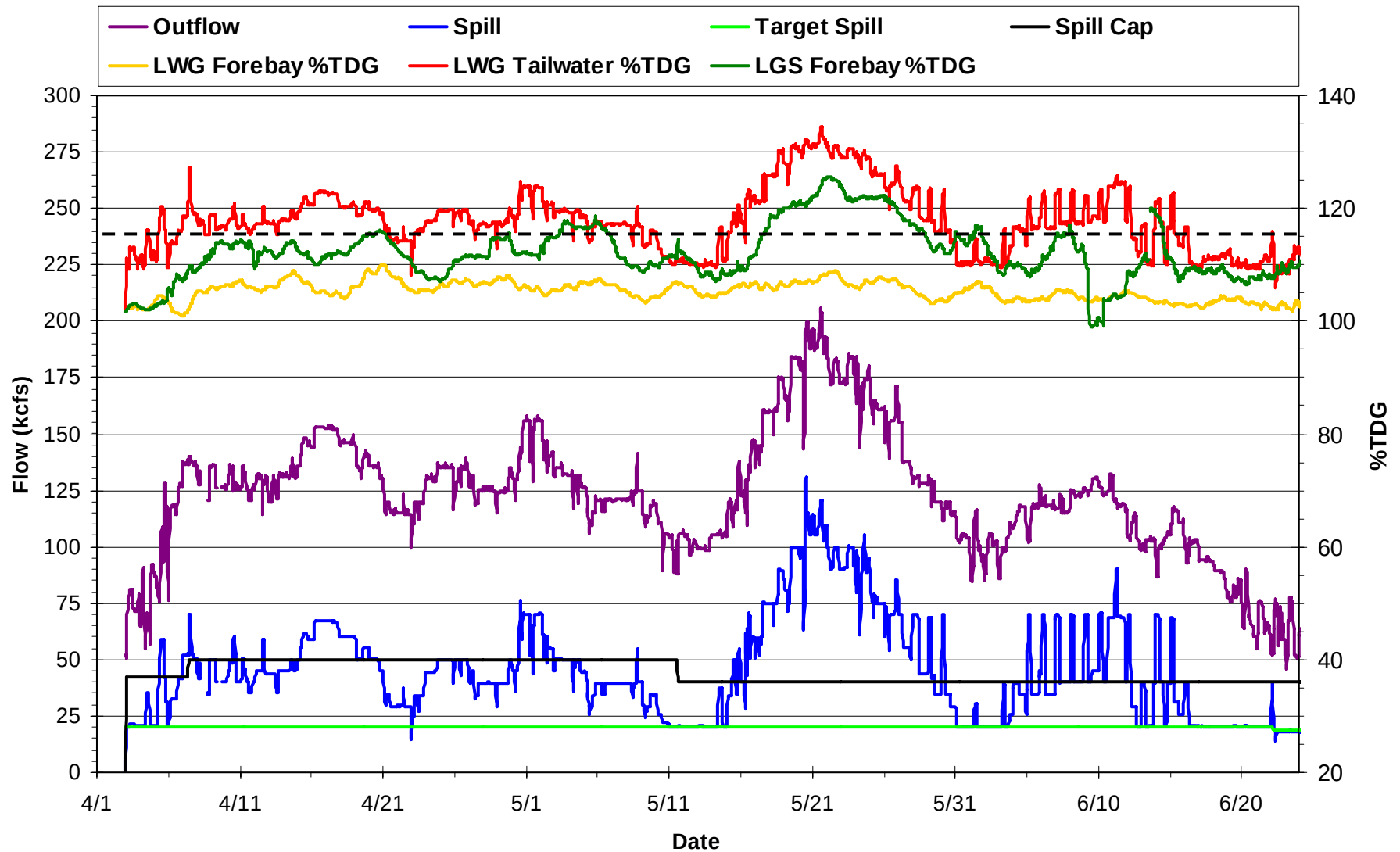
Lower Granite Spill Activities in 2006



2006 Fish Passage Implementation Plan

- Spring Spill (April 3 – June 20)
 - ❖ 20 Kcfs RSW Spill
- Summer Spill (June 21 – August 31)
 - ❖ 18 Kcfs RSW Spill

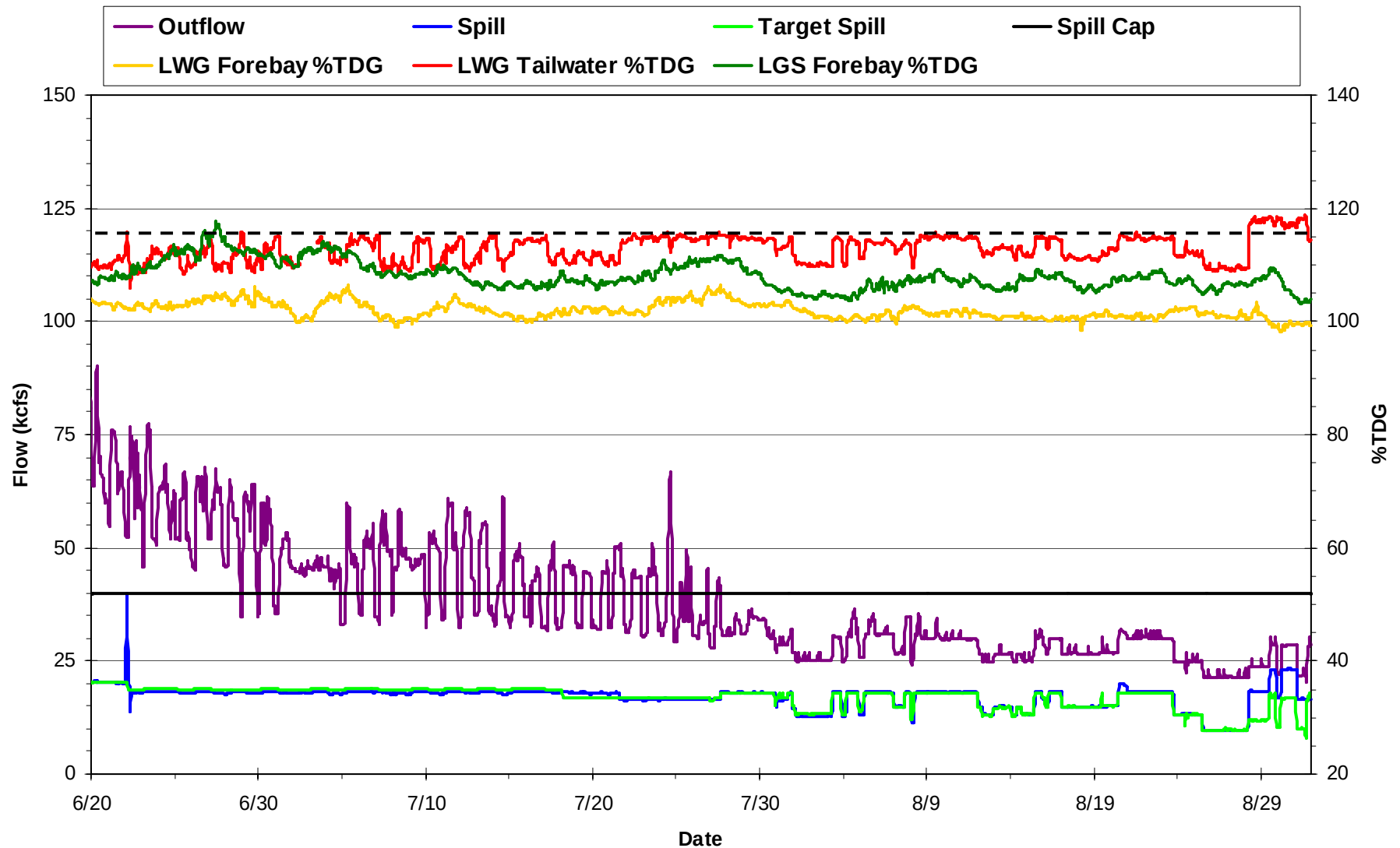
2006 Spring Spill - Lower Granite Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Summer Spill - Lower Granite Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



Lower Granite 2006 TDG Stats



Parameter	Lower Granite Forebay (LWG)	Lower Granite Tailwater (LGNW)	Little Goose Forebay (LGSA)
Number of High 12-hr %TDG Exceedances	0	28	24
Number of Hourly Exceedances of 125% TDG Criteria	0	215	23
Peak %TDG	110.03%	134.5%	125.7%
Hours TDG:	---	---	---
> 110%	1 (0.0%)	3,264 (90.1%)	1638 (45.2%)
> 115%	0 (0.0%)	1,606 (44.3%)	501 (13.8%)
> 120%	0 (0.0%)	556 (15.3%)	188 (5.2%)
> 125%	0 (0.0%)	215 (5.9%)	23 (0.6%)
> 130%	0 (0.0%)	91 (2.5%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



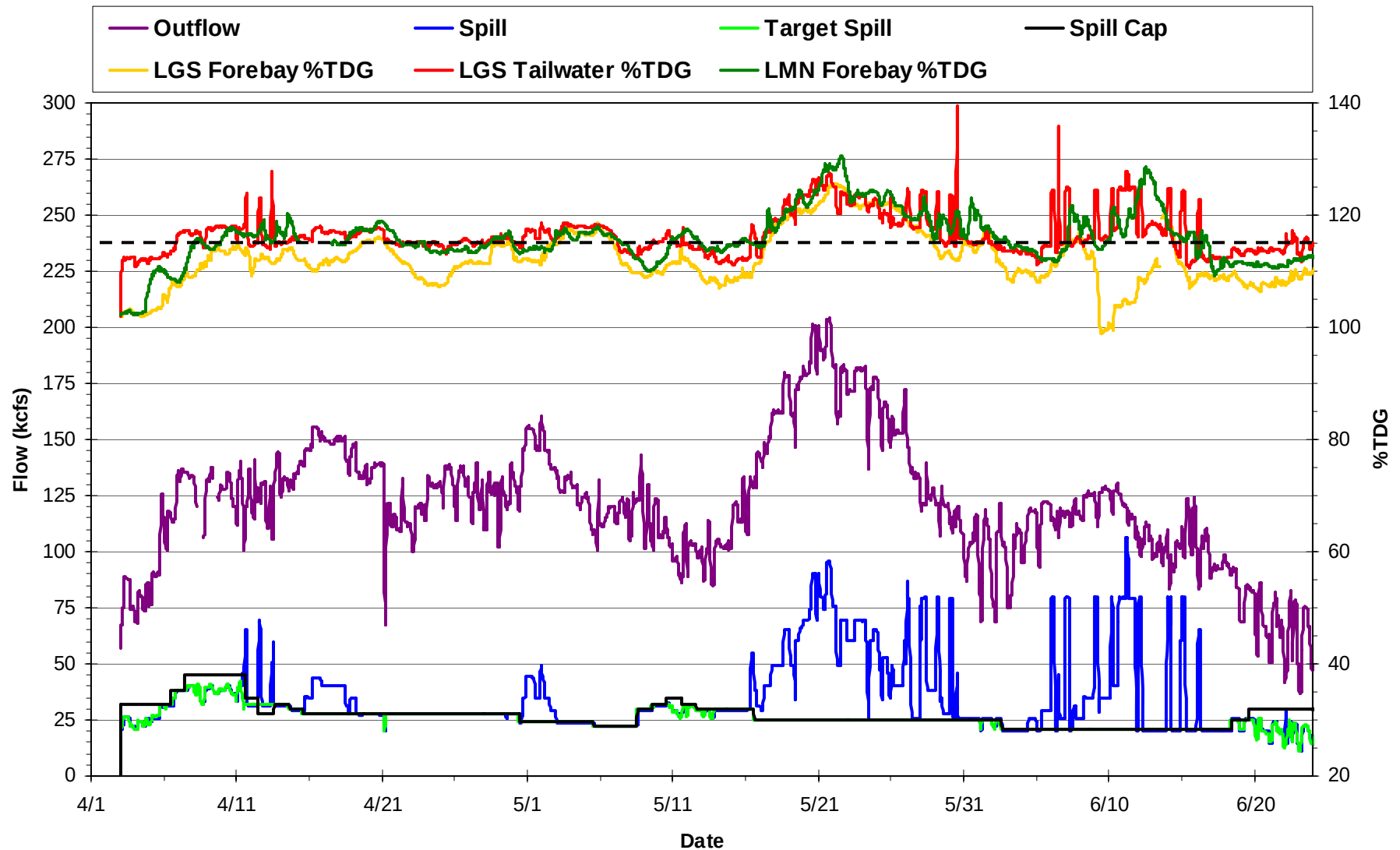
Little Goose Spill Activities in 2006



2006 Fish Passage Implementation Plan

- Spring Spill (April 3 – June 20)
 - ❖ 30% of Total Outflow, 24 Hrs per day.
- Summer Spill (June 21 – August 31)
 - ❖ 30% of Total Outflow, 24 Hrs per day.

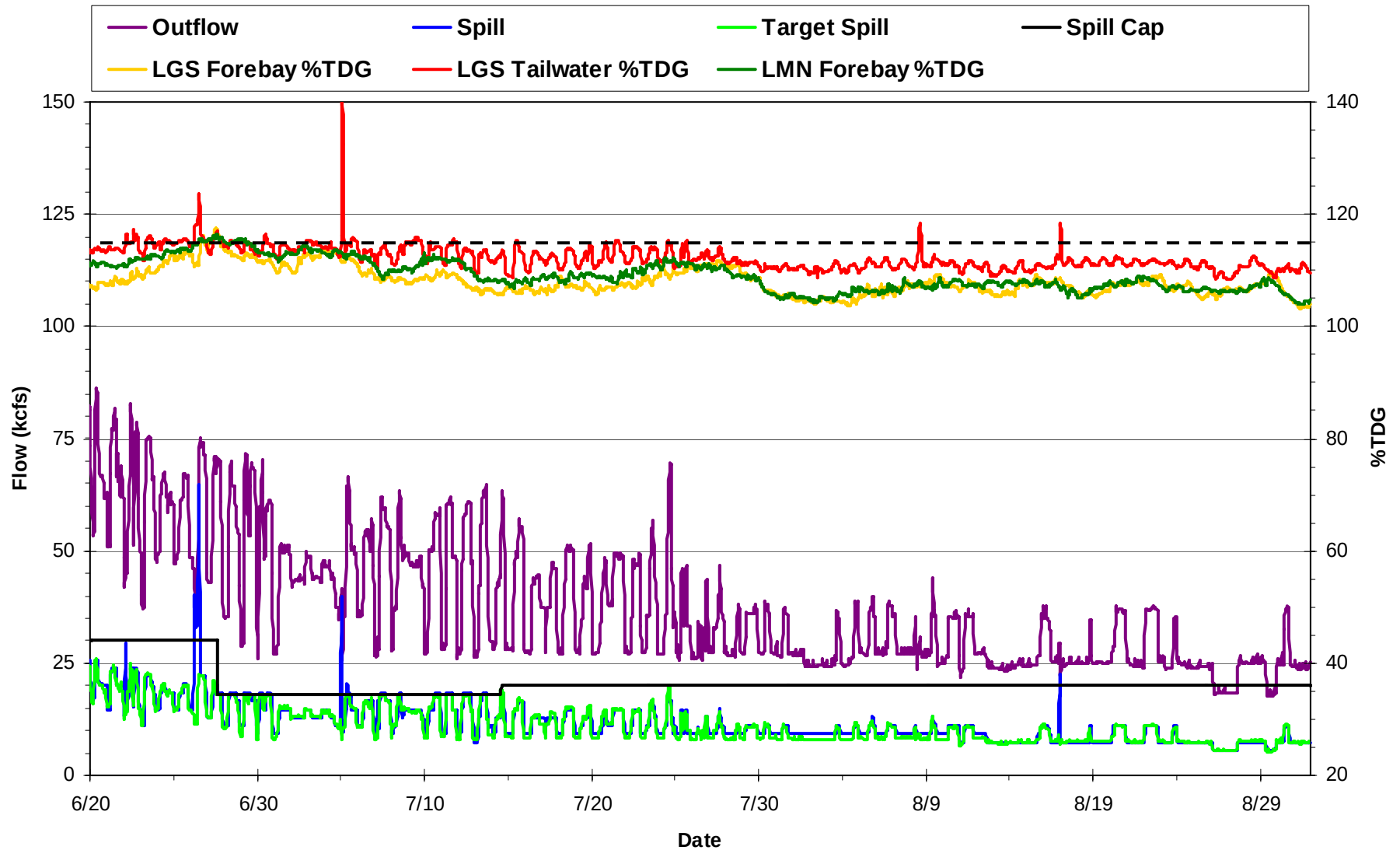
2006 Spring Spill - Little Goose Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Summer Spill - Little Goose Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



Little Goose 2006 TDG Stats



Parameter	Little Goose Forebay (LGSA)	Little Goose Tailwater (LGSW)	Lower Monumental Forebay (LMNA)
Number of High 12-hr %TDG Exceedances	24	18	56
Number of Hourly Exceedances of 125% TDG Criteria	23	45	74
Peak %TDG	125.7%	127.9%	130.6%
Hours TDG:	---	---	
> 110%	1638 (45.2%)	3444 (95.0%)	2358 (65.1%)
> 115%	501 (13.8%)	1329 (36.7%)	1132 (31.2%)
> 120%	188 (5.2%)	301 (8.3%)	310 (8.6%)
> 125%	23 (0.6%)	51 (1.4%)	74 (2.1%)
> 130%	0 (0.0%)	0 (0.0%)	4 (0.1%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



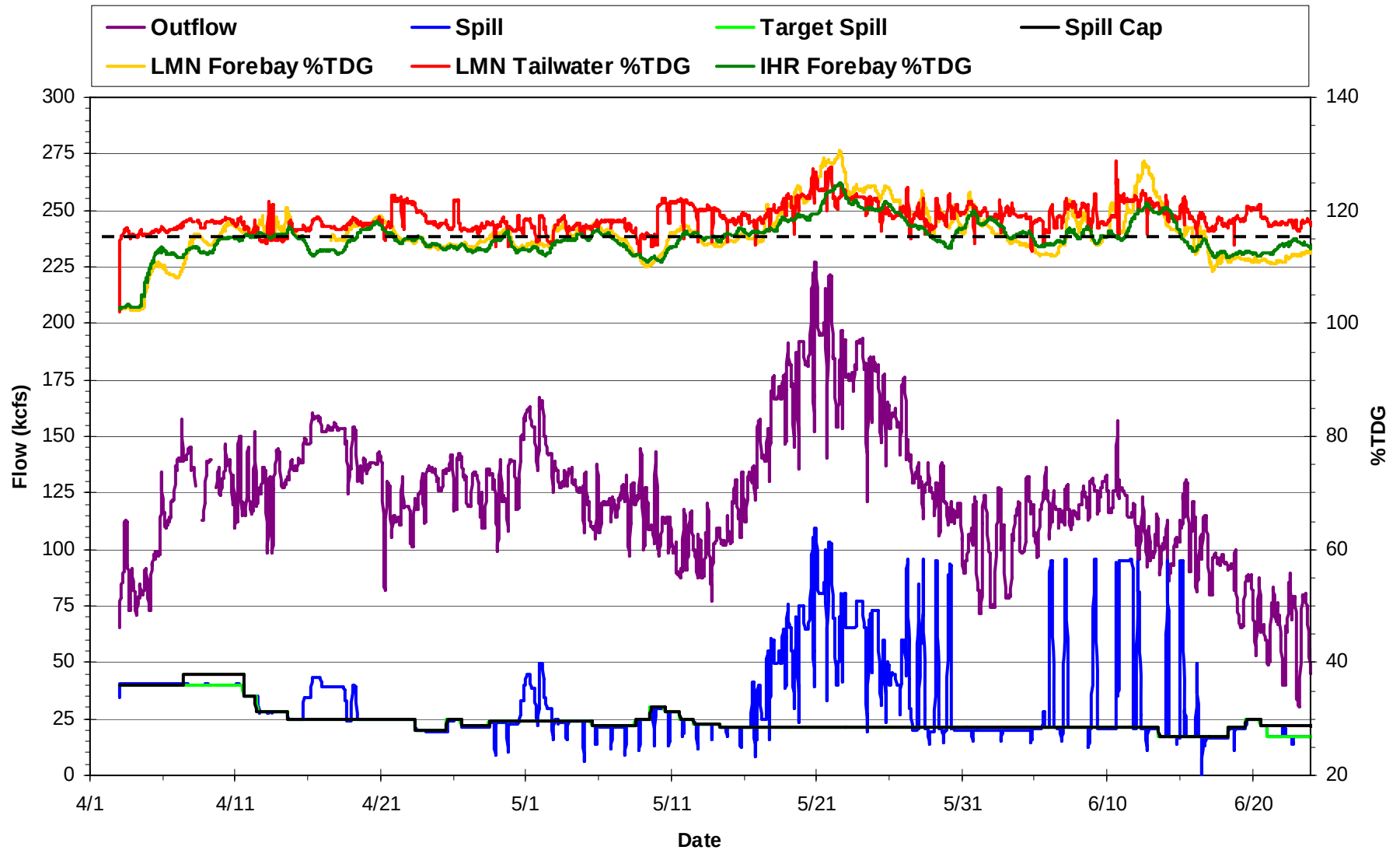
Lower Monumental Spill Activities in 2006



2006 Fish Passage Implementation Plan

- Spring Spill (April 3 – June 20)
 - ❖ To the spill cap up to 40 kcsf.
- Summer Spill (June 21 – August 31)
 - ❖ To the spill cap up to 17 kcfs.

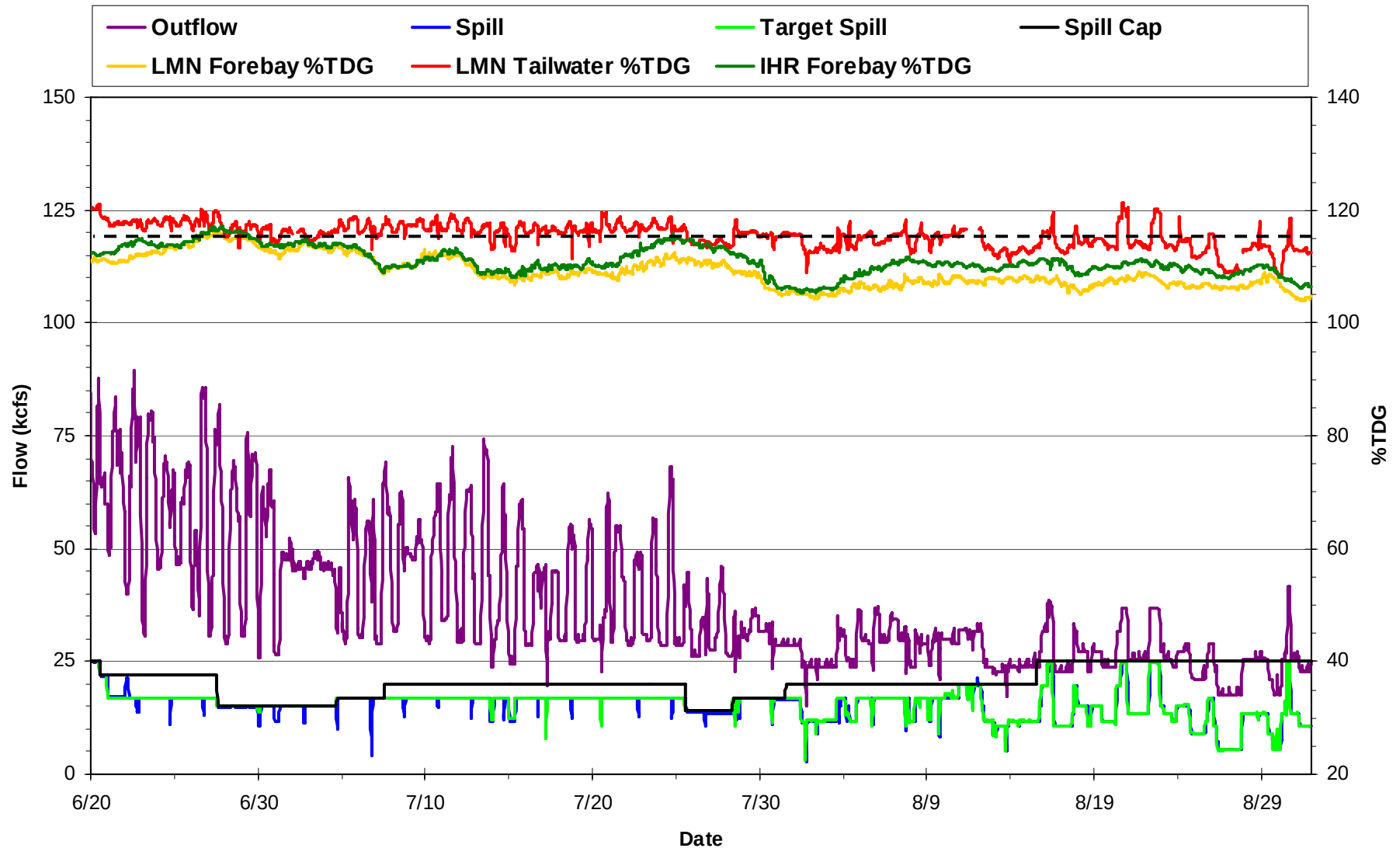
2006 Spring Spill - Lower Monumental Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Spring Spill - Lower Monumental Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



Lower Monumental TDG Stats 2006



Parameter	Lower Monumental Forebay (LMNA)	Lower Monumental Tailwater (LMNW)	Ice Harbor Forebay (IHRA)
Number of High 12-hr %TDG Exceedances	56	29	51
Number of Hourly Exceedances of 125% TDG Criteria	74	20	0
Peak %TDG	130.6%	128.8%	124.9
Hours TDG:	---	---	---
> 110%	2358 (65.1%)	3555 (98.1%)	2942 (81.2%)
> 115%	1132 (31.2%)	2864 (79.0%)	1058 (29.2%)
> 120%	310 (8.6%)	517 (14.3%)	145 (4.0%)
> 125%	74 (2.1%)	20 (0.6%)	0 (0.0%)
> 130%	4 (0.1%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)

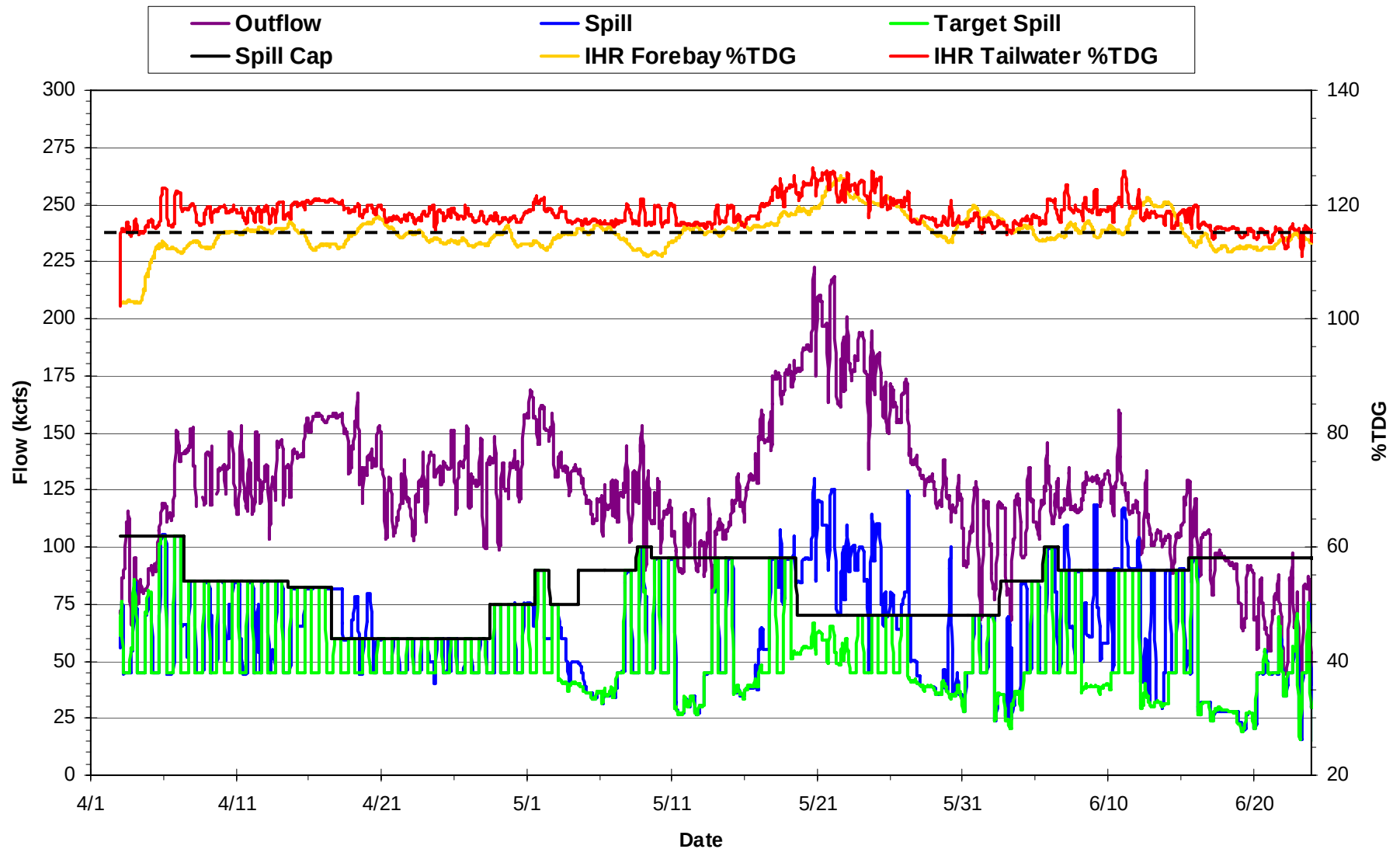


Ice Harbor Spill Activities in 2006

2006 Fish Passage Implementation Plan

- Spring Spill (April 3 - June 20)
 - ❖ Daytime (0500-1800 hrs) - 45 kcfs
 - ❖ Nighttime (1800-0500 hrs) - To the Spill Cap.
- Summer Spill (June 21 - August 31)
 - ❖ Alternate between 30% of outflow 24 hrs/day and 45 kcfs Daytime/to the Spill Cap at night.

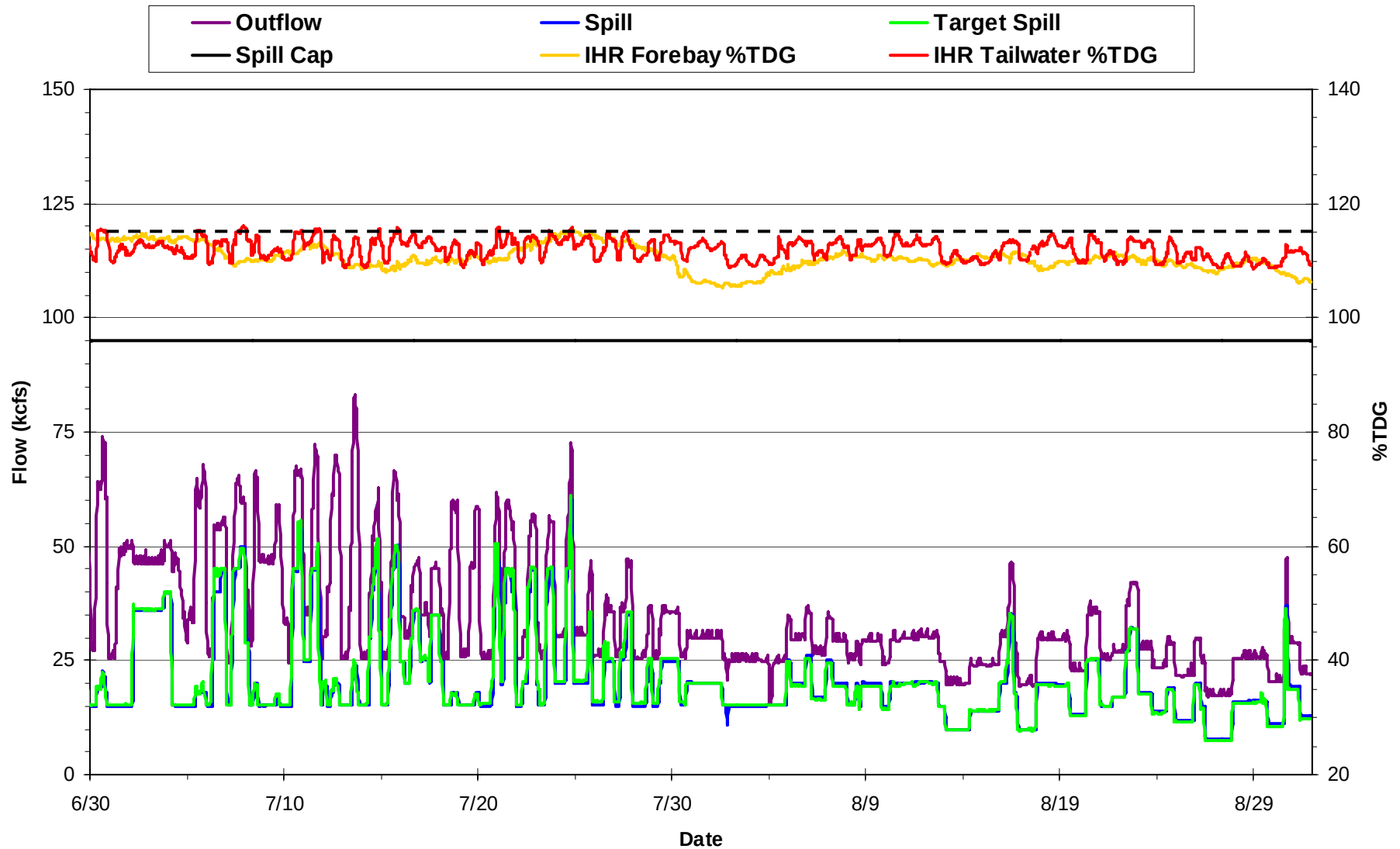
Spring Spill - Ice Harbor Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

Spring Spill - Ice Harbor Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

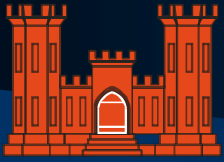
Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



Ice Harbor 2006 Spill Stats



Parameter	Ice Harbor Forebay (IHRA)	Ice Harbor Tailwater (IDSW)	McNary Forebay (MCNA)
Number of High 12-hr %TDG Exceedances	51	22	31
Number of Exceedances of 125% TDG Criteria	0	32	0
Peak %TDG	124.9	126.3%	119.8%
Hours TDG:	---	---	---
> 110%	2942 (81.2%)	3361 (92.7%)	2036 (56.2%)
> 115%	1041 (28.7%)	2002 (55.2%)	607 (16.7%)
> 120%	145 (4.0%)	403 (11.1%)	0 (0.0%)
> 125%	0 (0.0%)	32 (0.9%)	0 (0.0%)
> 130%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



McNary

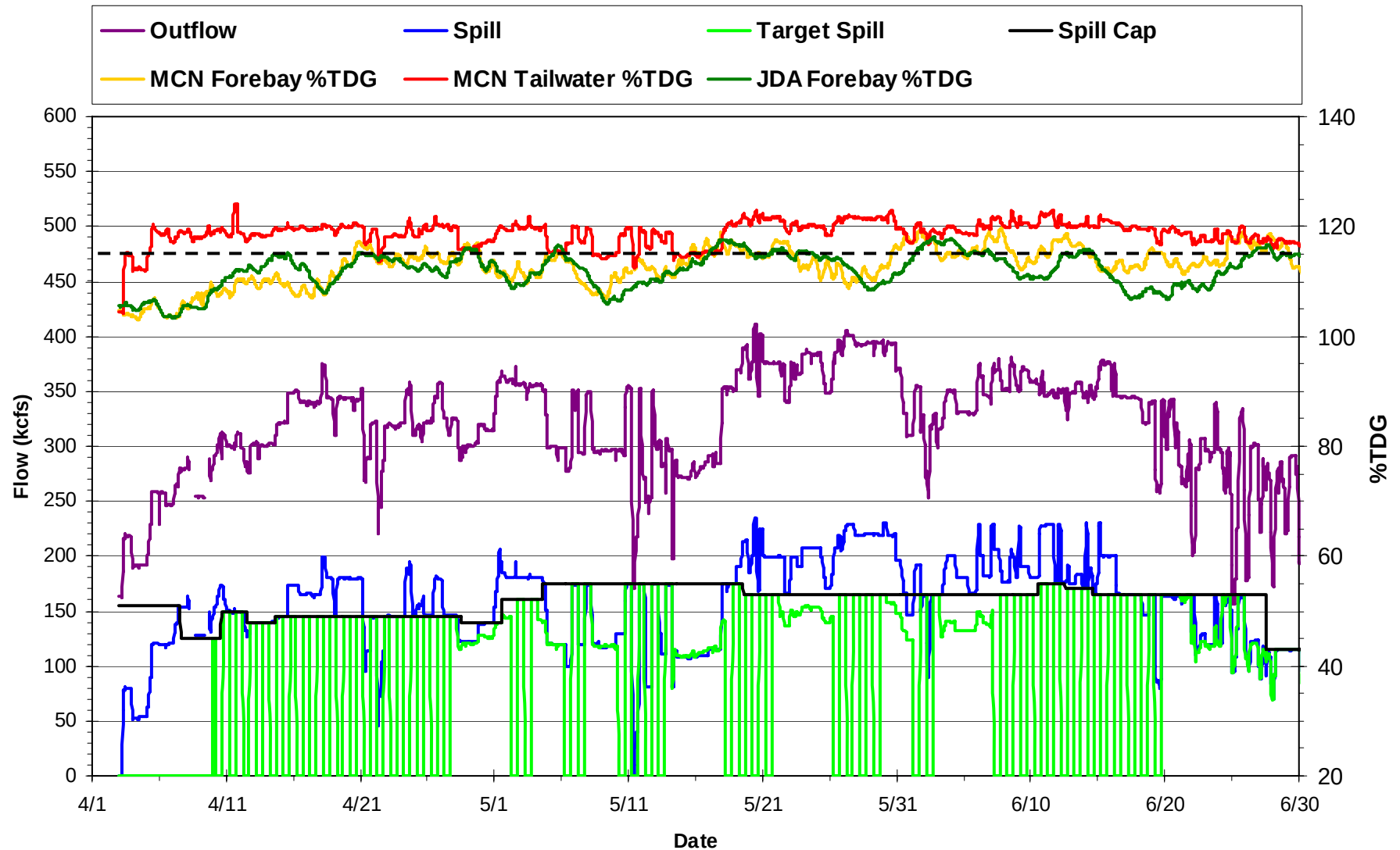


Spill Activities in 2006

2006 Fish Passage Implementation Plan

- Spring Spill (April 10 – June 30)
 - April 10 – April 22:
 - Daytime (0500-1800 hrs) – 0 kcfs
 - Nighttime (1800-0500 hrs) – To the Spill Cap
 - April 23 – June 19:
 - Alternate between 40% of Outflow, 24 hrs/day and 0 kcfs daytime/To the Spill Cap at night
- Summer Spill (June 20 – August 31)
 - Alternate between 40% and 60% of Outflow (up to the spill cap).

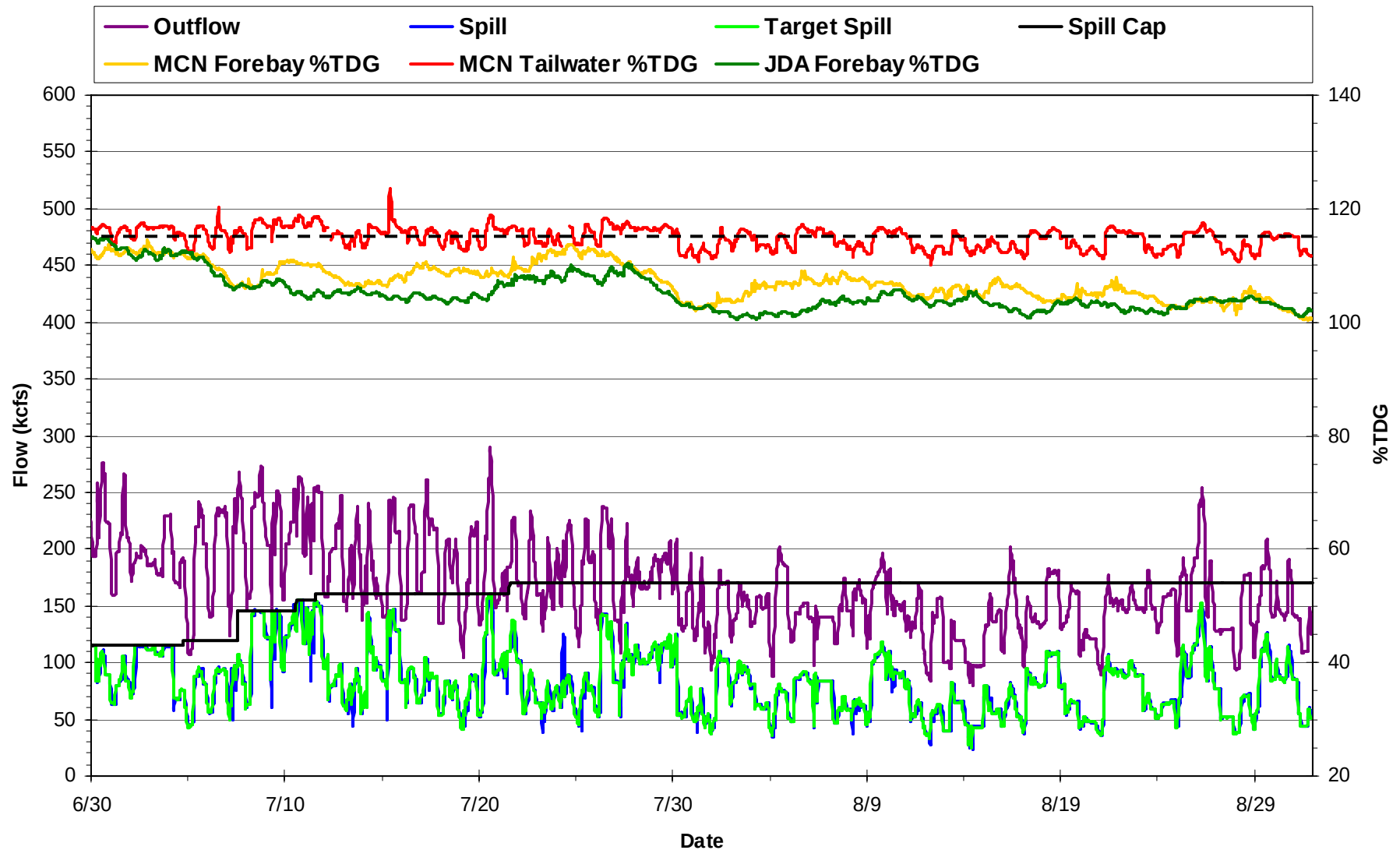
2006 Spring Spill - McNary Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

Summer Spill - McNary Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



McNary 2006 Spill Stats



Parameter	McNary Forebay (MCNA)	McNary Tailwater (MCPW)	John Day Forebay (JDY)
Number of High 12-hr %TDG Exceedances	31	32	20
Number of Exceedances of 125% TDG Criteria	0	0	0
Lower Granite Tailwater Peak %TDG	119.8%	124.1%	118.1%
Hours TDG:	---	---	---
> 110%	2036 (56.2%)	3602 (99.4%)	1678 (46.3%)
> 115%	607 (16.7%)	2784 (76.8%)	377 (10.4%)
> 120%	0 (0.0%)	551 (15.2%)	0 (0.0%)
> 125%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 130%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



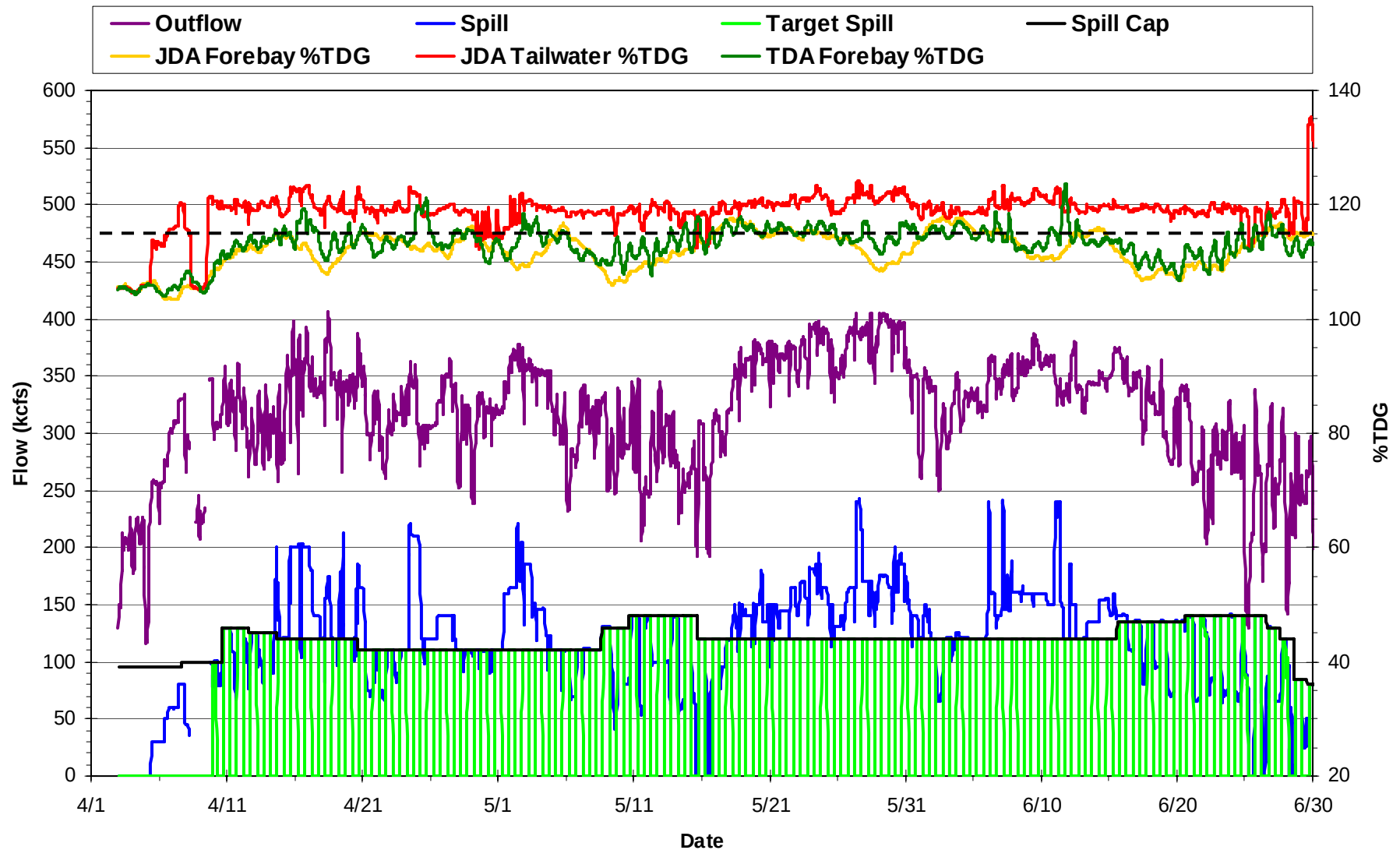
John Day Spill Activities in 2006



2006 Fish Passage Implementation Plan

- Spring Spill (April 3 - June 30)
 - ❖ Daytime (0600-1800 hrs) - 0 kcfs
 - ❖ Nighttime (1800-0600 hrs) - 60% of Outflow.
- Summer Spill (June 21 - August 31)
 - ❖ 30% of outflow 24 hrs/day.

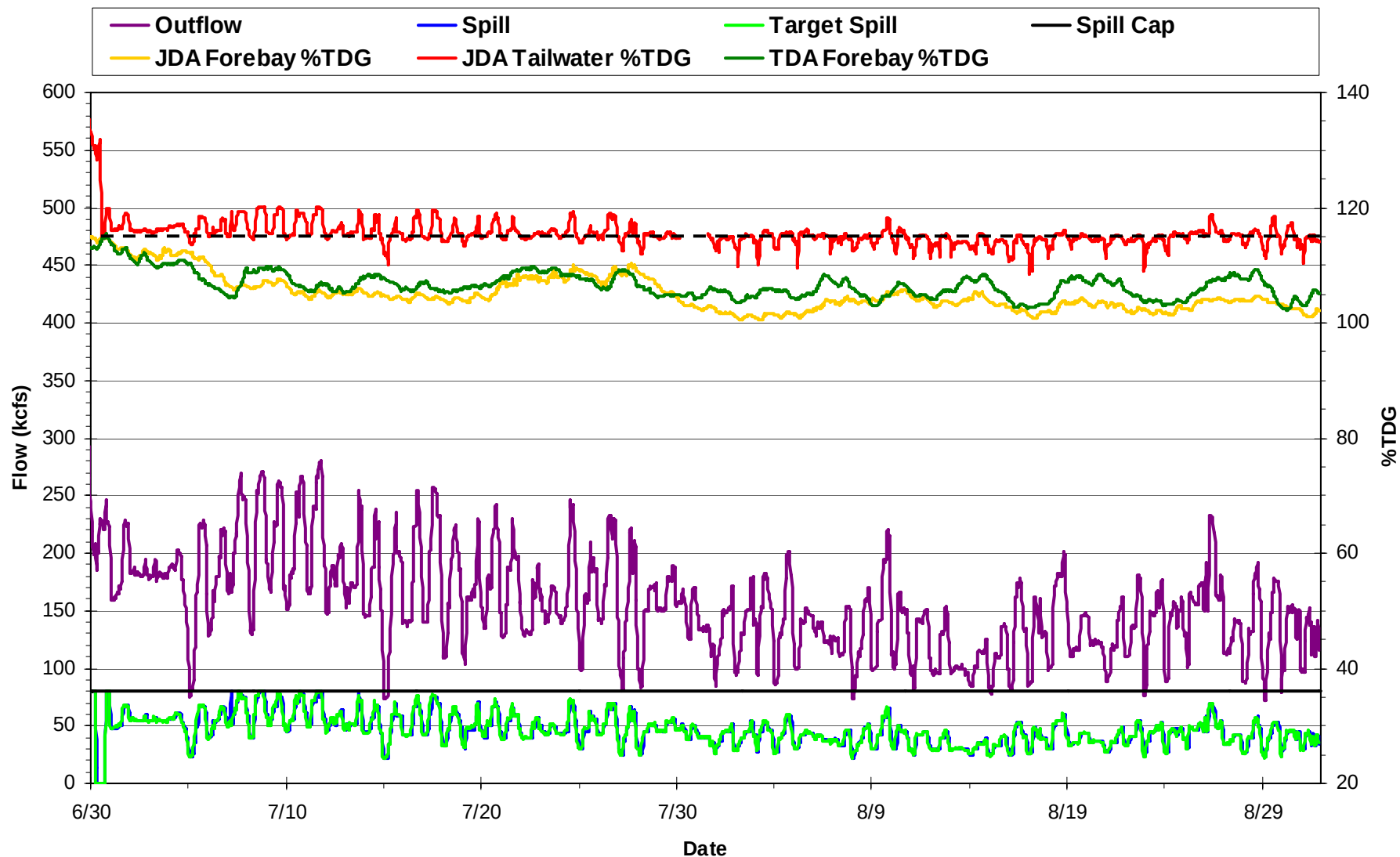
2006 Spring Spill - John Day Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Summer Spill - John Day Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

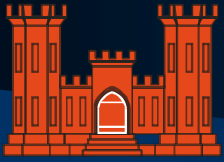
Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



John Day 2006 Spill Stats



Parameter	John Day Forebay (JDY)	John Day Tailwater (MCPW)	The Dalles Forebay (TDA)
Number of High 12-hr %TDG Exceedances	20	38	40
Number of Exceedances of 125% TDG Criteria	0	0	0
Peak %TDG	118.1%	124.2%	123.6%
Hours TDG:	---	---	---
> 110%	1678 (46.3%)	3498 (96.5%)	1933 (53.3%)
> 115%	377 (10.4%)	2759 (76.1%)	584 (16.1%)
> 120%	0 (0.0%)	615 (17.0%)	14 (0.4%)
> 125%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 130%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)

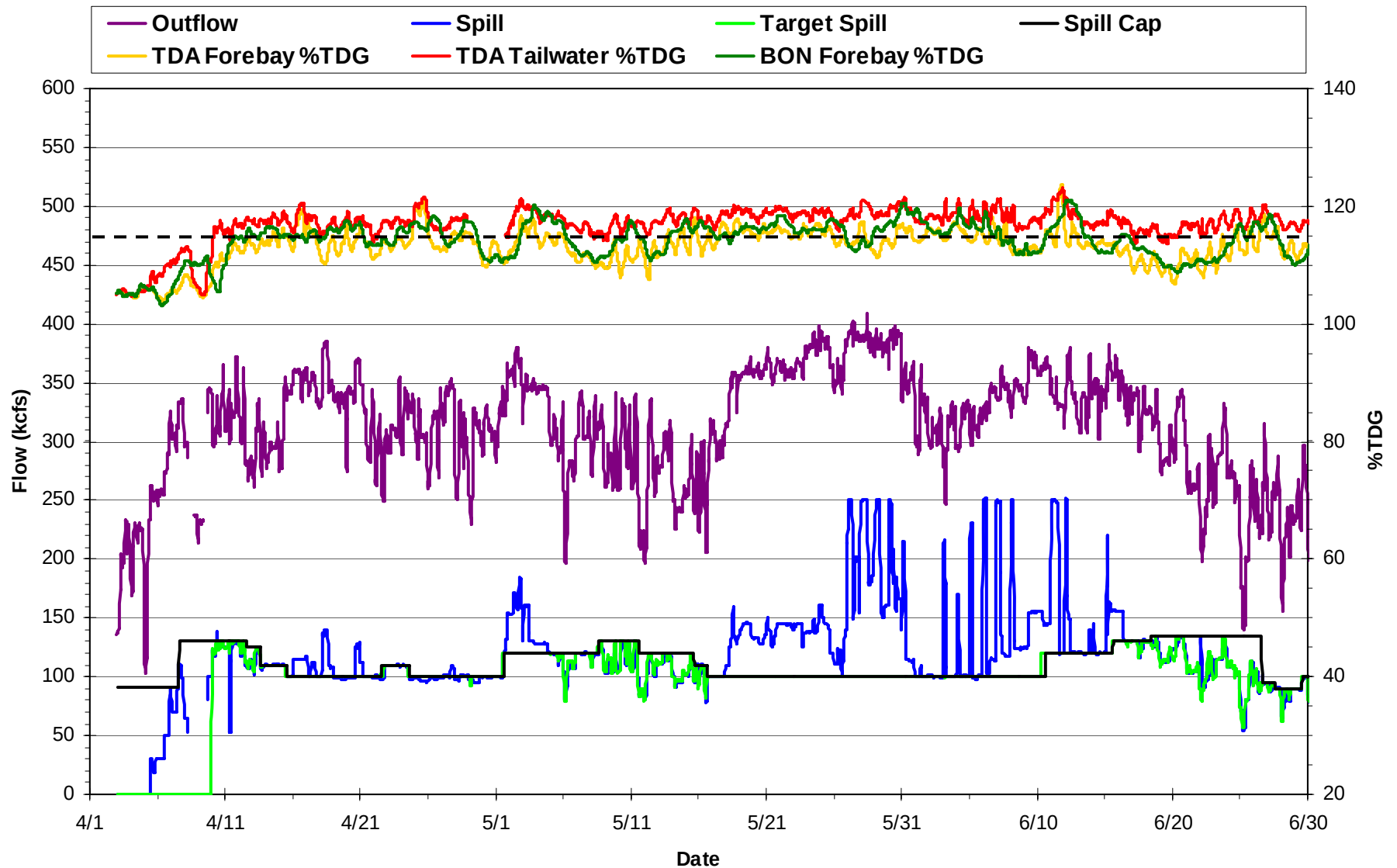


The Dalles Spill Activities in 2006

2006 Fish Passage Implementation Plan

- Spring Spill (April 3 - June 30)
 - ❖ 40% of Outflow, 24 hrs/day
- Summer Spill (July 1 - August 31)
 - ❖ 40% of Outflow, 24 hrs/day

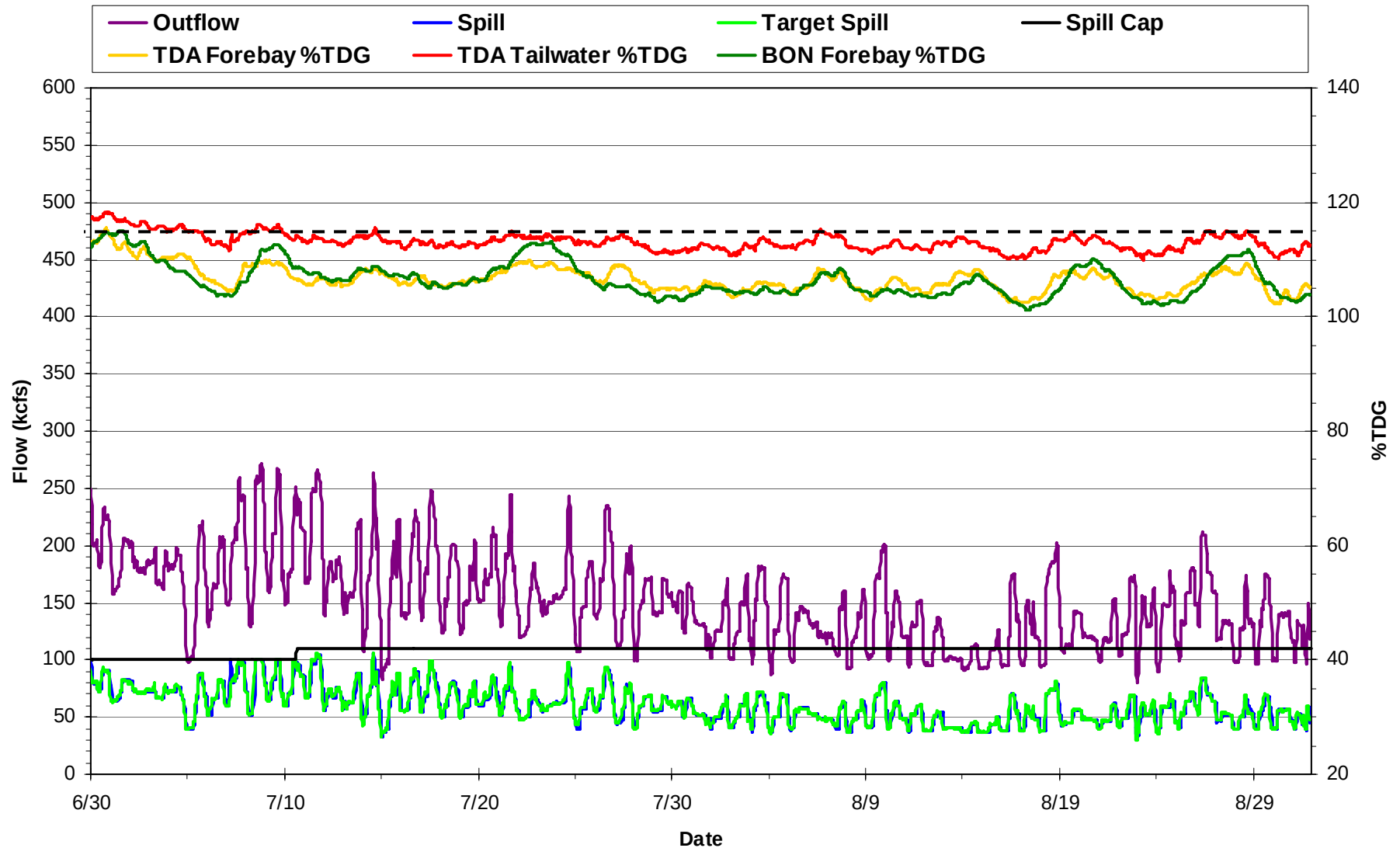
2006 Spring Spill - The Dalles Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Summer Spill - The Dalles Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



The Dalles 2006 Spill Stats



Parameter	The Dalles Forebay (TDA)	The Dalles Tailwater (TDDO)	Bonneville Forebay (BON)
Number of High 12-hr %TDG Exceedances	40	10	51
Number of Exceedances of 125% TDG Criteria	0	0	0
Peak %TDG	123.6%	123.1%	121.1%
Hours TDG:	---	---	---
> 110%	1933 (53.3%)	3434 (94.8%)	2141 (59.1%)
> 115%	584 (16.1%)	1974 (54.5%)	1005 (27.7%)
> 120%	14 (0.4%)	121 (3.3%)	33 (0.9%)
> 125%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 130%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



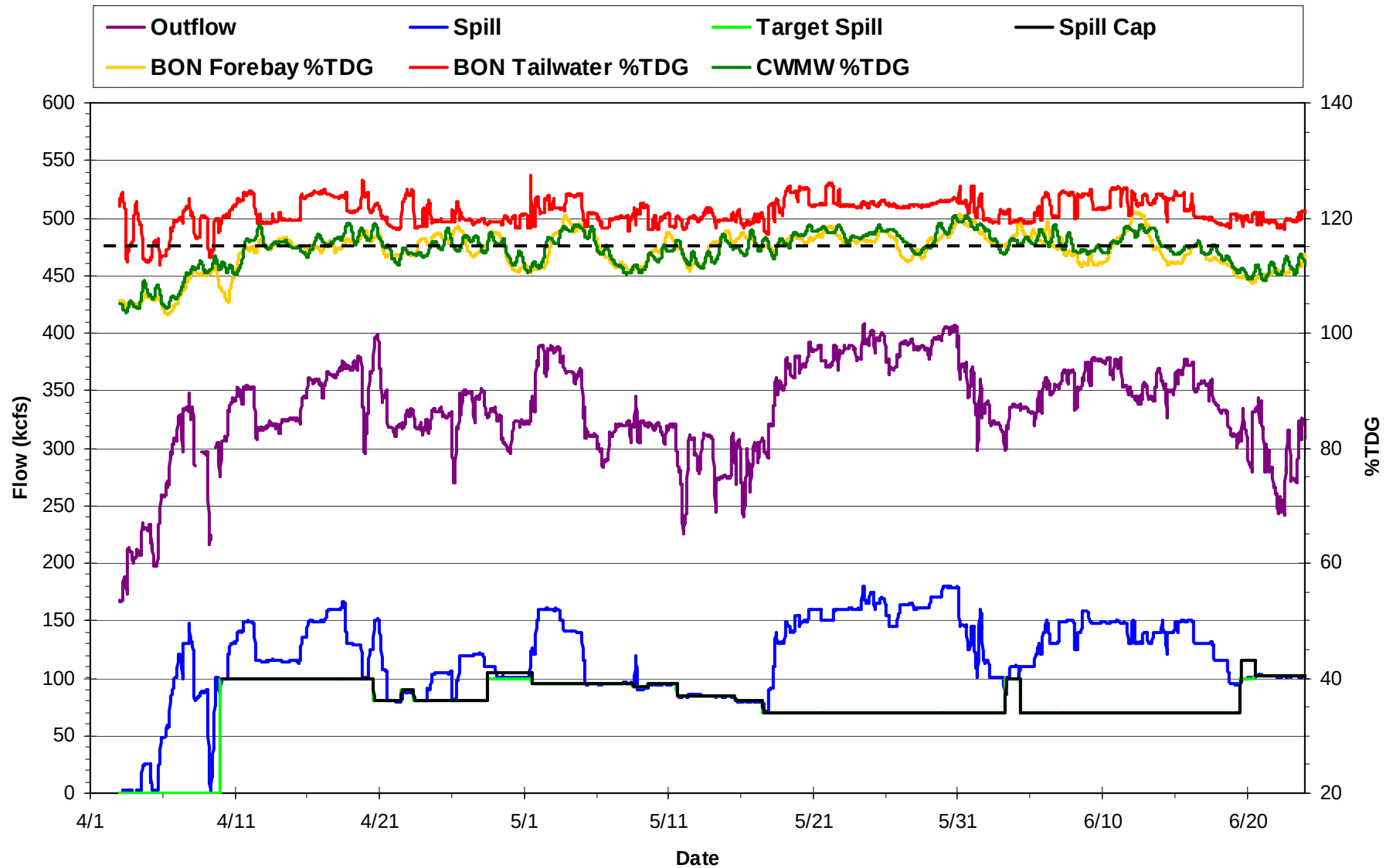
Bonneville Spill Activities in 2006



2006 Fish Passage Implementation Plan

- Spring Spill (April 10 - June 30)
 - ❖ To the Spill Cap up to 100 kcfs.
- Summer Spill (July 1 - August 31)
 - ❖ Daytime: 75 kcfs
 - ❖ Nighttime: To the Spill Cap

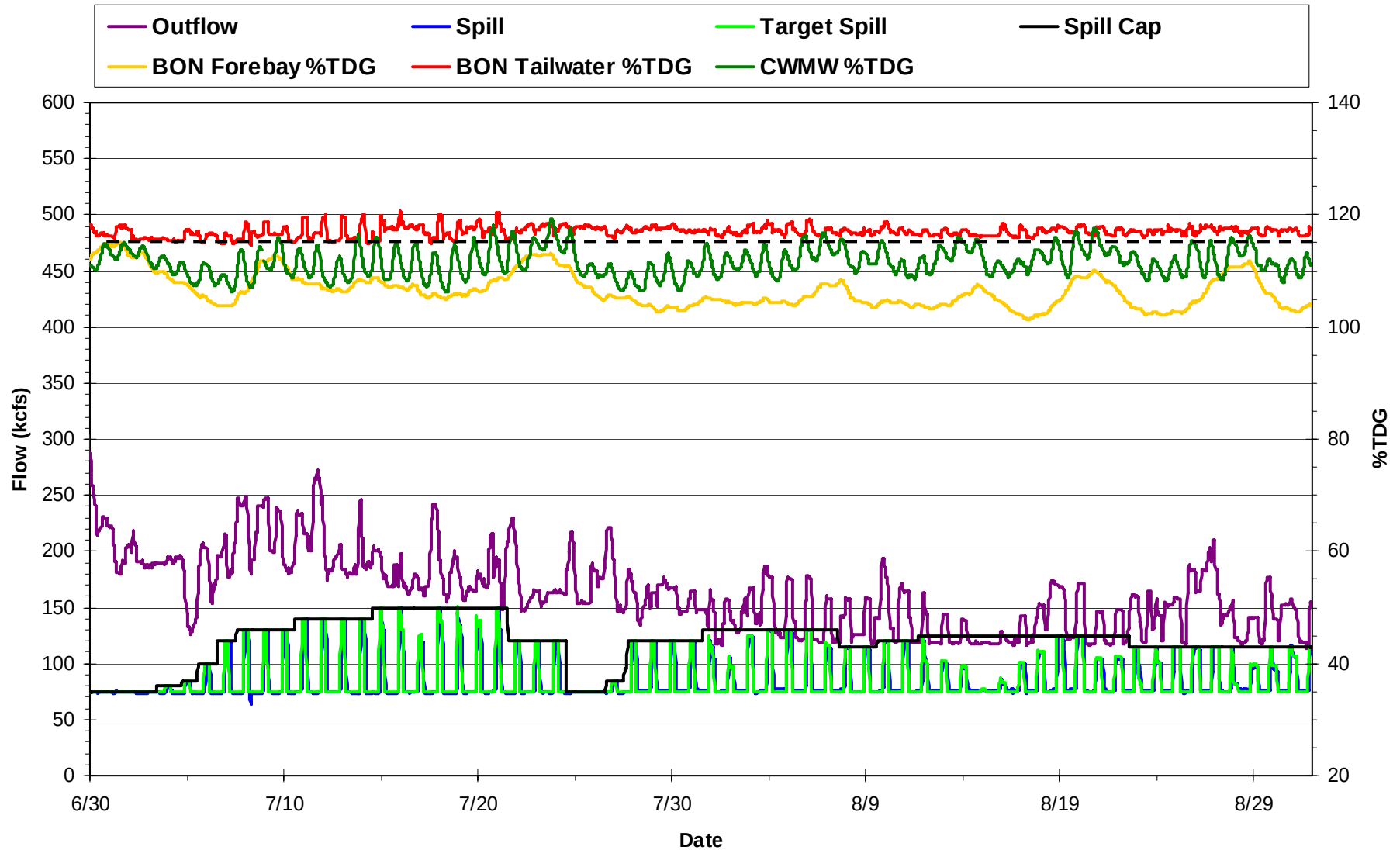
2006 Spring Spill - Bonneville Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.

2006 Summer Spill - Bonneville Dam



Target Spill = Quantity of Spill specified in the Fish Passage Implementation Plan.

Spill Cap = Maximum amount of spill that will keep TDG levels below State TDG Criteria.



Bonneville

2006 Spill Stats



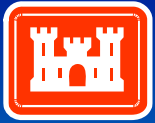
Parameter	Bonneville Forebay (BON)	Bonneville Tailwater (CCIW)	Camas-Washougal (CWMW)
Number of High 12-hr %TDG Exceedances	51	61	63
Number of Exceedances of 125% TDG Criteria	0	0	0
Lower Granite Tailwater Peak %TDG	121.1%	127.5%	120.5%
Hours TDG:	---	---	---
> 110%	2141 (59.1%)	3624 (100.0%)	3018 (83.3%)
> 115%	1005 (27.7%)	3568 (98.5%)	1149 (31.7%)
> 120%	33 (0.9%)	1179 (32.5%)	11 (0.3%)
> 125%	0 (0.0%)	64 (1.8%)	0 (0.0%)
> 130%	0 (0.0%)	0 (0.0%)	0 (0.0%)
> 135%	0 (0.0%)	0 (0.0%)	0 (0.0%)



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Anadromous Fish Evaluation Program Summary of 2006 Research

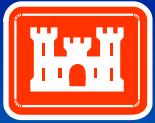
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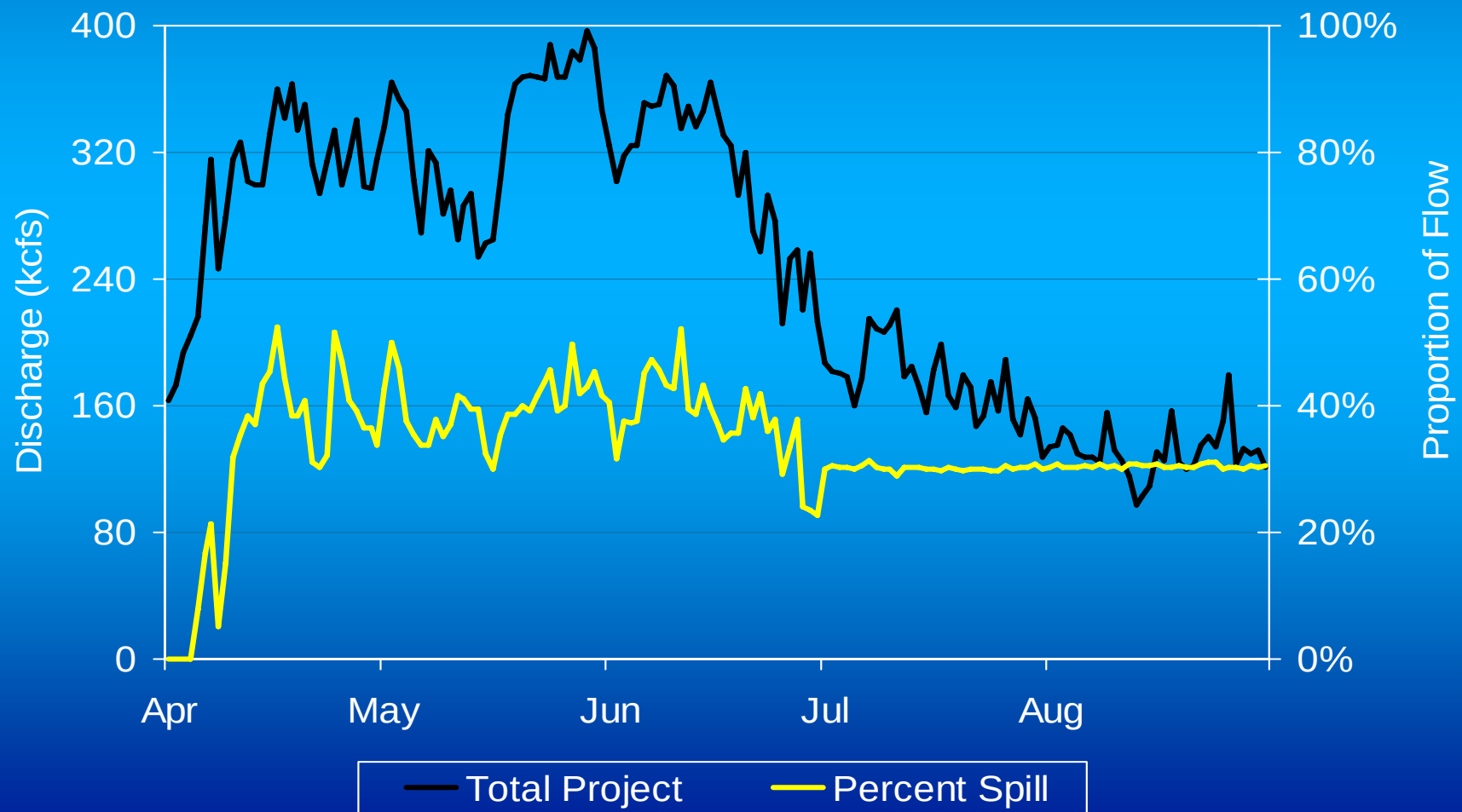
Portland District Projects

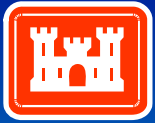
- **John Day Dam**
 - ◆ Turbine and tailrace survival
 - ◆ Plan for 2007
- **The Dalles Dam**
 - ◆ Spillway Studies
 - ◆ Plan for 2007
- **Bonneville Dam**
 - ◆ Corner Collector PIT detection
 - ◆ Survival (Pool, Project, Spillway)
 - ◆ Plan for 2007
- **System**
 - ◆ Turbine Survival Program
 - ◆ JSATS Tag Effects
 - ◆ Post-FCRPS Survival
 - ◆ Future Plans



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John Day Dam: *2006 Operations*

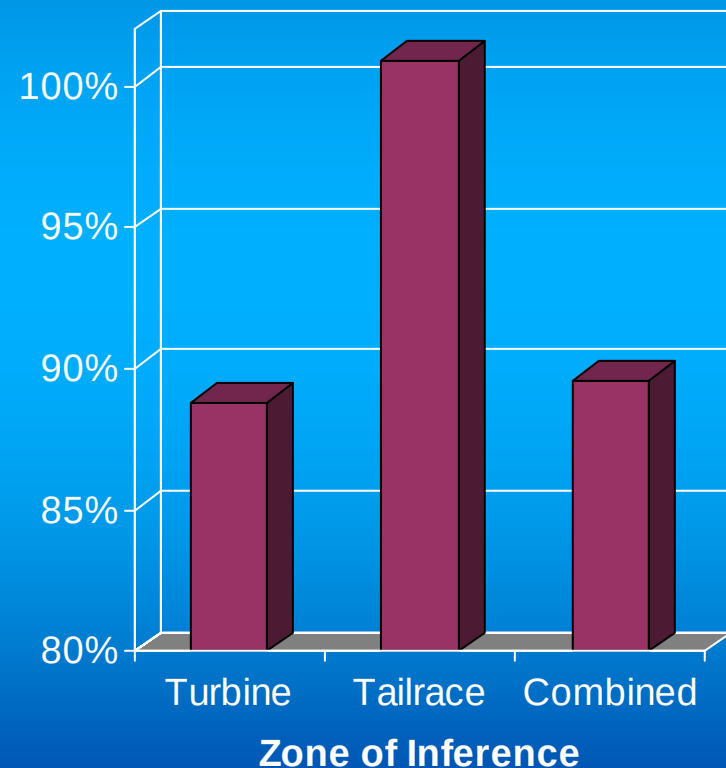


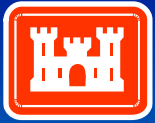


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John Day Dam: *Turbine and Tailrace* *survival*

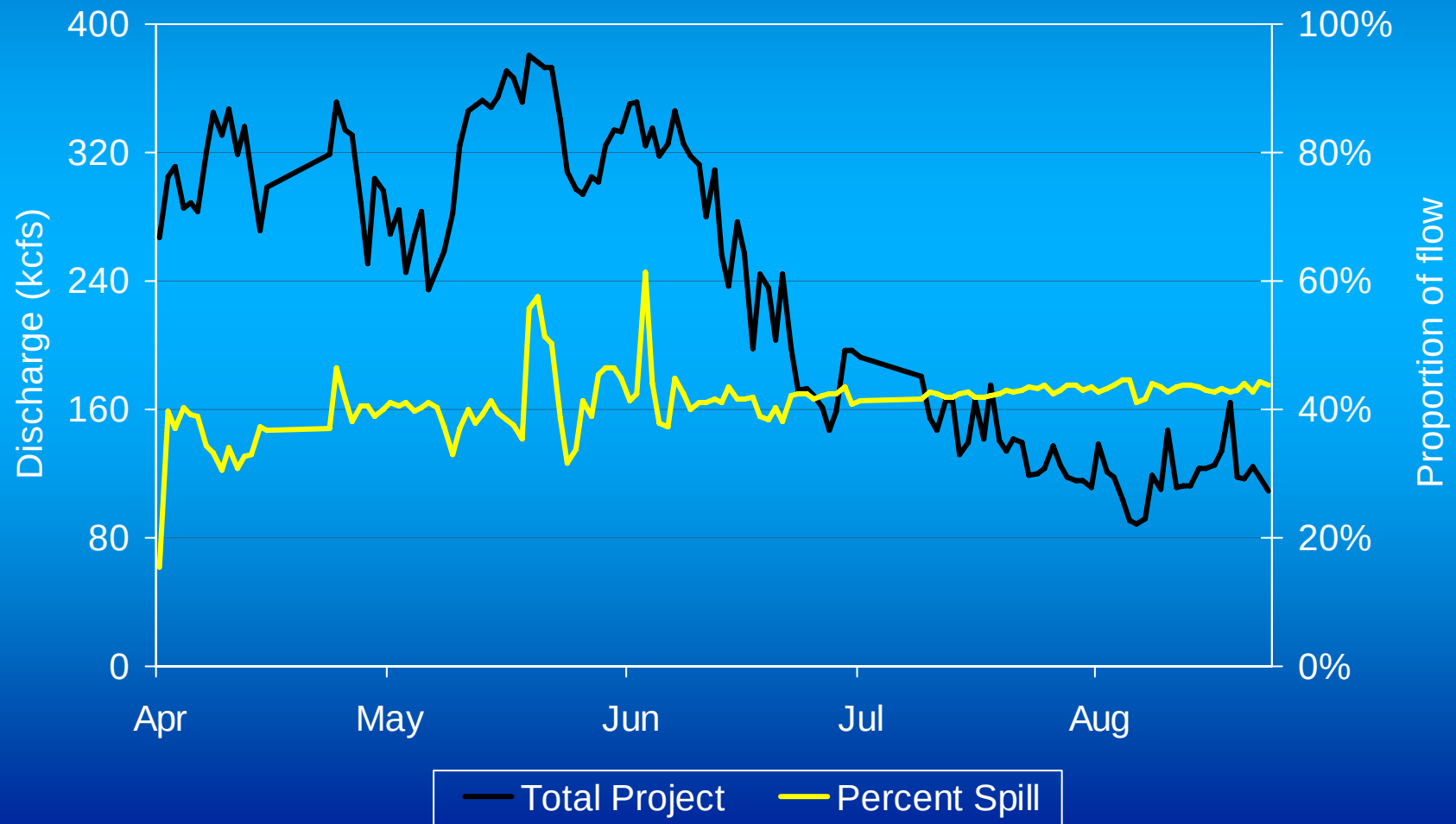
- 2006 Studies
 - ◆ Release Locations
 - ◆ Results
 - ◆ Conclusions
- Plan for 2007
 - ◆ TSW Development

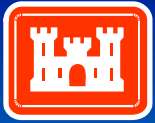




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The Dalles Dam: *2006 Operations*





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The Dalles Dam: *Spillway Studies*

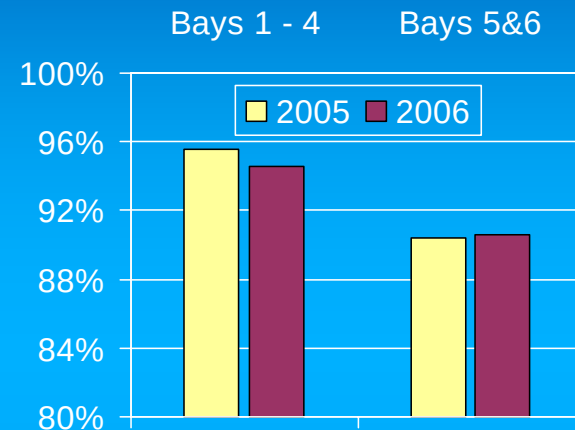
- **Spillway Vortex**

- ◆ *Distribution*
- ◆ *Survival (SR)*
- ◆ *Tailrace Egress*

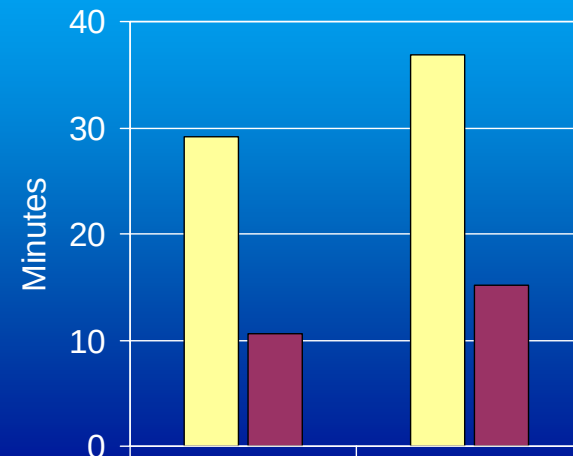
- **Project Survival (PR)**

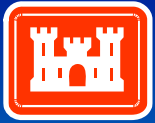
- **Plan for 2007**

Survival



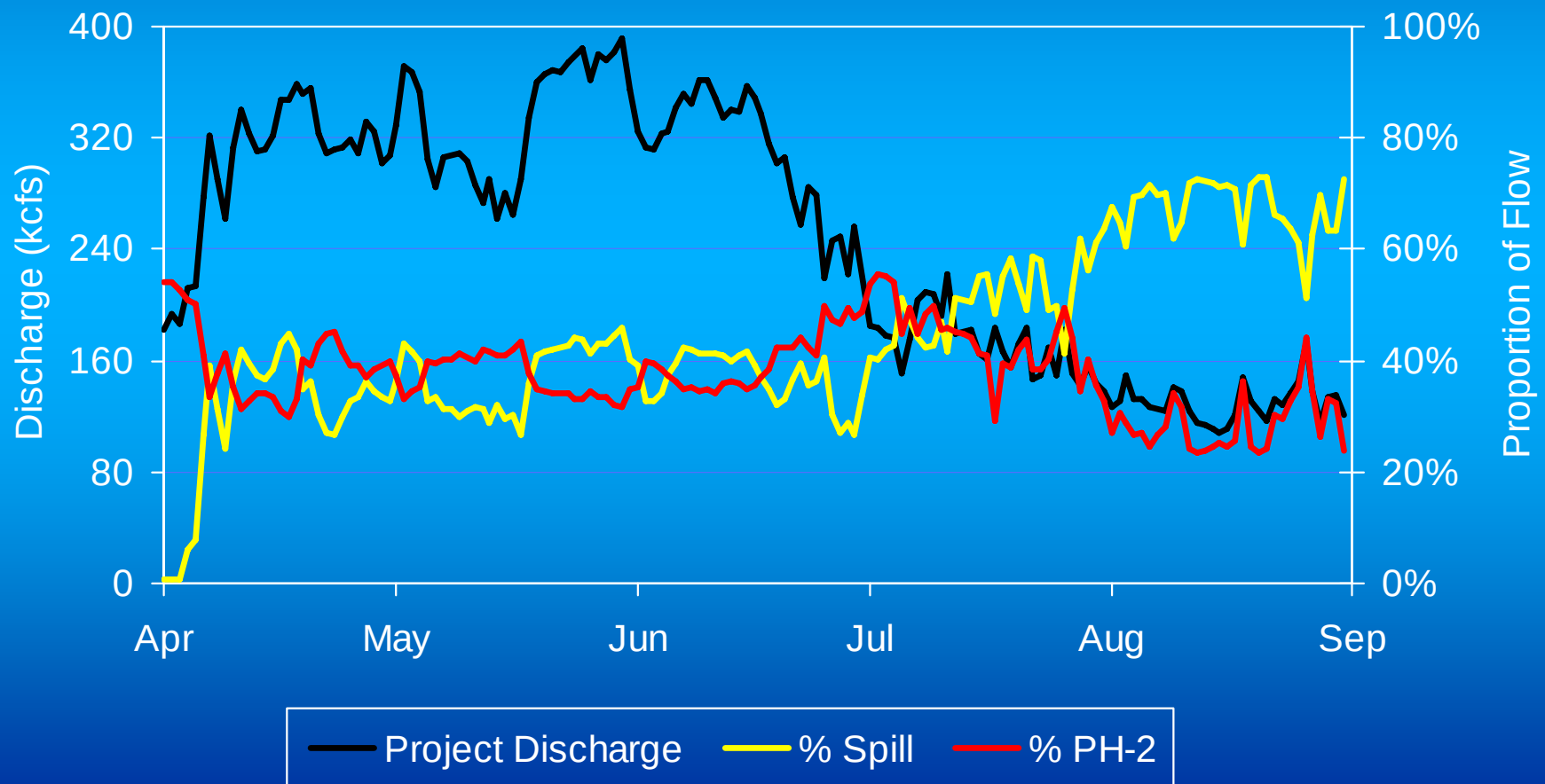
Tailrace Egress

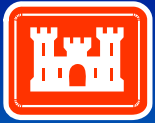




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Bonneville Dam: *2006 Operations*





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Bonneville Dam: *Detection and Survival*

● B2CC PIT Detection

- ◆ *ROR CH1 w/ST = 52%*
- ◆ *ROR CH1 w/SST = 69%*
- ◆ *Direct w/SST = 60%*

● Survival

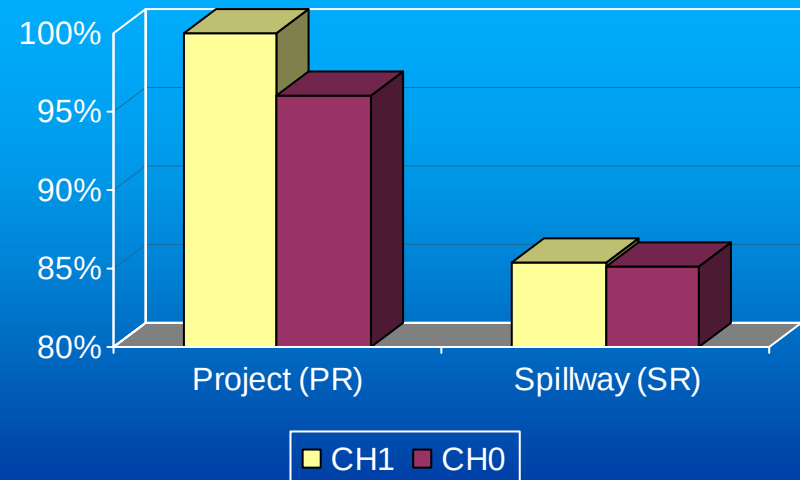
◆ *Yearling Chinook*

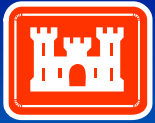
- *Project (16 May – 05 June)*
- *Spillway (01 June – 07 June)*

◆ *Subyearling Chinook*

- *Project (12 June – 15 July)*
- *Spillway (12 June – 15 July)*

● Plan for 2007

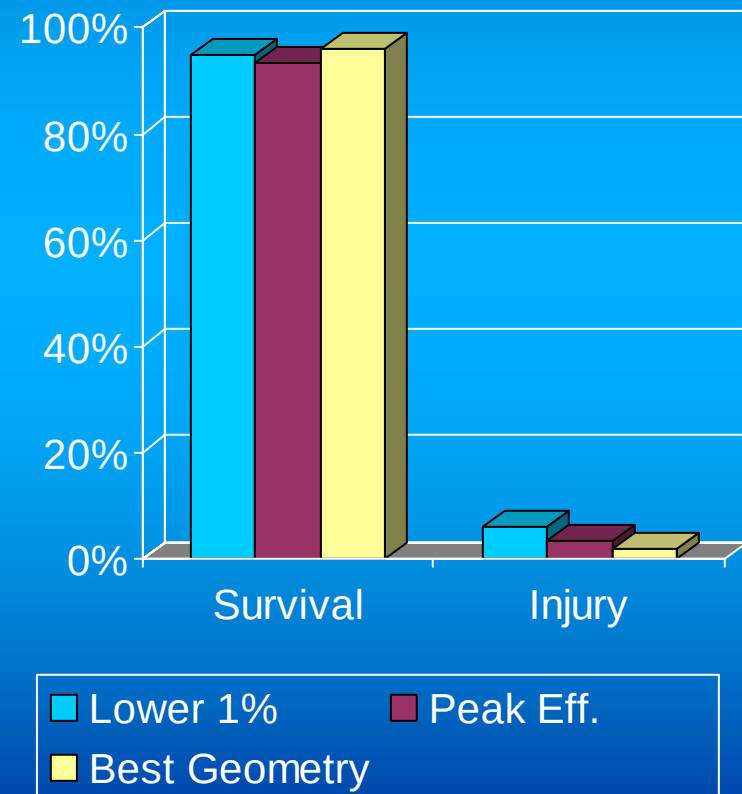


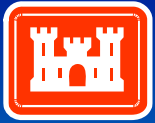


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System Wide: *Turbine Survival Program*

- Biological Index Testing
- Results
- Conclusions
 - ◆ Best geometry provided the most benign passage





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System Wide: *Post-FCRPS Survival*

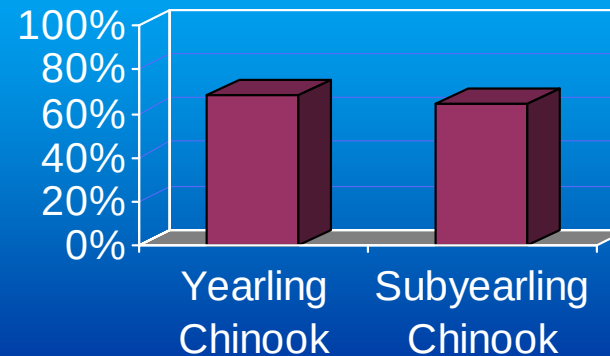
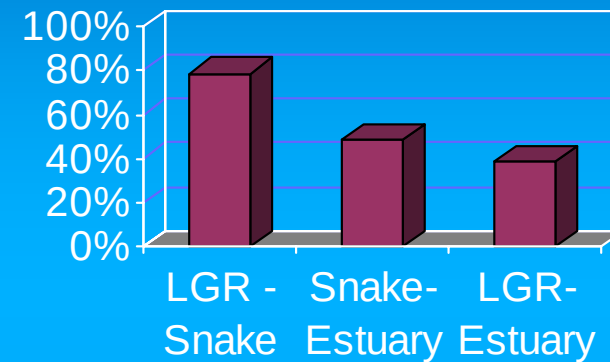
- Two release locations

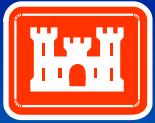
- ◆ LGR Tailrace
- ◆ Bonneville Tailrace

- Results

- ◆ LGR to Estuary
- ◆ Bonneville to Estuary

- Conclusions





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System Wide: *Tag Effects –Results and Conclusions*

● Tag Effects Study: JSATS vs. PIT

◆ Field

- *Survival*
- *Timing*
- *Detection Probability*

• *Not significantly different, however, sample sizes preclude ability to measure small differences*

◆ Laboratory

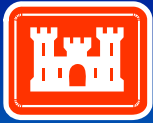
- *Predator avoidance*
- *Survival*
- *Tag Loss*
- *Growth*

• *No evidence of bias for CH1 or CH0*

• *No evidence of bias for CH1*

• *Evidence of bias for CH0 < 95 mm in fork length*

● *Plan for 2007*



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Acknowledgements: *Study PI's*

- **NMFS**

- ◆ *Lynn McComas (Post-FCRPS Survival)*
- ◆ *Eric Hockersmith (Tag Effects)*

- **PNNL**

- ◆ *Geoff McMichael (Post-FCRPS Survival)*
- ◆ *Rich Brown (Tag Effects)*
- ◆ *Gary Johnson (TDA Distribution)*
- ◆ *Tom Carlson (TSP BIT testing, TDA Vortex)*
- ◆ *Gene Ploskey (JDA Survival, Bonneville Survival)*
- ◆ *Mark Weiland (JDA Survival, Bonneville Survival)*

- **USGS**

- ◆ *Theresa Liedtke (Tag Effects, TDA Spillway Survival)*
- ◆ *Tim Counihan (TDA Spillway Survival)*

- **Normandeau Associates**

- ◆ *Paul Heisey (TSP BIT, TDA Vortex)*

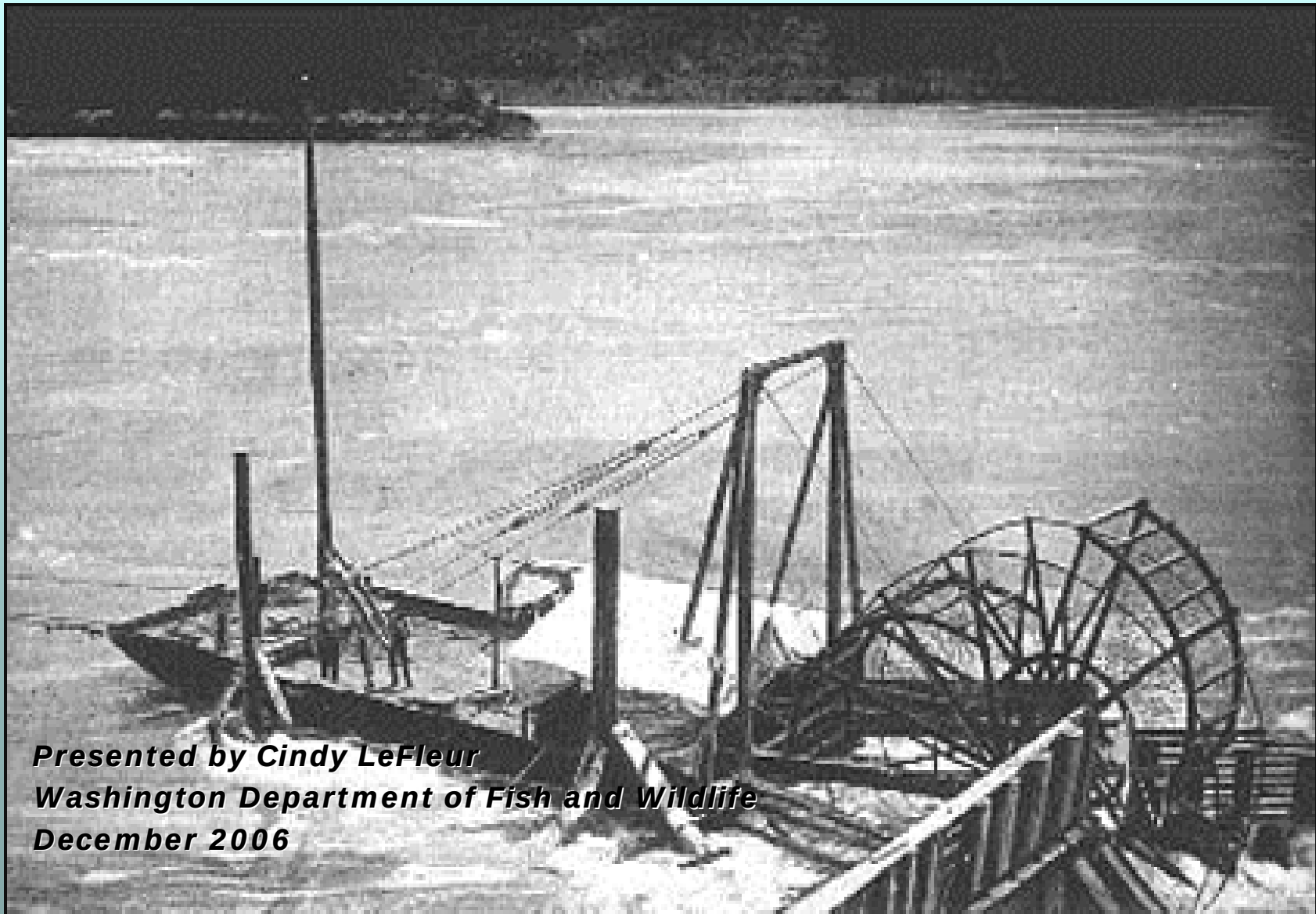
- **USACE NWW**

- ◆ *Dan Feil (TSP BIT)*

- **USACE NWP**

- ◆ *Bob Willis*
- ◆ *Mike Langeslay*
- ◆ *Dave Clugston*
- ◆ *Blaine Ebberts*
- ◆ *Brad Eppard*
- ◆ *Bern Klatte*
- ◆ *Dennis Schwartz*
- ◆ *Bob Wertheimer*

Columbia River Chinook Runs and Fisheries - 2006



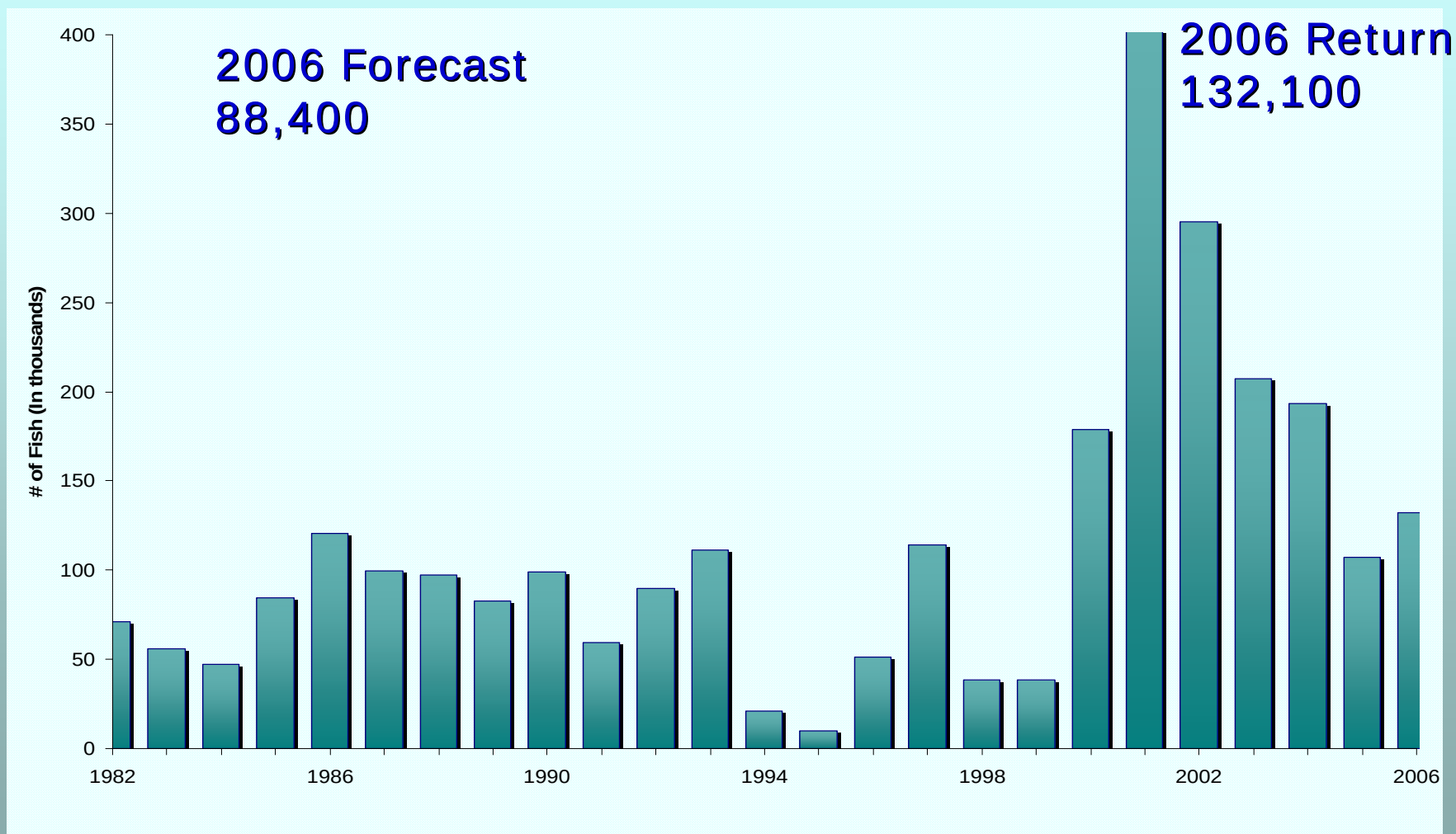
***Presented by Cindy LeFleur
Washington Department of Fish and Wildlife
December 2006***

2006 Preliminary Review

- ❑ 2006 Chinook Runs and Fisheries
- ❑ Forecast Accuracy
- ❑ Outlook for 2007 Returns

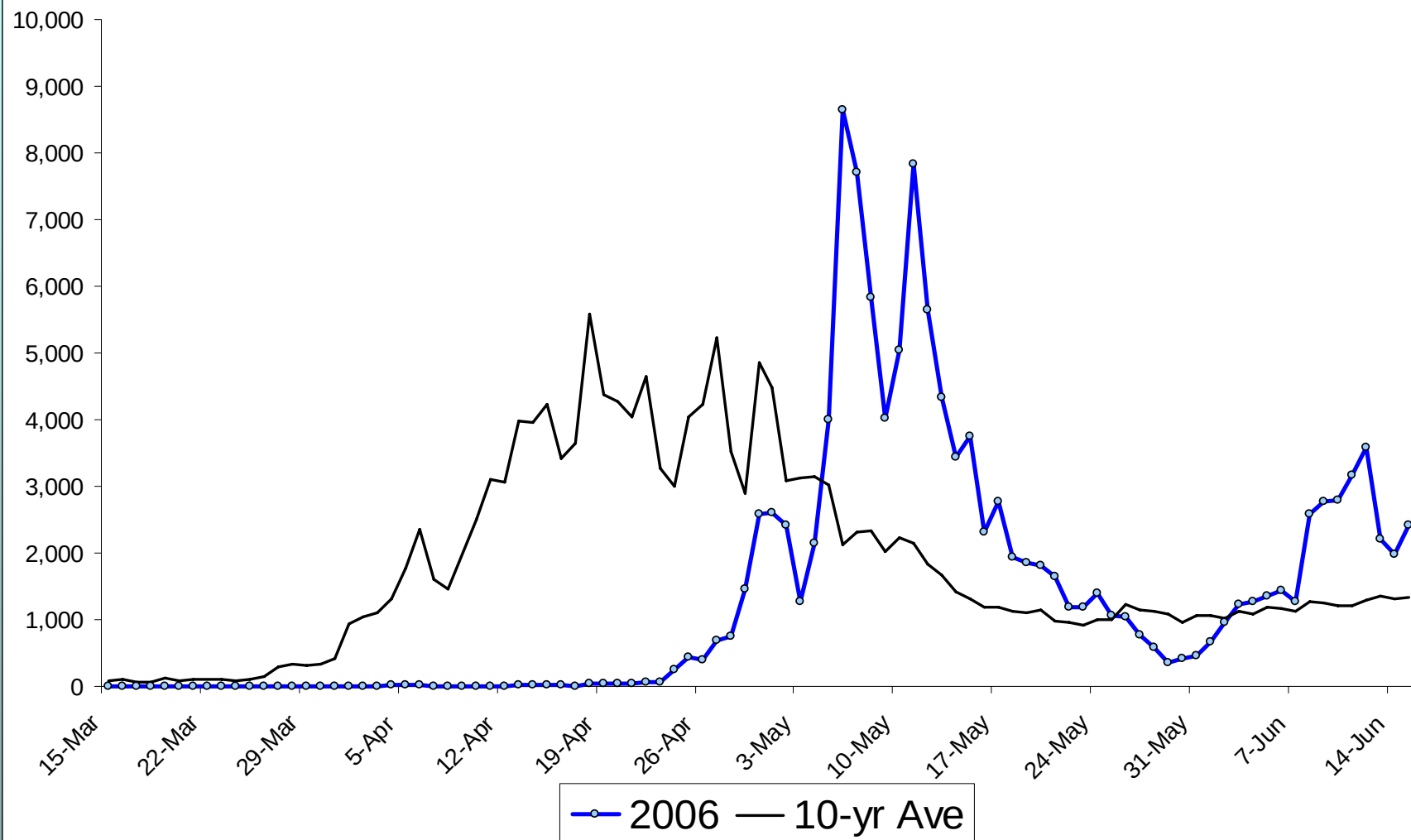


Upriver Spring Chinook Returns 1982-2006



TMT - December 2006

Spring Chinook Daily Passage at Bonneville Dam



TMT - December 2006

Spring Chinook Fisheries 2006

□ Recreational

- 87,000 angler trips
- 7,000 fish kept

□ Commercial

- 4,300 fish kept
- Ex-vessel value \$5.50/pound
- SAFE commercial harvest of 6,800



Spring Chinook Fisheries 2006 (continued)

□ Tribal

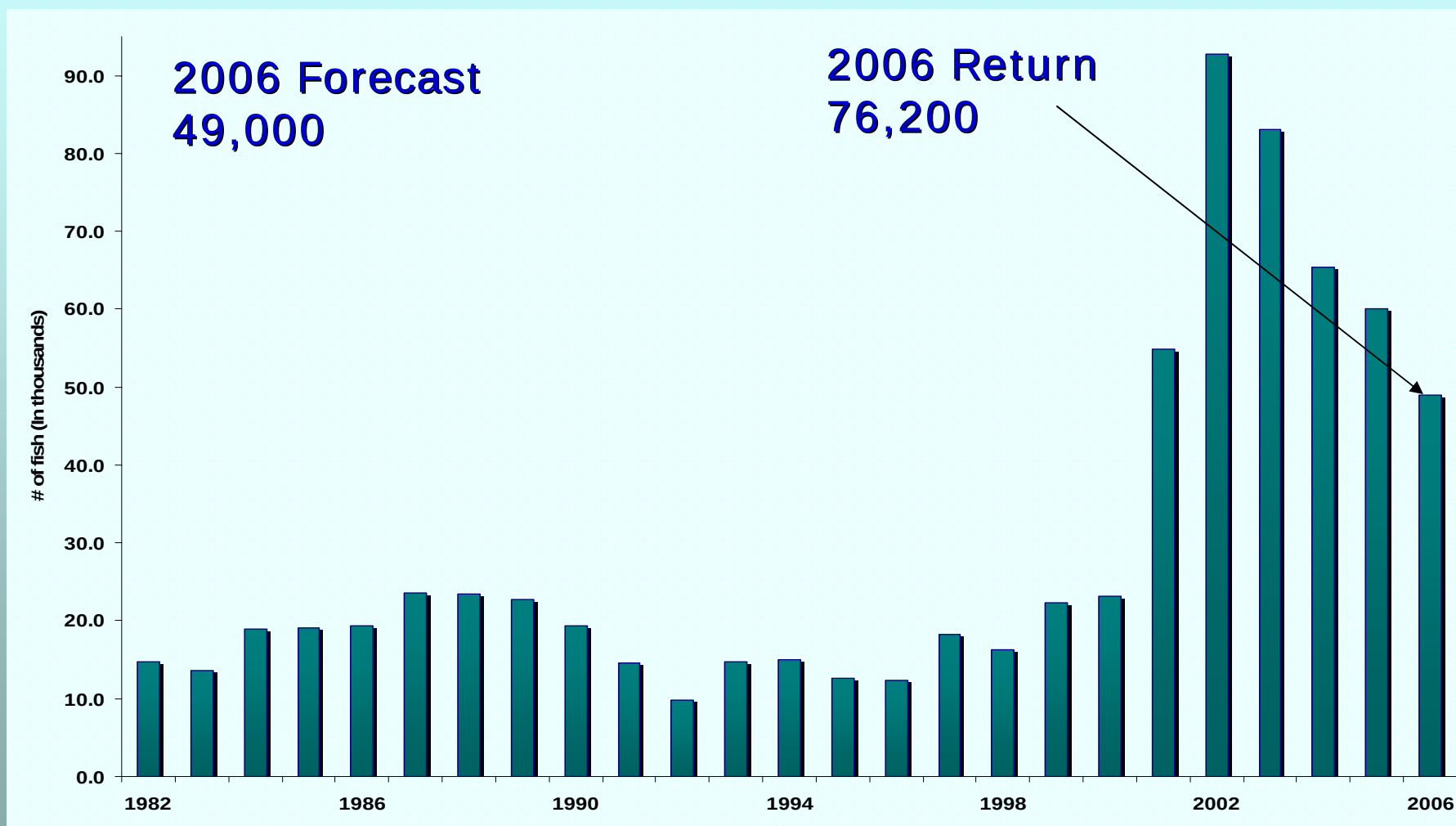
- 8,400 - C&S only

□ ESA impact rate

- Non-Indian – 1.8% vs 2% guideline
- Treaty Indian – 6.6% vs 8% guideline



Upper Columbia Summer Chinook Returns 1982-2006



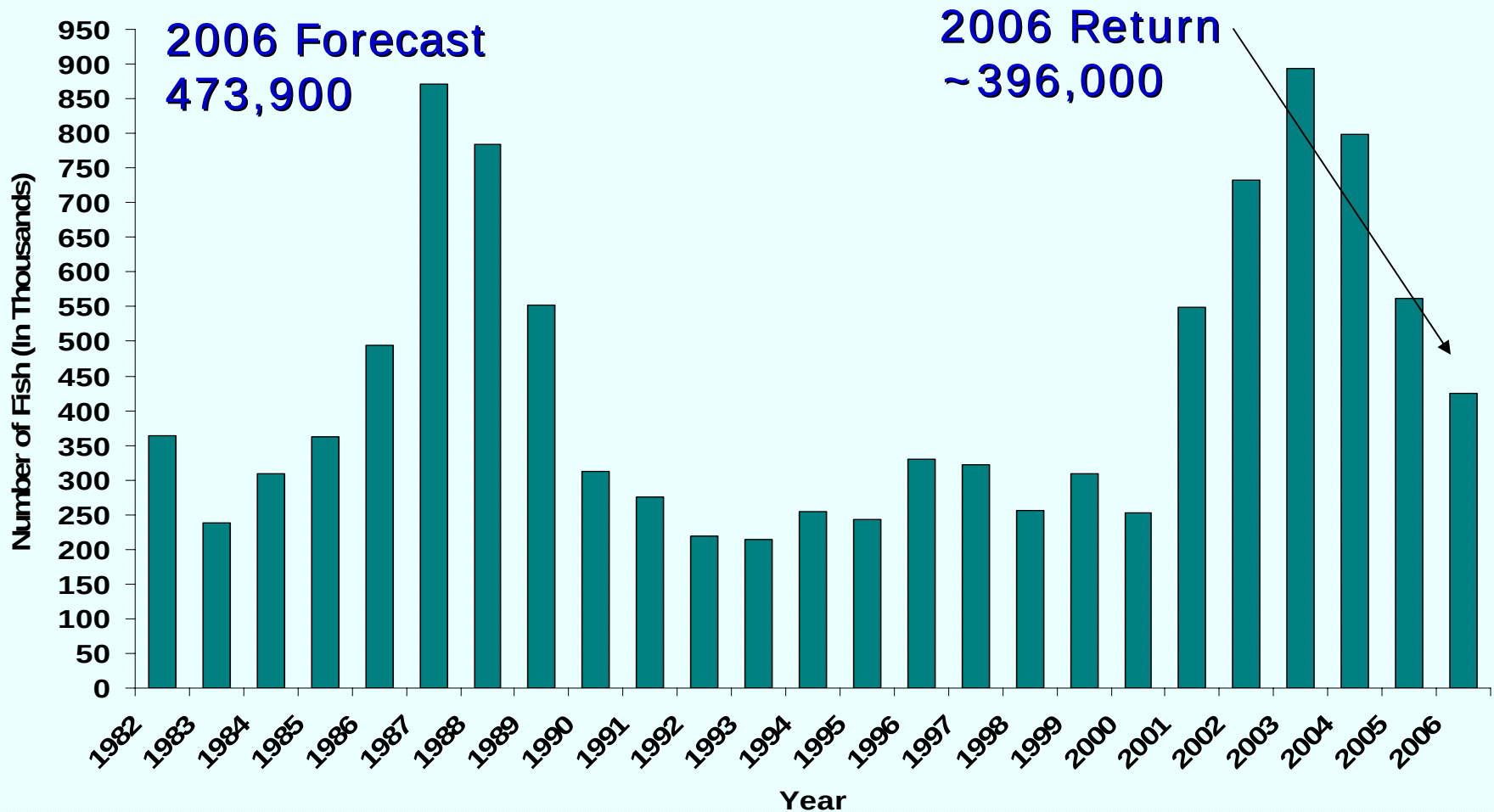
TMT - December 2006

Summer Chinook Fisheries 2006

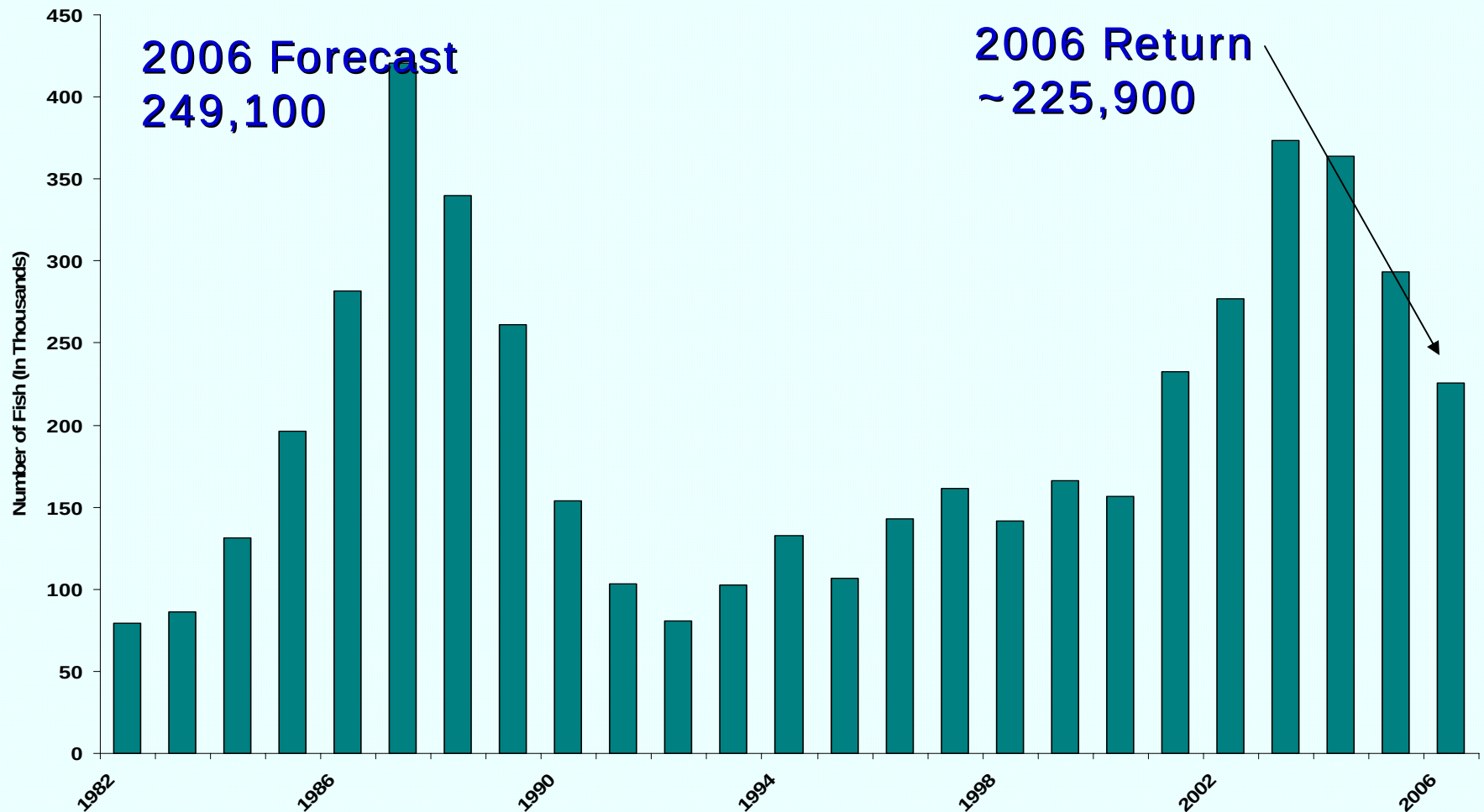
- ❑ Recreational
 - ❑ 44,300 angler trips
 - ❑ 5,200 fish kept
- ❑ Commercial
 - ❑ 4,800 fish kept
 - ❑ Ex-vessel value \$2 - \$3.50/pound
 - ❑ SAFE commercial harvest of 500
- ❑ Treaty harvest of 16,300



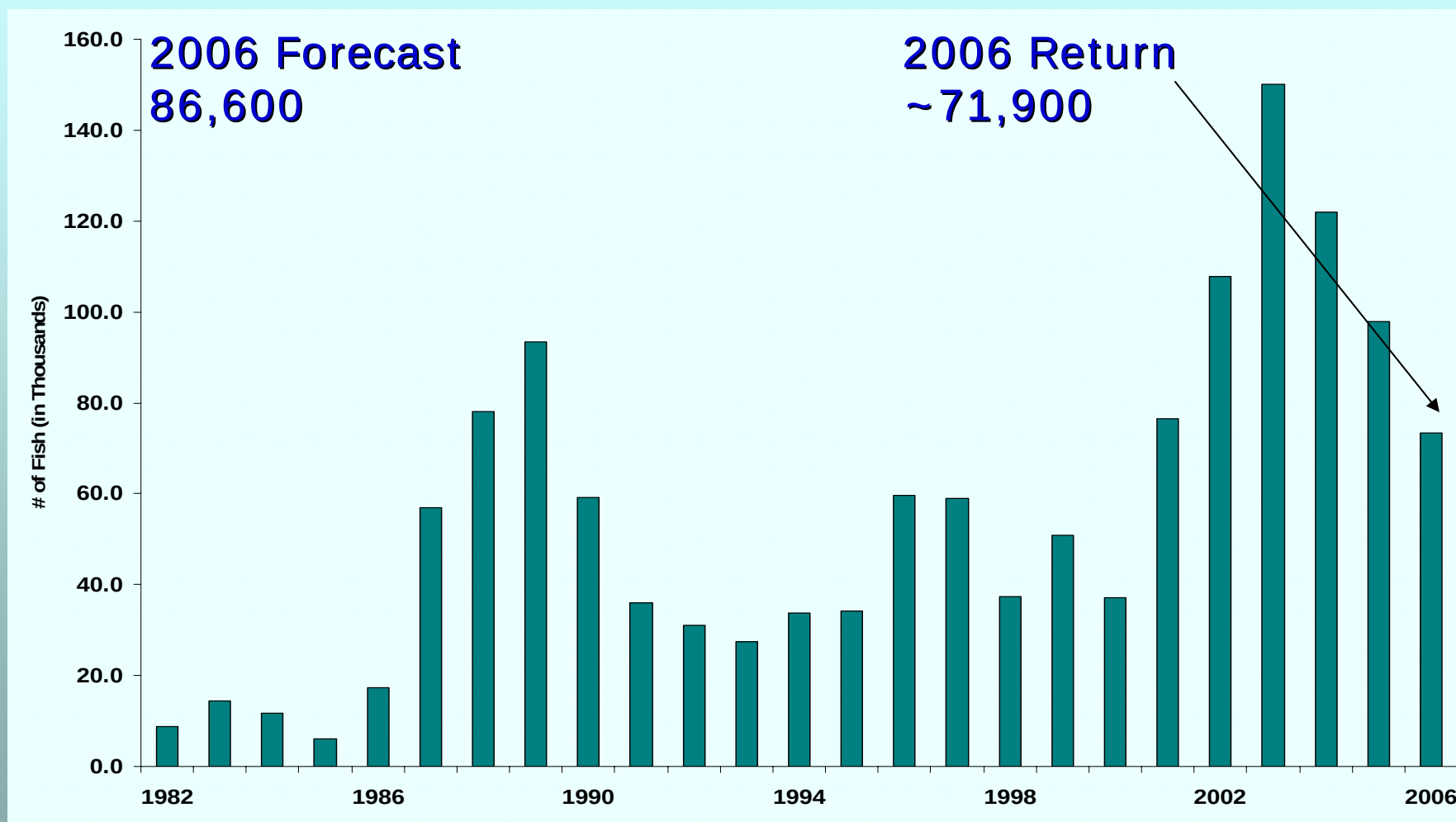
Columbia River Fall Chinook Returns 1982-2006



Upriver Bright Fall Chinook Returns 1982-2006

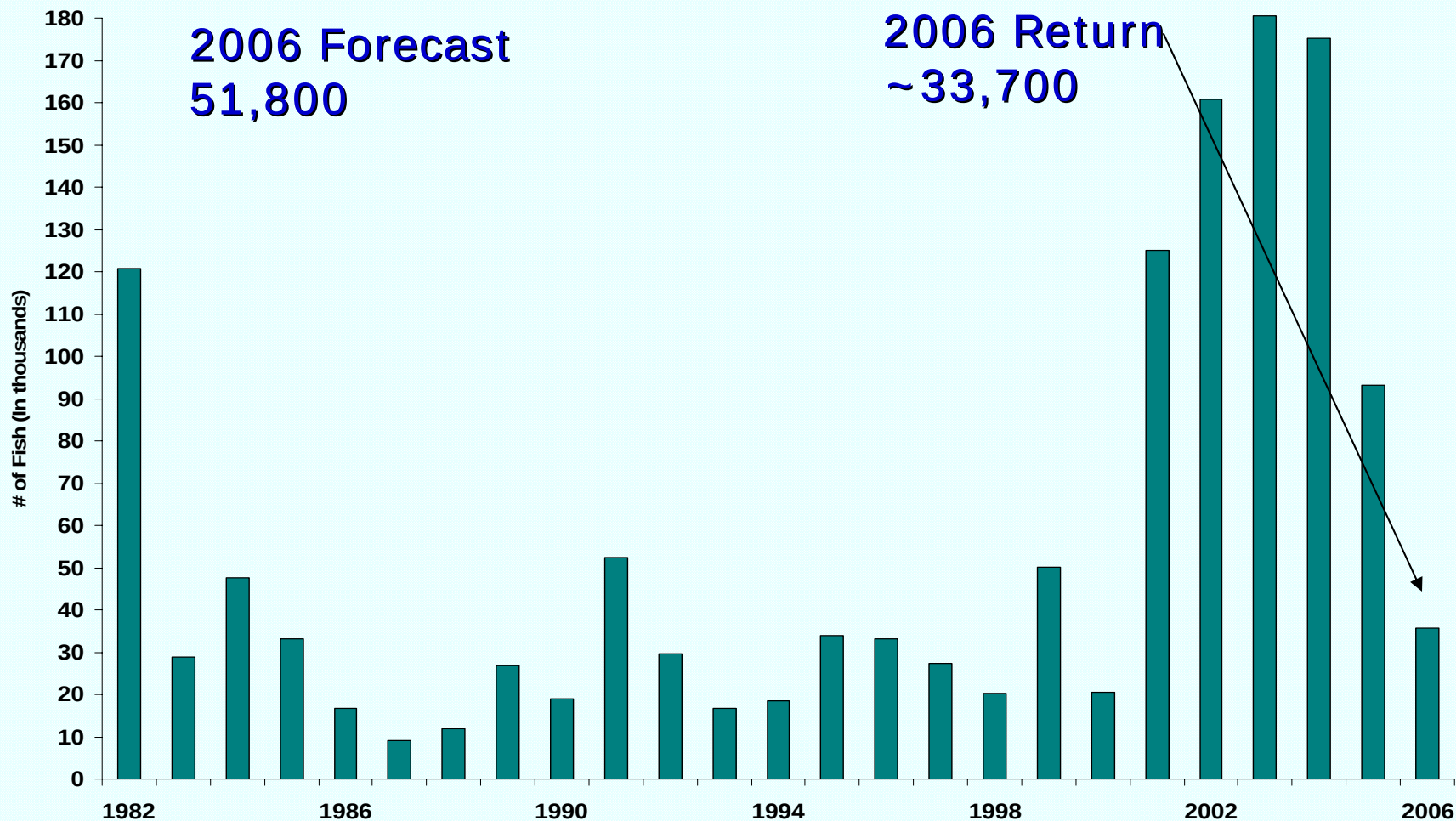


Mid-Columbia Bright Fall Chinook Returns 1982-2006



TMT - December 2006

Bonneville Pool Hatchery Fall Chinook Returns 1982-2006



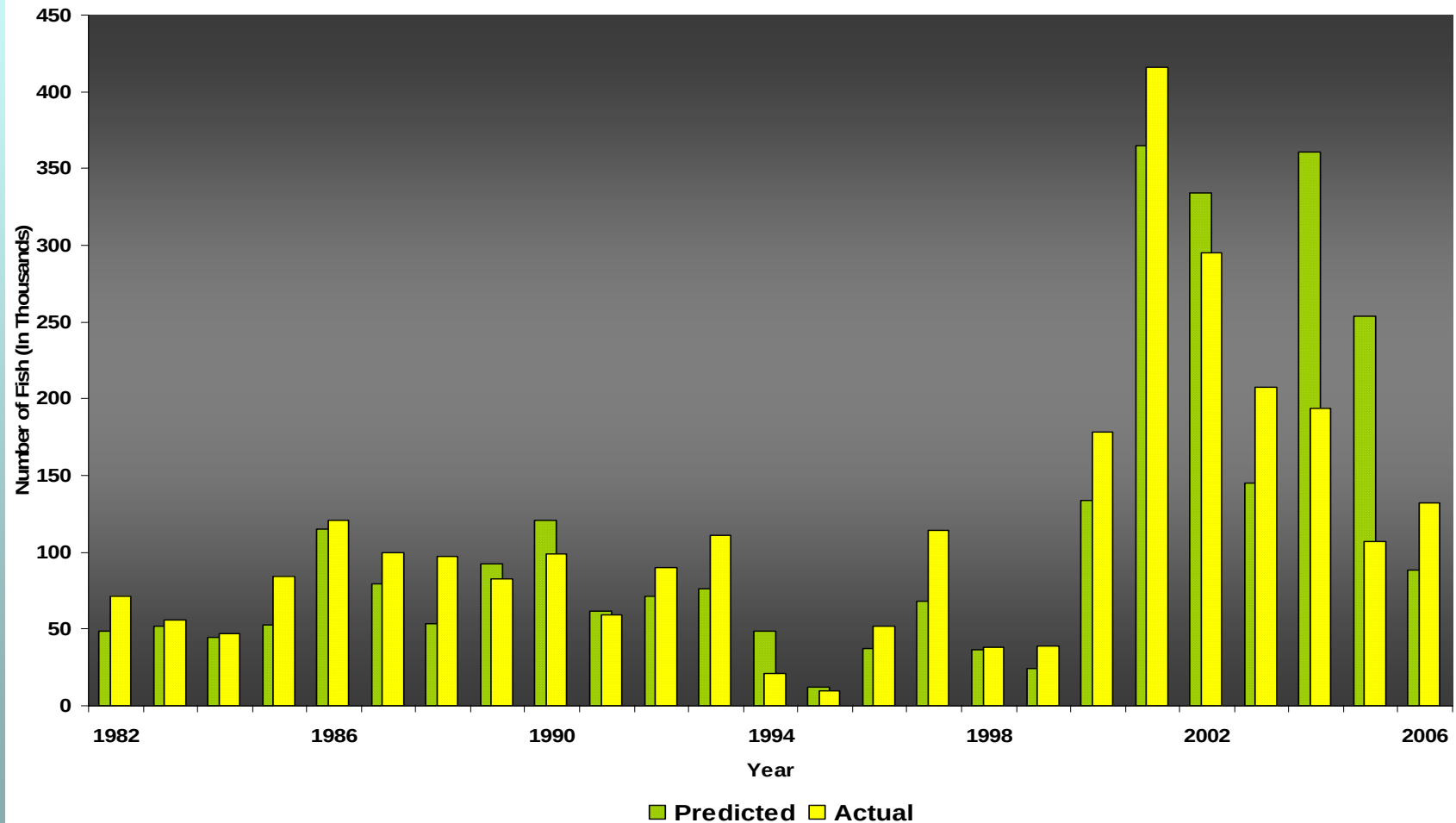
TMT - December 2006

Fall Chinook Fisheries 2006

- ❑ Recreational
 - ❑ 89,300 Angler trips
 - ❑ Chinook kept 13,700
- ❑ Commercial
 - ❑ 26,000 Chinook kept
 - ❑ Ex-vessel value up to \$3.50/pound
 - ❑ SAFE commercial harvest ~ 4,600
- ❑ Treaty harvest of 82,600 Chinook

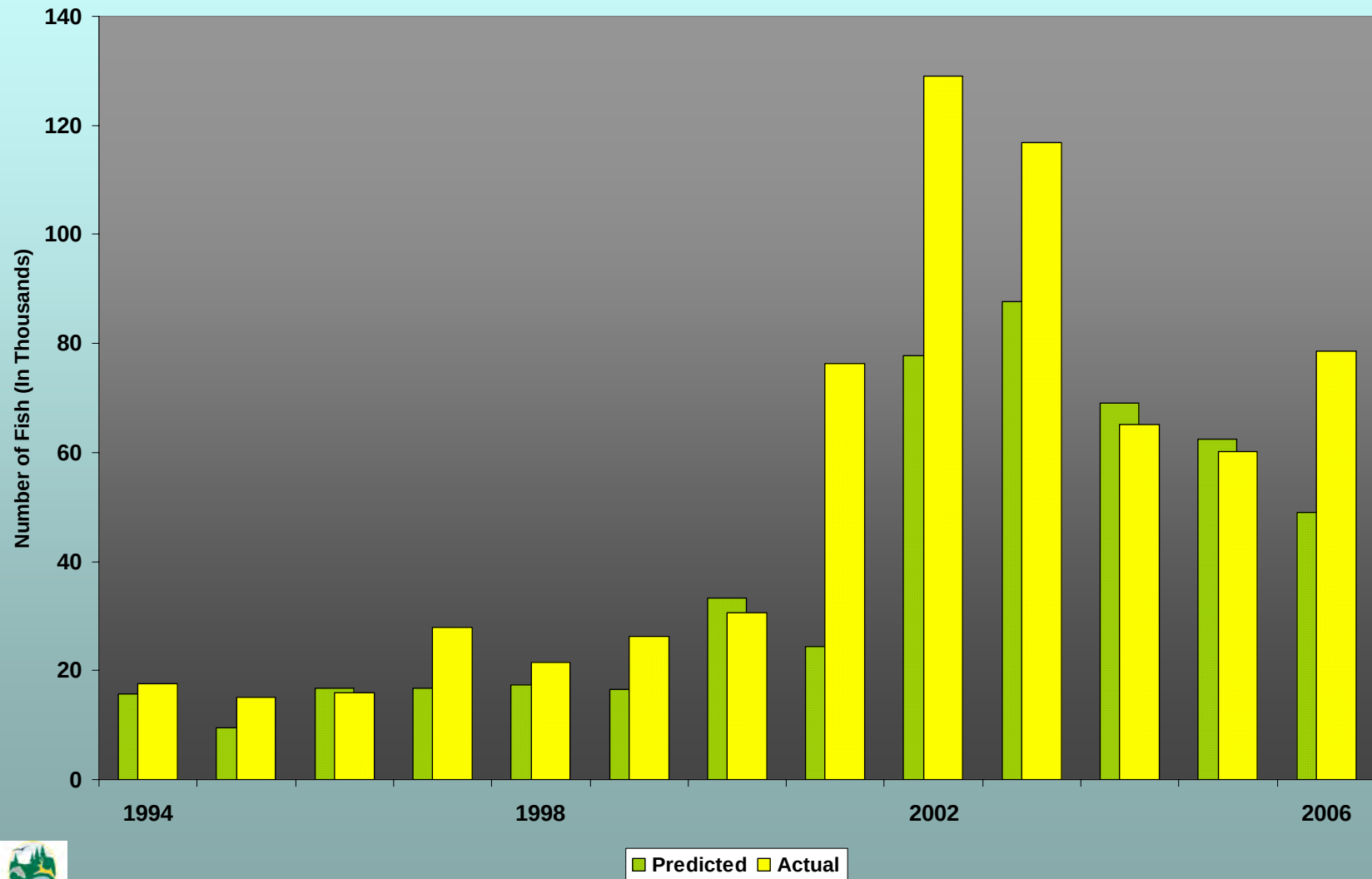


Forecast Accuracy Upriver Spring Chinook



TMT - December 2006

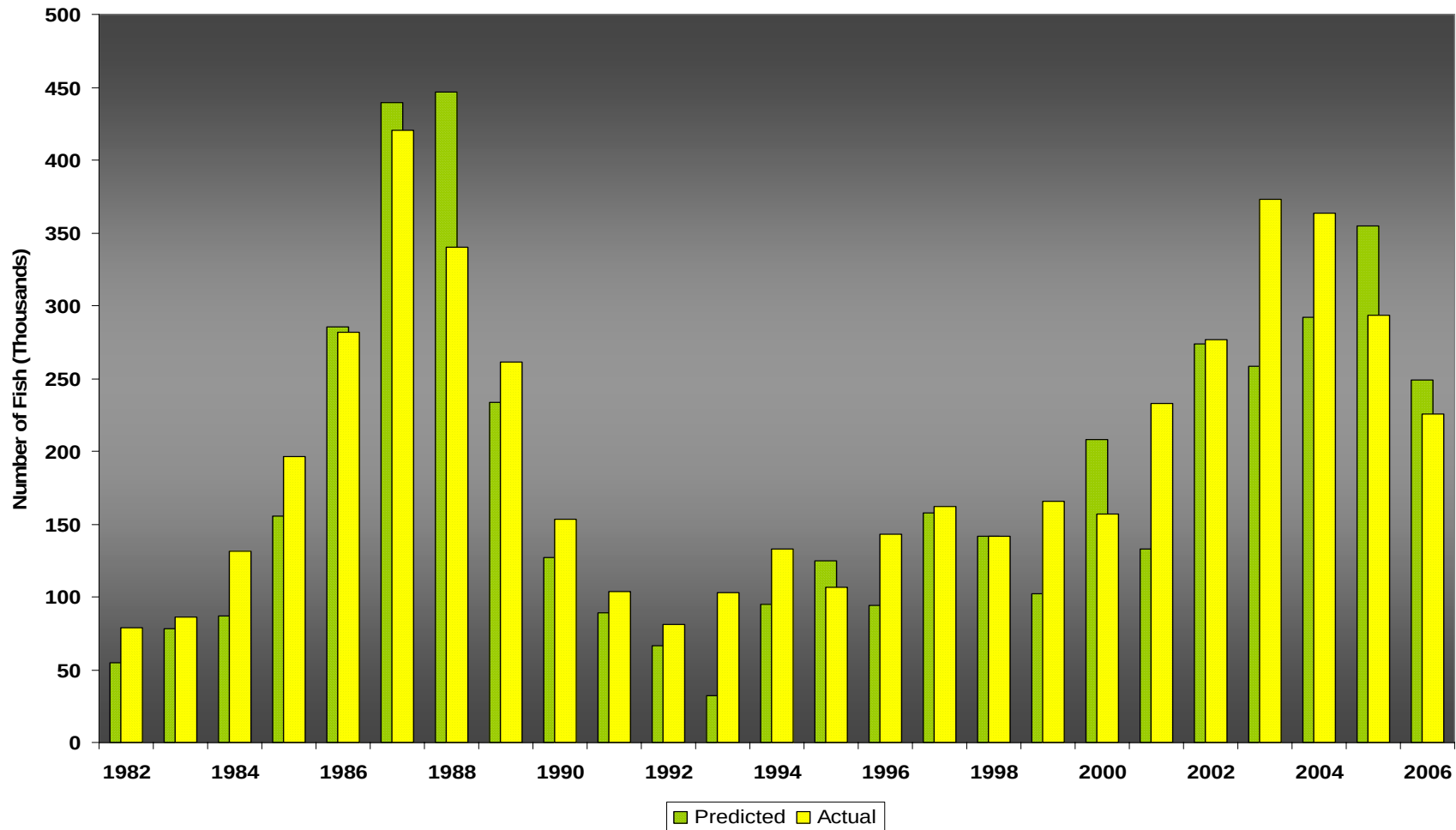
Forecast Accuracy Upriver Summer Chinook



TMT - December 2006

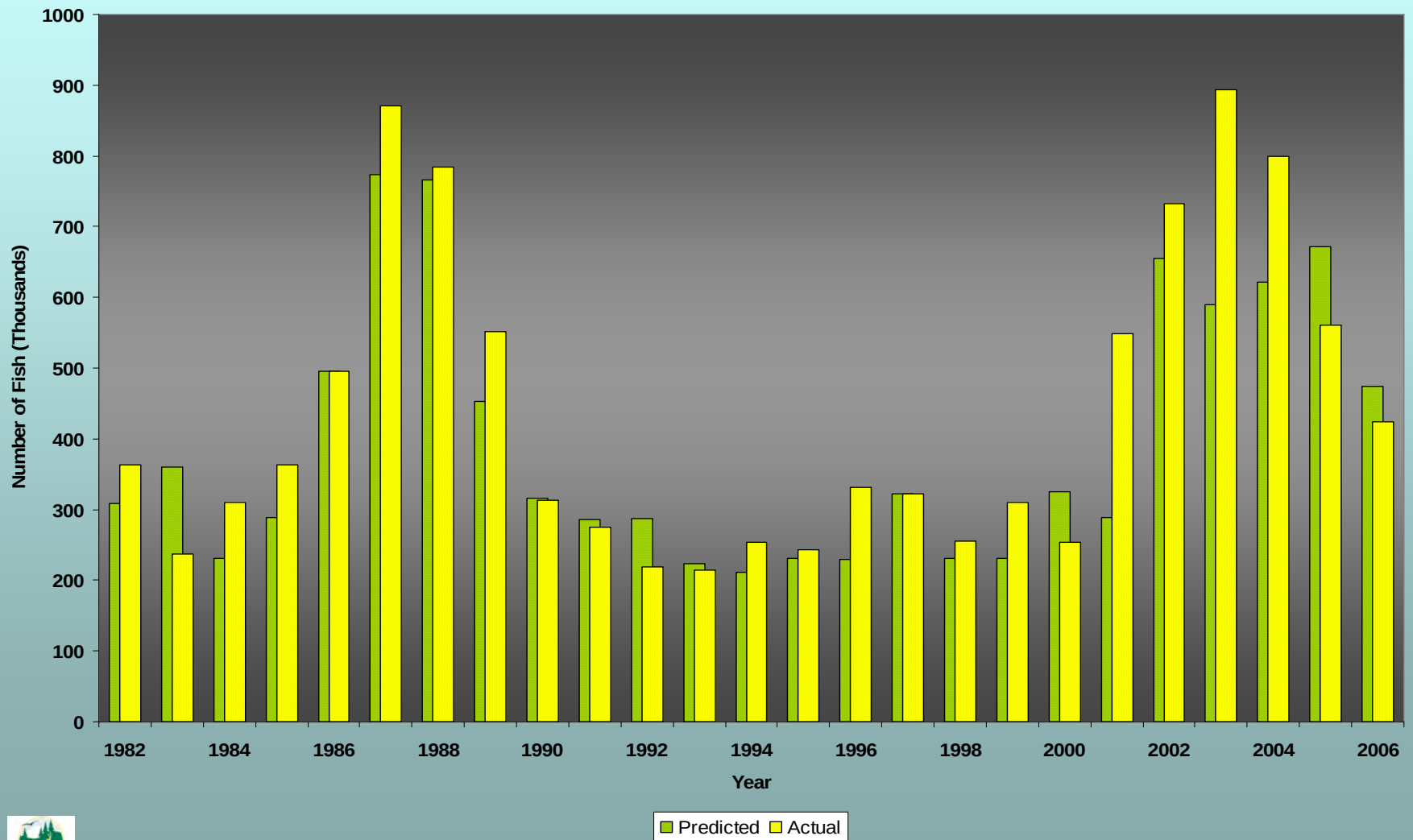
Forecast Accuracy

Upriver Bright Fall Chinook



TMT - December 2006

Forecast Accuracy Total Fall Chinook



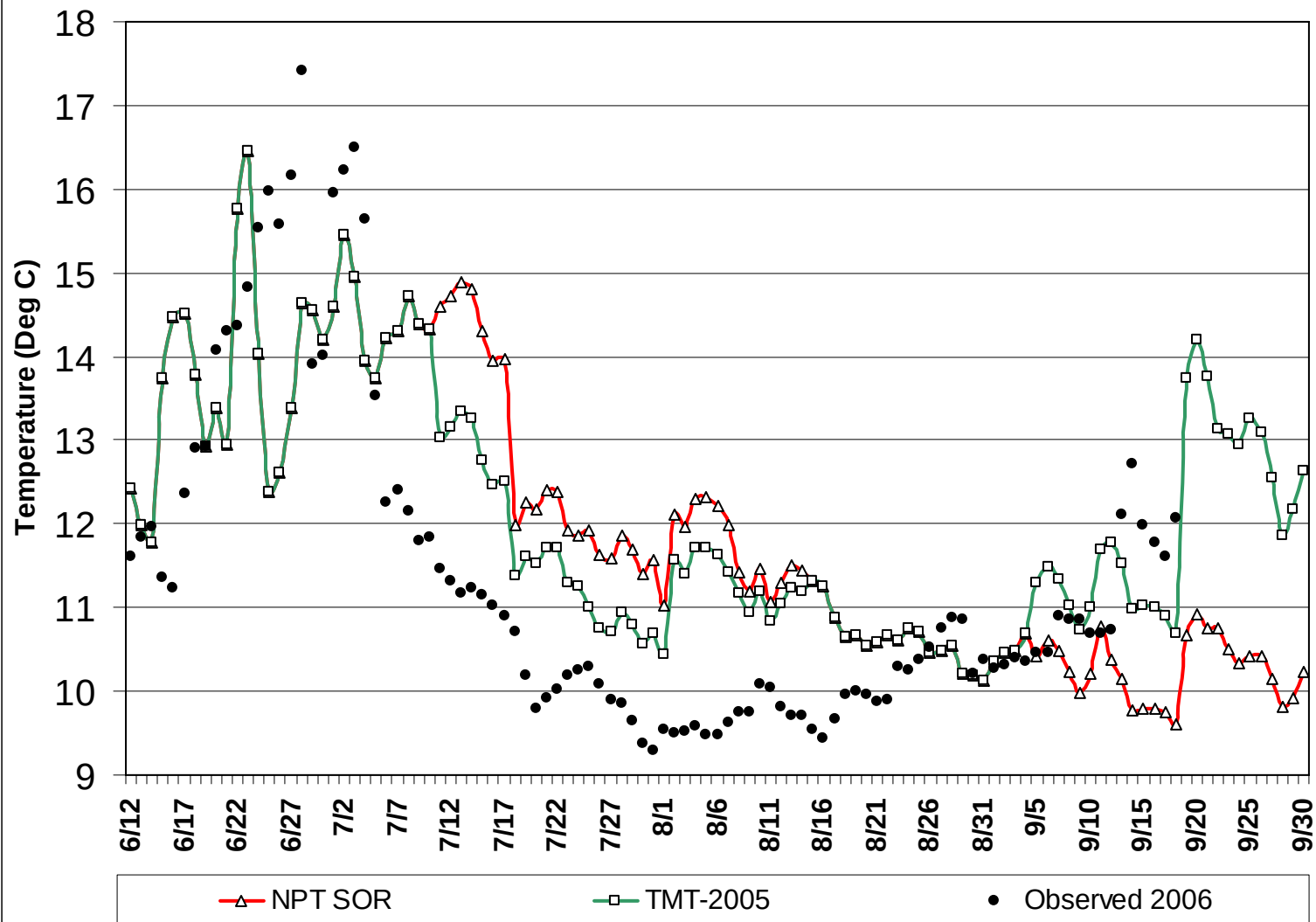
TMT - December 2006

Outlook for 2007 Returns

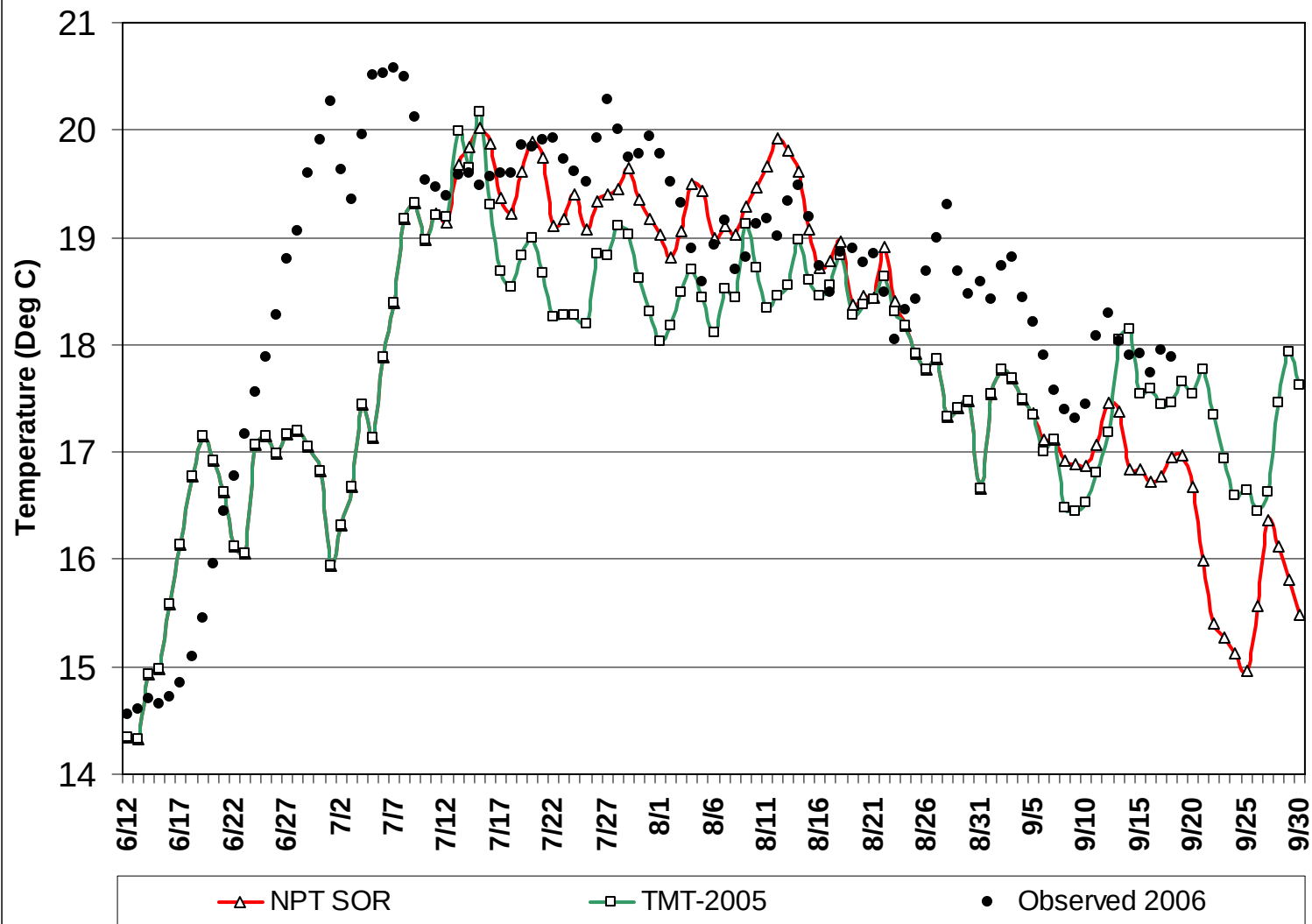
- ❑ Generally down from 2006
 - ❑ Upriver Spring Chinook – 78,500
 - ❑ Summer Chinook – 45,600
 - ❑ Sockeye – 27,300
 - ❑ Upriver Fall Chinook – about 20% less than 2006



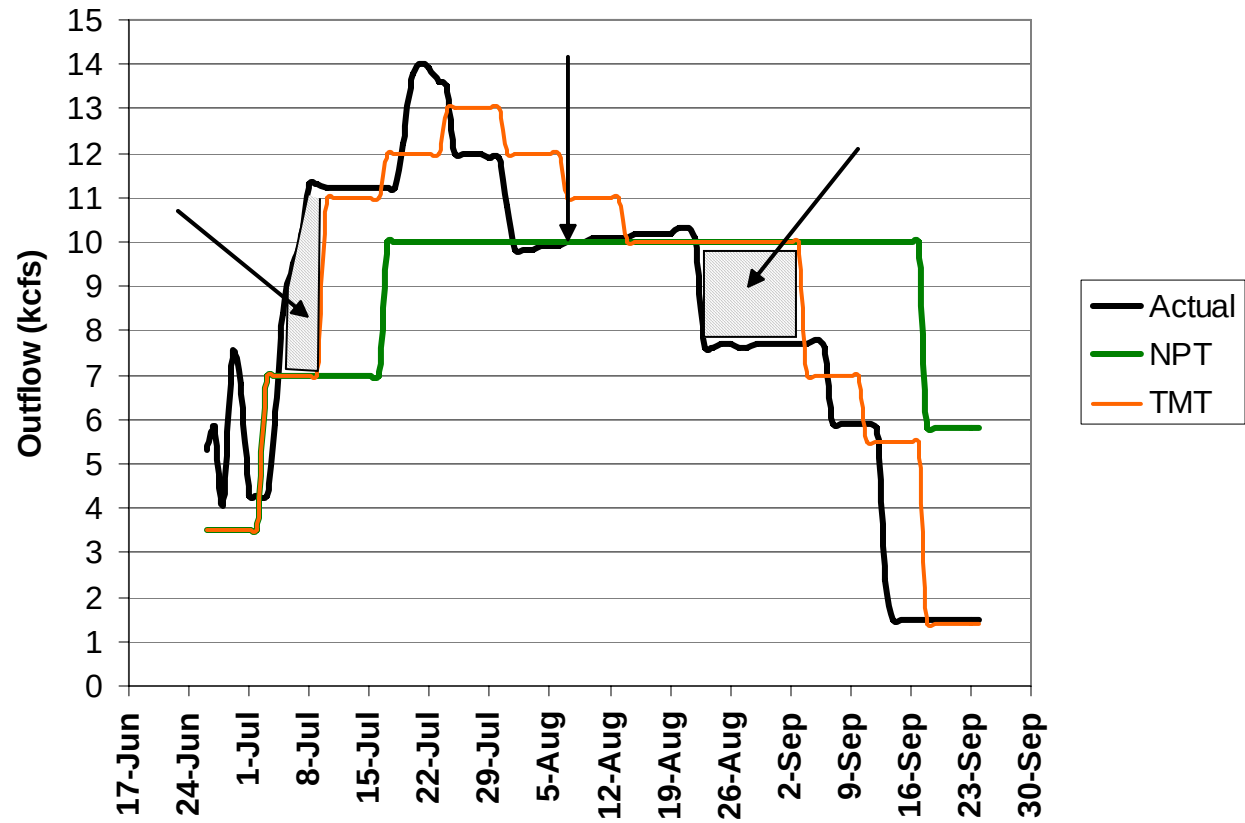
Clearwater River at Peck (1975, 1985, 1990, 1991 weather)



Snake at Lower Granite Dam (1975, 1985, 1990, 1991 weather)



Dworshak Releases (Planned and Actual Flows)



Smolt Migration 2006

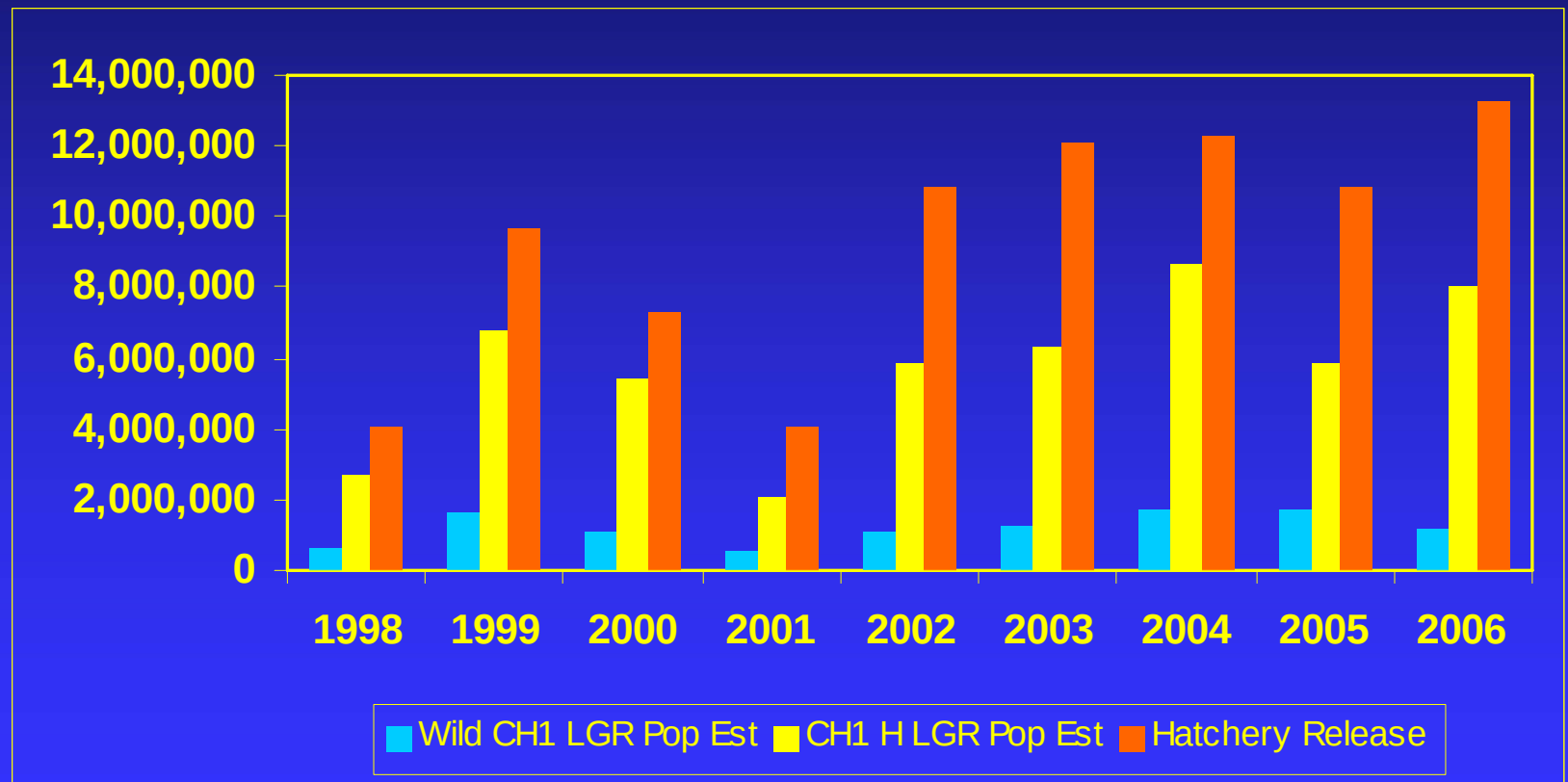
(preliminary results)

Fish Passage Center

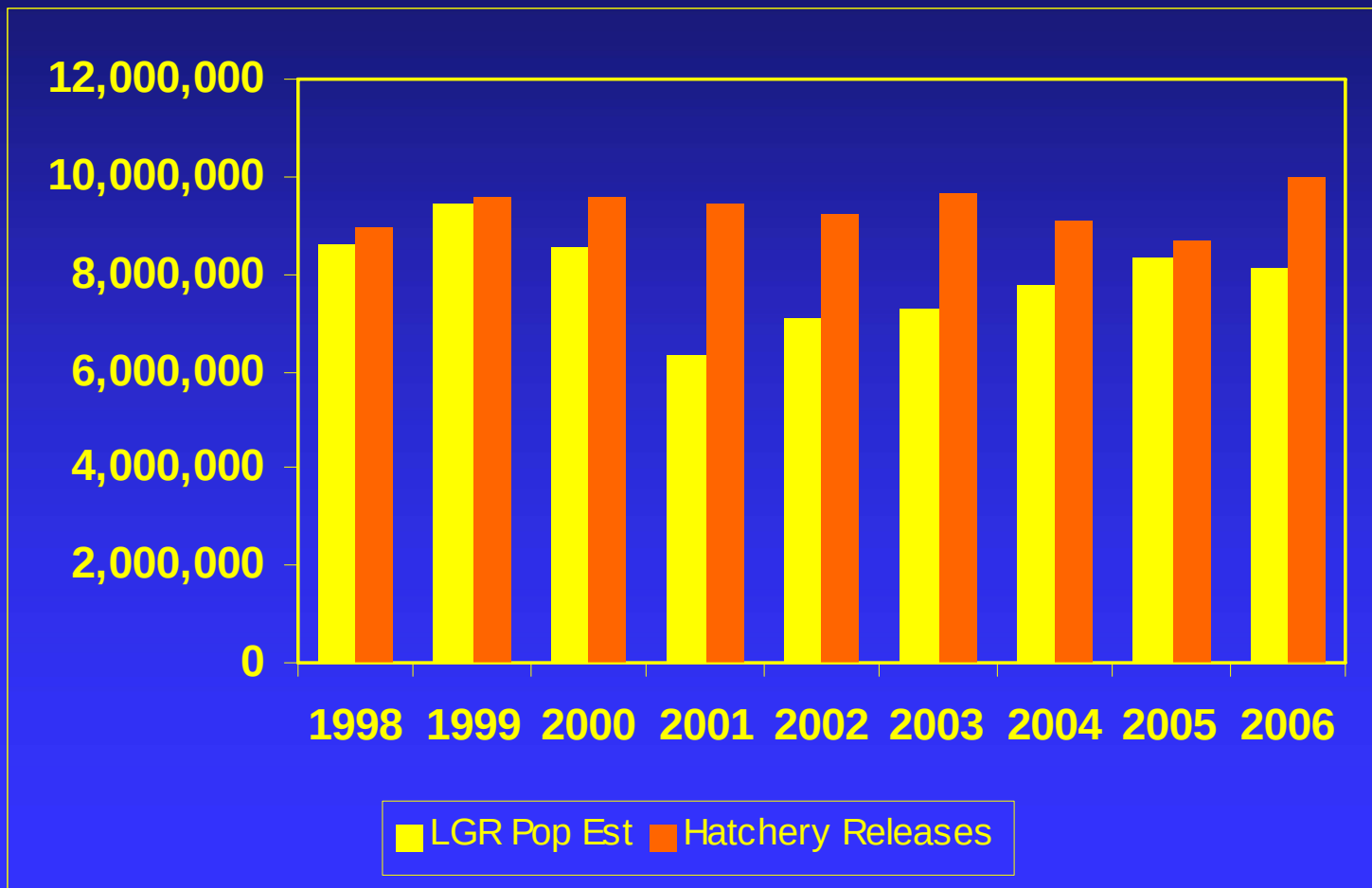
Review of 2006 Smolt Migration

- Run Size
- Timing
- Spread-the-risk delayed transport
- Subyearling survival & summer spill

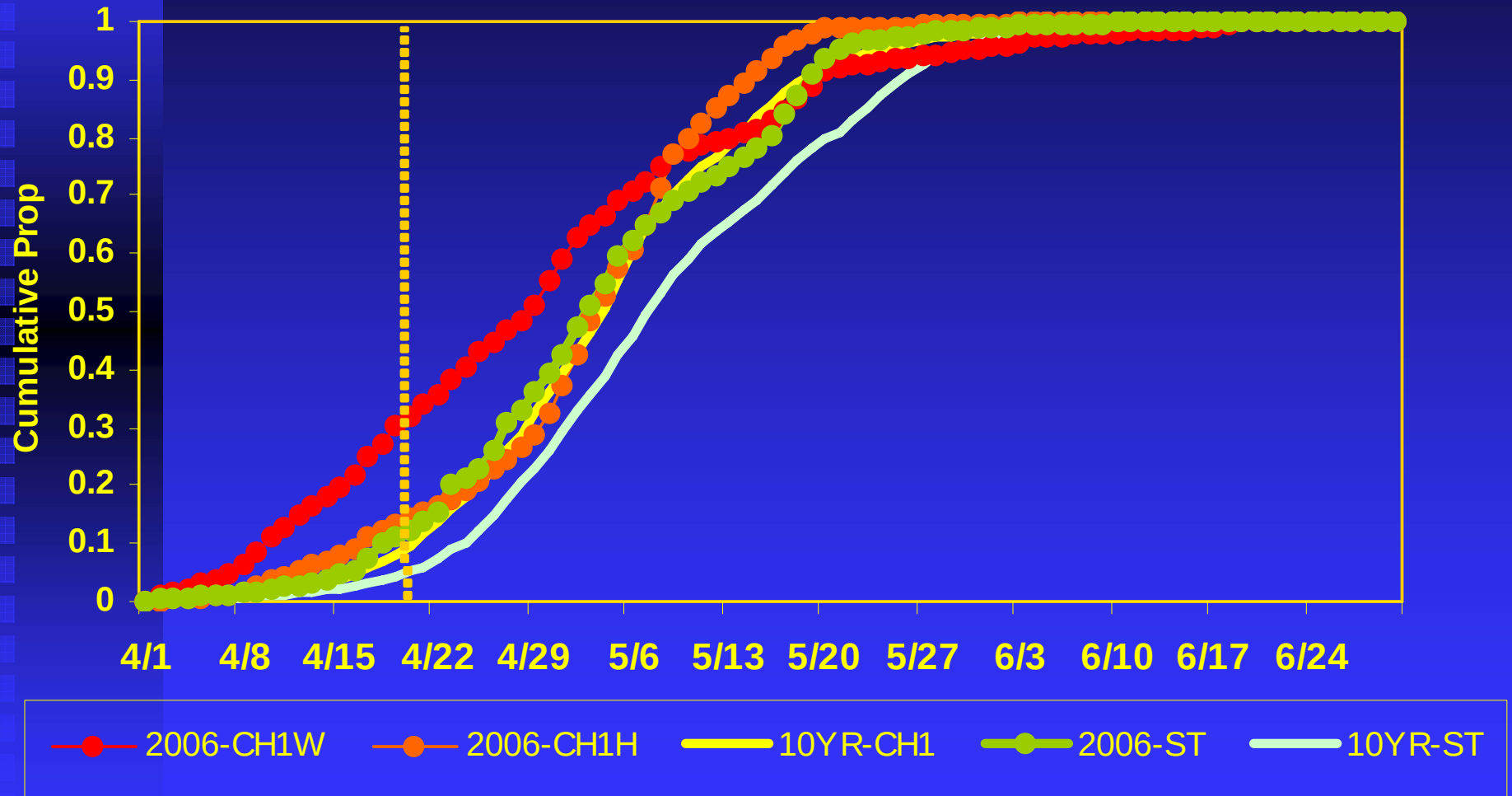
Yearling Chinook Population Index at Lower Granite and Hatchery Releases



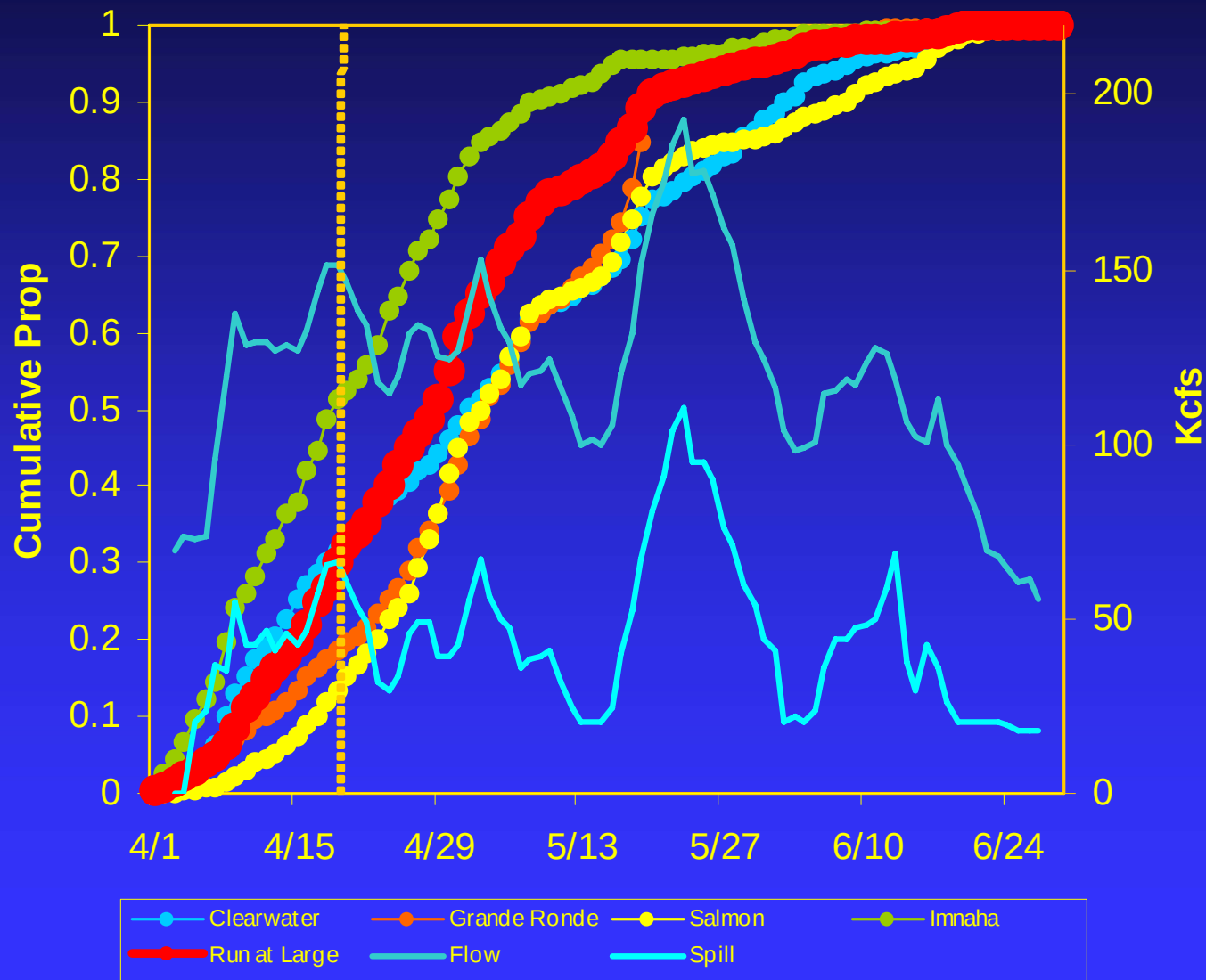
Combined H&W Steelhead Population at Lower Granite and Hatchery Releases



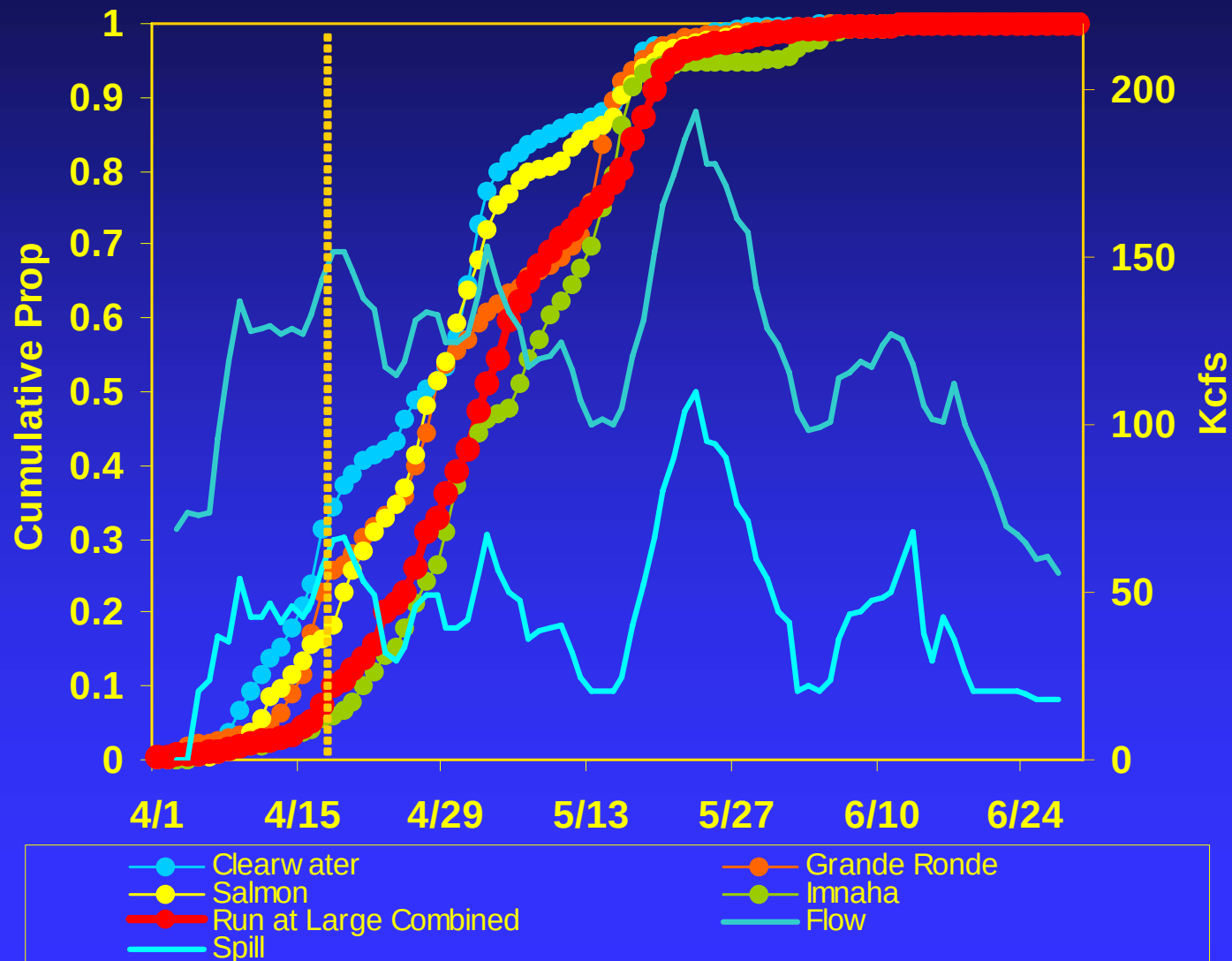
Timing of Spring Migrants at Lower Granite



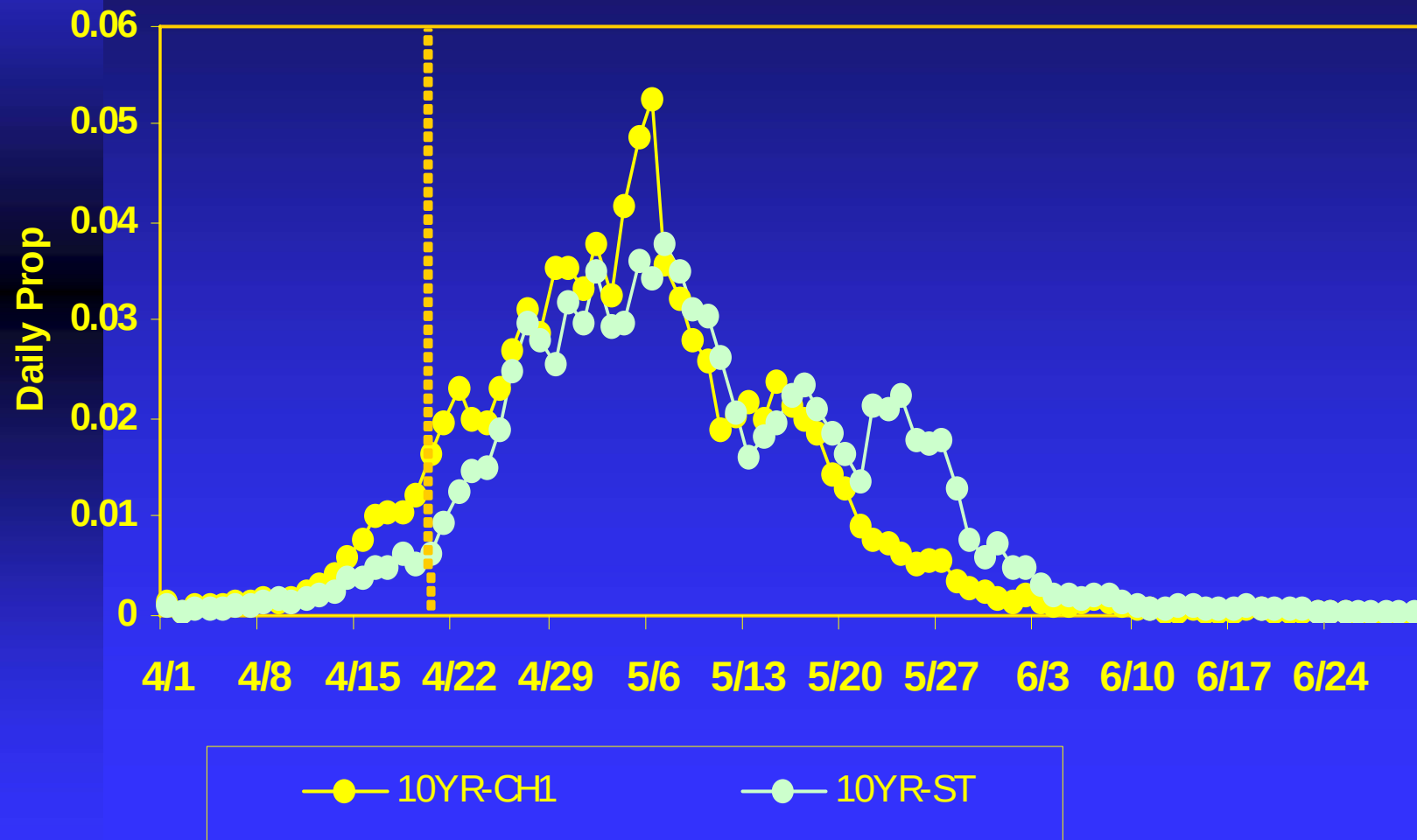
Wild PIT-tagged Yearling Chinook Timing at LGR and wild run at large



Wild PIT-tag Steelhead Timing at Lower Granite and Combined run at large



Run at Large ST & CH 10Yr Avg Timing at LGR



Summary of 2006 Transport

Species	Proportion Passing During Transport	Estimated Collection Efficiency				Proportion of Pop transport P(T)
		LGR	LGS	LMN	MCN	
Wild Steelhead	0.87^a	0.37	0.66	0.61	na	0.79
Hatchery Steelhead	0.87^a	0.35	0.62	0.53	na	0.76
Wild Sp/Su Chinook	0.68	0.32	0.58	0.5	na	0.58
Hatch Sp/Su Chinook	0.86	0.24	0.42	0.35	na	0.61
Wild fall Chinook (subs)	(1)	0.16	0.3	0.12	0.21	0.59
Hatch fall Chinook (subs)	1	0.16	0.32	0.18	0.17	0.61

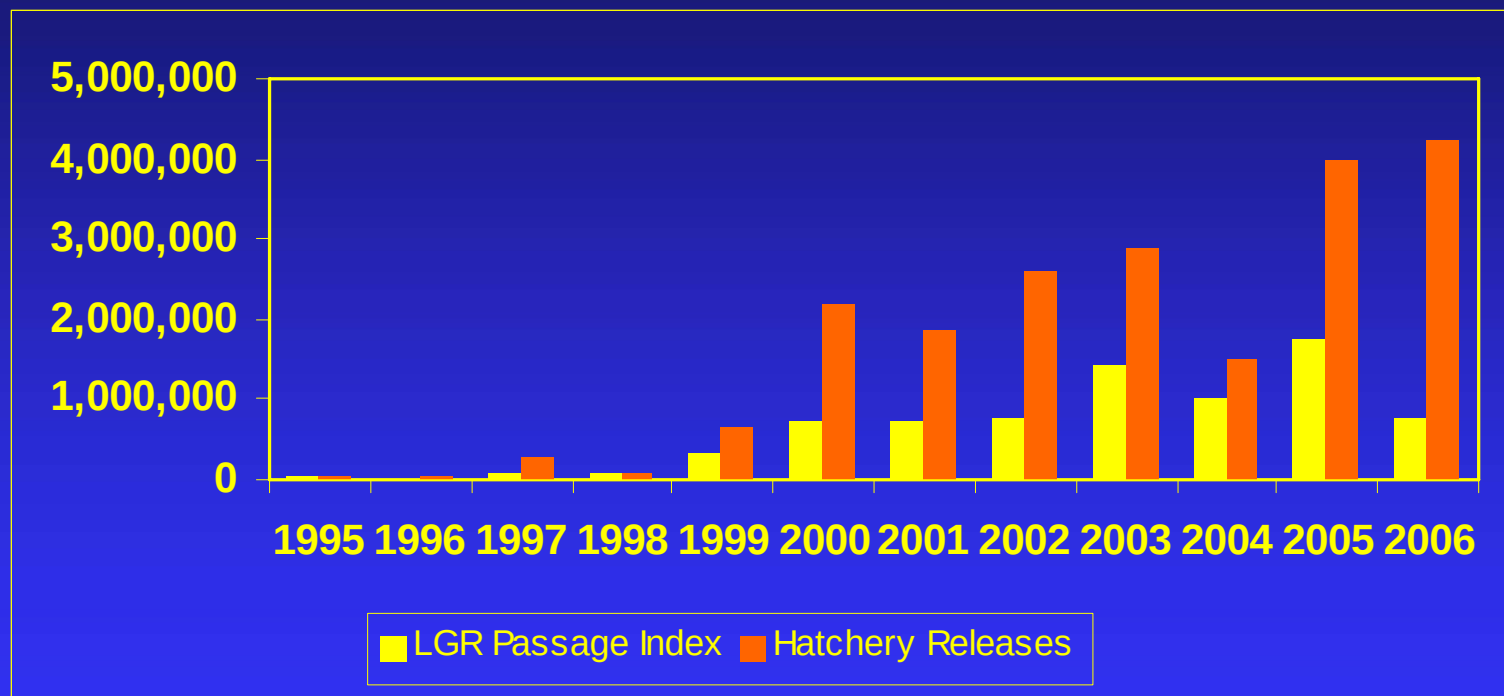
■
$$P(T) = [CE_{lgr} + CE_{lgs} * (1 - CE_{lgr}) + CE_{lmn} * (1 - CE_{lgs})(1 - CE_{lgr})] * Prop(Pop)$$

Other ways to measure transport proportion

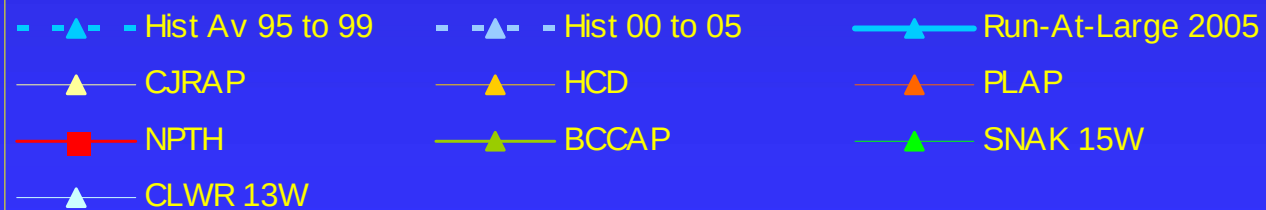
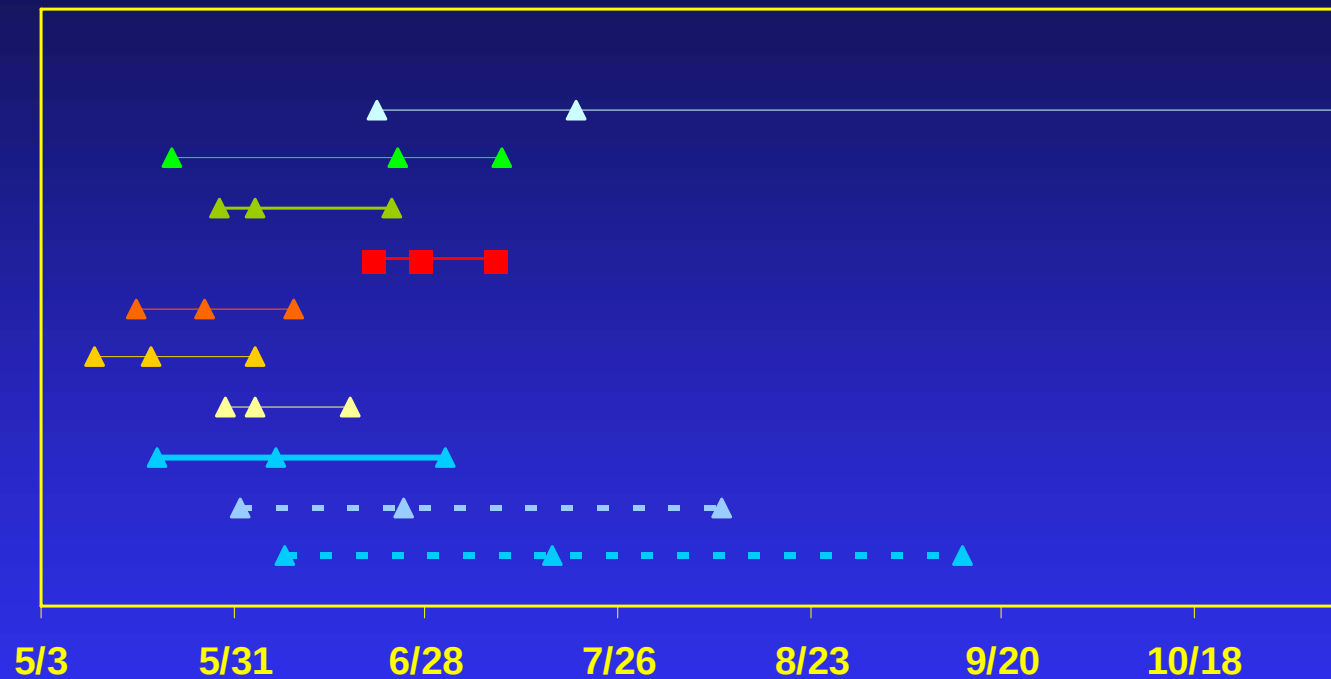
Species	Prop Pop Passing During Transport Prop(Pop)	Overall Prob of transport P(T)	Prob of transpt (Destin- ed) P(t)	Prob of passing uncollected P(Unc)	In-River Prop Below LMN P(InRiv)	In-Trans Prop Below LMN P(Tran)	InRiver Prop Bypassed P(Byp) (pct of InRiv)
Wild Steelhead	0.87^a	0.79	0.92	0.08	0.17	0.77	0.12(69%)
Hatchery Steelhead	0.87^a	0.76	0.88	0.12	0.20	0.74	0.11(58%)
Wild Sp/Su Chinook	0.68	0.58	0.86	0.14	0.32	0.55	0.27(85%)
Hatch Sp/Su Chinook	0.86	0.61	0.71	0.29	0.28	0.57	0.09(32%)
Wild fall Chinook (s)	(1)	0.59	0.59	0.41			
Hatch fall Chinook (s)	1	0.61	0.61	0.39			

- $P(T) = P(t) * \text{Prop(Pop)}$
- $P(t) = CE_{lgr} + CE_{lgs} * (1 - CE_{lgr}) + CE_{lmn} * (1 - CE_{lgs}) * (1 - CE_{lgr})$
- $P(Unc) = (1 - CE_{lgr}) * (1 - CE_{lgs}) * (1 - CE_{lmn})$
- $P(InRiv) = \text{Prop(Pop)} * [P(Unc) * S_{lgs} * S_{lmn}] + (1 - \text{Prop(pop)}) * S_{lgs} * S_{lmn}$
- $P(Tran) = \text{Prop(Pop)} * [CE_{lgr} + CE_{lgs} * (1 - CE_{lgr}) * S_{lgs} + CE_{lmn} * (1 - CE_{lgs}) * (1 - CE_{lgr}) * S_{lgs} * S_{lmn}]$
- $P(Byp) = [CE_{lgr} + S_{lgs} * CE_{lgs} * (1 - CE_{lgr}) + S_{lmn} * CE_{lmn} * (1 - CE_{lgs}) * (1 - CE_{lgr})] * (1 - \text{Prop(Pop)})$

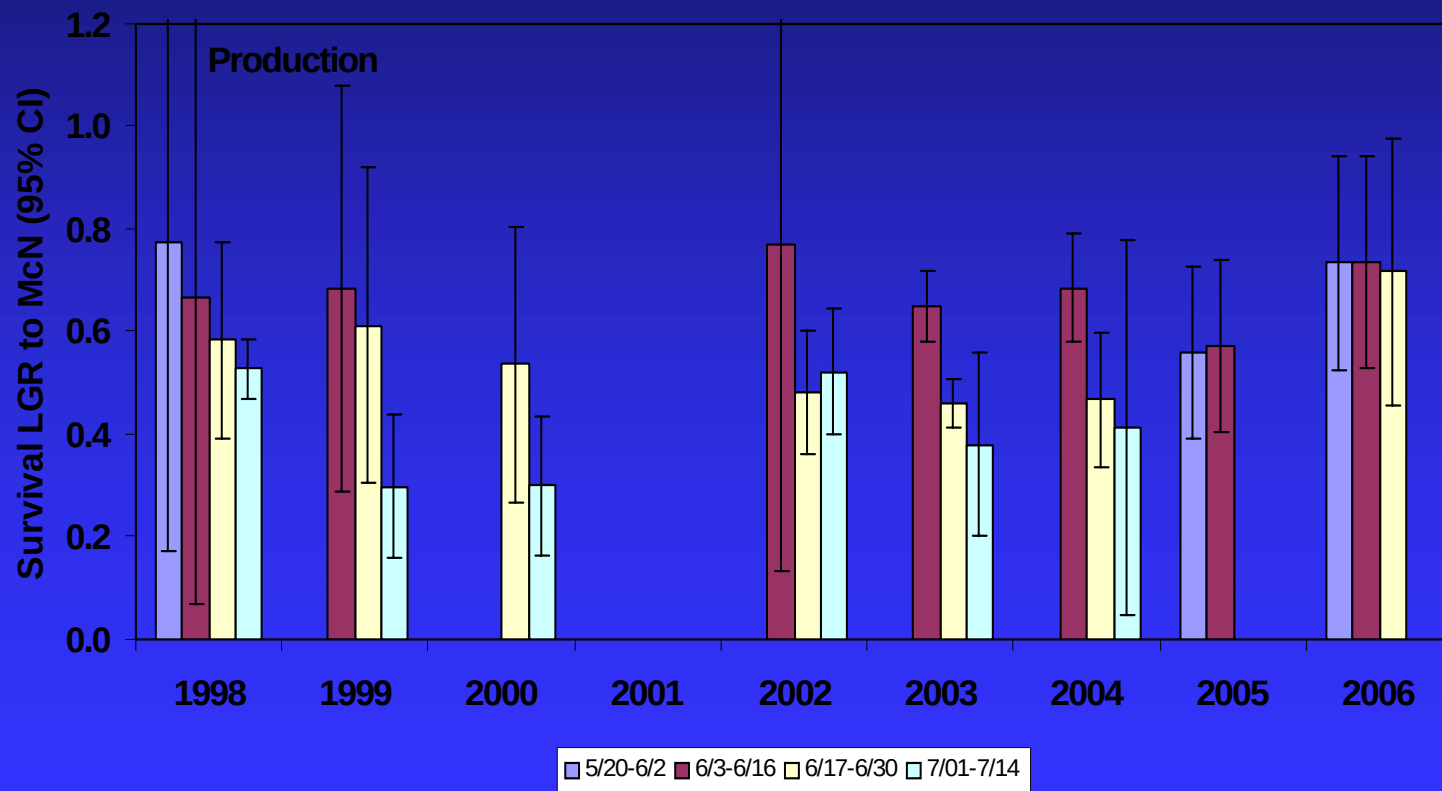
Hatchery/Supplementation Releases of Subyearling Chinook above LGR



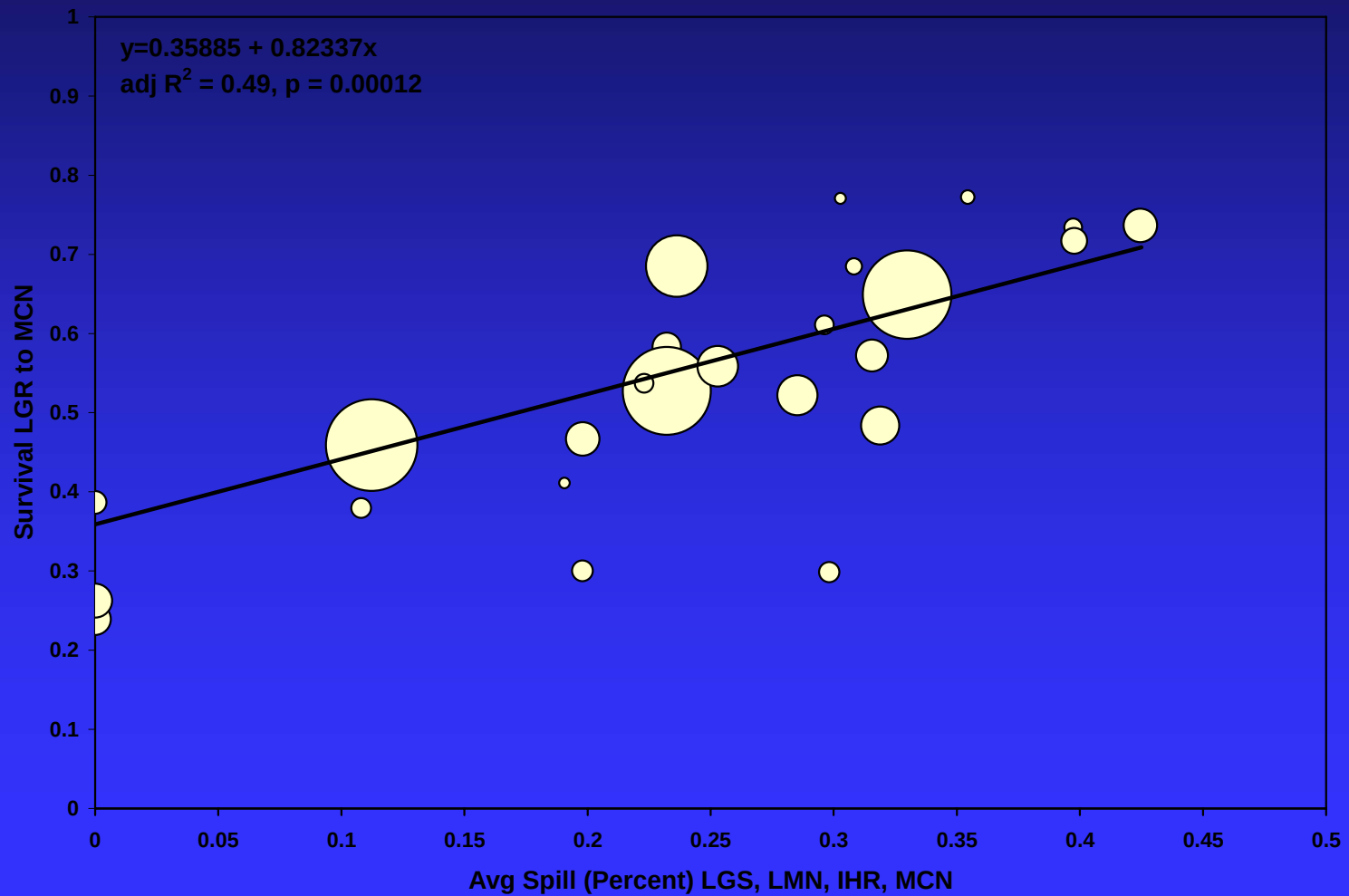
Subyearling Chinook Timing at LGR



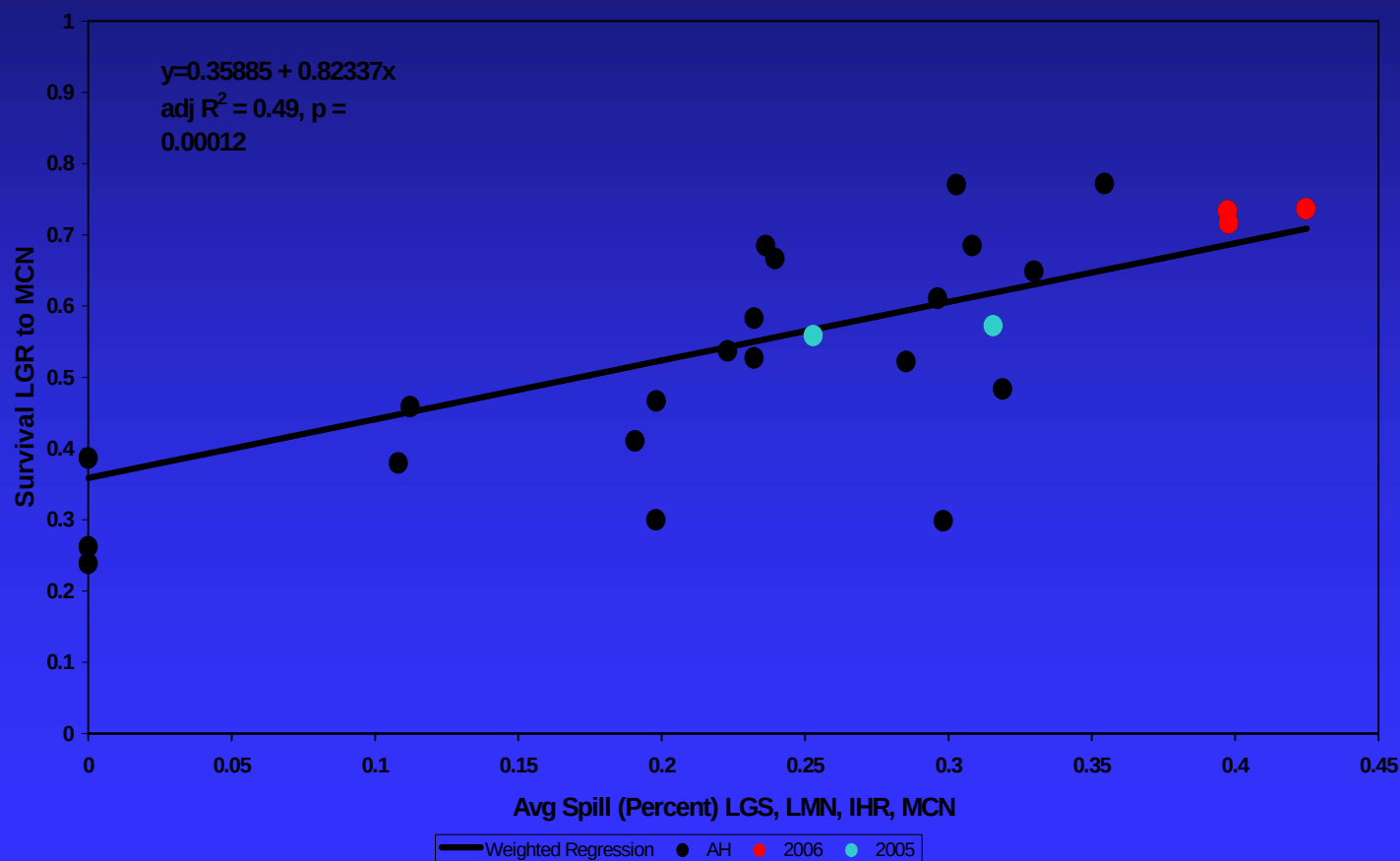
Survival for Production Subyearling Chinook LGR to McN 1998 to 2006 with 95% CI's



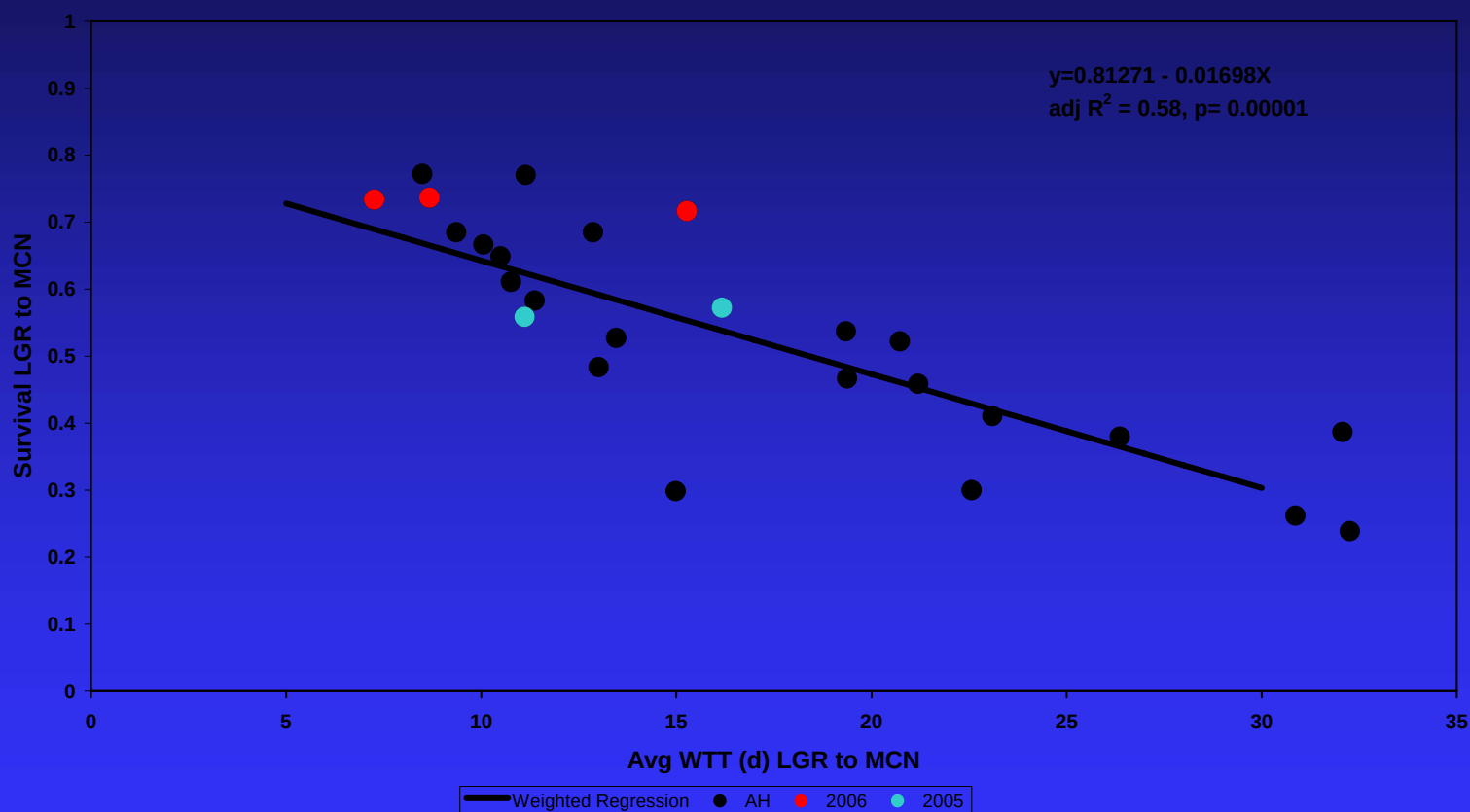
Weighted Regression example



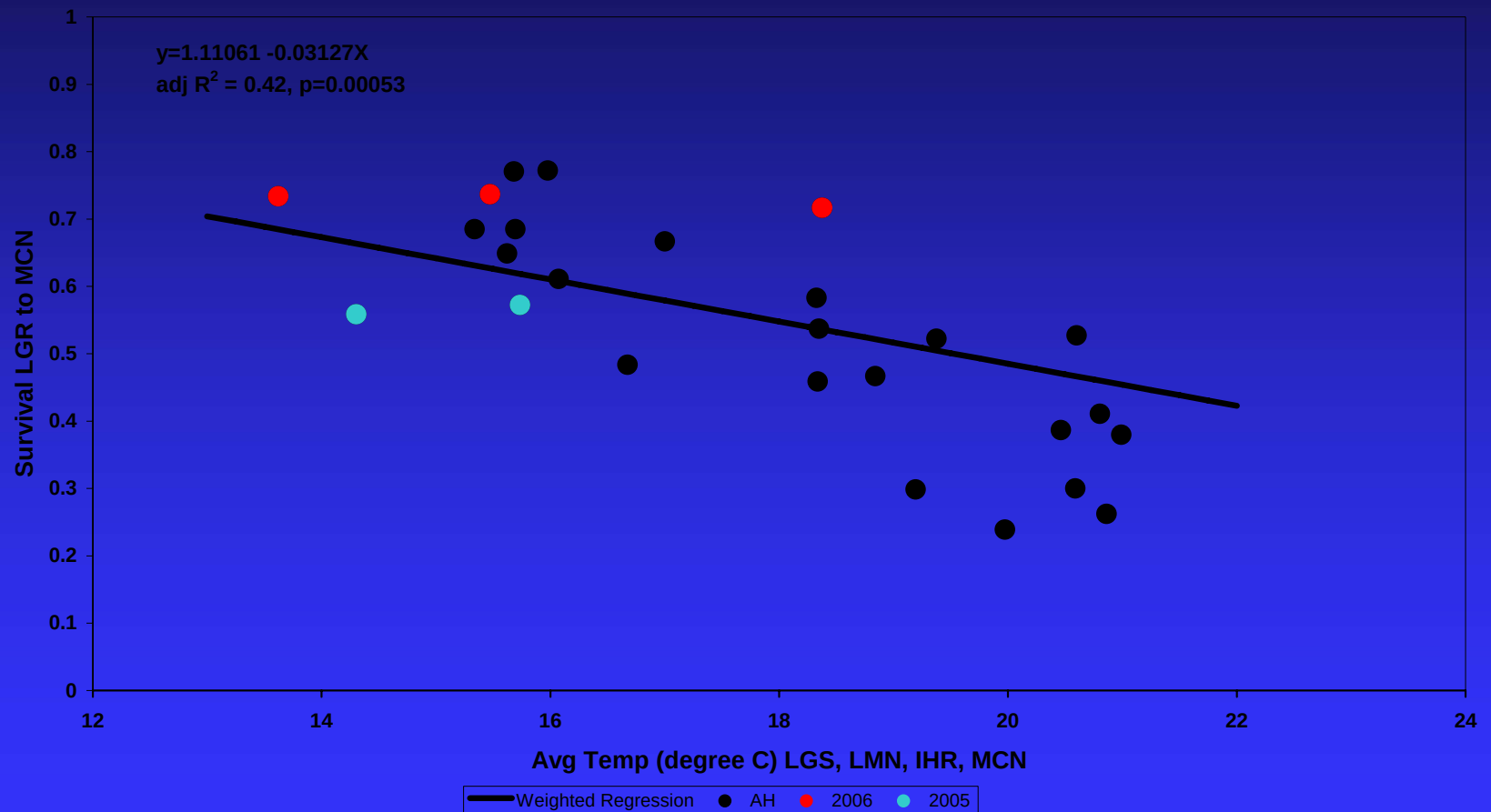
AH Subyearling Chinook Survival vs Avg Spill Pct LGS, LMN, IHR, MCN



AH Subyearling Chinook Survival vs sum WTT LGS, LMN, IHR, McN



AH Subyearling Chinook Survival vs Avg Temp LGS, LMN, IHR, MCN





OREGON CHAPTER

President: Kyle Dittmer, Columbia River Inter-Tribal Fish Commission
Vice-President: Tyree Wilde, National Weather Service Meteorologist
Secretary: Drew Jackson, KPTV / FOX-12 Meteorologist
Treasurer: Linda Ignoffo, Washougal (WA) High School Teacher
Website: <http://www.ametsoc.org/chapters/oregon/index.html>

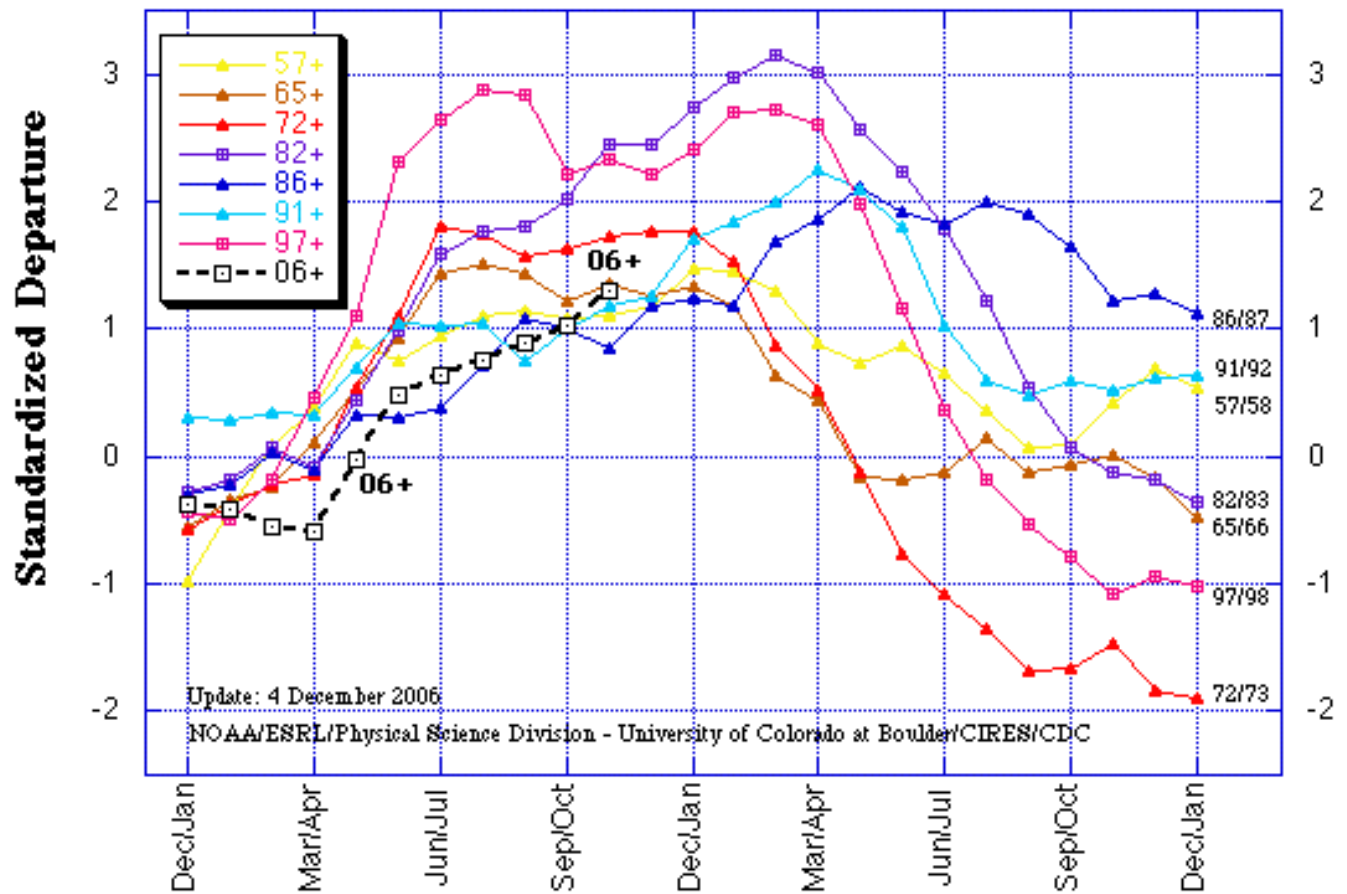
SUMMARY OF 14TH ANNUAL WINTER WEATHER MEETING FORECASTS

20-Oct-06 Forecaster	Temperature					
	Agency	NOV	DEC	JAN	FEB	MAR
Steve Todd	NOAA	A	A	A	N	N
Kyle Dittmer	CRITFC	N	N	N	N	N
George Taylor	OSU	N	N	A	A	A
Pete Parsons	KOIN-6	A	N	A	N	NA
George Miller	MU	A	A	N	N	N

20-Oct-06 Forecaster	Precipitation					
	Agency	NOV	DEC	JAN	FEB	MAR
Steve Todd	NOAA	B	B	B	N	N
Kyle Dittmer	CRITFC	B	N	N	B	N
George Taylor	OSU	A	A	N	N	N
Pete Parsons	KOIN-6	B	B	A	B	NA
George Miller	MU	B	B	N	N	N

A = Above normal
 N = Near normal
 B = Below normal
 NA = Not
 available

Multivariate ENSO Index for the 7 strongest El Niño events since 1950 vs. 2006-07



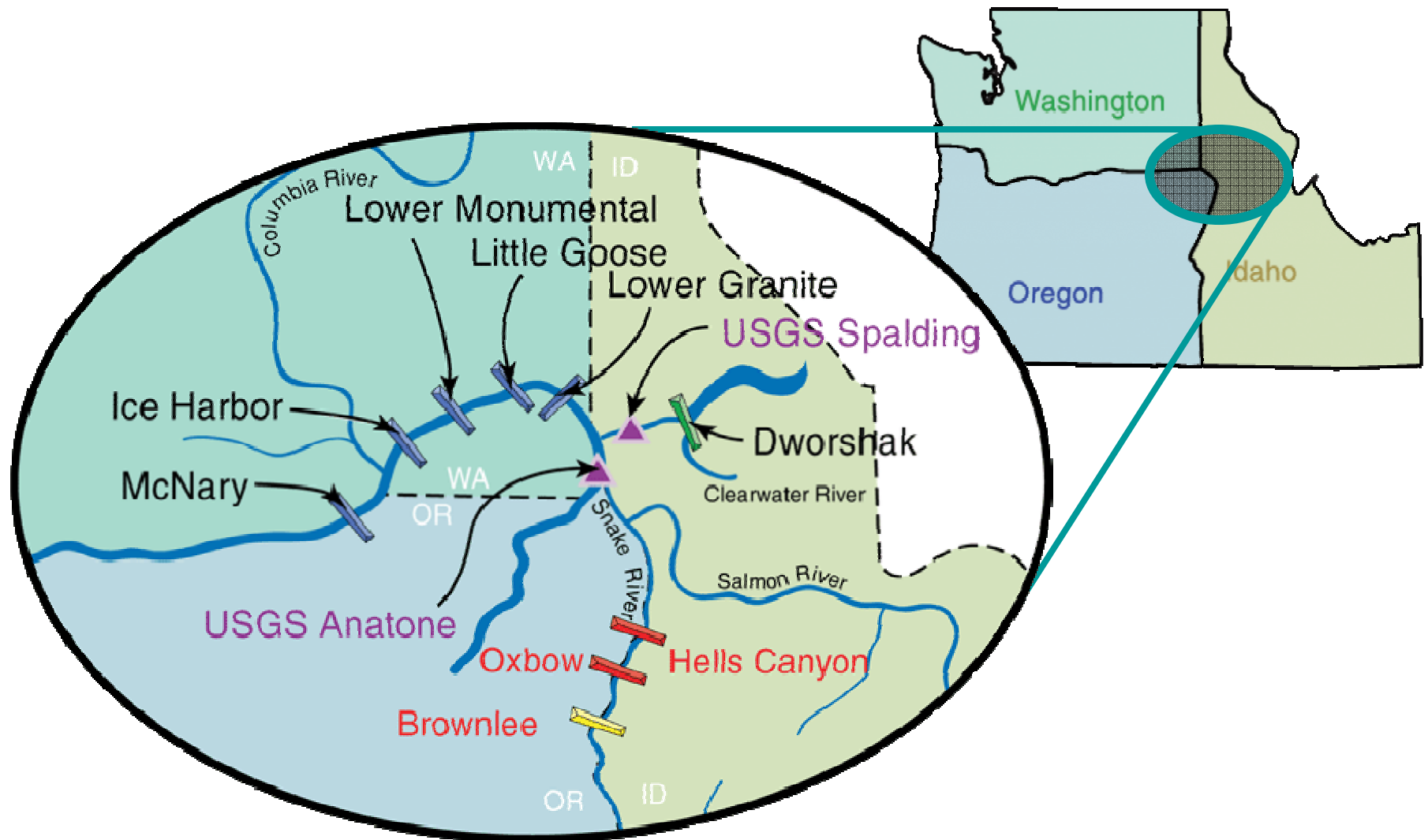
WATER SUPPLY FORECASTS (pre-season)

Wy 2007 forecast			The Dalles		date of
Forecaster	Agency	Method	WSF (MaF)	(Jan.-July)	forecast
Andy Wood	CIG-UW	ESP(cf)	111.6	104%	12-Dec
Kyle Dittmer	CRITFC	MEI	94.2	88%	8-Dec
	NWRFC	ESP	110.3	103%	6-Dec

2005-06 forecast			The Dalles		Observed
Forecaster	Agency	Method	WSF (MaF)	(Jan.-July)	(unreg.)
Andy Wood	CIG-UW	ESP(cf)	107	100%	114.7
Kyle Dittmer	CRITFC	MEI	99	92%	114.7
	NWRFC	ESP	105	98%	114.7

Lower Snake River Temperature Management

Dworshak Reservoir, Lower Snake River, and Hells Canyon Complex



Not to Scale

Lower Snake River Temperature Management 2006

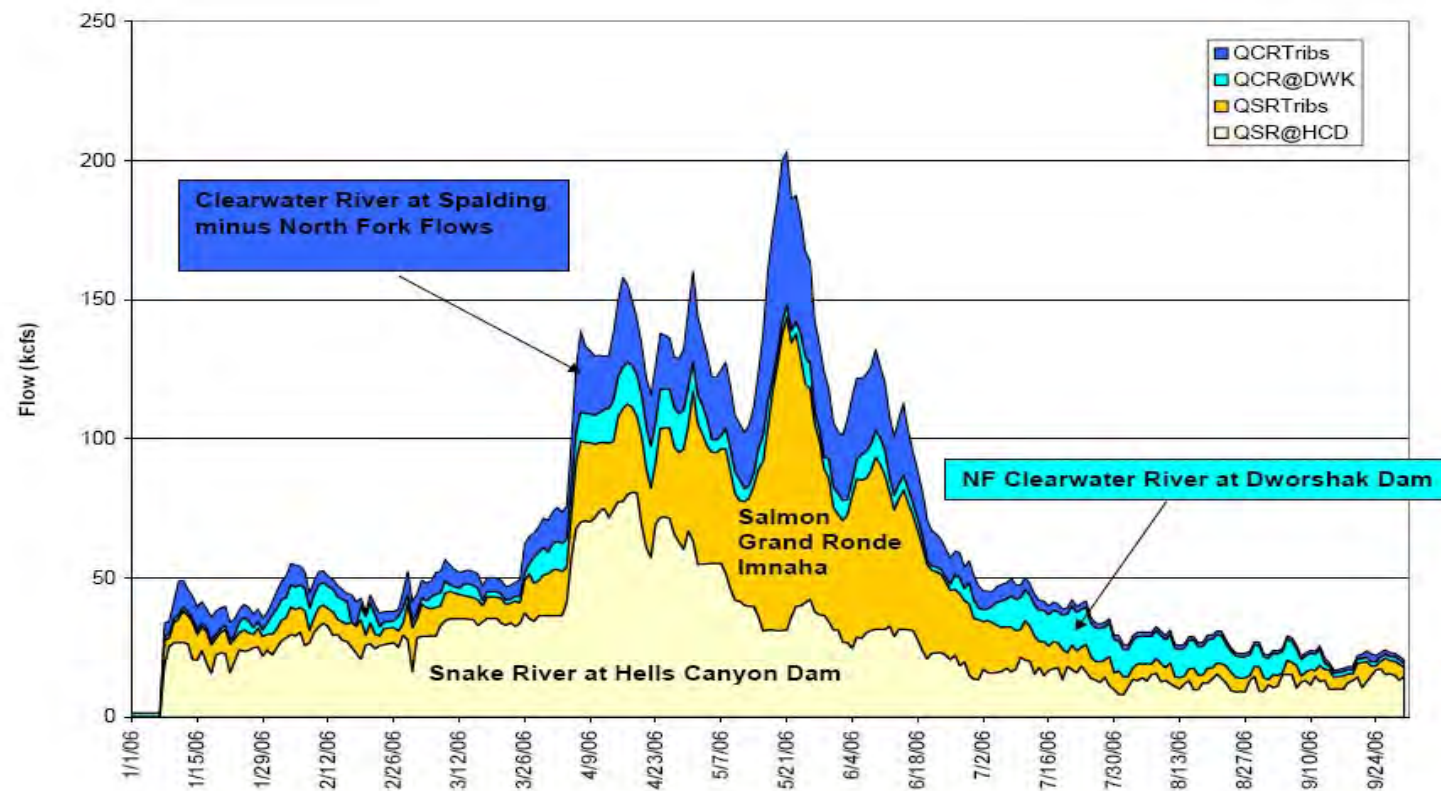
- Water Temperature released from Lower Granite Dam were generally less than 20 C during July and August of 2006
 - July Average of 19.8
 - August Average of 18.8
 - Warmer than 20 C during the first week in July
 - Very Hot conditions
 - Decision to begin draft after the 4th July Holiday
 - Several other short excursions above 20 C
 - Very Hot Weather
 - Above average flows from upstream (Salmon, Hells Canyon Projects)
 - Dworshak Operations
 - Undershot operations throughout
 - Stepped reduction in discharge
 - Spill of up to 4 kcfs to boost releases to 14 kcfs
 - Reached 1535 prior to August 31 (NP supported using more water)

Lower Snake River Temperature Management 2006

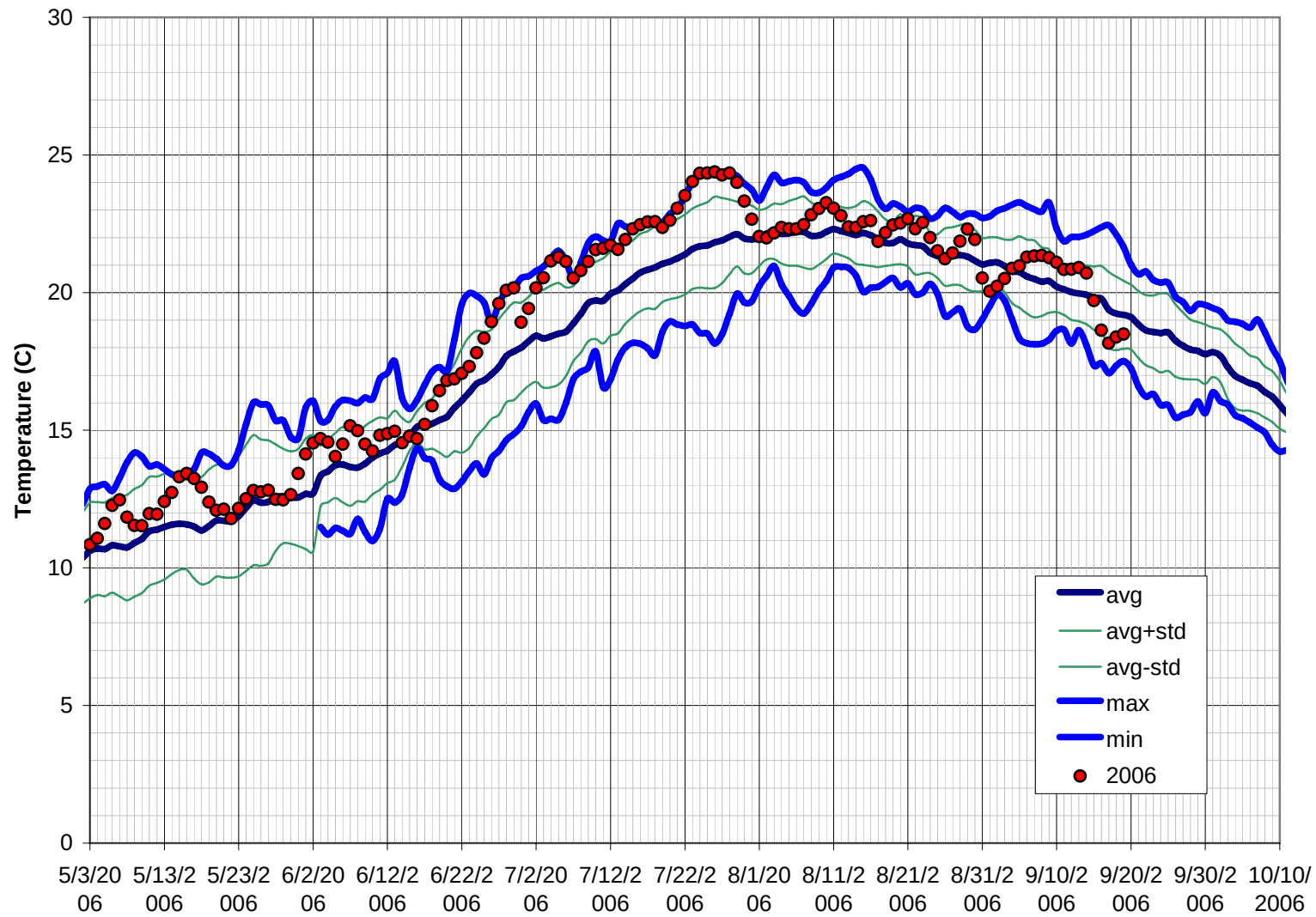
- Total Dissolved Gas Levels in the Clearwater River were generally held below 110%
 - Maximum amount of spill was 4.4 kcfs
 - Thermally induced variation in TDG saturation in Clearwater River
 - TDG production during small generation releases
 - Idaho WQ standards 110%
- Snake River at Ice Harbor > 20 C for over 2 months
 - Washington State Numeric Criteria 20 C or Natural Conditions
 - 2-3 Degree warming from LWG to IHR
- Snake River at Anatone was warmer than Ice Harbor
 - Peak temperature 25 C
 - Strong Diurnal component
 - Almost 3 months of 20+ Temperatures
 - Demonstrated cooling down to the confluence with Columbia River
- TMT Coordination
 - Weekly model simulations conducted to assess alternative operations
- Hells Canyon Peaking Operations
 - Introduces Heat Load cycling into Lower Granite Pool

Flow Contribution to the Lower Snake River - 2006

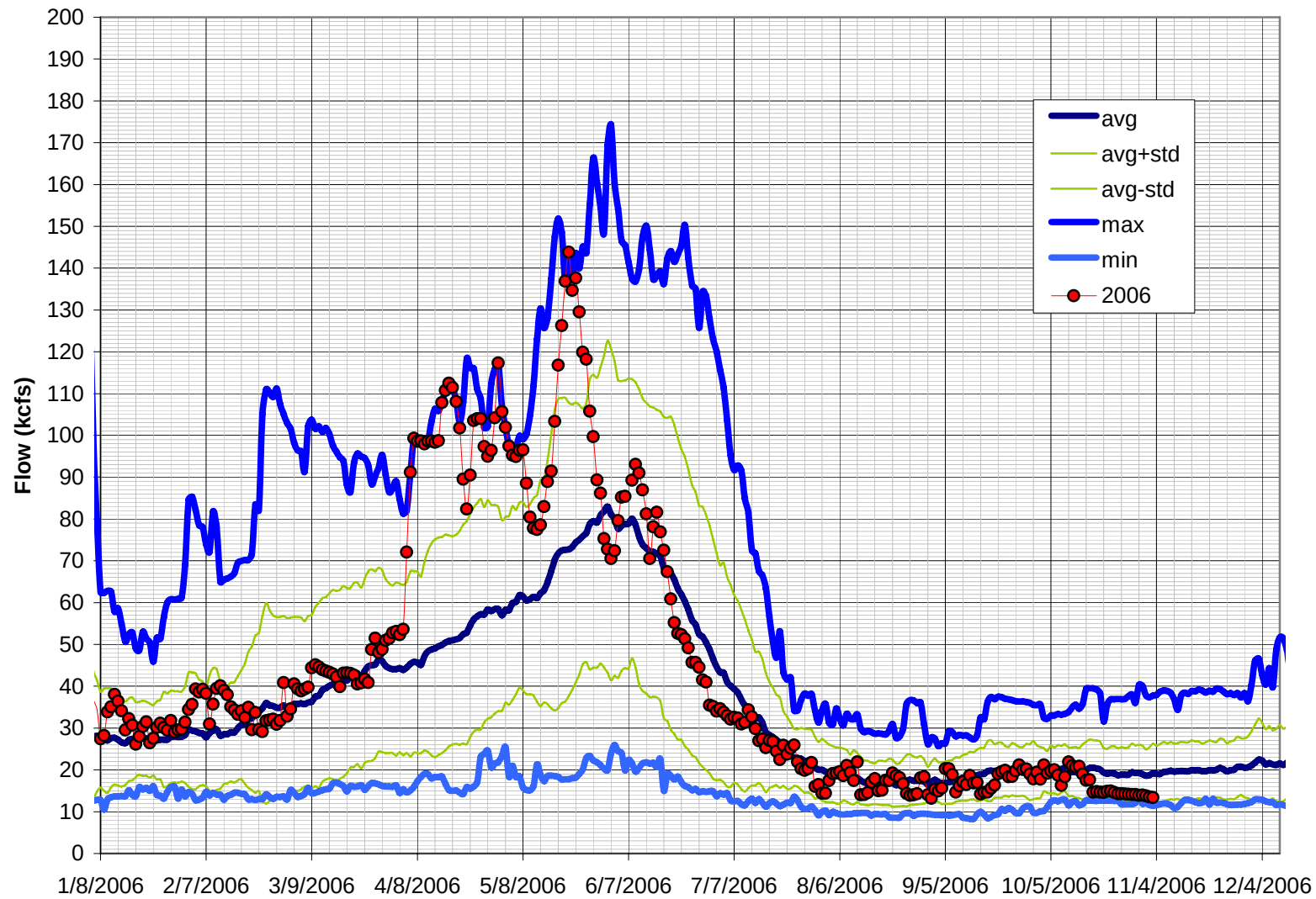
(Snake R. – Yellow, Clearwater R. – Light Blue)



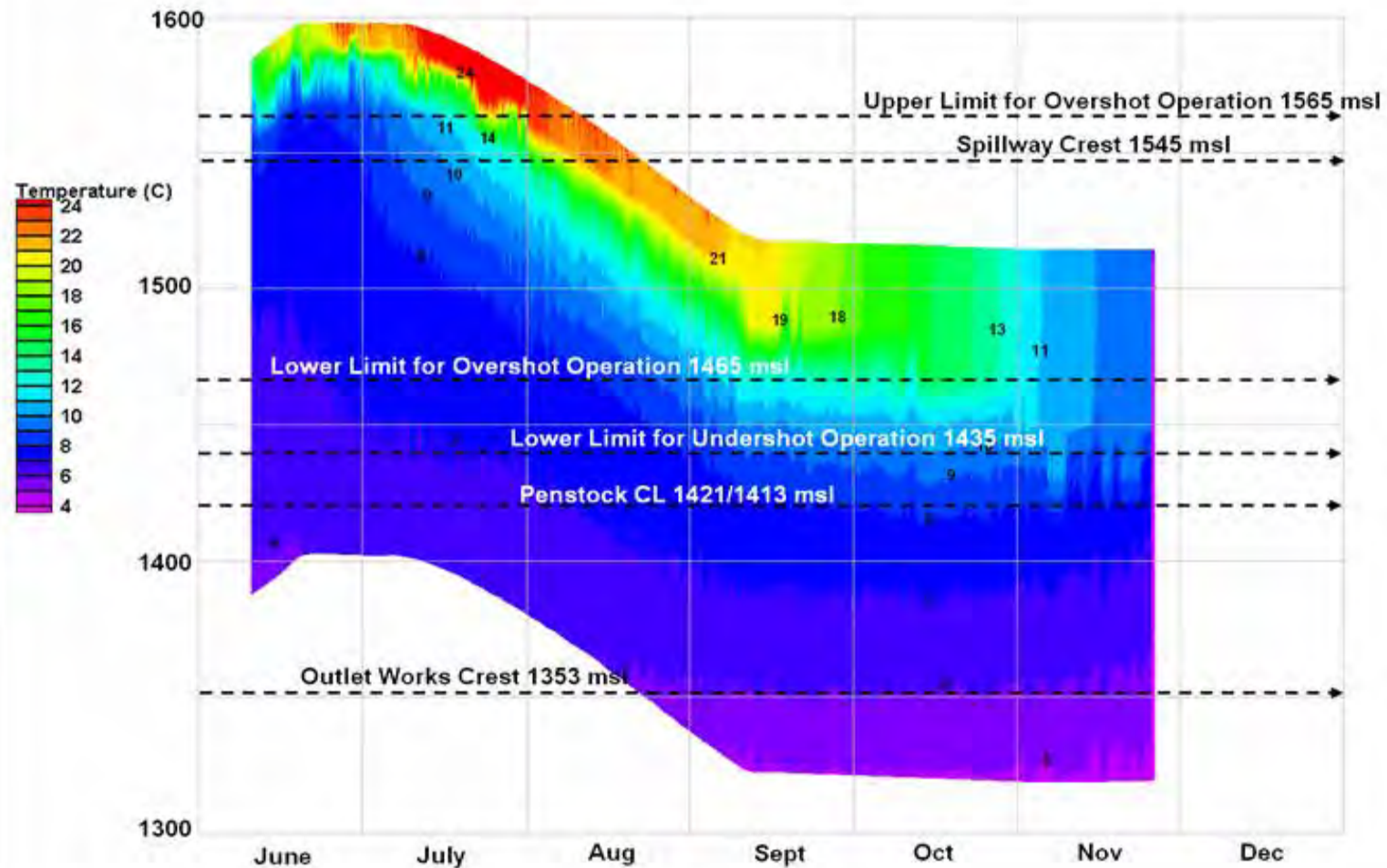
Snake River Temperatures at Anatone 1992-2006

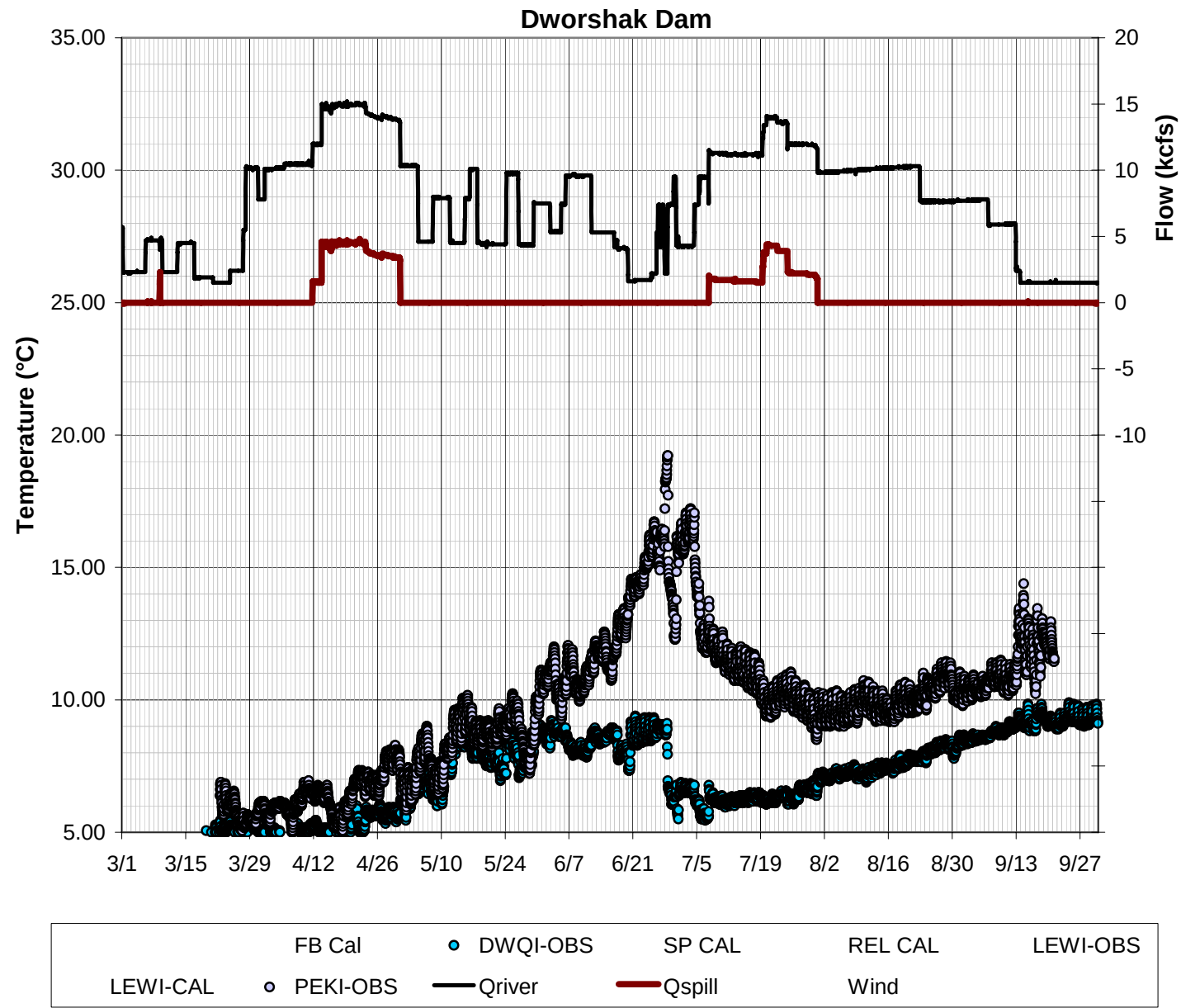


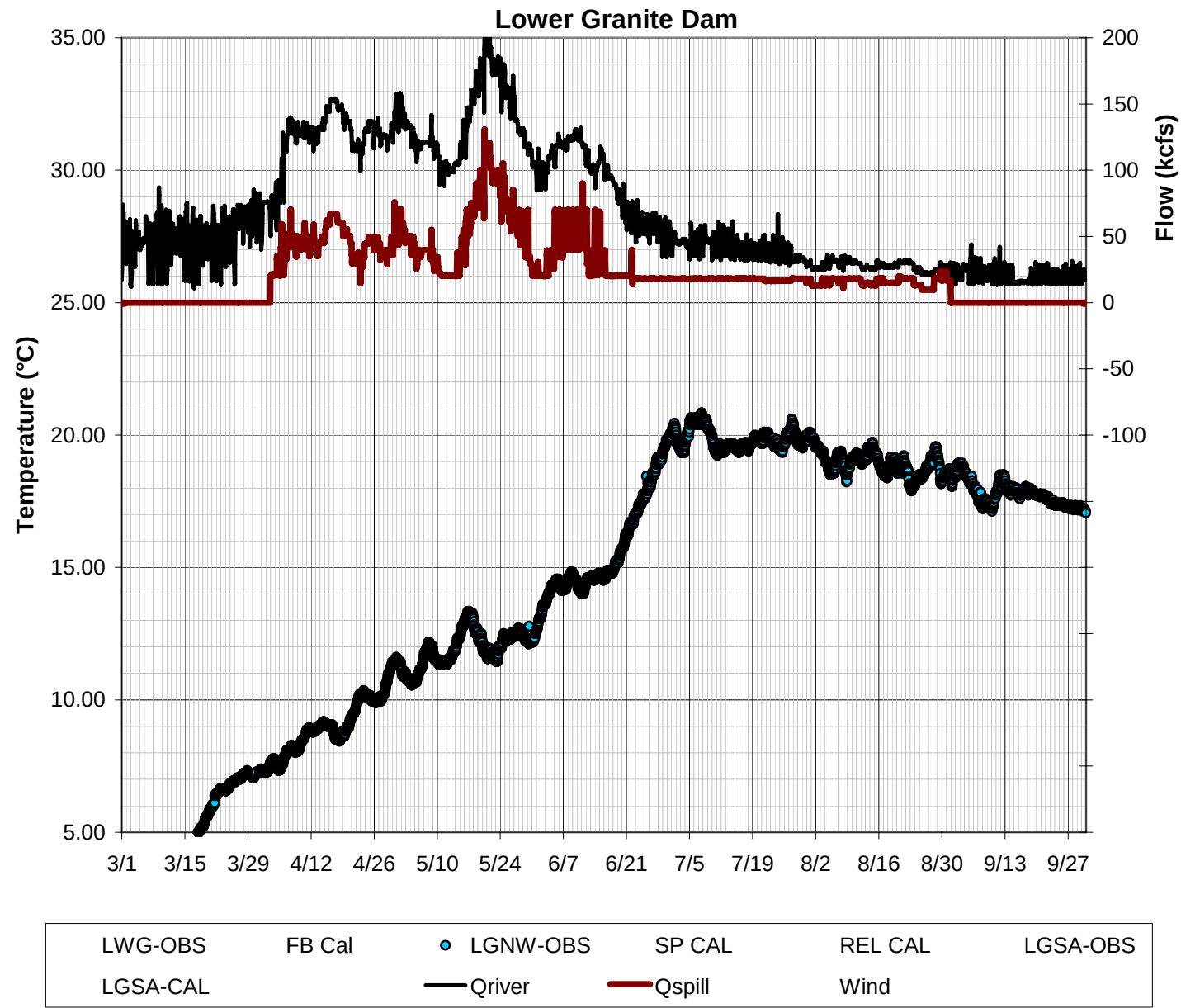
Snake River Flow at Anatone (kcfs)

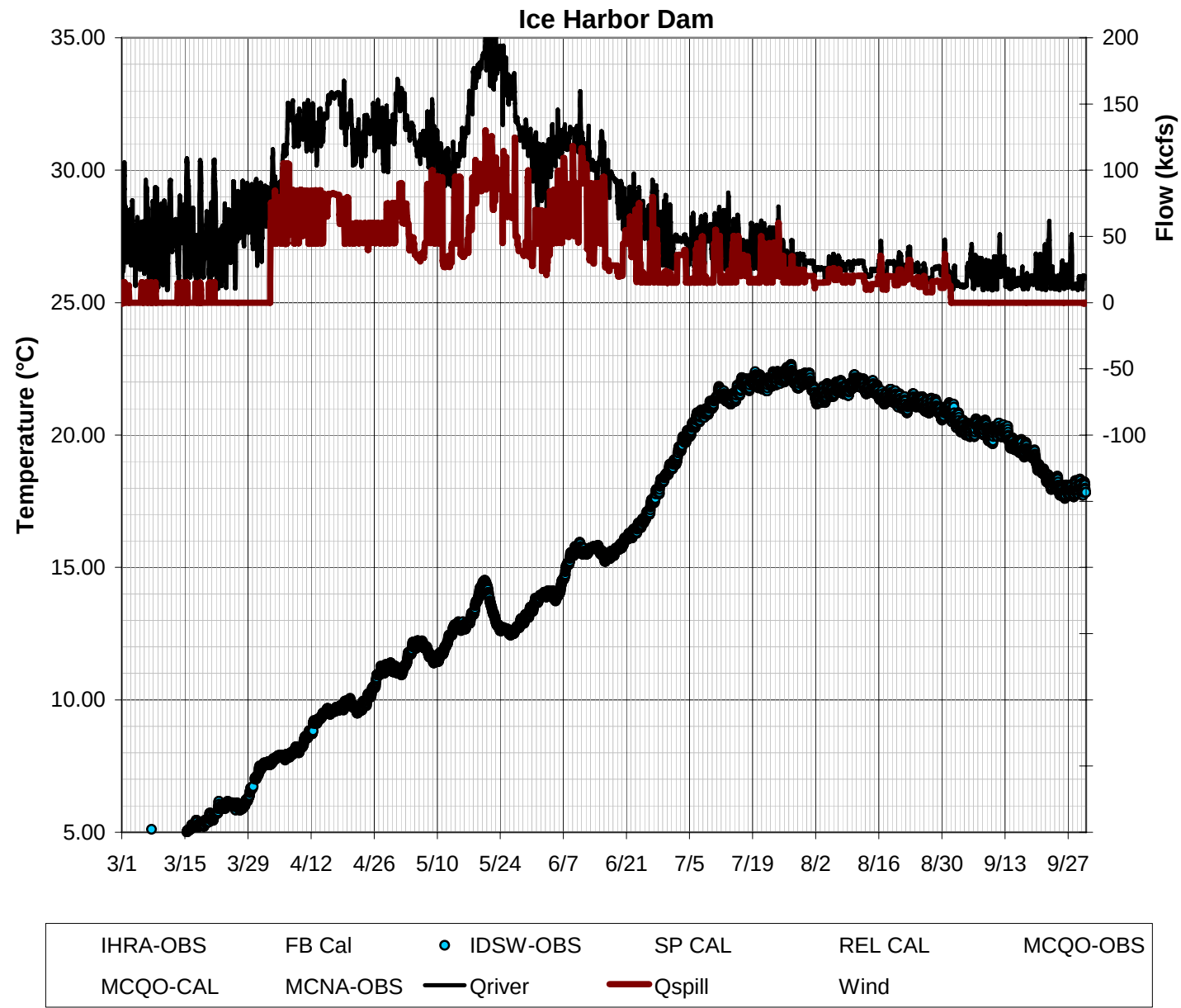


Dworshak Forebay Cross Section







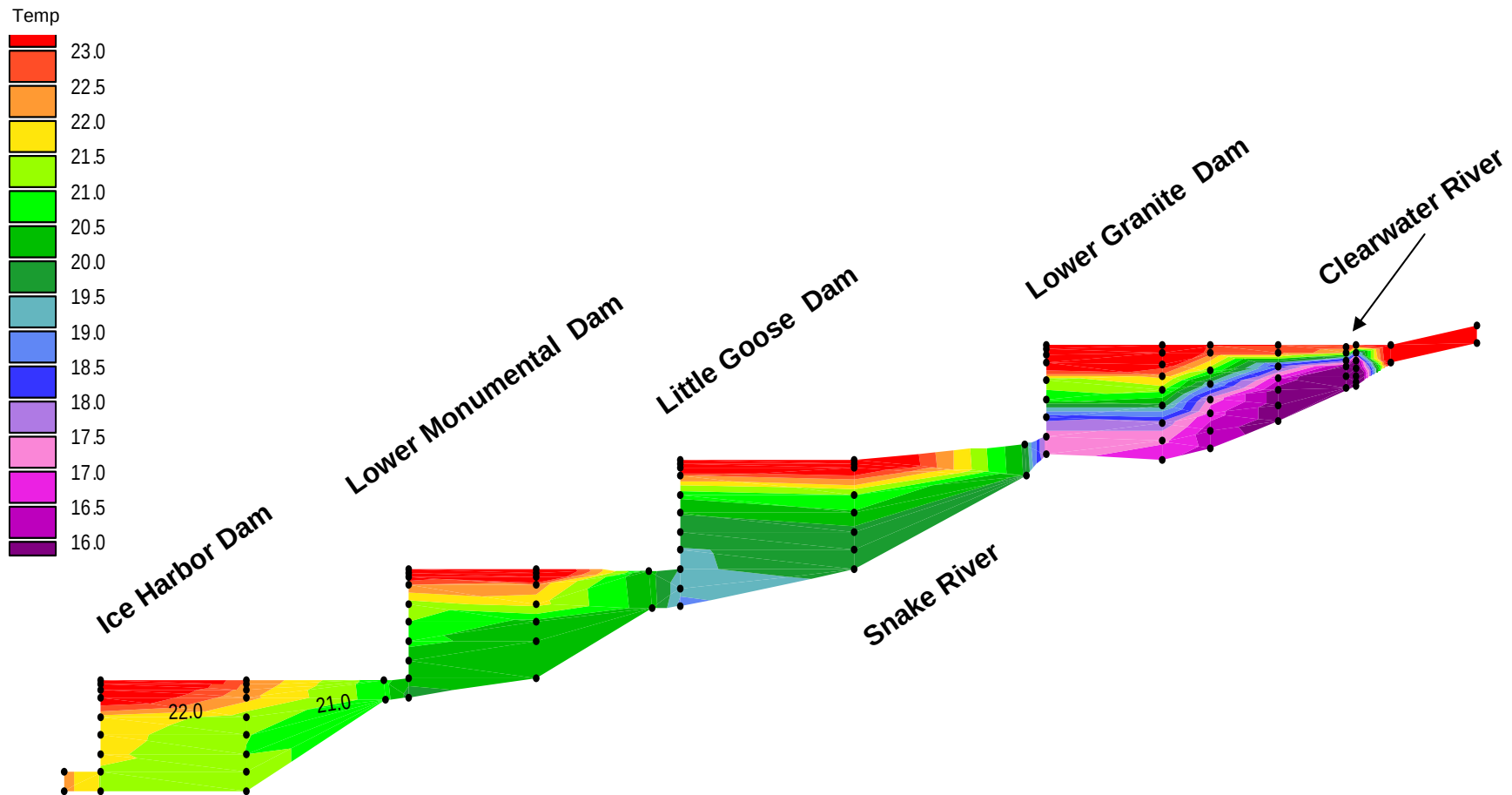


Bi-Op Measure 143

Water Temperature Modeling and Data Collection Plan For Lower Snake River Basin

“The Action Agencies shall develop and coordinate with NOAA Fisheries and EPA on a plan to model the water temperature effects of alternative Snake River operations. The modeling plan shall include a temperature data collection strategy developed in consultation with EPA, NOAA Fisheries and state and tribal water-quality agencies. The data collection strategy shall be sufficient to develop and operate the model and to document the effects of project operations.”

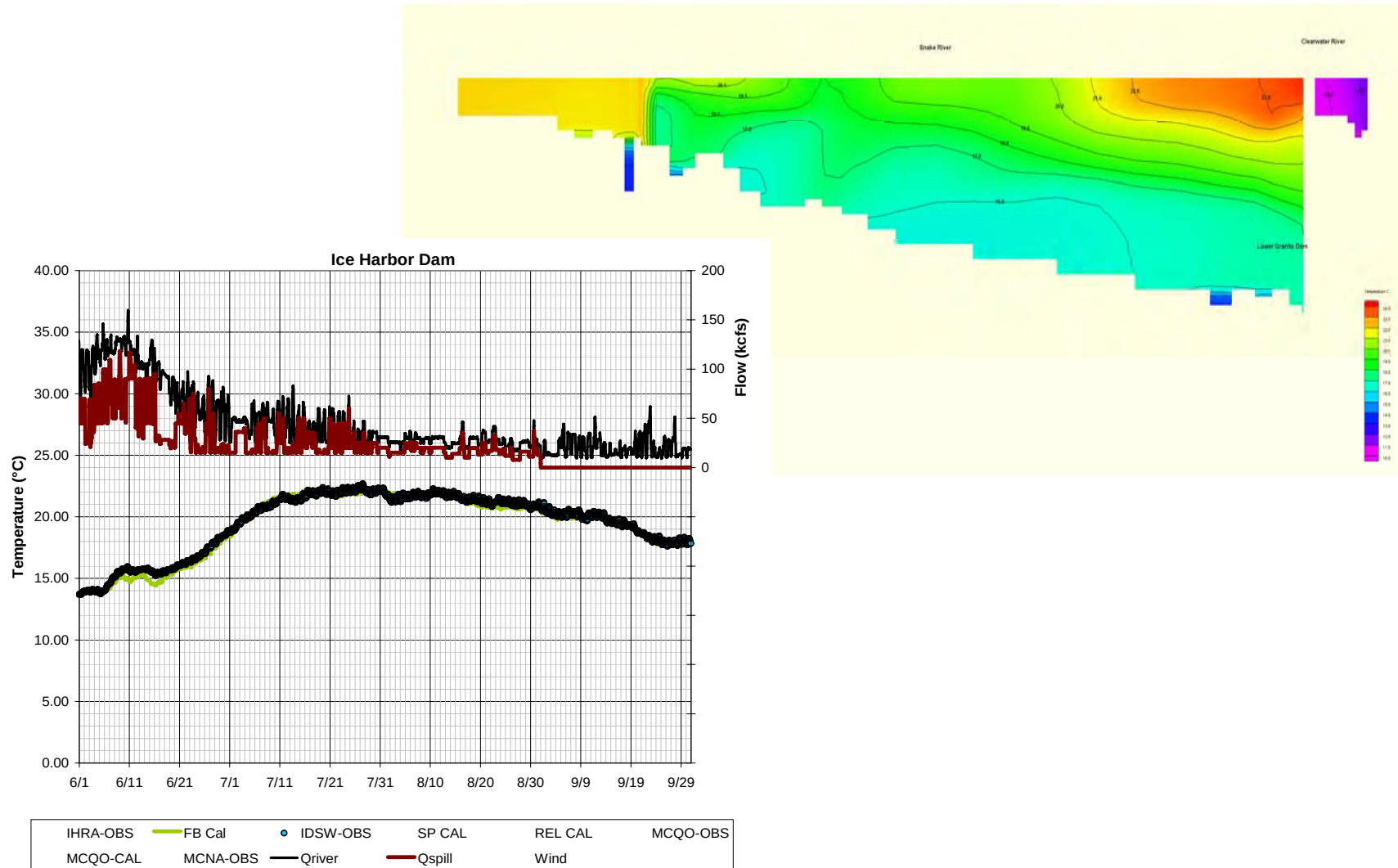
Lower Snake River Reservoir Temperature Profiles



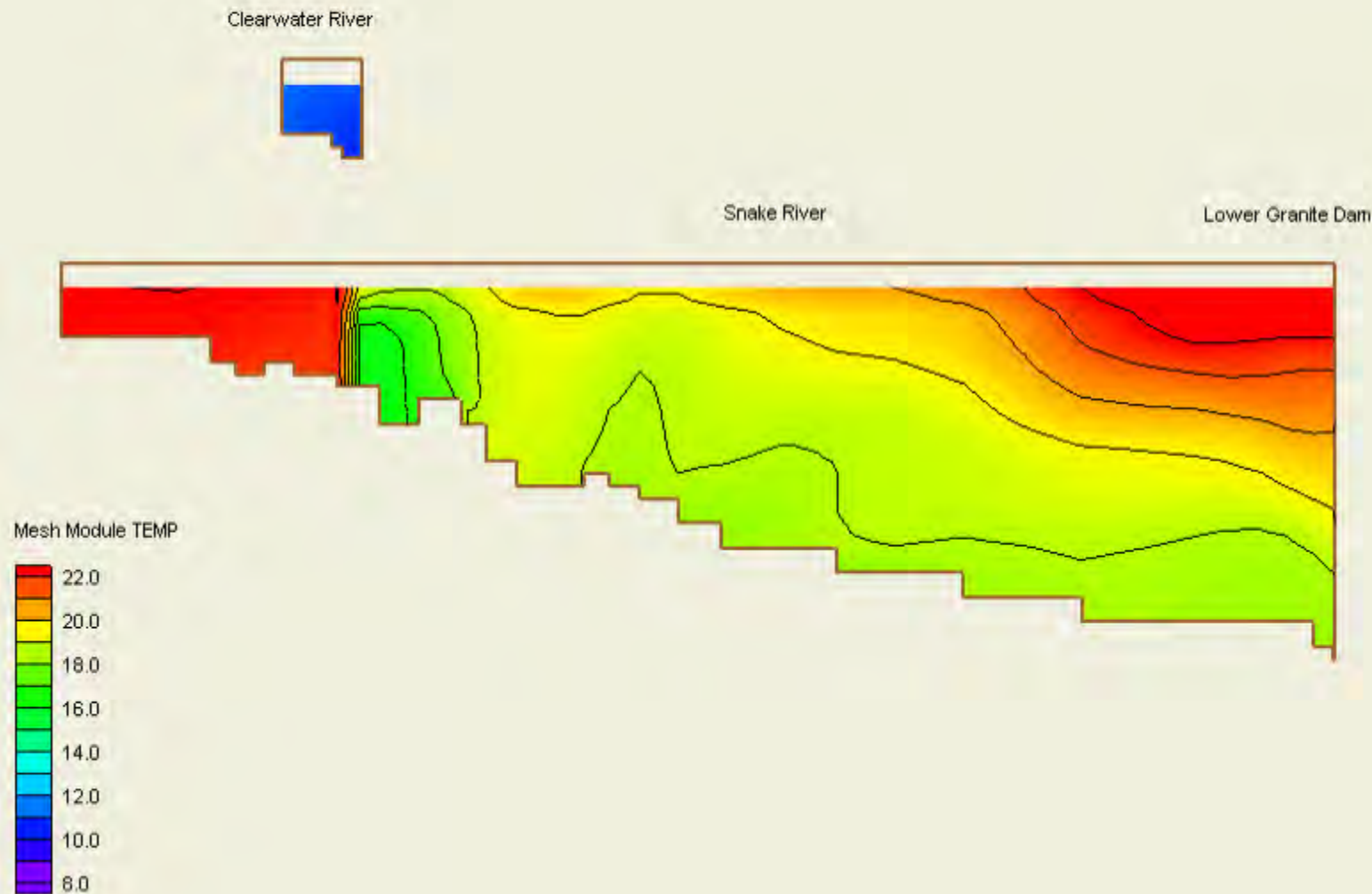
Data Collection and Analysis

- Characterized thermal patterns in the Lower Snake River System during the 2002-6 summer and fall period
- Provided information to evaluate existing water quality monitors in representativeness for both spatial and temporal patterns in temperature and provide guidance of future sampling requirements
- Provided information that helped to decide on the required model resolution and model.
- Provided calibration and verification data for selected model

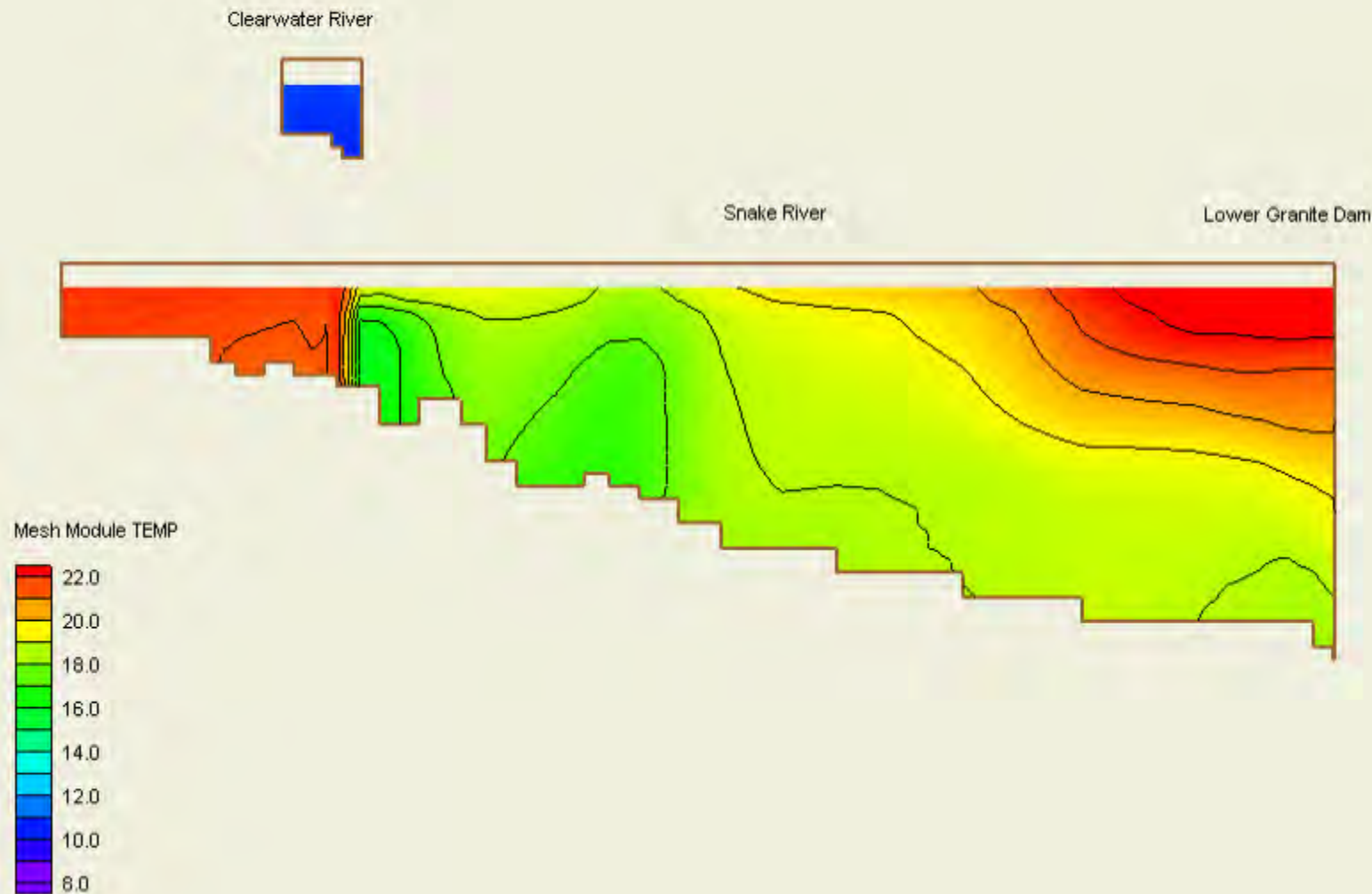
2006 CE-QUAL Simulation



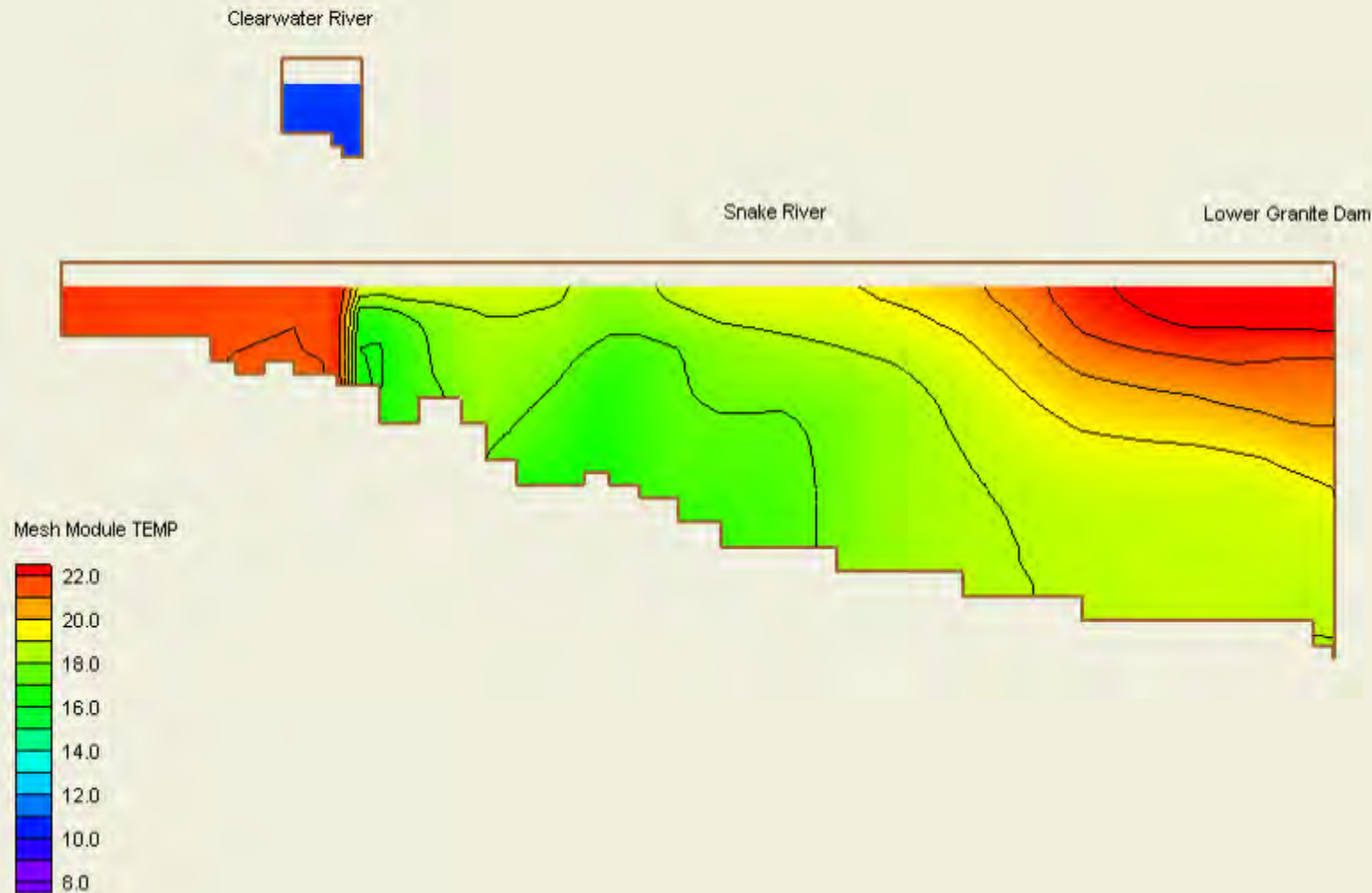
Water Temperature Contours in Lower Granite Pool, August 12 1200 hrs



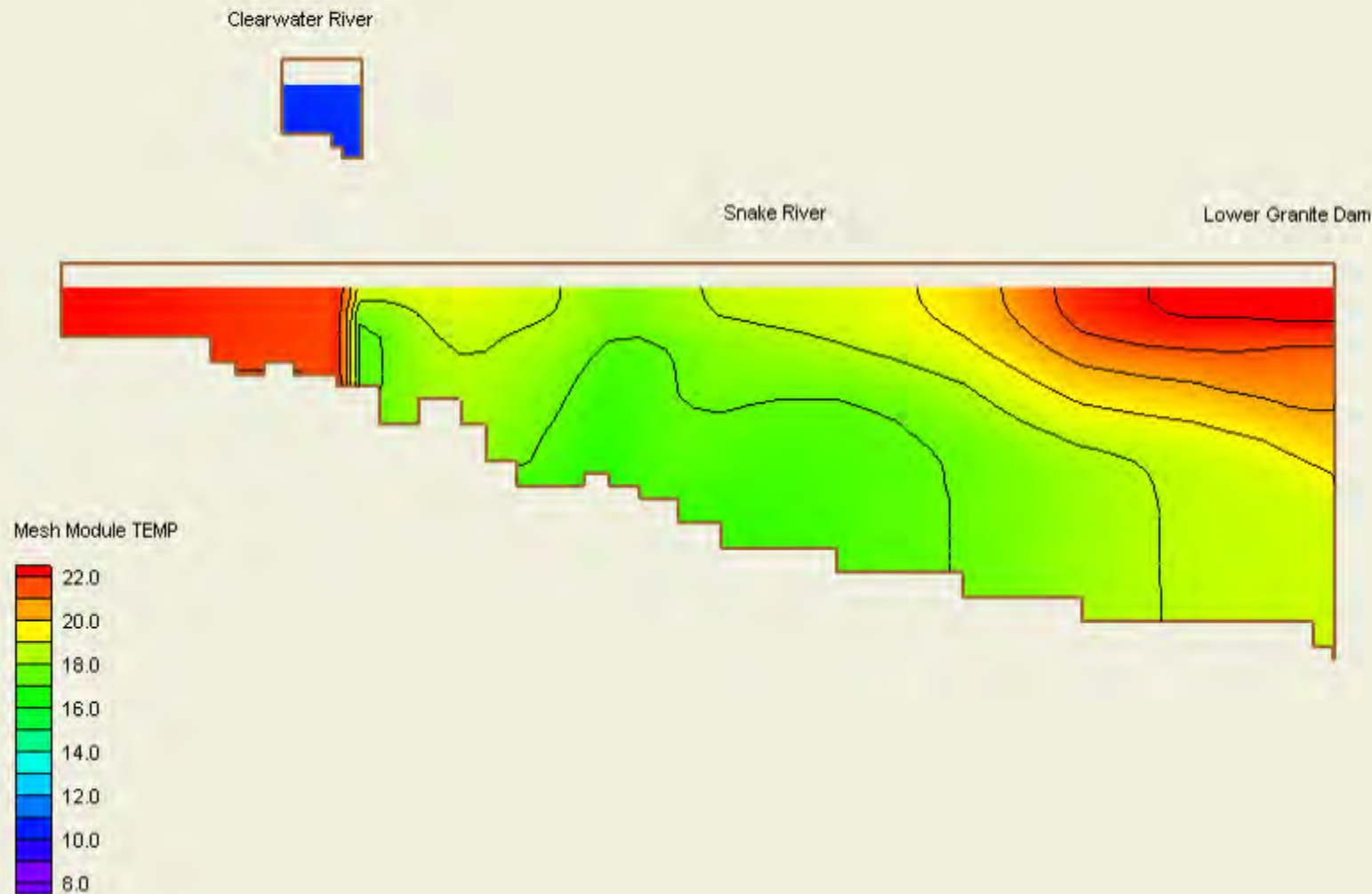
Water Temperature Contours in Lower Granite Pool, August 13 1200 hrs



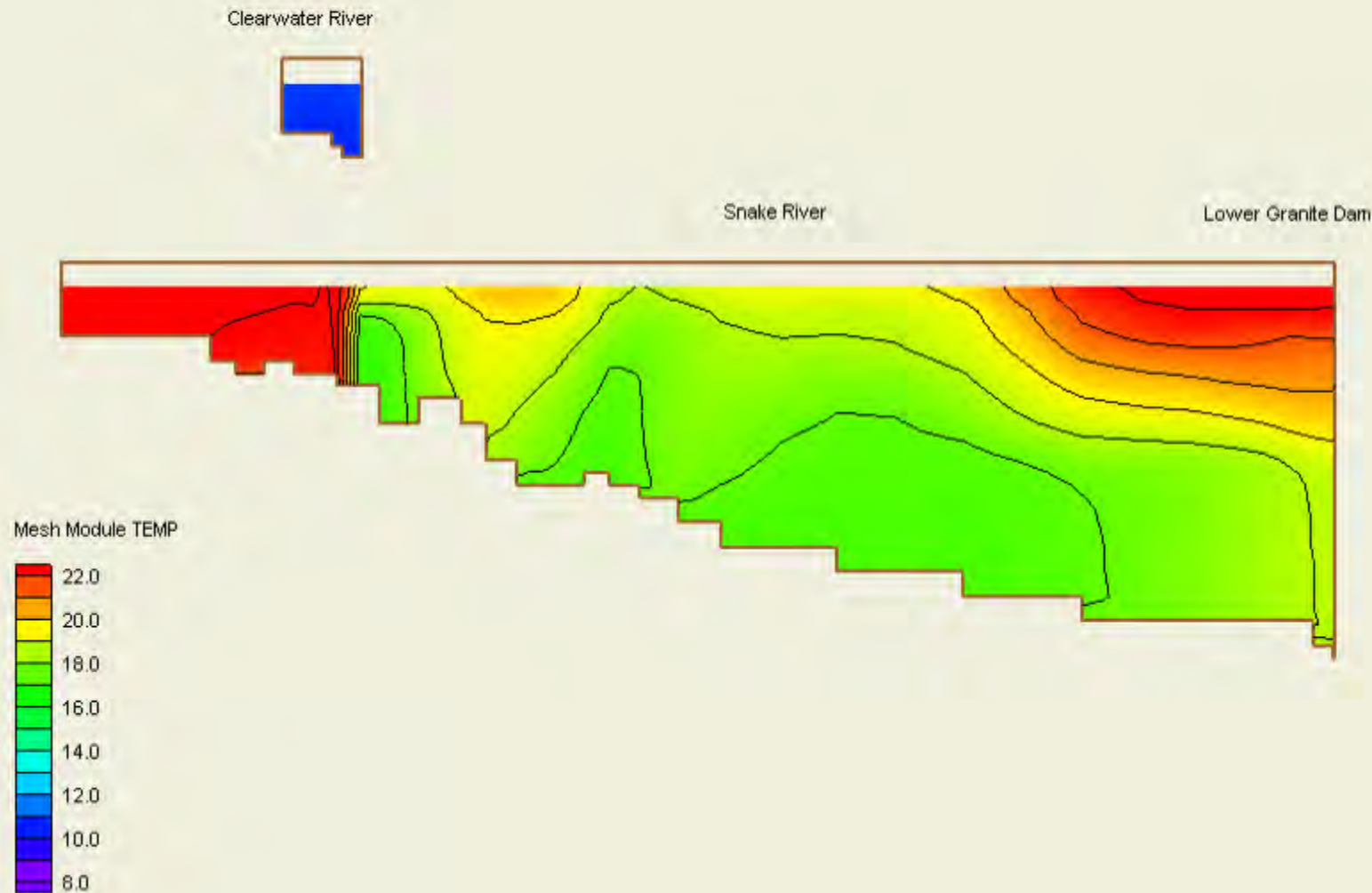
Water Temperature Contours in Lower Granite Pool, August 14 1200 hrs



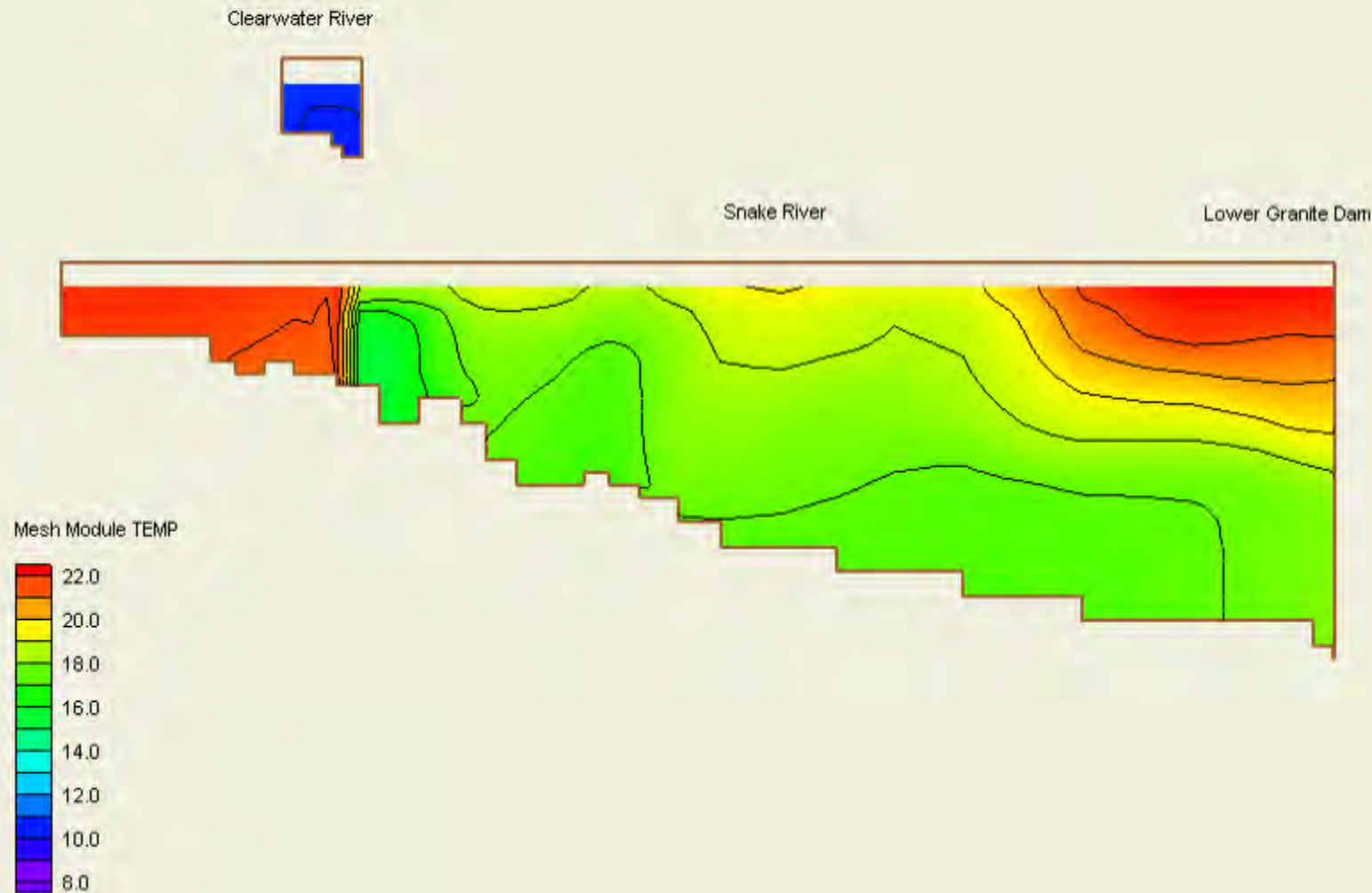
Water Temperature Contours in Lower Granite Pool, August 15 1200 hrs



Water Temperature Contours in Lower Granite Pool, August 16 1200 hrs



Water Temperature Contours in Lower Granite Pool, August 17 1200 hrs



Vector Legend

- 0.30 ft/s
- 0.30 ft/s
- 0.00 ft/s
- 0.00 ft/s

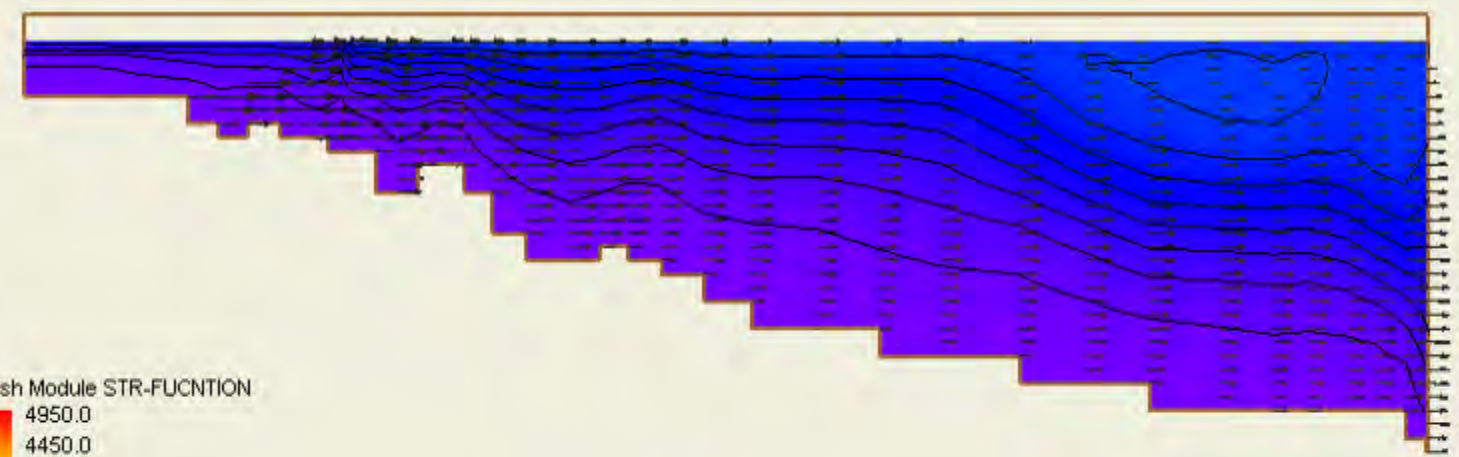
Velocity Field in Lower Granite Pool, August 12 1800 hrs

Clearwater River



Snake River

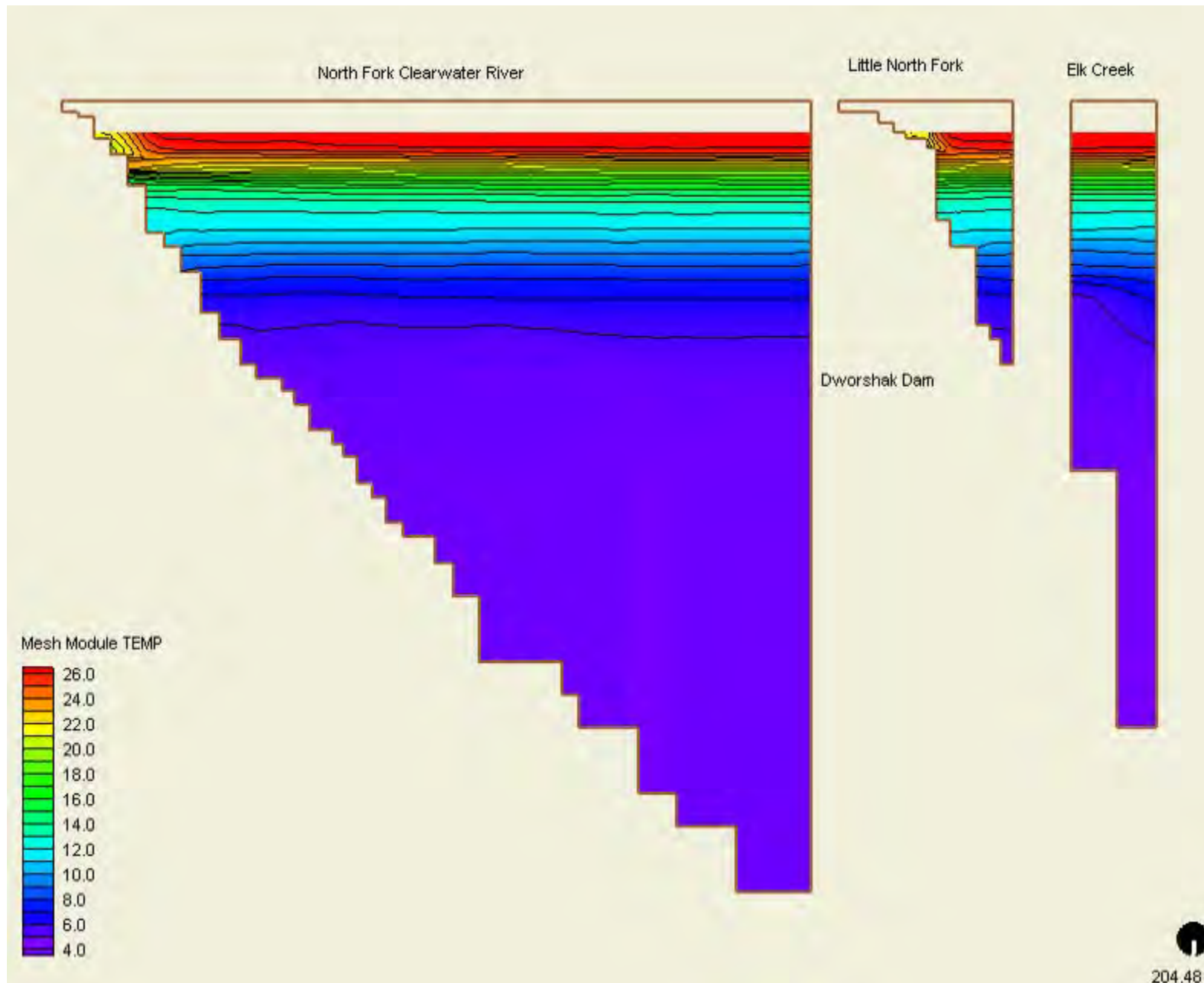
Lower Granite Dam



Mesh Module STR-FUCNTION



Temperature Field in Dworshak Pool, July 23 1100 hrs



CE-QUAL-W2 Model Implementation 2006

- Objective
 - Temperature Management for Habitat Improvement in the Lower Snake River Basin
- Approach
 - Development of Numerical Model and Data input
 - CEQUAL-W2
 - 2D Laterally Averaged Hydrodynamic-Water Quality Model
 - Short and Long Term Forecasts of Hydrologic and Meteorologic Conditions for real-time management
 - Alternative Structural/Operation Conditions

Lower Snake Temperature Management Real-time Forecasting

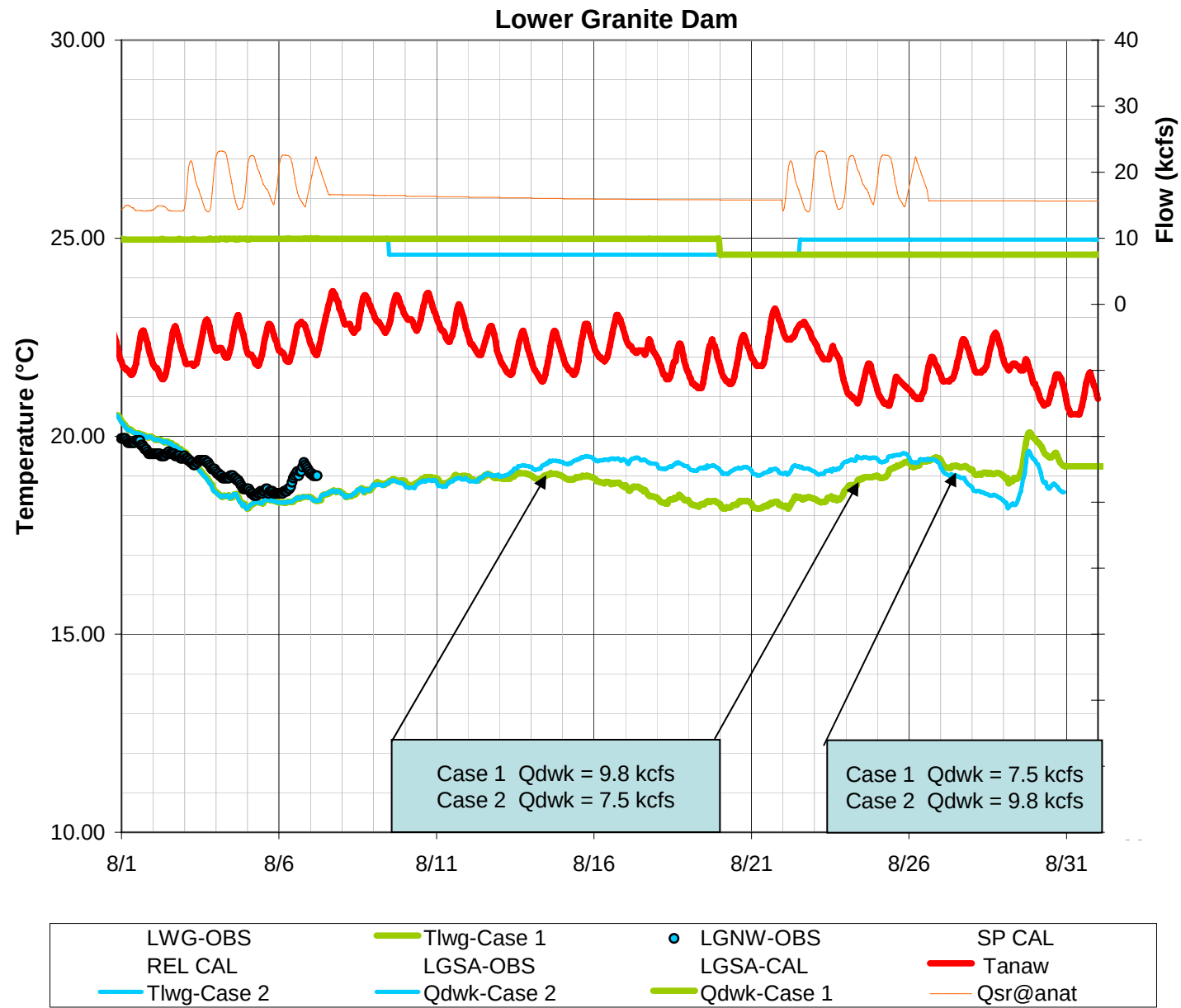
- Flows and Temperatures were simulated in the Snake River and Clearwater River Basins for the Month of July-August 2006.
 - Snake RM 107-167
 - Clearwater RM 0-42
- Meteorologic Conditions
 - NOAA 7 Day Forecast
 - Weather data 2005 Silcott Island/Dent Acres
- Boundary Conditions
 - Flows (STP)
 - Temperatures (2005 observed)
- Dworshak Operations (example)
 - Case 1 Aug 8-19 @ 9.8 kcsf, Aug 20-31 @ 7.5 kcfs
 - Case 2 Aug 8 @ 9.8 kcfs, Aug 9-22 @ 7.5 kcfs, Aug 22-31 @ 9.8 kcfs

Lower Snake Temperature Management

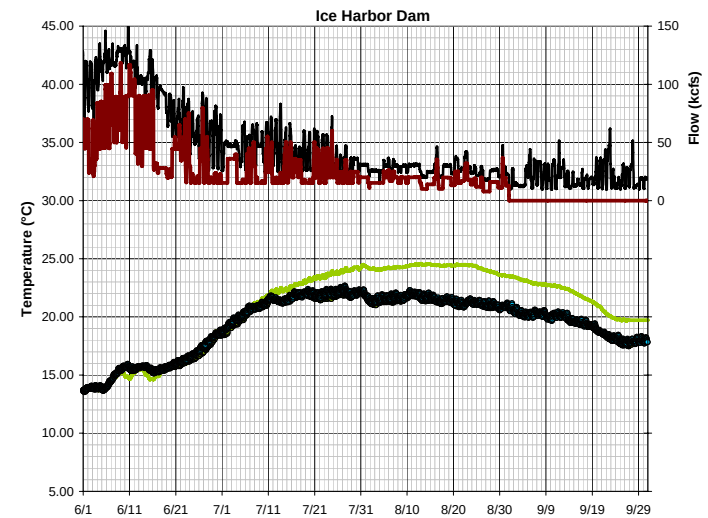
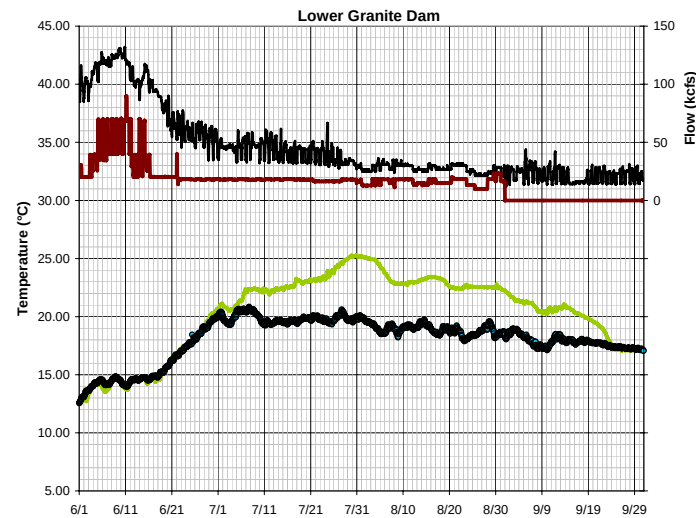
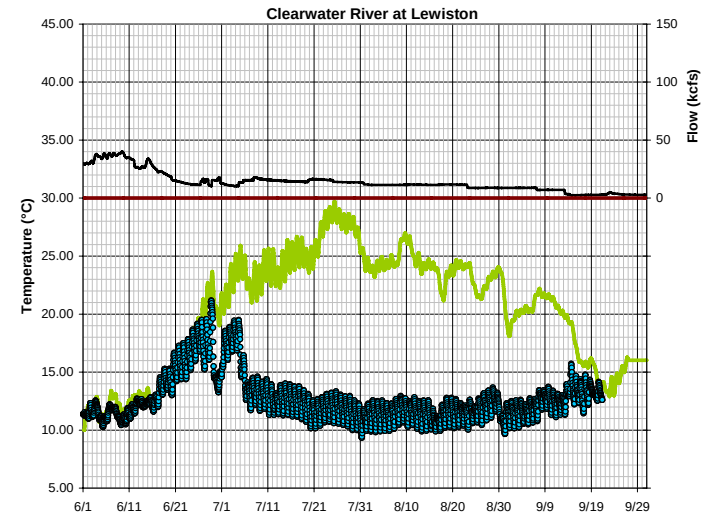
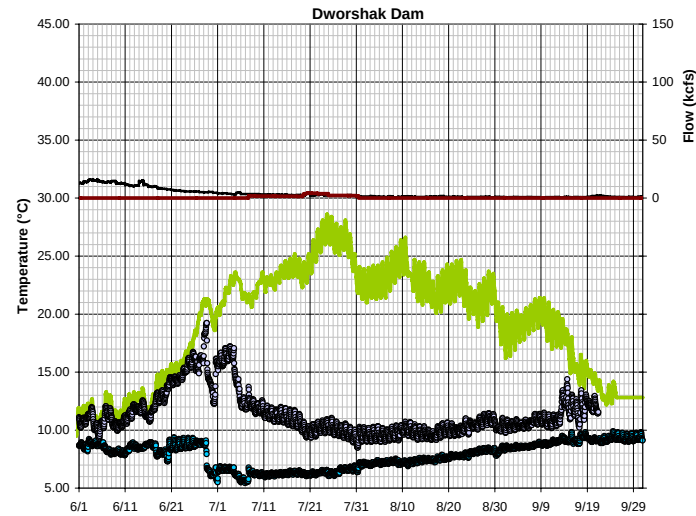
- Results
 - Shaping the releases (+/- 2.3 kcfs) from Dworshak can result in a ~1 C impact (increase or decrease) in releases from Lower Granite Dam
 - Case 1 – continued capacity releases from Dworshak will result in 19 C release temperatures from Lower Granite Dam this week
 - Case 1 - If releases from HC Dam are reduced to 10-11 kcfs daily average the release temperatures from Lower Granite Dam will fall below 19 C next week
 - Case 1 – operating schedule forces 2 turbine operation at 7.5 kcfs during the end of August to attain 1535 ft in Dworshak pool on Aug 31. This policy is less able to moderate a pulse of warm water from the SR during this time frame (second half of August).
 - Case 2 – Two turbine releases at 7.5 kcfs from Dworshak Dam are initiated on Aug 9 to conserve water for the second half of August with release temperatures at high as 19.5 C at Lower Granite Dam over the next week.
 - If HC Dam discharge remain higher than projected, temperature could approach 20 C.
 - Case 2 – The conservation of water in Dworshak pool afforded by this policy allows the moderation of water temperatures at the end of August during a pulse of warm water

Lower Snake Temperature Management

- Results
 - Recommended temperature management policy is to time capacity releases from Dworshak Dam with high thermal loading on the Snake River above the confluence with the Clearwater River
 - Metric of operational decision making should involve the average temperature of Clearwater River at Lewiston and Snake River at Anatone
 - When the average temperature from these sources is above 19 C it will generally result in 20+C at Lower Granite Dam
 - This location will allow for operational changes at DWK to be paired with thermal loading changes on the Snake River.
 - Lagged response between Dworshak operational change and thermal response at Lower Granite Dam
 - About a 5-6 day lag forecasted August conditions
 - Cooling influence of Dworshak releases go further in the second half of August due to lower forecasted flows on the Snake River.
 - Variability of forecasted water temperature are a function of model inputs (flows, temperatures, weather conditions)
 - Hells Canyon Dam Releases (Q & Temp)?
 - Reoccurrence of “hellishly” warm weather conditions or rain



2006 Simulation Without Dworshak

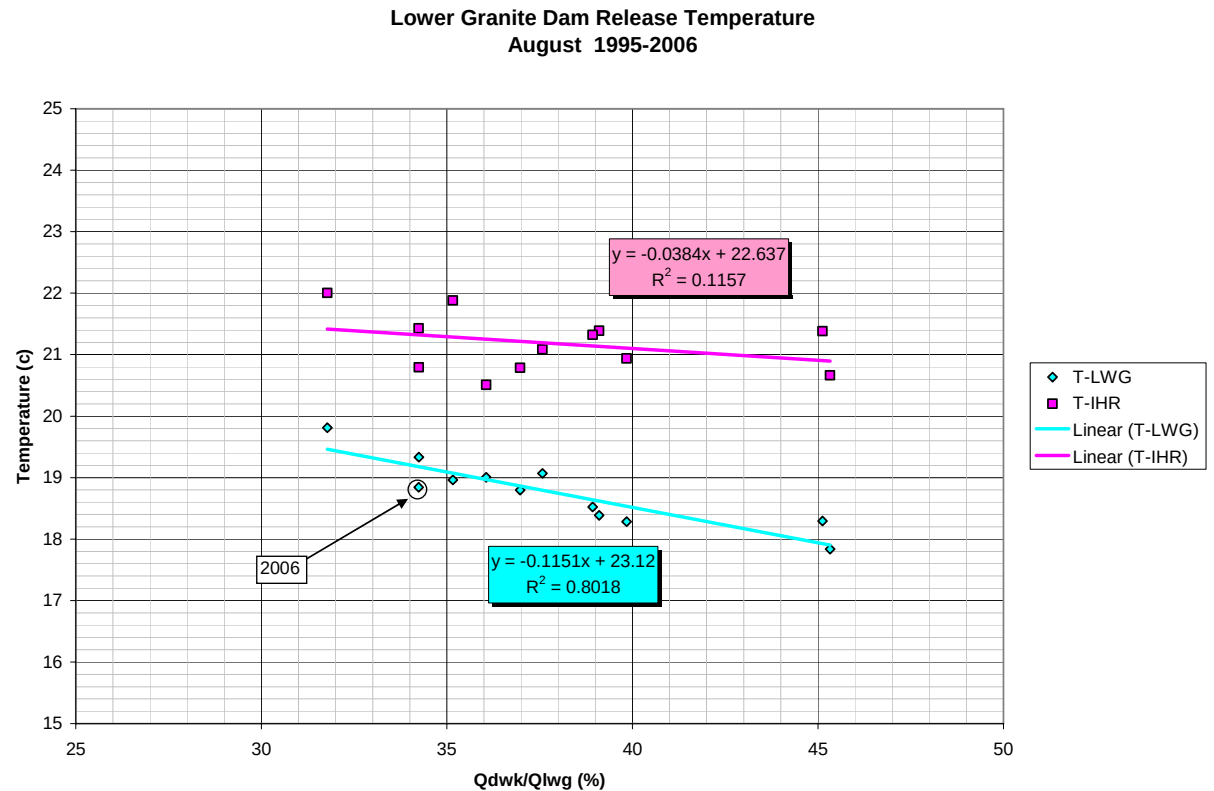


Snake River Temperature Management 2006

- Lessons learned
 - General
 - Managing Snake River Temperatures by Targeting Lower Granite Release Temperatures of 20 C or less should involve consideration of the thermal loading to the LWG Pool and the heat exchange during transit to the dam
 - Develop operation guidance for Dworshak releases involving thermal loading to LWG pool, time of travel, and atmospheric heating
 - Recommend consideration of alternative exposure metrics involving time of travel and suitable thermal habitat
 - First half of July will continue to be the most challenging period for maintaining temperature criteria

Snake River Temperature Management

- Q_{dwk}/Q_{lwg} and T_{lwg} are Strongly Correlated for the month of August
- August Average Temperatures all less than 20 C
- Weak relationship between Q_{dwk}/Q_{lwg} and T_{IHR}
- Temperature increase between Lower Granite and Ice Harbor Dam ranges from 2-3 degrees



Snake River Temperature Management 2006

- Lessons learned continued
 - General
 - Variability and Uncertainty of Temperature Forecasts should be a component of presenting management alternatives
 - Uncontrolled inputs of Thermal Loading
 - » Flows and Temperatures
 - » Atmospheric Heat Exchange
 - Worst Case Conditions in Lower Snake River
 - High flows from warm water sources
 - Hot weather conditions
 - Turbine outage at Dworshak
 - Flexibility in Scheduling Dworshak releases will lead to greater control of temperatures in the Lower Snake River
 - Optimal allocation of cold water

Snake River Temperature Management 2006

- Lessons learned continued
 - General
 - Washington State DEQ Water Quality Standards Updated
 - Site Specific Temperature Criteria for Lower Snake River
 - Temp Criteria
 - 1Dmax of 20°C or natural conditions+small allowance
 - » Temp>20°C Allowance=0.3 °C
 - » “At any time” Allowance = $34/(t+9)$
 - Potential conflict between CWA-ESA for development of temperature management policy for Lower Snake River

Snake River Temperature Management 2006

- Lessons learned continued
 - Dworshak Dam and Pool
 - Water Budget Considerations Sensitive to
 - Lake storage volume properties
 - Estimated inflow volumes
 - Effective elevation of withdrawal is several meters above the controlling gate elevation in overshoot mode
 - Early implementation of undershot withdrawals will lead to warmer releases as the season progresses
 - Initial conditions should be derived from averaged in-lake thermal conditions
 - transient temperatures

Snake River Temperature Management 2006

- Lessons learned continued
 - Clearwater River
 - Contains wide temperature range
 - North Fork 6-10 C
 - Clearwater River at Orofino 28 C
 - Travel Time to confluence less than one day
 - Typically 16 hours
 - Largest rate of warming (time rate of change)
 - Average warming rate 2-3 C in July and August

Snake River Temperature Management 2006

- Lessons learned continued
 - Lower Granite Pool
 - Dynamic conditions at the confluence
 - Development of density stratified flow
 - Vertical temperature gradients persist throughout the pool
 - Propagation of thermal fronts
 - Weather system induced
 - Flow ratio induced
 - Wide range in time of travel through pool (several days to weeks)
 - Release temperatures correspond closely with integrated temperatures in forebay
 - Temperature increase through pool 1-1.5 C

Snake River Temperature Management 2006

- Lessons learned continued
 - Lower Snake River Pools
 - Continual warming of average temperature
 - Weaker vertical gradients
 - Weather dependent
 - About 0.5-1.0 C warming per pool
 - Average Temperatures above 20 C (July, Aug)

– SR @ ANAW	22.4	22.2
– CR @ LEWI	13.1	11.0
– Lower Granite	19.8	18.8
– Little Goose	20.5	20.1
– Lower Monumental	20.7	20.7
– Ice Harbor	21.4	21.4

Snake River Temperature Management 2006

- Lessons learned continued
 - Modeling Issues
 - What is the influence of RSW operations on release temperatures and management issues?
 - How can uncertainties in system inputs best be captured in forecasted flow and temperature conditions?
 - Where should the upstream Snake River boundary be located?

SEA LION DETERRENTS AT BONNEVILLE DAM: DID THEY WORK?

Robert J. Stansell, Sean C. Tackley, Karrie M. Ewald



U. S. Army Corps of Engineers
Portland District
Fisheries Field Unit

Objectives

- Estimate number of adult salmonids and other fish caught
- Record seasonal timing, abundance of sea lions
- Record sea lion behavior, individual habits
- Test measures used to deter sea lion presence and predation on salmon

Observations

- Surface observations during daylight hours
 - One observer per tailrace (PH1, PH2, spillway)
 - Record catches and losses of fish
 - Identify individual sea lions
 - Estimate number of sea lions present at each tailrace
- Randomized, paired-treatment, 4-day (2 days on/off) block design to test effectiveness of hazing and acoustics combination

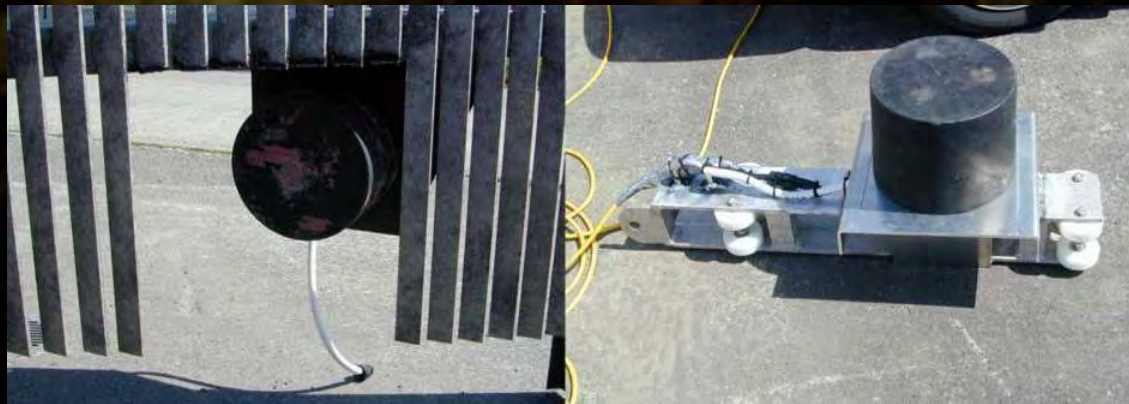
SLEDs

- Sea lion exclusion devices (SLEDs) installed at fishway entrances
- 12 entrances, 2 sections each, 15 3/8" gaps
- Designed to allow salmon passage



Acoustic Deterrent Devices (ADD)

- 205 decibel, 15 kHz frequency acoustic projectors installed at fishway entrances (March – May 2006)
- Advertised “painful” effective range of 30 ft., and potential effects up to 100 ft.
- ADDs turned on at 0500 hrs on hazing days, turned off at 2000 hrs at the end of each 2-day treatment
- No significant effects on salmon passage



USDA Hazing

- March – May 2006
- USDA APHIS Wildlife Services agents armed with cracker shells, rubber bullets, and screamer shells
- Opportunistically hazed sea lions hauled out and those within 100 ft. of fishways
- Identified hazed sea lions when possible



Boat-based Hazing

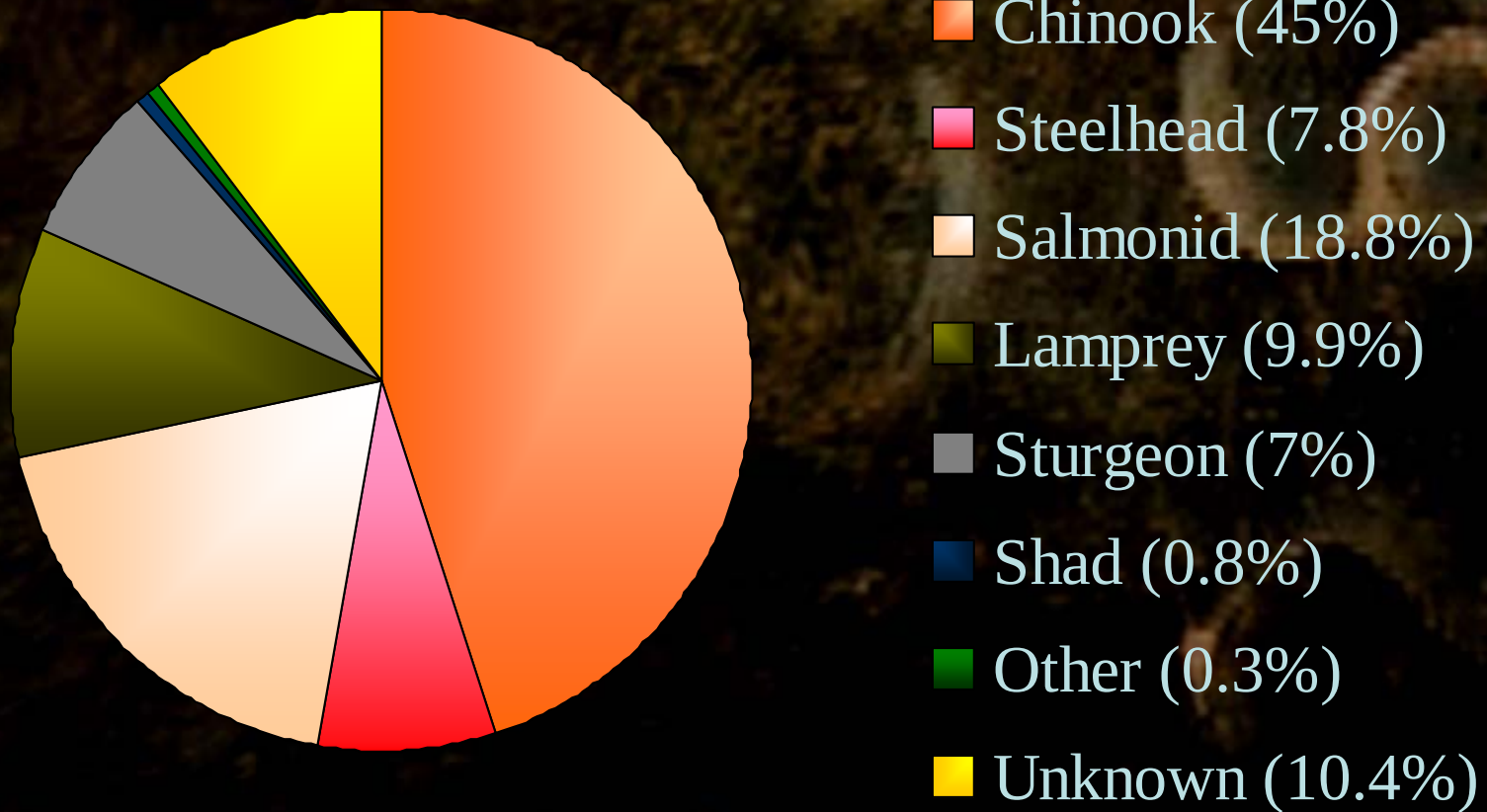
- State, federal, and tribal personnel armed with non-lethal hazing pyrotechnics and rubber bullets
- Hazed sea lions in all tailraces to chase them downstream of the dam
- Alternating (non-randomized) 4-day on/off blocks





RESULTS

Observed catches by pinnipeds at Bonneville Dam tailrace (2006)

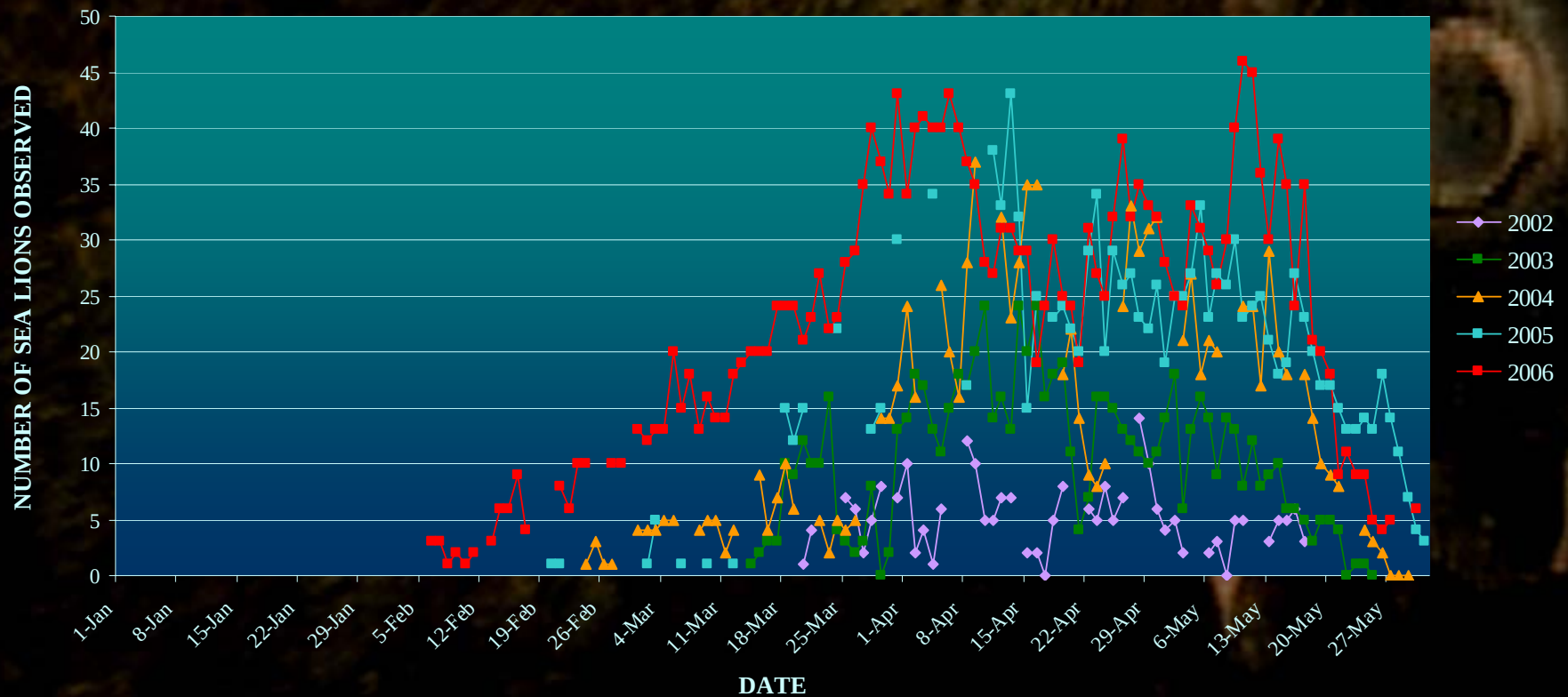




Estimated salmonid catch by sea lions at Bonneville Dam, 1 January – 31 May

Year	Estimate of Salmonids Caught	Total Salmonid Passage at Bonneville	% of Salmonid Run Taken by Sea Lions
2002	1,010	284,733	0.4%
2003	2,329	217,185	1.1%
2004	3,533	186,804	1.9%
2005	2,920+	82,006	3.4%+
2006	3,023	105,063	2.8%

Seasonal distribution of sea lions at Bonneville Dam, 2002-2006



Estimated pinniped abundance at Bonneville Dam, 2002-2006

	2002	2003	2004	2005	2006
California Sea Lions	30	106	101	80+	72
Steller's Sea Lions	0	3	2	4	10
Harbor Seals	1	2	2	1	3
TOTAL	31	111	105	85+	85

SLEDs

- Infamous C404 passed through SLEDs early
- No other sea lions entered the fishways
- Late arrival of Spring Chinook prompted concerns about potential impact of SLEDs on fish passage
- No significant effect on salmon passage



Acoustics: The Short Story

- No obvious effect on behavior of sea lions within 100 ft. of fishway entrances
- Turbulence near fishway entrances likely reduced effective range of ADDs
- Cannot separate results from hazing because of paired treatment design
- “...combined effects of hazing and ADDs did not impede the passage of radio-tagged adult spring Chinook salmon during 2006.” (Jepson et al. 2006)

Hazing: The Short Story

- Rubber bullets were used in 55% of hazing events, cracker shells in 40% of events
- 81% of hazing events involved animals near fishways, 16% of events involved hauled out animals
- Peak hazing activity was in early morning and late afternoon, coinciding with haul out and predation patterns
- Only 7 individuals were hazed more than 5 times
- Maximum number of times an animal was hazed was 21 (C309)

Hazing: The Short Story

- One USDA agent per shift seemed inadequate relative to predation levels
- Most predation (84%) occurred outside 100 ft. of fishway entrances
- Hazing sea lions off haul outs *may* increase predation activity (maybe, maybe!)
- Branded sea lions were easiest to identify, and were likely disproportionately represented in hazing tallies
- Hazed sea lions would temporarily leave, then resume activities

USDA Hazing and Acoustics

ON

OFF

Paired t

Total project salmonid take	1,488	1,177	0.02
Avg. daily pinniped presence	26.8	27.1	0.40
Salmonid take w/in 100' of entrances	202	232	0.22
Total pinniped activity w/in 100' of entrances	9,098	12,819	0.002

Boat Hazing

ON

OFF

Paired t

Total project salmonid take	1,147	1,241	0.33
Avg. daily pinniped presence	29.3	27.3	0.24
Salmonid take w/in 100' of entrances	183	186	0.47
Total pinniped activity w/in 100' of entrances	8,870	7,623	0.17



SUMMARY

Summary

- ~ 3,023 salmonids (2.8% of run) taken at Bonneville
- California and Steller's sea lions coming earlier, staying longer
- SLEDs seemed to work, didn't impede salmon
- Limited hazing/acoustic deterrence efforts failed to reduce predation on salmonids
- Hazing/ADD combination did not impede salmon passage

2007 Season

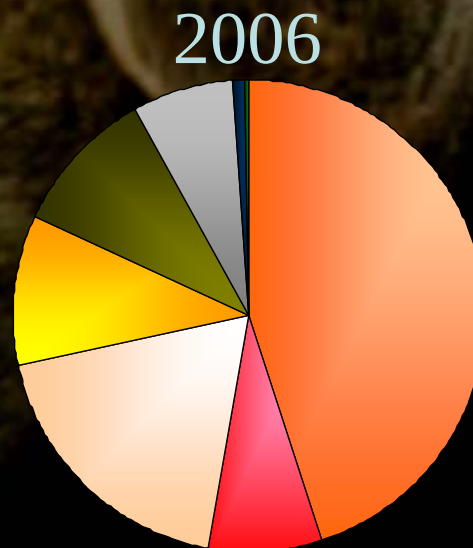
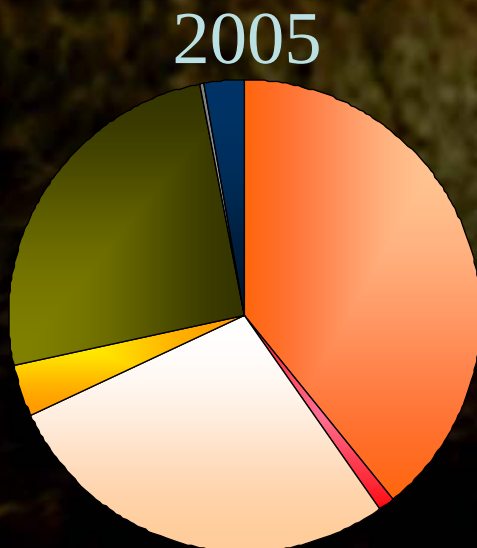
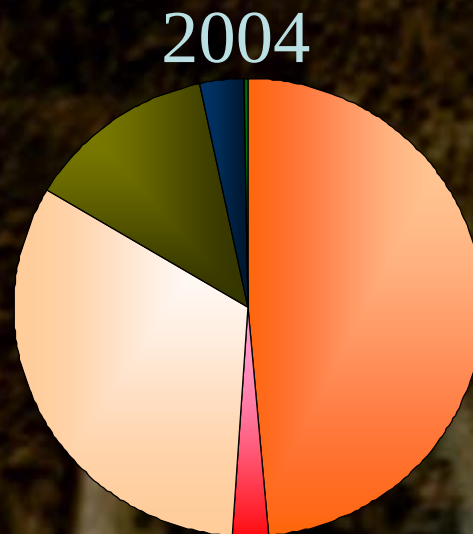
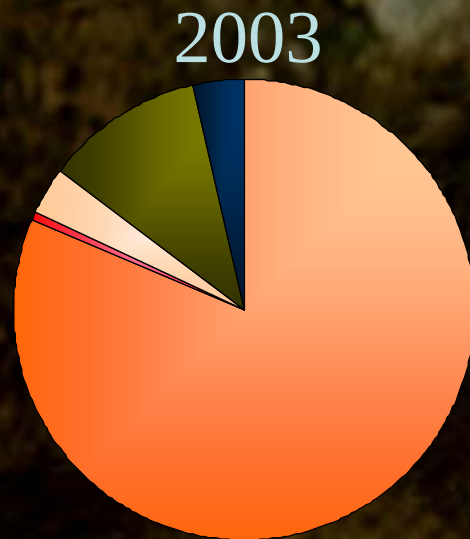
- Continue full-time daylight observations
- Start partial observations in January
- SLEDs to be installed by February
- ADDs will be activated in February
- Possibly more intensive and deliberate hazing to occur, dawn to dusk, 7 days/week, February thru May
- Possibly some trapping and branding
- Unlikely any lethal take to be conducted

Contributors and Partners

- NOAA Fisheries
- USGS
- USDA APHIS Wildlife Services
- Columbia River Treaty Indian Tribes
- University of Idaho
- Oregon Department of Fish and Wildlife
- Washington Department of Fish and Wildlife

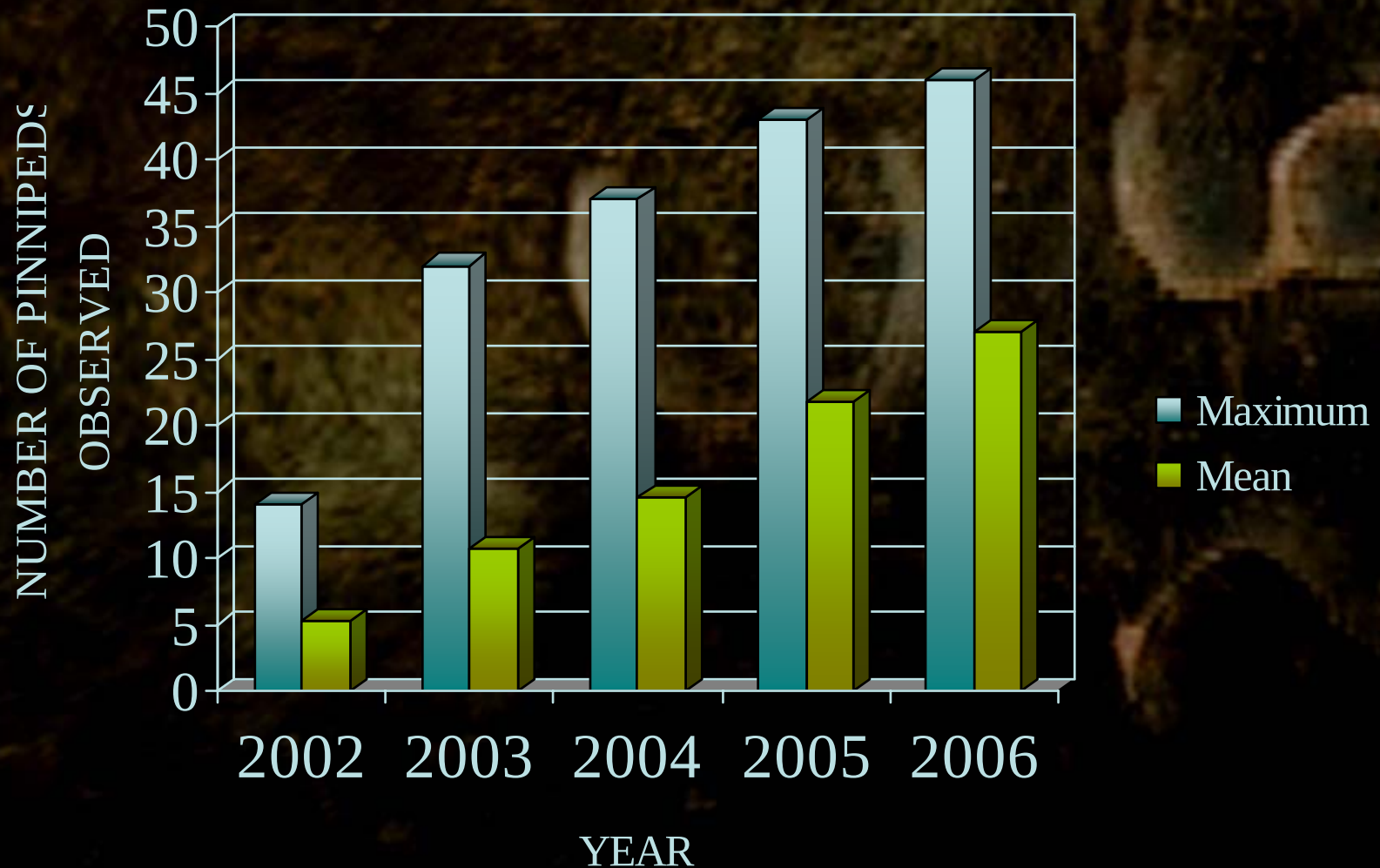


***Mmmm...
I could go
for some
salmon.***

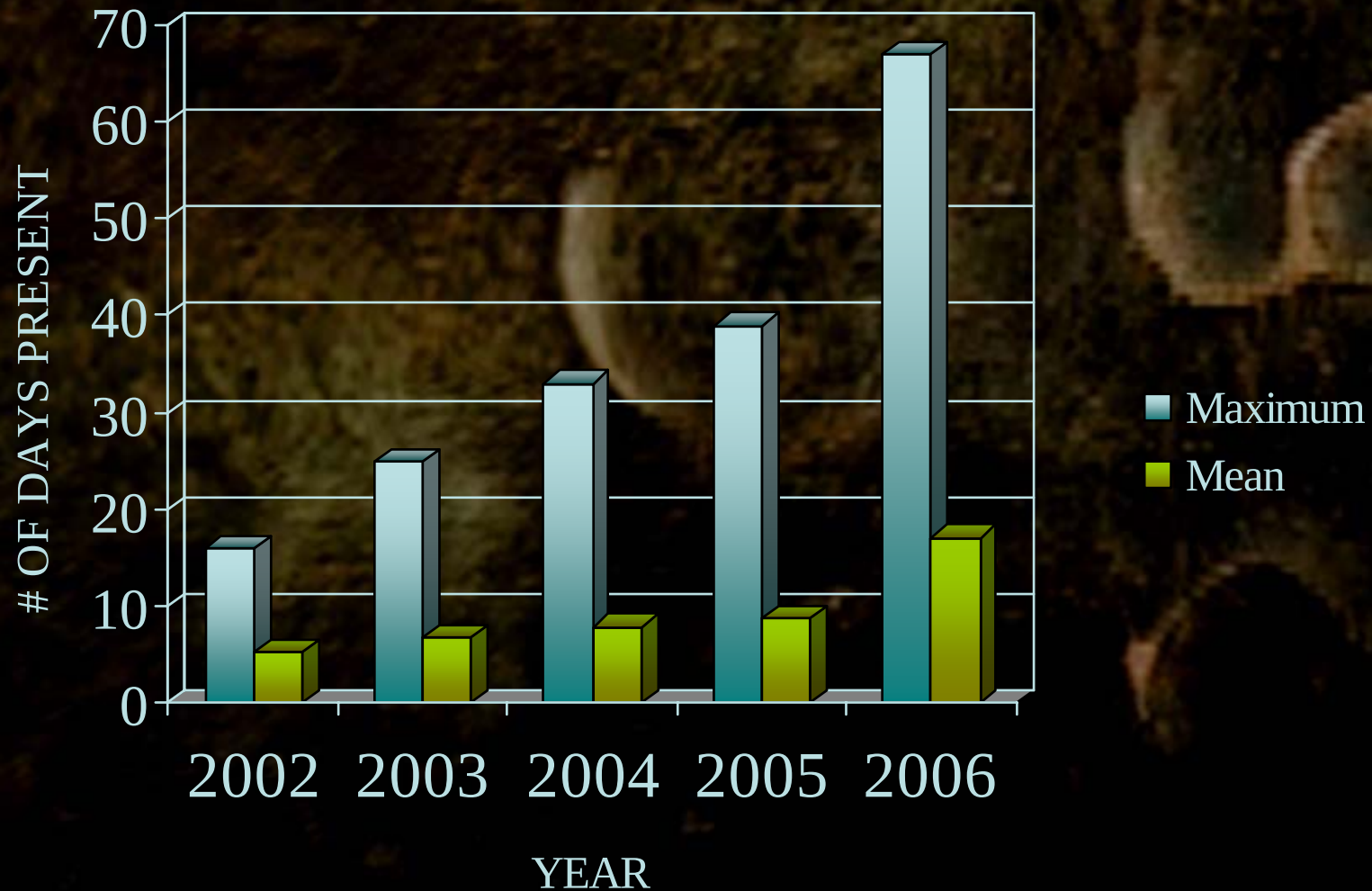


- Chinook Salmon
- Steelhead
- Salmonid
- Lamprey
- Sturgeon
- Shad
- Unknown
- Other

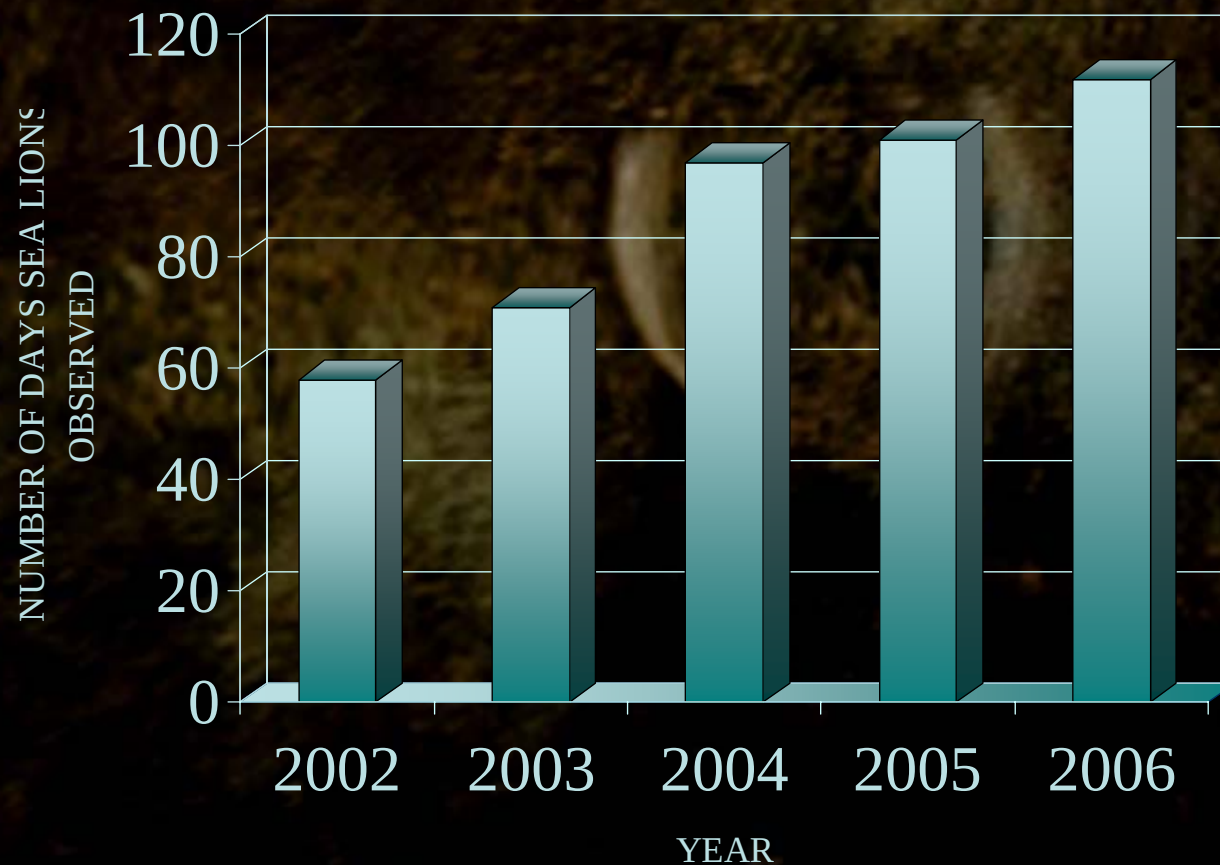
Daily maximum and mean # of pinnipeds observed at Bonneville Dam, 2002-2006



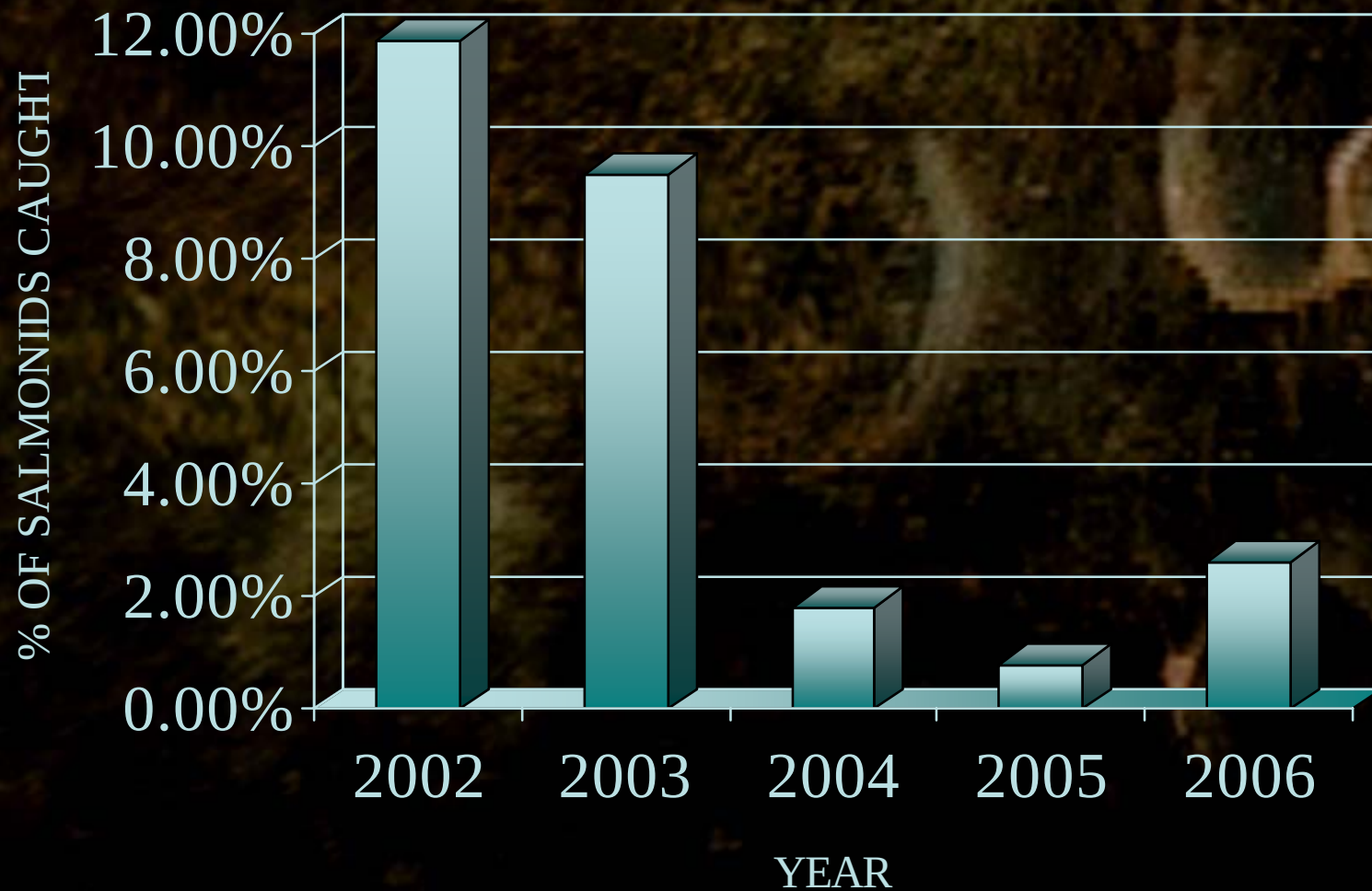
Number of days individual sea lions present, 1 January – 31 May



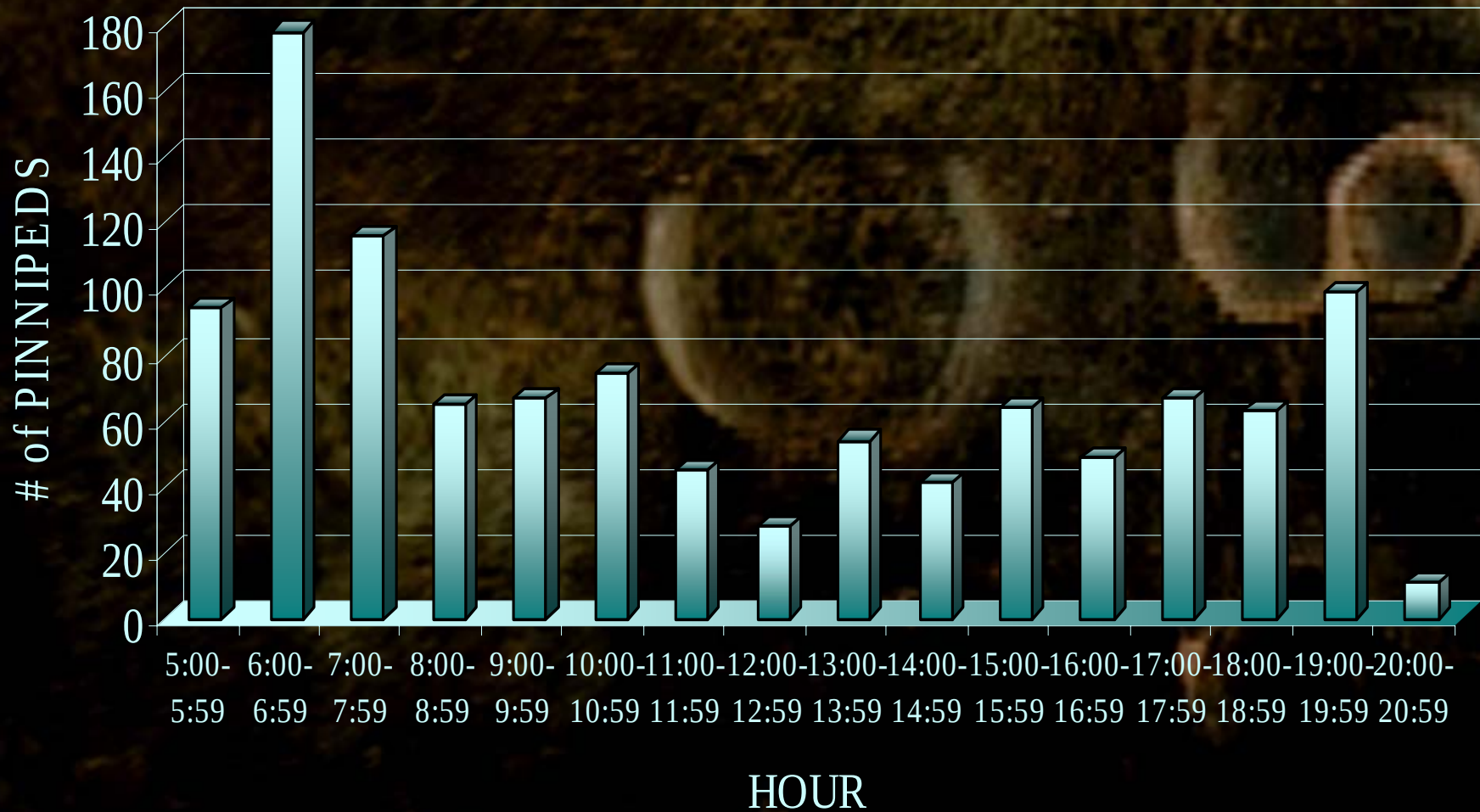
Number of days sea lions observed between 1 January and 31 May, at Bonneville Dam



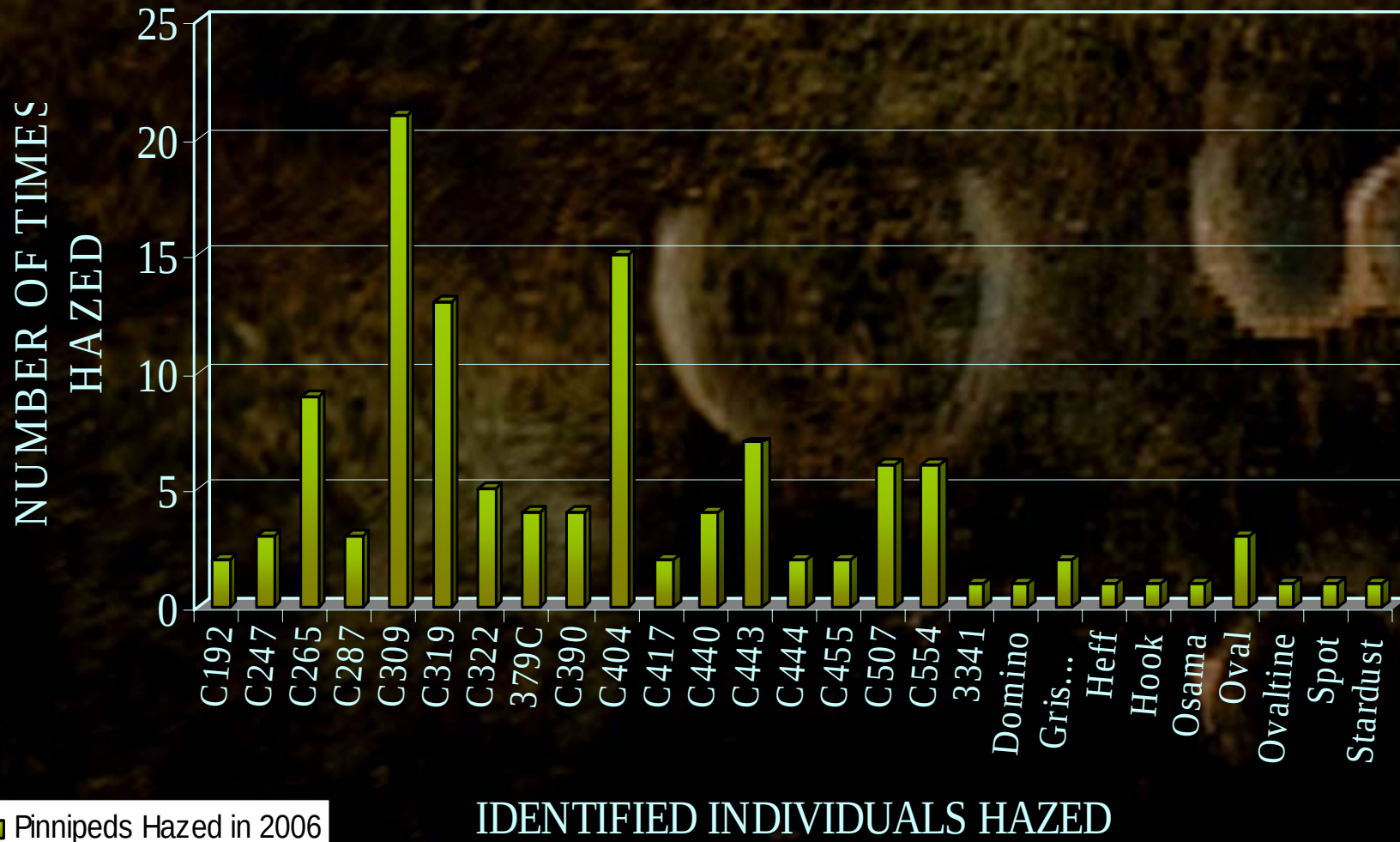
Salmonids that were caught by pinnipeds, but escaped being eaten



Total sea lions hazed per hour - USDA



Hazing frequency, by individual - USDA



Number of highly identifiable sea lions that returned in subsequent years

	2003	2004	2005	2006
2002	81%	75%	56%	38%
2003		59%	42%	26%
2004			61%	38%
2005				57%



COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232

Telephone (503) 238-0667

Fax (503) 235-4228

www.critfc.org

TO: Technical Management Team (TMT)
FROM: Kyle Dittmer, *Hydrologist-Meteorologist*, CRITFC Hydro Program
DATE: December 13, 2006

SUBJECT: **Summary of Water Year 2006 Weather**

At the request of the TMT, this memo summarizes monthly weather events that impacted basin flows and fish migrations during Water Year 2006 (October 2005 - September 2006). WY 2006 was noted for extreme variability in precipitation and temperature patterns (Figures 1 and 2).

Autumn started normally then trended to very wet by December which lasted for months. Temperatures stayed slightly above normal with basin departures of -0.7 to +1.4 °F.

Winter stayed very wet (except for February) and warm. January set the highest average basin departure for WY 2006 with +7.5 °F. Many record highs were set in March in the 60 to 75 °F range. The Snake basin saw non-stop precipitation from October through April. Many stations set new daily precipitation records throughout all of winter, but mostly in January and March.

Spring was extreme. A wet, slightly cold, April transitioned into a very wet and warm May, then a wet and warm June. May produced new high records in the 90 to 95 °F range across the basin. June 25-27 had new high records in the 95 to 105 °F range. Temperatures stayed slightly above normal with basin departures of -0.9 to +1.8 °F. Many stations set new daily precipitation records throughout all of spring.

Summer turned very dry very quickly. A very dry summer was in-store for migrating salmon. Record-breaking daily high temperatures hit in late July in the 100 to 112 °F range as well as August. Temperatures stayed slightly above normal with basin departures of +0.1 to +4.6 °F. Many record low temperatures were set basin-wide during summer. Most stations saw very little rain, as the jet stream persisted in staying north of the basin.

Cumulative precipitation totals for Water Year 2006 for Columbia at The Dalles ended at 105%. The driest basins of the Columbia (Figure 3) were the Northwest slopes of the Washington Cascades (89%), East slopes of the Washington Cascades and Columbia above Castlegar (93%), and Southeast Washington (94%). The wettest basins were the Upper Deschutes (133%), Owyhee (126%), and Salmon/Boise/Payette (125%).

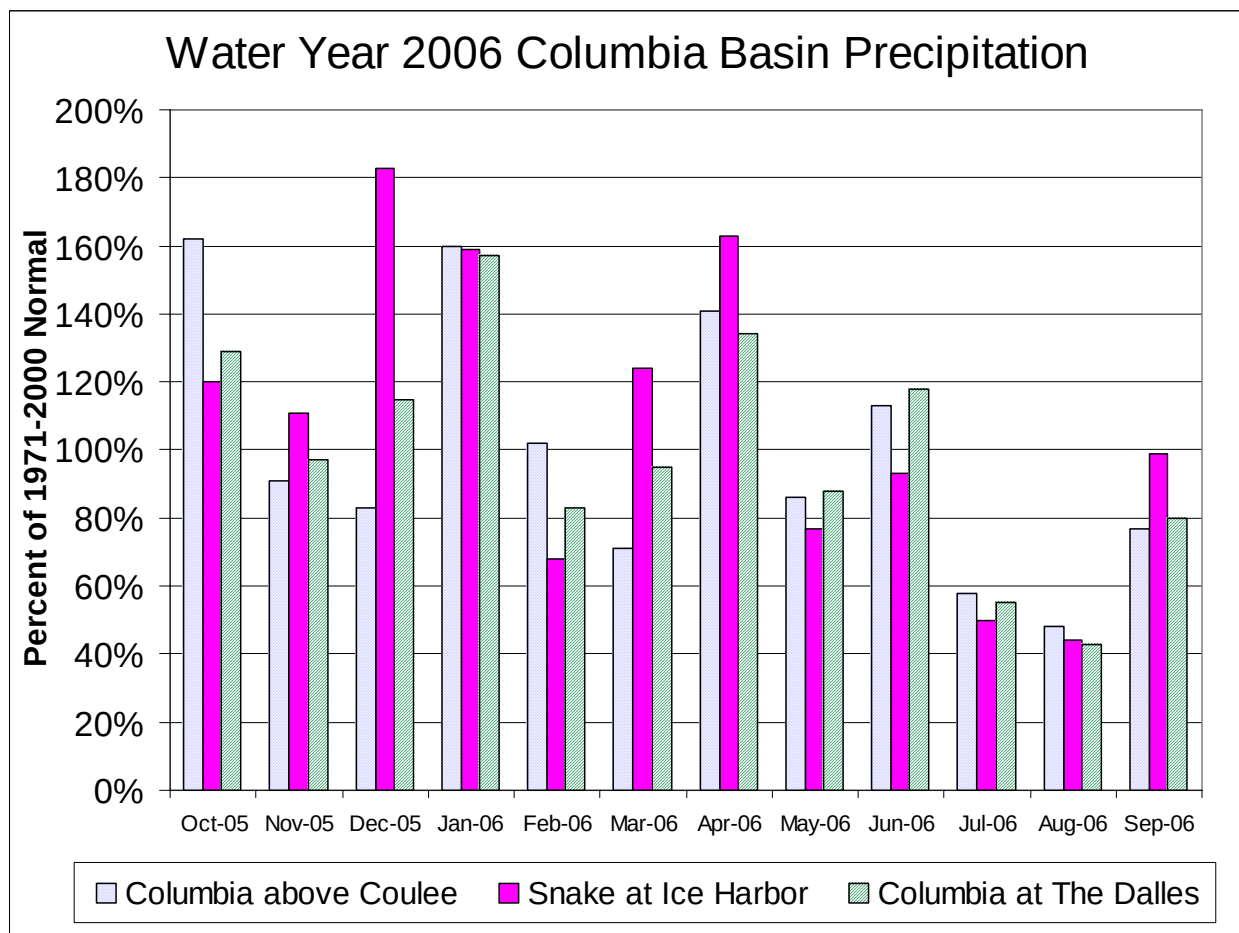


Figure 1. Water Year 2006 Division Precipitation Summary (NOAA-NWS-Portland data).

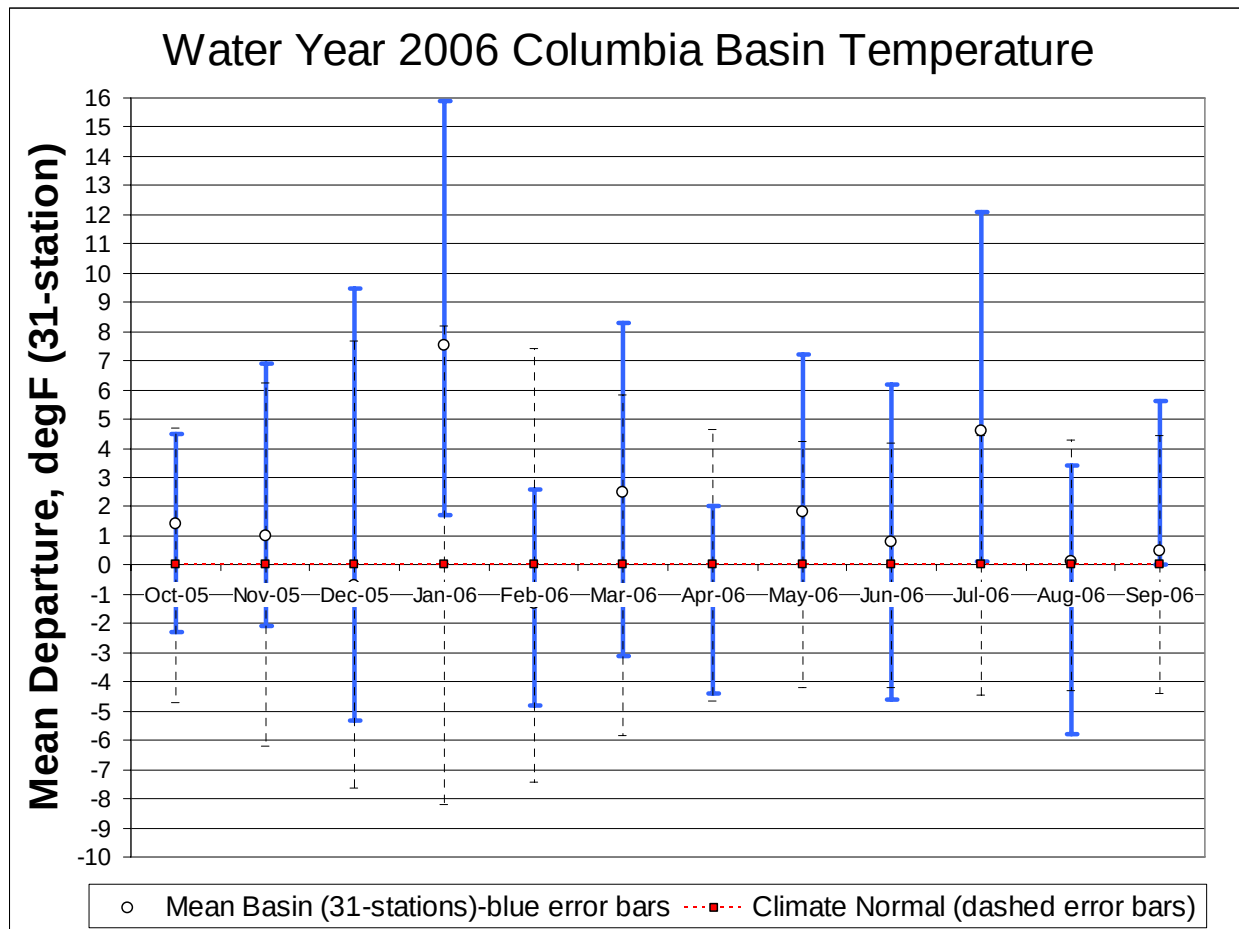


Figure 2. Water Year 2006 Temperature Departure Summary (NOAA-NWS-Portland data).

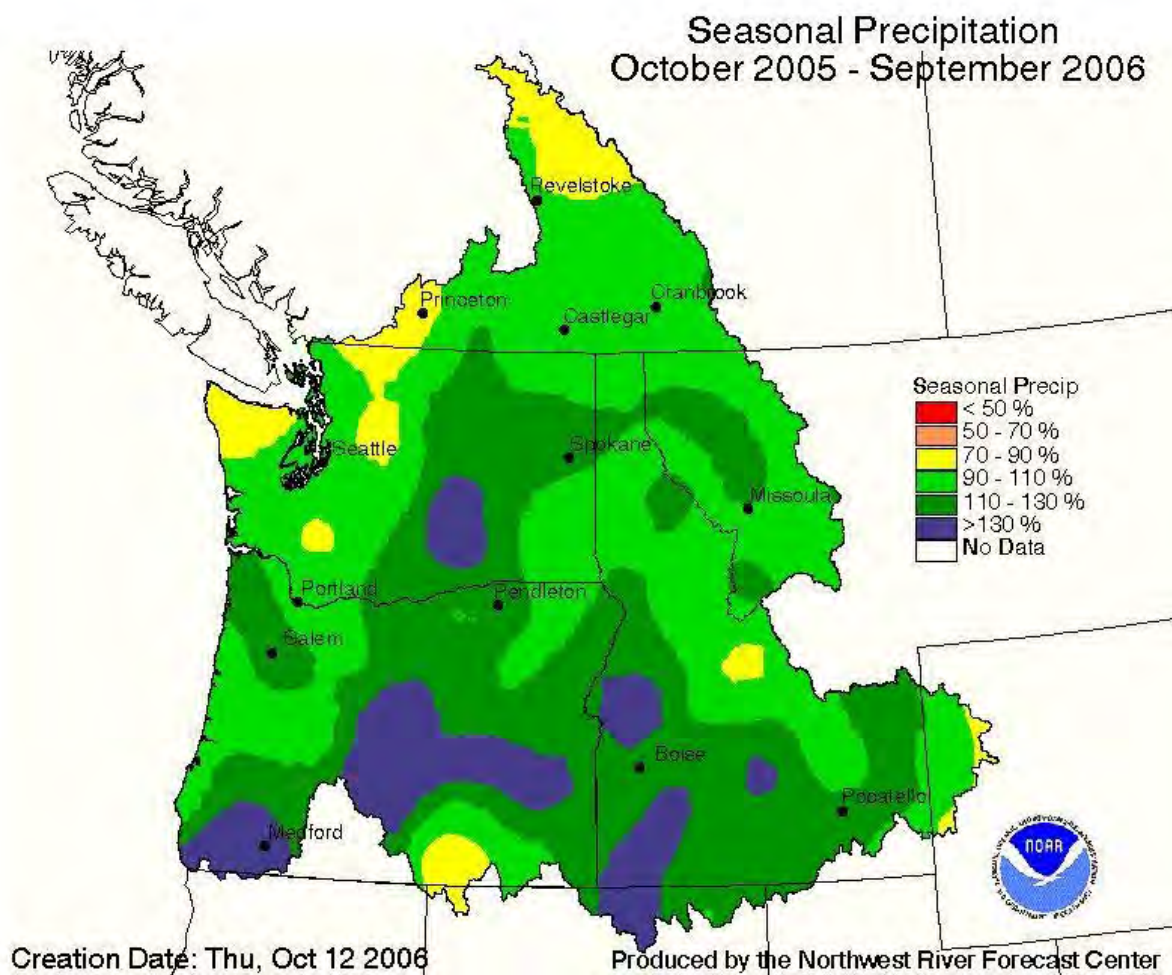


Figure 3. Water Year 2006 Columbia Basin Cumulative Seasonal Precipitation.

Downstream Survival of Juvenile Stream Type Chinook Salmon and Steelhead Through the Snake/Columbia River Hydropower System and Adult Return Rates

**TMT
December 13, 2006
Bill Muir**



Outline

- **Stream type Chinook survival from Snake River Basin hatcheries to LGR**



Outline

- Stream type Chinook survival from Snake River Basin hatcheries to LGR
- Chinook and steelhead survival through individual reaches



Outline

- Stream type Chinook survival from Snake River Basin hatcheries to LGR
- Chinook and steelhead survival through individual reaches
- **Their survival through the entire hydropower system**

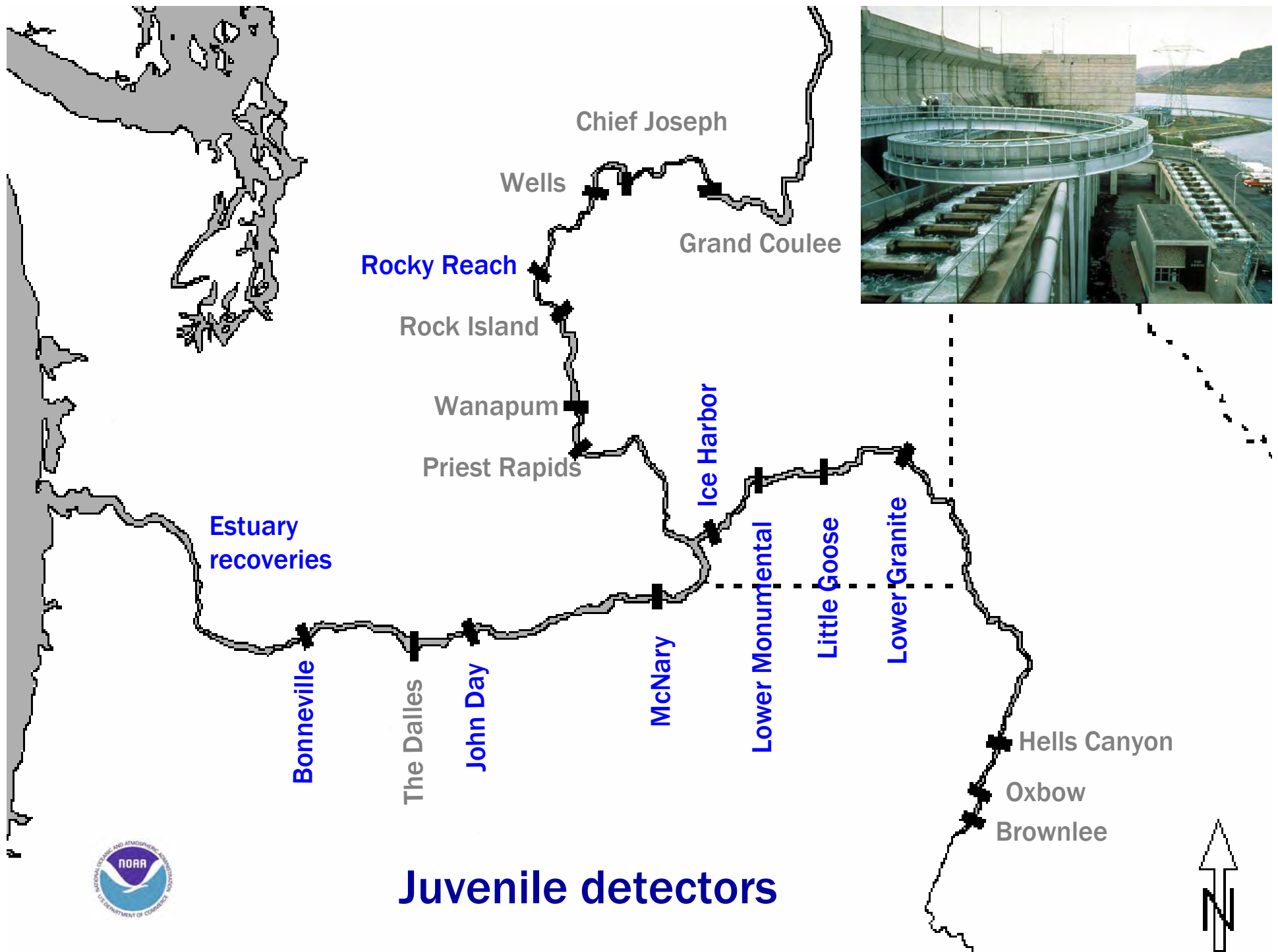


Outline

- Stream type Chinook survival from Snake River Basin hatcheries to LGR
- Chinook and steelhead survival through individual reaches
- Their survival through the entire hydropower system
- **Smolt-to-adult returns**

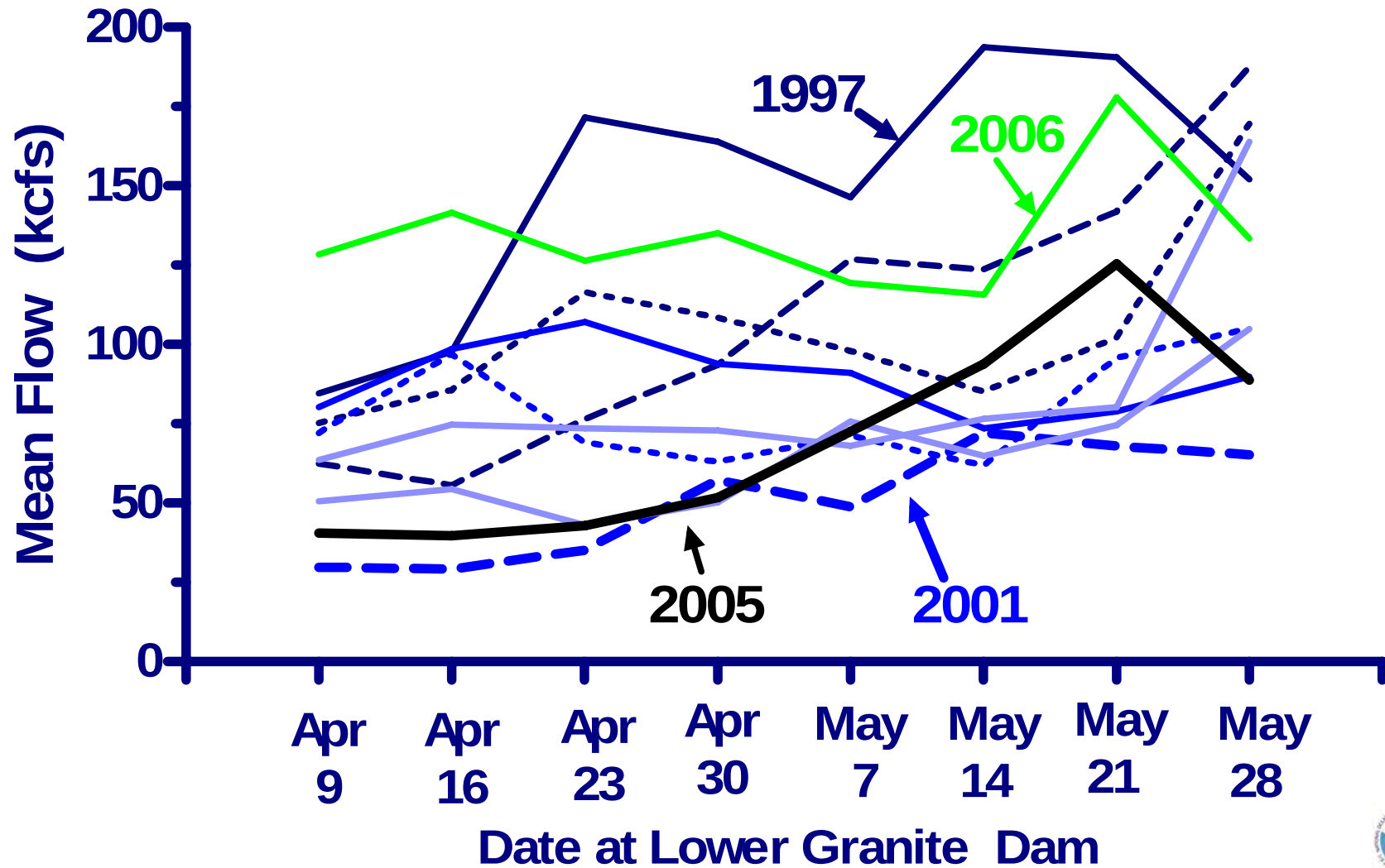




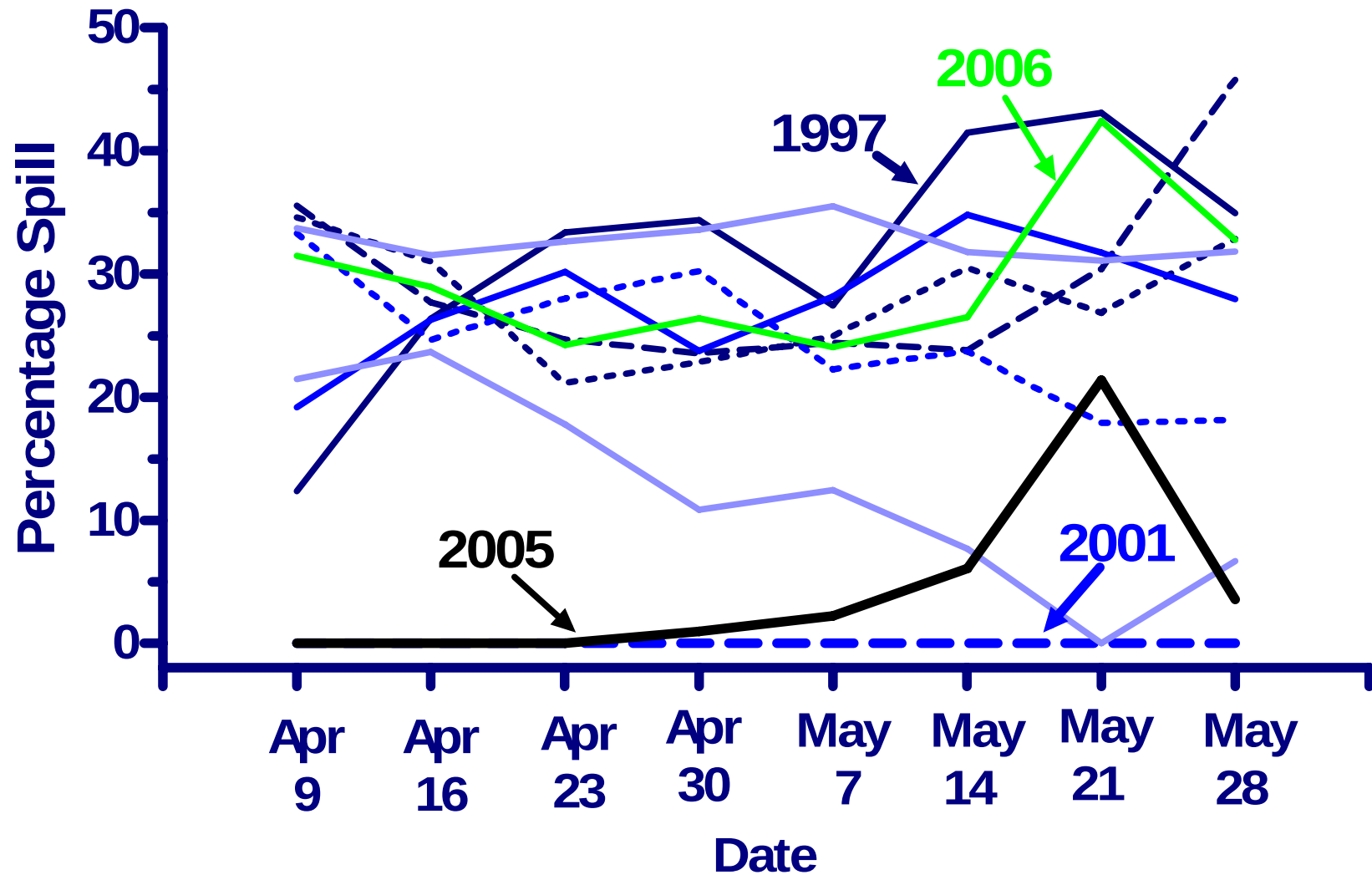




Weekly Mean Flow (kcfs) Lower Granite Dam



Mean Percentage Spilled LGR, LGS, LMN

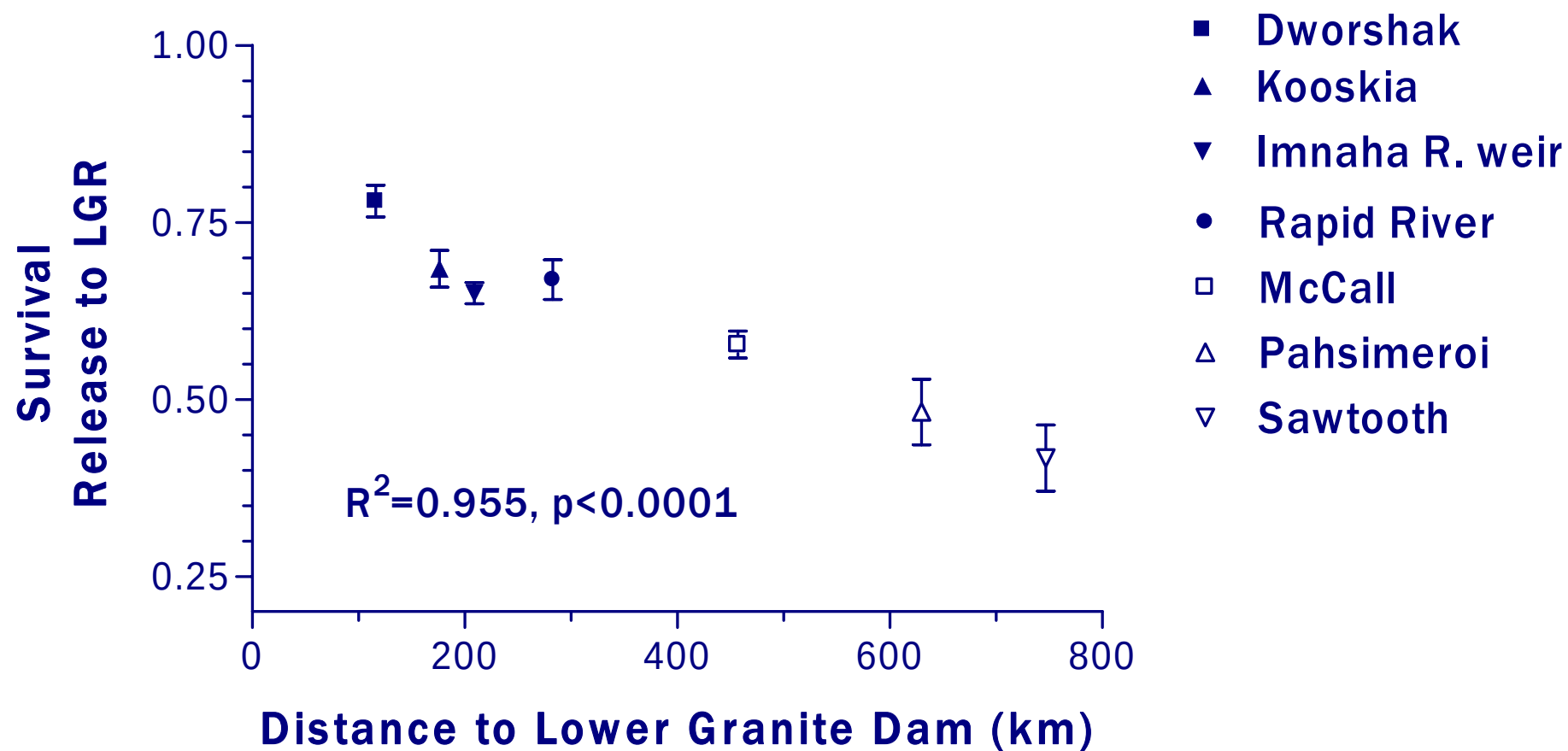


Transportation

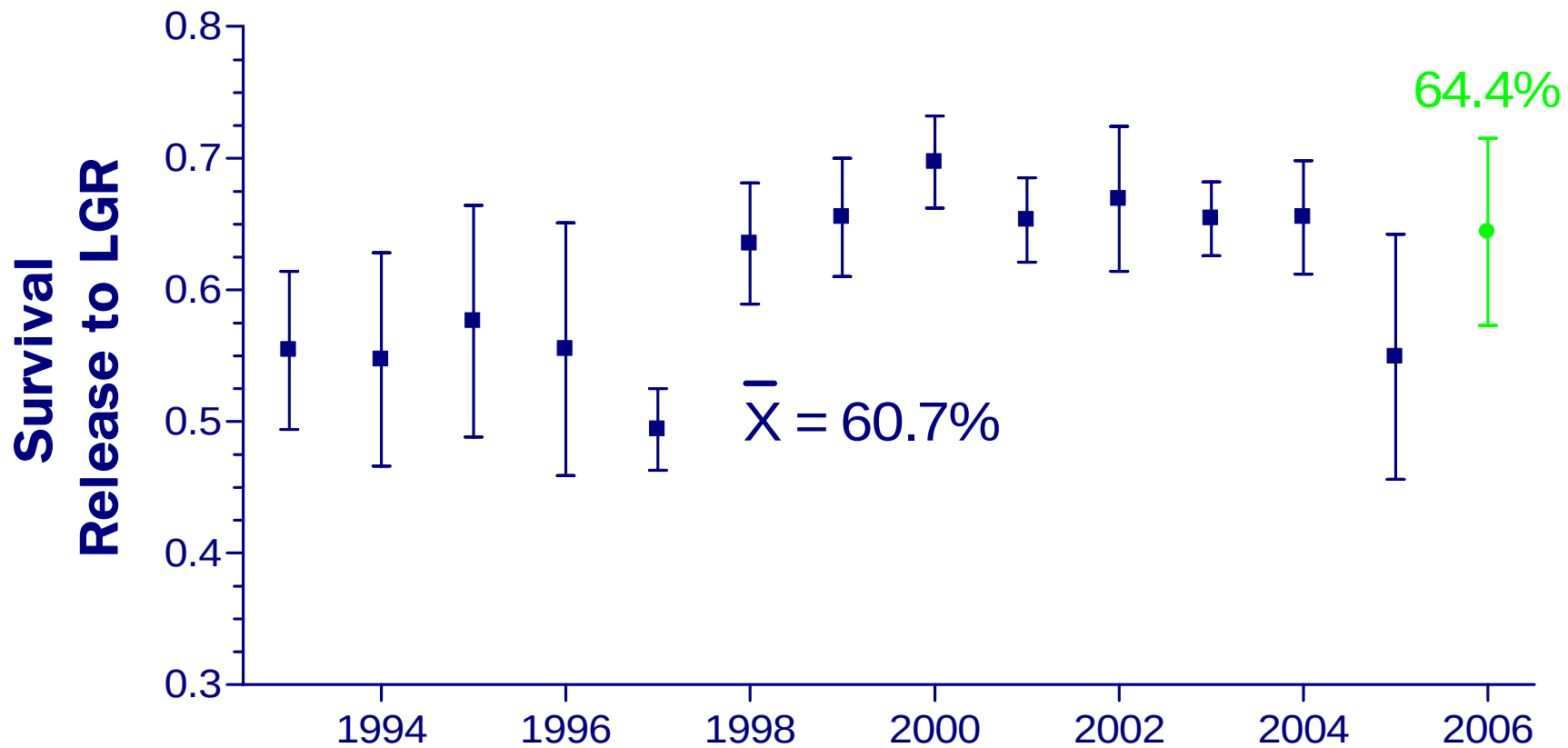
- 62% of non-tagged stream type Chinook
- 76% of non-tagged steelhead

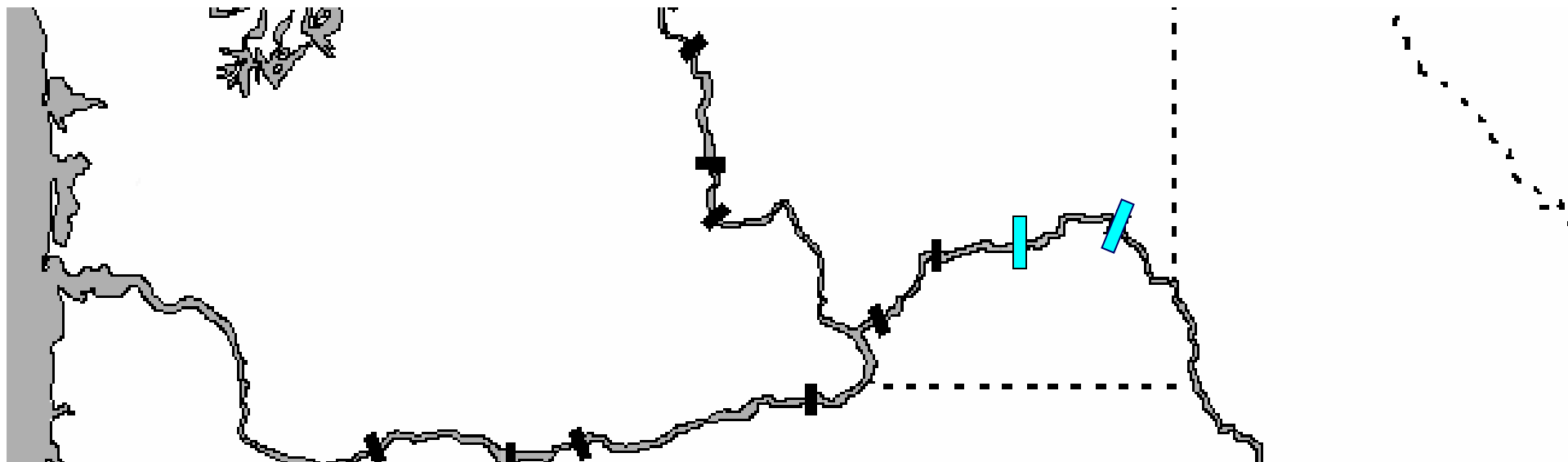


Hatchery stream type Chinook (1993-2006)



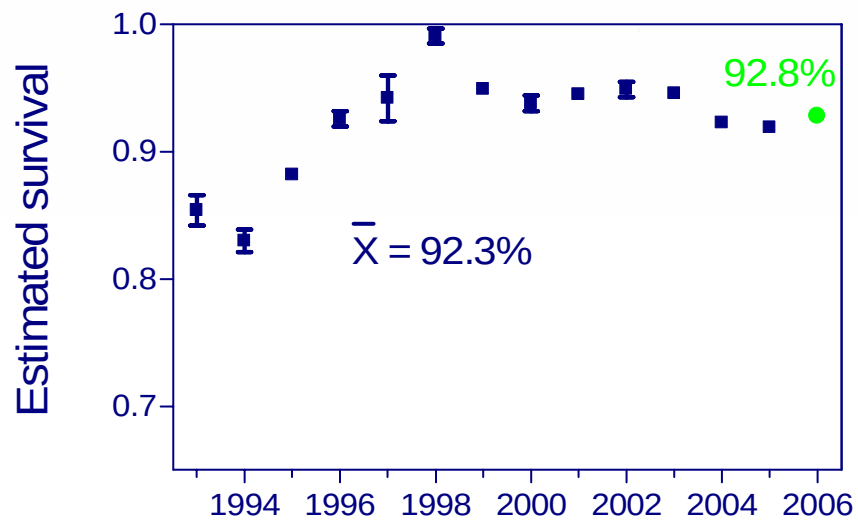
Stream type Chinook All Snake River Basin hatcheries combined



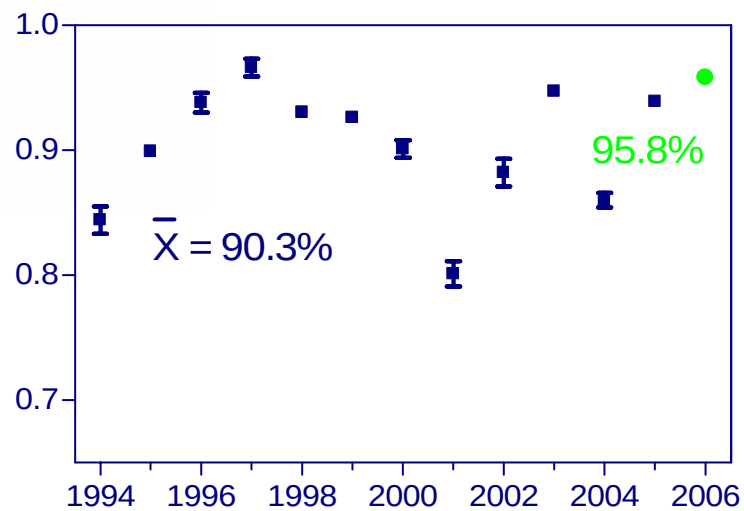


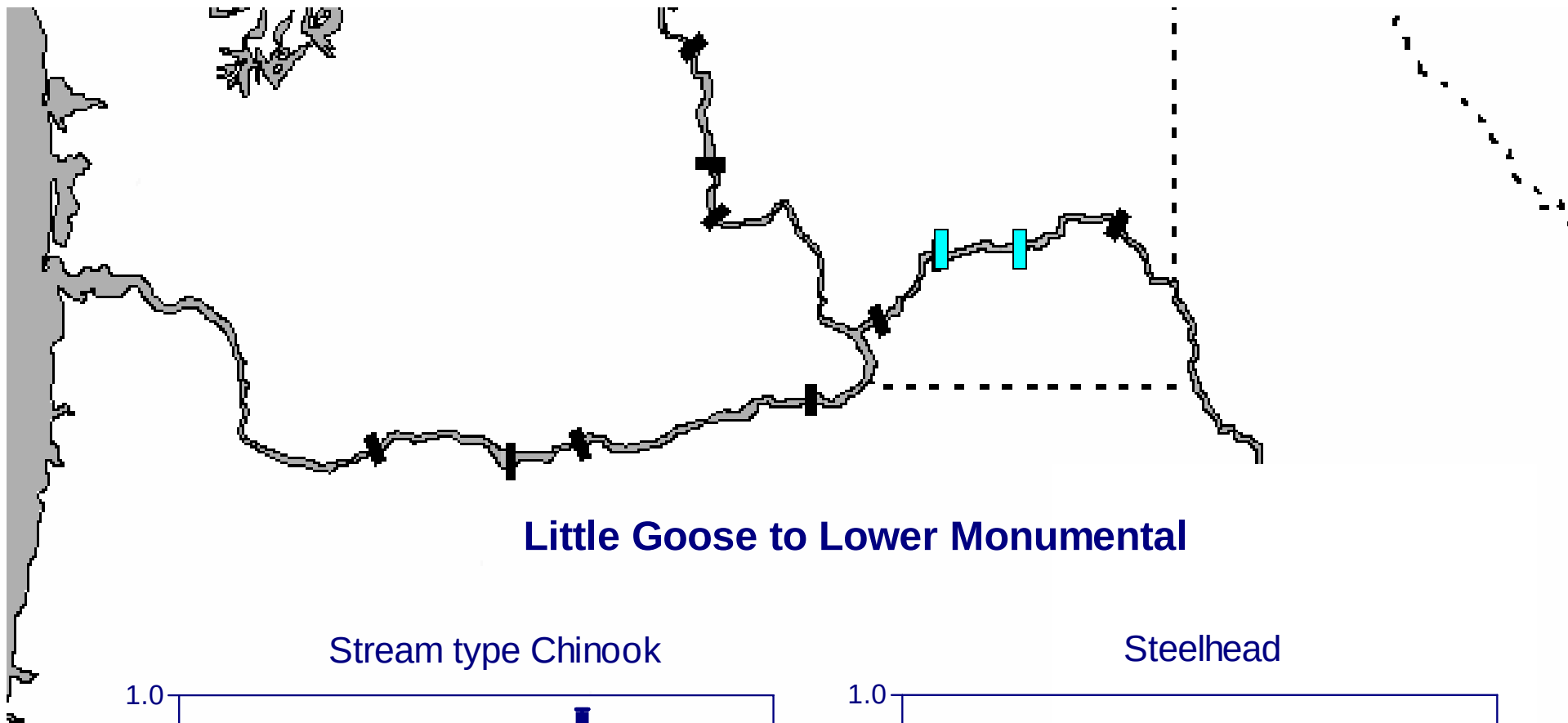
Lower Granite to Little Goose

Stream type Chinook



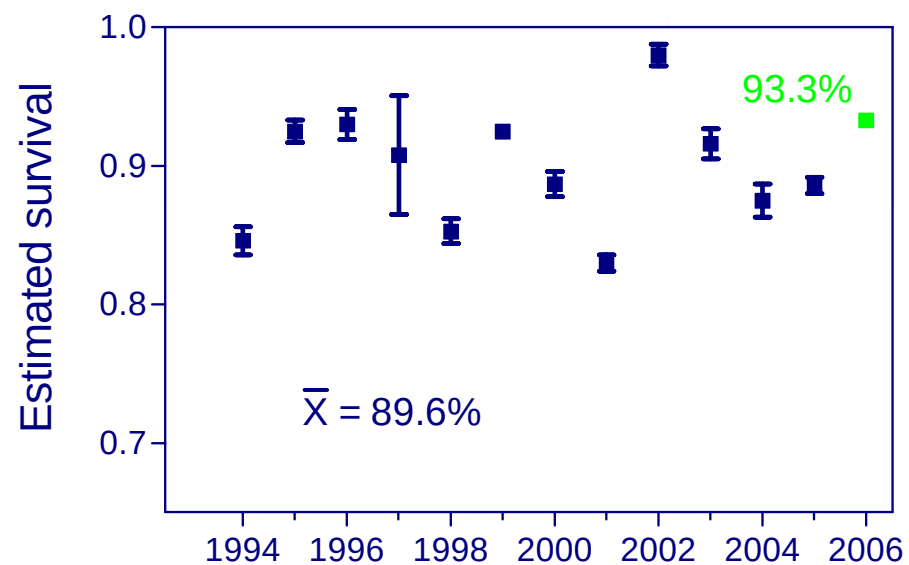
Steelhead



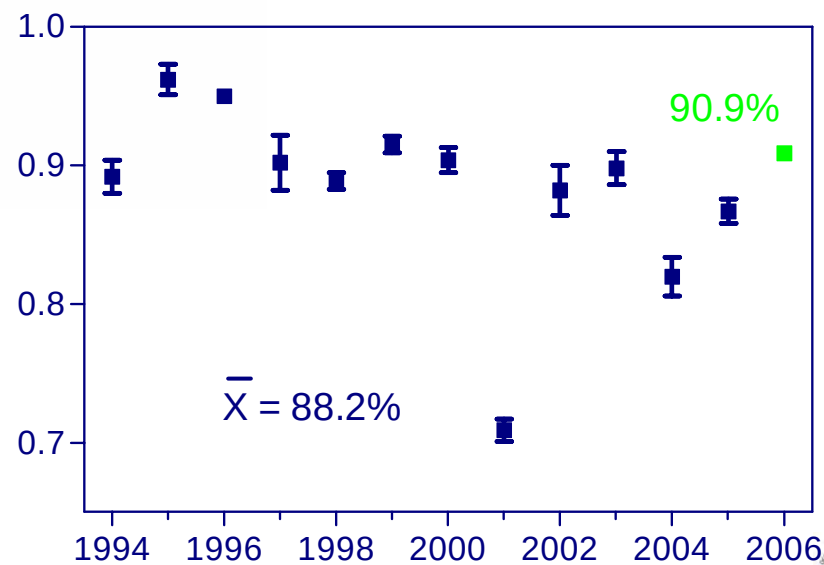


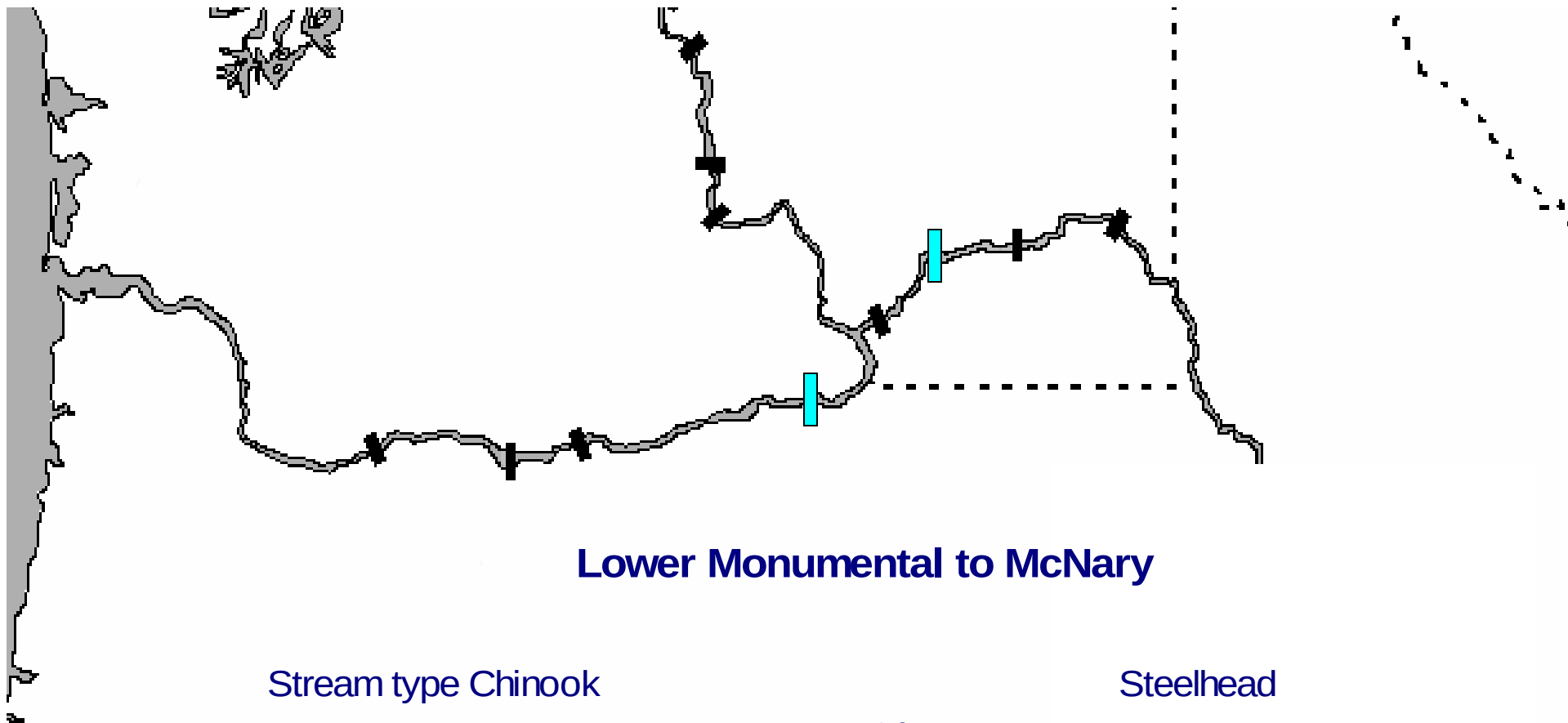
Little Goose to Lower Monumental

Stream type Chinook



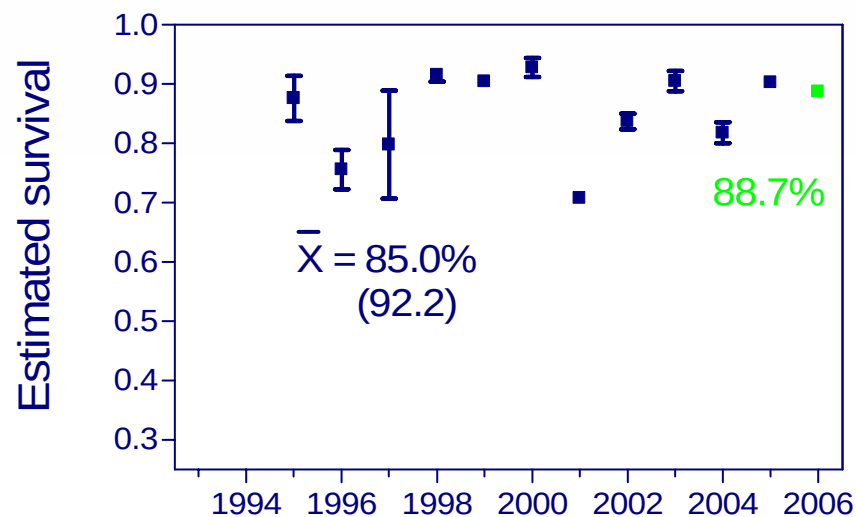
Steelhead



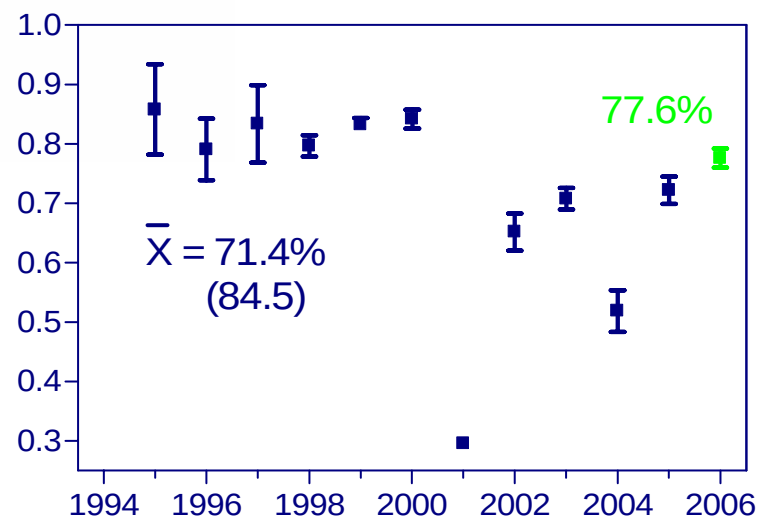


Lower Monumental to McNary

Stream type Chinook



Steelhead



Lower Monumental-McNary Survival Partitioned in 2006

- Chinook Salmon

- LMN-MCN 0.887 (0.004)

- Lower Monumental to Ice Harbor: 0.914 (0.003)

- Ice Harbor to McNary Dam: 0.964 (0.005)

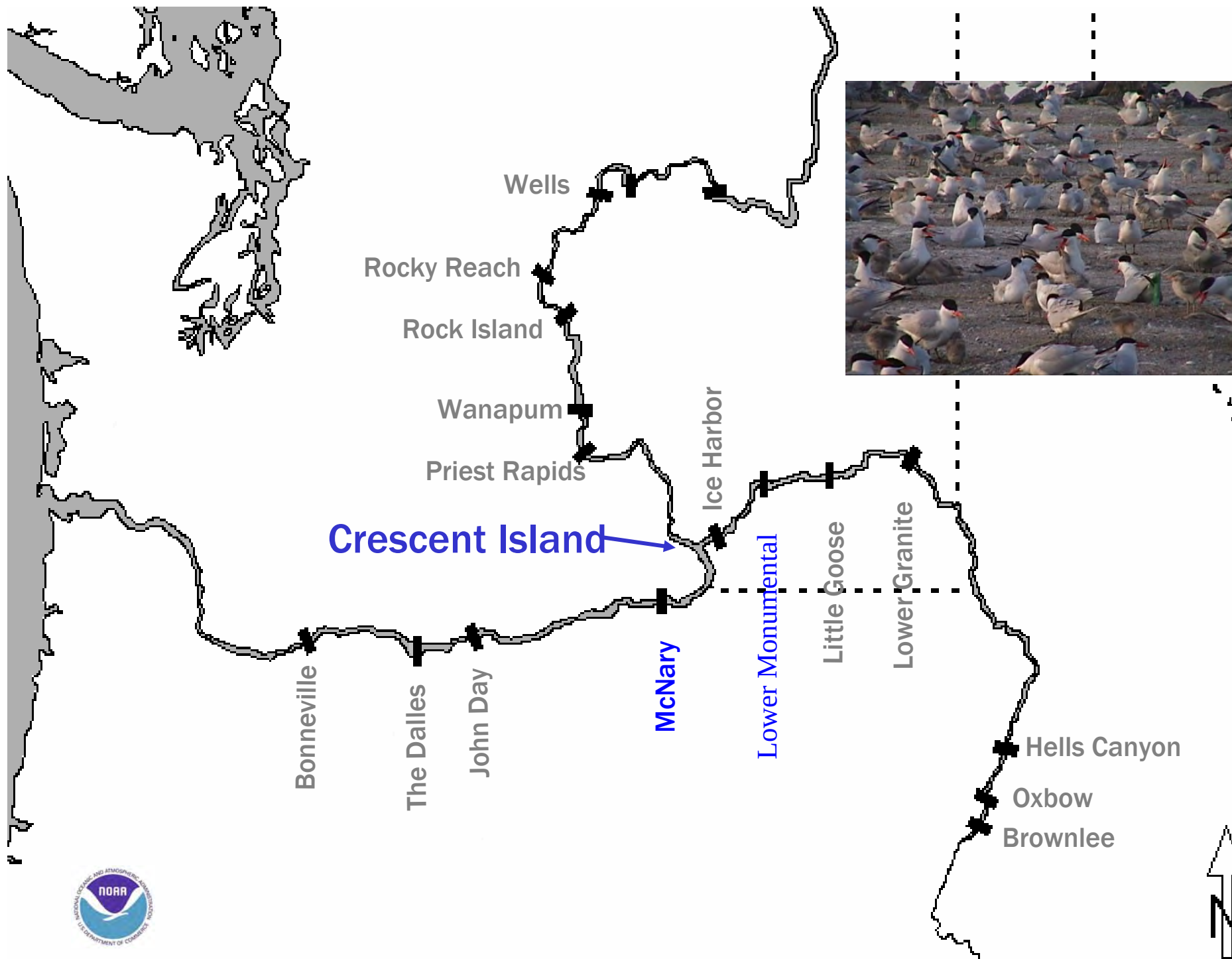
- Steelhead

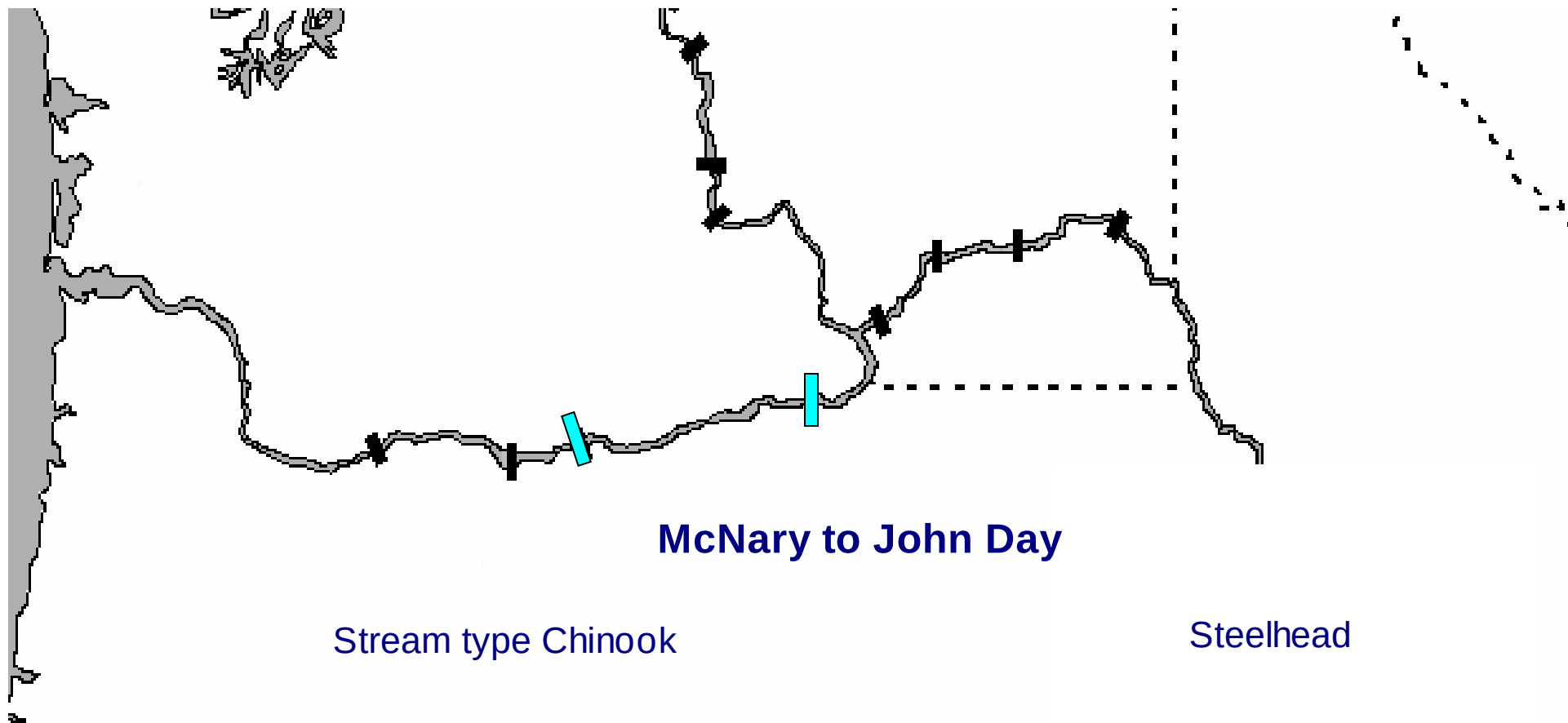
- LMN-MCN: 0.776 (0.016)

- Lower Monumental to Ice Harbor: 0.913 (0.010)

- Ice Harbor to McNary Dam: 0.863 (0.018)



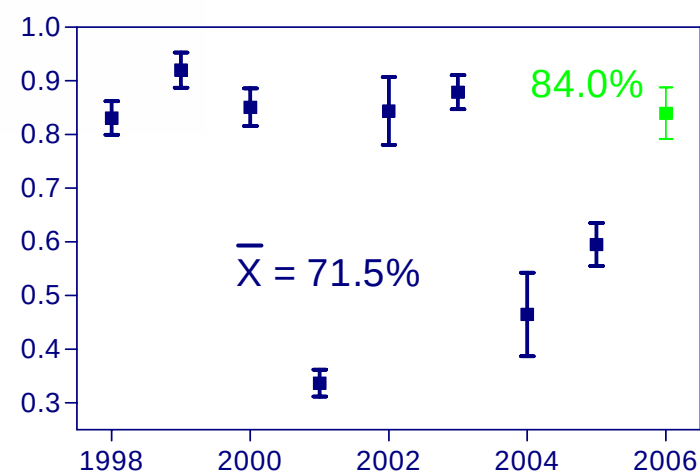
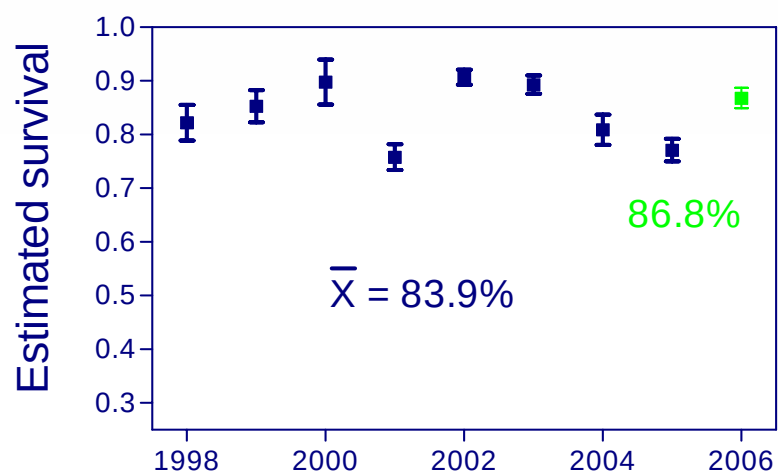


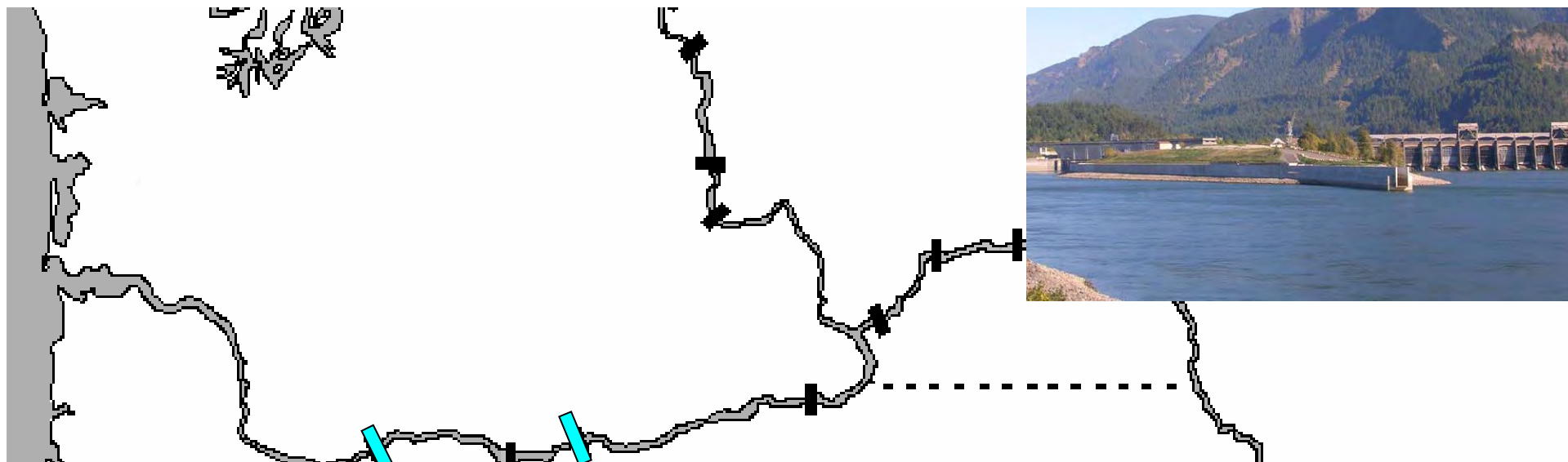


McNary to John Day

Stream type Chinook

Steelhead

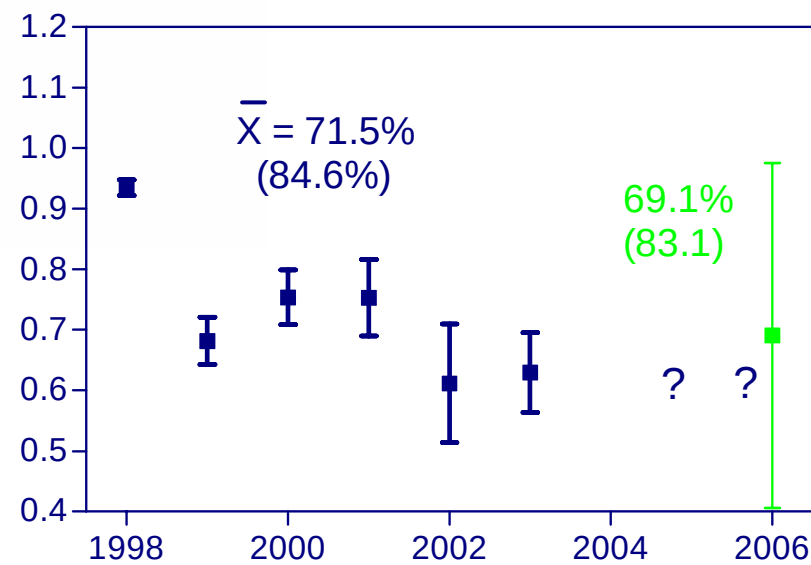
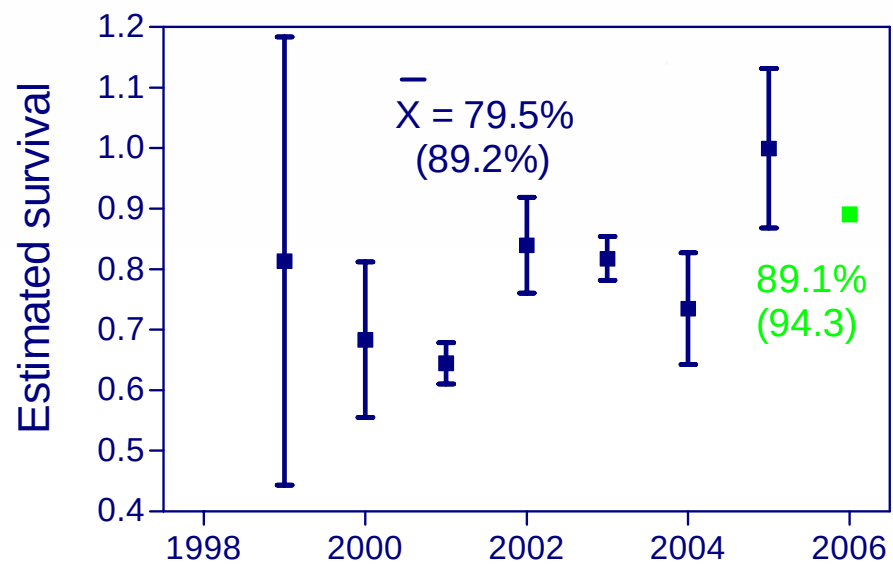




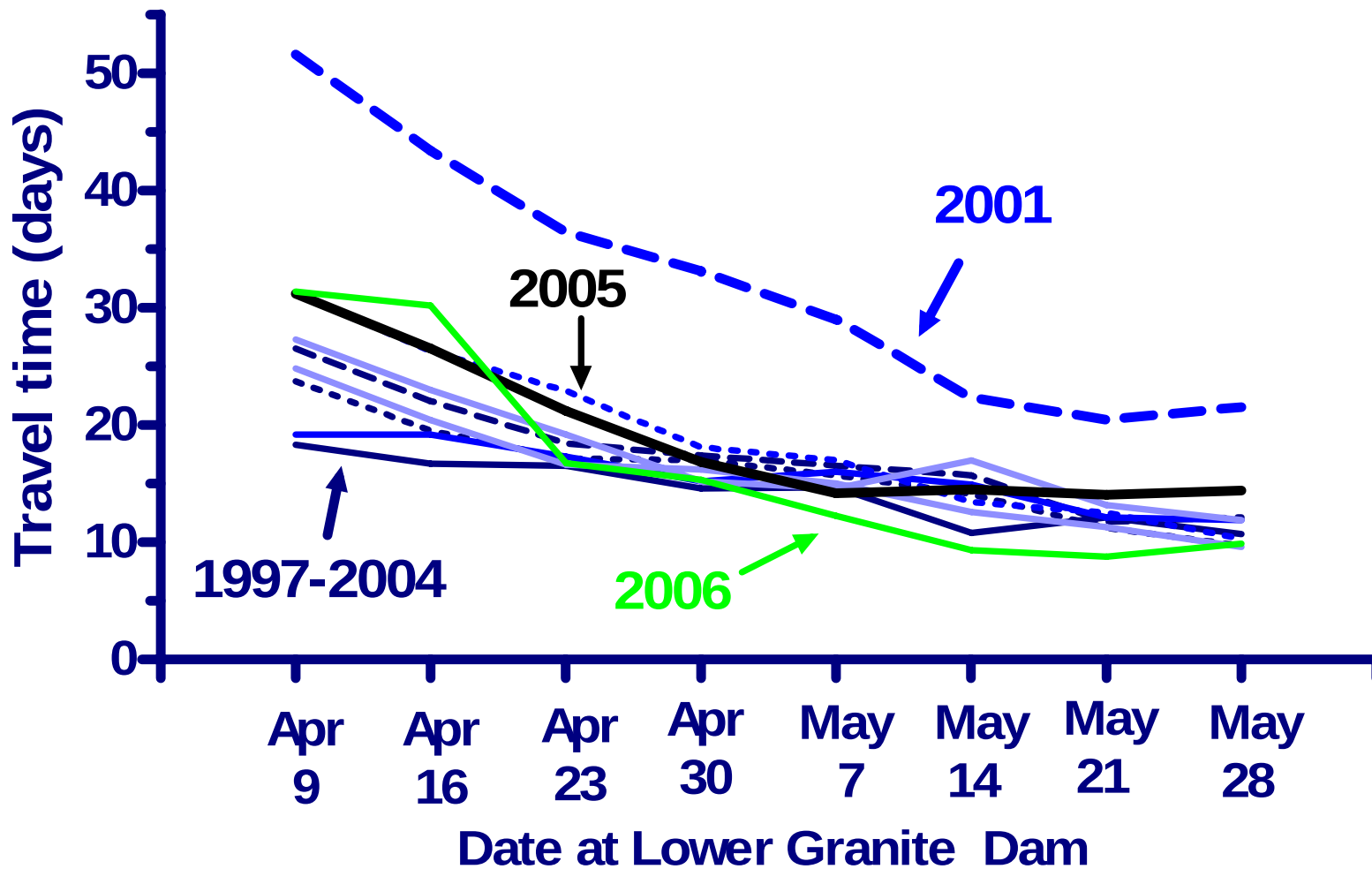
John Day to Bonneville

Stream type Chinook

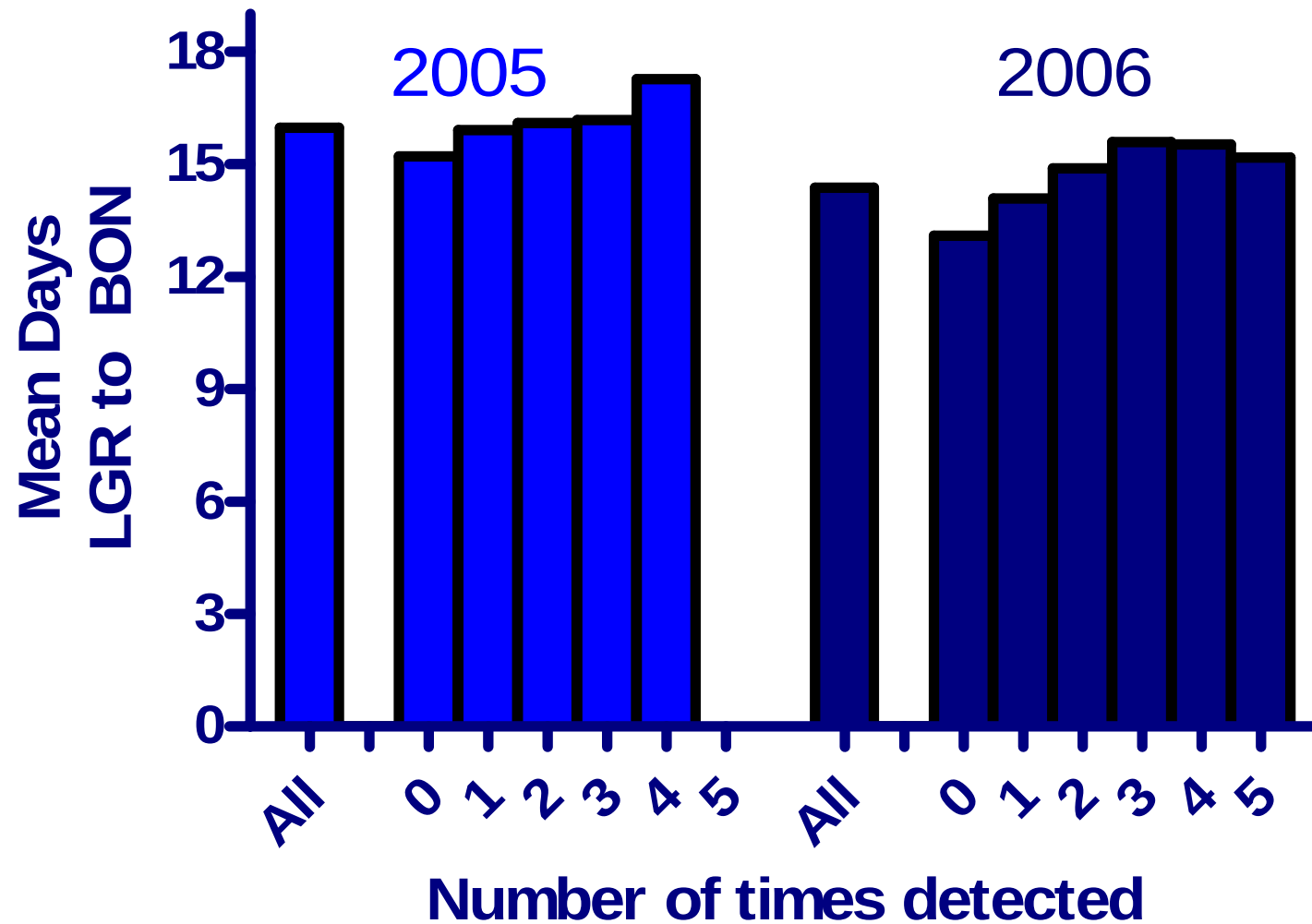
Steelhead



Median travel time Stream type Chinook Lower Granite to Bonneville (461 km)

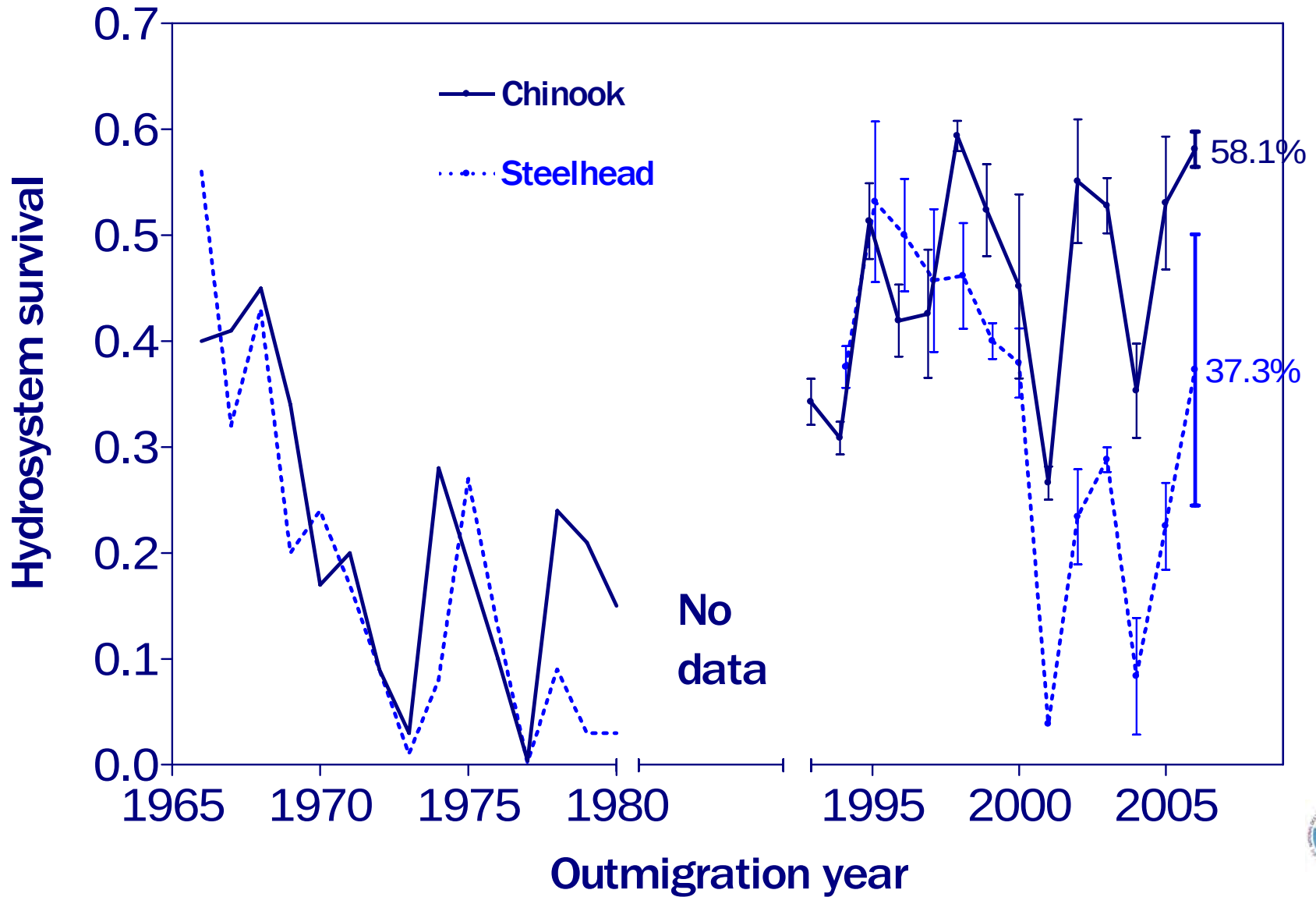


LGR-BON Travel Time by number of detections



Snake River Trap to Bonneville Dam Tailrace

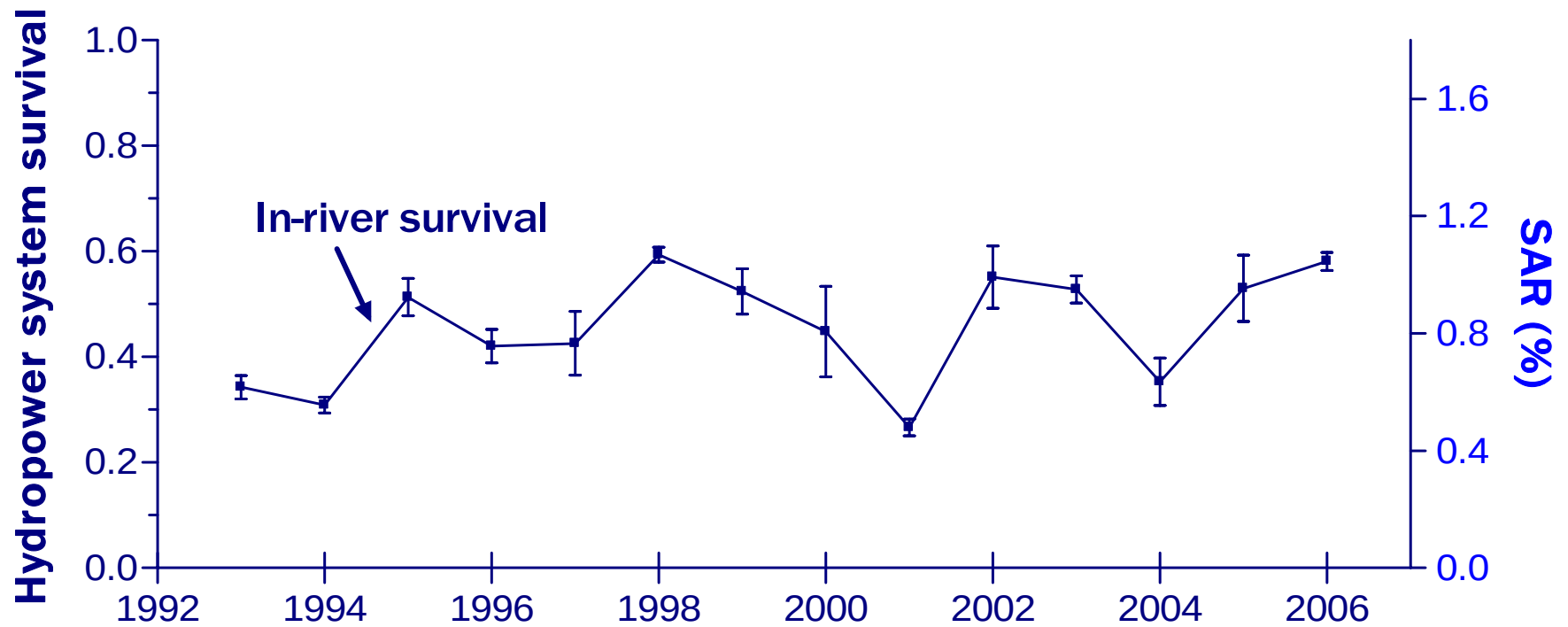
Per-project expansion in some years



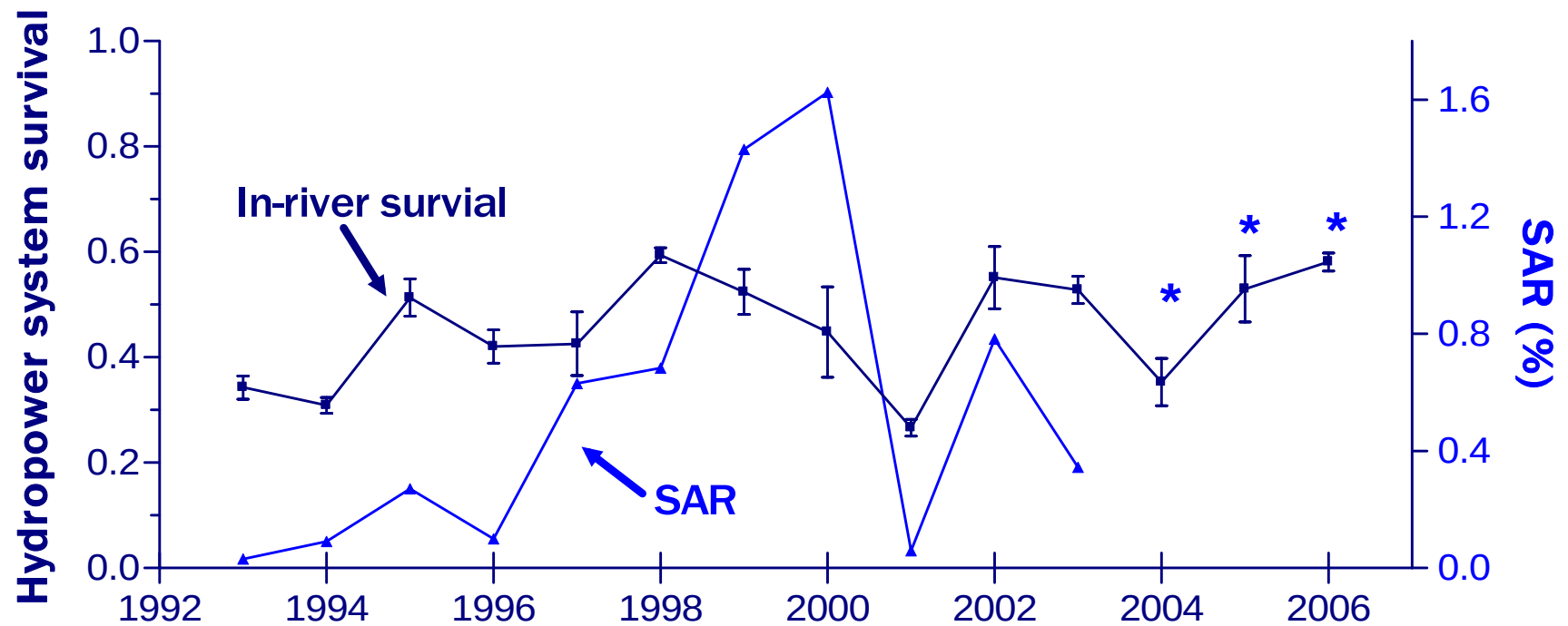
**How big of part does hydropower
system survival play in adult
returns?**



Stream type Chinook based on PIT tags



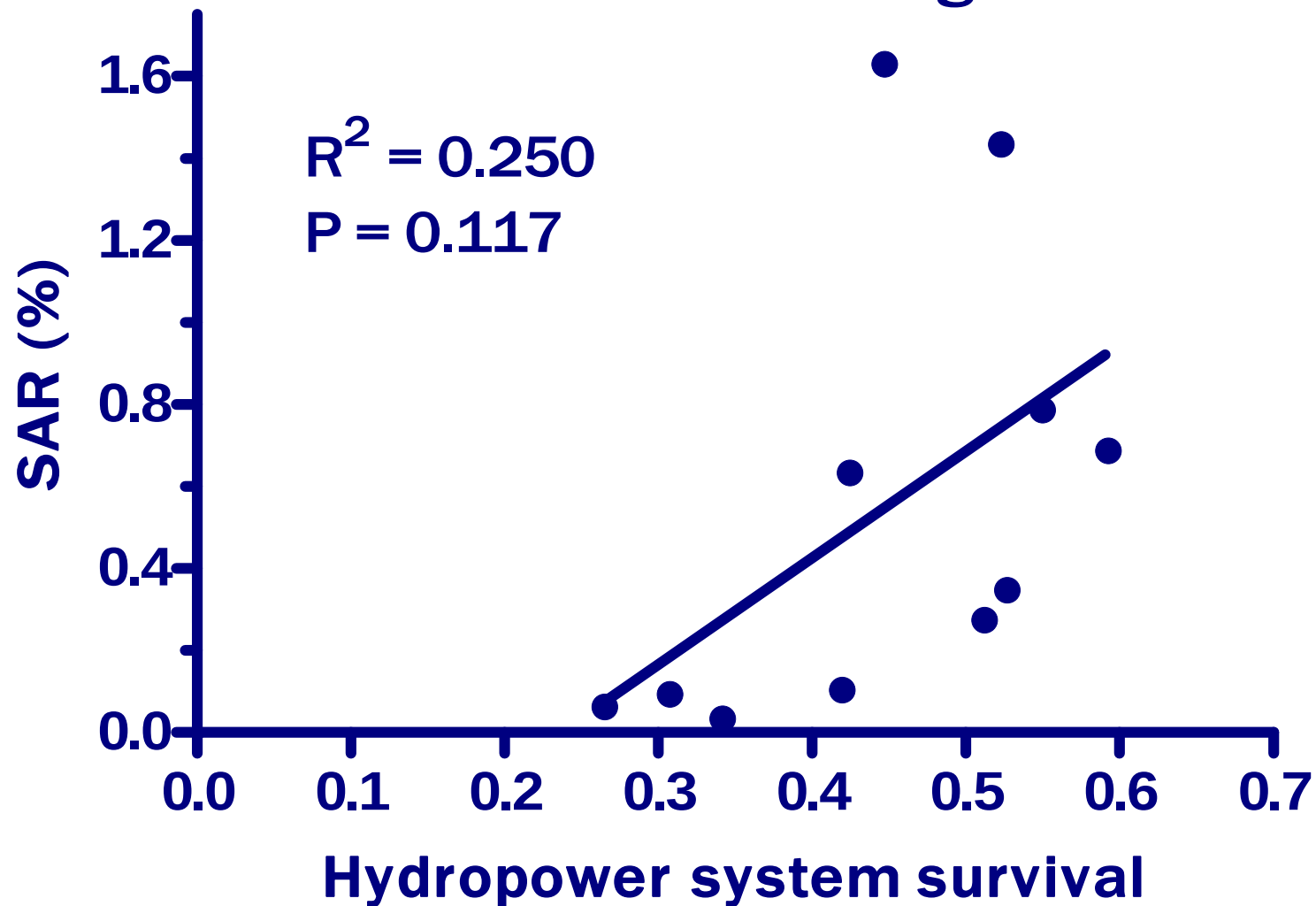
Stream type Chinook based on PIT tags



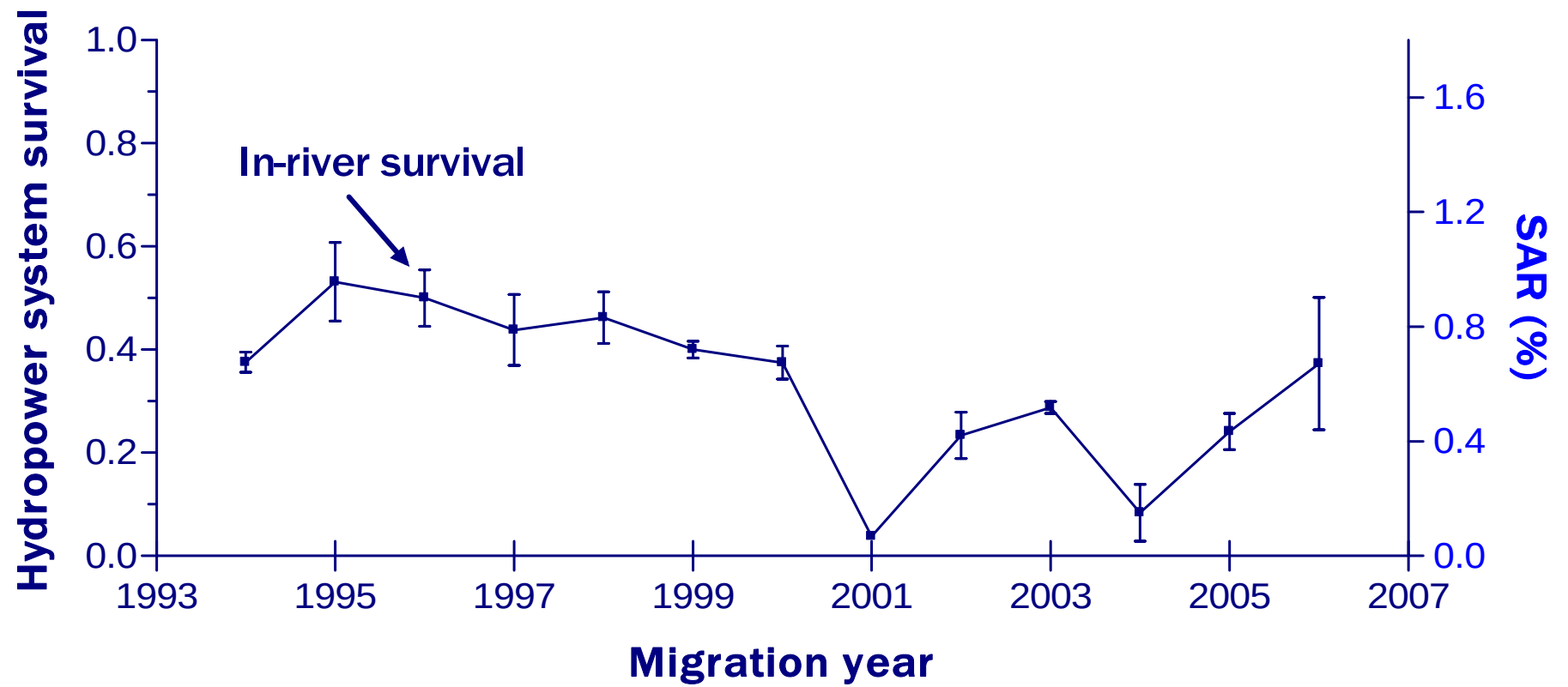
* Incomplete adult returns



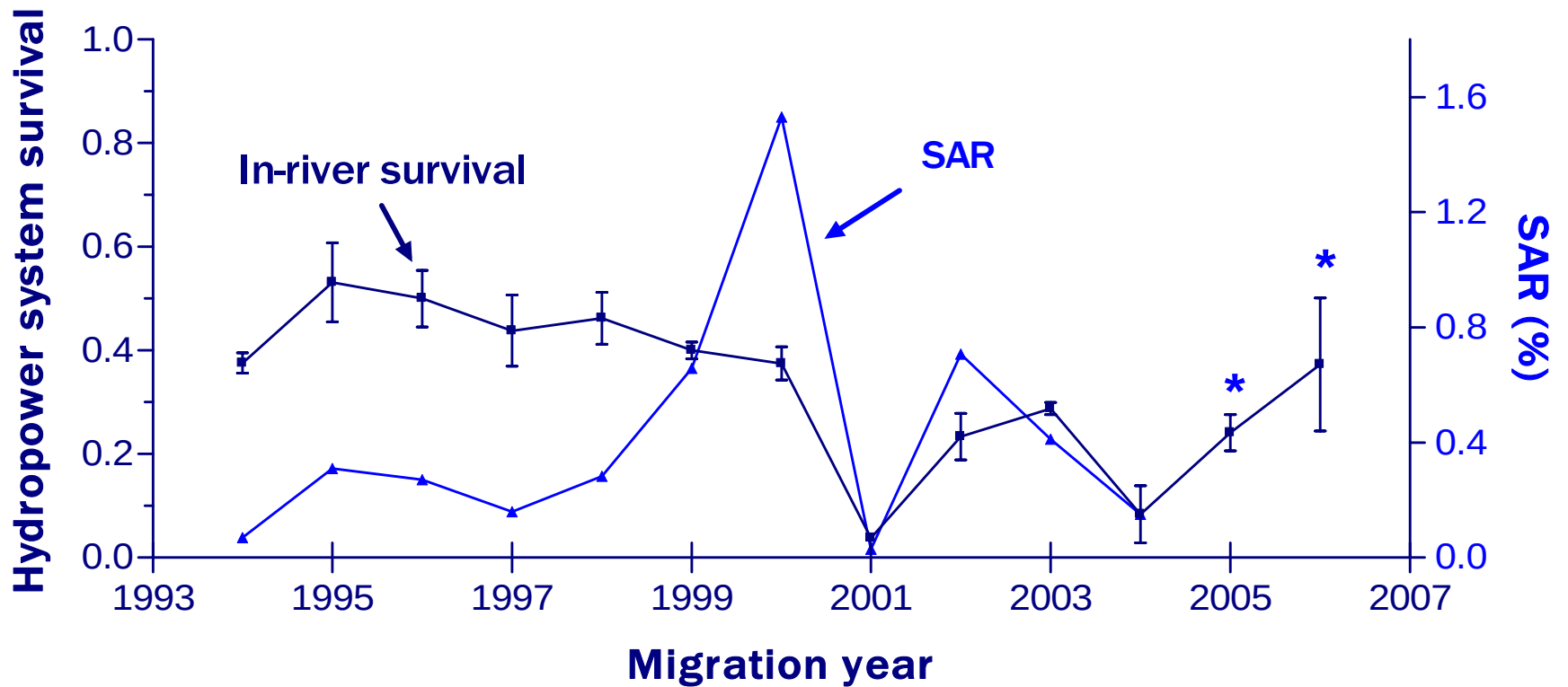
Stream type Chinook based on PIT tags



Steelhead based on PIT tags



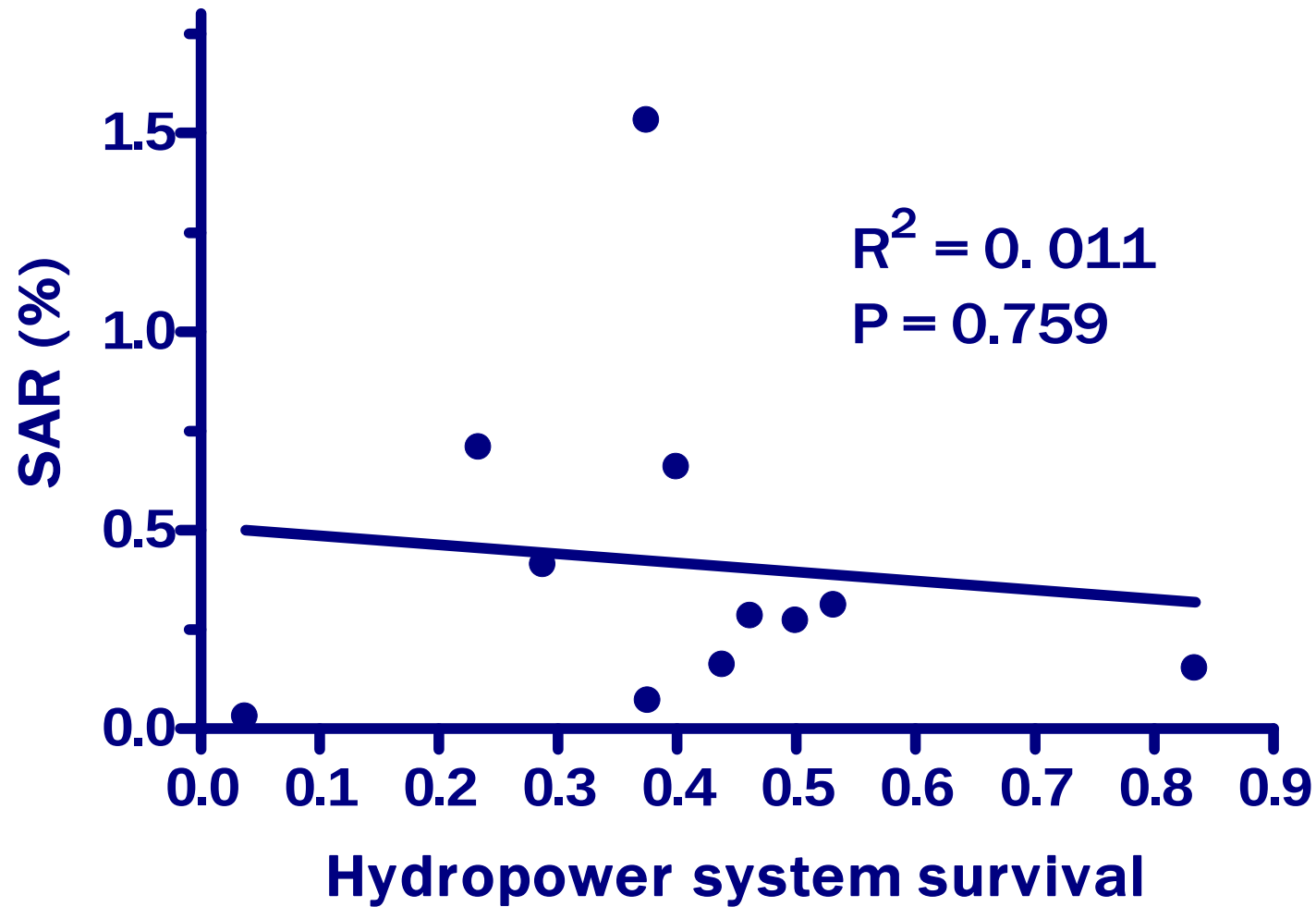
Steelhead based on PIT tags



* Adult returns incomplete



Steelhead based on PIT tags



Snake River fall Chinook

- Because not all fall Chinook salmon migrate while bypass systems are on, estimates of their survival are difficult to interpret (joint probability estimate).

Snake River fall Chinook

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- Therefore, we are relying on SARs instead.

Conclusions

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Conclusions

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- Reach survival averaged 93% per project for Chinook and 88% for steelhead in 2006
- Hydropower system survival was 58% for Chinook and 37% for steelhead in 2006
- **Chinook and steelhead direct hydropower system survival has little influence on SAR**



Questions



August 2006 Spill Changes At Lower Monumental
Dam To Facilitate Navigation

Boat

	No change	Pattern change	Zero Spill	
Capt Bob	12	1		13
Lewiston	1	4	4	9
Willamette			1	1
Clarkston	4		1	5
Queen	4			4
Deschutes	4			4
Cascades	4			4
Clearwater	2			2
	31	5	6	42

COLUMBIA RIVER REGIONAL FORUM
TECHNICAL MANAGEMENT TEAM
2006 Year End Review
December 13, 2006

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. Most presentations were accompanied by Power Point or other electronic information. Please go to the agenda on the TMT web page to see more detailed information.

2005 Comparison to Previous Years

- **Water and Runoff Patterns:** Cathy Hlebechuk, COE, presented information comparing runoff patterns 2003-2006 and specific operations for each of the projects in 2006. This year, actual runoff exceeded the objectives for April-June at Lower Granite, McNary and Priest Rapids. Cathy briefly highlighted operations at specific projects: Libby saw high runoff early in the spring and spill in June. Dworshak spilled in April for flood control, and released cold water before July 4 due to high summer temperatures. Hungry Horse saw several peak inflows in May and June, and Grand Coulee drafted into May.
- **TDG/Temperature:** Jim Adams, COE, reported on 2006 temperatures and total dissolved gas (TDG) exceedances. He noted that the McNary forebay gauge on the Oregon side was removed so there was one less fixed monitoring gauge in the system this year. Jim shared the spill operations at each of the projects, and reported 575 TDG exceedances due to involuntary spill, load issues, and uncertainty using best professional judgment. This year, a new spill pattern and high tailwaters at Bonneville posed operating challenges.
 - o **LESSON LEARNED:** For future consideration, a suggestion was made to seek a better balance of load and spill between day and night to address gas issues during high flow seasons/years.
 - o Dworshak outflows ramping up to address high temperatures at Lower Granite was successful in keeping the river at acceptable temperature levels. Drafting cool water in the summer could be the cause of this year's warmer temperatures in the winter in the Dworshak reservoir – AND, the warmer reservoir temperatures could be a result of warmer air temperatures. The region should continue to monitor this change and try to better understand it for the future.
- **Adult Fish Runs/Fisheries Update:** Cindy LeFleur, WDFW, reported that this year's adult spring chinook returns were higher than what was forecasted, and the run timing was later than usual. The fall chinook (not yet final) estimate has turned out lower than pre-forecasted and all returns are down from recent past years. It was noted that upriver bright fall chinook numbers are healthy, but that the tules have seen a much sharper decline. 2007 numbers are

expected to be down from this year (upriver fall chinook are expected to drop by 20% from 2006).

- **Fish Passage:** Jerry McCann, Fish Passage Center, reported on 2006 smolt migration. Timing for yearling chinook was earlier than the 10-year average, and steelhead numbers were higher and run timing later than the 10-year average. Re: transportation operations, an estimated 87% of steelhead were passing Lower Granite during collection, with a 79% probability of the wild run transported. 68% wild chinook were passing and 58% of those were transported; 86% hatchery chinook were passing with 61% of those transported. Jerry also reported that subyearling chinook run timing was earlier and shorter than the 10-year average.
 - o **LESSONS LEARNED:** A question was asked about holdover fish, to which Jerry responded that, while these fish were not counted, they also would not have influenced the results of the survival data in relation to spill, temperature, or transit time.
 - o Water transit time shows the highest relationship to smolt survival of those criteria noted above.
- **Weather:** Kyle Dittmer, CRITFC, reported that extreme precipitation and temperature patterns were the 'norm' in 2006, and he called it a 'yo-yo year' for weather. Record high temperatures were experienced in every quarter of WY 2006. The water year precipitation ended at 105% of normal for the Columbia River at The Dalles, with 89% to 95% at the low end and 125% to 133% at the high end. Winter forecasts presented at the OR-AMS Winter Weather meeting suggest near normal precipitation and near normal to above normal temperatures. The 2007 pre-season volume forecasts, for the Columbia River at The Dalles, vary from 88% to 104%
- **Montana 2006 VARQ Operation:** Brian Marotz, Montana, began his presentation with a recap of conditions and Libby operations in 2006: Less water was released April-May than that prescribed in strict VARQ, and given the 'yo-yo weather year', Libby filled faster than in past years, causing the project to spill in the summer, resulting in TDG levels exceeding the Montana standard. Gas bubble trauma was found in migrating bull trout due to these higher TDG levels. While there was not a high level of direct mortalities, Montana remains concerned for latent mortality effects and plans to do sample monitoring next spring to better understand the longer-term impacts of 2006 operations. Cindy Henriksen, COE, also reported on the COE's 'After Action Report' (a requirement for any emergency operation costing over \$500,000) which includes discussion of the Libby operation. The report can be found on the Seattle District COE web page. Cindy suggested that of special interest to TMT might be Chapter 2 (overview of the spring flood event/operation decisions); Chapter 4 (observations from the event); Chapter 5 (conclusions); and Appendix Y (lessons learned).
 - o **LESSON LEARNED:** The COE is looking back at past years' VARQ operations and currently in executive level discussions with the region about whether to operate to VARQ in 2007. The COE planned to make a decision about this matter by the end of December.
- **SPECIAL TMT discussion: SOR 2006-8:** TMT met to discuss an SOR brought forth by the salmon managers regarding VARQ operations for 2007. It was discussed here as it was relevant to the year end review item above. The request was to implement Libby VARQ in

2007 and was brought forth in an attempt to inform the COE of the fisheries' perspective on the issue, and get ahead of the COE's decision for 2007 operations.

The issue was also slated to be discussed at IT in January. Considering the timeline for decision, the COE suggested that folks weigh in at the executive level as this is the level at which is being discussed. A question was raised about consultation with the lower river tribes, and why this issue has not been vetted at the technical level. Some members of the Regional Forum urged the COE to consider waiting to make a decision until after the issue could be discussed through the Regional Forum. Again, the COE said that from the agency's perspective, the decision must be made by December 31.

Mainstem Lessons Learned:

- The thermocline in the forebay at Dworshak is warmer than in previous years. Potential causes and links to air temperature and/or system operations should be further explored.
- For future TMT Year End Reviews: Provide a list of changes in operations and initial lessons learned ahead of time. (It was noted that TMT will also continue its lessons learned discussion at their next process meeting in early 2007.)
- The extreme variability in weather patterns this year made it difficult for the RFC to forecast and in turn made it difficult to plan project operations.

Snake River Review:

- *Surface Passage Studies*: Tim Wik, Walla Walla District COE, provided information on surface passage studies, and noted that draft reports on each would be developed and sent out soon. The Lower Granite RSW summer study, which involved flat and bulk patterns, found that the patterns were not statistically different in how well they diverted fish from turbines. Ice Harbor survival probabilities showed little difference between treatments for any of the summer juveniles.
 - o **LESSON LEARNED**: Studies show that fish passage is deeper in the summer, and that fish pass near the crest of the RSW.
- *Snake River Navigation Operations*: Rob Wall, COE, reported on navigation operations in 2006: Dredging brought Ice Harbor, Little Goose, and Lower Granite pools to MOP ; spill pattern adjustments made in coordination with towboaters' and to address safety needs; and investigating 'silt' problems below Lower Monumental. He also discussed the phenomenon of Little Goose forebay readings being higher than Lower Granite tailwater readings, resulting in raising Little Goose forebay to provide 1' of sill depth at the downstream Lower Granite lock.
 - o **LESSON LEARNED**: Spill pattern adjustments made were successful in addressing safe passage for towboaters on the Lower Snake.
- *Fish Conditions*: Bill Muir, NOAA, presented information on reach survival of Snake River fish. For all reaches, survival of Lower Snake fish was higher than previous years for all but steelhead, of which survival percentages were slightly lower from John Day to Bonneville. Bill suggested that this lower steelhead survival is due to caspian tern predation on Crescent Island. Overall, survival through the hydrosystem was the highest ever, at 58%. It has not been determined whether reduced travel time results in higher survival.

- o **LESSON LEARNED:** No relationship has been found between juvenile survival through the hydropower system and adult return rates. Therefore, survival, travel time and ocean conditions should all be considered.
- o **LESSON LEARNED:** Survival for Snake River Fall chinook is difficult to interpret in terms of juvenile survival estimates. Instead, look at SAR's.
- o **LESSON LEARNED:** Future research topics: Survival relationship to MOP, and survival relationship to exotic fish predation.

- *Water Temperature Modeling:* Ben Cope, EPA, reported on EPA's RMB-10 model used to predict temperature forecasts for the Snake River based on releases from Dworshak, and actual conditions/operations for 2006. Mike Schneider, COE, presented information from his CE-QUAL W2 model used by the COE to regulate temperatures at Dworshak, and also discussed actual conditions and operations over the 2006 summer.
 - o **LESSON LEARNED:** The first half of July will continue to be the most challenging for maintaining temperatures. TMT members should begin discussing Dworshak/Lower Granite temperature issues earlier in the season, in early June, to get ahead of problems that might arise with summer temperature spikes.
 - o **LESSONS LEARNED:**
 - Look at inflow loads to the system (e.g. Anatone) to manage Snake River temperatures.
 - Consider alternative metrics for travel time.
 - Models should include uncertainty/variability components.
 - o **FOR FUTURE CONSIDERATION:**
 - Washington's water quality standards have been updated and may not be applied the same way on the Lower Snake.
 - Suggest looking at whether using Dworshak cool water earlier at a greater volume would have proven a better operating choice to balance temperatures, and what the trade-off would have been.

2006 Study Information that Might Impact 2007 Operations

- *Surface Passage Studies:* Brad Eppard, COE, reviewed surface passage studies for John Day, The Dalles, Bonneville, and Lower Granite. He also noted a 'tag effects study' that showed no survival difference between two different tags used.
 - o **LESSON LEARNED:** System-wide, John Day yielded the best direct survival and the least injury.
- *SLED Research:* Robert Stansell, COE, reviewed the hazing program and SLED installation to deter sea lion predation at and below Bonneville. The expectation for 2007 is a more intensive hazing program, possibly trapping and branding, but likely no lethal take.
 - o **LESSON LEARNED:** Acoustics did not deter sea lions, and did not impact salmonid passage. The SLEDs worked well as a deterrent (except for C-404) and did not appear to impact salmonid passage. Hazing was determined to be a short-term deterrent.
- *John Day T-1 Outage:* Dave Clugston, COE, reported on the John Day T-1 outage and potential impacts to: fish passage; The Dalles ladder usage; and Bonneville fallback, reascension and effects on escapement. He found that reductions to ladder use was minimal

and may not have been due just to the John Day outage. The Dalles ladder passage was very low compared to previous years, likely due to high flows/the new spill pattern.

- o **LESSON LEARNED:** Bonneville saw more fallback and less re-ascension. Could this be due to sea lion predation?
- Vernita Bar Preliminary Studies: Russell Langshaw, Grant County PUD, reported initial findings from a two year alternative load study.
 - o **LESSON LEARNED:** The Vernita Bar operation implemented this year was similar to Bonneville operations for chum, with two nighttime peaks to water redds already placed at higher elevations while discouraging new spawning in higher areas. At Vernita Bar, the operation was successful until the end of the operation, when peaks were longer. Shorter peaks, closer together, would likely produce more success. (It was also suggested to use caution when suggesting that the peaks were the cause of higher numbers of redds at higher elevations, and that this could be due to other factors.)

Other Lessons Learned/Thoughts

- RSW efficiency information may be misleading. The salmon managers would like to see what the response curves were for proportion of spillway passage.

All power point presentations from the TMT Year End Review can be found linked to the agenda on the TMT web page. Thank you all for your participation!

Technical Management Team Year-End Review

December 13, 2006

1. Greetings and Introductions.

Donna Silverberg facilitated the December 13 year-end review meeting of the Technical Management Team. 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 Cathy Hlebechuk at 503-808-3942.

Please note that all of the presentations for the year-end review meeting are hot-linked to today's agenda on the TMT homepage. Please refer to these presentations for full details.

2. Mainstem Review.

A. 2006 Water Temperature and Runoff Patterns. Cathy Hlebechuk began with a description of runoff patterns and operations of the major storage projects. Runoff volumes were near-normal at most of the storage projects, but the runoff was shaped heavily toward the early part of the spring in some basins. At Lower Granite, actual

flows, April 3-June 20, were 125 Kcfs, well in excess the 100 Kcfs objective. For the June 21-August 31 period, actual flows were 38 Kcfs; the target was 54 Kcfs.

At McNary, for the April 10-June 30 period, the objective was 260 Kcfs; actual flows were 326 Kcfs. For the July 1-August 31 period, actual flow was 166 Kcfs, while the objective was 200 Kcfs. At Priest Rapids, for the April 10-June 30 period, actual flows were 191 Kcfs; the target was 135 Kcfs.

At Libby, it was an unusual year, said Hlebechuk. The April-August actual runoff volume was 106% of normal; the May volume was 141% of normal. The reservoir climbed steeply toward full, elevation 2459, beginning in mid-May; the project was full by mid-June. The reservoir filled 37 feet in May, and we had to start spilling by June 8. Spill reached 31 Kcfs by the third week in June. The State of Montana and Kootenai Tribe submitted a SOR which requested a flat flow to draft 10 feet by the end of September rather than draft 20 feet by the end of August, per the Biop. The agreement was to release about 15 Kcfs from late July through August 31. The 15 kcfs operation was coordinated at the policy level. Outflow was then stepped down to about 9 Kcfs through September 30. That operation was coordinated through TMT.

At Dworshak, we also saw inflow spikes, Hlebechuk said. The 2006 Dworshak operation was also somewhat unusual, because there was a request to begin the cool water releases from Dworshak prior to Fourth of July weekend, due to high temperatures. We had some CE-QUAL W2 modeling from Mike Schneider that helped guide our operations throughout the season, she said; Dworshak was operated basically for water temperatures throughout the season. There was some Dworshak spill in April to draft to it's end of April flood control rule curve; the other goal was to refill Dworshak by June 30. Refill was achieved by July 1 at Dworshak. At Dworshak, there is also a Snake River Adjudication Agreement that gives the Nez Perce Tribe 200 kaf – 15 feet of Dworshak storage – for use during September. Some of that water was released in August to control warm Lower Granite temperatures so we actually released 153.5 kaf during September this year, Hlebechuk said. This operation was coordinated at TMT with members including the Nez Perce Tribe.

At Hungry Horse, the project almost filled by the end of June, Hlebechuk said; inflows peaked sharply at that project in May and early June due to warm temperatures and snowmelt, as well as a mid-June rain event that deposited 2 inches of precipitation in that basin. The State of Montana and Kootenai Tribe submitted a SOR which requested a flat flow to draft 10 feet by the end of September rather than by the end of September per the Biop. The agreement was to release about 3 Kcfs from late July through August 31. The 3 kcfs operation was coordinated at the policy level.

At Grand Coulee, the project drafted from January into May for power and chum flows. Grand Coulee refilled by July 4, to elevation 1290. Per the BiOp, 10 feet of storage was drafted by August 31; it was then refilled to elevation 1283 for kokanee spawning.

Why were we so far below Upper Rule Curve at Grand Coulee on March 31? Bpb Heinith asked. This graph is not correct, Hlebechuk replied – the actual shifted flood control elevation on March 31 at Grand Coulee was 1263.6. I will have the corrected graph posted. The project reached it's April 10 upper rule curve elevation, John Roache', BOR TMT representative, added.

B. Temperature/TDG Level Variations. Jim Adams provided an overview of water quality in the Columbia basin in 2006. He touched on the following major topics:

- Fixed monitoring stations: the Corps operated 28 gauges in 2006, one less than previous years (McNary forebay gauge, Oregon side was eliminated). Reclamation operated four additional gauges; the Mid-Cs operated 10 gauges.
- TDG – start of spill, end of spill, total days of spill at the 8 FCRPS projects (table)
- Snake River spill operations, by project (table)
- Lower Columbia spill operations, by project (table)
- Total Dissolved Gas – 575 total exceedences in 2006, significantly higher than anything seen in previous years. About 23% of the days monitored showed exceedences in 2006. The reason was that there was a lot of involuntary spill this year, due to the shape of the runoff, lack of load and lack of hydraulic capacity.
- TDG: number of days of exceedence, by project (table)
- TDG: types of exceedence, 2006 (table)
- Bonneville spill patterns – new spill pattern developed for spill flows less than 100 Kcfs, that increased spill at the end bays. This resulted in high TDG levels at the Cascades Island gauge, which may have resulted in an overestimation of actual TDG levels across the river.
- 2006 spring spill – Bonneville Dam (April 21-April 26) – graph

Russ Kiefer suggested that the TMT needs to address the lack-of-load problem during the spring – we need to do a better job of avoiding high volumes of nighttime spill, which then result in our having to curtail spill during the day to keep TDG levels down. Good suggestion, said Silverberg.

Continuing on, Adams touched on:

- Dworshak summer operations – June 28-September 13 (table)
- Dworshak outflows and Lower Snake River tailwater temperatures, 2006 – sharp rise in temperature by mid-June, with the temperature standard exceeded in late June. For the most part, the Corps was able to keep tailrace temperatures at the Lower Snake projects below the 68-degree standard during the summer of 2006.
- Lower Granite inflows and temperatures, 2006 (graph)
- Lower Granite tailwater temperatures, 2000-2006 (graph). In 2006, temperatures were warmer earlier in the season than normal, due to hot weather.
- Dworshak summer operations and Lower Granite tailrace temperatures – 223 hours of exceedence in 2006, the highest total since 1998.
- Dworshak forebay thermocline, 2006 – the reservoir was slightly warmer in 2006 than in previous years, either because of the warm weather or because we're causing a change in Dworshak thermocline temperatures because we're drafting the coldest water each year. The answer is unknown at this time, but needs to be investigated, Adams said.

C. Adult Fish Runs/Fisheries Review. Cindy LeFleur led this presentation, touching on the following major topics. She noted that all of these returns are to the mouth of the Columbia:

- Upriver spring chinook runs: 2006 prediction 88,000; 2006 return 132,000. The run timing was unusual, peaking about May 10, significantly later than the 10-year average of the third week in April.
- Spring chinook daily passage at Bonneville Dam – 2006 vs. 10-year average.
- Spring chinook fisheries, 2006 – 87,000 recreational angler trips, 7,000 fish kept. Commercial: 4,300 fish kept, ex-vessel value \$5.50/lb. SAFE commercial harvest 6,600 fish. Tribal fishery kept 8,400 spring chinook. The ESA impact rate was 1.8% vs. the 2% guideline (non-Indian) and 6.6% (treaty Indian) vs. the 8% guideline.
- Upper Columbia summer chinook returns, 1982-2006 (graph). 2006 forecast: 49,000; actual return 76,000.
- Summer chinook fisheries, 2006: recreational fishers caught 5,200 fish; commercial fishers kept 4,800 fish; the treaty fishery harvested 16,300.
- Columbia River Fall chinook returns, 1982-2006 graph) – prediction 475,000, actual return about 396,000.
- Upriver bright fall chinook returns, 1982-2006: 2006 forecast 249,000; actual return about 225,900.
- Mid-Columbia bright fall chinook returns, 1982-2006 86,600 vs. 71,900 actual.
- Bonneville pool hatchery fall chinook returns (tules): 2006 forecast 51,800; actual return about 33,700.
- Fall chinook fisheries, 2006: recreational, 13,700 chinook harvested, 26,000 commercial, treaty harvest 82,600. An excellent ex-vessel price of about \$3.50/lb.
- Forecast accuracy, upriver spring chinook – underpredicted in 2006. Upriver summer chinook were also underpredicted in 2006. Upriver bright fall chinook overpredicted in 2006. Total fall chinook were also overpredicted in 2006.
- Outlook for 2007 returns: generally down from 2006 – upriver spring chinook prediction: 78,500, down from 132,000 in 2006. Summer chinook: 45,000 predicted vs. 76,000 actual in 2006. Sockeye: 27,300 predicted in 2007, close to the 2006 return. Fall chinook: about 20% less than 2006.

In response to a question from Scott Bettin, LeFleur said she does not have an estimate of the 2006 chum return yet, but will provide that to the TMT. In response to another question from Paul Wagner, LeFleur said she will also provide summer steelhead information to the TMT. She said steelhead numbers have been pretty stable, at about 300,000, hatchery and wild above Bonneville, in recent years, and she expects the numbers to be similar for 2007.

D. Fish Passage. Jerry McCann led this presentation. He touched on the following major topics:

- Review of 2006 smolt migration – run size, timing, spread-the-risk delayed transport, Snake River subyearling survival and summer spill.
- Yearling chinook population index at Lower Granite and hatchery releases, 1998-2006 (graph)
- Combined H&W steelhead population at Lower Granite and hatchery releases, 1998-2006 (graph)
- Timing of spring migrants at Lower Granite, 2006 vs. 10-year average (graph) – 2006 steelhead timing slightly earlier than 10-year average; hatchery chinook timing average in 2006; wild chinook earlier than hatchery chinook in 2006, but typical for wild fish 10-year average.
- Wild PIT-tagged yearling chinook timing at Lower Granite and wild run at large (graph) – timing within the wild groups of fish is diverse. The earliest stock in 2006 was the Imnaha, with the Salmon River stock coming out later. The peak of the run timing coincided with the peak in flow and spill.
- Wild PIT-tagged steelhead timing at Lower Granite and combined run at large (graph) – Clearwater stock earliest; Imnaha stock latest in 2006.
- Run-at-large steelhead and chinook 10-year average timing at Lower Granite (graph) – 10-year average daily proportions of yearling chinook and steelhead. Steelhead start to predominate in late May, typically – may be a better way to look at impacts of operations on various populations, in the context of deciding when transportation should begin each year.
- Summary of 2006 transport, by species (table) – Lower Granite, Little Goose, Lower Monumental, McNary. Proportion passing during transport, estimated collection efficiency, proportion of population transported – ranged from 58% (wild spring/summer chinook) to 79% (wild steelhead).
- Other ways to measure transport proportion (table)
- Hatchery/supplementation releases of subyearling chinook above Lower Granite (graph) – 1995-2006
- Subyearling chinook timing at Lower Granite, May 3-October 18 – 1995-1999, 2000-2005, run-at-large 2006 (graph)
- Survival for production subyearling chinook, Lower Granite to McNary 1998-2006, with 95% CIs (graph) – about 70% in 2006.
- Weighted regression example (graph)
- AH subyearling chinook survival vs. average spill percent, Little Goose, Lower Monumental, Ice Harbor and McNary, May 20-July 15 (graph)
- AH subyearling chinook survival vs. summer water transit time, Little Goose, Lower Monumental, Ice Harbor, McNary, 2006
- AH subyearling chinook survival vs. average temperature, Little Goose, Lower Monumental, Ice Harbor, McNary, 2006.

To what extent are these results influenced by the holdover fall chinook? Jim Ruff asked. Very little, McCann replied – it is not a significant proportion of the overall population. In response to another question, McCann said the tightest correlation to survival among these variables was with water transit time.

E. Weather. Kyle Dittmer led this presentation, touching on the following major points:

- Water year 2006 will be noted for its extremes in weather patterns, precipitation and temperature.
- Water year 2006 Columbia Basin precipitation, by month (graph) – very wet fall, winter and spring, particularly in April, the last week in May and the first two weeks in June
- Water year 2006 Columbia Basin temperature (graph) – many new record daily highs during spring, particularly in May, June and July. Temperatures reached 110 degrees one day in late July in the Portland area
- The Dalles precipitation was 105% of normal in 2006; other subbasins hit between 89% to 133% of normal.

Dittmer then moved on to a summary of the AMS annual winter weather meeting forecasts. The bottom line is that there was agreement that we are heading into an El Niño year, Dittmer said. The CRITFC forecast is for near-normal temperatures and precipitation this year; most of the other forecasters expect above-normal temperatures and below-normal precipitation. He provided a graph showing moderate El Niño conditions predicted in 2007, but said that his interpretation of the sun spot data leads him to predict near-normal temperature and precipitation in water year 2007.

Dittmer then provided a table showing runoff predictions for The Dalles in 2007 (January-July), which ranged from 88% of normal (CRITFC) to 104% of normal (CIG-UW). He noted that, in 2005-2006, the CIG forecast was the most accurate.

F. Montana's 2006 VARQ Operations. Brian Marotz led this presentation, touching on the following major topics:

- What VARQ is and how it works – moves more water into the spring and summer period than typical historic operations
- In 2006, less water was released in April and May than would have been released if VARQ had been fully implemented, which resulted in less storage space being available to contain the high volume of runoff in May and June. This caused spill to occur at Libby, which caused significant exceedences of the Montana State standard of 110% TDG. TDG levels exceeded 130% when spill reached 31 Kcfs at Libby. By day 4 of spill, over 30% of the fish sampled showed signs of GBT; after day 11, that percentage reached 100% of the bull trout and 90%+ of the rainbow trout and mountain whitefish sampled. Direct mortality was relatively light, but Montana remains concerned about latent mortality as a result of the 2006 spill at Libby. More information will be available on latent mortality by this spring.
- In terms of population-level effects, we sampled in the fall; preliminary results indicated no apparent population impacts in the farthest downstream reach, where TDG levels were 125%. The reaches nearest the dam will be sampled this spring.

Did you notice a big difference in symptoms between the left bank and the right bank? one participant asked. Initially, yes, but as spill continued, the TDG

mixed across the river, and we saw fairly consistent incidence of signs across the river, Marotz replied. And what's the depth of the river below Libby? Ruff asked. About 30-40 feet in the stilling basin, but much shallower below David Thompson Bridge, Marotz replied. There are pockets down to 30-40 feet below the bridge, however, Marotz said.

Cindy Henriksen then led a presentation titled "Libby 2006 After-Action Report." She touched on the following major topics, noting that the report itself is quite lengthy:

- An after-action report is produced whenever the Corps launches an emergency action operation costing more than \$500,000.
 - The report is available from the Corps Seattle District webpage: www.nws.usace.army.mil.
- Contents of the report. From the TMT perspective, Chapter 2 ("Overview of 2006 Spring Flood Event") and Appendix K ("Water Management") are probably the most germane. Chapter 4 ("Observations from 2006 Flood Event") and Chapter 5 ("Conclusions") may also be of interest.
- Lessons learned are covered in Appendix Y; it covers flood response, public affairs and Libby operation.

There has been a lot of regional discussion of what will happen at the Montana projects in 2007, Henriksen said; the Corps of Engineers has not yet made a decision, but is considering everything from VARQ operations to standard flood control operations.

On December 12, the salmon managers submitted SOR 2006-8, covering Libby Dam VARQ operations. Wagner explained that this SOR, developed during yesterday's FPAC meeting, requests that the Corps implement VARQ at the Montana projects in 2007. The fishery managers wanted to get out ahead of the curve and let the Corps know that their operational preference, from a fisheries perspective, is to implement VARQ in 2007, Wagner explained.

We may have erred in not also including Hungry Horse in this SOR, David Wills observed – we would also like to see VARQ implemented at Hungry Horse in 2007.

Ruff observed that the IT will be discussing this issue at its January 11 meeting. He asked what is called for in the current draft of the 2007 Water Management Plan. The 2007 WMP is still in draft form; it rolled over the 2006 operation, Henriksen replied. We have been open to the concept that standard flood control may be on the table again, she said; that decision needs to be made by the end of 2006. This has been discussed extensively at the policy level, Henriksen said, but it's important to note that we are discussing 2007 operations only – not longer-term operations at the Montana projects. Basically, you're saying that the Corps needs to make its decision before the IT meets on January 11? Ruff asked. That's correct, said Eric Braun – any input needs to be made at the policy level, as soon as possible.

What will the operation of Libby be for the end of December? Ruff asked. That will be based on the end-of-December forecast, Henriksen said – the December final forecast for Libby was 122% of average, which puts Libby's December 31 elevation at 2411. Hlebechuk reiterated that the 2007 WMP is still in draft form and the Corps is still awaiting comments from many agencies.

Is the Corps engaged in formal consultations on this issue? Bob Heinith asked. We're not in a formal consultation process yet – we're having executive-level discussions on this issue, Braun replied. How did this issue go all the way to the executives without pausing at the technical level? Mark Bagdovitz asked. My guess is that, because the Corps has not yet signed an ROD on the Upper Columbia EIS, it is a timing issue, Henriksen replied. There have been some discussions of present operations at TMT, but not of future operations, Silverberg added.

Does the Corps believe VARQ has been implemented as designed since 2003? Marotz asked. No, it has not been implemented exactly as per the guidance, Henriksen replied, but there are different interpretations of what exactly full implementation would entail. I would agree with Mark that this decision has totally bypassed the Regional Forum process, said Ruff. An emergency IT meeting to discuss this is still an option, Silverberg observed. Russ Kiefer noted that, no matter what the Corps decides, Libby will be at 2411 on December 31; he asked that the Corps delay its decision until after the IT weighs in on January 11. Henriksen replied that 11 days can make a significant difference in Libby operations, and the Corps is obligated to make its decision on this issue by December 31.

G. Q&A and Lessons Learned, 2006. Ruff said the discussion about Dworshak, in particular, the changing thermocline in 2006, as well as the above-normal temperature departures in 2006 during the winter and spring period, lead him to conclude that weather, rather than the operation of Dworshak, was the cause of warmer thermocline temperatures in 2006. Adams replied that, in his opinion, more investigation is needed before that conclusion can be verified.

Ron Boyce observed that it would be nice to have a list, in advance of the year-end review meetings, of the lessons learned in a given year. We need some information on the "so what" part of the equation, Boyce said – what are the next steps, operationally, that would result from the lessons learned. So noted, Silverberg said.

Dittmer noted that increasingly extreme variability in weather patterns make forecasting and subsequent project operations very challenging. A quicker response to changing weather patterns is warranted. Everyone needs to be able to adapt quickly to changing weather, he said.

3. Snake River Review.

A. Surface Passage Studies. Tim Wik led this presentation, touching on the following major topics:

- Objectives (Lower Granite): compare fish passage performance, spring BGS in, BGS out, summer, bulk vs. uniform spill
- Treatment study: stratified two-treatment experimental design, spring (BGS in and BGS out) – uniform spill pattern, 2-day treatment periods with 4-day blocks, and summer (bulk vs. uniform spill) – 1-day treatment periods with 2-day blocks
- BGS in place or stowed upstream (diagram)
- BGS diverted fish in upper water column toward spillway (fish distribution during in and out treatments) – table showing FPE, SPE, SPS, FGE, RPE (% of fish over RSW) and RPS (effectiveness of RSW, #of fish vs. flow volume) with BGS in and out. FGE was more than 20% higher with the BGS out.
- BGS diverted 1/3 or more of spring migrants (graphs)
- Bulk spill decreased summer RSW performance (FPE, SPE, SPS, FGE, RPE and RPS under uniform and bulk spill patterns) – table
- Bulk spill reduced RSW efficiency and effectiveness (graph)
- Conclusions: BGS: reduced-height BGS diverted just over 33% of fish away from occluded spillway units, summer bulk spill, slightly more fish passed the spillway, but fewer fish passed via the RSW.

How significant is the 33% number? Wagner asked. It depends how you look at it, Wik replied – it diverted some fish, but the significance is hard to determine. High flows and spill during that period probably muddled the waters somewhat.

Moving on, Wik touched on:

- Spring conditions – powerhouse and total project during the study period
- Passage location – yearling chinook salmon – percent of fish by unit, spill bay and RSW, BGS stored and BGS deployed (graphs)
- Passage location – juvenile steelhead, by spill bay and unit, BGS deployed and BGS stored – a very high percentage of juvenile steelhead passed via unit 5 with the BGS deployed
- Survival probability, yearling chinook, BGS deployed vs. BGS stored – not much difference between passage route (pool, forebay, spill, RSW, turbine, bypass, dam)
- Survival probability, juvenile steelhead, BGS deployed vs. BGS stored, by route of passage – no meaningful difference between treatments
- Passage location – summer study, subyearling chinook bulk spill vs. uniform spill: RSW passed the most fish
- Survival probability, subyearling chinook, by route of passage – no meaningful difference between treatments, although survival was about 10% higher with the bay open 4 stops

Next, Wik provided the following information for radio-tagged fish at Ice Harbor:

- Project operations at Ice Harbor Dam for radio-tagged spring migrants, 2006, 30-40% spill vs. BiOp spill
- First approach and passage distribution, 30-40% spill (graph)
- First approach and passage distribution, BiOp spill treatment – slightly fewer fish passed the RSW during this treatment (graph)
- Chinook passage metrics by spill treatment (graph)
- Steelhead passage metrics by spill treatment (spill efficiency 20% higher under bulk spill) – graph
- Chinook survival by spill treatment (graph) – no significant difference between treatments
- Steelhead survival by spill treatment (graph) – no significant difference between treatments

In response to a question, Wik said that, with respect to the higher-than-100% survival estimates, all he can say is that the control fish died at a slightly higher rate than the fish that passed the dam. Moving on, Wik touched on passage behavior and survival for radio-tagged subyearling chinook at Ice Harbor, 2006:

- 2006 results: passage distribution (nearly 70% passed via the RSW)
- 2006 results: passage metrics – FGE averaged 70.4%. RSW effectiveness was 4.56.
- 2006 results: relative survival – 95.2% for the dam, 98% for the RSW, 98.8% for spillway
- 2006 results summary: 75% of the fish approached the RSW area first; 94% of the fish passed via spillway, 68% through the RSW; forebay residence time shorter than previous years; passage metrics were all high; tailrace egress time was less than 11 minutes; all relative survival estimates for actively migrating subyearling chinook were high.

Wik then moved on to “Evaluation of Fish Passage Distribution at the Ice Harbor RSW, 2006.” He touched on the following topics:

- Objective
- Methods: frame mount and new magnet-mount deployments
- Results: fish pass near the surface in the spring (graph)
- Passage is deeper during the summer (graph)
- Vertical distribution at release pipe is similar across deployments (table)
- Conclusions: fish pass near the RSW crest; late-summer conditions increase the proportion passing near the crest

B. Snake River Navigation Operations. Rob Wall from the Corps Walla Walla district led this presentation:

- 2006 dredging brought Ice Harbor, Little Goose and Lower Granite pools

- back to MOP, something that hasn't happened in recent years
- Lower Granite and Lower Monumental spill patterns had to be adjusted to accommodate navigation, to eliminate a whirlpool that was forcing barges into the guide wall. Two spill patterns developed, one of which produced acceptable safe operating conditions for navigation.
- Little Goose and Ice Harbor pools also had to be adjusted during periods of low flow and high spill

The Ice Harbor pool was adjusted because a barge operator reported a grinding, scraping noise, Wall said; a sounding showed a depth of 12 feet in one location, less than the required 14 feet, so the project elevation was increased above MOP. The surveys were repeated in September, and found no problem. Pool elevation was then reduced to MOP, after about two weeks above MOP. So you're not anticipating any problems operating at MOP for 2007? Wills asked. No, Wall replied. We may still have that problem at Little Goose, because of the need for one foot of sill depth, Hlebechuk added. With respect to the Lower Granite adjustment, that occurred during April, when flows were above 75 Kcfs. Once flows dropped below 75 Kcfs, the navigators had no problem until flows reached a very low level, Hlebechuk said. Also, with respect to Lower Monumental spill, the operators kept a log showing how often spill had to be curtailed or modified. Foss Maritime's tugs Clarkston and Lewiston were the tugs requiring all but 2 of the spill changes for non-fish transport barges at Lower Monumental. I will post that information on the Year End Review agenda, she said.

C. Fish Conditions. Bill Muir led this presentation, titled "Downstream Survival of Juvenile Stream-Type Chinook and Steelhead Through the Snake/Columbia Hydropower System and Subsequent Adult Returns," touching on the following major topics:

- Outline
- All estimates are for PIT-tagged fish
- Juvenile detector locations (map) – The Dalles is the only project without detection capabilities in the Lower Columbia; Rocky Reach is the only project that has PIT-tag detection capabilities in the upper Columbia
- Flow and spill, 2006
- Transportation – 62% of the non-tagged stream-type chinook were barged in 2006, along with 76% of steelhead
- Survival, release to Lower Granite vs. distance, hatchery stream-type chinook, 1993-2006 (graph)
- Survival, stream-type chinook, all Snake River Basin hatchery stocks combined, release to Lower Granite vs. distance (61% overall)
- Estimated survival, stream-type chinook and steelhead, by reach, Lower Granite to McNary (graphs)
- Lower Monumental-McNary survival partitioned in 2006 (89% for chinook, Lower Monumental-McNary, about 77% for steelhead, probably due to the tern colony encountered en route)
- Historic McNary-to-John Day estimated survival, stream-type chinook and

- steelhead (84% vs. 72%, respectively)
- John Day-to-Bonneville survival, 1998-2006 89 and 85%, historic average, 95% and 83%, 2006, respectively)
- Snake River trap to Bonneville, estimated survival, stream-type chinook and steelhead, 1998-2006. 2006 survival the highest on record since 2006 – 58% and 37%, respectively.
- Median travel time, stream-type chinook, Lower Granite to Bonneville, 1997-2006. Travel times normal in 2006 except during the latter part of the season, when the travel times were the highest on record.
- Lower Granite-to-Bonneville travel time, by number of detections, 2005 vs. 2006 (graphs)
- Snake River Trap to Bonneville Dam tailrace, hydrosystem survival by outmigration year, 1965-2005, steelhead and chinook (graphs)
- How big a part does hydrosystem survival play in adult return rates?
- Hydropower system survival, stream-type chinook, and SARs (graph)
- SAR vs. hydropower system survival, chinook and steelhead (graphs) – little relationship is apparent between survival through the hydropower system and adult returns, which means the marine phase of the life-cycle is the dominant influence on adult returns
- Snake River fall chinook – because not all fall chinook migrate while bypass systems are on, estimates of their survival are difficult to interpret. Therefore, we rely on SARs.
- Conclusions: stream-type chinook survival averaged 64% from hatchery release to first dam in 2006.

Do you have estimates of tern predation in 2006? Dan Spear asked. It averages about 22% of the PIT tags we release each year, Muir replied. Has there been any research on survival rates and travel time under MOP and non-MOP operations? Hlebechuk asked. We haven't looked at that specifically, but I wouldn't expect to see a lot of difference, Muir replied.

D. Fall Chinook Survival Study Review. This topic was not coevered during today's meeting.

E. Water Temperature: CE-QUAL-W2 Modeling. Ben Cope led this presentation, noting that he would be presenting his predictions of the outcome of different release patterns from Dworshak on water temperatures. He touched on the following major topics:

- Temperatures in the Clearwater River at Peck, June 12-September 30, based on 1975, 1985, 1990, 1991 weather) – graph showing predicted vs. observed temperatures in 2006. The correlation was “not too bad” in 2006, according to Cope, particularly once actual release temperatures from Dworshak began to mirror assumed release temperatures in late August.
- Temperatures in the Snake River at Lower Granite Dam, June 12-September 30, predicted vs. observed. Actual temperatures were higher than predicted early and late in the summer.
- Dworshak releases (planned vs. actual flows) – graph

Overall, the matrix managing team we have in place has done a good job of keeping water temperatures below 20 degrees C during the summer, Cope observed. One additional observation, said Dittmer – the present modeling method we're using hasn't been doing a very good job of capturing that rapid rise in temperature in late June or early July, and we will work on that for 2007. We would like Jim Adams to start looking at these water temperatures in June in 2007, Kiefer said – by the time we started looking at temperatures last year, we were too late. So noted, said Silverberg.

Next, Mike Schneider provided a presentation on Lower Snake temperature management issues. He touched on the following major topics:

- Lower Snake River temperature management, 2006 – water temperature released from Lower Granite Dam was generally less than 20 degrees C during July and August. There were several short excursions above 20 degrees C, due primarily to some very hot weather. The Snake at Ice Harbor was above 20 degrees C for more than 2 months. The Snake River at Anatone, above Lower Granite, was above 20 degrees C for more than 3 months, and reached 25 degrees C during some periods.
- Flow contribution to the Lower Snake, 2006 – Clearwater River at Spaulding, North Fork Clearwater, Salmon, Grande Ronde, Imnaha, Snake River from Hells Canyon Dam (graph)
- Snake River temperatures at Anatone, 1992-2006 – 2006 temperatures were the highest on record during early July (graph)
- Snake River flow at Anatone, January 2006-December 2006 (graph)
- Dworshak forebay cross-section, June-December (graph)
- 2006 Dworshak operations, March 1-September 30 – flow, spill, release temperature (graph)
- Temperature and flow at Lower Granite Dam, March 1-September 30, 2006 – a very rapid rise occurred between June 21 and July 5 (graph)
- Temperature and flow at Ice Harbor Dam, 2006 (graph)
- Lower Snake River reservoir temperature profiles, 2006 (graph)
- 2006 CE-QUAL simulation vs. observed conditions (sample graphs)
- Water temperature contours in Lower Granite pool, August 12-17, (sample simulations)
- Velocity fields in Lower Granite pool, August 12-17 (sample simulations)
- Temperature field in Dworshak pool, July 23 (sample simulation) – there is evidence that operating in undershot mode changed the temperature structure within the reservoir
- Lower Snake River temperature management – real-time forecasting methods
- Sample model outputs
- 2006 simulation without Dworshak – water temperatures in the Lower Granite tailrace would have exceeded 20 degrees C from July 1 through mid-September
- Lessons learned: need to look more closely at inflow temperature loads to the system, and develop operational guidance for Dworshak releases

- involving thermal loading to Lower Granite pool, time of travel and atmospheric heating. The first half of July will continue to be the most challenging temperature management period.
- Snake River temperature management (graph)
- The uncertainty inherent in the forecasting effort in the Snake. Flexibility in scheduling Dworshak releases will lead to greater control of temperatures in the Lower Snake River, and optimal allocation of cold water.
- There is a potential conflict between CWA and ESA for the development of temperature management policy for the Lower Snake River – Washington's new temperature standard for the Lower Snake have been updated.

Given the conditions we saw in the first two weeks of July 2006, have you done any simulations showing what might have happened if we had used Dworshak to a greater extent earlier in the season? Filardo asked. There certainly would have been a cooling effect, but we haven't run a retrospective analysis, Schneider replied. If you use more early, it won't be there later on. We can certainly run that analysis, however, Schneider added.

4. 2006 Study Information.

A. Surface Passage Studies. Brad Eppard led this presentation, covering results from 2006 Portland District AFEP research. Eppard touched on the following topics:

- John Day research included turbine and tailrace survival
- The Dalles research focused on spillway studies
- Bonneville studies focused on corner collector PIT detection, pool and spillway survival
- System studies included the Turbine Passage Survival program, others
- John Day: 2006 operations – flow and spill, April-September (graph)
- John Day turbine and tailrace survival study – release locations, results and conclusions. Survival estimates by release point ranged from 88% (turbine) to 100% (tailrace) to 89% (combined)
- John Day plan for 2007: TSW development, to be installed by 2008
- The Dalles 2006 operations – flow and spill, April-September (graph)
- The Dalles spillway vortex study – distribution, survival, tailrace egress, 2005 vs. 2006 (graphs).
- The Dalles plan for 2007: study planned to look at higher gate openings (16 feet)
- Bonneville Dam 2006 operations
- Bonneville Dam corner collector PIT detection and yearling and subyearling chinook survival results (graphs)
- System study results: turbine survival program – biological index testing, results and conclusions – the best geometry provided the most benign passage
- System study results: post-FCRPS survival, Lower Granite to estuary (yearling chinook only) and Bonneville to estuary (about 40% and just over

60%, respectively). Conclusions: the Corps undertook a tag effects study, JSATS vs. PIT-tags in the field and the laboratory. There is some evidence of bias for age-zero chinook less than 95 mm fork length. Sample sizes precluded the ability to measure small differences, however.

B. SLED Research Results. Robert Stansell led this presentation, touching on the following topic areas:

- Objectives
- Observations/methodology
- SLED configuration and installation locations
- USDA hazing efforts
- Boat-based hazing efforts
- Results: observed catches by pinnipeds at Bonneville Dam tailrace, 2006. Take included 7% sturgeon, much higher than previously observed. About 260 sturgeon were observed being taken. Estimated salmonid catch in 2006: more than 3,000 salmonids.
- Seasonal distribution of sea lions at Bonneville Dam, 2002-2006 (peaked on May 13 this year)
- Estimated pinniped abundance at Bonneville Dam, 2002-2006, by species
- SLEDs – how did they work? Very well, for the most part. Only one sea lion entered the fishways; although the late arrival of the spring chinook stirred concerns that the SLEDs were hampering salmonid passage, those concerns proved to be unfounded.
- Acoustics: the short story – no obvious effect on behavior of sea lions within 100 feet of fishway entrances
- Hazing: the short story – individual animals were hazed up to 21 times, so for some animals, hazing is definitely ineffective. Hazed sea lions would generally temporarily leave, but return as soon as field personnel departed.
- USDA hazing and acoustics – 2006 test results. The bottom line: more salmonids were taken by pinnipeds while hazing and acoustics were active.
- Boat hazing: slightly fewer salmonids were taken by pinnipeds while boat hazing was active.
- Summary: about 3,000 salmon were taken by pinnipeds in 2006; California and Steller's sea lions are arriving at the project earlier each year; the SLEDs were effective in keeping sea lions out of the fishways and had no effect on salmonid passage.
- For 2007, the plan is to continue full-time daylight observations, with partial observations starting in January; SLEDs will be installed by February; ADDs will be activated in February. The first sea lion has already been observed at Bonneville.

C. John Day T-1 Outage. Dave Clugston led this presentation, touching on the following major topics.

- Effects of T-1 outage on adult passage: 2006 John Day north shore

- ladder. The bottom line: significant numbers of fish still used the south ladder in 2006, but a definite shift occurred to the north ladder, compared to passage numbers from previous years.
- Median passage time was half as long for the north ladder, compared to the south ladder. The overall median passage time was in the low-mid range of historic passage times.
 - 2006 spring chinook passage by ladder at The Dalles. There was minimal passage via the north ladder in 2006 – about 7% – compared to previous years, in which 25-30% of spring chinook used the north ladder. This was probably due to high volumes of flow and spill early in the spring passage season, and to the change in juvenile spill pattern, which concentrated spill at the north end.
 - There was no apparent effect on passage times from the Bonneville exit to The Dalles exit or the John Day exit. The Dalles will be wired up for a 2007 SP CH RT fish passage evaluation.
 - 2006 Bonneville high flow and spill: effects on fallback, reascension and escapement (radio-tag study). Researchers saw nearly 14% fallback, the highest seen since 1996. The reascension rate was less than 50%, the lowest ever. If this is representative, hydrosystem escapement was reduced by 7% at Bonneville.

At John Day, are you saying that 70% of the spring chinook that approached the north ladder actually wound up passing via that ladder? Wagner asked. No, it says that 70% of the fish passed via the north ladder, Clugston replied. One concern last year was that, because of the powerhouse operation, spill was recommended to attract fish to the north ladder, Wagner said – that appears to be what happened. True, although there was uncontrolled spill during a significant portion of the season, Clugston replied. The question is whether daytime spill was effective in attracting fish to the north ladder, Wagner said. True, and we don't know the answer to that question, Clugston said.

D. Preliminary Vernita Bar Study Results. Russell Langshaw provided a brief overview of the 2006-2007 Vernita Bar study of reverse load factoring and its influence on spawning at Vernita Bar. This year, we developed a peaking program based on mean daily discharge, he explained; if flows were low, we would have one morning peak, then steady flow the rest of the day; as flows increased, we implemented two peaks.

We tagged 75 fish, 65 of which were detected on Vernita Bar, Langshaw said; some of those fish were detected on the spawning grounds for up to 10 days. We're in the process of analyzing that data now. The final official count found 37 viable redds above 65 Kcfs. And you will be producing a written report? Wills asked. Yes, Langshaw replied. Wills asked whether the Vernita Bar operation had helped to discourage higher-elevation spawning in 2006. Langshaw replied that it did appear to be successful, except during the periods when the flow peaks had to be extended longer than planned due to high flows. In the future, he said, we would like to consider shortening the duration of the peaks and moving them closer together to lengthen the low-flow period each day.

He said he will provide a more extensive presentation to TMT some time this February or March.

In response to a question from Wagner, Langshaw said the plan is to look at this year's study results, then decide whether to conduct an additional study in 2007, and go to the other signatories of the Hanford Reach agreement to work out the details of the study.

5. Other Lessons Learned.

Any first impressions as to lessons learned from 2006? Silverberg asked. One thing I noticed is that the presentations were much better this year than they were the first year we did this, she said. One concern I have is that a lot of the presentations about the RSWs focused on RSW efficiency, Kiefer said – I would prefer to see response curves for proportion spilled and proportion of fish passing via spillways. RSW efficiency is important, but so is passage via training spill, and if there is less training spill, RSW efficiency will increase. I would suggest that those involved with RSW research begin to de-emphasize RSW efficiency as a measurement of effectiveness. Kiefer added that adult return rates are the bottom-line measurement of success; he said he would trade 98% bypass survival for 92% spillway passage, because spillway passage returns more adults to the spawning ground. Sometimes what we can count, doesn't, Kiefer said, and what matters is what we can't count.

TECHNICAL MANAGEMENT TEAM

BOR :	John Roache / Mary Mellema	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield
COE: Cindy Henriksen / Cathy Hlebechuk			

TMT MEETING

Thursday December 14, 2006
1400 - 1430 hours (2 p.m. - 2:30 p.m.)

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

AGENDA

1. Welcome and introductions
2. Willamette forecast / Chum Operations
3. Other
 - Set agenda for next scheduled TMT meeting (conference call) on December 20, 2006 - [\[Reference Calendar\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

CONFERENCE CALL

December 14, 2006

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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

Chum Operations

During the December 14 call, Cathy again updated the group that the Willamette at Salem was forecasted to reach flows of 105 kcfs by Saturday, the Portland harbor was expected to peak at around 160 kcfs on Friday pm, and that the Bonneville pool was within 1' from full. The precipitation and resulting high flows was expected to recede and taper off sometime next week.

Rick Kruger, ODFW, reported that as of 12/12, new redds had shown up. 60 live and 136 redds were observed. The salmon managers recommended that the current operation be maintained to the extent possible for as long as possible, recognizing that the forecasted rain event would likely not allow the project to maintain its current operation—and that given the conditions, they were supportive of operators using their best professional judgment to manage the dam.

BPA offered that their expectation was that the project would reach its 7' exceedance and that additional water would be pushed out at night. BPA deferred to the COE on implementing the operation. There were uncertainties and concerns raised about exceeding 110% TDG levels if the operation was considered ‘voluntary spill’.

ACTION: The COE planned to operate the project to full powerhouse (using 1.5'/hour ramp rates) and up to 110% TDG until the system was able to resume to the preferred operation for chum, 12.3-12.8' tailwater during the day and up to two short peaks at night. TMT will continue to monitor conditions and revisit the issue during a conference call on Wednesday, December 20.

Technical Management Team Meeting

December 14, 2006

1. Greetings and Introductions.

The December 14 TMT emergency call was chaired by Cathy Hlebechuk. 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 Hlebechuk at 503-808-3942.

2. Bonneville Storm Operations

Hlebechuk explained the Willamette River at Salem was currently above bank full and was forecasted to increase, peaking on Friday night at Portland Harbor (due to high local flows, especially the Clackamas River) and peaking Saturday morning at Salem. She said in the immediate future, the project would need to increase outflows as the project is almost full. After the Bonneville pool is lowered and until the Willamette flows recede, she said she expected 80,000 cfs, minimum project outflow, to produce 13' – 13.5' tailwater elevation and asked the Salmon Managers if their preference was to try to hold lower flows during the day and higher at night or try to maintain a flat flow 24 hours/day until the project could return to the 12.3' – 12.8' daytime operation.

A question came up as to the latest status of chum. Rick Kruger gave a chum survey update. On December 12, we still had new redds – 136 – showing up, as well as 60 live chum, on the Ives Island spawning grounds, he said.

Wagner said it had been difficult to coordinate the preferred operation with the other salmon managers, but his preference is to keep the current operation intact to the greatest extent possible – keep the tailwater as low as possible during daytime hours and move the remaining water out at night. In other words, he said, restrict Bonneville outflow to 80 Kcfs during daytime hours, if possible, 7 am to 7 pm. We do understand that the operation could be overrun, given the weather conditions on the way, Wagner added.

How long do you anticipate it will be before you get the system back under control? Wagner asked. The forecast shows precipitation tapering off over the weekend and cold weather entering the basin, but how long the recession will take is hard to say, Hlebechuk replied – we should be back to the 12.3' – 12.8' tailwater operation by Sunday. We're only a foot from full right now at Bonneville, she added, so storage space is currently limited.

David Wills said the Fish and Wildlife Service agrees with the NOAA Fisheries position – keep Bonneville outflows as low as possible for as long as possible during daytime hours, and blow the remaining water out at night, with

the understanding that the actual operation will be up to the action agencies. Kruger said Oregon agrees with this recommended operation. There were no objections from the other Salmon Managers.

The group devoted a few minutes of discussion to the Bonneville operation. Initially the Bonneville outflows would need to be increased to keep the project from over filling, Hlebechuk. After a hole is dug in the reservoir, with the expected 180 kcfs inflow it should be possible to maintain 80 Kcfs outflow from Bonneville for 8-9 daytime hours, followed by releases of 280 Kcfs which would include spill for the remaining hours, This will yield a day-average flow at Bonneville of 180 Kcfs, while remaining within a 10-foot tailwater exceedence, Hlebechuk said. Cindy LeFleur said her recommendation is to implement Hlebechuk's suggested operation. It may be possible to get back into control by tomorrow morning if we increase Bonneville outflow now, Hlebechuk added. There were no objections from the other Salmon Managers.

Robin MacKay said she does not want to create any false expectations – the Bonneville tailwater is already rising toward the 10-foot daily exceedence, and BPA will have to spill tonight in order to move all of the water out of the reservoir. The Bonneville operation will change within the hour, she said. We have Grand Coulee cut back as far as possible, and Bonneville is purchasing power to help moderate flows. Could you store at any other mid-river projects, such as John Day? Wagner asked. If there is a flood issue, yes, Hlebechuk replied.

In response to a question, Jim Adams said spill up to 75 Kcfs should not cause an exceedence of the 120% tailrace limit – that volume will likely result in TDG levels in the 115% range. Rudd Turner noted, however, that this may be classified as voluntary spill, which is not permitted at this time of year. He suggested that it might make more sense to go to a shorter period of lower daytime flows in order to keep outflow volumes lower during the remaining hours of the day. Adams said his reading of the State of Washington waiver is that it would permit this operation. The Oregon standard is 110% at this time of year, however, Adams said – we are outside the waiver period. We would need to assure Oregon that the operation we are selecting is minimizing TDG in the river in some manner.

After a few minutes of further discussion, Hlebechuk clarified that the proposed operation is to increase Bonneville outflow, beginning now, to full powerhouse capacity, plus spill up to 110%, and to ramp back down to 80 Kcfs as soon as possible in the morning, possibly tomorrow. The action agencies will hold 80 Kcfs outflow for as long as possible during daylight hours, then increase outflow to get the remaining water out at night, up to 110% TDG. The maximum daily tailrace fluctuation allowed in a 24-hour period is normally 7 feet in the winter but she would get a tailwater exceedance of up to 10 feet from the Bonneville project manager. Adams noted that TDG is monitored at the

Warrendale gauge this time of year; he said it should be possible to spill up to 65 or 70 Kcfs at night and remain within 110% tailrace TDG. Turner said that, in his opinion, if it is necessary to spill more at night, and exceed the 110% standard, it should be possible for the Corps to write a letter to Oregon justifying that operation on ESA grounds, because the chum are a listed species.

No TMT objections were raised to this operation. It was agreed to revisit the Bonneville operation at the TMT's regularly-scheduled meeting on December 20.

The Corps reported that Dworshak's Unit 3 tested out OK and is now back in service.

TMT Meeting Participants
December 14, 2006]

Name	Affiliation
Cathy Hlebechuk	COE
Jim Adams	COE
Paul Wagner	NOAAF
Rick Kruger	ODFW
Robyn MacKay	BPA
Scot Bettin	BPA
Cindy LeFleur	WDFW
David Wills	USFWS
Robin Harkless	Facilitation Team
Russ Kiefer	IDFG
John Roche	USBR
Kyle Dittmer	CRITFC

TECHNICAL MANAGEMENT TEAM

BOR :	John Roache / Mary Mellema	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield
COE: Cindy Henriksen / Cathy Hlebechuk			

TMT CONFERENCE CALL

Wednesday December 20, 2006 09:00 - 12:00

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

AGENDA

1. Welcome and introductions
2. [\[Review Minutes\]](#)
3. Chum Salmon Operation - End of spawning, set incubation level
4. Snake River Zero Nighttime Flow
5. Water Management Plan
6. Operations Review
 - Reservoirs
 - Fish
 - Power System
 - Water Quality
7. Other
 - Set agenda for next meeting - [\[Reference Calendar 2006\]](#)  [\[Reference Calendar 2007\]](#) 

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

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 20, 2006 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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

Chum Salmon Operations

Paul Wagner, NOAA, shared that during their FPAC call, the salmon managers reached a consensus recommendation to increase the Bonneville daytime tailwater from 12.5 ft (12.3-12.8 ft range) to a minimum 13' (12.8-13.3') to support chum spawning in areas higher than 12', those of which to this point have been watered during night time pulses. This recommendation, he noted, lines up with the salmon managers' desire not to superimpose redds, and is an acceptable level of risk of dewatering redds later.

Paul and Rick Kruger, ODFW, reported that the most recent chum surveys revealed 11 live chum, 54 redds and 28 carcasses at Ives Island; 88 live chum at Hamilton Springs; and 37 live chum at Hardy Creek. The next survey was scheduled for Friday morning, December 22.

The action agencies shared their interest in choosing a date for the end of chum spawning as soon as possible, to allow for flexibility to move water out of the system as necessary. They raised concerns that increasing the tailwater elevation now added risk to sustaining the elevation through the spring should water supply forecasts drop, and perhaps necessitate dewatering of some redds by reducing tailwater elevations. The salmon managers shared that concern, and reiterated that the recommended operation from their perspective provides the best balance given current spawning activity and current and forecasted weather conditions. The salmon managers at this point were not prepared to recommend a chum spawning end date, and suggested that TMT check in again on Friday to discuss the results of the latest chum survey.

Dave Wills, USFWS, looked at last year's chum numbers and spawning end date, showing an end in the operation on December 29, after no chum were observed. It was noted that this year all, not a portion of, chum spawning areas are being protected which adds a unique challenge both to operations and balance between near and long term objectives.

ACTION: The action agencies agreed to implement the requested operation for the short term, while chum are spawning. Operators will continue to provide up to two pulses above 13.5' at night to keep higher elevation redds wetted. Rick Kruger will gather information on Friday's surveys as well as the plan/schedule for surveying into next

week, and share that on Friday's call. Dave and Paul will gather any additional information from past operations' that would help the discussion on Friday. **A conference call was scheduled for Friday at 3:00 pm.**

Snake River Zero Night Time Flow

Jim Adams, COE, reported that since December 15 (the start date for the option to go to zero nighttime flow on the Snake River), all projects went to zero briefly on 12/18 AM and 12/20 AM.

2007 Water Management Plan

The COE has received comments on the 2007 WMP and Fall/Winter Update – these comments can be found attached to the TMT web page, under Documents/Water Management Plan. If there are additional comments, send them to Jim Adams at james.r.adams@nwd01.usace.army.mil.

Operations Review

Reservoirs: Libby was at elevation 2417.6', with 5.1 kcfs in and 22 kcfs outflows. The precipitation forecast shows the project at 122% of normal. Albeni Falls was at elevation 2052.5', 19.9 kcfs inflows and 17.2 kcfs out. Dworshak was at 1543.6', with 3.1 kcfs in and 1.4 kcfs out; the project filled about 2.9'. Lower Granite daily average inflows were 27.9 kcfs. Bonneville averaged 171.9 kcfs out, and spilled some. Hungry Horse elevation was 3540.4', with 1 kcfs in and 2 kcfs out. Grand Coulee elevation was 1284.4' and holding steady to meet chum, Vernita Bar and power needs.

Fish, Power System, Water Quality: Nothing to report at this time.

TMT Schedule

- December 22, Conference Call at 3:00 pm to discuss chum
- January 3, Conference Call at 9:00 am
- January 17 & 31, Face to Face Meetings

Technical Management Team Meeting Notes

December 20, 2006

1. Greetings and Introductions.

The December 20 Technical Management Team meeting was 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 Cathy Hlebechuk at 503-808-3942.

2. Chum Salmon Operation.

Paul Wagner said the salmon managers met yesterday; the consensus was to move the protection level up from 12.5 feet (12.3 to 12.8 ft range) to 13 feet (12.8 to 13.3 ft range), in terms of Bonneville tailwater elevation. He noted that the tailwater elevation reached 15 feet over the past weekend, despite the valiant efforts of the action agencies. The salmon managers would now like to see an operating range of 12.8 to 13.3 feet at Bonneville. There still appear to be fish in the area, he said. Rick Kruger said the recent high water prevented the field crew from seeing anything during last Friday's Ives Island spawning ground survey.

So there is nothing new in the field – the chum may be there, but we can't see them, Wagner said. A total of 88 live chum were observed at Hamilton Springs, and 37 live chum at Hardy Creek, on December 18. The next survey is scheduled for Friday, Kruger said, adding that he doesn't have yesterday's survey results yet. We're on the decline of the run, but we can't really say it's over, at this point, Kruger said. How do we determine when it is over? Scott Bettin asked. It will be based on what the survey crews report, Wagner replied – when they stop seeing live fish, we're done.

The group devoted a few minutes of discussion to the chum protection operation, with Bettin noting that the sooner it can be determined that the run is over, the better, from an operational planning perspective. Once we know the results from yesterday's survey and from Friday's, perhaps we could convene via conference call on Friday afternoon, Wagner suggested. The main thing we want to know is whether they're still seeing significant numbers of live fish, Robin MacKay observed. It was agreed that the salmon managers will review what occurred in 2005, in terms of declaring the end of chum spawning, and will report on Friday whether or not that threshold has been achieved. The Friday conference call was set for 3 pm. In the interim, the action agencies agreed to implement a tailwater range of 12.8-13.3 feet, targeting as close to 13 feet as possible. This operation will remain in force until the end of spawning is declared.

It was noted that, last year, by December 29, no new chum redds were observed, and the end of spawning was declared. The reason Bonneville is interested in this is that it makes it a lot easier for us to get the water through, but flattening out flows and moving more water through during daytime hours, MacKay explained – that is definitely our preference from our operational perspective. We understand that need, and will try to get that information as soon as possible, Wagner said.

MacKay said her only concern about the requested operation is the ability of the action agencies to sustain it into February and March – we probably need to think about redd dewatering criteria as well, she suggested. We have been discussing dewatering criteria, Wagner replied; hopefully we won't have to go there, but we are aware that every additional increment of water carries an additional increment of risk. We will be getting another water supply forecast on

January 8, and if it goes down, the Corps' concern will be with the issues associated with dropping the tailwater elevation to 12 or 12.5 feet, said Adams. We can deal with that if it arises, but based on everything I've heard, the water supply forecast is unlikely to go down in January, Wagner replied.

Kruger said that, after a further phone call, he now has yesterday's survey information; they saw 11 live chum, 54 total redds and 28 new carcasses. That's the highest carcass count to date, so spawning is continuing. Flows were down to 12.5-13 feet, so conditions for the survey were good, he added.

After a few minutes of further discussion, it was reiterated that the action agencies will implement the requested operation, holding Bonneville tailwater elevation between 12.8 and 13.3 feet and targeting as close to 13 feet as possible. MacKay emphasized that this is a short-term operation only, recognizing that this is a unique water year. The TMT will revisit this operation at a conference call on Friday afternoon, December 22.

3. Snake River Zero Nighttime Flow.

Adams said this agenda item is just an update. the operation began last Friday, December 13; since then, there have been two instances where zero nighttime flow occurred, the morning of December 18 and the morning of December 20.

4. 2007 Water Management Plan.

Comments on the 2007 Water Management Plan were due on Friday, Harkless said; has the Corps received any additional comments, and are you still accepting comments? The Corps reported that comments have been received from IDFG and from the Fish and Wildlife Service; the comments have been posted to the TMT homepage under "2007 Water Management Plan – Comments." Adams asked that any additional comments be sent directly to him.

5. Operations Review.

The Corps reported that Libby was at elevation 2417.6 feet last night, with 5 Kcfs in and 22 Kcfs out. The project's target elevation is still 2411 on December 31. The latest water supply forecast at Libby shows 122% of normal. Albeni Falls is at elevation 2052 feet with 17.2 Kcfs out; that operation will continue until December 31, at which point the project will go to a one-foot operating range. Dworshak is currently at 1543.6 feet and releasing minimum outflow; the project has filled 2.9 feet in last 7 days. 1558 is the December 31 target elevation at that project and will not be achieved, but 1526 feet is the target on January 31. Dworshak's April-July forecast is currently is 125% of average. Average discharge at Lower Granite was 27.9 Kcfs yesterday; at Bonneville, 171.9 Kcfs.

Spill averaged about 18 Kcfs at Bonneville yesterday, which produced 102% TDG at Warrendale.

John Roche said Hungry Horse was at elevation 3540.4 feet at midnight last night, with 900 cfs in and 2 Kcfs out. The project is being operated to maintain the Columbia Falls minimum flow. The current elevation is 1284.4 feet at Grand Coulee; the project is being operating to meet the chum flows, Vernita Bar and power operations. All is well with the power system, MacKay reported.

6. Next TMT Meeting Date.

The next meeting of the Technical Management Team was set for Wednesday, January 3. Meeting summary prepared by Jeff Kuechle, BPA contractor.

TMT Participant List
December 20, 2006

Name	Affiliation
John Roche	USBR
Robyn MacKay	BPA
Scott Bettin	BPA
Kyle Dittmer	CRITFC
Paul Wagner	NOAAF
Robin Harkless	Facilitation Team
Rick Kruger	ODFW
Jim Adams	COE
Scott Boyd	COE
Laura Hamilton	COE
Russ George	WMCI
John Wasach	Bear Energy
Tim Heizenrater	Cascade Energy
Tom Le	PSE
David Wills	USFWS

TECHNICAL MANAGEMENT TEAM

BOR :	John Roache / Mary Mellema	BPA :	Robyn MacKay / Scott Bettin
NOAA-F:	Paul Wagner	USFWS :	David Wills / Steve Haeseker
OR :	Rick Kruger / Ron Boyce	ID :	Russ Kiefer
WA :	Cindy LeFleur	MT :	Jim Litchfield
COE: Cindy Henriksen / Cathy Hlebechuk			

TMT CONFERENCE CALL

Friday December 22, 2006 3:00 pm - 4:30 pm

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97208

Conference call line: 503-808-5190

Note: If you plan on attending the meeting in our building you will now need to call ahead and let Cathy Hlebechuk or Jim Adams know so your name can be added to the TMT Visitor List for access to the Building. Also you will need to present a form of ID at the Guards Station so a photo can be taken and ID badge will be issued for the day.

If you are a Federal Employee you will only need to present your Government ID.

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Please e-mail her at dsilverberg@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and introductions
2. Chum Salmon Operation - End of spawning, set incubation level
3. Other
 - Set agenda for next meeting - [\[Reference Calendar 2006\]](#)  [\[Reference Calendar 2007\]](#) 

Questions about the meeting may be referred to Cathy Hlebechuk at (503) 808-3942, Jim Adams at (503) 808-3938, or Cindy Henriksen at (503) 808-3945

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 22, 2006 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

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

Chum Salmon Operations

The TMT convened a conference call as follow-up to the 12/20 call, to check on current chum spawning surveys. Rick Kruger, ODFW, reported that there was no indication of spawning activity, and TMT agreed the chum spawning period had officially ended.

Operation: The COE agreed to the following recommended operation for chum incubation:

Operate the project to 13' tailwater minimum, 24-hours/day, with one pulse/day of 13.5' minimum for at least 20 minutes to keep higher redds watered up.

The salmon managers acknowledged and accepted the risk of providing higher protection levels, with no guarantee that this operation would be maintained through chum emergence. They also acknowledged this operation might affect the ability for Grand Coulee to refill. TMT will continue to monitor conditions and make recommendations as needed.

***The next face to face meeting is scheduled for Wednesday, January 17 at 9:00 am.
Note there is a new security system at the COE, so arrive early to sign in!!***