STATUS REPORT – PINNIPED PREDATION AND DETERRENT ACTIVITIES AT BONNEVILLE LOCK AND DAM

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This is the second status report for the 2017 pinniped monitoring season and summarizes the observed predation and deterrent activities at Bonneville Dam from 1 January through 28 April 2017 with a focus on the interval since the last report (7 April – 28 April). Future updates and status reports will be issued on a bi-weekly basis.

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.

SUMMARY

Using a stratified sampling design of observations from the dam's tailrace, trained observers monitor fish predation and pinniped abundance five days a week during daylight hours. Pinniped abundance is monitored year round (when pinnipeds are present), and pinniped-fish predation monitoring began 10 January 2017 and will continue through 31 May 2017.

Over the period 7 – 28 April pinniped abundance increased at the dam. Last week there was an average of 26.5 ± 12.5 SD Steller sea lions and 8.4 ± SD 5.1 California sea lions on project. These numbers are similar to the ten year average. Of the CSL documented to date, 40 have been uniquely identified with brands. Eight uniquely identifiable SSL have been recorded.

Predation levels are below years past, but increasing in the last week. The levels and intensity of predation are seemingly connected to the adult salmonid migration, which this year is much smaller than the long term average. However, the recent increase in fish passage and pinniped abundance indicates that sea lion predation on fish will continue to intensify in the coming weeks.

Deterrence and trapping activities are fully operational with all State, Tribal, and Federal entities working together to monitor this year's pinniped-fish interactions.

PINNIPED ABUNDANCE

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

Abundance 1 January – 28 April, 2017

The combined pinniped numbers at Bonneville Dam between 1 January and 28 April, 2017 are now higher than the 10 year average (Fig. 1). The dominate species in the tailrace continues to be (SSL; *Eumetopias jubatus*), wherein daily counts of all pinnipeds from 7 April – 28 April, 2017 averaged 34.8 ± SD 17.2 animals, the bulk of which were SSL (26.5 ± 12.5) and the balance, California sea lions (CSL; *Zalophus californianus*) (8.4 ± 5.1) (Fig. 2). No Harbor Seals (*Phoca vitulina*) were seen during this period (Table 1). The daily maximum count of 49 SSLs and 22 CSLs occurred on April 26 and April 28, respectively.

To date, we have documented eight SSL and 40 CSL as uniquely identifiable individuals. All uniquely identifiable pinnipeds have been seen on project in previous years or were recently branded on project (n = 5 CSL). The seemingly low number of uniquely identifiable SSL are due to the lack of branding effort for these animals in recent years.

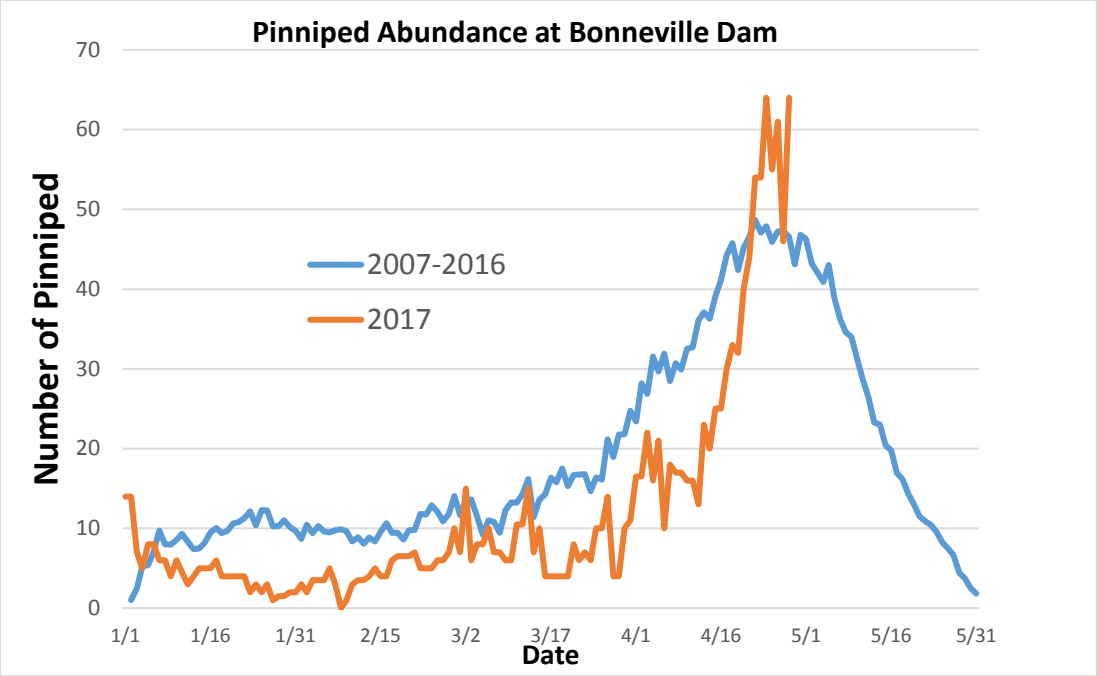

Figure 1. Comparison of estimated abundance of all pinniped species at Bonneville Dam between the 10 year running average and the current year.

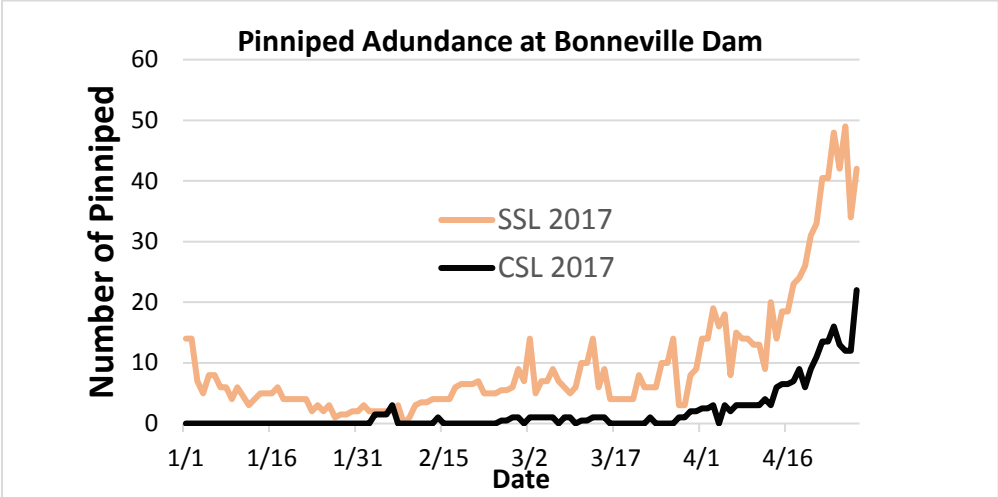

Figure 2. Comparison of estimated abundance of Steller sea lions (SSL) and California sea lion (CSL) at Bonneville Dam between 1 January and 28 April 2017.

Species	$\bar{x}$ ± S.D.	Range
SSL	26.5 ± 12.5	9 - 49
CSL	8.4 ± 5.1	2 - 22

Table 1. Expanded daily minimum counts of pinnipeds at Bonneville Dam tailraces between 7 April and 28 April 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 (via linear interpolation) for unidentifiable fish catches will be conducted at the seasons end once all data has been processed.

Predation 1 January – 28 April, 2017

To date, predation has been less than the long term average (Fig. 3). However, visual inspection of the last week of estimated adult salmonid predation indicates that the intensity is similar, but the total level of predation, far below the long term average (Fig. 3).

Between the period 7 April and 28 April 2017 we estimate that 735 adult salmonids have been consumed. This estimate is far lower than the long term average estimate of 2599 adult salmonids for the same time period (Fig. 3). As of 28 April 2017 unexpanded data documents a total of 236 total fish predation events, 153 of which have been Spring Chinook (*Oncorhynchus tshawytscha*) (Table 2). White sturgeon (*Acipenser transmontanus*), which historically (i.e. last 15 years) represented a large portion of the total documented predation events, have been observed being depredated by pinnipeds three times (Table 2). The first Pacific Lamprey (*Entosphenus tridentatus*) predation occurred last week (n = 2), but to date no lamprey have been documented crossing the dam.

The bulk of the predation has occurred by SSL, which is presumably a function of their increased and sustained presence at the dam relative to CSL (Fig. 2, Table 2). Two-thirds of the pinnipeds at the dam are SSL, and account for more than three-quarters of the fish predation events recorded. However, as of writing this report newly recruited and previously observed CSLs are arriving, indicating that the numbers will continue to grow in the coming weeks.

Species	SSL	CSL	Total
Chinook	120	33	153
Steelhead	29	9	38
Unknown	27	6	33
Other	5	2	7
White sturgeon	3	0	3
Lamprey	2	0	2
Total	186	50	**236**

*Table 2. Observed fish catches by pinniped at Bonneville dam through 28 April 2017. "Unknown" category contains catches that could not be identified and will be accounted for in the final analysis. The "Other" category includes fish not focal to our sampling, including but not limited to: Carp (Cyprinus carpio), American Shad (Alosa sapidissima), unidentifiable salmonid smolt, and Northern Pikeminnow (Ptychocheilus oregonensis). *Note: These numbers are raw and will be expanded to represent total estimated pinniped predation in the 2017 final report.*

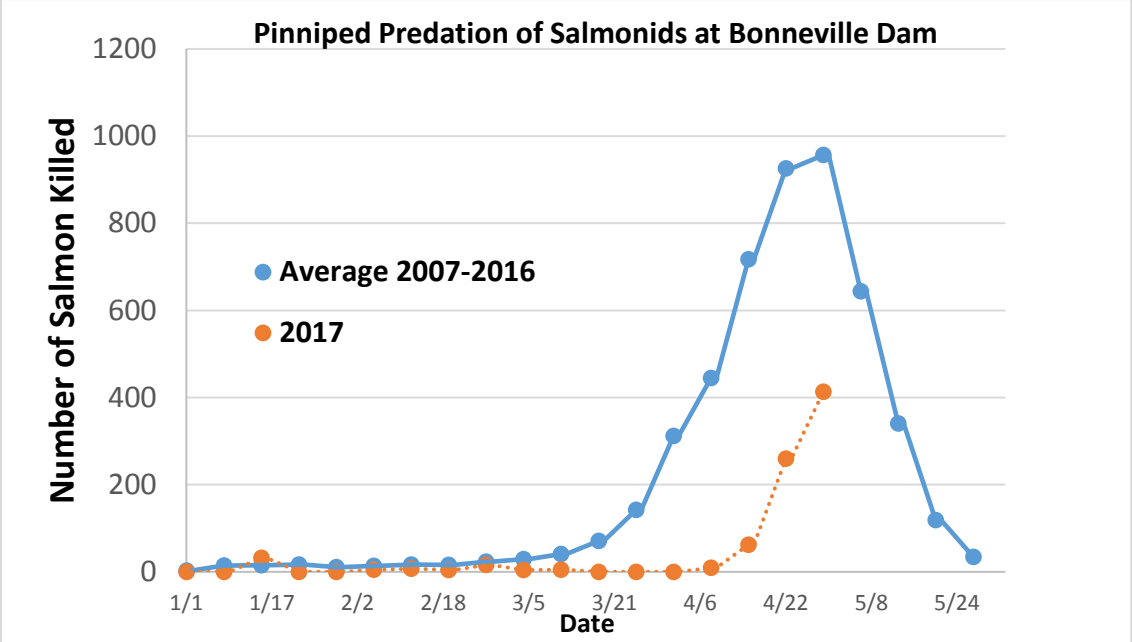

Figure 3. Comparison of estimated adult salmonid consumption by both species of pinniped at Bonneville Dam.

A review of the combined salmonid passage data for the month of April indicates that the 2017 passage was significantly less than the last ten year average (Fig. 4), however, in the last week the 2017 numbers are beginning to slightly increase. Collectively, these low numbers early on and recent increase of salmonid passage seem to coincide with the levels of predation and pinniped activity observed to date (Figures 2 & 4).

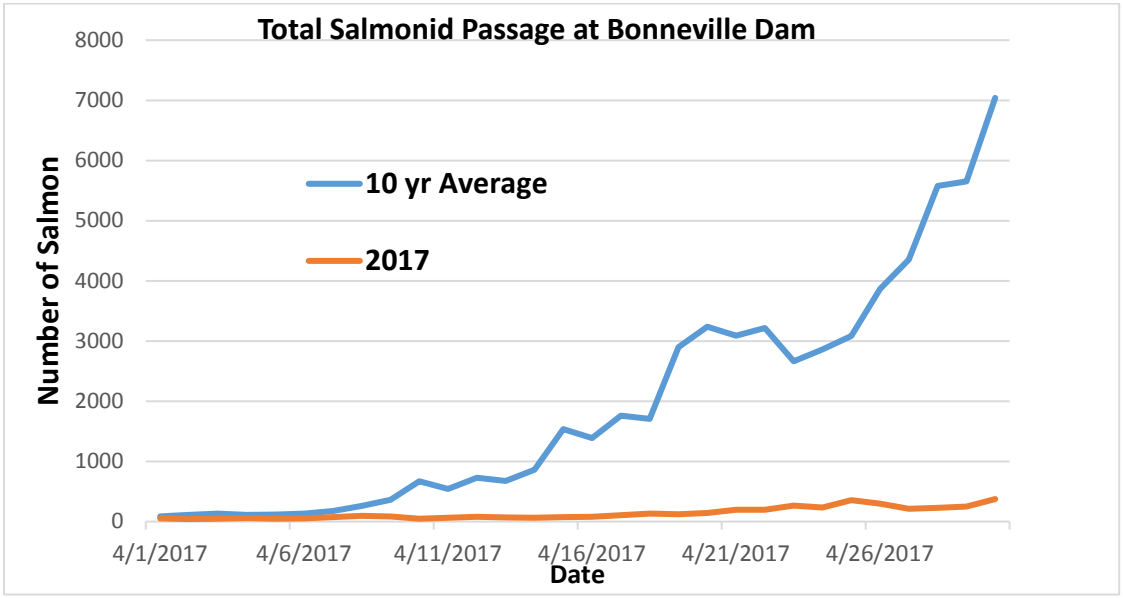

Figure 4. Number of combined salmonid species passing Bonneville Dam during the month of April.

PINNIPED DETERRENCE, TRAPPING, and SIGHTINGS ABOVE BONNEVILLE TAILRACES

Sea lion exclusion devices (SLEDs) have been deployed on all fish ladders since November 2016. In response to several Steller sea lions climbing over the floating orifice gates (FOGs) at powerhouse 2 last year, wood panels were placed on the top to prevent this behavior from recurring. This year one of the wood panels at Power House 2 was damaged and cannot currently be repaired due to high water. The high water in the tailraces have swelled the river such that the SLEDs were barely above water level, however, despite the high water and broken wood panel, no pinnipeds have been documented entering any of the fish ladders this monitoring season.

A CSL was observed transiting into the forebay on 23 April during a barge locking event. This animal was observed for two days in the forebay until it moved back through the navigation lock to the tailrace following an upstream locking event by the States.

We have also documented that the same uniquely identifiable CSL is at The Dalles Dam tailraces again this year. This animal is on the states removal list. His actions and movements are being monitored.

Boat-based hazing by Columbia River Inter-Tribal Fish Commission (CRITFC) began again on 24 April 2017. Dam-based hazing by USDA began on March 6 and continues seven days a week for 8 hour shifts during daylight hours.

The States have deployed the floating pinniped traps near Tower Island and have been operating them on a weekly basis. Reports of the trapping activities can be found here: http://www.dfw.state.or.us/fish/SeaLion/