

**TECHNICAL MANAGEMENT TEAM
MEETING NOTES
November 5, 2003
CORPS OF ENGINEERS NORTHWESTERN DIVISION OFFICES – CUSTOM HOUSE
PORTLAND, OREGON**

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

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

Chum Operations Update:

Ron Boyce, Oregon, began today's TMT discussion with information on the numbers of fish observed at the Ives Island complex on Tuesday, November 6th – six live chum and 108 Chinook. As of 11/6, the Bonneville tailwater was operating at an 11.2-11.5' range from 7 am to 7 pm, and an overnight minimum tailrace of 11.2'. The Salmon Managers, interested in flattening flows at night to accommodate chum spawning, requested an 11.5' minimum daytime elevation. BPA and the COE expressed concerns about starting the operation too soon and offered to wait a few days to maintain some flexibility. Russ Kiefer, Idaho, suggested that there be a 'medium' constraint placed on the project operation for now, and revisit the issue after the next survey.

ACTION: The Bonneville tailwater continued to be operated at 11.2-11.5' daytime and minimum 11.2' at night. The COE agreed to make best efforts to level out nighttime flows by putting flexibility into daytime operations. BPA agreed to run a feasibility analysis on the requested operation and respond to TMT via email as soon as possible.

2003 TMT YEAR END REVIEW:

2003 Comparison to Previous Years:

- Temperature/ water and runoff: Cindy Henriksen, COE, presented information on '03 operations for each of the projects. Of note, the year began with low expectations for water supply, the VARQ flood control operation was implemented at Libby, and the COE shifted flood control at Dworshak in April to release full powerhouse plus 15 kcfs to provide higher flows in the Snake River. (NOAA, Nez Perce, and others expressed appreciation for this operation.)
 - **LESSON LEARNED:** Chris Ross (NOAA) expressed appreciation for the Dworshak operation. The Nez Perce tribe agreed and said that in the future, they would prefer that outflows be increased to slightly *above* minimum at the same time that the freshet is observed.
- TDG/Temperature: Jim Adams, COE, reported on 2003 total dissolved gas exceedances. They totaled 243 and comprise a 91.2% compliance rate. This does not include Dworshak which has a different exceedance standard. Jim noted that most exceedances resulted from

professional judgment calls and high flows, and were generally off by a percent or two. The COE achieved better compliance in 2003 than the previous year. Jim also presented new temperature profiles that show where water was taken from and then used to cool in-river temperatures. A question was asked about the circulation and cooling system at the hatchery downstream of DWR.

- **LESSON LEARNED:** The new tools show that using Dworshak water to cool the Snake River in August/September is indeed a successful management strategy.
 - **LESSON LEARNED:** The Salmon Managers expressed an interest in viewing the new temperature profiles on the web to aid them in making operational recommendations.
 - **ACTION:** Dave Wills, USFWS, will share information on the circulation system that addresses problems with Dworshak release temperatures at the hatchery, at the next TMT meeting.
- *Fish Passage:* Jerry McCann, FPC, reported on 2003 smolt migration: run size, timing, travel time, and survival. There was an increase in subyearling summer Chinook hatchery releases this year, which impacted the run timing. Overall, hatchery and wild yearling Chinook survival and travel time was fairly consistent with previous years.
 - *Weather:* Kyle Martin, CRITFC, reported that 2003 saw low to normal temperatures early in the year and hot and dry late in the season. An early El Nino event provided difficulty for forecasting, unless looking at sun spot predictions. Kyle forecasted near normal precipitation and colder temperatures for 2004. He also said that, of six methodologies presented at the Oregon Chapter American Meteorological Society's annual winter weather forecasting event, all predicted snow in Portland! Kyle provided a handout showing last year's predictions compared to observed for 2003. Anyone interested in receiving monthly forecasts should contact Kyle at mark@critfc.org.

Snake River Review:

- *Snake River Fall Chinook Survival Studies:* Ken Tiffan, USGS, reported on Billy Connor's '98-'02 Fall Chinook survival studies that examined effects of summer flow augmentation on survival. An additional year of data will be collected for the study.
 - **LESSON LEARNED:** Billy Connor's analysis from the studies was that lower temperatures and higher velocity are supportive conditions for increasing survival rates of migrating juveniles in the Snake River. A few unintended consequences of these conditions noted were wandering, delay, and other altered migration behavior.

2003 Study Information that Might Impact 2004:

- *Status Review Related to LAMBDA:* Chris Toole, NOAA, reported on 'natural spawning trends' from results of 2001 returns – the data sets are available on the FPC web site. Fall Chinook results generally showed a positive growth rate over the 1980-present time period. Mid-Columbia steelhead also showed optimistic estimates of LAMBDA (population growth rate).

- **ACTION**: NOAA will present a white paper on this data at a workshop in Seattle on December 5th, along with a request for comments. Chris said that additional information on the process would be available later in the week.
 - **NEXT STEPS**: The data sets will be revised to include the 2002 return results, and available in early 2004. Chris said that it is unlikely that 2003 data will be included.
- **Lower Granite/Ice Harbor RSW Results**: Cindy Henriksen, COE, reported on RSW treatments that were used to test survival probabilities at Lower Granite and Ice Harbor. In its third year of the test at Ice Harbor, there are ongoing concerns with low survival. The final year of data at Ice Harbor will be collected next year, beginning in a few weeks.
 - **NEXT STEPS**: There will be a more detailed discussion of this information at a meeting in Walla Walla in two weeks – Cindy sent an email notice to TMT regarding this. TMT members expressed an interest in determining the benefits to out-migrating fish with the bulk spill operation that was implemented at Ice Harbor. This will be explored at the meeting in Walla Walla with an update at a future TMT meeting.
 - **NOAA Survival Studies**: Paul Wagner, NOAA, shared results on 2003 fish survival studies for yearling spring Chinook and steelhead. Overall there was earlier and better survival at Lower Granite. Chinook numbers were very similar in '02 and '03, both much higher than 2001. The trend for steelhead was much lower, but there was still improvement from 2001. Paul noted that the cause for lower increases in survival of steelhead is unknown at this time, but also noted that tern predation is often cited. He also offered preliminary estimates of the percentage of fish transported: Spring chinook saw 56% transported in 2003; 65% in 2002, and 99% in 2001. Steelhead percent transported was 76% in 2003 and 2002; and 99% in 2001.

Other Lessons Learned:

- **Impacts of 2001 Operations on Adult Returns**: Russ Kiefer, Idaho, presented preliminary results on PIT tag returns to the Snake River in 2003. He reminded the group that most of the wild PIT-tagged smolts were bypassed for river reach survival estimates, while the majority of the run-at-large (smolts in 2001) were transported. There was a very low 2-ocean adult return rate of PIT-tagged wild spring/summer Chinook compared to recent outmigration years. A proportionally large return of 3-ocean adults from the 2000 outmigration appears to have provided most of the wild Snake River Chinook spawning in 2003; the reason for this high proportion of 3-ocean returns is not yet known. Russ reported a similar trend for hatchery Chinook from the 2001 outmigration (with about half of these PIT-tagged hatchery fish being transported). Adult returns from the 2001 outmigrants will be virtually complete when the 3-ocean adults return in 2004, since very few 4-ocean adults are ever observed, and overall survival rates can be estimated then.
- **Performance Standards**: Paul Wagner, NOAA, gave an analysis of how well things are measuring up for in-river and transported fish. Overall, he offered that progress is being made in nearly all populations except for Snake River steelhead, which is doing much worse

for both in-river and transported fish. As noted above, the reasons for this are as yet unknown and studies are underway to explain the decline of steelhead.

- Comment from Nez Perce on operations to the Plan in '03: Dave Statler, Nez Perce, noted that overall, the hot, low water year provided unique challenges for cooling the Snake River. This which was achieved with the added cool water from Dworshak. He also noted that saving water for September was a positive action this year – and there was still a benefit for migration. The process of meeting, receiving data, discussing the relevant information and managing the system accordingly seemed to work toward making good management decisions this year. He was encouraged and encouraging about this perspective.

SUMMARY:

- The new tools for measuring and managing temperature and gas have improved the ability of TMT to do a more precise job of managing the system to meet needs of migrating fish.
- The monitoring and analytical data has improved, as has the ability to share that information with other salmon and action agency managers, with regards to nearly all aspects of the TMT since the first of the “lessons learned” meetings four or five years ago.
- A more comprehensive monitoring program could provide more answers to important questions about steelhead and late summer migrants.
- Improvements have been seen in the run size of most species—but notably NOT steelhead. It was noted by the facilitation team that steelhead are not a big portion of discussions at TMT and they suggested that focus may need to be brought towards these fish in future TMT meetings.

Next Meeting, November 19th, 9am-noon:

- Chum update-OR
- Other Snake River issues:
 - Chris Perry (U of ID) presentation;
 - Spring spill trigger and Dworshak operations into September – BPA
- Spring Creek Update
- Water Management Plan-Update
- Schedule process meeting

1. Greeting and Introductions

The November 5, 2003 Technical Management Team meeting was chaired by Cindy Henriksen of the Corps and facilitated by Donna Silverberg. The following is a distillation, not a verbatim transcript, of items discussed at the meeting and actions taken. Anyone with questions or comments about these minutes should call Henriksen at 503/808-3945.

Silverberg welcomed everyone to today’s meeting, noting that it had been agreed that today’s meeting would begin with a brief update on the status of the 2003 chum spawning.

Ron Boyce said that, during yesterday’s survey, field personnel found six live adult chum

and one redd in Section 1, near Hamilton Creek. They also found 108 live adult chinook near Hamilton Island and in the slot between Ives and Pierce Island. The bottom line is that the chum have begun to arrive, said Boyce, adding that field crews will be surveying the non-index sites – I-205 and Multnomah – later today. Henriksen noted that the chum operation -- an 11.2-11.5-foot tailrace elevation at Bonneville between the hours of 7 a.m. and 7 p.m. – started Monday morning, November 3.

Boyce said that, while that was the interim operation agreed to at last week's TMT meeting, now that the chum have arrived, ODFW recommends that the originally-requested operation – a minimum Bonneville tailwater elevation of 11.5 feet – be implemented immediately. Boyce noted that current day-average flows at Bonneville are 130 Kcfs, so the amount of water shouldn't be a problem. Nic Lane replied that BPA would prefer to maintain some operational flexibility at Bonneville and wait until a few more chum are present on the spawning grounds before agreeing to maintain the higher flow and tailwater level requested by the salmon managers.

Cindy Henriksen noted that there is no precipitation in the immediate forecast; while we recognize that we need to transition to the higher tailwater elevation, she said, we would like to know a bit more about what our water supply is likely to be. John Wellschlager said that maintaining the 11.5-foot minimum tailwater elevation for 24 hours is an operational problem for BPA at this point in the season, because reverse load factoring is leading to higher nighttime flows. Our concern is that if we commit to the 11.5-foot minimum tailwater elevation too early in the season, he said, that will cause Grand Coulee to draft more quickly than planned. Boyce noted that the Fish and Wildlife Service has documented nighttime chum spawning; providing higher flows, on the order of 170 Kcfs, at night could have detrimental consequences, in the form of dewatered redds later in the season.

Paul Wagner noted that while there is evidence that fish move gravel and may be spawning at night, there is no evidence that they are depositing redds at the higher levels watered up during reverse load factoring. We can't document detrimental impacts of pushing that much water out at night, said Boyce, but there is the potential for detrimental impact -- why can't you use a more conservative operation, given that uncertainty? We don't always push a lot of water out at night, Wellschlager replied, but Bonneville, the last dam in the system, is a pinch-point, and if you want to maintain a consistent flow and a higher tailwater elevation at that project, you're going to drain the system prematurely. Flow varies, and we need the flexibility to manage it effectively, Wellschlager said – there is a lot of refurbishment work going on at Bonneville, currently, and the project is actually quite constrained as to the amount of flow it can pass during any given hour.

Silverberg asked when the action agencies had planned to bump up to the 11.5-foot tailwater elevation at Bonneville. Again, said Henriksen, we would like to have a bit more information about the water supply forecast for the coming year – at the moment, we're in a dry weather cycle.

We have a day-average flow of 130 Kcfs at Bonneville, said Boyce – why can't you shape a bit more of that water into daytime hours? Again, the action agencies need the

operational flexibility to meet load, Tony Norris replied.

With respect to the weather, said Kyle Martin, the cold snap will end this weekend, with temperatures moderating to near-normal levels by Monday. We should start seeing a bit of precipitation next week as well, he said.

Wellschlager said that, in the action agencies' view, without more information about the water supply for the coming year, it would not be judicious for the action agencies to drain the system now to meet the needs of the chum when there is a host of other species with needs that must be met next year. There has to be some period during the 24 hours of the day when we have the flexibility to release higher flow at Bonneville, he said, whether that's during the day or during nighttime hours. Could we provide a tailwater range of 11.3 feet to 11.7 feet during the day? Boyce asked. Wouldn't it be better to wait until more chum arrive and the spawners become habitat-limited? Wellschlager asked. What Ron is suggesting is that you put more flow into the daytime hours to reduce the nighttime peak, Norris observed.

After a few minutes of further discussion, Wellschlager said it should be possible to bump up the Bonneville daytime tailwater elevation to the 11.3-11.7-foot range, but he would like to run some further analysis before definitively agreeing to this operation. And this would not be a hard constraint, but the action agencies will agree to do everything possible to meet that range? Silverberg asked. Correct, was the reply. And if we can try to level out the flows more to avoid large nighttime peaks, that would also be desirable on the part of the salmon managers, Jim Litchfield observed. Bear in mind, however, that if temperatures go back up to the 60-degree range, flows at Bonneville are going to recede from their current levels, Wellschlager said. In the meantime, if Bonneville can pass more water during the day, reducing the nighttime peaks, that's a win-win situation for both Bonneville and the chum, Litchfield said. That may be doable, but again, I would like to check with my technical staff before I agree, said Wellschlager -- the tailwater elevation at Bonneville is a complex calculation. He said he will provide the results of the BPA analysis to the TMT membership via email as soon as it is available.

And in the meantime? Boyce asked. We are continuing with the 11.2-11.5-foot operating range at Bonneville, until we hear otherwise from BPA, Henriksen replied. Again, said Wellschlager, I don't think the 11.3-11.7 range will be a problem, but I'm not doing my job unless I check first with my technical team before agreeing. And you understand that time is of the essence? Silverberg asked. I don't agree, said Wellschlager -- we've just heard that there are six chum on the spawning grounds. If there were 500, then time would be of the essence. As noted last week, said Boyce, it isn't just the number of spawners -- it is the depth of water over the spawning grounds and upwelling through the gravel that provide the conditions the chum are looking for. We will update the TMT on spawner numbers as additional field surveys are completed, Boyce said, adding that the salmon managers' preference would be the operation requested in the SOR (an instantaneous minimum tailwater elevation of 11.5 feet).

2. 2003 Comparison to Previous Years.

A. Temperature, Water and Runoff Patterns. Henriksen began by noting that her presentation today is available via hotlink from today's agenda on the TMT website. Beginning

with Libby, she noted that, on September 1, 2002, Libby was at elevation 2439, 20 feet from full. The project was on minimum flow through the winter, then increased outflow to draft to its flood control elevation. We did implement a VARQ operation at Libby this year, she said.

The January Libby water supply forecast was only 78% of average, Henriksen said; this resulted in low outflow from Libby through the spring. By March, the Libby forecast had fallen to 4.1 MAF, 67% of average, and the flood control point was 2450 – we were physically unable to get there. In June, we had a sturgeon pulse, beginning June 6; we ultimately released 950 kaf from Libby for sturgeon. We refilled to within the top foot by the end of June, and stayed at that level through the beginning of July, passing inflow; we then drafted to 2439 feet, 20 feet of full, by August 31, because we were unable to negotiate a Libby-Canada storage swap in 2003 due to hydrologic conditions in Canada, Henriksen said.

At Hungry Horse, said Henriksen, we began the season slightly above the August 31, 2002 draft limit because the salmon managers asked us to retain 140 kaf of Hungry Horse storage for release in September. We met the Columbia Falls minimum through the fall and winter. With the dry fall and low expected runoff, Hungry Horse was well below its flood control elevation through the season. The January water supply forecast at the project was only 85% of average, she said; bear in mind that this is the forecast used to calculate the project's flood control point. The seasonal average water supply at Hungry Horse actually turned out to be 74% of average, she said. Ultimately, Hungry Horse filled to within the top two feet by June 30, and drafted 20 feet by September 15, meeting its BiOp obligations.

At Grand Coulee, in 2002 the project drafted 10 feet by August 31, Henriksen said; Grand Coulee then refilled to elevation 1293 feet by September 4, very early, and stayed at that level through the rest of the fall and winter. The January Grand Coulee water supply forecast was 80% of average, and later dropped to 44 MAF, 73% of average. Observed runoff was 50.2 MAF, 83% of average, at Grand Coulee, Henriksen said. Grand Coulee drafted heavily through May for flow augmentation at Priest Rapids, reaching elevation 1265 on May 24. The project refilled over the July 4 weekend, then drafted to elevation 1278 by August 31.

Moving on to Dworshak, Henriksen said that, in 2002, 15 feet of storage was reserved for release during the month of September. The project reached elevation 1520 on September 15, then released minimum flow through the fall and winter. We were well below flood control until April, she said. Observed Dworshak runoff for the April-July period was 2.3 MAF, 86% of average, well above the January, February and March water supply forecasts, Henriksen said. We shifted flood control at Dworshak this year, storing above flood control at Dworshak and releasing more at Grand Coulee, she said; the shifted elevation was 1580 feet at Dworshak. We were actually able to fill above Dworshak's flood control elevation, allowing us to release 15 Kcfs from Dworshak during April to increase Snake River flows. Dworshak, too, was full by July 4; we reserved 200 kaf for release from Dworshak during the month of September. Chris Ross thanked the Corps for their extra efforts in agreeing to fill Dworshak above its flood control elevation limit in 2003 – that put a lot of water on the fish right when they needed it in April and May, he said.

However, Dworshak had to go to minimum outflow during the spring freshet in order to

refill, Dave Statler observed – it would have been preferable if Dworshak could have released some of that water a bit earlier. We had to get back to Dworshak’s flood control elevation in May, Henriksen said; also, the freshet was somewhat larger than expected. It seems to me that there wasn’t much of a flood control issue at that time, Statler said – it would be preferable for Dworshak not to have to reduce outflow to minimum while it’s refilling.

Moving on to Priest Rapids operations, Henriksen said flow augmentation for fish passage began at that project in late March and early April, using water from Grand Coulee’s draft to 1265. At Lower Granite, said Henriksen, we were able to keep outflows at or near the BiOp target flow in May even as Dworshak outflow was going to minimum, due to the size of the spring freshet. Flows peaked at about 200 Kcfs in mid-May at Lower Granite. The summer flow objective was 50 Kcfs at that project; observed flow was 32 Kcfs. Observed flow was 79% of average at Lower Granite for the year.

The observed average flow at McNary was 230 Kcfs during the spring period, above the target of 200 Kcfs, Henriksen said. Observed average flow at McNary was 135 Kcfs for the summer period, below the BiOp target. Flows at McNary peaked at 350 Kcfs on May 31. Observed water supply, January-July, was 82% of average at McNary, Henriksen said. In other words, 2003 was a somewhat dry water year, but not nearly as dry as 2001, she added.

B. TDG Level Variations. Jim Adams reviewed 2003 water quality data, noting that there were a total of 243 days of TDG exceedence during the 2003 runoff season. He went through the exceedences by location and type, noting that all of this information is available via the TMT homepage. Adams also touched on:

- April, May and June exceedences at a glance
- Exceedences at Dworshak (11 in all)
- A comparison of 2003 exceedences with previous years (there were 490 days of exceedence in 2002, and only 13 in 2001)
- 2003 Dworshak gate operations
- 2003 Dworshak outflow data
- Dworshak temperature profiles
- Hourly temperature data from the Anatone and Dworshak tailwater gauges

Has the Dworshak water temperature problem now been fixed? Jim Ruff asked. The recirculation system work is supposed to be complete this month, Davis Wills replied, but my understanding is that there may still be window when water temperature is a problem during the fall. Release temperature will no longer be a problem during the summer, though? Ruff asked. I’ll clarify that with the hatchery and report back at the next TMT meeting, Wills replied. Boyce noted that it would be helpful to have information on both the magnitude of the daily TDG exceedences and on days when TDG levels were under the waiver limits. Henriksen reminded Boyce that state waivers represent an upper limit. Any excursion above the waived limits is an exceedence. Ruff asked whether the state water quality agencies had contacted the Corps about any of these exceedences. No, Adams replied.

C. Fish Passage. Jerry McCann briefed the group on juvenile fish passage data from

2003, stressing that this is preliminary information. He touched on the following major topics:

- Combined yearling chinook passage at Lower Granite Dam'
- Yearling chinook timing at Lower Granite (similar to previous years)
- Survival of yearling chinook from Salmon River trap to Lower Monumental 1999-2003 (0.7% for wild chinook, 0.6% for hatchery, comparable to recent years)
- Combined hatchery and wild steelhead population at Lower Granite and hatchery releases, 1998-2003
- Steelhead timing at Lower Granite (comparable to the historic average)
- Survival of hatchery steelhead from traps to Lower Monumental 1999-2003 (2003 survival was higher than previous years)
- Hatchery/supplementation releases of subyearling chinook above Lower Granite, 1995-2003 (gradually-increasing numbers since 2000)
- Subyearling chinook timing at Lower Granite (significantly earlier than average in 2003 for the run at large)
- Water transit time Lower Granite to the tailwater of Ice Harbor vs. average flow at Little Goose, Lower Monumental and Ice Harbor
- Travel time, Lower Granite to McNary for hatchery and wild yearling chinook, 1998-2003 (2003 travel times similar to previous years)
- Survival of hatchery and wild yearling chinook, Lower Granite to McNary, 1998-2003 (2003 survival similar to previous years)
- Steelhead travel time, 1998-2003, Lower Granite to McNary (2003 travel time similar to previous years)
- Steelhead survival 1998-2003, Lower Granite to McNary (2003 survival similar to previous years)
- Travel time for hatchery and wild yearling chinook, 1999-2003, McNary to Bonneville (2003 survival similar to previous years)
- Survival for hatchery and wild yearling chinook, 1999-2003, McNary to Bonneville (2003 survival similar to previous years)
- Travel time for steelhead, 1999-2003, McNary to Bonneville (2003 similar to previous years)
- Survival for steelhead, 1999-2003, McNary to Bonneville (2003 similar to previous years).

Any lessons learned from 2003? Silverberg asked. Only that the timing of the spring migration was similar to previous years, McCann replied – again, this is preliminary data, and there is still a fair amount of analysis to be done.

D. Beginning and End of Spill Relative to Fish Passage.

E. Weather. Martin briefed the group on weather conditions in 2002/2003, noting that, last fall, temperatures were generally warmer than average, with below-average precipitation. The pattern held sway through February, a pattern consistent with an El Niño effect. Then in March, the El Niño died out, which gave us a late blast of precipitation in March and April, with temperatures near the average range. That's what basically saved our bacon, in averting another drought year in 2003, Martin said.

That's also where the good news ends, Martin continued; beginning in June, temperatures were well above normal, a pattern that continued up until two weeks ago. Precipitation for the basin during the June-September period was only about 50% of average. If you're wondering why the Corps wasn't able to keep flows up in the river, that's why, Martin said. The Columbia at The Dalles ended the season at 85% of normal runoff, Martin added; the Snake River Basin was drier, with runoff in the 70%-75% of normal range. The runoff in the Upper Columbia basin was also below normal, Martin said.

Martin noted that 2003 had a very unusual El Niño pattern, one that was accurately predicted using Southern Oscillation Index (SOI) and sunspot data. It was a weak El Niño, however, and its effects on runoff were moderate in the spring, but severe in the summer.

For the coming year, said Martin, both CRITFC and the University of Washington forecasts are predicting below-average temperatures and normal precipitation. With respect to runoff, the prediction is 104 MAF-110 MAF, 97%-102% of average at The Dalles, Martin said. But there are large bandwidths around that forecast at this point in the season, in terms of both minimum and maximum? Wellschlager asked. Correct, Martin replied.

3. Snake River Review.

A. Spring Spill Trigger. Ken Tiffan of USGS said he was here in place of Billy Connor, who was unable to attend today's meeting. Tiffan briefed the TMT on the most recent results of the USGS efforts to evaluate when spill should begin in the Lower Snake River. Tiffan touched on the following major topics:

- Rearing temperatures, subyearling chinook, 1998-2003
- Subyearling chinook growth, 1998-2003
- Flow during rearing, 1998-2003
- Subyearling chinook survival to Lower Granite Dam tailrace, 2003 (in 2003, for the first time, the earliest-emerging fish showed the lowest survival – normally, they have the highest survival. This year's result may have had something to do with the fact that the fish were flushed out with high flows, at a time when large amounts of woody debris were present at the dams)
- Mean cohort survival to the Lower Granite Dam tailrace, 1998-2003
- Survival to Lower Granite tailrace vs. fork length, 1998-2003 (the larger the fork length, the higher the survival)
- Survival to Lower Granite Dam tailrace vs. flow, 1998-2003
- Survival to Lower Granite Dam tailrace vs. temperature, 1998-2003
- Regression results using these variables
- Observed flow, approximate flow without augmentation and approximate flow for early Dworshak releases, June 1-August 31
- Observed temperature, approximate temperature without augmentation, and approximate temperature for early Dworshak releases, June 1-August 31
- Survival predictions, 2003
- Conclusion: without flow augmentation, water temperatures in the Lower Snake would

have been lethal for about three weeks after July 28, so augmentation increased the survival of late-migrating fish, assuming that these fish found the cold water

Tiffan then moved on to his evaluation of the effects of flow augmentation on fish behavior. He touched on the following topics:

- Objective: define the relationship between water velocity and fish migration rate
- Approach: release radio-tagged run-at-large subyearlings at lower Granite to obtain behavioral information and migration rate data, gather water velocity data
- Radio telemetry detection sites
- Detection efficiencies at these sites
- Water velocity data from the acoustic Doppler current profiler
- Water velocity vs. travel time data
- Upstream excursions (only one of the 10 fish that headed upstream was eventually detected at Lower Granite Dam)
- Temperature selection data
- Summary of temperature selection data
- Flow chart showing the relationship between temperature, flow augmentation, water velocity, travel time and survival

Any differences between the migratory behavior of the Clearwater and Snake fish? Statler asked. The radio-tagged fish showed little difference, but it is interesting that many of the temperature-tagged fish migrated in the warmer part of the water column, Tiffan replied – in other words, some, but not all, of the fish seemed to find the cooler water.

B. Fall Chinook Survival Studies. This topic was not addressed.

C. Dworshak Operations Into September. This topic was not addressed.

4. 2003 Study Information That Might Impact 2004 Operations.

A. Lower Granite Removable Spillway Weir (RSW) Results. Henriksen said a more detailed discussion of this data will take place two weeks from now at the Corps' Walla Walla District headquarters; some information is available via the TMT website. Basically, she said, in 2003, when the spillway weir operated, about 12 Kcfs was spilled; when it was not operating, the project spilled to the gas cap. The estimated survival probability was 98% through the RSW in 2003, and 93% through regular spill. There is some indication that forebay residence time was less when the RSW was operating, Henriksen said; the incidence of fish traveling upstream in the forebay was less with the RSW on.

Henriksen said that the plan, at this point, is to re-test the Lower Granite RSW in 2004, this time with the behavioral guidance system moved from the south shore to the north. Again, she said, we will be discussing the 2004 operation at Walla Walla in two weeks. She said she will send the agenda for this meeting to the TMT membership.

B. NOAA Survival Study. Wagner said this study focused on transported Snake River

spring/summer chinook and steelhead smolts. Using a series of PowerPoint slides, he touched on the following major topic areas:

- Estimated survival and standard error for yearling chinook released at Snake River and Upper Columbia hatcheries to the Lower Granite and McNary tailraces
- Mean estimated survival of Snake River yearling chinook and steelhead (hatchery and wild, in-river fish only) through the hydropower system, 2001-2003 (53% and 31%, respectively, to the Bonneville tailrace for chinook and steelhead smolts in 2003)

Wagner noted that the largest drop in between-project steelhead survival occurs in the Lower Monumental-McNary reach; it is believed that predation may be the cause.

Moving on, Wagner touched on:

- Mean estimated survival and standard error through the Lower Columbia River for yearling chinook and steelhead originating in the Upper Columbia River, 2002-2003 (hatchery only) – 77% and 70%, respectively, for chinook and steelhead in 2003
- Estimated survival probability for yearling chinook and steelhead, by reach
- Percentage of Snake River spring/summer chinook smolts transported, 1999-2003 (56% in 2003, compared to 99% in 2001 and 80% in 2000)
- Percentage of Snake River steelhead smolts transported, 1999-2003 (77% in 2003)

C. Ice Harbor Results. Henriksen said there were also two spill treatments at Ice Harbor in 2003: 45 Kcfs spill during the day and spill up to the gas cap at night, and 50% spill 24 hours a day. She said that, in March, the Corps tested bulk spill, confined to Spill Bays 2, 3 and 4 using similar spill volumes; preliminary results showed increased survival from this treatment. The decision was then made to continue with 45 Kcfs bulk spill 24 hours per day. Basically, it was the shape, rather than the quantity, of spill that was different at Ice Harbor this year, Henriksen said. For 2004, we will need to decide what spill pattern to use; that will be one of the items discussed at Walla Walla in two weeks, she said.

D. Status Review Related to LAMBDA. Chris Toole provided this presentation; he noted that it is derived from a report to the court titled “Preliminary Estimates of Updated Indicator Metrics Applied to the 2000 FCRPS BiOP.” Toole touched on the following major topic areas, noting that all data is through 2001 only:

- Population data availability
- Data sources through 2001
- What we did to the data sets
- Updated spawner or redd count estimates – example: Marsh Creek population of Snake River spring/summer chinook
- Estimating the trends in this population using the Dennis/Holmes method
- LAMBDA (population growth rate) fit to running sums since 1957 and since 1980
- Effects of choosing alternative start years on median LAMBDA estimate
- Effects of choosing alternative start years on LAMBDA confidence limits
- How data sets relate to proposed populations

- Updated 1980-present LAMBDA estimates for Snake River spring and summer chinook and steelhead and Upper Columbia spring chinook, Middle Columbia steelhead and Columbia River chum ESUs

Toole noted that many of these data sets are currently being revised to reflect 2002 data; the timeline for the incorporation of the 2003 data is uncertain at this time.

5. Other Lessons Learned.

A. Impacts of 2001 Operations on Adult Returns. This topic was not addressed.

B. PIT Tag Returns to the Snake River. Russ Kiefer said he had agreed to provide some of IDFG's preliminary data on PIT-tagged wild spring/summer chinook and steelhead returns tagged above Lower Granite Dam from migration year 2001 (through adult return year 2003). He touched on the following major topic areas:

- Detected SAR percentages for one-ocean (jack), two-ocean and three-ocean wild spring/summer chinook.
- Imnaha Hatchery summer chinook SARs smolt migration years 1995-2002
- Rapid River spring chinook SARs, smolt migration year 1995-2002
- Dworshak Hatchery spring chinook SARs, smolt migration year 1995-2002
- Wild steelhead SARs, migratory year 1990-2001

C. Juveniles and Adults. This topic was not addressed.

D. Mid-Columbia Stocks. This topic was not addressed.

E. Information from Transport Data. This topic was not addressed.

6. Performance Standards: How Are Things Measuring Up?

Wagner noted that the 2000 FCRPS BiOp set a goal for performance -- to exceed the 2000 average survival for both in-river fish and system survival. For in-river Snake River spring/summer chinook, (Lower Granite-Bonneville) that number was 49.6%; in 2001 the goal was not met; in 2002 and 2003, it was slightly exceeded. The system survival goal for this stock was 54.8%; in 2000, we were slightly under the goal; in 2001 and 2002, we were slightly above it.

Wagner said the BiOp goal for Upper and Middle Columbia steelhead survival was set at 66.4% for inriver fish; that goal has not been met in any of the years from 2000 to 2003. The system survival goal for this stock is 67.7%; again, it has not been met in any of the subsequent years.

Wagner said the BiOp RPA goal for Upper and Middle Columbia spring/summer chinook inriver migrants was 67.7%; that goal was exceeded in 2000, 2002 and 2003. The system survival goal for this stock was 66.4%; it has been met or exceeded every year since 2000, with

the exception of 2001, when survival with “D” was slightly below the goal.

For Snake River fall chinook, Wagner said the BiOp RPA goal was set at 14.3% survival for in-river fish; that goal was not met in 2000 or 2001. The system survival goal for this stock was set at 12.7%; that goal was slightly exceeded in 2000 and 2001.

Finally, said Wagner, the BiOp RPA survival goal for Snake River steelhead migrating inriver was set at 51.6%; we have been well below that goal since the BiOp was issued. The system survival goal for this stock was set at 49% with an assumed “D” value of 52%; again, we were below the goal in 2000, 2001 and 2002. With an assumed “D” value of 56%, the goal of 52.5% was exceeded slightly in 2001 and missed slightly in 2000 and 2002.

Wagner noted that there are various theories regarding the low survival rates for steelhead; avian predation is one popular idea. It is striking that things seem to be looking better for all of the stocks except steelhead, Silverberg noted; one thing to think about is how we might change management strategies to help the steelhead.

7. 2003-2004 Weather Forecast.

Martin ended the post-season review by briefing the group on his 2003/2004 climate forecast. First, however, he asked Statler to say a few words about Dworshak operations in light of the Nez Perce/Idaho plan and how it was implemented in 2003. It was a hot year and a low water year, Statler said; under those conditions, it was challenging to maintain temperatures in the Lower Snake. I think we met those conditions and did as well as we could do last summer in terms of moderating inriver temperatures, Statler said; as we heard in some of the earlier presentations, our operations did have a positive impact on the Lower Snake temperature regime. We were also able to retain some cool water storage in Dworshak for use in September, and given the weather conditions, it’s a good thing we did, Statler said. I don’t know if it was luck, skill or a combination of both, he added, but working from the information in hand, we made some very responsible week-to-week management decisions.

With that, Martin moved on to his weather briefing. First, however, he distributed a handout showing preliminary tribal fish harvest numbers from the summer and fall of 2003.

With respect to the upcoming weather, Martin said his forecast indicates the following:

| Month | Temperature | Precipitation (% of normal) |
|--------------|--------------------|------------------------------------|
| November | Near-normal | Near-normal (90%-110%) |
| December | Near-normal | Near-normal (90%-110%) |
| January | Below-normal | Below-normal (70%-90%) |
| February | Below-normal | Near-normal (90%-110%) |
| March | Near-normal | Near-normal (90%-110%) |

Martin noted that the Portland-area snow probability is 40% in November, 70% in December and January and 90% in February and March.

Moving on to his water year 2004 water resources forecast, Martin said that, according to his forecast, the region can expect the January-July water supply at The Dalles to be in the 104 MAF-110 MAF range, 97%-102% of normal.

Martin also provided a comparison of his 2002 weather predictions to the actual temperature and precipitation observed, by month. Martin's temperature forecast compared quite favorably to the actual temperatures observed in November, February and March but failed to predict the above-normal temperature excursions in December and January. For precipitation, Martin's forecast underpredicted observed precipitation in December, January and March and overpredicted precipitation in November and February. He asked anyone interested in receiving his 30-day and 90-day forecast to email him at mark@critfc.org.

With that, the TMT's 2003 post-season review was adjourned. Meeting summary prepared by Jeff Kuechle.