



## FISH PASSAGE CENTER

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December 28, 2012

Mr. Roger Elmore  
Lookingglass Fish Hatchery  
Oregon Department of Fish and Wildlife  
Route 2 Box 89-D-B  
Elgin, OR 97287

Dear Roger-

The Fish Passage Center has been marking fish from the Lookingglass 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 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 Lookingglass Hatchery facilities (Imnaha and Catherine Creek Acclimation Ponds).

Under the Smolt Monitoring Program, information is collected on the timing and migration speed from the hatchery to Lower Granite Dam (LGR). 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 provide estimates of minimum, median, and maximum travel times from release to Lower Granite Dam for the Imnaha Acclimation Pond (IHAP) (Table 1) and Catherine Creek (Table 2) releases. In 2012, there were two types of releases into Catherine Creek, a volitional release from Catherine Creek Acclimation Pond (CATHEP) and a direct stream release into Catherine Creek (CATHEC). For the CATHEP release, travel times were estimated as the date of arrival at LGR minus the date of detection at the acclimation pond detection site (CCP). For the direct release (CATHEC), travel times were estimated as the date of arrival at LGR minus the release date. These tables also provide the 95% confidence limits around the estimated median travel times.

**Table 1.** Imnaha Acclimation Pond – Spring Chinook Travel Time to Lower Granite Dam

| Release Date | Migration Year | Travel Time (Days) |      |       | Confidence Limits 95% |       | Lower Granite Flow (kcfs) |
|--------------|----------------|--------------------|------|-------|-----------------------|-------|---------------------------|
|              |                | Min                | Med  | Max   | Lower                 | Upper |                           |
| Apr-7        | 1997           | 9.1                | 28.1 | 79.7  | 27.9                  | 28.7  | 144.1                     |
| Apr-6        | 1998           | 8.3                | 26.2 | 60.8  | 26                    | 26.3  | 70.5                      |
| 3/16, 4/5    | 1999           | 5.1                | 54.7 | 175.6 | 54.4                  | 54.9  | 98                        |
| 22-Mar       | 2000           | 15.7               | 42.8 | 66.3  | 42.5                  | 43.1  | 82.1                      |
| 21-Mar       | 2001           | 8.8                | 42.1 | 93    | 41.7                  | 42.2  | 36.8                      |
| 21-Mar       | 2002           | 8.2                | 45.2 | 66    | 44.9                  | 45.4  | 27.9                      |
| 1-Apr        | 2003           | 7.2                | 34.6 | 76.6  | 34.5                  | 34.7  | 28                        |
| 26-Mar       | 2004           | 9.9                | 38.5 | 84.4  | 38.5                  | 38.6  | 23.6                      |
| 3/26, 3/29   | 2005           | 9.3                | 36.1 | 78.7  | 35.9                  | 36.3  |                           |
| 3/21, 3/30   | 2006           | 6.3                | 40.6 | 74.2  | 40.2                  | 41    | 44                        |
| 3/21, 3/31   | 2007           | 17.0               | 41.3 | 103.5 | 41.2                  | 41.4  | 49.6                      |
| 25-Mar       | 2008           | 17.4               | 43.8 | 163   | 43.7                  | 43.9  | 54.2                      |
| 30-Mar       | 2009           | 13.8               | 44.6 | 69.3  | 44.6                  | 44.8  | 85.0                      |
| 1-Apr        | 2010           | 17.1               | 41.6 | 79.5  | 40.4                  | 41.8  | 44.8                      |
| 30-Mar       | 2011           | 5.7                | 40.7 | 66.7  | 40.6                  | 40.8  | 102.4                     |
| 30-Mar       | 2012           | 1.4                | 28.6 | 75.8  | 28.5                  | 28.7  | 94.8                      |

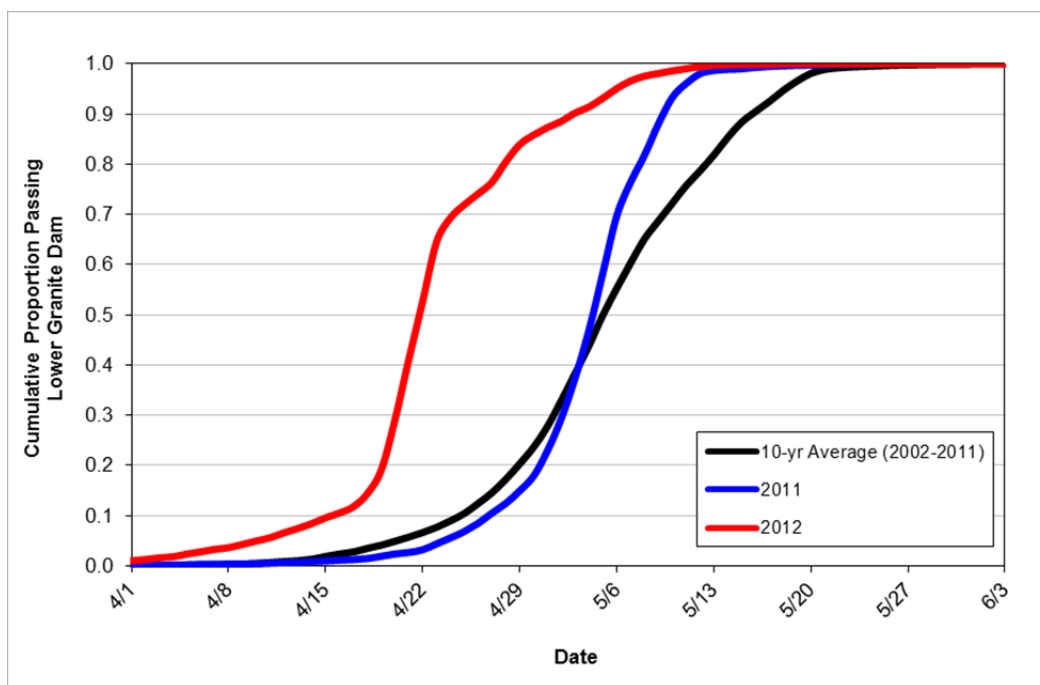
**Table 2.** Catherine Creek – Spring Chinook Travel Time to Lower Granite Dam.

| Release Date(s)  | Migration Year | Travel Time (Days) |        |       | 95% Confidence Intervals |       |
|------------------|----------------|--------------------|--------|-------|--------------------------|-------|
|                  |                | Min                | Median | Max   | Lower                    | Upper |
| 4/2              | 2001           | 8.3                | 28.2   | 62.8  | 28.1                     | 28.3  |
| 4/1-4/2          | 2002           | 12.7               | 33.9   | 75.5  | 33.6                     | 34.2  |
| 3/12, 3/23, 3/31 | 2003           | 8.2                | 32.3   | 74.4  | 31.6                     | 33.0  |
| 3/15, 3/30       | 2004           | 11.1               | 37.5   | 98.8  | 37.1                     | 38.4  |
| 3/14, 4/4        | 2005           | 14.1               | 34.0   | 72.7  | 33.2                     | 34.6  |
| 3/27             | 2006           | 11.6               | 31.1   | 78.8  | 30.4                     | 31.6  |
| 3/26             | 2007           | 15.9               | 30.2   | 59.5  | 29.5                     | 30.6  |
| 3/24             | 2008           | 11.5               | 28.1   | 102.8 | 27.9                     | 28.4  |
| 3/16, 3/24       | 2009           | 15.5               | 38.4   | 101.0 | 38.0                     | 39.1  |
| 3/29             | 2010           | 15.0               | 32.2   | 64.3  | 31.5                     | 32.8  |
| 3/21,3/30,4/5    | 2011           | 11.3               | 38.8   | 95.0  | 38.1                     | 39.4  |
| 3/22-4/14; 4/16  | 2012           | 9.8                | 30.8   | 61.3  | 30.5                     | 31.2  |

As with last year, we are providing you with tables that present the estimated 10%, 50%, and 90% passage dates at Lower Granite Dam for the yearling spring Chinook juveniles that are released from each of these sites (Table 3 for IHAP and Table 4 for CATHEP and CATHEC). We are also providing two figures to illustrate the 2012 passage timing for Lookingglass Hatchery yearling spring Chinook released for the CSS study. The first of these figures illustrates the passage timing of the 2012 release from IHAP, compared to that in 2011 and the 10-year average (2002-2011) (Figure 1). The second is a comparison of the passage timing of the 2012 releases from Catherine Creek, compared to that in 2011 and the 10-year average (2002-2011) (Figure 2).

**Table 3.** Imnaha Acclimation Pond – Estimated 10%, 50%, and 90% passage dates at Lower Granite Dam.

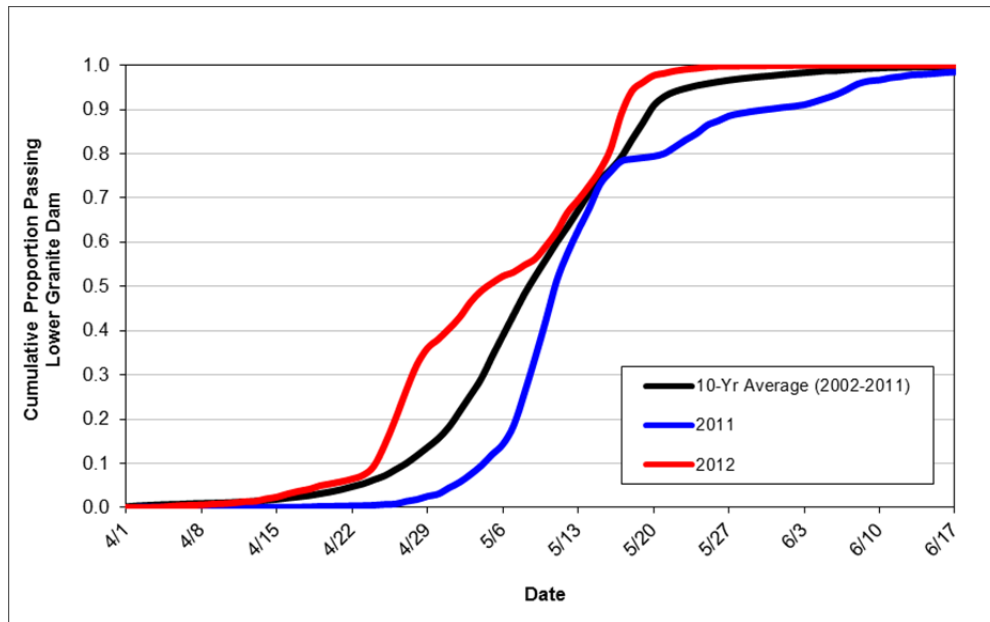
| Migration Year | Release Date(s) | 10% Passage Date | 50% Passage Date | 90% Passage Date |
|----------------|-----------------|------------------|------------------|------------------|
| 1997           | 7-Apr           | 26-Apr           | 6-May            | 15-May           |
| 1998           | 6-Apr           | 24-Apr           | 2-May            | 9-May            |
| 1999           | 3/16, 4/5       | 30-Apr           | 11-May           | 21-May           |
| 2000           | 22-Mar          | 24-Apr           | 4-May            | 12-May           |
| 2001           | 21-Mar          | 26-Apr           | 2-May            | 15-May           |
| 2002           | 21-Mar          | 16-Apr           | 4-May            | 17-May           |
| 2003           | 1-Apr           | 24-Apr           | 5-May            | 16-May           |
| 2004           | 26-Mar          | 24-Apr           | 4-May            | 9-May            |
| 2005           | 3/26,3/29       | 25-Apr           | 2-May            | 8-May            |
| 2006           | 3/21,3/30       | 22-Apr           | 2-May            | 13-May           |
| 2007           | 3/21,3/31       | 24-Apr           | 2-May            | 11-May           |
| 2008           | 25-Mar          | 30-Apr           | 8-May            | 16-May           |
| 2009           | 30-Mar          | 30-Apr           | 14-May           | 19-May           |
| 2010           | 1-Apr           | 30-Apr           | 11-May           | 20-May           |
| 2011           | 30-Mar          | 2-May            | 10-May           | 15-May           |
| 2012           | 30-Mar          | 21-Apr           | 27-Apr           | 8-May            |



**Figure 1.** Imnaha Acclimation Pond – Cumulative passage timing to Lower Granite Dam.

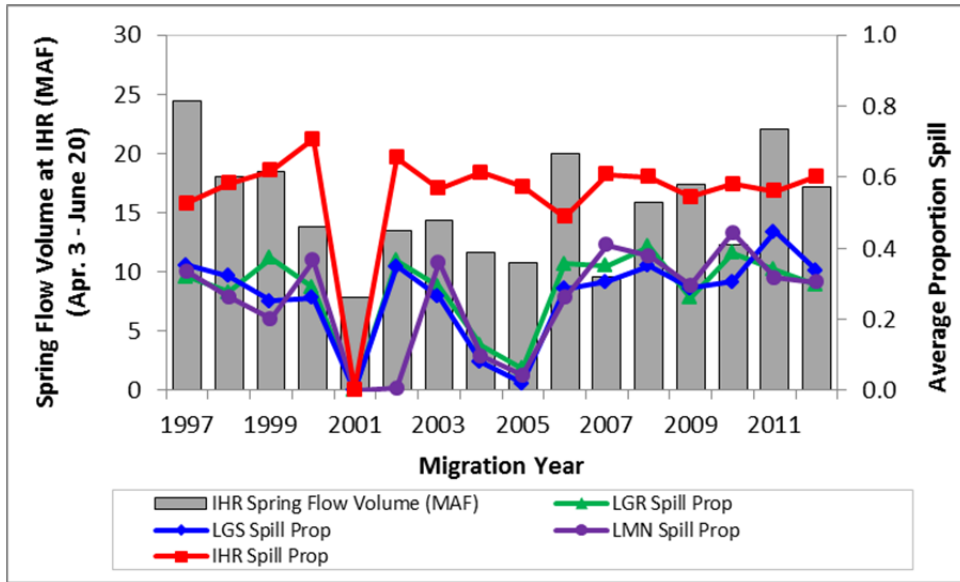
**Table 4.** Catherine Creek Releases – Estimated 10%, 50%, and 90% passage dates at Lower Granite Dam.

| Migration Year | Release Date(s) | 10% Passage Date | 50% Passage Date | 90% Passage Date |
|----------------|-----------------|------------------|------------------|------------------|
| 2001           | 4/2             | 4-May            | 15-May           | 22-May           |
| 2002           | 4/1-4/2         | 5-May            | 17-May           | 21-May           |
| 2003           | 3/12,3/23,3/31  | 13-Apr           | 29-Apr           | 15-May           |
| 2004           | 3/15,3/30       | 21-Apr           | 4-May            | 16-May           |
| 2005           | 3/14,4/4        | 26-Apr           | 5-May            | 10-May           |
| 2006           | 3/27            | 30-Apr           | 7-May            | 19-May           |
| 2007           | 3/26            | 2-May            | 10-May           | 15-May           |
| 2008           | 3/24            | 5-May            | 13-May           | 20-May           |
| 2009           | 3/16,3/24       | 2-May            | 15-May           | 23-May           |
| 2010           | 3/29            | 1-May            | 13-May           | 20-May           |
| 2011           | 3/21,3/30,4/5   | 5-May            | 11-May           | 31-May           |
| 2012           | 3/22-4/14, 4/16 | 25-Apr           | 5-May            | 18-May           |

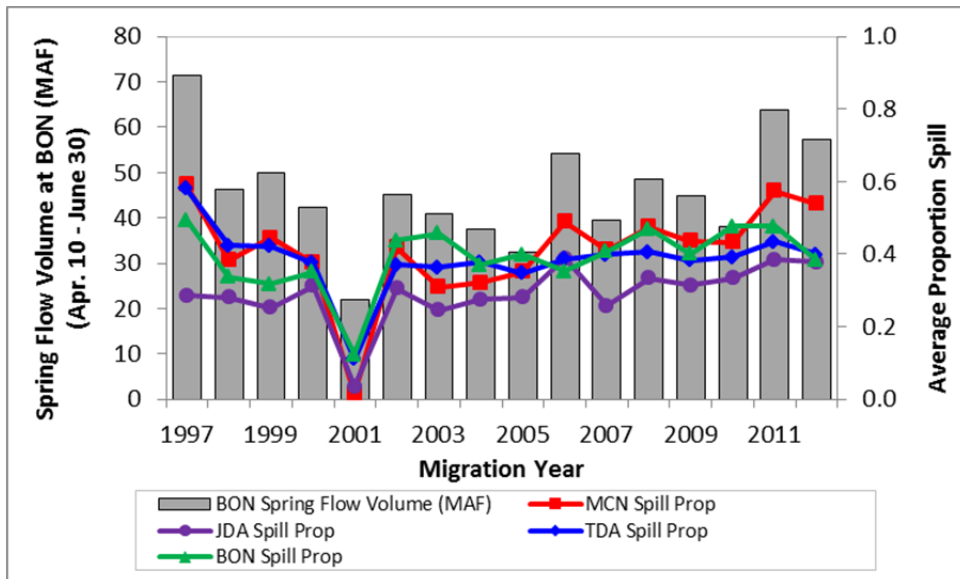


**Figure 2.** Catherine Creek Releases – Cumulative passage timing to Lower Granite Dam.

Figures 3 and 4 are provided below to illustrate the out-migration conditions that these spring migrants may have experienced in the Snake and Lower Columbia rivers over the years. Figure 3 provides the total spring flow volume (Apr. 3-June 20) for the Snake River (as measured at Ice Harbor), along with the average spring spill proportions at each of Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams, for each migration year. Figure 4 provides the total spring flow volume (Apr. 10-June 30) for the Lower Columbia (as measured at Bonneville), along with the average spring spill proportions at each of McNary, John Day, The Dalles, and Bonneville dams, for each migration year.



**Figure 3.** Total spring flow volume in the Snake River (at Ice Harbor Dam) and average spill proportion at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams. Spring period in the Snake River is April 3-June 20.



**Figure 4.** Total spring flow volume in the Lower Columbia River (at Bonneville Dam) and average spill proportion at McNary, John Day, The Dalles, and Bonneville dams. Spring period in the Lower Columbia River is April 10-June 30.

The tables below contain estimates calculated in the CSS study of juvenile survival in the hydrosystem between Lower Granite and Bonneville Dams and survival to adulthood of juvenile salmonids released from Innaha Acclimation Pond (Table 5) and Catherine Creek Acclimation Pond (Table 6) 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 (undetected at Snake River transportation collector sites), 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-to-LGR</sub>. In effect, the weighted SAR<sub>LGR-to-LGR</sub> is the estimated SAR for the overall hatchery release (without jacks). The data presented in Tables 5 and 6 were taken from various chapters and appendices of the 2012 CSS Annual Report, which can be downloaded from the FPC webpage (<http://www.fpc.org/documents/CSS.html>). Finally, Figure 5 is a time series of the Weighted SAR<sub>LGR-to-LGR</sub> over the years of available data for Lookingglass Hatchery spring Chinook released at the Imnaha Acclimation Pond and Catherine Creek.

**Table 5.** Imnaha Acclimation Pond – Spring Chinook Survival

| Release Date(s) | Migration Year      | Juvenile           |                        |           | Adult Survival |                        |                                    |
|-----------------|---------------------|--------------------|------------------------|-----------|----------------|------------------------|------------------------------------|
|                 |                     | Survival (LGR-BON) | Proportion Transported | T/C Ratio | SAR(T) %       | SAR(C <sub>0</sub> ) % | Weighted SAR <sub>LGR-to-LGR</sub> |
| Apr-7           | 1997                | 0.31               | 0.52                   | 1.36      | 1.16           | 0.86                   | 0.98                               |
| Apr-6           | 1998                | 0.53               | 0.85                   | 1.55      | 0.85           | 0.55                   | 0.80                               |
| 3/16, 4/05      | 1999                | 0.54               | 0.78                   | 1.89      | 2.69           | 1.43                   | 2.41                               |
| 22-Mar          | 2000                | 0.57               | 0.69                   | 1.29      | 3.11           | 2.41                   | 2.89                               |
| 21-Mar          | 2001                | 0.37               | 0.98                   | 10.8      | 0.62           | 0.06 <sup>B</sup>      | 0.61                               |
| 21-Mar          | 2002                | 0.50               | 0.66                   | 1.75      | 0.79           | 0.45                   | 0.68                               |
| 1-Apr           | 2003                | 0.70               | 0.55                   | 1.21      | 0.58           | 0.48                   | 0.53                               |
| 26-Mar          | 2004                | 0.56               | 0.89                   | 1.64      | 0.38           | 0.23                   | 0.36                               |
| 3/26, 3/29      | 2005                | 0.58               | 0.86                   | 1.77      | 0.28           | 0.16 <sup>C</sup>      | 0.27                               |
| 3/21, 3/30      | 2006 <sup>D</sup>   | 0.50               | 0.67                   | 0.62      | 0.77           | 1.25                   | 0.80                               |
| 3/21, 3/31      | 2007 <sup>D</sup>   | 0.69               | 0.23                   | 1.70      | 1.07           | 0.63                   | 0.67                               |
| 25-Mar          | 2008 <sup>D</sup>   | 0.59               | 0.54                   | 1.45      | 1.92           | 1.32                   | 1.76                               |
| 30-Mar          | 2009 <sup>D</sup>   | 0.51               | 0.50                   | 1.83      | 1.39           | 0.76                   | 1.04                               |
| 1-Apr           | 2010 <sup>A D</sup> | 0.83               | 0.26                   | 1.38      | 0.95           | 0.69                   | 0.75                               |
| 30-Mar          | 2011 <sup>D E</sup> | 0.55               | 0.56                   | N/A       | N/A            | N/A                    | N/A                                |

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

<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>

<sup>D</sup> Estimates for migration years 2006 through 2011 reflect use of new methodology developed for random pre-assignment of “monitor mode” and “return-to-river mode” operations. See 2012 CSS Annual Report for details.

<sup>E</sup> No adult returns to date, only juvenile metrics are available.

**Table 6.** Catherine Creek Acclimation Pond – Spring Chinook Survival

| Release Date(s) | Migration Year      | Juvenile           |                        |                                    | T/C Ratio | SAR(T) %          | Adult Survival         |  |
|-----------------|---------------------|--------------------|------------------------|------------------------------------|-----------|-------------------|------------------------|--|
|                 |                     | Survival (LGR-BON) | Proportion Transported | Weighted SAR <sub>LGR-to-LGR</sub> |           |                   | SAR(C <sub>0</sub> ) % |  |
| 4/2             | 2001                | 0.25               | 0.96                   | 5.33                               | 0.23      | 0.04 <sup>B</sup> | 0.22                   |  |
| 4/1-4/02        | 2002                | 0.65               | 0.71                   | 1.81                               | 0.89      | 0.49              | 0.77                   |  |
| 3/12,3/23,3/31  | 2003                | 0.62               | 0.55                   | 1.45                               | 0.36      | 0.25              | 0.31                   |  |
| 3/15, 3/30      | 2004                | 0.48               | 0.90                   | 1.94                               | 0.38      | 0.20              | 0.36                   |  |
| 3/14, 4/04      | 2005                | 0.51               | 0.86                   | 2.48                               | 0.44      | 0.18 <sup>C</sup> | 0.40                   |  |
| 3/27            | 2006 <sup>D</sup>   | 0.49               | 0.68                   | 0.48                               | 0.45      | 0.93              | 0.49                   |  |
| 3/26            | 2007 <sup>D</sup>   | 0.72               | 0.47                   | 1.35                               | 0.50      | 0.37              | 0.43                   |  |
| 3/24            | 2008 <sup>D</sup>   | 0.70               | 0.60                   | 1.41                               | 2.58      | 1.83              | 2.13                   |  |
| 3/16,3/24       | 2009 <sup>D</sup>   | 0.61               | 0.56                   | 1.35                               | 1.76      | 1.30              | 1.54                   |  |
| 3/29            | 2010 <sup>A,D</sup> | 0.68               | 0.29                   | 1.4                                | 1.07      | 0.76              | 0.84                   |  |
| 3/21,3/30,4/5   | 2011 <sup>D,E</sup> | 0.57               | 0.54                   | N/A                                | N/A       | N/A               | N/A                    |  |

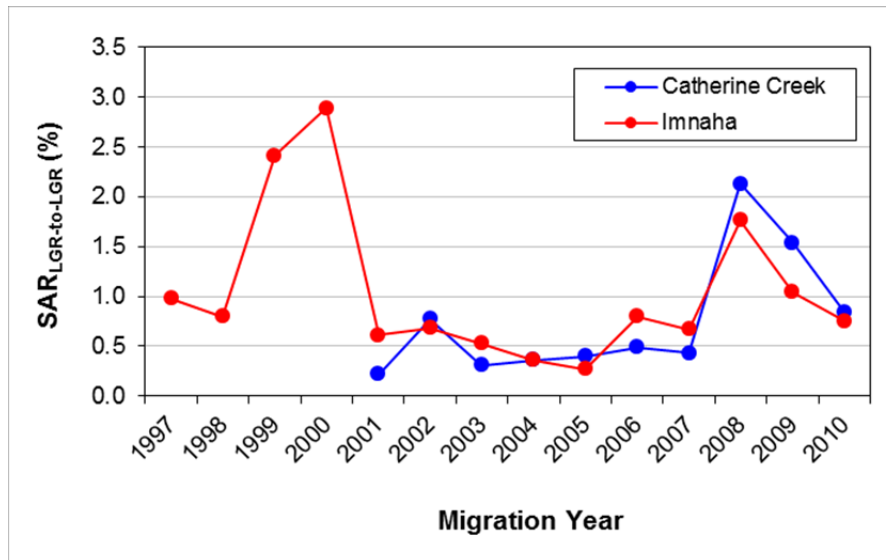
<sup>A</sup> Migration year 2010 is incomplete with Age 2-salt adult returns through 9/10/2012

<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>

<sup>D</sup> Estimates for migration years 2006 through 2011 reflect use of new methodology developed for random pre-assignment of “monitor mode” and “return-to-river mode” operations. See 2012 CSS Annual Report for details.

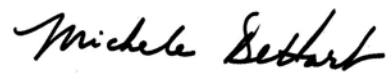
<sup>E</sup> No adult returns to date, only juvenile metrics are available.



**Figure 5.** Weighted SAR<sub>LGR-to-LGR</sub> for Lookingglass hatchery spring Chinook released from Imnaha Acclimation Pond (1997-2010) and Catherine Creek (2001-2010). Migration year 2010 is incomplete 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 at the hatchery 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,

A handwritten signature in black ink that reads "Michele DeHart". The signature is written in a cursive, flowing style.

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