

# Restoring Ecological Function in the Campbell River Estuary

## FWCP Project COA-F22-W-3546 – Final Report



*Figure 1: Weiwaikum Guardian Watchmen planting native trees and shrubs following Himalayan blackberry removal, fall 2021.*

Prepared for: Fish and Wildlife Compensation Program

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## Executive Summary

In 2021/2022, *Restoring Ecological Function in the Campbell River Estuary* completed its sixth year providing tangible and measurable conservation benefits to the ecology of the estuary. The 2021/2022 season ran from April 1, 2021 to March 31, 2022. The marsh areas with the high density of yellow flag iris and purple loosestrife, as well replanted areas with some Himalayan blackberry and Scotch broom, were prioritized for invasive species management. This year also saw the removal of Sitka spruce infected with pine weevil, and efforts towards revegetating habitats within the Campbell River Estuary.

Long-term funding for this project is majority funded by the City of Campbell River and the Fish and Wildlife Compensation Program, with additional support from Wei Wai Kum First Nation, Greenways Land Trust, the Nature Conservancy of Canada, and TD Friends of the Environment Foundation. In 2021/2022, Greenways was able to put additional resources towards the project thanks to funding from the Healthy Watersheds Initiative which allowed us to hire a crew of five to restore and protect urban watersheds within Campbell River, including the Campbell River Estuary.

The Campbell River Estuary is an iconic sensitive ecosystem that is recovering from over a century of degradation through industrial use. The estuary provides habitat to many wildlife species, including great blue herons, bald eagles, waterfowl, and four species of Pacific salmon, including the iconic “Tyee” chinook. It also contains remnants of diverse wildflower meadows in upper intertidal marsh habitat. Healthy estuarine ecosystems are key to supporting this rich biodiversity. While most industrial uses have ceased in the estuary, ecological scars from decades of impacts are still healing. Disturbance from activities such as log milling and log storage offered an unparalleled opportunity for invasive species to spread, and impacts must continue to be addressed to recover the ecological integrity of the estuary.

Invasive species were first inventoried in the Campbell River estuary for the Management Plan for Baikie Island Nature Reserve in 2002. Yellow flag iris was not treated until 2012 and was able to invade several hectares of sensitive marsh habitat. Invasive management is a priority 1 action of the Campbell River Watershed Action Plan’s Wetland and Riparian Ecosystem chapter (action CBR.WAR.HB.31.01 – Implement Wetland and Riparian Restoration Projects); and a priority 2 action of the Campbell River Watershed Action Plan’s Rivers, Lakes and Reservoirs Ecosystem chapter (action CBR.RLR.HB.11.06 – Implement habitat restoration, enhancement measures – Campbell River Watershed).

Greenways Land Trust has been managing invasive species in the estuary for over 8 years, with intensive progress being made with the *Restoring Ecological Function in the Campbell River Estuary Project* since 2016. In 2021/2022, 4650 kg of yellow flag iris was removed from over 0.25 ha of marsh habitat, 2905 kg of purple loosestrife was removed from 2 ha of marsh habitat, and 2380 kg of Himalayan blackberry, Scotch broom, English Ivy and English holly was removed from almost 3 ha of riparian/upland habitat. There were also repairs done to several of the benthic barriers installed to cover and eradicate dense yellow flag iris infestations. Japanese knotweed infestations were monitored with no significant change. Riparian areas treated were revegetated with 1302 trees and shrubs. Due to Covid-19, we had lower volunteer participation in the project in 2021/2022 with a total of 76 volunteer hours.

Continued invasive species management in the estuary is vital for the benefit of the estuary’s wildlife and its biodiversity. FWCP funding for 2022/23 will help maintain our momentum controlling invasive species and revegetating habitats, while returning to larger volunteer events and supporting Weiwaikum Guardian Watchmen with invasive species management and revegetation within the estuary.

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## Introduction

In 2021/2022, *Restoring Ecological Function in the Campbell River Estuary* completed its sixth year focusing on providing tangible and measurable conservation benefits to the ecology of the Campbell River estuary, particularly targeting restoration of wetland and riparian habitats through invasive species management. The 2021/2022 year refers to April 1, 2021 to March 31, 2022.

This project has been long-term majority funded by the City of Campbell River and the Fish and Wildlife Compensation Program, with significant in-kind or financial support from Wei Wai Kum First Nation, Greenways Land Trust, the Nature Conservancy of Canada, and TD Friends of the Environment Foundation. This year has also benefited from a Healthy Watershed Initiative fund that allowed Greenways to hire a crew of 5 to work on restoration and protection activities within Campbell River's watersheds, including invasive plant removal and replanting within the Campbell River Estuary (as well as other activities such as trail work, infrastructure repair, cleaning up homeless encampments and more).

Invasive species were first noted in the Campbell River estuary in an inventory completed for the Management Plan for Baikie Island Reserve in 2002. At that time, it was recommended that "immediate management efforts should be taken against yellow-flag iris before it establishes larger populations, as it is currently restricted to small, scattered clumps (District of Campbell River and Nature Conservancy of Canada, 2002)." Unfortunately, yellow-flag iris treatments did not start in the estuary until 2012, and in the intervening 10 years, this species invaded several hectares of sensitive marsh habitat all around the estuary. We are urgently trying to get this invasive species under control to prevent further infestation, and as in most years, much of the funding requested of FWCP has been allocated to treating the invasive plants in sensitive marsh habitats.

The Campbell River estuary is an iconic sensitive ecosystem that is currently recovering from over a century of degradation through industrial use. As proposed provincial Wildlife Management Area, the estuary provides habitat to many wildlife species, including great blue herons, bald eagles, waterfowl, and four species of Pacific salmon, including the iconic "Tyee" chinook. It also still contains remnants of amazingly diverse wildflower meadows in upper intertidal marsh habitat. Healthy estuarine ecosystems are key to supporting this rich biodiversity.

While most industrial uses have now ceased in the estuary, the ecological scars from decades of impacts are still healing. The disturbance caused by activities such as log milling and log storage offered an unparalleled opportunity for invasive species to spread, and they are one of the primary impacts that remain to be addressed for the estuary to recover its ecological integrity.

This project builds on over 15 years of restoration projects by many agencies to restore ecological function in the estuary. The City of Campbell River estimates that over \$1 million has already been spent on restoring the estuary, and the City continues to fund ongoing restoration of its Baikie Island Nature Reserve, which is currently managed by Greenways Land Trust under an annual maintenance contract. The Nature Conservancy of Canada holds a conservation covenant on the Baikie Island Nature Reserve.



*Figure 2: A mature Henderson's checkermallow in full bloom on one of the small islands within the Campbell River Estuary, summer 2021.*

Invasive species are impacting the ecosystem functioning of the entire estuary, particularly the provincially red-listed Henderson's checkermallow-Tufted Hairgrass marsh ecological community. Both the Vancouver Island beggarticks (a species of Special Concern under the Species at Risk Act) and the Henderson's checkermallow (a blue-listed species), are found in these marsh habitats (BC Species and Ecosystems Explorer, 2022). Mitigating threats from invasive species is a management objective under the SARA Management Plan for the Vancouver Island Beggarticks in British Columbia (Environment Canada, 2015). One of the greatest threats to the functioning of the Campbell River estuary is the impacts of invasive species in natural and created wetland habitats. The goal of this project is to reduce and eventually eradicate all invasive species from sensitive habitats in the estuary over the long term. This project focuses on protecting investments already made towards restoring the estuary to a well-functioning, productive, and ecologically diverse wetland which supports numerous wildlife species.

Greenways Land Trust is keen to continue to address the threat of invasive species in order to restore the rare ecological communities present in the estuary, ensuring their continued ecological health and continuing to work towards the goal in the Campbell River Estuary Management Plan of “establishing a mix of rehabilitated, revegetated and natural upland, shoreline setbacks and foreshore that will support improved fish and wildlife habitat” (Penfold, 2002). As a locally based environmental non-governmental organization, Greenways can work with all the landowners in the estuary to restore and enhance the estuary's ecological functions. Greenways has a long-term interest in restoring our estuary and we are committed to eradicating all invasive species from the estuary over time.

### Greenways Land Trust

The mission of Greenways Land Trust is to restore, sustain and protect natural areas and critical habitats, particularly ecological and recreational greenways, for the benefit of our community. Since we were established in 1996, our volunteer board has been active in championing environmental projects and collaborating with partners.

Greenways has been actively involved with management of invasive species in Campbell River, including developing and implementing programs to control yellow flag iris, purple loosestrife, Himalayan

blackberry, Scotch broom, and Japanese knotweed with our partners. Greenways has an excellent track record in facilitating volunteering and stewardship among community members and school students. Volunteers contributed an astonishing 8000 hours towards our community stewardship projects in 2020/2021.



*Figure 3: Cynthia Bendickson, Executive Director of Greenways Land Trust, touring some of the more pristine areas of marsh habitat in the Campbell River Estuary, with many species of native wildflowers in bloom.*

## Goals and Objectives & Linkage of FWCP Action Plans and Specific Actions

One of the greatest threats to the functioning of the Campbell River Estuary is the impacts of invasive species in both wetland habitats. The goal of this project is to contribute towards reducing the area of invasive species infestation and preventing their spread; eventually eradicating all invasive plants from sensitive habitats in the estuary over the long term. This project focuses on protecting the investments already made in the Campbell River estuary and restoring the estuary to a well-functioning, productive, and ecologically diverse wetland which supports numerous wildlife species.

The project approach focuses on continuing invasive species management programs already undertaken by Greenways Land Trust, the City of Campbell River and the Nature Conservancy of Canada, alongside new partners including the Weiwaikum Guardian Watchmen program initiated in 2018. Activities include the physical removal of yellow flag iris and purple loosestrife by digging, pulling and/or seed removal. Areas of very dense yellow flag iris infestation have been treated using the installation of benthic barriers to kill the entire plant, including rhizomes and seeds in the soil. Areas where previous invasive species removals have already taken place, or areas that have remained free of invasive plants, continue to be monitored. Removal and treatment areas have and will continue to be revegetated with donor seeds and transplants from elsewhere in the estuary, and stock from local native plant nurseries.

### FWCP Action Plan Alignment:

#### Primary Action:

Coastal Watershed Action Plan: Campbell River Watershed Action Plan

Ecosystem Chapter: Wetland and Riparian

Action Type: Habitat-based Actions

Priority Action Short Description: CBR.WAR.HB.31.01 Implement Wetland and Riparian Restoration Projects – P1

This project manages invasive plants in the Campbell River Estuary, identified as a high priority restoration activity by both estuary stakeholders and through assessment and mapping (Campbell River Estuary Vegetation Community Mapping and Assessment, Mimulus Biological Consultants, 2017). This project directly addresses Priority Action CBR.WAR.HB.31.01 which states "Implement wetland and riparian restoration projects that are identified as high priorities through inventory, mapping or assessment... This can include managing invasive plants as needed."

#### Secondary Action:

Coastal Watershed Action Plan: Campbell River Watershed Action Plan

Ecosystem Chapter: Rivers, Lakes and Reservoirs

Action Type: Habitat-based Actions

Priority Action Short Description: CBR.RLR.HB.11.06 Implement habitat restoration, enhancement measures – Campbell River Watershed – P2

Estuarine habitat restoration is a priority 2 action for anadromous and resident salmonids. Removal of invasive species and restoration of native vegetation, especially intertidal and riparian species, will provide the habitats and prey productivity essential for rearing juvenile salmonids, as well as improving substrate stability and reducing erosion.

## Study Area

The study area is the Campbell River Estuary from the highway bridges and Highway 19 to Discovery Passage at Tye Spit. The area includes the main channel of the Campbell River; mudflats, tidal marshes, riparian areas and upland forests of Baikie Island, Tye Spit and several peninsulas and small islands; finally outflowing into the Discovery Passage.

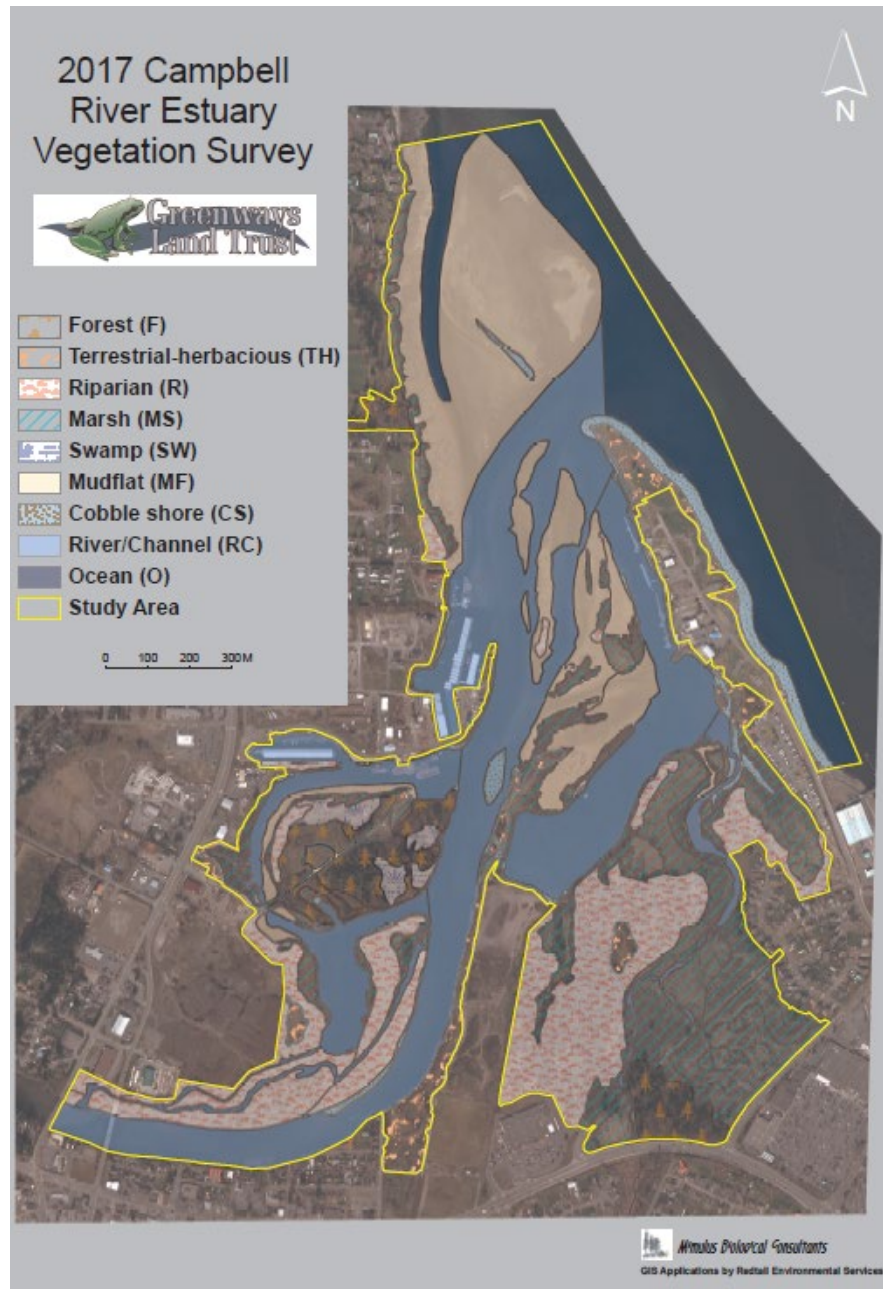


Figure 4: Study Area: the Campbell River Estuary

## Methods

Invasive species removal and treatments followed best practices to ensure that efficient and effective control measures were used, and long-term impacts were maximized. The targets of our invasive species management during the 2021/2022 season were yellow flag iris and purple loosestrife in marsh habitat, and Himalayan blackberry and Scotch broom from upland riparian habitat; focusing treatment efforts on ensuring more pristine areas are free of invasives, as well as targeting several very dense areas of invasive plant infestation.

The area of tidal marsh with the highest density of yellow flag iris in the estuary was treated using a multi-pronged approach of digging rhizomes in the areas that previously had extensive digging done and repairing benthic barriers covering adjacent areas of dense infestation. The yellow flag iris dug out at this time was primarily new growth from seeds from missed flowers in previous years so while many thousands of small plants were removed, the size of each plant was very small compared to earlier project years. The benthic barrier technique used is effective for dense well-established areas as it prevents light infiltration and gas exchange killing the entire plant including the rhizomes and seeds existing in the soil (Tarasoff, 2016). Some small areas of benthic barrier that were in areas more exposed to storm surges were lifted and needed to be removed in the spring of 2021.

Purple loosestrife removals were focused on marsh habitat on Myrt Thompson and in an area in the Baikie Island Nature Reserve referred to as Fred's Slough. Wherever possible, plants were removed along with their roots (by digging larger mature plants, or by pulling smaller seedlings). In some areas the purple loosestrife was growing through shrubs such as sweet gale and hardhack. In these cases, the flower heads were removed to prevent seeds spreading, however the roots were not possible to remove.

Himalayan blackberry was cut, and roots were dug out of the soil. As we were working in very dense areas of Himalayan blackberry, the majority of blackberry removed was taken to the landfill to make the areas more accessible for volunteers and contractors to plant. In less dense areas, canes were cut small and left on site, adding much needed organics to the soil. Scotch broom and English holly were cut at the base of the plant and young plants were pulled whenever possible. English ivy was hand pulled including as much of the



*Figure 5: A dedicated Greenways volunteer, and the son or Greenways staff member, removing purple loosestrife from Myrt Thompson on a work-with-mom day.*

root system as possible. When removed from trees, ivy was cut at breast height and removed to the base of the tree.

Treatment data has been compiled and will be recorded into the provincial Invasive Alien Plant Program (IAPP) database to ensure that all stakeholders are aware of the works. Treated areas will continue to be monitored for regrowth in future years.

This year also saw the first year of a several-year effort to reduce the number of Sitka spruce infected with white pine weevil. Sitka spruce were planted at a high density on Baikie Island in the early days of restoration with a strain that was not resistant to white pine weevil. Because white pine weevils target the leaders, or top-most tips, of their host trees, the resulting forest was dominated by very wide bushy trees that would never grow to anything close to the typical height of a conifer tree. Affected Sitka spruce were cut and limbed with the tops and limbs being chipped on site to add much needed organics, while the trunks were left to provide large woody debris for amphibian and small mammal habitat. To not reduce too much nesting habitat at once, this removal will be staggered into several years to allow new vegetation to grow before removing more infected trees. This area was replanted with a diversity of trees and shrubs including Sitka spruce that are resistant to white pine weevil.

Effective invasive species management should also include revegetation of treated areas. Replanting this funding year occurred in upland riparian areas that were formerly dominated by Himalayan blackberry and Sitka spruce infected with white pine weevil. Planting prescriptions were determined based on native species were present and thriving in nearby natural areas with similar conditions. Other revegetation efforts included a training day where with the Guardians of Mid-Island Estuaries and Weiwaikum Guardian Watchmen taught us the techniques the use for transplanting sedges (together on this date we harvested and replanted 2020 sedges but these numbers were not included in the planting numbers for this project as they were included in the Guardians' exclusion fencing project).



*Figure 6: Greenways staff learning how to transplant sedges from marsh habitat adjacent to Baikie Island, lead by the Guardians of Mid-Island Estuaries and Weiwaikum Guardian Watchmen.*

## Results and Outcomes

In 2020/2021, an astounding 9935 kg of invasive plant material was removed from habitats in the Campbell River Estuary. 4650 kg of yellow flag iris seedlings were removed from one area just over 0.25 ha of densely infested marsh habitat on Baikie Island by hand-digging and then taking to the landfill. As the yellow flag iris removed was primarily seedlings within previously dug areas and between benthic barriers, the volume removed adds up to many hours of digging hundreds of thousands of small plants. We are optimistic that this year will have made a very significant leap in momentum towards removing this area of yellow flag iris infestation. We are looking forward to removing most of the benthic barriers this coming April and comparing the results of a variety of revegetation treatments to determine what is best for returning these areas to native marsh habitat (including lifting barriers and leaving nature to revegetate, using transplants and collected seeds from nearby to revegetate, and lastly using nursery purchased sedges, reeds, and lady ferns to revegetate).

2021/2022 also saw some minor repairs to the 293 m<sup>2</sup> of benthic barriers installed in previous years following the technique developed for controlling yellow flag iris (Tarasoff, 2016). This method was piloted in 2018/2019 and the pilot benthic barrier was found to have been a success, killing almost all the rhizomes and all of the seeds it was covering, with the vast majority managing to have stayed in place through both the storm season and the king tides. The pilot benthic barrier, and the 253 m<sup>2</sup> of barriers installed in the spring of 2020, were inspected for growth in March 2021 with no viable rhizomes or seeds found. There was some viable yellow flag growing under a small portion of the barriers installed in 2020/2021 that were damaged by storms. This area was more exposed than the areas installed in the previous funding year.

This year also saw 2905 kg of purple loosestrife removed from 2 ha of marsh habitat. This included two main areas, and area along Myrt Thompson Trail, and an area within Baikie Island Nature Reserve that is referred to as Fred's Slough. In all areas except where growing under sweet gale and Hardhack shrubs, the whole plant was removed including the roots and disposed of at the landfill. Towards the end of the summer, one section of the area at Myrt Thompson had just flower heads collected to ensure all were removed prior to seed dispersal. This area will be the main target for purple loosestrife removal in 2022/2023 to ensure all of the mature plants are removed.

All other marsh habitat was monitored twice over the season and any purple loosestrife and yellow flag iris found was removed. This includes the small islands in the estuary, all of the shoreline around Baikie Island Nature Reserve, and the adjacent shorelines at Myrt Thompson.

In upland riparian habitats totaling over 3 ha, 2380 kg of Himalayan blackberry, Scotch broom, English holly and English ivy was removed and taken to the landfill (excluding some areas where Himalayan blackberry was cut into small segments and left in situ to return organics to the habitat). Because crews removed all three simultaneously, these species were not totaled individually this year.

Staff and volunteers also revegetated these upland riparian areas with 1302 native trees and shrubs planted in areas that were densely infested with Himalayan blackberry or Sitka spruce infected with white spine weevil. Other revegetation efforts to date include transplanting Henderson's checkermallow while installing benthic barriers, as well as collecting seeds of flowering marsh plants occurring naturally in the area for future germination and planting.



*Figure 7: Greenways' crew removing blackberry and infill planting a replanted area at the end of Myrt Thompson Trail, spring 2021.*

All treatment data will be recorded in the provincial Invasive Alien Plant Program (IAPP) database along with the 2021/2022 data to ensure that all stakeholders are aware of the invasive treatments completed.

## Discussion

The Campbell River Estuary is an iconic sensitive ecosystem that is currently recovering from over a century of degradation through industrial use. The estuary has been proposed as a Wildlife Management Area and provides habitat to many wildlife species. It also contains remnants of incredibly diverse wildflower meadows in upper intertidal marsh habitat. Healthy estuarine ecosystems are key to supporting this rich biodiversity.

While most industrial uses have now ceased in the estuary, the ecological scars from decades of impacts are still healing. The disturbance caused by activities such as log milling and log storage offered an unparalleled opportunity for invasive species to spread. The goal of this project is to reduce the area of invasive species infestation and eventually eradicate all invasive species from sensitive habitats in the estuary over the long term, particularly in both natural and created wetlands.

Invasive plants are of particular threat to the sensitive, provincially red-listed Henderson's checker-mallow-Tufted Hairgrass marsh ecological community, and habitat for the Vancouver Island beggarticks, a species of Special Concern under the Species at Risk Act (BC Species and Ecosystems Explorer, 2018). This project focuses on protecting the investments already made in the Campbell River estuary and restoring the estuary to a well-functioning, productive, and ecologically diverse wetland which supports numerous wildlife species. In Year 6 of the project, invasive species removal and treatments continued to follow best practices to ensure that efficient and effective control measures were undertaken, and long-term impacts were maximized.

Treatment for yellow flag iris followed the technique attempted in 2020/2021 of early spring removal of very small seedlings in areas previously dug, and we expanded this in 2021/2022 to include areas between benthic barriers to prepare these areas for revegetation with native plants. This method was very effective as it allowed us to remove many thousands of plants at much smaller volumes than if they were removed later in the growing season. This is also possible because we are building upon prior years and most of the areas of thick rhizomes have already been removed.

This year also saw some minor repairs to benthic barriers installed in previous years following the technique developed for controlling yellow flag iris (Tarasoff, 2016). This method, piloted in 2018/2019 and continued in 2019/2020, was found to have been a great success, killing almost the rhizomes and seeds it was covering. A smaller area (40m<sup>2</sup>) of benthic barrier installed in 2020/2021 was not as successful as they were more exposed and therefore damaged by winter storm surges. There was some viable yellow flag iris growing under these. These have been repaired and will be left in place another season. All remaining yellow flag iris existing in higher density is in a small exposed area that would not work for benthic barriers so this will be the target for 2022/2023 with hand digging as the method of removal.

Future project years will place more and more emphasis on revegetating areas with significant invasive removals as this is an important aspect of invasive species management. Replanting in upland areas saw another large jump in 2021/2022 with 633 native trees and shrubs planted in riparian areas that were dominated by Himalayan blackberry. Tree guards were installed on all Western red-cedar planted to prevent losses from deer browse.



*Figure 8: Brian Hays of Sellinton's Habitat Restoration, our lead contractor on yellow flag iris infestations, discussing management options for an area of marsh seeing increased density of reed canary grass, summer 2021.*

An area of reed canary grass was found to be becoming very dense in the summer of 2021 and seems to be outcompeting the native vegetation in this area (see Figure 9). In 2022/2023 we are planning to brush the grass to the base and cover it with reused benthic barriers as it is an area higher in the marsh on Baikie Island that should respond well to treatment with the benthic barrier technique. Another addition to our removal efforts in 2022/2023 will be an area on Myrt Thompson Trail where white sweet clover has been found. We will remove this by cutting it at the base before the plants go to seed.

Management of invasive species in the format that Greenways champions provides a limited risk profile. While manual removal of invasive species can also disturb valuable native species, the long-term benefit of preventing infestations from growing will negate the harm to native species. Infestations located on the Baikie Island Nature Reserve will continue to be monitored and treated if necessary, using annual maintenance funds provided by the City of Campbell River. While Greenways has been successful in finding additional funding for treating and maintaining areas outside of the Baikie Island Nature Reserve to date, we will mitigate the risk of reduced

funding using our large volunteer labour pool, which can maintain treated areas in future. However, without additional funding, we will not be able to treat new areas. Removing yellow-flag iris rhizomes is slow but effective for controlling the plant. Most areas where we have removed rhizomes in the past only need minimal maintenance for continued control. The use of the benthic barrier method will increase efficiency of treatment over time by reducing labour cost in the long-term as the seed bank in the soil is also killed. During the installation of benthic barriers, efforts were made to transplant native plants, particularly, Henderson's checkermallow to adjacent areas outside of the barriers to protect this species.

One invasive species treatment that may carry some risk is the chemical treatment of Japanese knotweed within the Pesticide Free Zone, if permitted by regulators. The City of Campbell River is currently working with the Coastal Invasive Species Committee to investigate options for chemical treatments in sensitive areas. If this activity is approved, we will proceed with caution and only where all stakeholders are supportive, particularly First Nations.

2021/2022 was a great year for collaborations within the estuary. Greenways has been working closely with the Weiwaikum Guardian Watchmen on ongoing management of the estuary. We have also been meeting regularly with them, as well as with the Guardians of Mid-Island Estuaries to ensure that our projects are not getting in each other's way and to find opportunities for collaborations and sharing of learning. This past year we have also worked with the Nature Conservancy of Canada within the estuary. We had one large purple loosestrife removal day where Greenways' staff worked alongside our contractors, Sellinton's Habitat Restoration, as well as the Weiwaikum Guardian Watchmen and a crew

from the Nature Conservancy to cover a large area of marsh habitat along Fred’s Slough within Baikie Island Nature Reserve (see Figure , below), as well as along Myrt Thompson the following day with a smaller crew from the same groups. We have also had increased opportunities to collaborate on other improvements to trails and infrastructure with staff from the City of Campbell River.



*Figure 9: Multiple conservation organizations working together as a team of 15 removing purple loosestrife from Fred's Slough in the Baikie Island Nature Reserve.*

### Community Engagement, Education and Outreach

Greenways Land Trust is committed to providing environmental education and outreach to our community. We engage with our community through activities such as work parties where individuals, families, and school groups can participate in invasive species management and habitat restoration. The Covid-19 pandemic meant that we were not able to host many of our usual invasive removal and planting work parties, and in 2021/2022 many of our busier seasons happened to correspond with times of increased Covid-19 restrictions to gathering. As a result, we were only able to host a small number of volunteer events this funding cycle, as well as a group of volunteers that regularly assisting our watering efforts during the summer heat dome, together totaling 76 volunteer hours (see Table 1). Greenways has been committed to following the recommended guidelines from Island Health, including social distancing use of personal protective equipment to reduce risks associated with Covid-19. During this period, the number of participants per event was kept low to ensure social distancing was possible.

Table 1: Summary of volunteer activities in the Campbell River Estuary between April 1, 2021 and March 31, 2022.

Date	Number of Volunteers	Volunteer Hours	Activity
May 28, 2021	4 Conservation Team	8	Removing Scotch broom and Himalayan blackberry
June 8, 2021	4 Conservation Team	8	Removing Scotch broom and Himalayan blackberry
June 23, 2021	5 Interfor volunteers	30	Digging yellow flag iris
Summer 2021	4 Watering volunteers	24	Watering plantings 3 years and less
December 1, 2021	4 Conservation Team	6	Planting trees and shrubs
<b>4 events, ongoing watering over heat wave</b>	<b>21 volunteers</b>	<b>76 hours</b>	<b>Various activities</b>

### Project Communications

Since the COVID-19 pandemic began in 2000, Greenways Land Trust has tried to be creative in our reach to our community given that our ability to gather for our more typical on the ground outreach has been limited by public health restrictions. During this time, we shifted more towards social media, presentations in the community and to program partners, and attempts to gain media attention. We usually highlight the restoration of the estuary in the later spring and summer months when we are directly engaging volunteers in Scotch broom removals in upland habitats or purple loosestrife removals within marsh habitats. While this has not been possible in the past two funding years, we are very excited to have plans in place to return to these larger work party events in 2022/2023 now that most restrictions are lifting. We will also continue to engage the community using social media, newsletters and through local media, including our appreciation of our funders for making these projects possible.

During this funding period, our e-news article [Baikie Island Nature Reserve & Campbell River Estuary Project Update](#) published March 1, 2022 featured an update of our accomplishments this year as well as acknowledgement of FWCPs ongoing support and funding.

Also of interest was an article published in the Campbell River Mirror on July 21, 2021 titled "[Environmental groups battle invasive species on banks of Campbell River estuary](#)" in which Greenways was able to put additional supports towards the invasive removal of purple loosestrife this year thanks to additional funding from the Province of BC's covid restart Healthy Watersheds Initiative program (O'Doherty, 2021). Unfortunately, our mention of our appreciation of our long-term funders (FWCP and the City of Campbell River) did not make it into the article itself. These efforts were building on all of the years of invasive plant removals made possible by the ongoing funding from both Fish and Wildlife Compensation Program and the City of Campbell River towards invasive species management of the Campbell River Estuary.

Facebook posts in this timeframe have included several celebrating the invasive plant removals and revegetation and made possible by Fish and Wildlife Compensation Program, the City of Campbell River and TD Friends of the Environment Foundation.

## Recommendations

Greenways is proud to be a part of the ongoing restoration of this iconic estuary and enthusiastically recommends the continuation of this intensive invasive species management and revegetation project in the Campbell River Estuary to benefit the biodiversity of the entire estuary. Much progress is being made, and we believe that our goal of eradication of many of these species from the estuary is possible in time. We recommend an increased emphasis on revegetation over time, and that Wei Wai Kum Guardians continue to be supported by partners and funders, allowing them to continue their efforts to restore these areas that include both their traditional territories and their reserve lands. We look forward to continuing to work closely with them and other program partners in 2022/2023 and years to come.

## Acknowledgements

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