



## FISH PASSAGE CENTER

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September 25, 2008

Mr. Mark Drobish  
U.S. Fish and Wildlife Service  
P.O. Box 18  
4147 Ahsahka Rd.  
Ahsahka, ID 83520-0018

Dear Mark-

The Fish Passage Center has been marking fish from the Dworshak National Fish Hatchery facility over the last several years as part of the Smolt Monitoring Program (SMP) and the Comparative Survival Study (CSS). For purposes of these studies data are collected on either the juvenile life stage, or both the juvenile and adult life stages. The SMP provides information for in-season management of the hydrosystem and post-season analyses to the federal, state, and tribal fishery agencies. The CSS is a multi-year program that estimates survival rates over different life stages for spring and summer Chinook and steelhead produced in major hatcheries. We would like to share with you some of the information we developed under these studies for the fish used from the Dworshak NFH facility in 2008.

Under the Smolt Monitoring Program, information is collected on the timing and migration speed from the hatchery to Lower Granite Dam. In addition, as part of the CSS study, juvenile survival estimates are developed for the hydrosystem between Lower Granite and Bonneville Dams, as well as survival to adulthood of different passage histories.

The tables below describe the median travel times for each year's release to Lower Granite Dam, along with the minimum and maximum travel time estimates for both spring Chinook (Table 1) and steelhead (Table 2). They also provide the 95% confidence limits around the estimated median travel time. In addition to the usual steelhead releases for the CSS, Dworshak provided PIT-tagged steelhead in 2008 that were released into the Clearwater River (Clear Creek Clearwater South Fork). For comparison purposes, separate travel times are provided for each of the three steelhead releases in 2008.

**Table 1. Dworshak NFH Spring Chinook Travel Times to Lower Granite Dam**

Release Date	Migration Year	Travel Time (Days)			Confidence Limits 95%		Lower Granite	
		Min	Med	Max	Lower	Upper	Flow (kcfs)	Temp (F)
7-Apr	1997	3.2	31.9	97.6	31	32.8	156.6	52.3
3/23-3/26	1998	2.8	28.1	78.2	27.8	28.1	60.2	49.7
4/7-4/8	1999	4.6	27.7	133.7	27.4	28.2	97.4	44.7
3/23, 4/5-4/6	2000	3.9	27.3	86.8	27.2	27.3	74.8	48.8
28-Mar	2001	3.9	30.4	151.1	30.3	30.4	33.5	46.9
3/27-3/28	2002	3.4	38.1	77.6	38.1	38.2	27.4	
3/19-3/20	2003	6	49.4	121.4	49	49.7	28.4	
3/31-4/1	2004	6.2	32.2	74.9	32	32.4	23.4	
4/4-4/6	2005	5.6	30.2	76	30.2	30.2		
3/27-3/29	2006	2.7	35.6	78.7	35.4	35.9	43.3	
3/28-3/29	2007	4.4	27.8	76.9	27.4	28.4	46.4	
4/2-4/3	2008	5.6	34.6	88.3	34.5	34.9	56.3	50

**Table 2. Dworshak NFH Steelhead Travel Times to Lower Granite Dam**

Release Date(s)	Release Site	Migration Year	Travel Time (Days)			Confidence Limits 95%		Lower Granite	
			Min	Med	Max	Lower	Upper	Flow (kcfs)	Temp (F)
28-Apr	DWOR	1997	1.3	2.8	28.6	2.4	3.6	160.6	50.6
2-May	DWOR	1997	1.9	6.7	30.5	5.1	11.2	156.6	52.3
29-Apr	DWOR	1997	1.2	1.8	30.1	1.7	1.8	160.6	50.6
1-May	DWOR	1997	1.5	6.9	64.8	5.5	8.8	150.9	52.3
4/27-4/30	DWOR	1998	2.3	4.7	48.8	4.5	5	90.6	53.5
4/26-4/30	DWORMS	1999	1.5	6.2	60.1	5.8	6.5	115.4	50.8
5/3-5/5	DWORMS	2000	1.6	3.5	66.6	3.5	3.5	95.2	53.2
4/23-4/26	DWORMS	2001	2.5	6.8	110	6.7	7	46.6	44.9
4/22-4/25	DWORMS	2002	2.4	5.7	47.4	5.5	6.4	22.5	
4/24	DWORMS	2003	0.6	7.1	54.8	6.6	7.7	18	
4/29-4/22	DWORMS	2004	2.9	8.8	34	8.4	9.3	21.8	
4/18-4/22	DWORMS	2005	3.4	11.2	60.8	10.4	11.6		
4/17-4/21	DWORNF	2006	1.0	10.5	52.7	8.1	12.6	47.5	
4/16-4/19	DWORMS	2007	1.9	14.6	52.7	13.0	15.8	53.0	
4/14	CLEARC	2008	3.6	16.4	44	15.4	17.4	59.3	50.6
4/14	CLWRSF	2008	4.5	23.9	56.5	23.6	24.5	63.2	50.4
4/21-4/24	DWORMS	2008	0.5	8.6	49.5	8.4	8.8	59.3	50.5

The tables below contain estimates calculated in the CSS study of juvenile survival in the hydrosystem between Lower Granite and Bonneville Dams and the survival to adulthood of spring Chinook (Table 3) and steelhead (Table 4) in several categories. Those categories are SAR(T), SAR(C<sub>0</sub>), and Weighted SAR<sub>LGR-10-LGR</sub>, where SAR(T) represents smolts transported from Lower Granite, Little Goose, or Lower Monumental Dam, SAR(C<sub>0</sub>) represents smolts migrating in river, and SAR<sub>LGR-10-LGR</sub> is a weighted estimate that is obtained by taking the proportion of the total population of smolts (tagged and untagged) at Lower Granite Dam in each study category and multiplying by the respective study category's SAR<sub>LGR-10-LGR</sub>. In effect, the weighted SAR<sub>LGR-10-LGR</sub> is the estimated SAR for the overall hatchery release. The data presented in Tables 3 and 4 were taken from the Draft 2008 CSS Annual Report, which can be downloaded from the FPC webpage (<http://www.fpc.org/documents/CSS.html>).

**Table 3.** Dworshak NFH Spring Chinook Survivals from CSS, as presented in Draft 2008 Annual Report

Release Date	Migration Year	Juvenile Survival LGR-BON	Proportion Transported	T/C Ratio	SAR(T)	Adult Survival SAR(C <sub>0</sub> ) %	Weighted SAR <sub>LGR-to-LGR</sub>
7-Apr	1997	0.49	0.48	1.75	0.83	0.47	0.62
3/23-3/26	1998	0.51	0.71	0.72	0.90	1.25	1.00
4/7-4/8	1999	0.54	0.74	0.99	1.18	1.19	1.18
3/23, 4/5-4/6	2000	0.48	0.66	0.99	1.00	1.01	1.00
28-Mar	2001	0.24	0.98	8.76	0.36	0.04 <sup>B</sup>	0.36
3/27-3/28	2002	0.62	0.57	1.24	0.62	0.5	0.57
3/19-3/20	2003	0.68	0.54	1.21	0.26	0.21	0.24
3/31-4/1	2004	0.50	0.84	0.89	0.28	0.32	0.29
4/4-4/6	2005	0.51	0.84	1.43	0.20	0.14 <sup>C</sup>	0.20
3/27-3/29	2006 <sup>A</sup>	0.51	0.67	0.87	0.33	0.38	0.35

<sup>A</sup> Migration year 2006 is incomplete with Age 2-salt adult returns through 8/13/2008

<sup>B</sup> Assumed SAR(C<sub>0</sub>) same as SAR(C<sub>1</sub>) for 2001

<sup>C</sup> In-river SAR is combination of groups C<sub>1</sub> and C<sub>0</sub>

**Table 4.** Dworshak NFH Steelhead Survivals from CSS, as presented in Draft 2008 Annual Report

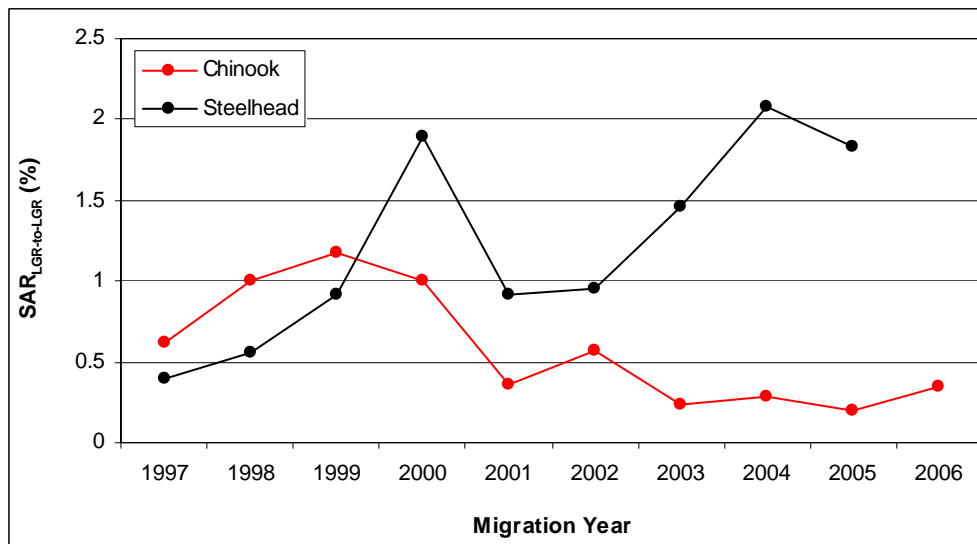
Release Date	Migration Year	Juvenile Survival LGR-BON	Proportion Transported	T/C Ratio	SAR(T)	Adult Survival SAR(C <sub>0</sub> ) %	Weighted SAR <sub>LGR-to-LGR</sub>
4/28-5/2	1997	0.40	0.61	2.21	0.52	0.24	0.39
4/27-4/30	1998	0.64	0.87	0.58	0.51	0.89	0.56
4/26-4/30	1999	0.45	0.85	0.87	0.90	1.04	0.92
5/3-5/5	2000	0.22	0.82	2.2	2.10	0.95	1.89
4/23-4/26	2001	0.04	0.98	59.7	0.94	0.02 <sup>B</sup>	0.92
4/22-4/25	2002	0.37	0.70	1.51	1.06	0.70	0.95
4/24	2003	0.51	0.69	2.65	1.81	0.68	1.46
4/29-4/22	2004	0.17	0.97	10.3	2.13	0.21 <sup>C</sup>	2.08
4/18-4/22	2005 <sup>A</sup>	0.36	0.89	8.44	2.03	0.24 <sup>C</sup>	1.83

<sup>A</sup> Migration year 2005 is incomplete until 3-salt returns (if any) occur after 7/1/2008 at LGR

<sup>B</sup> Assumed SAR(C<sub>0</sub>) same as SAR(C<sub>1</sub>) for 2001

<sup>C</sup> In-river SAR is combination of groups C<sub>1</sub> and C<sub>0</sub>

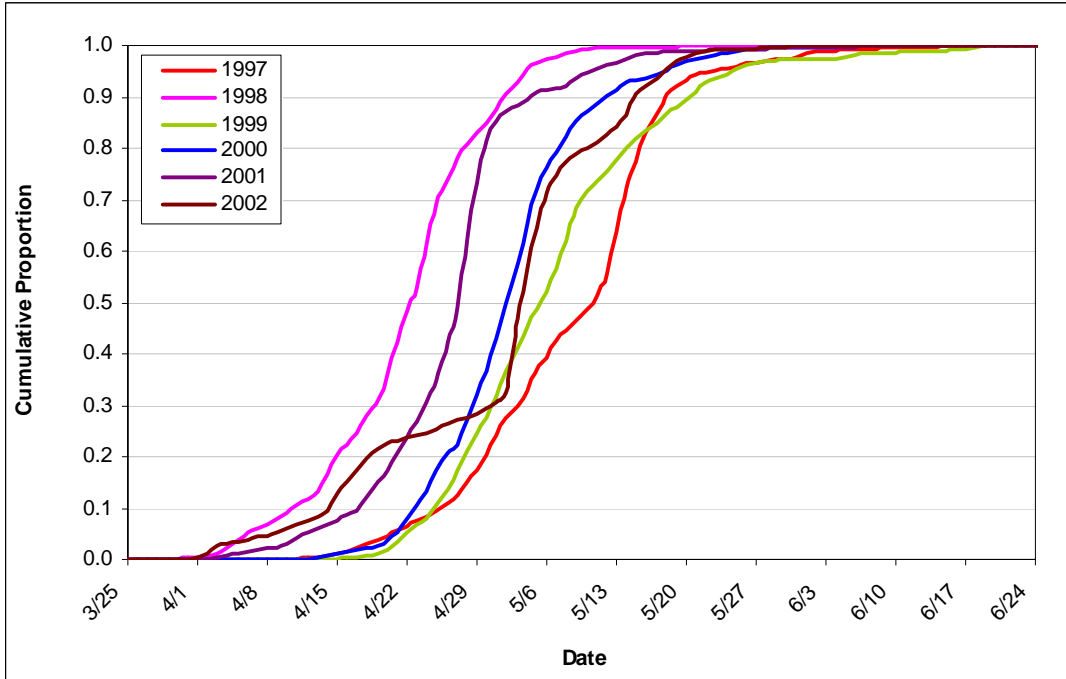
Figure 1 below is a time series of the Weighted SAR<sub>LGR-to-LGR</sub> over the years of available data for Dworshak NFH spring Chinook and steelhead.



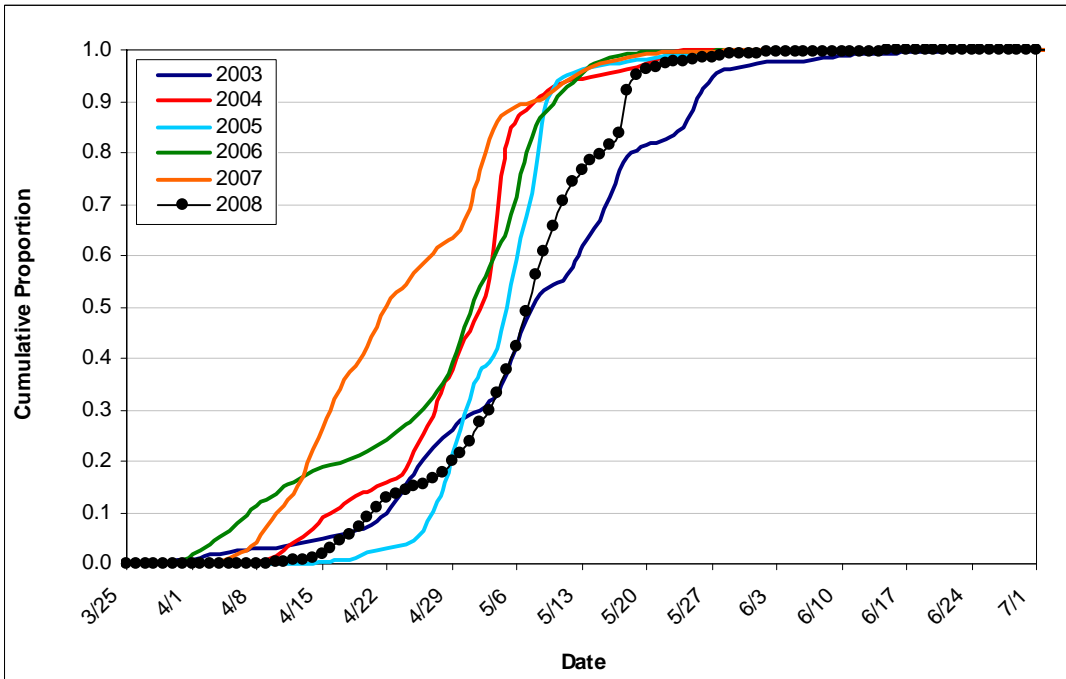
**Figure 1.** Weighted SAR<sub>LGR-to-LGR</sub> for Dworshak NFH spring Chinook (1997-2006) and steelhead (1997-2005)

Finally, we are providing figures to illustrate passage timing of Dworshak NFH spring Chinook and steelhead at Lower Granite Dam for the past several years. To better facilitate comparison, we have broken the years into two separate graphs. Please note the different scales on the x-axis among the graphs.

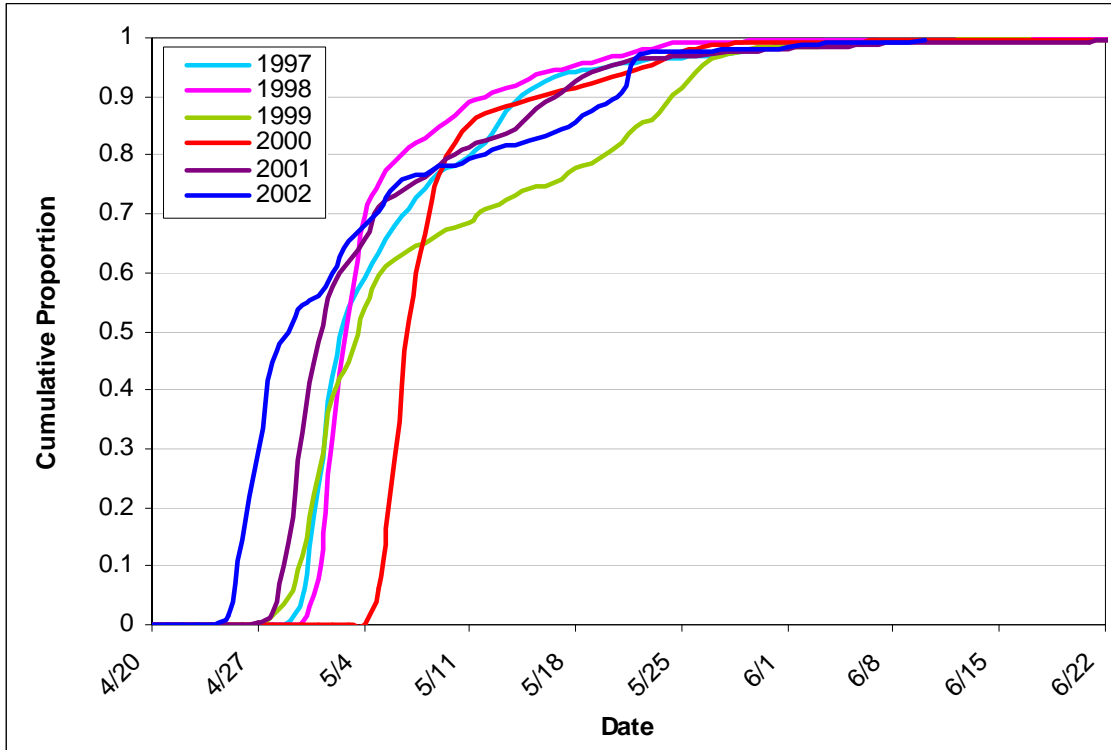
**Dworshak NFH – Spring Chinook (1997-2002)**  
**Passage Timing to Lower Granite Dam**



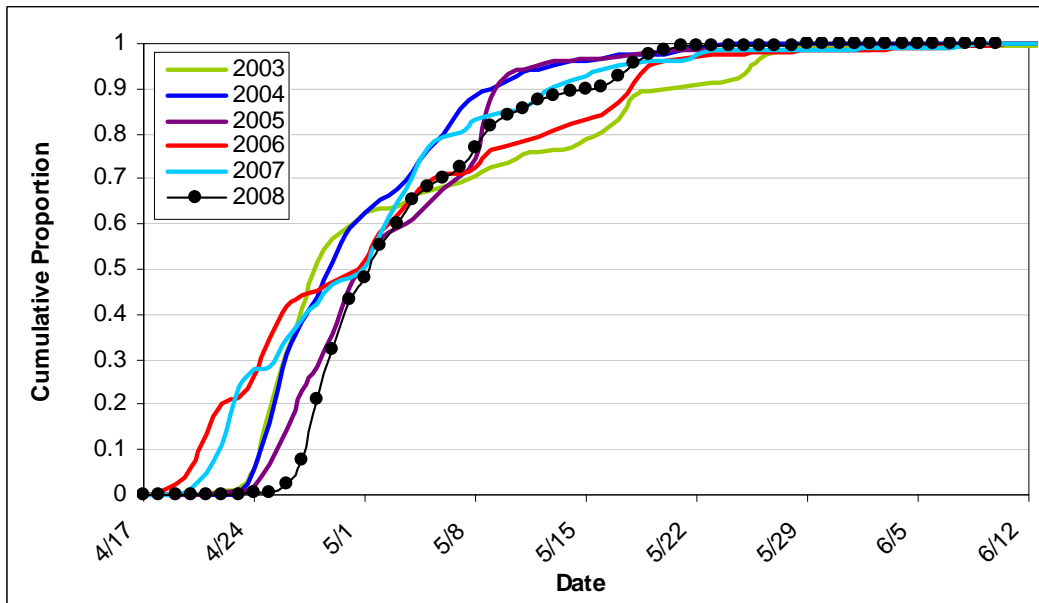
**Dworshak NFH – Spring Chinook (2003-2008)**  
**Passage Timing to Lower Granite Dam**



**Dworshak NFH – Steelhead (1997-2002)  
Passage Timing to Lower Granite Dam**

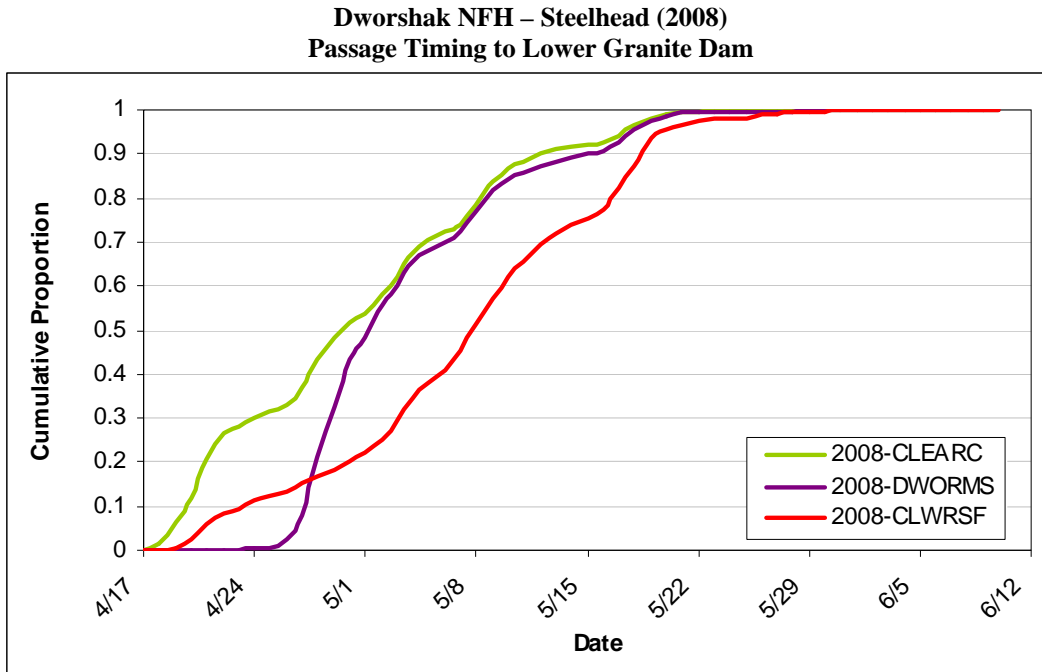


**Dworshak NFH – Steelhead (2003-2008<sup>1</sup>)  
Passage Timing to Lower Granite Dam**



<sup>1</sup> The timing for 2008 represents the cumulative timing of steelhead released at DWORMS, CLEARC, and CLWRSF combined.

Since 2008 included additional release sites for steelhead under the CSS, we are providing a separate passage timing graph to illustrate differences in passage timing between the three release groups.



We hope that the information we have provided regarding the use and application of information from the marked groups over the last several years is of some use to you. If you would like any additional information regarding these releases please feel free to contact us.

Sincerely,

Michele DeHart  
Fish Passage Center Manager

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