



FISH PASSAGE CENTER

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MEMORANDUM

TO: Jayson Wahls, WDFW

FROM: Brandon R. Chockley

DATE: January 4, 2017

RE: 2016 Wells Hatchery Report

The Fish Passage Center has been marking Chinook from the Wells Hatchery facility since 1997 as part of the Smolt Monitoring Program (SMP). For purposes of these studies 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 Wells Hatchery facility in 2015 and past years.

Under the Smolt Monitoring Program, information is collected on the timing and migration speed from the hatchery to McNary Dam. Tables 1 and 2 below provide 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.

Table 1. Wells Hatchery Subyearling Chinook Travel Times from Release to McNary Dam (May releases).

Release Date	Migration Year	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
12-May	2004	27.8	47.2	78.5	46.4	48.3
18-May	2005	12.6	37.1	60.9	35.8	38.5
12-May	2006	16.3	38.6	65.8	37.0	39.1
17-May	2007	24.7	50.9	84.7	50.2	51.9
13-May	2008	11.9	46.8	86.8	45.9	47.2
15-May	2009	16.7	51.9	75.1	50.7	52.9
17-May	2010	14.7	33.5	79.3	32.7	34.2
19-May	2011	6.6	21.5	77.6	20.4	23.7
15-May	2012	13.7	44.2	89.6	42.6	46.1
20-May	2013	28.3	51.4	73.9	51.1	52.0
16-May	2014	17.3	41.1	67.8	39.1	44.4
27-May	2015	19.7	34.6	51.8	33.4	36.0
14-May	2016	19.1	28.6	51.5	27.3	29.5

Table 2. Wells Hatchery Subyearling Chinook Travel Times from Release to McNary Dam (June releases).

Release Date	Migration Year	Travel Time (Days)			95% Confidence Limits	
		Min	Med	Max	Lower	Upper
24-June	1997	5.1	23.0	80.6	20.9	24.9
10-June	1998	8.1	30.8	68.4	29.8	32.0
19-June	1999	9.6	30.6	65.5	29.6	31.3
19-June	2000	12.4	35.3	67.0	32.5	36.5
20-June	2001	14.8	37.8	309.5	36.9	39.6
17-June	2002	7.1	25.8	66.3	25.3	26.3
17-June	2003	12.7	23.9	54.7	23.7	24.3
15-June	2004	11.4	27.1	150.5	26.9	27.6
13-June	2005	12.6	23.4	38.9	19.9	28.8
14-June	2006	9.7	21.2	51.8	19.8	23.5
15-June	2007	16.8	35.4	67.7	30.9	36.7
16-June	2008	10.4	22.5	66.2	21.2	23.4

In addition to travel time data, we are providing estimates of the 10%, 50%, and 90% passage dates of Wells Hatchery summer Chinook juveniles at McNary Dam for each of the years of tagging (Tables 3 and 4). Separate estimates of timing are provided for the May (Table 3) and June (Table 4) releases. Also, Figure 1 is provided as an illustration of how the arrival timing of the May 2016 smolt release relates to last year's May release, as well as the current 10-year average of the May releases (2006–2015).

Table 3. Estimated 10%, 50%, and 90% passage dates of Wells Hatchery subyearling summer Chinook at McNary Dam (May releases).

Migration Year	Release Date	10% Passage Date	50% Passage Date	90% Passage Date
2004	12-May	15-Jun	27-Jun	10-Jul
2005	18-May	17-Jun	25-Jun	1-Jul
2006	12-May	12-Jun	19-Jun	28-Jun
2007	17-May	21-Jun	7-Jul	13-Jul
2008	13-May	12-Jun	28-Jun	7-Jul
2009	15-May	26-Jun	6-Jul	15-Jul
2010	17-May	16-Jun	27-Jun	7-Jul
2011	19-May	1-Jun	19-Jun	25-Jun
2012	15-May	16-Jun	28-Jun	6-Jul
2013	20-May	27-Jun	10-Jul	16-Jul
2014	16-May	16-Jun	27-Jun	13-Jul
2015	27-May	25-Jun	1-Jul	10-Jul
2016	14-May	4-Jun	12-Jun	25-Jun

Table 4. Estimated 10%, 50%, and 90% passage dates of Wells Hatchery subyearling summer Chinook at McNary Dam (June releases).

Migration Year	Release Date	10% Passage Date	50% Passage Date	90% Passage Date
1997	24-Jun	10-Jul	16-Jul	8-Aug
1998	10-Jun	29-Jun	10-Jul	24-Jul
1999	19-Jun	6-Jul	20-Jul	3-Aug
2000	19-Jun	9-Jul	24-Jul	5-Aug
2001	20-Jun	17-Jul	28-Jul	20-Aug
2002	17-Jun	5-Jul	13-Jul	23-Jul
2003	17-Jun	9-Jul	11-Jul	18-Jul
2004	15-Jun	4-Jul	12-Jul	23-Jul
2005	13-Jun	1-Jul	8-Jul	14-Jul
2006	14-Jun	30-Jun	6-Jul	16-Jul
2007	15-Jun	10-Jul	20-Jul	3-Aug
2008	16-Jun	3-Jul	8-Jul	18-Jul

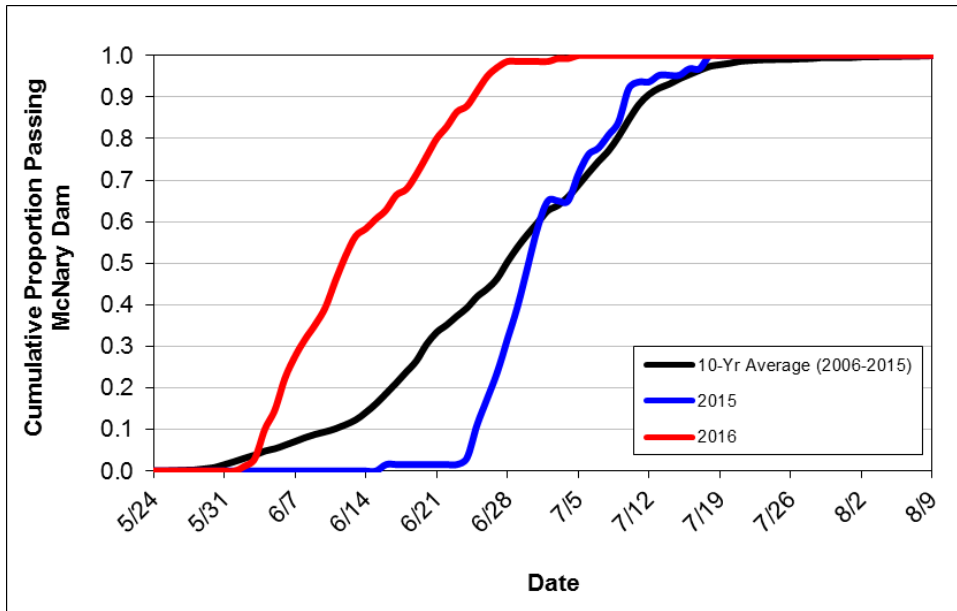


Figure 1. Cumulative passage timing of Wells Hatchery subyearling summer Chinook to McNary Dam. Timing plots are for May releases only.

Finally, Tables 5 and 6 below provide estimates of survival from release at the hatchery to McNary Dam, along with the upper and lower confidence limits on these estimates. We provide separate survival estimates for the May (Table 5) and June (Table 6) releases. Due to low detection probabilities in the Middle Columbia, we were not able to estimate survival for this group in 2015. To put into context the out-migration conditions that these summer Chinook juveniles may have experienced, Figure 2 provides the total flow volume (April 15–August 31) for the Upper Columbia River (as measured at Priest Rapids Dam), along with the average spring spill proportions at each of Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids dams, for each migration year.

Table 5. Wells Hatchery yearling and subyearling Chinook survivals (Release to McNary Dam) (May releases).

Release Date	Migration Year	Survival (Rel to MCN)	95% Confidence Limits	
			Lower	Upper
12-May	2004	0.251	0.205	0.296
18-May	2005	0.341	0.243	0.456
12-May	2006	0.376	0.285	0.478
17-May	2007	0.260	0.189	0.347
13-May	2008	0.371	0.298	0.444
15-May	2009	0.284	0.204	0.364
17-May	2010	0.317	0.241	0.393
19-May	2011	0.527	0.378	0.676
15-May	2012	0.247	0.169	0.324
20-May	2013	0.252	0.181	0.340
16-May	2014	0.257	0.198	0.328
27-May	2015	N/A	N/A	N/A
14-May	2016	0.240	0.144	0.337

Table 6. Wells Hatchery yearling and subyearling Chinook survivals (Release to McNary Dam) (June releases).

Release Date	Migration Year	Survival (Rel to MCN)	95% Confidence Limits	
			Lower	Upper
24-June	1997	0.254	0.170	0.338
10-June	1998	0.291	0.241	0.340
19-June	1999	0.373	0.281	0.465
19-June	2000	0.210	0.168	0.253
20-June	2001	0.211	0.166	0.257
17-June	2002	0.449	0.395	0.503
17-June	2003	0.456	0.406	0.506
15-June	2004	0.160	0.106	0.215
13-June	2005	N/A	N/A	N/A
14-June	2006	0.352	0.199	0.534
15-June	2007	0.281	0.155	0.454
16-June	2008	0.294	0.190	0.398

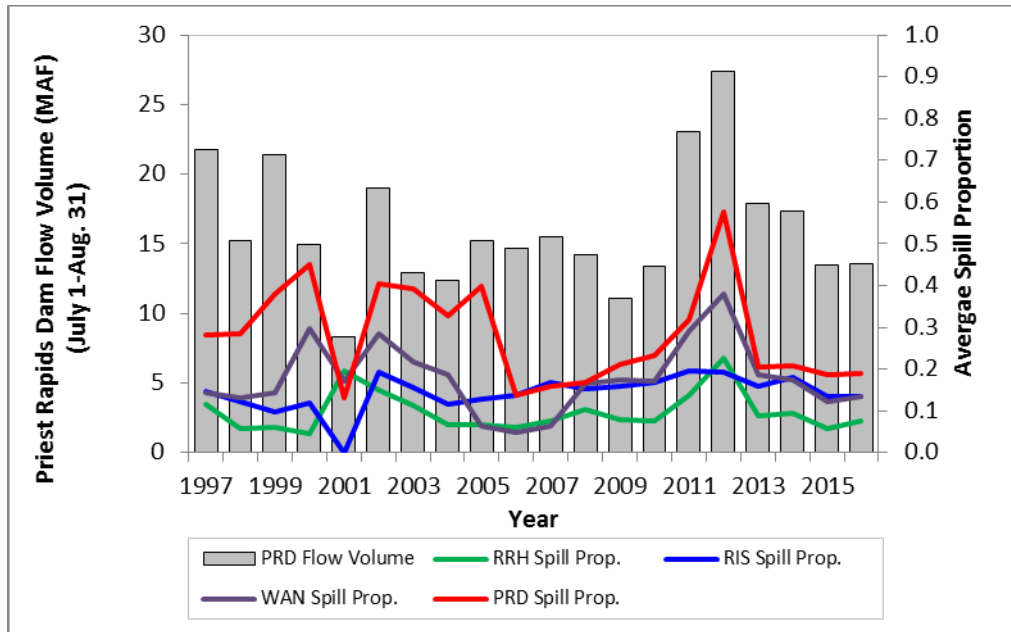


Figure 2. Total flow volume (April 15–August 31) in the Upper Columbia River (at Priest Rapids Dam) and average spill proportion at Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids dams.

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
- Bill Tweit, WDFW
- Jay Hesse, Nez Perce
- Tom Rien, ODFW
- Steve Haeseker, USFWS
- Kyle Hanson, USFWS
- Erik Merrill, NPCC
- Tony Grover, NPCC
- Leslie Bach, NPCC
- Tom Kahler, Douglas County PUD
- Greg Mackey, Douglas County PUD
- FPAC