FISH PASSAGE CENTER

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MEMORANDUM

TO: Jim Ruff, NMFS
Doug Marker, NWPPC
FPC Board of Directors
FPAC

FROM: Michele DeHart

DATE: October 22, 2001

RE: FPC Preliminary Analysis 2001 Juvenile Out Migration

Attached is a written response to a data request we received from Jim Ruff, National Marine Fisheries Service on October 15, 2001. Jim had asked us to provide a written description of the FPC analysis of the portion of the presentation that dealt with spill at John Day Dam. That written documentation is attached. **Again as was stated in the previous presentations, the data analysis is preliminary, completed in response to specific requests by the fishery managers and tribes. The final analysis of the downstream migration for 2001 is, according to the FPC work statement, included in our final report. The data used in the analysis is available to the public through the PTAGIS data system.**

In addition, I have attached an article that appeared in the recent NW Fishletter about funding. That article included a reference to the Fish Passage Center analysis and included several misleading comments regarding the FPC presentation. Below are plain facts regarding the presentation by the FPC, which I hope will clear up the misinformation included in the NW Fishletter.

- The NMFS Implementation Team and the Columbia Basin Fish and Wildlife Authority requested that FPC present a preliminary analysis of the 2001 downstream migration. The FPC responded to both of those specific requests with the same presentation on October 4 and October 11, 2001. We did not receive any other requests for presentations.
- Both the NMFS, Implementation Team and the Columbia Basin Fish and Wildlife Authority requested that FPC specifically review Mid-Columbia and Lower Columbia River passage.
- The presentation clearly stated that the information was preliminary, and that it would be finalized according to our normal process in the 2001 Annual Report. It was clearly

explained that the analysis was done using the consistent methodology and techniques described in each of our annual reports and implemented each year.

- On October 15, 2001 Jim Ruff requested a specific description of the spill analysis. I explained to Jim that the techniques and analysis would be included in our annual report. He asked for a specific write up describing our preliminary conclusions on spill at John Day, which we are providing to him and the public on October 22, 2001.
- Bruce Suzumoto, NWPPC telephoned on October 10, 2001 and asked FPC staff if a written analysis was available. The staff explained that we would have the final analysis in our annual report. The FPC staff also stated that, if the NWPPC had immediate needs, we would sit down with the NWPPC staff and go over the details of the analysis at their request at anytime. No such request was received from the NWPPC. In addition, no request for written analysis was received. We remain available to discuss the analysis at anytime.
- The NMFS Science Center staff did not request any details of analysis nor did they speak to anyone on the FPC staff about the presentation. They did not request any data that was the basis of the analysis. In fact the NMFS Science Center staff did not speak to anyone at the FPC about the analysis or about questions regarding the analysis.
- The NW Energy Newsletter staff, which wrote the article about the analysis, did not contact the FPC staff.
- The FPC presentation was posted on the FPC Web site on Monday, October 8, 2001.
- This memorandum and the spill analysis will be posted on the FPC Web site today, October 22, 2001.

As is always the case and in accord with our normal procedures the FPC staff is always available to respond to questions or comments. The FPC annual report is circulated in draft for a 45-day public review prior to being finalized.

Subject: funding story - N.W. Fishletter

SEPT. 11 EVENTS MAY AFFECT NEXT YEAR'S SALMON BUDGETS
http://www.newsdata.com/enernet/fishletter/fishltr132.html#4

With budget issues a main item on the agenda, the NW Power Planning Council's F&W committee played to a packed house the other day in Portland. BPA is still committed to spending $186 million on the Columbia Basin's F&W program, but Council members heard that other federal agencies may not have any money to pay for their share of the BiOp next year, due to shifts in priorities brought about by last month's terrorist attack on the World Trade Center. The Council is struggling with the BiOp itself, and working to integrate it into its new subbasin planning process.

A cameo appearance by the new NMFS regional administrator Bob Lohn, late of the Power Council staff, added to the draw. He hinted that NMFS may soon make some significant changes in how it handles the ESA and fish listings in response to a recent court decision that ruled against the agency.

"One signal I want to send clearly is in regard to how the Administration responds to the Hogan decision," Lohn said, referring to the Oregon federal judge's ruling that NMFS erred by not providing ESA protection for hatchery fish along with wild stocks of the same evolutionarily significant unit. "Subbasin planning is absolutely critical." He said that no one in the Administration "is comfortable with the idea that you can walk away from stocks in poor condition."

Lohn said there has been intense discussion in DC over the Hogan ruling and that it will go through a full set of ESA policy decision-making. "There's no final decision yet."

He told Council members that in a few weeks, their work would be seen to be very important. But Lohn wouldn't elaborate, leading to speculation that he was referring to the extensive effort, led by Council staff, to overhaul hatchery practices throughout the basin. More than one observer said the remark signaled a possible sea change in the way NMFS will rate hatchery stocks in ESA-listed fish populations. Whether that could lead to de-listing of some stocks is anybody's guess.

Council staffer Doug Marker, acting head of the NWPPC's fish and wildlife division, said Bush Administration priorities have shifted due to the Sept. 11 terrorist attacks. The five-year plan to implement the BiOp is on hold, he said, but the ongoing one-year implementation plan is still moving ahead.

Using the Bureau of Reclamation as an example, Marker said funding for irrigation screens and water rights to aid fish recovery in tributaries--items that also give the action agencies credit against the BiOp--may not be available because the agency may have to ask for money to safeguard its projects. But neither the Council nor BPA wants to be on the hook for all BiOp costs.

"The Council can play a central role in getting appropriations," Marker told the group, by lobbying for agency budgets. Federal agencies are not allowed to lobby Congress for their funds.

Sarah McNary, BPA's own F&W head, was there to show support for the Council's subbasin planning process and discuss the 50 pages of comments her agency had sent the Council over funding F&W proposals. She called it "the beginning of a dialog" and stressed that BPA's comments do not mean that it's exclusively a BiOp-focused review. It's all part of a complicated effort to reach compliance with the BiOp, after input from NMFS on whether certain proposals get "credit" for implementing the plan to avoid jeopardy to fish stocks listed under the ESA.

The immediate issue is how to prioritize fish recovery proposals in the Columbia plateau region, where the Council's independent science panel and fish managers agreed on $66 million in projects for next year.

With no budget ceiling to work with originally, fish managers had come up with over $80 million in proposals before the scientific review. Last year, the plateau province budget amounted to only $28 million.

"BPA never gave us a number to work with," said Brian Allee, head of the Columbia Basin Fish and Wildlife Authority. He said CBFWA will now be going back to take another look at the budget with BPA.

Marker said the problem is how to allocate funding among the provinces still under review, since $41 million has already been committed to three regions. Though BPA has bumped total F&W spending from $159 million last year to $186 million, pro-rating the increase over the provinces still under review would add only about $8 million for the plateau province and bump spending for the area, which contains some of the program's spendiest hatchery projects, up to $35 million. That means cutting the current number of recommended proposals in half.

So the Council staff will lead the prioritization effort. The question, Marker said, is whether BPA will OK those recommendations, even if it didn't say yes the first time around, as with the so-called "early action" and "high priority" projects BPA decided to fund on its own.

A sleeper issue that made the agenda last week was the proposal to create a new oversight board to guide activities of the Fish Passage Center, long seen by power advocates and some others as an advocacy group when it was created to provide information on fish passage and make recommendations for flow and spill operations of the hydro system.

FPC staffer Margeret Filardo recently made headlines by announcing results of juvenile survival that showed benefits of spill during this year's migration, adding to earlier results announced in August (See *NW Fishletter* 129) . However, when pressed, the FPC was not able to produce documentation to explain the findings. In fact, NMFS scientists told *NW Fishletter* that they were unable to duplicate the FPC survival results and that sample sizes were so low that results from the spill survival analyses were "statistically insignificant."

That's exactly why some Council members have pushed for more oversight of the Fish Passage Center. When Council counsel John Shurts said he thought the FPC results should be presented to Council members along with the latest NMFS results, Montana's Stan Grace asked if the Fish Passage Center had any supporting documents besides the presentation that's available on its website. "They have not, I've been told," said Grace. Shurts said the staff was working on that. *-B. R.*

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MEMORANDUM

TO: Michele DeHart

FROM: Tom Berggren

DATE: October 22 2001

RE: Effect of spill at John Day Dam on yearling chinook and steelhead survival estimates from McNary Dam tailrace to John Day Dam tailrace in 2001.

This memorandum is in response to the October 15, 2001 request received from National Marine Fisheries Service to provide the details of the preliminary analysis of spill at John Day Dam, which was discussed in FPC presentations on October 4 and October 11, 2001.

Migration year 2001 was characterized by record low flows and power emergency operations in the Columbia Basin hydro system. The springtime spills provided by the NMFS' BiOp measures were curtailed at the COE operated dams for the entire season in the Snake River and for all but a few weeks at reduced levels, in the lower Columbia River.

In summary, the analysis showed:

- Increased juvenile salmonids survival was observed between McNary Dam tailrace and John Day Dam tailrace.
- The increase in survival was a result of spill.
- Spill duration in 2001 was too limited to protect all migrating stocks.

Lower Columbia River spill provision in 2001

For planning purposes, the NMFS Biological Opinion calls for springtime spill for fish passage to be provided between April 10 and June 30 at McNary, John Day, The Dalles, and Bonneville dams in the lower Columbia River. It also calls for summertime spill for fish passage between July 1 and August 31 at John Day, The Dalles, and Bonneville dams. In migration year 2001, a federally declared power emergency allowed BPA and the COE to operate outside the provisions of the NMFS Biological Opinion. As a result, springtime spill for fish passage in 2001 was provided only between May 25 and June 15 at McNary and John Day dams and between May 16 and June 15 at The Dalles and Bonneville dams. Summertime spill for fish passage in 2001 was provided only at The Dalles and Bonneville dams between July 24 and August 31. **This memorandum addresses the springtime migration and the effects of the**

spill provided during that migration period because of our ability to estimate survival of smolts in the lower Columbia River only during that period.

Yearling chinook reach survival estimates from McNary Dam tailrace to Bonneville Dam tailrace in 2001

Significantly greater numbers of yearling chinook were available for study this year because of the survival studies conducted by the Mid Columbia PUDs. These fish were PIT tagged and released into the Mid Columbia River. Most PIT tagged yearling chinook and steelhead passed McNary Dam between May 1 and June 9 in 2001. During this time there were 138,205 PIT tagged yearling chinook and 5,328 PIT tagged steelhead detected at McNary Dam on a route that confirmed they were returned to the river. These fish were a composite of Mid Columbia and Snake River origin.

The PIT tagged yearling chinook were blocked into nine multi-day passage groups, spanning May 1-10, May 11-15, May 16-18, May 19-21, May 22-23, May 24-25, May 26-27, May 28-30, and May 31-June 9. The Cormack-Jolly-Seber (CJS) methodology was used with McNary Dam considered the release location and John Day Dam, Bonneville Dam, and the NMFS trawl in the Jones Beach section of the lower Columbia River as three recovery sites. Release numbers per block ranged between 11,883 and 25,778 and provided detection numbers in the trawl between 137 and 301 fish (average 220), large enough to provide survival estimates in the lowest reach between John Day Dam tailrace and Bonneville Dam tailrace with standard errors (c-hat adjusted) <0.14. The c-hat adjustment increases the CJS theoretical variance to compensate for over-dispersion in the data relative to the underlying multinomial model. The product of two reach survival estimates (McNary Dam tailrace to John Day Dam tailrace and John Day Dam tailrace to Bonneville Dam tailrace) produced the overall survival estimate from McNary Dam tailrace to Bonneville Dam tailrace. The estimates of these survival parameters are negatively correlated (i.e., if survival in the upstream reach is overestimated, then the survival in the downstream reach will be underestimated), and so the variance of S_1*S_2 was computed as $var(S_1*S_2)=(S_1*S_2)^2\{var(S_1)/(S_1)^2+var(S_2)/(S_2)^2+2cov(S_1,S_2)/(S_1*S_2)\}$. The computation used the identity $cov(S_1,S_2) = se(S_1)*se(S_2)*correlation(S_1,S_2)$. Both season unweighted and weighted averages are computed. A seasonal weighted average is generated using the inverse relative variance of each estimate as a weight, i.e., $w_j=1/(se(S_j))^2/S_j^2= S_j^2/(se(S_j))^2$.

Table 1. Yearling chinook survival estimate from McNary Dam tailrace to Bonneville Dam tailrace, 2001.

date range	S	se(S)
5/1-5/10	0.3978	0.0470
5/11-5/15	0.5477	0.0852
5/16-5/18	0.5069	0.0661
5/19-5/21	0.5261	0.0817
5/22-5/23	0.6437	0.0804
5/24-5/25	0.5969	0.0615
5/26-5/27	0.6755	0.0783
5/28-5/30	0.5690	0.0990
5/31-6/9	0.4830	0.1249
Weighted mean	0.5598	0.0309
Simple mean	0.5496	0.0282

Whenever the survival estimates of the groups released over time do not significantly differ, a single seasonal average is a logical summary statistic. However, if significant differences occur over time, then it is important to present these differences and investigate potential influencing factors. To determine if any significant differences occurred within a year, a test of whether the "between group" variance component was significantly greater than zero (Burnham 1987 *et al*., Chapter 4). This is a chi-square test equal to [empirical variance of mean survival*(1-degrees of freedom)]/ [theoretical variance of mean survival]. In cases where the chi-square test was not significant at the 95% confidence level, then the average was computed for the season; otherwise, the season was split into periods showing the different survival levels. The chi-square test result of 8.25 was not significant (less than the significance level of X^2[8 df, 0.05] = 15.51), and so temporal differences were not greater than what is expected by random chance.

Yearling chinook reach survival estimates from McNary Dam tailrace to John Day Dam tailrace in 2001

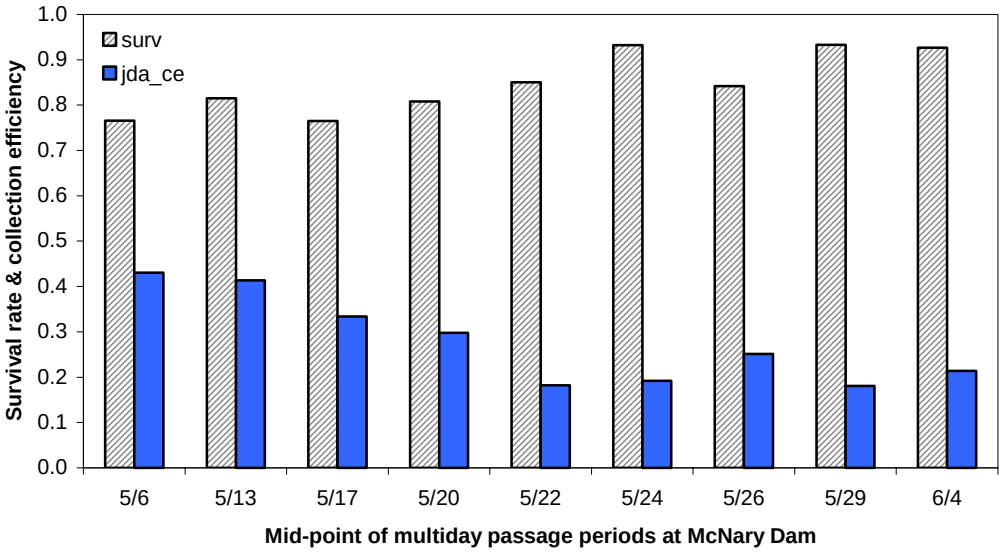
The McNary Dam tailrace to John Day Dam tailrace component of the overall lower river survival estimate showed differences in survival over the time period of passage. Within the shorter reach, the release numbers per block provided detection numbers at Bonneville Dam between 1,657 and 2,959 fish (average 2,137). These recapture numbers were large enough to provide survival estimates in the reach between McNary Dam tailrace and John Day Dam tailrace with standard errors (c-hat adjusted) <0.063.

Table 2. Yearling chinook survival estimate (S) from McNary Dam tailrace to John Day Dam tailrace, 2001, along with estimated collection efficiency (ce) at John Day Dam.

date range	S	se(S)	ce	se(ce)
5/1-5/10	0.7660	0.0195	0.4306	0.0116
5/11-5/15	0.8148	0.0240	0.4133	0.0105
5/16-5/18	0.7647	0.0265	0.3336	0.0094
5/19-5/21	0.8080	0.0341	0.2980	0.0101
5/22-5/23	0.8505	0.0373	0.1822	0.0088
5/24-5/25	0.9322	0.0363	0.1916	0.0073
5/26-5/27	0.8418	0.0267	0.2512	0.0088
5/28-5/30	0.9326	0.0625	0.1809	0.0090
5/31-6/9	0.9268	0.0536	0.2138	0.0074
Weighted mean	0.8238	0.0204	------	-------
Simple mean	0.8486	0.0226	0.2772	0.0325

Estimated survival of yearling chinook from McNary Dam tailrace to John Day Dam tailrace in 2001 ranged from around 76% early in the season to around 93% late in the season. The chi-square test value of 25.47 was significant (greater than the significance level of X^2[8 df, 0.05] = 15.51), and so temporal differences were greater than what is expected by random chance. This lead to the need to determine during which date ranges the significant changes in survival were occurring. As shown in Figure 1, the first four periods through May 21 appeared to have lower survival than during the next five periods. Chi-square tests of the temporal survival estimates within each of these two extended periods showed non-significant

Figure 1. Yearling chinook survival from McNary Dam tailrace to John Day Dam tailrace and collection efficiency at John Day Dam in 2001



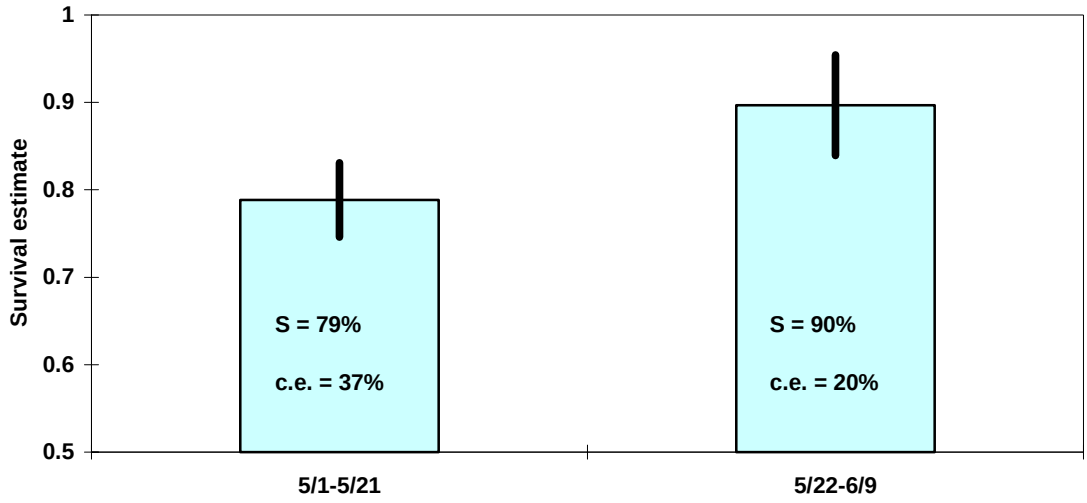
values of 3.04 (less than the significant level of X^2[3 df, 0.05] = 7.81) and 4.21 (less than the significant level of X^2[4 df, 0.05] = 9.49), respectively. It was apparent that the migration was split into two extended blocks of time, pre- and post-May 21, during which survival was fairly homogenous within the temporal block but significantly different between temporal blocks. The collection efficiency at John Day Dam also showed a difference between the pre-May 21 and post-May 21 temporal blocks (Table 2 and Figure 1), dropping from 43% to 30% during the first four periods, and fluctuating between 18% and 25% during the last five periods

For the four periods through May 21 and five periods after May 21, 2001, the unweighted mean survival estimate for yearling chinook from McNary Dam tailrace to John Day Dam tailrace was 78.8% and 89.7%, respectively (Table 3 and Figure 2). This reflects an approximate 14% increase (11 percentage points) in survival between the pre- and post-May 21 temporal blocks. The collection efficiency at John Day Dam for yearling chinook dropped from an average of 37%

Table 3. Yearling chinook and steelhead survival estimates (S) from McNary Dam tailrace to John Day Dam tailrace, 2001, along with estimated collection efficiency (ce) at John Day Dam (unweighted mean estimates for yearling chinook; single point estimates for steelhead).

date range	Blocks	S	se(S)	ce	se(ce)
YEARLING CHINOOK					
5/1-5/21	4	0.7884	0.0134	0.3689	0.0317
5/22-6/9	5	0.8968	0.0207	0.2039	0.0132
STEELHEAD					
5/1-5/21	1	0.3138	0.0201	0.3993	0.0291
5/22-6/9	1	0.3807	0.0563	0.0963	0.0164

Figure 2. Yearling chinook survival from McNary Dam tailrace to John Day Dam tailrace in 2001

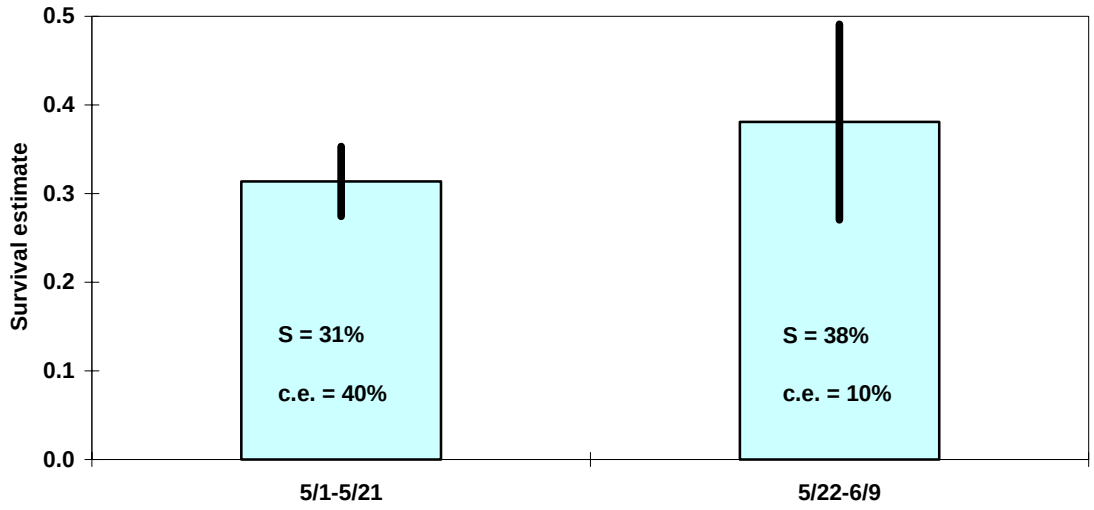


to 20% between the pre-May 21 and post-May 21 temporal blocks (Table 3). The question of whether this same trend in survival and collection efficiency was occurring with steelhead was next to be investigated.

Steelhead reach survival estimates from McNary Dam tailrace to John Day Dam tailrace in 2001

Because the number of PIT tagged steelhead passing McNary Dam in 2001 was only about 4% of the number of PIT tagged yearling chinook, it was not possible to create more than a couple of periods over the steelhead migration season. Therefore a pre- and post-May 21 set of periods was established for steelhead with 2,163 PIT tagged steelhead in the May 1-21 period and 3,165 PIT tagged steelhead in the May 22-June 9 period. These release numbers for the two blocks were providing detection numbers at Bonneville Dam of 272 and 308 fish, respectively, large enough to provide survival estimates in the reach between McNary Dam tailrace and John Day Dam tailrace with standard errors <0.057. The point estimate of survival estimate for steelhead from McNary Dam tailrace to John Day Dam tailrace was 31.4% and 38.1%, respectively, in the pre- and post-May 21 temporal blocks (Table 3 and Figure 3). This reflects an approximate 21% (7 percentage points) increase in survival between the two blocks. The collection efficiency at John Day Dam for steelhead dropped from 40% to 10% between the pre-May 21 and post-May 21 temporal blocks (Table 3).

Figure 3. Steelhead survival from McNary Dam tailrace to John Day Dam tailrace in 2001



Effects of John Day Dam spill on smolt survival in 2001

It was apparent that both yearling chinook and steelhead passing McNary Dam after May 21 experienced conditions that improved their in-river survival. No spill occurred at John Day Dam in 2001 prior to May 25, so nearly all yearling chinook and steelhead passing McNary Dam between May 1 and May 21 would pass John Day Dam before the spill commenced. Most yearling chinook and steelhead passing McNary Dam between May 22 and June 9 would pass John Day Dam during the spill period of May 25 to June 15. Spill volume during the 22-day spill period average 13.2% of the daily average flow at John Day Dam (Table 4). Estimated collection efficiency dropped approximately 45% for yearling chinook and 75% for steelhead when the third route of passage, i.e., spill, was added between May 25 and June 15 (see Table 3), indicating that during this time many smolts would now be using the spill route of passage. So even though the proportion of spill at John Day Dam was relatively low (averaging 13.2%), there appears to be a large movement of both yearling chinook and steelhead passing through the spill route under the extremely low flow conditions (averaging 138 kcfs) in the lower Columbia River at that time. Average flows in the lower Columbia River remained fairly similar for yearling chinook and steelhead passing McNary Dam after May 1 (Table 4). The lower average flows in April would be experienced by smolts originating in tributaries below McNary Dam that were migrating at that time. Which stocks were passing John Day Dam before and during the spill period of 2001 was the next question to address.

Table 4. Flow and spill conditions during springtime migration at John Day Dam in 2001.

Time period	Average Flow	Average Spill	Spill percentage
April 1 – April 14	113.7 kcfs	None	0.0%
April 15 – April 30	110.8 kcfs	None	0.0%
May 1 – May 24	132.3 kcfs	none	0.0%
May 25 – June 15	138.1 kcfs	18.2 kcfs	13.2%

Stocks affected by the springtime spill

Yearling chinook and steelhead stocks that originated in the Walla Walla, Umatilla and John Day rivers appeared to mostly pass John Day Dam in 2001 before the spill period commenced. The percent of PIT tagged yearling chinook from the Umatilla and John Day rivers detected at John Day Dam before the spill began was approximately 92% and 98%, respectively (Table 5). The percent of PIT tagged steelhead from the Walla Walla, Umatilla, and John Day rivers detected at John Day Dam before the spill began was approximately 87%, 87% and 92%, respectively (Table 6). Yearling chinook from the Yakima River basin and yearling chinook and steelhead originating in the Mid-Columbia River basin at or above Rock Island Dam had at least 50% of their detections during the spill period at John Day Dam. The PIT tagged chinook and steelhead from the Snake River basin also had detection percentages around 50% during the spill period. But since most unmarked chinook and steelhead were transported from the Snake River basin in 2001, there would be very few smolts from that basin passing John Day Dam in-river at any time in 2001.

Table 5. Proportion of PIT tagged yearling chinook detected at John Day Dam over specific periods of the 2001 migration season. May 25 - June 16 was the only spill period at John Day Dam in 2001.

Dates of PIT tag detections at John Day Dam	Snake R basin	Mid-Columbia R basin at/above Rock Island Dam[1]	Yakima R basin	Umatilla R basin	John Day R basin
Total detections	14,086	2,091	4,041	1,291	1,743
3/30 – 4/30	0.0002	0.0000	0.0084	0.1332	0.5295
5/1 – 5/24	0.3369	0.1836	0.3606	0.7854	0.4509
5/25 – 6/15	0.5422	0.6738	0.5048	0.0736	0.0132
6/16 – 9/15	0.1207	0.1425	0.1262	0.0077	0.0063

[1] PIT tagged hatchery chinook released on alternating days at Rock Island and Rocky Reach dams in large numbers for specific studies were omitted because they do not represent the timing of the run-of-the-river fish.

Table 6. Proportion of PIT tagged steelhead detected at John Day Dam over specific periods of the 2001 migration season. May 25 - June 16 was the only spill period at John Day Dam in 2001.

Dates of PIT tag detections at John Day Dam	Snake R basin	Mid-Columbia R basin at/above Rock Island Dam	Walla Walla R basin	Umatilla R basin	John Day R basin
Total detections	440	59	23	1,005	97
3/30 – 4/30	0.0045	0.0000	0.0000	0.1124	0.3093
5/1 – 5/24	0.4841	0.1525	0.8696	0.7532	0.6082
5/25 – 6/15	0.3886	0.5254	0.0870	0.1085	0.0825
6/16 – 9/15	0.1227	0.3220	0.0435	0.0259	0.0000

Conclusions:

- Significant increases in survival between McNary Dam tailrace and John Day Dam tailrace were observed for both yearling chinook and steelhead migrating past McNary Dam after May 21.

- This time is coincident with the initiation of spill at John Day Dam.

- The initiation of spill is evidenced by the decrease in collection efficiency at the John Day Project.

- Data from 2001 prior to the beginning of spill showed that FGE at John Day Dam under low flow conditions was under 40%, a level lower than the 57% value recommended by NMFS in the past for use in modeling exercises. With even the moderate spill provided in 2001 under the existing low flow conditions, there was a large decrease in estimated collection efficiency of the bypass system at John Day Dam, indicating substantial movement of smolts through the spillway route.

- The duration of the spill program was too short to afford protection to all stocks migrating through the lower Columbia River.

- Most chinook and steelhead from the Snake River Basin were transported in 2001.

- With the lower fish guidance efficiency of the turbine intake screening devices (FGE) at dams such as John Day and Bonneville dams compared to those in the Snake River and McNary Dam, plus no screening devices at The Dalles Dam, spill is considered an important mitigation for increasing the survival of smolts migrating through the lower Columbia River hydro system.

- Therefore, it would appear prudent that even in extremely low flow years such as 2001, that spill is provided.

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TELEPHONE LOG # 01-50:

CALL DATE: 10/10/01

CALL FROM:Bruce Suzumoto

CALL TO: Margaret J. Filardo

SUBJECT: IT Presentation

DISCUSSION: Bruce called and asked about the presentation that we had given last Thursday at the IT meeting. He asked if we had any additional information. I told him that the entire Power Point presentation was on our web site. Bruce asked if anything was written up yet. I said that we had been asked the previous month to put together a summary of the 2001 migration for the IT. I told Bruce that we had done all the analyses in that month that we would normally do for the annual report, and that we would be writing it in the next several weeks for the annual report. Bruce said that some of the staff at the NPPC were interested in the information. I told Bruce that we would be happy to explain any specific questions that they might have.

Bruce also asked me an additional question, which was if I thought the low steelhead survival could be explained on the basis of tern predation. I told Bruce that while the question of tern predation had been brought up by the Mid Columbia PUDs at the IT meeting I did not think it could be used to explain the mortality. I told Bruce that I had no doubt that an increase in numbers of birds was observed in the Mid Columbia and could possibly have been related to the stranding caused by the peaking operations. However, the survival of steelhead was extremely low both in the Snake and in the lower Columbia, which do not have the same observations of tern presence. Therefore, it seems unlikely that terns alone can be used to explain the mortality. I suggested that perhaps there were additional factors, like size and timing that could also be contributing to a higher mortality rate.

I told Bruce to let me know if he needs anything else.

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