

DAMMED TO EXTINCTION?

THE PRECARIOUS STATUS OF SOUTHERN RESIDENT KILLER WHALES

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ABSTRACT

As a 12-year-old with a keen eye to the planet's future, I have become involved in a flagship environmental issue for the region in which I live: Southern Resident Killer Whales (SRKW, *Orcinus orca*). Here, we review the status of this endangered population. The current estimate of abundance for SRKW is 73 animals in 3 pods, down from 98 in 1995. Reproduction is low, with only 6 calves born since 2015. 42% of neonates do not survive the first few critical years of life. We have since estimated that the pregnancy loss rate in utero is close to 70%. (Wasser, et al.) Also, recent aerial photogrammetric images have shown that the body condition of some individuals is poor and indicative of nutritional stress. Various factors have been invoked to explain the decline in SRKW, including pollution, noise, harassment from whale watching vessels, and insufficient prey. Of these, the lack of prey is widely regarded as the main factor affecting recovery. SRKW preferentially target fat-rich Chinook salmon (*Oncorhynchus tshawytscha*), the abundance of which has declined, in large part because of anthropogenic degradation of habitat. In Puget Sound, only 22 of at least 37 historic Chinook populations remain. The remaining wild Chinook salmon are at 10% of historic numbers. The single most effective conservation action to assist SRKW would be breaching of four dams on the Snake River to restore free passage of spawning and juvenile salmon; yet despite broad agreement on the importance of this, it remains seemingly politically intractable. Considerable funding has been proposed by the Governor of Washington State for SRKW recovery, but unless salmon populations are restored, SRKW will likely continue to decline.

OVERVIEW

Southern Resident Killer Whales (SRKW) range from Canada to California. Heavily impacted by captures for public display in the 1960s and 1970s, their abundance was close to 100 animals in 1995, but they have since declined to 73 in 2019, with low reproduction and juvenile survival (Figure 1). Designated by the U.S. as critically endangered in 2005, various causes for the decline have been proposed, including pollution, noise, and harassment from vessel traffic. However, these factors also apply to the mammal-eating transient type (Bigg's killer whales), which appear to be thriving. It is increasingly accepted that the major issue underlying the SRKW decline is insufficient abundance of their primary salmonid prey.

Eighty percent of the diet of SRKW consists of fat-rich Chinook (king) salmon (Figure 2) runs, of which are at an estimated 10% of historic numbers. SRKW abundance and mortality appears to be broadly correlated with Chinook abundance (Figure 3), and some individuals exhibit poor body condition that is almost certainly related to nutritional stress (Figure 4). Prey availability is likely further compromised by predation from increasing pinniped populations.

Consequently, restoring salmon runs is likely to be the single-most effective means of promoting SRKW recovery, but this is hampered by politics relating to dams on a historically important river system.

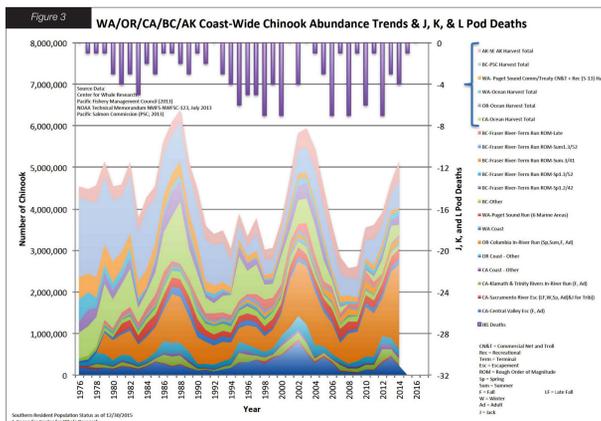
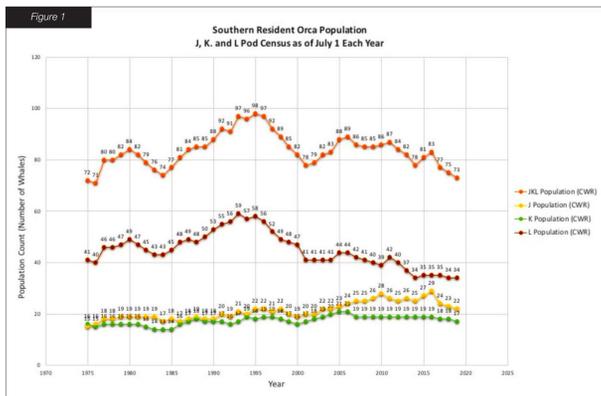
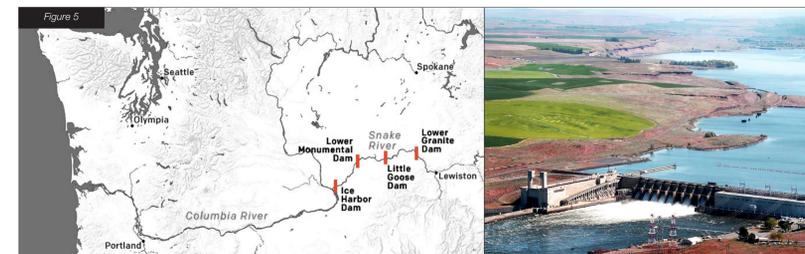


Figure 4. Images of SRKW individual J-15, showing decline in body condition over a four-year period (photo: John Durban & Holly Fearbach).

THE SNAKE RIVER DAMS



The Snake River and associated Columbia River system were once critical spawning habitat for millions of salmon, but damming and other human impacts has radically transformed these rivers and caused untold damage to fish populations. The four dams on the lower Snake River were built to create a navigable channel from the river mouth to the beginning of Hell's Canyon (Figure 5). Together, they form a cascade of shallow reservoirs with no free-flowing water between. This results in static water that is too warm for salmon: for example, 96% of returning Sockeye salmon died in 2015. Power generation from these aging dams is no longer critical for the region and is largely sold for surplus; it is being increasingly replaced by green alternatives.

A model generated by the Environmental Protection Agency showed that a free-flowing Snake River after dam removal would run at temperatures acceptable to returning salmon even with high air temperatures (Keefer and Caudill 2015; Shultz & Johnson 2015).

The four Lower Snake River Dams are man-made structures with a finite lifetime; they are part of the problematic aging U.S. infrastructure that requires more money for maintenance every year. Despite the logic of removing them, there remains considerable opposition to this action. What is truly at stake are the hundreds of millions of dollars per year in federal (taxpayer) financing of dam and lock operations and maintenance, dredging, turbine replacement (the turbines are at their life expectancy), plus the vastly expensive attempts at mitigation (fish weirs, sluices, barging fish, etc.) to reduce the mortality of juvenile salmon. That massive federal payout has supported the pro-dam lobbies and funded the campaigns of pro-dam politicians.

Removing these four dams would restore the lower Snake River to a functional habitat, and potentially allow a slow recovery of the 13 endangered salmon and steelhead trout populations that historically relied on the river for spawning. In so doing, it would also give Southern Resident Killer Whales the best chance of recovering so that they will continue to be a significant feature of the marine ecosystem for future generations.

More information: <https://www.wildsalmon.org/facts-and-information/myths-and-facts-about-lower-snake-river-dam-removal.html>

KEY POINTS

Southern Resident Killer Whales are in decline, with low abundance, reproduction and juvenile survival.

Decline in prey availability (notably Chinook salmon) from habitat loss is the principal cause; predation by increasing pinnipeds likely exacerbates this factor.

Poor body condition of some individuals is consistent with **nutritional stress**.

The single-most effective measure to promote SRKW recovery would be restoration of salmon habitat, notably through **breaching of the four dams** on the Lower Snake River.

While dam removal would not significantly affect power generation, politics and money currently make this **solution difficult to implement**.

More information: <https://www.wildsalmon.org/facts-and-information/myths-and-facts-about-lower-snake-river-dam-removal.html>

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