



THE PACIFIC SALMON FOUNDATION MAGAZINE

SALMON STEWARD

SPRING 2022 | PSF.CA

PULLING FOR SALMON

Sumas rescue demonstrates need for climate-change adaptation strategy

CLIMATE CHANGE CONUNDRUM

Understanding where and why salmon are most vulnerable, and what we can do

FRESH FROM THE SEA

New research ties salmon health to open-ocean conditions

GAME CHANGER

Jetty breach project improves salmon habitat



SALMON STEWARD

SPRING 2022



PACIFIC SALMON
FOUNDATION

ABOUT US

We're salmon first, salmon always. Our vision is healthy, sustainable, and naturally diverse populations of Pacific salmon for the benefit of ecosystems and Canadians for generations to come.

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CEO'S MESSAGE

In reading Washington State conservation biologist Thor Hanson's new book, *Hurricane Lizards and Plastic Squid*, I am struck by the many examples of how "flexibility matters" for species amidst climate change.

While Pacific salmon experience climate change throughout their lifecycles, we take heart from their long arc of evolution — they are flexible and resilient fish. However, Hanson says that even the most resilient species will "struggle to reconcile adaptations that worked well in the past with a new set of rapidly changing conditions." We need only look at the last 12 months that include a heat dome, wildfires, and devastating floods to understand what is meant by "rapidly changing conditions."

This is why PSF has launched a Climate Adaptation for Salmon Program under the leadership of VP Salmon Jason Hwang, and why we are stressing to our Crown and Indigenous government partners the need for urgent action, to use every power at our disposal, and help salmon adapt.

An immediate opportunity at hand is building back from the fall floods with salmon-friendly infrastructure. The work underway to rebuild roads, rails, and pipelines takes place in highly important salmon habitat. Mid- and long-term rebuilding projects represent major infrastructure that our communities depend on *and* directly intersect with salmon migration and habitat.

There are ways to rebuild that simultaneously protect salmon *and* support human activity. (See p. 6–7 and our recommended post-flood priorities on at psf.ca/floodpriorities).

The provincial government has responsibility for land and water, therefore many of the opportunities depend on provincial leadership in concert with other governments. PSF was pleased to see B.C. Premier Horgan's announcement of the new Ministry of Land, Water and Resource Stewardship. We are optimistic that the alignment facilitates B.C.'s ability to take action (and responsibility) for virtually all development activities that negatively impact salmon's fresh water habitat.

With this in mind, we implore the Province to advance a strategic and coordinated effort with Fisheries and Oceans Canada (DFO) and



Michael Meneer presents Conor McMullan, Director of Educational Programs, Cheakamus Centre, with funding from the Community Salmon Program.

“ We implore the Province to advance a strategic and coordinated effort with Fisheries and Oceans Canada (DFO), and Indigenous governments, to catalyze a common and coordinated action plan to rebuild our Pacific salmon populations and their habitats. ”

Indigenous governments to catalyze a common action plan to rebuild our Pacific salmon populations and their habitats.

On the federal front, PSF was heartened to hear new Fisheries Minister Joyce Murray affirm the commitment to transition away by 2025 from open-net-pen aquaculture that poses serious health risks to wild Pacific salmon. But the clock is rapidly ticking, and we are still waiting for details on the plan. PSF stands by our position for a move to closed-containment salmon farming — full stop. And we are working with several Indigenous governments who are seeking science advice on decisions that they will make about existing salmon farms in their traditional waters.

I hope you will take from my message that PSF is showing leadership across the range of complex issues facing our Pacific salmon, and this is only possible with your support.

Michael Meneer
President & CEO, Pacific Salmon Foundation



ON THE COVER:

Henry Ned of Semá:th First Nation and team rescue salmon from flooded fields in Abbotsford (see p. 6).

Photo (top): Linda Aylesworth

COMMUNITY CORNER



KIDS SALMON ART CONTEST

PSF's 2021 Kids Salmon Art Contest received more than 200 salmon-inspired art submissions from students across the province. Thank you to our incredible community for making this contest a huge success. We look forward to hosting it again in 2022. (Pictured: Winning submission by Irene Lee, age seven.)



2021 PORT ALBERNI ULTIMATE FISHING DERBY

Gone Fishin's Al Ehrenberg hands PSF's Christina McIntyre a \$25,000 donation to support community-driven salmon projects. The derby benefits salmon conservation and restoration work; event proceeds were also directed to local stewardship groups in the Alberni area. To host a fundraiser or learn more about PSF events contact Christina McIntyre: cmcintyre@psf.ca



2021 PERCY WALKUS HATCHERY EGG TAKE

At the Percy Walkus Hatchery, people for salmon work to help Chinook rebound. The hatchery, a collaboration between the Wuikinuxv Nation, local sport-fishing lodge

owners, Fisheries and Oceans Canada, Rick Hansen Foundation, and the Pacific Salmon Foundation, provides a model to conserve, restore, and enhance unique salmon stocks. Early results indicate great success since the first eggs were incubated in the fall of 2016. The science-based pilot includes tagging juvenile fish and tracking DNA in adults, estimating spawning populations, and monitoring catch with an eye to maintaining natural genetic diversity. As the model proves effective, PSF looks forward to opportunities to partner with other First Nations and watersheds to improve stocks.

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PSF'S REFRESHED LOOK

Inspired by the passion of our community and their love of the "yellow fish," we're finally making it official. Our brand refresh, launched in April, speaks to our story of harnessing the passion and power of people to save and restore wild Pacific salmon.



GAME CHANGER

BREACHING THE FRASER RIVER NORTH ARM JETTY TO SUPPORT WILDLIFE

The gigantic Fraser River — the longest in British Columbia — flows for 1,375 kilometers and empties into the Strait of Georgia, forming the largest estuary along the Pacific Coast of North America.

Thousands of animals and plants live here.

Prior to the industrial development of Vancouver, the river ebbed and flowed with the tide.

However, in the early 1900's, the North Arm of the renowned river was dredged to aid navigation, and a 7-km barrier was built to support boat transit.

Although the jetty has aided ship passage for more than 100 years, it has been detrimental to the juvenile salmon population that relies on a gradual transition from fresh to salt water for its survival.

“Salty water before they’re ready can stunt the growth of juvenile salmon and limit their ability to survive,” says Dave Scott, a PhD-candidate in the Pacific Salmon Ecology and Conservation Lab

at UBC and biologist with Raincoast Conservation Foundation.

The man-made jetty effectively denies millions of juvenile salmon a gradual transition through brackish water, forcing them directly into the salty Strait of Georgia.


Scott oversees an estimated \$650,000 project funded by the Pacific Salmon Foundation, the Government of Canada, and the Province of British Columbia. The PSF Raincoast project creates three 30-meter-wide breaches in the North Arm jetty. The breaches allow the Georgia Strait saltwater to mix with the Fraser River freshwater, allowing a more natural transition for juvenile salmon and the other species that depend on estuaries.



Dave Scott, a PhD-candidate in the Pacific Salmon Ecology and Conservation Lab at UBC and biologist with Raincoast Conservation Foundation

“Estuaries are really important nursery habitats for many species including juvenile Pacific salmon,” says Dr. Isobel Pearsall, director of PSF’s Marine Science program. “This environment allows them to obtain rich food resources so they can grow bigger before they migrate into the open ocean.”

The breaches restore the natural pathway, create a more gradual transition for salmon, and benefit the habitat by bringing river sediment into the estuary, supporting marsh ecosystem health and countless species. **And good news — in less than two months since the initial breach, salmon are already finding their way through the new passage.** Immediate success like this is rare in conservation projects.

“Given our understanding of how vital estuaries are, it is only right that we start to fix some of the damage we humans have caused. Projects like this are really important to address some of the issues we have caused to juvenile salmon habitat, and hopefully give these fish a fighting chance on their way into the open ocean,” says Pearsall. 



Photos: Linda Aylesworth

TOOLS YOU CAN USE:

PSF LAUNCHES TWO VALUABLE RESOURCES

Interested in learning what you can do to support your local shoreline and surrounding habitat?

Conservation isn't just for professionals, it's for everybody. The PSF's Marine Science team recently developed two free, public-access tools to raise awareness about coastal ecosystems. Learn more to take action in your community.

EVERYTHING YOU NEED TO KNOW ABOUT NATURE-BASED SOLUTIONS

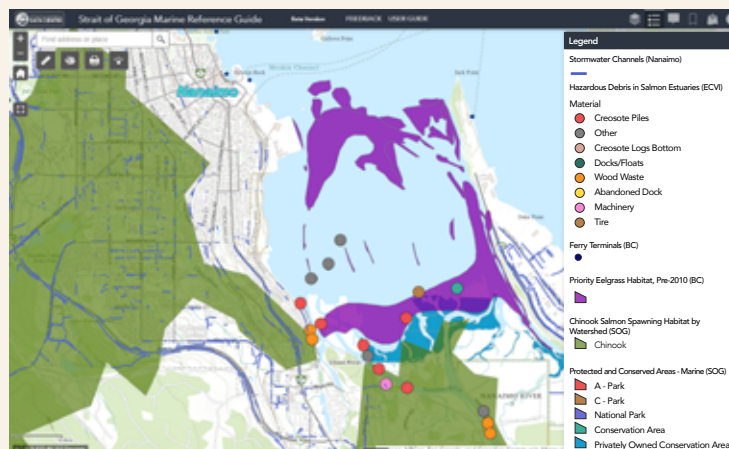
Pacific salmon are counting on us to preserve healthy shorelines. Not only are healthy shorelines essential for salmon survival, but they also support entire ecosystems and human communities. Action is needed to manage shorelines to be as adaptive and dynamic as possible.

RESILIENT COASTS FOR SALMON, a PSF-led collaborative initiative, is raising awareness on how to re-naturalize shorelines to advance salmon recovery and build resilience to climate change. The program recently published a Climate Change Primer, which provides an overview of:

- **Potential climate impacts** on eastern Vancouver Island
- **The effects of coastal hard armouring** and the value of preserving natural shorelines
- **How to incorporate** nature-based solutions into your everyday life

Visit resilientcoasts.ca to learn about healthy shorelines and how to reduce your environmental impact.

Resilient Coasts for Salmon is a partnership between the Pacific Salmon Foundation, the Stewardship Centre for BC, the World Wildlife Fund – Canada, Peninsula Streams Society, and others. This project was funded in part by the Government of Canada.



THE STRAIT OF GEORGIA'S MARINE SEARCH ENGINE

The Strait of Georgia – a marine corridor between Vancouver Island and the southwestern mainland coast of B.C. – is a highly productive ecosystem with a diversity of habitats that supports more than 3,000 species, including Pacific salmon.

PSF has produced the Strait of Georgia Marine Reference Guide (SOG MRG) to streamline data access. The tool centralizes and visualizes more than 400 data layers relevant to the Strait's marine ecosystem into one digital library, which can be thought of as a marine data search engine. It is intended to support marine decision-makers and coastal users alike in making informed decisions in how they interact with the sea. Use the guide to compare shoreline sensitivity to future sea-level rise projections in different communities, identify important habitat areas, or plan a boat trip with sustainable marina locations. Within the map you can also identify freshwater spawning areas for salmon within the Strait of Georgia region thanks to data provided by PSF's Salmon Watersheds Program.

Visit sogdatacentre.ca/sogmrg to use the Marine Reference Guide and share feedback. The SOG MRG is a product of PSF's Strait of Georgia Data Centre.



From left: Biologist Dr. Mike Pearson speaks with Lester Ned of Semá:th Nation during 2021 salmon rescue.

PULLING FOR SALMON

WHEN EXTREME WEATHER WREAKS HABITAT HAVOC, PEOPLE PITCH IN

Last November passionate people put on their waders and stepped into the icy waters in the fields flooded by the Sumas River, pulling for Pacific salmon.

“These are our most endangered species of coho, so if we can save four females, then we save thousands of eggs,” says Lester Ned of Semá:th First Nation, after rescuing salmon in Abbotsford B.C.

In immediate response to the unprecedented flooding, the Pacific Salmon Foundation catalyzed action. Collaborating with the Lower Fraser Fisheries Alliance (LFFA), Semá:th Nation, Fisheries and Oceans Canada (DFO), and environmental non-government organizations, PSF rapidly funded emergency projects ranging from urgent habitat restoration to fish rescue.

Since November, PSF has provided more than \$200,000 to support urgent flood recovery efforts. This funding has been underwritten by the Pacific Salmon Endowment Fund, which has also allocated funds for PSF to continue to show leadership on “salmon-friendly” flood planning. From the restoration of the Eaton Beaton side channel in the Coldwater River to fish rescue with the Lower Fraser Fisheries Alliance, Semá:th Nation, and Stó:lō Nation Society, PSF has supported numerous partnerships working to save salmon.



Photos: Linda Aylesworth & John Christie

B.C.’s recent extreme climate events were not limited to November’s atmospheric river. If you were in the province at any point between June and December 2021, you likely experienced the impact of floods, a heat dome, drought, and wildfires. Sadly, these events had terrible impacts on many communities, and also affected salmon populations around the province. As these catastrophic events are predicted to occur more frequently, salmon need our help in order to adapt to human-created conditions.

Recovery work is essential. Some populations of Chinook and coho have dropped by 90 per cent, threatening salmon dependent economies and the entire ecosystem that includes more than 130 species. Now, already struggling populations must confront life-threatening climate extremes.

“Pacific salmon are the 21st Century canaries in the coal mine. Their health reflects that of the environment. The recent B.C. floods wreaked havoc on salmon habitat and further threaten endangered populations. Although we made great strides in the initial time-sensitive recovery effort, the long-term effects are yet to be seen. PSF relies on the generosity of people who care about salmon. With your help, the future can be salmon friendly,” says Michael Meneer, PSF President and CEO.

Many salmon survived the floods. Thanks to early rescue efforts coordinated by PSF, Semá:th Nation and Stó:lō Nation, healthy adult coho were rescued from flooded fields and released to spawn in the nearby Sumas River.

Time-sensitive, emergency projects funded by PSF include:

- **Fraser Valley Salmon Habitat** — 18 projects supporting at-risk habitat capable of producing several million juvenile salmon.
- **Coldwater River** — Eaton Beaton side-channel, a tributary to the Nicola River, one of the most important rearing habitats for coho and early-run Chinook, and the most important for steelhead. The November 2021 storms dramatically altered the course of the river; PSF supported the repair and restoration of this important habitat.
- **Anderson Pond** — The channel in Chilliwack was completely buried with sediment. PSF supported the reconstruction on December 10, and the next day 40 adult coho showed up and began spawning.

INFRASTRUCTURE REBUILD: A “SALMON FIRST” COORDINATED EFFORT IS THE ONLY WAY

The Fraser River and its tributaries — areas severely affected by the November 2021 floods — comprise some of the most valuable salmon habitat in the world.

Effective response requires government and all of us to better prepare to ensure effective and efficient short, mid- and long-term strategies.

“Infrastructure being rebuilt right now presents the quintessential opportunity to integrate flood recovery efforts and reconstruction planning with salmon conservation. There is a finite window of time that will see post-flood rebuilding efforts either contribute positively to improving conditions for salmon or permanently harm their future,” says PSF VP Salmon Jason Hwang.



THANKS TO OUR DONORS!

PSF's work with our partners is funded substantially by our donors. A special thanks goes out to Groupe Ocean who contributed \$5,000 and Pacific Angler who contributed \$6,000 to the recovery effort.

By ensuring salmon are part of the rebuilding equation, we can help nature and our ecosystems thrive.

Through a coordinated effort, governing jurisdictions must develop and implement post-flood strategies that include salmon. Our neighbours in Washington State have a program that is designed to accelerate integrated efforts to reduce flood risks and restore habitat along the state's major river corridors. Its goal is to improve the resiliency of floodplains in order to protect local

communities and the health of the environment. Infrastructure rebuilding plans here in B.C. would be wise to adopt similar strategies and approaches. We have the knowledge and opportunity to do better for people, salmon, and natural environments.

“The urgent and important challenge is timely coordination across entities — First Nations, Federal, Provincial, and local government — for the conservation of our wild Pacific salmon,” says Hwang.



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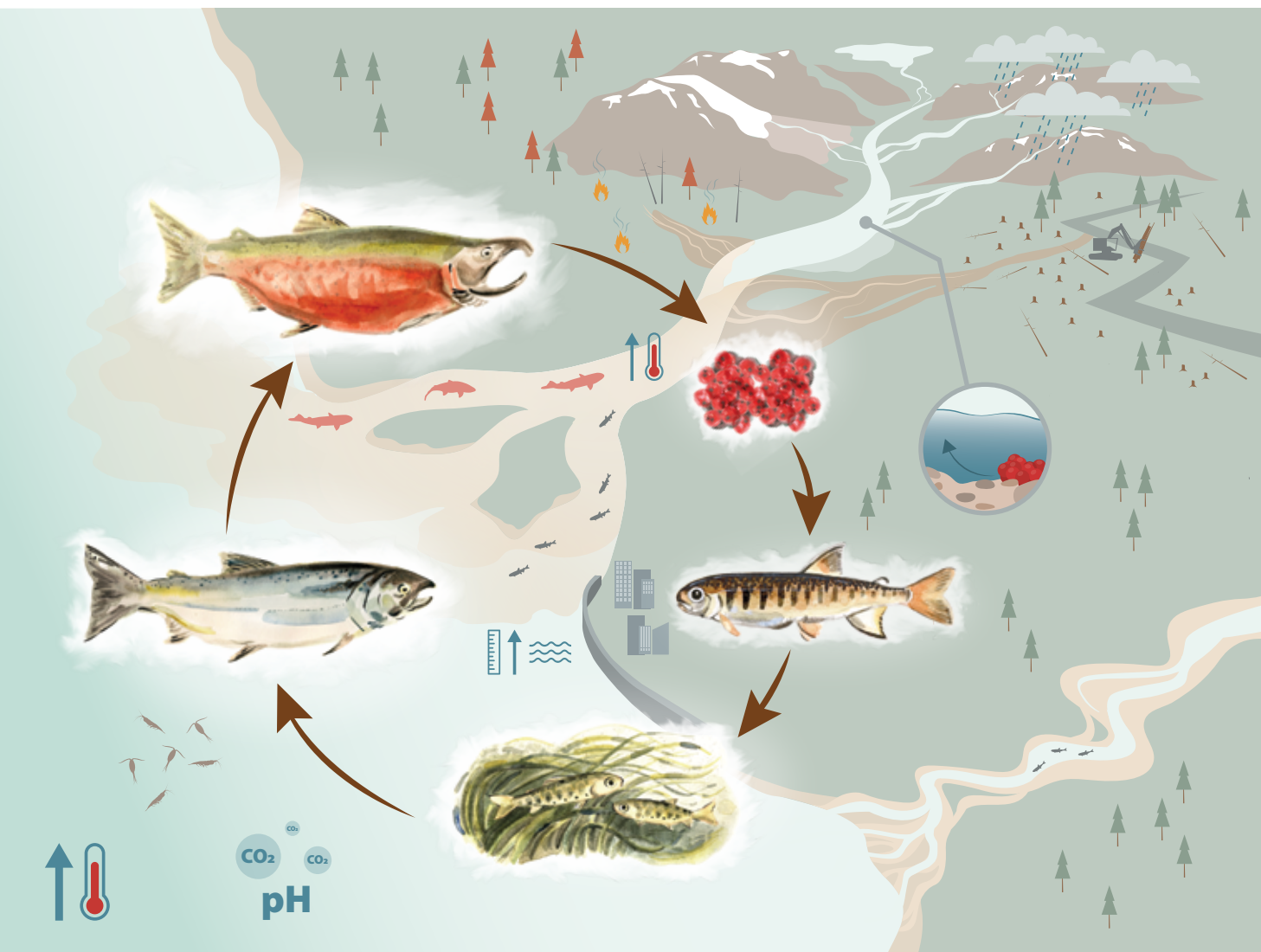
Together, we can repair and strengthen the most important salmon habitat and ensure Pacific salmon recover. PSF mobilizes partnerships and leads efforts to mitigate the short-term effects of catastrophic weather events and develops climate adaptation and recovery strategies for the long-term health of salmon.

SALMON NEED YOUR HELP FOR THE FOLLOWING CRITICAL AREAS OF WORK:

- Post-flood habitat restoration
- Reduce impact of wildfires on salmon
- Research on rising stream temperatures
- Habitat restoration to mitigate effects of sea-level rise
- Ensuring high quality habitat conditions for salmon spawning

We invite you to participate in habitat restoration and help ensure wild Pacific salmon for generations to come.

**PLEASE DONATE
TODAY AT PSF.CA**



Watercolour illustration by Aimée van Drimmelen, Infographic by Fuse Consulting

CLIMATE CHANGE CONUNDRUM

WHERE AND **WHY** ARE B.C. SALMON MOST VULNERABLE,
AND **WHAT** CAN WE DO TO HELP THEM?

Climate change has undoubtedly made its mark in British Columbia, as demonstrated by a year of extreme climate events throughout 2021. Record-breaking floods, droughts, heatwaves, and wildfires ravaged the province, affecting both human and ecological communities. **Pacific salmon and their habitats were no exception.**

Climate change is one of the most pressing risks to Pacific salmon populations. Salmon feel the effects of climate change at every stage of their life cycle.

However, not all salmon populations are equally vulnerable to the impacts of climate change. The PSF's Salmon Watersheds Program has initiated a multi-year project to assess the climate change vulnerability of salmon populations throughout B.C. The results will show which populations are most vulnerable to climate change, why that might be the case, and what we can do about it.

The Pacific Salmon Foundation (PSF) is developing a made-in-B.C. approach to assessing the vulnerability of salmon to climate change that is quantitative, data-driven, and broadly applicable.

“Climate change has affected, and will continue to affect salmon differently depending on the region in B.C. and the characteristics of each salmon population,” says Dr. Katrina Connors, director of PFS’s Salmon Watersheds Program. “These broad-scale climate change vulnerability assessments can help inform the prioritization of conservation and mitigation actions aimed at increasing the resilience of salmon populations.”

PSF’s approach to assessing salmon vulnerability to climate change is two-fold. First, a research team led by PSF scientists identifies relevant **climate indicators** such as stream temperature, flow, sea surface temperature, and shoreline inundation, that reflect how salmon freshwater and marine habitats are changing. Second, the research team will determine each salmon population’s relative **climate change vulnerability**.

“The vulnerability of Pacific salmon populations will depend on the magnitude of their exposure to climate changes, as captured by the indicators we are compiling, but also on their biological sensitivity to these changes and their capacity to adapt,” says Dr. Stephanie Peacock, Salmon Watersheds Program analyst.

“Pacific salmon display a wide diversity of life histories, meaning variability in sensitivity and adaptability. Climate change vulnerability assessments must factor in these differences.”

Ultimately, the visualization of climate indicators and climate change vulnerability of salmon populations throughout B.C. will be integrated into the Pacific Salmon Explorer (www.salmonexplorer.ca). Launched in 2016, this data-visualization tool is continually expanded and updated to provide the most complete and up-to-date information on Pacific salmon and their habitats. The goal of the Pacific Salmon Explorer is to create a shared understanding of Pacific salmon **status and trends** among communities, conservationists, and decision makers.

VISIT PSF.CA/CLIMATEVULNERABILITY TO LEARN MORE.

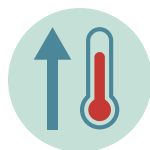
This work has been supported by the British Columbia Salmon Restoration and Innovation Fund (BCSRIF) through Fisheries and Oceans Canada and the Province of B.C.

CLIMATE CHANGES

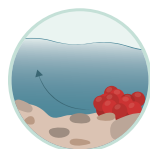
CONSEQUENCES FOR SALMON



FOREST FIRES can devastate salmon habitats in the short term – leading to landslides that fragment and degrade salmon habitats – but improve them in the long term by providing instream wood.



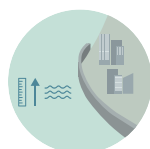
HIGHER STREAM TEMPERATURES are stressing all freshwater life stages, causing faster development of eggs and juveniles and higher en-route mortality of returning spawners.



Increased precipitation as rain in autumn, exacerbated by deforestation, leads to **FLOODS** that flush out juveniles and incubating eggs and can prevent returning adults from accessing spawning grounds.



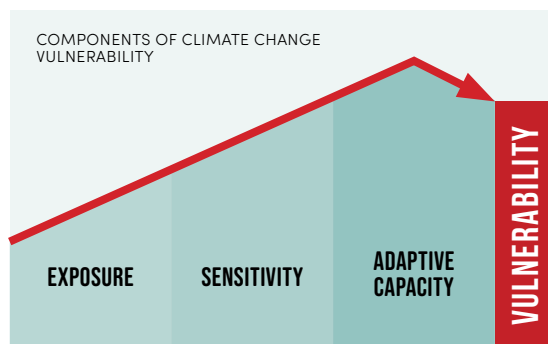
LOWER SUMMER FLOWS can limit available oxygen in the water and restrict habitat for juveniles and spawners.



SEA-LEVEL RISE can lead to loss of estuarine rearing habitats, particularly in steep or urban areas where those habitats are restricted from shifting inland.



Rising sea surface temperatures and ocean acidification are **SHIFTING MARINE FOOD WEBS**, potentially increasing competition for resources and decreasing the availability of **NUTRITIOUS ZOOPLANKTON** to ocean-rearing salmon.



WILD PACIFIC SALMON

TOMORROW'S HEALTH DEPENDS ON TODAY'S RESEARCH

FRESH FROM THE SEA: RESEARCH CLUES HELP SOLVE PACIFIC SALMON MYSTERY


As Dr. Christoph Deeg sets foot on dry land after weeks in the North Pacific as part of the **2022 International Year of the Salmon (IYS) High Seas Expedition**, he brings back a host of clues to solve the mystery of factors that influence salmon mortality in the open ocean. His study follows up on research conducted in 2019 and 2020 during previous expeditions.

Deeg's research in environmental DNA (eDNA) fills a gap in our understanding of salmon in the open ocean and enables us to study the biodiversity in ocean waters and compliments the fishing operations. His sampling for pathogens links salmon in the high seas with PSF's Salmon Health Program's studies in freshwater and near-shore environments.

Two scientific journals recently published these findings. Together, the studies provide the first report on the health, condition, and infections of Pacific salmon in the Northeast Pacific during the winter. The research team found hints that warmer than usual ocean temperatures and reduced prey availability were correlated with increased infection, highlighting the potential impact of future warming. Further, salmon that were found in unusually warm waters showed signs of stress and had more infections.

The research, funded by the North Pacific Anadromous Fish Commission and DFO's BC Salmon Restoration and Innovation Fund, identifies two common parasites transmitted by salmon prey as key pathogens of all salmon species encountered, and suggests that they are transmitted in the open ocean. While Fit-Chips (see inset) showed that these common parasites had limited impact on the infected fish, several high impact infectious agents found in coastal waters were absent. Perhaps infected salmon recover or die before reaching the open ocean. More research is needed.

Also returning from research at sea on the 2022 IYS expedition, PSF scientist Svetlana Esenkulova is collecting eDNA samples and collaborating on research with Deeg for eDNA analyses. An integral part of the IYS field-sampling program and an expert in harmful algae, her focus at PSF is research in the Salish Sea.

PSF is committed to a three year-plan for the Salmon Health Program. If you are interested in donating to this program, please contact support@psf.ca. 

ENVIRONMENTAL DNA (eDNA) PROVIDES UNSEEN CLUES TO SALMON ECOSYSTEMS

eDNA analysis can provide evidence of the presence of organisms living in an environment by detecting their genetic fingerprint. Water samples are analyzed by extracting the genetic material from microorganisms and animal cells that are naturally left behind without having to capture them. eDNA can be used to assess biodiversity in aquatic ecosystems, or to screen for invasive species or disease agents.



Dr. Christoph Deeg and
PSF scientist Svetlana Esenkulova



Pictured: Dr. Andrew Bateman

Photo: Amy Romer

ADVANCING SALMON HEALTH

Wild Pacific salmon face several obstacles and perils through their life-cycle moving from freshwater to open oceans and back to their natal streams to spawn.

Natural human-derived stressors like climate change and open-net pen aquaculture create additional pressure. For a decade now, PSF researchers have conducted studies on the health of wild Pacific salmon to inform evidence-based policy to protect salmon for future generations.

HIGH-IMPACT TRACK RECORD

Launched in 2013 with DFO and Genome BC, the Strategic Salmon Health Initiative (SSHI) has positioned PSF as a global leader in salmon health research. The ground-breaking research led by DFO Scientist Dr. Kristi Miller-Saunders informed the world on how infectious agents affect the health of wild Pacific salmon. The findings helped secure the Government of Canada's commitment to transition away from open-net aquaculture in B.C. by 2025.

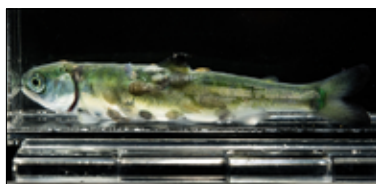
"Through independent science, the development of novel technology, and nearly 60 publications, the SSHI revolutionized our understanding of Pacific salmon health, and greatly influenced policy and decisions through an evidence-based approach that puts Pacific salmon first," says Dr. Brian Riddell, former Pacific Salmon Foundation CEO and project co-lead of the SSHI.

Photo (below & inset): Tavish Campbell



In order to continue critical research to guide action and evidence-based policy, in 2021 PSF launched a Salmon Ecosystems Health program focusing on three key areas:

- **Independent Research + Monitoring of Aquaculture:** PSF experts research and monitor pathogen transfer.
- **Broughton Partnership:** PSF works with the Mamalilikulla, 'Namgis, and Kwikwasut'inuxw Haxwa'mis First Nations to implement the Indigenous Monitoring and Inspection Program. PSF Salmon Health is running this program in collaboration with DFO,



HOW DO WE KNOW A FISH IS STRESSED?

Various genes are turned on and off due to different health stressors. Using a Salmon Fit-Chip we can measure changes to find out what environmental conditions — salinity, low oxygen, and viral disease — stress salmon.

“ Given the perilous state of Pacific salmon migrating past these fish farms filled with Atlantic salmon — that amplify harmful pathogens and sea lice — we believe strongly that moving the farms out of the water is urgent and essential in order to rebuild Pacific salmon stocks in British Columbia. ”

— Michael Meneer, President and CEO

conducting a study that compares the results obtained by standard fish health monitoring operations with the use of eDNA technology. The scope is to monitor the fish health status of Atlantic salmon in the farms and the distribution of pathogens in the waters surrounding the farms while actively measuring the presence of and the potential exposure of wild salmon to infectious pathogens.

- **Cumulative Environmental Stressors:** PSF deploys innovative Fit-Chip technology to understand the impact of changing environmental conditions on long-term survival of wild Pacific salmon.

"It is imperative to understand the effects of marine stressors, including disease agents, sea lice, ocean temperature, and predation," says Dr. Andrew Bateman, who manages PSF's Salmon Ecological Health program and whose research indicates that numerous infective agents are present in the millions of fish held in open-net salmon farms. "The long-term health of wild Pacific salmon depends upon the research we conduct today."

The Pacific Salmon Foundation invites you to partner in advancing Salmon Health. To contribute, visit: psf.ca/salmonhealth

OPEN-PEN SALMON FARMING

Government of Canada's Minister of Fisheries Joyce Murray recently reaffirmed its commitment to transition away from open-net pen salmon farming in B.C.

The Pacific Salmon Foundation continues to support the health of wild Pacific salmon first and recommends a move to closed-containment salmon aquaculture. Our position is based on the risks to wild salmon, shown through the comprehensive independent research our teams have conducted over the past decade through the SSHI, in collaboration with DFO, Genome BC, and UBC.



**PACIFIC SALMON
FOUNDATION**

SALMON FIRST, SALMON ALWAYS A HEALTHY FUTURE FOR SALMON DEPENDS ON YOUR SUPPORT

The combined impacts of climate change, 150 years of industrial development, habitat degradation, and introduction of disease-causing pathogens through aquaculture have placed Pacific salmon in peril.

Our goal is simple: to save and restore Pacific salmon populations for the future.

PSF's Salmon Health Program will undertake critical research to guide action and evidence-based policy in support of salmon health.

To do this, we need your help.

**Donate today to help ensure a future
for salmon. Call us at 604-664-7664**

**DONATE TODAY
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Photo: Tavish Campbell