



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Scott Levy

FROM:   
Michele DeHart

DATE: September 28, 2011

RE: Juvenile survival estimates for Snake River sockeye for 2011 out-migration

In response to your request, the FPC staff has conducted a preliminary analysis of survivals of PIT-tagged juvenile Snake River sockeye for migration year 2011. Below is a brief summary of our findings, followed by a more detailed discussion of the analyses and results.

- The juvenile survival (LGR-MCN) estimate for Snake River sockeye in 2011 is 0.67. This estimate is lower than what was observed in 2009 and 2010 and the same as 2008.
- The 2011 survival estimate of 0.67 was higher than the average survival (0.62) for the 1998-2011 period (excluding 2004).
- The FPC estimate of 0.67 for the 2011 out-migration is similar to the NOAA estimated (0.66) for the same reach (NOAA 2011).
- Given that the 2011 Snake River sockeye survivals are similar to recent years', it appears that the high spill and high TDG levels in the Snake River in 2011 did not result in an unusually high mortality for in-river migrating juvenile sockeye.

### **Methods:**

FPC staff estimated juvenile reach survivals for PIT-tagged Snake River sockeye from Lower Granite Dam (LGR) to McNary Dam (MCN) for migration year 2011 using the same methodologies as in previous analyses. For a more detailed explanation of methodologies, see the FPC memo published on January 26, 2010 (<http://www.fpc.org/documents/memos/09-10.pdf>). In addition to survivals, we also estimated the median fish travel times (FTT) from the point of LGR detection to MCN detection.

**Results:**

The LGR-MCN survival estimate for the 2011 Snake River sockeye outmigration was 0.67 and the median FTT was 5.7 days (Table 1). This survival estimate is higher than the overall average of 0.62 for the 13 years of survival data that the FPC has analyzed (2004 survivals could not be estimated). Furthermore, the 2011 survival estimate was similar to what was observed in 2008, but lower than the 2009 and 2010 estimates.

The 2011 median FTT of 5.7 days is the second fastest FTT estimate among the 14 years of FTT data that the FPC has analyzed (Table 1). Survival and FTT estimates for the 2011 out-migration can be found in Table 1 below, along with the estimates for previous migration years from previous analyses.

**Table 1.** Juvenile reach survival (LGR-MCN) and median fish travel time (FTT) of hatchery and wild Snake River sockeye juveniles (1998-2011). Survival estimate for 2004 was not possible due to a large proportion of PIT-tagged individuals being transported that year.

Migration Year	FTT	Juvenile Survival	95% Confidence Interval	
			Lower Limit	Upper Limit
1998	10.3	0.60	0.22	0.98
1999	6.4	0.63	0.42	0.84
2000	7.5	0.64	0.37	0.91
2001	12.5	0.26	0.06	0.46
2002	8.6	0.50	0.35	0.66
2003	5.6	0.71	0.50	0.91
2004	6.8			
2005	14.3	0.45	0.13	0.77
2006	6.8	0.86	0.47	1.25
2007	8.4	0.62	0.38	0.86
2008	6.9	0.67	0.43	0.90
2009	6.7	0.76	0.62	0.89
2010	7.1	0.72	0.59	0.86
2011	5.7	0.67	0.53	0.82
<b>Average Survival</b>		<b>0.62</b>		

**Conclusions:**

On September 13, 2011, NOAA issued their annual memo of preliminary survival estimates for spring migrants through the Snake and Columbia River reservoirs (NOAA 2011). This memo provided reach estimates for yearling Chinook, steelhead, and sockeye juveniles through the Snake River, Upper Columbia River, and Lower Columbia River, along with some information about out-migration conditions. In their memo, NOAA's estimate of Snake River sockeye survival from LGR to MCN was 0.66, which is very similar to the FPC estimate of 0.67.

According to the Northwest River Forecast Center ([http://www.nwrfc.noaa.gov/water\\_supply/ws\\_verify\\_table.cgi?date=2011](http://www.nwrfc.noaa.gov/water_supply/ws_verify_table.cgi?date=2011)), the April-August run-off volume at LGR in 2011 was 153% of normal. As a result, spill from Snake River projects in spring and summer of 2011 was uncontrolled for much of May through the end of

June. This uncontrolled spill caused total dissolved gas (TDG) levels at Snake River projects to exceed the 115%/120% standards for nearly two months, until early to mid-July. With the increased TDG, there was concern that increased mortality may have occurred among juvenile out-migrants. During this period of high spill, the FPC provided updates on the Gas Bubble Trauma (GBT) monitoring efforts to the fisheries managers in a weekly memo. These memos were posted to the FPC webpage <http://www.fpc.org/documents/memos> on May 27, June 3, June 10, June 17, and June 24, 2011.

The FPC and NOAA estimates of LGR-MCN survival for Snake River sockeye juveniles in 2011 were in the 0.66-0.67 range. These survival estimates are above the overall average among the years analyzed (1998-2011 for FPC and 1996-2011 for NOAA). Given the 2011 survival estimates for the LGR to MCN reach, it does not appear that there was unusually high mortality due to the conditions observed in the Snake River in 2011.

**Literature Cited:**

NOAA 2011. NOAA Technical Memorandum for Bruce Suzumoto from John W. Ferguson  
Entitled: "Preliminary survival estimates for passage during the spring migration of  
juvenile salmonids through Snake and Columbia River reservoirs and dams, 2011."



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DATA REQUEST FORM

Request Taken By: Michele DeHart Date: 1-July-2011

Data Requested By:

Name: Scott Gery Phone: \_\_\_\_\_  
Address: \_\_\_\_\_ Fax: \_\_\_\_\_  
Email: red fish @ blue fish . org

Data Requested:

Study juvenile sockeye migration of 2011 through  
lower Snake River dam.

Data Format: Hardcopy  Text  Excel   
Delivery: Mail  Email  Fax  Phone

Comments:

Provided estimates of LGR-MEN survival for 2011  
sockeye and median FRT. Also provided NOAA  
estimates.

Data Compiled By: [Signature] Date: 28-Sept-2011

Request # 73