



Burrard Inlet Environmental Science and Stewardship Fund Year-end Report: 2022-23

July 27, 2023

Treaty, Lands and Resources Department
Tsleil-Waututh Nation / səlilwətəl



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Introduction

Stewardship Fund Overview

Fiscal year 2022-23 marked the second year of the Burrard Inlet Environmental Science and Stewardship Agreement. The Agreement established a \$20 million dollar fund (the Stewardship Fund) that distributes \$2 million annually to Tsleil-Waututh Nation (TWN) for 10 years to fund environmental science and stewardship work in Burrard Inlet. The agreement also established a joint Tsleil-Waututh–Crown Burrard Inlet Environmental Science and Stewardship Secretariat (the TWN-Crown Secretariat) to coordinate stewardship activities and scientific work in the inlet.

The Stewardship Fund is managed by TWN's Treaty, Lands and Resources Department (TLR) to support the ongoing stewardship work that Tsleil-Waututh people have been doing since time out of mind. This funding allows TLR to plan long-term work based on TWN priorities and timelines, rather than relying on external funding for activities defined by others.

The Stewardship Fund's objectives defined by the TWN-Crown Secretariat are as follows:

1. Build capacity to implement TWN stewardship work in Burrard Inlet, including required staffing, equipment, field work, specialized expertise, and overhead costs.
2. Work to restore TWN priority ecosystem components in Burrard Inlet.
3. Monitor TWN priority species, habitats and the marine environment in Burrard Inlet.
4. Support development of TWN planning initiatives, structures and processes to guide TWN stewardship priorities and activities in Burrard Inlet.
5. Engage the TWN community in stewardship activities, including youth, Elders and community members.
6. Support TWN relationship building and collaboration with the wider community of Burrard Inlet, including other First Nations, all levels of Canadian governments and government agencies, NGOs, academic researchers and other agencies and stakeholders working in the Inlet.

Additionally, the TWN-Crown Secretariat establishes a unique forum for Tsleil-Waututh and multiple Canadian departments to work together on environmental science and stewardship activities in the inlet. Overall, this agreement supports TWN's efforts to restore the health of Burrard Inlet, to build relationships, collaborate with others, and to strengthen and maintain the community's connections to the water and lands of the territory. These are important steps towards restoring Tsleil-Waututh governance in Burrard Inlet.

2022-23 Annual Report

The purpose of this report is to provide information to the TWN community regarding the Burrard Inlet Environmental Science and Stewardship Agreement, and work completed under the Stewardship Fund in 2022-23.



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The Stewardship Fund is structured on Canada's fiscal year, and every April 1st \$2 million is provided to TLR to fund work until March 31st the following year. Any funding that is unused at the end of that period is added to the following year's budget. While 2022-23 was the second year of funding, it marked the first complete year that the Stewardship Fund was available, as the agreement was finalized and signed part way through 2021. Therefore, this year saw capacity growth within TLR and many exciting new projects commence based on TWN priorities and stewardship in Burrard Inlet. This work, informed by TWN Knowledge and Western science, will help uphold TWN rights, title, and interests, and implement TWN stewardship practices throughout Burrard Inlet.



The view looking south down Indian Arm during the TWN field crew's morning commute.



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Tsleil-Waututh Fieldwork and Data Collection Programs

A pillar of TWN science and stewardship work in Burrard Inlet is TLR's fieldwork, led by our crew of Natural Resource Technicians. In 2022-23, this longstanding program grew to eight full-time field staff, two boats, three vehicles, and significant specialized field equipment for marine, freshwater and terrestrial science and stewardship. Additionally, TLR field programs now have a designated Manager and Senior Environmental Specialist. This team works throughout Burrard Inlet and the Indian River Watershed year-round and relies on TWN Knowledge and Western science to exercise TWN stewardship rights, monitor the health of the territory, support ecosystem restoration, and facilitate TWN harvesting practices. While our Field Programs is not recognized by Canada as a Guardian Program, they engage in activities that align with other Indigenous Guardian Programs, including stewardship, data collection, and education-based enforcement.

In 2022-23, many field activities previously funded by other agreements shifted to be funded by the Stewardship Fund. This allows TLR to continue long-standing programs with greater certainty and pursue additional priorities and new programs. The funding also provides flexibility to cover costs associated with equipment, vehicles, boats and safety in order to maintain our comprehensive approach to field work. Below is an overview of activities conducted by TWN field crews that relied on the Stewardship Fund in 2022-23.

Clam population surveys

Overview and activities: In summer 2022, TWN conducted clam population surveys at 5 sites throughout Burrard Inlet to understand species distribution, population density, and site-specific



Softshell clams at a survey site in Indian Arm. Photo credit to [Kayla MacInnis](#).

variation in clam populations. These are transect-quadrat surveys and can help inform future harvesting priority locations. We reduced the number of sites for these surveys this year, as they must be conducted during limited daytime low tide windows, which are also required for other work that was prioritized in 2022, such as clam contaminant surveys.

Objectives supported: 1 and 3.



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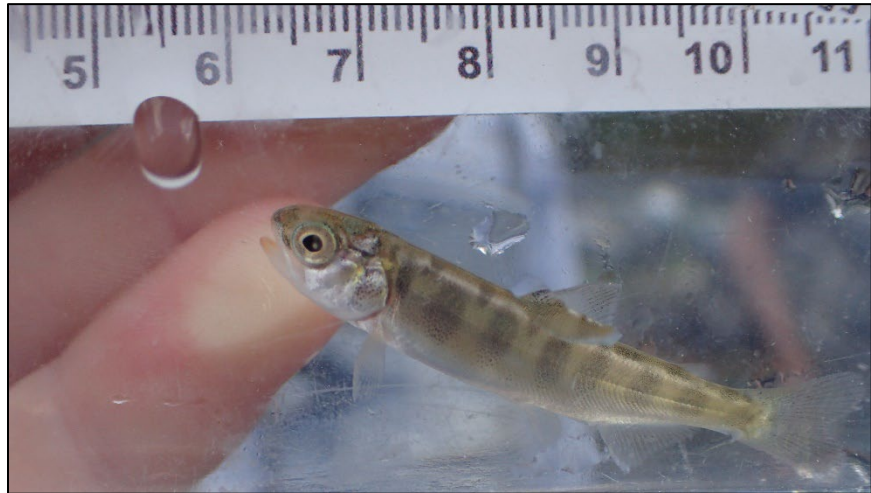


Beach Seining

Overview and activities: In spring and summer 2022, TWN field crews conducted beach seine surveys in Indian Arm to better understand juvenile salmon migration routes from the Indian River to the Salish Sea. This included bi-weekly surveys at 6 sites from February through May. Surveys include deploying a seine net from one of our vessels in intertidal or nearshore habitats and identifying and counting the species caught

before releasing them back to the inlet. These surveys provide valuable insight into the health of local salmon populations and priority habitats and areas for juvenile salmon.

Objectives supported: 1 and 3.



A juvenile coho salmon caught in Indian Arm and measured for TWN's beach seine surveys.

Oceanography data collection: CTD surveys and seafloor observatory

Overview and activities: In 2022-23, TWN field crews continued our ongoing physical oceanography surveys at 16 locations throughout all basins of Burrard Inlet, using an instrument to measure conductivity, temperature, pressure, dissolved oxygen, turbidity, and chlorophyll-a fluorescence (called a CTD, standing for conductivity, temperature and depth). Additionally, Ocean Networks Canada (ONC) provides servicing, data management and software support for our CTD surveys. This program contributes to a long-term dataset that TWN started collecting in 2019, as part of DFO's Coastal Environmental Baseline Program. [Data from these surveys is available here.](#)

The broad spatial coverage of these surveys compliment data collected by TWN's seafloor observatory near Brockton Point, installed in 2019 with ONC. This is a permanent, cabled, seafloor monitoring platform that collects continuous data on many oceanographic variables, including conductivity, density, salinity, temperature, turbidity, oxygen, pH, CO2 and other variables. The seafloor observatory requires annual servicing and maintenance, and ongoing data management. Annual servicing for the seafloor observatory occurred in fall 2022 and included retrieving the platform and immediately redeploying an identical platform (a "live swap"). The retrieved platform was taken to ONC's lab for maintenance and instrument calibration. Data management services are provided by ONC and data from the seafloor observatory is [available in near-real time here.](#)



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Overall, this work supports TWN stewardship by identifying long-term changes in Burrard Inlet, such as changing temperature, dissolved oxygen and pH, and improving our understanding of nutrient cycling and transport through the inlet.

Objectives supported: 1, 3 and 6.

Eelgrass Transplanting

Overview and activities: Many activities in Burrard Inlet negatively impact eelgrass beds, and TWN has long been working to preserve and improve local eelgrass habitat. In 2022, TWN collaborated with SeaChange Marine Conservation society to transplant approximately 2000 eelgrass shoots along the north shore of Burrard Inlet's central. This work followed established protocols, and included working with TWN Elders, youth and broader community. It is the most recent collaboration between TWN and SeaChange, following successful eelgrass transplant projects in 2015 and 2021.



Eelgrass near TWN's reserve in North Vancouver.

Objectives supported: 1, 2, 5 and 6.

Underwater Noise Monitoring

Overview and activities: TWN is partnered with Vancouver Fraser Port Authority's ECHO program to understand current levels of underwater noise in Burrard Inlet. In 2022-23, we deployed three hydrophones throughout the Inlet, one of which was owned by Ocean Networks Canada and deployed on TWN's seafloor observatory near Brockton Point. The others are deployed by contractors working for ECHO and must be retrieved and redeployed approximately every three months to collect data and replace batteries. This supports TWN stewardship by characterizing current underwater noise in the inlet and detecting marine mammal presence. We work with the port and their contractors to retrieve and redeploy hydrophones, and work with ONC to ensure data collection continues from the hydrophone on the seafloor observatory.

Objectives supported: 1 and 3.



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Bird Surveys

Overview and activities: TWN collaborates with Birds Canada to conduct boat-based winter coastal waterbird surveys. Burrard Inlet has large data gaps for waterbirds in areas with low human population density or low access for birders, such as the Indian River Estuary. TWN is working to fill the data gaps in Indian Arm by conducting surveys based on methodologies and training from Birds Canada. Surveys are boat based and conducted two hours on either side of high tide. Visual observations are recorded on data sheets from Birds Canada, and data is uploaded to the Bird Studies Canada website. This helps inform the current status of important bird populations in the area.

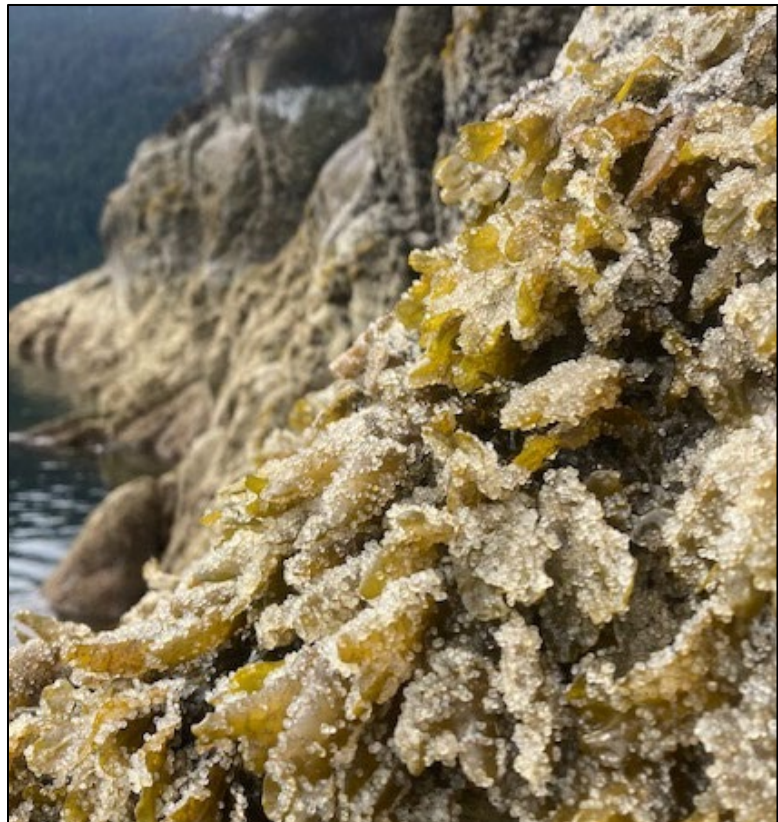
Objectives supported: 1 and 3.

Herring spawn surveys

Overview and activities: After colonial fisheries extirpated herring from Burrard Inlet over 100 years ago, the small fish have started a comeback, and have spawned in Indian Arm every spring since 2019. Tsleil-Waututh field crews have been instrumental in identifying these spawning events. In 2022, we led a dive survey to estimate the size of the spawning population, following the Department of Fisheries and Oceans' standard methods (Herring Spawn Survey Manual, Revised January 2013, by C. Ford, K. Daniel, and M. Thompson). These surveys rely on a dive team to determine the percentage of egg coverage and thickness in quadrats along transects throughout the spawning area to estimate the total number of eggs deposited during the spawning event.

The estimated number of eggs is then used to estimate the number of spawning females and subsequently the total number of adult herring involved in the spawning event.

Objectives supported: 1 and 3.



Herring eggs on kelp at low tide in Indian Arm.

Restoration work in the Indian River Watershed

Overview and activities: In August 2022, TWN and DFO's Restoration Centre of Expertise Lower Fraser Area team, undertook a spawning channel restoration project on Brandt channel in the Indian River



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Watershed. The goal of the project was to reconnect Brandt channel to the Indian River, after a major landslide event in 2017 disconnected the channel. This landslide event plugged up the channel with boulders, sediment and wood, and prevented adult spawning salmon access. Additionally, some juvenile coho salmon were accessing the north end of the channel during high flow events, but inevitably were stranded and died as water levels dropped. To address this, we built a protective berm on the north end of Brandt channel where it connected to the mainstem of the Indian river. This work successfully reestablished access to the channel, opening up about 5km of spawning and rearing habitat to support chum and coho salmon populations. The project was confirmed a success when TWN's field crews observed and recorded chum salmon spawning in the newly restored channel only two months after work completed. The Stewardship Fund covered TWN staff time associated with this work, while the Restoration Centre of Expertise Lower Fraser Area team and other funding covered DFO staff time, contractor, machine and equipment costs.

Objectives supported: 1, 2 and 6.



Intertidal data collection with DFO

Overview and activities: In 2022, TWN collaborated with DFO's Science Branch and Ecosystem Management Branch to install an array of data recording equipment on four beaches in Burrard Inlet and Indian Arm. At each site we installed up to five temperature loggers on the surface within each intertidal stratum (low, med, high), and temperature loggers buried 30cm below the surface. Additionally, we have installed air temperature loggers, and subtidal current meters on special moorings to measure water flow. This equipment will help better understand the physical and environmental properties at each beach and help inform most suitable habitat for various clam species in the inlet. Moreover, this data can inform how extreme heat events affect different beaches and clams, and can help inform future clam beach restoration projects.



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Objectives supported: 1, 3 and 6.

Analysis, Policy Development and Planning

In addition to field-based science and stewardship activities, TLR studies and analyzes data and information about Burrard Inlet to improve our understanding of the health of the inlet and guide relevant policies, plans and regulations. Much of this work uses data and information collected by the TWN field crew to help inform decisions, restoration priorities, and long-term stewardship planning. Moreover, TLR engages extensively with experts and external groups working on topics related to TWN interests to expand the reach of TWN stewardship through partnerships, collaboration and relationships. This external engagement is integral to much TLR-led research and analysis, and helps connect TWN Knowledge and environmental science to policies and regulations implemented in Burrard Inlet.



A horse clam collected at Maplewood Mudflats.

Contaminant Surveys and Analysis

Overview and activities: TWN is working to better understand contamination in priority TWN food sources throughout Burrard Inlet, with a significant focus on clams. In summer 2022, we collected six species of clams from 14 sites throughout Burrard Inlet to analyze concentrations of metals, PAHs, PDEs, PCBs, dioxins and furans. In 2023, we are finalizing results to compare contaminant concentrations to the Burrard Inlet Water Quality Objectives. This work will help TWN understand spatial variability in contaminants across the inlet and between species, improve understanding of the most severe contaminant types and sources, and help inform safe harvesting practices and potential future harvesting locations.

Objectives supported: 1, 3 and 4.

Bivalve Sclerochronology and Geochemical analysis

Overview and activities: In 2022, TWN partnered with Dr Meghan Burchell and signed an agreement with Memorial University to analyze clam shells from archaeological sites and living clams in Burrard Inlet to understand long-term trends and changes in clam populations and harvesting practices. This includes analyzing stable oxygen isotopes and radiocarbon to determine changes in sea surface temperatures and harvesting intensity over time. The work will also include trace elemental analysis to examine long-term trends in heavy metal and hydrocarbon contamination in Burrard Inlet. TWN has



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provided Dr Burchell with several hundred shells from live clams (the same clams that were used for contaminant analysis described above) and archaeological sites around the inlet.

Objectives supported: 1, 3 and 4.

Marine Traffic Analysis

Overview and activities: TWN is working to better understand marine traffic and related impacts to TWN rights and activities throughout Burrard Inlet. In 2022, we worked with a consultant to analyze vessel tracking AIS data to quantify key metrics of commercial marine traffic, including vessel count, operating hours and types. Through this work we developed an interactive dashboard map to visualize vessel traffic and related information, such as vessel name, type, date and extent of transit, and velocity. Acquiring this foundational information is an essential first step for analysis related to vessel traffic impacts on TWN rights, interests and marine uses, such as harvesting, canoeing, and cultural practices.

Objectives supported: 1, 3 and 4.



A snapshot of the interactive vessel traffic dashboard, displaying transits by tugboats (orange), pleasure crafts (green), and passenger vessels (yellow) for one week in May.

Ecosystem Modelling

Overview and activities: TWN is partnered with researcher Dr Villy Christensen and PhD student Meaghan Efford at UBC's Institute for the Oceans and Fisheries to develop an ecosystem model (Ecopath with Ecosim and Ecospace) of Burrard Inlet to inform TWN's Cumulative Effects Monitoring Initiative. The model will have two temporal anchor points, one representing Burrard Inlet before European contact in 1792, and one representing current conditions. By comparing these two points, we will trace the arc of ecosystem change in Burrard Inlet since European contact and evaluate future scenarios to help inform management decisions considering the entire Burrard Inlet system. In 2022, model development continued, focused on pre-contact conditions. The project team completed a



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research paper that will be published in 2023 and used archaeological methods to better understand TWN stewardship practices related to salmon, leading to a sustainable salmon harvest for over 3000 years. Additionally, work continued to develop and refine TWN's pre-contact diet, which can inform the historical ecological abundance, biodiversity and carrying capacity of Burrard Inlet as a guideline and reference point for present-day work.

Objectives supported: 1, 3 and 4.

Burrard Inlet Water Quality Objective Implementation

Overview and activities: TWN has been leading the update of the [Burrard Inlet Water Quality Objectives](#) (WQOs) collaboratively with the Ministry of Environment and Climate Change Strategy (ENV). Fourteen parameters have updated objectives with corresponding technical chapters and the provincial policy has been updated iteratively to reflect each new addition. TWN has begun implementing these objectives by: convening an implementation working group with ENV, the Ministry for Indigenous Relations and Reconciliation and the Ministry of Water, Lands and Resource Stewardship; developing communications materials for the TWN community, water quality practitioners as well as the general public; and working with the established Water Quality Roundtable to support participants in applying and implementing the WQO in their own work. Additionally, TWN is collaborating with researchers from UBC's Pelagic Ecosystem Laboratory to better understand how different sources of organic material (including stormwater and wastewater) may be affecting the diets, and subsequently the health, of shellfish in the inlet. This work will augment our understanding of how water quality may affect food web dynamics.

Objectives supported: 1, 4 and 6.

Review and Update of the Burrard Inlet Action Plan

Overview and activities: In 2017, TWN published the [Burrard Inlet Action Plan](#), which relied on Western science and TWN Knowledge to summarize relevant scientific knowledge in the inlet, identify priority issues and knowledge gaps, and highlight near-term actions to improve the health and integrity of the inlet. This document continues to guide much science and stewardship work led by TWN and others in Burrard Inlet but is due to be updated. TWN contracted Kerr Wood Leidel to support an extensive review of our progress so far, identify remaining gaps and to draft an updated Action Plan. Numerous internal workshops were held with TWN staff to inform the update, create a new framework for the plan and develop an implementation plan. The next step is to engage inter-departmental and external stakeholders in key aspects of the plan, before refining and finalizing.

Objectives supported: 1, 4, 5 and 6.



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Kelp Restoration Planning and Implementation

Overview and activities: TWN is collaborating with the Kelp Rescue Initiative to bring together organizations working and interested in kelp restoration in Burrard Inlet, with the goal of completing successful kelp restoration projects and conducting research into restoration methods. Work in 2022-23 included propagation, planting, and monitoring at various sites throughout Burrard Inlet to determine feasibility of larger scale projects and refine relevant methodologies. Staff time is funded through the Stewardship Fund, while contractor services and equipment are covered through other grants. TWN is also planning a 50 person kelp symposium to facilitate knowledge sharing and collection regarding kelp restoration in Burrard Inlet for fall 2023.



Canopy-forming kelp on the south shore of Burrard Inlet's central harbour.

Objectives supported: 1, 2 and 4.

Marine Spatial Planning Review and Prioritization

Overview and activities: TWN has been involved for many years in conversations related to Marine Protected Areas and Marine Spatial Planning. In February 2018, former Chief Maureen Thomas was appointed by the former Minister of Fisheries and Oceans to the National Advisory Panel on Marine Protected Area Standards. TWN currently attends the Southern BC Marine Spatial Planning pre-planning workshops and participated in the first working group for the Átl'ka7sem/Howe Sound Marine Stewardship Initiative. Over the last year, TWN worked to collect, evaluate and update our work on marine spatial planning and marine protected areas in order to prioritize and determine next steps for our involvement in marine spatial planning initiatives and opportunities for Indigenous Protected Areas.

Objectives supported: 1 and 4.

Coastal Park Co-Management

Overview and activities: TWN co-manages two municipal, one provincial and one regional coastal parks in TWN territory and intend to expand our co-management agreements to include other coastal parks and marine areas in the territory. This year, TWN began developing a relationship with City of Burnaby to co-manage Barnet Marine Park. Establishing new co-management agreements includes building relationships, establishing shared interests and values, integrating TWN knowledge, value and



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perspectives into parks planning processes, establishing committees and drafting agreements, plans and implementation work plans.

TWN advanced key priority actions in parks this year including conducting feasibility assessments for building a remote Longhouse in Say Nuth Khaw Yum Provincial park, planning for an extensive shoreline restoration and adaptation project at Whey-ah-Wichen and are currently installing two welcome figures in Whey-ah-Wichen and təmtəxʷtən parks.

Objectives supported: 1, 4 and 6.

Baseline Ecology Excavations

Overview and activities: TWN is working to establish a pre-contact baseline of ecological conditions in Burrard Inlet as a fixed reference point from which subsequent change is measured. This reference point is important when defining what a healthy inlet looks like, and can counter shifting baseline syndrome, which occurs when current perceptions and management decisions do not consider past impacts to the landscape. This implicitly accommodates past impacts to an ecosystem and adopts them as an inherent part of current, or “normal”, conditions.



TWN staff and contractors set up to start baseline ecology excavations in Whey-ah-wichen Park.

An important aspect of establishing a pre-contact baseline involves using archaeological data to inform the pre-contact ecology of Burrard Inlet. In 2022-23, we began work to conduct excavations at several locations around the inlet to collect new archaeological data, focusing on sites with limited documented faunal assemblages. The investigations include small-scale excavations from cultural shell deposits (shell middens) to obtain faunal samples and radiocarbon dates that can help inform knowledge gaps, such as pre-contact species diversity,

richness, seasonality and continuity over time. Additionally, this work has been an excellent opportunity to engage TWN youth, the school, Elders and broader community in on-the-ground applied research that can inform TWN stewardship. Excavations will continue at 2-3 sites across the inlet in summer 2023, with interim analysis and reporting expected in late 2023. In 2024, we will conduct excavations at an additional 2-3 sites and finalize analysis and reporting.

Objectives supported: 1, 4 and 5.



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Report on Historical Forage Fish Ecology in Burrard Inlet

Overview and activities: In past years, TWN has conducted extensive [research on archival materials](#) from the early colonial period in the Vancouver area to contribute to a pre-contact baseline and counteract shifting baseline syndrome. Building on this, in 2022 TWN compared information from archival materials on forage fish (herring, smelt and ooligan) to archaeological data and TWN's traditional use data to trace changes in forage fish populations from pre-contact conditions to the mid-20th century. This work was [published in the peer-reviewed journal Human Ecology](#) in spring 2023.

Objectives supported: 1 and 4.



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Relationships, Engagement and Program Management

TLR is working to implement long-term and sustainable stewardship programs. This requires strong administrative processes, sustainable organizational structures, effective internal strategic plans, and healthy external relationships and engagement. TLR deliberately commits time and resources to all of these priorities in order to develop a healthy department and programs with lasting positive impacts.

Engagement with external organizations and the community of the inlet is an important aspect of TLR's work supported by the Stewardship Fund. This expands the reach and benefit of TWN stewardship through partnerships, collaboration and relationships. In general, this relies on staff time spent on internal planning and coordination, liaising and relationship building with external partners, and direct participation in federal and provincial initiatives on various topics, such as Southern Resident Killer Whales (SRKW), Marine Spatial Planning, and BC's Coastal Marine Strategy. TLR also actively engages with various municipalities, NGOs, academic researchers, industry, and others working in Burrard Inlet. Furthermore, TLR regularly presents on our stewardship work at conferences, such as the Salish Sea Ecosystem Conference, and at local workshops and information sessions hosted by municipalities, NGOs, and industry groups.

Stewardship Funding also supports TLR staff time on external engagement with federal and provincial agencies enforcing Canadian laws related to stewardship and resource protection in Burrard Inlet. In 2022, TWN planned, coordinated and convened a patrol partners day on Burrard Inlet with enforcement officers from the Department of Fisheries and Oceans, Environment and Climate Change Canada, the RCMP, BC Ministry of Forests, Lands, Natural Resources and Rural Development, B.C. Parks, and Metro Vancouver. Throughout the year, TLR conducts joint patrols and directly communicates with these agencies to identify illegal and harmful activities in Burrard Inlet. These patrols have helped build relationships and have led to catching poachers and illegal harvesters, identifying people destroying fish habitat, enforcement and removal of derelict vessels and marine debris, and increased communication between TWN crews and Canadian enforcement agencies.

Compliance and Enforcement Partner Engagement

Overview and activities: TWN has been leading and organizing an annual 'patrol partners' meeting, where we aim to build new and expand existing relationships with all the government agencies who have similar or overlapping interest for enforcement and compliance within TWN's territory. These include, but are not limited to, DFO, Natural Resource Officers, Conservation Officers, RCMP, BC Parks, Metro Vancouver Parks, Canadian Coast Guard, and search and rescue organizations. The goal of this is to develop meaningful relationships with the people on the water to reduce our reliance on generic email addresses when issues arise. Since TWN field crews are on the land and water everyday of the week, we regularly witness and report offences related to illegal fishing, damage and destruction of fish habitat, pollution, poaching, and unsafe behaviour. Knowing the Canadian and provincial officers in the territory greatly increases how effective we can be together in enforcing these shared priorities.



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Objectives supported: 1, 4 and 6.



Tire tracks damaging sensitive fish habitat in the Indian River Estuary.

WATCH Conference

Overview and activities: In November 2022, four staff attended a conference hosted by the [First Nations Health Authority's We All Take Care of the Harvest \(WATCH\) Project](#) on Vancouver Island. The two-day event was intended for Indigenous communities and focused on sharing knowledge, information and strategies to ensure a safe and secure seafood system for coastal First Nations, and information on effective monitoring programs to inform bivalve harvests.

Objectives supported: 1, 3 and 6.

Environmental Program Management, Planning and Strategic Development

Overview and activities: Through the Stewardship Funding, TLR environmental program managers are able to plan long-term work based on Tsleil-Waututh priorities and timelines, rather than working on specific requirements of funding agreements. This includes developing adequate staff capacity and maintenance of institutional structures and programs that ensure long-term, sustainable operations in TLR. Moreover, it increases flexibility to provide professional development opportunities, properly funded administrative programs, and training for staff working on TWN science and stewardship. These strategies support TLR's internal capacity to lead science and stewardship work in a long-term and sustainable way.



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In 2022-23, we continued to increase internal capacity for science and stewardship work by hiring a Field Programs Manager and two new Natural Resource Technicians. Adding these new positions helps situate TLR to expand science and stewardship programs in future years and more effectively implement work based on TWN's stewardship priorities.

Additionally, the funding provides greater ability to develop internal strategy and coordinate on closely related projects and work. For example, [Canada's jurisdiction over coastal waters in BC is complex](#) and includes federal, provincial, and municipal agencies and regulations that overlap with TWN's jurisdiction throughout the Nation's territory. In many cases, each level of Canadian government has separate programs relating to the same component of TWN rights and stewardship priorities, with varying degrees of direct coordination among Canadian agencies. Therefore, it is up to TWN to ensure our work on a given right or activity, such as clam harvesting, is coordinated in a practical way with all related external agencies. This requires considerable internal strategizing and coordination, and external communication and collaboration. TWN often plays the role of convener, bringing together Canadian government agencies, NGOs, industry and others who may not otherwise work together directly.

For example, under Canadian law harvesting safe and healthy clams is regulated, monitored and licenced by Canada's Department of Fisheries and Oceans, Environment and Climate Change Canada, and the Canadian Food Inspection Agency. However, provincial wastewater regulations and municipally managed wastewater infrastructure directly affect clam harvesting. Further still, the Vancouver Fraser Port Authority, industry, recreational users, and legacy contamination also affect clam populations and safe harvesting in Burrard Inlet. However, there is minimal coordination between the various levels of Canadian government and other parties, and TWN spends considerable time and effort to determine how different activities by these various parties affect TWN clam harvesting and stewardship. This time and effort on TWN's behalf is difficult to account for or quantify, and TWN plays a similar role for many other aspects of TWN stewardship beyond clams. The Stewardship Funding ensures TWN can spend the required time and effort to practice holistic and comprehensive stewardship of marine resources in Burrard Inlet with all levels of Canadian government and other organizations that impact TWN rights.

Objectives supported: 1, 4, 5 and 6.



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Integrating TWN Culture into Science and Stewardship

The Stewardship Funding also supports many other aspects of work required for comprehensive TWN stewardship that were previously hard to account for through other funding opportunities, such as properly considering and integrating TWN culture into our science and stewardship work. TLR employs TWN Knowledge Holders and cultural advisors to provide guidance and input into all of our work. This includes regular and targeted check-ins for specific projects or questions, as well as more general guidance. For example, all staff in TLR require considerable on-the-job training regarding TWN's way of life, territory, history, culture, rights, and stewardship obligations. This is essential to help develop programs that effectively implement TWN priorities. The Stewardship Fund helps cover staff costs associated with cultural training, advice and guidance.

Objectives supported: 1 and 5.



Canoes on the water at the south end of Indian Arm.

Environmental Program Operating Costs and Administration

Overview and activities: TLR's environmental programs also have ongoing costs associated with managing staff, budgets, hiring and training processes, and other administrative expenses. The Stewardship Funding supports covering these costs and provides important long-term sustainability for these organizational requirements. Further, TLR is accountable to the TWN community and Chief and Council, and we must regularly communicate with the community and community leadership. We also actively collaborate with other TWN departments, which requires regular updates and communication on our science and stewardship work in Burrard Inlet.

Objectives supported: 1 and 5.

Secretariat Participation

Overview and activities: Beyond the Stewardship Fund, an important aspect the Stewardship Agreement signed between Tsleil-Waututh Nation and Canada is the establishment of the TWN-Crown Secretariat to coordinate stewardship activities and scientific work in Burrard Inlet. The Secretariat acts as a forum to bring together TWN and Canadian agencies working on related projects to ensure



Tsleil-Waututh Nation səlilwətał



coordination and collaboration. Additionally, other First Nations, the Port, provincial and local governments, and NGOs may be invited to participate in the Secretariat when required or relevant.

Additionally, the Secretariat helps TWN and Canada plan and coordinate related or collaborative stewardship activities, identify knowledge gaps, and prioritize restoration work in Burrard Inlet. Further, the Secretariat can make recommendations to TWN and Canada on any priority stewardship or scientific work in Burrard Inlet.

In 2022-23, the formal TWN-Canada Joint Secretariat meetings proceeded as planned. One meeting occurred in November to review work and activities completed by Canada and TWN in Burrard Inlet over the previous year. The second meeting occurred over two days in February and March, focused on planning and coordinating work and activities by Canada and TWN in 2023-24. These meetings included five representatives from TWN, and representatives from all Federal Ministries that are signatories of the Stewardship Agreement. In addition to the official TWN-Canada Joint Secretariat meetings, TWN staff met regularly with Canada's secretariat representatives from DFO, ECCC and Transport Canada to discuss targeted priorities and activities relevant to each of the ministries.

From work at the Secretariat, TWN and Canada have identified many opportunities to collaborate and coordinate on science and stewardship work in Burrard Inlet, including monitoring conditions at important clam beaches, monitoring conditions in the Indian River such as temperature, flow and suspended sediment, opportunities to collaborate on salmon habitat restoration in the Indian River Watershed, opportunities to collaborate on clam contaminant surveys and monitoring, and opportunities to collaborate on monitoring vessel traffic. This forum will ensure ongoing information sharing, coordination, and collaboration on TWN and Canada's scientific and stewardship work in Burrard Inlet.

Objectives supported: 1 and 6.