



Burrard Inlet Environmental Science and Stewardship Fund Year End Report: 2021-2022

July 31, 2022



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



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Cover photo of killer whales in Indian Arm, January 2022, taken by Travis George Jr, TWN Natural Resource Technician and community member.



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Introduction

Stewardship Fund Overview

In August 2021, Tsleil-Waututh Nation (TWN) and Canada signed the Burrard Inlet Environmental Science and Stewardship Agreement. This agreement established a \$20 million dollar fund (the Stewardship Fund) that distributes \$2 million annually to 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 general objectives are:

- a) Protecting and conserving ecosystem components of Burrard Inlet;
- b) Sharing information, leveraging expertise and resources to address joint priorities in a way that encourages collaboration between Canada and TWN;
- c) Restoring the health of Burrard Inlet so that it can once more contribute to the health and well being of TWN members and others with whom TWN shares its legacy;
- d) Developing a rigorous Indigenous and western science program that will provide a foundation to support ongoing Stewardship Activities in Burrard Inlet.

Additionally, the Secretariat establishes a unique forum for Tsleil-Waututh and multiple federal 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 relationship and 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.

2021-22 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 TLR's science and stewardship work funded by this agreement in 2021-22.

The Stewardship Fund is structured on Canada's fiscal year, and \$2 million is provided annually to TLR on April 1st to fund work until March 31st the following year. Any funding that is unused at the end of that period is added to the budget the following year. 2021-22 was the first year of the funding agreement and represented a transition and important opportunity to plan and build capacity for long-term, sustainable growth for TLR's science and stewardship work in Burrard Inlet. Since the agreement was finalized part way through the fiscal year, planning and funding for many related TLR-led activities was already in place through pre-existing agreements that covered the remainder of the year. Therefore,



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many TLR-led activities that are not included in this report will be supported by the Stewardship Fund in future years.

TLR has pursued long-term, sustainable funding focused on TWN stewardship in Burrard Inlet for many years. Now, the Stewardship Fund is a significant opportunity to expand TLR's work implementing TWN stewardship practices and priorities, as informed by TWN Knowledge and Western science, to uphold TWN rights, title, and interests. We are excited to share our progress over the last year with the TWN community, and look forward to growing TLR's science and stewardship programs in Burrard Inlet over the next decade.



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Field Programs and Activities

A pillar of TWN science and stewardship work in Burrard Inlet is TLR's fieldwork, led by our crew of Natural Resource Technicians. This longstanding program has grown in recent years and includes seven full-time field staff, two boats, three vehicles, and significant specialized field equipment for marine, freshwater and terrestrial science and stewardship. 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 Natural Resource Technicians are not called a Guardian Program, they engage in activities that align with other Nation's Guardian Programs, including stewardship, data collection, and education-based enforcement.

In 2021-22, funding for many field activities was already in place through pre-existing agreements and annual fieldwork was substantially planned when the agreement was signed in August 2021. Still, this funding allowed TLR to pursue some long-standing priorities and capitalize on opportunities beyond previously planned work for the year. Additionally, TLR invested in our training and safety program for field staff, and expanded staff capacity to plan, coordinate and implement new field programs. Finally, Stewardship Funding helped cover ongoing general costs associated with fieldwork, such as boat and vehicle expenses. In subsequent years, Stewardship Funding will cover more of TLR's fieldwork in Burrard Inlet and act as a cornerstone to further expand and grow TLR's field programs.

Fieldwork Projects

Eelgrass Planting

In May 2021, TWN and SeaChange Marine Conservation Society led an eelgrass restoration and planting project in Burrard Inlet. The project included divers gathering live, intact eelgrass plants from healthy eelgrass beds, which was brought to TWN students, staff, Elders and community members who affixed weights to the eelgrass stems. The divers then transplanted the eelgrass to suitable habitat areas without healthy eelgrass beds. Aspects of this work were supported by existing and external funding, while TWN staff time, Elders' honoraria, and event costs, such as catering, were covered by Stewardship Funding. A video clip about the project [is available here](#).

Bird Surveys

In 2021, TLR field crews conducted bird surveys to better understand migratory bird populations in and around Burrard Inlet. The surveys are boat-based and focus on marine birds, such as Barrow's goldeneye, surf scoters, cormorants, and gulls. Understanding the current state of bird populations in Burrard Inlet is important for TWN stewardship, as waterfowl were historically one of the most important aspects of TWN's subsistence economy.



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Knowledge Exchange and Community Engagement on Clam Populations and Stewardship Practices

In fall 2021, TLR hosted a Knowledge Exchange with partners from Simon Fraser University, focused on clam populations and TWN stewardship practices related to clams in Burrard Inlet. This included bringing together TWN Elders, youth, and staff, with academic researchers and experts to discuss TWN harvesting and stewardship practices related to clams, harmful impacts to clams, current clam populations in Burrard Inlet, and TWN's vision for future clam stewardship in Burrard Inlet. The Knowledge Exchange included sharing stories and histories, land-based learning on Maplewood Mudflats, and photo and video recordings. It will help inform research that TLR is leading in partnership with SFU on current clam populations in Burrard Inlet and related TWN stewardship practices, and inform TWN's long-term goals to increase clam harvesting in Burrard Inlet.

Crab Light Trap Installation with Hakai and DFO

In 2021, the Hakai Institute approached TWN to partner on installing a light trap that attracts and traps crab larvae in Burrard Inlet. The larvae are counted and released, and provide information that can inform crab population trends in Burrard Inlet. Following discussions regarding appropriate locations and organizational capacities, TWN reached out to DFO to discuss installing the light trap on the dock at DFO's Pacific Science Enterprise Centre in West Vancouver. DFO agreed, and the trap was installed in spring 2022. DFO staff and volunteers check the trap approximately every three days and upload data to an [interactive map](#). TLR field staff were also trained in data collection techniques and we are looking for opportunities and locations to expand this program. The TWN-Crown Secretariat facilitated this activity by identifying an opportunity to collaborate and ensuring effective coordination and communication between multiple parties working on data collection in Burrard Inlet.

Field Operations and Safety

Safety is front-of-mind during all of TLR's fieldwork. This funding allowed expanded investment and training in our safety program beyond industry standards to ensure staff are equipped and educated to safely navigate any situations they may encounter. Through Stewardship Funding, we purchased industry-best safety equipment for work in and around water, such as inflatable PFDs appropriate for boat-based and in-stream work, foul weather field gear, and updated first aid equipment. Additionally, all field staff received advanced vessel operation training, and conducted regular safety training exercises, such as man-overboard recovery drills. The Stewardship Funding allowed us to prioritize safety training based on field crew requirements and schedules.

Further, under the Stewardship Funding we created a new, full-time Senior Environmental Specialist position focused on planning, coordinating and managing day-to-day operations of fieldwork to ensure work is conducted as planned, safety standards are upheld, and vehicle, vessel and equipment maintenance schedules are met. The funding also covered many ongoing operational costs associated with fieldwork, such as fuel, repairs, maintenance and insurance for our vehicles and vessels.



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Analysis and Engagement

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 policy, planning and regulations. Much of this work uses data and information collected by the TLR field crew to help inform decisions, restoration priorities, and long-term stewardship planning. Moreover, TLR engages extensively with external groups and experts 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.

Cumulative Effects Monitoring Initiative

TWN's Cumulative Effects Monitoring Initiative is working to understand total impacts of colonial development on Burrard Inlet and TWN's way of life. This multifaceted and interdisciplinary work is informed by TWN Knowledge and Western science. It includes research to establish a pre-contact baseline of environmental conditions in the inlet prior to European arrival; data collection to understand current conditions and ongoing impacts in the inlet; and tools to forecast future conditions and help inform decision-making. In 2021, Stewardship funding supported TLR staff time on research to [map Burrard Inlet's shoreline as it existed prior to European contact](#). Additionally, the funding supported TLR staff time on research into [historical ecology and fisheries practices in Burrard Inlet](#) based on Euro-Canadian historical and archival documents. Under the funding, we also started a project to analyze the impact of underwater noise on the Burrard Inlet ecosystem, and are currently working with subject matter experts to analyze available underwater noise data. Further, we are partnered with researchers at UBC's Institute for the Oceans and Fisheries to develop an ecosystem model of Burrard Inlet to understand complex, long-term changes to the ecosystem and forecast future changes.

In 2021, we developed and published an [interactive online map](#) to visualize some complex and long-term impacts to Burrard Inlet. This map demonstrates the geographic distribution and overlap between many aspects of development that negatively affect the health of Burrard Inlet, and is a tool to communicate some cumulative effects in the inlet.

Burrard Inlet Water Quality Program

Tseil-Waututh Nation and the provincial Ministry of Environment and Climate Change Strategy have updated [Burrard Inlet Water Quality Objectives](#) to help protect many values related to water quality, including human consumption of shellfish and cultural practices, among other priorities. This work relates to many aspects of TWN stewardship in Burrard Inlet, and under the Stewardship Funding we are developing a story map in partnership with the City of Vancouver to help communicate complex issues associated with storm water discharges and contamination. Additionally, through Stewardship Funding we reviewed datasets and information collated for the Water Quality Objectives update and [synthesized information for all known contaminants that exceed thresholds protective of consumption of shellfish and finfish by TWN](#). This review of extensive information on general water quality in Burrard Inlet



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provides a refined focus on contaminants that most severely impact TWN harvesting rights to help prioritize and inform future stewardship actions.

The Stewardship Funding allowed TLR to create a new Senior Environmental Specialist staff position focused on healthy marine ecosystems, including a major emphasis on understanding water quality and contamination. This has significantly increased our internal capacity to lead work on water quality projects in Burrard Inlet.

External Engagement

Engagement with external organizations and the community of the inlet is an important aspect of TLR's work supported by the Stewardship Fund and a strategy to expand the reach of TWN stewardship through partnerships, collaboration and relationships. This includes staff time spent on internal planning and coordination, and direct participation in federal and provincial engagement on various topics, such as Southern Resident Killer Whales (SRKW), Marine Spatial Planning, BC's Coastal Marine Strategy. TLR also actively engages with various municipal organizations, 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 2021, 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 and relationship building 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.



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Environmental Program Management, Development and Administration

Environmental Program Management, Planning and Strategic Development

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 provides significant opportunity to establish institutional structures and programs to ensure long-term, sustainable operations and functioning in TLR, and allows for internal growth through professional development, properly funded administrative programs, and adequate training for staff working on TWN science and stewardship. In 2021, TLR worked to set up the department for successful science and stewardship work in Burrard Inlet over the next decade.

Importantly, the Stewardship Funding provides TLR the ability to expand capacity to lead science and stewardship work in a long-term and sustainable way. In 2021, we prioritized increasing internal capacity to manage science and stewardship work by creating three new Senior Environmental Specialist positions focused on field program implementation, healthy marine ecosystems, and freshwater ecosystems in the Indian River Watershed. Through these new positions, TLR is situated to expand science and stewardship programs in future years and more effectively implement work based on TWN's stewardship priorities.

Another central aspect of TLR's long-term planning for science and stewardship in Burrard Inlet funded by the Stewardship Funding is an update to the [Burrard Inlet Action Plan](#). Originally developed from 2015-2017, the Action Plan summarizes scientific knowledge about the inlet, identifies priority issues and knowledge gaps, and provides a vision for stewardship actions to improve the health and integrity of the inlet. The Action Plan has guided much of TLR's environmental science and stewardship since its publication, and we have made significant progress on the identified priorities. Now, TLR is updating the Action Plan to consider progress and developments since its publication to help guide TWN's long-term vision and work in Burrard Inlet over the next 10 years. This in-depth update started in 2021 and will continue through 2022.

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 TWN right 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



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Oceans, Environment and Climate Change Canada, and the Canadian Food Inspection Agency. Moreover, provincial wastewater regulations and municipal wastewater infrastructure and treatment processes 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. Yet there is minimal coordination between the various levels of Canadian government and other parties, and TWN spends considerable time and coordination efforts to determine how different activities by these various parties relate to and 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.

Environmental Program Operating Costs and Administration

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. For example all staff in TLR require considerable education and on-the-job training regarding TWN's way of life, rights, and stewardship obligations, which must be integrated into all of our environmental work. 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. TLR's environmental team is also committed to continued professional growth for staff in order to implement the best available stewardship and scientific practices, and Stewardship funding allows for continued professional development opportunities.

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.

Secretariat Participation

Beyond the Stewardship Fund, an important aspect the Stewardship Agreement signed between Tseil-Waututh Nation and Canada is the establishment of the TWN-Crown Secretariat to coordinate stewardship activities and scientific work in Burrard Inlet. This Secretariat acts as a forum or body to bring together TWN and Canadian agencies working on science and stewardship in Burrard Inlet and ensure coordination and collaboration. Additionally, other First Nations, the Port, provincial and local governments, NGOs may be invited to participate in the Secretariat when required or relevant.

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.



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In 2021, TWN invested in establishing internal processes and structures to ensure the Secretariat's work reflect TWN priorities. This included considerable internal strategic development with technical staff and TWN Knowledge Holders and cultural experts. Additionally, TLR staff coordinated and met with multiple Canadian federal departments, including the Department of Fisheries and Oceans, Environment and Climate Change Canada, Transport Canada, and Crown Indigenous Relations and Northern Affairs. From work at the Secretariat, TWN and Canada have already identified many opportunities to collaborate and coordinate on science and stewardship work in Burrard Inlet, including monitoring crab populations, monitoring conditions in the Indian River such as temperature, flow and suspended sediment, and opportunities to collaborate on salmon habitat restoration in the Indian River Watershed. This forum will ensure ongoing information sharing, coordination, and collaboration on TWN and Canada's scientific and stewardship work in Burrard Inlet.