



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Todd Garlie, IDFG

FROM: Brandon R. Chockley

DATE: January 4, 2017

RE: 2016 Pahsimeroi Hatchery Report

The Fish Passage Center has been marking summer Chinook from Pahsimeroi Hatchery over the last several years as part of the Comparative Survival Study (CSS). 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 the CSS for the Chinook used from Pahsimeroi Hatchery in 2016 and past years.

With the marking efforts over the past several years, information on the timing and migration speed from the hatchery to Lower Granite Dam is available. 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.

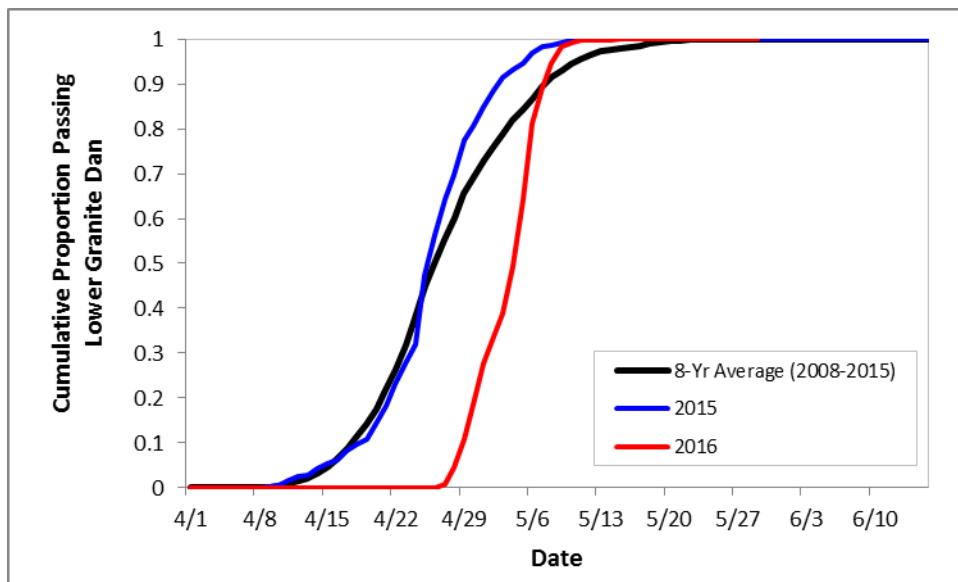
Table 1 provides estimates of minimum, median, and maximum travel times for each year's release of summer Chinook to Lower Granite Dam. Also provided are estimates of the 95% confidence limits around the estimated median travel time. In addition, we are providing you with the estimated 10%, 50%, and 90% passage dates of yearling summer Chinook (Table 2) juveniles at Lower Granite Dam for each of the years of tagging. Figure 1 provides an illustration of the 2016 arrival timing at Lower Granite Dam compared to the previous year and the current 8-year average (2008–2015).

**Table 1.** Travel times (release to LGR) of Pahsimeroi Hatchery yearling summer Chinook.

Migration Year	Release Date	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
2008	3/31	18.6	38.2	153.4	37.9	38.3
2009	3/30	13.3	24.8	52.3	24.6	24.9
2010	3/30	21.4	30.5	66.6	30.5	30.6
2011	4/1	7.3	26.8	62.4	26.6	27.0
2012	4/1	6.3	18.3	48.9	18.2	18.4
2013	4/5	7.6	22.8	56.7	21.9	23.3
2014	4/9	6.5	16.5	40.5	16.3	16.5
2015	4/1	7.3	24.9	41.6	24.7	25.2
2016	4/22	4.5	12.5	36.8	12.5	12.6

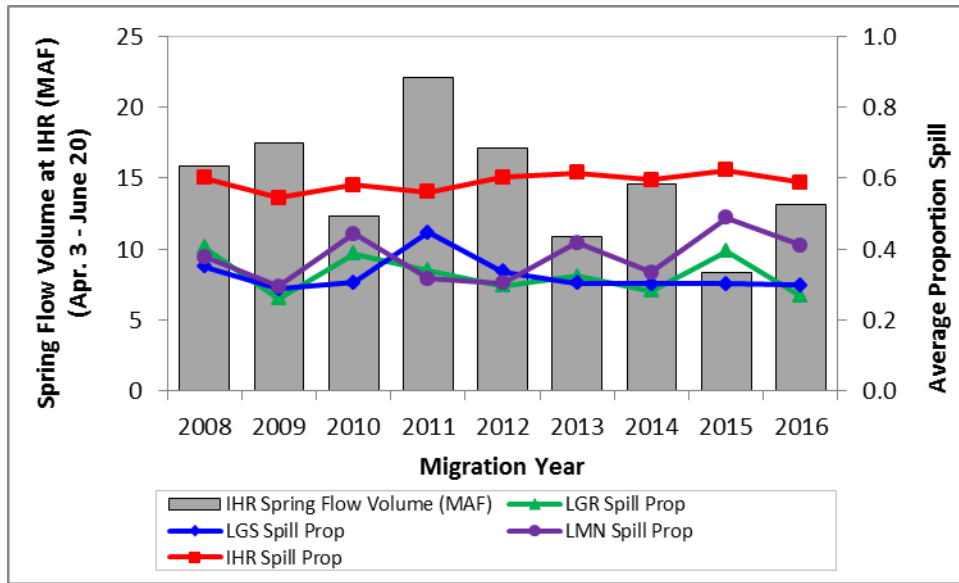
**Table 2.** Estimated 10%, 50%, and 90% passage dates of PIT-tagged Pahsimeroi Hatchery yearling summer Chinook at Lower Granite Dam.

Migration Year	Release Date(s)	10% Passage Date	50% Passage Date	90% Passage Date
2008	3/31	1-May	8-May	18-May
2009	3/30	19-Apr	24-Apr	4-May
2010	3/30	25-Apr	29-Apr	5-May
2011	4/1	18-Apr	27-Apr	7-May
2012	4/1	13-Apr	20-Apr	25-Apr
2013	4/5	17-Apr	27-Apr	6-May
2014	4/9	19-Apr	25-Apr	4-May
2015	4/1	19-Apr	26-Apr	3-May
2016	4/22	22-Apr	29-Apr	8-May

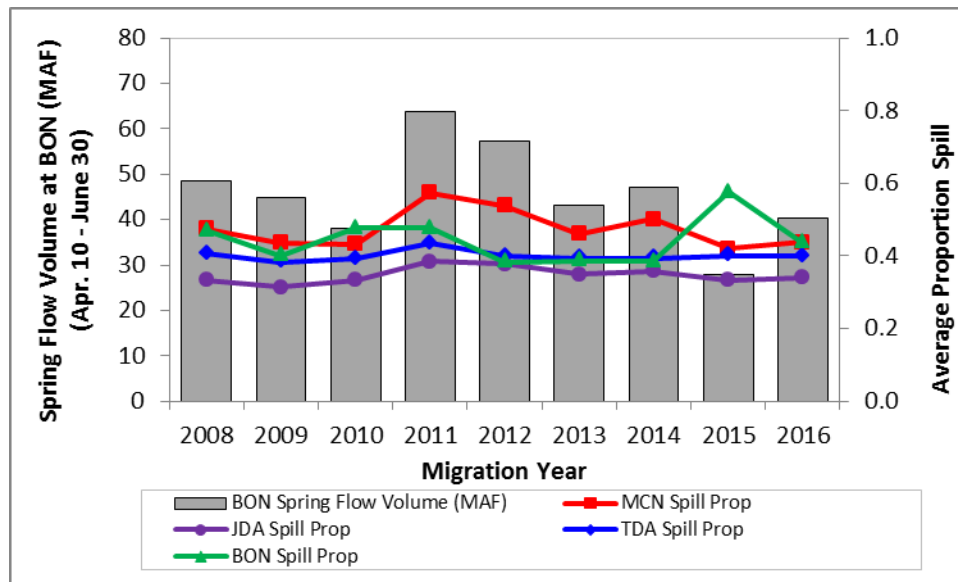


**Figure 1.** Cumulative passage timing of Pahsimeroi Hatchery yearling summer Chinook to Lower Granite Dam.

Figures 2 and 3 are provided below to illustrate the out-migration conditions that these spring migrants may have experienced in the Snake and Middle Columbia rivers. Figure 2 provides the total spring flow volume (April 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 3 provides the total spring flow volume (April 10–June 30) for the Middle 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 2.** 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 3.** Total spring flow volume in the Middle 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.

Finally, Tables 3 and 4 contain estimates calculated for Pahsimeroi Hatchery Chinook by the CSS. The estimates provided include: (1) juvenile survival in the hydrosystem between Lower Granite and Bonneville dams (Table 3), (2) the proportion of the juvenile population destined for transportation (Table 3), and (3) the smolt-to-adult survival (SAR) for several passage categories (Table 4). Those passage categories are SAR(T), SAR(C<sub>0</sub>), and Overall SAR, 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 Overall SAR is the estimated SAR for the overall hatchery release. All SAR estimates are for the LGR-to-GRA reach with jacks excluded. The data presented in Tables 3 and 4 were taken from various chapters and appendices of the 2016 CSS Annual Report, which can be downloaded from the FPC webpage [www.fpc.org/documents/CSS.html](http://www.fpc.org/documents/CSS.html). Figure 4 is a time series of the Overall SAR over the years of available data for Pahsimeroi Hatchery summer Chinook.

**Table 3.** Pahsimeroi Hatchery summer Chinook juvenile survivals and estimated proportion transported (with 90% confidence intervals) from CSS.

<b>Release Date(s)</b>	<b>Migration Year<sup>A</sup></b>	<b>Juvenile Survival (LGR-BON)</b>	<b>Proportion Transported</b>
3/31	2008	0.51 (0.40-0.69)	0.54 (0.52-0.56)
3/30	2009	0.71 (0.65-0.77)	0.08 (0.08-0.09)
3/30	2010	0.52 (0.38-0.73)	0.21 (0.19-0.23)
4/1	2011	0.44 (0.39-0.52)	0.21 (0.20-0.22)
4/1	2012	0.68 (0.60-0.77)	0.02 (0.02-0.03)
4/5	2013	0.66 (0.51-0.92)	0.13 (0.12-0.14)
4/9	2014	0.66 (0.57-0.76)	0.22 (0.21-0.23)
4/1	2015	0.48 (0.37-0.64)	0.06 (0.05-0.06)

<sup>A</sup> All migration years reflect use of new methodology developed for random pre-assignment of “monitor mode” and “return-to-river mode” operations. See 2016 CSS Annual Report for details.

**Table 4.** Pahsimeroi Hatchery summer Chinook TIR, SAR by study category (T vs. C<sub>0</sub>), and Overall SARs (with 90% confidence intervals). SAR estimates are for LGR-to-GRA reach and are without jacks.

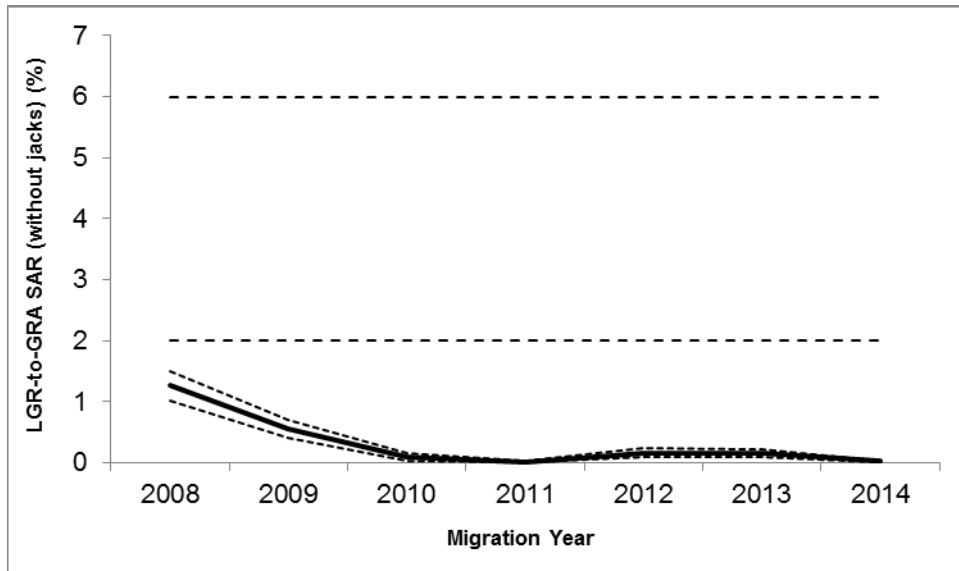
<b>Release Date(s)</b>	<b>Migration Year<sup>A</sup></b>	<b>TIR</b>	<b>SAR(T) %</b>	<b>SAR(C<sub>0</sub>) %</b>	<b>Overall SAR %</b>
3/31	2008	1.23 (0.85-1.90)	1.53 (1.18-1.88)	1.24 (0.85-1.63)	1.26 (1.02-1.49)
3/30	2009	1.62 (0.44-3.34)	0.87 (0.19-1.58)	0.54 (0.36-0.73)	0.55 (0.40-0.70)
3/30	2010	N/A <sup>B</sup>	0.33 (0.08-0.64)	0.02 (0.00-0.05)	0.09 (0.03-0.16)
4/1	2011	N/A <sup>B</sup>	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.04)
4/1	2012	N/A <sup>B</sup>	--- <sup>C</sup>	0.24 (0.11-0.38)	0.16 (0.09-0.23)
4/5	2013	1.18 (0.00-3.09)	0.17 (0.00-0.36)	0.15 (0.08-0.22)	0.15 (0.09-0.22)
4/9	2014 <sup>D</sup>	N/A <sup>B</sup>	0.04 (0.00-0.12)	0.00 (0.00-0.00)	0.02 (0.00-0.04)

<sup>A</sup> All migration years 2006 through 2015 reflect use of new methodology developed for random pre-assignment of “monitor mode” and “return-to-river mode” operations. See 2016 CSS Annual Report for details.

<sup>B</sup> Too few adults in Transport and/or C<sub>0</sub> study category estimate TIR and D.

<sup>C</sup> SAR(T) not estimable – small estimated juvenile population and zero returning adults.

<sup>D</sup> Adult returns for 2014 are incomplete with Age 2-salt adult returns through 9/16/2016.



**Figure 4.** Overall SAR for Pahsimeroi Hatchery summer Chinook (without jacks) (2008–2014) (with 90% confidence intervals). The NPCC 2-6% SAR objectives for listed wild populations are shown for reference. Migration year 2014 is incomplete with Age 2-salt adult returns through 9/16/2016

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.

- c: Lance Hebdon, IDFG
- Tim Copeland, IDFG
- Brian Leth, IDFG
- Bill Tweit, WDFW
- Stuart Rosenberger, IPC
- Jay Hesse, Nez Perce
- Tom Rien, ODFW
- Steve Haeseker, USFWS
- Kyle Hanson, USFWS
- Erick Merrill, NPCC
- Tony Grover, NPCC
- Leslie Bach, NPCC
- FPAC