Avian predation at John Day Dam 2009: Estimated fish consumption using direct observation with diet analysis.

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ABSTRACT

In 2006 US Army Corps of Engineer project biologists reported a sharp increase in the number of gulls (*Larus spp.*) feeding in the John Day Dam tailrace. As this dam recently failed to meet its Biologic Opinion required survival goals for ESA listed salmonid passage increased avian predation is a concern. The Fish Field Unit was tasked with determining the impact of avian predators on fish passing the dam in 2009. We laid out four objectives: 1) Determine species composition, number, and spatial distribution of piscivorous avian predators; 2) Estimate smolt consumption by gulls; 3) Compare consumption by gulls among zones protected and not protected by avian lines.

To quantify avian consumption observers used binoculars to count gulls, the number of attacks (dives), and determine if an attack was successful (fish in bill) over the May to June peak smolt outmigration. We then estimated salmonid consumption using those variables and diet information from weekly gull stomach collections. Additionally, counts were collected on a much smaller population of other fish eating birds including grebes, pelicans, cormorants, and others.

The daily abundance of gulls beginning 4 May increased from 71 to a high of 314 on 1 June and dropped to a low of 8 gulls by 28 July with a seasonal mean of 98. The daily abundance was bimodal beginning with a morning low of 4 gulls during the 0400 hour, rising to the first peak of 84 (0900 hour), dropping to 41 (1000 hour), and rising again to 103 (1700 hour), then dropping to an evening low of 16 (2100 hour).

Overall, 127 California Gull (*Larus californicus*) stomachs were collected of which 49 contained freshly eaten fish, revealing a 97% salmonid diet. We found 129 salmonids, dominantly Chinook, four macropthalmia, ("silver" *Lampetra tridentate*), and one unknown fish as well as 4 PIT tags and one sonic tag. Other identified gut contents included terrestrial and aquatic insects, berry seeds, other vegetations, and french fries, with bones and pebbles found in the lower gut (gizzard).

Estimates of smolt consumption, which includes additive and compensatory sources of mortality, were 80,000 ± 30,000 (95% CI) or between 1.3 and 2.9% of the John Day

smolt passage index during the three month study (ca. 3.8 million smolt). Smolt consumption by gulls was spatially uneven ($X^2_{0.05,\,7}$, p-value < 0.001). It was greatest in two uncovered and one partially covered zone, all immediately down stream of the dam on the spillway side and less in all other zones.