Comox Valley Nature
Wetland Restoration Project Report 2012

Prepared by Frank Hovenden

Comox Valley Naturalists Society

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1 Acknowledgements

Our efforts to remove invasive plants and restore habitat would not be possible without the generous grants from our donors and sponsors. On behalf of the Comox Valley Naturalists Society I would like to thank the following organizations.

Comox Valley Regional District

City of Courtenay

Ducks Unlimited Canada

Federation of BC Naturalists

I would also like to thank our Contractor Ernie Sellentin and his field crew of Brain Hay and Jason Guthrie. Ernie brings a vast body of experience and expertise to the project and we were happy to have him work for us this year. From within the CVNS, a special thanks to the many volunteers who helped with this project. A special thanks to Anita Wood our club treasurer who took care of all the financial details. Also many thanks to Bill Heidrick and Pat MacDonald for adopting knotweed patches for continuous cutting trails, and Bob Bartsch for the many tasks he did in the Courtenay River Airpark.

This Report was written by Frank Hovenden of the Comox Valley Naturalists Society and is available on line at http://comoxvalleynaturalist.bc.ca/

2 Introduction

The Wetland Restoration Project is an initiative of the Comox Valley Naturalists Society. We are a membership-based non-profit society with charitable status which has been active in the Comox Valley for over forty-seven years. As an affiliated club of BC Nature we share their mandate "to know nature and keep it worth knowing."

The Wetland Restoration Project was started when the invasive introduced purple loosestrife (*Lythrum salicaria)* was discovered to be spreading in the Courtenay River estuary 20 years ago. The Project was spearheaded by a past president of the society, Betty Lunam, as a volunteer effort, to preserve the last remaining natural areas of the estuary. Over the years the project has expanded both in scope and scale as more invasive plants have been introduced to our area. The volunteer effort has been augmented by a paid contract crew, and the project has taken on a more holistic approach. This includes public outreach and education, planting of native plants, and contact with higher level organizations such as the Coastal Invasive Plant Committee. Much of our funding comes from local governments and reflects our shared concern for protecting our environment and insuring the Comox Valley retains a healthy environment for its citizens.

At the heart of the project are the volunteers from within and outside our society. This year volunteers from our Society bashed broom in the Courtenay River Airpark, cut knotweed patches, as well as helping with our attempted prescribed burn. Assisting in the Airpark, the Youth for Ecological Restoration helped plant the donated camas bulbs. This local organization works with troubled local youth helping them develop useful skills in the environmental field.

Figure 1: Volunteers bashing Scotch broom

In 2012, crews continued to tackle purple loosestrife, yellow flag iris (*Iris pseudacorus),*Himalayan blackberry (*Rubus discolor),*Scotch broom (*Cytisus scoparius)* and various members of the Knotweed complex.

Over the years the scope and focus of the project has changed in response to changing environmental conditions. In terms of invasive plants, Purple loosestrife has largely been controlled within the estuary. Unfortunately knotweed has increased its invasion of the Courtenay River riparian zone. There seems to be a new foreign invader every few years and it is not limited to plants. Several years ago rabbits made their first appearance locally, having moved northward. This year we have had the first reports of the Eastern grey squirrel being seen in Seal Bay Park. It is a fact of life that many invasive species are here to stay and our battle is often one of mitigation and damage control.

The geographical scope of the project is the Courtenay River estuary and the tidal areas adjoining it. At the request of funders, we will extend this area slightly. The Comox Valley Regional District had a request for weed inventory work for their Royston Trail Project. As the work fitted our project aims

and goals we were happy to do this and the report can be found on the CVNS website.

This report will document the work completed in 2012. This will include the numbers of plants removed and the time worked in the various areas. The financial details of the project as well as recommendations for the future direction of the project are included.

3 Background

On the local level the Comox Valley Regional District is once again updating its Weed Control Act 2347 which was first passed in 2001. It is adding several more species to the list of noxious weeds. This follows on the heels of last year's amendment of the provincial Weed Control Act. This would seem to reflect an increased awareness of the magnitude and the changing nature of the invasive plant problem here in the Comox Valley. The Comox Valley Naturalists Society have submitted comments on this amendment in the hopes of making it a more effective bylaw.

Invasive species have caused large environmental and economic impacts throughout British Columbia. The Invasive Plant Council of BC defines an invasive plant as any alien species that has the potential to pose undesirable or detrimental impacts on humans, animals or ecosystems. These plants usually have the ability to establish quickly and dominate sites, sometimes forming monocultures which exclude other species and thus reduce biodiversity.

It is often wondered why invasive plants are so successful in their new habitats. One reason is the lack of biological controls in their new environment. Of equal importance is their new environment itself. Much of this is the result of our settlement and resource extraction patterns. For example, Scotch Broom and the various knapweeds often follow new roads. Along roadsides, we create and maintain disturbed sites, preventing natural plant secession which would shade these invasive species out over time. Instead we attempt to maintain a static ecosystem where conditions for many invasives are optimized. Needless to say, our infrastructure is here to stay and we will have to learn to live with many invasives. However there are places and situations where invasive plants cannot be allowed to establish.

The Comox Valley Naturalists have taken an interest in combating invasive plants on a local level. We have identified an area which has high biodiversity value (Courtenay River estuary) and which is threatened by various invasive plants. With our limited resources we have concentrated in keeping invasive plants at a manageable level in this area. At the request of our funders we have worked throughout the Comox Valley although our focus remains the tidal waters and adjacent areas of the Courtenay River.

In BC the fight against invasive species has historically been centred on those species causing economic loss to a resource. The fight against them has been divided among the various provincial ministries such as the Ministry of Agriculture, Ministry of Natural Resources Operations, Ministry of the Environment as well as lower levels of government. Biology seldom recognizes jurisdictional boundaries of a political nature which makes tackling a biological problem extremely difficult. The Coastal Invasive Plant Committee attempts to take a broader geographic view of the problem and is a

registered non-profit society serving our geographic area. This organization has provided training and an inventory data base, as well as sponsoring weed removal crews. The problem is immense, and limited funding has meant limited success.

This year the author completed another course in the University of Victoria's Native Species and Natural Processes Professional Specialization Certificate Program. This not only keeps me current in the field but also give me good local contacts with other workers and professionals in the field of environmental restoration.

4 Summary of Work Completed

A new area was added to our core areas of concern this year. Area eight contains a number of purple loosestrife plants and yellow flag iris which were discovered 3 years ago. It is situated slightly to the south of our historic core areas along the shore of Baynes Sound in the Argyle Road area of the CVRD. It was felt by Sellentin's Habitat Restoration that these plants were contributing a large amount of seed which was being deposited in the Courtenay River estuary due to southeast storm events. The purple loosestrife plants here are growing along the shoreline in fresh water seepages.

Figure 2: Area 8 Argyle Rd.

The core areas of concern (except Area 8) surround the Courtenay River estuary and are located in the City of Courtenay and the Comox Valley Regional District (CVRD). Geographically the funded work broke down to 70% within the CVRD and 30% in the City of Courtenay. In addition to the core areas, at the request of funders or the public, work may be carried out in adjacent areas. This year several calls were received via the CVNS to help identify or remove Giant Hogweed (*Heracleum mantegazzianum)*. Figure 3 is a map of our core areas.

This year at the request of the CVRD, an inventory of invasive plants was done for an area that has been proposed for a walkway. This report can be found our website http://www.comoxvalleynaturalist.bc.ca/ in the sidebar under "Wetland". This area is composed of the former logging railway right-of-way in the Royston area and is to the south of our core areas.

The core areas are identified as priority because they are areas where historically purple loosestrife has been found. They are either tidally influenced or are along watercourses that connect to the estuary. The work is focused on public lands; however access to private lands such as the Comox Bay Farm and the Berry farms has been established through informal agreements that must be renewed annually.

A high priority is given to lands of high ecological significance such as Area 6 which is commonly called Hollyhock Flats. This area is fairly undisturbed it terms of human modification and also contains the blue-listed plant Henderson's checker-mallow *(Sidalcea hendersonii)*. Close to 90% of the purple loosestrife removed this year by the project came from this area.

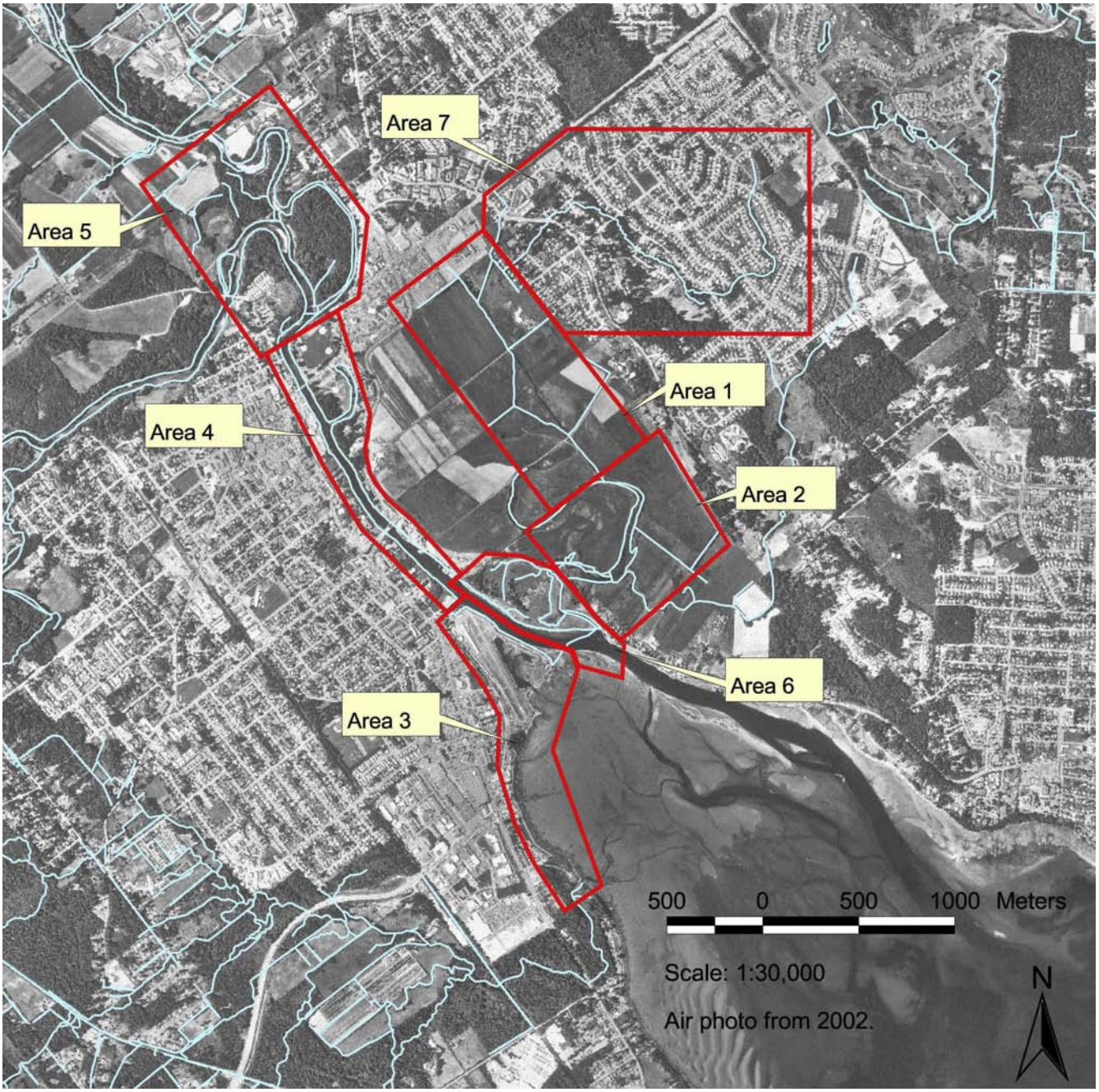
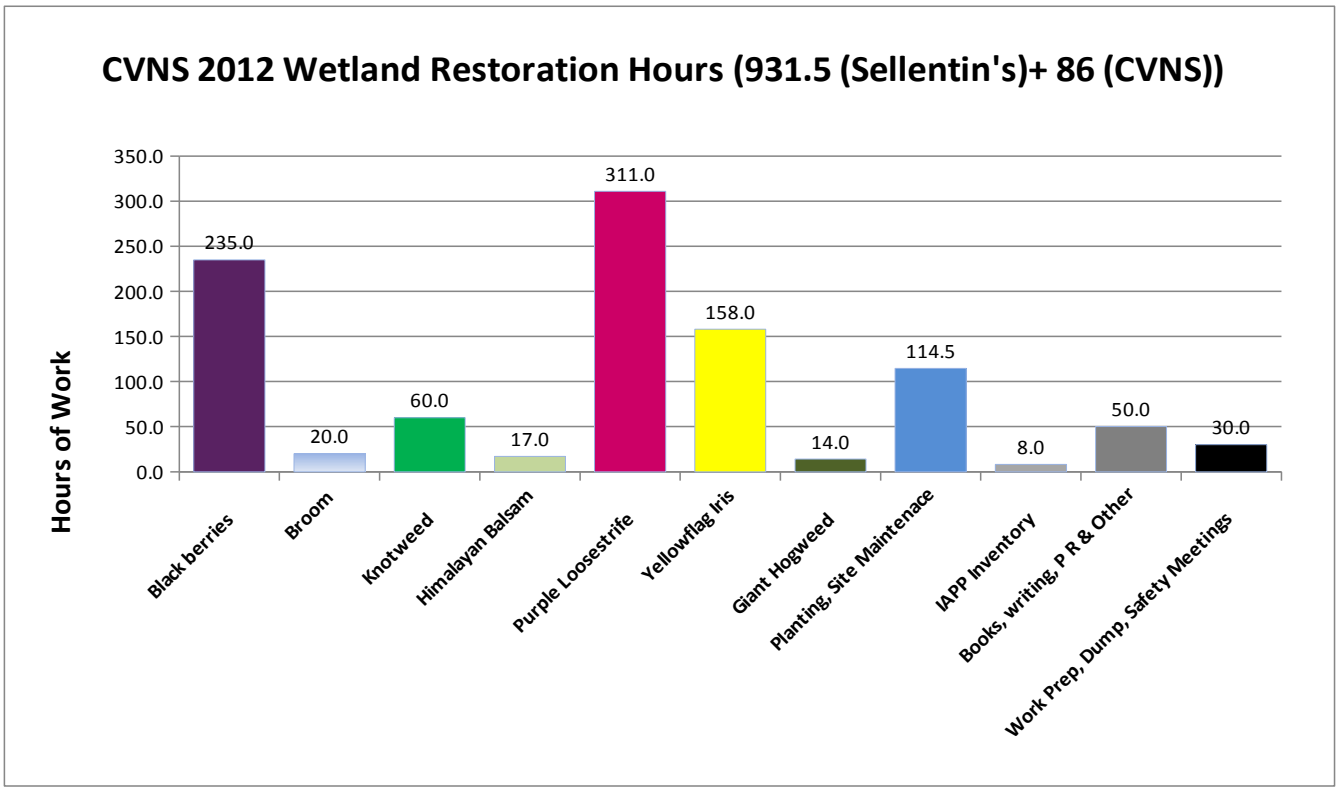


Figure 3: Core areas of concern for the Wetland Restoration Project

Figure 4: Project hours by task



The project hours were tracked by task and geographic area. This year Sellentin's Habitat Restoration completed a total of 931.5 hours of field work for the project. This was augmented by 86 hours of volunteer labour from the CVNS. The volunteer work consisted of removing Scotch broom from the Courtenay River Airpark and the cutting of knotweed along the Courtenay River. In addition the volunteers maintained the signage in the Courtenay River Airpark, performed public outreach and assisted with the prescribed burn.

Because of inherent dangers of working in the estuary proper, this is left for Sellentin's Habitat Restoration team rather than volunteers.

Weed Control

Purple loosestrife - *Lythrum salicaria*

The number of purple loosestrife plants removed this year was 3566 which is an increase from the 2328 plants found the previous year. The numbers although less than a tenth of what they were in 1999 have nonetheless shown a slight increase in the last 3 years. The vast majority of these plants continue to come from Area 6.

Figure 5: Brian Hay removing a purple loosestrife plant

It has been felt that a large seed-bearing plant has been missed and is

continuing to produce seed which is repopulating the area. In fact a very large plant was discovered this year in Area 5. This is upstream from Area 3 and could be a major seed source.

It was speculated in last year's report that many of the new plants were coming from areas where there had been disturbances. The last several winters have seen several severe high water storm events which may have contributed to an increase in the disturbed areas and thus an increase in purple loosestrife plants.

Because of the plant's ability to reproduce from small bits of root, all purple loosestife was disposed of at the Comox Valley Waste Management Centre. This year a total of 510 kg. of purple loosestrife was disposed of in this fashion.

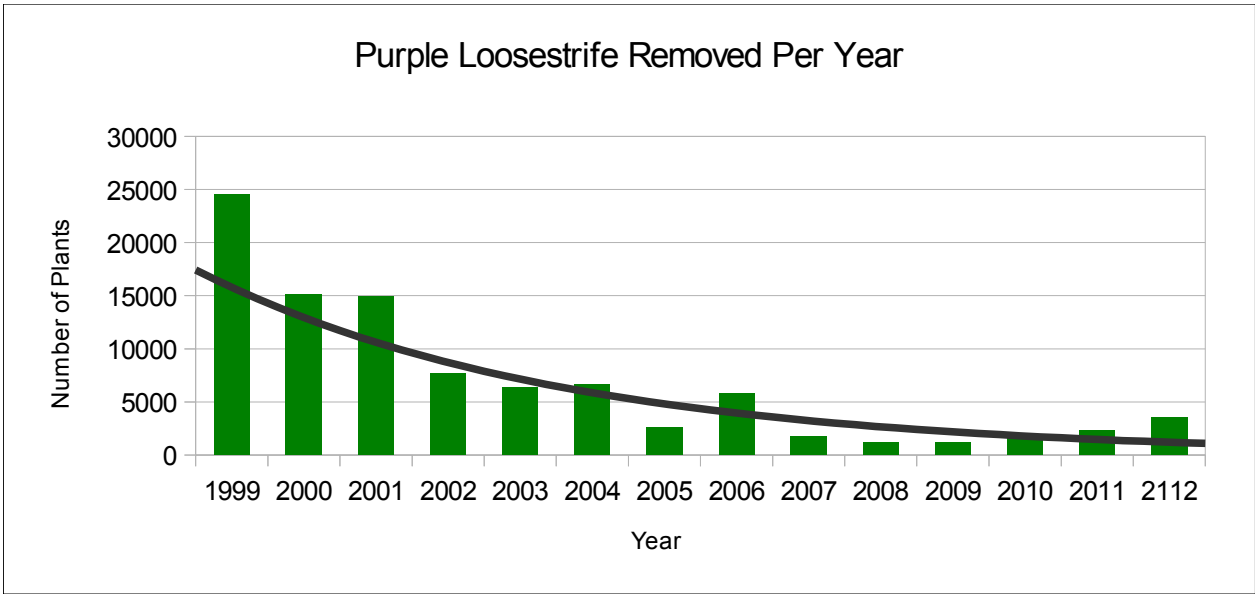


Figure 6: Trend line for Purple loosestrife

Yellowflag Iris - *Iris pseudacorus*

The third highest amount of time for the project is spent removing Yellowflag iris. This is a popular and attractive garden plant. Like Purple loosestrife, however, once released into wetlands it can cause real ecological damage by dominating the site to the detriment of native plants like the bull rush (*Typha spp.)* This is most evident locally in Lazo Marsh, where it constitutes the dominant species in much of the marsh.

We have been removing this plant, which forms large rhizomes, from the Courtenay River estuary for many years. This year a total of 790 kg. were brought to the CV Waste Management Centre for disposal.

Scotch Broom - *Cytisus scoparius*

The control of Scotch broom in the Courtenay River Airpark was done entirely by volunteers from the CVNS.
Within the Comox Valley a new group called the Broom Busters has emerged with the goal of removing broom from roadsides and public places. We have made contact with this group and hope to cooperate and assist them with our shared goals.

Knotweed - *Polygonacae*

The various species of knotweed continue to pose a challenge in their control. There are several species of knot weed found in the Comox Valley and in fact there may be some hybridization between species making the taxonomy difficult. For simplicity I shall refer to them all as knotweed.

The map (Figure 7) shows sites which were chosen for control using a continuous cutting method.
The control of knotweed is made more difficult by their occupation of riparian zone sites. This further limits the tools and techniques which can be used against this invasive plant. In the past we have used cutting in an attempt to weaken the plant and at least control it ability to spread. This has met with only moderate success when plants were cut on a monthly basis. This year some sites were cut nine times during the growing season.
Personal communication with Dave Polster (UVic) indicated that a very disciplined continuous cutting program would assure success.

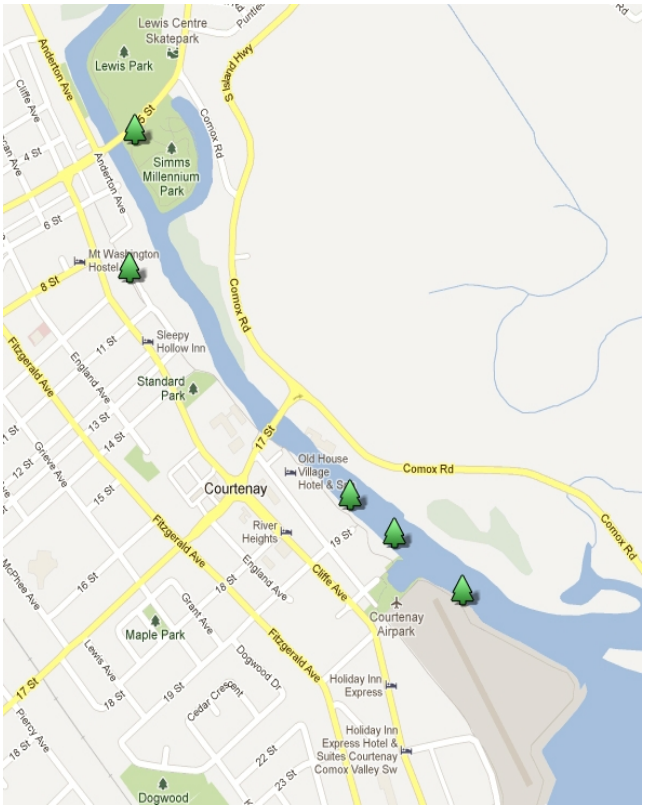


Figure 7: Knotweed control sites

As the adjacent graph shows the plant is attacked when its energy reserves are at their lowest. This starts with the new growth in the spring. Repeated cutting continues to deplete the plants' energy reserves.

To test this we picked five knotweed sites with different amounts of shade and competition along the Courtenay River. Volunteers from within the Comox Valley Naturalists Society adopted a site which they were responsible for cutting on a regular basis. This

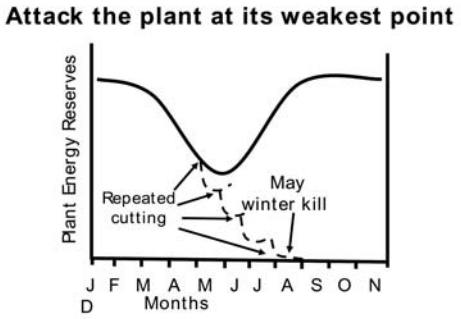


Figure 8: Multiple cuts reduce energy reserves

augmented the work being done by Sellentin's Restoration in other parts of the estuary.

On some of the sites temporary signage was installed to keep the public informed of the problem and the action being taken to address it. (see Appendix 1) The plant is easily cut with hand pruners and care was taken to cut all stems within each site. The cut material was left on site to desiccate and die in the summer sun.

Figure 9: Simms Park, First cut May 2012 volunteer Bill Heidrick

Table 1 on Page 12 lists the different sites with their different characteristics. Although the plant can grow over a wide range of sites, its ability to respond to continuous cutting seems to vary considerably. This small experiment was by no means a rigorous scientific test. Nonetheless it is clear that continuous cutting of the plant can be an effective control technique give certain conditions. If the site is shaded and has well established competition the knotweed can be controlled by continuous cutting. However where the plant is established with no competition and is in full sun this technique is less effective and ultimately some sort of herbicidal treatment may be the only option. The two photos on the right show the Simms Park site which borders a constructed wetland. The site is shaded by planted red alder and black cottonwood. There were very few signs of emerging growth of knotweed by October after being cut back nine times during the growing season. This site will be monitored next year to see if any new growth emerges in the spring.

Figure 10: Ninth Cut Sept 2012 Simms Park

It is troubling to see that this plant is continuing to be spread through poor landscape practices. In Simms Park knotweed could be found emerging from a grass clippings pile deposited in the forested section of the Park. Local governments should train their landscaping crews so they recognize invasive plants and do not aid their spread by mowing and transporting live viable plant material to new sites.

Even more troubling is the continuing illegal dumping of landscape refuse on public property. The photo in Figure 11 shows one site behind the local Dairy Queen. A break in the fence has allowed a landscaper to dump his refuse along the Courtenay River walkway. There are at least 6 different invasive plants including knotweed at this location. A 'No Dumping' sign and better fencing might be a start to addressing this problem.

Figure 11: Illegal dumping behind the Dairy Queen

The 20th Street (Figure 12) site shows some of the problems in controlling an invasive like knotweed in the urban environment. On this site the plant is growing on both sides of the Courtenay River Walkway. On the lower side it is established in the riparian zone of the Courtenay River. Control cutting was done here, with limited effect.

This is due to the root system of the plant which extend under the walkway and into the private land on the upper side. It is clear that for continuous cutting to be effective there can be no outlying connected patches left.

Knotweed roots travel great distances underground and the emerging plant is extremely powerful. Figure 12 shows the plant from the 19th Street site growing on both sides of the walkway. Despite the nine cuttings, control at this site is poor. We feel this can be attributed to the satellite patch on private property on the high side of the River Walkway.

Knotweed is not only a threat to the natural environment but is also damaging to infrastructure. The plant is capable of penetrating paved surfaces and even house foundations. In Illustration 12 young plants can be seen emerging through the pavement next to the retaining wall.

Table 1 summarizes our findings with respect to continuous cutting. This can be an effective control where the patch is isolated from other patches by a distance great enough so that there are no rhizomous connections. Another requirement seems to be that the plant does not totally dominate the site to the exclusion of all competition.

Figure 12: Knotweed extending from private land under the walkway and into riparian zone

Good control was obtained by continuous cutting in Simms Park. Here the knotweed was shaded and facing competition from well established red alder and cottonwood trees. At the other end of the spectrum was the site in the Courtenay Airpark. Here the knotweed is well established with no shade or competition.

	Simms Park	**Central Builders**	**19th Street**	**20th Street**	**Courtenay Airpark**
Shade	heavy	medium	light	medium	none
Competition	heavy	heavy	medium	heavy	none
Substrate	unknown fill	unknown fill	native soil	native soil and rip rap	rip rap
Number of cuts	9	9	9	9	6
Control Effectiveness	good	good	poor	medium	poor

Table 1: Comparison of knotweed control sites.

Prescribed Burn

The Garry oak meadow ecosystem was a great source of traditional food for the First Nations. Perhaps best known were the camas bulbs which provided a source of carbohydrate. In this part of its range the Garry oak meadow is an early successional habitat which slowly gets converted to Douglas-fir forest if succession is allowed to proceed. First Nations peoples prevented this from happening by periodic burnings. This had the effect of killing young Douglas-fir and thereby maintaining the open meadows. Burning had other effects such as releasing nutrients and changing the soil structure.

We had hoped to burn 3 sample plots (8mx8m) this autumn in the Courtenay River Airpark in the autumn of this year. This is very much an experiment as conditions are unlike the historical norms both in terms of soils and existing plants. It is our hope to seed the site post-burning with native seed. We have taken a prudent approach until we can determine how the existing invasive plants on the site will respond to fire or how native seed will react.

Figure 13: Attempted burn at Courtenay River Airpark

The summer drought did not allow a safe burn until mid October. Photos were taken of the plots as well as existing plants noted. A fire permit was obtained from the Courtenay Fire Department, and a crew organized when a small window of opportunity presented itself. Unfortunately a rain shower arrived shortly before we had planned to light up. This dampened the fine fuels sufficiently so that ignition was impossible. It is our hope to attempt this experiment early in the new year.

Because of the location of the site in a city park , extra effort was taken to inform the public what we were doing. The only neighbour to the site, Courtenay Airpark Association, were given a copy of the Burn Plan (Appendix 4) as were the City of Courtenay and the Courtenay Fire Department. Posters were erected around the Airpark and at the request of the City an announcement was made over local radio.

As can be seen in Figure 13 vegetation surrounding the plot was cut and a small fire guard dug. As part of the permit requirements a water pump and hose were on site. Due to the small size of the plots and their location surrounded by the lagoon we are confident that these burns can be done quickly and safely with minimum disturbance to the public.

New Plantings

Each year a small planting project is completed in the Courtenay River Airpark. This is in line with our modest budget but our long-term stewardship plans. The initial goal for this park was to recreate a Garry oak meadow habitat for this area. This is probably unrealistic in light of the many factors both biological and cultural which went into forming these ecosystems. There are many reasons such as the non-native fill type soil on the site, to emerging climate change, which prevents a complex Garry oak ecosystem from being recreated on the site. Nonetheless a simple novel ecosystem capturing some of the characteristics of a Garry oak meadow is not an unreasonable goal for the site. It is towards this end that we now aim.

The Comox Valley is situated in the Coastal Western Hemlock[1](CWH) biogeoclimatic zone. The northernmost extent of Garry oak along the Pacific coast is found here in the Comox Valley. Most of these Garry oak ecosystems on Vancouver Island are found to the south of the Comox Valley in the Coastal Douglas-fir zone. While we have consulted with the Garry Oak Gardener's Handbook[2] in choosing plants we have taken some liberties as not all the plants listed as Garry oak companion plants are suitable for the CWH zone.

The plants added this year are listed in Appendix I. The spring plantings were purchased from Steamside Native Plants in Bowser BC. Camas seed was collected in the estuary from the previous year and spread around many of the Garry oaks. Close to 100 camas bulbs were donated to the project from a plant rescue by Louise Goulet. These were planted in October with the assistance of the Youth for Ecological Restoration.

Figure 14: Youth for Ecological Restoration planting camas bulbs

Large organic debris (LOD) is scattered around all new plantings. The new plantings are mulched with a soil amelerant and a sprinkling of bone meal in the planting hole. Maintenance during the summer drought period consists of weekly watering of the plants installed during the current year. Also the areas around the plants are weeded once during the first year.

Native plant seed was collected this year from Hollyhock Flats and other sites in the Comox Valley. These include the tall camas, Henderson's checker-mallow, chocolate lily, nodding onion and rice root. This seed will be spread early in 2013.

Old Plantings

This year all the Garry oaks over 2 m in height were fertilized in the early spring using tree spikes. Some minor pruning was done on these trees to encourage good form.

1 Green R.N. Klinka K. 1994
2 Goert 2009

As noted in last year's report, a small amount of seeded camas was observed flowering for the first time since being planted in 2007. We are happy to report that this year the number of flowering camas has increased to over 70 plants.

Public Outreach

Signage

No new permanent signage was added this year. However temporary signage was erected at four knotweed sites where we worked this year (Appendix II). Due to the changing weed locations and vandalism we have found this to be a cost effective method of informing the public. Posters were also erected in the Courtenay River Airpark shortly before our proposed prescribed burn.

Community Events

Earth Day this year was celebrated at Lake Trail School. As part of the CVNS booth, the Wetland Restoration Project displayed invasive plants, and distributed brochures on invasive plants and safe alternatives for local gardeners to use.

I had an opportunity to give a presentation on our project at the Garry Oak Gardening Workshop. This was a great opportunity to meet a broad range of both academics and municipal workers from further afield. This lead to the donation of 100 rescued camas bulbs for our project.

Cooperation with other Environmental Groups

Combating invasive plants has attracted the attention of other organizations within the Comox Valley. The CVNS has existed for close to 50 years and takes pride in our close cooperation with other groups with common interests and shared goals. We have loaned out our weed removal tools such as broom pullers and supplied volunteers to both the Comox Valley Land Trust and Mountainaire Avian Rescue in their weed removal projects this year.

We have also met and discussed our common goals with the Broom Busters group, a relatively new organization dedicated to the removal of Scotch broom.

The Youth for Ecological Restoration have participated in our project and helped in the planting of donated camas bulbs in the Courtenay River Airpark.

The Estuary Working Group of Project Watershed has consulted with us on their proposal to modify the culverts draining the Simpson Slough to make them more fish friendly. On a joint field review with Esther Guimond we looked at possible impacts on the Hollyhock Marsh portion of the Courtenay River Estuary.

Newspaper Articles

Two articles were written this year for the local Comox Valley press. One discussed the prescribed burn planned for the Courtenay River Airpark while another discussed the various groups within the Comox Valley fighting invasive plants. These may be found on the website http://www.comoxvalleynaturalist.bc.ca/ under the Wetland Restoration Project on the sidebar.

5 Financial Summary

The 2012 budget is presented in Table 2. The project was slightly smaller than in 2011. Surpluses from the project are placed in a Wetland Restoration fund and not general revenues of the CVNS. This gives us a degree of flexibility to operate the project while waiting for grant monies early in the next spring.

Table 2. 2011 CVNS Wetland Restoration Project Budget

Labour	**Hours**	**Total**
Sellentins Restoration	933.5	19071
CVNS Report	50	1000
Labour Total	983.5	**20071**
Vehicles, transportation, fuel		1530
Plants		442
Insurance		1013
office supplies, postage		26
Soil amendments, Equipment rental		96
Equipment and Materials Total		**3107**
Project Total		**23178**
Project Contributors		**amount**
Comox Valley Regional District		18000
BC Nature		2000
City of Courtenay		2500
Ducks Unlimited Canada		2000
Comox Valley Naturalists Society Wetland Fund		0
Total Project Funds		**24500**
Surplus (2013 Wetland Fund)		**$1,322.00**

Table

It should be noted that the Regional District waives the dump charges at the Comox Valley Waste Management Centre for the plant material that we dispose of there.

6 Conclusions and Future Plans

The Wetland Restoration Project is now over 20 years old. Its longevity is a testament to its importance not just to the CVNS but the community as a whole. Paramount in the fight against invasive species is persistence. Short-term projects are seldom successful when dealing with dynamic biological forces. The combination of this project with a society like the Comox Valley Naturalists is ideal in that it imparts the long-term stability and community partnership necessary for this fight.

This past year we attempted a prescribed burn in the Courtenay Airpark. This generated a great interest within the CVNS and many volunteers came forward, many of whom had valuable experience in the field of fire management. Although this was not successful it is hoped we will be able to attempt this again in the coming spring. Native seed from plants associated with the Garry Oak ecosystem have been collected and will be sown following the burn.

Our new club president has brought a passion for the Garry oak ecosystem. He organized a well-attended workshop this past summer which brought experts to the Comox Valley. I made a short presentation on our Wetland Restoration Project, and met many workers in the field of restoration ecology.

The Comox Valley Regional District started preliminary work this year on the Royston waterfront trail. The Wetland Restoration Project did an inventory of the invasive plants found on the proposed route. With actual construction slated for next year we hope to have a role to play in removing or controlling the invasive plants found on the trail.

This year we did a continuous cutting project on knotweed in a variety of sites. Several members of the CVNS volunteered for this project and were very dedicated. I think we have proven that this can be a viable alternative to herbicide treatment on some sites. Unfortunately there are some sites where herbicide may be the only method of controlling this plant.

The Comox Valley Regional District is in the process of adding more species to its Weed Control Regulation bylaw. Although we are not sure how this will play out in the field in terms of bylaw enforcement it is undoubtedly a step in the right direction.

In terms of purple loosestrife control there has been a slight rise in numbers over the last three years. This has not affected the overall downward trend line and we are hoping that this may be just a slight anomaly.

7 Literature Cited

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Appendix I

Plant List

Courtenay River AirPark 2012

Spring Planting

Plant		Number	Pot Size
Arbutus	*Arbutus menziesii*	1	2 gal
Kinnikinnick	*Arctostaphylos uva-ursi*	10	1 gal
Wild Gooseberry	*Ribes divaricatum*	4	2 gal
Pacific Crab Apple	*Malus fusca*	4	2 gal
Scouler's willow	*Salix scouleriana*	10	1 gal
Red Elderberry	*Sambucus racemosa*	2	5 gal
Licorice fern	*Polypodium glycyrrhiza*	4	2 gal
Tall Oregon Grape	*Mahonia aquifolium*	5	1 gal
Black Twinberry	*Lonicera involucrata*	5	2 gal
White Fawn Lily	*Erythronium oregonum*	3	10 cm

Autumn Planting

Tall Camas	*Camassia leichtlinii*	app. 80	mature bulb
Common Camas	*Camassia quamash*	app. 20	mature bulb

Appendix II

INVASIVE PLANT

Japanese Knotweed (Japanese bamboo)

This plant like many invasives is an escaped ornamental which originated in eastern Asia. Here it is a highly aggressive invader which can dominate riparian zones. It can out compete and eliminate our native species. Note how the salmonberry and other native plants are missing from this section of the river bank.

This plant spreads by deep creeping rhizomes. As can be observed on this site, these are capable of penetrating asphalt. A very small piece of stem or root can start a new plant.

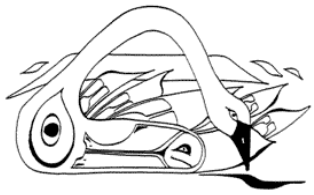
We have been trying to control patches along the Courtenay River for several years by repeated cuttings to weaken it. We have met with only moderate success. Due to its proximity to the water, existing herbicides can not be used at this location.

WHAT YOU CAN DO

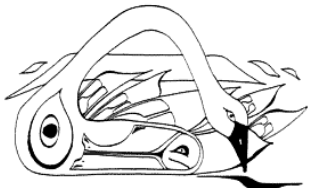
Properly dispose of yard and garden waste. Compost or kill unwanted vegetation. Never throw it on a vacant lot or into waterways.

Report a weed. Inform the Invasive Plant Council of BC if you see new infestations of invasive plants. On line go to "Report-A-Weed" or dial 1-888-WEEDSBC

Comox Valley Naturalists Society
www.comoxvalleynaturalist.bc.ca



Appendix III



Comox Valley Naturalists Society

Burn Plan for the Courtenay River Airpark

Prepared by Frank Hovenden
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OBJECTIVES

Introduction

The Comox Valley is at the northern tip of the range of the Garry Oak Ecosystem in British Columbia. This ecosystem is recognized as one of the most threatened in BC and it is thought that less than 5% of this ecosystem survives in its original state. As most of this ecosystem found in BC is along the Southeastern side of Vancouver Island, it has been subjected to pressure and displacement from agriculture and development.

Historically this ecosystem was associated with First Nations, who utilized it as a food source and maintained it through periodic burnings. Camas is one of the prominent plants associated with this ecosystem. It was relied on as major carbohydrate source and was highly used and traded by First Nations. In order to keep the meadow clear of large conifers like Douglas fir, meadows were historically set afire. This halted the natural succession process and maintained it at an early seral stage conducive for food crops, such as camas.

Approximately 15 years ago the Comox Valley Naturalists Society started a project (Wetland Restoration Project) to create a small Garry Oak meadow on parkland owned by the City of Courtenay in the Courtenay River Airpark. Since that time invasive plants have been removed while shrubs, trees, and forbs associated with the Garry Oak ecosystem have been planted and cared for. The site which was a former sewage lagoon consists of poor soils which in large part is made up of trucked in fill material. There is a deficit of organic matter and as there is no watershed above the site and as a result it is very dry during the summer drought period.

Signage explaining the project as well as identifying native plants have been installed and maintained on the site. Public education is an important component of this project.

Purpose of Burns

We are proposing to burn 3 sample plots within the Courtenay River Airpark. The plots will have different aspects and slope. It is our plan to spread a mixture of native plant seed on the plots in the late Autumn following the burning. We will then monitor these plots and record the vegetation. A preburn inventory will record the plants currently found in the burn plots. Of particular interest will be the invasive species. Long-term monitoring is crucial to see how both native species and invasive

species react to the burning.

METHODOLOGY

The Site

A google map can be viewed at http://goo.gl/maps/JHts1 The burn area is surrounded by the lagoon meaning any escape would have a natural water barrier. There is an unpaved loop trail around this area, which will be blocked by volunteers to prevent the public from venturing too close to the burn plots.

Mechanics

The burn plots measure 8m x 8m and for the most part are vegetated by grasses. There is virtually no large wood debris in these plots. Grass fires typically burn quickly with relatively low intensity. The fire and resultant smoke will be short lived.

Each plot will be burned using a hand-held portable propane torch. Only one plot will be burned at a time.

A minimum of 7 people will be present during the burn.

- Path blocking and public information - 2 to 4
- Ignition and fire control - 3
- Communications - 1
- Post burn monitoring and mop up - 2

Safety

There are inherent risks associated with a prescribed burn. We recognize this and in this operation the safety of the public is paramount.

A valid burn permit issued by the Courtenay Fire Department will be obtained and conditions of this permit will be followed. A cell phone will be on site and the Fire Department will be notified prior to ignition.

The burn will only take place when conditions are such that the chance of an escape is minimal. The forest fire index for Courtenay will be low/moderate or less. Winds should be under 20 Km /hr. The plots will be delineated with flagging tape and 1m buffer around each plot will be cleared using a brush saw. Combustible material within this zone will be placed inside the plots.

A portable pump with sufficient hose to reach the burn areas will be on site. Two backpack sprayers will be used to wet down the perimeter areas.

Public Awareness

Contact with the City of Courtenay, the Courtenay Fire Department and the Courtenay Airpark has been made and each party presented with a copy of this burn plan. Within 48 hours of the burn, posters will be placed in the Airpark to inform the public of our intentions.