



Ruth Masters Greenway Stewardship
Mapping invasive species and measuring trampling
YER Phase II Project July 1-5, 2022



Tanis Gower, Fernhill Consulting
#210 – 2202 Lambert Drive
Courtenay, BC V9N 1Z8

Graham Hilliar, Youth and Ecological Restoration Program
4327 Minto Road
Courtenay, B.C. V9N 9P7
<https://youthecology.ca>

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This report describes the enthusiastic efforts of youth field technician Jet Browning and a youth field technician who wishes to remain anonymous, and their mentors. The Youth and Ecological Restoration Program (YER) was created by Wendy Kotilla and this project was organized and overseen by Youth Support Worker Graham Hilliar. The YER Program is funded by the BC Ministry of Children and Family Development. Brian Allaert and Andrew Burger of the Comox Valley Regional District (CVRD) Parks Department provided direction and technical support. The CVRD Parks Department funded Tanis Gower of Fernhill Consulting to lead the field program and produce this report.

1. Introduction

The purpose of the study was to work in Ruth Masters Greenway Regional Park to:

1. Map the locations of invasive plant species as a baseline for a future park management plan;
2. Measure vegetative cover and bare ground in an area affected by trampling, and compare to vegetative cover in an unaffected area, as a baseline for ongoing efforts to manage trampling;
3. Conduct annual covenant monitoring, as required by Masters Greenway co-covenant holders the Comox Valley Land Trust and The Land Conservancy of British Columbia; and,
4. Support vulnerable youth within the Comox Valley by providing them with hands-on, meaningful opportunities to engage with nature and adult mentors.

1.1. YER Program

The Youth and Ecological Restoration program (YER) provides youth aged twelve to eighteen with one-on-one work experience through ecological restoration methods, ecotherapy practices and mentoring support. Youth learn social, practical and communication skills to motivate them in becoming confident, respectful, and productive members of society.¹

All youth involved in the program begin with Phase 1, where they work with a YER staff person and with environmental organizations and volunteers focused on restoring local watersheds and ecosystems. On program completion, youth give an oral presentation for a community group.

Some graduates of Phase 1 are accepted into Phase 2. In Phase 2, two youth, a YER staff person, and an environmental professional work on a project together. The focus is on a specific environmental project for advanced learning about ecological information, research techniques, and collaboration and communication.¹ The project is completed to a professional standard and provides useful information and/or assistance to land managers. On the last of five days, the youth co-facilitate a public tour to complete the project.

1.2. Study Location

Ruth Masters Greenway is located within Electoral Area C of the Comox Valley Regional District (CVRD). It has been a regional park since 2004, when Ruth Masters donated the land to the CVRD to create a greenway and wildlife corridor. The property consists of maturing mixed second growth forest, and newer forested areas that were once a home site and an access road (Jones 2004). An unnamed stream flows through the property and enters the Puntledge River over a steep drop-off that precludes salmon access to the site. Non-native and invasive plant species are more common in the areas with greater historical disturbance. Well-used trails traverse the property, including unauthorized trails from adjacent residential properties.

¹ <https://youthecology.ca>

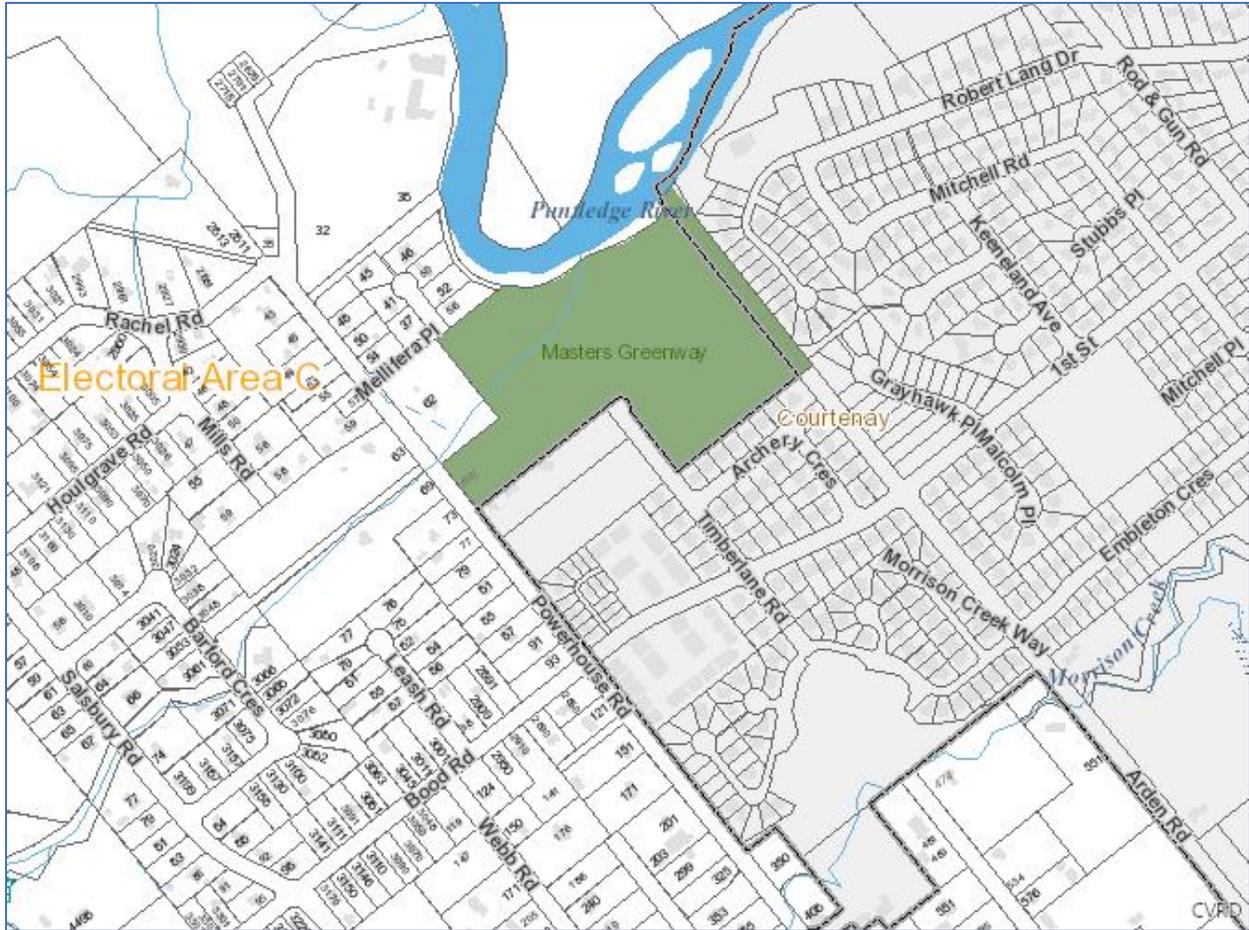


Figure 1: Masters Greenway location, from CVRD iMap. The Greenway is on the border of the City of Courtenay and Electoral Area C of the Comox Valley Regional District.

2. Methods

The field program was carried out from July 1 to 5, 2022. The four YER team members were youth participant Jet Browning, a youth participant who wishes to remain anonymous, YER Youth Support Worker Graham Hilliar, and Registered Professional Biologist Tanis Gower.

Over the first three days the team conducted invasive species mapping, measured the effects of trampling in an affected area and a control, and conducted covenant monitoring. In addition, Hazel Lennox, a local historian, came on day 3 to share the story of Ruth Masters life and the history of the property. On days four and five the focus was on the preparation and presentation of a public tour by the youth.

2.1. Invasive species mapping

The non-native invasive plant species of primary concern in Masters Greenway are common ivy (*Hedera helix*), goutweed (*Aegopodium podagraria*) and lamium (*Lamium galeobdolon spp argentatum*).

The project team visited the known locations of ivy, goutweed and lamium provided by CVRD Parks, then searched for further sites. In addition, the team noted locations of periwinkle (*Vinca minor*), areas

with multiple holly trees or seedlings (*Ilex aquifolium*), and one English hawthorn (*Crataegus monogyna*).

The team used a 6th generation iPad and Avenza Maps 4.0.4 software paired with a Bluetooth enabled GPS (Garmin Glo II) to navigate, record tracks and waypoints, take photos, and make notes. These data were later imported into the GIS program QGIS to enable analysis and reporting.

2.2. Mapping and measuring trampling damage

Areas of significant trampling within the park were noted and mapped. One area of particular concern is along the bank of the unnamed stream adjacent to the main trail, where people and their dogs are accessing the waterway and taking a shortcut between two points on the trail. The vegetation cover was measured in this location and in a control site on the less-accessible opposite bank of the stream.

The method employed to measure the vegetation on the sites was adapted from the relevant procedure in the Field Manual for Describing Terrestrial Ecosystems, 2nd Edition (Province of BC 2010). This manual provides a standardized methodology to describe vegetative cover and plant species according to the following vegetation layers: trees, shrubs, herbs, moss/lichen/liverworts/seedlings, and epiphytes (plants growing on other living plants). Based on the needs of this project, the methodology was simplified. The percent vegetative cover was noted for each of the two plots in the following categories: trees, shrubs, herbs, moss, and bare ground. Within the tree, shrub and herb layers, all species were noted and placed into one of four cover categories: 1: one or two plants 2: a few plants 3: many plants, 4: dominant. This followed methodology used in an earlier YER II project (Ennis and Kotilla 2019).

The two plots were roughly equal in size and roughly rectangular in shape. The four corners of each plot were marked with rebar capped with a bright orange plastic cap, to enable repeat measurements by parks staff or for a future YER project.

The location of the two sites is shown in Figure 2.

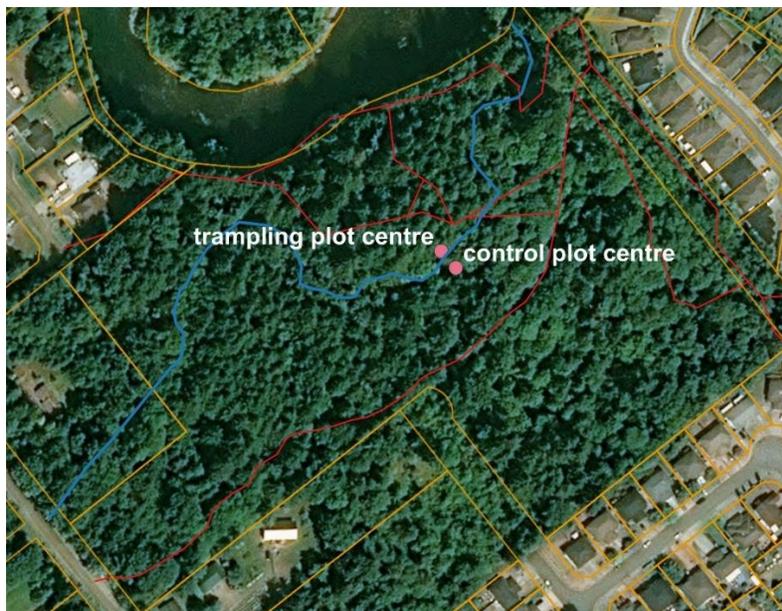


Figure 2: The centre point of the vegetation plots to measure the effects of trampling. The trampling plot is on the north bank of the unnamed creek next to the trail (shown in red), while the control is on the less-accessible south bank.

2.3. Covenant monitoring

Masters Greenway has a conservation covenant registered on the land title. This covenant was put in place when the land was donated to the Comox Valley Regional District. Like all conservation covenants, this legal document includes permitted actions and specific restrictions to ensure that the land is maintained in a natural state, and according to the intent of the covenant.

The project team obtained permission from the Comox Valley Land Trust to carry out annual covenant monitoring on their behalf. A conservation covenant is “held” by an organization (like a land trust) which agrees to take on the perpetual responsibility to monitor and enforce the agreement. In this case, the Comox Valley Land Trust and The Land Conservancy of BC are co-covenant holders.

To conduct the monitoring, the project team reviewed the permitted actions and restrictions, then walked the main trails and an unauthorized trail within the Greenway to note whether any violations were observed, and to make general observations regarding the condition of the property. The route was mapped, and several photos were taken. Subsequently the project team reviewed each of the restrictions to determine whether there were any violations observed.

3. Results

3.1. Invasive species mapping

The mapped locations of the six species of interest are shown in Figure 3. This information will provide a baseline for forming a management plan or priorities for Greenway maintenance.

Most locations were recorded as points, but some patches of goutweed and holly were large enough that they were recorded as polygons. However, the large area of goutweed near the park entrance on Powerhouse Road was recorded as a point, as was the large area of lamium nearby. Both areas are receiving control efforts by Parks staff.

The mapped polygons for holly included scattered seedlings that formed a minority of cover within the native forest vegetation.

Ivy was identified in several locations, on the forest floor as well as growing on individual trees. Some locations previously identified by Parks staff had likely received control efforts, as the remaining ivy plants were small and scattered, and were not growing on trees.

Two areas of periwinkle were identified, and one English hawthorn tree.

There are likely further areas of ivy and holly that were not identified, as the crew did not systematically survey the entire area of the park.

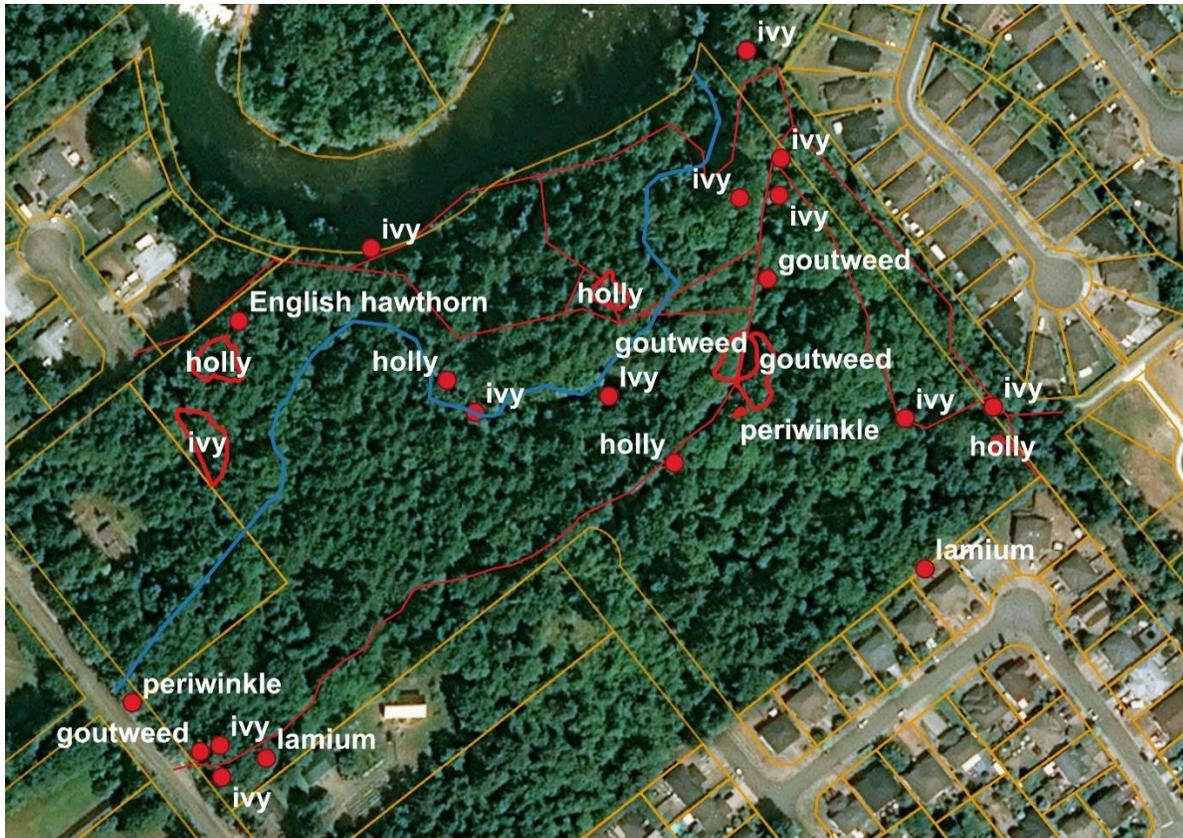


Figure 3: The main locations of ivy, goutweed, lamium, holly, periwinkle and English hawthorn.



Figure 4: The locations of trampling, including unauthorized trails.

3.2. Mapping and measuring trampling damage

The vegetation cover on the trampled site and the control site were significantly different. The trampled site had 25% bare ground and the control had almost no bare ground (<1%). The control had significantly more herb cover (35% vs. 20%), somewhat more shrub cover, and more species in the shrub layer. The trampled site had a greater amount of grass cover.

The two plots differed in tree cover: the control had approximately 30% tree cover and the trampled site had 45%. This is due to natural variability across the landscape, including the fact that the control included four dead hemlock trees.

There is high plant species diversity in Masters Greenway, and this is reflected in the long list of species found. Of note is that the trampled site contained wall lettuce (*Lactuca muralis*) and hairy cat's ear (*Hypochaeris radicata*), both weedy non-native species in the dandelion family. The control site did not include these species.

Figure 4 shows four main areas of trampling within the park, plus unauthorized trails from the adjacent residences. Figures 5 and 6 are photographs of the two plots. Appendix 1 contains the detailed results of the vegetation survey.

3.3. Covenant monitoring

Monitoring Locations A through I are shown in Figure 7. There were no issues with regards to non-compliance with the intent of the covenant by the landowner, the CVRD. The notes section of the monitoring form included a mention of the problem of trampling in at least four locations, and that park managers are aware and taking remedial actions.

Photos of the monitoring locations are included in Appendix 2.

3.4. Public tour and presentation

A tour was held on July 5 and was attended by 25 family members, neighbours, and members of the wider community. The two youth successfully explained the project in an engaging and informative way. After the tour, the youth were presented with completion certificates, letters of reference and a fifty dollar honorarium.



Figure 5: Standing in the centre of the control plot, looking across the unnamed creek toward the trail.



Figure 6: The trampled plot, showing the streambank of the unnamed creek, bare ground, grass, swordfern and planted cedar trees in the white cones.



Figure 7: For the covenant monitoring, the route taken through the Greenway is shown in green, with monitoring points along the route noted as letters A to I.

4. Discussion

CVRD Parks does ongoing maintenance to control ivy, goutweed and lamium. Based on the mapping done for this project, additional efforts may be undertaken in more locations, and for holly, periwinkle, and English hawthorn. Parks staff have been suppressing goutweed and lamium in two main locations. Both locations require ongoing efforts to remove the surviving plants.

Outreach to neighbours can be an important part of invasive plant species control. For instance, lamium originates from hanging baskets that have been disposed of in natural areas. For this reason, it is typically found near backyards, as is the case for the two locations of lamium in Masters Greenway. Parks are sometimes also used for disposal of general yard waste. As the project team was conducting their work, one park neighbour related that he sees neighbours disposing of plant materials over the cliff beside the Puntledge River. This could be a source of the ivy that is seen in two areas along the cliff.

Trampling is occurring in at least four areas within the park, in addition to the unauthorized trails connecting to adjacent residences. In at least two of these locations, additional fencing or signage may ameliorate the problem.

While bicycles are not allowed in the park, the project team saw several people on bicycles. In addition, one person passed through the park on a motorcycle.

5. Recommendations

The two youth developed the following recommendations for the consideration of park managers:

To address trampling:

- Create a map with designated routes with signs that encourage people to stay on the trail;
- Create barriers to off-trail access, including natural barriers;
- Create special no-access zones;
- Install special gates to keep bicycles and motorcycles out of the park;
- Install friendly signs to remind people to stay on the trail;
- Outreach to neighbours; and,
- Install fencing along the backyards of Archery Crescent.

To address non-native invasive plant species:

- Educate neighbours to not dump yard waste;
- Raise awareness of invasive plants through signage;
- Create volunteer opportunities to remove invasive species; and,
- Create more programming such as this project to teach people.

6. Conclusion

The project team collected the planned information while providing a meaningful mentoring opportunity for the two youth participants. Both youths enjoyed the project and would like to participate in any related future opportunities.

7. References

Ennis, T and W. Kotilla. Ecological Inventory, Morrison Headwaters Nature Preserve. Prepared for the Youth and Ecological Restoration Program. August 31, 2019. Accessed at: [Ecological Inventory of Morrison Creek Headwaters Nature Preserve 2019 | YER \(youthecology.ca\)](#) on May 12, 2022.

Jones, M. 2004. Ecological Assessment of Lot B, Plan VIP64357, Comox Land District. Prepared by Mimulus Biological Consultants for the Comox Valley Land Trust, May 28, 2004.

Province of British Columbia, Ministry of Forests and Range and Ministry of Environment. 2010. Field Manual for Describing Terrestrial Ecosystems. 2nd Edition. Land Management Handbook No. 25. Province of British Columbia. Victoria, BC.

Appendix 1: Vegetation plot data

Table 1: Field form for vegetative cover at the trampled site

Youth and Ecological Restoration Program - Site Description Field Form				
Date: July 2		Weather: Sunny and no wind, 22° C		
Crew: TG, GH, JB, AR				
Site/plot name: Trampled zone upstream of trail along west bank of unnamed creek			Site coordinates (center):	
Cover by Layer (%)				
Trees: 45	Shrubs: 15	Herbs: 20	Moss: 10	Bare Ground: 25
Cover categories by layer/species 1 = one or two plants; 2 = a few; 3 = many; 4 = dominant				
Species in Tree layer (>10 m tall)			Cover category	
Western red Cedar			1	
Big leaf Maple			2	
Douglas-Fir			2	
Species in shrub layer (woody plants 0.15 to 10m including trees greater than 2 years old)			Cover category	
Dull Oregon grape			3	
Red huckleberry			1	
Red elderberry			1	
Snowberry			1	
Species in herb layer (including woody spp < 0.15 m)			Cover category	
Sword fern			3	
Grass (not identified to species)			3	
Bracken fern			2	
Trailing blackberry			2	
Western red cedar			2	
Western starflower			2	
Vanilla leaf			2	
Pathfinder			2	
Wall lettuce			2	
Carolina bugbane			2	
Creeping buttercup			2	
Hooker's fairybells			2	
Common horsetail			2	
Cleavers			2	
False lily-of-the-valley			2	
Trillium			2	
Sitka spruce			1	
Skunk cabbage			1	
Lady fern			1	
Sedge spp.			1	
Prunus spp.			1	
Sweet cicely			1	

Siberian miner's lettuce	1
Mountain ash	1
Licorice fern	1
Hairy cat's ear	1

Table 2: Field form for vegetative cover at the control site

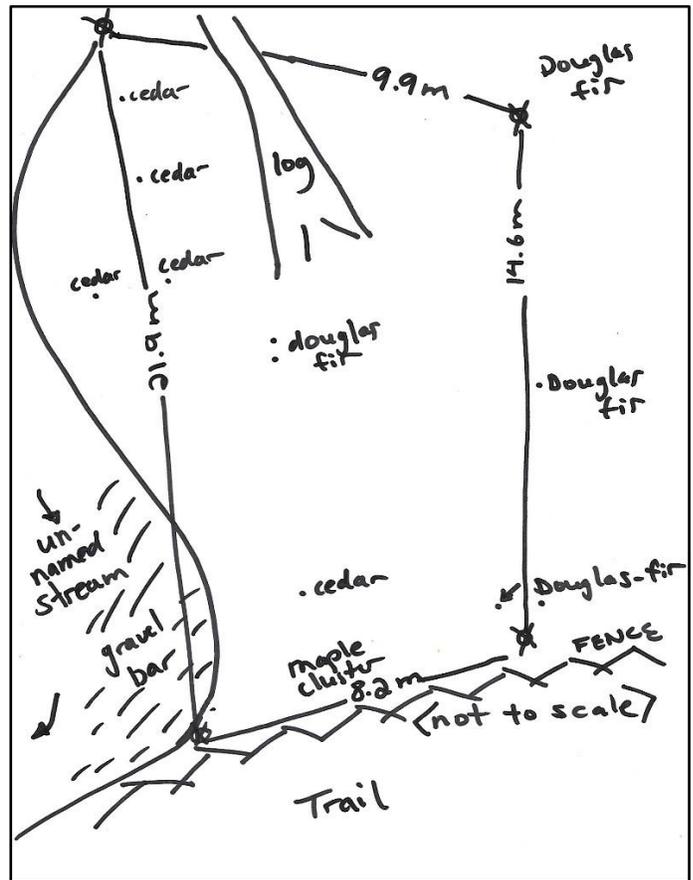
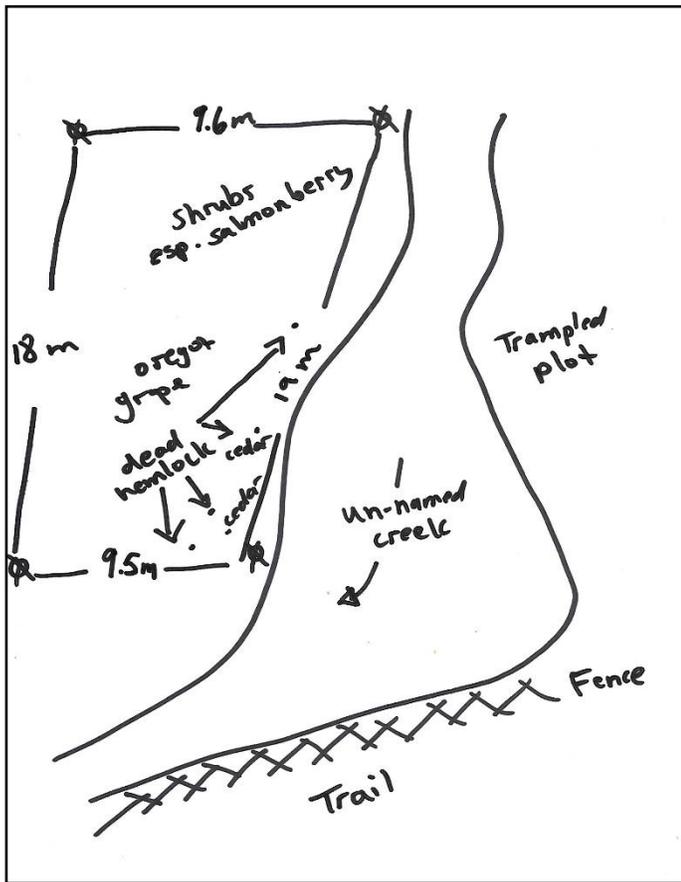
Youth and Ecological Restoration Program - Site Description Field Form				
Date: July 3, 2022		Weather: Cloudy, 17°C		
Crew: TG, GH, JB, AR				
Site/plot name: Untrampled control on east streambank upstream of bridge			Site coordinates (center): UTM 353597, 5505424	
Cover by Layer (%)				
Trees: 30	Shrubs: 20	Herbs: 35	Moss: 3	Bare Ground: <1%
Cover categories by layer/species 1 = one or two plants; 2 = a few; 3 = many; 4 = dominant				
Species in Tree layer (>10 m tall)			Cover category	
Western hemlock (all dead)			2	
Western red cedar			2	
Grand fir			1	
Red alder			1	
Big leaf maple			1	
Species in shrub layer (woody plants 0.15 to 10m including trees greater than 2 years old)			Cover category	
Dull Oregon grape			3	
Red huckleberry			2	
Salmonberry			2	
Beaked hazelnut			1	
Red elderberry			1	
Pacific ninebark			1	
Grand fir			1	
Big-leafed Maple			1	
Species in herb layer (including woody spp < 0.15 m)			Cover category	
Sword fern			3	
Lady fern			3	
Trillium			3	
Western starflower			3	
Big-leaf maple			3	
Pacific bleeding heart			3	
False lily-of-the-valley			3	
False bugbane			3	
Enchanters' nightshade			2	
Vanilla leaf			2	
Hooker's fairybells			2	

Trailing blackberry	2
Skunk cabbage	2
Three-leaved foam flower	2
Wall lettuce	2
Maidenhair fern	1
Stink currant	1
Sedge spp.	1
Grass spp.	1

Table 3: common names and Latin names of plant species in the vegetation plots.

Common Name	Latin Name
Trees	
Big-leaf maple	<i>Acer macrophyllum</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Grand fir	<i>Abies grandis</i>
Red alder	<i>Alnus rubra</i>
Western hemlock	<i>Tsuga heterophylla</i>
Western red cedar	<i>Thuja plicata</i>
Shrubs	
Beaked hazelnut	<i>Corylus cornuta</i>
Coastal red elderberry	<i>Sambucus racemosa ssp. pubens var. arborescens</i>
Common snowberry	<i>Symphoricarpos albus</i>
Dull Oregon-grape	<i>Mahonia nervosa</i>
Pacific ninebark	<i>Physocarpus capitatus</i>
Red huckleberry	<i>Vaccinium parvifolium</i>
Salmonberry	<i>Rubus spectabilis</i>
Sitka mountain ash	<i>Sorbus sitchensis</i>
Stink currant	<i>Ribes bracteosum</i>
Herbs	
Alpine enchanter's nightshade	<i>Circaea alpina</i>
Bracken fern	<i>Pteridium aquilinum</i>
Cleavers	<i>Galium aparine</i>
Common horsetail	<i>Equisitum arvense</i>
Creeping buttercup	<i>Ranunculus repens</i>
False bugbane	<i>Trautvetteria caroliniensis</i>
False lily-of-the-valley	<i>Maianthemum dilatatum</i>
Hairy cat's-ear	<i>Hypochaeris radicata</i>
Hooker's fairybells	<i>Prosartes hookeri</i>
Lady fern	<i>Athyrium filix-femina</i>
Licorice fern	<i>Polypodium glycyrrhiza</i>
Mountain sweet cicely	<i>Osmorhiza berteroi</i>
Northern maiden-hair fern	<i>Adiantum aleuticum</i>
Pacific bleeding heart	<i>Dicentra formosa</i>
Pathfinder	<i>Adenocaulon bicolor</i>

Sword fern	<i>Polystichum munitum</i>
Siberian miner's-lettuce	<i>Claytonia sibirica</i>
Skunk cabbage	<i>Lysichiton americanus</i>
Three-leaved foamflower	<i>Tiarella trifoliata</i> var. <i>trifoliata</i>
Trailing blackberry	<i>Rubus ursinus</i>
Wall lettuce	<i>Lactuca muralis</i>
Vanilla-leaf	<i>Achlys triphylla</i>
Western starflower	<i>Trientalis latifolia</i>
Western trillium	<i>Trillium ovatum</i>

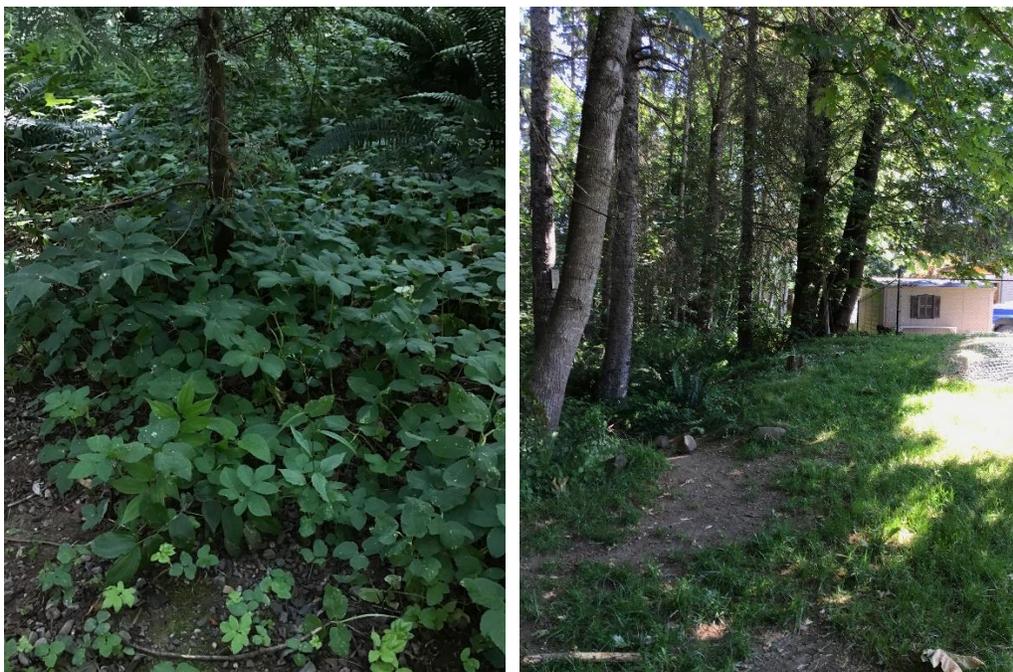


Drawing 1: Sketches of the control plot (left) and the trampled plot (right).

Appendix 2: Covenant monitoring photographs



Photograph 1 (left) shows Monitoring Site A, where goutweed is being suppressed by landscape fabric. Photograph 2 (right) shows Monitoring Site B, where lamium has been smothered and landscape fabric removed. Some lamium is still present, along with goutweed. Hand pulling is recommended.



Photograph 3 (left) shows part of the extensive patch of goutweed on both sides of the trail at Monitoring Site C. Photograph 4 (right) is Monitoring Site D, showing part of the area directly behind Archery Crescent, where lawns are extended into the park and there are unauthorized trails and trampling.



Photograph 5: Monitoring Site E, beside the upper bridge, showing fencing installed to prevent trampling, and showing planted cedar trees (the white cones in the distance).



Photograph 6: Monitoring Site F, showing fencing at the cliff edge along the Puntledge River. This fencing is to be moved back from the cliff edge to prevent access and allow vegetation to regrow.



Photograph 7: Monitoring Site G, showing the waterway with trampling from dogs.



Photograph 8: Monitoring Site H, showing a healthy section of waterway and riparian zone.



Photograph 9: Trailhead at Mellifera Place, showing signage with the Greenway rules.