

PINNIPED PREDATION AND DETERRENT EVALUATION AT BONNEVILLE DAM

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ABSTRACT:

Since 2002, we have used surface observations to meet three objectives: (1) estimate the number of adult salmonids (*Oncorhynchus* spp.) and other fish consumed by pinnipeds in the Bonneville Dam tailrace and estimate the proportion of the January-May adult salmonid run impacted; (2) determine the seasonal timing and abundance of pinnipeds at Bonneville Dam, documenting individual California sea lion (*Zalophus californianus*) presence and predation activity when possible; and (3) evaluate the effectiveness of pinniped deterrents used at Bonneville Dam.

Pinniped predation on salmonids has increased almost every year, with an estimated 4,489 (2.4% of the run) salmonids taken in 2009. When adjusted for unidentified catch, the estimate was 4,960 (2.7%). Chinook salmon (*O. tshawytscha*) was the most commonly identified prey species, while Pacific lamprey (*Lampetra tridentata*) comprised only 1.4% (102) of observed catch, the lowest proportion we have recorded in eight years of monitoring. Steller sea lions (*Eumetopias jubatus*) continued to be the dominant white sturgeon (*Acipenser transmontanus*) predator in the area, taking 95.1% of the 1,241 estimated sturgeon catches in 2009 (1,710 adjusted estimate) and estimates through March 3, 2010 are already higher (1,315 estimated).

Only 54 California sea lions were observed in 2009, the fewest since 2002, while at least 26 Steller sea lions were observed (and 33 in 2010). Only 2 harbor seals (*Phoca vitulina*) were documented during the study period. The highest number of pinnipeds counted on any one day was 47 (April 21) which was the lower than the past two years.

Physical barriers, including sea lion exclusion devices (SLEDs) and floating orifice gate (FOG) barriers, prevented sea lions from entering the fishways, but acoustic deterrents installed near fishway entrances continued to have no visible effect on the sea lions. During daylight hours, dam-based and boat-based crews from partnering agencies used non-lethal pyrotechnics and rubber bullets to haze sea lions in the dam tailrace. Hazing did appear to temporarily alter the behavior of some sea lions, but hazing efforts did not reverse the upward trend in predation estimates.

The Oregon and Washington Fish and Wildlife departments used four floating sea lion traps to capture, then either mark and release or permanently remove sea lions since 2008. In 2008 11 California sea lions were captured, seven were removed as authorized by NOAA under Section 120 of the Marine Mammal Protection Act, and four were processed (measured, weighed, marked with a 3-digit brand) and released. Four California sea lions and two Steller sea lions died on traps under unknown circumstances on May 4, 2008, halting trapping operations for the season. In 2009 15 California sea lions were removed and 6 were processed and released. In 2010, as of March 9, six California sea lions were removed and two processed and released.