APPENDIX F

Steelhead Stock Assessment at Priest Rapids Dam

Priest Rapids Dam Upper Columbia River Steelhead Stock Assessment Sampling Report, 2005

Adult Steelhead Stock Assessment

Upper Columbia River (UCR) steelhead stock assessment sampling at Priest Rapids Dam (PRD) is authorized through the Endangered Species Act (ESA) Section 10 Permit 1395 (NMFS 2003). Permit authorizations include interception and biological sampling of 10 percent of the UCR steelhead passing PRD to determine upriver adult population size, estimate hatchery to wild ratios, determine age class contribution and evaluate the need for managing hatchery steelhead consistent with ESA recovery objectives which include fully seeding spawning habitat with naturally produced UCR steelhead supplemented with artificially propagated enhancement steelhead (NMFS 2003).

Results

The 2005-2006 steelhead run-cycle sampling at Priest Rapids Dam began 12 July 2005 and concluded 13 October 2005. Sampling consisted of operating the left bank ladder coded wire tag trap 8 hours per day, on Tuesdays and Thursdays, for a total of 26 sampling days. Steelhead were trapped, handled and released in accordance with Section 2.1 and 2.2.1 of the National Marine Fisheries Service (NMFS) Biological Opinion for ESA Permits 1395, 1396 and 1423 (NMFS 2003a). The cumulative sample rate attained during 2005 totaled 6.6% and no steelhead mortalities were observed.

The Washington Department of Fish and Wildlife (WDFW) sampled 896 steelhead of the 2005/2006 run-cycle passing PRD, totaling 13,479 steelhead, for an overall sampling rate of 6.6%. Of the 896 steelhead sampled, 688 (76.8%) were hatchery origin and 208 (23.2%) were natural origin. The estimated 2005-206 run- cycle total natural origin steelhead return was 3,169 representing 143% of the 1986-2005 average, 90% of the recent 5-year average and third largest since 1986 (Table 1).

Based on external marks, external and internal tags, 688 hatchery origin steelhead were sampled at Priest Rapids Dam during the 2005 return cycle included, 86 (12.5%) Wenatchee hatchery-origin steelhead, 518 (75.3%) "Above Wells Dam" [1/] hatchery origin steelhead (Table 2). Ringold FH origin steelhead accounted for 7.8% (54 fish) of the hatchery origin recoveries, while 4.4 of the hatchery origin steelhead sampled could not be assigned to a specific hatchery program.

1/- Defined as "Above Wells Dam" because hatchery origin, adipose-clipped steelhead release into the Methow River from the Wells FH and Winthrop NFH have the same marks and are indistinguishable from one another.

Table 1. Priest Rapids Dam adult steelhead returns and stock composition, 1974-2005.

Run-Cycle *	Hatchery	Wild	Wild Percent	Total Run
1974				2,950
1975				2,560
1976				9,490
1977				9,630
1978				4,510
1979				8,710
1980				8,290
1981				9,110
1982				10,770
1983				32,000
1984				26,200
1985				34,010
1986	20,022	2,342	10.5	22,364
1987	9,955	4,058	29.0	14,013
1988	7,530	2,670	26.2	10,200
1989	8,033	2,685	25.1	10,718
1990	6,252	1,585	20.2	7,837
1991	11,169	2,799	20.0	13,968
1992	12,102	1,618	11.8	13,720
1993	4,538	890	16.4	5,428
1994	5,880	855	12.7	6,735
1995	3,377	993	22.7	4,370
1996	7,757	843	9.8	8,600
1997	8,157	785	8.8	8,942
1998	4,919	928	15.9	5,847
1999	6,903	1,374	16.6	8,277
2000	9,023	2,341	20.6	11,364
2001	24,362	5,715	19.0	30,077
2002	12,884	2,983	18.8	15,867
2003	14,890	2,837	16.0	17,729
2004	15,670	2,985	16.0	18,655
2005	10,352	3,127	23.2	13,479
1986-2005 Average	**10,180**	**2,223**	**18.0**	**12,410**
2001-2005 Average	**16,952**	**3,537**	**18.7**	**19,161**

*- A return cycle is the combined total of steelhead passing PRD from 1 June – 30 November during year (x), plus steelhead passing PRD between April 15 – May 31 on year (x+1).

Table 2. Origin classification of steelhead sampled at Priest Rapids Dam, 12 July - 13 October, 2005.

Steelhead Origin																				
Wild			Hatchery																	
Wild			Wenatchee						Above Wells Dam				Ringold FH			Unknown Hatchery				
Criteria			VIE						Criteria				Criteria			Criteria				
NS	NM	Total	LTGR	RTGR	RTOR	RTPK	RDLT	Total	AD	LTYL	RTYL	Total	AD	RV	Total	SD	NM	Total	Total Wild	Total Hatchery	Total Steelhead
x	x	208	x					37	x			474	x	x	54	x	x	30			
				x				0		x		6									
					x			24			x	38									
						x		8													
							x	17													
Total		**208**						**86**				**518**			**54**			**30**	**208**	**688**	**896**
% Hatchery								**12.5%**				**75.3%**			**7.8%**			**4.4%**		**100.0%**	
% Total		**23.2%**						**9.6%**				**57.8%**			**6.0%**			**3.3%**	**23.2%**	**76.8%**	**100.0%**

Table Key
NS = Non-stubbed dorsal fin
SD = Stubbed dorsal fin
NM = Non adipose clipped
VIE = Visual Implant Elastomer Tag
LTGR= left green VIE (HxW parental cross)
RTGR= right green VIE (HxW parental cross)
RTOR= right orange VIE (WxW parental cross)
RTPK= right pink VIE (WxW parental cross)
RDLT= right red VIE (HxH parental cross)
LTYL= left yellow VIE (HxW parental cross)
RTYL= right yellow VIE (HxW parental cross)
AD = Adipose clipped
RV = Right ventral clipped

Reconciled salt-age of natural origin steelhead sampled at Priest Rapids Dam during 2005 was accomplished through scale sample analysis. Hatchery origin salt-age determination included scale analysis and VIE interrogation. Salt-age analysis of the 2005 UCR steelhead run-cycle provides an estimated hatchery-origin 1-salt / 2-salt age composition of 33.6% / 66.4% / and a 34.5% / 65.5% 1-salt /2-salt composition for natural origin steelhead (Table 3).

Table 3. Salt water age composition of 2005 return cycle Upper Columbia River steelhead sampled at Priest Rapids Dam, corrected by scale age/origin determination.

	Hatchery		Wild		Combined	
Salt-Age	***N***	**%**	***N***	**%**	***N***	**%**
Unknown	283		0	0.0%	283	
1-Salt	136	33.6%	75	35.5%	211	34.5%
2-Salt	269	66.4%	132	32.9%	401	65.5%
3-Salt	0	0.0%	0	0.0%	0	0.0%
Total	688		207		895	

An examination of freshwater residency of natural origin Upper Columbia River steelhead reveals a freshwater life history that is dominated by age-2 freshwater residency (82.4%), comparable to the 1986-2004 average of 75.7%% (Table 4).

Table 4. Freshwater age of wild Upper Columbia River steelhead sampled at Priest Rapids Dam during steelhead stock assessment activities, July -October, 1986-2005

	2005-2006 run-cycle		1986-2004 average	
Freshwater age	**%**	**N**	**%**	**N**
1.x	7.3%	14	6.5%	162
2.x	82.4%	159	75.7%	1,881
3.x	10.4%	20	17.0%	422
4.x			0.7%	18
5.x			0.1%	2
Total	100.0%	193	100.0%	2,485

Natural and hatchery origin steelhead exhibited similar saltwater growth in the 2005-2006 run-cycle. Wild 1and 2-salt adults were slightly larger than their hatchery cohorts (Table 5). Hatchery and wild, 1 and 2-salt steelhead observed in the 2005-2006 adult run-cycle return past PRD were of similar length to the 1986-2004 1 and 2-salt average fork lengths (Table 5).

Table 5. Average fork length of 1-salt and 2-salt, Upper Columbia River steelhead sampled at Priest Rapids Dam during July -October, 1986-2005.

	Average Fork Length (cm)			
	2005-2006 run-cycle		1986-2004 run-cycle	
Salt-Age	**Wild**	**Hatchery**	**Wild**	**Hatchery**
x.1	60.3	58.1	60.0 cm	59.2
x.2	72.3	71.0	73.2 cm	72.0

Petersen Disc Tagging

Petersen Disc Tags were attached to adipose absent steelhead sampled at Priest Rapids Dam. Beginning 10 September, all adipose clipped, non radio-tagged steelhead sampled at Priest Rapids Dam were tagged with ½ in. diameter Petersen Disc Tags in an effort to positively identify those fish which were anesthetized with Tricaine Methanesulfonate (MS-222) during sampling efforts. The tagging was necessary to provide a means of prohibiting MS-222 treated steelhead from being retained in an authorized steelhead fishery in the UCR prior to the 21-day withdrawal period for MS-222 specified by the Food and Drug Administration (FDA). The 2005-2006 steelhead fishery authorized in the UCR was implemented as a conservation measure to reduce the number of hatchery (hatchery x hatchery parental crosses) contributing to the natural spawning escapement. A total of 239 adipose absent steelhead were marked with Petersen Disc Tags between 13 September and 13 October 2005.