

FALL AND WINTER UPDATE: PINNIPED ABUNDANCE AND SALMON PREDATION AT BONNEVILLE LOCK AND DAM

Fisheries Field Unit

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This is a status report for the 2018 fall and winter pinniped monitoring season and summarizes the observed fish predation and pinniped abundance at Bonneville Dam from 1 July through 10 October, 2018. Observations for the fall and winter period will continue through 31 December, 2018. A final report will be compiled thereafter. The traditional spring sampling period will begin 1 January, 2019 and continue through 31 May, 2019.

Previous reports and related PMP information can be found at the link below:

<http://pweb.crohms.org/tmt/documents/FPOM/2010/Task%20Groups/Task%20Group%20Pinnipeds/>

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 2019 Pinniped Monitoring Program will be available in the Spring of 2019.

BACKGROUND

Concerns regarding an increased number of pinnipeds at Bonneville Dam during the fall and winter and their potential associated impacts on endangered salmonids led to a request by NOAA to monitor the abundance and number of fish killed by these pinnipeds. In response to these concerns, and to fulfill the requirements set forth in the Federal Columbia River Power System Biological Opinion (NMFS 2000, 2008) – which outlines operational criteria for dams to protect ESA-listed fish – the U.S. Army Corps of Engineers, Fisheries Field Unit initiated a fall and winter pinniped monitoring program to fulfill the Reasonable and Prudent Alternatives outlined under the predation management strategy of the Biological Opinion and provide estimates of pinniped abundance, fish predation, and deterrence strategies. This progress report documents the pinniped monitoring activities at Bonneville Dam from their first arrival in the fall of 2018 through 10 October, 2018.

Similar to last year's fall monitoring period, we manipulated previously used spring-time sampling methods to fit the fall and winter conditions of the Columbia River system and started sampling the priority tailrace (as determined by planned winter outages) and sampled only that tailrace four hours per day in a stratified random fashion whenever the daily abundance counts were greater than 20 pinnipeds (as per study plan provided and approved by the NOAA, March 2017). The planned outages for winter maintenance in 2018 are to take place at Power House 2, and as such, Power House 1 tailrace was prioritized for fish predation observations. Methods and assumptions for observations and estimates of fish predation are captured in the previous year's annual report (Tidwell et al. 2018). These methods consist of visual observation of predation events that are incorporated by fish and pinniped species separately into a probability based estimation calculation to assess the mean level of predation each week. Bootstrap sampling of these estimates provide bounded estimates of predation by week, for each fish species, and by each species of pinniped. Due to the in-season nature of this update and the need to QA/QC data prior to analysis, the estimates provided here are the raw, unadjusted, and un-expanded estimates. Final (bounded) estimates will be provided after the season has completed and the data have been reviewed and analyzed.

Abundance estimates are made by sampling across and tailrace sites and known haul-out sites on Bonneville Project in the early morning hours when animals are most easily observed. Each site is independently counted and aggregated to provide a project wide estimate of pinnipeds each day. Counts are interpolated across weekends.

Thus, the data provided herein, are the daily project wide abundance estimates and the raw number of observed fish killed in Power House 1 tailrace only. A final report with expanded fish predation estimates will be available after 31 December, 2018.

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: 14 July – 10 October, 2018

Following the departure of the last observed pinniped on 14 June, 2018, the first Steller Sea Lion (SSL; *Eumetopias jubatus*) returned to BON on July 14, 2018. No California Sea Lions (CSL; *Zalophus californianus*) have returned to Bonneville Dam since the spring departure (Figure 1). The most abundant species in the tailrace continues to be the SSL with an average daily abundance of $16.7 \pm SD 11.1$ (Table 1), an average that is higher than the 10-year average (Figure 1). No harbor seals (*Phoca vitulina*) have been observed since January 24, 2018.

To date, we have documented 39 SSL as uniquely identifiable individuals. The number of individually identifiable pinnipeds is difficult to estimate due to the low number of branded SSL that are present at Bonneville Dam. The number of unique individuals for this period is at least 39 given the high count on 27 September, 2018, but the number of individually identifiable SSL based on brands and unique markers is 11 animals.

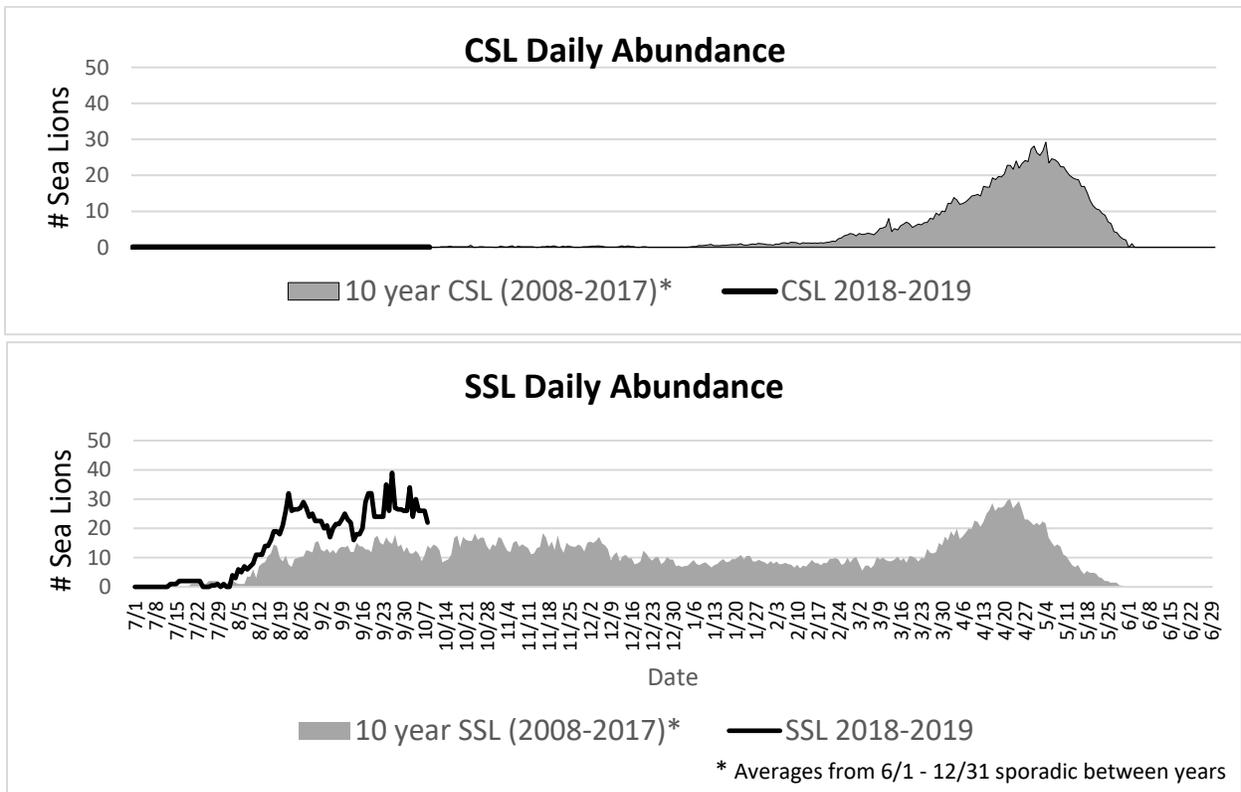


Figure 1. Comparison of estimated abundance of each pinniped species at Bonneville Dam between the 10 year running average and the current year.

Species	$\bar{x} \pm S.D.$	Range	$n = 0$
SSL	16.7 ± 11.1	0 - 39	0
CSL	-	-	-

Table 1. Interpolated daily minimum counts of pinnipeds at Bonneville Dam tailraces between 14 July and 10 October, 2018.

FISH PASSAGE & PREDATION

A review of the combined salmonid passage during the fall sampling period, to date, shows that the run was below the 10 year average (Figure 2). The arrival of the first pinnipeds at Bonneville Dam in mid-July coincides with the beginning of the fall run.

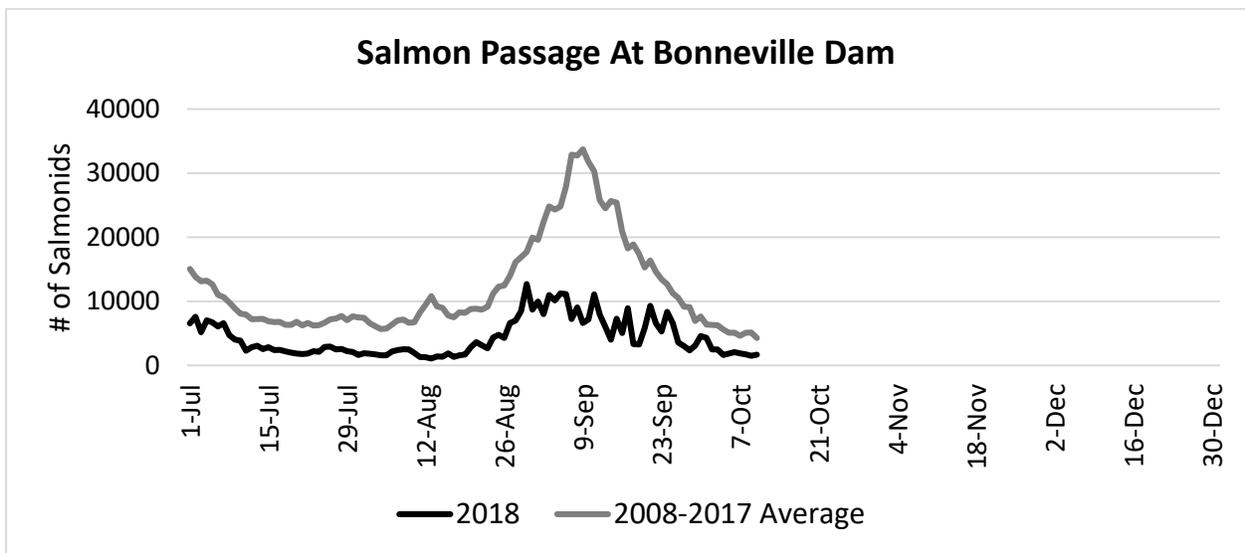


Figure 2. Comparison of the ten year average and current passage of all salmonids over Bonneville Dam between 1 July and 10 October. Data obtained from USACE, FPC – www.FPC.org.

Predation sampling began on 15 August when pinniped abundance was greater than or equal to 20 animals each day. From 15 August to 10 October, 2018 a total of 59 Chinook salmon (*Oncorhynchus tshawytscha*), 15 Coho (*Oncorhynchus kisutch*), 35 Steelhead (*Oncorhynchus mykiss*) and 58 White Sturgeon (*Acipenser transmontanus*) have been documented being killed by pinnipeds in the Power House 1 tailrace (Table 2). Upon review and expansion for hours not observed and unknown fish predation events, the estimated number of fish killed will increase.

Fish Predation: 15 August – 10 October, 2018

Species	Chinook	Coho	Steelhead	Sturgeon	Lamprey	Other	Unknown	Total
SSL	59	15	35	58	0	23	64	254

Table 2. Observed fish consumption by both species of pinniped at Bonneville Dam from 15 August – 10 October, 2018.

DISCUSSION

Relative to fall and winter monitoring conducted last year, SSLs returned on an earlier date (i.e. 14 days earlier) and have been increasing in abundance at a greater rate. Due to the increased abundance and residence, more fish predation sampling has been required (i.e. ≥ 20 animals/day). The result of this has been continuous abundance monitoring, and higher levels of sampling effort since 15 August to provide the pinniped predation estimates, which will continue until abundance drops below the 20 animal trigger.

LITERATURE

NMFS (National Marine Fisheries Service). 2000. Federal Columbia River Power System Biological Opinion.

NMFS (National Marine Fisheries Service). 2008. Federal Columbia River Power System Biological Opinion.

Tidwell, K.S., B.K. van der Leeuw, L.N. Magill, B.A. Carrothers, and R. H. Wertheimer. 2018. Evaluation of pinniped predation on adult salmonids and other fish in the Bonneville Dam tailrace, 2017. U.S. Army Corps of Engineers, Portland District Fisheries Field Unit. Cascade Locks, OR. 54pp.