

Regarding the Senate Order of Reference 2022-10-04 "Examine and report on Canada's seal populations and their effect on Canada's fisheries," by the Fisheries and Oceans Standing Committee, a brief from Harpseals.org, a nonprofit organization based in the United States, on the subject of Pacific seals and sea lions:

Fishermen of British Columbia have been vilifying seals and sea lions because of their consumption of fish and have demanded a cull or commercial kill of these pinnipeds for years. They claim that seals and sea lions eat too many fish, especially salmon, and are the cause of the decline in the salmon population. They also claim that seals and sea lions are overpopulated and that a cull would restore the balance of the ecosystem and allow the salmon to recover.

The Pacific waters off British Columbia are home to seven species of salmon, but the Sockeye yield far more revenue for fishermen than the others. The Chinook yield the highest price per ton. However, of the 29 populations of Chinook, all but two are considered "species at risk" of extinction by The Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Of the seven Sockeye populations, COSEWIC lists the status of two as being of "special concern," two are endangered, and three are extinct. Scientists understand why the salmon populations are at risk of extinction, but fishermen maintain their own beliefs, and act on their anger at and hatred of seals and sea lions.

One fisherman who has formed an organization and a company with the intent to kill seals and sea lions on a commercial scale is Thomas Sewid. He uses his indigenous identity as a free pass to kill seals and sea lions, not for the purpose of consuming their flesh to sustain his family or community, but to eliminate what he sees as his competition as a fisherman.

After another fisherman wrote on Facebook, "I usually leave once seals/sealions are around, why continue? Lol," Thomas Sewid responded, "Bring an indigenous to harvest them. Why leave when you can watch them get removed."

British Columbia beachgoers have been shocked by the sight of headless sea lions washing up on shore over the past few years. Sewid posted this about the situation:

"THE WORLDS MEDIA CALLING ME FOR INTERVIEWS ON HEADLESS BRITISH COLUMBIA SEA LIONS.

"What do you have to say about the headless sea lions washing ashore?"

HARVEST THE HERDS COME HELL OR HIGH WATER, THOUSANDS OF BLOATER FLOATERS TO COME, HEAD ON AND HEADLESS!"

Sewid also posted on Facebook, "If you look at whiner BS coming out of anti-camps it's the non-native group they are targeting. They know well you don't pick on the Indians; otherwise I spin it to their financial supporters that they best stop funding ENGO's that impede socio-economic and cultural development of the indigenous peoples. Stopping donation dollars is their Archelle's heal. This is a war and I am not about to show weakness nor coddle anyone. Hell or high water, we will harvest the herds!"

Another fisherman who identifies as indigenous, Samuel Doolan, posted on one of Sewid's Facebook pages, "We blasted our fair share sea lions this season. I know it's not enough but we do our best. But we're blasting seals now that salmon seals are here. Like I said we don't need dfo permission and nothing they can do about it here in the north with us."

Though these and other fishermen may never change their beliefs, those who study salmon and have studied them for years and even decades, have developed a science- and evidence-based understanding of the problems that have caused the severe decline in salmon populations.

“The salmon decline in the Pacific Northwest, including British Columbia and Alaska, is not a new phenomenon. We have 4 populations of salmon worldwide, and they have followed the same general pattern. And those populations of salmon are on the west coast of North America, the ones we’re talking about, the east coast of North America, Europe and the Asian Far East. They’ve all followed the same general decline pattern; and that is, as the human population grew in those areas, economic development took place, land use changed. There was all kinds of human activities. The salmon population declined. In those areas where there’s been relatively little human action, the Asian Far East in the Northern half, which is Russia and that area, populations of salmon are doing fabulous. In the European area, the northern parts of Norway, Finland, around the Russian area, those populations are also doing fine. Lots of salmon, few people. If you go over to eastern North America, the lower half of the distribution of salmon, which was the United States, primarily, those populations are essentially gone,” according to Robert Lackey, Ph.D., Professor, Department of Fisheries and Wildlife, Oregon State University, who was interviewed by Harpseals.org in 2020.

Prof. Lackey continued, “British Columbia runs, generally speaking, are about 20% of what they were historically. About 80% of the run is composed of hatchery fish, not wild fish. The run size in the lower 48 was about historically, it was about 50 million fish. Right now, it’s about 3 million wild fish.”

Hatcheries are used to repopulate salmon in the wild but, though they look alike, hatchery salmon are less “fit” - that is, they are less likely to survive in the ocean. If they do reproduce, they produce fewer offspring. They are bred to be caught by fishermen, yet they compete with wild salmon, interbreed with wild salmon, and contribute to the decline of wild populations.

What types of human actions harmed salmon?

“Land use changes caused by human actions were a major initial effect on salmon runs, the salmon runs in this part of the world. Started in 1848, with the discovery of gold in California. The miners, of course, used sluicing techniques to mine for gold. There was tremendous amounts of tailings. Those tailings were distributed in lots of places and invariably, they started sluicing for gold in salmon streams, explained Prof. Lackey.

“They also needed animal protein to survive. They harvested large numbers of salmon in the late 1840’s and 1850’s, and those salmon runs were decimated.

“The land in the Central Valley of California is tremendously altered from what it was in 1850, pre-1850, and it’s not ever going to come back to what it was in the foreseeable future. Those salmon runs, those wild salmon runs in California, Central Valley, are essentially gone. There’s a few residual fish and of course, there’s some other fish from hatcheries.

“You see the same pattern along the coast of North America, starting in the coast of California – heavy industrial fishing in the 1870’s, moving up through Washington, British Columbia, eventually hitting Alaska in the 1890’s. Heavy industrial fishing did a number on salmon.

“So right now, you have a situation where you have tremendously altered land, you have tremendous demands on a finite supply of water, you have tremendous irrigation requirements, you have tremendous use for water for other purposes. You have things like roads, housing, schools, other, all the other things that humans do cause effects on salmon.

We have warmer climate, warmer waters, we have a lot of alteration of habitat, primarily through dam construction, road construction, diversions, and so forth. This has created an aquatic environment which is ideal for certain species of fish but not for salmon. So we have a lot of non-native species - the American shad, the walleye, the smallmouth bass, the largemouth bass. These species are doing fabulously well, but wild salmon are not.

And of course, you have general water quality problems. Obviously, if the water is taken out, it warms up, gets used, gets fertilized and other kinds of things. You've got a general lowering of the water quality from the salmon perspective. Great for other species, but not for salmon, which tend to demand relatively clean, high quality, cold water," Prof. Lackey continued.

As described in the series of articles on the Salish Sea Marine Survival Project in the Encyclopedia of Puget Sound, posted in 2018, chemical pollution is increasingly being seen as a threat to salmon. Studies found high enough concentrations of poisons in several salmon estuaries to cause impaired growth and suppressed immunity in juvenile salmon. When scientists analyzed Chinook salmon tissues, they found chemicals ranging from pharmaceuticals to industrial compounds at high enough concentrations to affect their physiology.

Salmon farming has also impacted wild salmon. Farmed salmon have been infected with sea lice and have infected wild salmon in the vicinity of the ocean pens where the farmed salmon are raised. Infected wild salmon have been impacted in terms of reduced foraging success. Other diseases originating in farmed salmon have also impacted wild salmon, including infectious salmon anemia, a disease caused by a virus, that has become more virulent in the ocean pen environment and has been found in wild salmon of BC.

Do seals and sea lions have any effect on salmon populations?

Wherever humans have added impediments or restrictions to waterways that are used by salmon, including dams in rivers, a variety of wildlife, including seals and sea lions, bears, otters, eagles, and other fish, come to take advantage of the easier catches.

In the ocean, other fish are the main predators of salmon. "In the open ocean, when you get changing current, which you naturally do, you can get some serious predators that come up from the south, depending on what the temperatures are, like pike or mackerels and things like this. They'll eat a lot of salmon, too," according to Prof. Lackey. But salmon survived these natural predators for thousands of years. What they haven't been successful at overcoming are the human impacts.

Have seals and sea lions become overpopulated today, as fishermen claim?

"I think the single biggest misconception out there, the jargon I hear out there is the term 'overpopulated'. Somehow, the jargon has gotten out there that seals and sea lions are overpopulated. They're not overpopulated. We know harbor seals, for example, were drastically reduced in a government-sanctioned cull in the early part of the 20th century. They're just getting back to normal numbers. And sea lions as well. They are not quite at normal numbers. They're just getting there. So that whole idea that the animals have suddenly boomed and are overpopulated and all over the place is just wrong," Dr. Martin Haulena, DVM, MSc, DACZM, Head Veterinarian, Ocean Wise / Vancouver Aquarium, Adjunct Professor, University of British Columbia Marine Mammal Research Unit, explained in our 2019 interview.

"The thing is, we normally use the word overpopulated when a population interferes with our interest. Wild populations will tend to stabilize themselves when they reach a certain number

that the system can sustain,” said David Costalago, Ph.D., MITACS-Pacific Salmon Foundation Post-Doctoral Research Fellow, Pelagic Ecosystems Lab, University of British Columbia, in our 2019 interview.

“In ecology, we use the term carrying capacity, which is how much a particular population system can sustain, given the amount of food that it produces, given how much the habitat that offers for the species. So, when a species reaches the carrying capacity, it doesn’t grow beyond that; and if it does, it alters the rest of the food web in a way that it will compensate, so these particular species will balance out eventually...The harbor seal population in the strait of Georgia has stabilized and hasn’t increased in the last 10-15 years at least,” he clarified.

On the other hand, there is a species whose population has exploded in this region. The number of humans living in British Columbia has increased from about 55,000 in 1851, to over five million in 2021. The state of Washington had about 1,200 people in 1850, and over 7.7 million in 2020. The state of Oregon had about 12,000 people in 1850, and over 4.2 million in 2020.

“You know, we have a serious overpopulation problem in the form of us. I mean there are a lot of people, over 7 billion people on this small planet right now. And in the case of the most abundant seal in the world, we’re talking maybe 8 or 10 million. In the case of most seal populations, we’re talking about numbers in the area of a few hundred thousand or a few million,” averred Peter Ross, Ph.D., Vice President Research & Executive Director, Coastal Ocean Research Institute, Ocean Wise, in our 2019 interview.

“Seals in BC,” he added, “are largely eating middle of the food chain fish that are not the ones that we’re typically going after, so hake and herring and other species.”

Dr. David Costalago explained, “There have been some studies with sea lions feeding on salmon because they believe there is no herring available. And herring and anchovy are what we call forage fish, these fish are nutritionally richer than salmon for most pinnipeds because of their content in lipids and some particular fatty acids. So, whenever herring and anchovy are available for the sea lions to eat, they will prefer to eat these fish rather than the salmon.”

Despite the poor state of the herring population in B.C., fishermen continue to kill the fish in large numbers. Herring is an important prey for seals and sea lions, dolphins and whales, various sea birds, and other fish, including salmon. Canada’s Department of Fisheries and Oceans (DFO) has mismanaged the herring fishery, allowing herring quotas so large that estimates of herring biomass have fallen from 130,000 metric tons in 2016, to about 54,000 in 2020. Spawning biomass has continued to decline steeply in the past two years.

“I think we’re getting to the point where I can say that restoration of our forage fish and other preferred prey species would help steelhead and coho salmon smolts survive their migration to the ocean. It is probably not the case that we have too many harbor seals, but the lack of their preferred prey items may cause them to switch to eating salmonid smolts.” according to Dr. Barry Berejikian, Supervisory Research Fish Biologist, NOAA Northwest Fisheries Science Center, Manchester Research Station – Station Chief (via email in 2020).

How important are predator-prey issues in the decline in salmon?

As Prof. Lackey explains, changes to salmon habitat are far and away the most significant factor in the decline of salmon. “The biggest single thing, I think, that causes problems for salmon is not predation by humans or anything else, it’s the fact that the habitat that they live in is just so different than it was pre-1850. If you looked at the 1850 habitat and looked at the habitat now,

you'd say, "Wow, how can we even have any salmon here? The habitat's just so different, and not only that, is your on a trajectory, in the 4 states up here, including British Columbia, you're on a trajectory to go from 14 or 15 million people to 65 million people by the end of the century."

Fishermen still believe that culling seals and sea lions will help salmon. Is there any truth to this?

"In the case of seals, it's easy to target them and to blame them for what is wrong with our own fisheries. It's easy for us to shoot seals rather than deal with the truth of today's reality. We have runaway greenhouse gas emissions and climate change, which is diminishing the health of our oceans. We have pollution of all types getting into the ocean, we are fishing too heavily in many cases. And who's going to take action? Well, we're expecting the seals to take the blame for this one. And unfortunately, in my view at least, it's not defensible," Dr. Ross asserted.

"There's a lot of effort on the part of fisheries management agencies to predict how many fish or how many kilos or tons of fish are eaten by seal populations or species. The problem with this - I mean it's a useful exercise - but there's one fundamental problem with this. And it ignores the beneficial role that a predator plays in terms of creating ultimately a stronger prey population and stronger individuals. Mother Nature prides itself in creating a mix of all sorts of species and they don't get stronger by having no competition. They get stronger by having predators picking off the weak and the infirm, and the genes that are not going to contribute to the long life expectancy of this population, etc.," he continued.

"I think it's virtually impossible to predict what the removal of a portion of a seal population would do, and I think it's unlikely that the outcome would be predictable. The fact is that predator-prey dynamics are complicated, ecosystems are complicated, food webs are complicated, and often times, seals are eating other fish that might be eating the baby fish of the prey that we want to harvest in our own fisheries," he explained.

"It's very difficult to determine how a potential seal or sea lion cull might affect fish species of commercial value. Seals and sea lions are an important, normal part of our ecosystem. They are a normal part, and the numbers that they occur are quite normal. They certainly eat a lot of salmon and other fish of commercial interest, but they also eat other predatory fish, for example, that prey on those same species. So they are very, very important in maintaining salmon, for example, population numbers. They are also themselves a very important food for other animals, like killer whales. I think people think it is a simple solution, less seals equals more salmon. But that's entirely untrue. Less seals might mean less salmon because for example, harbor seals eat hake. Hake is a predatory species on salmon," Dr. Haulena affirmed.

"One of my concerns when people talk about the need to cull seals or sea lions is that they see the world as an ecosystem that there's just two species in it. You've got the seal; you've got the fish. You remove the seal, and that fish that it didn't eat well, I can catch it. Well, the reality is that every fish that is not eaten by a seal is not going to get caught by a person. There are a host of other predators out there that are just in line. It's like a food buffet, line up of other predators just waiting to eat," said Andrew W. Trites, Ph.D., Professor and Director, Marine Mammal Research Unit, Institute for the Oceans and Fisheries, University of British Columbia, in our 2019 interview.

"Ecosystems are far more complex than that and in fact, the biggest predator of other fish are other fish. We often attribute that the problem is only what our eye can see; because we can't see what goes on below the surface, we really have very little idea. What do we do if the experiment fails? We remove all the seals, and in fact, the salmon don't come back, the cod

don't come back. Well then you blame it on what? The whales? Do you blame it on Mother Nature? What do you blame it on? I think it is a very risky proposition to be taking to think that we can somehow control things by removing one species at a time. I don't know where it ends," Dr. Trites averred.

"I think one of my biggest concerns about culling seals is that, if you remove 50% of the seals, you are effectively removing 50% of the food for the transient killer whales," he added.

Dr. Costalago also cautioned about a cull of pinnipeds: "When we try to remove a top predator from the ecosystem, we risk impacting an entire food web. For example, if we open a cull for pinnipeds in the strait of Georgia, we will probably reduce the available food for the transient killer whales. At the same time, it is not only going to be a problem for a species that is a predator of these seals or sea lions, it is also that we don't know if the fish are actually being controlled by the predators or by the food production in the system. We don't know if eliminating the predators is actually the solution for the fish to recover."

What can we do to restore the salmon, as well as forage fish?

This is an even more complicated problem than the issue of the North Atlantic cod. In this case, so much damage has been done by the millions of humans who have moved into and destroyed salmon habitat and used and contaminated the water on which salmon depends, that fully restoring salmon seems impossible. However, progress can be made by removing dams and culverts and restoring rivers, creeks, and riparian habitats, improving fish passages and water flow management in rivers that still have dams, conserving water and requiring farmers to conserve water, reducing home and farm pesticide, herbicide, and fertilizer use, and making other behavioral changes. See, for example the State of Salmon in Watersheds "How to help" section: <https://stateofsalmon.wa.gov/>.

Combining habitat restoration, hatcheries, and broodstock programs to increase genetic diversity and fitness of captive-born salmon can further help reduce the decline in wild salmon runs.

Improving prey availability for salmon, seals and sea lions, and sea birds is also important and requires a reduction in fishing of forage species, especially herring. The precautionary principle also requires that quotas be low and at times, zero, for a species like herring, that exhibits frequent population crashes and for which biomass forecasts are unreliable.

In addition to all these individual and group efforts, government programs and fishery regulations, the DFO must stop the attacks on seals and sea lions by fishermen, regardless of the fishermen's race or ethnicity. Seals and sea lions along the coast of B.C. are being shot and left to bleed to death by people who unjustly blame them for damaging the salmon population and see them as competitors. One of the seals who was rescued by the Vancouver Aquarium was shot in the eye and blinded. This cruelty to animals must not be tolerated. The Canadian government must pass a marine mammal protection law that forbids the killing of seals and sea lions by anyone, and it must enforce the law vigorously.

For more information, visit <https://www.ScapegoatSeals.org>.