



# FISH PASSAGE CENTER

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December 28, 2012

Travis Collier  
Assistant Hatchery Manager  
Leavenworth National Fish Hatchery  
12790 Hatchery Rd.  
Leavenworth, WA 98826

Dear Travis-

The Fish Passage Center has been marking fish from the Leavenworth National Fish Hatchery facility over the last several years as part of the Smolt Monitoring Program (SMP). For purposes of SMP, passage data are collected on 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. We would like to provide an update of some of the information we developed under this study for the fish used from the Leavenworth National Fish Hatchery facility in 2012 and past years.

Under the Smolt Monitoring Program, information is collected on the timing, migration speed, and survival of juveniles from the hatchery to McNary Dam. Table 1 below provides estimates of minimum, median, and maximum travel times from each year's release to McNary Dam. Also provided are estimates of the 95% confidence limits around the estimated median travel time.

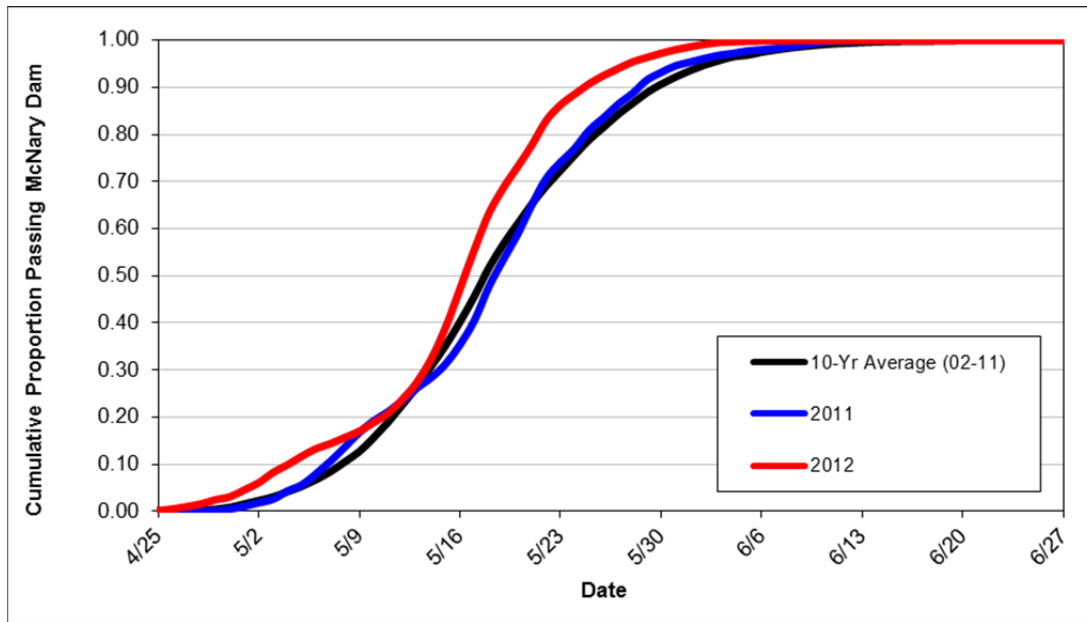
In addition, we are providing estimates of the 10%, 50%, and 90% passage dates of Leavenworth NFH spring Chinook juveniles at McNary Dam for each of the years of tagging (Table 2). Also, Figure 1 is provided as an illustration of how the arrival timing of the 2012 smolt release relates to last year's release, as well as the 10-year average arrival timing (2002-2011).

**Table 1.** Leavenworth Hatchery Spring Chinook Travel Times to McNary Dam

| Release Date   | Migration Year | Travel Time (Days) |      |       | Confidence Limits 95% |       | Priest Rapids Flow (kcfs) |
|----------------|----------------|--------------------|------|-------|-----------------------|-------|---------------------------|
|                |                | Min                | Med  | Max   | Lower                 | Upper |                           |
| 17-Apr         | 1997           | 8.6                | 28.7 | 52.2  | 22.7                  | 41.8  | 92                        |
| 20-Apr         | 1998           | 10.3               | 21.7 | 55.1  | 21.2                  | 22.2  | 141.7                     |
| 19-Apr         | 1999           | 6.8                | 27.8 | 55.7  | 27.3                  | 28.1  | 171.1                     |
| 18-Apr         | 2000           | 11.9               | 36.1 | 79.2  | 34.6                  | 36.9  | 184.7                     |
| 17-Apr         | 2001           | 11.3               | 37   | 72    | 36.9                  | 37.2  | 63.8                      |
| 22-Apr, 24-Apr | 2002           | 3.6                | 35.9 | 64.4  | 25.9                  | 26    | 100.3                     |
| 21-Apr         | 2003           | 5.8                | 27.6 | 110.1 | 27.4                  | 27.7  | 83.9                      |
| 19-Apr         | 2004           | 0.1                | 25.2 | 107.2 | 25.1                  | 25.1  | 104.3                     |
| 15-Apr         | 2005           | 11.9               | 29.8 | 116.7 | 29.4                  | 30.1  |                           |
| 17-Apr         | 2006           | 22.8               | 28.5 | 48.2  | 28.3                  | 28.8  | 108.2                     |
| 18-Apr         | 2007           | 7.7                | 30.8 | 65.1  | 30.4                  | 31.2  | 171.4                     |
| 28-Apr         | 2008           | 3.9                | 19.9 | 55.9  | 19.8                  | 20.1  | 128.2                     |
| 28-Apr         | 2009           | 8.8                | 25.4 | 69.8  | 24.9                  | 25.7  | 112.9                     |
| 23-Apr, 26-Apr | 2010           | 8.1                | 22.2 | 50.9  | 21.9                  | 23.0  | 104.5                     |
| 19-Apr, 20-Apr | 2011           | 9.4                | 28.2 | 61.5  | 27.4                  | 28.6  | 160.9                     |
| 17-Apr, 18-Apr | 2012           | 6.0                | 28.8 | 88.0  | 28.5                  | 29.1  | 218.7                     |

**Table 2.** Estimated 10%, 50%, and 90% passage dates of Leavenworth NFH spring Chinook at McNary Dam.

| Migration Year | 10% Passage Date | 50% Passage Date | 90% Passage Date |
|----------------|------------------|------------------|------------------|
| 1997           | 1-May            | 14-May           | 22-May           |
| 1998           | 3-May            | 12-May           | 23-May           |
| 1999           | 7-May            | 17-May           | 25-May           |
| 2000           | 12-May           | 23-May           | 3-Jun            |
| 2001           | 15-May           | 24-May           | 31-May           |
| 2002           | 11-May           | 20-May           | 28-May           |
| 2003           | 7-May            | 19-May           | 31-May           |
| 2004           | 3-May            | 14-May           | 27-May           |
| 2005           | 5-May            | 15-May           | 3-Jun            |
| 2006           | 11-May           | 16-May           | 21-May           |
| 2007           | 7-May            | 19-May           | 31-May           |
| 2008           | 13-May           | 19-May           | 27-May           |
| 2009           | 16-May           | 24-May           | 1-Jun            |
| 2010           | 10-May           | 18-May           | 2-June           |
| 2011           | 7-May            | 19-May           | 29-May           |
| 2012           | 5-May            | 17-May           | 25-May           |

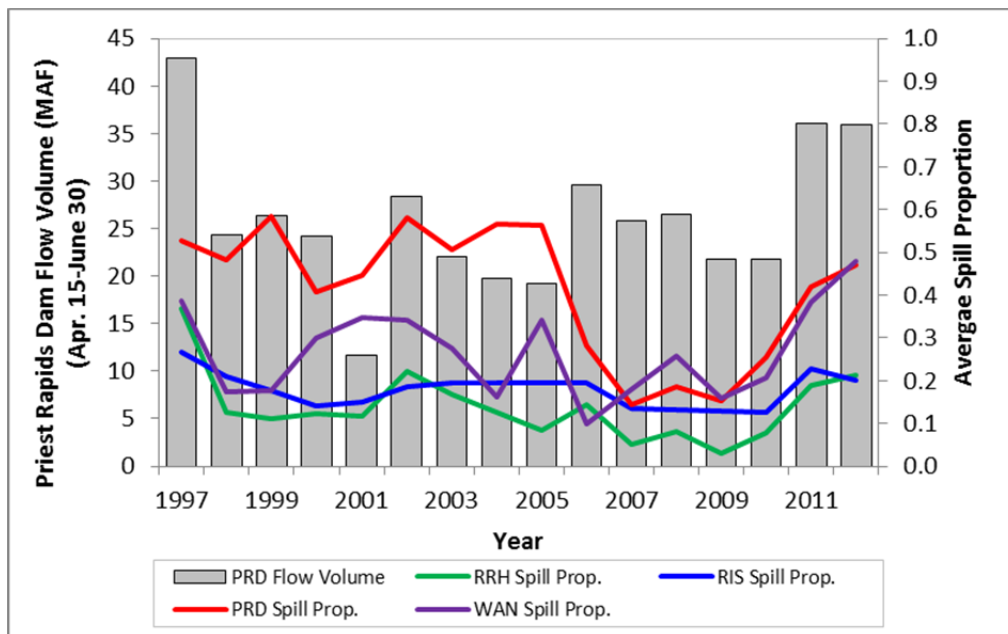


**Figure 1.** Cumulative passage timing of Leavenworth National Fish Hatchery spring Chinook to McNary Dam.

Table 3 below provides estimates of survival from release at the hatchery to McNary Dam, along with the upper and lower confidence limits on these estimates. To put out-migration conditions that these spring Chinook juveniles may have experienced in context, Figure 2 provides the total spring flow volume (Apr. 15-June 30) for the Upper Columbia River (as measured at Priest Rapids Dam), along with the average spring spill proportions at each of Rocky Reach, Rock Island, Wanapum, and Priest Rapids dams, for each migration year.

**Table 3.** Leavenworth Hatchery Spring Chinook survivals (Release to McNary Dam)

| Release Date   | Migration Year | Survival | Confidence Limits (95%) |       |
|----------------|----------------|----------|-------------------------|-------|
|                |                |          | Lower                   | Upper |
| 17-Apr         | 1997           | N/A      | N/A                     | N/A   |
| 20-Apr         | 1998           | 0.546    | 0.491                   | 0.602 |
| 19-Apr         | 1999           | 0.586    | 0.550                   | 0.622 |
| 18-Apr         | 2000           | 0.593    | 0.520                   | 0.667 |
| 17-Apr         | 2001           | 0.501    | 0.484                   | 0.517 |
| 22-Apr, 24-Apr | 2002           | 0.560    | 0.553                   | 0.567 |
| 21-Apr         | 2003           | 0.662    | 0.655                   | 0.669 |
| 19-Apr         | 2004           | 0.483    | 0.473                   | 0.494 |
| 15-Apr         | 2005           | 0.526    | 0.500                   | 0.553 |
| 17-Apr         | 2006           | 0.558    | 0.531                   | 0.585 |
| 18-Apr         | 2007           | 0.593    | 0.571                   | 0.615 |
| 28-Apr         | 2008           | 0.571    | 0.528                   | 0.614 |
| 28-Apr         | 2009           | 0.481    | 0.442                   | 0.520 |
| 23-Apr, 26-Apr | 2010           | 0.662    | 0.603                   | 0.721 |
| 19-Apr, 20-Apr | 2011           | 0.426    | 0.383                   | 0.469 |
| 17-Apr, 18-Apr | 2012           | 0.590    | 0.548                   | 0.630 |



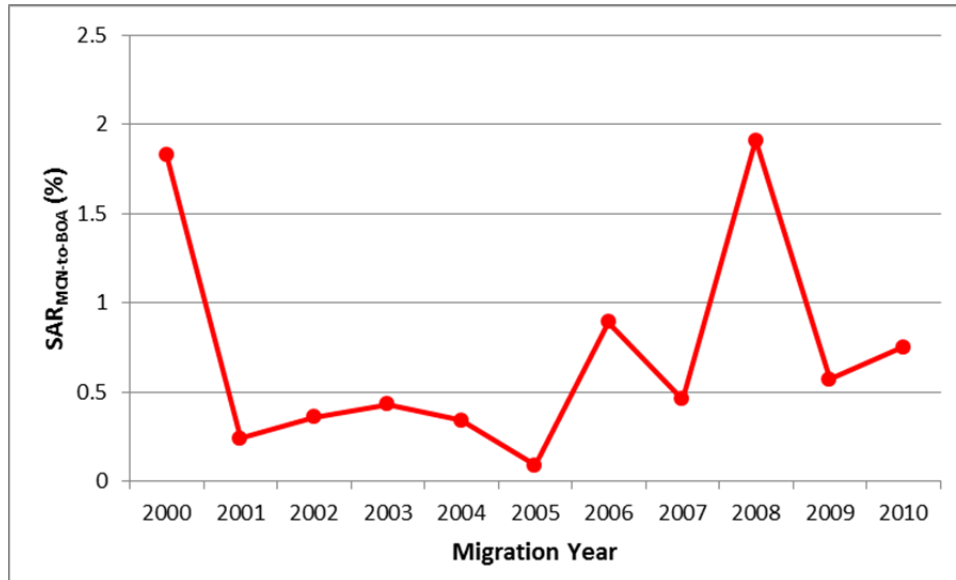
**Figure 2.** Total spring flow volume in the Upper Columbia River (at Priest Rapids Dam) and average spill proportion at Rocky Reach, Rock Island, Wanapum, and Priest Rapids dams. Spring period is April 15-June 30.

Finally, Table 4 contains estimates of SARs for MCN-to-BOA (without jacks). These SAR estimates were taken from Chapter 4 (see Table 4.32) of the 2012 CSS Annual Report, which can be downloaded from the FPC webpage: <http://www.fpc.org/documents/CSS.html>. Figure 3 is provided to illustrate the time series of the SAR estimates over the years of available data for Leavenworth NFH spring Chinook.

**Table 4.** Leavenworth NFH Spring Chinook SARs (without jacks) from CSS, as presented in 2012 CSS Annual Report

| Release Date(s) | Migration Year    | Overall SAR <sub>MCN-to-BOA</sub> |
|-----------------|-------------------|-----------------------------------|
| 18-Apr          | 2000              | 1.83                              |
| 17-Apr          | 2001              | 0.24                              |
| 22-Apr, 24-Apr  | 2002              | 0.36                              |
| 21-Apr          | 2003              | 0.43                              |
| 19-Apr          | 2004              | 0.34                              |
| 15-Apr          | 2005              | 0.09                              |
| 17-Apr          | 2006              | 0.89                              |
| 18-Apr          | 2007              | 0.46                              |
| 28-Apr          | 2008              | 1.91                              |
| 28-Apr          | 2009              | 0.57                              |
| 23-Apr, 26-Apr  | 2010 <sup>A</sup> | 0.75                              |

<sup>A</sup> Migration year 2010 is incomplete with Age 2-salt adult returns through 9/10/2012



**Figure 3.** Overall SAR<sub>MCH-to-BOA</sub> (without jacks) for Leavenworth NFH spring Chinook (2000-2010). Migration year 2010 is incomplete for yearling Chinook, with Age 2-salt adult returns through 9/10/2012.

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  
Bill Tweit, WDFW  
Jay Hesse, Nez Perce  
Tony Nigro, ODFW  
Howard Schaller, USFWS  
FPAC  
Tom Kahler, Douglas County PUD  
Greg Mackey, Douglas County PUD