Comox Valley Naturalists Society
Wetland Restoration Project Report 2010

Prepared by Juniper Environmental Services
December 2010

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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.

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 Project annual reports. The 2008 annual report provides details about the serious threat presented by invasive alien species - for biodiversity, species survival, and the viability of ecosystems and protected areas. A list of the most common invasive plant species within the Comox Valley Regional District - by number of occurrences and area covered – is provided. Each of these plants is considered to be at a different stage of invasion, from Introduction, to the Explosion stage, to the Establishment stage. The author highly recommends that managers coordinate efforts to control invasive plant species long before the Establishment phase, when the costs of control become excessively prohibitive. For example, knapweeds, knotweeds, and Giant Hogweed were considered by the author of the 2008 report 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 2010 including: species and areas of focus; results and management recommendations for focal species; financial details; and general project recommendations.

2 Summary of Work Completed

This year, work was conducted in seven core control areas. These areas are identified as priority because they are areas where 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 and Barry Farms has been established through informal agreements that must be renewed annually. The areas are described below[2] and displayed in Figure 1.

- Area 1: Comox Bay Farm to Barry Farm
- Area 2: Dyke Road Slough (Simpson and Barry Farms)

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

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

- 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).

Responding to requests from the CVNS, the Comox Valley Regional District (CVRD) and the City of Courtenay, crews may conduct removals of invasive plants in areas beyond the seven listed above. Additional 2010 removal areas included:

Dyke Road
After contacting and getting access approvals from private landowners, the crew worked to remove established and seedling Scotch Broom plants from along the south side of Dyke Road from the bird viewing stand to the base of Comox Hill. 30.3 (4 days) hours were worked in this area in May and June.

Wilkinson Road Park
This new Regional District Park is located near the Little River Ferry Terminal between Wilkinson Road and the beach. The crew spent 92.3 hrs (12.3 days) here from June 22 to 29 removing Scotch Broom, Himalayan Blackberry and Dalmation Toadflax in areas identified for remediation.

Muir Road constructed wetlands
The crew spent 36.8 hrs (4.9 days) removing Scotch Broom, Himalayan Blackberry and Bull Thistle from around the outer edge of the City of Courtenay's constructed wetlands. In September educational brochures published by the Invasive Plant Council of BC were delivered to landowners living adjacent to the wetlands.

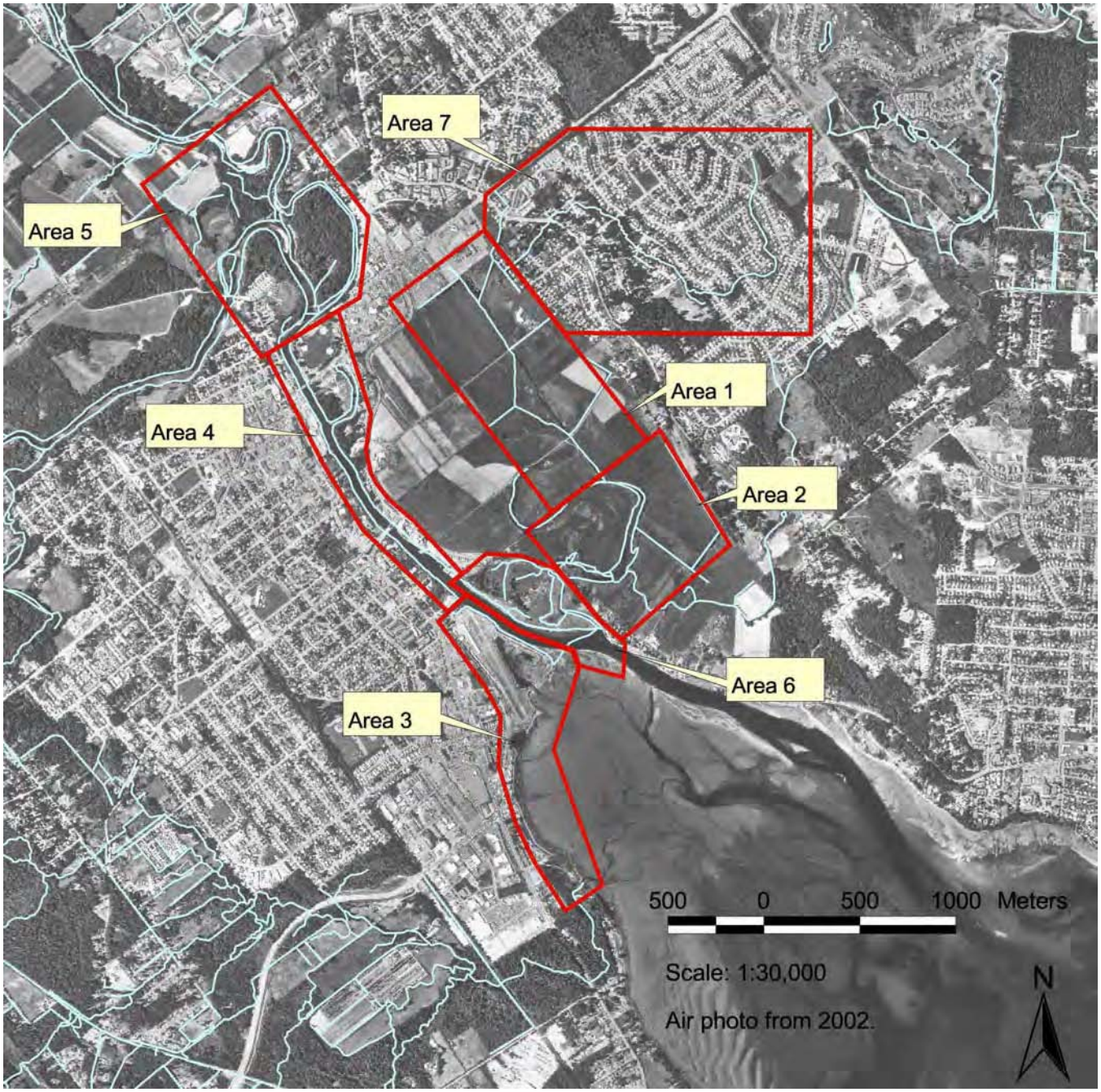
Topland Road
A Purple Loosestrife plant growing in the ditchline along Topland Road was removed. This plant was dug out in 2009 also, and the site should be checked in 2011.

Hector Road
On request from a landowner on Hector Road in Comox, the crew removed and landfilled two large Giant Hogweed plants growing in a garden on private land.

Royston Shoreline
The crew used Argyle Road to access a stretch of Royston shoreline where Purple Loosestrife had been reported growing in a fresh water seep. On August 25, 6.8 hrs were spent removing 110 Purple Loosestrife, inventorying other invasive plants along the shoreline (mainly Yellow Flag Iris) and talking to landowners about the project. Yard waste dumping is prevalent along the foreshore. Yellow flag Iris removal is needed and inventory along the shoreline from Millard/Piercy estuary to Royston, should be undertaken by boat at high tide.

In total this year, 819.9 hours (109.3 work days) were spent removing and disposing of invasive plant materials. 2290 kg of invasive plant material was removed from the project area and disposed of at the landfill. The 2290 kg consisted mainly of Scotch Broom, Yellow Flag Iris, Purple Loosestrife and Japanese Knotweed with some amount of other priority species (details in Section 3.7 below). As with Himalayan Blackberry, Scotch Broom is usually left to decompose on site; however, this year some removal was conducted after the seeds had set requiring the plants to be landfilled.

Figure 1. Overview of Wetland Restoration Project Areas



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, and priority areas for future control efforts.

3.1 Purple Loosestrife (Lythrum salicaria)

Both the amount of time spent on control (181.3 hours/24.2 days) and the numbers of loosestrife removed (1663 plants) in 2010, show an increase from 2009 (131.8 hours/17.6 days and 1160 plants). Although the numbers are higher this year than last, they still correspond with the overall downward trend in loosestrife occurring in the project area since 1999 (see Figure 2). The main contributor to the higher numbers is patches of young plants that have germinated where logs and debris have shifted over the storm season, exposing new soil. The crew found several of these patches in the estuary (Area 3) and one patch in Area 6, on the foreshore just south of the lookout hill in the Airpark. In addition, 110 plants were found and removed from a new area - the Royston shoreline at Argyle Road. The crew started loosestrife removal on July 20; however the loosestrife wasn't in full flower until the very end of July and so Areas 1, 2 and 4 (Comox Bay Farm, Simpson and Barry Farm and the Courtenay River Channel) had to be redone later in the season. It is important to remember that the loosestrife flowers earliest in the Courtenay River Estuary East Side (Area 6), where it is exposed to full sunlight, but other areas generally flower a week or two later.

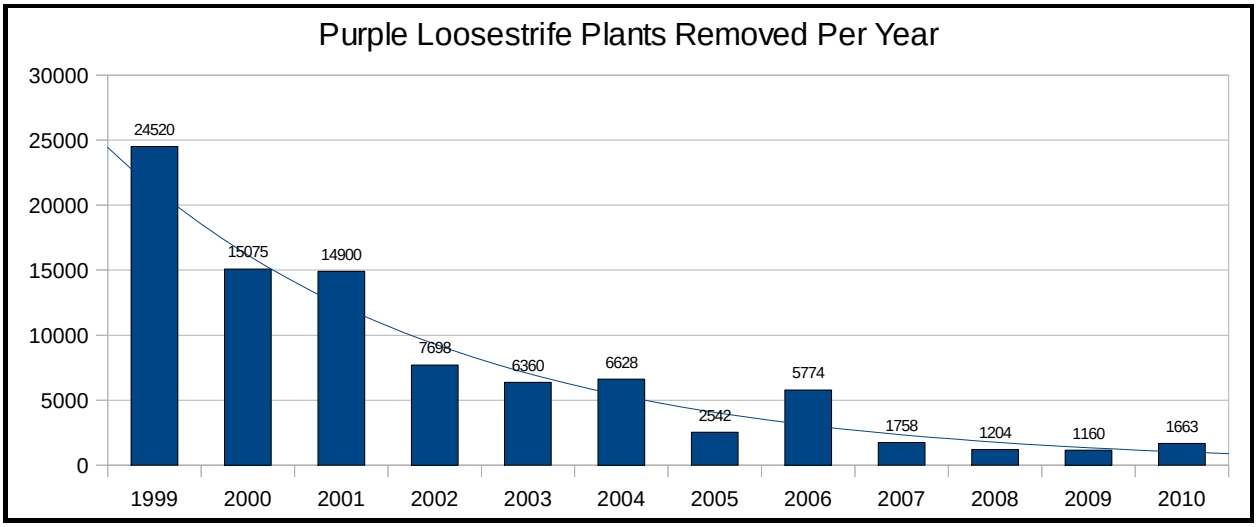
Table 1 below, shows the days spent on loosestrife removal in each of the main control areas; the amount of time spent per area can be used as a guide to the relative densities of this species per area.

Area 6 continues to have the highest numbers of loosestrife plants (1135), with high densities of immature plants emerging wherever soil has been exposed. In the Tsolum Backchannel (within Area 5), 201 plants were found and removed. An especially large loosestrife plant was removed from along the shoreline between the Airpark Marina and the Millard Piercy Estuary (Area 3) and a patch of 157 young plants was discovered growing in newly disturbed ground. The loosestrife removed from the Royston foreshore were all large, mature and multi-branching plants. Eight loosestrife were found in the Glen Urquhart Watershed (Area 7), all within the headwaters area accessed near the corner of Malahat Drive and Arrowsmith Avenue. As in 2009, no loosestrife plants were found this summer in the Simms Millenium Park/Courtenay Slough portion of Area 4. A total of 12 loosestrife plants were removed from along the Courtenay River (Areas 4 and 5). In Area 2, 34 plants were found on the flats close to the access point at Dyke Road. Five loosestrife were found along the ditchlines in Area 1.

Table 1. Purple Loosestrife Removal – Area and Number of Days Worked 1999-2010												
		Days	**Days**	**Days**	**Days**	**Days**	**Days**	**Days**	**Days**	**Days**	**Days**	**Days**
Area	**Name[3]**	**1999**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1	Comox Bay Farm	18	8.1	5	5.5	2.9	4.3	1.6	3.5	1.07	2.0	1.1
2	Simpson & Barry Farms	5	1.8	1.3	5.1	3.2	1.2	1.9	2.7	0.87	1.2	2.2
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	1.5
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	1.4
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	5.7
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	11.0
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	0.7
8	StapleyRd/ Camp River/Seal Bay Park				3.9	3.6	0.0	1.8	0.7	0.67	0	0
other	Topland Road										0.1	0.1
other	Royston Shoreline - Argyle Road											0.5
	Totals	**109**	**66.8**	**44.6**	**58.3**	**53**	**46**	**34.5**	**31.7**	**18.07**	**17.6**	**24.2**

[3] Names for the seven main control areas were modified in 2009 to better describe them for future management and reporting.

Figure 2. Purple Loosestrife Removal, 1999-2010



Management Recommendations
All parts of the project areas must continue to be checked for new plants that might emerge from the existing seed bank, or germinate from seeds or plant parts washed downstream.

3.2 Yellow Flag Iris (Iris pseudacorus)

A total of 78.5 hours (10.5 days) were spent to remove Yellow Flag Iris this year, which is a slight increase from 71.8 hours (9.5 days) spent in 2009. Area 6 (Courtenay River Estuary East Side) continues to have the highest numbers of Yellow Flag plants, with high densities of immature plants found wherever debris has shifted and soil has been exposed. Yellow Flag continues to be removed in Area 5 from the Old Tsolum Channel, although less time was spent in this area in 2010 than in 2009. No plants were found in the Old Tsolum Wetland this year, but it must be checked because this wetland experiences water influx corresponding with the tide so there is the risk of seeds and plant materials entering. Two large patches of Yellow Flag were discovered in Area 3, on the foreshore to the south of the Airpark lookout hill. These patches were so big that they had been only seed headed by crews in previous years. Approximately 385 kg of Yellow Flag plant and rhizome was removed from these two sites in 2010 and the sites were covered with weighted tarps that were removed at the end of the season. No Yellow Flag was found in the Glen Urquhart Watershed (Area 7) this year. Large Yellow Flag plants were identified and mapped along a short section of the Royston shoreline near Argyle Road. For more information about Yellow Flag locations refer to the maps in Section 8.

Table 2. Yellow Flag Iris Removal – Area and Number of Days Worked

Area	Name	Days 2009	Days 2010
3	Courtenay River Estuary West Side	1.1	2.5
5	Courtenay River North	1.2	0.8
6	Courtenay River Estuary East Side	7.1	7.2
7	Glen Urquhart Watershed	0.1	0
	Totals	9.5	10.5

Management Recommendations
Continue to check all control areas thoroughly. At the large removal site in Area 3, start controlling Reed Canary Grass in mid-May so that any Yellow Flag that might emerge from remnant rhizomes in the soil can be easily found and removed. Further inventory of Yellow Flag Iris is needed along the Royston shoreline to determine the spread of this plant, and removal effort at identified sites is needed.

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 over 34 known sites located along the Courtenay and Tsolum Rivers and in the Courtenay River estuary.[4] Last year, the project tackled the Japanese Knotweed growing in Area 3 along the Airpark walkway. The intention was to test the effectiveness of manual control (by cutting) in reducing the vigour of the plants and preventing their spread. 12.6 days were spent cutting down three established patches along the Airpark walkway between the float plane ramp and the north end of the runway, and an estimated 1000 kg of plant material was removed.

This year, after discussions with the City of Courtenay Parks Supervisor and Jeff Hallworth at the BC Ministry of Forests and Range (MoFR), it was decided to wait until we can do stem injection with a pesticide that is safe to use at aquatic sites. Hallworth was fairly certain that such a product will be available in Canada by next year.[5]

This year only 23.3 hours (3.1 days) were spent manually controlling knotweed. The three 2009 control areas were cut twice - on May 14 and May 28. The crew tested burning the plants as a control method using a Tiger Torch. It took longer than expected to cause the plants to wilt because the knotweed stems are saturated with water. As with manual cutting, there was a concern that any parts of the stem that remained viable could break off and re-generate downstream. It was difficult to handle the Torch on the uneven surface of the riprap. Furthermore, in the test patches this method didn't slow the speed and level of vigour in stem regrowth according to our observations. This method may be more effective in upland areas with a level ground surface that don't have the risk of transportation of plant fragments into a watercourse. The importance of using best practices for fire safety is obvious (i.e. this tool can only be used when the risk of fire is low).

A large patch of Japanese Knotweed that was growing in Area 3 at the south end of the Airpark runway and starting to spread, was removed this year by the City of Courtenay. The roots were excavated and removed in order to build a playground at this site.

Management Recommendations:
Contact the Invasive Plant Council of BC or Jeff Hallworth at the beginning of the 2011 project year to determine pesticide availability and develop scheduling for stem injections. In the meantime, careful manual removal (cutting) is considered feasible for slowing further root growth in smaller patches (<100 stems).

[4] Sellentin's Habitat Restoration & Invasive Species Consulting Ltd. (2008).
[5] Personal communication, Jeff Hallworth, BC Ministry of Forests and Range - Range Branch – Coast Zone (phone conversation) June 18, 2010.

3.4 Himalayan Blackberries (Rubus discolor)

A total of 265.3 (35.4 days) were spent on controlling Himalayan Blackberry in 2010. Within Areas 3 and 6, the crew spent 26.5 days removing invasive blackberry covering 2.8 hectares - this includes the approximately 2-hectare native plant restoration area at the Courtenay River Airpark.

Table 3. Himalayan Blackberry Removal – Area and No. Days Worked – Core Areas 2010			
Area	**Name**	**Days (2009)**	**Hectares (ha)**
3	Courtenay River Estuary West Side	14.2	2.1
6	Courtenay River Estuary East Side	12.3	0.7
	Total	**26.5**	**2.8**

Some amount of blackberry removal was done in all of the project areas this year, with the exception of Area 5. The bulk of the remainder of the 35.4 days was spent in Area 4 (at Simms Park), Area 7 (along upper Glen Urquhart Creek), at the Muir Road wetlands and at Wilkinson Road Park.

Management Recommendations:
Continued visits to removal sites in Areas 3 and 6 will be needed to dig out regrowth and any remaining roots. Maps 7 and 11 show high priority areas for 2011. Control of Himalayan Blackberry is needed along most waterways within the project area, in order that crews can continue to gain access for removal and inventory purposes.

3.5 Scotch Broom (Cytisus scoparius)

109.3 hours (14.6 days) were spent on controlling Scotch Broom. In addition to the annual maintenance of broom within Area 6, removals were conducted at three other sites: along the south side of the Dyke Road (access was granted by private landowners and the Comox Band); at Wilkinson Road Park; and at the Muir Road Wetlands.

Management Recommendations
With permission of private landowners it may be possible to engage volunteers for broom removal along the Dyke Road as this is a high profile and popular part of the Valley/Courtenay estuary.

3.6 Himlayan Balsam (Impatiens glandulifera)

The number of Himalayan Balsam plants found and the time dedicated to removing them, dropped dramatically from last year. A total of 203 Himalayan Balsam plants were removed this year, with 5.0 hours (0.7 days) dedicated to removal. This is down from 4830 plants removed over 26.0 hours (3.5 days), in 2009.

Table 5. Himalayan Balsam Control Results 2006 – 2010					
Year	**2006**	**2007**	**2008**	**2009**	**2010**
No. Plants Removed	99110	11061	2005	4830	203

Himalayan Balsam plants were found and removed from the same areas as in 2009: Areas 1, 4, 5, and 7. A few large Himalayan Balsam patches have been identified on private lands: in Area 7 along Glen Urquhart Creek west of Williams Road; in Area 4 - on the west bank of the Courtenay River between the 5th Street

and 17th Street bridges; and a site on Brazier Road in the headwaters of Chile Creek – this site may be contributing seeds to lower reaches of the Tsolum and Courtenay Rivers. Landowner contact is needed in order to request permission to access these properties for removal.

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 need to be issued early in the field season. Removal of this plant needs to wrap up before mid-August when seeds are released.

3.7 Other Species of Concern

92.3 hours (12.3 days) were spent controlling other invasive species of concern within the project area in 2010. These species include: Giant Hogweed (*Heracleum mantegazzianum*), Spotted Knapweed (*Centaurea stoebe* subsp. *micranthos),* Morning Glory (*Convulvulus arvensis*), English Holly (*Ilex aquifolium*), English Ivy (*Hedera helix*), Common (English) Hawthorn (*Crataegus monogyna*), Reed Canary Grass (*Phalaris arundinaceae),* Common Tansy (*Tanecetum vulgare*), Fuller's Teasel (*Dipsacus fullonum* subsp. *sylvestris*), Black Locust (*Robinia pseudoacacia*), Yellow Archangel (*Lamium galeobdolon*), Nightshade (*Solanaceae* spp.), Monte Brecia (*Crocosmia* x *crocosmiiflora*). Sow-thistle (*Sonchus* spp.) is growing in Area 6, in diffuse patches that seem to reflect the spread of seed by wind. Although listed on E-Flora as a "nuisance alien, invasive or noxious species in BC,"[6] Sow-thistle is not considered to be a serious threat to the ecology of the estuary in comparison to other species of concern.

On July 26, the Project Manager attended a Spartina Working Group Meeting and Training Seminar organized by the Coastal Invasive Plant Committee (CIPC). Those in attendance learned to identify the two types of Spartina known to be growing in the Courtenay estuary: *Spartina patens* (Seacoast cordgrass) and *Spartina densiflora* (Dense-flowered cordgrass). *S. patens* is now a common species in the Courtenay estuary as it has apparently been growing here for decades. The species of most concern due to its ability to transform mudflats - *Spartina anglica* (English Cordgrass) - has not yet been found within the Courtenay estuary and adjacent areas. Spartina is of particular concern to the BC government, which has signed a mandate and dedicated resources, for eradication of this plant from the province by 2018. The CIPC has set up a list serve (Spartina.ca) to facilitate communication amongst various groups and agencies, about Spartina inventory and removal efforts, and to access resources. The CIPC would like to establish a Vancouver Island Spartina Working Group, with the structure of this group to be determined.[7]

This summer, the CIPC's 2010 Hot Spot Crew was scheduled to spend three to four days on Spartina inventories within the Courtenay estuary. Results of that inventory had not yet been posted on the Spartina Atlas[8] at the time of this report.

[6] 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].
[7] Vancouver Island Working Group Meeting and Workshop (Monday July 26, 2010, 9:30-noon), Meeting Minutes (compiled by Melissa Noel, Coordinator, Coastal Invasive Plant Committee).
[8] Community Mapping Network. *Invasive Species – Spartina.ca*. http://cmnbc.ca/atlas_gallery/invasive-species-spartinaca

3.7.1 Giant Hogweed (*Heracleum mantegazzianum*)

The Giant Hogweed plant removed in 2009 from Area 3 - the edge of the Airpark Walkway at the south end of the runway – has not come back. Control was conducted on the plant at the southeast property corner of 2703 Dyke Road - the old Lafarge cement tower site and a new plant found growing along the beach side of Dyke Road. The crew cut the roots of these plants at 4 inches below the ground surface twice over the season. On a call from a landowner, the crew removed two large Giant Hogweed plants from a garden on Hector Road in Comox. In this case all plant parts were removed and landfilled. Public awareness about Giant Hogweed increased this year due to media attention including a press release by the CVNS.

Management Recommendations:
Continue to control and inventory Giant Hogweed within the project area.

3.7.2 Spotted Knapweed (*Centaurea stoebe* subsp. *micranthos)*

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

Management Recommendations:
Ongoing control efforts are required to remove knapweed from the lookout hill area and prevent it from dispersing seeds.

3.7.3 Morning Glory (*Convulvulus arvensis*)

Control at the several patches of Morning Glory/Field Bindweed noted in Area 6 continued this year. Control involved pulling all vegetative growth and as much of the root as possible. This appears to be reducing the density of Morning Glory in open areas of the estuary, where it cannot climb into trees or shrubs and so is subject to competition by native wetland plants.

Management Recommendations:
Where time allows, continue control efforts in mapped locations of the estuary. Special attention is needed along tree line areas where Morning Glory can gain competitive advantage and spread into the sub canopy.

3.7.4 English Holly (*Ilex aquifolium*), English Ivy (*Hedera helix*) & Common (English) Hawthorn (*Crataegus monogyna*)

Removal of English Holly, English Ivy, and Common Hawthorn was focused in Simms Park (within Area 4). Where possible, English Holly roots were dug and removed. Where holly plants were too large to dig out the roots, the stems were cut and burnt with the Tiger Torch in an effort to prevent re-sprouting. A Common Hawthorn tree growing along the Dyke Road northwest of the bird viewing stand was cut at the base and should be checked for re-growth next year.

Management Recommendations
In 2011, the crew should return to this year's English Holly and Common Hawthorn control sites to check whether the stems are re-sprouting and conduct further control if needed. Further English Ivy removal is required at Simms Park.

3.7.5 Reed Canary Grass (*Phalaris arundinaceae*)

Reed Canary Grass distribution and density in the estuary has increased over time.[9] Reed Canary Grass emerges early in the spring, thus gaining a competitive advantage over the native herbaceous species.[10] It creates dense patches within which few native species can be found growing by the time it reaches full height in mid-June.

Management Recommendations
If time allows, establish test patches for Reed Canary Grass control in 2011. Brush cut test patches starting in early May and then as necessary to prevent Reed Canary Grass from overtaking the native herbaceous species, and to prevent it from seeding. Report on results.

4 Courtenay River Airpark - Site Maintenance Results & Recommendations

Maintenance of the native plant restoration area at the Courtenay River Airpark was ongoing throughout the field season beginning in early May with broom and blackberry removal. On May 10, seventeen native plants were installed at the south end of the runway. The crew watered these plantings throughout the summer and applied comfrey leaves as mulch. Brush cutting of Common Tansy was carried out in July, to reduce the spread of this plant by seed. In September, the crew did a last sweep to remove blackberry and broom re-growth. On September 23, twenty native plants left over from the springtime planting were installed at a second location within the Airpark. The locations of 2010 native plantings are shown on Map 11.

This summer was very dry and a few of the native plants considered to be established at the site succumbed to the drought conditions. However, most of the native plantings were observed to be in healthy condition - especially Oregon Grape, Common Snowberry and Nootka Rose, which continue to produce new vegetative growth around the parent plants.

Management Recommendations:
A follow-up on the 2009 application of Sky-Rocket is needed in the spring of 2011, to cover areas not mulched that year (the 2009 final report shows areas where mulch was applied). The City of Courtenay has offered to bring a load of Garry Oak leaves from the cemetary on Dingwall Road. These leaves are considered to be an ideal amendment for the native plant restoration area.

[9] Personal communications: Graham Hilliar, Wetland Restoration Project crew member 2005-2010.
[10] E-Flora BC: Electronic Atlas of the Plants of British Columbia. *Phalaris arundinacea* L. http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Phalaris arundinacea&redblue=Both&lifeform=6

5 Financial Summary

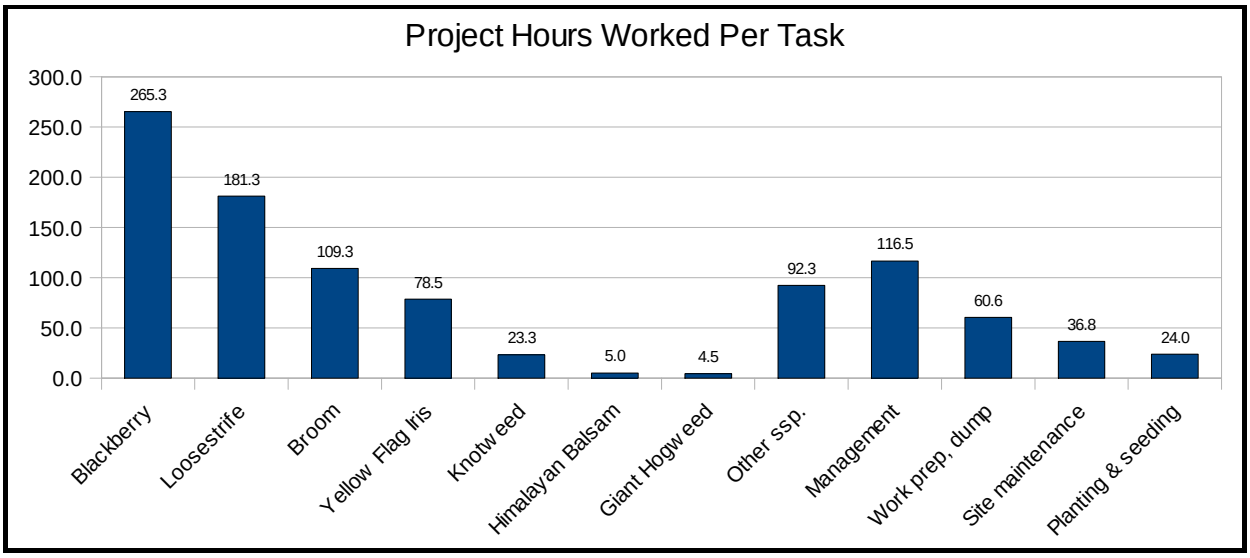
The 2010 budget and project time allocation details are provided below (Table 7 and Figure 3 respectively).

Table 7. 2010 CVNS Wetland Restoration Project Budget

Descriptor	Hours (Days)	Rate	Total
Project Management and Field Supervision	430.55 (57.4)	24.24	10437.39
Field work	325.75 (43.4)	20.00	6515.00
Field work	199.75 (26.6)	17.00	3395.75
Field work	12.50 (1.7)	15.00	187.50
Field work	29.00 (3.9)	10.00	290.00
Subtotal	*997.55 (133.0)*		*20825.64*
GST and HST			*2499.08*
Labour Total			**23324.72**
Descriptor	**Days**	**Rate**	**Total**
Equipment Purchase	n/a	Var.	375.37
Truck Rental	1	48.00/day	48.00
Fuel	n/a	Var.	25.78
Canoe Rental	3	25.00	75.00
Trailer Rental	10	25.00	250.00
Mileage	872 km	$0.46/km	401.12
Equipment and Materials Total			**1175.27**
Project Total			**24499.99**

Project Contributors	Amount
Comox Valley Regional District	18000.00
BC Nature	2000.00
City of Courtenay	2500.00
Ducks Unlimited	2000.00
Total Project Funds	**24500.00**

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.

- Focus removal efforts for mature Himalayan Blackberry plants in March and September to minimize interference with birds nesting activities.

- Where significant patches of invasive plants have been identified on private lands, outreach is needed to request access for removal/restoration works. This would most effectively be done by local governments at the beginning of the field season in early spring.

- Crew members should carry educational literature for distribution while working in areas adjacent to private lands. Handouts should provide the rationale for invasive plant removal and control and give prevention tips to private landowners. It would be ideal to distribute brochures developed by Comox Valley local governments in support of the project; however in the mean time brochures can be ordered from the Invasive Plant Council of BC.

- Continue to issue press releases over the season to let private landowner know that crews will be working adjacent to private lands at several sites within the project area (e.g. along Glen Urquhart Creek and the Courtenay River), and to educate the public about the effects of invasive plants and the high vulnerability of the project area to upstream activities.

- Continue to communicate and coordinate restoration efforts with the Estuary Working Group.

- Install a portable washroom at south end of the Airpark walkway during the field season.

7 Conclusion

The CVNS Wetland Restoration Project enjoyed another successful year in protecting and restoring native habitat within the core project area. Thirty-seven native plants were added to the restoration area at the Courtenay River Airpark. The project employed interns from Mountainaire Avian Rescue Society (MARS) and Bridges Contracting to remove Himalayan Blackberry and other invasive species in the Courtenay estuary. The crew was able to respond to special requests from the City and the CVRD to conduct invasive plant removal in high priority wetland and park sites beyond the core project areas. In addition, the CVNS helped to raise community awareness about invasive plants through press releases to the newspaper and the distribution of educational brochures.

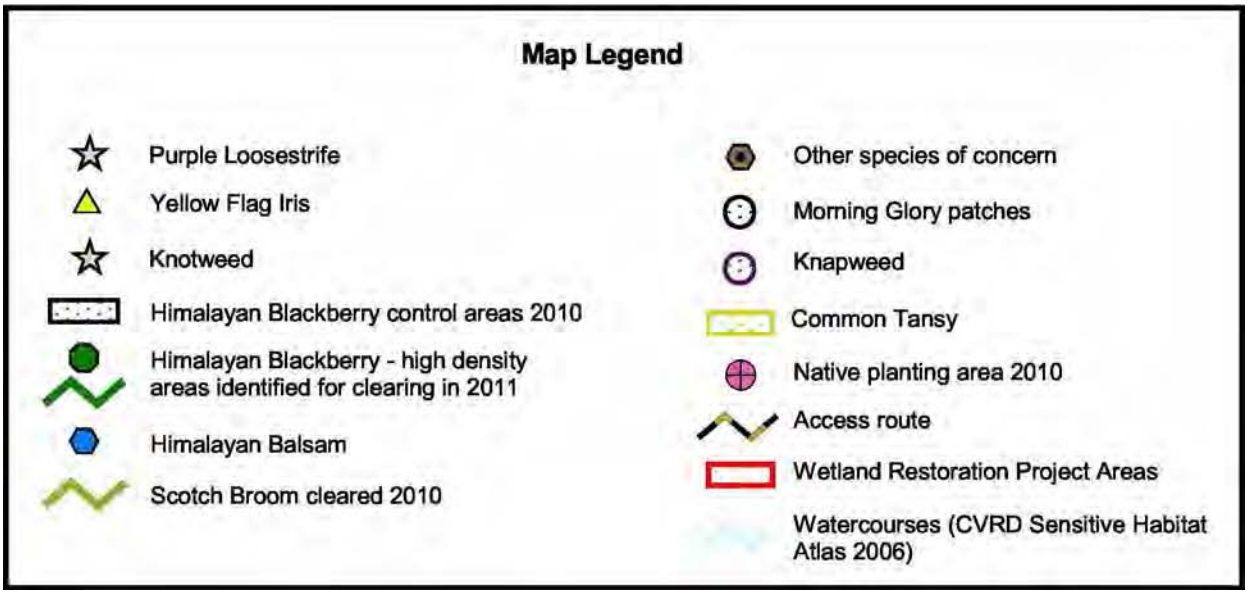
This year showed the positive results of five years of Himalayan Balsam removal, with numbers at 0.2% of what they were in 2006. Remaining large patches of Himalayan Balsam are on private property and therefore not accessible without focused landowner outreach. Purple Loosestrife and Yellow Flag Iris continue to decline in the Courtenay Estuary and surrounds; however the proliferation of new plants in disturbed sites is evidence of the seed bank that remains. Himalayan Blackberry is an issue in all parts of the project area and continuing removal is needed in order to maintain access along the watercourses for inventory and removal of other high priority invasive species. Next year may see stem injection of Japanese Knotweed incorporated into the control methods of the CVNS-WR crew if a product suitable for use in riparian areas becomes available.

Thank-you to the Comox Valley Naturalists Society and the 2010 funders of this valuable project: Comox Valley Regional District, BC Nature, City of Courtenay and Ducks Unlimited.

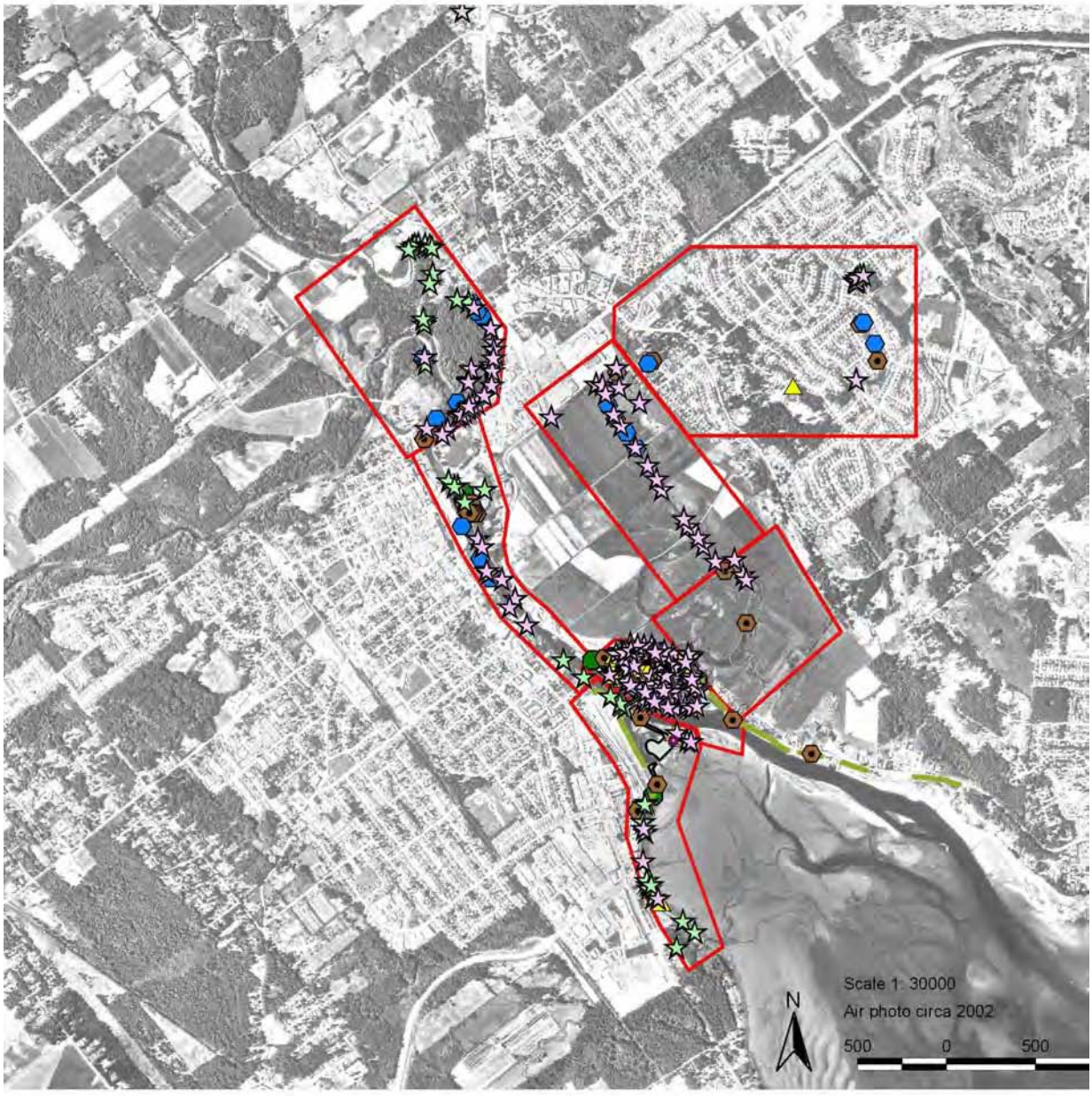
8 Maps

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 2011, to look for new plants that might emerge from the existing seed bank or germinate from seeds or plant parts washed downstream.

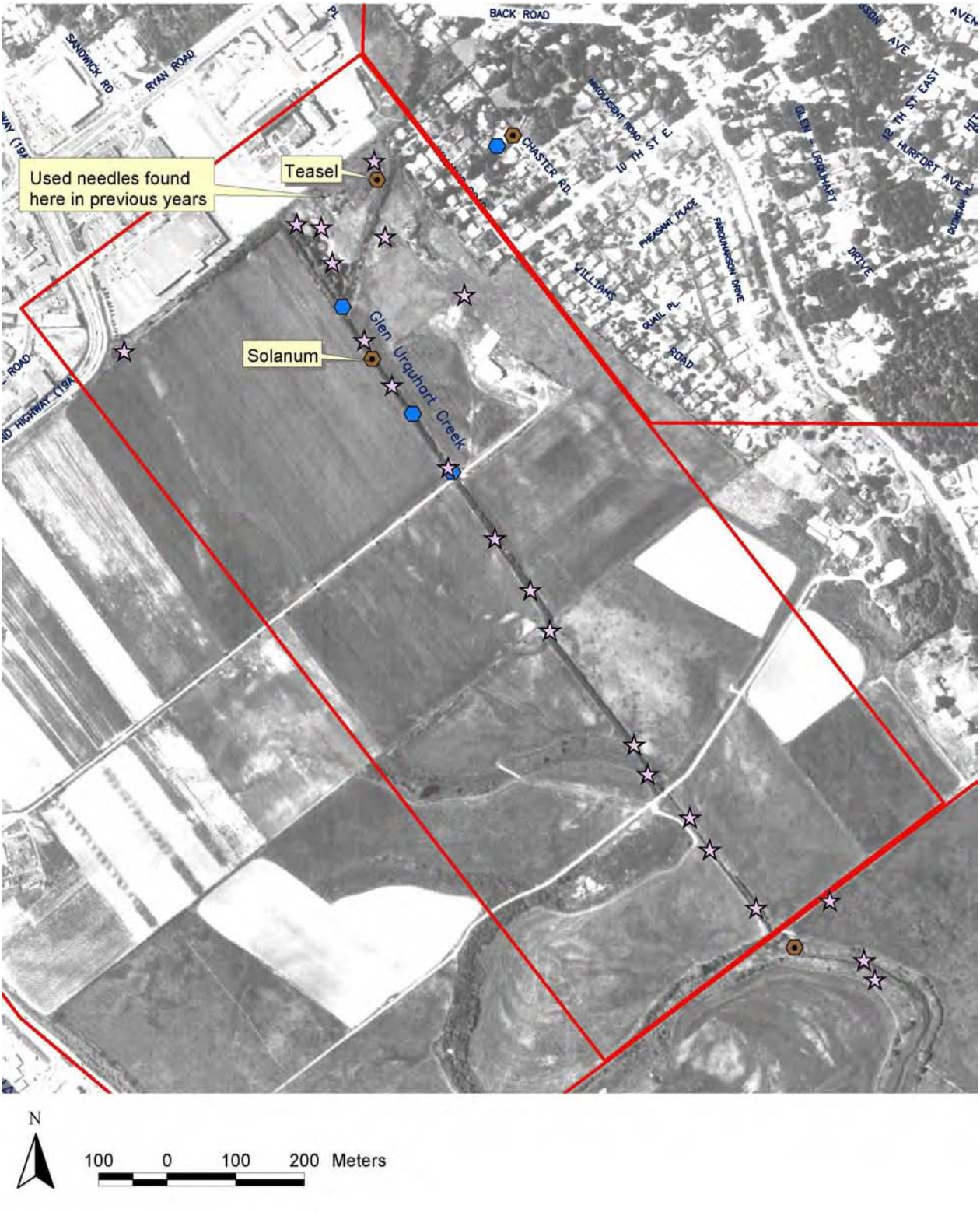
8.1 Map Legend



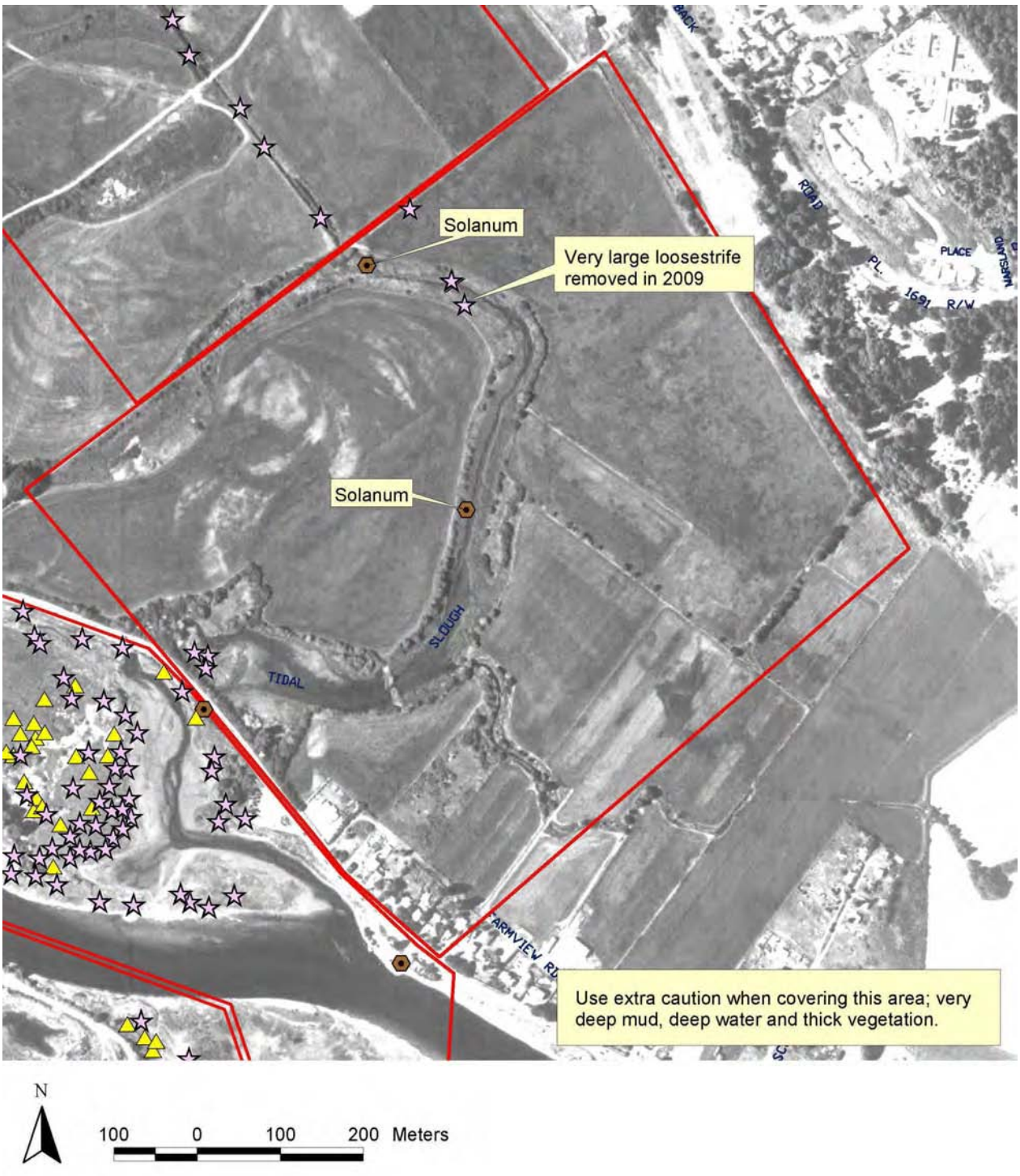
8.2 Overview



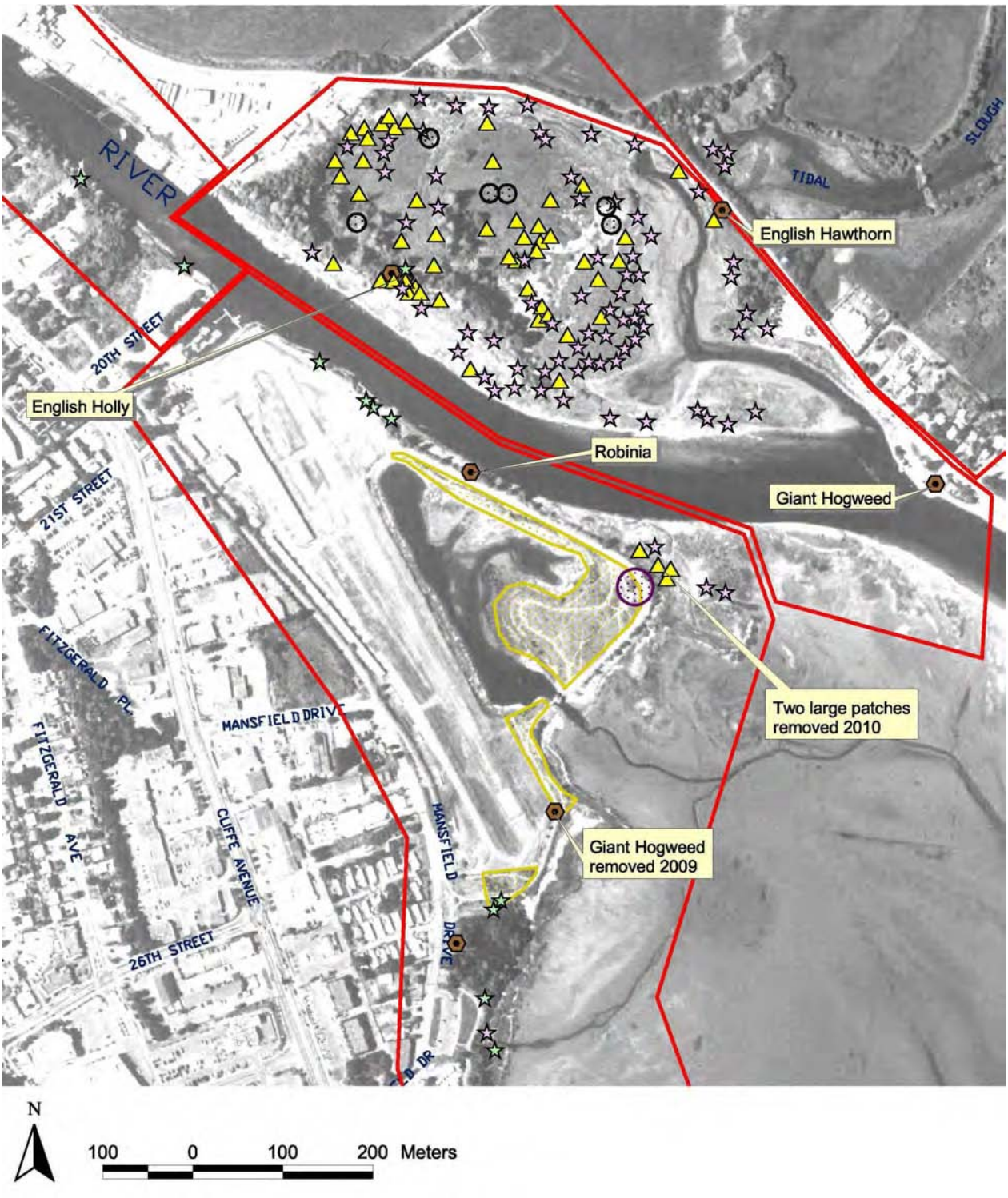
8.3 Area 1


Used needles found here in previous years
Teasel
Solanum
Glen Urquhart Creek
BACK ROAD
SANDWICK RD
RYAN ROAD
CHASTER RD.
10 TH ST E
PHEASANT PLACE
FERGUNSON DRIVE
QUAIL PL.
ROAD
N
100 0 100 200 Meters

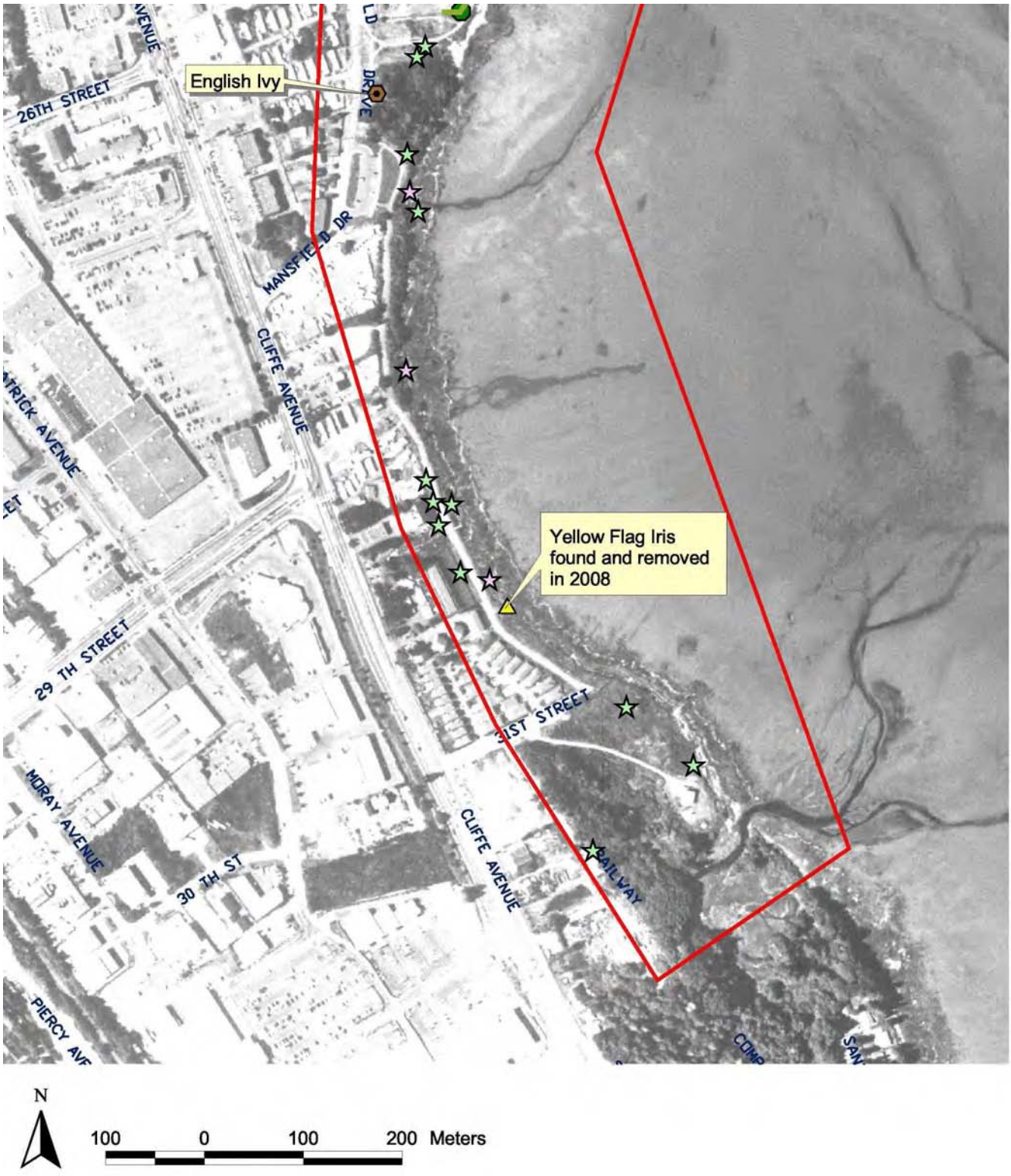
8.4 Area 2


Solanum
Very large loosestrife removed in 2009
Solanum
TIDAL
SLOUGH
FARMVIEW
ROAD
PLACE
MARSHLAND
1691 R/W
Use extra caution when covering this area; very deep mud, deep water and thick vegetation.
N
100 0 100 200 Meters

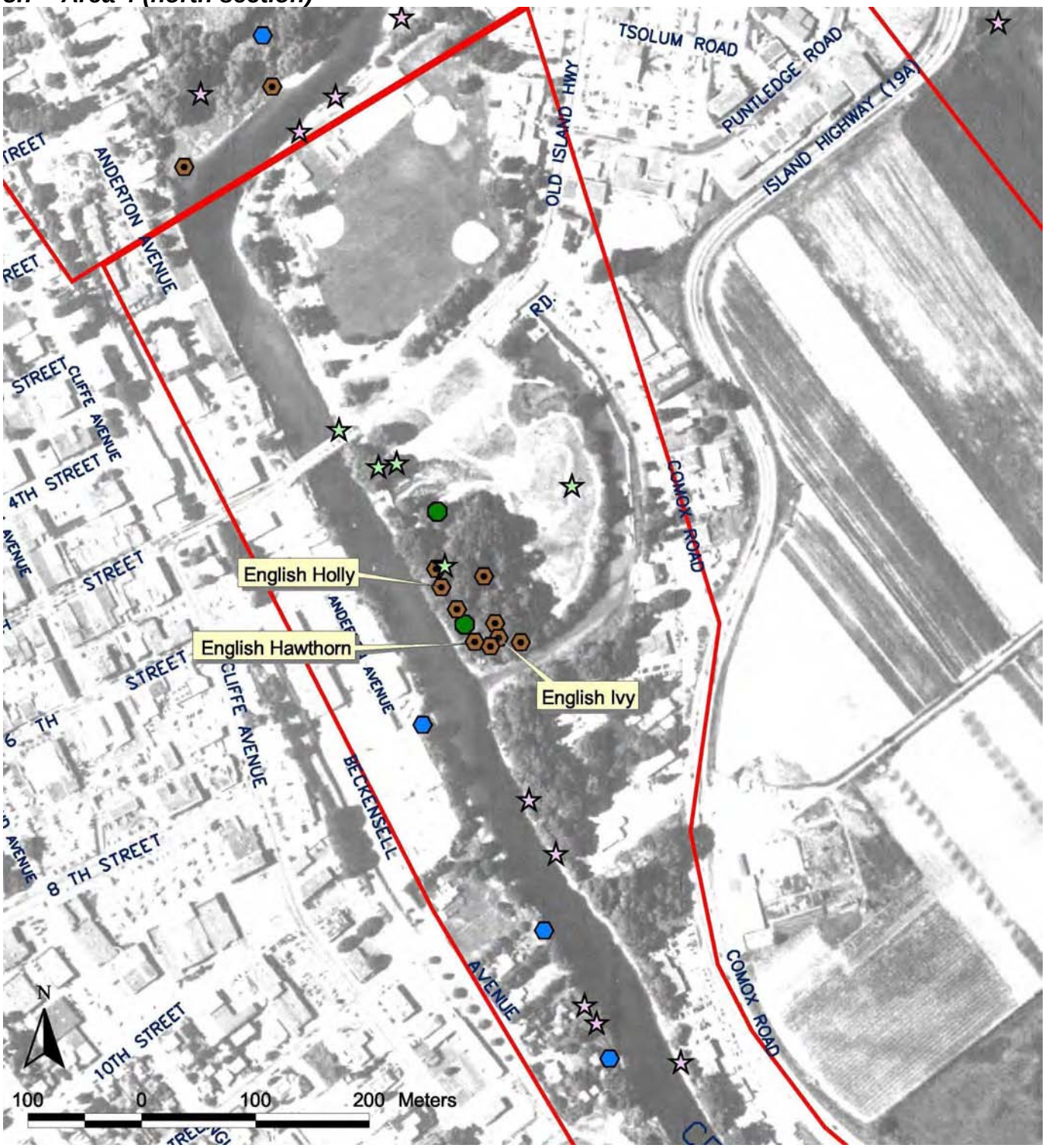
8.5 Areas 3 and 6



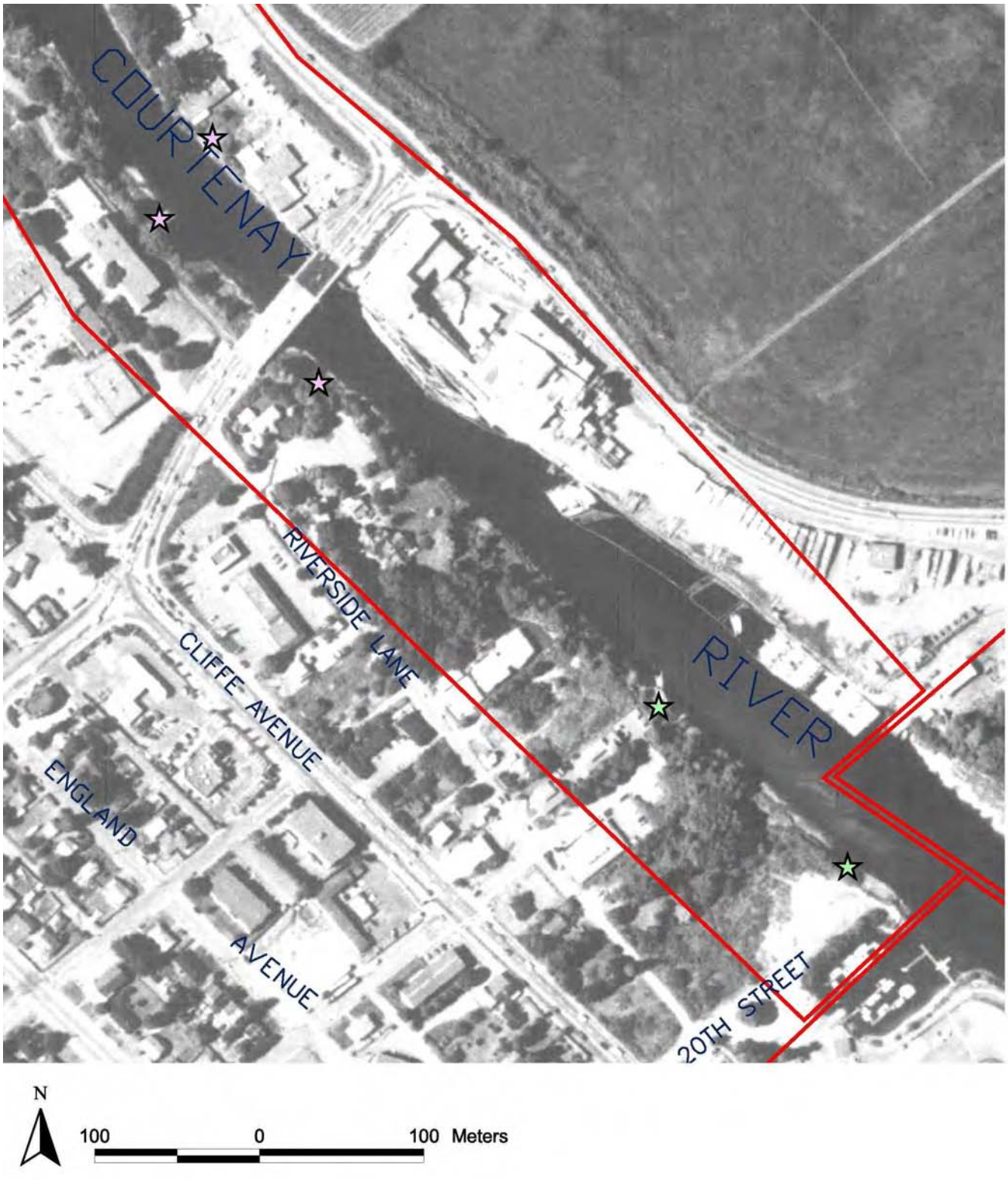
8.6 Area 3 (south section)



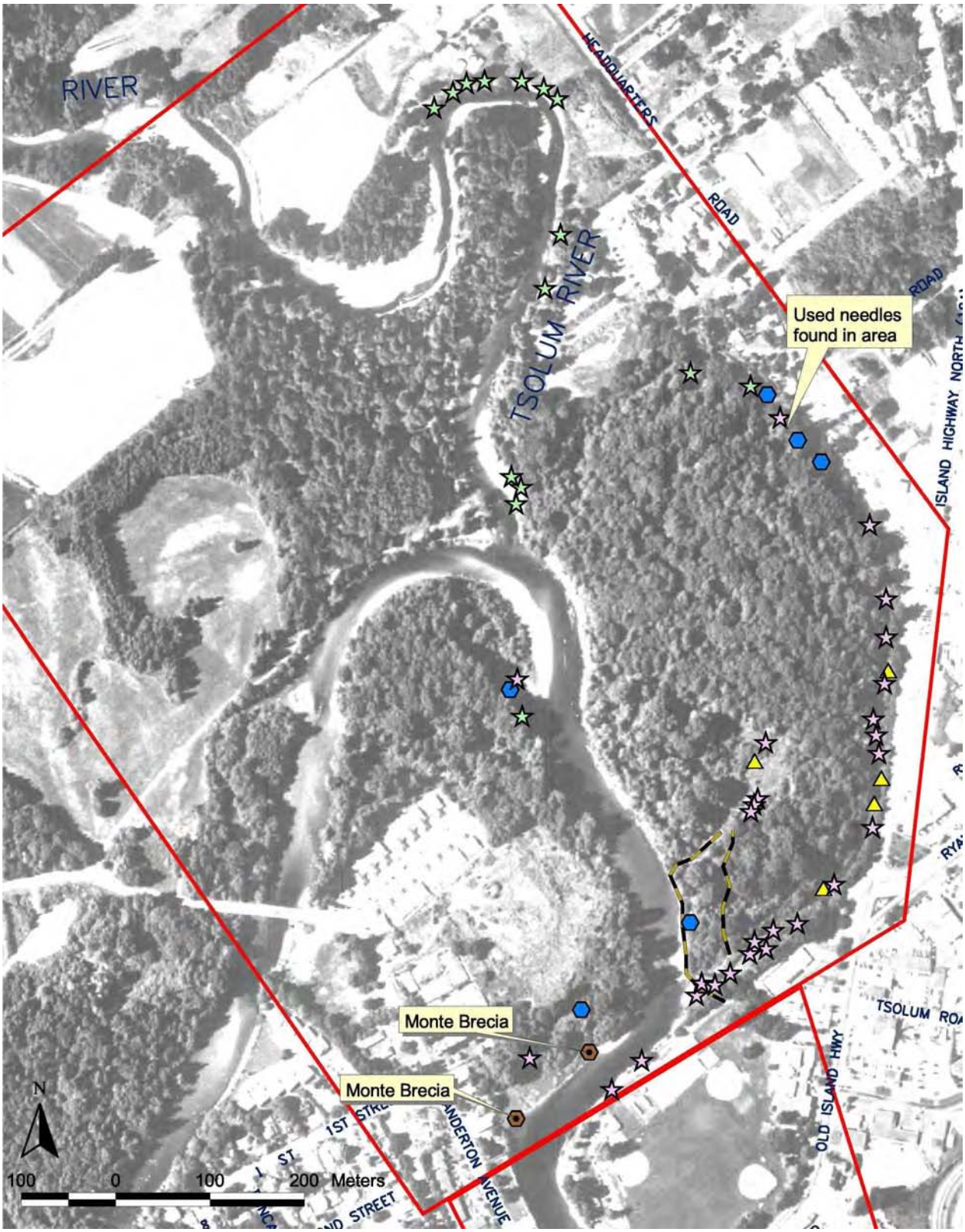
8.7 Area 4 (north section)



8.8 Area 4 (south section)



8.9 Area 5


RIVER
HEADQUARTERS
ROAD
TSOLUM RIVER
Used needles found in area
ISLAND HIGHWAY NORTH
Monte Brecia
Monte Brecia
TSOLUM ROA
OLD ISLAND HWY
1ST STREET
N
100 0 100 200 Meters

8.10 Area 7


Lamium
Lamium, English Holly
Solanum
BACK ROAD
6TH STREET EAST
HALLARD DRIVE
HALAHAT DRIVE
EVERGREEN AVE.
THORPE AVENUE
ST. SITKA AVENUE
HOBSON AVE.
HURFORT AVE.
SITKA AVE.
N
200 0 200 400 Meters

8.11 Areas 3 and 6 - Blackberry & Broom Removal & Priority Areas & Native Plantings