



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Glen Pearson, WDFW

FROM: Gabe Scheer

DATE: June 13, 2018

RE: 2017 Priest Rapids Hatchery Report

The Fish Passage Center has been marking Chinook from the Priest Rapids Hatchery facility since 1997 as part of the Smolt Monitoring Program (SMP). For purposes of this program, 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 share with you an update of some of the information we developed under the SMP program for the fish used from the Priest Rapids Hatchery facility in 2017 and past years.

Under the Smolt Monitoring Program, information is collected on the timing, migration speed, and survival from the hatchery to McNary Dam. Priest Rapids Hatchery divides the release of PIT tags over three release dates. Table 1 below provides estimates of minimum, median, and maximum travel times to McNary Dam from each of the years' releases. Also provided are estimates of the 95% confidence limits around the estimated median travel time.

In addition, we are providing a table that presents the estimated 10%, 50%, and 90% passage dates of Priest Rapids fall Chinook juveniles at McNary Dam for each of the years of tagged release groups: early (Table 2), middle (Table 3), and late (Table 4). Also, Figures 1–3 are provided as illustrations of how the arrival timing of the 2017 smolt releases related to last year's releases, as well as the current 10-year average arrival timing for the three releases (2007–2016).

**Table 1.** Priest Rapids Hatchery subyearling Fall Chinook Travel Times to McNary Dam.

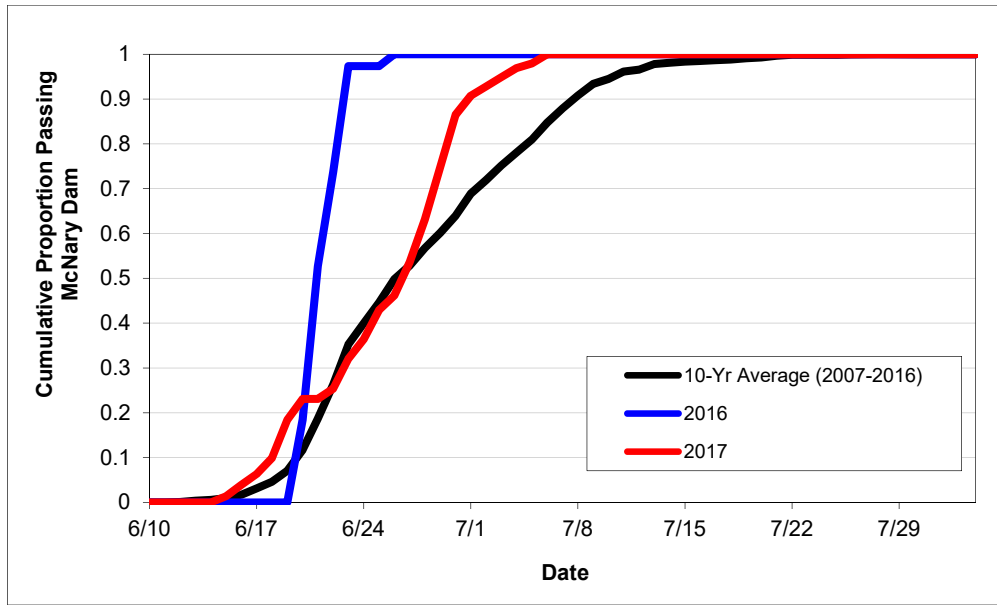
Release Date	Migration Year	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
16-Jun	1997	4.3	21.2	65.4	18.5	21.9
20-Jun	1997	1.3	11.9	54.4	11.4	12.6
24-Jun	1997	4.3	10.6	38.9	9.7	11.1
13-Jun	1998	2.6	7.4	39.1	7.03	8.01
25-Jun	1998	2.5	9.6	27.4	9.2	9.9
14-Jun	1999	3.8	13.0	39.6	12.0	13.6
18-Jun	1999	3.2	10.5	34.3	9.7	11.2
23-Jun	1999	2.2	11.7	57.2	11.0	12.2
15-Jun	2000	5.1	12.1	49.9	11.5	13.1
19-Jun	2000	4.4	13.4	37.4	12.3	14.2
27-Jun	2000	4.3	11.5	43.0	11.2	13.1
11-Jun	2001	4.9	14.0	46.8	13.6	14.6
15-Jun	2001	7.2	13.2	60.0	12.8	14.0
19-Jun	2001	6.8	13.9	57.8	13.7	14.1
11-Jun	2002	5.2	14.1	41.8	13.7	14.9
15-Jun	2002	5.9	11.4	39.9	11.1	13.2
19-Jun	2002	3.9	11.3	38.9	10.2	13.1
12-Jun	2003	3.9	11.1	41.7	10.6	11.4
16-Jun	2003	4.2	9.3	34.0	8.9	9.8
20-Jun	2003	4.5	11.1	35.8	10.9	11.4
14-Jun	2004	3.9	6.2	19.6	6.1	6.6
18-Jun	2004	3.2	6.8	21.6	6.5	7.0
22-Jun	2004	2.7	5.9	27.2	5.6	6.0
9-Jun	2005	3.4	7.8	28.2	7.2	8.4
13-Jun	2005	3.2	5.5	22.9	5.4	6.1
17-Jun	2005	0.2	7.0	19.4	6.7	7.3
12-Jun	2006	3.0	10.8	27.5	8.3	12.3
16-Jun	2006	3.4	12.1	25.0	11.1	12.4
20-Jun	2006	3.2	9.9	22.3	9.3	10.5
13-Jun	2007	5.3	15.6	35.8	13.8	17.6
17-Jun	2007	3.9	11.8	31.4	11.0	12.8
21-Jun	2007	4.8	10.0	23.5	9.0	11.1
12-Jun	2008	3.8	17.0	39.3	15.4	19.4
16-Jun	2008	4.4	17.2	33.8	16.0	19.5
20-Jun	2008	4.2	16.7	31.3	15.9	17.6
11-Jun	2009	4.2	16.4	40.7	14.8	18.4
15-Jun	2009	4.8	14.2	36.7	12.4	15.7
19-Jun	2009	6.0	16.5	31.0	14.6	17.7
9-Jun	2010	2.8	13.6	29.3	12.7	15.7
13-Jun	2010	5.2	16.8	33.1	15.8	18.3
17-Jun	2010	2.5	13.9	30.7	12.8	15.2
15-Jun	2011	2.8	10.0	34.0	8.5	12.0
19-Jun	2011	3.0	14.0	36.0	11.0	16.0
23-Jun	2011	2.8	12.2	31.9	9.8	14.5
12-Jun	2012	6.9	25.6	40.1	24.1	26.4
16-Jun	2012	5.5	22.9	36.9	21.1	26.1
20-Jun	2012	8.9	19.9	38.8	18.5	23.4
12-Jun	2013	6.9	19.0	43.9	18.2	20.8
14-Jun	2013	9.2	19.1	34.9	17.9	21.2
15-Jun	2013	6.1	13.9	41.7	12.9	14.7

**Table 1 (continued).** Priest Rapids Hatchery subyearling Fall Chinook Travel Times to McNary Dam.

Release Date	Migration Year	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
12-Jun	2014	4.8	14.2	30.2	14.3	17.9
18-Jun	2014	4.5	12.3	28.6	11.7	13.0
25-Jun	2014	4.3	10.3	21.2	9.6	10.9
12-Jun	2015	4.8	12.0	27.1	10.1	14.3
18-Jun	2015	5.7	12.9	19.9	12.0	13.7
25-Jun	2015	4.7	10.1	17.7	9.6	10.6
16-Jun	2016	3.4	5.0	10.0	4.7	5.9
20-Jun	2016	2.6	6.1	18.0	5.8	6.3
23-Jun	2016	3.0	8.1	25.6	7.7	8.2
23-May	2017	5.7	12.7	34.7	10.5	13.1
25-May	2017	10.6	21.7	39.6	18.8	27
9-Jun	2017	5.3	16.0	16.0	13.6	18.7
12-Jun	2017	5.9	15.4	15.4	15.2	18.2
19-Jun	2017	5.5	12.3	12.3	11.4	13.2

**Table 2.** Estimated 10%, 50%, and 90% passage dates of Priest Rapids Hatchery subyearling fall Chinook at McNary Dam (early releases – May 23-25).

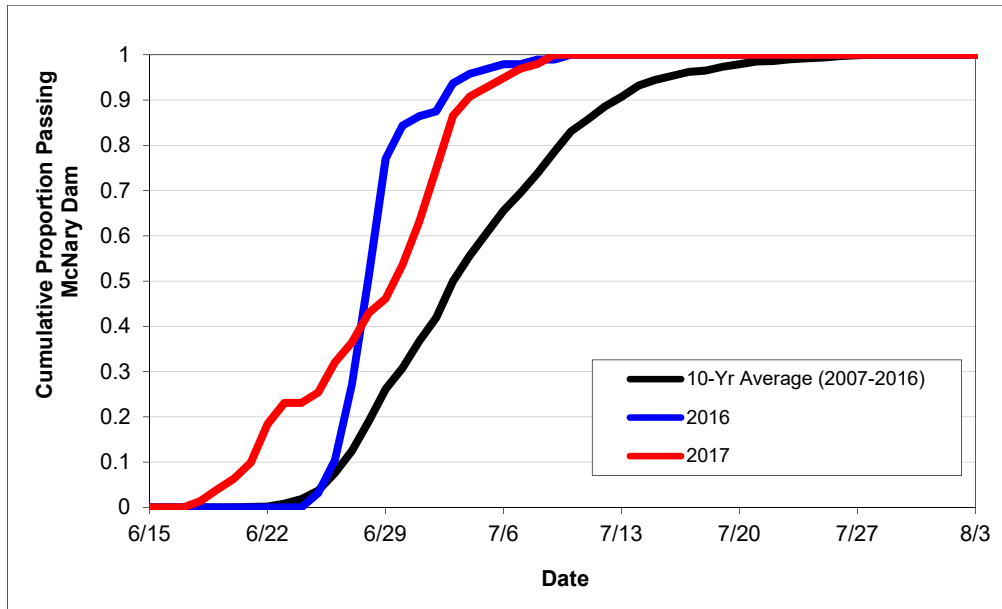
Migration Year	Release Date	10% Passage Date	50% Passage Date	90% Passage Date
1997	16-Jun	23-Jun	5-Jul	19-Jul
1998	13-Jun	18-Jun	20-Jun	28-Jun
1999	14-Jun	20-Jun	27-Jun	11-Jul
2000	15-Jun	22-Jun	26-Jun	6-Jul
2001	11-Jun	21-Jun	25-Jun	2-Jul
2002	11-Jun	19-Jun	25-Jun	6-Jul
2003	12-Jun	18-Jun	23-Jun	29-Jun
2004	14-Jun	19-Jun	20-Jun	25-Jun
2005	19-Jun	14-Jun	17-Jun	27-Jun
2006	12-Jun	17-Jun	23-Jun	1-Jul
2007	13-Jun	22-Jun	28-Jun	9-Jul
2008	12-Jun	23-Jun	29-Jun	8-Jul
2009	11-Jun	20-Jun	28-Jun	7-Jul
2010	9-Jun	16-Jun	23-Jun	4-Jul
2011	15-Jun	20-Jun	25-Jun	11-Jul
2012	12-Jun	24-Jun	7-Jul	13-Jul
2013	12-Jun	24-Jun	1-Jul	9-Jul
2014	12-Jun	20-Jun	26-Jun	5-Jul
2015	12-Jun	19-Jun	24-Jun	6-Jul
2016	16-Jun	20-Jun	21-Jun	23-Jun
2017	23-May	19-Jun	27-Jun	1-Jul



**Figure 1. Early Release Group (May23-25) – Cumulative passage timing of Priest Rapids Hatchery subyearling fall Chinook to McNary Dam.**

**Table 3.** Estimated 10%, 50%, and 90% passage dates of Priest Rapids Hatchery subyearling fall Chinook at McNary Dam (middle releases – June 9-12).

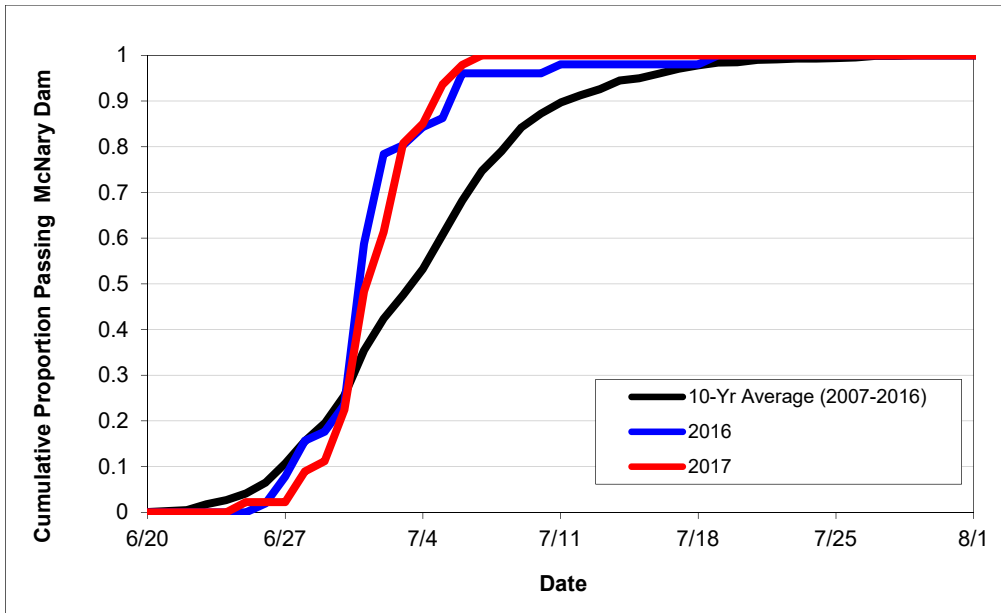
Migration Year	Release Date	10% Passage Date	50% Passage Date	90% Passage Date
1997	20-Jun	25-Jun	2-Jul	12-Jul
1998	N/A	N/A	N/A	N/A
1999	18-Jun	24-Jun	28-Jun	10-Jul
2000	19-Jun	26-Jun	1-Jul	11-Jul
2001	15-Jun	24-Jun	28-Jun	4-Jul
2002	15-Jun	23-Jun	26-Jun	9-Jul
2003	16-Jun	23-Jun	25-Jun	2-Jul
2004	18-Jun	23-Jun	25-Jun	27-Jun
2005	13-Jun	17-Jun	18-Jun	23-Jun
2006	16-Jun	22-Jun	28-Jun	4-Jul
2007	17-Jun	23-Jun	29-Jun	9-Jul
2008	16-Jun	23-Jun	3-Jul	10-Jul
2009	15-Jun	23-Jun	29-Jun	8-Jul
2010	13-Jun	22-Jun	30-Jun	7-Jul
2011	19-Jun	25-Jun	3-Jul	12-Jul
2012	16-Jun	30-Jun	9-Jul	17-Jul
2013	14-Jun	25-Jun	2-Jul	9-Jul
2014	18-Jun	25-Jun	30-Jun	6-Jul
2015	18-Jun	26-Jun	1-Jul	7-Jul
2016	20-Jun	23-Jun	25-Jun	30-Jun
2017	9-Jun	19-Jun	27-Jun	1-Jul



**Figure 2. Middle Release Group** – Cumulative passage timing of Priest Rapids Hatchery subyearling fall Chinook to McNary Dam.

**Table 4.** Estimated 10%, 50%, and 90% passage dates of Priest Rapids Hatchery subyearling fall Chinook at McNary Dam (late releases – June 19<sup>th</sup>).

Migration Year	Release Date	10% Passage Date	50% Passage Date	90% Passage Date
1997	24-Jun	30-Jun	4-Jul	10-Jul
1998	25-Jun	1-Jul	4-Jul	10-Jul
1999	23-Jun	28-Jun	4-Jul	17-Jul
2000	27-Jun	5-Jul	8-Jul	22-Jul
2001	19-Jun	30-Jun	3-Jul	20-Jul
2002	19-Jun	25-Jun	29-Jun	11-Jul
2003	20-Jun	27-Jun	1-Jul	9-Jul
2004	22-Jun	27-Jun	28-Jun	30-Jun
2005	17-Jun	22-Jun	24-Jun	27-Jun
2006	20-Jun	26-Jun	30-Jun	5-Jul
2007	21-Jun	27-Jun	1-Jul	9-Jul
2008	20-Jun	29-Jun	7-Jul	16-Jul
2009	19-Jun	27-Jun	5-Jul	11-Jul
2010	17-Jun	24-Jun	1-Jul	9-Jul
2011	23-Jun	29-Jun	5-Jul	14-Jul
2012	20-Jun	2-Jul	10-Jul	19-Jul
2013	15-Jun	23-Jun	28-Jun	5-Jul
2014	25-Jun	2-Jul	5-Jul	10-Jul
2015	25-Jun	2-Jul	5-Jul	9-Jul
2016	23-Jun	28-Jun	30-Jun	6-Jul
2017	19-Jun	29-Jun	2-Jul	5-Jul

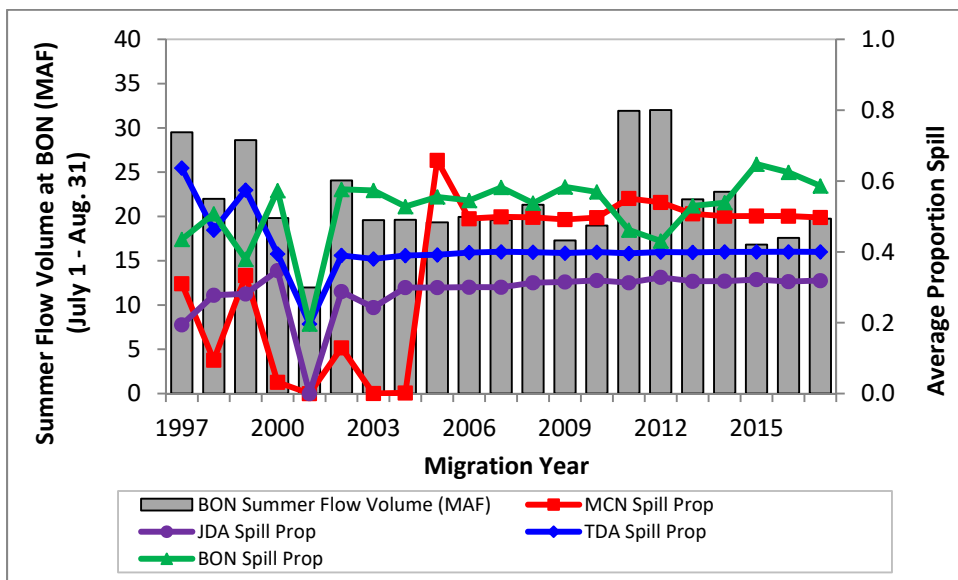


**Figure 3. Late Release Group** – Cumulative passage timing of Priest Rapids Hatchery subyearling fall Chinook to McNary Dam.

Finally, Table 5 provides estimates of survival from release at the hatchery to McNary Dam, along with the upper and lower confidence limits on these estimates. These yearly survival estimates are for all releases of subyearling fall Chinook within a given migration year. Due to low detection probabilities in the Lower Columbia, we were not able to estimate survival for this group in 2015. To put into context the out-migration conditions that these fall Chinook juveniles may have experienced, Figure 4 provides the summer flow volume (July 1–August 31) for the Middle Columbia River (as measured at Bonneville Dam), along with the average summer spill proportions at each of McNary, John Day, The Dalles, and Bonneville dams, for each migration year.

**Table 5.** Priest Rapids Hatchery subyearling fall Chinook survivals (release to McNary Dam).

Release Dates	Migration Year	Survival (Rel-MCN)	95% Confidence Limits	
			Lower	Upper
June 16-24	1997	0.568	0.458	0.679
June 13-25	1998	0.840	0.639	0.940
June 14-23	1999	0.757	0.679	0.836
June 15-27	2000	0.666	0.577	0.755
June 11-19	2001	0.746	0.670	0.794
June 11-19	2002	0.697	0.627	0.767
June 12-20	2003	0.633	0.590	0.677
June 14-22	2004	0.775	0.689	0.861
June 09-17	2005	0.655	0.573	0.729
June 12-20	2006	0.671	0.577	0.765
June 13-21	2007	0.686	0.564	0.808
June 12-20	2008	0.646	0.485	0.807
June 11-19	2009	0.626	0.510	0.742
June 09-17	2010	0.647	0.514	0.780
June 15-23	2011	0.820	0.567	1.073
June 12-20	2012	0.499	0.354	0.645
June 12-15	2013	0.674	0.518	0.799
June 12-25	2014	0.798	0.602	0.912
June 12-25	2015	N/A	N/A	N/A
June 16-23	2016	0.374	0.223	0.525
May 23-June19	2017	0.682	0.441	0.923



**Figure 4.** Summer flow volume (July 1–August 31) in the Middle Columbia River (at Bonneville Dam) and average spill proportion at McNary, John Day, The Dalles, and Bonneville dams.

We hope that the information we have provided regarding the use and application of information from the groups that have been marked 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.