State, Federal and Tribal Fishery Agencies Joint Technical Staff Memo

TO: Carley Francis
The Columbia River Crossing Project Team
700 Washington Street, Suite 300
Vancouver, WA 98660

FROM:

Paul Wagner (FPAC Co-Chair) on behalf of FPAC

SUBJECT: FPAC Comments and Contributions to Columbia River Crossing Analysis

DATE: November 6, 2009

On Tuesday, October 20, 2009, the Columbia River Crossing (CRC) project team presented results from its analysis of the potential hyrdoacoustic impacts resulting from the construction of the new Interstate 5 (I-5) bridge between Portland, Oregon and Vancouver, Washington. During this presentation, the CRC provided copies of its report entitled: "Hydroacoustic Analysis Discussion Fish Passage Advisory Committee Presentation". The purpose of this presentation was to inform FPAC members what data have been used thus far and to request that FPAC review the report and provide insight into how the analyses may be improved/revised in the future. The end of the report identifies several pieces of data that the CRC project team does not have and requested that FPAC fill in the blanks, where possible. Herein, FPAC members provide comments on the analyses presented thus far, as well as information on where additional data can be found for future analyses.

Comments on Current Analyses:
The CRC analyses assume that spatial distribution of fish in the river is uniform for both juvenile and adult salmonids. While the spatial distribution of juvenile salmonids is more likely to be uniform, it is unclear whether adult distribution is going to be uniform or more clumped. Furthermore, the analyses thus far assume the diel distribution of juvenile and adult salmonids is also going to be uniform throughout the day. Past analyses of adult and juvenile passage at hydroelectric projects have revealed that diel distribution is not uniform. There may acoustic data from the I-205 bridge that may inform the CRC project team on both the temporal and diel distribution patterns of juvenile salmonids. These studies are being funded by the U.S. Army Corps of Engineers (USACE) and data are being collected by Battelle and NOAA. FPAC suggests that the CRC project team contact Mike Langeslay (phone: 503-808-4774, e-mail:

mike.j.langeslay@usace.army.mil) or Brad Eppard (phone: 503-808-4780, e-mail: matthew.b.eppard@usace.army.mil) at the USACE t to get these data to help inform spatial and diel distribution of juvenile salmonids. Furthermore, Dr. Chris Perry (USFWS) (phone: 208-476-2257) might have data on diel and spatial distribution of adult salmonids. These data may be of adults migrating in reservoirs but they may still be valuable to your future analyses.

Additional ESUs/DPS/Species to be Included:

As mentioned above, the CRC report provided a list of additional ESU/DPS/Species that the CRC would like to include in future analyses. Cindy LaFleur from WDFW has already provided timing data for adult salmonids that were on this list. Herein, we provide timing data for juvenile salmonids (and some non-salmonids) that the CRC may find useful. These timing data are of PIT-tagged fish detected at Bonneville Dam (BON) over the past 10 years (1999-2008). When possible, we also estimated travel times from BON to I-5 (days) and migration rates (meters/second), based on the travel time estimates of individuals detected at BON and at the NOAA Trawl in the estuary. Travel time (BON to I-5) and migration rate (meters/second) estimates are provided for each migration years analyzed (Appendix A). These data are being provided to the CRC project team electronically, so they can use them as they see fit. Below are some details about each of the ESUs/DPS/Species of interest that FPAC was able to gather data for, along with caveats of each of the analyses.

Lower Columbia Chinook, Steelhead, and Coho:

Lower Columbia (LCOL) Chinook, steelhead, and coho are defined as those stocks found from the mouth of the Columbia River to the Wind River on the Washington side (River km 251) or Hood River on the Oregon side (River km 273). Because the FPAC timing data for this region are based on detection at BON, we were only able to use fish released between BON (River km 234) and the eastern boundary for this region (River km 251 or 273). This means that stocks from tributaries below BON are not included in this analysis. Migration rate and passage timing data for these Lower Columbia stocks can be found in Tables A-1 and B-1.

LCOL spring Chinook timing data presented in this analysis are for hatchery fish only. There are no mass PIT-tagging efforts for wild spring Chinook in this region. Because these data represent the timing of hatchery spring Chinook, they are highly dependent on release dates of the major PIT-tagged hatchery groups (e.g., Carson NFH) and should be interpreted with caution.

LCOL summer steelhead timing data presented in this analysis are for migration years 2000 to 2008. There were no detections of PIT-tagged summer steelhead from this region at BON in 1999. LCOL winter steelhead timing data presented in this analysis are for migration years 2005 to 2008. PIT-tagging efforts of winter steelhead in the Lower Columbia River (above BON) were limited prior to 2005.

There were no consistent PIT-tagged releases of fall Chinook or coho in the Lower Columbia (above BON) for this analysis. Therefore, we could not use PIT-tag data to determine passage timing of these species at Bonneville Dam.

Mid-Columbia and Upper Columbia Steelhead:
Mid-Columbia (MCOL) summer steelhead are those steelhead stocks found from the Wind River on the Washington side (River km 251) or Hood River on the Oregon side (River km 273) to the mouth of the Yakima River (River km 539). This includes the tributaries between these two points. Upper Columbia (UCOL) steelhead stocks are those stocks found above Rock Island Dam (RIS). Migration rate and passage timing data for these Mid-Columbia and Upper Columbia stocks can be found in Tables A-2 and B-2. For these analyses, we relied on all releases of hatchery and wild salmonids throughout the Mid-Columbia and Upper Columbia region. However, we excluded releases made directly from Rocky Reach and Wells dams because these releases are part of acoustic telemetry studies and those fish may migrate at different rates than untagged fish and may not be representative of the run at large. Fish that were collected and tagged at Rock Island Dam as part of the Smolt Monitoring Program were included in this analysis.

Snake River Spring/Summer Chinook, Fall Chinook, Summer Steelhead, and Sockeye:
Snake River (SNAKE) Chinook, steelhead, and sockeye are those stocks found on the Snake River (or it tributaries) from its confluence with the Columbia River (River km 522) to Hells Canyon Dam. Migration rate and passage timing data for these Snake River stocks can be found in Tables A-3 and B-3. For these analyses, we relied on all releases of hatchery and wild salmonids throughout the Snake River basin. However, we excluded releases made directly from the dams because these releases are part of acoustic telemetry studies and those fish may migrate at different rates than untagged fish and may not be representative of the run at large.

Since these data are dependent on detections at BON, timing and migration rate data for Snake River sockeye are limited. Timing at BON in migration year 2001, 2004, and 2005 are based on fewer than 20 fish. Estimates of migration rates are dependent on fish being detected both at BON and at the NOAA trawl. In migration years 2001 and 2005 there were no fish that were detected at both these sites. Therefore, migration rates for these migration years were not possible.

Run-at-Large versus ESU Specific Timing at BON:
Throughout the juvenile out-migration season, the Smolt Monitoring Program (SMP) at BON collects juvenile salmonids as they pass the project. Sampling at BON typically occurs from early to mid-March to late October. The numbers of sampled juveniles are expanded to collection counts based on sample rates that were used each day. These daily collection counts are then expanded into a daily passage index based on the operations at the project that day. Specifically, the collection counts are expanded for the proportion of the total discharge at the project that passed through powerhouse 2 (powerhouse 1 in 1999). The passage index is not a population estimate but can be used for run timing information. Based on the daily passage index at BON over the past 10 years (1999-2008), we estimated the average run-at-large timing for yearling Chinook, subyearling Chinook, steelhead, and sockeye. The run-at-large passage timing data for BON can be found in Table B-4. The purpose of this analysis is to determine whether the run-at-large timing at BON is similar to the stock specific passage timing at BON. This might help inform whether the run-at-large is adequate at addressing the questions that the CRC project team is interested in.

Yearling Chinook:
For the most part, the run-at-large timing of yearling Chinook at BON tracks well with both Lower Columbia spring Chinook and Snake River spring/summer Chinook (Fugure 1). However, one thing to remember is that LCOL spring Chinook timing data presented in this analysis are for hatchery fish only. Because these data represent the timing of hatchery spring Chinook, they are highly dependent on release dates of the major PIT-tagged hatchery groups (e.g., Carson NFH) and should be interpreted with caution.

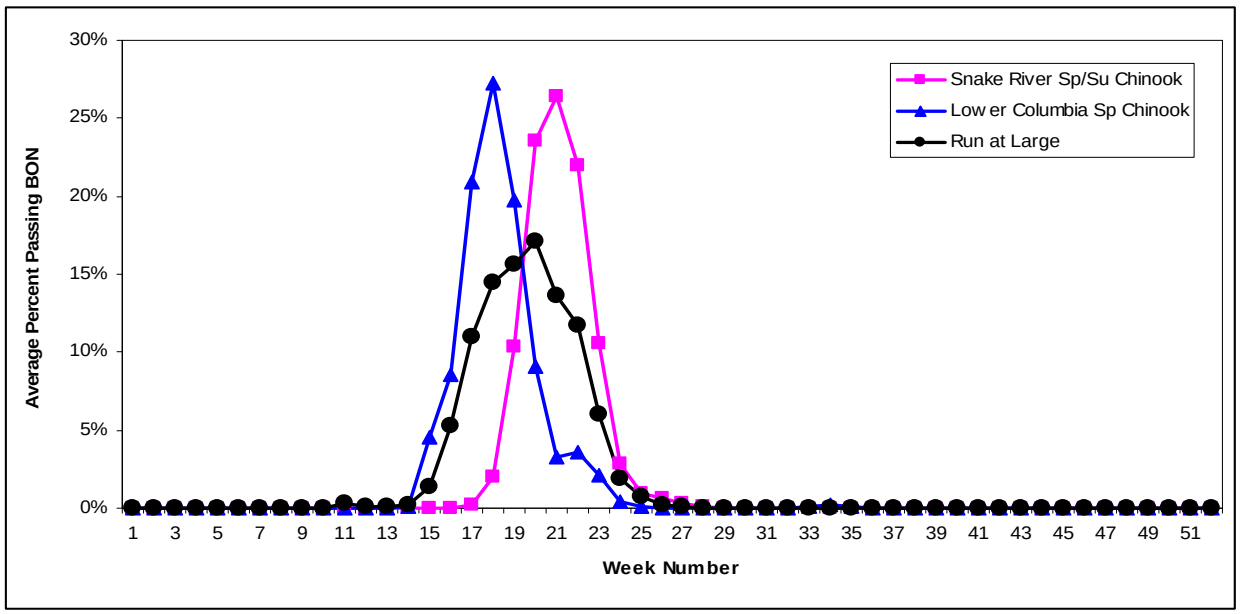

Figure 1 – Yearling Chinook. Average weekly passage timing of Run-at-large yearling Chinook and PIT-tagged Lower Columbia spring Chinook (1999-2008), and PIT-tagged Snake River spring/summer Chinook at Bonneville Dam.

Subyearling Chinook:
The peak in the run-at-large timing in weeks 9 through 13 are likely subyearling fall Chinook tules that were released from Spring Creek National Fish Hatchery in March (Figure 2). However, beginning in 2009, Spring Creek NFH has cancelled these March releases. Instead, these juvenile fall Chinook tules are now released in April and May from various facilities above Bonneville. It is likely that the subyearling Chinook run-at-large percent passing BON in weeks 15 through 20 will increase with this change in release strategy for subyearling fall Chinook tules.

Furthermore, some hatchery Snake River fall Chinook are released in early to mid-April as yearlings. In recent years, these yearling fall Chinook releases represent approximately 17-20% of the overall hatchery production of fall Chinook juveniles in the Snake River Basin. Because these fish are typically larger, they are counted as yearling Chinook in the SMP sampling. Also, because these fish are released earlier in the season (April) they typically arrive at BON earlier than most fall Chinook, which naturally out-migrate as subyearlings in late May to June. This is likely why the run-at-large timing for subyearling Chinook at BON does not track the timing of Snake River fall Chinook, particularly for the early portion of sampling (weeks 17-23) (Figure 2).

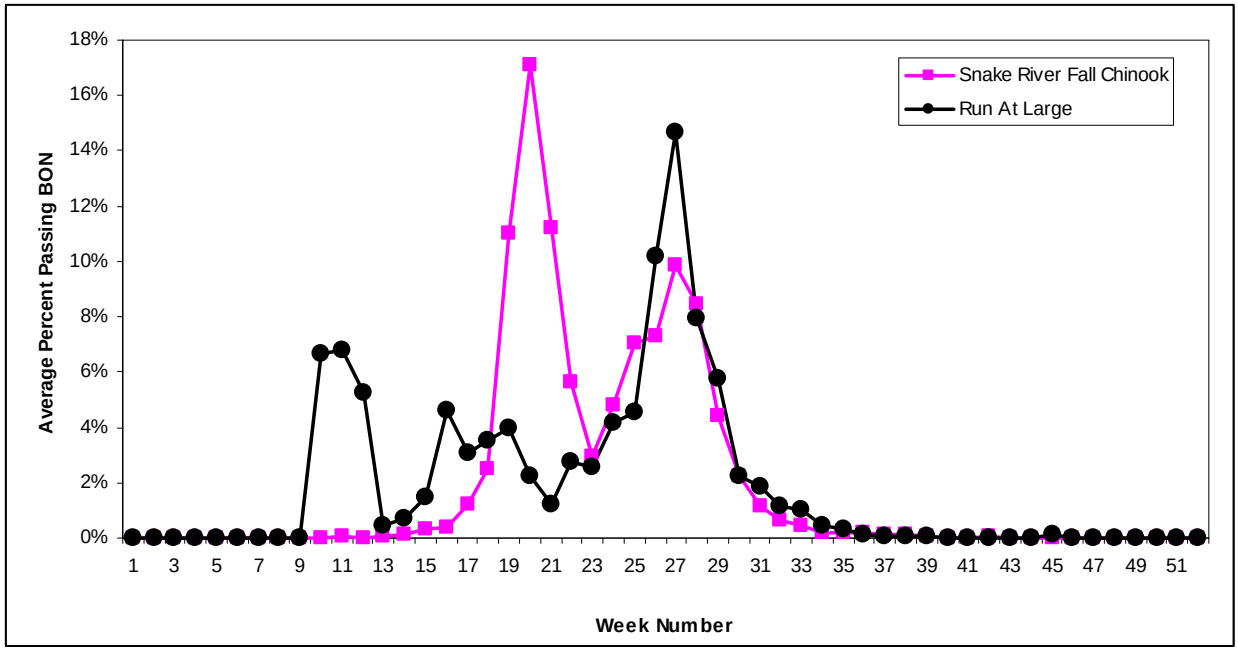

Figure 2 – Subyearling Chinook. Average weekly passage timing of Run-at-large subyearling Chinook and PIT-tagged Snake River fall Chinook at Bonneville Dam.

Steelhead:

Overall, the run-at-large timing of steelhead at BON tracks well with all of the stock specific steelhead timing that we were able to estimate (Figure 3). The only group of PIT-tagged steelhead that appears out-side of the run-at-large peaks is the LCOL winter steelhead.

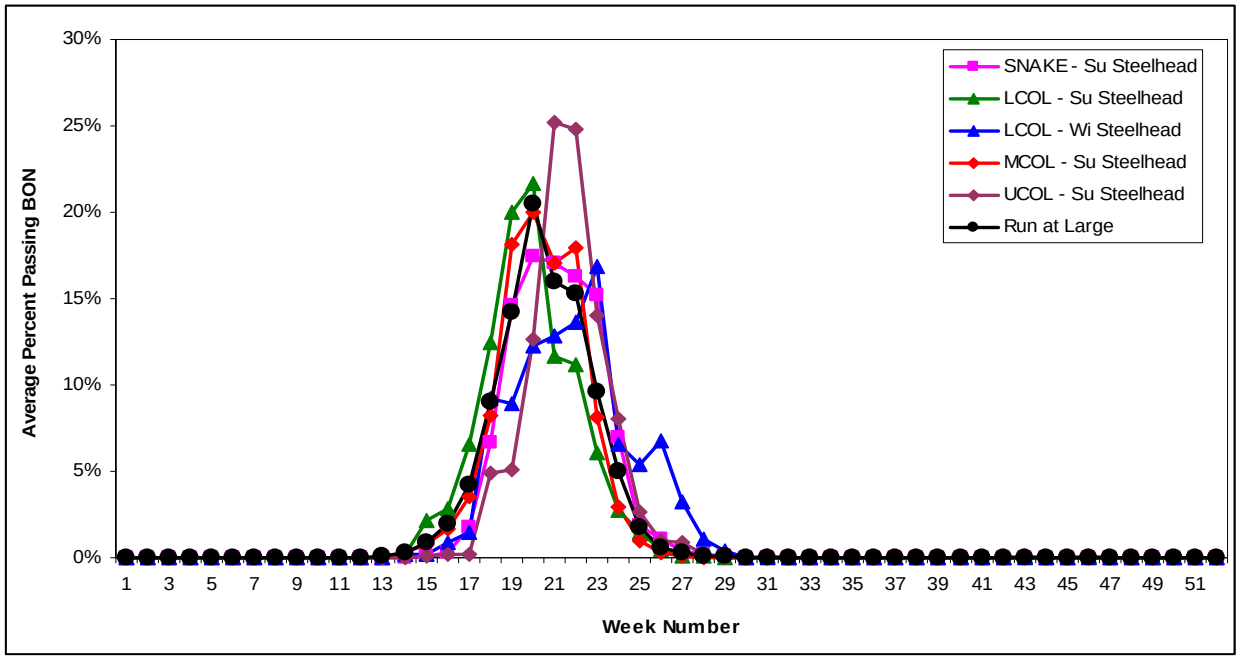

Figure 3 – Steelhead. Average weekly passage timing of Run-at-large steelhead and PIT-tagged Snake River summer steelhead, LOCL summer steelhead, LCOL winter steelhead, MCOL summer steelhead, and UCOL summer steelhead at Bonneville Dam.

Sockeye:
The run-at-large peak timing for sockeye at BON is slightly earlier than that for PIT-tagged Snake River Sockeye (Figure 4). This is likely due to earlier passage of Mid- and Upper Columbia Sockeye at BON. Even with the run-at-large peak timing being slightly earlier, the overall timing of the run-at-large seems to track well with that for PIT-tagged Snake River sockeye.

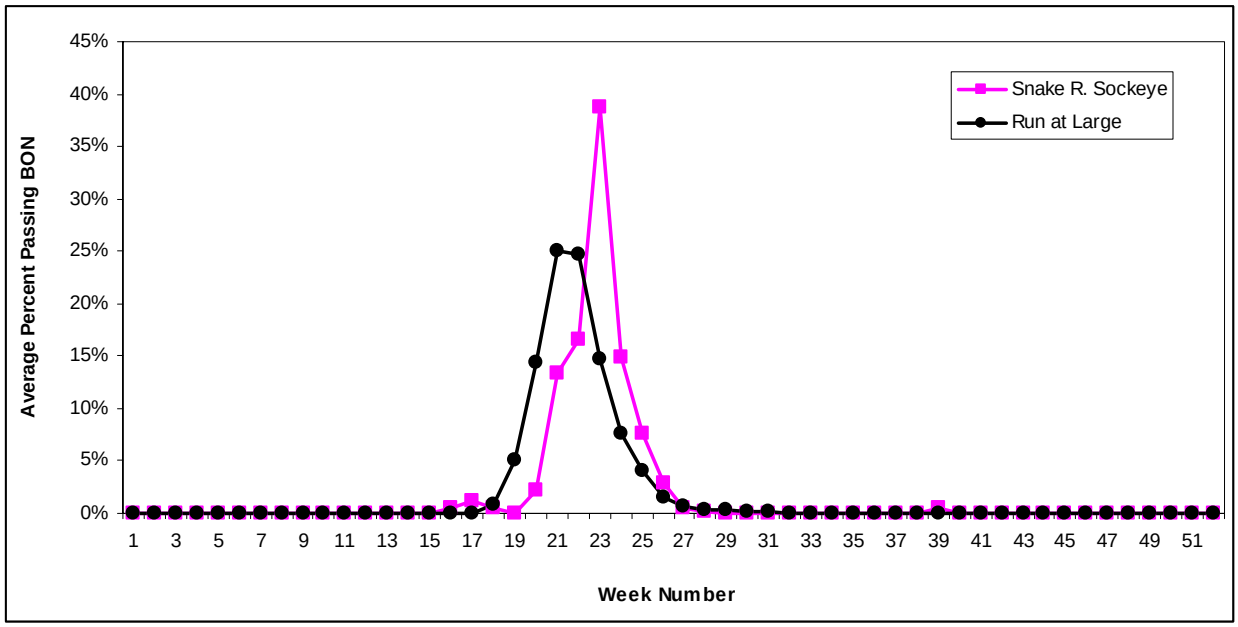

Figure 4 – Sockeye. Average weekly passage timing of Run-at-large sockeye and PIT-tagged Snake River sockeye at Bonneville Dam.

Miscellaneous Species – Juvenile Lamprey:
Although PIT-tag data are not available for juvenile lamprey, we were able to estimate passage timing of juvenile lamprey at Bonneville Dam based on the Smolt Monitoring Program sampling for incidental species. These analyses relied on the daily samples of juvenile lamprey at Bonneville Dam for the years 2000 to 2008. The daily sample counts were expanded for the proportion of total discharge passing through powerhouse 2 in order to generate a daily passage index. The indices were then grouped by week. Passage timing data for juvenile lamprey can be found in Table B-5 and Figure 5.

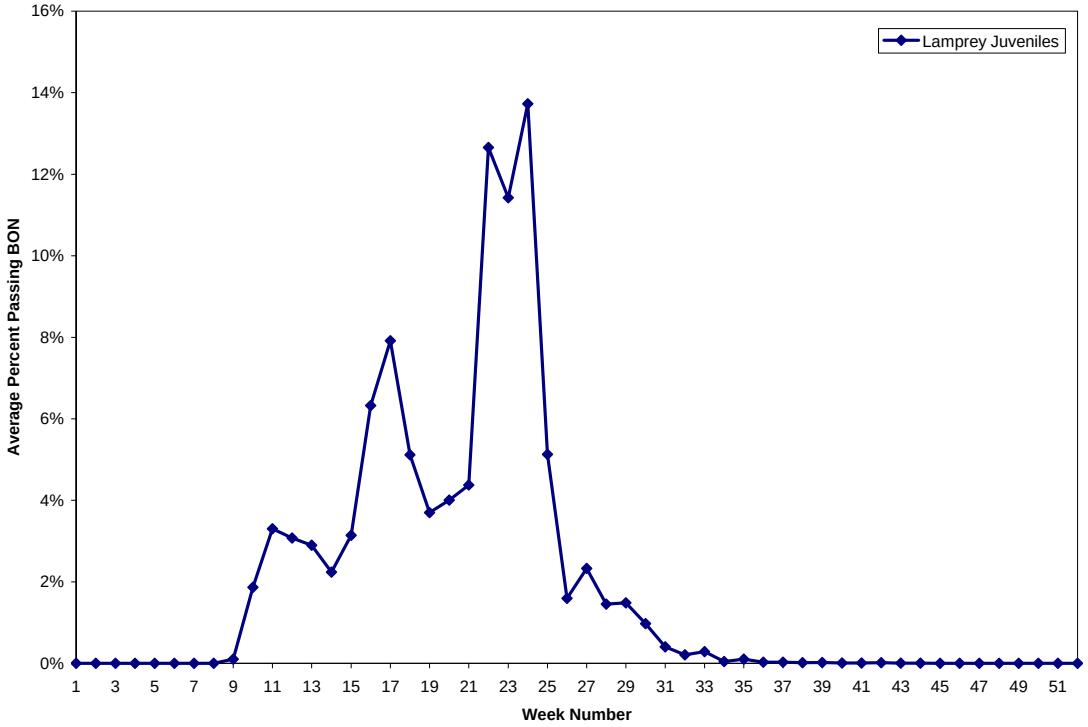

Figure 5. Average weekly passage timing of juvenile lamprey (2000-2008) at Bonneville Dam.

Appendix A

Estimated Travel Times and Migration Rates

Juvenile travel times and migration rates are based on detections of PIT-tagged salmonid juveniles at Bonneville Dam and at the NOAA trawl in the estuary. Fish travel times (FTT) were estimated for each juvenile salmonid that was detected at both of these detection sites. The distance from Bonneville Dam to the I-5 bridge is approximately 36% of the distance from Bonneville Dam to the trawl. Therefore, we estimated the travel time from Bonneville Dam to the I-5 bridge (days) as approximately 36% of the travel time from Bonneville Dam to the trawl. To estimate migration rates (meters/second), we relied on the estimated FTT (BON to Trawl, days) and distance between these two detection sites (163.83 km).

Table A-1. ***Lower Columbia Stocks*** **-** Estimated fish travel time from Bonneville Dam to the I-5 bridge and estimated migration rates.

Species	Migration Year	Average Travel Time (days)	Average Migration Rate (m/s)
Spring CH*	1999	2.64	0.39
	2000	2.83	0.45
	2001	2.05	0.41
	2002	1.92	0.51
	2003	2.82	0.41
	2004	3.32	0.32
	2005	3.25	0.28
	2006	4.52	0.33
	2007	2.80	0.42
	2008	2.88	0.40
	Average	**2.90**	**0.39**
Summer ST	1999	N/A	N/A
	2000	0.84	0.82
	2001	N/A	N/A
	2002	0.80	0.86
	2003	0.78	0.89
	2004	0.65	1.05
	2005	0.86	0.83
	2006	0.56	1.25
	2007	0.71	1.00
	2008	0.96	0.82
	Average	**0.77**	**0.94**
Winter ST	2005	2.57	0.60
	2006	0.63	1.13
	2007	0.83	0.98
	2008	1.46	0.83
	Average	**1.37**	**0.89**

* Travel time and migration rate estimates for Lower Columbia spring Chinook are for hatchery fish only. No estimates were available for wild Lower Columbia spring Chinook.

Table A-2. ***Mid and Upper Columbia Stocks*** **-** Estimated fish travel time from Bonneville Dam to the I-5 bridge and estimated migration rates.

Species	Migration Year	Average Travel Time (days)	Average Migration Rate (m/s)
Mid-Columbia Summer ST	1999	0.60	1.19
	2000	0.60	1.13
	2001	0.88	0.79
	2002	0.56	1.25
	2003	0.66	1.04
	2004	0.80	0.88
	2005	0.70	0.99
	2006	0.56	1.22
	2007	0.61	1.12
	2008	0.67	1.06
	Average	**0.66**	**1.07**
Upper Columbia Summer ST	1999	0.61	1.14
	2000	0.63	1.10
	2001	0.80	0.87
	2002	0.55	1.26
	2003	0.64	1.09
	2004	0.75	0.94
	2005	0.74	0.94
	2006	0.56	1.23
	2007	0.63	1.10
	2008	0.54	1.29
	Average	**0.64**	**1.10**

Table A-3. ***Snake River Stocks*** - Estimated fish travel time from Bonneville Dam to the I-5 bridge and estimated migration rates.

Species	Migration Year	Average Travel Time (days)	Average Migration Rate (m/s)
Sp/Su CH	1999	0.54	1.19
	2000	0.63	1.10
	2001	0.82	0.85
	2002	0.69	1.03
	2003	0.66	1.05
	2004	0.71	0.99
	2005	0.66	1.06
	2006	0.63	1.12
	2007	0.35	1.08
	2008	0.07	1.14
	Average	**0.58**	**1.06**
Fall CH	1999	0.67	1.03
	2000	0.70	0.98
	2001	0.86	0.81
	2002	0.74	0.94
	2003	0.76	0.91
	2004	0.81	0.86
	2005	0.82	0.87
	2006	0.70	1.01
	2007	0.71	0.97
	2008	0.70	1.00
	Average	**0.75**	**0.94**
Summer ST	1999	0.60	1.19
	2000	0.67	1.06
	2001	0.80	0.88
	2002	0.64	1.09
	2003	2.60	1.14
	2004	0.72	0.96
	2005	0.71	0.99
	2006	0.60	1.16
	2007	0.61	1.13
	2008	0.60	1.16
	Average	**0.85**	**1.08**
Sockeye	1999	0.48	1.41
	2000	1.00	0.82
	2001	N/A	N/A
	2002	0.50	1.37
	2003	0.61	1.17
	2004	1.08	0.63
	2005	N/A	N/A
	2006	0.57	1.21
	2007	0.57	1.21
	2008	0.51	1.36
	Average	**0.67**	**1.15**

Appendix B

PIT-tag Passage Timing at Bonneville Dam

Table B-1. ***Lower Columbia Stocks*** – weekly average percent of PIT-tagged Lower Columbia spring Chinook (1999-2008), summer steelhead (2000-2008), and winter steelhead (2005-2008) passing Bonneville Dam.

Week Number	Spring Chinook	Summer Steelhead	Winter Steelhead
10	0.01%	0.00%	0.00%
11	0.01%	0.00%	0.00%
12	0.00%	0.00%	0.00%
13	0.03%	0.00%	0.03%
14	0.12%	0.19%	0.17%
15	4.50%	2.11%	0.17%
16	8.55%	2.86%	0.92%
17	20.91%	6.57%	1.44%
18	27.28%	12.46%	9.18%
19	19.71%	19.97%	8.95%
20	9.04%	21.63%	12.30%
21	3.24%	11.64%	12.81%
22	3.56%	11.16%	13.63%
23	2.07%	6.07%	16.89%
24	0.41%	2.78%	6.54%
25	0.07%	1.47%	5.40%
26	0.04%	0.50%	6.76%
27	0.02%	0.15%	3.26%
28	0.01%	0.06%	1.11%
29	0.01%	0.02%	0.36%
30	0.01%	0.02%	0.04%
31	0.00%	0.07%	0.00%
32	0.01%	0.02%	0.01%
33	0.08%	0.00%	0.00%
34	0.16%	0.00%	0.00%
35	0.09%	0.00%	0.00%
36	0.01%	0.00%	0.00%
37	0.01%	0.00%	0.03%
38	0.01%	0.00%	0.00%
39	0.01%	0.00%	0.00%
40	0.01%	0.00%	0.00%
41	0.00%	0.00%	0.00%
42	0.00%	0.04%	0.00%
43	0.00%	0.08%	0.00%
44	0.00%	0.00%	0.00%
45	0.00%	0.02%	0.00%
46	0.00%	0.08%	0.00%
47	0.00%	0.00%	0.00%
48	0.00%	0.00%	0.00%
49	0.00%	0.02%	0.00%

Table B-2. ***Mid- and Upper Columbia Stocks*** – weekly average percent of PIT-tagged Mid-Columbia and Lower Columbia summer steelhead (1999-2008) passing Bonneville Dam.

Week Number	Mid-Columbia Summer Steelhead	Upper Columbia Summer Steelhead
10	0.00%	0.00%
11	0.00%	0.00%
12	0.04%	0.00%
13	0.01%	0.00%
14	0.28%	0.00%
15	0.79%	0.01%
16	1.65%	0.14%
17	3.56%	0.16%
18	8.27%	0.23%
19	18.12%	4.89%
20	19.97%	5.06%
21	17.01%	12.62%
22	17.89%	25.20%
23	8.09%	24.79%
24	2.90%	13.99%
25	0.95%	8.06%
26	0.28%	2.68%
27	0.08%	1.02%
28	0.04%	0.86%
29	0.00%	0.20%
30	0.02%	0.02%
31	0.00%	0.01%
32	0.01%	0.00%
33	0.00%	0.02%
34	0.00%	0.01%
35	0.00%	0.00%
36	0.00%	0.00%
37	0.00%	0.00%
38	0.00%	0.00%
39	0.04%	0.00%
40	0.00%	0.00%

Table B-3. ***Snake River Stocks*** – weekly average percent of PIT-tagged Snake River spring/summer Chinook, fall Chinook, summer steelhead, and sockeye (1999-2008) passing Bonneville Dam.

Week Number	Sp/Su Chinook	Fall Chinook	Summer Steelhead	Sockeye
10	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.04%	0.00%	0.00%
12	0.00%	0.02%	0.00%	0.00%
13	0.00%	0.06%	0.02%	0.00%
14	0.00%	0.10%	0.00%	0.00%
15	0.00%	0.35%	0.10%	0.00%
16	0.02%	0.41%	0.27%	0.56%
17	0.21%	1.23%	1.78%	1.22%
18	1.96%	2.52%	6.64%	0.56%
19	10.32%	10.99%	14.63%	0.06%
20	23.60%	17.09%	17.43%	2.25%
21	26.37%	11.18%	17.01%	13.44%
22	21.96%	5.66%	16.24%	16.52%
23	10.52%	2.96%	15.18%	38.81%
24	2.83%	4.80%	6.95%	14.96%
25	1.00%	7.07%	1.84%	7.65%
26	0.62%	7.28%	1.08%	2.85%
27	0.34%	9.88%	0.38%	0.49%
28	0.15%	8.48%	0.20%	0.09%
29	0.05%	4.40%	0.08%	0.00%
30	0.02%	2.23%	0.04%	0.00%
31	0.01%	1.16%	0.02%	0.00%
32	0.00%	0.64%	0.01%	0.00%
33	0.00%	0.48%	0.04%	0.00%
34	0.00%	0.17%	0.00%	0.00%
35	0.00%	0.18%	0.00%	0.00%
36	0.00%	0.17%	0.00%	0.00%
37	0.00%	0.10%	0.00%	0.00%
38	0.00%	0.10%	0.00%	0.00%
39	0.00%	0.03%	0.00%	0.56%
40	0.00%	0.00%	0.00%	0.00%
41	0.00%	0.03%	0.00%	0.00%
42	0.00%	0.03%	0.02%	0.00%
43	0.00%	0.03%	0.00%	0.00%
44	0.00%	0.00%	0.00%	0.00%
45	0.00%	0.00%	0.00%	0.00%
46	0.00%	0.00%	0.00%	0.00%
47	0.00%	0.01%	0.00%	0.00%
48	0.00%	0.01%	0.00%	0.00%
49	0.00%	0.03%	0.00%	0.00%
50	0.00%	0.03%	0.00%	0.00%
51	0.00%	0.01%	0.00%	0.00%
52	0.00%	0.00%	0.00%	0.00%

Table B-4. ***Bonneville Dam Run-at-Large*** – weekly average percent of yearling Chinook (CH1), subyearling Chinook (CH0), steelhead (ST), and sockeye (SO) juveniles (1999-2008) passing Bonneville Dam.

Week Number	CH1	CH0	ST	SO
9	0.00%	0.00%	0.00%	0.00%
10	0.03%	6.66%	0.00%	0.00%
11	0.34%	6.81%	0.02%	0.00%
12	0.12%	5.23%	0.03%	0.08%
13	0.13%	0.43%	0.06%	0.01%
14	0.24%	0.70%	0.27%	0.02%
15	1.35%	1.46%	0.89%	0.04%
16	5.31%	4.62%	1.94%	0.06%
17	10.96%	3.07%	4.17%	0.08%
18	14.46%	3.55%	9.04%	0.88%
19	15.63%	3.98%	14.23%	5.13%
20	17.11%	2.22%	20.47%	14.33%
21	13.64%	1.23%	15.96%	24.95%
22	11.69%	2.79%	15.29%	24.71%
23	6.00%	2.55%	9.65%	14.70%
24	1.88%	4.15%	5.03%	7.66%
25	0.72%	4.53%	1.80%	4.02%
26	0.24%	10.16%	0.61%	1.60%
27	0.08%	14.64%	0.30%	0.75%
28	0.05%	7.97%	0.11%	0.35%
29	0.01%	5.78%	0.08%	0.28%
30	0.00%	2.25%	0.01%	0.13%
31	0.00%	1.86%	0.01%	0.10%
32	0.00%	1.13%	0.01%	0.02%
33	0.00%	1.00%	0.01%	0.03%
34	0.00%	0.42%	0.00%	0.01%
35	0.00%	0.30%	0.00%	0.00%
36	0.00%	0.14%	0.00%	0.01%
37	0.00%	0.06%	0.00%	0.00%
38	0.00%	0.04%	0.00%	0.01%
39	0.00%	0.03%	0.00%	0.00%
40	0.00%	0.02%	0.00%	0.01%
41	0.00%	0.03%	0.00%	0.00%
42	0.00%	0.02%	0.00%	0.00%
43	0.00%	0.02%	0.00%	0.00%
44	0.00%	0.01%	0.00%	0.00%
45	0.00%	0.13%	0.00%	0.00%
46	0.00%	0.00%	0.00%	0.00%
47	0.00%	0.00%	0.00%	0.00%
48	0.00%	0.00%	0.00%	0.00%
49	0.00%	0.00%	0.00%	0.00%
50	0.00%	0.00%	0.00%	0.00%
51	0.00%	0.00%	0.00%	0.00%
52	0.00%	0.00%	0.00%	0.00%

Table B-5. ***Juvenile Lamprey*** – weekly average passage of juvenile lamprey (2000-2008) passing Bonneville Dam.

Week Number	Weekly Passage Percent
9	0.10%
10	1.87%
11	3.30%
12	3.07%
13	2.90%
14	2.24%
15	3.14%
16	6.32%
17	7.92%
18	5.11%
19	3.70%
20	4.01%
21	4.37%
22	12.66%
23	11.43%
24	13.73%
25	5.13%
26	1.59%
27	2.33%
28	1.45%
29	1.48%
30	0.97%
31	0.40%
32	0.21%
33	0.29%
34	0.04%
35	0.10%
36	0.03%
37	0.03%
38	0.01%
39	0.02%
40	0.01%
41	0.01%
42	0.01%
43	0.01%
44	0.01%