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Southern Resident killer whales: from captivity to conservation

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Speaker

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Southern Resident Killer Whales: From Captivity to Conservation

Colleen Weiler¹, Rob Lott¹, Erich Hoyt¹, D.A. Giles², Giulia Good-Stefani³, Francine Kershaw³, Howard Garrett⁴, Susan Berta⁴, Rein Attemann⁵

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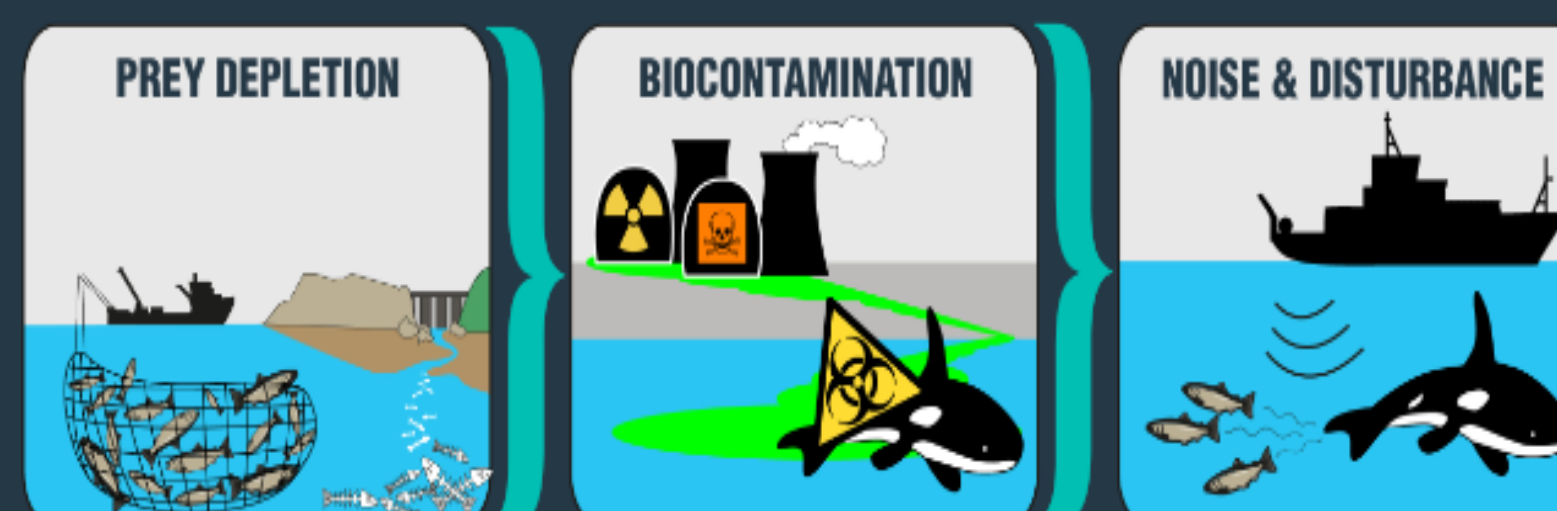


The Legacy of Captivity

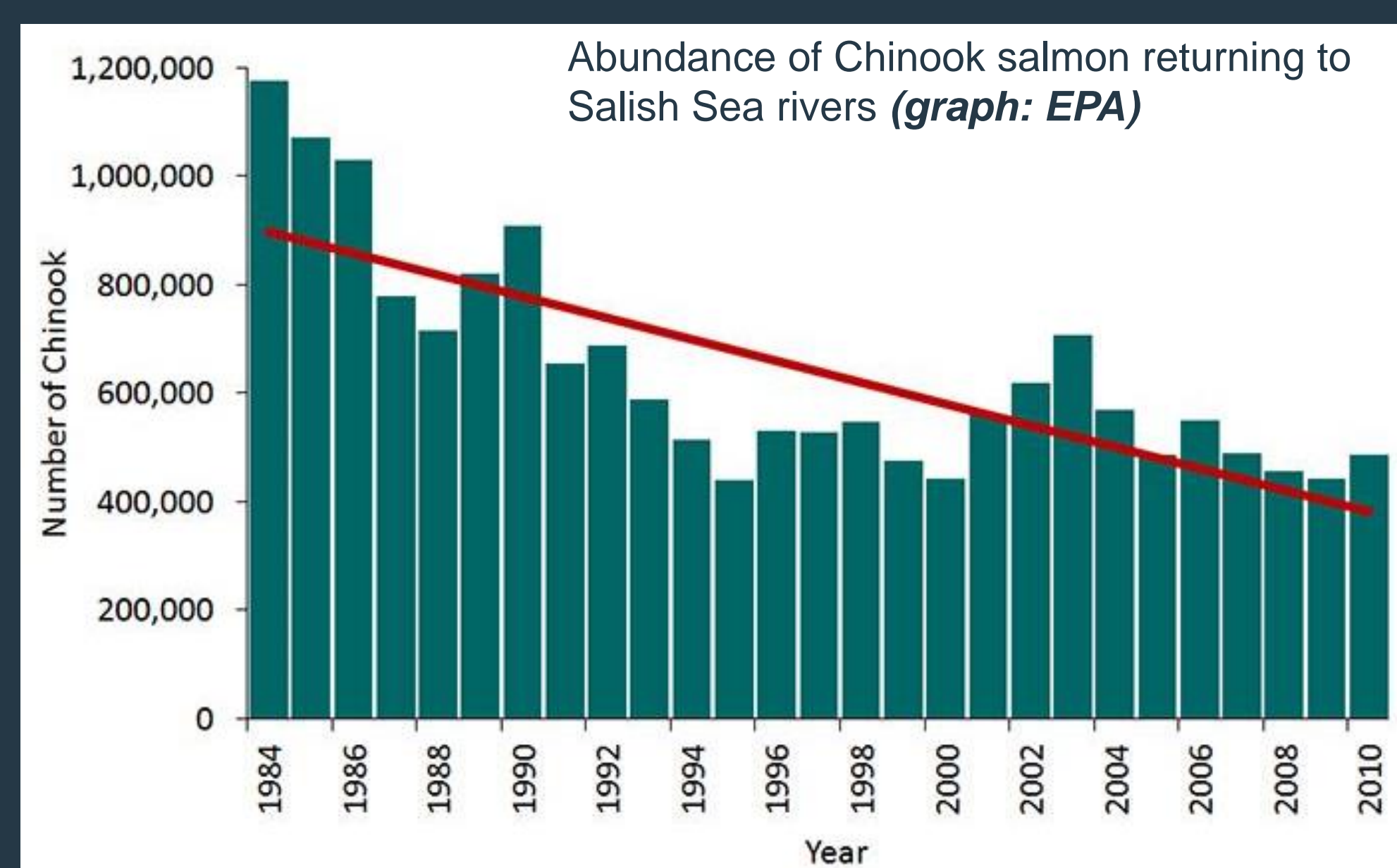
Between 1962 and 1977, at least 275 (up to 307) killer whales were captured in the waters off Washington State and British Columbia. At least 47 individual SRKWs were sold to marine parks or died during the capture effort - approximately 40% of their population. Juveniles were disproportionately targeted, effectively removing an entire generation. From an estimated historic size of more than 200 whales, the SRKWs had just 70 individuals in 1974.



The Rise of Modern Threats



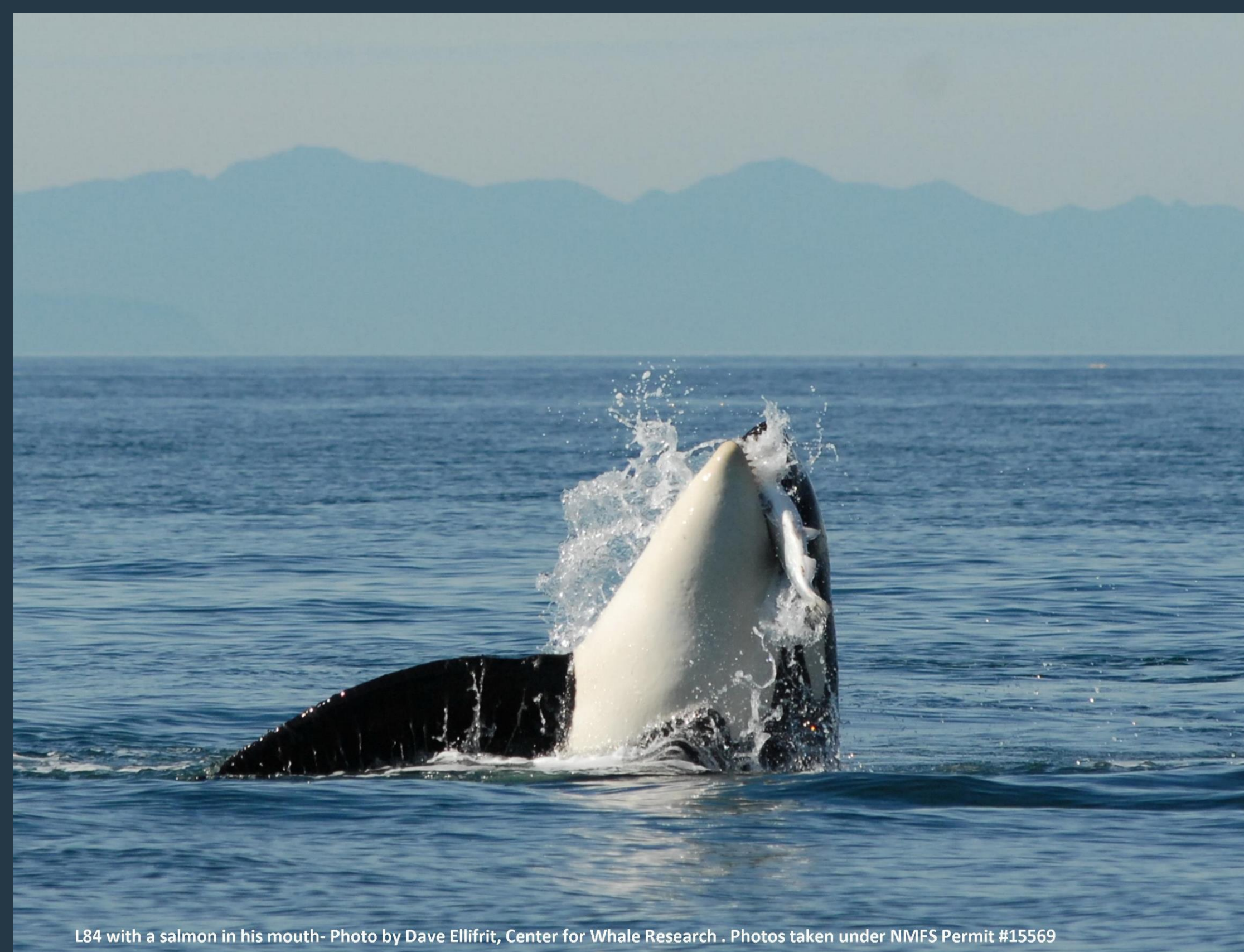
While capture efforts directly decreased the SRKW population, new threats to their survival emerged. The cumulative impact of these threats causes a negative feedback loop, further impeding recovery and increasing stress. A lack of prey causes individuals to metabolize blubber, releasing stored contaminants and compromising reproductive and immune systems. Research indicates that about 69% of detected pregnancies were lost due to nutritional stress; other studies have found correlations between declining salmon stocks and high SRKW mortality rates.



ABSTRACT

The endangered Southern Resident killer whale (*Orcinus orca*) (SRKW) population remains the only killer whale population listed under the United States Endangered Species Act in U.S. waters since it was added in 2005. In the 1960s and 70s, the population was reduced by approximately 40% following intensive efforts to capture individuals for a growing marine park captivity industry. The first Northwest killer whale census (1974) found just 70 remaining individuals in the SRKW community. This population has struggled to return to pre-capture numbers, and in the face of new threats including prey depletion, toxic contamination, and vessel effects, fewer than 80 individuals remain today. Over the last 40 years, this unique killer whale community has transitioned from targets of the captivity industry to one of the most iconic wild species of the Pacific Northwest, but is now desperately in need of meaningful and effective conservation efforts. As threats to this population have changed, environmental and advocacy groups have revised their strategies from a focus on separate issues to a recognition of the need for an ecosystem approach to ensure the long-term recovery and survival of these iconic killer whales. Recent research indicates that ecosystem-based efforts drive quicker recovery of ecosystems and endangered species. This innovative method has led to new partnerships with groups from disparate backgrounds working together to address multiple issues in the Pacific Northwest to recover the SRKWs and their habitat - in particular addressing the threat of prey depletion for the SRKWs by working for salmon restoration. By focusing on the role of whales in the ecosystem and their needs, we can increase conservation efforts for the SRKWs and demonstrate the potential of ecosystem-based management.

Southern Resident Killer Whales



184 with a salmon in his mouth- Photo by Dave Ellifrit, Center for Whale Research. Photos taken under NMFS Permit #15569

A *Distinct Population Segment* of killer whales in the Eastern North Pacific
 Three pods: J, K and L
Range: Central California to Southeast Alaska; Salish Sea
Diet: fish, predominantly Chinook salmon (79.5% of summer diet)
Status: *critically endangered*
Threats: Prey depletion, toxic contamination, vessel effects (noise and harassment), oil spill risk, small population size (disease and inbreeding)
As of October 1st, 2017: 76 individuals remaining
J pod:23, K pod:18, L pod:35

The Orca Salmon Alliance

- A diverse coalition of research and advocacy groups working together to address the decline of SRKWs and salmon in the PNW by protecting the entire ecosystem.
- Focuses on the interactions and connections between ecosystem elements and offers a new perspective on conservation issues.
- Encourages new partnerships and collaborative efforts between multiple sectors: advocates, managers, and policy-makers.
- Works to increase knowledge and improve communication about the source of threats and create new opportunities for involvement.
- Creates public knowledge and engagement to influence policy.



Ecosystem-based Recovery

Ecosystems are complex, and recovery requires a holistic approach based in environmental knowledge, with coordination and partnerships between agencies and sectors, public education and involvement, connections between science and policy, and adaptive management. Isolated, single-issue management does not address the source of threats and does not contribute to long-term survival.

Endangered Species Act: "The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved..." (ESA section 2(b))

Marine Mammal Protection Act: "...efforts should be made to protect essential habitats... from the adverse effects of human actions" (MMPA section 2(2))

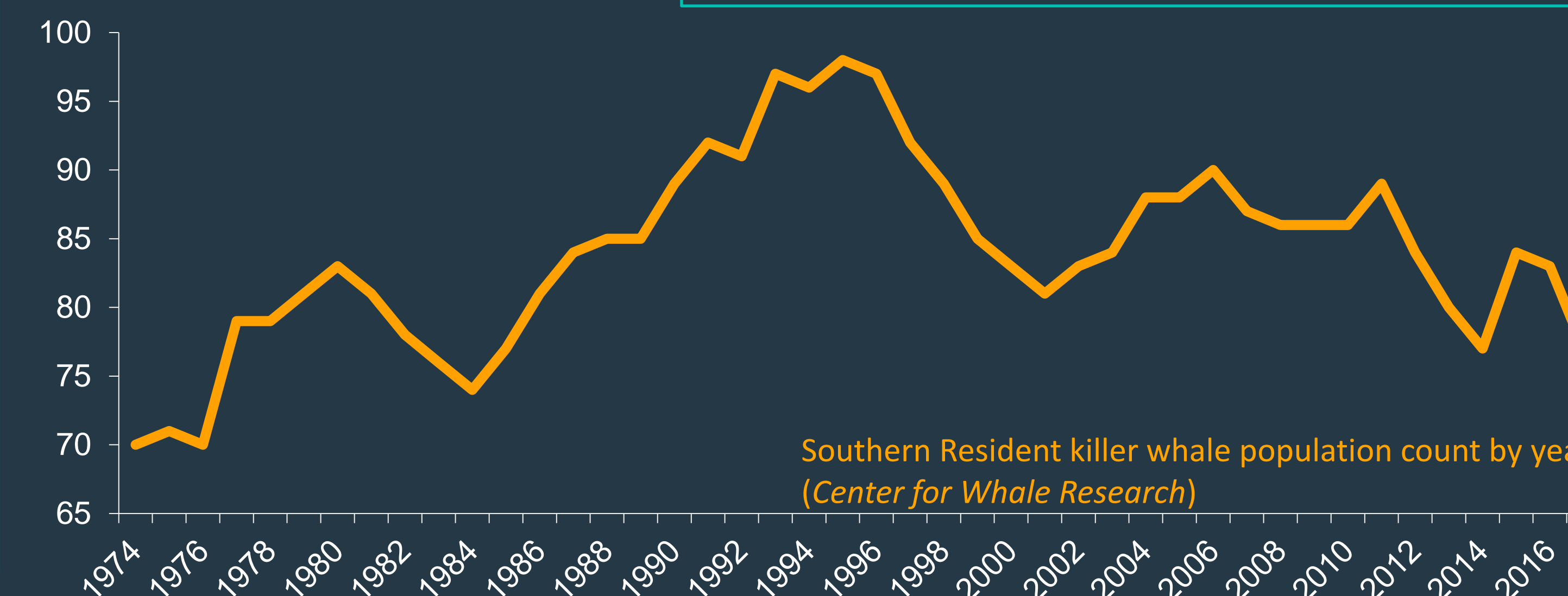
US Commission of Ocean Policy: "A comprehensive and coordinated national ocean policy requires moving away from the current fragmented, single-issue way of doing business and toward ecosystem-based management."

Ecosystem approach to endangered species recovery: Southern Resident killer whales and salmon

- Recognize and address cumulative impacts.
- Research indicates that restoring predator and prey species together is almost always more efficient than sequential recovery. **The sequence of restoration matters when one target is eaten by another.** "Slow or failed recoveries may be the result of predator-first approaches in which specialist predators do not have access to a readily available and abundant prey base." (Samhuri et al. 2017).
- Habitat restoration** benefits salmon and helps to reduce toxin loads.
- Critical habitat designation creates the "umbrella effect" of additional protection for important prey species.
- Ecosystem recovery is necessary to ensure long-term survival of the SRKWs, but their decline and critical status requires EBM to be paired with short-term, immediate impact actions.

Recommendations:

- Immediate measures to improve salmon survival** (spill, floodgates, culverts) and local availability, and continued efforts to rebuild wild salmon populations (habitat, long-term dam operations).
- Interagency and transboundary cooperation** to address salmon, habitat, and pollution.
- Apply research to developing concrete actions through **adaptive management**.
- Expand critical habitat and identify **essential habitat features**.
- Address **point and non-point** source pollution.
- Develop and enact **measurable, ecologically relevant** noise reduction goals.



Estimated birth year of Granny, oldest known killer whale 1911	1916 Dam construction begins in Klamath Basin	1933 Dam construction begins in Columbia Basin	1945 DDT now available for widespread use	1960s DDT and PCBs reach peak concentrations in Puget Sound; rise of commercial shipping begins	1962 WA State capture era begins; dam construction starts on Snake River	1964 Last of the four Klamath River dams completed	1971 Columbia River mainstem dams completed	1975 Four Lower Snake River dams finished	1974 First orca census counts just 70 SRKWs	1976 WA State bans live captures; Orca Survey begins	1979 U.S. bans PCBs	1995 98 SRKWs, highest count in 40+ years	2002 Stockholm Convention on POPs signed	2002 SRKWs listed under Species at Risk Act (SARA) in Canada	2005 Listed under Endangered Species Act in U.S.	2006 U.S. establishes critical habitat	2008 NMFS Recovery Plan is published; WA state restricts PBDES	2009 Ambient ocean noise has increased by up to 12 dB since 1960s	2011 Dept. of Fisheries and Oceans Recovery plan published; NMFS enacts vessel regulations; Elwha River dam removal begins	2012 WA State matches vessel regulations	2016 Granny dies, estimated 105 years old	2017 Nine deaths in past two years, 0 successful births. 76 SRKWs remain
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