



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Paul Hoffarth, WDFW

FROM: Michele DeHart

DATE: January 9, 2013

RE: Update: Passage timing, travel times, and juvenile survival of wild Hanford Reach sub-yearling Chinook to McNary Dam (1993-2012).

In response to your request, FPC staff updated a 2007 analysis entitled: Historical passage timing, travel times, and juvenile survival of wild Hanford Reach sub-yearling Chinook to McNary Dam. This update provides passage timing, travel times, and survival estimates for PIT-tagged wild subyearling Chinook from the Hanford reach through migration year 2012. As in 2007, we approached this task in a manner similar to analyses conducted for hatcheries that release PIT-tagged juvenile salmonids for the Smolt Monitoring Program (SMP) and Comparative Survival Study (CSS).

Since 1993, wild subyearling Chinook have been captured, PIT-tagged, and released in the Hanford Reach of the Upper Columbia River, below Priest Rapids Dam (excluding 2002 and 2006). With the release of these PIT-tags, information on the timing and migration speed of tagged individuals becomes available, along with information on survival as these juveniles migrate downstream.

Table 1 describes the median travel times for each release to McNary Dam along with the minimum and maximum travel time estimates for wild subyearling Chinook tagged and released from Hanford Reach. This table also provides the 95% confidence limits around the estimated median travel time. In addition, Table 2 provides the estimated 10%, 50%, and 90% passage dates at McNary Dam for each migration year. Passage timing at McNary Dam for each migration year is also illustrated in Figures 1 through 3. To better facilitate comparison, we have

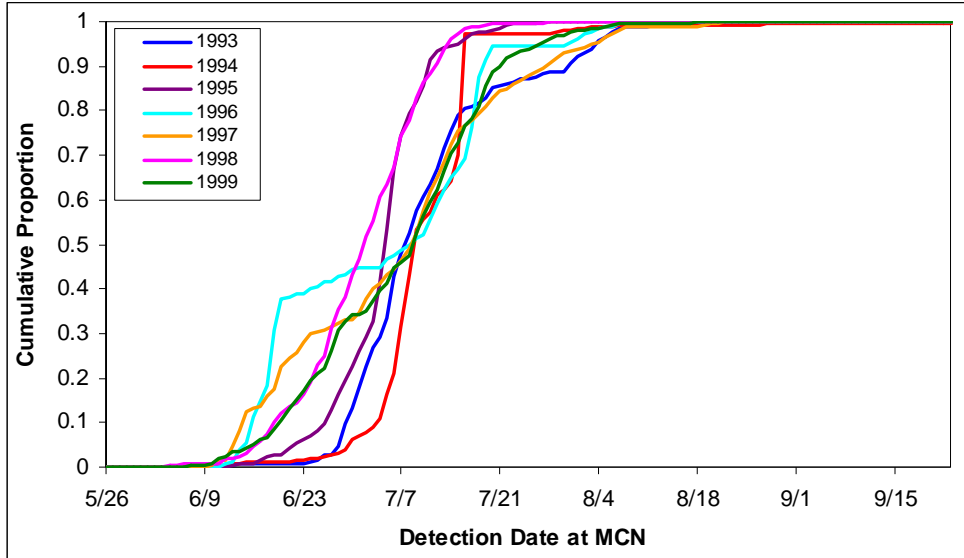
broken the years into three separate graphs; Figure 1 (1993-1999), Figure 2 (2000-2007), and Figure 3 (2008-2012).

**Table 1.** Median travel time from release to McNary Dam for wild Hanford Reach subyearling Chinook.

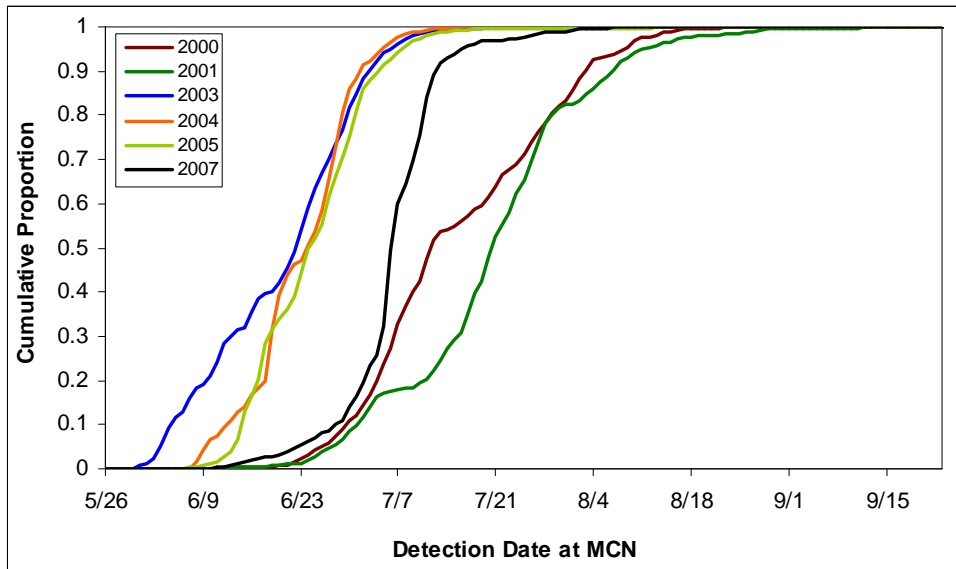
Release Dates	Migration Year	Travel Time (Days)			Confidence Limits (95%)	
		Min	Median	Max	Lower	Upper
6/7-6/15	1993	3.2	29.1	79.0	28.7	30.0
6/6-6/7	1994	3.1	32.5	109.1	32.0	33.7
6/6-6/8	1995	6.0	28.1	49.8	27.7	28.5
6/10-6/13	1996	1.9	31.7	57.2	30.2	33.2
6/9-6/13	1997	1.2	29.1	72.8	28.3	30.1
6/1-6/3	1998	2.3	31.6	56.9	30.9	32.3
6/3-6/10	1999	2.4	33.0	74.8	32.0	34.1
6/1-7/3	2000	3.7	31.1	80.5	30.7	31.5
5/29-7/1	2001	1.6	33.0	298.4	32.0	33.8
5/27-5/30	2003	2.1	26.3	58.9	25.6	27.1
6/2-6/4	2004	4.0	23.2	57.7	25.6	27.1
5/31-7/1	2005	2.1	14.5	154.7	14.0	14.9
6/6-6/10	2007	2.3	28.7	63.3	28.4	28.9
6/4-6/7	2008	1.9	35.8	75.8	35.1	36.0
6/2-6/8	2009	1.8	35.0	55.4	34.6	35.3
6/1-6/4	2010	3.1	34.5	50.8	33.7	35.2
6/6-6/10	2011	3.3	39.9	65.9	39.3	40.6
6/5-6/8	2012	2.1	38.9	57.0	37.8	39.4

**Table 2.** Estimated 10%, 50%, and 90% McNary Dam passage date of Hanford Reach wild subyearling Chinook.

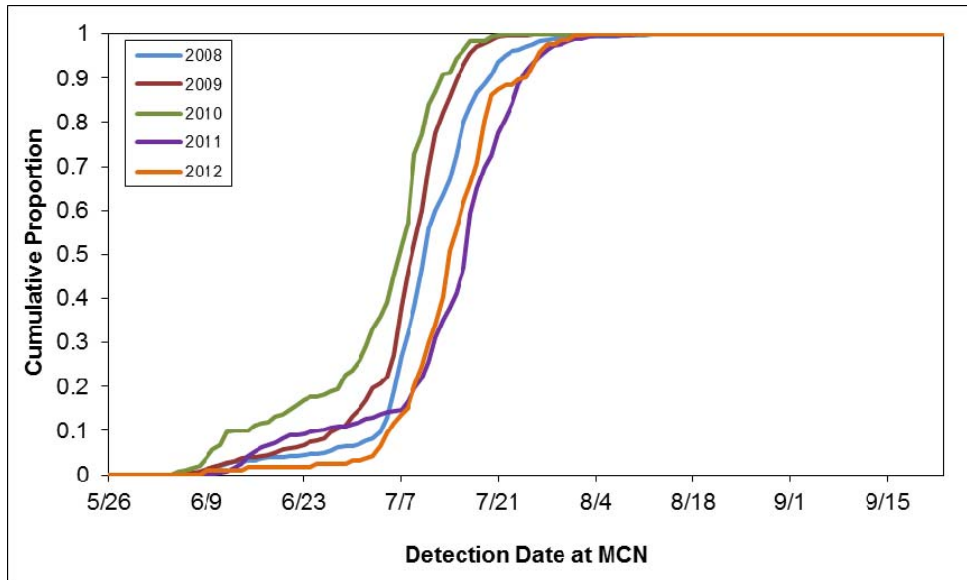
Release Dates	Migration Year	10% Passage Date	50% Passage Date	90% Passage Date
6/7-6/15	1993	30-Jun	8-Jul	31-Jul
6/6-6/7	1994	4-Jul	9-Jul	16-Jul
6/6-6/8	1995	27-Jun	5-Jul	11-Jul
6/10-6/13	1996	16-Jun	9-Jul	19-Jul
6/9-6/13	1997	15-Jun	9-Jul	28-Jul
6/1-6/3	1998	19-Jun	2-Jul	12-Jul
6/3-6/10	1999	20-Jun	9-Jul	22-Jul
6/1-7/3	2000	30-Jun	12-Jul	3-Aug
5/29-7/1	2001	2-Jul	21-Jul	7-Aug
5/27-5/30	2003	5-Jun	23-Jun	3-Jul
6/2-6/4	2004	13-Jun	24-Jun	2-Jul
5/31-7/1	2005	15-Jun	25-Jun	5-Jul
6/6-6/10	2007	28-Jun	7-Jul	13-Jul
6/4-6/7	2008	5-Jul	11-Jul	20-Jul
6/2-6/8	2009	28-Jun	9-Jul	16-Jul
6/1-6/4	2010	13-Jun	7-Jul	13-Jul
6/6-6/10	2011	26-Jun	13-Jul	25-Jul
6/5-6/8	2012	6-Jul	14-Jul	25-Jul



**Figure 1.** Passage timing to McNary Dam of PIT-tagged wild Hanford Reach subyearling Chinook (1993-1999).



**Figure 2.** Passage timing to McNary Dam of PIT-tagged wild Hanford Reach subyearling Chinook (2000-2007).



**Figure 3.** Passage timing to McNary Dam of PIT-tagged wild Hanford Reach subyearling Chinook (2008-2012).

Finally, Table 3 contains estimates of juvenile survival from release to McNary Dam, along with upper and lower confidence limits on these estimates. The yearly estimates are for all wild subyearling Chinook tagged and released at Hanford Reach in each migration year.

**Table 3.** Survival (release to McNary) of Hanford Reach wild subyearling Chinook.

Release Dates	Migration Year	PIT-Tags Released	Survival	Confidence Limits (95%)	
				Lower	Upper
6/7-6/15	1993	3,046	N/A	N/A	N/A
6/6-6/7	1994	2,983	N/A	N/A	N/A
6/6-6/8	1995	2,993	0.414	0.096	0.733
6/10-6/13	1996	2,957	N/A	N/A	N/A
6/9-6/13	1997	2,980	0.490	0.338	0.643
6/1-6/3	1998	2,955	0.617	0.518	0.707
6/3-6/10	1999	5,042	0.399	0.352	0.448
6/1-7/3	2000	10,967	0.416	0.386	0.446
5/29-7/1	2001	9,973	0.365	0.341	0.390
5/27-5/30	2003	2,975	0.311	0.273	0.351
6/2-6/4	2004	2,989	0.331	0.292	0.373
5/31-7/1	2005	22,814	0.286	0.262	0.310
6/6-6/10	2007	21,007	0.377	0.348	0.406
6/4-6/7	2008	16,651	0.332	0.283	0.385
6/2-6/8	2009	13,728	0.333	0.284	0.385
6/1-6/4	2010	4,850	0.281	0.225	0.344
6/6-6/10	2011	10,338	0.385	0.321	0.453
6/5-6/8	2012	4,892	0.272	0.210	0.344

Cc: Howard Schaller, USFWS  
Don Anglin, USFWS  
Steve Haeseker, USFWS  
Bill Tweit, WDFW  
Jeff Fryer, CRITFC  
Mike Matylewich, CRITFC



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**DATA REQUEST FORM**

Request Taken By: Michelle DeHart Date: 3-Jan-2013

Data Requested By:

Name: Paul Hoffarth (WDFW) Phone: \_\_\_\_\_

Address: \_\_\_\_\_ Fax: \_\_\_\_\_

\_\_\_\_\_ Email: Paul.Hoffarth@dfw.wa.gov

Data Requested:

Update analyses of wild Hanford Reach  
fall Chinook from September 2007.

Data Format: Hardcopy  Text  Excel

Delivery: Mail  Email  Fax  Phone

Comments:

Data Compiled By: [Signature] Date: 9-Jan-2013

Request # 2