The rivers of British Columbia used to run red with salmon each fall. The spawning fish were so plentiful that it looked like you could walk from one stream bank to the other on their backs. Those days of stupendous abundance are long gone. Today, one of Canada’s most iconic species is in a fight for its very survival.

In B.C. and Yukon, 121 stocks of migratory salmon and trout (a group of fish that spawn in close proximity to one another within the same species) have gone extinct in the last century, mostly due to urbanization and dams that eliminate spawning routes. Another dozen stocks are at high risk of extinction. In the U.S. states (Washington, Oregon, Idaho) more than 100 stocks are now extinct, with another 200 at a high risk of extinction.

Of the five species of Pacific salmon — chinook, sockeye, coho, pink and chum — the population of the first three are all shadows of their former selves. Since the late-1990s, severe fishing restrictions have virtually eliminated all fisheries targeting coho and have radically restricted the harvest of chinook to the point where catches for these two species accounts for less than five per cent of the wild salmon harvest.

RED ALERT

B.C.’s wild salmon population is dwindling. What is going wrong and why?

By Kerry Banks
Skeena River at the beginning of the 20th century

Left, sockeye swarm the Adams River. Right, on the upstream each year. In 2016, the annual run was 856,000 of the largest in the world, with 100 million fish heading...
four- to seven-year cycles — means they have faster generation times and deal more readily with environmental changes. They hatch in the spring, move to the ocean as fry the same year, overwinter there, eat like gluttons and return home to spawn the next fall. In contrast, chinook, sockeye and coho spend more time in rivers where they are vulnerable to a host of dangers, including dams, industrial pollution, a sketchier food supply and higher water temperatures.

Another unwanted consequence of the hatchery hordes is the straying of these “ocean-ranched” salmon into wild salmon streams where they breed with wild stock. Says Peterman: “It degrades the fitness of the wild population. Wild salmon have a great deal of genetic diversity that enables them to respond to a variety of situations. Hatchery salmon have an impoverished genetic diversity. The survival rate of hatchery raised salmon is half that of wild salmon.” As well, the offspring of these fish may not have the “homing guidance system” of wild salmon. If interbreeding happens often enough, the genetic makeup of the wild stock may be altered, threatening its viability.

LOOSING COUNT
Fisheries and Oceans Canada (DFO), the department responsible for salmon management, can’t be blamed for global warming, but according to a 2017 study in the Canadian Journal of Fisheries and Aquatic Sciences, the department does get a failing grade for its monitoring efforts. The study notes that the number of streams being monitored by DFO on B.C.’s north and central coasts dropped dramatically from 1,533 streams in the mid-1980s to an all-time low of 476 streams in 2014 — a 70 per cent reduction. “As a result, we’re now only able to assess half of wild salmon populations,” says one of the study’s authors, SFU fisheries biologist Michael Price. The process of monitoring spawning streams provides vital information on trends over time. Without such data, fisheries may continue to catch diminished populations. “In the past, monitoring was done by individuals who had been doing this job year after year for decades,” explains Price. “They would walk the entire system counting fish. These people are retiring and are not being replaced. Fishery officials used to make decisions in real time according to what these people told them. Now it’s all based on what happened last year.”

A rollback in monitoring is not the only area in which the department has come under fire. Critics see a clear conflict of interest in DFO’s mandate to regulate the salmon-farming industry while it also promotes the industry and its products as debate rages about the potentially harmful effects of fish farms on wild stocks.

ON THE FARMS
Many conservation groups and First Nations fear that pathogens and sea lice are spreading from B.C.’s open-penned fish farms and infecting wild stock, especially in the Broughton Archipelago on the northeastern tip of Vancouver Island where salmon pass through a bottleneck en route to the open sea. There is also concern about Atlantic salmon escaping and competing with native species. One such jailbreak occurred in 2017, when high tides and currents...

What is causing the decline?
“Overfishing, disease, pathogens from fish farms, habitat loss, the warming of the oceans. It’s death by a thousand cuts,” says one salmon expert...
caused pens to implode, releasing 300,000 fish from a Washington state farm near the Canadian border.

According to DFO’s own data, Atlantic salmon have been found in 81 B.C. rivers and streams. However, Byron Andres, the department’s senior biologist with aquaculture environmental operations, says there is no evidence of farmed salmon interbreeding with Pacific salmon or becoming established in B.C. watersways.

The question of what kind of negative impact farmed fish may be having on wild salmon stocks remains unresolved, but there is no denying their economic impact. There are now 120 fish farms, holding 3.3 million fish, 90 per cent of which are of Atlantic salmon. Virtually all these enterprises are Norwegian-owned, and most of the harvest is shipped overseas. In fact, farmed Atlantic salmon is now B.C.’s top seafood export, valued at about $25 million per year.

The situation is a complete reversal from 30 years ago. In 1990, there were 18,000 tonnes of farmed salmon produced in B.C. and 100,000 tonnes of wild salmon harvested. Today, farmed salmon production is up to 80,000 tonnes, while the wild salmon harvest is down around 20,000 tonnes.

In June 2018, the B.C. government introduced new rules that may change the way salmon farming is done in the province. To get their fish farm licences renewed, companies will need to obtain consent from local First Nations, and DFO must also certify that the operation will pose no risk to wild salmon stocks. However, these rules won’t take effect until 2022, reportedly because most of the sites have federal licences that won’t expire until 2022. Adam Olsen of B.C.’s Green Party slammed the delayed time frame. “It’s like surgeons announcing that starting in 2022 they are going to start washing their hands before procedures. This should have been the standard all along.”

SWIMMING UP

Of course, the loss of wild stocks is much more than simply an economic question. Salmon are a keystone species, essential to the health of the ecosystem. When they die, their rotting bodies return valuable nutrients to river systems, and supply food for other animals and nitrogen for the soil. As David Montgomery writes in his book King of Fish, “Up to a third of the nitrogen in valley-bottom forests swam up the river as a fish. Trees growing along salmon-bearing streams grow up to three times faster than those growing along salmon-free streams.”

In the midst of this mood of spiralling doom, one looks for signs of optimism. Hope begins with the fish itself — it’s a resilient species that evolves quickly, produces a multitude of offspring and maintains a diversity of populations. Evidence of how salmon can rebound with the proper support is clear in the revitalization of lost salmon streams such as Vancouver’s severely poluted Still Creek, which saw a miraculous return of salmon for the first time in nearly 80 years in 2012. It has continued to host a salmon run each year since.

There is also the inspiring story of Okanagan sockeye. In the mid-1990s, this population, which must navigate past nine dams to reach its spawning grounds in the B.C. Interior, was near extinction. But thanks to the efforts of a coalition of groups, the sockeye are back with a bang. In fact, there are now so many sockeye in Okanagan Lake that DFO was recently able to open up a recreational fishery. There had never been one here before.

On a strategic level, Michael Price would like to see a transition away from ocean mixed-stock commercial fisheries that catch salmon near a river’s mouth toward terminal fisheries that catch the fish closer to their spawning stream.

“Interestingly, this was the system that had been used for several thousand years by First Nations on B.C.’s coast. We need to learn from the past if we want to be sustainable in the future,” says Price. “This approach allows us to target only those populations considered abundant and enables depressed populations to escape fisheries and spawn in their natal streams.”

Aaron Hill believes the building blocks for a salmon recovery are in place. “We have a strong Wild Salmon Policy; we have an excellent Water Sustainability Act and an improved new Fisheries Act. We need to get politicians to live up to the laws and regulations that are already on the books and restore lost protections.”

If hope for recovery starts with salmon, it ultimately ends with people. From public surveys his organization has undertaken, Hill is convinced there is keen public support for improving the management of salmon. People want salmon to be around because they feel they are an integral part of our cultural identity. Where there is a will, there is a way.

VIEW FROM THE LADDER

What a CWF project in Yukon will tell us about the state of salmon spawning

Just outside Whitehorse is the world’s longest wooden fish ladder: 366 metres long and 15 metres high. It transports spawning chumock salmon past the Whitehorse hydropower plant. Here, amid the roar of the Yukon River, researchers with the Canadian Wildlife Federation are tagging fish, gathering data they hope will help solve the puzzle of the river’s declining chumock salmon run.

The Yukon River boasts the longest salmon run in the world. About 100 spawning grounds are spread along its various tributaries in the Canadian portion of the river alone. The chinook that journey farthest upriver after exiting the ocean must swim 3,200 kilometres against the current to reach their home streams.

Before 1997, an average 300,000 chinook entered the Yukon annually. In 2013, only 37,000 fish returned. As a result, in 2014, and again in 2015, fishing for chinook was closed from here to the spawning grounds and in some cases must still travel another 200 kilometres to reach their home streams. “We’re trying to fill in gaps in knowledge on either side of the ladder,” says senior CWF conservation biologist Nick Lapointe. “We are expecting that we will learn all of the places in gaps in knowledge on either side of the ladder,” says senior CWF conservation biologist Nick Lapointe. “We are expecting that we will learn all of the places