



**US Army Corps  
of Engineers®**

Portland District

USACE PMP Update – 31 January 2019

---

## **JANUARY UPDATE: PINNIPED ABUNDANCE AND SALMON PREDATION AT BONNEVILLE LOCK AND DAM**

Fisheries Field Unit

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

Correspondence: [Kyle.S.Tidwell@usace.army.mil](mailto:Kyle.S.Tidwell@usace.army.mil)

This is a monthly status report for the pinniped monitoring program at Bonneville Dam and summarizes the observed fish predation and pinniped abundance at Bonneville Dam from 08 December, 2018 through 31 January, 2019. Observations will continue through 31 May 2019, with monthly updates provided throughout the season. A final report will be compiled thereafter.

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 fall of 2019.*



**US Army Corps  
of Engineers®**

Portland District

USACE PMP Update – 31 January 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, the Fisheries Field Unit initiated a fall and winter pinniped monitoring program to fulfill the Reasonable and Prudent Alternatives defined in the predation management strategy of the Biological Opinion and to provide estimates of pinniped abundance, fish predation, and deterrence strategies. This progress report documents the monitoring of pinniped activities at Bonneville Dam from 08 December, 2018 through 31 January, 2019.

Similar to last year's fall and winter monitoring period, we manipulated previously used spring sampling methods to fit the fall and winter conditions of the Columbia River system. We sampled 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 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 through 31 December, 2018.

The spring sampling period began on 1 January, 2019. As such, both power house tailraces are now being monitored using the same stratified random fashion with the four sampling hours being spread across the two tailraces. 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.

Estimates of abundance are made by sampling across the tailrace and at 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 and holidays.



**US Army Corps  
of Engineers®**

Portland District

USACE PMP Update – 31 January 2019

---

Thus, the data provided herein, are the daily project wide abundance estimates and the raw number of observed fish killed between 08 December 2018 and 31 January 2019. A final report with expanded fish predation estimates will be available after 31 May, 2019.

### **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: 08 December, 2018 – 31 January, 2019***

Following the departure of the last pinniped in the spring (i.e. 02 June 2018), the first Steller Sea Lion (SSL; *Eumetopias jubatus*) returned to BON on July 14, 2018 and have been observed at the dam every day since. The first California Sea Lions (CSL; *Zalophus californianus*) were observed on 05 November, 2018 (Figure 1). The most abundant species in the tailrace continues to be the SSL with an average daily abundance of  $7.9 \pm \text{SD } 4.8$  (Table 1), which has dropped below the 10-year average for this time period (Figure 1). The average daily abundance of CSLs in the tailrace was  $0.04 \pm \text{SD } 0.2$  which is also lower than the 10-year average. No harbor seals (*Phoca vitulina*) have been observed since 24 January, 2018.

To date, we have documented 24 SSLs as uniquely identifiable individuals. The number of unique individuals for this period is at least 24, given the high count on 08 December, 2018, but the number of individually identifiable SSL based on brands and unique markers is 12 animals. The number of individually identifiable pinnipeds is difficult to estimate due to the limited branding effort for the SSL.

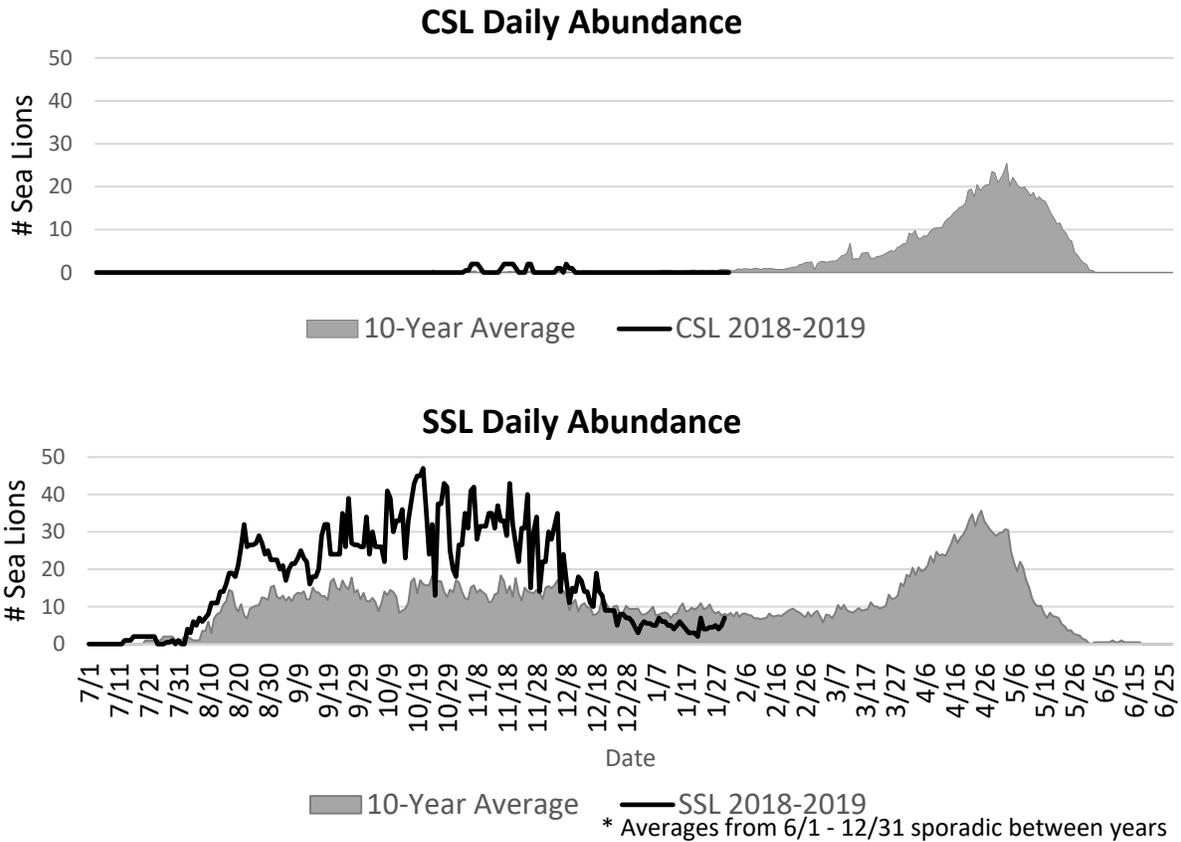


Figure 1. Comparison of estimated abundance of each pinniped species at Bonneville Dam between the 10 year running average and the current year.

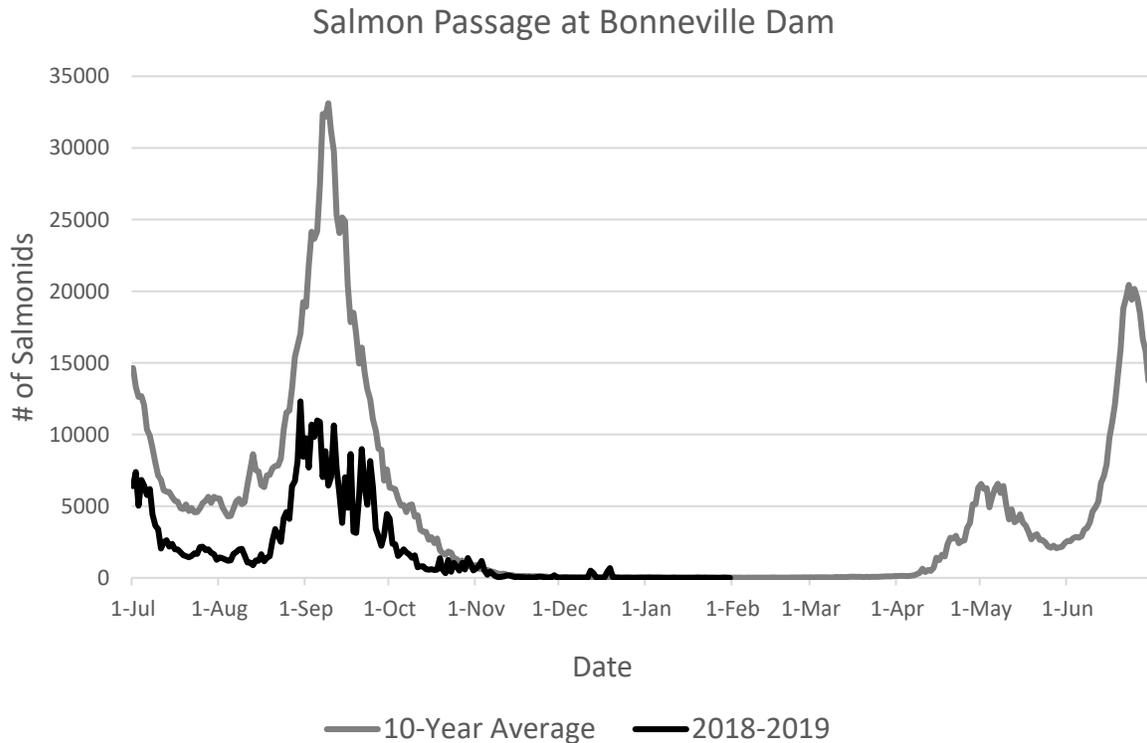
Table 1. Interpolated daily minimum counts of pinnipeds at Bonneville Dam tailraces between 08 December, 2018 and 31 January, 2019.

Species	$\bar{x} \pm S.D.$	Range	$n = 0$
SSL	$7.9 \pm 4.8$	2 - 24	0
CSL	$0.04 \pm 0.2$	0 - 1	53



**FISH PASSAGE & PREDATION**

A spike in Coho Salmon passage in mid-December brought salmonid passage above the 10-year average for December. However, salmonid passage in January was below the 10-year average (Figure 2).



*Figure 2. Comparison of the ten year average and current passage of all salmonids over Bonneville Dam between 08 December, 2018 and 31 January, 2019. Data obtained from USACE, FPC – [www.FPC.org](http://www.FPC.org).*

***Fish Predation: 08 December, 2018 – 31 January, 2019***

Predation sampling began on 15 August when pinniped abundance was greater than or equal to 20 animals each day and predation monitoring has continued since then. From 08 December, 2018 to 31 January, 2019, a total of one Chinook Salmon (*Oncorhynchus*



*tshawytscha*), four Coho Salmon (*Oncorhynchus kisutch*), 11 steelhead (*Oncorhynchus mykiss*), and three White Sturgeon (*Acipenser transmontanus*) have been documented being killed by pinnipeds (Table 2). Of the 11 catches that were classified as “Other,” one was a bass (likely Smallmouth Bass: *Micropterus dolomieu*), four were Chum Salmon (*Oncorhynchus keta*), one was a Walleye (*Sander vitreus*), and the other five were not identified. Upon review and expansion for hours not observed and unknown fish predation events, the estimated number of fish killed will increase.

Table 2. Observed fish consumption by both species of pinniped at Bonneville Dam from 08 December, 2018 and 31 January, 2019.

Species	Chinook	Coho	Steelhead	Sturgeon	Lamprey	Other	Unknown	Total
SSL	1	4	11	3	0	11	13	43
CSL	0	0	0	0	0	0	0	0
Total	1	4	11	3	0	11	13	43

### **DISCUSSION**

Relative to the 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.  $\geq 20$  animals/day threshold for sampling). The result of this has been continuous predation monitoring since 15 August 2018 which will continue until the end date of 31 May, 2019 is reached.

### **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.