

Comox Valley Naturalists Society Wetland Restoration Project Report 2009



Prepared by Juniper Environmental Services

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1 Introduction

The Wetland Restoration Project was initiated by Betty Lunam, a former president of the Comox Valley Naturalists Society (CVNS), with the simple mandate of eliminating an introduced invasive plant, purple loosestrife (*Lythrum salicaria*) from the Courtenay River estuary. As the project has evolved over nearly 20 years since its inception, its mandate has been expanded to include elimination of all invasive non-native plants and the re-establishment of native plant material in the estuary. Over the years, project work has included planting of native species, removal of garbage and debris, and invasive plant inventories sponsored by the Ministry of Transportation and the Inter-Ministry Invasive Plant Committee in 2004/2005. Since 2004, all the invasive plant information collected by the program has been entered into the Ministry of Forests and Range (MFR) database.

In 2008, Ernie Sellentin reported that “Due to the efforts of the CVNS, the CVRD has the highest level of invasive plant inventory and control of any area on Vancouver Island and the mainland coast.” The CVNS undertakes this work in cooperation with local governments, and with the help of contractors and volunteers; this statement speaks to the commitment, hard work, and passion of the project’s many participants over the years.

The rationale behind this project has been well documented in previous Wetland Restoration Program annual reports. The 2008 annual report discusses the serious threat presented by invasive alien species - for biodiversity, species survival, and the viability of ecosystems and protected areas. The 2008 report provides a list of the most common invasive plant species - by occurrence and area covered - within the Comox Valley Regional District. While some species, such as Scotch Broom are considered to be established in the region, the author highly recommends that managers coordinate efforts to control invasive plant species long before the establishment phase, when the costs become excessively prohibitive. For example, knapweeds, knotweeds, and Giant Hogweed were considered at that time to be “on the verge of the explosion phase;” therefore, prime candidates for dedicated partnership efforts.¹

The purpose of this report is to document the work completed in 2009 including: species and areas of focus; results and management recommendations for focal species; financial details; and general project recommendations.

¹ Sellentin’s Habitat Restoration & Invasive Species Consulting Ltd. (2008). *Comox Valley Naturalist Society Wetland Restoration Project Report 2008*.

2 Summary of Work Completed

This year, work was conducted in seven of the eight main control areas that are identified in the 2008 report. These areas are described below² and displayed in Figure 2.

- Area 1: Comox Bay Farm to Barry Farm
- Area 2: Dyke Road Slough (Simpson and Barry Farms)
- Area 3: Courtenay River Estuary West (the west side of the Courtenay River and Estuary from the Airpark Marina to Millard/Piercy Estuary)
- Area 4: Courtenay River Channel (both sides of the Courtenay River from the bend at Lewis Park, to the Airpark Marina)
- Area 5: Courtenay River North (from the bend in the Courtenay River at Lewis Park up past the confluence of the Puntledge and Tsolum Rivers - includes the Old Tsolum Channel)
- Area 6: Courtenay River Estuary East (the east side of the Courtenay River and Estuary, south of the old sawmill site and extending to the bird viewing platform on Dyke Road)
- Area 7: Glen Urquhart Creek Watershed (from Williams Road, to the storm water detention pond below Malahat Drive).

Crews did not work in Area 8, the Stapley Road Wetland, but did conduct a couple of spot removals of invasive plants in areas beyond the seven listed above, responding to requests from the CVNS and from the Comox Valley Regional District (CVRD). 743.8 hours (99.2 work days)³ were spent removing and disposing of invasive plant materials. A total of 1550 kg of invasive plant material was removed from the project area and disposed of at the landfill; this weight consisting mainly of Japanese Knotweed, Purple Loosestrife, Yellow Flag Iris, and Himalayan Balsam and some amount of other priority species (details in Section 3 below). Scotch Broom and Himalayan Blackberry are left at or near the site of removal, to decompose into the soil.

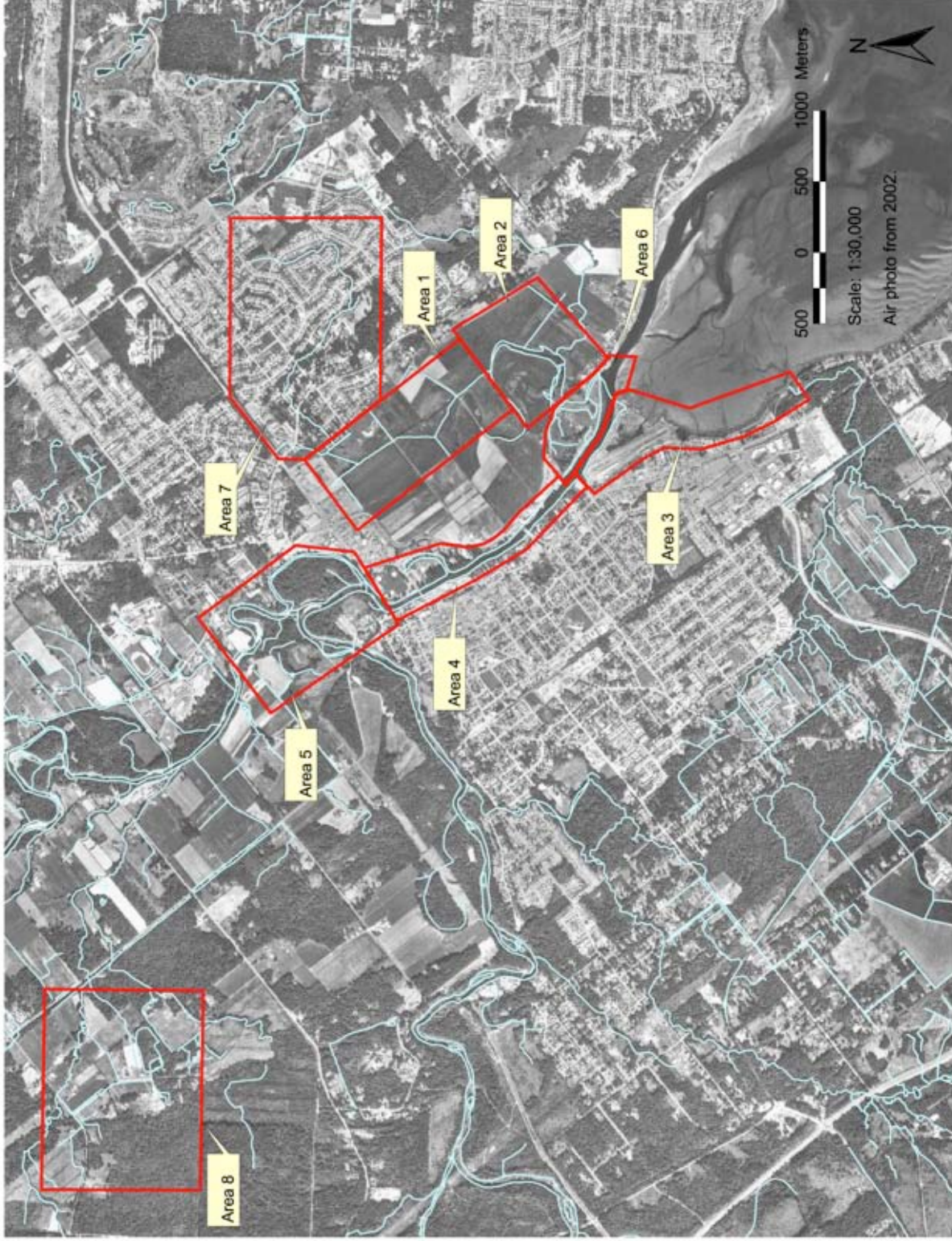
Figure 1. Invasive Plant Control Schedule for Top Six Focus Species in 2009.

Purple Loosestrife													
Yellow Flag Iris													
Knotweed (control sites)													
Himalayan Blackberry													
Scotch Broom													
Himalayan Balsam													
	Apr 16-31	May 1-15	May 16-30	Jun 1-15	Jun 16-30	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sept 1-15	Sept 16-30	Oct 1-15	Oct 16-31
		Begin control in 2010											

² Names for the seven main control areas were modified in 2009 in an attempt to better describe them for future management and reporting.

³ Hours are divided by 7.5 to provide the number of work days.

Figure 2. Overview of Wetland Restoration Project Areas (control conducted in Areas 1 to 7 in 2009)



3 Invasive Plant Removal Results and Recommendations

Detailed results and recommendations for Purple Loosestrife, Yellow Flag Iris, the Knotweeds, Himalayan Blackberry, Himalayan Balsam and other species of concern are provided below. The maps in Section 8 of this report show the locations of plants removed this year and priority areas for future control efforts.

3.1 Purple Loosestrife (*Lythrum salicaria*)

Both the amount of time spent on control 131.8 hours (17.6 days) and the numbers of loosestrife removed (1160 plants) in 2009, are down from 2008 (136.5 hours/18.1 days and 1204 plants). These numbers contribute to the downward trend in loosestrife occurrence in the project area since 1999. Table 2 below, shows the days spent on loosestrife removal in each of the main control areas; the amount of time spent in each area can be used as a guide to the relative densities of loosestrife found in each of these areas.

All of the loosestrife plants were found in Areas 1 to 7, with the exception of two plants that were removed from the ditch beside Topland Road. Area 6 (Courtenay River Estuary East Side) continues to have the highest numbers of loosestrife plants, with high densities of immature plants emerging wherever soil has been exposed. Especially large plants were removed from the Dyke Road Slough (Area 2), the Old Tsolum Channel (Area 5) and from the ditch along Topland Road. No loosestrife plants were found this year in the Simms Millenium Park/Courtenay Slough (within Area 4) or along the shoreline from the Airpark Marina to the Millard Piercy Estuary (in Area 3). These areas must continue to be checked however, to look for new plants that might emerge from the existing seed bank or germinate from seeds or plant parts washed downstream.

		Days	Days	Days	Days	Days	Days	Days	Days	Days	Days
Area	Name⁴	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Comox Bay Farm	18	8.1	5	5.5	2.9	4.3	1.6	3.5	1.07	2.0
2	Simpson & Barry Farms	5	1.8	1.3	5.1	3.2	1.2	1.9	2.7	0.87	1.2
3	Airpark & Walkway (Courtenay River Estuary West Side)	4	0.9	3.1	3.3	3.5	0.8	3.3	1.6	2.53	1.1
4	Courtenay River (Courtenay River Channel)	2	5.4	3.9	7.9	2.6	4.7	1.6	2.3	2.40	0.7
5	Lewis Park (Courtenay River North)	15	27.9	14.8	12.8	16.5	14.1	6.1	8.3	2.53	1.9
6	Estuary (Courtenay River Estuary East Side)	64	22.2	15.8	19.5	19.9	20.2	16.7	10.0	7.47	10.1
7	Malahat Drive (Glen Urquhart Watershed)	1	0.5	0.8	0.4	0.9	0.7	1.5	1.3	0.53	0.5
8	StapleyRd/ Camp River/Seal Bay Park				3.9	3.6	0.0	1.8	0.7	0.67	0
other	Topland Road										0.1
	Totals	109	66.8	44.6	58.3	53	46	34.5	31.7	18.07	17.6

Management Recommendations

Continue to check all control areas thoroughly.

3.2 Yellow Flag Iris (*Iris pseudacorus*)

A total of 71.8 hours (9.5 days) were spent to remove Yellow Flag Iris this year, which is a decrease from 102.5 hours (13.6 days) spent in 2008. Area 6 (Courtenay River Estuary East Side) continues to have the highest numbers of Yellow Flag plants, with higher densities of immature plants found wherever soil has been exposed. Yellow Flag was also found in Area 5 in the Old Tsolum Channel and wetland. Although Area 3 was searched thoroughly along the shoreline between the Airpark Marina to the Millard/Piercy Estuary, no Yellow Flag were found in this section. One Yellow Flag was pulled from the storm drain detention pond in Hurford Hill

⁴ Names for the seven main control areas were modified in 2009 in an attempt to better describe them for future management and reporting.

Park (Area 7). Most of the plants found this year were well hidden in the understory of shrubs and amongst Reed Canary Grass.

Area	Name	Days 2009
3	Courtenay River Estuary West Side	1.1
5	Courtenay River North	1.2
6	Courtenay River Estuary East Side	7.1
7	Glen Urquhart Watershed	0.1
	Totals	9.5

Management Recommendations

Continue to check all control areas thoroughly.

3.3 Japanese and Giant Knotweed (*Fallopia japonica* and *F. sachalinense*)

As documented in the 2008 annual report, knotweeds are spreading rapidly in the Comox Valley wetlands and riparian areas, with 34 known sites located along the Courtenay and Tsolum Rivers and in the Courtenay River estuary.⁵

This year, the project tackled the Japanese Knotweed growing in Area 3 along the Courtenay River, from south of the Airpark Marina to the south end of the Airpark runway. The intention was to test the effectiveness of manual control by cutting - at three control sites – in reducing the vigour of the plants and preventing their spread.

Advice and resources from the Coastal Invasive Plant Council, confirmed that manual removal of the plant is currently the best option where it is growing amongst the rip-rap inside the riparian zone of the Courtenay River. Although covering and sealing the control site is generally recommended after cutting, this follow-up method was not considered to be viable due to the location of the sites on the river bank. It is generally expected that knotweed eradication without the use of herbicide can take 20 years or more, since knotweed can enter a 20-year dormancy period if threatened too heavily.⁶

Starting on May 27, crews cut down three established patches along the Airpark walkway between the airplane ramp and the north end of the runway. The total weight of this first cut was 600 kg and took 34.8 hours (4.6 days). Over the field season, a total of 94.8 hrs (12.6 days) were spent carefully clipping (using sequiters), bagging and removing all plant parts for disposal at the landfill. It is estimated that 1000 kg of plant material was removed from the three control sites over the summer.

⁵ Sellentin’s Habitat Restoration & Invasive Species Consulting Ltd. (2008).

⁶ Resources from the Coastal Invasive Plant Council of BC. (November 21, 2008). *Non-Herbicidal Knotweed Eradication and Manual/Mechanical/Chemical – Knotweed Control Recommendations*.

Table 3. Japanese Knotweed Control at Three Established Sites in Area 3 - Time and Weight Results		
Removal Date/Period	Time (Days)	Estimated Weight (kg)
May 27 – June 5 2009	4.6	600
June 18 2009	0.8	80
July 2 – 9 2009	1.2	60
July 22 2009	1.8	100
August 7 2009	2.4	80
September 2 – 4 2009	1.8	80
Totals	12.6	1000

The table above shows the increase in the amount of time required after the second cutting session and until the fifth session in August. The increase was due to the increasing proliferation of stems, which was a very noticeable response of the plant to our control measures. The amount of time required peaked during the August session, indicating that stem proliferation began to slow after this time.

The six control sessions, with crews working right next to this highly traveled section of the Airpark walkway, provided many excellent opportunities to educate members of the public about Japanese Knotweed: the threat it presents to our native ecosystems and what can be done to prevent it from spreading. On June 4th and 5th, the crew handed out brochures and educational materials from the Invasive Plant Council of BC and on September 4th the crew spoke with over 20 people who stopped to inquire about our work.

In Area 5, one new patch (4 stems) was removed down channel from the previously inventoried knotweed patches in the Old Tsolum River Channel.

Management Recommendations:

This year 12.6 days were dedicated to cutting and removing plant material from three control sites, and near the end of the field season a fourth patch of Japanese Knotweed was found just south of the airplane ramp. Next year cutting needs to be started in April or as soon as the plants appear, and this fourth patch should be added to the control sites. The areas surrounding and downstream of the control sites must be checked regularly for new growth. Manual removal of Japanese Knotweed by cutting is very time and energy consuming, and more importantly, it carries the risk that any overlooked plant fragment could wash into the river and re-establish downstream. It is recommended that optional control methods - such as use of a propane weed torch and/or an industrial steam cleaner - be explored for next year. Unfortunately, initial inquiries to the Coastal Invasive Plant Council did not turn up any case studies for these methods.

There is a large patch of Japanese Knotweed growing at the top of the northwest facing slope at the south end of the Airpark runway. This patch is starting to spread downslope toward the native plantings and should be controlled regularly by cutting with a mower or weed eater.

The project should continue to take advantage of the educational opportunities created through working in this high profile area. Educational signage or notice boards along the walkway, and increased use of brochures/handouts⁷ and press releases, are recommended.

3.4 *Himalayan Blackberries (Rubus discolor)*

A total of 240.5 hours (32.1 days) were spent on controlling Himalayan Blackberry in 2009, with 2.6 hectare area covered (this includes the approximately 2 hectare native plant restoration area at the Courtenay River Airpark).

Area	Name	Days (2009)	Hectares (ha)
3	Courtenay River Estuary West Side	16.7	2.1
6	Courtenay River Estuary East Side	15.4	0.5
	Total	32.1	2.6

Himalayan Blackberry removal in Area 3 was focused on the CVNS’ native plant restoration area at the Courtenay River Airpark where intensive control of blackberry and broom has been conducted by project crews over the years. The positive results of this work are evidenced by weakened new growth of invasive blackberry and the increasing growth and spread of native plants.

In Area 6, follow-up removal was conducted in areas that have been cleared by crews in previous years, and three new areas targeted for removal.

Management Recommendations:

Himalayan Blackberry continues to be a major threat to native plants in the estuary. Although an attempt has been made to remove all roots during clearing this year and in previous years, complete removal will require continued visits. Control of Himalayan Blackberry along Glen Urquhart Creek – especially downstream from Hurford Hill Park – will be necessary next year in order to make it passable for field workers. This work will require advance notice to the landowners living adjacent to Glen Urquhart Creek.

3.5 *Scotch Broom (Cytisus scoparius)*

61.5 hours (8.2 days) were spent on controlling Scotch Broom, all within Area 3. In addition to their work in the 1.5 ha native plant restoration area, the crew removed broom growing inside the Airpark along the edge of the runway, with permission from the Airpark Board. Many large mature broom plants were removed and plant debris was piled along the bank of the lagoon, in order to provide some shelter and barrier for birds.

⁷ Such as the Invasive Plant Council of BC handout: *Targeted Invasive Plant Solutions (T.I.P.S.) # 16: Invasive Knotweeds.*

Management Recommendations

Plantings of native species along the bank of the lagoon are recommended, to assist in re-establishing the hedge-row where broom has been removed.

3.6 Himalayan Balsam (*Impatiens glandulifera*)

The number of Himalayan Balsam plants found and the time dedicated to removing them, increased from last year. A total of 4830 Himalayan Balsam plants were removed this year, with 50.0 hours (6.7 days) dedicated to removal. This is up from 2005 plants removed over 26 hours (3.5 days), in 2008.

Year	2006	2007	2008	2009
No. Plants Removed	99110	11061	2005	4830

Area No.	Area Name	Days 2009
1	Comox Bay Farm	0.6
4	Courtenay River Channel	0.3
5	Courtenay River North of Lewis Park	4.5
7	Glen Urquhart Watershed	1.3
	Total	6.7

Although the numbers of Himalayan Balsam plants in Area 5 at the Old Tsolum Channel have dropped significantly,⁸ several new large patches were found: in Area 5 on the bank of the Courtenay River approximately 60 metres upstream from the mouth of the Old Tsolum Channel; in Area 7 at the Glen Urquhart Watershed below Chaster Road; and in Area 4 - three patches on the west bank of the Courtenay River between the 5th Street and 17th Street bridges. There is a very large area of Himalayan Balsam growing on private property in the headwaters of Chile Creek, which may be contributing seeds to lower reaches of the Tsolum and Courtenay Rivers.

Management Recommendations:

Outreach is needed to landowners who are actively cultivating Himalayan Balsam in private gardens within the project area. Requests to access private properties for invasive plant removal would likely be more effective if they were to originate from local governments. These requests would need to be issued early in the field season. Removal of this plant needs to wrap up before mid-August; by August 25 of this year the plants were throwing seeds.

⁸ Personal communication: Graham Hilliar, 2009.

3.7 Other Species of Concern

31.3 hours (4.2 days) were spent removing other invasive species of concern from within the project area this year.

3.7.1 Giant Hogweed (*Heracleum mantegazzianum*)

Two Giant Hogweed plants were found and removed this year. One was removed from Area 3 - the edge of the Airpark Walkway at the south end of the runway - and the other was removed from the southeast property corner at 2703 Dyke Road (the old Lafarge cement tower site).

Management Recommendations:

Next year, both sites and surrounding areas must be checked in the late spring and periodically throughout the field season.

3.7.2 Morning Glory (*Convolvulus arvensis*)

Several patches of Morning Glory/Field Bindweed were noted in Area 6. Where it is growing in the open area of the estuary, Morning Glory is beginning to inhibit the growth of the native wetland plants. The crew concentrated removal efforts in a couple of areas, working to remove vegetative growth and as much of the root as possible.

Management Recommendations:

It is recommended that control of Morning Glory within the estuary is made a priority, before it becomes impossible to control.

3.7.3 Knapweed (*Centaurea spp.*)

An estimated 30 to 40 knapweed plants were found in Area 3 at the Airpark lookout hill.

Management Recommendations:

Ongoing control efforts are required.

3.7.5 Nightshade (*Solanum spp.*)

Solanum was found in the Slough (Area 2) and in the ditches that run through Area 1. Crews this year looked for the source of this plant in the upper reaches of the Glen Urquhart Watershed. Unfortunately, downstream from Hurford Hill Nature Park, the creek was impassable due to overgrowth of Himalayan Blackberry. It is thought that the *Solanum* originates somewhere along this creek between 10th Street East and Chaster Road.

Management Recommendations:

The section of Glen Urquhart Creek between 10th Street East and Chaster Road needs to be traversed early in the summer in order to locate the source of *Solanum*. Control of Himalayan Blackberry along the creek is needed to make it passable. Advance notice to the landowners living adjacent to Glen Urquhart Creek would increase safety for crews traversing the creek.

3.7.6 Sow thistle (*Sonchus spp.*)

Sow-thistle is growing in Area 6, in diffuse patches that seem to reflect the spread of seed by wind. No Sow thistle was removed by the crew this year; however flower heads were picked and bagged whenever possible.

Management Recommendations:

Investigation is needed to determine if this is a perennial or annual species of Sow thistle (both are listed on E-Flora),⁹ to assess the level of threat this plant poses to wetland environments, and to develop a control strategy.

4 Site Maintenance Results and Recommendations

Maintenance of the native plant restoration area at the Courtenay River Airpark was ongoing throughout the field season beginning in May with broom and blackberry removal. Brush cutting of Common Tansy was carried out between July and October, to reduce the spread of this plant by seed. In September, the crew worked again to remove blackberry and broom re-growth. Any bare soil patches that were created from this work and any devegetated areas were seeded with a mix of Slender Wheatgrass (*Agropyron trachycaulum*)¹⁰ and Tufted Hairgrass (*Deschampsia cespitosa*).¹¹ Also in September, Purple Camas and Death Camas seeds were spread in the area surrounding the lookout hill. The City of Courtenay donated a truck load of Sky-Rocket mulch in early October and this was spread around native plantings in two main areas (see Section 8.12).

Management Recommendations:

With a few exceptions, the native plantings were observed to be in healthy condition - especially Oregon Grape, Common Snowberry and Nootka Rose, which are producing new vegetative growth around the parent plants. No watering was done by the crew this year, as mostly all of the native plantings are considered to be mature enough to grow independently. However, some of the plants, such as those on the southeast facing side of the lookout hill, could use extra water and mulch over the summer as they were looking particularly stressed from exposure and drought. The native plantings that didn't receive mulch in 2009 would benefit from a layer of mulch applied early next year. The comfrey growing near the south end of the runway is a rich source of green manure that can be used for mulch, but the leaves must be harvested well before the plant produces seeds.

⁹ Perzoff, Tania. 2009. Invasive, Noxious and Problem Plants of British Columbia (September, 2009). In: Klinkenberg, Brian. (Editor). 2009. E-Flora BC: Atlas of the Plants of British Columbia [www.eflora.bc.ca].

¹⁰ Pojar, J. and Mackinnon, A. (Eds.) (1994). *Plants of Coastal British Columbia including Washington, Oregon and Alaska*. Canada: BC Ministry of Forests and Lone Pine Publishing (p.362)

¹¹ Ibid (p 384).

5 Financial Summary

The 2009 budget and project time allocation details are provided below (Table 7 and Figure 3 respectively).

Descriptor	Hours (Days)	Rate	Total
Project Management and Field Supervision	459.40 (61.3)	22.52	10345.23
Field work	236.00 (31.5)	18.50	4366.00
Field work	178.50 (23.8)	17.00	3034.50
Field work	71.50 (9.5)	12.00	858.00
<i>Subtotal</i>	<i>945.40 (126.1)</i>		<i>18603.73</i>
GST			930.19
Labour Total			19533.92
Descriptor	Days	Rate	Total
Equipment Purchase	n/a	Var.	1421.34
Truck Rental	1	31.53/day	31.53
Fuel	n/a	Var.	24.87
Canoe Rental	2	25.00	50.00
Trailer Rental	5	15.00	75.00
Mileage	989 km	\$0.45/km	445.05
Equipment and Materials Total			2047.79
Project Total			21581.71

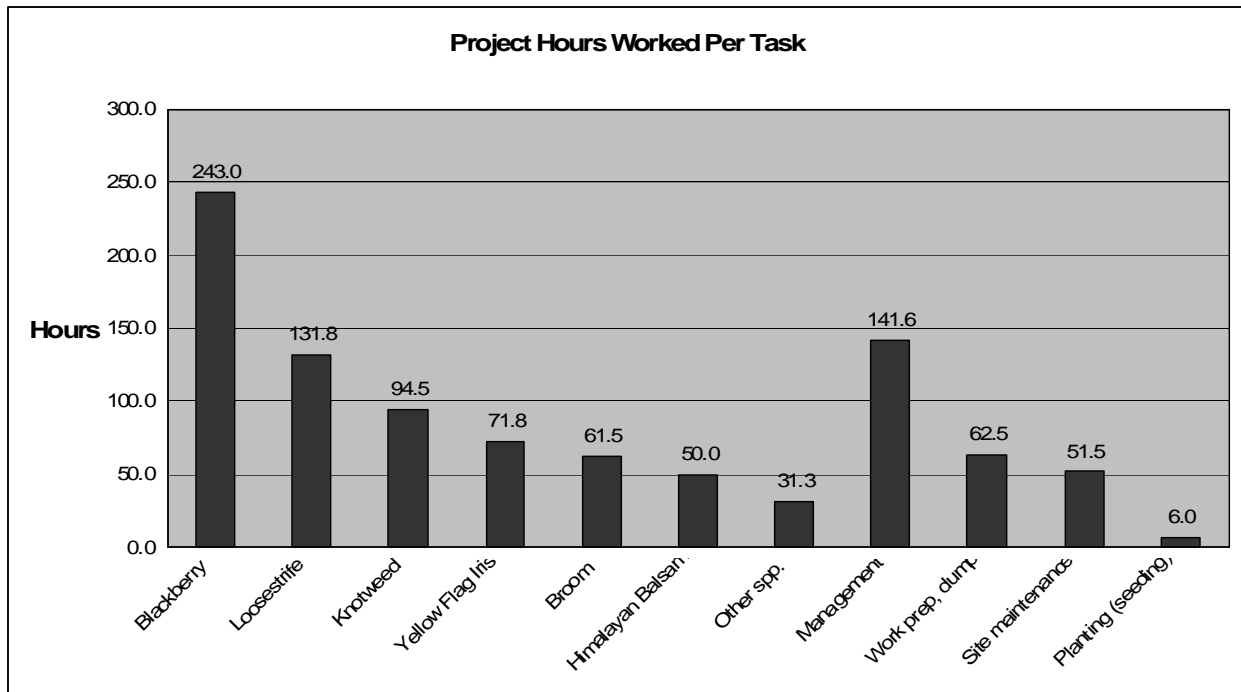
Project Contributors	Amount
Comox Valley Regional District	18000.00
BC Nature	1500.00
City of Courtenay	2500.00
Ducks Unlimited	2000.00
Total Project Funds	23000.00

This year, \$1421.34 was spent to purchase the following equipment for the project:

- Long-handled loppers (1)
- Ratcheting loppers (1)
- Sequiters (2)
- Short-handled, 3-pronged mattock (3)
- Machete (2)
- Brush cutter/weed eater (1)
- Metal tally counters (3)
- Re-useable plant bags (50)

In addition, the project purchased one 10 pound (lb) bag each of Tufted Hairgrass and Slender Wheatgrass for re-seeding exposed soil.

Figure 3. Project Hours Worked Per Task



*Management includes hiring, record keeping, equipment purchase, public relations, research and report writing.

6 General Project Recommendations

The following general recommendations are suggested to improve the project next year, by increasing public understanding and support for the project and increasing crew safety and efficiency.

- Install signs at either end of the Airpark walkway, describing the work of the Wetland Restoration Project and the importance of invasive plant control.
- Where significant patches of invasive plants have been identified, conduct outreach to private landowners, requesting access for removal/restoration works.
- Submit press releases to the local papers in advance of crews working along Glen Urquhart Creek, in order to alert private landowners living adjacent to this watercourse.
- Develop an adopt-a-plant program – similar to the bench dedication program. High numbers of people enjoy using the Airpark, and this may be a successful way to engage them in the project.
- Develop a map of the native plant restoration area, detailing the locations and names of species planted by the project over the years.
- Install port-a-potty at south end of the Airpark walkway during the field season.

- Establish permanent photo sites within the native plant restoration area, to be monitored annually. This would allow the CVNS to monitor changes over time and would assist in communicating the success of the project to the public and funders.

7 Conclusion

















The CVNS Wetland Restoration project is making critical progress in protecting and restoring native habitat within the main control areas. This year, the crew was able to respond quickly to remove two new Giant Hogweed plants that were observed and reported to us. Ongoing efforts are needed so that the project continues its progress in controlling Purple Loosestrife, Yellow Flag Iris, Himalayan Blackberry and Himalayan Balsam in the Courtenay Estuary and surrounds. In particular, the number of Himalayan Balsam plants found and removed by the crew this year was double that of last year. Some large patches of Himalayan Balsam have been identified on private property and are therefore not accessible without focused landowner outreach. Himalayan Blackberry has become so dense in the Glen Urquhart Watershed that some sections of the creek have become nearly impassable for survey (e.g. from Hurford Hill Nature Park to the Back Road). Regular control of Japanese Knotweed at the Airpark sites should be continued; however, the level of care needed to control knotweed that is growing adjacent to a watercourse cannot be stressed enough. Although manual cutting of these plants is currently considered to be the best method, the project should continue to communicate with other agencies, such as the Invasive Plant Council of BC, to ensure that new information is incorporated into control strategies. Increased outreach by the project - to educate the public about the dangers of invasive plants and the high vulnerability of the project area to upstream activities - is recommended.

Thank-you to the Comox Valley Naturalists Society and this year's funders of this valuable project: Comox Valley Regional District, BC Nature, City of Courtenay and Ducks Unlimited.

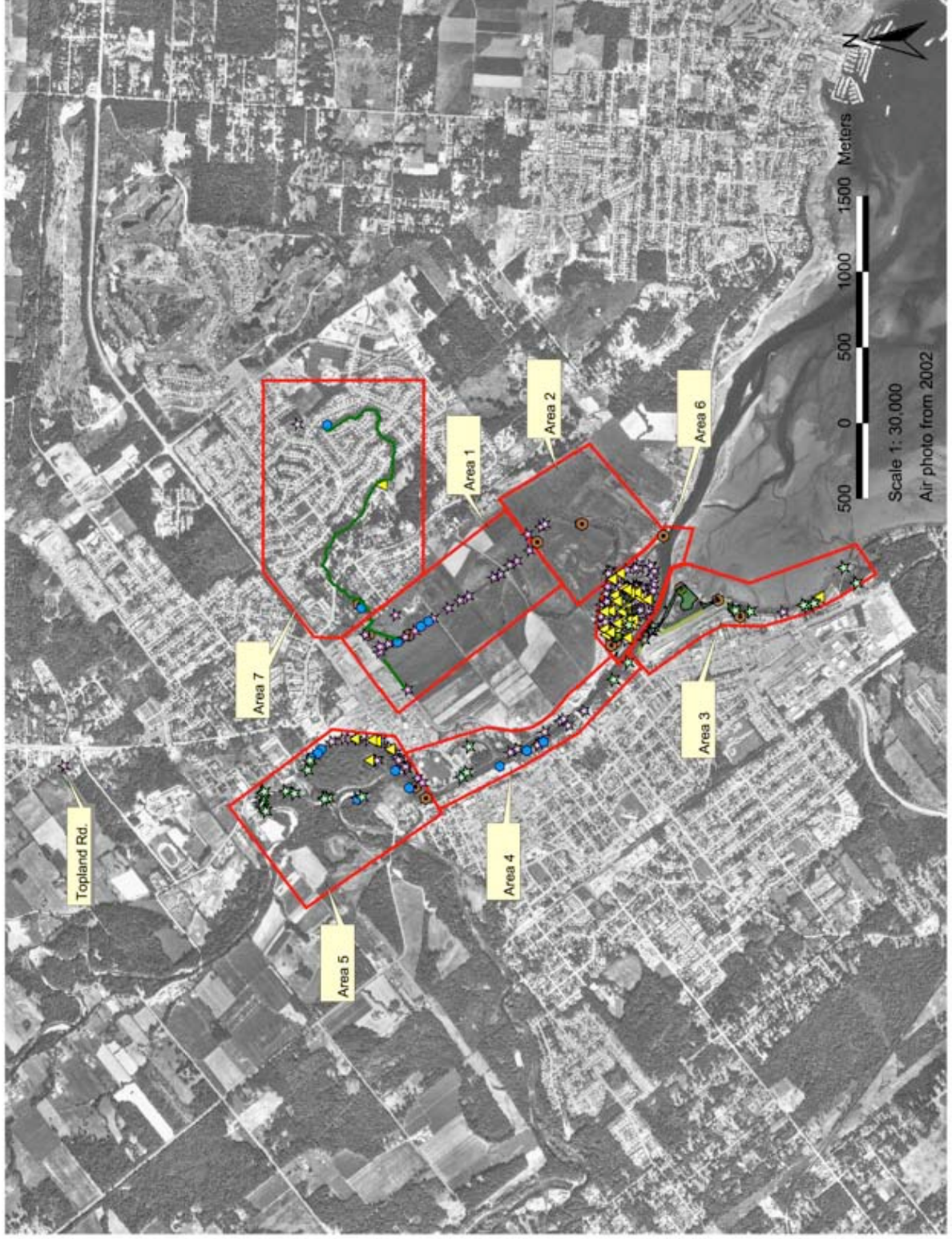
8 Maps

The maps below show the locations of invasive plants removed this year and priority areas for future control efforts. All areas should be thoroughly checked in 2010, to check for new plants that might emerge from the existing seed bank or germinate from seeds or plant parts washed downstream.

8.1 Map Legend

Legend			
	Purple Loosestrife		Other species of concern
	Yellow Flag Iris		Morning Glory patches
	Knotweed		Sow thistle distribution
	Knotweed control sites		Area spot seeded with native grasses
	Himalayan Blackberry cleared		Area spread with Sky Rocket mulch
	Himalayan Blackberry - high density areas identified for clearing in 2010		Area seeded with Purple & Death Camas
	Himalayan Balsam patch		Invasive plant removal areas
	Scotch Broom cleared		Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.2 Overview



8.3 Area 1



Legend			
☆	Purple Loosestrife	●	Other species of concern
▲	Yellow Flag Iris	○	Morning Glory patches
☆	Knotweed	●	Sow thistle distribution
☆	Knotweed control sites	□	Area spot seeded with native grasses
■	Himalayan Blackberry cleared	▨	Area spread with Sky Rocket mulch
⚡	Himalayan Blackberry - high density areas identified for clearing in 2010	▨	Area seeded with Purple & Death Camas
●	Himalayan Balsam patch	□	Invasive plant removal areas
⚡	Scotch Broom cleared	~	Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.4 Area 2



Legend	
☆ Purple Loosestrife	● Other species of concern
▲ Yellow Flag Iris	○ Morning Glory patches
☆ Knotweed	● Sow thistle distribution
☆ Knotweed control sites	□ Area spot seeded with native grasses
□ Himalayan Blackberry cleared	□ Area spread with Sky Rocket mulch
✓ Himalayan Blackberry - high density areas identified for clearing in 2010	□ Area seeded with Purple & Death Camas
● Himalayan Balsam patch	□ Invasive plant removal areas
✓ Scotch Broom cleared	~ Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.5 Areas 3 and 6



Legend	
☆	Purple Loosestrife
▲	Yellow Flag Iris
☆	Knotweed
☆	Knotweed control sites
■	Himalayan Blackberry cleared
■	Himalayan Blackberry - high density areas identified for clearing in 2010
●	Himalayan Balsam patch
~	Scotch Broom cleared
●	Other species of concern
○	Morning Glory patches
●	Sow thistle distribution
■	Area spot seeded with native grasses
■	Area spread with Sky Rocket mulch
■	Area seeded with Purple & Death Camas
■	Invasive plant removal areas
~	Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.6 Area 3 (south section)

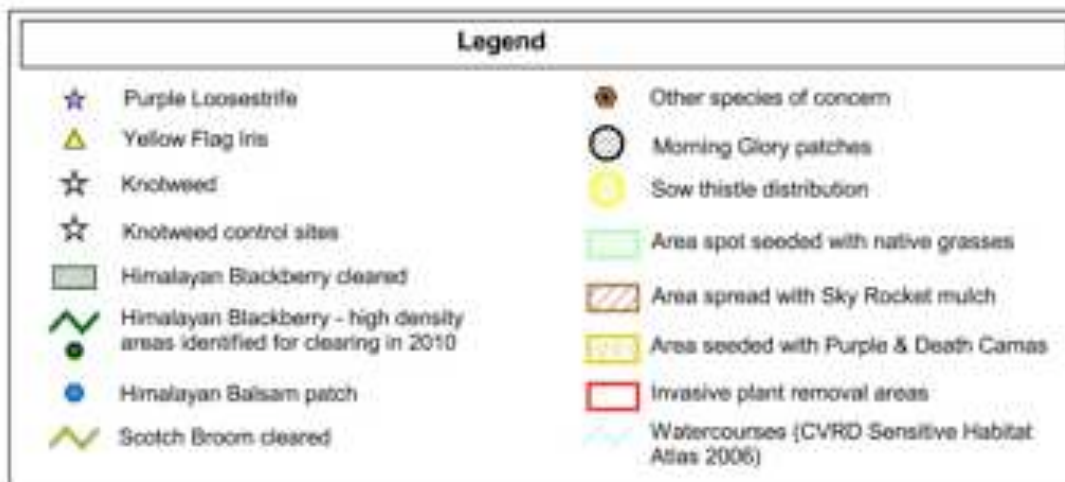


Legend	
☆ Purple Loosestrife	● Other species of concern
▲ Yellow Flag Iris	○ Morning Glory patches
☆ Knotweed	● Sow thistle distribution
☆ Knotweed control sites	□ Area spot seeded with native grasses
■ Himalayan Blackberry cleared	▨ Area spread with Sky Rocket mulch
✓ Himalayan Blackberry - high density areas identified for clearing in 2010	▨ Area seeded with Purple & Death Camas
● Himalayan Balsam patch	□ Invasive plant removal areas
⚡ Scotch Broom cleared	~ Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.7 Area 4 (north section)



8.8 Area 4 (south section)



8.9 Area 5



Legend	
☆ Purple Loosestrife	● Other species of concern
▲ Yellow Flag Iris	⊙ Morning Glory patches
☆ Knotweed	● Sow thistle distribution
☆ Knotweed control sites	□ Area spot seeded with native grasses
□ Himalayan Blackberry cleared	▨ Area spread with Sky Rocket mulch
▲ Himalayan Blackberry - high density areas identified for clearing in 2010	▨ Area seeded with Purple & Death Camas
● Himalayan Balsam patch	▭ Invasive plant removal areas
▲ Scotch Broom cleared	~ Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.10 Area 7



8.11 Areas 3 and 6 - Blackberry & Broom Removal & Priority Areas 2009



Legend			
☆	Purple Loosestrife	●	Other species of concern
▲	Yellow Flag Iris	○	Morning Glory patches
☆	Knotweed	●	Sow thistle distribution
☆	Knotweed control sites	□	Area spot seeded with native grasses
■	Himalayan Blackberry cleared	▨	Area spread with Sky Rocket mulch
■	Himalayan Blackberry - high density areas identified for clearing in 2010	▨	Area seeded with Purple & Death Camas
●	Himalayan Balsam patch	□	Invasive plant removal areas
■	Scotch Broom cleared	—	Watercourses (CVRD Sensitive Habitat Atlas 2006)

8.12 Area 3 Native Plant Restoration Area – Maintenance 2009



Legend			
☆	Purple Loosestrife	⦿	Other species of concern
▲	Yellow Flag Iris	○	Morning Glory patches
☆	Knotweed	●	Sow thistle distribution
☆	Knotweed control sites	□	Area spot seeded with native grasses
■	Himalayan Blackberry cleared	▨	Area spread with Sky Rocket mulch
✓	Himalayan Blackberry - high density areas identified for clearing in 2010	■	Area seeded with Purple & Death Camas
●	Himalayan Balsam patch	□	Invasive plant removal areas
~	Scotch Broom cleared	~	Watercourses (CVRD Sensitive Habitat Atlas 2006)