



FISH PASSAGE CENTER

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MEMORANDUM

TO: Tom Lorz

FROM: Jerry McCann

DATE: July 1, 2013

RE: Estimated Change in Proportion Transported with April 21 Transport Start Date

Based on your request we reviewed the most recent 5-year transport data from FPC Annual Reports to determine the potential impact of moving the start date of transportation to April 21. We examined the change in the proportion destined for transport for hatchery and wild yearling Chinook and steelhead based on Lower Granite Dam passage timing and PIT-tag detection probability at Lower Granite, Little Goose and Lower Monumental dams. Our findings are summarized below.

- Moving the start date to April 21 resulted in an estimated increase in the proportion of fish transported for all groups of hatchery and wild yearling Chinook and steelhead.
- Based on the 5 years presented here, the proportion of wild yearling Chinook transported would show the greatest increase.
- In all cases the shift to an earlier date increased the average proportion of fish transported more than 0.14 or 14%.
- In all cases the shift to an earlier date increased the proportion of fish passing during transport operations more than 0.20 or 20%.

The proportion destined for transport represents the proportion of fish starting at Lower Granite Dam forebay that would be barged if no mortality occurred. However, since there would be mortality to both in-river and transported fish, the proportion destined for transport represents

the proportion of fish at the outset that would be routed to transport. The remainder would pass either through spill or turbines and remain uncollected, or pass prior to the start of transport and be bypassed back to the river. Since all fish passing prior to the start of transport would be bypassed back to river, timing of passage as well as detection probability were both important in determining the proportion destined for transport.

We used PIT-tag detection probability estimates of fish survival from SMP trap releases to determine seasonal average probability of being detected at a transport facility. We used passage indices at Lower Granite Dam to determine the proportion of fish passing prior to the start of transportation. We used data from the years 2008 to 2012 to estimate the impact of moving the start date of transportation from May 1 to the earlier date of April 21. We examined timing and detection probability to develop estimates of proportion destined for transport. For further details on this methodology, see [Appendix G of the Draft FPC 2012 Annual Report](#) available on the FPC website.

Results

Tables 1 through 4 show the estimated increase in the proportion destined for transport based on moving the start date to transport from May 1 to April 21. Generally moving the start date earlier increased the proportion destined for transport (see Table 1 to Table 4). The largest increases estimated were for both hatchery and wild yearling Chinook. In particular, wild Chinook showed the largest increase in transport proportion in the year 2012 with an absolute increase in proportion of +0.38 (from 0.21 to 0.59). For hatchery and wild Chinook, when the start date was moved to April 21 the proportion destined for transport increased above 0.50 in all years but 2010. That year, 2010, was a low flow year and transport was begun on April 25 so there was not as large an increase in proportion transported. Also, due to low flows and normal spill operations, detection probability at the transport dams were very low that year resulting in low probability of fish being transported. For those reasons, 2010 was a very unusual year.

Table 1. Estimated increase in the proportion of Hatchery Yearling Chinook destined for transport and the proportion past LGR prior to transport given a change in transport date to April 21.

Migr_yr	May 1 begin transport		April 21 begin transport		Change in proportion destined for transport
	Proportion past LGR prior to start	Proportion destined for transport	Proportion past LGR prior to start	Proportion destined for transport	
2012	0.64	0.21	0.18	0.51	+0.30
2011	0.28	0.42	0.10	0.52	+0.10
2010 ^a	0.17	0.24	0.01	0.28	+0.04
2009	0.34	0.36	0.08	0.50	+0.14
2008	0.20	0.49	0.05	0.59	+0.10

^aTransport began on April 25 in 2010.

Table 2. Estimated increase in the proportion of Wild Yearling Chinook destined for transport and the proportion past LGR prior to transport given a change in transport date to April 21.

Migr_yr	May 1 begin transport		April 21 begin transport		Change in proportion destined for transport
	Proportion past LGR prior to start	Proportion Destined for transport	Proportion past LGR prior to start	Proportion Destined for transport	
2012	0.74	0.21	0.25	0.59	+0.38
2011	0.41	0.40	0.22	0.54	+0.14
2010 ^a	0.12	0.41	0.00	0.46	+0.05
2009	0.47	0.40	0.10	0.68	+0.28
2008	0.24	0.49	0.08	0.59	+0.10

^aTransport began on April 25 in 2010.

Table 3. Estimated increase in the proportion of Hatchery Steelhead destined for transport and the proportion past LGR prior to transport given a change in transport date to April 21.

Migr_yr	May 1 begin transport		April 21 begin transport		Change in proportion destined for transport
	Proportion past LGR prior to start	Proportion Destined for transport	Proportion past LGR prior to start	Proportion Destined for transport	
2012	0.65	0.24	0.20	0.56	+0.32
2011	0.40	0.36	0.27	0.44	+0.08
2010 ^a	0.09	0.36	0.00	0.39	+0.03
2009	0.38	0.46	0.06	0.70	+0.24
2008	0.31	0.41	0.10	0.54	+0.13

^aTransport began on April 25 in 2010.

Table 4. Estimated increase in the proportion of Wild steelhead destined for transport and the proportion past LGR prior to transport given a change in transport date to April 21.

Migr_yr	May 1 begin transport		April 21 begin transport		Change in proportion destined for transport
	Proportion past LGR prior to start	Proportion Destined for transport	Proportion past LGR prior to start	Proportion Destined for transport	
2012	0.59	0.28	0.13	0.61	+0.33
2011	0.22	0.48	0.13	0.53	+0.05
2010 ^a	0.08	0.39	0.01	0.42	+0.03
2009	0.35	0.48	0.06	0.70	+0.22
2008	0.29	0.45	0.12	0.55	+0.10

^aTransport began on April 25 in 2010.

We summarized the estimated increased in the proportions destined for transport for all groups as a result of moving the start date of transportation to April 21. Wild yearling Chinook transport proportion increased the most increasing from 0.05 to 0.38 among the years presented. All groups showed an average increase in the proportion destined for transport from 0.14 to 0.18.

That increase in transport proportion was due to the increased proportion of fish that were estimated to pass during transport operations.

In conclusion shifting the start date to April 21 would subject a much larger proportion of the migrant yearling Chinook and steelhead populations to transportation operations. Due to that shift a larger proportion of the populations would be transported. The greatest increase would be to the wild Chinook.