

Appendix 4: Attachment 1

Abundance Estimates Applied to Interim Severe Decline Triggers

The purpose of this attachment is to describe the data used to define the abundance-based interim Severe Decline Triggers and abundance-based interim Early Warning Indicators. Because population-level estimates are not currently available within a time frame useful for evaluating triggers, dam counts are used as an index of the status of the listed species. It is important to note that use of an indicator of species abundance based on dam counts for this purpose does not imply that the dam counts represent the information needed for viability assessments and assessment of the FCRPS biological opinion quantitative metrics. These criteria and metrics are assessed at the population level and then population results are considered at the major population group (MPG) and the species level, rather than simply relying on an index of the composite species abundance.

The number of naturally produced adult Chinook salmon¹ and steelhead passing a specific dam was generated by state and tribal co-managers for use in *US v. Oregon* Technical Advisory Committee (TAC) run reconstructions². Counts at Lower Granite Dam are used for Snake River species, counts at Priest Rapids or Rock Island dams are used for Upper Columbia River steelhead and spring Chinook salmon, respectively, and counts at Prosser Dam are used for the Yakima River MPG of Mid-Columbia River steelhead.³ The available data varies by species within the 1975 to 2008 time frame.

The abundance estimates used for the Severe Decline Triggers and Early Warning Indicators are displayed in Table 1.⁴ Table 2 displays the running four-year averages, with the year indicating the last year of the four-year period. Figures 1a-6a are plots of the estimated natural-origin adults passing relevant dams each year. Figures 1b-6b show the four-year averages by year, along with the corresponding triggers and indicators. The Early Warning Triggers are defined by abundance levels estimated to be reached in 10% or less of the years in the time series while the Early Warning indicators represent levels estimated to be reached in 20% or fewer of the years.

¹ Chinook “Jacks” are excluded from this data as they are predominantly small males which return to spawn after spending only a single year in the ocean and generally represent a minor contribution to the viability of a population.

² Estimates for most dam counts from TAC spreadsheets (three files): 2009 sp_su_ch_ba_tables-050109.xls, Draft TablesforBA041808.xls, and wild steelhead at LGR.xls, provided by E. Patino, NOAA Fisheries. Estimates for Prosser Dam counts from draft Mid-Columbia Steelhead Recovery Plan, ODFW, <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Columbia/upload/Mid-C-Prop-Plan.pdf>.

³ Mid Columbia River steelhead populations pass one to four mainstem dams and cannot be distinguished at those dams from other listed species traveling further upstream. Prosser Dam is an adult counting site on the Yakima River that does provide a census of adults in this MPG. We acknowledge that the Yakima River MPG is a single MPG and may or may not be representative of the distinct population segment (DPS) as a whole and therefore this trigger will initiate a rapid review to determine whether the problem is limited to the MPG or represents a DPS-wide decline. In addition to the Yakima River MPG, it may be possible to develop MPG level indices for other MPGs in the relatively near future.

⁴ As noted in Appendix 4, NOAA and the Action Agencies will further review the data used for the triggers assessments and develop a process for the regular sourcing, annual updating and public dissemination of the data used in the trigger determinations.

Table 1. Estimated abundance of natural-origin adult Chinook and steelhead at Lower Granite (Snake River), Priest Rapids or Rock Island (Upper Columbia), and Prosser Dam (Yakima MPG of Mid-Columbia steelhead).

<u>Year</u>	<u>SR Fall Chinook at LGR</u>	<u>SR Spring/Summer Chinook at LGR</u>	<u>Upper Columbia Spring Chinook at RIS</u>	<u>SR Steelhead at LGR</u>	<u>UCR Steelhead at PRD</u>	<u>Yakima MCR Steelhead at Prosser Dam</u>
1975	1,000					
1976	470					
1977	600				1,421	
1978	640				661	
1979	500	5,761	1,949		1,284	
1980	450	6,134	2,532		1,225	
1981	340	11,292	2,450		1,346	
1982	720	11,300	2,780		1,414	
1983	428	9,838	4,653		1,538	
1984	324	7,929	3,645		1,771	
1985	438	10,182	6,271		3,223	2,191
1986	449	10,109	3,942		2,342	2,230
1987	253	9,622	3,620	22,029	4,058	2,424
1988	368	10,826	3,443	25,392	2,670	2,601
1989	295	6,454	2,774	21,085	2,685	1,066
1990	78	9,342	2,460	24,968	1,585	727
1991	318	5,756	1,252	9,287	2,799	730
1992	549	12,673	3,013	17,316	1,618	2,012
1993	742	12,522	2,888	19,346	890	1,104
1994	406	1,856	713	7,345	885	540
1995	350	1,167	89	7,522	993	838
1996	639	3,643	150	7,042	843	450
1997	797	5,557	604	7,133	785	961
1998	306	7,599	216	8,740	928	948
1999	905	2,853	417	9,384	1,374	1,018
2000	1,148	8,187	890	11,038	2,341	1,571
2001	5,163	44,572	4,938	20,263	5,715	3,032
2002	2,116	29,872	2,809	41,024	2,983	4,491
2003	3,856	32,080	1,191	42,350	2,836	2,190
2004	2,983	20,967	1,436	29,158	2,985	2,739
2005	2,602	9,832	1,444	23,051	3,127	
2006	2,483	9,340	962	18,197	1,677	
2007	2,016	6,903	722	9,470	2,724	
2008		16,953	1,312	14,402		

Table 2. Four-year average estimated abundance of natural-origin adult Chinook and steelhead at Lower Granite (Snake River), Priest Rapids or Rock Island (Upper Columbia), and Prosser Dam (Yakima MPG of Mid-Columbia steelhead).

<u>Year</u>	<u>SR Fall Chinook at LGR</u>	<u>SR Spring/Summer Chinook at LGR</u>	<u>Upper Columbia Spring Chinook at RIS</u>	<u>SR Steelhead at LGR</u>	<u>UCR Steelhead at PRD</u>	<u>Yakima MCR Steelhead at Prosser Dam</u>
1975						
1976						
1977						
1978	678					
1979	553					
1980	548				1,148	
1981	483				1,129	
1982	503	8,622	2,428		1,317	
1983	485	9,641	3,104		1,381	
1984	453	10,090	3,382		1,517	
1985	478	9,812	4,337		1,987	
1986	410	9,514	4,628		2,219	
1987	366	9,460	4,370		2,849	
1988	377	10,185	4,319		3,073	2,362
1989	341	9,253	3,445		2,939	2,080
1990	249	9,061	3,074	23,369	2,750	1,705
1991	265	8,095	2,482	20,183	2,435	1,281
1992	310	8,556	2,375	18,164	2,172	1,134
1993	422	10,073	2,403	17,729	1,723	1,143
1994	504	8,202	1,967	13,323	1,548	1,097
1995	512	7,054	1,676	12,882	1,097	1,124
1996	534	4,797	960	10,314	903	733
1997	548	3,056	389	7,261	877	697
1998	523	4,491	265	7,609	887	799
1999	662	4,913	347	8,075	983	844
2000	789	6,049	532	9,074	1,357	1,125
2001	1,881	15,803	1,615	12,356	2,590	1,642
2002	2,333	21,371	2,263	20,427	3,103	2,528
2003	3,071	28,678	2,457	28,669	3,469	2,821
2004	3,530	31,872	2,593	33,199	3,630	3,113
2005	2,889	23,188	1,720	33,896	2,983	
2006	2,981	18,055	1,258	28,189	2,656	
2007	2,521	11,760	1,141	19,969	2,628	
2008		10,757	1,110	16,280		

Figure 1a. Annual estimates of naturally produced Snake River spring/summer Chinook salmon adults at Lower Granite Dam.

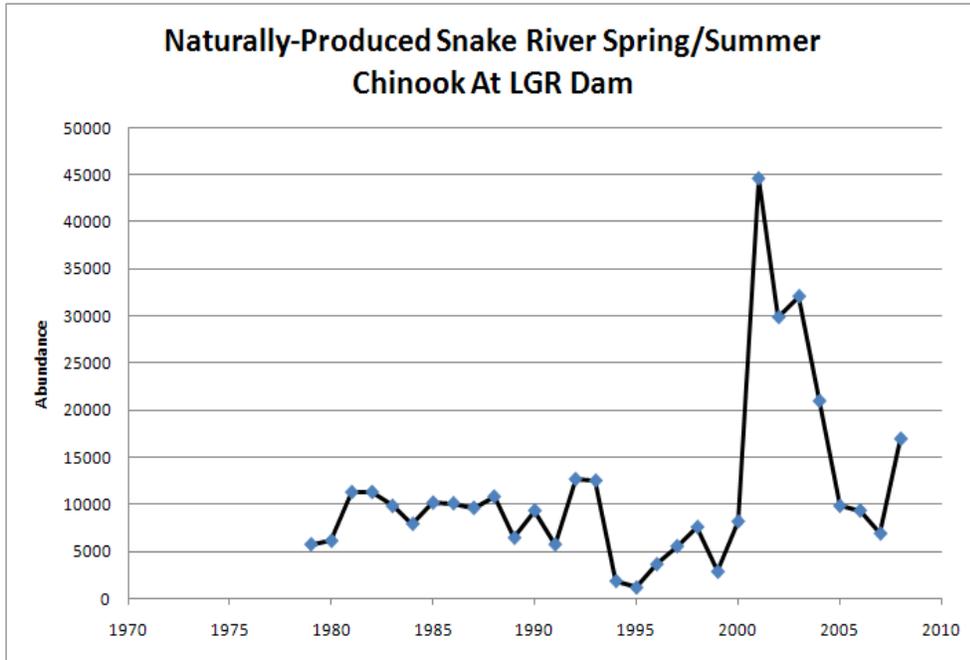


Figure 1b. Running four-year averages of naturally-produced Snake River spring/summer Chinook adults at Lower Granite Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

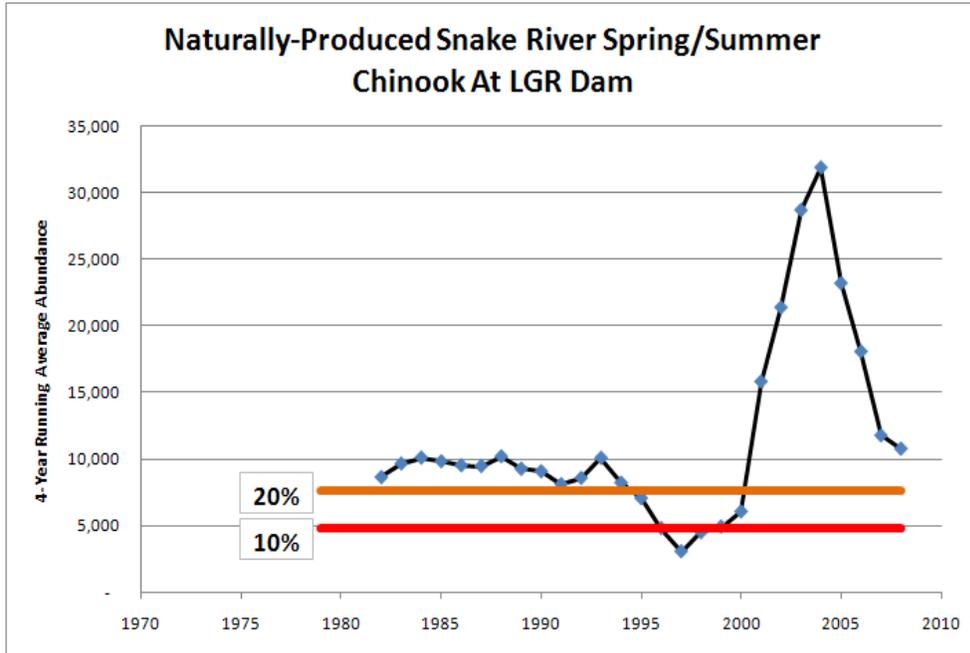


Figure 2a. Annual estimates of naturally produced Upper Columbia River spring Chinook salmon adults at Rock Island Dam.

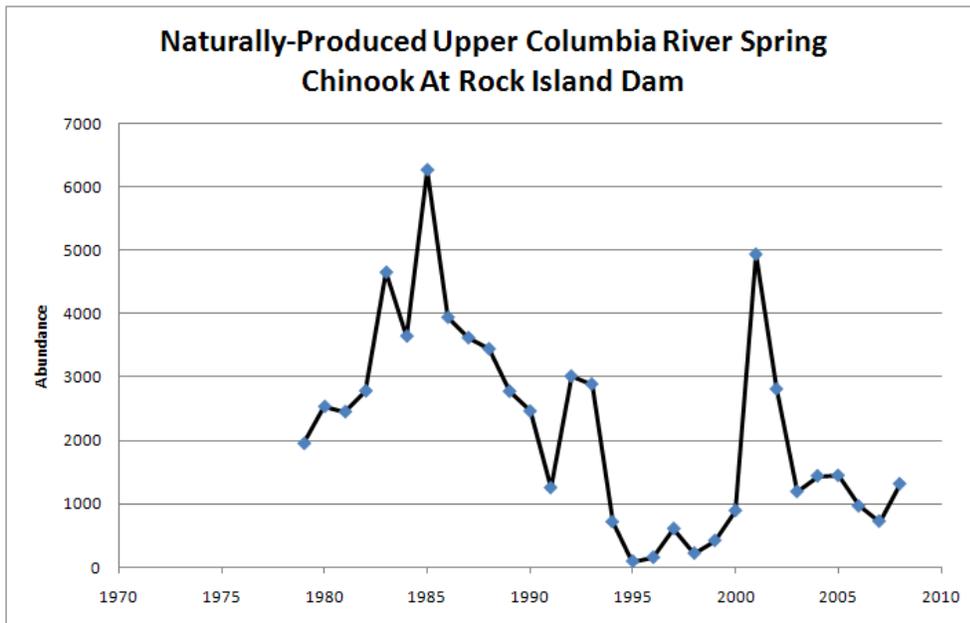


Figure 2b. Running four-year averages of naturally-produced Upper Columbia River spring Chinook adults at Rock Island Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

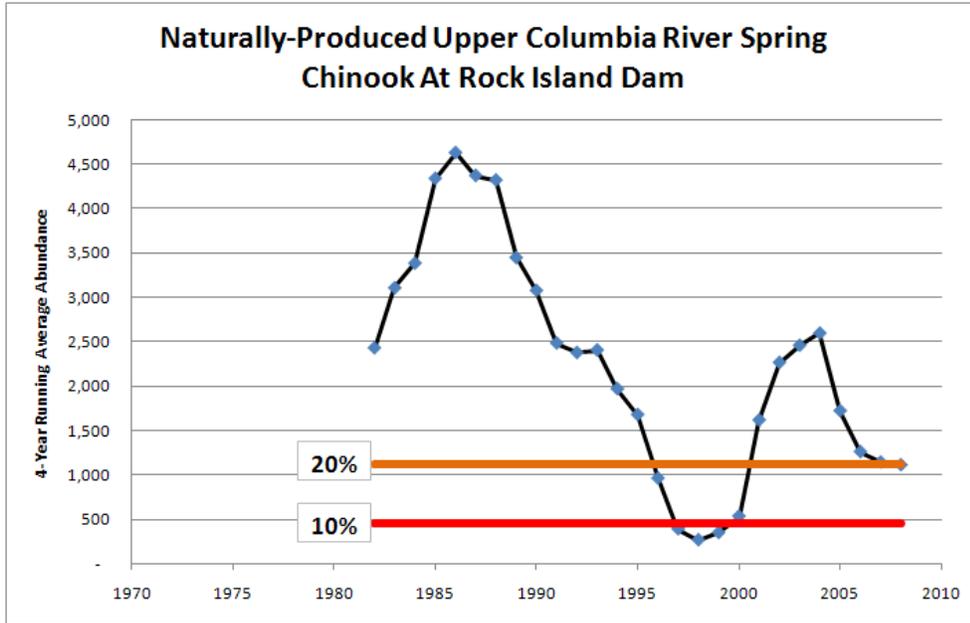


Figure 3a. Annual estimates of naturally produced Snake River fall Chinook salmon adults at Lower Granite Dam.

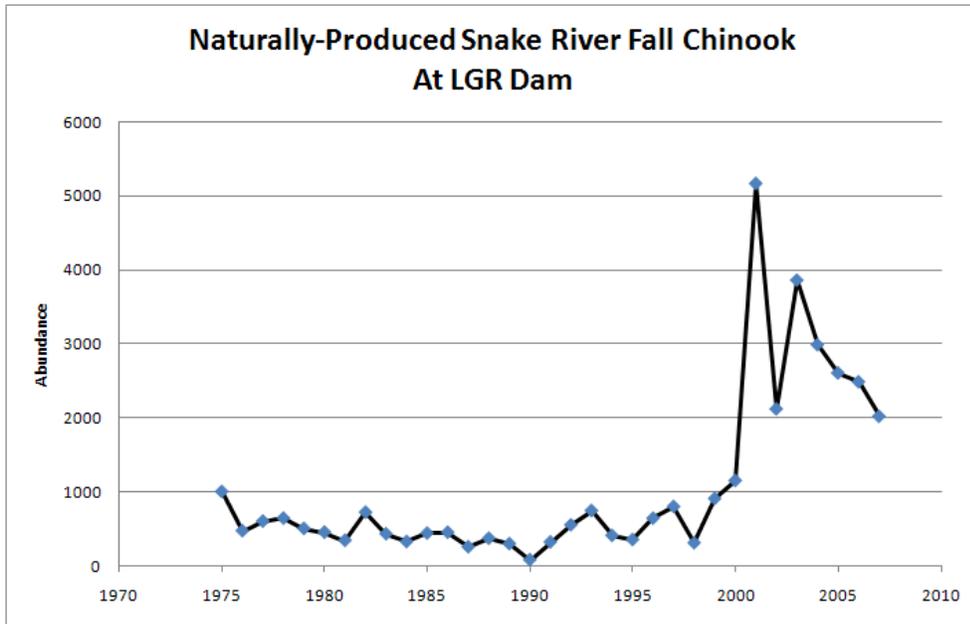


Figure 3b. Running four-year averages of naturally-produced Snake River fall Chinook adults at Lower Granite Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

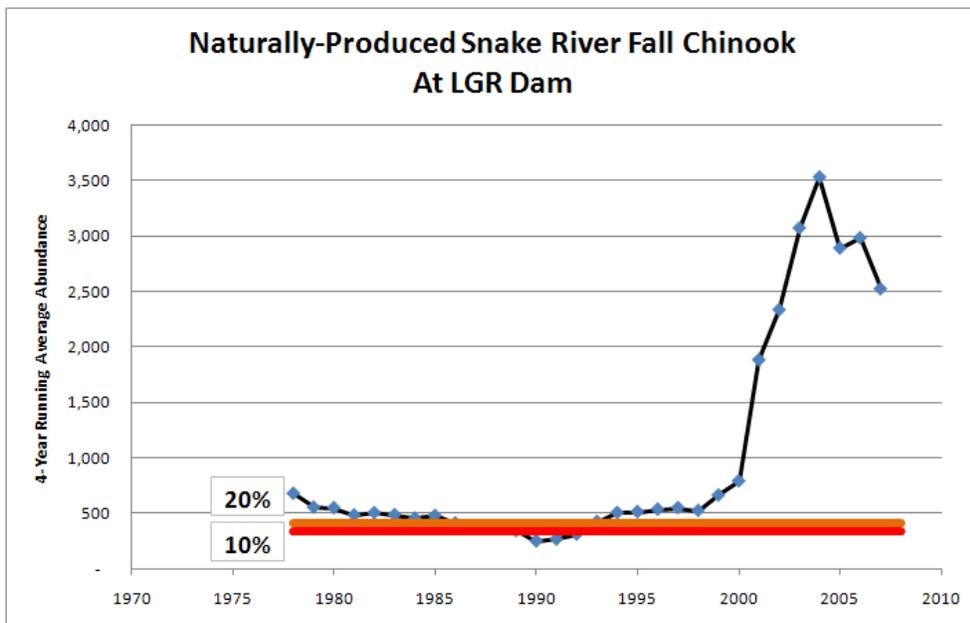


Figure 4a. Annual estimates of naturally produced Snake River steelhead adults at Lower Granite Dam.

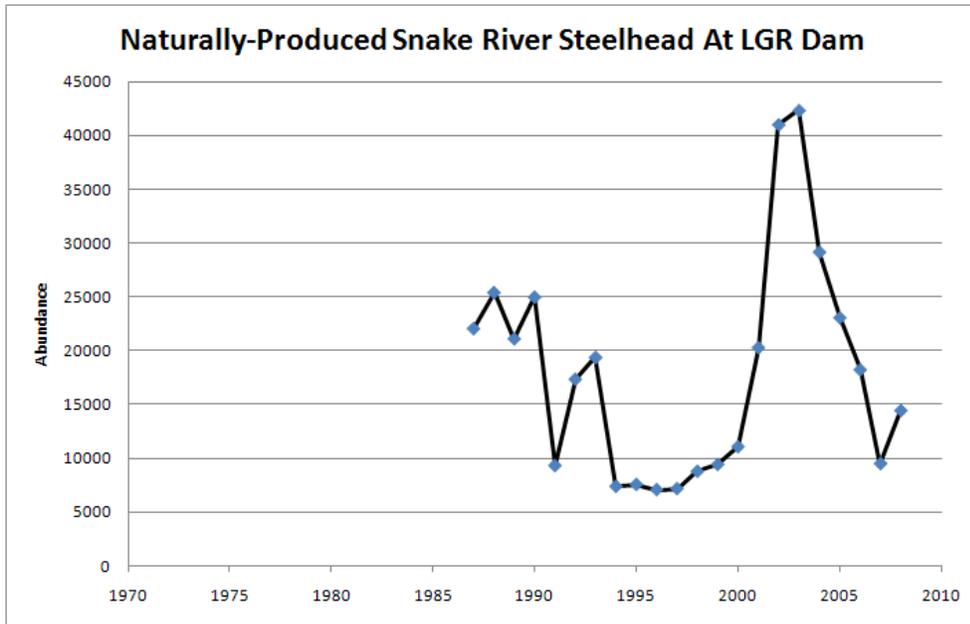


Figure 4b. Running four-year averages of naturally-produced Snake River steelhead adults at Lower Granite Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

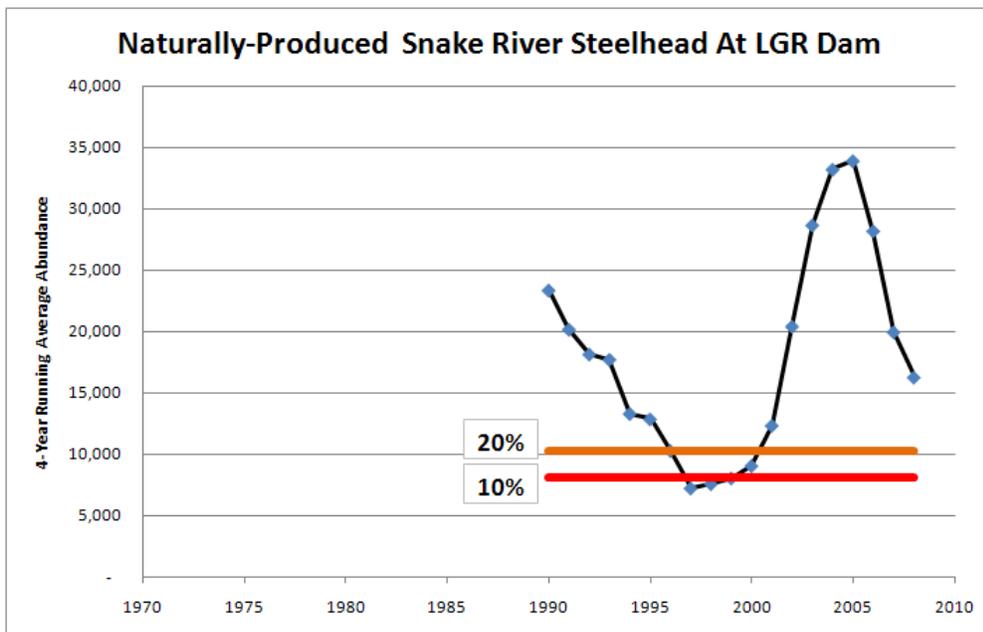


Figure 5a. Annual estimates of naturally produced Upper Columbia River steelhead adults at Rock Island Dam.

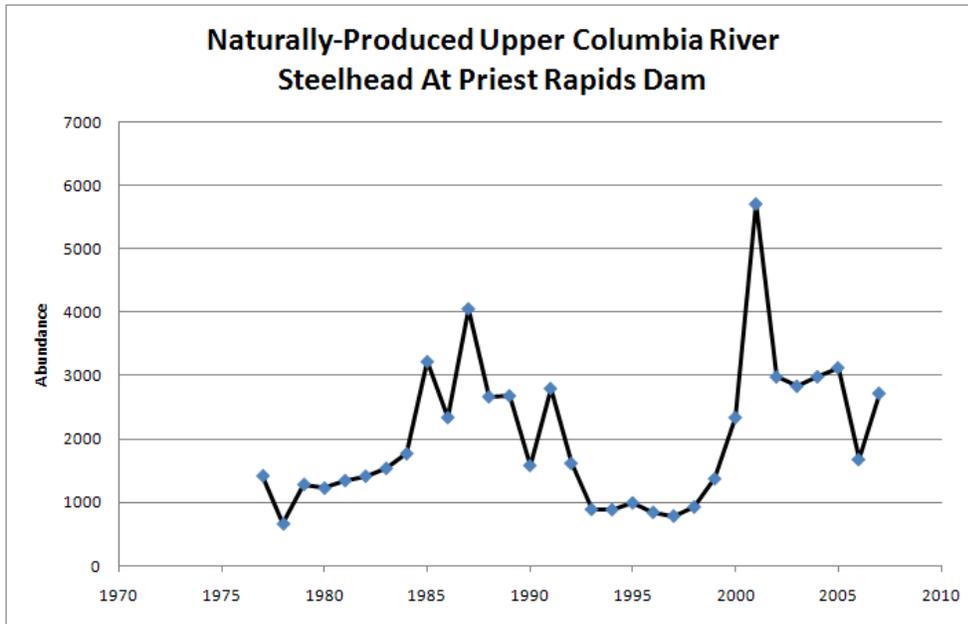


Figure 5b. Running four-year averages of naturally-produced Upper Columbia River steelhead adults at Rock Island Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

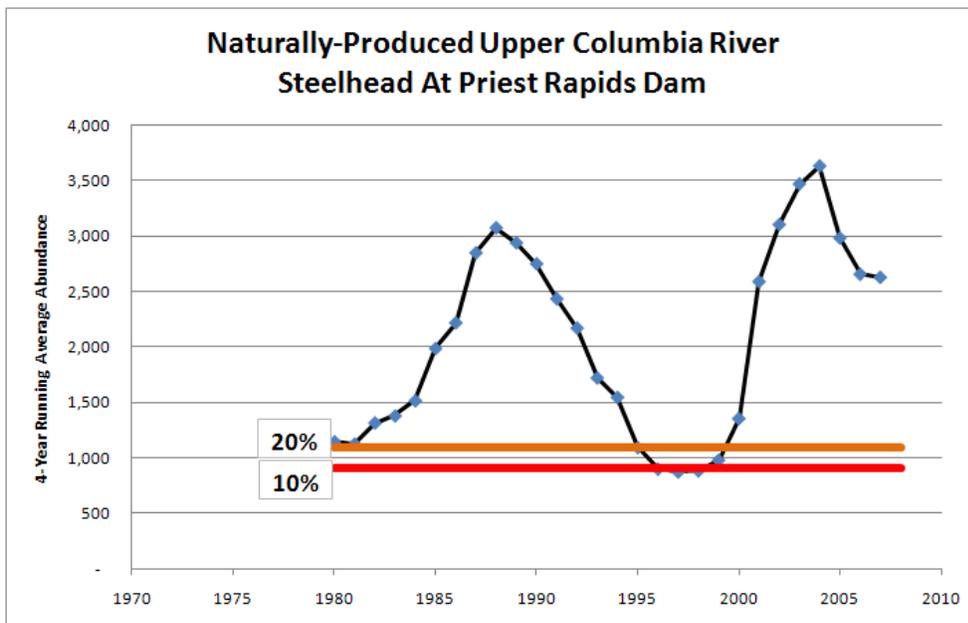


Figure 6a. Annual estimates of naturally produced Yakima MPG Middle Columbia River steelhead adults at Prosser Dam.

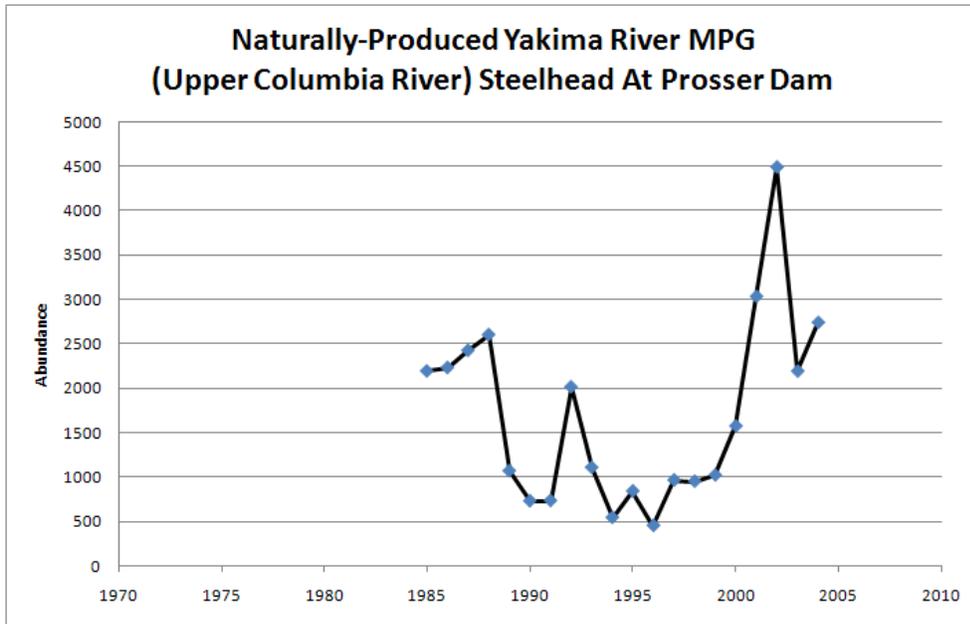


Figure 6b. Running four-year averages of naturally-produced Yakima MPG Middle Columbia River steelhead adults at Prosser Dam. Levels below which 10% (red) and 20% (orange) of estimates occur are indicated.

