



FISH PASSAGE CENTER

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Mr. Mark Drobish
U.S. Fish and Wildlife Service
P.O. Box 18
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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 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 an update of some of the information we developed under these studies for the fish used from the Dworshak Hatchery facility in 2009 and past years.

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. Beginning in 2008, Dworshak NFH began releasing additional PIT-tagged steelhead into the Clearwater River at Clear Creek and Clearwater South Fork. For comparison purposes, separate travel times are also provided for each of the three steelhead release sites in 2009 (Table 3).

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

Release Date	Migration Year	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
7-Apr	1997	3.2	31.9	97.6	31	32.8
3/23-3/26	1998	2.8	28.1	78.2	27.8	28.1
4/7-4/8	1999	4.6	27.7	133.7	27.4	28.2
3/23, 4/5-4/6	2000	3.9	27.3	86.8	27.2	27.3
28-Mar	2001	3.9	30.4	151.1	30.3	30.4
3/27-3/28	2002	3.4	38.1	77.6	38.1	38.2
3/19-3/20	2003	6	49.4	121.4	49	49.7
3/31-4/1	2004	6.2	32.2	74.9	32	32.4
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
3/28-3/29	2007	4.4	27.8	76.9	27.4	28.4
4/2-4/3	2008	5.6	34.6	88.3	34.5	34.9
3/25-3/26	2009	5.5	43.5	89.2	43.3	43.6

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

Release Date(s)	Release Site(s)	Migration Year	Travel Time (Days)			95% Confidence Limits	
			Min	Med	Max	Lower	Upper
4/28-5/2	DWOR	1997	1.2	3.3	64.8	2.7	4.0
4/27-4/30	DWOR	1998	2.3	4.7	48.8	4.5	5
4/26-4/30	DWORMS	1999	1.5	6.2	60.1	5.8	6.5
5/3-5/5	DWORMS	2000	1.6	3.5	66.6	3.5	3.5
4/23-4/26	DWORMS	2001	2.5	6.8	110	6.7	7
4/22-4/25	DWORMS	2002	2.4	5.7	47.4	5.5	6.4
4/24	DWORMS	2003	0.6	7.1	54.8	6.6	7.7
4/29-4/22	DWORMS	2004	2.9	8.8	34	8.4	9.3
4/18-4/22	DWORMS	2005	3.4	11.2	60.8	10.4	11.6
4/17-4/21	DWORMS	2006	1.0	10.5	52.7	8.1	12.6
4/16-4/19	DWORMS	2007	1.9	14.6	52.7	13.0	15.8
4/14,4/21-4/24	DWORMS, CLEARC, CLWRSF	2008	0.5	11.5	56.5	11.1	11.9
4/14-4/17	DWORMS, CLEARC, CLWRSF	2009	2.5	7.5	64.2	7.48	7.54

Table 3. 2009 Dworshak NFH Steelhead Travel Times from each release site to Lower Granite Dam

Release Date(s)	Release Site	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
4/14-4/17	DWORS	2.5	6.5	54.2	6.5	6.6
4/15	CLEARC	3.5	8.5	64.2	8.5	8.6
4/15	CLWRSF	3.7	10.6	54.8	10.4	11.2

In past years, we have provided you with figures to illustrate passage timing of Dworshak NFH yearling spring Chinook and steelhead to Lower Granite Dam since tagging began in 1997. However, given that these releases have been going on for so many years, these figures have become cumbersome. This year, we have decided to provide tables that present the estimated 10%, 50%, and 90% passage dates of yearling spring Chinook (Table 4) and steelhead (Table 5) juveniles at Lower Granite Dam for each of the years of tagging. As with the travel time tables,

we are also providing the estimated 10%, 50%, and 90% passage dates for each of the three steelhead releases in 2009 (Table 6).

Table 4. Estimated 10%, 50%, and 90% passage dates of Dworshak NFH yearling spring Chinook at Lower Granite Dam.

Migration Year	Release Date(s)	10% Passage Date	50% Passage Date	90% Passage Date
1997	7-Apr	26-Apr	11-May	18-May
1998	3/23-3/26	11-Apr	23-Apr	2-May
1999	4/7-4/8	25-Apr	6-May	21-May
2000	3/23, 4/5-4/6	23-Apr	3-May	12-May
2001	28-Mar	18-Apr	28-Apr	5-May
2002	3/27-3/28	15-Apr	4-May	15-May
2003	3/19-3/20	23-Apr	8-May	26-May
2004	3/31-4/1	17-Apr	3-May	8-May
2005	4/4-4/6	27-Apr	6-May	10-May
2006	3/27-3/29	8-Apr	2-May	11-May
2007	3/28-3/29	11-Apr	22-Apr	8-May
2008	4/2-4/3	21-Apr	8-May	18-May
2009	3/25-3/26	20-Apr	8-May	19-May

Table 5. Estimated 10%, 50%, and 90% passage dates of Dworshak NFH steelhead at Lower Granite Dam.

Migration Year	Release Date(s)	Release Site(s)	10% Passage Date	50% Passage Date	90% Passage Date
1997	4/28-5/2	DWOR	1-May	3-May	15-May
1998	4/27-4/30	DWOR	2-May	3-May	13-May
1999	4/26-4/30	DWORMS	30-Apr	4-May	25-May
2000	5/3-5/5	DWORMS	6-May	7-May	16-May
2001	4/23-4/26	DWORMS	29-Apr	2-May	17-May
2002	4/22-4/25	DWORMS	26-Apr	30-Apr	21-May
2003	24-Apr	DWORMS	25-Apr	28-Apr	20-May
2004	4/19-4/22	DWORMS	25-Apr	29-Apr	9-May
2005	4/18-4/22	DWORMS	26-Apr	1-May	10-May
2006	4/17-4/22	DWORMS	21-Apr	1-May	18-May
2007	4/16-4/19	DWORMS	22-Apr	1-May	13-May
2008	4/14, 4/21-4/24	DWORMS, CLEARC, CLWRSF	27-Apr	2-May	17-May
2009	4/14-4/17	DWORMS, CLEARC, CLWRSF	20-Apr	23-Apr	8-May

Table 6. Estimated 10%, 50%, and 90% passage dates of Dworshak NFH steelhead at Lower Granite Dam. Separate estimates are provided for each of the three release sites in 2009.

Release Date	Release Site	10% Passage Date	50% Passage Date	90% Passage Date
4/14-4/17	DWORMS	19-Apr	22-Apr	8-May
15-Apr	CLEARC	20-Apr	23-Apr	6-May
15-Apr	CLWRSF	22-Apr	25-Apr	11-May

Finally, Figure 1 is provided as an illustration of how the arrival timing of the 2009 release of yearling spring Chinook relates to last year's release, as well as the average of the most recent 10-years (1999-2008). We are providing two figures to illustrate the 2009 passage timing for steelhead released by Dworshak NFH. The first of these figures illustrates the collective timing of the 2009 releases, compared to those in 2008 and the 10-year average (Figure 2). The second is a comparison of the timing from each of the three release sites (DWORMS, CLEARC, CLWRSF) in 2009 and 2008 (Figure 3).

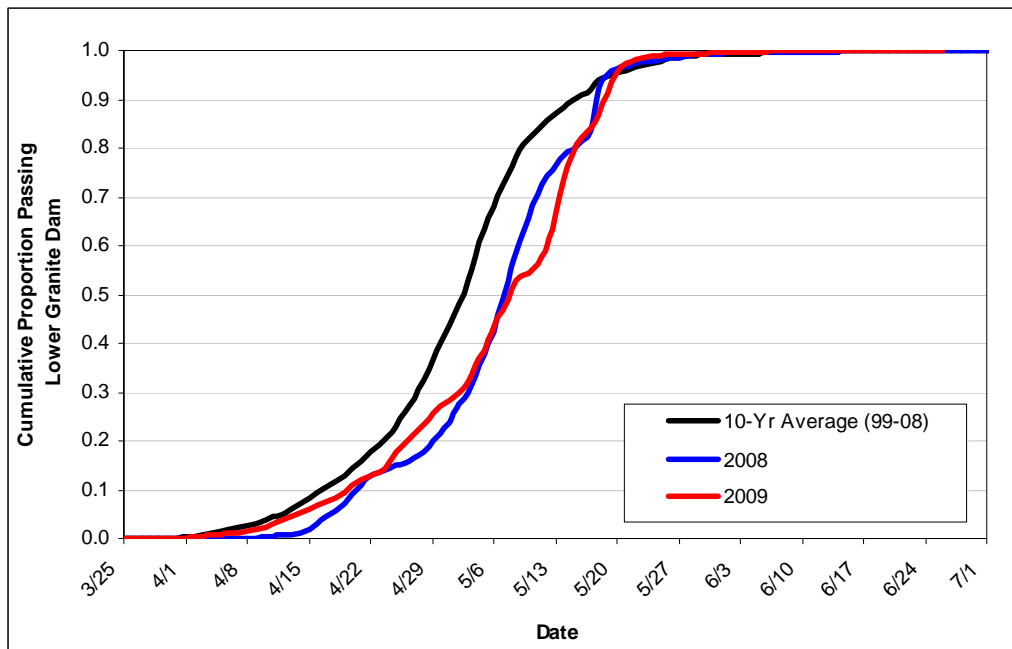


Figure 1. Cumulative passage timing of Dworshak NFH yearling spring Chinook to Lower Granite Dam.

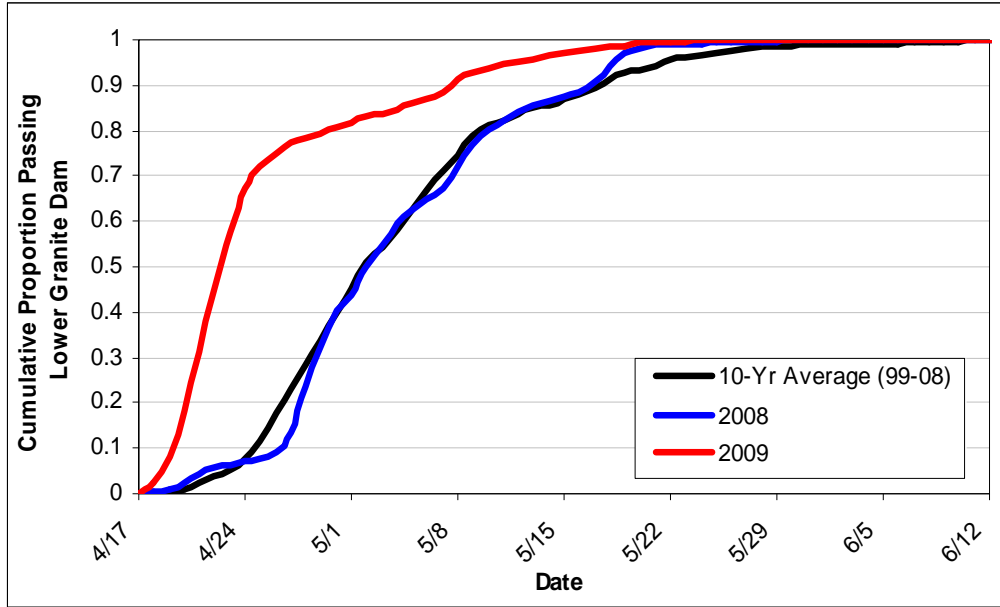


Figure 2. Cumulative passage timing of Dworshak NFH steelhead to Lower Granite Dam. Timing plots for migration years 2008 and 2009 are collective timing of the three release sites in these years.

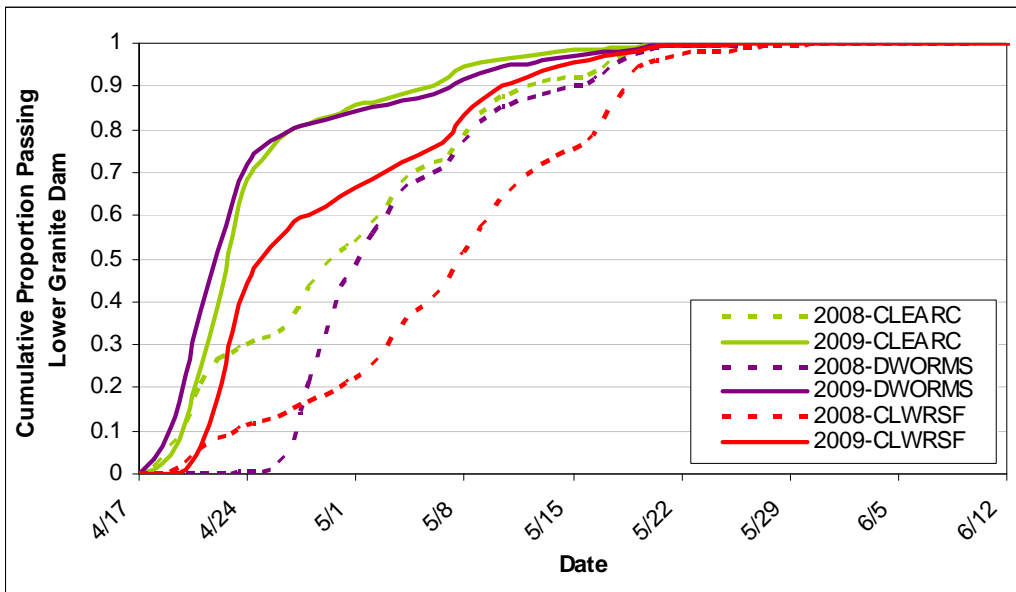


Figure 3. Cumulative passage timing of Dworshak NFH steelhead to Lower Granite Dam. Separate timing plots are provided for each of the three release sites in 2008 and 2009.

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 7) and steelhead (Table 8) in several categories. Those categories are SAR(T), SAR(C₀), and Weighted SAR_{LGR-10-LGR}, where SAR(T) represents smolts transported from Lower Granite, Little Goose, or Lower Monumental Dam, SAR(C₀) represents smolts

migrating in river, and SAR_{LGR-10-LGR} 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_{LGR-10-LGR}. In effect, the weighted SAR_{LGR-10-LGR} is the estimated SAR for the overall hatchery release. The data presented in Tables 7 and 8 were taken from the Draft 2009 CSS Annual Report, which can be downloaded from the FPC webpage (<http://www.fpc.org/documents/CSS.html>).

Table 7. Dworshak NFH Spring Chinook Survivals from CSS, as presented in Draft 2009 Annual Report

Release Date(s)	Migration Year	Juvenile			Adult Survival		
		Survival (LGR-BON)	Proportion Transported	T/C Ratio	SAR(T) %	SAR(C ₀) %	Weighted SAR _{LGR-10-LGR}
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 ^B	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 ^C	0.19
3/27-3/29	2006 ^D	0.54	0.66	0.90	0.35	0.39	0.36
3/28-3/29	2007 ^{A D}	0.67	0.27	2.19	0.68	0.31	0.41

^A Migration year 2007 is incomplete with Age 2-salt adult returns through 8/3/2009

^B Assumed SAR(C₀) same as SAR(C₁) for 2001

^C In-river SAR is combination of groups C₁ and C₀

^D Smolt migration year 2006 and 2007 use combined TWS and BWS data

Table 8. Dworshak NFH Steelhead Survivals from CSS, as presented in Draft 2009 Annual Report

Release Date(s)	Migration Year	Juvenile			Adult Survival		
		Survival (LGR-BON)	Proportion Transported	T/C Ratio	SAR(T) %	SAR(C ₀) %	Weighted SAR _{LGR-10-LGR}
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 ^B	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 ^C	2.08
4/18-4/22	2005 ^D	0.36	0.89	8.44	2.03	0.24 ^C	1.83
4/17-4/22	2006 ^{A D}	0.62	0.79	1.49	2.13	1.42	1.96

^A Migration year 2006 is incomplete until 3-salt returns (if any) occur after 7/1/2009 at LGR

^B Assumed SAR(C₀) same as SAR(C₁) for 2001

^C In-river SAR is combination of groups C₁ and C₀

^D Smolt migration year 2006 and 2007 use combined TWS and BWS data

Figure 4 below shows a time series of the Weighted SAR_{LGR-10-LGR} over the years of available data for Dworshak NFH spring Chinook and steelhead.

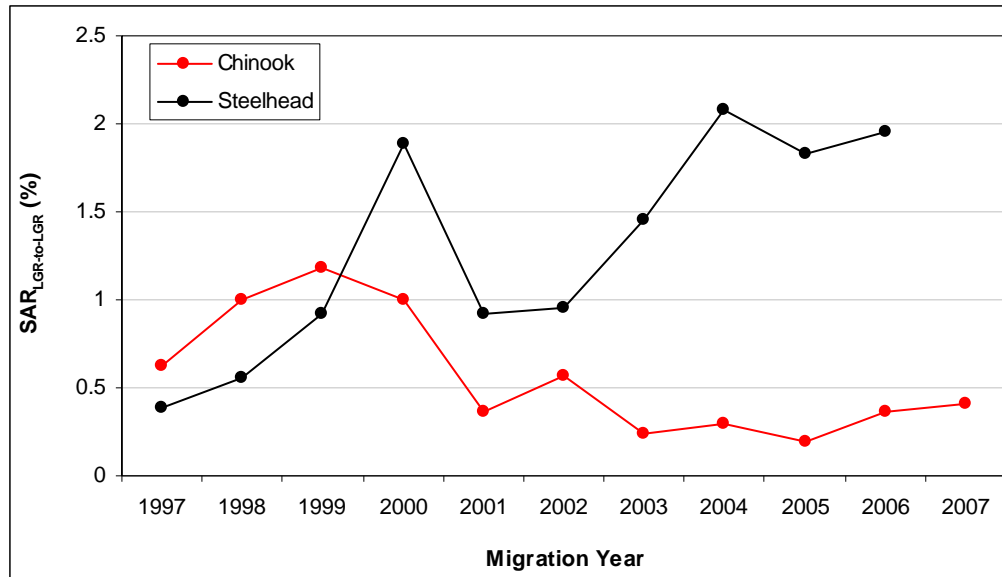


Figure 4. Weighted SAR_{LGR-to-LGR} for Dworshak NFH spring Chinook (1997-2007) and steelhead (1997-2006). Migration year 2007 is incomplete for yearling Chinook, with Age 2-salt adult returns through 8/3/2009. Migration year 2006 is incomplete for steelhead until 3-salt returns (if any) occur after 7/1/2009 at Lower Granite Dam.

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

Cc: Pete Hassemer, IDF&G
Doug DeHart, USFWS
Brian Lipscomb, CBFWA
Tony Nigro, ODFW
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FPAC