



FISH PASSAGE CENTER

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MEMORANDUM

TO: Anne Richardson

Michele DeHart

FROM: Michele DeHart

DATE: March 28, 2006

RE: Data request annual mortalities of juvenile salmon

The attached tables were developed in response to your request regarding juvenile salmon and steelhead mortalities annually through the Columbia River. We have attached an explanation of the methods we used to develop the estimates. Specifically in response to your request:

- The estimates we developed do not include or account for fish that are removed from the river in the Corps of Engineers Smolt transportation program. Nor do they account for the mortality that occurs to fish including transported fish below Bonneville Dam.
- For the years 1999 – 2002 estimated mortality to wild and hatchery juvenile steelhead migrating through the hydrosystem from Lower Granite Dam on the Snake River to Bonneville Dam on the Columbia River ranged from approximately 85,000 to 1,273,000 fish annually.
- For the years 1999-2003 estimated mortality to hatchery juvenile spring chinook migrating through the hydrosystem from Lower Granite Dam on the Snake River to Bonneville Dam on the Columbia River ranged from approximately 29,000 to 809,000 fish annually.
- For the years 1999-2003 estimated mortality to wild juvenile spring chinook migrating through the hydrosystem from Lower Granite Dam on the Snake River to Bonneville Dam on the Columbia River ranged from approximately 7,700 to 193,000 fish annually.

Keep in mind that these are estimates based upon monitoring program results. They present a measure of the magnitude and variability of mortality occurring to juvenile fish migrating in river in the Columbia Snake River systems.

Interpretation of data on fish mortality in the hydrosystem each year.

1. Table 1 only shows estimated number of smolts that migrated inriver and died within the hydrosystem between Lower Granite and Bonneville dams. Any delayed mortality that may occur after passing Bonneville Dam is not included in these estimates.
2. Smolts that are transported and any delayed mortality that may occur on the transported smolts after passing Bonneville Dam are not included in computing these estimates. Therefore, the inriver mortality numbers presented here do not reflect the total losses due to all routes of passage through the hydrosystem.
3. The population numbers at Lower Granite Dam are taken from the 2004 Fish Passage Center's Annual Report (data in tables 18, 19, and 20); smolts collected at Lower Granite Dam are expanded by estimated collection efficiency (the latter is computed with PIT-tagged smolts).
4. The estimated proportion of smolts arriving Lower Granite Dam that are destined to remain inriver below Lower Monumental Dam (last transportation site in the Snake River) is computed as "1 - proportion of smolts destined to be transported." The transportation proportion estimates are taken from the 2004 Fish Passage Center's Annual Report Appendix I Table I-5.
5. The estimated reach survival from Lower Granite Dam to Bonneville Dam is the parameter V_c taken from the 2005 Comparative Survival Study Annual Report tables 14, 26, 27, 29, 30, 37, and 44. The estimate used for hatchery Chinook was the average of V_c 's from Rapid River, Dworshak, Imnaha, and McCall hatcheries which provide around half the hatchery spring/summer Chinook production above Lower Granite Dam, but most of the available PIT-tagged hatchery Chinook smolts in 1999-2003.
6. The inriver mortality estimate for combined wild and hatchery steelhead in 2001 was approximately 85,000 smolts which is the number of smolts mentioned in Jillian Schoene's reply email to Michele DeHart on March 27, 2006. However, her email goes on to mention the smolt kill as occurring in the Klamath River.
7. The results presented in Table 1 reflects only Chinook and steelhead originating in the Columbia River basin above Lower Granite Dam and their estimated direct losses within the Columbia River Basin hydrosystem for smolts migrating inriver from Lower Granite Dam to Bonneville Dam.

Table 1. Estimated mortality (numbers) of wild and hatchery Chinook and Steelhead smolts migrating inriver through the Columbia River Basin hydrosystem between Lower Granite and Bonneville dams in 1999 to 2003 (steelhead data through 2002).

Estimated Parameter	1999	2000	2001	2002	2003
Wild Chinook					
Population at LGR	1,600,000	1,100,000	500,000	1,100,000	1,300,000
Prop. "Destined" Inriver	0.223	0.29	0.02	0.317	0.371
# at LGR "Destined" Inriver	356,800	319,000	10,000	348,700	482,300
Reach Survival LGR to BON	0.59	0.48	0.23	0.61	0.60
Inriver fish alive at BON	210,512	153,120	2,300	212,707	289,380
Inriver Mortality LGR to BON	146,288	165,880	7,700	135,993	192,920
Hatchery Chinook					
Population at LGR	6,800,000	5,400,000	2,100,000	5,900,000	6,300,000
Prop. "Destined" Inriver	0.138	0.29	0.02	0.317	0.371
# at LGR "Destined" Inriver	938,400	1,566,000	42,000	1,870,300	2,337,300
Reach Survival LGR to BON	0.54	0.56	0.30	0.57	0.67
Inriver fish alive at BON	509,082	876,960	12,705	1,061,395	1,565,991
Inriver Mortality LGR to BON	429,318	689,040	29,295	808,905	771,309
Wild & Hatchery Steelhead					
Population at LGR	9,400,000	8,500,000	6,300,000	7,100,000	
Prop. "Destined" Inriver	0.175	0.19	0.014	0.323	
# at LGR "Destined" Inriver	1,645,000	1,615,000	88,200	2,293,300	
Reach Survival LGR to BON	0.45	0.26	0.038	0.445	
Inriver fish alive at BON	740,250	419,900	3,352	1,020,519	
Inriver Mortality LGR to BON	904,750	1,195,100	84,848	1,272,781	