Restoring the Lower Snake River

Environmental Anthology

It just makes
DAM SENSE!
DAMSENSE.ORG

DamSense is a coalition of diverse interests—anglers, recreationists, engineers, families, businesses and economists—advocating for fact-based, economically sensible use of the lower Snake River. We are a force for truth and a catalyst for change, and we hold local, state, and federal government agencies accountable for serving the public interest and protecting the public purse.

We support revitalizing local economies, sustaining natural resources, preventing extinction of iconic Northwest species, and returning the lower Snake River to its rightful owners: Native American people.

"The four lower Snake River dams are man-made structures with a finite lifetime. They are part of the problematic aging U.S. infrastructure which requires more money for maintenance each year. Although these dams will be breached in the future, they are economically unsustainable today. It's simply a matter of time before the responsible federal agencies admit it. So, the question is, when the dams come down, will the salmon and Southern Resident Killer Whales still be with us? Extinction is forever; dams are not."

~DamSense

"We are all intricately connected, from tiny plankton to forage fish, salmon, orcas, tall firs and cedars, mountains, rivers, and the ocean. It is time to reflect, to reconnect, and to respond as better caretakers of our planet."

~Susan Berta Orca Network

Environmental Anthology

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Forward

After a 35-year career as a Civil Engineer with the U.S. Army Corps of Engineers (the Corps), I began dedicating my retirement time and energy to reviewing the government documents related to the biological and economic reasons for breaching the 4 lower Snake River Dams (4LSRD) in eastern Washington. The Corps' 2002 lower Snake River Feasibility Report and Environmental Impact Statement (EIS) is the major source document I studied. The 5,000 page EIS, which is the product of a seven year $33 million study, offers four alternatives from which to choose the most reasonable and prudent method to improve juvenile salmon passage over the 4LSRD. Of the four alternatives, do nothing to the dams was determined to be slightly better than either of the two non-breach alternatives: (1) transporting juveniles fish around the dams in barges and (2) building additional fish passage systems at the dams. Even though not selected, breaching the earthen berms to by-pass natural river flow around the remaining concrete structure was and still is the environmentally preferred alternative. However, this fourth alternative was deemed to be "not necessary at this time." Consequently, the two non-breach alternatives were implemented at what has added up to at least $1 billion.

Over the past five years, I've dedicated myself to in depth comprehensive research into biological, economic, and policy data in order to understand, correct, and update the 2002 EIS and other government documents with well researched comprehensive data. These corrections and updates repeatedly reveal breaching as the only viable solution to save money, salmon, and orca. I welcome every opportunity to share my research in order to inform and educate agency officials, elected leaders, non-government organizations, media outlets, and the general public. The informal citizen-scientist DamSense team has joined forces to support revealing the unvarnished truth about an ecosystem devastated by fish killing dams. The 1970s dam builder promise that dams and wild fish could harmoniously coexist has proven to be a billion dollar fantasy.

I agree with other Corps retirees and employees that the Corps' 2002 EIS, after a few minor updates, will provide adequate operational instruction to remove the earthen berms from the 4LSRD. This initial step to restoring the Snake River watershed's ecosystem can be accomplished in a matter of months with the right political will and support. Using the 2002 EIS's substantial body of operational guidance supporting a decision by the Corps and Bonneville Power Administration to immediately breach the 4LSRD is at the foundation of DamSense. To alleviate the threat of extinction, Pacific Northwest endangered Snake River salmon and Southern Resident Killer Whales depend on achieving this goal.

Documents in this anthology were created or chosen for inclusion by a diverse group of men and women that includes fisherman, economists, federal employees and retirees, environmentalists, scientists, politicians,Tribal members, and various business entity personnel. I hope this anthology provides you with a basic understanding of how the lower Snake River watershed ecosystem can and must be set on a path of restoration this year.

I greatly appreciate the dedicated DamSense volunteers and staff who stay passionately involved with supporting the DamSense goal. Thank you DamSense team for countless hours of work, impeccable attention to detail, and a deep seated commitment to restoring a free flowing Snake River.

Jim Waddell,
Civil Engineer, PE USACE Retired
January 2019

The 2018 “State of the Snake”

In 2018 the fish returns at Lower Granite dam are **down for all categories** compared to both the 10-year average, 2017, and 2016. A **total of 55,364 Chinook salmon and 53, 136 steelhead returned** to Lower Granite Dam in 2018. These precipitous declines should come as no surprise. They were predicted in the 2015 Salmon White Paper (see Damsense.org, reports page) which was distributed to Pacific NW state representatives as well as federal agency representatives.

Five-year reviews by NOAA show *minimal improvement* in the risk-status of ESA-listed salmon and steelhead despite a billion taxpayer dollars being spent on system improvements. Current NOAA recovery plans are predicted to NOT achieve fish recovery. Pacific NW state fisheries reports show that smolt-to-adult ratios have not improved either and still show Snake River fish returns are not meeting criteria for species survival.

Lower Granite Dam			
	Compared to 10yr Average		
Fish Returns	**2016**	**2017**	**2018**
Spring Chinook	+6%	-56%	-50%
Summer Chinook	-28%	-48%	-58%
Fall Chinook	+6%	-35%	-54%
Sockeye	-21%	-80%	-76%
Steelhead	-42%	-54%	-67%
Wild Steelhead	-47%	-67%	-72%
Data from Columbia Research Basin, http://www.cbr.washington.edu			

Snake River wild steelhead are on a decline to levels not seen in 20 years. Adult returns in 2018 will mark the third steepest 5-year trend since the 2009-2013 trend. The fourth worst 5-year trend will be from 2002-2006 adult counts*. This recent 5-year trend is so low that it will hit a trigger point in the 2014 biological opinion.* The BiOp states that the agencies must implement a solution within 12 months. However, the downward trend is not the only problem; the actual number of wild steelhead is now so low that the only solution or recovery action that can be implemented quick enough to prevent virtual extinction is the breaching alternative in the existing EIS for the 4 Lower Snake River dams.

From both the 2016 and 2017 NOAA Recovery Plans for Snake River Spring/Summer Chinook Salmon & Snake River Steelhead, National Marine Fisheries Service, West Coast Region “*Over $1 billion* has been invested since the mid-1990s in baseline research, development, and testing of prototype improvements, and construction of new facilities and upgrades.” “NMFS estimates that recovery of the Snake River spring/summer Chinook salmon ESU and steelhead DPS, like recovery for most of the ESA-listed Pacific Northwest salmon and steelhead, ***could take 50 to 100 years***.” This recovery plan contains an extensive list of actions to move the ESU and DPS towards viable status; **however, the actions will not get us to recovery.**

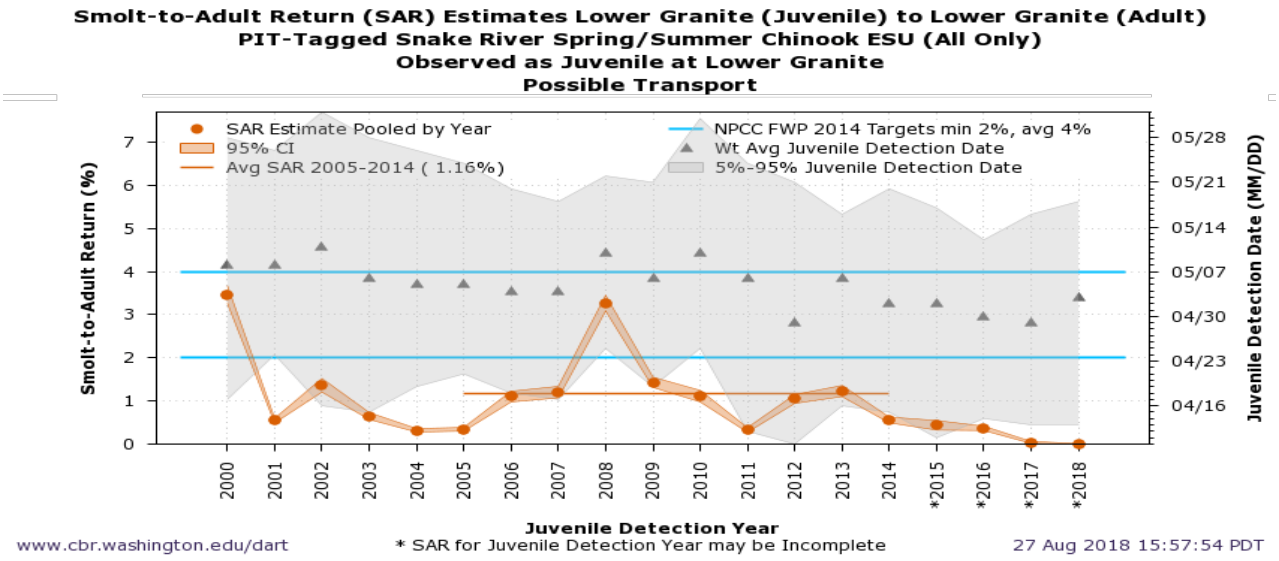
From the 2016 Comparative Survival Study SAR Patterns: Snake and Mid-Columbia

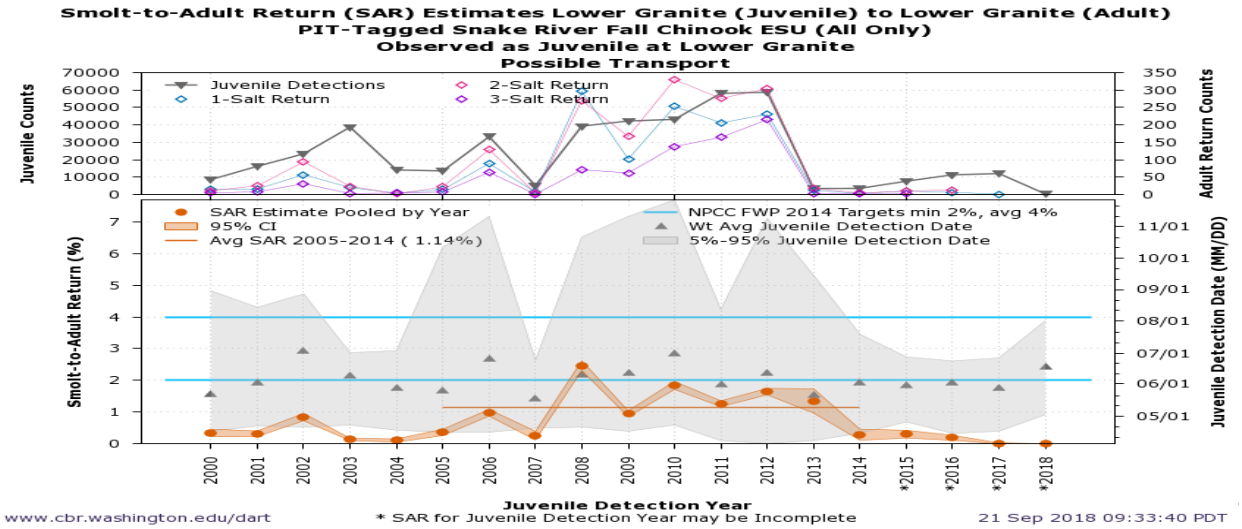
SAR (smolt to adult return ratio) is a measure of fish survival, or the % of smolts that return as spawning adults. The Northwest Power & Conservation Council's goals are **2% for mere survival of the species** and **6% for recovery of the species**. Overall, Snake River Chinook and steelhead SARs have only been above 2% in 5 of 20 years in recent history (and never above 6%). These results are in spite of increased spill and barging around the dams.

In contrast, Mid-Columbia Chinook and steelhead are generally meeting the NPCC SAR goals and have SAR ratios ***2.3x – 3.4x greater than Snake River wild SARs***. Keep in mind that Snake River salmon and steelhead pass over 8 dams... 4 on the Columbia and 4 on the Snake. Mid-Columbia fish only pass 1- 4 lower Columbia dams. ***If the 4 lower Snake River dams were removed, Snake River salmon and steelhead would have very similar migration and spawning conditions, which should lead to fish recovery. See charts below for trend of SAR's below 1.***

From the Draft Comparative Survival Study 2017 Annual Report by the Fish Passage Center

"If the lower four Snake River dams are breached and the remaining four Columbia dams operate at BiOp spill levels, we predict approximately **a 2-3 fold increase in abundance** above that predicted at BiOp spill levels in an impounded system, and up to a **4 fold increase if spill is increased** to the 125% TDG limit. This analysis predicts that higher SARs and long-term abundances can be achieved by reducing powerhouse passage and water transit time, both of which are reduced by increasing spill, and reduced further when the lower four Snake River dams are breached."





DAMSENSE

Lower Granite Dam

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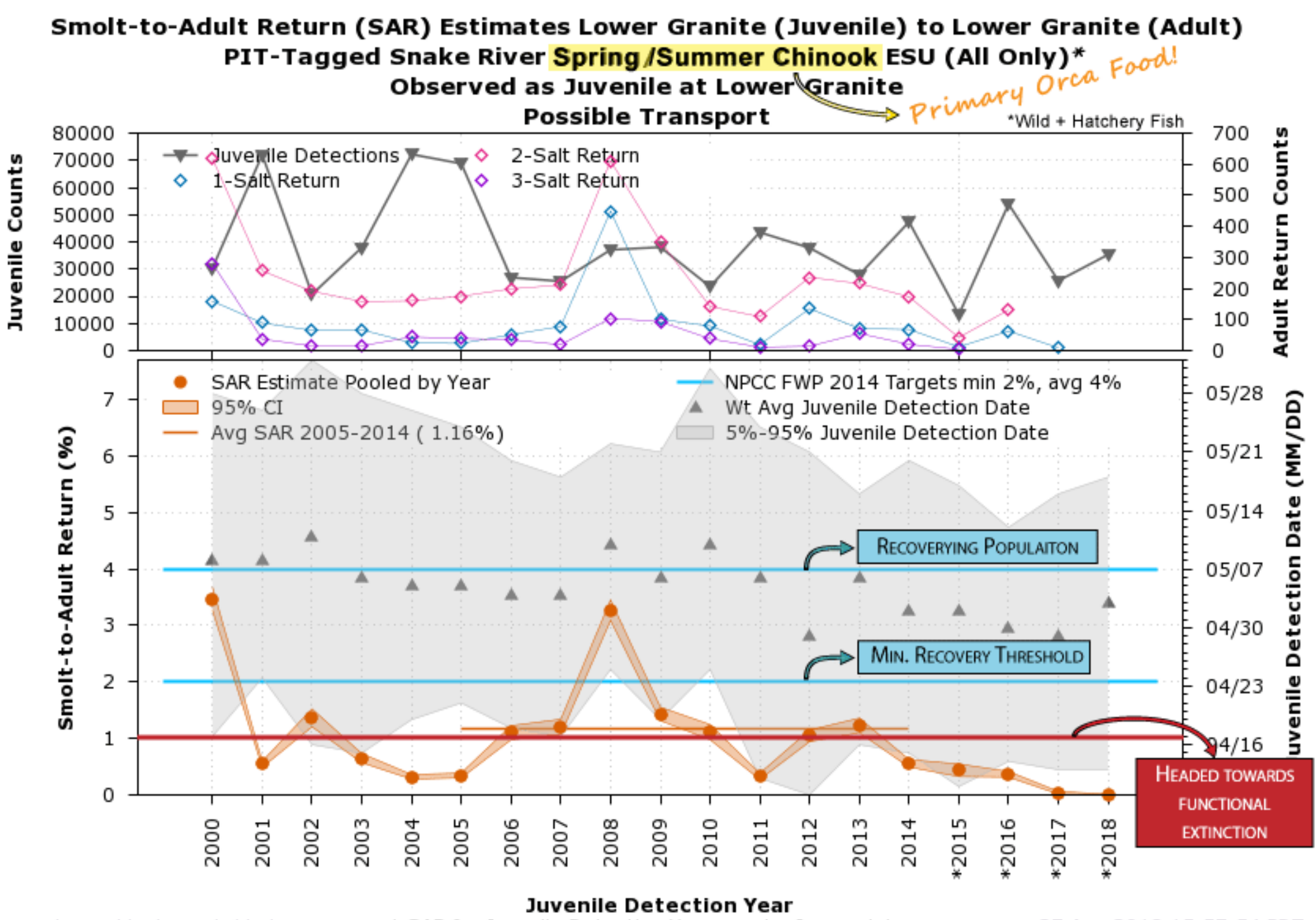
Data from Columbia Research Basin, http://www.cbr.washington.edu

So Far This Year?

On Dec. 5, 55,364 total Chinook compared to the 10yr average of 117,438 (-53%)

Jacks: 8,767 vs. 37,819. Down 77% from the 10yr average very bad news for 2019 returns!

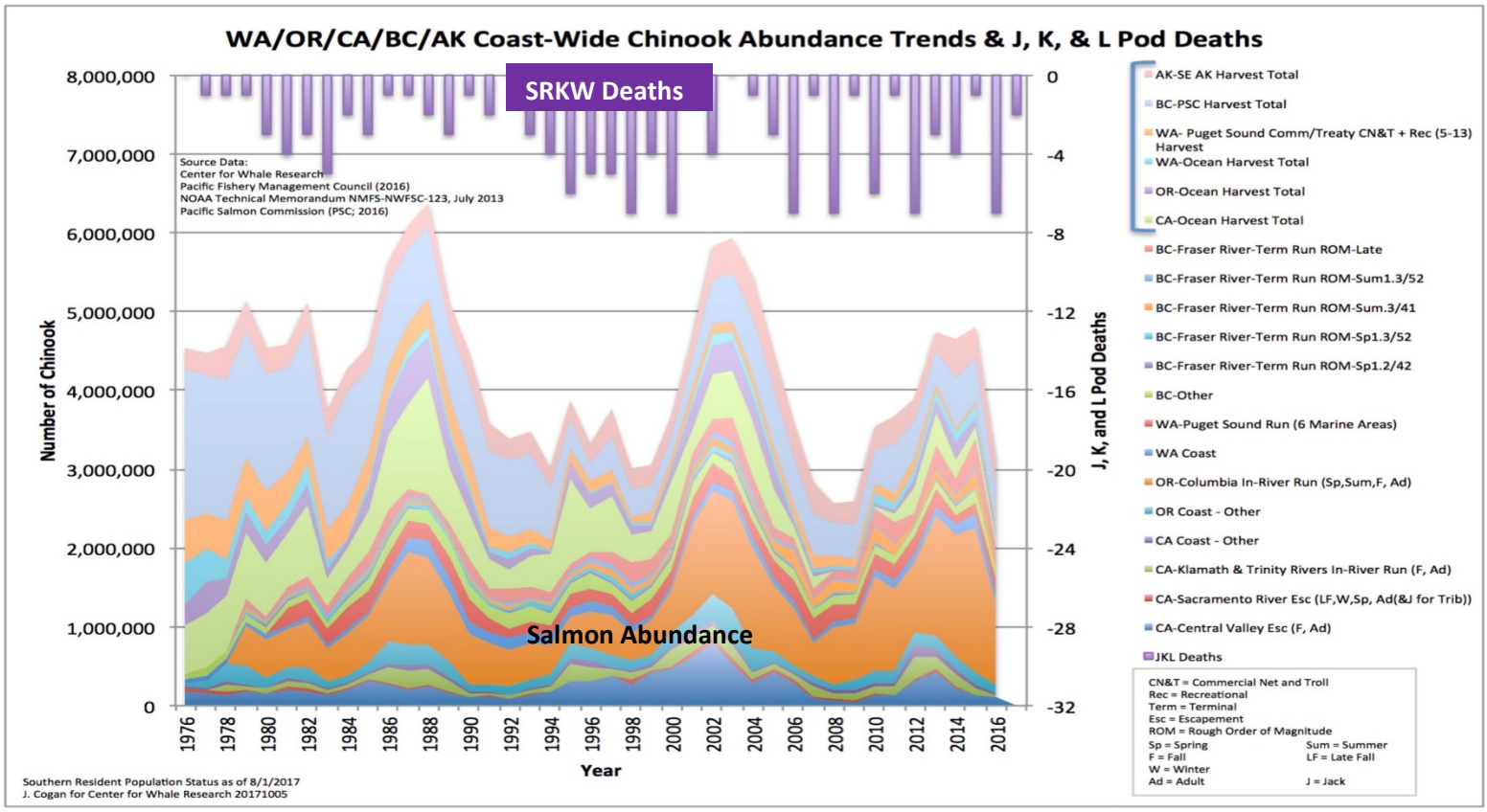

Smolt-to-Adult Return (SAR) Estimates Lower Granite (Juvenile) to Lower Granite (Adult)
PIT-Tagged Snake River Spring /Summer Chinook ESU (All Only)*
Observed as Juvenile at Lower Granite
Possible Transport
Primary Orca Food!
*Wild + Hatchery Fish
Juvenile Counts
Adult Return Counts
Juvenile Detections
1-Salt Return
2-Salt Return
3-Salt Return
SAR Estimate Pooled by Year
95% CI
Avg SAR 2005-2014 (1.16%)
NPCC FWP 2014 Targets min 2%, avg 4%
Wt Avg Juvenile Detection Date
5%-95% Juvenile Detection Date
Smolt-to-Adult Return (%)
Juvenile Detection Date (MM/DD)
RECOVERYING POPULAITON
MIN. RECOVERY THRESHOLD
HEADED TOWARDS FUNCTIONAL EXTINCTION
Juvenile Detection Year
www.cbr.washington.edu/dart
* SAR for Juvenile Detection Year may be Incomplete
27 Aug 2018 15:57:54 PDT

The Southern Resident Killer Whale Situation

The Southern Resident Killer Whale Breeding Population as of Jan. 2019:

- 75 individuals divided into 3 separate pods (J, K, and L) consisting of:
  - 26 adult Females of breeding age
    - 14 have had viable calves in the last 10 years
    - 5 have had viable calves in the last 5 years
    - **NO viable calf in the last 3 years**
  - 12 adult Males of breeding age
    - 1 has fathered offspring

SRKW Mortality and Chinook Salmon Abundance



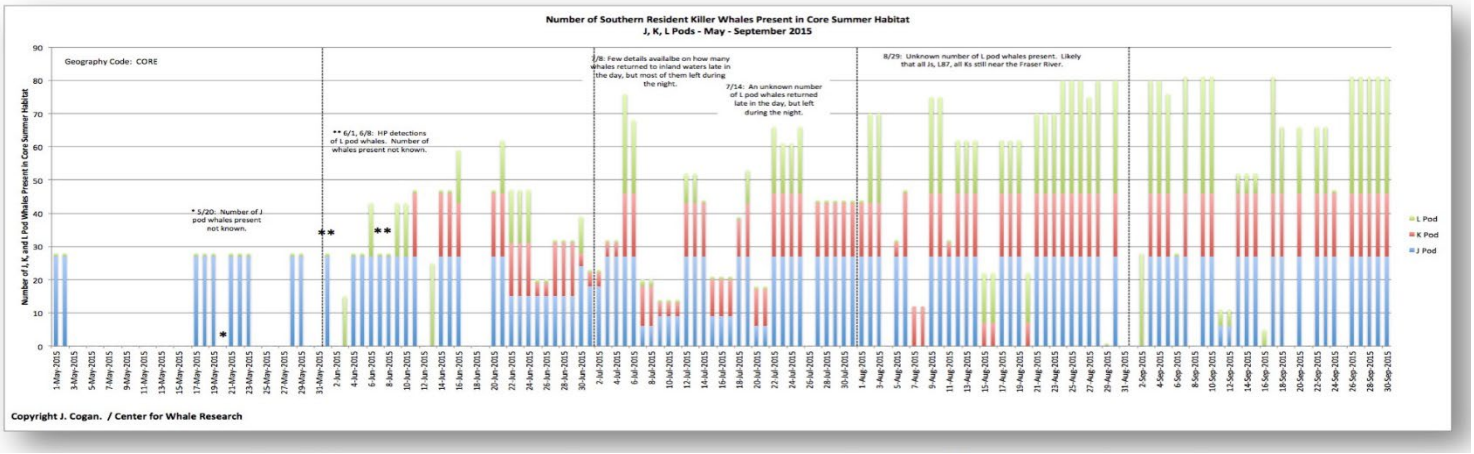
Top purple bars depict SRKW deaths. Colored area graph depicts numbers of Chinook in coastal waters.

Notice, with less Chinook there are more SRKW deaths.

Comparison of SRKW Core Summer Habitat

SRKW Presence in Core Summer Habitat

May – September 2015

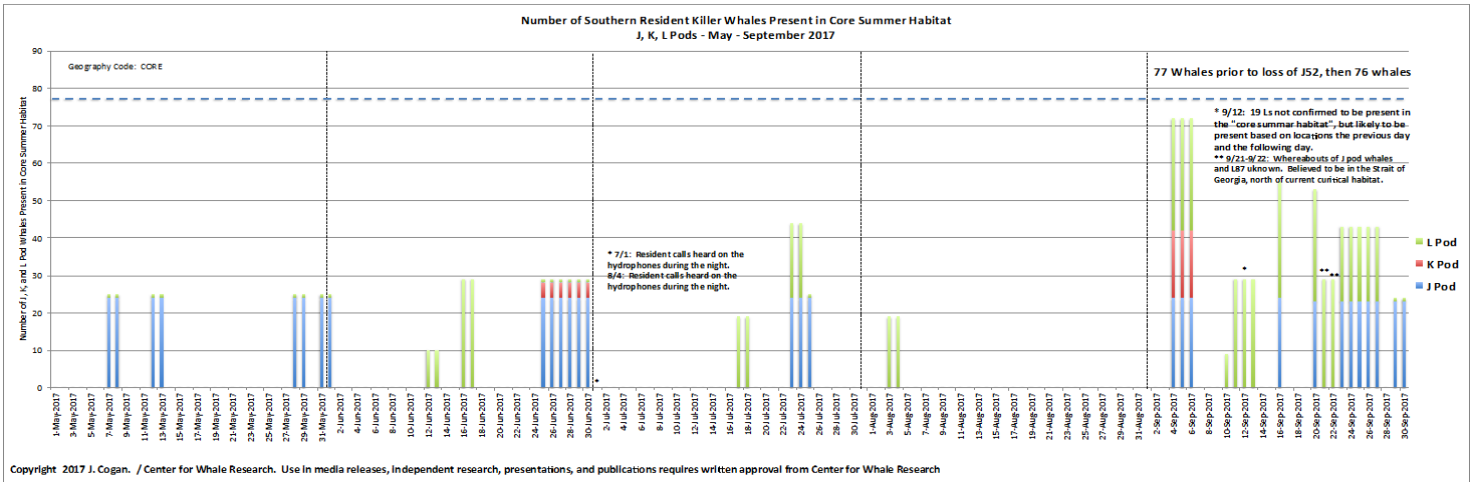


Colored lines represent J (blue), K (red), and L (green) pod.

A relatively "good" year for Chinook salmon. SRKW were present in their Core Summer Habitat 118 days - often all three pods!

SRKW Presence in Core Summer Habitat

May – September 2017



Colored lines represent J (blue), K (red), and L (green) pod.

A relatively "poor" year for Chinook salmon. SRKW were present in their Core Summer Habitat 43 days - often all three pods!

How much prey do they need?

The remaining 74 SRKW need to find, catch, and consume 1,500 fish per day weighing 17lbs each (80% Chinook). This is 550,000 fish per year per whale.

- The record Chinook caught at the 2018 Port Angeles Salmon Derby was 16lbs
- Total Chinook returns to Puget Sound for the last 10-years has been between 200,000 and 300,000.

To reach 1994 numbers, we need 685,000 fish weighing 17lbs each, per year in Puget Sound.

What if they can't find these numbers and/or burn off too many calories chasing smaller fish?

J32 on December 5, 2014

L51 with prolapsed uterus

L60 with prolapsed uterus

2018

NOAA FISHERIES
West Coast Region

Saving Southern Resident Killer Whales

NOAA Fisheries research, recovery actions, and partnerships to recover a keystone species

Southern Resident killer whales are unique and iconic to the West Coast. They are also among the most endangered marine mammals in the world. NOAA Fisheries named the whales a national Species in the Spotlight and adopted an aggressive action plan to help recover them. We are also working closely with Canada, the State of Washington, tribes, and interest groups to further step up our actions.

We are targeting the three main threats to the whales:

- Availability of prey: improving Southern Resident access to their preferred prey, Chinook salmon.
- Vessel noise and traffic: reducing vessel interference in Southern Resident foraging and other activities.
- Chemical pollutants: cutting exposure to and contamination by pollution that threatens their health and reproduction.

In 2018, we are forging ahead on three primary fronts--research, recovery actions, and partnerships--to address these threats. Here are some highlights of our comprehensive recovery program.

RESEARCH

We know much more about the Southern Residents now than we did only a few years ago, which better positions us to support their recovery.

- We are combining our data on Pacific salmon and Southern Residents to develop food-web models and identify specific salmon stocks and hatchery programs that the whales rely on for food.
- We are collecting and analyzing photos from drones and biological samples, like fecal samples, to track the health of individual Southern Residents in different seasons. This helps us understand the condition of each whale, as well as trends or factors affecting the population as a whole.
- New research funded by the National Fish and Wildlife Federation (NFWF) will examine whale breath, feces, and skin to identify harmful microbes from urban wastewater that may affect the whales so that we do not miss what could be an important emerging threat.

Photos from top: Southern Residents in Puget Sound, photo: NOAA; Migrating Chinook salmon in a fish ladder, photo: Lance Kruzic, NOAA Fisheries; Photogrammetry image of Southern Resident and calf, photo: NOAA Fisheries/Vancouver Aquarium; NOAA research boat and Southern Resident, photo: NOAA

Setting the Record Straight

The SRKW are unique and do not exist in other part of the world. There are only 74 remaining Southern Resident Killer Whales (SRKW). Of these only 38 are of reproducing age: 26 females and 12 males. Only 14 females have had calves in the past 10 years. No viable calf has been born since 2015. Chinook Salmon make up 80% of SRKW diet. SRKW are incapable of changing their diet to eat either seals or sea lions.

The Snake River watershed historically provided 25% of the SRKW diet. The most aggressive action plan possible must include the immediate breaching of the 4 Lower Snake River Dams (LSRD) along side other mitigation measures.

Of the three threats listed a dire lack of Chinook is the most immediate concern.

A direct consequence of starvation is the thinning of blubber, which releases bioaccumulated toxins. Added vessel noise does not inhibits their ability to find prey.

NOAA's photos depict SRKW bounding from the water inferring "joy," when the population is at its lowest number since 1984. These photos fail to portray the reality of emaciated calves and dead mothers with failed pregnancies caused by a perpetual lack Chinook salmon. NOAA camouflages reality by omitting photos of SRKW on the verge of extinction due to starvation.

J35 with dead calf.

J32 dead with calf.

According to NOAA, two of the top five priority SRKW Chinook salmon runs are from the Snake River. Annually, the 4 LSRD account for the deaths of over 8 million Chinook smolts, thus depriving SRKW from adequate food. Starvation is a systemic threat that must immediately be resolved by increasing food availability. Within 18 months of breaching, 500,000 Chinook will survive to becoming food for Orca.

RECOVERY ACTIONS

We are translating our growing knowledge into action that will help protect and stop the decline of Southern Residents in the short term and promote recovery in the longer term.

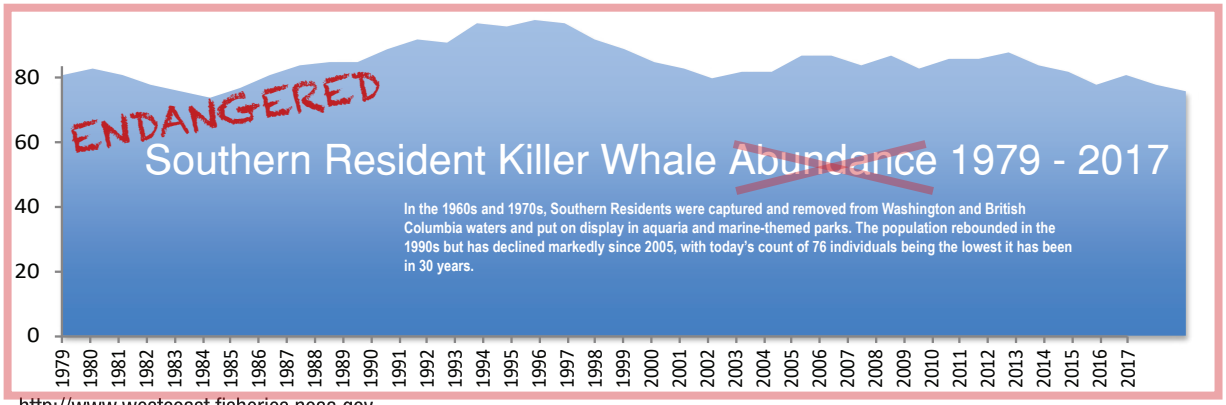
- Using individual health profiles for Southern Residents, we are tracking the condition of each whale to spot specific risk factors and target actions to increase survival and reproduction.
- We are prioritizing and implementing actions to strengthen and potentially increase critical salmon prey that provide the greatest benefit to the whales, including new opportunities to coordinate with salmon recovery efforts. Actions include leveraging salmon habitat restoration and exploring adjustments to hatchery programs to benefit the whales while still protecting vulnerable salmon and steelhead populations.
- Following a recent review of current vessel regulations, we are supporting increased enforcement presence on the water and focusing new education efforts for recreational boaters who frequently violate distance rules meant to protect the whales from disturbance.

PARTNERSHIPS

Only through strong partnerships can we make enough progress, fast enough, to save the Southern Residents. We rely on our partners to help raise awareness, fill data gaps, identify priorities, and take actions.

- Grants from NOAA Fisheries support Washington Department of Fish and Wildlife enforcement of vessel regulations, which a recent review showed has reduced disturbance to Southern Residents.
- We are expanding partnerships with conservation groups such as NFWF, who committed more than $800,000 in 2017 for research and salmon recovery actions that support Southern Resident recovery. The grants will generate $1.3 million in matching contributions for a total conservation impact of more than $2 million.
- NOAA Fisheries' Pacific Coastal Salmon Recovery Fund (PCSRF) supports partnerships with states, tribes and local groups to restore habitat for native salmon that Southern Residents rely on.

Photos from top: Southern Resident and Washington State Ferry, photo: NOAA; Migrating salmon, photo: PCSRF; Volunteers monitoring vessel traffic in Puget Sound when Southern Residents are present, photo: SoundWatch/The Whale Museum; Salmon habitat restoration, photo: PCSRF



http://www.westcoast.fisheries.noaa.gov

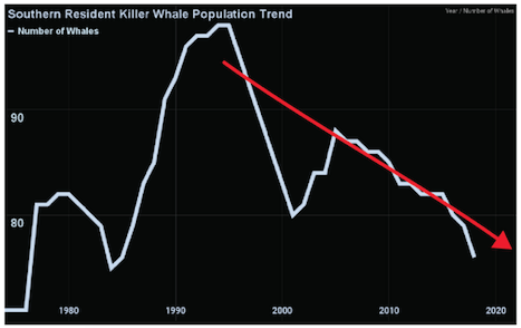
Monitoring an individual whale does not reflect what the population of SRKW is experiencing: food insecurity resulting in starvation. NOAA omits the word "starvation" in this document. We must take any and all measures to address the Chinook food supply holistically.

Why would NOAA work toward a "potential increase" of salmon? We need to take actions that will, with out a doubt, increase Chinook counts. This is not the time for "exploring adjustments to hatchery programs" leading to unknown results. We must take proven actions that provide more prey. Dam breaching is the solution, as stated in the FR/EIS .

NOAA created "partnerships" with USACE, BPA, Idaho Department of Fish and Game, and the Orca Task Force. NOAA's conflated "scientific conclusions" has influenced decision makers in these and other agencies. Consequently, NOAA's endorsement of the future CRSO/EIS has blinded all organizations that receive NOAA documents. USACE has a fiduciary responsibility to the American people to breach under its current FS/EIS.

NOAA states none of their proposed actions will recover Chinook Salmon. NOAA is also incapable of recovering SRKW. Ken Balcomb of the Center for Whale Research states, "the Orca only have 5 years of reproductive life left..."

Since NOAA's SRKW Recovery Plan was released in 2008, the SRKW population has decreased by 11. The SRKW have not had a successful pregnancy in over 3 years. Although these two NOAA graphs display the same information, only one displays SRKW current path of decline. We don't subscribe to NOAA's rosy depiction of SRKW extinction.



DamSense.Org

2018

NOAA FISHERIES
West Coast Region

Southern Resident Killer Whales and West Coast Chinook Salmon

Endangered Southern Resident killer whales prey primarily on Chinook salmon that historically returned in great numbers to rivers up and down the West Coast. NOAA Fisheries analyzed Chinook salmon stocks based on their estimated importance to the whales and found that the most crucial stocks are those returning to the Fraser River in British Columbia, other
1 rivers draining into Puget Sound and the Salish Sea, and the Columbia, Snake, Klamath, and Sacramento rivers. Tracking studies show that some of the whales visit the mouths of these West Coast rivers in search of their preferred Chinook salmon prey, but all of the rivers help support the whales over the course of each year.

Recent declines underscore the urgency of addressing the threats facing the Southern Residents:

- reduced prey (Chinook salmon) in some areas,
- vessel traffic and noise,
- toxic contaminants, and
- health risks such as inbreeding.

2 This fact sheet looks at the latest research on the prey question—what is the status of the salmon stocks the Southern Residents rely on, and where can we make the greatest difference for the whales now?

3 The number of juvenile salmon produced by West Coast rivers has increased since the 1970s, as
4 have adult returns to the Columbia and Snake rivers. Puget Sound rivers have not seen the same increases but remain very important because Southern Residents can access them throughout much of the year. This makes salmon stocks around the Salish Sea and Puget Sound a primary target for recovery as described in NOAA Fisheries' Puget Sound Chinook Salmon Recovery Plan.

Adult spring Chinook. Photo: Michael Humling, USFWS

Setting the Record Straight

1 The Snake River once produced millions of salmon annually. After multiple dams were built, those numbers dramatically declined. Today, the 4 Lower Snake River Dams (4LSRDs) are the major cause of death for migrating Chinook.

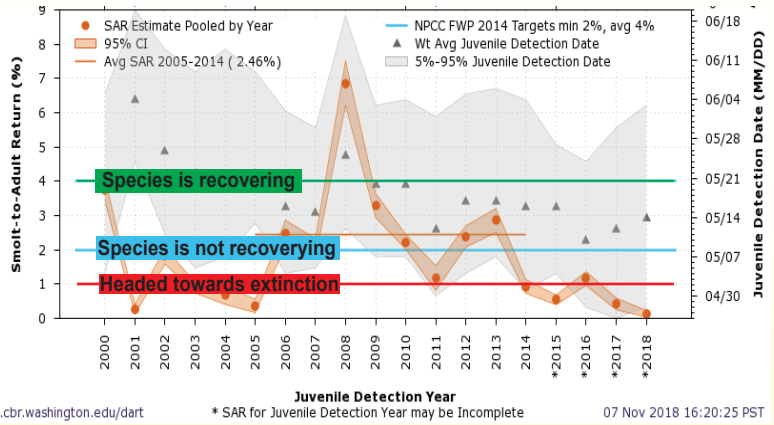
In the last two years, the importance of the Snake River has become critical. The Fraser, Klamath, and Sacramento rivers runs have collapsed and large drops of Chinook output in the Salish Sea are adding more pressure than ever on the Snake River.

2 **Latest research on the prey question** Yet NMFS continues to leave out years 2015-2018 on many of the graphs.

3 **Juvenile salmon in West Coast rivers have been increasing, but Puget Sound rivers are not** As depicted on the next page, West Coast rivers include Puget Sound. Therefore, NMFS' statement here is not only misleading and confusing, but just flat wrong. The SRKW also travel the West Coast annually in search of food. Much of their food (nearly 80%) comes from the Snake/Columbia confluence.

4 **Returns have increased** The Snake River (which is a "West Coast" river) has not been increasing. In fact, the Smolt-to-Adult Ratio (SAR) has been below 1% since 2014.

SAR over Bonneville Dam. Adult to Adult Counts



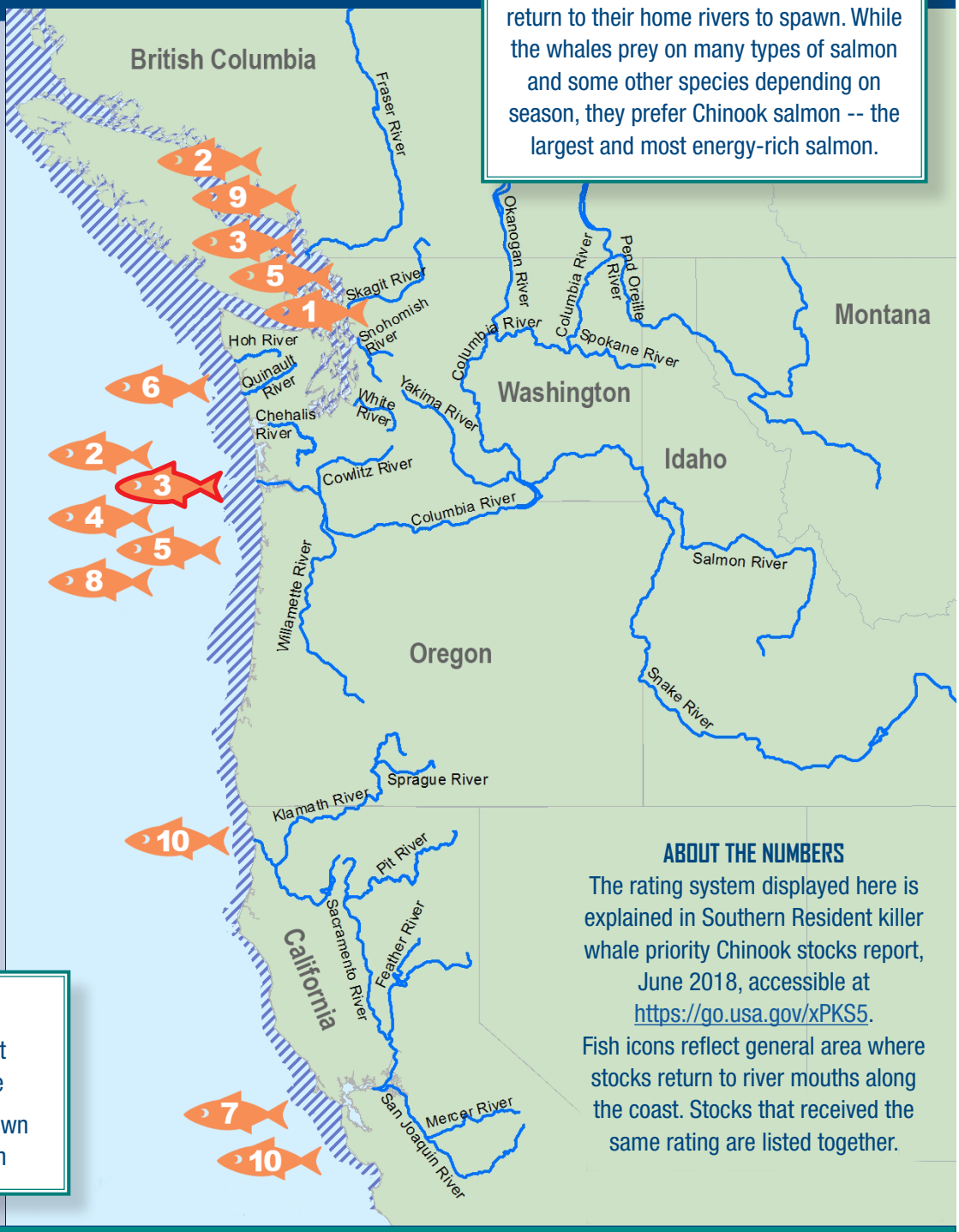
www.cbr.washington.edu/dart * SAR for Juvenile Detection Year may be Incomplete 07 Nov 2018 16:20:25 PST

Furthermore, a brief look at the Columba Basin Research DART charts will reveal this "increase" has become a strong decrease in the last few years. See www.cbr.washington.edu

TOP 10 PRIORITY CHINOOK POPULATIONS FOR SOUTHERN RESIDENTS

As the southernmost resident killer whales on the West Coast, Southern Residents have access to salmon stocks as adult fish return to their home rivers to spawn. While the whales prey on many types of salmon and some other species depending on season, they prefer Chinook salmon -- the largest and most energy-rich salmon.

1. **Northern and southern Puget Sound (fall)**
2. **Lower Columbia River (fall), Strait of Georgia (fall)**
3. **Upper Columbia River and Snake River (fall), Fraser River (spring), and lower Columbia (spring)**
4. **Mid-Columbia River (fall)**
5. **Snake River (spring-summer), Northern Puget Sound (spring)**
6. **Washington Coast (spring and fall)**
7. **California Central Valley (fall)**
8. **Mid-Columbia River and upper Columbia River (Spring and summer)**
9. **Fraser River (summer)**
10. **California Central Valley (fall/late fall), Klamath River (fall and spring)**



LEGEND

Southern Resident Killer Whale range

Salmon stock shown near river of origin

ABOUT THE NUMBERS

The rating system displayed here is explained in Southern Resident killer whale priority Chinook stocks report, June 2018, accessible at https://go.usa.gov/xPKS5.

Fish icons reflect general area where stocks return to river mouths along the coast. Stocks that received the same rating are listed together.

SOUTHERN RESIDENT KILLER WHALE CHINOOK PREY BY SEASON

LATE SPRING/SUMMER

Whales in inland waters of British Columbia and Washington, sometimes west side of Vancouver Island, eating spring, summer and fall Fraser and Puget Sound Chinook salmon.

WINTER

K and L Pods on outer coast as far south as California, eating Columbia/Snake River, Central Valley, Puget Sound, Fraser River, and other coastal stocks.

J Pod largely in inland waters, eating British Columbia and Northwest United States Chinook salmon stocks.

LATE WINTER/EARLY SPRING

K and L Pods often off the Washington Coast and Columbia River, eating Columbia/Snake River and other coastal stocks.

J pod largely in inland waters and west side of Vancouver Island, eating British Columbia and Northwest United States stocks.

West Coast Chinook salmon production has increased over the last 50 years

While human activities caused significant declines in salmon abundance starting in the 1800s, particularly resulting from salmon habitat loss, progress has been made towards increasing salmon abundance in the last 50 years, in part due to supplemental hatchery production and enhanced fish passage. Combined natural and hatchery West Coast Chinook salmon production grew from an estimated 225 million juvenile salmon in 1975 to 406 million in 2015, according to recent studies. Fish hatchery production drove this increase until the mid-1980s, when hatchery production decreased. Increases in wild fish production from rivers including the Columbia and Snake rivers have since compensated for those decreases.

Today, the Columbia and Snake rivers produce most of the wild and hatchery Chinook salmon on the West Coast. The Independent Scientific Advisory Board, a panel of scientists that advises the Northwest Power and Conservation Council, concluded in 2015 that the Columbia and Snake Rivers may now produce more juvenile salmon than they did prior to dams and development, when hatchery fish are included. While ocean conditions impact their survival to adulthood and availability to the Southern Residents, this data indicates that passage methods have improved and more juvenile fish are getting to the ocean. As far as researchers can determine, the whales do not distinguish between hatchery and naturally produced adult salmon.

Natural and hatchery Chinook salmon production by area

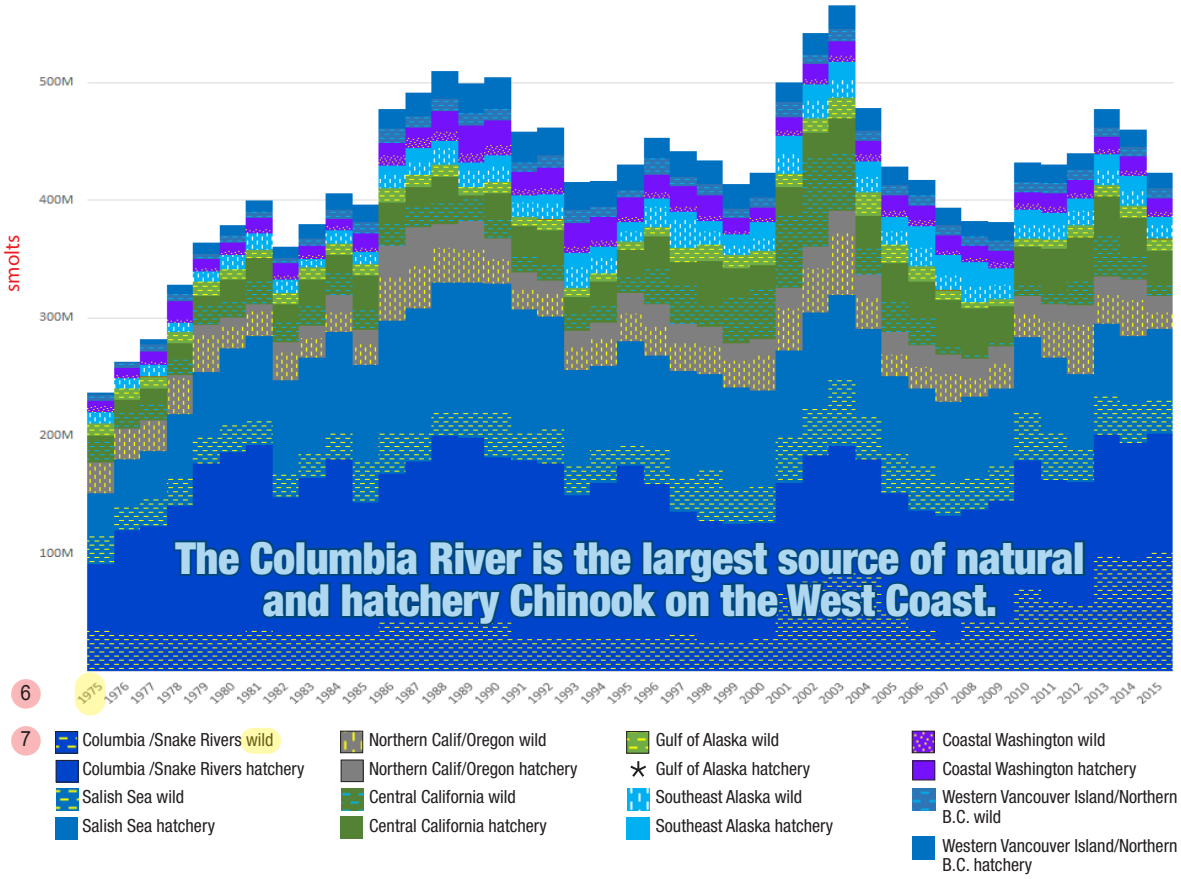


*Figure 1. Natural (patterned) and hatchery (solid) West Coast Chinook juvenile fish production by area. The Columbia River is the largest source of natural and hatchery Chinook on the West Coast. Modified from Chasco et al., 2017. *Gulf of Alaska hatchery numbers are not large enough to appear.*

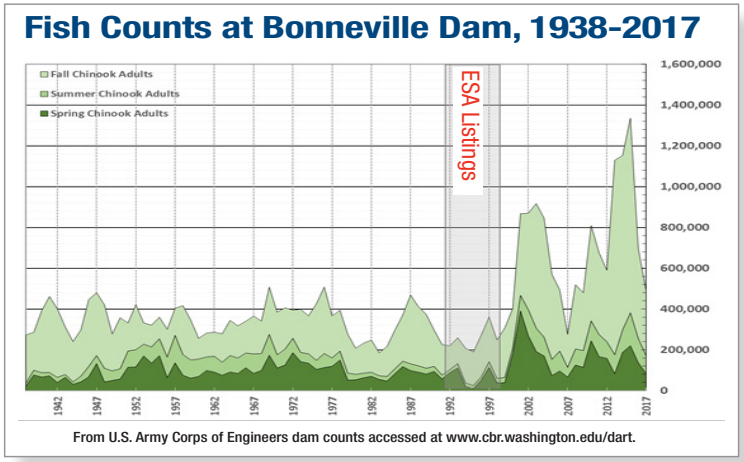
1. **When hatchery production decreased** It's worth noting, at this same time the wild fish counts were nearly zero. The Corps counted roughly 90 fish passing Lower Granite during this time.
2. **Wild fish compensation** Figure 5 (pg. 6) does not support NMFS' statement given here. The "compensation" actually came about due to the 2005 Alaska Fishing Lawsuit.
3. **Snake may now produce more juvenile salmon** This conclusion actually addresses the hatchery input *currently*, which is causing density dependent effects. This effect is *bad* for wild fishes and Snake River Fall Chinook.
   ESA hatcheries ramped up further in the late 1990s and early 2000s when the Corps Snake River Compensation Plan was nearing full implementation.
4. **Passage "improvements"** What NMFS is failing to take into account is the latent mortalities. Fish are injured or negatively impacted when crossing any dam and continue migration injured. If they die later (i.e. while in the reservoir) due to injurey (ex. embolisms, scales being blasted off because of water pressure, fatigue) the deaths are not associated with the dams. NMFS does not count these deaths. In addition, the Corps has spent nearly $1 billion on fish passage improvements sinze the 2002 EIS was signed. There has been litle positive effect for the fish.
5. **Whales do not distinguish between hatchery and naturally produced salmon** Okay, they do not have a choice anyway because orcas locate schools of fish and parse out single fish for pursuit. The majority of schools are actually composed of hatchery fish.
6. **Year 1975** when the last dam on the Snake River closed off the migratory path of the fish. Why does NMFS not show pre-dam numbers?
7. **Wild** should actually be titled "naturals" as there are no longer any true "wild fish." I do not believe the numbers given for Columbia/Snake River naturals (wilds before 2001) anyway.

USACE Fish Biologist

Killer whales, including both the Southern Residents and other populations in Canada and Alaska, are large consumers of West Coast Chinook salmon in terms of biomass and numbers of adult Chinook salmon. 1 Their estimated consumption exceeds the annual biomass of Chinook salmon consumed by pinnipeds (seals and sea lions) and annual catches by commercial and recreational fishermen, peer-reviewed research 2 has found. The 74 Southern Resident killer whales, a small subset of all killer whales on the West Coast, consume an 3 estimated 190,000 to 260,000 adult Chinook salmon each year.

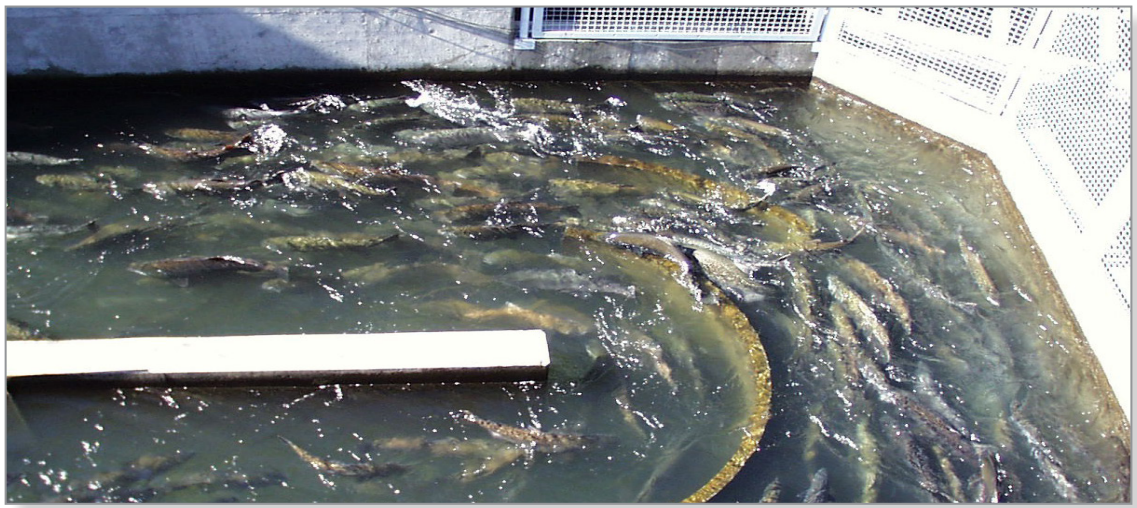
Like the Southern Residents, some of these salmon stocks are endangered or threatened. This includes Puget Sound Chinook, as well as other Chinook from the Columbia, Snake, Klamath, and Sacramento rivers. The Southern Residents depend on a diversity of salmon stocks that together provide the food they need throughout the year. The more diverse and healthy stocks available to the whales, the better they can withstand variable ocean conditions, climate change, and other factors that may affect the availability of salmon.

Columbia/Snake River Chinook salmon returns have increased



Some Chinook stocks are now available in increasing numbers to support the Southern Residents. For example, in the last decade more adult Chinook salmon have returned past Bonneville Dam on the Columbia River than at any other time since the dam was completed in 1938. NOAA Fisheries has found that hatchery Chinook more than compensate for fish lost to the dams in terms of the total numbers of Chinook available to the killer whales.

Figure 2. Chinook salmon returns to Bonneville Dam since its construction. Numbers do not reflect the many returning salmon harvested or consumed by predators prior to reaching the dam. From U.S. Army Corps of Engineers counts accessed at www.cbr.washington.edu/dart.



Below: Fall Chinook returns in Bonneville Dam fish ladder. Photo: U.S. Army Corps of Engineers.

1 **SRKW estimated consumption exceeds the biomass of Chinook consumed by pinnipeds** So what? What is NMFS' negative argument That SRKW are a nuisance competing with fisherman? Because pinniped killing is also on the books of things to do.

2 **74 SRKW** This breaks down to 3 pods: J, K, and L pod consisting of:

26 Adult Females of Breeding Age
14 have had viable calves in the last 10 years
5 have had viable calves in the last 5 years

12 Adult Males of Breeding Age
1 has fathered viable offspring

No viable calves in the last 3 years

3 **Estimated 190,000 to 260,000 Chinook** The remaining 74 SRWK need to eat 1,500 fish per day at 17lbs each. That's 550,000 fish per year at 17lbs each. To sustain 94 SRKW (the highest population to date), they would need 685,000 fish per year.

Each dam on the Snake kills roughly two million smolts. Allowing these fish to survive will produce 500,000 adult salmon to be available as "orca food" within 14-18 months post breaching. But only if the breach is started this winter, 2018. ***Nothing besides breaching the Snake River dams can achive this Chinook number as quickly.***

USACE Fish Biologist

Snake River Fall Chinook salmon

Adult Snake Fall Chinook (hatchery & wild) Returns to Lower Granite Dam

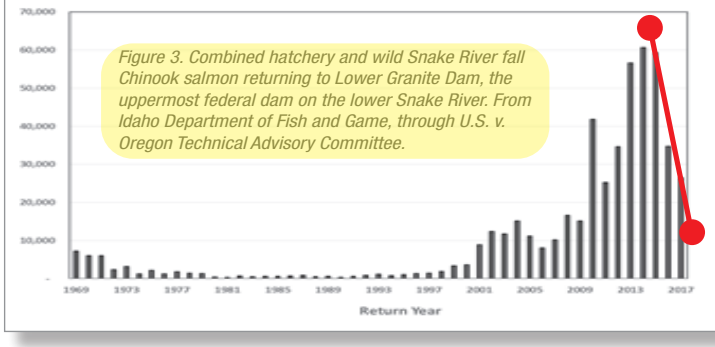


Figure 3. Combined hatchery and wild Snake River fall Chinook salmon returning to Lower Granite Dam, the uppermost federal dam on the lower Snake River. From Idaho Department of Fish and Game, through U.S. v. Oregon Technical Advisory Committee.

Abundance of Wild Snake River Fall Chinook at Lower Granite Dam

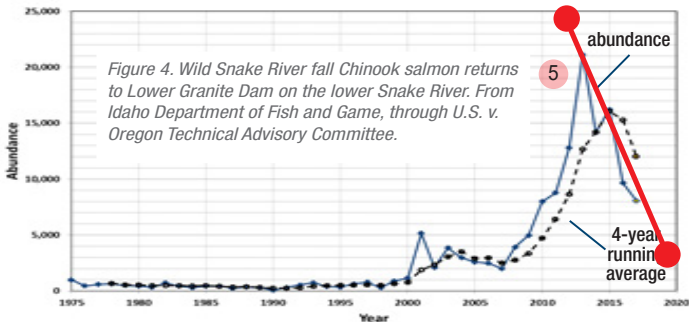


Figure 4. Wild Snake River fall Chinook salmon returns to Lower Granite Dam on the lower Snake River. From Idaho Department of Fish and Game, through U.S. v. Oregon Technical Advisory Committee.

A joint evaluation of West Coast Chinook salmon stocks by NOAA Fisheries and Washington Department of Fish and Wildlife identified Snake River fall Chinook salmon as among the most important to Southern Resident killer whales. Safer passage at hydroelectric dams, hatchery production, and other recovery and protection strategies have helped Snake River fall Chinook rebound recently to some of their highest numbers in decades. This is true for both hatchery and wild fall Chinook salmon, as reflected in figures 3 and 4.

Photo: Karoline Cullen

1. **Lower Granite Dam** NMFS should really be looking at Bonneville Dam. SRKW feed coastal, not at the dams. Bonneville Dam is the first dam on the Columbia and will be a better determinant of how many Chinook the SRKW can have. However, Bonneville Dam is also experienceing a significant decline in returns.
2. **Figure 3, bar graph** This is a moot point. Notice the steep decline between 2015-2017; this decline does not support NMFS's position that the fish are "doing well".
3. **Safer passage** Not safe enough since reservoir deaths are still at high rates.
4. **Snake River fall Chinook rebound** This is a misrepresentation. Based on these graphs, fish counts are declining, even with hatchery input. The fish are not recovering.
5. **Figure 4** Look at the trend from 2013 - 2018. This rapid declinine was predicted in the 2015 Salmon White Paper/Surrogate Appendix, which was prepared with input by senior Corps biologists. Past research programs were adding significant amounts of hatchery smolts, which were atifically increasing the trends between 2008-2013.

USACE Fish Biologist

Snake River spring-summer Chinook salmon

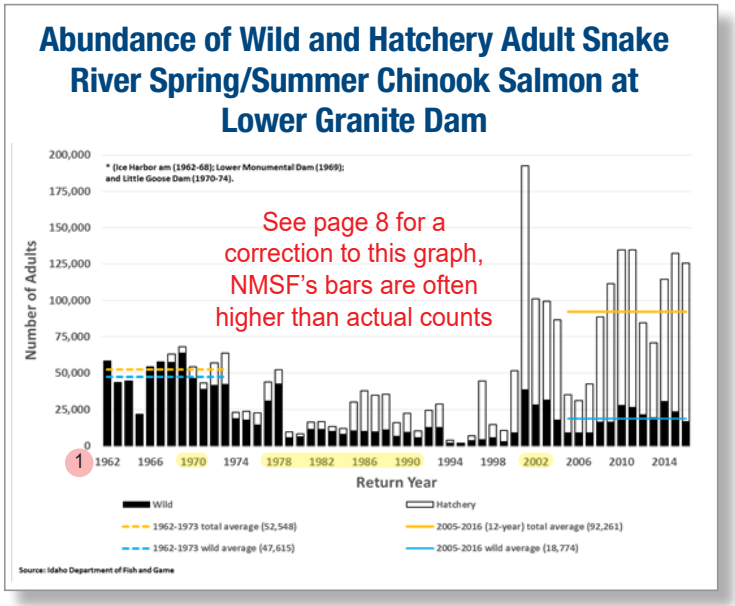


Figure 5. Abundance of wild and hatchery adult Snake River spring-summer Chinook salmon returning to Lower Granite Dam, the uppermost of the four lower Snake River dams. From Idaho Department of Fish and Game.

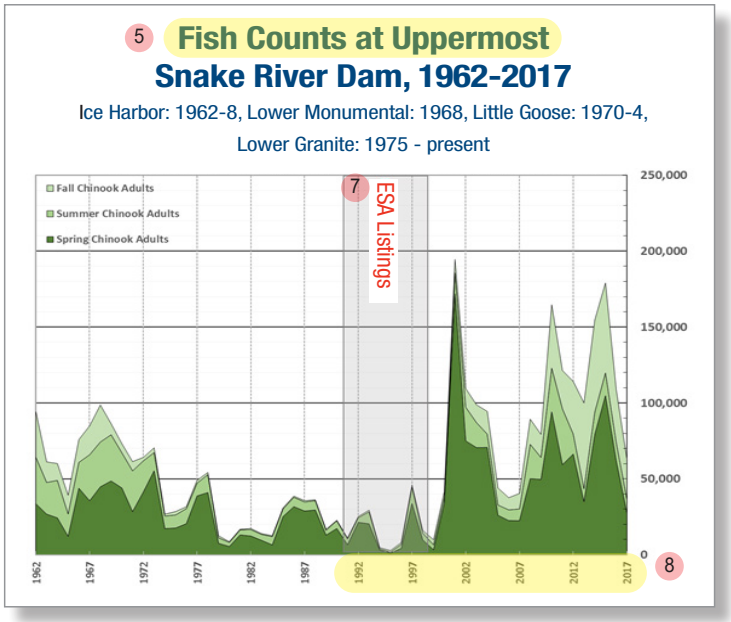


Figure 6. Combined returns of spring-summer, and fall Chinook salmon returning to the uppermost of the four lower Snake River dams, indicating the total number continuing on to spawning habitat in Idaho. From U.S. Army Corps of Engineers counts, accessed at www.cbr.washington.edu/dart.

In addition to Snake River fall Chinook salmon, the average abundance of Snake River spring-summer Chinook salmon has also increased. While hatchery fish that have supplemented this spring-summer run abundance cannot on their own recover the species in the long-term, they provide more Chinook salmon for Southern Resident killer whales in the shorter-term, while recovery strategies such as habitat restoration take hold and further increase natural abundance.

Major commitments to habitat restoration across the Columbia River Basin are also helping more fish return to some watersheds. Salmon returns always have and always will fluctuate from year to year as ocean conditions and the climate vary, and the last few years have seen weaker returns as an unusual warming pattern dominated the Pacific Ocean.

Snake River spring-summer Chinook salmon are mainly available to Southern Resident killer whales when the fish gather off the mouth of the Columbia. Snake River fall Chinook remain closer to the coast and would be available for a longer period before migrating upriver in the fall. Other stocks, especially those surrounding Puget Sound and the Salish Sea, remain essential to provide prey for the whales at other times of the year.

1 **1970:** hatchery production started
1978-1984: there were less hatchery before the Compensation Program
1985-1988: a large implementation of fish hatcheries
1990: ESA starts
2001: another larger hatchery program

2 **Hatchery fish cannot Chinook** Therefore, we should be looking towards other options that WILL recover these fish - such a breaching the Snake River Dams.

3 **Recovery strategies...increase abundance** The 2017 Spring/Sumoer ChinookRecovery Plan refutes this. NOAA still fails to admit that the greatest habitat restoration action in the Snake River is dam breaching. Of the 140-mile free flowing river, 55% will return to spawning habitat and 84% will return to rearing habitat.

4 **Major commitments to habitat restoration** NMFS cannot measure this, which leads me to believe this is an erounous statement.

5 **Fish Counts at Uppermost** These are counts from Bonneville dam, the first dam on to the Columbia River, *not* the Snake River.

6 **Snake River spring-summer Chinook** Since the Snake is so important to the SRKW, why should we not do all we can to produce a sustainable fish population? This paragraph seeminly supports breaching the 4LSRDs immediatly.

7 **ESA Listing** These fish are still listed as ESA, the graph insinuates the listing stopped in 2000. ESA looks at wild counts, not hatchery. The graph here displays both wild and hatchery combined.* For ESA purposes, it should only display wild counts.

8 **1990-Present** These animals are still listed on the ESA. The goal should be increasing wild counts - not hatchery or "natural." An article in *The Osprey,* "Replacing Hatchery Driven Salmon Management with a Place-Based Focus" discusses the inefficiency of hatchery production, "over 6 billion hatchery salmon are released into the wild annually from nearly 1,000 hatcheries around the Pacific-rim, even though survival of hatchery fish typically is less that 1/10th of 1% of those released." Also noted that return on investment for hatcheries is 0.1% which is consistent with the production of Coho by the Nez Perce. Obvioulsy is a losing proposition for all.

USACE Fish Biologist

Puget Sound Chinook Salmon stocks are not showing improvement

Unfortunately positive trends are not playing out everywhere. For instance, NOAA Fisheries' analysis showed that Puget Sound Chinook salmon stocks are one of the most important salmon stocks for Southern Resident killer whales, since they surround the heart of the whales' habitat and the whales have access to them for a greater part of the year than fish from the Columbia, Snake, and Fraser rivers.

The abundance of Chinook salmon returning to Puget Sound rivers has scarcely changed in recent decades, in large part because much of their habitat has been lost entirely or degraded so it cannot support healthy runs as it once did. In addition, many juvenile Puget Sound salmon and steelhead do not make it through their first few months at sea. NOAA Fisheries researchers have further found that young Puget Sound Chinook salmon carry high levels of contaminants of emerging concern such as prescription drugs and antibacterial compounds, likely from local wastewater, at levels high enough to adversely affect their growth, reproduction, and behavior.

We must address all of the threats to Southern Residents, because plentiful salmon will provide less help to the whales if they carry toxic contaminants, or if ship noise drowns out the echolocation the whales use to track salmon prey.

One challenge of salmon recovery is to focus funding and other resources where they will make the most difference.

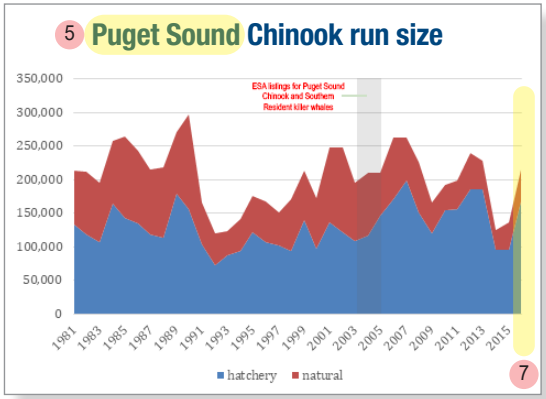


Figure 7. Puget Sound Chinook salmon returns, including harvest and returns to rivers. Does not include recreational harvest. From Pacific Fishery Management Council, 2017.

The analysis of Chinook stocks important to Southern Residents is already helping channel resources where they will best help the whales. For instance, the National Fish and Wildlife Foundation's Killer Whale Research and Conservation Program has dedicated more than $3 million to research and conservation of the Southern Residents, including habitat restoration for Chinook salmon in watersheds surrounding Puget Sound and the Salish Sea. NOAA Fisheries' Pacific Coastal Salmon Recovery Fund is further supporting habitat restoration across Puget Sound.

A young resident killer whale chases a Chinook salmon in the Salish Sea near San Juan Island, Washington State, in September 2017. Image obtained under NMFS permit #19091. Photograph by John Durban (NOAA Fisheries/Southwest Fisheries Science Center), Holly Fearnbach (SR3: SeaLife Response, Rehabilitation and Research) and Lance Barrett-Lennard (Vancouver Aquarium's Coastal Ocean Research Institute).

1. **Puget Sound Chinook are the heart of SRKW** This is wrong. Puget Sound is not the "heart" of SRKW, unless NMFS' is inferring to the transient orcas, who eat pinnipeds and other marine mammals. SRKW do not stay solely in Puget Sound; they spent over 300 days along the coastline in 2017. The biggest source of prey along the coastline is Columbia/Snake Chinook, which is why breaching the 4LSRDs is so important.

2. **Columbia, Snake, and Fraser rivers** This is also wrong. The Fraser River is a major part of Puget Sound. Chinook runs in the Fraser have collapsed as well.

3. **One challenge...is to focus on funding** This sounds like a pressure-statement for more studies to be done. The US Army Corps spent 7 years and $34 million on studying the Snake River as it relates to Chinook salmon recovery. More studies is not the answer and will not reveal anything new towards how to recover these species.

4. This paragraph means nothing. Over $1 *billion* has been spent on fish recovery efforts (in *addition* to the $1 billion already spent by the Corps on fish passage improvement) with nothing to show for it, but a further declining fish population.

5. **Puget Sound** Interesting that NMFS is posting Puget Sound data, when it generally like to argue Fraser River data.

6. **Years on graph** NMFS left out years 2016-2018, which are very telling years. During these, runs have been 50% or below the 10-year average.

7. **Does not include recreational harvest** The recreational harvest accounts for half as many more returns. NMFS needs to pre-date this graph to the Bolt vs. Washington case.

USACE Fish Biologist

1 What about breaching dams on the lower Snake River?

The U.S. Army Corps of Engineers, Bureau of Reclamation and the Bonneville Power Administration are preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act (NEPA) to assess and update their approach for long-term operations, maintenance, and configuration for the 14 federal projects in the Columbia River System. This process, scheduled for completion in 2021, will evaluate impacts of the 14 projects on both ESA-listed and non-listed anadromous fish species. Based on public input during NEPA scoping, the EIS also includes an alternative that evaluates breaching the four Lower Snake River dams.

During this NEPA process, and subsequent ESA Section 7 consultation with NOAA Fisheries on the final preferred alternative, the co-lead federal agencies will consider the effects of operating the lower Snake River dams on ESA-listed Pacific salmon, including any associated measures to avoid, offset, or minimize those effects.

2 Dam breaching is a long-term proposition. If it were decided on today, breaching one or more Snake River dams would take congressional authorization and several generations of salmon, at least, before any results could become clear.

NOAA Fisheries continues to consult with the agencies on recommended actions to improve fish passage, to address

3 growing impacts of predators on salmon, such as sea lions and birds, and to restore salmon habitat.

4 Looking ahead

NOAA Fisheries and numerous partners have collaboratively developed recovery plans for salmon that outline strategies on all fronts to promote their recovery and eventual delisting from the ESA. These plans include continued and improved safe passage through dams, restoration of important rearing habitat, science-based improvements in hatchery operations, and adjustments in harvest levels. All play an important role in putting salmon on the road to recovery, and supporting Southern Resident killer whales.

Photo: Karoline Cullen

For more information on Southern Resident killer whales:

NOAA Fisheries West Coast Region Southern Resident killer whales
http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/

Southern Resident killer whale Recovery Plan
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/planning_implementation.html

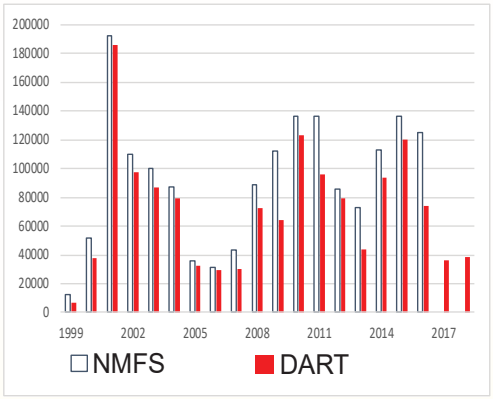
1 **What about breaching dams on the Lower Snake?** NMFS should not be lobbying for what the Corps or BPA does with its projects. This is illegal.

2 **Dam breaching** this is bull. The Corps can breach the Snake River dams in a matter of months, should its leadership want to (or be told to).

3 **Predators on salmon** SRKW are predators of salmon. Are we picking/choosing which predators get prey and which don't?

4 **Looking ahead** Based on 30-years experience with NEPA, the reader should have zero to very-little confidence the CRSO will result in anything.

Correction of NMFS Spring/Summer Chinook "Abundance" at Lower Granite on pg. 6



Notice, NMFS regularly reports higher numbers than actual counts recorded via Columbia Basin Research DART. www.cbr.washington.edu DART counts are based on Corps fish ladder counts, located at each dam.

This Idaho Department of Fish and Wildlife chart (pg. 6) has appeared in three separate SRKW NOAA fact shees as evidence that Chinook runs are doing fine. Notice, in the last two years, the Chinook runs have significantly dropped. These runs are not "doing fine."

USACE Fish Biologist

Southern Resident Killer Whale Chinook Salmon Initiative

By Sharon Grace, Jim Waddell, Ken Balcomb, Susan Berta, and Howard Garrett

RESPONSE TO NOAA WEST COAST REGION'S POSITION PAPER ENTITLED *SOUTHERN RESIDENT KILLER WHALES AND SNAKE RIVER DAMS* (MARCH 2016)

NOAA Fisheries Service West Coast Region ("NOAA") recently chose to protect four salmon-killing dams on the lower Snake River, at the expense of ESA-listed salmon and critically endangered Southern Resident Killer Whales. NOAA ignored compelling evidence that the Snake River dams must be breached to recover threatened and endangered salmon and to help save the whales from extinction. NOAA's decision to support dam retention is contrary to its legal duty under the Endangered Species Act to take affirmative steps to protect, conserve, and restore wild Snake River salmon and Southern Resident Killer Whales to the level that would permit them to be removed from the Endangered Species list. The science dictates that NOAA should take the exact opposite position and advocate for the one alternative left in the operative EIS, Alternative 4, dam breaching through channel bypass, to restore both wild salmon and wild orca populations.[1]

In a March 2016 document entitled *Southern Resident Killer Whales and Snake River Dams* ("*NOAA Killer Whale Position Paper*"),[2] NOAA argues that it is not necessary to breach the dams to recover either Snake River salmon or the salmon-dependent killer whales. NOAA takes this position despite admitting that:

- increased Chinook returns to the Snake River helps support the Southern Residents to the extent they improve overall salmon abundance;
- increased Chinook abundance is an important component of the recovery plan for the Southern Residents; and,
- the survival and reproductive success of the whales is positively correlated with Chinook salmon abundance. (*NOAA Killer Whale Position Paper*, pp. 2-3.)

NOAA claims that the dams do not harm killer whales, contending that Snake River hatchery fish more than offset any losses of wild salmon to the orcas' prey base caused by the dams. (*Id.*, p. 1.) NOAA disingenuously argues that hatchery fish have replaced wild salmon, despite knowing that hatchery fish cannot replace wild fish on a sustained basis. The argument shows that NOAA has made a calculated bureaucratic response to defend policies that NOAA should know are contradicted by the best available science.

Historically the Columbia/Snake River Basin was the largest salmon producing watershed in the continental United States. The Snake River, the Columbia's largest tributary, produced about half of the salmon originating in the combined river system. Wild salmon are the keystone species on which the Columbia/Snake Rivers ecosystem depends. For years federal agencies have been releasing more and more hatchery fish in an effort to recover wild Snake River salmon runs that have been decimated by the dams. Yet the wild runs continue to decline. Hatchery salmon cannot replace wild salmon in the long term because hatchery fish are not self-sustaining. In contrast, wild salmon have the genetic diversity that provides the resilience necessary to survive adverse circumstances, such as poor ocean conditions, El Nino occurrences and climate change.

NOAA's argument that dam breaching is unnecessary to recover wild Snake River salmon and Puget Sound orcas ignores decades of research, much of it NOAA's own. The chronology preceding NOAA's current position is important, because it reveals the lack of scientific support for the notion that the Snake River dams need not be breached to recover wild Snake River salmon.

- In 1999 the National Marine Fisheries Services (NMFS), aka NOAA Fisheries, determined that to recover ***Snake River spring/summer Chinook***, the ***most risk averse action*** would include dam breaching, a harvest moratorium, and vigorous improvements in habitat and hatcheries. (*Emphasis in original*.) [3]
- In 1999 NMFS' results demonstrated that for ***Snake River fall Chinook and steelhead***, ***dam breaching by itself would likely lead to recovery***.[4]
- In 2001 the Plan for Analyzing and Testing Hypotheses (PATH) analyses suggested that ***breaching was more likely than any other change in the hydropower system to meet survival and recovery criteria for the listed species across the widest range of assumptions and scenarios***. [5]
- In its 2002 Record of Decision the Army Corps of Engineers ("Corps") Walla Walla District relied on NMFS' 2000 Biological Opinion that concluded that, despite the science showing that Alternative 4 in the EIS, dam breaching through channel bypass, was the best option for salmon recovery, ***breaching was not necessary at that time. NMFS reserved breaching as a contingency management alternative depending upon the findings in the 2005 and 2008 check-in.***[6]
- In making the decision not to breach in 2002, the Corps announced to the taxpaying public that the dams would not have to be breached, if $350 million were spent on massive "system improvement" projects (Alternative 3 in the EIS) on the four Snake River dams to permit less hazardous juvenile fish passage. ***This would give the region time to determine if salmon survival and recovery could be affected through the non-breaching alternatives.***[7] ***If these efforts did not succeed, the nine involved federal agencies, including NOAA, agreed that EIS Alternative 4, dam breaching, must be considered***.[8] Ten years was the outside time period allowed for results.[9]
- In the intervening years the Corps has implemented EIS Alternative 2, juvenile fish transport, in addition to Alternative 3, major system improvements, to attempt to halt the decline of wild salmon populations.[10] Still the wild stocks continue to decline.

Fifteen years have passed and $850 million has been spent on "system improvements," while hundreds of millions of dollars more has been expended on fish transport around the dams. Yet wild salmon runs continue to decline. Rather than consider dam breaching when it became clear that wild salmon runs were not recovering as NOAA had agreed to do, NOAA now simply resorts to its 2008 Biological Opinion conclusions, which federal courts consistently have rejected for failing to adequately protect salmon from the harm caused by the hydropower system.

In remanding NOAA's 2008/2010 Biological Opinion because it violated the ESA, the Court ruled, among other things that the speculative habitat restoration measures contained in the Biological Opinion were "***neither reasonable nor prudent***." Further, the Court found that *"**the lack of scientific support for [its salmon] survival predictions is troubling**,"* and noted that

even the government's own scientists "expressed skepticism about whether [salmon survival] benefits will be realized." As a result, the Court concluded that th**e *government's approach to these issues "is neither cautious nor rational."*** In fact, NOAA has not been able to produce a biological opinion for Columbia/Snake River salmon that has passed court review for a decade and has done so only once in the past 20 years.

NOAA's current position reneges on the agreement it made in 2000 that if wild salmon runs had not recovered after 10 years, it must consider dam breaching. The taxpaying public deserves better. It relies on NOAA for accurate information regarding fisheries and oceans. As a government agency NOAA has a mandate to provide the public with accurate information based on the best available science, rather than render conclusions based on political considerations.

The best available science establishes that Southern Resident Killer Whales are likely to become extinct in our lifetime, unless dam breaching begins immediately. NOAA listed Southern Resident Killer Whales as endangered in 2005. They remain so today. The primary issue is lack of food --- Chinook salmon. The single greatest change in food availability for resident killer whales since the late 1800s may be the decline of salmon from the Columbia River Basin.[11] Due to their precarious status, in May 2015 NOAA Fisheries designated the Southern Resident Killer Whales as one of eight endangered species most likely to go extinct in the immediate future, stating:

> The best available information points to their extinction if action isn't taken. . . . [E]xtinction is almost certain in the immediate future because of a rapid population decline or habitat destruction ..... We know the threats facing these species and understand the management actions we can take that will have a high probability of success." NOAA Fisheries, *Species in the Spotlight, Survive to Thrive, Recovering Threatened and Endangered Species* (2015), p. 2.[12]

At the end of 2014 the situation for the Southern Resident orcas was dire. No new calves had survived between September 2012 and late December 2014. At least seven members of the population had died during that period. Only 76 whales remained. Then the population took a turn for the better. Since the last days of 2014, the Southern Residents have celebrated the birth and survival of eight calves. Not all the news is good though. This year the population has taken a turn for the worse. Since the beginning of 2016 J pod has had at least three calves that haven't survived. On April 1, 2016, L95, a young adult male that NOAA had satellite tagged on February 24, 2016 washed up dead off the western coast of Vancouver Island.

Even the survival of the eight calves has a downside because the population is prey limited. If all eight calves continue to survive, the population will need between 30,000 and 50,000 additional Chinook salmon to sustain the calves as juveniles, and many more Chinook will be needed as the calves grow to adulthood. Breaching the Snake River dams in the immediate future likely would provide many of the additional fish the orcas need to recover.[13] As the lower Snake River is restored, each year the runs should become larger and could support the growing needs of the orca population.

The large Chinook salmon runs returning to the Snake River in the past several years are the best evidence to show that Snake River salmon abundance is a necessity for the Southern Residents. The recent orca "baby boom" is not a mere coincidence, but the result of larger than average Snake River Chinook salmon runs inflated by specially produced lower Snake River

hatchery fish. The gestation period for orcas is approximately 17 months. That means the eight births coincided with the larger Chinook runs that occurred in 2013 through 2015. Many of the calves were conceived in the year 2013 when the Southern Residents largely were absent from the Salish Sea inland waters, presumably feeding on coastal Chinook, a number of which likely were the larger specially bred Chinook. The lower Snake River hatchery research project last released fish in 2012, which means the larger fall Chinook runs of the last several years will not continue. The research fish were expensive to produce and the research project will not be resumed. Nonetheless, the inflated hatchery runs show that when there are plentiful Snake River Chinook, the Southern Resident orcas can conceive, reproduce, survive and recover.

The best available science establishes that lower Snake River salmon are likely to go extinct in the next decade, if the dams are not breached immediately. The construction of the four lower Snake River dams in the 1960's and 1970's decreased the already decimated lower Snake River wild salmon runs up to 75%,[14] causing all four salmon and steelhead runs to be listed under the ESA by the 1990's. By the year 2000 conservationists were predicting the extinction of wild Snake River salmon and steelhead to occur as early as 2017.[15] The predictions seem to be on track, unless the dams are breached immediately.

Indeed, NOAA recognizes the harm to salmon caused by the dams. In its recent *Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon* (October 2015) ("*Proposed Fall Chinook Recovery Plan*"), NOAA describes some of the problems created by the dams:

- "In addition to blocking access to or inundating historical fall Chinook salmon production areas, hydropower system development and operations also reduce mainstem habitat quality and affect both juvenile and adult migration." *Proposed Fall Chinook Recovery Plan*, p. 38.
- Limiting factors for adult fall Chinook salmon in the migration corridor include reduced spawning area. *Id.*
- Naturally spawning hatchery fish contribute to density dependence. *NOAA Recovery Plan*, p. 202.
- Hatchery fish dilute wild fish genetics, which decreases the viability of the ESU. *NOAA Recovery Plan*, pp. 200-201. See also*, id.,* pp. 202-205, for a discussion and summary of other hatchery caused threats to Snake River wild fall Chinook salmon.

Today the statement that began the *Feasibility Report*, Appendix M in 2002, that ***"[d]espite considerable expense and management efforts, [wild] anadromous fish stocks in the Snake River Basin continue to decline,"*** is as true today as it was then.[16] Yet to avoid breaching the dams, the federal agencies have spent billions of dollars on ineffective mitigation efforts, with $700 million expended on "system improvements" alone for fish passage at the four dams.

System improvements have failed at recovering wild salmon. More importantly, they do nothing to improve the slack water reservoir conditions, which are as lethal to salmon and steelhead as dam passage. The only effective means of addressing reservoir mortality is to drain the reservoirs through dam breaching and allow the natural flowing river regime to return.

As a final important point, the Snake River dams are not needed. The hydropower produced by the dams is surplus and has been replaced three times over by greener solar and wind

energy. Unlike hydropower, these energy sources do not destroy entire river ecosystems. The highly subsidized Snake River barge traffic is being replaced by rail transport at a lower overall cost and a similar carbon footprint. And with a free-flowing Snake River, recreation benefits will skyrocket in many Washington counties. Recovering the wild salmon runs will strengthen the Pacific Northwest economy and save tax/rate payers money.

By supporting keeping the Snake River dams, NOAA continues to renege on the agreement it made 15 years ago to consider dam breaching if non-breaching alternatives did not recover salmon. The *Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement* (2002) ("LSRFS/EIS") is the operative, working document that is used today by the federal agencies to attempt to mitigate the harm to salmon caused by the four lower Snake River dams. All means other than breaching that are set forth in the LSRFS/EIS have been implemented over the last fourteen years have failed. The only alternative left in the LSRFS/EIS is dam breaching. To live up to its agreement to recover wild Snake River salmon by breaching, if other methods did not work, and to recover the fish eating Southern Resident orcas, NOAA now must support dam breaching.

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[1] *Lower Snake River Juvenile Salmon Migration Feasibility Report* (2002), http://www.nww.usace.army.mil/Library/2002LSRStudy.aspx.

[2] http://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/killer_whales/3.16.2016_srkw_factsheet.pdf

[3] Budy, P., *Analytical Approaches to Assessing Recovery Options for Snake River Chinook Salmon* (2001), p. 4, UTCFWRU 2001(1): 1-86, http://www.fws.gov/columbiariver/publications/recopt.pdf; see also *Lower Snake River Juvenile Salmon Migration Feasibility Report* (2002), *Appendix A, Anadromous Fish Modeling*, pp. A ES 5-6, http://www.nww.usace.army.mil/portals/28/docs/environmental/lsrstudy/Appendix_A.pdf.

[4] *Id.*, p. A ES 6.

[5] USACE, *Record of Decision, Lower Snake River Juvenile Salmon Migration Feasibility Study,* p. 15, http://www.nww.usace.army.mil/Portals/28/docs/environmental/lsrstudy/lsr_rod.pdf.

[6] *Id.*, p. 21.

[7] *Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy*, Vol. 3, (2000), p. 20, http://permanent.access.gpo.gov/lps57088/d3/Final_Strategy_Vol_3.pdf.

[8] *Id.*

[9] *Lower Snake River Juvenile Salmon Migration Feasibility Report* (2002), *supra*, *Appendix A, Anadromous Fish Modeling,* p. A ES-8, "It will require anywhere from 2 to 10 years for these studies to provide information about the feasibility of achieving demographic improvements through different management actions." http://www.nww.usace.army.mil/portals/28/docs/environmental/lsrstudy/Appendix_A.pdf.

[10] Alternative 1 in the EIS is "no action."

[11] NOAA, *SRKW Recovery Plan Recovery Plan for Southern Resident Killer Whales*, (Orcinus orca), National Marine Fisheries Service, Northwest Region, Seattle, Washington (January 2008), p. II-82.

[12] http://www.nmfs.noaa.gov/stories/2015/05/docs/noaa_recoveringspecies_report_web.pdf.

[13] Although NOAA argues that increases in salmon abundance, whether from breaching dams or otherwise, would result in only a marginal change in the total salmon available to the killer whales, this argument is specious. All things being equal, the larger the salmon pie, the larger the slice for the orcas. Doubling the Snake River runs, which breaching the dams could do, would significantly increase the orcas' pie slice. This may be the positive action the whales need to recover, and may also take pressure off other Pacific Chinook salmon populations so that they may recover.

[14] See, *NOAA Killer Whale Position Paper*, p. 3, graph, *Abundance of wild and hatchery adult Snake River spring-summer Chinook salmon at Lower Granite Dam*.

[15] Higgins, M., *Snake River Dams Defy Clean Water Act* (2002), http://www.bluefish.org/damsdefy.htm.

[16] *Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, (2002), Appendix M, *supra,* M ES-1.

Information presented to Governor Inslee's Orca Task Force

The following documentation was present to the first three meetings of the Orca Task Force. Each consecutive document was updated, and graphics were overlaid on the pertinent information for the Orca Task Force to quickly review.

The chronic declines of chinook, which are at least 80% of the endangered Southern Resident Killer Whales diet, has exacerbated their decline to an effective breeding population of less than 30 individuals. Without, immediate increases in chinook, a few more deaths will make recovery unlikely.

Because genetic diversity in wild chinook is dangerously low and spiraling downward, a breaching delay of even one more year could likely preclude any recovery, especially in the face of climate change. Loss of diversity will also lead to the further demise of hatchery fish. Actions short of breaching (such as increased spill, more hatchery fish, more habitat restoration, more bypass hardware at the dams, vessel, noise, even a nearly complete shutdown of fisheries in US waters) will not recovery these orcas; although it may allow a few to struggle on until they are "legally" extinct 20-30 years from now. Existing studies and data show their prey dependency on Columbia/Snake runs, and the biological benefits of breaching, which yields immediate smolt survival in the millions. Nothing else can produce similar results. Breaching can be achieved at no cost to the State. The Corp's current Environmental Impact Statement has dam breaching as an alternative to salmon recovery, as affirmed by the Assistant Secretary of the Army for Civil Works. Governor Inslee can provide most if not all of the impetus to the Corps NW Division Commander to make a breach decision.

Whereas;
The 4 LSRD's have a benefit to cost ratio of 15¢ on the dollar, forego about 4,000 jobs and $500 million in direct expenditures and about $20 million per year that could go to State School budgets, when compared to the benefits of a free-flowing river.
The cost of producing power (that is surplus and rarely available for meeting peak demands) adds significant pressure to BPA's dire financial situation causing rate increases and diverts funds from other dams and restoration work. In the last 96,000 hours of production, the 4 LSRDs produced only 2 hours of power needed by BPA customers.
Northwest Power and Conservation Council recognizes BPA financial crisis:
Elliott Mainzer to NPCC, March 2018, "If there is an axis of nonchalance (on one end) to panic (on the other), I think it's important that we don't get into a panic mode, I'm not in a panic mode, but I am in a very very significant sense of urgency mode."
https://vimeo.com/260456507

The 4LSRDs provide no flood protection. Irrigation to a small number of farms on Ice Harbor pool can easily be upgraded as a mitigation feature of breaching.
Inland waterborne transport on the lower snake of wheat has declined significantly over the last 10 years as Washington State (through its grain shuttle service) and farmers are finding it

cheaper to ship by rail. Petroleum shipments up the lower Snake virtually ceased several years ago with the only remaining terminal located at mile 1 on the lower Snake River which is NOT impacted by breaching of the 4LSRD's

As such, the Corps needs no new authorities to place the 4 LSRDs into a "non-operational" status. It has an inherit fiduciary responsibility to do so and can do so immediately if asked. Nor does the ongoing litigation over the 2014 Federal Biological Opinion or the Court's order for a new EIS constrain the Corps from breaching the dams through channel bypass ***now***. Breaching can be financed through existing debt reduction and credits mechanisms as a fish mitigation action by BPA and is far easier than originally planned, making it possible to move from a breach decision, to breaching, in a *matter of months*, not years.
The 2002 EIS's breach alternative has been delayed for over 15 years while implementing failed mitigation alternatives on the dams soaring to nearly $1 billion in cost.

Salmon survival has averaged below 1-to-1 replacement for years and is nowhere near agency recovery goals, wild steelhead returns are now below NOAA established triggers that call for immediate action, and overall returns of Snake runs are down over 70% in the last four years, but these failings have been masked by statements of "record runs" based mostly on massive releases of hatchery fish as well as using a post dam base line of very low returns as opposed to predam runs. The "record runs" of 4-7 years ago of wild fish were about 3% of the historic runs or about 30% of predam runs.
This year's returns of spring/summer chinook are down 40% of the 10-year average and are headed for a 5th year of decline.

NOAA's 2016 draft and 2017 final Recovery Plan for Spring/Summer Chinook admits that despite an extensive list of salmon recovery actions, ***without dam breaching, lower Snake River salmon runs will not recover***. This leaves little hope of recovering SRKW's unless breaching is started during the winter in water work window starting in December of 2018.

It is strongly suggested that the Orca Task Force immediately implore Governor Inlsee of the need to press the Corps and BPA to take action now as the measure or metric of when to declare an emergency he asked for in his comments to the Puget Sound Partnership in November of 2017 has already been crossed. Historical and empirical evidence from NOAA, the Center for Whale Research and others provide more than [illegible] without the need for elaborate prey studies [illegible] given the low numbers of SRKW and Chinook [illegible]
The Task force can then continue with further [illegible] of other factors bearing on SRKW recovery. Supporting documentation available on the website damsense.org.

Another month has passed, and a second SRKW has died and still no action!!!

Webinar on Dam Removal – Key Questions

Answers by Jim Waddell

Introduction

The SRKW Task Force Steering Committee is organizing a webinar to help its members further understand the issues, benefits, and trade-offs associated with potential removal of 4 lower snake river dams as one option to improve prey availability for the Southern Residents. This is a highly contentious issue with strong feelings among many different stakeholders about the merits – or lack thereof - of dam removal.

The Task Force's job is to recommend to the governor priority actions that could improve conditions for the Southern Residents. The first set of recommendations are focused on actions that either 1) have an immediate benefit or 2) are both essential and feasible to implement now to provide substantial benefits in the near to longer term.

Regarding the 4 lower snake river dams, the Task Force seeks to understand the potential increase in prey and associated timeframe for that potential increase that would result from dam removal. The webinar is intended to bring forward the facts and best available science to answer these questions. We recognize, however, that there is uncertainty regarding the impact of dam removal on prey and that there may be differences of opinion on how the process works, costs, and other underlying assumptions and variables. Therefore, we have invited a mix of practitioners, experts, and advocates to participate in the webinar.

We also recognize that the context - the costs and benefits of dam removal to other interests including irrigators, agriculture, and power users - is important and relevant as the Task Force makes its decision about what to recommend. Accordingly, we are inviting representatives from different stakeholder groups to participate as well.

In sum the webinar will focus on providing Task Force members with 1) an objective fact-based understanding of the process associated with dam removal and the science regarding potential increase in prey and consideration of unintended consequences; and 2) a general understanding of some of the different stakeholder perspectives and interests associated with the issue of dam removal.

Questions

Please provide written answers to the questions below where you either have a particular expertise or advocacy position. Please do not feel compelled to answer all the questions – only those that are pertinent to your expertise or interests. Answers from the panelists will be collated and provided to the Task Force. In the webinar we will focus the discussion on a subset of the questions with an emphasis on those questions that appear to have the widest disparity in responses.

Thank you so much for taking the time to assist with this important effort!

The Process of Lower Snake River Dam Removal

Jim Waddell: (Note of Clarification: The term "removal" is often taken to mean or suggest removal of all of the dam structure, Power House, Spillways, Lock etc. However, the Corps of Engineers Feasibility study and EIS completed in 2002 clearly shows that this is not necessary to achieve a free flowing river and fish passage through "channel bypass". What is "removed" is the earthen portion of the dams and for the lower two dams some of the earthen abutment to achieve required channel with. Indeed, the cost of full removal would be over $3 Billion, which would make breaching infeasible from an economic standpoint.)

1) **What current process is underway to examine the issue of dam removal?**

As a result of a 5th failed Biological Opinion the Federal court ordered the National Marine Fisheries Service, the Corps of Engineers, and other federal defendants to develop a new BiOp and Environmental Impact Statement, (EIS). Commonly referred to as the CRSO process (Columbia River Systems Operation Review) it has a massive scope covering all 17 Federal Dams and the entire Columbia basin (except for Canada). Corps staff and retirees who worked on the original CRSO review, (this review quickly focused on a study of the four lower Snake Dams that led to the current EIS in 2002), view this scope as tool large to execute at any reasonable budget or in a time frame less than 8-10 years, if ever.

HOWEVER, The ongoing litigation over this BiOP and the Court's order for a new EIS process *does not limit or constrain the Corps* from acting in the meantime to accelerate salmon and steelhead recovery via breaching and channel bypass.
The January 2017 letter from the Assistant Secretary of the Army for Civil Works (ASACW) confirms that the Court's (Judge Simon's) direction for a new and broader NEPA process is a separate action, meaning it does not prevent the Corps from exercising its responsibilities to comply with existing law and regulation today. In other words, it is not a "get out of jail free card" to avoid any action until a new EIS comes out, which is probably 4-6 years away, since the new EIS will be a "programmatic" type for the entire Federal Columbia River Power System (FCRPS). Should breaching the 4 LSRDs be included as one of the many alternatives in the Programmatic EIS and a decision, through yet another process, be made to develop a breach plan, a specific EIS would have to be prepared. By then the endangered Southern Resident Killer Whales (SRKW), chinook and other salmonids, and steelhead will have have long since degraded to functional extinction.

a. What entity is running the process and why was that entity chosen?
   The Corps and BPA are primarily funding and running the process. The Corps because they built and operate the dams and are responsible for insuring they meet Congressional intent, i.e, economic benefit and conformance to all federal laws and state water quality standards, among others. The BPA because they must pay for 92% of all cost associated with the dams since they sell the hydro power to rate payers. They also have an interest based in the 1980 Power Planning and Conservation Act which makes them almost entirely financially

responsible for mitigating environmental damages caused by the dams and reservoirs.

b. When did the process start and when is a decision expected?

It began around September 2016. The judge granted the agency request of 5 years for completion of the EIS. However, given the vast scope of the EIS, it will have hundreds of possible recommendations for Habitat, Harvest, Hatcheries, and Hydro actions were federal agencies have responsibility, so will be a "Programmatic Type" EIS. Assuming there is a breach alternative for the 4LSRD's in the EIS, and it is decided to further study it for implementation, a separate site specific EIS, like the one the Corps is using now for mitigation on the dams, will need to be completed. This could take another 6 months if the existing EIS is used. So, a breach decision, if any, following this process could easily take another 4-6 years. This does not include any delays. Corps technical staff are already insisting that modeling will take another year since the hydro alternatives for the lower Snake Dams are still in debate, primarily because breaching is contentious by upper management who still insist that no alternative that eliminates navigation can be considered. (Rebecca Weis, COE, Comments at the CRSO status conference in June 2018)

c. How much will the process cost?

In 2016 cost estimates were $40 million BPA and $40 million Corps. However, as noted above given the scope and delays already noted, a reasonable estimate is likely over $120 million. This is based on my past experience managing the 2002 Feasibility Study/ EIS and consultation with NEPA specialists within the Corps and the Environmental Protection Agency (EPA). As a point of reference, the 02 FS/EIS took $33 million and 7 years, but was quickly focused during the system operation review of the lower Columbia and Snake River dams to the 4 lower Snake River Dams. Nor, did it look at the other H's, so it is not hard to imagine the infeasibility of the new CRSO/EIS process achieving anything useful for SRKW and Snake River salmon recovery.

2) **What are the steps involved in gaining approval to remove the dams?**

If the existing 2002 EIS is used, it is a simple matter of writing a new Record of Decision (5-10 pages) which the Commander of the Corps Northwest Division, MG Helmlinger then would sign. This is possible because The Corps has a fiduciary responsibility ultimately derived from the Public Trust Doctrine to protect the public interest and to fund only beneficial projects as measured by National Economic Development benefit-to-cost ratios (BCR) that exceed 1. That means for every dollar spent, at least one dollar in benefit is returned. The 4 LSRDs have a combined BCR of .15. That means the 4 LSRDs are returning only 15¢ for every $1 invested. This compares to projections that a free flowing lower Snake River could return at least $4 for every $1 invested.

Protecting the public's interest means the Corps can place an underperforming project, such as the 4 LSRDs, into a "caretaker" or "non-operational" status. This does not require a specific or new authorization from Congress to do so. Nor does it require that

the project be "deauthorized" by Congress first. The underlying reason for this is that a project "authorization" is not a mandate. It gives the Corps *permission* to build and operate a project for specific purposes as long as it provides economic benefit, conforms to other applicable laws and policies, such as the Endangered Species Act, and receives appropriations. When one or more of these criteria is not met, the Corps does not have permission to build or to continue operation. So, the Corps has an an inherent responsibly to make the decision to place these dams into a non-operational status. It is Corps policy to "notify" Congress of their intent to close a project. Traditionally the Corps works closely with members when such closures are required.

Importantly, the Corps would be loath to have a policy that would require authorization from Congress to stop spending money on a project, decommission, or place it into a non-operational status as it would make it impossible to make budget decision across the Corps when there are insufficient appropriations. This has been the case for 200 years. For these reasons, if Congress tried to write legislation to somehow mandate the uninterrupted operation of a project it would violate the principles of congressional authorization versus appropriations. HR 3144, sponsored by Congresswoman Cathy McMorris-Rodgers, may indeed be an attempt to do so and is likely motivated by her realization that the Corps can take action to place the 4 LSRDs into a non-operational status.

However, It is also a long held cultural or institutional norm for local Corps districts and divisions to ignore the economic reality of a project, and, instead, go to great lengths to defend the project. This is understandable to some degree, since the Corps district offices are trying to protect their budget and livelihood. But this does not conform to the Corps' stated values toward public service and avoiding squandering taxpayer dollars, nor does it comport with the Public Trust Doctrine. Compounding this problem are the special interest groups or a small number of individuals who can parlay oversized influence with elected officials by claiming that the Corps will somehow damage locals by asserting fiscal responsibility and placing the dams into nonoperational status.

Congressional representatives and governors are often reluctant to support decommissioning a project by placing it into a non-operational status for fear of being perceived as taking something away from their constituents. This leads to frequent arguments between the Senior staff in Headquarters US Army Corps of Engineers (HQUSACE) and the Assistant Secretary of the Army for Civil Works (ASACW) on one hand, and the Corps field commander/staff and elected officials on the other hand, who are not faced with the budget priorities and limitations directed by the Office of Management and Budget (OMB). In short, there is never enough money to fund even high performing projects. And with the administration trying to further reduce the Corps' Civil Works budget, the Corps should be particularly attentive to eliminating poor performing projects in the manner proposed in this paper. Therefore, given the geographic relationship of Washington State Senators, Congressmen and the Governor to these dams and the ongoing ideological log jamb, the Corps would be reluctant to make a decision without some "ask" or "pressure" from said elected official or officials. In this case most notably, Governor Inlsee through his actions establishing the Orca Task Force looking for meaningful solutions to increasing chinook.

If, the court ordered CSRO is followed through, the above steps would also be used, but at least five years from now.

a. Who has the authority to authorize removal?

As stated above, the US Army Corps of Engineers has the authority

b. What agencies need to be involved in the decision?

The Corps and BPA. BPA, because they would need to fund the breach costs and mitigation features resulting from the drawdown of the reservoirs. Assuming the 2002 EIS is used as the NEPA documentation, all other relevant agencies, Tribes, NGO's and the public have already played a role in this process. This is what led to the four Alternatives in the 2002 EIS. Breaching being the 4th Alternative. Which, for many years, has been the only remaining Alternative that could recover chinook and play a key role in quickly providing prey resources for the SRKW's.

c. What role do Tribal Nations and other entities, including State of Washington play in the process?

As noted, from a formal NEPA engagement process they have already played a role. Today, they can and should play a role in pressing the Corps to utilize the existing 02 EIS to implement the breach Alternative immediately, if SRKW's are to gain the benefit of the 100's of thousands of chinook that will keep them alive as well as sustaining Tribal and state fisheries.

d. How long might the process of gaining approval take?

If the 02 EIS is used to place the projects into a non-operational status, a matter of days. IF, another process is used, like the CRSO process and/or asking for legislation and federal appropriations, years to decades.

3) **What are the steps involved in removing or decommissioning the dams?**

Other than the decision process noted above, the first step would be to notify the public and shippers of the Corps intent to breach one or more dams and that the existing navigation project will be closed. This would require that vessels be moved downstream or hauled out at existing boat ramps. The original Navigation Project has a 5-foot depth so boaters able to handle those drafts could move their vessels upstream prior to drawdown so as to avoid being stranded. Existing boat ramps on the Snake and Clearwater Rivers above the pool of Lower Granite will still be useable.

It is likely that some group will file an injunction in Federal Court to stop the Corps from breaching. In such cases, where the urgency is the paramount driver in terms of timing this will be decided quickly. If properly defended in Court, it is doubtful that the injunction would be successful given the ecological/NEPA history, the use of an updated EIS, the fact that economic mitigation measures are included and the risk of significant natural resource damage if the Corps is not allowed to use its inherent discretion to act. It should also be noted that according to the White House Council for Environmental Qualities guidance on agency discretion in such matters, if the action is driven by an emergency situation, as in this case, an EIS can be developed or updated in parallel or after the action is completed. So, the 2002 EIS' even in its existing state, is far more NEPA coverage than is really required. Therefore the Corps has a highly defensible argument if properly represented in Court and the supporting documents and data.

Breaching itself is far easier than originally planned, making it possible to move from a decision to breach to breaching in a matter of months, not years.
Given the relative ease of hydraulically breaching an earthen embankment, there is no need for lengthy modeling, engineering, design or complicated/lengthy contracting. New ,"dam overtopping", modeling software has been developed since the 2002 EIS was drafted which allows a safe breach plan to be created quickly. The breach itself is done in two phases. First, as drawdown of the reservoir is taking place, earth moving equipment, likely two D8 bulldozers and an excavator, will be cutting a notch in the earthen portion of the dam. When drawdown is below spillway crest and the notch cut to that depth, controlled hydraulic breaching will begin which uses the turbine gates to control flow. This takes approximately 8 hours with maximum flows not exceeding high flows normally encountered during spring runoff. Armoring protection and other channelization work can also be accomplished with several pieces of heavy equipment. The entire deconstruction effort can easily be accomplished through "Time and Materials" or rental contracts. Details to the breach approach can be found in the 18 Feb 2016 Supplement (unofficial) to Appendix D Natural River Drawdown Engineers of the 2002 EIS. In short, what the Corps' Walla Walla District originally estimated would take several years in modeling, engineering, design and contracting and well over $70 million, can be done in a matter of months for around $1 million.

a. Who will be responsible?

   The Corps of Engineers, most likely the Walla Walla District Commander.

b. What mitigation/restoration is likely to be needed, if any, as part of the process?

   The 2002 Feasibility Study and EIS (FS/EIS) addressed all imaginable mitigation and restoration concern in terms of regional and national economic costs or benefits. In most cases it included any mitigation cost as part of the breach plan and budget. Examples of the mitigation features assessed are: Irrigation modifications for 14 farmers on Ice Harbor pool (the 4th dam to be breached), shifting truck-barge shipments on the river to truck-rail, cost of replacement power, relocating Clearwater Paper Companies cooling pond out fall, relocating boat ramps, cultural resource protection, etc.
   In terms of restoration, the fact that breaching allows for full restoration of the 140 mile stretch of the lower Snake River to a pre-dam state. That is the main restoration feature. Others include seeding the exposed riparian areas during drawdown to reduce erosion from rainfall that might expose cultural resources, reduce dust, and provide forage food for deer and elk. Another major feature of restoration could be allowing return of agriculture, such as the viticulture and orchards that once occupied roughly 10,000 of 20,000 acres now covered by the reservoirs. However, the Corps left out any benefits associated with this (1,000 jobs and $100 million annually based on reclamation of 5,000 acres) so no restoration plan was developed to show how much riparian buffer to reestablish. Such a plan for land conveyance and use should be undertaken in parallel to breaching.

c. Who will pay for it? Are any financial commitments secured?

The mitigation features and costs identified in the 2002 FS/EIS and updated over the last 3 years, get paid for in two ways. First, mitigation features such as power replacement and navigation were not incorporated in the 02 EIS as part of the funds needed to breach. This is because shifts in National Economic costs and benefits are used for calculating the Benefit Cost Ratios (BCR) between alternatives and may not be something the taxpayers could pay in a straightforward way. Nevertheless, to some degree they represent real cost and benefits to someone and I have incorporated them into the breach cost. The second way the 02 FR/EIS these mitigation costs are accounted for is in the breach cost itself. Except for power, navigation and irrigation, they were all included in the breach cost estimate and validated in 2016 by a small team of current and retired Corps employees and volunteers in the Reevaluation and Supplement Report to the Drawdown and Engineering Appendix of the 2002 FR/EIS. These cost were then pulled into the updated economic analysis and Benefit/Cost Tables by Earth Economics. These reports are available at damsens.org.

Who will pay? In theory, power mitigation, that is replacement if needed, would be BPA via its rate payers. At the time of the 02 FR/EIS this was modeled by BPA to be around $271 million on an average annual basis. However, because the Corps and BPA did not adequately anticipate the shifts in the power markets driven by: deregulation; conservation, which reduced demand; wind and solar which added nearly an equivalent amount of power to BPA hydro power…….all of which created a massive surplus of power which is sold mostly at a loss for the last 5-7 years…now combined with accelerating escalation cost for repairing and rehabilitating hydro projects, leaves us with virtually *no mitigation costs for anyone, with breaching*. *Indeed, breaching saves money for BPA* that should result in rate decreases or applied to other hydro projects which has a similar, but indirect, effect on rate reductions.

For navigation, the economic effects for shifting to rail was assumed to cost $27 million on annual average basis if commodities were shipped by rail. However, the2002 FFR/EIS itself showed that there was sufficient evidence to conclude that there was virtually no economic effect by shifting to rail, but this conclusion was not drawn due to a lack funds to recalculate the BCR based on input from navigation economists contracted to field verify the original calculations generated by models. Since then, and largely driven by the fact that in most cases there was little difference between barge and rail rates, several significant strides were taken that have already shifted all petroleum shipments and 30-40% of the grain to rail shipments. Farmer Co-Ops built two 100 car unit train grain loaders in the lower Snake Region and are building a third only a few miles from the river; the rail lines along the lower Snake River have been upgraded to class 1 and 2 standards allowing more economical shipments from Lewiston to barge loading facilities on the Columbia or grain terminals in Portland Oregon; the State of Washington's "Grain Train" has grown from a small shuttle service of 30 cars to over 110 and have upgraded most of their rail lines. It is noteworthy that this

shuttle service delivers most of the grain to a loading facility built after 2002 on the Columbia River that loads it onto barges. Because pro-dam advocates often state, albeit erroneously, that barge traffic has not declined on the Columbia/Snake system, this shift from the lower Snake to the Columbia gets ignored. From an economic standpoint the Snake projects are separate from the Columbia. Similarly, petroleum shipments through the lower Snake navigation leg have ceased even though there is a viable and growing terminal at river mile 1 on the lower Snake, but it is not affected by breaching. These improvements have all been market driven and show that the conclusions drawn in the 2001 FR/EIS were wrong, even though data in the report showed otherwise. This analysis has all been updated by my work and that of Earth Economics.

There are however further improvements that could be made to expedite the transfer of the remaining grain shipments to rail. They are; a $29 million repair/upgrade of for the rail line between Dayton and Prescot WA owned by the Port of Columbia; Rail siding improvements and handling facilities at grain elevators and perhaps a unit train loading facility along this line, $5-37 million; upgrade of 2 miles of rail line in Idaho to the Lewis and Clark Grain Terminal along with expansion of siding and handling facilities, $5-32 million. Total improvements range from $40 to $98. Now that these mitigation cost are known they should be included in the total cost of breaching.

For irrigation, the 02 FR/EIS provided an estimate of $291 million to modify the irrigation system as a result of drawdown of Ice Harbor pool. This was twice the assed value of the farmland. As such the conclusion was that these 14 or so farmers would be bought out, no doubt leading to their antagonistic view toward breaching. However, it was known at the time the $291 million was very speculative and based on faulty assumptions, but again, corrections were not made for the lack of more study funds and time. In recent months water supply engineers have recalculated the cost of pump and pipe modifications and found that in current year dollars it would cost $19 million. Because available pipe and pump sizes inevitably lead to larger system capacities, these mods will allow for the irrigation of an additional 5,000 to 7,000 acres, further driving up farm employment and income not accounted for in the original 02 FE/EIS. The $19 million should be part of the breach cost.

d. How much might this cost?

The breach costs themselves will be about $170 million for all 4 dams. When contingencies for rail relocations and repairs, abutment armoring, channelization dikes and the additional rail and irrigation mitigation features noted above it will bring the full-up cost of the breaching of all four dams to around $400 million. It should be noted that the first two dams to be breached would be about $40 million for the breach costs alone. Compare that to the study costs for a new EIS.

e. How long might this take?

If a decision were made quickly, it is still possible two breach the first two dams in the in-water work window between December 2018 and March 15 2019. The remaining two dams could be breached one per year there afterwards or two in one year for an additional $15 million. The object of quickly breaching 2 dams is to prevent the death of 4 million chinook smolts in 2019, the fastest way to deliver several hundred thousand adults to SRKW while not harming and most likely benefiting the fishing industry.

4) **Why have prior environmental reviews (NEPA, EIS, etc.) not concluded with breaching as the preferred alternative?**

The 2002 EIS did conclude that Alternative 4 breaching provided the highest probability of meeting the survival and recovery criteria. Note the below statement from the 2002 FR/EIS.

"Overall, PATH results indicate that the chance of meeting NMFS survival and recovery criteria for the four listed species under **Alternative 1 (do nothing) would likely be the same or slightly better than Alternatives 2 and 3.** Alternative 4 provides the highest probability of meeting the survival and recovery criteria under the PATH analysis. Both the CRI and PATH **analyses indicate that further improvements in the hydrosystem passage system are unlikely to recover listed Snake River stocks** unless there is an improvement in juvenile fish survival downstream of Bonneville Dam, either through such factors as improved fish conditions or improved timing of entry into the ocean" (Page 25 of the Summary document of the 2002 FR/EIS)

Also note that the Corps, with "support" from BPA and elected officials, chose a combination of Alternatives 2 and 3, at an estimated cost of $351 million, that were going to have less benefit than doing nothing else to the dams. This choice, even though recommendations within the Corps to proceed with breach plans were ignored. This decision was largely based on the conclusion that in the face of "devastating" economic costs of breaching, it was not necessary at this time. The economic effect of breaching, given in 15 public meeting, the draft and final FR/EIS, was around $246 million on an average annual basis. Truly a case of "Sticker Shock" for Breaching. But as noted in the discussion above and using corrected assumptions for the cost of breaching and of dam operations, maintenance, repair and rehabilitation costs, the economic effect should have been stated as a $69 million *benefit* with breaching, a "game changing" error of over $300 million average annual. The $69 million breach benefit still included a $271 million power replacement charge, which is now known to be unnecessary, thus putting the breach benefit at $340 million average annual ($69 plus $271).

The costs of implementing, what was known to be pointless Alternatives, are now reaching $1 Billion with the predicted results of no recovery, indeed further declines.

The Impact on Prey (Chinook) Availability

5) **What is the estimate - informed by best available science - of potential increase in Snake River chinook availability as a result of dam removal?**

a. How many additional Snake River chinook are estimated on an annual basis? Starting when and what were the assumptions at arriving at the estimate?

Based on the fact that roughly 20 million juvenile chinook enter the lower Snake system, and that each LSRD *and reservoir* kill on average 10% of them. Then breaching 2 dams immediately will prevent the destruction of about 4 million smolts, aged 9 to 14 months depending on run, in 2019. Of these, several hundred thousand will make it to the size suitable for SRKW 14 to 18 months later, ie., Spring, Summer and Fall runs of 2020. Four dams would add at least a million chinook to the ocean environment. It should also be noted that the 2002 FR/EIS Appendix gave SAR's for Spring/Summer and Fall chinook at 11% and 31% respectively with breaching, far greater than the SAR estimates generated the CSS models presented in the "Spill" Webinar. These high survival rates are show that wild fish can rapidly recover. However, as wild genes continue to be diluted by hatchery fish and overall number continue to drop, recovery in any meaningful time frame will not occur. For this reason, Corps technical members working on the CRSO Alternatives are now suggesting that if breaching the 4LSRD's does not occur shortly, then it will be necessary to not only breach these four but to drawdown to

b. What baseline or status is used as the baseline to develop the future estimate, e.g. what was the annual number of Snake River chinook over the last 50 years and what was the historical (pre-European settlement) abundance and distribution?

Current numbers of smolts passing through the lower Snake hydro System. Estimates vary widely and depend on where the question of abundance is being asked. Obviously important for SRKW is how many were in the in the coastal areas of Washington where SRKW historically fed and now, do so much more often with the near collapse of the Frasier River stocks.

c. What assumptions have been made to develop this projected estimate related to:

i. Hatchery production

The above 20 million chinook smolts is based on hatchery and wilds. Hatcheries comprise roughly 85% of this number. The hatchery fish come from the Compensation Plan or "mitigation" hatches to offset losses by the 4LSRD's. Mitigation will not be complete until wild runs are restored. So, these hatcheries will need to be a primary course of chinook for SRKW but should be phased out as wild fish return.

ii. Habitat conditions – restoration needs, impact of upstream dams, etc.;

With breaching, habitat work to date and future work will have a benefit and should continue as part of a broadly-based recovery strategy. Without breaching, it is being sub optimized. That is, too few fish survive to return to the spawning grounds in the restored habitats to warrant continued funding in the Snake basin. Furthermore, the food web in pristine habitats in Idaho and eastern Oregon are degrading because of a lack of biomass from retuning adults. In the coastal areas and Salish Sea, habitat investments will also be sub optimized since these local stocks

now represent a larger proportion of the prey and harvest base, thus reducing adult returns to spawning grounds.

iii. Other

Sediment movement during and after dam breaching has been and continues to be brought up erroneously as a negative impact that must be mitigated or would prevent breaching altogether. This issue was of course looked at carefully in the 02 FR/EIS and then again in the Dredge Material Management Study for the lower Snake River. This later, $17 million study was done to determine the feasibility of maintaining the navigation channel through roughly 100 million cubic yards of sediment and depositing the dredged material from the navigation channel into the river chinook habitat. Extensive testing for contaminants and other factors showed in water disposal of this material would have no negative impact on aquatic life. This is the same material that would be exposed and moved downstream after breaching. Corps original studies show that this bed load movement is both natural and desired for chinook habitat. Sediment movement does increase turbidity but except for the day or two in which the hydraulic breach of the earthen embankment is ongoing, turbidity levels will not be harmful. Indeed, this turbidity is beneficial in that it hides juvenile salmon from predators. A further benefit from the finer material dropping out behind McNary Dam is it will cove or "cap" radionuclides that deposited during the days of active enrichment of nuclear material at Hanford. After all four dams are breached the heavier materials, sand and small pebbles, will drop out at just below the location of Ice Harbor dam. This will not have any effect on navigation at the Pasco ports at mile 1 of the lower Snake for at least 50 years. At that time navigation dredging similar to current maintenance dredging for the Ports of Lewiston and Clarkston may be required.

d. What costs, if any, might be involved to achieve the estimated benefits? (other than dam removal and mitigation addressed in question 3c)

The Corps cost for a Section 216 Disposal Study to determine final disposition (ownership) of the 40,000 acres of land and the concrete dam structures themselves. Estimated at $5 million. Transfer to the State would be typical but may take a while through this process. In the meantime, the Corps does have the authority to lease lands for agricultural or recreational use.

e. What science or studies are referenced? When were those studies conducted?

Primarily the 2002 FR/EIS which is available on the Corps Walla Walla District web page, under "library". Numerous updates and corrections to the FR/EIS have been made and are posted on the damsense.org website as a matter of public information.

6) **What is the relationship (status and trend) between abundance of Snake River chinook and abundance of SRKW and what data was used to conclude SRKW are highly dependent on Snake River chinook?**

Previous reports provided to the Task Force show that the relationship is historically, empirically and scientifically grounded. While many desires much more certainty as to the numbers of each chinook run consumed, what is clear without the need of any further research and the delays that would ensue, is that there is an important dependency. We note that NOAA recently produced a display showing sources of chinook contribution to the SRKW diet and noted that the Columbia and Snake rivers each contribute about 25% of the diet. While a collapse of even 25% from the Snake would lead to, indeed already is, SRKW deaths related to complications from malnourishment and simple starvation, the situation is even worse now with the virtual collapse of the Frasier river runs. Also, this percentage is based on runs over the last twenty years or so but does not take into consideration the much larger potential of chinook increases resulting from immediate breaching. The data is direct observation, NOAA satellite tracking, a few scat samples and process of elimination, if they are not eating Columbia/Snake Runs in their coastal foraging, then what could they possibly eat in numbers to keep them out there?

I also offer these comments about the relationship from Ken Balcomb:

To begin, I do not think that the SRKW were forced into a migratory behavior by the collapse of Fraser and other chinook stocks; rather, I think they have always travelled up and down the coast and into the Salish Sea "cherry picking" the Chinook salmon, but never staying in one location (e.g., off a major river mouth to gorge on all of the fish). In my experience, they travelled with pulses of inbound spawners from coastal waters through the Strait of Juan de Fuca and Haro Strait to Georgia Strait where they turned around and went back to or toward the coastal waters. They travelled at 3.75 knots and covered about 75-90 miles per day, in relaxed foraging mostly during incoming tides when the fish were moving toward the river mouth. They were and are always moving. However, as the biomass of Chinook per square mile diminishes, the whales spread out in smaller groups and appear more "busy" - attending to foraging rather than entertaining whale watchers. Now they come into these waters much less often because the fish have collapsed.

The three pods that Dr. Mike Bigg identified in southern BC waters were called J, K, and L (A-I pods were in northern BC waters), and they were discrete and separate enough for us to discern slightly different patterns in their distribution and association. J pod was encountered in Salish Sea waters in all months of the year and made forays into Puget Sound once or twice each month. They were frequently seen in Haro Strait, and they passed through the strait every day or two from May through September when the seiners were fishing daily. From the seiners we obtained a pretty good idea of how many salmon were heading toward the Fraser River, and from the test sets we had an index of how many got to the river. It took us awhile and much scale sampling in trail of the whales to

figure out that they were targeting Chinook, even during runs of millions of Sockeye and Pink salmon. The scat sampling and the molecular data show the same pattern.

During big runs of Chinook, K and L pods joined J pod in the interior waters, and in the late 70s and early 80s spent much of the May through September season going back and forth from coastal waters to the Fraser plume. We know they went as far out the Strait of Juan de Fuca as Swiftsure and La Perouse Banks because a colleague, Brian Gisborne, photographed them out there whenever they were not with us in interior waters.

The satellite tagging studies of SRKW by Dr. Brad Hanson showed much the same pattern, and also illuminated the pattern particularly for winter months. L pod was most coastal in distribution, spending much time off Washington State, particularly in and north of the Columbia River plume; but, occasionally traveling for a week or so down to central California (Sacramento/San Joaquin fish). K pod sometimes went with them, but in general seemed to range intermediate between L and J pods. they were always moving at 3-4 knots, but sometimes in circles or polygons.

Because the SRKW must eat the equivalent of about 2.5-5% of their body weight pretty much daily, the coastal waters were and are important foraging areas for all three pods, but we have not documented J pod south of Newport Oregon. In total, they probably eat as many as 580,000 twenty-pound Chinook per year, and we can probably calculate when and where they dine for the past. I am sure that we can come up with the Salish Sea contribution to their diet, and the rest is coastal. But, the take home message is that they go where the fish are, and they find the energy rich big ones. I am working on this from the whales' point of view, and their distribution shows me that the WA coast/Columbia/Snake contribution is vital. IF the Snake became a big wild Chinook producer again, that would be a huge benefit.

7) **Why the emphasis on the 4 lower snake river dams and why not other dams, especially those that have no fish passage?**

Notably, CRSO reviews in the 1990's looked at this. Major dams without fish passage such as Chief Joseph and Grand Coulee are very high head dams that makes fish passage extremely expense, especially in light of their irrigation and flood control functions. The 4 LSRDS are not flood control dams. Idaho dams were looked at but because they are nonfederal were not assessed through Corps studies and the EIS. The Idaho Hells Canyon dams are undergoing FERC relicensing, but this could take years. Also, the uppermost dam has significant containments behind it and the historical habitat above these dams has been heavily impacted by agricultural practices,

Other Considerations

8) **What is the potential impact of dam removal on:**

a. Agriculture and irrigation

Impacts are positive for both as noted above

b. Transportation sector

Other than those noted above, a small number, less than 10, barging jobs will be lost but about the same amount will be hired due to increased rail traffic.

c. Energy production and cost

As noted above, dam breaching reduces surplus power by about 17%. Surpluses are selling at a loss to BPA and its ratepayers. The 4LSRDs are twice as expensive to operate the Corps Chief Joseph dam on the Columbia which produces twice the amount of power of all four Snake Dams. Over a recent period of 93,000 hours of power production from the 4LSRD's only 2 hours were actually used by BPA customers,

d. Recreation

A review and update of the recreational analysis done in the 02 FR/EIS by Earth Economics show that the Corps left important analysis by the recreational economist. What this analysis would have shown is that the recreational benefits would produce 3,000 to 4,000 full and part time jobs in the six-county area along the lower Snake River in Eastern Washington. This yields direct expenditures of approximately $250 million per year. Claims by the Corps Walla Walla District of 2.8 million visitors currently is absurd. As a point of reference, Yosemite National Park gets a little over 3 million visitors and anyone who has visited this park in the summer will have an idea what this kind of visitation looks like. For decades visitation at lower Snake recreation facilities has been so low that neither the Corps, the State or the Counties could justify the expenses to keep them all open, several have closed. Free flowing river recreation and fishing combined with viticulture, orchards, wineries, country inns, restaurants, trails, etc., with multimodal transportation options can yield a tourism renaissance of these counties

e. CO_2 emissions

Reservoirs emit methane which is 85% more potent than CO_2. The 4LSRds emit about 45,000 equivalent tons in CO_2 emissions from methane on a constant basis, which is several times more than any increase in CO_2 emissions resulting in a shift from truck-barge to truck-rail. The idea that thousands of trucks will be added to roads and CO_2 emissions is false.

9) **What potential mitigation costs are associated with dam removal to address the adverse economic impacts on affected sectors?**

a. Have any financial commitments been made to cover these costs?

Unlikely, since no Government Agency, elected official, NGO or Tribe has pressed for immediate breaching.

b. What assumptions or expectations do you have about how those costs would be covered?

Breaching can be financed through existing debt reduction and credits mechanisms as a fish mitigation action by BPA. New appropriations are not needed. Since BPA is the responsible bill payer for 92% of the cost of these four dams, BPA is responsible for at least 92% of the breach cost. (The 92% is an average. The cost share ranges from 98.4% for Lower Granite dam to 78% for Ice Harbor dam.[i]) However, if BPA sought to pursue breaching the 4 LSRDs as the most cost effective "fish mitigation" measure for salmon and steelhead recovery under the 1980 Power Planning and Conservation Act, BPA can book a 22% credit against the US Treasury debt on these dams. This has the added advantage of avoiding any of the appropriation and authorization conundrums involved in attempting to get Congress to act.

Another financial component concerns the debt and debt service resulting from these 4 LSRDs. Given the failed alternatives selected by the Corps in the 2002 EIS and the nearly $1 billion spent since 2000 on these failed alternatives, e.g., little or no improvements in Smolt to Adult Returns (SARs) for salmon and steelhead, BPA ratepayers have a good argument for not repaying this debt nor the interest bearing on it. Likewise, Corps' mitigation expenditures on the 4LSRD's prior to signing the EIS yielded few if any sustained recovery benefits. Therefore, these expenditures also should be exempt from repayment by the BPA ratepayers. Ratepayers should not be held accountable for the decisions made by the Corps, especially in light of the fact that over 80% of the individual comments made/sent to the Corps in 1999 supported dam breaching. While BPA has been slow at paying down its debt burden, presumably because it would significantly increase power rates, BPA must make timely interest payments to the US Treasury. These interest payments alone account for about 25% of BPA's cost to operate, maintain, and repair the 4 LSRDs and bypass systems (mitigation), and will continue to increase without debt relief. This approach of using $1billion in debt relief could not only finance all breaching and mitigation cost but could also fund additional habitat work and hatchery transitions or phase outs.

However, the economic analysis that shows that BPA can save money on breaching assumes they pay 100% of the breach and mitigation costs with ratepayer funds. Treasury credits ranging from 22%, easily done, to 100% are additional benefits.

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http://www.nww.usace.army.mil/portals/28/docs/environmental/lsrstudy

BREACHING THE LSRDS

PICTURE FROM THE CORPS ACTIVE 2002 EIS SHOWING DAM BREACHING HAS ALREADY BEEN STUDIED

FAST SALMON RETURNS

Each dam breached prevents the death of 2 million smolts.

BREACHING TIMELINE- BEGINS IN 2018

1 SEPT	15 OCT	1 DEC	23 JAN	15 MAR, 2019
Prepare Supplemental EIS materials & Record of Decision.	Prepare/Solicit /Award Cost-Type Contract for Excavation	Lower Granite draw-down begins.	Controlled hydraulic breach of Lower Granite. Little Goose draw-down begins.	Lower Granite & Little Goose breached. 70 miles of Free Snake!

BREACH vs. REMOVAL

$340 Million FOR ALL 4 DAMS	vs.	$2 - $3 Billion!
Simple/small size of USACE project- just remove earthen berms	vs.	One of the largest project they have- would remove entire structure.
Can start in December 2018 and finish by March 2020	vs.	Could take years just to begin

TIME IT TAKES FOR SALMON TO BE READY FOR SRKWS VIA:

BREACHING: 14-18 MONTHS

HATCHERIES: 3-10 YEARS

We must request Alternative 4 in the active 2002 EIS be implemented starting in December of 2018.

No new authorities are needed to place these dams in "non-operational" status; the Corps can do so immediately if they are asked.

1

The Corps needs no new authorities to place the 4 LSRD's into a "non-operational" status while normative River flows are reestablished by removing the dams' earthen portions.

2

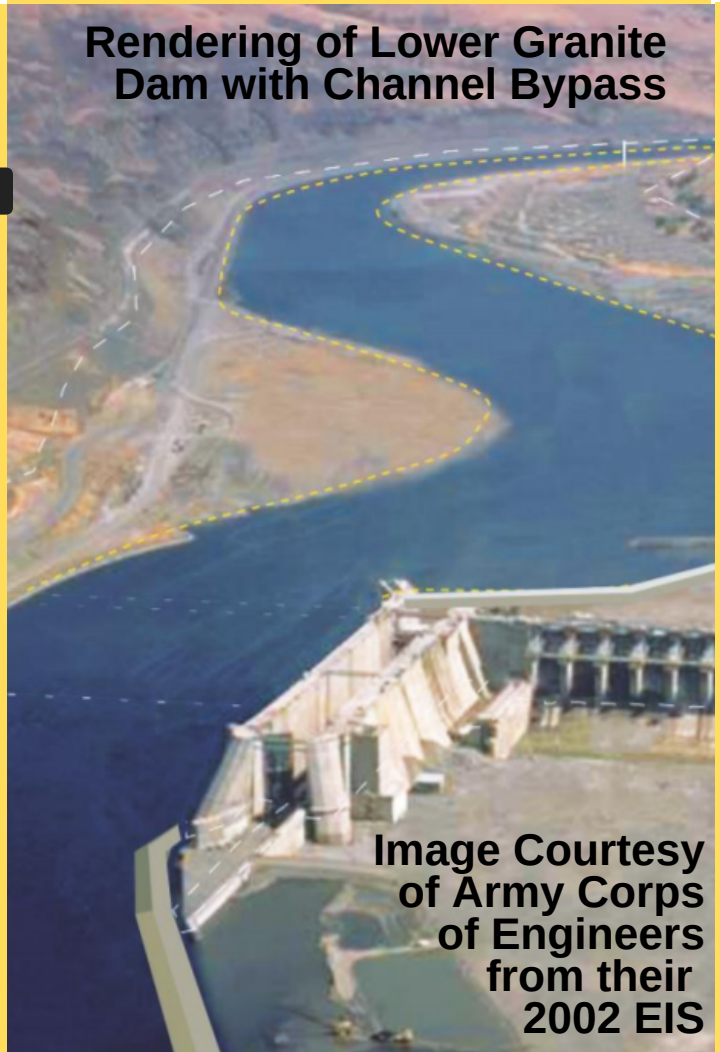
The Corps already studied dam breaching. It's Alternative 4 in the 2002 Environmental Impact Statement (EIS). If updating is necessary, the Corp can do it in 3-4 months.

3

Neither the ongoing litigation over the 2014 Federal Biological Opinion nor the Court's order for a Columbia River Systems Operation review (CRSO/EIS) constrains the Corps from breaching the dams through channel bypass now.

4

Breaching can be financed through existing debt reduction and credits mechanisms as a fish mitigation action or direct funding by BPA. New appropriations are not necessary.



Rendering of Lower Granite Dam with Channel Bypass

Image Courtesy of Army Corps of Engineers from their 2002 EIS

5

Breaching the 4 LSRD's is far easier than originally planned, making it possible to move from a decision to breach, to breaching in a matter of months, not years.

The CRSO/EIS is approximated at $100M, the cost of breaching Lower Granite and Little Goose Dams.

Stakeholder Outreach Timeline

Letters and documents were mailed via U.S. Mail or hand-delivered to the many stakeholders listed. You can review each document in its entirety at www.damsense.org. This list is not exhaustive and does not include all public outreach or education events attended by DamSense volunteers nor the many telephone calls to various parties.

Executive Branch

1. Dec. 26, 2018 | Jim Waddell letter to General Semonite at HQUSACE
2. Oct. 12, 2018 | Email Response from NWD BG Helmlinger
3. Jan. 4, 2018 | Joyce D Parks to Mindy Simmons US Army Corps urging immediate use of 2002 EIS to begin dam breaching
4. Aug. 2, 2018 | Letter to Elected Officials from Amber Rose
5. July 6, 2018 |Letter to General Semonite from Amy Eberling
    a. Aug. 6, 2018 | Response from General Semonite
    b. Aug. 14, 2018 |Rebuttal from Amy Eberling
6. Jan. 1,2018 | Joyce D Parks Letter to Anne Cann, US Army Corps encouraging LTG Semonite, the Environmental Advisory Board and Corps leadership to take immediate action using 2002 EIS
7. Jan. 1, 2018 | Joyce D Parks to President Trump requesting Executive Order to Breach the Dams
8. Feb. 23, 2017 | Jo-Ellen Darcy, Asst Secretary of the Army to James Waddell, page 3
9. Dec. 20, 2016 | Sharon Grace to Chris Yates, NOAA Assistant Regional Administrator
10. June 17, 2016 | Jim Waddell to Lieutenant General Todd Semonite, US Army Corps of Engineers
11. May 11, 2016 | Sharon Grace/Jim Waddell to Jo-Ellen Darcy, Asst Secretary of the Army; re Court Decision
12. April 14, 2016 | Balcomb/Berta/Grace/Waddell to Kathryn D. Sullivan, Undersecretary of Commerce for Oceans and Atmosphere Administrator NOAA
13. March 4, 2016 | Jim Waddell to President Barack Obama letter, email
14. Feb. 23, 2016 | Sharon Grace/Jim Waddell to Jo-Ellen Darcy, Asst Secretary of the Army
15. Nov. 3, 2015 | Carl Christianson/Jim Waddell to Eileen Sobeck, Assistant Administrator, NOAA Fisheries; Recovering Federally Endangered Snake River Salmon and Steelhead
16. Dec. 21, 2015 | Group to Bostic re Vail Follow Up Letter
17. Oct. 21, 2015 | Group to Lt. Col. Timothy Vail, Commander, USACE Walla Walla District
18. May 27, 2015 | Hansen/Waddell/Weiss/Wieland to President Barack Obama; Recovering Federally Endangered Killer Whales

19. May 2015 | Maxine Waddell to Michelle Obama; Recovering Endangered Species by breaching lower Snake dams
20. April 28, 2015 | Thomas O'Keefe, American Whitewater to President Barack Obama
21. April 23, 2015 | Kevin Lewis, Idaho Rivers United to President Barack Obama
22. Jan. 21, 2015 | Group to Jo-Ellen Darcy, Asst Secretary of the Army; Recovering Federally Endangered Killer Whales by breaching the lower Snake dams; also sent to Patty Murray, U.S. Senate 2015
23. Oct. 9, 2014 | Jim Waddell to Jo-Ellen Darcy, Asst Secretary of the Army
24. April 14, 2014 | Jim Waddell comments to the U.S. Army Corps of Engineers Waterway Users Advisory Board
25. Sept. 13, 2013 | Jim Waddell to Jo-Ellen Darcy, Assist Secretary of the Army

Congressional Branch

1. June 13, 2018 | Letter to Senator Kilmer from members of Gig Harbor Rotary Club
2. April 24, 2018 | Joyce D Parks to Alaska's US Congress Murkowski, Sullivan & Young
3. April 2, 2018 | Jim Waddell to the office of Washington Representative Dan Newhouse
4. April 12, 2017 | Gary Lane & Group (small businesses of Riggins ID) to Idaho Senator James Risch
5. Nov. 2, 2016 | Howard Garret, Orca Network to Governor Jay Inslee
6. Nov. 2, 2016 | Howard Garrett, Orca Network to The Honorable Patty Murray
7. Nov. 2, 2016 | Howard Garrett, Orca Network to The Honorable Maria Cantwell
8. Jan. 24, 2015 | Group of Scientists to Senator Patty Murray, SRKW CSI Scientist's Letter
    a. In addition, this letter personally addressed and hand delivered to the following DC offices by Jim Waddell and Jenna Ziogas; Maria Cantwell, Mike Crapo, Jo-Ellen Darcy, Susan Delbene, Eric Hansen, Derek Kilmer, Rick Larson, Rodger McMorris, Jeff Merkley, Dan Newhouse, David Reichert, Adam Smith, Ron Wyden, ASA(CW), CEQ and the Secretary of the Interior.
9. Nov. 3, 2015 | Carl Christianson/Jim Waddell to Senator Murray

State Branch

1. May 1, 2018 | Jim Waddell (hand delivered) to Washington's Southern Resident Killer Whale Recovery and Task Force
    a. Was subsequently handed out at all other five Orca Task Force meetings
2. Sept. 20, 2018 | Howard Garrett in response to Sen. Kevin
3. Sept 10, 2018 | 2nd Letter to Senator Kilmer from Gig Harbor Rotary Club
4. Sept. 5, 2018 | Jim Waddell to the residents of Eastern Washington

5. Jan. 14, 2018 | Jim Waddell to WA Representative Mike Chapman. Provides requested input re: House Bill 2417
6. Jan. 5, 2018 | Howard Garrett to Orca/Salmon Alliance re News Release and Explaining the Feasibility of Breaching
7. Nov. 1, 2017 | Sharon Grace to Puget Sound Leadership Council
8. Oct. 30, 2017 | Howard Garrett, Orca Network appeals to Puget Sound Partnership for help
9. July 19, 2017 | John Twa Comments for the Inland Waterway Users Board meeting
10. July 19, 2017 | James M Waddell Comments for the Inland Waterway Users Board meeting
11. July 12, 2017 | John Twa Letter to the Army Corps of Engineers Environmental Advisory Board meeting in Traverse City, MI
12. July 12, 2017 | James M Waddell Letter to the Army Corps of Engineers Environmental Advisory Board meeting in Traverse City, MI
13. April 17, 2017 | John Twa to the Nez Perce County Commissioners about dam breaching
14. Feb. 23, 2017 | Jim Waddell Addendum ASACW Darcy letter to the Honorable Michael H Simon
15. Feb. 13, 2017 | Jim Waddell Amicus Brief to the Honorable Michael H Simon
16. Dec. 1, 2016 | Letter from London Fletcher, public input to Federal Agency Scoping Meeting
17. Dec. 1, 2016 | Letter from Joel Fletcher, public input to Federal Agency Scoping Meeting
18. March 16, 2016 | Earth Economics Press Release Snake River Dams

Environmental and Other Organizations

1. Dec. 23, 2018 | Full-page newspaper ads published in The Seattle Times, The Oregonian, The Bellingham Herald, Peninsula Daily News, and the Journal of the San Juan Islands
2. Sept. 17, 2018 | Amy Eberling to the Environmental Advisory Board
3. Oct. 29, 2018 | Southern Resident Orca Task Force Draft Report: A Guide for BOLD Commenting
4. Aug. 22, 2018 |Letter to Gov. Inslee & Orca Task Force by Joyce Parks
5. Aug. 20, 2018 |Letter to Mark Pointer by Joyce Parks
6. May 20, 2018 |Tacoma News Tribune, John Burkhart
7. May 8, 2018 |News Release from University of Washington Tacoma, ‘Hope for Orcas’ to Discuss Threats, Prospects for Southern Resident Killer Whales

8. May 5, 2018 |Hope for Orcas: Orca researcher Ken Balcomb and an Urgent Call to Action and Jim Waddell, UW-Tacoma William Philip Hall
9. April 29, 2018 |Salmon and Orca are on the Edge of Extinction, Anacortes Library Community Room
10. Jan. 10, 2018 |Ad expands to the The Olympian to bring attention to plight of Southern Resident Killer Whales and endangered wild salmon they depend upon.
11. Jan. 7, 2018 |Seattle Times Full-page Ad: Dammed to extinction, Southern Resident Orcas are starving. Time is running out!
12. Jan. 6, 2018 |Press Release re Ad Informing Governor Inslee and Senator Murray
13. Jan. 5, 2018 | The Journal of the San Juan Islands: Thousands start ad campaign to breach Snake River dams