

ANNUAL REPORT OF OPERATIONS

FISH FACILITIES: 2008

Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, Washington
98802-4497

Wells Hydroelectric Project
F.E.R.C. Project No. 2149

April 2009

FISH FACILITIES OPERATIONS ANNUAL REPORT FOR 2008

WELLS HYDROELECTRIC PROJECT, NO. 2149

Located on the Columbia River at River Mile 515.6

I. FISH COUNT AND RIVER CONDITIONS

A. Enumeration of adult salmon and steelhead using fish ladders at Wells Dam began on May 1 and continued through November 15. Counting was accomplished by reviewing digital video records of fish passing ladder windows. The ladders were operational 24-hours a day. A summary of the counting season by month is shown in Table 1. Monthly and annual fish counts of each species by ladder for 24-hour and 16-hour count periods are included in Tables 1 and 2, respectively (note that Table 1 includes bull trout [*Salvelinus confluentus*] and lamprey [*Lampetra tridentata*], while Table 2 does not). Table 3 shows the nighttime percent of total adult passage of salmon and steelhead. Broodstock for steelhead and spring, summer, and fall Chinook and coho salmon removed from the ladders are not included in the fish-passage summaries. Numbers of fish removed for broodstock are shown in Tables 4 and 5. Attachment A shows the 24-hour fish passage report (0000-2400 PST) by species by day from May 1 through November 15th. Attachment B shows the Wells Dam annual ladder counts of salmon and steelhead (16-hour count) from 1967 through 2008. For comparison, Attachment C shows the 24-hour count totals for the years 1998 through 2008.

B. Bull trout passage records were first initiated at Wells Dam in 1999. In 2008, 43 migratory sized bull trout were counted between May 1 and November 15 (see Table 1). Daily passage numbers for 2008 are found in Table 6. Starting in the winter of 2004-2005, Douglas PUD, following a request from the USFWS, has also been conducting winter bull trout counts (November 16 – April 30). During the past five years of winter bull trout counting, no bull trout have been observed using the fish ladders at Wells Dam.

C. Adult lamprey passage records were first initiated at Wells in 1995. Lamprey counts were recorded from May 1 through November 15, 2008 (see Table 1), and daily passage numbers for 2008 are shown in Table 7.

II. PROJECT OPERATIONS

A. Adult Fish Passage Facilities

The adult fish passage facilities were operated using the criteria documented in the Wells Habitat Conservation Plan (HCP), and in cooperation with the Fisheries Agencies and Tribes (See HCP Section 15, Appendix A: Adult Fish Passage Plan). Information from several years of radio-telemetry studies with both salmon and steelhead at Wells Dam showed that ladder passage time was reduced by closing the side entrance at both east and west ladders. Based upon approval of the Joint Fisheries Parties, who serve on the Wells HCP Coordinating Committee, a decision was made in 2001 to change the ladder operation criteria at Wells Dam including the closure of the side entrance on each ladder and increasing the opening of the end gates from a six-foot opening to an eight-foot opening.

Routine inspection and maintenance was performed on the west ladder from January 9 through February 19, 2008 and on the east ladder from December 2, 2008 through February 3, 2009. Both ladders operated at criteria throughout the entire fish passage assessment period.

Following the development of a hydraulic model and following discussions with the HCP Coordinating Committee, a flow-guidance baffle to concentrate flow into the collection gallery was installed in the east fishway of Wells Dam during the 2006-2007 winter maintenance period. A radio-telemetry study to evaluate fish response to the flow-guidance baffle was conducted during the summer of 2007. Based on the results of that study, the Wells HCP Coordinating Committee approved the installation of an identical baffle in the west fishway in 2008. The baffle was installed on Weir 1 of the west fishway during the winter of 2007-2008.

Two aluminum traps, for the capture of adult lamprey, were also installed in each fishway at Pool 39. The traps are located against the side walls at the top of the overflow weir between Pools 38 and 39, and are used to collect study fish for a lamprey passage study (see Section V (F), below).

On July 30, an inspection of the attraction pump gallery of the east fishway revealed live adult sockeye. Since this area is closed off to all migrating salmon and steelhead, the discovery of these fish was a likely indicator of a failure of a diffusion grate between the attraction gallery where extra water flow is introduced and the collection gallery where fish begin their ascent of the ladders. A dive inspection on August 1 of both the floor and wall grates in the collection gallery indicated that all grates were secure and in their proper position. Through a process of elimination, it was determined that sockeye within the east fish ladder were leaping into the attraction gallery from one of the fishway corners. Fish that leap within the fishway typically land within the fishway; but there are a few points where leaping could potentially allow a fish to drop into the attraction gallery. Netting will be strategically placed in the ladder during the 2008-2009 maintenance work window to prevent leaping salmon from entering the attraction gallery. Fish biologist have speculated that the record return of sockeye salmon combined with numerous summer Chinook in the fishway at the same time caused an increase in fish leaping compared to previous years of study.

B. Juvenile Bypass Facilities

The juvenile bypass facilities at Wells Dam are designed to attract downstream migrating fish (salmon, steelhead, bull trout and lamprey) before they enter the turbine intakes. The hydrocombine design of Wells Dam incorporates the spillways and powerhouse components of the dam into a single 1,130-foot-long section, where all flow through the dam must pass. Five spillways (Spillway 2, 4, 6, 8 and 10), located above paired turbine intakes, are equipped with bypass flow barriers. Because of the hydrocombine design, flow through the turbine intakes attracts juvenile salmonid migrants to the bypass facilities, where they are attracted by water velocities at slotted bypass barriers and pass the project with a small volume of bypass flow.

Based upon the approval of the HCP Coordinating Committee, the spring 2008 operation of the juvenile bypass facilities began on April 12 and continued on a 24-hour schedule until the end of the spring migration on June 13. Spring bypass operations passed a total flow volume of 1.24 MAF (million acre feet) of water or an average of 9.92 thousand cubic feet per second (kcfs), which was 6.5 percent of the project inflow, over a 63-day period. Four hundred sixty-nine (469) hours of forced spill (31.0 percent of the time) occurred during the spring bypass period, with the highest hour of forced spill occurring on June 2, with a spill rate of 144.9 kcfs.

Based upon the approval of the HCP Coordinating Committee, summer bypass operations

began on June 14 and ran through August 26, for a total of 74 days. The summer operation passed a total flow volume of 1.65 MAF of water, or an average of 11.25 kcfs, which was 8.5 percent of the project inflow. During the summer bypass operating period, there were 425 hours (23.9 percent of the time) of forced spill.

The operation of the bypass in 2008 was consistent with operational timing specified in the Wells HCP. In the past, hydroacoustics and fyke netting provided real-time fish migration data. The fixed dates of bypass operation specified in the Wells HCP were established based upon a statistical analysis of 21 years of hydroacoustic data and 14 years of species composition information collected on juvenile run patterns and timing at Wells Dam.

III. WATER QUALITY

Daily turbidity, water temperature and total dissolved gas readings from April 1 through November 15 are provided in Attachment D. Historically, water-temperature data were collected at the turbine cooling-water intake at Unit 5. Since 2003, water temperatures have been measured at the fish-ladder attraction-flow pumps located in the tailrace of Wells Dam. Turbidity is measured in the forebay by Secchi disc readings from the deck of the dam, with the data values reported as visible depth in feet. Total Dissolved Gas (TDG) data are reported for both the forebay and tailwater as the 12-hour high continuous average (12C-High) in percent TDG. High TDG values were seen at the tailrace TDG monitoring station in June and July (see Attachment D).

IV. FISH PRODUCTION

The Washington Department of Fish and Wildlife (WDFW) are responsible for managing the commercial, sport, and non-game fish and wildlife resources of the state. The Wells and Methow hatcheries are owned and funded by Public Utility District No. 1 of Douglas County (District), and operated by WDFW. WDFW personnel provided the information on summer/fall Chinook and steelhead production at the Wells Hatchery (see Table 4) and spring Chinook production at the Methow Hatchery (see Table 5) in 2008.

V. FISH STUDIES AND PROGRAMS

Douglas PUD funded several fish-related studies and programs during 2008. A summary of each follows.

A. Sockeye Salmon Enhancement

At the end of 2001, the Wells HCP Coordinating Committee agreed to shift focus on the District's sockeye responsibility from an experimental sockeye hatchery program to a water-management planning tool for the Canadian Okanagan River. Untimely or excessive water released from Okanagan Lake was found to adversely affect the survival of both sockeye and Kokanee during the winter and spring months when eggs are incubating in gravels. The new plan involved working with the Canadian fisheries parties to develop a model-based flow-management program for use as a decision-making tool by river managers for preventing or minimizing the occurrence of damaging flows. The Fish Water Management Tool (FWMT) is the model developed to allow both fish and water managers, collectively, to determine how releases of water would affect Kokanee and sockeye resources, flood control, water-dependent recreation, and irrigators. During 2003, considerable time was spent on the FWMT model development and the estimation of physical and biological model parameters.

To determine if the FWMT model could improve water-release practices, retrospective analyses were performed during 2004 using historical monthly records collected over the past twenty-five water years. The retrospective analyses indicated that the average improvement in salmon egg-to-emergence survival from water management was about 55 percent. According to the model, estimated smolt savings from using the FWMT were better in a wet year (75%) rather than a dry year (38%) because of the avoidance of egg scour. The best results from the FWMT retrospective analyses demonstrated a 443-percent improvement in salmon survival during one historic water year. On October 5, 2004, the Parties to the Wells HCP via the Hatchery Committee approved the FWMT program as meeting the sockeye mitigation responsibility for unavoidable juvenile sockeye losses at Wells Dam.

2008 was the fourth year that the FWMT was used by Canadian fisheries and water managers to guide water-release decisions for the Canadian Okanagan River. The Operational Team comprising water managers and fisheries scientists utilized the FWMT to make water-management decisions and, by the end of the season, the team members reaffirmed their support for annual operational deployment of the FWMT and the team approach to decision making. Despite atypical climatic and hydrologic conditions experienced during the first four years of implementation, the Operational Team has managed river flows and lake levels with the FWMT in a manner that effectively minimized property damage and fisheries losses. Thus, the real-time performance of the FWMT has consistently matched expectations based upon the retrospective analyses performed in 2004. In July of 2008, in recognition of the outstanding success of the FWMT, the partners in the development and implementation of the FWMT received a 2007/2008 Premier's Award from Gordon Campbell, Premier of British Columbia. Considering the positive results of using the FWMT as predicted by the retrospective analyses and the confirmation of those results through the first four years of implementation, the District will continue to support the FWMT program in 2009.

B. Adult Fishway PIT-Tag Detection System

The National Marine Fisheries Service's 2000 Biological Opinion required that the District install adult PIT-tag detectors in the two adult fishways at Wells Dam. A PIT-tag detection system was installed in the winter of 2001-2002 and began collecting data during the 2002 adult migration. Analysis from tests of system performance indicated a detection efficiency of 99.9%.

Because the adult traps in each fishway are below the PIT-tag detection system, PIT-tagged fish diverted from the fishway at each trap were not monitored by the PIT-tag detection system. To increase the coverage of the system, additional PIT-tag detectors were installed in 2004 on the exit of each trap. However, detection failures by the detection system on the west ladder trap exit in 2006 led to an investigation of the cause of the failures and unsuccessful attempts at correction. Finally, electromagnetic interference in the location of the detection array was the identified as the cause of the detection failures. To resolve the problem, the detection system was upgraded and relocated away from the pumps responsible for the electromagnetic interference at the original location at the trap exit. Advancements since 2004 in tag and tag-detection technology facilitated the upgrade and relocation of the system, which was installed in May 2008, effectively restoring the reliability of the trap detection system.

C. Northern Pikeminnow Removal in the Wells Tailrace and Reservoir

As required by the Wells HCP, the District contracted for removal of and data collection on northern pikeminnow (*Ptychocheilus oregonensis*) from the Wells Project (tailrace and reservoir) in 2008. Northern pikeminnow have been identified as a major predator of juvenile salmonids. The contractor used set-line gear to capture 20,414 northern pikeminnow in 2008. Of that total,

18,272 were at least 9 inches in fork length and 2,142 were less than 9 inches in fork length. These fish were captured during 3,425 hours of angling effort translating into an overall catch-per-unit-effort (CPUE) or fish-per-hour value of 6.0. Angling effort was determined by total hours spent to pull, check, and reset lines as well as travel and preparation time (tying hooks, assembling lines, etc.). Numbers of fish captured were similar between the Wells tailrace (10,103) and Wells Reservoir (10,311), which includes the lower 1-mile section of the Methow River. From 1995 through 2008, the pikeminnow removal programs sponsored by Douglas PUD have resulted in the removal of approximately 174,000 pikeminnow from the Wells Project.

D. Bull Trout Radio-Telemetry

From 2001 through 2004, the District participated in regionally coordinated bull trout radio-telemetry studies. In support of these studies, 79 bull trout were radio-tagged at mid-Columbia River dams in 2001 and 2002. Passage times and migration rates for these fish were monitored at Rock Island, Rocky Reach, and Wells dams. Reservoir passage and tributary entrance times were also monitored. Based upon the 2001-2004 study results, the Wells Project and its operations do not appear to impact bull trout survival, migration, and spawning success.

As identified in the 2004 Bull Trout Biological Opinion, the District, in consultation with the FERC and the U.S. Fish and Wildlife Service (USFWS), developed the *Wells Hydroelectric Project Bull Trout Monitoring and Management Plan, 2004-2008*. The primary goal of this plan is to identify potential project-related impacts on upstream and downstream passage of adult bull trout through the Wells Dam and reservoir and if warranted, implement appropriate measures to monitor any incidental take of bull trout. Bull trout radio-tagged during the 2005-2007 research years were monitored while in the Project area (dam, reservoir, and tailrace) until July 2008. No upstream or downstream passage events of Douglas PUD tagged bull trout occurred during the 2008 monitoring period, though one fish radio-tagged by Chelan PUD made two passage events. No documented incidental take or mortality of tagged fish occurred during the past eight years of monitoring (2001-2008), as confirmed by detected movement of each fish following each passage event ($N = 120$).

E. Lamprey Radio-telemetry Study

In the fall of 2008, Douglas PUD performed a radio-telemetry study to investigate migration and passage behavior of adult lamprey migrating through Wells Dam. Adult lamprey were captured in the fishways at Wells Dam during August and September 2008, and all captured lamprey meeting specific size criteria were tagged and released at or below Wells Dam. Fixed-station monitoring at Wells Dam was used to detect the movements of these tagged fish in and around the fishways. The purpose of this study was to provide the information needed to inform relicensing decisions related to adult lamprey passage through Wells Dam.

F. Total Dissolved Gas Monitoring at Wells Dam

In 2008, the volume of water in the Columbia River passing Wells Dam from April to September was 104.3 percent of the 20-year average. During 2008, TDG data were collected from the Wells Dam forebay and tailwater, and were reported using a new metric: an average of the twelve highest consecutive readings in any one day, designated as 12C-High. The forebay TDG monitor recorded 12C-High values of 102.7 – 119.2 percent. The tailwater monitor recorded 12C-High values from 103.0 – 136.3 percent. Operations of the juvenile bypass system at Wells Dam resulted in only slight increases in TDG values in the Wells tailrace.

In 2008, a spill playbook was developed to guide spill operations at the Wells Project (specifically, the implementation of spread spill and concentrated spill) in a manner that further

evaluated the results of the 2006 TDG study and that examined the spill playbook operating scenarios over a broader range of environmental conditions. There were no scheduled spill tests in 2008 and project operators were instructed to utilize the playbook only during forced spill events (when river flows exceeded flows needed to meet load).

River flows in spring 2008 were 104.3 percent of the 20-year average, but the monthly flows for June were 128 percent of the 20-year average. The peak hourly total river discharge at Wells Dam was 269.6 kcfs, and the maximum spill flow was 145 kcfs. There were few spill events in excess of the fish bypass spill before May 22. Between May 23 and July 10, there were 861 hours (73 percent of the potential time) with spill that exceeded bypass operations. Of these spill operations, more than twenty events had flow (power unit and spill gate operations) that did not change for three or more hours. These static operations met the equilibrium conditions at the downstream TDG monitoring station (WELW). Conclusions of the 2008 assessment are as follows:

1. While 2008 was an average water year, due to a late spring run-off the month of June was an unusually high water month. During the 2008 fish passage season (April 1 – September 15) forebay TDG was in excess of 115 percent for 24 percent of the season (due to spill at Chief Joseph Dam). The tailrace standard of 120 percent was exceeded for 68 days or for 17 percent of the season.
2. Wells spill operations during 2008 were consistent with analytical results for the 2006 TDG field study and the 2008 TDG Model.

VI. EXPENSES for the 2008 Calendar Year

A. Fish Passage and Production Facilities and Non-study Expenses

	Total Costs	Minus Credits ¹
1. Operation of District Wells Hatchery a/c 537.2, 545.34	\$1,476,982	\$1,326,771
2. Supervision of Fish & Game Facilities a/c 537.3	\$238,815	\$238,815
3. Operation of District Methow Hatchery a/c 537.7, 545.5	\$1,289,374	\$474,060
4. Fish Management a/c 537.9, 545.8	\$438,995	\$438,995
5. Maintenance of District Fish Facilities a/c 545.2	\$77,579	\$77,579
6. Maintenance Miscellaneous Fish Related a/c 545.6	\$2,632	\$2,632
7. Annual Debt Service on Fish and Game Plant	\$3,733,701	\$3,733,701
Totals	\$7,258,078	\$6,292,553

¹Actual District costs calculated according to the terms of existing hatchery sharing agreements

B. Licensee Fisheries Study Costs

1. Fish Studies a/c 537.5	\$513,607
2. Fish Studies – Methow Hatchery Evaluation a/c 537.6	\$810,296
Total	\$1,323,903

Table 1. Wells Dam fish counts; monthly summaries for 24-hour count period; 2008

Month	Chinook Salmon						Coho	Sockeye	Steelhead		Total Steelhead	Bull Trout	Lamprey	
	Spring		Summer		Fall				Hatchery	Wild				
	Adults	Jacks	Adults	Jacks	Adults	Jacks	Chinook							
May	1,348	86					1,434			42	103	145	9	0
June	1,360	340	312	2			2,014		3,632	71	96	167	28	0
July			15,705	663			16,368		160,206	406	455	861	6	1
August			5,043	710	454	119	6,326		1,467	1,625	1,167	2,792	0	2
September					1,794	1,621	3,415	53	24	2,472	1,268	3,740	0	2
October					1,385	694	2,079	801	5	1,086	494	1,580	0	2
November					330	26	356	337		303	220	523	0	0
Total	2,708	426	21,060	1,375	3,963	2,460	31,992	1,191	165,334	6,005	3,803	9,808	43	7

Wells fish counts were made using WDFW conversion dates

Spring Chinook May 1 - June 28

Summer Chinook June 29 - August 28

Fall Chinook August 29 - November 15.

Table 2. Wells Dam fish counts; monthly summaries for 16-hour count period; 2008 (counting from 0400-2000 PST)

Month	Chinook Salmon						CA+CJ	Coho	Sockeye	Steelhead	
	Spring		Summer		Fall					Hatchery	Wild
	Adults	Jacks	Adults	Jacks	Adults	Jacks					
May	1,289	85					1,374			38	90
June	1,051	314	301	2			1,668		356	52	55
July			14,847	622			15,469		143,532	360	395
August			4,530	652	424	112	5,718		1,153	1,514	1,073
September					1,637	1,453	3,090	45	21	2,204	1,100
October					1,230	639	1,869	622	5	919	386
November					271	22	293	258		261	175
Total	2,340	399	19,678	1,276	3,562	2,226	29,481	925	145,067	5,348	3,274

Table 3. Wells Dam fish counts; percentage of night passage, 2008 (percent seen between the hours 000-0400 and 2000-2400)

Month	Chinook Salmon						CA+CJ	Coho	Sockeye	Steelhead	
	Spring		Summer		Fall					Hatchery	Wild
	Adults	Jacks	Adults	Jacks	Adults	Jacks					
May	4%	1%					4%			12%	11%
June	23%	8%	4%	0%			17%		18%	0%	7%
July			5%	6%			5%		14%	5%	4%
August			10%	8%	7%	10%	10%		15%	8%	9%
September					9%	8%	10%		22%	13%	13%
October					11%	15%	18%	15%	17%	14%	15%
November					18%	10%	8%	22%		13%	14%
Total	10%	6%	7%	7%	10%	10%	8%	22%	12%	11%	14%

Wells fish counts were made using WDFW conversion dates

Spring Chinook May 1 - June 28

Summer Chinook June 29 - August 28

Fall Chinook August 29 - November 15.

Table 4. Production from the Wells Hatchery in 2008

	Summer Chinook	Summer Steelhead ¹
Adult broodstock trapped, 2008	1,454	370
Jack broodstock trapped, 2008	0	0
Females spawned in 2008	659	181
Eggs taken, 2008	3,081,802	990,000
Eggs transferred, 2008	780,200	111,869 ²
Eggs for Lake Chelan release, 2008	91,352	0
Juveniles transferred (Ringold FH)	NA	107,290 ³
Juveniles released, 2006 brood	311,880	0
Juveniles released, 2007 brood	406,199	97,716
Released to Lake Chelan, 2007 brood	39,756	0

1. Adult steelhead collected at Wells Dam for broodstock are held until spawning during the following year. Thus, the steelhead spawned in 2008 (designated 2008 brood) were actually collected in 2007.
2. Transfer to the Winthrop National Fish Hatchery
3. Steelhead transferred to Ringold Hatchery.

Table 5. Spring Chinook production from the Methow Hatchery in 2008

	Twisp R.	Chewuch R.	Methow R.
Adults trapped, 2008 brood	44		337 ¹
Females spawned, 2008 brood	25		202 ²
Eggs taken, 2008 brood	90,248		749,620
Juveniles released, 2006 brood	45,682	154,381	221,712

1. In 2008, Spring Chinook adults were trapped at the West Ladder trap at Wells Dam (75 males and 61 females), the Methow Hatchery outfall channel and the Twisp tributary trap. Twisp-origin fish collected at the Methow Hatchery and Wells Dam were identified using genetic analysis. Only those fish collected from the West Ladder trap at Wells Dam were excluded from the fish passage summaries (see Tables 1-3).
2. The hatchery distinguished only the Twisp River fish in their report of the number of females spawned from all collection locations, and did not otherwise provide numbers of females spawned categorized by collection location. All non-Twisp fish were categorized as Methow-Composite (MetComp).

Table 6. Passage of bull trout at Wells Dam, 2008

Day	April	May	June	July	Aug	Sept	Oct	Nov
1		0	4	2	0	0	0	0
2		0	2	1	0	0	0	0
3		0	0	0	0	0	0	0
4		0	2	0	0	0	0	0
5		0	2	0	0	0	0	0
6		0	1	0	0	0	0	0
7		0	0	0	0	0	0	0
8		0	2	0	0	0	0	0
9		0	1	1	0	0	0	0
10		0	1	0	0	0	0	0
11		0	3	0	0	0	0	0
12		0	0	0	0	0	0	0
13		0	0	0	0	0	0	0
14		0	3	0	0	0	0	0
15	0	0	0	1	0	0	0	0
16	0	0	1	0	0	0	0	
17	0	2	0	0	0	0	0	
18	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	
20	0	0	1	0	0	0	0	
21	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	
23	0	0	0	1	0	0	0	
24	0	0	0	0	0	0	0	
25	0	1	0	0	0	0	0	
26	0	1	1	0	0	0	0	
27	0	1	2	0	0	0	0	
28	0	0	1	0	0	0	0	
29	0	0	0	0	0	0	0	
30	0	4	1	0	0	0	0	
31	0	0		0	0		0	
Total	0	9	28	6	0	0	0	0
							Season total	43

Table 7. Passage of lamprey at Wells Dam, 2008

Day	April	May	June	July	Aug	Sept	Oct	Nov
1		0	0	0	0	0	0	0
2		0	0	0	0	0	0	0
3		0	0	0	0	1	0	0
4		0	0	0	0	0	1	0
5		0	0	0	0	0	1	0
6		0	0	0	0	0	0	0
7		0	0	0	0	0	0	0
8		0	0	0	0	0	0	0
9		0	0	0	0	0	0	0
10		0	0	0	0	0	0	0
11		0	0	1	0	0	0	0
12		0	0	0	0	0	0	0
13		0	0	0	0	0	0	0
14		0	0	0	0	0	0	0
15		0	0	0	0	0	0	0
16		0	0	0	1	0	0	
17		0	0	0	0	0	0	
18		0	0	0	0	0	0	
19		0	0	0	0	0	0	
20		0	0	0	0	0	0	
21		0	0	0	0	0	0	
22		0	0	0	0	1	0	
23		0	0	0	0	0	0	
24		0	0	0	0	0	0	
25		0	0	0	0	0	0	
26		0	0	0	0	0	0	
27		0	0	0	1	0	0	
28		0	0	0	0	0	0	
29		0	0	0	0	0	0	
30		0	0	0	0	0	0	
31		0	0	0	0		0	
Total		0	0	1	2	2	2	0
Season total								7

Attachment A. Wells Dam Daily Fish Passage Report, 2008.
 Passage for the hours 0000 to 2400 PST.

May-08								Jun-08							
Chinook								Chinook							
Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wld	Lamprey	Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wld	Lamprey
1					1	1		1	161	31			2	4	0
2					2	3		2	115	40			4		0
3						3		3	39	27				2	0
4						2		4	102	43			3	2	0
5	1				2	5		5	75	36			2	2	0
6	2				2	1		6	23	14			1		0
7					2	4		7	106	57			1	3	0
8	2				4	8		8	76	13		1	4		0
9	21				3	5		9	17	1			2	4	0
10	11				1	2		10	46	4			3	2	0
11	10				2	3		11	33			1	1		0
12	23	1			1	3		12	19	2		1	2		0
13	3					2		13	35	15			1	1	0
14	25					4		14	37	12			1	3	0
15	11					9		15	10	4				4	0
16	14				1	3		16	28	6			5	5	0
17	62	1			1	9		17	29	2		1	3	6	0
18	32				2	5		18	17			2	4	2	0
19	6				-1	2		19	56	11		7	4	6	0
20	61	2			4	7		20	36	3		14	2	7	0
21	12				5	2		21	6			15		2	0
22	11					1		22	46			52	2	7	0
23	55	4				2		23	50	3		68	4	2	0
24	187	12			1	2		24	14	2		100	1		0
25	18	5			1	2		25	9			129	4	2	0
26	62	8			1	3		26	51	8		214	3	6	0
27	230	6			1	5		27	24	2		195	3	10	0
28	82	8			1	1		28	100	4		436	2	2	0
29	167	10			4	1		29	136	1		893	2	2	0
30	183	19			1	2		30	176	1		1503	5	10	0
31	57	10				1									
Totals	1,348	86	0	0	42	103	0	Totals	1,672	342	0	3,632	71	96	0

Attachment A (Continued). Wells Dam Daily Fish Passage Report, 2008.
 Passage for the hours 0000 to 2400 PST.

Jul-08								Aug-08							
Chinook								Chinook							
Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wld	Lamprey	Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wld	Lamprey
1	111	4		2818	3	4	0	1	251	18		151	21	19	0
2	335	8		4984	5	6	0	2	435	26		240	31	43	0
3	328	6		5717	5	8	0	3	184	18		200	41	30	0
4	315	2		5968	5	7	0	4	177	8		125	32	16	0
5	725	3		9858	5	14	0	5	349	17		91	29	23	0
6	708	26		12169	4	14	0	6	214	14		70	16	21	0
7	535	9		11275	8	17	0	7	140	21		63	13	21	0
8	649	20		12165	12	13	0	8	151	17		72	26	18	0
9	714	32		11583	8	13	0	9	66	15		60	18	26	0
10	953	45		12852	11	18	0	10	171	15		37	42	28	0
11	1237	36		12457	14	19	1	11	198	14		32	31	19	0
12	750	51		10650	18	10	0	12	102	10		31	32	18	0
13	574	24		9716	12	14	0	13	122	34		72	56	48	0
14	329	29		6029	2	19	0	14	191	35		42	54	79	0
15	263	22		5291	10	14	0	15	158	24		43	40	33	0
16	473	23		5104	11	12	0	16	307	30		41	55	46	1
17	765	16		3467	18	16	0	17	163	38		24	70	50	0
18	436	21		4375	13	7	0	18	198	25		25	39	25	0
19	526	26		2705	9	11	0	19	270	31		13	74	58	0
20	496	46		2149	12	17	0	20	108	58		4	69	59	0
21	605	14		1841	8	7	0	21	114	30		2	64	59	0
22	463	21		1256	21	24	0	22	322	41		6	70	47	0
23	202	28		1079	14	22	0	23	197	24		2	68	50	0
24	284	13		1013	20	13	0	24	50	8		3	55	42	0
25	484	28		740	20	20	0	25	88	31		6	26	10	0
26	270	21		644	10	22	0	26	24	21		2	39	20	0
27	259	15		593	26	17	0	27	17	29		1	48	17	1
28	634	21		587	13	9	0	28	276	58		3	139	59	0
29	424	18		391	30	22	0	29	200	40		2	116	67	0
30	391	23		391	30	19	0	30	153	35		2	99	57	0
31	467	12		339	29	27	0	31	101	44		2	112	59	0
Totals	15,705	663	0	160,206	406	455	1	Totals	5,497	829	0	1,467	1,625	1,167	2

Attachment A (Continued). Wells Dam Daily Fish Passage Report, 2008.
 Passage for the hours 0000 to 2400 PST.

Sep-08								Oct-08							
Chinook								Chinook							
Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wild	Lamprey	Date	Adults	Jacks	Coho	Sockeye	Steelhead Hat	Steelhead Wild	Lamprey
1	106	85		3	97	55	0	1	17	46	9		86	28	0
2	40	26		2	19	10	0	2	34	77	13		114	65	0
3	17	8		1	29	14	1	3	30	24	13		43	24	0
4	31	21		1	47	29	0	4	41	30	11	1	54	26	1
5	51	21			88	52	0	5	215	54	17		64	25	1
6	29	41		3	52	33	0	6	36	32	8		28	21	0
7	65	55		2	50	41	0	7	29	17	4	2	39	24	0
8	37	51		2	25	10	0	8	17	8	1		26	15	0
9	58	29			41	28	0	9	17	21	14		57	18	0
10	23	21		1	25	13	0	10	13	20	12		59	16	0
11	188	75			114	68	0	11	32	36	13		45	17	0
12	92	49		1	135	75	0	12	86	20	14		45	26	0
13	212	105		2	125	63	0	13	17	30	16		18	5	0
14	161	119			125	76	0	14	43	24	14		24	8	0
15	77	77			81	56	0	15	49	23	11		27	19	0
16	31	55		1	68	38	0	16	62	24	19		47	21	0
17	31	70		1	95	42	0	17	49	13	28		45	22	0
18	64	87	1		156	54	0	18	25	13	31		28	7	0
19	118	94	4		152	104	0	19	39	24	40	1	24	18	0
20	92	88	1	2	178	74	0	20	26	12	14		25	3	0
21	57	61	1	1	127	45	0	21	33	9	7		17	10	0
22	23	35	1		50	22	1	22	30	12	28	1	23	11	0
23	18	59	4		54	24	0	23	33	9	31		22	11	0
24	26	73	4		59	28	0	24	50	10	32		14	16	0
25	28	48	6		85	49	0	25	39	12	45		11	8	0
26	42	33	7		128	57	0	26	70	19	94		13	6	0
27	22	21	5		84	30	0	27	44	16	59		5	4	0
28	24	13	9		86	51	0	28	90	24	31		22	2	0
29	13	35	9	1	56	14	0	29	43	16	45		23	6	0
30	18	66	1		41	13	0	30	47	12	61		18	5	0
								31	29	7	66		20	7	0
Totals	1,794	1,621	53	24	2,472	1,268	2	Totals	1,385	694	801	5	1,086	494	2

Attachment A (Continued). Wells Dam Daily Fish Passage Report, 2008.
 Passage for the hours 0000 to 2400 PST.

Date	Nov-08						
	Chinook			Sockeye	Steelhead Hat	Steelhead Wld	Lamprey
Adults	Jacks	Coho					
1	42	2	69		20	25	0
2	35	4	36		21	8	0
3	26	3	26		19	7	0
4	13	2	24		15	6	0
5	55	2	41		24	9	0
6	44	6	21		29	27	0
7	24	1	35		15	12	0
8	12	1	28		18	22	0
9	15	3	19		12	7	0
10	20	1	14		15	9	0
11	13		9		37	24	0
12	9		5		20	14	0
13	7		6		24	15	0
14	10		2		14	12	0
15	5	1	2		20	23	0
16							0
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
Totals	330	26	337	0	303	220	0

Attachment B. Wells Dam Annual Ladder Counts of Salmon and Steelhead for a 16-hour Daily Count Period (1967-2007)

Year	Chinook Spring	Chinook Summer	Chinook Fall	Chinook Trapped	Chinook Total	Coho	Sockeye	Steelhead	Steelhead Trapped	Steelhead Total	Total Salmonids	Count Dates Include:
1967	1,157	12,504	2,732	2,004	18,397	255	113,232	1,474	171	1,645	133,529	5/21-11/19
1968	4,931	8,922	2,623	2,277	18,753	221	81,530	2,112	413	2,525	103,029	5/01-11/15
1969	3,599	6,846	2,929	2,873	16,247	29	17,352	1,391	530	1,921	35,549	5/01-11/15
1970	2,670	8,003	4,388	1,745	16,806	62	50,667	1,597	399	1,996	69,531	5/01-11/15
1971	3,168	5,988	2,030	1,793	12,979	161	48,172	3,782	358	4,140	65,452	4/30-11/15
1972	3,616	4,141	2,419	1,694	11,870	665	33,398	1,894	354	2,248	48,181	4/30-11/15
1973	2,937	5,052	2,650	2,088	12,727	331	37,178	1,820	627	2,447	52,683	4/30-11/15
1974	3,420	4,567	1,114	2,893	11,994	112	16,716	580	260	840	29,662	5/01-10/31
1975	2,225	8,522	3,806	3,253	17,806	25	22,286	517	227	744	40,861	5/01-10/31
1976	2,759	7,901	3,843	2,518	17,021	99	27,619	4,664	337	5,001	49,740	5/01-11/15
1977	4,211	7,527	3,260	2,628	17,626	68	21,973	5,282	355	5,637	45,304	5/01-11/15
1978	3,615	6,419	1,336	2,259	13,629	77	7,458	1,621	356	1,977	23,141	5/01-10/31
1979	1,103	10,080	1,108	2,352	14,643	63	22,655	3,695	367	4,062	41,423	5/01-11/16
1980	1,182	4,892	709	1,827	8,610	82	26,573	3,443	372	3,815	39,080	5/01-11/22
1981	1,935	4,276	686	1,533	8,430	26	28,234	4,096	650	4,746	41,436	5/01-11/22
1982	2,401	3,349	2,064	700	8,514	357	19,005	7,984	590	8,574	36,450	5/01-11/22
1983	2,869	2,821	1,150	942	7,782	82	27,925	19,525	670	20,195	55,984	5/01-11/30
1984	3,280	5,941	1,812	1,094	12,127	104	81,054	16,632	690	17,322	110,607	5/01-11/25
1985	5,257	4,456	2,097	1,689	13,499	72	53,170	19,867	750	20,617	87,358	5/01-11/22
1986	3,150	4,178	1,143	1,118	9,589	87	34,876	13,303	650	13,953	58,505	5/01-11/14
1987	2,344	3,142	3,253	1,275	10,014	42	39,948	5,493	603	6,096	56,100	5/01-11/13
1988	3,036	2,775	1,935	1,364	9,110	75	33,980	4,401	651	5,052	48,217	5/01-10/31
1989	1,740	3,333	1,435	2,147	8,655	14	15,895	4,600	716	5,316	29,880	5/01-10/31
1990	981	3,354	749	1,109	6,193	32	7,597	3,815	735	4,550	18,372	5/01-11/07
1991	779	2,028	827	1,525	5,159	21	27,492	7,751	726	8,477	41,149	5/01-11/15
1992	1,623	1,967	1,503	895	7,980	28	41,844	7,027	658	7,685	57,537	5/01-11/15
1993	2,444	3,603	1,228	1,780	9,055	19	28,038	2,494	633	3,127	40,239	5/01-11/16
1994	257	4,891	3,017	2,287	10,452	3	1,662	2,163	620	2,783	14,900	5/01-11/15
1995	103	3,076	1,229	2,164	6,572	6	4,801	942	619	1,561	12,940	5/01-11/15
1996	*	2,389	917	1,665	4,971	4	17,703	4,128	509	4,637	27,315	5/01-11/15
1997	971	2,721	766	1,655	6,113	8	25,754	4,107	630	4,737	36,612	5/01-11/15
1998	*	3,799	1,067	1,559	6,425	0	4,135	2,520	460	2,980	13,540	5/01-11/15
1999	345	7,787	2,548	938	11,618	224	12,388	3,504	416	3,920	28,150	5/01-11/15
2000	2,435	9,673	3,049	1,327	16,484	0	53,351	5,575	369	5,944	75,779	5/01-11/15
2001	10,414	35,990	8,634	556	55,594	473	64,819	16,251	392	16,643	137,529	5/01-11/15
2002	7,098	59,540	5,573	556	72,767	104	9,594	8,253	373	8,626	91,091	5/01-11/15
2003	4,480	43,480	7,397	556	55,913	137	24,684	8,721	374	9,095	89,829	5/01-11/15
2004	2,493	31,172	5,265	558	39,488	234	64,959	7,825	452	8,277	112,958	5/01-11/15
2005	4,831	30,842	3,110	563	39,346	273	46,891	6,331	417	6,748	93,258	5/01-11/15
2006	3,996	26,345	4,658	575	35,574	399	18,880	5,877	368	6,245	61,098	5/01-11/15
2007	2,543	15,866	2,356	521	21,286	2,033	19,106	6,574	379	6,953	49,378	5/01-11/15
2008	2,739	20,954	5,788	415	29,896	925	145,067	8,622	370	8,992	207,924	5/01-11/15
Mean	2,878	10,598	2,624	1,554	17,565	201	35,230	5,768	490	6,258	59,793	
Gmean	2,200	6,771	2,107	1,353	13,706	79	25,612	4,128	464	4,734	49,597	

Chinook counts include jacks. WDFW counting dates: spring Chinook, May1-June 28; summer Chinook, June 29-August 28; Fall Chinook, August 29-November 15.

*All spring Chinook were trapped for broodstock at Wells Dam; 387 in 1996, and 363 in 1998.

Attachment C. Wells Dam Annual Ladder Counts of Salmon and Steelhead for a 24-hour Daily Count Period from 1998-2007.

Year	Chinook Spring	Chinook Summer	Chinook Fall	Chinook Trapped	Chinook Total	Coho	Sockeye	Steelhead	Steelhead Trapped	Steelhead Total	Total Salmonids	Count Dates Include
1998	*	4,108	1,200	1,582	6,890	0	4,669	2,984	460	3,444	15,003	5/01-11/15
1999	345	7,787	2,548	938	11,618	224	12,388	3,504	416	3,920	28,150	5/01-11/15
2000	2,587	10,156	3,418	1,327	17,488	0	59,944	6,280	369	6,649	84,081	5/01-11/15
2001	10,871	38,126	9,591	556	59,144	612	74,490	18,528	392	18,920	153,166	5/01-11/15
2002	7,626	62,623	6,472	556	77,277	132	10,768	9,478	373	9,851	98,028	5/01-11/15
2003	4,702	46,391	8,253	556	59,902	168	28,977	9,963	374	10,337	99,384	5/01-11/15
2004	4,793	32,847	5,777	558	43,975	291	78,053	9,317	452	9,769	132,088	5/01-11/15
2005	4,996	31,763	3,461	563	40,783	348	55,559	7,203	417	7,620	104,310	5/01-11/15
2006	4,376	27,196	5,043	575	37,190	409	22,075	6,674	368	7,042	66,716	5/01-11/15
2007	2,793	16,817	2,670	521	22,801	2,432	22,273	7,500	379	7,879	55,385	5/01-11/15
2008	3,134	22,435	6,423	415	32,407	1,191	165,334	9,808	370	10,178	209,110	5/01-11/15

Chinook counts include jacks. WDFW counting dates: spring Chinook, May1-June 28; summer Chinook, June 29-August 28; Fall Chinook, August 29-November 15.

*All spring Chinook were trapped for broodstock at Wells Dam; 387 in 1996, and 363 in 1998.

Attachment D. Wells Dam Daily Water Quality Report, 2008

Apr-08					May-08					Jun-08					Jul-08				
Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG
1		40	103%	103%	1	10	45	105%	106%	1	2	54	116%	121%	1	10	58	119%	
2		40	104%	104%	2	10	46	106%	108%	2	2	54	114%	124%	2	10	58	118%	
3		40	104%	105%	3	10	46	107%	108%	3	3	54	117%	129%	3	10	59	118%	122%
4		40	105%	105%	4	12	46	107%	109%	4	5	53	116%	133%	4	10	59	118%	125%
5		41	105%	105%	5	12	47	108%	110%	5	5	54	116%	123%	5	10	59	117%	124%
6		41	105%	105%	6	10	47	108%	110%	6	5	53	119%	122%	6	10	59	116%	121%
7		42	105%	105%	7	11	47	108%	109%	7	5	54	114%	120%	7	10	59	116%	119%
8		42	105%	105%	8	10	48	107%	109%	8	5	54	113%	120%	8	10	59	117%	124%
9		42	105%	105%	9	10	48	107%	108%	9	7	54	115%	123%	9	10	60	117%	126%
10		42	104%	105%	10	9	48	106%	108%	10	7	54	115%	126%	10	10	60	117%	123%
11		42	105%	105%	11	12	47	106%	108%	11	7	54	114%	127%	11	10	60	114%	118%
12		42	105%	107%	12	12	48	105%	107%	12	7	55	115%	125%	12	10	60	116%	117%
13		43	107%	108%	13	12	48	106%	107%	13	7	55	115%	126%	13	10	60	116%	117%
14		43	107%	109%	14	9	49	105%	107%	14	7	55	115%	117%	14	10	60	117%	118%
15		43	107%	108%	15	9	49	106%	107%	15	7	56	116%	119%	15	10	60	116%	118%
16		43	104%	106%	16	5	50	107%	109%	16	7	56	116%	122%	16	10	61	116%	118%
17		44	106%	107%	17	4	50	108%	110%	17	7	56	115%	120%	17	12	61	116%	118%
18		44	107%	108%	18	2	51	108%	110%	18	7	56	114%	119%	18	12	62	116%	118%
19		44	106%	107%	19	2	51	107%	109%	19	7	56	115%	118%	19	12	62	117%	118%
20		44	105%	106%	20	2	50	108%	110%	20	8	56	116%	119%	20	12	62	117%	118%
21		44	105%	106%	21	2	50	107%	110%	21	8	56	116%	119%	21	12	63	117%	119%
22		44	106%	108%	22	3	50	108%	110%	22	10	56	115%	117%	22	12	63	117%	119%
23		44	106%	107%	23	3	50	108%	111%	23	10	56	114%	117%	23	12	63	115%	117%
24		43	105%	107%	24	3	50	108%	114%	24	10	56	115%	117%	24	12	63	115%	117%
25		44	104%	106%	25	3	51	108%	117%	25	10	56	115%	121%	25	12	64	115%	118%
26		44	104%	106%	26	4	52	111%	117%	26	10	56	115%	123%	26	12	64	115%	116%
27		45	106%	107%	27	4	52	110%	123%	27	10	56	116%	124%	27	12	65	114%	116%
28		45	110%	111%	28	1	53	110%	124%	28	10	57	116%	120%	28	12	65	113%	115%
29		45	110%	111%	29	2	53	110%	123%	29	10	57	118%	120%	29	12	65	113%	115%
30		45	106%	107%	30	2	53	112%	119%	30	10	57	119%		30	12	64	112%	114%
					31	2	54	112%	120%						31	12	64	114%	116%
Avg		43	105%	106%	Avg	7	49	108%	111%	Avg	7	55	116%	122%	Avg	11	61	116%	119%

Attachment D (continued). Wells Dam Daily Water Quality Report, 2008

Aug-08					Sep-08					Oct-08					Nov-08				
Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG	Date	Turbidity	Water Temp (F)	Forebay TDG	Tailwater TDG
1	12	64	114%	116%	1	11	66	104%	104%	1	12	65			1	12	59		
2	11	65	111%	115%	2	11	66	103%	104%	2	12	65			2	12	59		
3	13	65	113%	114%	3	11	66	104%	104%	3	12	65			3	12	59		
4	13	65	113%	115%	4	11	67	104%	104%	4	15	65			4	12	59		
5	13	65	113%	116%	5	15	66	106%	105%	5	14	65			5		59		
6	13	65	114%	116%	6	15	66	105%	106%	6	12	64			6	12	58		
7	13	65	114%	116%	7	14	66	105%	106%	7	12	64			7	12	58		
8	13	65	114%	116%	8	15	67	107%	107%	8	12	64			8	12	58		
9	13	65	113%	116%	9	15	67	106%	107%	9	12	64			9	12	58		
10	12	65	112%	116%	10	15	67	105%	106%	10	12	63			10	12	58		
11	14	66	111%	113%	11	15	67	105%	105%	11	12	63			11	12	58		
12	12	66	111%	113%	12	15	67	105%	106%	12	12	62			12	12	57		
13	12	66	111%	113%	13	15	67	105%	105%	13	13	62			13	12	57		
14	12	66	112%	114%	14	15	67	104%	104%	14	13	62			14	12	57		
15	12	66	112%	114%	15	15	67	104%	104%	15	13	62			15	12	56		
16	12	67	112%	115%	16	15	67			16	13	62			16		55		
17	12	68	113%	115%	17	15	67			17	13	62			17		55		
18	12	68	113%	115%	18	15	67			18	13	62			18		55		
19	12	68	111%	113%	19	15	67			19	13	62			19		55		
20	12	67	110%	112%	20	15	67			20	13	62			20		54		
21	12	67	109%	111%	21	15	67			21	13	61			21		54		
22	12	66	107%	110%	22	15	67			22	12	61			22		54		
23	12	67	107%	110%	23	15	66			23	12	61			23		53		
24	12	67	107%	110%	24	12	66			24	12	61			24		53		
25	12	66	106%	110%	25	12	66			25	12	61			25		53		
26	11	66	105%	108%	26	15	66			26	12	60			26		53		
27	11	66	105%	107%	27	15	65			27	12	60			27		53		
28	11	66	104%	105%	28	15	65			28	12	60			28		52		
29	11	67	105%	106%	29	12	65			29	12	60			29		52		
30	11	67	105%	105%	30	12	65			30	12	60			30		52		
31	11	67	104%	105%						31	12	60							
Avg	12	66	110%	112%	Avg	14	66	105%	105%	Avg	12	62			Avg	12	56		