

July 22, 2016: The following is an update of the latest run forecasts for hatchery-origin summer Chinook returning to Entiat National Fish Hatchery (ENFH). These data are in-season return estimates based on PIT tag detections at Bonneville Dam and expanded by PIT tag ratios by year. Tagging ratios are not included in this report but are available by request (Greg Fraser gregory_fraser@fws.gov).

For this forecast I estimated that 85% of the ENFH-origin summer Chinook run have passed over Bonneville Dam based on the run timing of previous years with similar age-class structures and abiotic conditions (www.cbr.washington.edu). Chinook exhibit an age-dependent temporal pattern in their returns with older fish returning earlier than younger fish (Beer 2007; Beer and Anderson 2009; Bracis and Anderson 2013). ENFH began summer Chinook production in 2009, the first release was 2011 and the first full production release was in 2013. The early returns from ENFH production (2011–2013) were disproportionately composed of younger age-classes therefore the overall timing of the run was likely skewed towards later dates. Considering the temporal pattern of returns by age the more recent years (2014 and 2015) were favored in assessing the percentage of the run over Bonneville. Summer Chinook returns from other hatchery programs in the upper Columbia River basin were also evaluated.

The total count of summer Chinook over Bonneville Dam is 109,607 adults (ages 4–6) and 9,730 jacks (age-3) (fpc.org).

As of July 22 of the ENFH-origin Chinook detected at Bonneville 78% have been detected at McNary Dam, 65% have been detected at Rocky Reach Dam and 28% have been detected in the lower Entiat River. Detection efficiencies at each facility differ but larger dams are in general consistent and highly efficient while the in-stream antenna array efficiencies are not as consistent and are heavily dependent on flow.

Table 1. Entiat National Fish Hatchery (ENFH)-origin summer Chinook PIT tag detections, PIT tag expansion estimates and the run forecast above Bonneville Dam (BON) as of 7/22/2016.

Age	PITs detected at BON	PIT Expansion	Run Forecast
3	0	0	0
4	31	1,211	1,425
5	96	3,429	4,034
6	6	105	124
Totals	133	4,745	5,582

Run forecast were produced estimating that 85% of the summer Chinook run has passed Bonneville Dam.

Table 2. ENFH summer Chinook escapement estimates to Rocky Reach Dam and ENFH, based on PIT tag detections at Bonneville (Bon) on 7/22/2016 and a 5-year average of conversion rates.

Estimated ENFH Returns to Rocky Reach	3,238	<i>58% conversion from Bon to Rocky Reach</i>
Estimated ENFH Returns to ENFH	2,085	<i>64% conversion from Rocky Reach to ENFH</i>

REFERENCES

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Bracis, C. and J. J. Anderson. 2013. Inferring the relative oceanic distribution of salmon patterns in age-specific arrival timing. *Transactions of the American Fisheries Society* 142: 556–567.