DFO Pacific Region
2024 Drought Response Summary Report

Image 1: DFO biologist is setting up small fish traps to catch stranded salmon fry in an area impacted by drought to move them to larger pools of cooler, oxygenated water.

Introduction and Background

Pacific Region is experiencing the effects of climate change, with warming temperatures and changing precipitation contributing to more frequent events such as floods, droughts, landslides, and wildfires. Since 2022, British Columbia (BC) has experienced extreme drought conditions that pose significant and widespread risks to fish and fish habitat, including Pacific salmon and species listed under the *Species at Risk Act* (SARA). Drought conditions lead to habitat disruptions, warmer water and oxygen depletion, dewatered streams and river confluences, delayed movement of migrating fish into spawning streams due to low stream flows, and fish strandings and mortalities.

At the end of the 2023 Drought Season, Fisheries and Oceans Canada (DFO) conducted a debrief and identified key actions to strengthen its drought preparedness, mitigation, and response efforts. The development of a Drought Strategy was recommended to clarify roles, responsibilities, and communication protocols. Internally, DFO proposed the formation of task teams and a centralized tracking system to improve coordination and information sharing.

Partnerships with Indigenous groups, stewardship organizations, the Government of BC, and contractors were emphasized as essential for localized monitoring and response. A watershed-

based approach was encouraged to guide planning and collaboration with water committees. The development of a prioritization framework for field monitoring—based on drought severity and available resources—was recommended, along with the exploration of remote technologies to expand monitoring capacity. For communications, DFO identified the need for a public-facing outreach plan, drought education materials, and media training for staff.

Operational priorities included identifying surge capacity, securing funding, and preparing equipment ahead of the drought season. Additional recommendations included enhancing climate-resilient hatchery operations, reviewing infrastructure for fish passage under low-flow conditions, and building long-term ecosystem resilience. Identifying vulnerable watersheds and engaging communities in mitigation efforts were highlighted as key elements of future planning.

In preparation for the 2024 drought season, DFO adopted several key recommendations from the lessons learned in 2023. Enhanced drought response structures improved DFO's ability to work efficiently and collaboratively with partners to mitigate and respond to impacts on fish, fish habitat, and aquatic species at risk (SAR). This report summarizes 2024 activities across key themes and highlights opportunities to further strengthen drought response efforts for the benefit of fish, fish habitat, and SAR.

DFO's Enhanced 2024 Drought Preparedness and Response

Drought Governance and Coordination

Coordination of DFO's 2024 drought response activities was supported by the realignment of Pacific Salmon Strategy Initiative (PSSI) priorities and the designation of a Regional Drought Response Coordinator. Pre-season planning and coordination began in January and included engagement with First Nations Governments, the government of BC, Indigenous Fisheries Organizations, Stewardship Organizations and other partners. These efforts were guided by the development and implementation of a provisional 2024 Regional Drought Response Strategy and Operations Plan.

To prepare internally for the 2024 drought season, DFO conducted weekly Regional Drought Task Team (RDTT) meetings beginning in April. These meetings supported coordination on drought governance, technical guidance, funding, prioritization, situational awareness, and emerging issues and actions. Local drought response plans were refined to incorporate watershed prioritization frameworks, coordinated funding requests with partners, and the identification of surge teams. Regular internal drought meetings further enhanced information sharing, coordination, and operational efficiency during monitoring and response efforts.

In 2024, new multi-jurisdictional governance structures were implemented and existing ones strategically aligned to strengthen support for BC water management decisions, foster collaboration on cross-cutting issues, and enable coordinated field response efforts. These structures facilitated cooperation among the First Nations Fisheries Council (FNFC), the Pacific Salmon Foundation (PSF), the BC Ministry of Water, Land and Resource Stewardship (WLRS), and DFO.

In response to the escalating challenges facing salmon, a collaborative partnership was formed in 2023 between PSF, the government of BC, and DFO to address drought risks to salmon. In 2024, this partnership was formalized as the Salmon Emergency Action Support (SEAS) working group and expanded its membership to include the FNFC. Additionally, SEAS broadened its mandate to address a range of climate emergencies beyond drought, including landslides, wildfires, and floods. This table received strategic guidance from the Drought Preparedness and Response for Salmon Executive Leads group (DPRSE) group.

DFO and BC WLRS met regularly through the BC-DFO Executive Drought Table and the BC-DFO Leadership Table to strengthen collaboration and guide the work of the BC WLRS/DFO All Hazards Technical Coordination Working Group. Initially established in late 2023 after the extensive drought season, the working group was formalized in February 2024 to collaboratively address shared challenges to fish, fish habitat, and SAR caused by environmental hazards and identify strategic province-wide projects.

During the 2024 drought season, DFO actively supported BC's implementation of the BC Drought and Water Scarcity Response Plan (2024). This included participation by DFO technical experts in key Provincial Water Management Committees such as the Provincial Technical Drought Working Group (PTDWG), Regional Technical Drought Working Groups (RTDWGs), Drought Advisory Tables (DATs), flow committees, and other water management forums.

DFO also collaborated directly with Indigenous governments and fisheries authorities, provincial and municipal agencies, regulatory bodies, environmental and conservation organizations, academia, industry, and fisheries management groups. These engagements, through established mechanisms and fisheries meetings, supported joint drought mitigation and response actions.

Field Monitoring, Emergency Actions, and Restoration

In 2024, DFO supported a wide range of drought-related field activities and emergency response actions through funding, technical guidance, and collaboration.

DFO allocated $245,000 of PSSI Contribution funds to First Nations to support monitoring and remediation of drought impacts on fish and fish habitat. Additionally, $195,000 in PSSI Operations and Maintenance funds were redirected to facilitate monitoring flights, charter patrols, and the procurement of drought-related supplies. Further funding of $1,970,814 was provided by the British Columbia Salmon Restoration and Innovation Fund (BCSRIF), with DFO contributing $1,379,570, to PSF across Fiscal Years 2024-2025 and 2025-2026. These funds enable partner-led emergency actions and strategic mitigation efforts through the SEAS working group.

The Department updated its Emergency Juvenile Salmonid Relocation and Emergency Adult Salmon Passage Guidelines and released a technical report outlining key considerations for rapid drought approaches and consideration in salmon bearing streams. These resources informed emergency actions and supported safe and effective interventions in the field.

In collaboration with approximately 60 partners, DFO supported around 75 proactive mitigation and emergency response activities. These included: flow management, fish passage improvements, fish stranding response, creation and enhancement of cold-water refugia, beaver dam management, oxygenation of off-channel habitats, and riparian shading projects.

Image 2: Before and after photos of the new groundwater channel constructed on the Indian River led by səlilwətaɬ (Tsleil-Waututh Nation) with support from DFO's Restoration team

In 2023 and 2024, severe drought conditions dried up sections of the Indian River preventing coho, chum, and pink salmon from swimming upstream to more spawning habitat. To address this, səlilwətaɬ (Tsleil-Waututh Nation), with funding from the Aquatic Ecosystems Restoration Fund, collaborated with our Restoration team in the summer of 2024 to design and construct a groundwater channel that expands fish access to further habitat downstream. Crews worked together to dig a shallow channel that expanded and connected low lying wet areas on the floodplain, which helped boost water flow in the area. This new groundwater channel has added more capacity for juvenile and adult coho, chum, and pink salmon during periods of low water in future years.

Image 3: One of the sockeye spawning beaches on Great Central lake.

During the 2023 drought season, a multi-stakeholder advisory committee was assembled with representatives from BC WLRS, Hupacasaht First Nation, Tseshaht First Nation, Alberni-Clayoquot Regional District, BC Hydro, Domtar, DFO, and several local knowledge holders to coordinate water management advice for dam and weir operators in the Somass Watershed on Vancouver Island. This committee takes a consensus-based approach to provide recommendations and advice to the Port Alberni Mill, such as when to store and release water. The dam and weir have historically been operated to support the needs of the paper mill; however, this committee plays a critical role in ensuring that water levels also support critical juvenile sockeye salmon nursery habitats and enable adult salmon to reach their spawning grounds, among other objectives. During the 2024 drought season, this coordination was critical in protecting vulnerable juvenile and adult salmon in the Somass Watershed.

Throughout 2024, DFO piloted new technology and expanded the use of new methods to facilitate drought resiliency including: remote monitoring technologies such as remote cameras, satellite imagery, hydrometric stations, trail cameras, and drone thermal imaging, solar-powered aeration units, constructed cobble weirs, and low tech in-stream woody debris installations to improve fish passage during low flow conditions. These tools and techniques proved valuable in facilitating timely and informed actions on the ground.

Image 4: Cross Creek disconnected from Babine Lake on September 13, 2024

DFO's 2024 North Coast drought response initiative introduced groundbreaking methods for monitoring drought in remote areas like Babine Lake tributaries. Traditionally, accessing these areas for consistent stream observations meant expensive and logistically challenging helicopter or boat trips. But with the advent of remote camera systems and satellite imagery, monitoring has become more efficient and far-reaching. A remote camera at Cross Creek proved especially impactful, capturing daily images that documented stream disconnection and drought effects. This real-time data allowed Lake Babine Nation and DFO crews to act quickly when salmon were stranded, ensuring timely interventions. Beyond water flow, the camera provided valuable insights into weather patterns, ice formation, and predator activity—essential data for long-term restoration planning. Plans are now underway to maintain the Cross Creek camera, and to add systems at Four Mile Creek and a third, yet-to-be-identified site.

Where response efforts were more complex or unfunded, DFO collaborated with the SEAS working group to support emergency projects aimed at protecting salmon during time-sensitive natural hazard climate emergencies. Through these efforts, the SEAS working group approved 18 emergency projects, totaling $548,000 in funding.[1] These projects included habitat restoration, flow augmentation to support critical habitats, targeted monitoring, and salmon relocation efforts. The SEAS working group played a pivotal role in providing rapid, targeted support for local initiatives across BC.

[1] One project received funding from FNFC through the Emergency Fund Program. Two additional projects were approved but did not utilize their allocated funds due to the emergency resolving itself and delays caused by spawners in the work area. In 2024, 15 PSF-funded projects were successfully completed, totaling $450,000 in expenditures. The remaining BCSRIF funds ($824,000) will be used to support strategic mitigation projects and urgent need and rapid action projects in 2025.

Communications and Reporting

In 2024, DFO developed a pre-approved Communications Strategy marking a critical shift from reactive to proactive media engagement. Key elements of this strategy include:

- Empowering field personnel with pre-approval to conduct media interviews about their work, along with media training to ensure effective engagement and expanded coverage of DFO initiatives.
- Launching a public awareness campaign via DFO's social media accounts and website to educate the public on drought impacts and how to adopt fish-friendly water use and recreation habits.
- Collaborating with partners to showcase success stories on DFO's website, highlighting impactful activities to address the impacts of drought on fish and fish habitat.

Several initiatives enhanced communication internally, with partners, and with the public:

- The Observe, Record, and Report (ORR) line operations and website were strengthened to encourage public reporting of drought-related incidents impacting fish and fish habitat. A complementary communications protocol was established to ensure timely information sharing with both internal teams and partners, enabling swift response actions.
- A centralized drought tracker was quickly developed to document monitoring efforts and response activities.
- Internal situational awareness was enhanced through RDTT meetings, executive briefings, intranet updates, and a dedicated MS Teams channel focused on drought-related discussions.
- Partner situational awareness improved with the weekly distribution of DFO Situation Reports.

Enhancement and Infrastructure

In 2024 the Department developed drought plans to proactively identify potential risks and develop mitigation measures specific to each hatchery. Longer term infrastructure investments were also made to ensure more reliable water sources for hatcheries, particularly those vulnerable to drought. For example, DFO Chilliwack Hatchery improved its water intake by installing a wing dam and modifying its system to reduce water loss. To address significant water loss at the DFO Weaver Creek Spawning Channel through seepage, a protective liner was installed beneath the gravel, covering 60% of the channel so far. These upgrades have significantly improved water flow with plans for further enhancements in the future. A number of fish passage structures constructed throughout the Pacific Region were built at a time when water conditions were much different than they are today. The increasing trend of extreme low water conditions has led to dewatering of fish passage infrastructure resulting in passage and migration concerns on systems including the mid-Fraser River. DFO has been working with Indigenous Governments to action short term mitigations so that immediate fish passage is enabled and a longer term solution is under development.

Legislative Authorities

Water management during drought is led by the Government of BC primarily under the *Water Sustainability Act* (WSA) and the BC Drought and Water Scarcity Response Plan (2024). Under this

plan, DFO has the responsibility, where capacity allows, to monitor and report on fish and fish habitat conditions during drought. DFO is also responsible for administering the federal *Fisheries Act* (FA) and SARA (as it applies to aquatic species at risk) insofar as drought conditions may inform decisions made under these Acts; for example, in-season fisheries decisions may be made during drought, or proponents receiving FA authorizations may be required to consider drought before or during their works, undertakings, or activities. DFO may also support the Government of BC's use of Temporary Protection Orders (TPO) under the WSA to curtail licensed water use in order to mitigate the impact of low flows on fish, fish habitat, and aquatic species at risk. DFO improved our communication and engagement with BC in 2024 through:

- Exploring actions to support the survival and recovery of two aquatic Species at Risk, Nooksack Dace and Salish Sucker, in systems that experienced low flow in the Fraser Valley.
- Preparing two Variation Orders to mirror the Provincial recreational fishery closures on the Kispiox River and in Nechako River tributaries, due to drought conditions.
- Expediting regulatory approvals under the WSA (WLRS) and FA (DFO) for emergency drought response field projects.
- Discussing potential actions against unlicensed water use under the FA and examined potential regulatory tools to mitigate drought impacts to SAR.
- Incorporating better information for salmon and SAR species in the BC Drought Portal.
- Sending three letters of support to BC for potential TPOs in Bessette Creek, Salmon River, and Koksilah River based on concerns for migrating and spawning Pacific salmon.

Lessons Learned

1. **Clear Response Plans and Dedicated Roles Strengthen Emergency Preparedness** – The establishment of structured drought response plans and dedicated drought coordination positions significantly improved coordination and effectiveness.
2. **Strategic Governance Enhances Effectiveness** – Formalizing governance structures helped streamline response actions, decision-making, and resource allocation.
3. **Streamlined Reporting Improves Efficiency and Decision-Making** – Implementing a centralized drought tracker and standardized reporting processes enhanced situational awareness, data accuracy, and coordination.
4. **Partnerships and Shared Responsibilities Improve Outcomes** – Partnerships proved to be one of the most critical and effective response strategies that enabled the gathering/disseminating of accurate/timely information to facilitate and coordinate meaningful response actions on the ground.
5. **Flexible Funding Mechanisms Enhance Effectiveness** – Coordinating funding across agencies allowed more projects to proceed. The ability of PSF and FNFC to provide immediate funding, ensured critical projects were not delayed due to bureaucratic processes.
6. **Long-Term Planning, Infrastructure, and Mitigation are Key to Climate Resilience** – Many fish passage structures, hatcheries, and habitats were not designed for increasingly severe drought conditions**.** A Climate Vulnerability Index assessment is underway for DFO's 2,000

assets and 230 sites in the Pacific Region. Proactive planning, infrastructure upgrades, and sustained mitigation efforts are essential to protecting fish populations and ecosystems in the face of climate change.

7. **Balancing Drought Response and Core Programs Remains Difficult** – DFO staff faced persistent difficulties in managing the demands of drought-related meetings, immediate emergency response, and delivery of core programs.
8. **Coordinating Communications Opportunities with Partners Continues to Pose Challenges** – While DFO advanced its proactive media engagement work and continues to strengthen relationships with key drought partners, coordinating joint communications opportunities during the summer months remains difficult. This is due in part to the fast-paced nature of drought response activities and the varying availability of partners during peak operational periods.
9. **Aquatic Species at Risk** – Further work is required to inform how BC and DFO can best work together to mitigate drought impacts on aquatic species at risk
10. **Separate Climate Event Responses Create Inefficiencies** – DFO currently addresses droughts, floods, fires, and landslides separately, which can lead to inconsistencies, inefficiencies, and gaps in response efforts. A more integrated approach would improve coordination, resource allocation, and overall effectiveness in managing climate-related emergencies.

Recommendations

1. **Formalize the Drought Response Strategy and Operations Plan** – DFO should finalize its strategy and plan to enhance transparency and enable broader sharing with external partners.
2. **Strengthen Multi-Government Coordination and Governance** – DFO and BC WLRS should work in the off season to streamline meeting scheduling, review drought response table terms of reference and membership, strengthen feedback mechanisms, and enhance structure effectiveness.
3. **Clarify Roles and Responsibilities** – Improve understanding of drought response roles and responsibilities through collaboration with key partners to develop and disseminate improved visual guides outlining drought response structures, processes, agency roles, decision-making pathways, and available funding in an accessible manner.
4. **Prioritize Climate-Resilient Infrastructure Upgrades** – Prioritize infrastructure upgrades based on the Climate Vulnerability Index results, ensuring that high-risk DFO Salmonid Enhancement Program facilities and fishways receive targeted protection and investment.
5. **Reliable and Adaptive Funding for Climate Emergencies** – Explore avenues for long-term financial support for climate emergencies, enhancing the accessibility and speed of existing funding for partners, considering funding mechanisms for a wider range of natural hazards, and emphasizing strategic resource allocation.

6. **Improve Resource Allocation and Workload Management** – Strengthen surge capacity by maintaining a trained roster for rapid deployment and conducting regular training and readiness exercises. Integrating climate emergency management into core programs will support a more proactive approach and smoother transitions between routine operations and emergency response.
7. **Enhance Public Awareness and Engagement** – Work with key partners to develop a collaborative communication strategy, to improve opportunities for joint communications and timely media responses. This could include joint statements, town halls, and public outreach campaigns.
8. **Strengthen Water Management Processes and Legislative Tools** – Refine the fish flow methodology process in partnership with BC and others to create more certainty with regard to when low flows are impacting fish, ensure that SAR considerations are integrated into drought planning, and continue to explore regulatory flow tools which are available under the FA and other federal legislation.
9. **Develop an Integrated Climate Emergencies Response Strategy (ICERS)** – Advance the development of ICERS to clearly define mandates, roles, and procedures for managing climate-related emergencies such as droughts, floods, fires, and landslides. This strategy should streamline internal processes, support consistent response efforts, and enhance coordination with external partners.
10. **Strengthen Integration into Emergency Management System** – Enhance collaboration with Emergency Management and Climate Readiness BC, as well as the Federal Coordination Group, to improve response efficiency and ensure better alignment with other agencies during climate-related events.

Conclusion

DFO's 2024 drought response in BC marked a notable advancement in preparedness, coordination, and mitigation compared to previous years. Early planning, improved governance structures, and expanded partnerships facilitated a more effective and proactive approach to managing drought-related challenges. Investments in field monitoring, infrastructure resilience, and communication strategies improved situational awareness and public engagement, while lessons learned from prior droughts shaped strategic improvements in emergency management**.**

Looking ahead, formalizing the Drought Response Strategy, improving multi-government coordination, and implementing an Integrated Climate Emergencies Response Strategy will be pivotal in ensuring resilience and adaptability amid the continuing impacts of climate change. By refining response frameworks, fostering greater collaboration, and investing in climate-resilient infrastructure, DFO will strengthen its capacity to protect fish, fish habitat, and aquatic species at risk in increasingly extreme environmental conditions.