

Restoring Ecological Function in the Campbell River Estuary

FWCP Project COA-F20-W-3086 – Final Report



Figure 1: Greenways summer student, Katie, triumphantly removing invasive yellow flag iris plants from a marsh on Myrt Thompson Trail, July 2020

Prepared for: Fish and Wildlife Compensation Program

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Date: Oct. 30, 2020



Executive Summary

In 2019/2020, *Restoring Ecological Function in the Campbell River Estuary* completed its fourth year providing tangible and measurable conservation benefits to the ecology of the estuary, particularly targeting the restoration of diverse wetland habitats through invasive species management.

This project is currently majority funded by the City of Campbell River and the Fish and Wildlife Compensation Program, with in-kind and financial support from Wei Wai Kum First Nation, Greenways Land Trust, the Nature Conservancy of Canada, and TD Friends of the Environment Foundation.

The Campbell River Estuary is an iconic sensitive ecosystem that is currently 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 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 impacts that remain to be addressed for the estuary to recover its ecological integrity.

Invasive species were first noted in the Campbell River estuary in an inventory completed for the Management Plan for Baikie Island Reserve in 2002. Unfortunately, as yellow flag iris treatments did not start in the estuary until 2012, this species was able to invade several hectares of sensitive marsh habitat all around the estuary. Invasive species management is a priority 1 action of the Campbell River Watershed Action Plan’s Wetland and Riparian Ecosystem chapter, under action item 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, under action item CBR.RLR.HB.11.06 – Implement habitat restoration, enhancement measures – Campbell River Watershed.

Greenways Land Trust has been working to manage invasive species in the estuary for over 6 years, with intensive progress being made with the *Restoring Ecological Function in the Campbell River Estuary* since 2016. In 2019/20, approximately 4,290 kg of yellow flag iris was removed from 7.5 hectares of marsh habitat; 450 kg of purple loosestrife from 6 ha of marsh habitat; 580 kg of Scotch broom from 8.7 ha of riparian/upland habitat; and 1165 kg of Himalayan blackberry from 3.5 ha of riparian/upland habitat. Iris and loosestrife were taken to the landfill for disposal while blackberry and broom were left to decompose on site where appropriate. In addition to removals, there was also 253m² of benthic barrier installed to cover and eradicate dense yellow flag iris infestations. While no new infestations of Japanese knotweed were found this year, monitoring occurred for 12 infestations that were previously found and eradicated, and 2 infestations previously found but deemed not suitable for herbicide treatment. In 2019/2020, Greenways facilitated volunteers carrying out approximately 517 hours of invasive species removals, as well as 320 hours of native tree and shrub planting, watering, and installing habitat features in the Campbell River Estuary.

Our recommendation is to continue the intensive invasive species management in the estuary for the benefit of the estuary’s wildlife and its biodiversity in general. We have requested FWCP funding for year-5 of the project in 2020/21 to help us to maintain our momentum controlling these invasive species, revegetating these habitats and engaging volunteers with on-the-ground improvements.

Table of Contents

Executive Summary.....	2
List of Figures	4
List of Tables	5
Introduction	6
Greenways Land Trust	7
Goals and Objectives & Linkage of FWCP Action Plans and Specific Actions	8
FWCP Action Plan Alignment:	8
Primary Action:	8
Secondary Action:	8
Study Area.....	9
Methods.....	10
Results and Outcomes	12
Discussion.....	14
Community Engagement, Education and Outreach	16
Project Communications.....	17
Recommendations	19
Acknowledgements.....	19
References	20

List of Figures

Figure 1: Greenways summer student, Katie, triumphantly removing invasive yellow flag iris plants from a marsh on Myrt Thompson Trail, July 2020.....	1
Figure 2: The provincially blue-listed Henderson's checkermallow is one of the many native plants threatened by spread of marsh invasives including yellow flag iris and purple loosestrife	7
Figure 3: Study Area: the Campbell River Estuary	9
Figure 4: Greenways employee, Camille, and her family inspecting small islands in the Campbell River Estuary for invasive plants by boat, and removing yellow flag iris, July 2020.....	10
Figure 5: Rice root and Henderson's checkermallow are two marsh species native to the Campbell River Estuary.	11
Figure 6: Greenways volunteers measuring yellow flag iris benthic barriers to calculate the area covered (253m ²)	12
Figure 7: Greenways contractors installing benthic barriers to treat dense areas of yellow flag iris infestation on Baikie Island.....	14
Figure 8: Volunteers planting native trees on Baikie Island.	16
Figure 9: Greenways' staff, Cynthia and Camille, hosting a virtual presentation via You-Tube titled ZOOMING IN: Campbell River Estuary & Baikie Island, as a part of Campbell River's Art + Earth Festival	17

List of Tables

Table 1: Impact of Invasive Species Treatments Completed in 2019/2020	13
Table 2: Volunteer Engagement in the Restoration of Campbell River Estuary, 2019/2020	16

Introduction

In 2019/2020, *Restoring Ecological Function in the Campbell River Estuary* completed its fourth year focusing on providing tangible and measurable conservation benefits to the ecology of the Campbell River estuary, particularly targeting restoration of diverse wetland habitats through invasive species management. As Greenways was given an extension, 2019/2020 refers to the period from April 1, 2019 to September 30, 2020.

This project was majority funded by the City of Campbell River and the Fish and Wildlife Compensation Program, with significant in-kind and financial support from Wei Wai Kum First Nation, Greenways Land Trust, the Nature Conservancy of Canada, and TD Friends of the Environment Foundation.

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 most 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, estuary provides habitat to many wildlife species, including great blue herons, bald eagles, waterfowl, and four species of Pacific salmon, including the iconic “Tye” 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: The provincially blue-listed Henderson's checkermallow is one of the many native plants threatened by spread of marsh invasives including yellow flag iris and purple loosestrife

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, 2018). Mitigating threats from invasive species is a management objective under the recently adopted 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 both natural and created wetland habitats. 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. 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.

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 and ensure their continued ecological health, and continue 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

Established in 1996, 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. Our volunteer board is 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 Japanese knotweed, Himalayan blackberry, Scotch broom, purple loosestrife, and yellow flag iris with our partners. Greenways has an excellent track record in facilitating volunteering and stewardship among community members and school students. Volunteers contributed over 6,142 hours towards our community stewardship projects in 2018/2019.

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 Wei Wai Kum Guardians 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 as appropriate with donor seeds and transplants from elsewhere in the estuary, and stock from a local native plant nursery.

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.

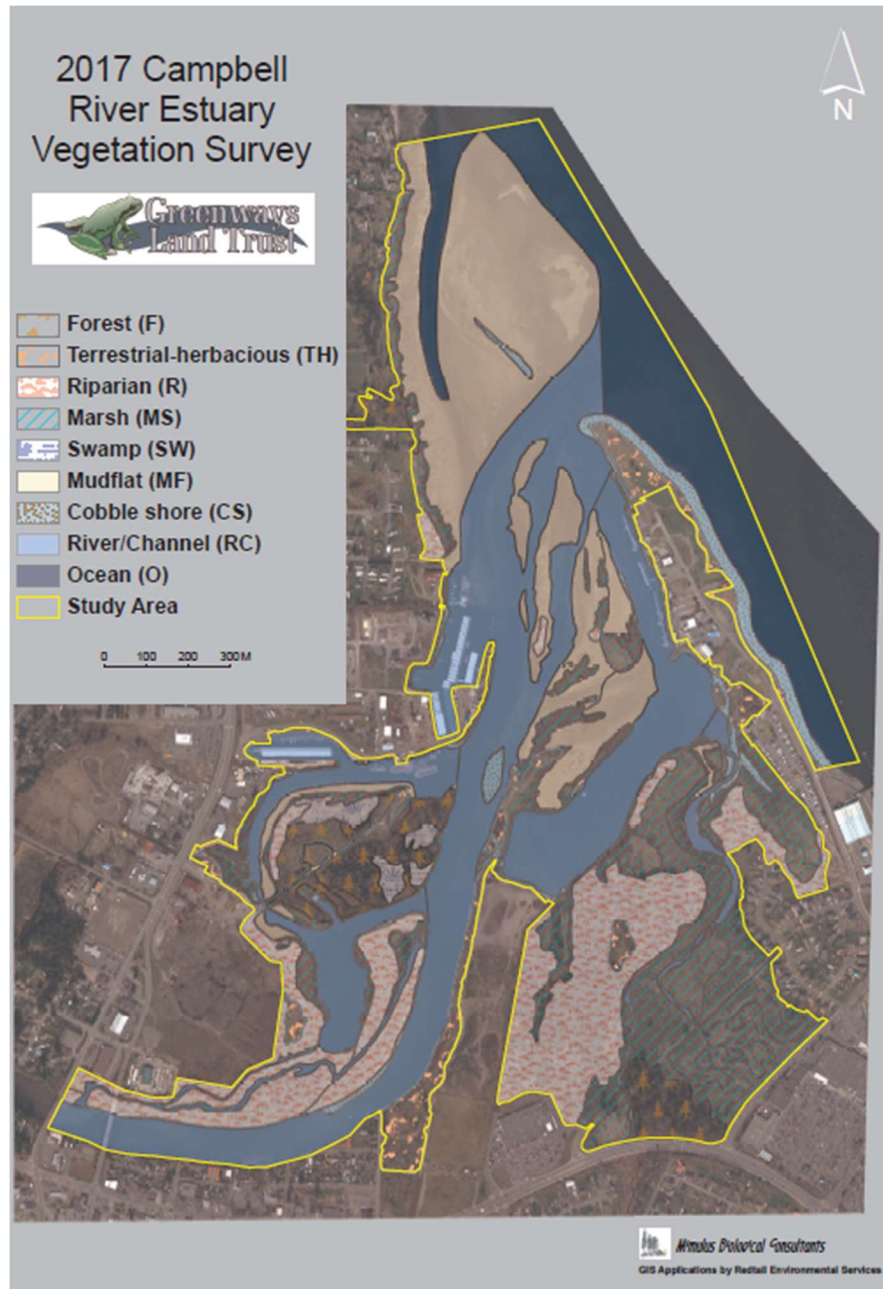


Figure 3: Study Area: the Campbell River Estuary

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. Following the methods used in 2018/2019, isolated and outlying populations of invasive plants were prioritized for treatment to prevent continued spread. Contractors and Greenways staff inspected the polygons (by boat where necessary) where invasive species were identified during vegetation mapping in 2017 (Campbell River Estuary Vegetation Community Mapping and Assessment, Mimulus Biological Consultants, 2017). Inspections were carried out while these species were in flower or otherwise visible on the landscape and marked for treatment as necessary. Once treatment of outlying populations had taken place, contractors, staff, and volunteers continued to treat existing dense infestations in easily accessible areas.

Areas of tidal marshes with yellow flag iris infestations were treated using a multi-pronged approach of digging rhizomes in the areas that previously had extensive digging done and in areas with very sporadic yellow flag iris plants, followed by disposal at the landfill. This grant cycle also saw extensive use of a benthic barrier technique that prevents light infiltration and gas exchange killing the entire plant including the rhizomes and seeds existing in the soil (Tarasoff, 2016). Lastly, seed pods were removed in areas that could not be dug or covered before seed production to prevent further spread into the infected or adjacent areas.



Figure 4: Greenways employee, Camille, and her family inspecting small islands in the Campbell River Estuary for invasive plants by boat, and removing yellow flag iris, July 2020

The primary technique used for purple loosestrife in the tidal marshes was hand-pulling entire plants or digging out larger more established plants, prior to seed formation, and disposing of them at the landfill. When it was not possible to remove plants before seed formation, flower heads were removed. To adequately remove this invasive plant, it was found that all areas of infestation had to be inspected several times, a couple weeks apart, as plants continued to emerge and flower over quite a long period of the summer. There is also an effective biocontrol available which persists in adjacent non-tidal areas from introductions approximately a decade ago (e.g. Nunns Creek estuary). In the spring of 2019 biocontrol was collected from an existing non-tidal population and spread into tidal areas (n.b. according to Dan Buffet at Ducks Unlimited (2018), the biocontrol cannot overwinter in tidal areas). Biocontrol collection was not attempted in the spring of 2020 due to Covid-19 preventing social gathering.

Scotch broom and Himalayan blackberry were both cut and left in-situ wherever possible to add to the organic content of the upland, often riparian habitat they were found in. When this was not possible due to the site aesthetics or simple volume of material, plant waste was taken to the landfill. Scotch broom was cut just below the soil surface, primarily while flowering and Himalayan blackberry roots were dug up to prevent future regrowth. If broom plants were cut while seeds were on the plant, they were left to decomposed on site to prevent spread of seeds during removal. Blackberry left in piles continues to be monitored for regrowth as this is known to be possible when nodes are exposed to soil.

Though treated in prior grant years, no new infestations of knotweed species were found that were suitable for treatment. Two infestations exist that are less than one meter above the high-water mark but they are not being treated as no effective or available treatment method is currently possible. If knotweed infestations higher than one meter above high water are found in the future, they will be chemically treated via a qualified contractor.



Figure 5: Rice root and Henderson's checkermallow are two marsh species native to the Campbell River Estuary.

Treatment data has been compiled and will be recorded in the provincial Invasive Alien Plant Program (IAPP) database in the winter of 2020 to ensure that all stakeholders were aware of the works. Records were kept including maps of areas treated, weight of invasive species removed, and estimates of weights for invasive plants left to decompose in-situ (based on known weights of an average truckload of each type of material). Treated areas will continued to be monitored for regrowth in future years.

Effective invasive species management should also include revegetation of areas with significant disturbance. Replanting to date has primarily occurred in upland and riparian areas that were primarily Himalayan blackberry and Scotch broom. 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.

Results and Outcomes

In 2019/2020, 4,740 kg of invasive plant material was removed from marsh habitats in the Campbell River Estuary and taken to the landfill. In upland/riparian habitats, an additional 765 kg of invasive plants was removed and taken to the landfill, and an estimated 1030 kg was cut and left in situ to return organics to the habitat (estimates were based on percentages of truckloads given known average weights per truckload of each type of invasive). See Table 1 for a species-specific breakdown of invasive plants removed. In total, approximately 6,535 kg of invasive plants were removed from the estuary. This does not include any efforts made in this time-period by the Wei Wai Kum Coastal Guardian Watchmen program as they were working independently of this project during this time.

As in previous years, contractors and Greenways staff inspected the polygons where invasive species were identified during vegetation mapping in 2017 (Campbell River Estuary Vegetation Community Mapping and Assessment, Mimulus Biological Consultants) while these species were in flower or otherwise visible on the landscape, and treated as necessary to ensure that all isolated populations are being treated. Efforts were also made to check areas previously unaffected by invasives to prevent unchecked spread to new areas.

2019/20 saw significant increase in the use of the benthic barrier 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, while managing to have stayed in place through both the storm season and the king tides. The pilot benthic barrier will be left in place for one more year to see if this kills all of the rhizomes.



Figure 6: Greenways volunteers measuring yellow flag iris benthic barriers to calculate the area covered (253m²)

This year of the project also saw an increase in upland invasive plant removals as our response to Covid-19 distancing requirements meant more individuals and family units were interested in volunteering on their own. Projects like Himalayan blackberry and Scotch broom removals to be a perfect fit for this as they are more straight-forward and less labour-intensive than other invasive projects in the estuary.

Volunteers have also been busy planting these upland and riparian areas with 286 native trees and shrubs planted in areas that were primarily Himalayan blackberry and Scotch broom. 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.

All treatment data will be recorded in the provincial Invasive Alien Plant Program (IAPP) database in the winter of 2020 to ensure that all stakeholders are aware of the works.

Table 1: Impact of Invasive Species Treatments Completed in 2019/2020

Invasive Species	Impact 2019/20
Yellow flag iris	253m ² of very dense yellow flag iris infestation was covered with benthic barriers. In addition, approximately 4,290 kg of plants removed, including 250 kg of flowers and seedpods, from approximately 7.5 ha of wetland habitat.
Purple loosestrife	Approximately 450 kg of plants were removed from 6 ha of wetland habitat and disposed of at the landfill.
Himalayan blackberry	Approximately 535 kg of blackberry were sent to landfill. Additional biomass estimated at 630 kg was left to decompose on site where possible to increase organics on site (if left they were monitored for regrowth from nodes). These removals were from over 3.5 ha of upland riparian habitat, primarily within replanting sites or to create room for replanting with native trees and shrubs.
Scotch broom	Approximately 180 kg of plants were sent to landfill. An estimated 400 kg was left to decompose on site. Treatments were from over 8.5 ha of upland habitat within the estuary.
Other invasive species (bull thistle, curled dock and reed canary grass)	Approximately 50 kg sent to landfill (reed canary grass) or left to decompose on site (thistle and dock), from treatments from over 3.5 ha of upland habitat within the estuary. These removals were primarily within replanting sites.
Knotweed species	Continued monitoring of 12 sites where knotweed has been successfully eradicated. No new infestations found in untreatable areas (2 known of from previous years; one in the Campbell River in front of Campbell River Lodge, the other near the double footbridges on the NCC trail).

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 4 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. For all species, isolated and outlying populations were prioritized for treatment, however, successes in previous years have meant that this was much easier to accomplish, allowing the focus for year 4 to shift to areas of dense infestations, and treating re-growth in isolated areas. For example, 2019/2020 saw a significant increase in the use of the benthic barrier method of yellow flag iris eradication developed by Catherine Tarasoff (2016). As the technique was developed for marshes not impacted by tidal fluctuation, variations have been attempted in 2020 to see if slight modifications may speed up the process of death of these plants by allowing for less gas exchange.



Figure 7: Greenways contractors installing benthic barriers to treat dense areas of yellow flag iris infestation on Baikie Island

While efforts have been and will continue to be made to revegetate areas with significant invasive removals, future project years will place more and more emphasis on this important aspect of invasive species management. Replanting to date has primarily occurred in upland and riparian areas with 286 native trees and shrubs planted in 2019/2020 in areas that were primarily Himalayan blackberry and Scotch broom. 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. Henderson's checkermallow seeds have been collected in the fall of 2019 and 2020, and collection will also occur for other marsh plants occurring naturally in the area (including common red paintbrush, Douglas aster and riceroot). When the benthic barriers are removed and underlying yellow flag iris has been effectively killed (estimated to occur in one to two years after covering), transplants of lady fern, silverweed, cattail and sedges will be harvested from adjacent areas to be planted alongside the flowering plant seedlings.

The 2019/2020 project year was impacted by several influences that delayed many of Greenways efforts. As a result, Greenways requested a 6-month extension to allow us to catch up and complete our intended objectives. These influences included a health issue causing a primary contractor to be delayed and eventually unable to complete invasive removal works, the hiring of a new staff member, as well as the global Covid-19 pandemic significantly impacting our staff, contractors, and volunteers to complete their normal works. Greenways Land Trust greatly appreciated this flexibility, allowing us to successfully complete this important work that we are so passionate about.

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 impact of allowing infestations to grow will negate the effects of trying to protect native species rather than continuing with invasive species treatments. 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 benthic barrier technique was piloted in the third year with almost all rhizomes and seeds killed after one year. This method was used much more widely in Year 4 with 235m² covered. This 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.

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.

Community Engagement, Education and Outreach

Greenways Land Trust is committed to providing environmental education and outreach, and engaging with our community through activities such as work parties where the community can participate in invasive species management and habitat restoration. While this was possible in 2019, the Covid-19 pandemic meant that we were not able to host many of our usual invasive removal work parties in the Spring and Summer of 2020. As a reaction to this new reality, the nature of volunteering shifted for some volunteers who completed an amazing number of hours of invasive plant removals as individuals, some even disposing of invasives at the landfill using their own vehicles. Greenways was able to resume work parties at a smaller scale in the end of the Summer of 2020 to ensure the recommended social distancing was possible. The result of these combined efforts was an astounding 837 volunteer hours towards primarily invasive plant removal!



Figure 8: Volunteers planting native trees on Baikie Island.

Table 2: Volunteer Engagement in the Restoration of Campbell River Estuary, 2019/2020

Date	No. Volunteers	No. Hours	Community Event or Volunteer Activity
06-Mar-19	8	12	Himalayan blackberry and Scotch broom removal
12-Mar-19	22	34.25	Himalayan blackberry removal
02-May-19	27	40	Himalayan blackberry removal & tree and shrub planting
11-May-19	16	28	Scotch broom removal
29-May-19	27	53	Insect hotel installation
31-May-19	20	48	Yellow flag iris seed pod removal
04-Jun-19	4	8	Mulching planting & installing habitat feature
05-Jun-19	21	48.5	Yellow flag iris seed pod removal
17-Jul-19	4	6	Collecting purple loosestrife biocontrol
31-Jul-19	4	6	Yellow flag iris benthic barrier installation
21-Aug-19	15	27	Purple loosestrife removal
01-Sep-19	3	20	Watering tree and shrub planting
01-Sep-19	3	19.5	Watering tree and shrub planting
04-Sep-19	2	3	Native plant seed collection
01-Oct-19	3	1.5	Himalayan blackberry removal
05-Oct-19	12	21.5	Himalayan blackberry removal
06-Oct-19	47	141	Planting native trees and shrubs
31-Jul-20	3	4.5	Purple loosestrife removal
04-Aug-20	3	4.5	Purple loosestrife removal
Spring & Summer	18	297	Volunteering as individuals (due to Covid-19) removing Himalayan blackberry, Scotch broom, thistle, purple loosestrife and yellow flag iris; and planting and watering native trees and shrubs.

Project Communications

In 2020, Greenways Land Trust has tried to be creative in our reach to our community, especially in this current environment with a global pandemic limiting our ability to gather for our more typical on the ground outreach. Our communications in 2019/2020 have including the 3 news articles, 3 E-newsletter articles (one of which featured FWCP as a major funder), and 25 Facebook posts (some of which mentioned FWCP funding). We have also communicated our passion for the ongoing restoration of the Campbell River Estuary through a CBC interview on July 23, 2020 ([All Points West with Kathryn Marlow](#)) and a You-Tube Presentation on September 25, 2020 ([ZOOMING IN: Campbell River Estuary & Baikie Island](#)) which also included reference to FWCP funding) as a part of the annual Art + Earth Festival.

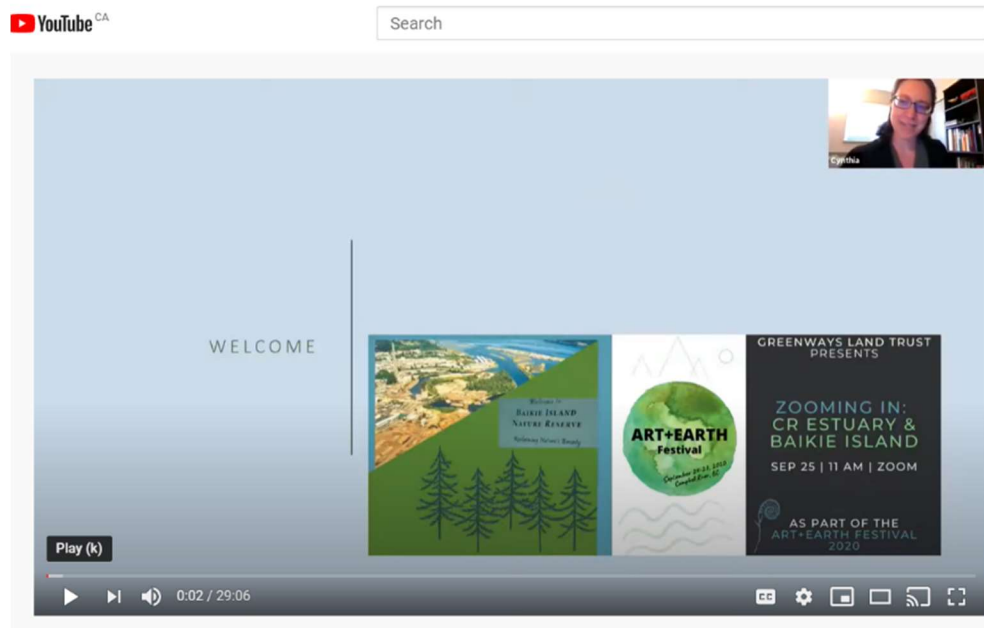


Figure 9: Greenways' staff, Cynthia and Camille, hosting a virtual presentation via You-Tube titled *ZOOMING IN: Campbell River Estuary & Baikie Island*, as a part of Campbell River's Art + Earth Festival

E-newsletter Articles:

- June 2020 – ["Project Update: Invasive Plant Management"](#)
- March 2020 – ["Broom Bash 2020"](#)
- January 2020 - ["Project Update: the Campbell River Estuary" & "Greenways = One Stop Shop for your New Year's Resolution"](#)

Newspaper Articles:

- Oct. 7, 2019 - ["VIDEO: 300 trees planted at Baikie Island Nature Preserve for TD Tree Days"](#)
- Aug. 7, 2019 - ["Purple loosestrife: beautiful, yes, but bad for the Campbell River estuary"](#)
- May 9, 2019 - ["Greenways bashes broom again Saturday at Myrt Thompson Trail"](#)

[Facebook Posts:](#)

- Sept. 29, 2020 – ZOOMING IN: Campbell River Estuary & Baikie Island (270 people reached)
- Sept. 24, 2020 (2) – ZOOMING IN: Campbell River Estuary & Baikie Island (513 & 492 people reached)
- Sept. 23, 2020 – Greenways Out & About: Removing canary reed grass from Baikie Island (224 people reached)
- Sept. 22, 2020 - ART OF NATURE (234 People Reached)
- Sept. 18, 2020 – Greenways Detective: Bear scat on Baikie Island (380 people reached)
- Sept. 3, 2020 – Greenways Out & About: Repairing bridge railings at Baikie Island Nature Reserves, Ocean Blue restoration (811 people reached)
- Sept. 1, 2020 – ZOOMING IN: Campbell River Estuary & Baikie Island (141 people reached)
- Aug. 20, 2020 – Greenways Out & About: Removing purple loosestrife with the volunteer Conservation Team (448 people reached)
- Aug. 6, 2020 – Greenways Out & About: Removing blackberry from the Raven Trail in Baikie Island Nature Reserve (411 people reached)
- Jul. 28, 2020 – Listen to Greenways on CBC highlighting Baikie Island (298 people reached)
- Jul. 28, 2020 – Greenways Out & About: Removing yellow flag iris from Myrt Thompson Trail (369 people reached)
- Jul. 32, 2020 – Greenways Out & About: Removing invasive plants and tending to plantings in the estuary (408 people reached)
- Jun. 2, 2020 – Greenways E Newsletter: Are you wondering what we are covering up on Baikie Island, educating about Yellow flag iris benthic barriers (658 people reached)
- May 11, 2020 – Promoting flora of Baikie Island Nature Reserve including maidenhair ferns (415 people reached)
- May 7, 2020 – Greenways is tackling Yellow Flag Iris on Baikie Island (494 people reached)
- May 2, 2020 – Greenways Detective: Views of Baikie Island (420 people reached)
- Mar. 24, 2020 – Greenways Detective: View of Campbell River Estuary from Raven Trail (355 people reached)
- Mar. 17, 2020 – Greenways Detective: View from Myrt Thompson Trail (357 people reached)
- Oct. 3, 2019 – Greenways' Conservation Team removing Himalayan blackberry from Baikie Island to prepare for native tree and shrub planting (292 people reached)
- Jul. 19, 2019 – Purple loosestrife pull and lunch event (109 people reached)
- Jul. 12, 2019 – Greenways' Conservation Team – Removing invasive plants from Campbell River Estuary (78 people reached)
- May 11, 2020 – Greenways' Conservation Team – Broom Bashing on Myrt Thompson Trail (280 people reached)
- Apr. 12, 2020 – Wei Wai Kum Interpretive Walk at Tye Spite (324 people reached)
- May 11, 2020 – Greenways' Conservation Team – Broom Bashing on Myrt Thompson Trail (280 people reached)
- Apr. 10, 2020 – Yellow Flag Iris Control & Wetland Restoration Workshop (237 people reached)

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 are supported by partners and funders to continue their efforts to restore these areas that include both their traditional territories and their reserve lands, and we look forward to working closely with them in years to come.

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