

MEMORANDUM THRU:

Robert Witham, Operations Project Manager, Lower Monumental Dam

FOR Chief, Operations Division
ATTN: John Bailey / Ann Setter

SUBJECT: Submission of 2011 Juvenile Fish Collection and Bypass Report, Lower Monumental Dam Juvenile Fish Facility.

1. Enclosed find the 2011 Juvenile Fish Collection and Bypass Report for Lower Monumental Dam as requested.
2. If you have any questions contact Bill Spurgeon or Elizabeth Lindsey at Lower Monumental Dam, (509) 282-7211 and (509) 282-7216, respectively.

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Enclosure

2011 Juvenile Fish Collection and Bypass Report
Lower Monumental Dam Juvenile Fish Facility

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TABLE OF CONTENTS

	Page
Introduction.....	5
Facility Modifications.....	6
River Conditions.....	6
Fish Collection.....	7
Migration and Collection.....	7
Adult Fallbacks.....	8
Separator Efficiency.....	12
Sampling.....	13
Transportation.....	14
Bypass.....	15
Incidental Species.....	16
Fish Condition.....	19
Descaling.....	19
Other Injuries and Disease.....	19
Mortality.....	20
Research.....	22
Gas Bubble Trauma Monitoring (PSMFC).....	22
Operation and Maintenance.....	22
Turbine Operations.....	22
Debris/Trash Racks.....	25
Submersible Screens.....	25
Vertical Barrier Screens.....	25
Gatewells.....	25
Orifices/Collection Channel.....	26
Primary Dewaterer.....	26
Wet Separator/Distribution and Sampling Systems.....	26
Barge Loading Operations.....	27
Truck Loading Operations.....	27
Recommendations.....	27

LIST OF TABLES

	Page
Table 1. Comparisons of average monthly flow and spill at Lower Monumental Dam, 2007-2011.....	8
Table 2. Annual collection, bypass, and transport at Lower Monumental Dam, 2007-2011.	10
Table 3. Annual peak collection dates at Lower Monumental Dam, 2007-2011.	11
Table 4. Annual totals of adult salmonids released from the juvenile fish separator at Lower Monumental Dam, 2007-2011.	11
Table 5. Monthly totals of adult salmonids released from the juvenile fish separator at Lower Monumental Dam, 2011.	12
Table 6. Condition of adult salmonids ¹ released from the juvenile fish separator at Lower Monumental Dam, 2011.	12
Table 7. Annual separator efficiency in percent at Lower Monumental Dam, 2007-2011.....	13
Table 8. Annual percentage sampled of each juvenile salmonid species group at Lower Monumental Dam, 2007-2011.	14
Table 9. Weekly sample rates in percent and sample totals at Lower Monumental Dam, 2011.	18
Table 10. Estimated collection of incidental species at Lower Monumental Dam, 2011.....	21
Table 11. Annual descaling rates in percent for fish sampled at Lower Monumental Dam, 2007-2011.....	22
Table 12. Weekly descaling rates in percent for fish sampled at Lower Monumental Dam, 2011.	23
Table 13. Annual facility mortality in percent at Lower Monumental Dam, 2007-2011.	24
Table 14. Weekly facility mortality rates in percent at Lower Monumental Dam, 2011.....	24
Table 15. Annual sample mortality in percent at Lower Monumental Dam, 2007-2011.	25

LIST OF FIGURES

	Page
Figure 1. Comparisons of daily powerhouse flow and spill at Lower Monumental Dam, 2011. .	7
Figure 2. Daily juvenile salmonid collection, all species combined, versus daily average river flow at Lower Monumental Dam, 2011.....	9

APPENDIX

	Page
Appendix Table 1. Daily collection and bypass numbers and river conditions at Lower Monumental Dam, 2011.	28
Appendix Table 2. Daily number of fish trucked and barged from Lower Monumental Dam, 2011.....	28
Appendix Table 3. Percent descaling and daily facility mortality numbers at Lower Monumental Dam, 2011.....	28
Appendix Table 4. Daily number of adult fallbacks and fallback mortality at Lower Monumental	

TRANSPORT OPERATIONS - LOWER MONUMENTAL DAM

Introduction

Juvenile fish transportation and bypass operations occurred for the nineteenth year at Lower Monumental Dam Juvenile Fish Facility (JFF) in 2011. The bypass system was watered up at 1520 on March 14, and the STSs were installed on March 13 and 14. The JFF was watered up for testing on March 28. Primary bypass occurred from March 14 through March 31, and was then intermittently interrupted for fish condition monitoring every third day through May 7. During this period 4,039 fish were examined and returned to the river. These fish are not included in the 2011 season spreadsheet (Appendices 1-4) as collection for transport had yet to begin. No research was done at Lower Monumental JFF this season.

Collection for transport began at 0700 hours on May 8 and ended at 0700 hours on October 1. On May 16 at 1500 hrs the facility was placed in primary bypass due to high river flows and the inability of the tug to transition the tailrace. Transport began again at 1500 hrs on May 18. The facility returned again to primary bypass at 1500 hrs on May 22 as transport could not occur due to a lock outage at The Dalles Dam. Transport again resumed at 1500 hrs on May 27. The rest of the season went smoothly, and collection for transport ended at 0700 on October 1. The facility was returned to primary bypass at that time and continued in bypass through December 15. Smolt collection for the 2011 season was 1,582,908 which is 48.6% greater than that of 2010 (1,065,007), 33.9% greater than 2009 (1,182,585) and 24.5% lower than 2008 (2,097,408). Of the 1,582,908 fish collected in the 2011 season, 5,481 were trucked, 1,365,734 were barged, and 207,023 were bypassed.

Pacific States Marine Fisheries Commission (PSMFC) technicians examined 1,745 fish for gas bubble trauma (GBT) in 2011. Examinations were conducted once a week from April 1 through August 31 to encompass the duration of the spill season. Only those GBT fish examined during collection for transportation are included in the bypass numbers.

The passive integrated transponder (PIT) tag system detected 240,888 PIT tagged fish coming through the JFF from April 1 to October 1, of which 87,539 were diverted to the river or failed to be detected moving to the raceways, the sample, or the exits. None of these 240,888 PIT tagged fish are included in the bypass numbers.

This season's total collection by species group included: 592,941 clipped yearling chinook, 172,598 unclipped yearling chinook, 76,552 clipped subyearling chinook, 176,205

unclipped subyearling chinook, 355,269 clipped steelhead, 176,206 unclipped steelhead, 8,326 clipped sockeye, 11,719 unclipped sockeye, and 13,092 clip/unclip coho. Full powerhouse screening and bypass operations continued through December 15, 2011.

Juvenile hatchery chinook salmon, hatchery coho salmon, and hatchery steelhead in the Snake River Basin are normally designated by fin clips, usually the adipose fin but occasionally one of the pectoral or ventral fins. Before 1998, Idaho Fish and Game (IDFG) was the only agency that released sizeable numbers of unclipped hatchery fish. Starting in 1998, increasing numbers of unclipped hatchery fish were released by state, federal, tribal, or other agencies (FPC), therefore, the reported clipped/unclipped fish collected, sampled, bypassed, and transported no longer represent hatchery/wild origins of these fish. As of the 2005 report, juvenile salmonids are designated as clipped/unclipped not hatchery/wild. Coho were reintroduced by the tribes and if clipped or not they are all hatchery progeny.

Corps of Engineers personnel included: supervisory biologist Bill Spurgeon, assistant biologist Elizabeth Lindsey, biological technicians: Shelly Montoya, Ken Bennett, Rick Blevins, K.C. Deife and Nathan Malkow and truck driver / maintenance personnel: Kenneth Fletcher. Representing Pacific States Marine Fisheries Commission (PSMFC) was biologist Monty Price and Washington Department of Fish and Wildlife (WDF&W) biologist Sharon Lind. PSMFC technicians Carol Williams, Dawn Kunkel, and Wanda Blackwell conducted fish sampling, and were responsible for the numerous quality control and data keeping tasks.

Facility Modifications

The following modifications were made to the JFF prior to or during the 2011 fish collection season:

1. Installed a shade roof over con-x storage unit. This protects the contents from the high solar heat gain previously observed.
2. Modified safety cables at raceways to remove metal splinter hazard.
3. Completed the JFF archive in stairwells wasted space, and finished storage shelf improvements in the room off JFF shop.
4. Built protective covers over direct load barge hoses and over plastic position indicators for sample dewatering valves.

River Conditions

During the 2011 collection season, the average daily flow exceeded 100.0 kcfs on 79 days and exceeded 150 kcfs on 49 of these days. The highest daily average flow for the season was 216.4 kcfs on June 9. The lowest daily average flow for the season occurred on September 25 with a flow of 21.2 kcfs. The average flow for the season was 97.8 kcfs. Spill occurred for 154 days from April 1 through midnight on August 31, with a maximum spill of 104.0 on June 9. The RSW was deployed when Court ordered spill began on April 3.

River temperature averaged 56.1°F for the season and ranged from 42.1°F on April 8 to

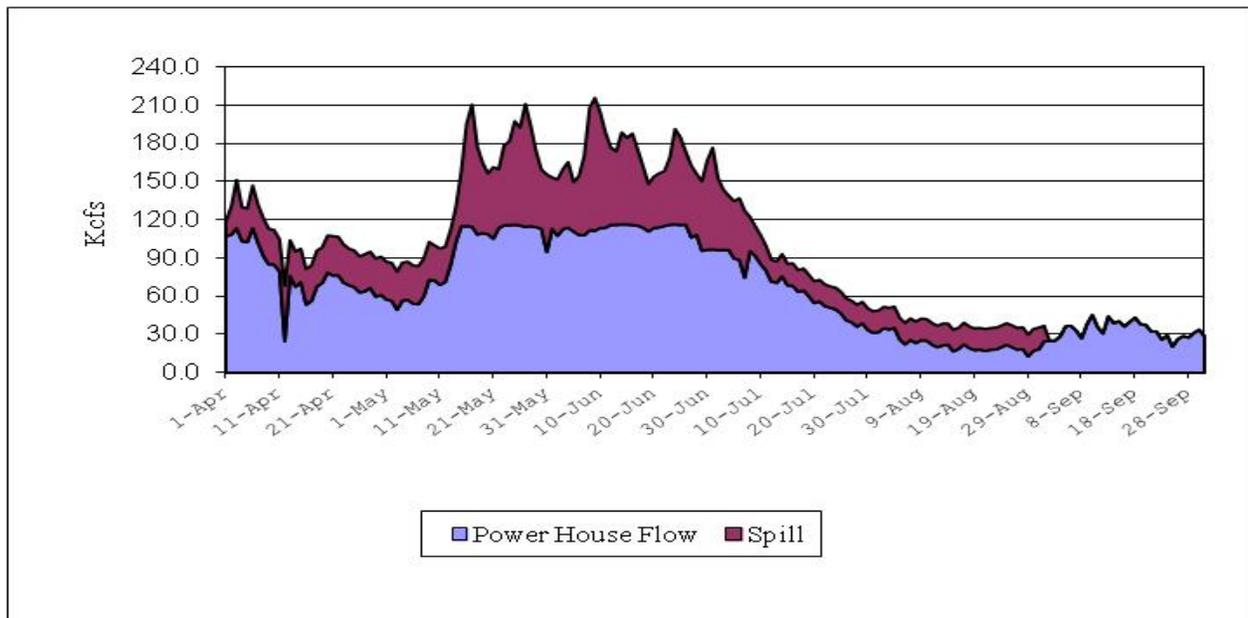
66.6° F on August 12. A comparison of daily powerhouse flow and spill is shown in Figure 1. Average monthly flow and spill for the 2007-2011 collection seasons are provided in Table 1.

Fish Collection

Migration and Collection

Pre-transport primary bypass occurred from March 14 to May 8. Fish collection for transportation began at 0700 hours on May 8 and, with the exception of a couple of interruptions, continued until 0700 hours on October 1. An estimated 1,582,908 juvenile salmonids were collected in 2011 (Table 2). Within each species group, the number collected and percent of the total collection was: 592,941 clipped yearling chinook (37.5%), 172,598 unclipped yearling chinook (10.9%), 76,552 clipped subyearling chinook (4.8%), 176,205 unclipped subyearling chinook (11.1%), 355,269 clipped steelhead (22.4%), 176,206 unclipped steelhead (11.1%), 8,326 clipped sockeye/kokanee (0.5%), 11,719 unclipped sockeye/kokanee (0.7%), and 13,092 clip/unclip coho (0.8%). Post-season bypass occurred from October 1 through December 15. Daily collection and bypass numbers are provided in Appendix Table 1.

Figure 1. Comparisons of daily powerhouse flow and spill at Lower Monumental Dam, 2011.



By the end of May, 82.2% of the total yearly collection had arrived. The percent of the total collection arriving by the end of June and the end of July was 94.7% and 99.0%, respectively. The months of August and September contributed about 1.0% of the total collection, and were responsible for the collection of 8.4% of the year's unclipped subyearling chinook.

The peak daily collection total and date for each species group were: clipped yearling

chinook 109,701 (May 16), unclipped yearling chinook 19,851 (May 15), clipped subyearling chinook 4,700 (June 3), unclipped subyearling chinook 8,609 (June 1), clipped steelhead 48,060 (May 16), unclipped steelhead 26,269 (May 19), clipped sockeye 1,600 (May 29), unclipped sockeye 1,045 (May 9), and clip/unclip coho 1,791 (May 21). Total daily collection in 2011 peaked at 192,388 (May 16). Peak collection date and daily collection total by species group are listed in Table 3. Daily collection of all species combined versus total flow is shown graphically in Figure 2.

Table 1. Comparisons of average monthly flow and spill at Lower Monumental Dam, 2007-2011.

Month	2007	2008	2009	2010	2011	Average
<u>Flow</u>						
April	46.1	51.2	86.9	40.6	108.3	66.6
May	77.8	113.4	115.6	65.0	141.9	102.7
June	45.4	126.6	111.2	127.2	171.9	116.5
July	30.9	54.8	48.7	46.8	93.4	54.9
August	23.7	34.1	30.4	29.1	39.9	31.4
Sept.	18.1	21.8	22.2	22.6	34.4	23.8
<u>Spill</u>						
April	21.6	24.2	25.7	18.1	27.9	23.5
May	20.6	35.0	33.8	28.8	49.2	33.5
June	20.7	33.4	25.4	36.8	59.1	35.1
July	15.8	16.9	17.5	18.3	25.9	18.9
August	11.3	17.0	16.4	14.1	16.9	15.1
Sept.	0.3	0.4	0.2	0.3	0.4	0.3

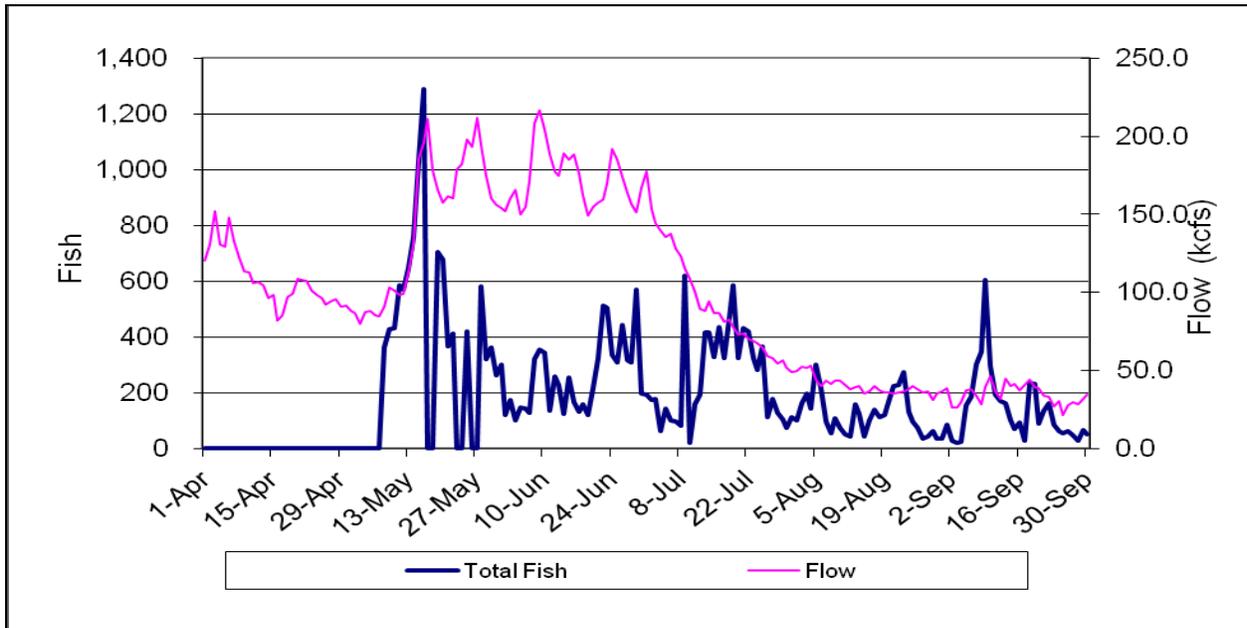
Adult Fallbacks

A total of 2,110 adult salmonids fell back through the juvenile bypass system and were bypassed from the separator between April 1 and October 1, 2010 (Table 4). The total includes: 254 adult chinook salmon, 152 jack chinook salmon, 557 clipped steelhead, 1,142 unclipped steelhead, 4 clipped sockeye, 1 unclipped sockeye, and no coho. The total fallback number in 2011 was the highest in the past 5 years with the 2009 operating year coming in second highest. All groups showed a marked increase in their numbers from 2010, except hatchery steelhead which decreased 15.3%. Jack chinook (+463%) and unclipped steelhead (+194%) showed the biggest change with adult chinook (+57%) a distant third. The daily numbers of adult fallbacks and fallback mortalities at Lower Monumental Dam can be found in Appendix Table 4.

As has been the case in previous years, most adult fallbacks in 2011 were steelhead. During the months of May and June 76.7% of the steelhead fallback occurred (Table 5). Spring/summer chinook accounted for 81.5% and fall chinook accounted for 18.5% of chinook

fallbacks. Monthly adult salmonid fallback peaked in May, with a second peak in September.

Figure 2. Daily juvenile salmonid collection, all species combined, versus daily average river flow at Lower Monumental Dam, 2011.



The condition of adult salmonids was evaluated as they were released from the separator. Their condition was predominantly good to fair with 84.6% of the fallbacks rated in these categories (Table 6). Condition ratings of the 2,105 adults examined were as follows: 1,156 good (54.9%), 624 fair (29.6%), 281 poor (13.3%), and 44 were dead (2.1%). The number and species group of dead adult salmonids was: 1 adult chinook, 14 clipped steelhead and 29 unclipped steelhead. Adult chinook had a higher percentage of good/fair fish (95.7%) than steelhead (82.0%).

Table 2. Annual collection, bypass, and transport at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un.	
<u>Collection</u>										
2007	238,259	33,735	17,441	25,229	449,158	119,033	3,561	593	13,524	900,533
2008	804,634	173,342	123,909	118,226	495,988	273,524	24,915	2,973	79,897	2,097,408
2009	250,165	63,625	136,847	188,835	398,056	115,117	11,460	4,469	14,011	1,182,585
2010	215,435	89,934	192,968	316,986	155,299	84,071	530	995	8,789	1,065,007
2011	592,941	172,598	76,552	176,205	355,269	176,206	8,326	11,719	13,092	1,582,908
<u>Bypass</u>										
2007	993	31	1,416	2,656	3,943	1,399	0	0	0	10,438
2008	600,095	101,070	774	1,469	347,937	191,131	17,013	743	70,648	1,330,880
2009	1,332	120	2,905	2,921	4,931	1,680	0	1	1	13,891
2010	1,046	46	91	495	3,140	1,319	0	0	0	6,137
2011	109,943	17,304	3,344	5,227	51,470	17,673	160	798	1,104	207,023
<u>Truck</u>										
2007	0	3	14	222	102	46	1	0	17	405
2008	1	3	89	2,093	3	2	0	3	0	2,194
2009	0	7	31	650	1	2	0	0	49	740
2010	1	2	13	1,423	0	2	0	0	0	1,441
2011	0	38	46	5,324	1	4	0	2	66	5,481
<u>Barge</u>										
2007	236,922	33,644	15,940	22,171	444,804	117,441	3,551	579	13,505	888,557
2008	204,260	72,178	122,769	114,466	147,912	82,336	7,902	2,226	9,246	763,295
2009	248,620	63,462	133,622	184,820	392,911	113,380	11,458	4,462	13,950	1,166,685
2010	214,220	89,844	192,538	314,702	151,968	82,617	530	991	8,789	1,056,199
2011	481,872	154,883	72,591	164,197	303,228	158,228	8,126	10,706	11,903	1,365,734
<u>Total Transported</u>										
2007	236,922	33,647	15,954	22,393	444,906	117,487	3,552	579	13,522	888,962
2008	204,261	72,181	122,858	116,559	147,915	82,338	7,902	2,229	9,246	765,489
2009	248,620	63,469	133,653	185,470	392,912	113,382	11,458	4,462	13,999	1,167,425
2010	214,221	89,846	192,551	316,125	151,968	82,619	530	991	8,789	1,057,640
2011	481,872	154,921	72,637	169,521	303,229	158,232	8,126	10,708	11,969	1,371,215

Table 3. Annual peak collection dates at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un	
2007	May 14 56,011	May 14 7,921	June 10 1,896	June 11 3,389	May 15 120,895	May 15 27,761	May 17 747	May 12 200	May 15 2,836	May 15 207,762
2008	May 21 390,000	May 21 61,045	June 6 10,360	June 6 5,976	May 21 192,388	May 21 109,104	May 21 10,000	May 23 448	May 23 47,463	May 21 810,597
2009	May 20 31,600	May 20 4,600	June 4 10,300	June 6 11,400	May 22 32,400	May 23 9,400	May 21 2,500	May 27 700	May 20 1,100	May 22 69,300
2010	May 19 40,261	May 19 7,908	June 11 26,000	June 10 35,800	May 22 12,200	May 21 7,000	May 26 100	May 22 100	June 5 1,600	June 10 74,800
2011	May 16 109,701	May 15 19,851	June 3 4,700	June 1 8,609	May 16 48,060	May 19 26,269	May 29 1,600	May 9 1,045	May 21 1,791	May 16 192,388

Table 4. Annual totals of adult salmonids released from the juvenile fish separator at Lower Monumental Dam, 2007-2011.

Year ¹	Adult Chinook	Jack Chinook	Clipped Steelhead	Unclipped Steelhead	Total
2007	78	17	458	295	848
2008	195	43	586	394	1,219 ²
2009	178	118	1,030	576	1,914 ³
2010	162	27	642	389	1,226 ³
2011	254	152	557	1,142	2,110 ³

¹ Seasons varied in length.

² Coho are included in the total.

³ Clipped and unclipped sockeye are included in the total.

Table 5. Monthly totals of adult salmonids released from the juvenile fish separator at Lower Monumental Dam, 2011.

Month	Adult Chinook	Jack Chinook	Clipped Steelhead	Unclipped Steelhead	Total
April	1	0	13	16	30
May	30	8	247	546	831
June	121	62	59	451	693
July	60	39	16	14	129
August	10	4	59	42	115
September	30	38	156	71	295
October	2	1	7	2	12
Total	254	152	557	1,142	2,105

¹Neither Coho or Sockeye are included in this table.

Table 6. Condition of adult salmonids¹ released from the juvenile fish separator at Lower Monumental Dam, 2011.

Condition	Adult Chinook	Jack Chinook	Clipped Steelhead	Unclipped Steelhead	Total
Good	213	135	307	501	1,156
Fair	30	9	171	414	624
Poor	10	8	65	198	281
Dead	1	0	14	29	44
Total	254	152	557	1,142	2,105

¹Neither Coho or Sockeye are included in this table.

Separator Efficiency

Separator efficiency for 2011 by species group was: clipped yearling chinook 80.6%, unclipped yearling chinook 83.1%, subyearling chinook 54.5%, clipped steelhead 60.5%, unclipped steelhead 42.1%, clipped sockeye/kokanee 42.3%, and unclipped sockeye/kokanee 54.3% (Table 7).

Table 7. Annual separator efficiency in percent at Lower Monumental Dam, 2007-2011.

Year	Clipped Yearling Chinook A-side	Unclipped ¹ Yearling Chinook A-side	Subyearling Chinook A-side	Clipped Steelhead B-side	Unclipped ¹ Steelhead B-side	Clipped Sockeye/Kokanee A-side	Unclipped Sockeye/Kokanee A-side
2007	60.4	62.9	54.3	93.3	82.7	40.6	47.2
2008	53.9	52.0	51.6	90.6	67.1	35.1	19.5
2009	58.8	53.2	54.4	92.3	71.4	40.3	38.9
2010	78.9	65.2	54.2	83.6	55.0	11.3	56.3
2011	80.6	83.1	54.5	60.5	42.1	42.3	54.3

¹This category includes unclipped hatchery fish.

Sampling

Consistent with the 2011 Fish Operations Plan (FOP) Appendix B and guidance provided by the Technical Management Team (TMT), the juvenile fish transportation program allows for a variable start date, based on expected river flows. During years when the spring seasonal average river flow in the Snake River is expected to equal or exceed 65 kcfs, transport operations will begin on staggered start dates between April 21 and May 1 at Lower Granite, Little Goose, and Lower Monumental Dams. Prior to a dam's transport start date, all fish collected will be bypassed to the river. In years when the spring seasonal average river flow is expected to be below 65 kcfs, transport operations at Lower Monumental Dam will start on April 1. This year TMT put out a system operational request (SOR) delaying the start of transportation at Lower Monumental Dam until May 8 at 0700 hours. The SOR was based on PIT tag travel time data showing that in-river migration of juvenile spring chinook passing Lower Granite Dam would arrive at Lower Monumental approximately 7 days later. As stipulated in the FPP all fish sampled during this time were bypassed.

Limited sampling took place for two purposes in accordance with the FOP from April 1 through May 7. Fish were sampled to monitor fish condition, ensure systems were operating correctly, and to train personnel on facility operation and sampling protocols. This type of sampling, "sampling for condition", was conducted every third day. The total number of fish sampled during this period was 4,039. The number sampled within each species group was: 889 clipped yearling chinook, 1,179 unclipped yearling chinook, no clipped or unclipped sub yearling chinook, 1,521 clipped steelhead, 237 unclipped steelhead, no clipped sockeye, 213 unclipped sockeye, and no hatchery coho. In all, 12.1% of all fish sampled in 2011 were sampled during this period.

Sampling for transport began at 0700 hours on May 8. Sample examinations were conducted daily through August 15, and on alternate days thereafter through October 1. A total of 33,504 fish (2.1% of the collection) was sampled in 2011 (Table 8). Within each species group, the number and percent sampled of those collected in that group was: 4,229 clipped yearling chinook (0.7%), 1,667 unclipped yearling chinook (1.0%), 3,663 clipped subyearling

chinook (4.8%), 17,792 unclipped subyearling chinook (10.1%), 3,440 clipped steelhead (1.0%), 2,076 unclipped steelhead (1.2%), 133 clipped sockeye/kokanee (1.6%), 222 unclipped sockeye/kokanee (1.9%), and 282 clip/unclip coho (2.2%). Average weekly sample rates ranged from 1.0% to 100% (Table 9).

Transportation

An estimated 1,371,215 juvenile salmonids (86.6% of the collection) were transported from Lower Monumental Dam in 2011. Of these, approximately 5,481 were transported by truck and 1,365,734 by barge. Within each species group, the number transported and percent of those collected in that group was: 481,872 clipped yearling chinook (81.3%), 154,921 unclipped yearling chinook (89.8%), 72,637 clipped subyearling chinook (94.9%), 169,521 unclipped subyearling chinook (96.2%), 303,229 clipped steelhead (85.4%), 158,232 unclipped steelhead (89.8%), 8,126 clipped sockeye/kokanee (97.6%), 10,708 unclipped sockeye/kokanee (91.4%), and 11,969 clip/unclip coho (91.4%). Daily truck and barge transportation numbers are provided in Appendix Table 3.

Table 8. Annual percentage sampled of each juvenile salmonid species group at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un.	
2007	1.0	1.6	24.7	39.4	1.6	2.0	2.9	6.1	2.5	3.0
2008	1.1	1.6	6.9	12.7	1.4	1.4	1.3	2.8	0.9	2.2
2009	1.5	1.9	7.5	10.6	1.9	2.1	1.3	2.1	6.3	3.9
2010	1.9	1.8	1.5	3.4	2.2	1.8	1.7	2.2	1.6	2.3
2011	0.7	1.0	4.8	10.1	1.0	1.2	1.6	1.9	2.2	2.1

There was no early season trucking from this site this year. Juvenile fish were trucked by midi-tanker, and later with the addition of the mini-tanker, from August 17 through October 1. A salt solution of 2.5 grams per liter (g/l) (6 pounds per 300 gallons of water) is used routinely in the mini and midi-tankers to treat or ease the *Columnaris* symptoms common at this time of year. A total of 5,481 fish (0.3% of the collection) were transported by truck in 2011 (Table 2). Within each species group, the number trucked and percent of those collected in that group was: no clipped yearling chinook (0.0%), 38 unclipped yearling chinook (0.02%), 46 clipped subyearling chinook (0.06%), 5,324 unclipped subyearling chinook (3.02%), 1 clipped steelhead (0.0%), 4 unclipped steelhead (0.0%), no clipped sockeye/kokanee, 2 unclipped sockeye/kokanee (0.02%), and 66 clip/unclip coho (0.5%).

Juvenile fish were transported by barge from Lower Monumental Dam from May 9 through August 15. An estimated 1,365,734 fish (86.3% of the collection) were transported by barge in 2011 (Table 2). Within each species group, the number barged and percent of those

collected in that group was: 481,872 clipped yearling chinook (81.3%), 154,883 unclipped yearling chinook (89.7%), 72,591 clipped subyearling chinook (94.8%), 164,197 unclipped subyearling chinook (93.2%), 303,228 clipped steelhead (85.4%), 158,228 unclipped steelhead (89.8%), 8,126 clipped sockeye/kokanee (97.6%), 10,706 unclipped sockeye/kokanee (91.4%), and 11,903 clip/unclip coho (90.9%).

Bypass

Primary bypass occurred from March 14 through May 7. There were a couple of other periods early this season in May when the facility was again put into primary bypass. Sampling at this time was for fish condition monitoring (COE). During the juvenile transport season (May 8 to October 1) a total of 207,023 fish were bypassed, 13.08% of the collection (Table 2). Within each species group, the number bypassed and percent of those collected in that group was: 109,943 clipped yearling chinook (18.5%), 17,304 unclipped yearling chinook (10.0%), 3,344 clipped subyearling chinook (4.4%), 5,227 unclipped subyearling chinook (3.0%), 51,470 clipped steelhead (14.5%), 17,673 unclipped steelhead (10.0%), 160 clipped sockeye/kokanee (1.9%), 798 unclipped sockeye/kokanee (6.8%), and 1,104 clip/unclip coho (8.4%). These numbers include fish examined for GBT during the transport season, but not fish bypassed by the PIT tag system.

Juvenile salmonids were bypassed rather than transported for the following purposes this season.

1. A total of 598 fish were checked for GBT symptoms from May 8 through September 1. All GBT evaluated fish were taken from the porosity control unit and were bypassed via the adult fish release pipe.
2. Fish sampling for condition monitoring took place from April 1 to May 7 at 1500 hours; these fish were bypassed to the river. During this period a total of 4,039 fish were bypassed. Within each species group, the number bypassed and percent of those collected in that group was: 889 clipped yearling chinook (0.1%), 1,179 unclipped yearling chinook (0.7%), no clipped subyearling chinook (0.0%), no unclipped subyearling chinook (0.0%), 1,521 clipped steelhead (0.4%), 237 unclipped steelhead (0.1%), no clipped sockeye/kokanee (0.0%), 213 unclipped sockeye/kokanee (1.8%), and no clip/unclip coho (0.0%). In all, 12.1% of all fish sampled in 2011 were sampled during this period. These fish are not included in the bypass numbers.
3. Fish were sampled from 1500 hrs on May 7 to 0700 hrs May 8 to obtain data for transportation calculations. During this time the facility was in secondary bypass. These sampled fish were returned to the river. During this period a total of 54,172 fish were bypassed and they are not included in the bypass numbers of the appendix. Within each species group, the number bypassed for this event was: 26,716 clipped yearling chinook, 13,731 unclipped yearling chinook, no clipped subyearling chinook, no unclipped subyearling chinook, 11,640 clipped steelhead, 1,192 unclipped steelhead, no clipped sockeye/kokanee, 744 unclipped sockeye/kokanee, and 149 clip/unclip coho.
4. On May 16 at 1500 hrs the facility was again put on primary bypass due to high river flows. Because the barge could not transition to the barge dock under these high

- flows 192,126 fish were released from the raceways into the river.
5. The facility was put into primary bypass at 1500 hrs on May 22 because of a lock outage at The Dalles Dam. Because the river flows were high, collection for transport didn't resume until 1500 hrs on May 27.
 6. The PTAGIS3 database revealed that 240,888 PIT-tagged fish of different species groups were bypassed through the PIT tag system. These fish are not included in the facility bypass total.

PIT-tag diversion gates are set to bypass PIT-tagged fish when sample rates are 20% or higher, and during sampling intervals when fish were being collected for research (this prevents anesthetizing study fish a second time).

The fish rearing designation used by PTAGIS is hatchery/wild not clipped/unclipped; therefore you will find said designation used to report the PIT tag numbers in the following section rather than the clipped/unclipped designation used throughout the rest of this report. According to the PTAGIS3 database, 240,888 PIT-tagged fish were detected at Lower Monumental Dam in 2011. Of these, 87,539 were bypassed through the PIT tag diversion system to the river (36.3%), 1,802 were last interrogated by the sample monitor (0.7%) (transported), 46,239 last interrogated by the raceway monitors (19.2%) (transported), and 105,308 were last interrogated at monitors that do not constitute exits to the river or transport system (43.7%) (fish disposition unknown). The composition of bypassed PIT-tagged fish was: 23,138 hatchery spring/summer chinook, 21,885 hatchery fall chinook, 3,987 hatchery chinook of unknown run, 8,332 wild spring/summer chinook, 51 wild fall chinook, 4,966 wild chinook of unknown run, 612 chinook of unknown run or rearing disposition, 29,481 hatchery steelhead, 5,524 wild steelhead, 30 steelhead of unknown rearing, 6,607 hatchery sockeye, 32 wild sockeye, 161 hatchery coho, and 502 orphans. An unknown number of other fish were bypassed incidentally with the PIT-tagged fish as the PIT-tag diversion gates opened and closed to divert the PIT tagged fish.

In addition it is believed that an unknown number of PIT-tagged and other fish escaped from the sample holding tanks through the emergency evacuation slots. These slots are fitted with removable screens and are normally closed, however they were accidentally and inadvertently opened during the course of the season probably by technicians cleaning the holding tanks. The open slot was not found until the sample holding tanks were drained at the end of the season. Locking devices will be installed on these gates before the 2012 outmigration to prevent this in the future.

Incidental Species

Non-target fish species that were too large to pass through the separator bars were recorded and bypassed through the adult release pipe at the separator. Those that were small enough to pass through the separator bars were either sampled and bypassed, or held in the raceways and transported with the juvenile salmonids. Fortunately, most incidentals generally arrive late in the season while we are sampling 100% of the collection. At that time they are easily removed while working up the sample, therefore avoiding transport. Sample fish from each incidental species were counted and their total numbers were calculated using the sample rate. These numbers were then added with separator counts of the same group to estimate the

total collection for each species. The most common incidental species for 2011 included: juvenile shad (23,201), peamouths (7,757), sucker spp. (6,353), Siberian prawn (2,818), juvenile pacific lamprey (750), whitefish (739), and juvenile and adult smallmouth bass (393). The group showing the largest increase from the previous year was peamouth, rising from 3,225 collected last year, to this year's 7,756 fish. Juvenile shad numbers remained high but did not approach the 2010 operating year collection of 35,673. The number of some of the other fish species dropped dramatically. Shad and other species numbers often tend to fluctuate from year to year, but, this year we saw an unprecedented falloff on the collection of juvenile lamprey (750) and sculpin (75). Last year the expanded collection of the juvenile (silver) lamprey was 218,102 fish, but only 750 fish were collected this year. The brown lamprey (ammocoete) collection last year was 2,802 fish, but only 8 were seen in the sample this year. It is unclear if this represents an actual drop in the fish numbers, because upon dewatering we found that we had partial opening of some perforated plate slide gates located on the back wall of the sample holding tanks. These openings are at the bottom of the discharge wall of the tank, and would act as a made to order form of egress for lamprey and sculpin. The change in collected incidental fish could also be a reflection of the change in population numbers from year to year. Last year's collection of silver lamprey was several times larger than that seen in previous years. Estimated numbers of some groups may become exaggerated from year to year due to the low sample rates on the days they occurred. Historically, juvenile crappie is one of our most encountered incidental species, however, their numbers have plummeted over time and were extremely low again this year. The sandroller was another species missing this year with only 23 observed. Sandroller and yellow perch numbers this year were based on single representatives in the sample. A summary of incidental fish collection and disposition is provided in Table 10.

Table 9. Weekly sample rates in percent and sample totals at Lower Monumental Dam, 2011.

Week Ending	Weekly Rate (%)	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho Clip/Un.	Totals*
		Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.		
07-Apr	0.0	0	0	0	0	0	0	0	0	0	0
14-Apr	0.0	0	0	0	0	0	0	0	0	0	0
21-Apr	0.0	0	0	0	0	0	0	0	0	0	0
28-Apr	0.0	0	0	0	0	0	0	0	0	0	0
05-May	0.0	0	0	0	0	0	0	0	0	0	0
12-May	14.8	1,061	433	0	0	492	73	0	13	8	2,080
19-May	0.7	2,352	498	1	5	1,122	419	0	17	15	4,429
26-May	43.2	579	237	6	3	604	398	17	6	30	1,880
02-Jun	13.4	163	109	153	365	507	514	56	41	40	1,948
09-Jun	2.6	37	31	304	458	257	213	21	36	5	1,362
16-Jun	5.2	23	56	423	487	253	215	18	24	7	1,506
23-Jun	6.5	6	68	813	815	96	127	11	23	6	1,965
30-Jun	5.0	3	80	892	1,355	57	69	6	15	3	2,480
07-Jul	6.2	5	28	241	639	20	12	0	3	1	949
14-Jul	16.7	0	40	327	1,492	18	11	2	9	2	1,901
21-Jul	14.8	0	12	301	2,540	8	9	1	16	4	2,891
28-Jul	10.0	0	15	99	1,665	1	2	0	15	9	1,806
04-Aug	14.8	0	8	19	831	1	0	1	1	33	894
11-Aug	20.3	0	6	16	823	1	1	0	0	37	884
18-Aug	57.1	0	13	11	669	0	2	0	3	21	719
25-Aug	100.0	0	12	12	1,193	0	2	0	0	20	1,239
01-Sep	100.0	0	6	2	340	0	0	0	0	16	364
08-Sep	100.0	0	6	8	1,033	1	1	0	0	11	1,060
15-Sep	100.0	0	7	23	1,556	1	2	0	0	9	1,598
22-Sep	100.0	0	1	2	956	1	3	0	0	4	967
29-Sep	100.0	0	1	5	390	0	3	0	0	1	400
01-Oct	100.0	0	0	5	163	0	0	0	0	0	168
Total Sampled		4,229	1,667	3,663	17,792	3,440	2,076	133	222	282	33,504
% of Sample		12.6	4.9	10.9	53.1	10.3	6.2	0.4	0.7	0.8	100.0
% of Collection		0.7	1.0	4.8	10.1	1.0	1.2	1.6	1.9	2.2	2.1

* 24 hour sampling at Lower Monumental Dam began this year on May 6.

Fish Condition

Descaling

Descaling data was collected from all live sample fish (full sample) rather than just a portion (subsample). Full sample data collection provides a larger sample size and therefore a better representation of fish condition.

The descaling rate for all fish sampled in 2011 was 3.0%. The annual descaling rate by species group was: clipped yearling chinook 4.5%, unclipped yearling chinook 2.2%, clipped subyearling chinook 2.7%, unclipped subyearling chinook 1.8%, clipped steelhead 5.9%, unclipped steelhead 4.7%, clipped sockeye/kokanee 1.5%, unclipped sockeye/kokanee 3.7%, and clip/unclip coho 4.3% (Table 11). The highest rate ever recorded at the JFF was 6.7 in 1993. Rates of the last five years have ranged from a low of 1.8% in 2009 to a high of 4.9% in 2007.

The highest weekly descaling rate for all species combined was 5.8% for the week ending May 19, while the lowest rate (1.1%) occurred the week ending September 22 (Table 12). Daily descaling rates are provided in Appendix Table 2.

Other Injuries and Disease

Injury data was gathered from a sub sample of 100 of the dominant species and not more than 100 each of the non-dominant species. There were 21,496 fish examined for injury and disease in 2011. The most common symptom observed in 2011, as has been the case in other years, was blood pooling. Blood pooling is defined as the vasodilatation of the capillaries in fins (also referred to as fin pinkness). It seems to be a symptom of anesthetic use during higher water temperatures and is mostly found on subyearling chinook. Evidence of blood pooling was found on 7.1% of all fish examined. The incidence of blood pooling by species group was: clipped yearling chinook 0.6%, unclipped yearling chinook 0.4%, clipped subyearling chinook 2.7%, unclipped subyearling chinook 15.2%, clipped steelhead 0.9%, unclipped steelhead 0.6%, clipped sockeye/kokanee 0.0%, unclipped sockeye/kokanee 0.0%, and clip/unclip coho 1.4%.

Fin hemorrhaging is not to be confused with blood pooling. Hemorrhaging is the discharge of blood outside the body. Fin hemorrhaging is a sign of trauma. Hemorrhaging was found on 2.4% of all fish examined for injuries in 2011. The incidence of hemorrhaging by species group was: clipped yearling chinook 2.7%, unclipped yearling chinook 2.9%, clipped subyearling chinook 1.5%, unclipped subyearling chinook 3.7%, clipped steelhead 0.5%, unclipped steelhead 0.2%, clipped sockeye/kokanee 0.8%, unclipped sockeye/kokanee 2.1%, and clip/unclip coho 1.4%.

Other common injuries included bird marks, body fungus, body damage, and folded opercula. Bird marks were observed on 1.6% of all fish examined. Most of the bird mark injuries were on clipped yearling chinook 3.2%, clipped steelhead 4.4%, and unclipped steelhead 3.0%.

Fungus was found on 0.3% of all fish examined. Fungus was found on all species and rearing types with the exception of clipped sockeye. The occurrence of fungus is generally seen early in the season while the water is still relatively cold.

Columnaris was seen again this year. It occurs most frequently in subyearling chinook but is seen on coho as well. Typically it is found on the fish during the warmer water conditions of July, August, and September. Peamouth also appear to be susceptible to this disease. *Columnaris* can be recognized by the presence of yellowish lesions on the belly, as well as some damage to the gills, pelvic fins, snout, and caudal fins. It was also found in the dorsal region this year. This year both clipped and unclipped subyearling chinook, as well as a couple of coho showed signs. *Columnaris* rates for the species above were: clipped subyearling chinook 0.5%, unclipped subyearling chinook 4.9%, and hatchery coho 1.4%. Daily *columnaris* rates were the historic high at this facility this year with rates for the unclipped subyearling chinook reaching a high of 47% on September 25. The last 3 weeks of September had an average daily rate of 26.8%. The mortality rate for unclipped subyearling chinook on September 25 was 22.2%. The average daily mortality rate from September 10 to October 1 was 15.5%. The mortality rate closely mirrored the *Columnaris* rate during this time.

Mortality

Annual facility mortality for all groups combined was 0.3% in 2011 (Table 13) and totaled 4,670 fish. Within each species group, the number of facility mortalities and percent of those collected in that group was: 1,126 clipped yearling chinook (0.2%), 373 unclipped yearling chinook (0.2%), 571 clipped subyearling chinook (0.7%), 1,457 unclipped subyearling chinook (0.8%), 570 clipped steelhead (0.2%), 301 unclipped steelhead (0.2%), 40 clipped sockeye/kokanee (0.5%), 213 unclipped sockeye/kokanee (1.8%), and 19 clip/unclip coho (0.1%). Total annual facility mortality has ranged from a low of 0.1% in 1997, 1999, and from 2006 through 2010 to a high of 0.5 % in 2001. Weekly mortality rates had a high of 19.8% for the week ending September 29 and a low of 0.1% for the week ending May 12 (Table 14). Daily mortality rates are provided in Appendix Table 2.

Annual sample mortality for all groups combined was 2.0% in 2011 (Table 15) and totaled 659 fish. The number of sample mortalities and mortality rate by species group was: 1 clipped yearling chinook (0.0%), no unclipped yearling chinook (0.0%), 26 clipped subyearling chinook (0.7%), 624 unclipped subyearling chinook (3.5%), 2 clipped steelhead (0.1%), no unclipped steelhead (0.0%), no clipped sockeye/kokanee (0.0%), no unclipped sockeye/kokanee (0.0%), and 6 clip/unclip coho (2.1%). Sample mortality for all groups combined has ranged from a low of 0.3% in 2008 and 2010 to the high this year of 2.0%.

Annual post-sample mortality for all groups combined was 0.2% in 2011 and totaled 56 fish. The number of post-sample mortalities and mortality rate by species group was: 2 clipped yearling chinook (0.05%), 1 unclipped yearling chinook (0.06%), 4 clipped subyearling chinook (0.11%), 44 unclipped subyearling chinook (0.25%), 2 clipped steelhead (0.06%), 1 unclipped steelhead (0.05%), and 2 clip/unclip coho (0.71%). . The highest post-sample mortality rate (0.7%) occurred in 2004 and the lowest (0.0%) in 1999.

Annual truck mortality for all groups combined in 2011 was 0.8% (45 of 5,481 fish). The number of truck mortalities and mortality rate by species group was: 1 clipped yearling chinook (2.2%) and 44 unclipped yearling chinook (0.8%). The annual truck mortality rate in 2010 was 0.14%.

Table 10. Estimated collection of incidental species at Lower Monumental Dam, 2011.

Common Name	Scientific Name	Exp. Sample	Separator	Total Collection ¹
American shad (Adult)	<i>Alosa sapidissima</i>	1	79	80
American shad (Juvenile)	<i>A. sapidissima</i>	22,787	414	23,201
Banded Killifish	<i>Fundulus diaphanus</i>	10**	0	10
Bullhead (misc.)	<i>Amiurus</i> spp.	26	2	28
Bull Trout	<i>Salvelinus confluentus</i>	1*	5	6
Channel catfish	<i>Ictalurus punctatus</i>	8	100	108
Chiselmouth	<i>Acrocheilus alutaceus</i>	144	4	148
Common carp	<i>Cyprinus carpio</i>	85	178	263
Crappie	<i>Pomoxis</i> spp.	6	1	7
Kokanee	<i>Oncorhynchus nerka</i>	917	0	917
Northern Pikeminnow	<i>Ptychocheilus oregonensis</i>	5	10	15
Pacific lamprey (Adult)	<i>Lampetra tridentatus</i>	25	2	27
Pacific lamprey (Juvenile)	<i>L. tridentatus</i>	746	4	750
Pacific lamprey (Ammocoete)	<i>L. tridentatus</i>	8	0	8
Peamouth	<i>Mylocheilus caurinus</i>	7,719	38	7,757
Rainbow Trout ²	<i>Oncorhynchus mykiss</i>	0	10	10
Sandroller	<i>Percopsis transmontana</i>	22	1	23
Sculpin	<i>Cottus</i> spp.	75	0	75
Siberian Shrimp/Prawn	<i>Exopalaemon modestus</i>	2,814	4	2,818
Smallmouth bass	<i>Micropterus dolomieu</i>	384	9	393
Sucker (misc.)	<i>Catostomus</i> spp.	6,176	177	6,353
Sunfish (misc.)	<i>Lepomis</i> spp.	19	3	22
Whitefish	<i>Prosopium</i> spp.	735	4	739
White Sturgeon	<i>Acipenser transmontanus</i>	1	5	6
Walleye	<i>Stizostedion vitreum</i>	0	19	19
Warmouth	<i>Lepomis gulosus</i>	0	0	0
Yellow perch	<i>Perca flavescens</i>	1	18	19
Others	-----	119	160 ²	279
Total		42,834	1,247	44,081

¹ Incidental species collection estimates are based on (sampled number of group expanded by the sample rate) plus separator count.

² Rainbow trout are classified by morphological characteristics, but this may include juvenile steelhead.

*Only one Bull Trout was sampled. For that sample rate we would have gotten 50 fish, which was unlikely. **This is the first Killifish that we have seen in the sample, and expanding the one sample fish out gives us 10 fish.

Table 11. Annual descaling rates in percent for fish sampled at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho Clip/Un.	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.		
2007	4.5	3.6	2.8	4.0	5.6	7.3	2.9	10.5	7.1	4.9
2008	4.2	3.4	3.0	3.5	7.0	5.8	3.3	3.3	3.8	4.3
2009	2.2	1.3	1.2	1.0	3.2	2.6	2.0	3.4	1.8	1.8
2010	3.2	2.2	2.3	1.6	4.2	3.7	0.0	4.8	3.6	2.5
2011	4.5	2.2	2.7	1.8	5.9	4.7	1.5	3.7	4.3	3.0

Research

Gas Bubble Trauma Monitoring (PSMFC)

Juvenile chinook and steelhead were sampled once a week for GBT from April 07 through August 31 in 2011. This season 1,745 fish were sampled for GBT. PSMFC personnel examined up to 100 individuals of each of the following groups: yearling chinook, subyearling chinook, and juvenile steelhead. The fish were searched for evidence of bubbles in paired and unpaired fins, and in the eye, as per Fish Passage Center GBT protocols. After examination the fish were bypassed to the river. Weekly GBT sampling continued for up to eight hours or until 100 fish had been sampled per species group. The number sampled for GBT by species group was: 269 clipped yearling chinook, 196 unclipped yearling chinook, 82 clipped subyearling chinook, 334 unclipped subyearling chinook, 616 clipped steelhead, and 248 unclipped steelhead. In the 2011 season, 52 fish showed signs of GBT.

Operation and Maintenance

Turbine Operations

Efforts were made to operate all turbine units within one percent of the peak efficiency from April 1 to October 31. Deviations were infrequent and brief or required by BPA.

Unit outages from April 1 through October 31 were fairly common. Total unit unavailable time through this period was 2,272.4 hours. The unit and total time unavailable was: Unit 1 (429.7 hours), Unit 2 (487.4 hours), Unit 3 (368.6 hours), Unit 4 (466.7 hours), Unit 5 (564.3 hours) and Unit 6 (798.8 hours). Causes included: trash rack raking, STS/VBS installation/inspection and repair, annual maintenance, voltage regulator repair, and slip ring

cleaning. It is impractical to list these occurrences and the time required individually in this report, but most are noted in the Lower Monumental seasonal weekly reports.

Table 12. Weekly descaling rates in percent for fish sampled at Lower Monumental Dam, 2011.

Week Ending	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho Clip/Un.	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.		
07-Apr	---	---	---	---	---	---	---	---	---	---
14-Apr	---	---	---	---	---	---	---	---	---	---
21-Apr	---	---	---	---	---	---	---	---	---	---
28-Apr	---	---	---	---	---	---	---	---	---	---
05-May	---	---	---	---	---	---	---	---	---	---
12-May	4.5	1.5	---	---	3.3	0.0*	---	0.0*	0.0*	3.5
19-May	5.6	4.2	0.0*	0.0*	7.9	3.3	---	0.0*	20.0*	5.8
26-May	3.5	3.9	0.0*	0.0*	9.4	4.1	0.0*	16.7*	3.3*	5.5
02-Jun	1.4	1.0	3.5	0.9	8.0	6.2	3.6	7.3	2.5	4.6
09-Jun	0.0*	0.0*	4.4	1.3	7.7	7.7	0.0*	0.0*	0.0*	3.9
16-Jun	0.0*	1.9*	4.7	3.1	8.9	6.4	0.0*	8.3*	0.0*	4.8
23-Jun	16.7*	0.0*	2.2	2.3	6.7*	8.2	0.0*	4.3*	0.0*	2.7
30-Jun	0.0*	1.3*	1.5	1.1	6.8*	8.2*	0.0*	13.3*	0.0*	1.5
07-Jul	0.0*	0.0*	1.3	2.2	0.0*	8.3*	---	0.0*	0.0*	1.9
14-Jul	---	2.5*	3.8	1.7	5.9*	0.0*	0.0*	22.2*	0.0*	2.2
21-Jul	---	0.0*	2.4	1.8	0.0*	0.0*	0.0*	6.3*	0.0*	1.8
28-Jul	---	13.3*	2.0*	2.0	---	0.0*	---	6.7*	0.0*	2.1
04-Aug	---	0.0*	17.6*	1.9	0.0*	---	0.0*	0.0*	3.1*	2.2
11-Aug	---	0.0*	14.3*	1.8	0.0*	0.0*	---	---	8.1*	2.3
18-Aug	---	7.7*	0.0*	2.0	---	0.0*	---	0.0*	5.3*	2.2
25-Aug	---	8.3*	0.0*	1.8	---	0.0*	---	---	0.0*	1.8
01-Sep	---	0.0*	0.0*	0.9	---	---	---	---	12.5*	1.4
08-Sep	---	0.0*	12.5*	1.4	0.0*	0.0*	---	---	0.0*	1.5
15-Sep	---	0.0*	0.0*	2.1	0.0*	0.0*	---	---	0.0*	2.0
22-Sep	---	0.0*	0.0*	1.1	0.0*	0.0*	---	---	0.0*	1.1
29-Sep	---	100.0*	0.0*	2.9	---	0.0*	---	---	0.0*	3.1
01-Oct	---	---	0.0*	2.9	---	---	---	---	---	2.8
Total										
<u>Descaled</u>	234	59	97	298	262	97	2	16	12	1,077
Total										
<u>Examined</u>	5,246	2,703	3,555	16,834	4,482	2,076	133	437	277	35,743
Percent										
<u>Descaled</u>	4.5	2.2	2.7	1.8	5.9	4.7	1.5	3.7	4.3	3.0

--- No fish sampled during the week.

* Fewer than 100 fish sampled during the week.

Table 13. Annual facility mortality in percent at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un.	
2007	0.1	0.2	0.4	0.7	0.1	0.1	0.3	2.4	0.0	0.1
2008	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1
2009	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1
2010	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.4	0.0	0.1
2011	0.2	0.2	0.7	0.8	0.2	0.2	0.5	1.8	0.1	0.3

Table 14. Weekly facility mortality rates in percent at Lower Monumental Dam, 2011.

Week Ending	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un.	
07-Apr	---	---	---	---	---	---	---	---	---	---
14-Apr	---	---	---	---	---	---	---	---	---	---
21-Apr	---	---	---	---	---	---	---	---	---	---
28-Apr	---	---	---	---	---	---	---	---	---	---
05-May	---	---	---	---	---	---	---	---	---	---
12-May	0.1	0.1	---	---	0.1	0.1	---	2.7	0.0	0.1
19-May	0.2	0.2	0.0	0.0	0.1	0.1	---	3.5	0.2	0.2
26-May	0.2	0.2	0.0	0.0	0.1	0.1	0.7	4.7	0.0	0.2
02-Jun	1.3	1.1	1.6	0.4	0.4	0.4	0.2	0.9	0.1	0.6
09-Jun	0.1	0.7	0.7	0.5	0.6	0.2	1.0	0.7	0.3	0.5
16-Jun	0.0	0.0	1.2	1.0	0.5	0.4	3.1	1.1	0.0	0.9
23-Jun	0.0	0.0	0.4	0.3	0.2	0.1	2.4	0.8	0.0	0.3
30-Jun	0.0	0.0	0.2	0.2	0.4	0.4	0.0	0.0	0.0	0.2
07-Jul	0.0	0.0	0.4	0.3	0.0	0.0	---	1.8	0.0	0.3
14-Jul	---	0.0	0.6	0.4	0.0	1.6	0.0	0.0	0.0	0.4
21-Jul	---	0.0	0.3	0.4	0.0	1.4	0.0	0.9	3.6	0.4
28-Jul	---	0.0	0.5	0.7	0.0	5.0	---	0.0	0.0	0.7
04-Aug	---	0.0	2.3	1.8	0.0	---	0.0	0.0	0.5	1.7
11-Aug	---	0.0	6.8	1.8	0.0	0.0	---	---	0.0	1.8
18-Aug	---	0.0	4.3	3.5	---	0.0	---	16.7	7.4	3.6
25-Aug	---	0.0	0.0	2.1	---	0.0	---	---	15.0	2.3
01-Sep	---	0.0	0.0	2.6	---	---	---	---	0.0	2.5
08-Sep	---	0.0	0.0	2.5	0.0	0.0	---	---	0.0	2.5
15-Sep	---	0.0	60.9	18.6	0.0	0.0	---	---	0.0	19.0
22-Sep	---	0.0	50.0	12.7	0.0	0.0	---	---	0.0	12.6
29-Sep	---	0.0	40.0	19.7	---	0.0	---	---	0.0	19.8
01-Oct	---	---	0.0	15.3	---	---	---	---	---	14.9

--- No fish collected during the week.

Table 15. Annual sample mortality in percent at Lower Monumental Dam, 2007-2011.

Year	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
	Clipped	Unclip	Clipped	Unclip.	Clipped	Unclip.	Clipped	Unclip.	Clip/Un.	
2007	0.4	0.1	0.6	1.0	0.5	0.8	0.0	0.0	0.0	0.6
2008	0.2	0.2	0.4	0.4	0.2	0.1	0.0	0.0	0.0	0.3
2009	0.1	0.4	0.4	0.5	0.1	0.2	0.0	1.0	0.2	0.4
2010	0.2	0.1	0.6	0.5	0.2	0.3	0.0	4.6	0.0	0.4
2011	0.0	0.0	0.7	3.5	0.1	0.0	0.0	0.0	2.1	2.0

Debris/Trash Racks

Trash rack raking occurred between March 11 and 12. A total of 115 cubic yards of debris was removed in this operation.

Submersible Screens

The submersible traveling screens (STSs) were inspected and tested on March 10 and were installed on March 13 and 14. Screen inspection began with the on deck inspection March 10. Inspection was done monthly by underwater video camera thereafter through November. The only STS problems during the 2011 season were in gatewells 3B twice (8/1 and 10/3), 3C (7/6), 2C twice (9/7 and 11/7) and 4C (9/7). Screens had missing clips, and/or tears and were repaired and/or replaced generally within a day of when discovered. The STS in 2C was replaced a week post discovery.

STSs were operated in “cycle” mode while the average fork length of subyearling chinook and/or sockeye/kokanee were greater than 120 mm (March 14 through May 31), and in continuous “run” mode when either was less than 120 mm (May 31 to August 16). From August 16 to December 16 they again were operated in cycle mode as fish length exceeded 120 mm.

Vertical Barrier Screens

The vertical barrier screens (VBSs) were inspected by underwater video camera in July. Additionally, they were spot-checked monthly during STS inspections. No problems were found.

Gatewells

Dipping the bulkhead slots (gatewells) yielded 73 cubic yards of debris this season. Gatewells were normally less than 10% covered. Gatewell drawdown was out of criteria on June 26 with readings in gatewells 2B and 2C that were 0.4’ over the allowable 1’ deviation from the initial annual reading. The unit was taken out of service and fifty one cubic yards of debris were raked from unit 2 trash racks at that time. Gatewells exceeded the 50% debris criterion seven times this season; once in unit 1, four times in unit 2, and once in unit 6. High flow and a heavy debris load was the cause. In all cases debris was promptly removed as soon as a crew was

available.

Orifices/Collection Channel

During the 2011 season the number of open orifices varied from 18 to 21 according to forebay level. With the Lower Monumental reservoir at minimum operating pool, water discharge through an orifice is reduced. During this period, extra orifices were opened to supply additional water to the adult fishway. Orifices were cycled and backflushed with air daily to remove debris. Orifice fouling was a problem while high flows and a large debris load were occurring. Orifice lights were checked daily. If a light was not working, the operating orifice was switched to the other orifice in the slot until repairs could be made.

Primary Dewaterer

Three major problems occurred regarding the primary dewaterer this season. 1. The programmable logic controller, controlling the mechanical screen cleaner and weirs, had undergone electrical maintenance over the winter and its switch had inadvertently been left in the off position. After water up, seeing that the gear would work in manual though not in auto, the mechanical cleaner was operated manually, as often as hourly, and a trouble report was issued to have the problem corrected. Eventually it was. 2. The brake on the primary dewaterer mechanical screen cleaner failed on June 2. It took weeks to determine why the cleaner was drifting off the east travel limit switch, and thereby, was thwarting the automated systems begin-cycle commands. It was additionally out of service for approximately a month until brake repair parts arrived. A replacement motor and brake assembly has been added to our emergency parts supply. 3. The weir drive gearbox for weir #6 had a drive gear failure early in the season. The weir stem was set to an acceptable elevation and an adjustment nut was used to hold it in place. A new gear will be machined and installed this winter.

The bubbler system maintained a clean screen through the period with some help via manual cycling of the mechanical screen cleaning system. The compressed air screen cleaner functioned well, as usual, and the system as a whole functioned very well keeping debris from plugging the inclined screen. No other breakdowns occurred during the transport season but occasional adjustment of the cables and cable tension device of the mechanical screen cleaner was required.

Wet Separator/Distribution and Sampling Systems

Sudden water level drops occurred at the separator again this year. Water level fluctuations in the forebay, automatic adjustments of the weirs at the primary dewaterer, and the closing and opening of orifices were the main causes. As has been the case for the last few years, the separator was run at a higher water level to mitigate this problem. The tech section at the dam is investigating the problem to pin down the root cause so that a solution can be formulated.

A Smith Root counter box worked poorly in early April. The cause was a loose wire at

the plug. It was repaired and a new racking arrangement is being developed to prevent the cable from the plugs from being crimped and stressed.

No problems occurred with the PIT-tag diversion gates this season. Gate position sensors were installed five years ago. These sensors act to prevent the over-travel problem we once had and by so doing they eliminated gate failure problems caused by metal fatigue.

Barge Loading Operations

Barge loading operations occurred from May 8 through August 16. Barge loading went very smoothly this season. The downstream mooring bit guide for the downstream mooring bit, having been deformed in a collision by a barge years ago, has had a problem with sticking low in the guides and not floating. Additionally it has been taking on water. Plans are being made to pull the mooring bit and take measurements to find the problem.

Truck Loading Operations

Juvenile fish were trucked by mini and midi-tankers from August 16 to October 1. Throughout the late season the mini and midi-tankers were used because of low fish numbers. A 2.5 mg/l salt solution was used to treat and/or ease suspected outbreaks of *columnaris*. Every day trucking occurred from September 22 through October 1 due to an extremely high incidence of *columnaris*.

Recommendations

1. Design and fabricate screened overflow weirs on the sides of the separator to maintain a minimum water level under higher supply volumes. This will prevent water level drops in the separator.
2. Replace the separator adult fish release pipe with a pipe of larger diameter for the ease of accommodating larger fish.
3. Resolve the separator sudden water loss problem so that separator efficiency can be improved and fish safety can be achieved at optimum separator water levels. Also make sure the alarm system for the primary dewaterer will sound when the mechanical screen cleaner stops moving during its cycle.
4. Install a system to lock bypass slide gates in the sample holding tanks in the closed position. These gates were partially open for a time this season allowing an unknown number of fish to escape back to the river.

APPENDIX TABLES

Appendix Table 1. Daily collection and bypass numbers and river conditions at Lower Monumental Dam, 2011.

Appendix Table 2. Daily number of fish trucked and barged from Lower Monumental Dam, 2011.

Appendix Table 3. Percent descaling and daily facility mortality numbers at Lower Monumental Dam, 2011.

Appendix Table 4. Daily number of adult fallbacks and fallback mortality at Lower Monumental Dam, 2011.