BI-WEEKLY UPDATE: PINNIPED ABUNDANCE AND SALMON PREDATION AT BONNEVILLE LOCK AND DAM

Prepared by:

Kyle Tidwell, Thomas Van Hevelingen, Lindsay Magill, and Bjorn van der Leeuw

Fisheries Field Unit

U.S. Army Corps of Engineers, Bonneville Lock and Dam Cascade Locks, OR 97014

Correspondence: kyle.s.tidwell@usace.army.mil

This is the fourth and final status report for the 2017 pinniped monitoring season and summarizes the observed predation and deterrent activities at Bonneville Dam from 1 January through 2 June 2017 with a focus on the interval since the last report (12 May – 2 June). A final report is being compiled and will be available before fall.

PLEASE NOTE - All data presented here are preliminary as of the status report date. Predation numbers and abundance estimates are unexpanded and will change as data are proofed and analyzed. Final predation estimate data will be expanded to adjust for hours and days not observed as well as "unknown" prey species consumed for the final report. The final report summarizing the results of the 2017 Pinniped Monitoring Program will be available in the fall of this year.

PINNIPED ABUNDANCE

We present abundance data using the maximum number of individuals counted during a comprehensive tailrace point count and interpolated for days not observed. For inter and intra-year comparison of abundance estimates, we report average daily abundance with standard deviation as measures of variance.

Abundance 1 January – 2 June, 2017

The combined pinniped numbers at Bonneville Dam for the month of May through 2 June were higher than the 10 year average (Fig. 1). The bulk of the Steller sea lions (SSL; *Eumetopias jubatus*) left by 27 May and by 2 June none were observed. The bulk of the California sea lions (CSL; *Zalophus californianus*) left by 30 May, and currently there is only one at the dam. Daily counts of all pinnipeds from 13 May – 2 June averaged 37.5 ± SD 23.5 animals. The dominate species in the tailrace was the SSL with an average abundance of 24.3 ± SD 17.9, followed by CSL with an average of 13.1 ± SD 6.3 (Fig. 2). No Harbor seals (*Phoca vitulina*) were seen during this period (Table 1).

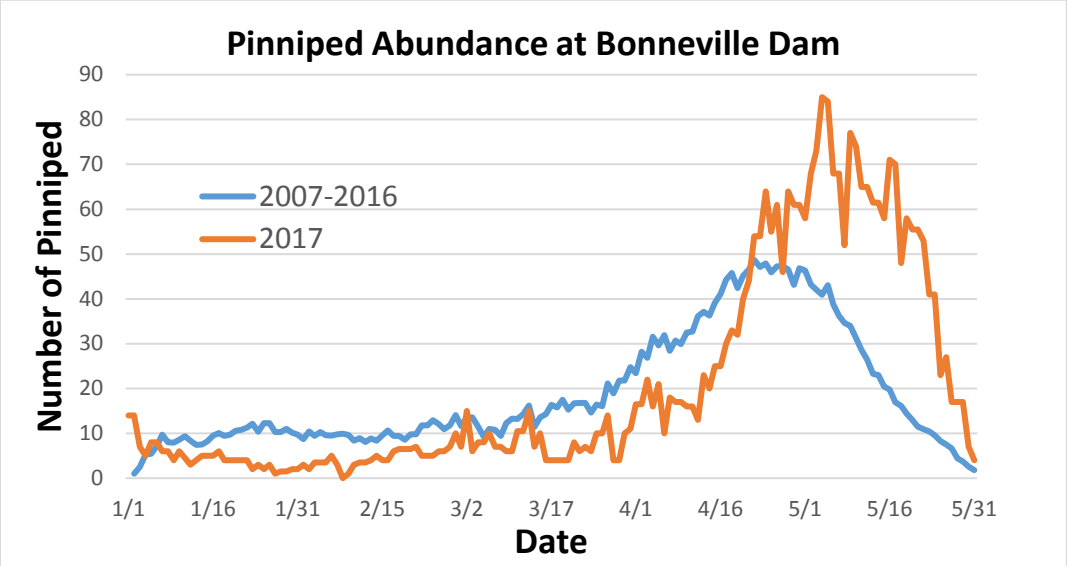

Figure 1. Comparison of estimated abundance of all pinniped species at Bonneville Dam between the 10 year running average and the current year.

To date, we have documented 15 SSL and 88 CSL as uniquely identifiable individuals. All uniquely identifiable pinnipeds have been documented near Bonneville tailraces project in previous years or were recently branded at Bonneville (n = 24 CSL, 11 SSL). No pinnipeds have been observed at the Dalles Dam or above the Bonneville Dam since 18 May 2017.

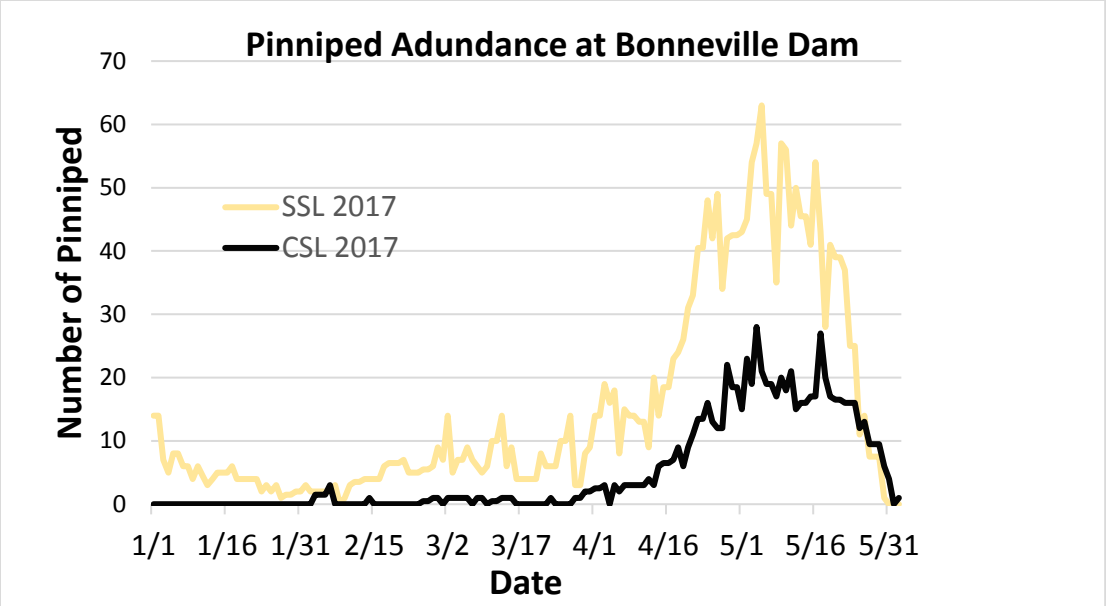

Figure 2. Comparison of estimated abundance of Steller sea lions (SSL) and California sea lion (CSL) at Bonneville Dam between 1 January and 2 June 2017.

Species	$\bar{x}$ ± S.D.	Range	$n = 0$
SSL	24.3 ± 17.9	0 - 54	3
CSL	13.1 ± 6.3	0 - 27	1

Table 1. Interpolated daily minimum counts of pinnipeds at Bonneville Dam tailraces between 13 May and 2 June 2017.

PREDATION DATA

To enable contrast of historical predation data, and data collected in 2016 and 2017 using a new sampling scheme, we concatenate historical data by week and average across years to align it with the one week strata design now used to estimate predation. Expansion to account for unidentifiable fish catches will be conducted at the seasons end once all data has been processed.

Predation 1 January – 2 June 2017

Salmonid predation decreased between 13 May and 2 June, wherein the final week of monitoring had an estimated 63 salmonids depredated by pinnipeds (Fig. 3). The delayed run of Spring Chinook and prolonged residency of pinnipeds at the dam likely accounts for the lag of predation observed this year relative to the 10 year average.

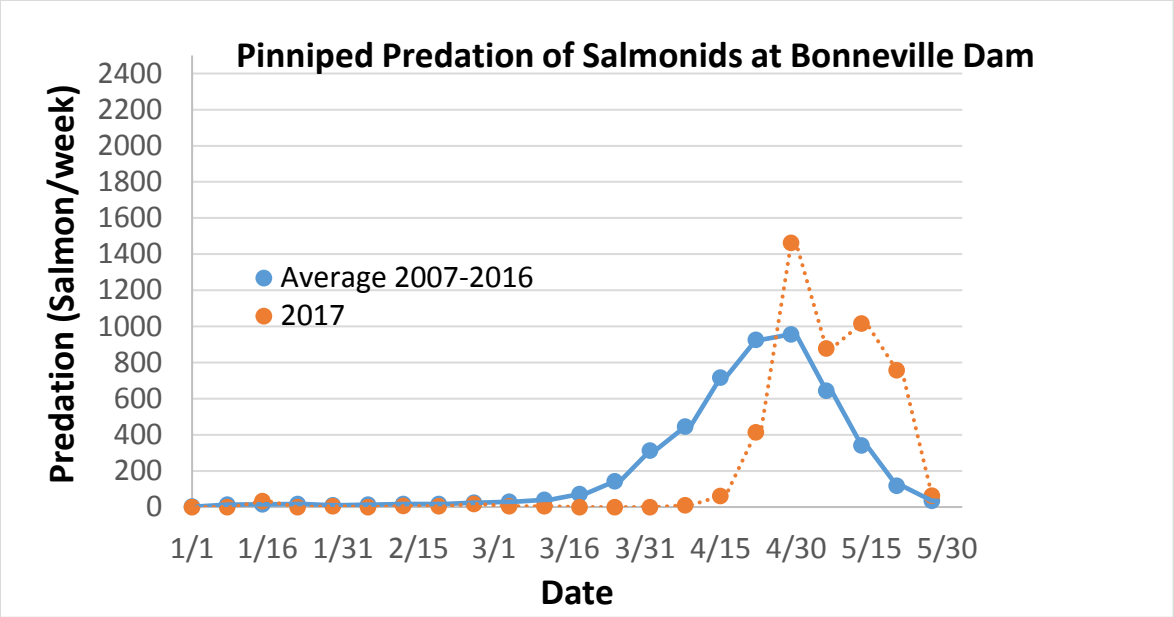

Figure 3. Comparison of estimated adult salmonid consumption by both species of pinniped at Bonneville Dam.

Between the period 13 May and 2 June 2017 we estimate that 1837 ± 130 adult salmonids were consumed. This estimate is greater than the ten year average estimate of 494 adult salmonids for the same time period (Fig. 3). From 1 January to 2 June 2017, an estimated, but not adjusted, 4993 ± 234 adult salmonids have been consumed by pinnipeds. Of these estimated consumed salmonids, 82 percent have been Spring Chinook (*Oncorhynchus tshawytscha*). White sturgeon (*Acipenser transmontanus*), which historically (i.e. last 15 years) represented a large portion of the SSL diet, have been observed being depredated by pinnipeds six times. Pacific Lamprey (*Entosphenus tridentatus*) and other non-salmonid fish predation events account for less than five percent of the total observed predation events.

A review of the combined salmonid passage counts for the pinniped sampling season shows that the runs were delayed relative to previous years and smaller than the long term average. As such, the duration of pinniped presence and levels of fish predation were protracted relative to the 10 year average. The reduced salmonid runs and persistently high numbers of pinnipeds in the latter part of the season suggests that the total impact by pinnipeds on this year's salmonid run may be large. The final numbers are being processed and will be available at a later date.