

# SALMON STEWARD WINTER 2022 | PSF.CA

PROGRESS IS POSSIBLE

Cowichan Watershed Board shows how collaboration can move the needle

**KELP BIOBANK** Experts develop solution to address declines in kelp forests

DO LOG BOOMS INFLUENCE SALMON SURVIVAL? A new study investigates potential impact on salmon

# SALMON Steward

WINTER 2022



### 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.

#### EDITOR

ErinRose Handy

# CONTRIBUTING WRITERS

Braela Kwan ErinRose Handy Margaret Buttner

#### **DESIGN** Carmen Bright



Printed on FSC® certified paper.

No part of this magazine may be reproduced without written permission of Pacific Salmon Foundation.

### JOIN THE CONVERSATION AT:

FACEBOOK pacificsalmonfoundation INSTAGRAM @pacificsalmonfoundation

> TWITTER @psf

#### HELP US REDUCE PAPER AND MAILING COSTS!

Contact salmon@psf.ca to sign up for a digital copy of Salmon Steward.

#### CONTACT US

300 – 1682 West 7<sup>th</sup> Avenue Vancouver, B.C. Canada V6J 4S6 T: 604.664.7664 | F: 604.664.7665 salmon@psf.ca | psf.ca

CDN Charitable Registration No. 119075638RR0001

# CEO'S MESSAGE



Jordan Point and Michael Meneer with Sarah Murdoch and Gord Sterritt at First Nations Fisheries Council Assembly

The Pacific Salmon Foundation was proud to sponsor the Adams River Salmon Society's Salute to the Sockeye festival at Tsútswecw Provincial Park, aptly renamed in 2018 with the Secwépemc word roughly translated to "many rivers," referring to the numerous side-channels that comprise the river.

Hosted by SKWLAX Little Shuswap Lake Band, the festival opening on Sept. 30 marked the second annual observance of National Day for Truth and Reconciliation, a date to recognize the multi-generational impact of Canada's residential schools on Indigenous people.

The festival opening integrated traditional ceremony to welcome the sockeye and brought together five First Nations along with Fisheries and Oceans Canada, BC Parks, the Adams River Salmon Society, and hundreds of individuals who care about salmon.

The experience served as an important reminder of the cultural importance of salmon to First Nations. It also served as a reminder that it's going to take all of us, working together, to rebuild and protect wild Pacific salmon.

This notion of working together is the driving force behind the Pacific Salmon Action Dialogue Series, a coordinated effort between the First Nations Fisheries Council (FNFC) of B.C. and PSF convening those who share the belief that we must unite for salmon.

The first four Dialogues engaged a diverse coalition of leaders including First Nations, federal and provincial governments, and nonThe experience served as an important reminder of the cultural importance of salmon to First Nations. It also served as a reminder that it's going to take all of us, working together, to rebuild and protect wild Pacific salmon.

governmental conservation organizations, and resulted in unwavering support for a collaborative framework to drive action for salmon. All agreed it is imperative that First Nations continue to play a leadership role in rebuilding wild Pacific salmon.

With continuous input from Dialogue participants, we are working with FNFC on the outline of a collaborative framework. (See p. 4 for details.)

In closing, I want to sincerely thank our partners: Jordan Point, executive director of the First Nations Fisheries Council of B.C. and team, our Steering Committee, and all participants, as well as the Sitka Foundation for their generous support of the Dialogues.

It's salmon first, salmon always, and we don't go it alone.

Michael Meneer President & CEO, Pacific Salmon Foundation



#### Photo (top): Tom Rutherford

# COMMUNITY CORNER

#### GIVING BACK NOW AND IN THE FUTURE – DONOR ADVISED FUNDS

There are many ways to support the Pacific Salmon Foundation now and in the future. As you examine how to most effectively manage your annual giving, you may consider turning to your local community foundation or investment management company and establish a Donor Advised Fund.

For more information on how to leave a lasting legacy, please contact Margaret Buttner, manager, development at **604-664-7664** or **mbuttner@psf.ca** 



# RED BOAT CHALLENGE SETS NEW FUNDRAISING HIGH

The "Red Boat Challenge," a longrunning trip to Langara Island Lodge, brings together Canadian mining leaders with a penchant for fishing. Proceeds of the fundraiser benefit Pacific Salmon Foundation and help advance conservation projects. This year marked the first in-person event after a two-year hiatus and set a new high with over \$110,000 raised. A huge THANK YOU to all participants as well as Langara Island Lodge for matching the contributions.



### NEW STUDY: SOME ALGAE BLOOMS ADVERSELY AFFECT SALMON

A team of PSF researchers published a first-of-itskind study in *Harmful Algae* journal that highlights how some algae blooms may adversely affect wild salmon, exploring potential linkages between juvenile Chinook salmon behaviour and type and abundance of phytoplankton.

Learn more at: psf.ca/HABstudy



### SALMON SPOTTING ACROSS B.C.

The Pacific Salmon Foundation proudly sponsored the 2022 Salute to the Sockeye festival at the Adams River at Tsútswecw Provincial Park where thousands of sockeye salmon returned to their birthplace. Thanks to the many who took part from the Adams River and across the province in our #ISpySalmon photo contest in partnership with BC Parks.

View the PSF salmon spotting map at: **psf.ca/salmonspotting** 

#### **UPCOMING EVENTS**

South Vancouver Island Gala Dinner & Auction, Feb. 25, 2023 at the Victoria Conference Centre. Vancouver Gala Dinner & Auction, March 31, 2023 at the Vancouver Convention Centre.

More info at psf.ca/events

# TABLE OF CONTENTS

#### 4 PROGRESS IS POSSIBLE

Through a unified approach, much can be accomplished. The Cowichan Watershed Board exemplifies how strategic efforts coordinated across entities can move the needle for salmon conservation.

# 6 DO LOG BOOMS INFLUENCE SALMON SURVIVAL?

Bays and estuaries off the coast of B.C. have long housed log booms. These same waters are also home to salmon. A PSF study investigates the potential impact of booms on salmon.

### 7 KELP BIO-BANK

Experts worry that declines in kelp forests — critical habitat for salmon could accelerate in the coming years as climate change causes oceans to warm.

# 8 TOOL DELIVERS INSIGHTS INTO FISH HEALTH

Experts and FitChips bring clarity to the role of environmental stress and disease in salmon.

# 9 TRADITIONAL KNOWLEDGE LEADS TO INNOVATIVE SOLUTION

Community group and First Nations guardians receive award for eco-cultural solution to Canada geese challenge.

# 10 DROUGHT: MITIGATING IMPACT IS ESSENTIAL

As climate change continues to drive extreme weather events, salmon need our help more than ever to prevail.

## **11** PARTNERING FOR SUCCESS

The Government of Canada and Province of British Columbia's B.C. Salmon Restoration and Innovation Fund supports partnerships to help rebuild and conserve Pacific salmon. Learn about PSF progress with partners so far.

# THROUGH A COORDINATED PLAN PROGRESS IS POSSIBLE

# In 2003, the Cowichan River reached a tipping point.

After weeks of drought conditions, salmon had to be trucked to reach their spawning grounds as there was not enough water for them to swim upstream.

This crisis led to an immediate confluence of interested parties: federal and provincial government, local pulp and paper industry, and local environmental groups. All came together on Cowichan Tribal land, the ancestral home of the Quw'utsun First Nation.

"Kudos to those that came together in the early days where the collaboration started as a parking lot meeting," says Tom Rutherford, who served as executive director for the Cowichan Watershed Board for the past six years.

The crisis and ensuing "parking lot" meeting led to an unprecedented collaborative framework of working together for nearly 20 years with a common goal — water management for fish.

"In the face of climate change, we need to change our behaviour to ensure we have sustainable salmon populations," says Rutherford, a former DFO fisheries biologist. "We have the science to know what is happening. We must change our behaviour to effectively address the challenges we are facing."

## A MODEL OF SUCCESS

The Cowichan Watershed Board is a unique local governance partnership co-chaired by Cowichan Tribes and the Cowichan Valley Regional District (CVRD) that promotes watershed sustainability in the Cowichan/Koksilah watershed. Through this model, they work together to advance "whole-of-watershed health."

As the rapidly growing Cowichan Valley balances competing water interests of local Indigenous and non-Indigenous communities with forestry, agriculture, recreation and tourism, the Cowichan Watershed Board serves as a model for collaborative planning to benefit the entirety of the watershed.

The Board was developed to enact the Cowichan Basin Water Management Plan and measure progress on targets including: water quality, estuarine health, salmon sustainability, wise water use, watershed connections (education and outreach), water supply/flows, and riparian habitat protection.

For example, within the estuarine health target, the goal of safely consumable shellfish from Cowichan Bay is measured by water quality. Early monitoring in the bay revealed extremely high levels of coliform bacteria. DNA tracking turned up two prominent sources: human and bovine.

These findings led to the Environmental Farm Plan that provided funding to improve nutrient management practices, which local dairy producers now follow. Coupled with agricultural outreach and education, extensive water quality monitoring continues and bacteria levels in the water are dropping substantially — by as much as an order in magnitude — at some sampling sites.

The cumulative effect of implementing the watershed targets thus far appears to be positively impacting salmon stocks in the Cowichan.

Over the last four years the average annual Chinook return into the Cowichan River has been over 23,000, remarkable considering the population dipped to 500 fish in 2009.

By finding ways to work together, Cowichan Valley residents are truly making a difference — a difference that can be seen as thousands of adult Chinook salmon swim upstream through the counting fence.

"Everybody is playing an important role," says Rutherford. "First Nations, ENGOs, fishers, and all levels of government are working hard to work together. It's not always easy but the results speak for themselves."

Tim Kulchyski, Cowichan Tribes Board member and fisheries biologist and resource consultant says, "It's not only about figuring out what this process looks like, it's about building trust. You have representatives from the two levels of government and First Nations with a lot of water under the bridge. This is an opportunity to come together and build trust for the land and the future."

Another potentially ground-breaking initiative being supported by the board is the province's first Water Sustainability Planning process taking place in the Koksilah watershed, the largest subbasin of the Cowichan.

Cowichan Tribes and the province are in the initial stages of this process which could guarantee "water for fish" moving forward. Rutherford notes the Water Sustainability Plan has the potential to be a real difference maker in two ways: one, it can result in an enforceable plan that provides for adequate flows to sustain environmental values, and two, it can provide a truly collaborative decision-making model.

"It is the first time that First Nations have partnered with the provincial government to develop a collaborative watershed management framework using Water Sustainability Act tools," says Rutherford. "It is all about moving the needle and not about finger pointing."



We have the science to know what is happening.
We must change our behaviour to effectively address the challenges we are facing. ))



Photo: Barry Hetschko

# PROCESS FOR PROGRESS: PACIFIC SALMON ACTION DIALOGUES

The Cowichan Watershed Board provides an example of a successful, coordinated management effort for salmon recovery.

In early 2022, the Pacific Salmon Foundation and the First Nations Fisheries Council (FNFC) of B.C. formed a partnership, creating the Pacific Salmon Action Dialogues to convene people who are keen to come together for salmon.

"We have reached a historic point where many Pacific salmon stocks are threatened or endangered. Current salmon management and conservation efforts are fragmented and complex due to overlapping and conflicting jurisdictions and authorities. This is compounded by the complex life cycles and migration patterns of Pacific salmon," says Michael Meneer, CEO and president, Pacific Salmon Foundation.

"We need a new model and plan to rebuild Pacific salmon. One that breaks down silos and fosters coordination between federal, provincial, and Indigenous governments."

The Salmon Action Dialogues focus on the understanding that it will require all vested groups and individuals to work together in a coordinated effort to develop necessary solutions to improve the state of salmon.

"We need to come together to develop a process for progress for salmon," says Jordan Point, executive director of the First Nations Fisheries Council of B.C. "The dialogues provide an opportunity to create a unified strategy for salmon. It is only through this coordinated effort that we can create economies of scale to truly help salmon."

The initial dialogues focused on learnings from successful models like the Cowichan Watershed Board and others across B.C. and Washington state. Essential to the success of the dialogues thus far has been the continuous input from participants.

#### SALMON ACTION DIALOGUE PROGRESS

As the dialogues progress, PSF and FNFC are planning future sessions and developing a collaborative framework outline. As current salmon management and conservation efforts are complicated, it is necessary to divide the framework into two key areas: **Clear actions and outcomes**; and a **commitment to an ongoing process**. The upcoming dialogues will focus on these topics. (See sidebar for key ingredients to success.)

"A foundational principle of the Cowichan Watershed Board is trust among stakeholders that each is coming together for a common goal of protecting the water supply," says Meneer. "As we deploy the Salmon Action Dialogue plan, if we focus on trusting that we all come to the table with the goal of sustaining salmon, then we will succeed."

# PACIFIC SALMON ACTION DIALOGUES UPCOMING FOCUS

1. CLEAR ACTIONS AND OUTCOMES 2. COMMITMENT TO AN ONGOING PROCESS

# KEY INGREDIENTS FOR SUCCESS:

#### LEADERSHIP FROM GOVERNMENTS, CHAMPIONS, AND COMMUNITY

- Trustworthy relationships, continually working to build trust
- Informed of local experience
- · High-level commitments
- Enduring and accountable through different phases

### STRUCTURED INVOLVEMENT BETWEEN IMPLICATED GROUPS

- Inclusive of all people and interests
- **Meaningful** First Nations engagement throughout
- **Balanced** between bottom-up and top-down approaches
- Adaptive to capacity constraints and ongoing communications

#### INVESTMENTS IN FINANCIAL AND HUMAN RESOURCES

- **Proportionate** to the level of the problem
- **Emphatic** of equipped people with capacity
- **Strategic** to build momentum, such as through incentive programs
- **Perpetual** to support an enduring salmon population

#### DEVELOPMENT OF STRATEGIC GOALS AND TARGETS

- Informed by expert advice, such as independent science and thirdparty bodies
- Aligned across diverse interests and geographic scales
- **Measurable** and continuously monitored, with results guiding iteration
- Long-term and ambitious to see real results



A log boom in Cowichan Bay.

Photo: Jamieson Atkinsor

# LOGS IN B.C.'S BAYS: DO BOOMS INFLUENCE SALMON SURVIVAL?

# There's an extensive history of log storage along B.C. coastlines.

Bays and estuaries have historically served as ideal locations for transport and access to sawmills. Log booms, the orderly storage of floating logs into rafts, are used to support the transit and inwater storage of the wood.

Those same bays and estuaries are critical migratory corridors for juvenile salmon during their spring outmigration to the sea and as adults returning to freshwater habitats to spawn. In the fall, returning adult salmon "stage" in estuaries as their bodies adapt to the freshwater transition. They also must wait for the arrival of ideal freshwater conditions — such as sufficient water flow and suitable water temperature to signal them to enter their natal rivers and streams.

The Salish Sea Marine Survival Project (SSMSP), a five-year international research effort coordinated by PSF and Long Live the Kings, identified predation by harbour seals as a critical threat to struggling salmon populations. One SSMSP study indicated that seals consume up to 43 per cent of juvenile Chinook as they migrate through the Strait of Georgia.

Harbour seals may utilize log structures as platforms to assist in their predation of fish, making salmon highly vulnerable along their crucial migration corridors. Although salmon and seals have coexisted in equilibrium in the past, human activities such as log booms may be shifting this balance.

The Cowichan Tribes and British Columbia Conservation Foundation (BCCF), with support from the University of Victoria and PSF, are studying the effects of log booms in the Cowichan Bay Estuary on the survival of returning adult Chinook salmon.

"Quw'utsun elders tell us how plentiful Chinook salmon used to be at a time when we harvested them using only spears and weirs," says Cowichan Tribes Chief Lydia Hwitsum. "Cowichan Tribes is feeling the immense pressure to study Cowichan River Chinook salmon now, while we still have them to study." The multi-year project uses acoustic and passive integrated transponder (PIT) tags and their associated receivers and antennas to track the movement of returning adult Chinook salmon in Cowichan Bay and the lower river during the fall. By tracking tagged Chinook that migrate beyond the lower river, survival rates can be calculated. To better understand the impacts of log boom presence on salmon, the survival rates in years when log booms are present are compared to 2019, when the booms were absent. The study also assesses different environmental factors like flows and temperatures and human-influenced factors like vessel noise and fishing.

Early results of the ongoing study indicate that log booms may amplify seal predation efficiency on adult Chinook in Cowichan Bay and negatively influence salmon survival. There is strong evidence that the bay and estuary represent a survival bottleneck where the Chinook are susceptible to predation.

Based on variation in river flows during sample years, the results also reiterate the importance of early fall river flows from the Cowichan Lake weir to assist fish movement into the upper river and away from lower river and estuary predation.

A Best Management Practices guide for log booming activities in Cowichan Bay, currently in development, will strive to reduce the negative impacts log booms have on returning Chinook and the ecosystem health of the entire estuary. Recommendations may include removing log booms during the fall migration and maintaining river flow above certain thresholds to improve Chinook survival.

"With salmon stocks declining, we need to start looking at what kinds of things we as humans can do to help alleviate some of the pressure and different stressors that are being put on these critical populations," says Kelsie Murchy, a PhD candidate at the University of Victoria who is an integral part of the project's team.

The research team recently completed the 2022 field season and is currently analyzing the data. Funding applications have been submitted to continue the study for an additional three years with potential to extend the project to other river systems on Vancouver Island.

PSF has contributed more than \$94,000 to help advance this study.



Pacific harbour seals perched on a log boom in Cowichan Bay.

# KELP BIO-BANK DRAWS INTEREST

In some parts of the Salish Sea, kelp forests have declined by as much as 80 per cent in the last 50 years. Experts worry that declines could accelerate in the coming years as climate change causes oceans to warm.

"Kelp forests are a critical habitat for salmon providing protection and food resources," says Isobel Pearsall, director of PSF's Marine Science Program.

"Steps must be taken to ensure that kelp biodiversity is conserved, both in the Salish Sea and worldwide, as oceans continue to warm. Given the speed with which some local kelp populations are declining, it is imperative that action be taken swiftly to protect these important organisms before they are lost forever," Pearsall adds.

Researchers point to Australia as an example of how fast kelp can disappear. The continent has lost up to 95 per cent of its kelp forests in some areas within 80 years, spurring urgent restoration efforts.

## SAVING FOR LATER

The Pacific Salmon Foundation is supporting a team at Simon Fraser University, led by Professor Sherryl Bisgrove, working to preserve the genetic diversity of kelp. They have developed a new cryopreservation technique that will be used to store the germplasm, or "seeds," of at-risk bull kelp for years to come in a kelp biobank. The biobank is a facility to store seed deposits for future restoration and research purposes.

This allows the team, which also includes Postdoctoral Fellow Liam Coleman and Laboratory Manager Silven Read, to preserve local bull kelp biodiversity in case some localized populations become extinct. The collection and preservation of kelp seed could be used to aid restoration efforts and advance research projects such as identifying kelp populations that may be better suited to survive in the warmer waters expected with climate change.

"As climate change progresses, we're going to lose populations of kelp. And when we lose populations of kelp, we lose genetic diversity and stand to lose the kelp forests irretrievably," says Bisgrove. "Once they're gone, we won't be able to get them back. So, the goal of this project is to save as much of the genetic diversity as we can, so we can use it for restoration efforts in the future."

## THE BIOBANK

The team sees the biobank as a seed bank for kelp, where eventually groups can access samples resilient to climate change and reintroduce them into coastal waters.



Researchers studying kelp in Salish Sea.

The biobank is designed to store millions of kelp samples compared to the current methods of long-term storage of only a few hundred or a few thousand.

"We've taken great strides in developing a novel cryopreservation technique," says Coleman. "Hopefully, even decades in the future we can bring out a sample that we've put into cryo and it'll be in virtually the same state as when we put it in, and use that culture to repopulate forests."

With files from: Simon Fraser University 🤨





# NEW TOOLS HELP DELIVER INSIGHTS INTO FISH HEALTH

Kristi Miller-Saunders of Fisheries and Oceans Canada (DFO) leads a team of researchers that focus on infectious disease and environmental

**stress in salmon.** PSF has partnered with her lab since 2013 to develop and deploy genomic technology that can bring clarity to the role of environmental stress and disease in salmon.

"Kristi and her whole team have been instrumental in advancing our understanding of how pathogens impact wild Pacific salmon," says Andrew Bateman, manager of PSF's Salmon Health program. "Using cutting-edge genetic tools, her lab can rapidly draw conclusions about health, stress, and disease in salmon that we only dreamt of 20 years ago."



Fit-Chip allows for testing of up to 96 fish at once.

# **Q&A WITH KRISTI MILLER-SAUNDERS**

# HOW HAS TECHNOLOGY AIDED YOUR RESEARCH DISCOVERIES?

Innovative technology is allowing us to ask questions that were always considered too difficult to answer, especially in a field setting. For example, we've developed genomic tests called Fit-Chips, which offer the first technology to understand cumulative stressors of salmon. They show how salmon are affected by alterations in their environment due to climate change as well as immediate stressors such as parasites.

# HOW DOES A FIT-CHIP WORK?

Salmon Fit-Chips recognize specific stressors in salmon, similar to those used in personalized human medicine.

Have you ever gone to your doctor and asked to be tested for all viruses and bacteria? We can do that for salmon, for up to 96 fish at once!

As salmon environments are becoming more stressful, and opportunistic diseases are often triggered by stress, we built tools to recognize different kinds of stress. With non-lethal gill samples, Fit-Chips tell us when and where fish are most compromised and which diseases are more likely associated with population-level impacts.



Earlier this year, PSF's Salmon Health Program received a vital \$450,000 pledge from the North Family Foundation led by long-time salmon advocates Rudy and Patricia North. The gift advances important research into the cumulative ecological stressors salmon face at a critical time when half of B.C.'s wild populations are in decline.

"Through my lifetime, I've been a passionate advocate for our marine ecosystems and salmon research and recovery efforts. My hope is that this donation, together with the support of others in our community, will advance the research required to galvanize action to stop the dramatic decline in salmon populations that we have all witnessed in recent decades," says Rudy North.

Donate today at **PSF.ca/SalmonHealth** 

# WHY ARE FIT-CHIPS IMPORTANT?

Fit-Chips provide a tool to understand the cumulative factors associated with climate change and human-caused disruptions on salmon health. Climate change has many adverse impacts for salmon. It can alter the oxygen level, raise temperatures, increase salinities, and change the mixture of organisms that wild salmon encounter.

All of these elements come into play in a cumulative way to influence whether salmon will survive or perish. Importantly, if we understand the interplay between stressors and diseases that are undermining salmon survival, where they are likely to occur, and whether they are influenced by human activities, we can develop mitigation strategies to reduce their impact.

We can only mitigate what we can control, which means that stressors enhanced by industrialization or other human activities are where we need to concentrate our efforts.

A special thank you goes out to all the Salmon Health research collaborators. Miller-Saunders' team at DFO's Pacific Biological Station includes: Arash Akbarzadeh, Art Bass, Karia Kaukinen, Shaorong Li, Tobi Ming, Angela Schulze, and Amy Tabata. Collaborators from PSF and universities include: Jonathan Archambault, Andrew Bateman, William Bugg, Christoph Deeg (PSF & UBC), Emiliano Di Cicco, Sean Godwin, Gideon Mordecai (UBC), Kaleb Mantha-Rensi, Amy Teffer (University of Massachusetts, Amherst), and Kayla Zielke.



Team members from Guardians of Mid-Island Estuaries Society and K'ómoks Guardian Watchmen.

# TRADITIONAL KNOWLEDGE LEADS TO INNOVATIVE HABITAT SOLUTION

COMMUNITY GROUP AND FIRST NATIONS GUARDIANS EMPLOY ECO-CULTURAL RESTORATION FOR VANCOUVER ISLAND ESTUARIES

# Overabundant Canada geese have grazed estuarine marshes on Vancouver Island for decades, leading to the loss of more than 90 per cent of this important juvenile salmon habitat.

The Guardians of Mid-Island Estuaries Society is working to restore these highquality fish and wildlife habitats.

"Estuaries are so important for salmon and for other wildlife. Now, we're dealing with this problem of too many geese on Vancouver Island. The Canada geese that are here now — which were introduced in the 1970s and 1980s — love to eat the Carex sedge, a plant we're trying to protect," says Tim Clermont, executive director of the Guardians of Mid-Island Estuaries Society.

The society has created strong partnerships with local Indigenous groups, including the K'ómoks and Wei Wai Kum Nations Guardian Watchmen. Together, they developed a unique Canada goose management solution, called eco-cultural restoration, to rehabilitate critical salmon estuary habitat. The technique involves installing alder and willow fencing around Carex sedge grasses to keep geese out and allow salmon to utilize the now protected and recovering sedge marsh, similar to ancient Indigenous fish trap technology.

"Our goal is to provide nature with the ability to recover," says Clermont.

PSF awarded the 2022 Hungerford Award to the Guardians of Mid-Island Estuaries Society.

The Hungerford Award, named after PSF founding chairman George

Photo: Braela Kwan

The Guardians of Mid-Island Estuaries Society conducts their restoration work in six estuaries across Vancouver Island: Campbell River, K'ómoks (Courtenay River), Little Qualicum River, Englishman River, Nanaimo River, and the Craig Creek estuary.

Hungerford, is a \$10,000 prize granted to individuals or community groups that demonstrate exceptional dedication to salmon conservation and restoration. Awardees are recognized for their community impact, contributions of influence and innovation, and benefit to Pacific salmon and their watersheds.

Since 2018, PSF has supported the Guardians of Mid-Island Estuaries Society with more than \$123,000 delivered through grants from PSF's Community Salmon Program. PSF proudly presents the Hungerford Award to the group to advance their vital habitat rehabilitation efforts.

PSF presented the award to Clermont at the annual PSF Comox Valley Gala Dinner & Auction, presented by Mosaic Forest Management, on Sept. 23, 2022.

# **RESILIENT SALMON**

B.C. set weather records this fall with high temperatures and extended dryness. With drought conditions persisting into late October, <mark>many regions reached the highest Level 5 warning, where adverse effects are almost certain.</mark>

Extreme weather conditions are becoming the new norm. Planning for and mitigating the impacts is essential for salmon to survive.

"While faced with these realities of climate change, it's important to remember that salmon are resilient; they have adapted for thousands of years," says Katrina Connors, director of PSF's Salmon Watersheds Program. "While they currently face their biggest challenge yet, climate change, it is critical that we plan for these conditions with conservation strategies that seek to enhance their resilience."

Across B.C., salmon populations suffered during the recent drought.

Sadly, tens-of-thousands of stranded pink and chum salmon were found dead in Neekas Creek within the Great Bear Rainforest. And across the province, spawning was delayed, which could introduce a series of ripple effects for the next generation of salmon.

## SALMON NEED OUR HELP

A focus on watershed restoration and protection is critical to ensuring the diverse habitat for salmon that allows them to adapt to changing conditions. Proactive land and water management can help maintain the natural complexity of salmon habitats that have allowed diverse populations to evolve over the course of millennia. Better management decisions can be made with improved data.

The Pacific Salmon Explorer, an online mapping tool that displays the status of salmon and their habitats across B.C., provides data to support more informed conservation and management decisions.

In-season monitoring of stream flows and temperature is essential for understanding how droughts are affecting salmon populations. For example, this year in the Quinsam River on Vancouver Island, stream discharge were about 80 per cent below average creating challenging conditions for salmon. Monitoring can also help identify areas that could serve as drought refuges and for strategically protecting salmon habitats that are vulnerable to severe droughts.

"We need to stop treating these climate events as emergencies. Climate change



Photo: Rheanna Drennan

is negatively impacting salmon ecosystems across B.C., and our management systems need to anticipate these changes and implement strategies for mitigating risks and supporting the capacity of salmon to adapt to a rapidly changing world," says Connors.

Although salmon are resilient to occasional drought, climate change results in severe weather events occurring more frequently, which will likely impact salmon populations. With our help, the effects of a warming climate can be reduced by making "salmon first" decisions and investments in habitat restoration and climate adaptation strategies to give salmon the best chance possible.

# CURRENT HABITAT PRESSURES | FUTURE HABITAT PRESSU



All Salmon ~ All conservation Units CE SPARMING PRESSURE © Conservation Units CE SPARMING PRESSURE © CE SPARMING PRESSURE



Left: Habitat pressures and biological status information for salmon near the Quinsam River. *Source: Pacific Salmon Explorer.* 

Right: October average stream discharge (black points and line) and range (grey) for the Quinsam River from 1997–2022. Figure created by the Salmon Watersheds Program using data from the Water Survey of Canada.

# PARTNERING FOR SUCCESS

The B.C. Salmon Restoration and Innovation Fund (BCSRIF), a joint investment funded 70 per cent by the Government of Canada and 30 per cent by the Province of British Columbia, supports partnerships to help rebuild and conserve Pacific salmon.

Since the fund was initiated in 2019, the Pacific Salmon Foundation has been working closely with partners on several projects. The funding enables important work to restore and conserve Pacific salmon and their habitat.

Here is a brief update of projects underway.

## SALMON AND CLIMATE

Climate change indicators are being integrated into the Pacific Salmon Explorer - an interactive online mapping tool that provides information on the status and trends of Pacific salmon and their habitats. This information

will help decision-makers better understand the current extent and intensity of climate pressures on salmon, vulnerability of specific salmon populations to future climate changes, and prioritize strategies for mitigating these pressures and enhancing the resilience of salmon.



their survival.

BOTTLENECKS TO SURVIVAL

More than 100,000 fish from

nine river systems have been

tagged with Passive Integrated

Transponders (PIT) tags. This allows

for fish tracking and monitoring to learn what factors are impacting



2022 Salute to the Sockeye Festival

# **CLIMATE ADAPTATION**

One advanced genetics study of upper Fraser River salmon looks for traits that may be important to conserve. This valuable data is important to inform rebuilding and conservation measures. DNA sequencing is well underway and there are samples from 214 sockeye, 286 Chinook, and 200 coho collected from areas throughout the middle and upper Fraser River watershed.



Comprehensive reviews of hatchery release strategies have recently been published. They include recommendations to improve hatchery management while minimizing risks to wild salmon. Currently underway are a literature review of salmon hatchery-wild interactions, results of community hatchery interviews, and an overarching synthesis of findings and recommendations with emphasis on risks, benefits, and effectiveness of hatcheries.



# **USING ARTIFICIAL INTELLIGENCE TO COUNT SALMON**

Developing artificial intelligence (AI) software to automate the counting and identification of salmon from video and sonar data will not only eliminate the need to review hundreds of hours of data postseason, it will also provide critical inseason information on salmon returns.

In August, Fisheries and Oceans Canada and the Province of British Columbia announced the expansion of the BCSRIF with key priorities in improving salmon health and ensuring a sustainable fishing sector.

"We welcome the renewal of the BCSRIF and value the fact that B.C. and Canada are jointly investing in partnerships with organizations like PSF. We are using these funds to catalyze projects with our Indigenous, community, conservation, and university partners to help rebuild our Pacific salmon populations that are struggling the most," says PSF CEO and President Michael Meneer.





This program is funded by the Government of Canada and the Province of British Columbia.



# WE ALL NEED SALMON.

More than 137 plants and animals — including orcas, bears, and forests — depend on Pacific salmon for their survival.

Mr. Brown joined the PSF team as a resident salmon expert to help galvanize support to save and restore Pacific salmon as they face increasingly challenging conditions due to climate change.

The good news is, you can help.

We all need salmon, not just bears.

DONATE TO HELP SUPPORT SALMON TODAY PSF.CA/MRBROWN

