July - September 2006 Quarterly Report

Fort Lewis Conservation Project

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Fort Lewis is a key military installation and the most important conservation area in the Puget Trough region. The Nature Conservancy strives to assist Fort Lewis in the conservation of its natural resources within the framework of the Fort's military training mandate. Fort Lewis and The Nature Conservancy have shared interests because:

- ***Healthy natural ecosystems are essential for realistic and sustainable training lands.***
- ***Rare species recovery throughout the region reduces the burden of recovery on any single landowner or site.***
- ***Pest plants harm natural areas and reduce their suitability for military training.***

Conservation at Fort Lewis

Fort Lewis continues to play a vital role in the regional effort to restore western Washington prairie and oak habitats. The Fort has the largest and best quality remnants of these threatened habitat types, and The Nature Conservancy is assisting the Fort to reach its conservation goals. Fort Lewis and The Nature Conservancy have a shared vision of conservation at the Fort which simultaneously promotes sustainable military training lands and robust natural ecosystems. The following three points provide a framework for this vision.

1. *Healthy natural ecosystems are essential for realistic and sustainable training lands.*
2. *Rare species recovery throughout the region reduces the burden of recovery on any single landowner or site.*
3. *Pest plants harm natural areas and reduce their sustainability for military training.*

The open structure of prairie and oak woodland habitats is highly desirable for military training and essential to many rare species. These habitats are currently threatened by invasive trees, shrubs and weeds that can quickly degrade large areas into dense woodlands and brush patches with reduced visibility and native diversity. It is realistic to pursue a vision of prairie and oak ecosystem management that supports sustainable military training and conservation values simultaneously.

Quarterly Overview July through September 2006

Summer quarter saw the new aquatic weed control program get into full swing. We treated numerous invasive plant species that threaten habitat of federally listed species. With continued effort, we should see the eventual eradication of several of these invasives from critical habitat.

Lack of prescribed fire on prairies in recent years (most notably this year) has resulted in an abundance of mowing tolerant broom. Without fire, our only practical control approach is herbicide control. Because of the backlog of unburned broom that threatens to set our control effort back by many years, we (Fort Lewis and TNC) resolved to spray large areas during the late summer season when prairie habitats are least vulnerable. In total, we sprayed 750 acres using a combination of spot and boom applications.

For the future, we hope that fire can be given the priority that it truly holds as a critical conservation tool that will allow the Fort to realize many of its sustainability and training goals. Every effort should be made to build a robust and functioning prescribed fire program.

The following report summarizes the past quarter's activities and upcoming tasks. Each task description indicates its associated task order name and TNC center number. This report is not intended to provide detailed descriptions and planning level details. Those details are available in task order plans and final reports and will be compiled each January in an annual report.

The report is divided into the following sections: Prairie Enhancement; Oak and Western Gray Squirrel Habitat Enhancement; Noxious Weeds; and Riparian Enhancement. *Appendix I* summarizes the work completed under each task order rather than by the above program elements.

Active task orders (and their TNC center numbers) for this quarter include: Pine and Oak Enhancement (TNC# 3867), Gophers (TNC# 3872), Training Land Weeds (TNC# 3873), Prairies 2006 (TNC# 3874), Oaks for Squirrels (TNC# 3875), Butterflies (TNC# 3876), Streaked Horned Lark (TNC# 3877), and Water Howellia Aquatic Weeds (TNC# 3887)

PRAIRIE ENHANCEMENT

Streaked Horned Lark Habitat Enhancement. Streaked Horned Larks may be unique among imperiled prairie species in their ability to use habitat that has been heavily "degraded" by non-native species as long as the structure of the vegetation is appropriate for their needs. This creates a habitat improvement opportunity we believe can be used to make Streaked Horned Lark habitat quickly and at moderate cost. Treatments and vegetation monitoring were conducted this summer. (Larks – 3877)

- Boom sprayed 16 experimental lark habitat plots with triclopyr ester (Tahoe 4e) at Pacemaker and Upper Weir Prairie.
- Conducted vegetation measurements on all plots. This will serve as a baseline to evaluate treatment related changes to habitat structure.

Scotch Broom Control. In total, approximately 788 acres of Scotch broom was controlled through spraying and some mowing. Higher quality prairie sites were avoided after April 15 to avoid damage to native plants and animals. Approximately 38 acres were mowed at the beginning of summer. The remainder of the treated areas were sprayed beginning August 7th. Broom was sprayed with a 1.5-2% solution of Tahoe 4e (triclopyr ester). See Appendix II, figures 1 through 3 for maps of treated areas.

- *Johnson Prairie Mowing.* About 14 acres of lower quality prairie on the northwest edge of Johnson Prairie was mowed in the early summer to prevent broom seed set. In addition, the entire outside perimeter of the prairie was mowed back about 10 feet along the road edge. This should reduce seed spread from the heavily infested road edges to the interior prairie areas. (Gophers – 3872)
- *Upper Weir Prairie Mowing*. Mowed about 21 acres under the oak woodland on the western edge of the prairie and a small 3 acre patch that had been missed in the spring. (Gophers - 3872)
- *Muck Creek Triangle Area Spraying*. A majority of the quality prairie areas in the Triangle Area have been repeatedly treated for broom and are at a stage where spot treatment by hand crews can be done quickly and with minimal herbicide application. Areas adjacent to the quality prairie have been less intensively managed and broom tented to be much heavier and larger. These areas were treated with a tractor using a combination of spot and boom spray. In total, about 125 acres were treated in this area. (Prairies '06 - 3874)
- *Range 74/76 Spraying*. About 221 acres of broom, black cottonwood and Douglas-fir was treated in Range 74/76. This area is habitat for the streaked horned lark. The area typically gets skipped by the frequent fires of the AIA, allowing the broom population to grow. Due to the risk of unexploded ordinance, tractors could not be used to boom spray off of roads, so the entire area was spot treated. (Larks - 3877)
- *Pacemaker Area Spraying.* The area west of the Pacemaker landing strip is core habitat for streaked horned lark. Portions of the area are of good quality and other areas are severely degraded. In total, about 203 acres were treated using a combination of boom spraying in the dense broom patched and spot spraying in areas of lower density. In addition, several large infestations of blackberry were treated. (Larks - 3877)
- *Johnson Prairie Spraying.* In total, 132 acres of broom was treated at Johnson prairie. The core portions of Johnson Prairie have seen a marked reduction in broom density due to rigorous management. Therefore, much of the area required very little effort by hand crews to spot treat remaining broom. Some areas still have higher densities of broom and required a combination of spot and boom treatment. (Prairies 06 – 3874)

- *Upper Weir Prairie Spraying.* Of the 150 acres planned for treatment this year, only about 59 acres was treated on Upper Weir due to unanticipated access scheduling conflicts. The area west of the north/south road was hand treated where density was lower and habitat quality higher. East of the road was treated with a tractor with a combination of boom and spot spraying. (Prairies 06 – 3874)
- *South Weir Prairie Spraying.* About 10 acres was treated at South Weir northeast of the pipeline. Access and weather were constraints to completing more area. Our focus was on areas with higher native grass cover. (Prairies 06 – 3874)
- Experimental plots were established for Scotch broom control. Ten 10x10 plots are established in TA 15 south of the triangle. The following treatments were applied: 2% and 5% crop oil only; 0.5%, 1%, and 1.5% triclopyr ester with 0.25% NuFilm IR; 2 % triclopyr ester with 0.5% non-ionic surfactant (this is the typical solution from previous years); 2% triclopyr ester with 2% crop oil; 2.5%, 3.25%, and 4% triclopyr amine with 0.25% NuFilm IR. Early results look promising for even the lowesat concentrations of herbicide, and even the crop oil only plots show signs of significant stress. Final results will have wait until the spring growing season.

Wildland Fire Training. Prescribed fire is by far the preferred prairie restoration tool, and TNC has been working with Fort Lewis Forestry and Fish and Wildlife staff to develop a mechanism whereby TNC can provide staff support for prescribed fires on base. We researched other DOD/TNC cooperative partnerships where installations with cooperative agreements to provide fire support. TNC has a total of nine certified wildland firefighters on staff. It is unfortunate that the Fort's prescribed fire program was unable to accomplish its burning objectives for habitat this year.

Propagation. Plugs were maintained through the summer. In total, over 50,000 plugs will be available for planting in fall 2006. See Appendix IV table 2 for list of available plugs. (Prairies 06 – 3874)

Valley Silverspot Monitoring. TNC spent a great deal of time surveying known and likely locations on Fort Lewis to detect valley silverspot butterflies. Sites were visited at regular intervals during the appropriate season. No detections were made. This lack of detections is consistent region wide – it appears to have been an unsuccessful year for this species.

WDFW Regional Streaked Horned Lark Populaiton Study. WDFW's regional population monitoring project was under funded this year. In order to keep the project moving forward, Fort Lewis agreed to pay for monitoring work to be conducted. TNC contracted with Mark Hopey for the second portion of the field season. Results of the 2006 field season will be made available when WDFW completes its annual report.

Upcoming Tasks.

- Mow broom in priority prairie areas to prevent 2007 seed set.
- Enhancement planting at13th Division, Johnson and South Weir Prairies.
- Construct and plant seed beds at Shotwell's Nursery.

OAK, PINE AND WESTERN GRAY SQUIRREL HABITAT ENHANCEMENT

Western Gray Squirrel Habitat Enhancement. Two areas were mowed to enhance WGS habitat at the beginning of summer after the critical breeding and rearing period. Both areas have had western gray squirrel tube presence, and a western gray squirrel was trapped during eastern gray squirrel control in TA 12, adjacent to the work area. Activities included:

- Mowed 13 acres in the Vietnam Village area of TA 8. The main objectives were to reduce fuels under oaks and improve understory structure. A prescribed fire that was scheduled for this area did not occur.
- Mowed 13 acres east of Chambers Lake in TA 12 in an area adjacent to core WGS habitat.

See Appendix II Figure 3 for map of sites and activities (Oaks for Squirrels – 3875)

Oak and Pine Woodland Enhancement. The remainder of the mowing and Douglas-fir girdling was for this project was completed during the spring. Oak thinning in TA 5 and follow up brush cutting in previously mowed areas was initiated.

- Mowed and released from Douglas-fir competition 8.2 acres of Ponderosa pine/Oregon white oak woodland in TA 10. In the previous quarter, actions were completed to the west of the road, while in this quarter; the area to the east of the road was completed.
- Ponderosa pine release was conducted on 5 acres just south of the ammo depot in TA 8, completing this project.
- Mowed and brushcut 12 acres in the Siebert staked portion of TA 6 to control Scotch broom under Ponderosa Pine.
- Several site visits were made to the TA 12 oak thinning site to clarify prescriptions and evaluate required effort. A single day was spent thinning on the western edge. The remainder of work is scheduled for mid-October

See Appendix II Figure 3 for map of sites and activities. (Pine and Oaks – 3867)

Eastern Gray Squirrel Control. No trapping occurred during summer quarter. Squirrel activity was monitored using hair snag tubes (see below). Targeted trapping based on monitoring results is anticipated to occur during the coming fall and winter quarters.

Western Gray Squirrel Monitoring. Three squirrel monitoring tasks were worked on during summer quarter. These are discussed below. (Oaks for Squirrels – 3875)

- An additional 87 hair snag tubes were installed to complement the eastern gray squirrels control effort. Results from the monitoring initially revealed a relatively restricted distribution of eastern gray squirrel activity in early May. More recent results through September reveal a more widespread distribution of eastern gray squirrel activity. Because of the presence/absence nature of the hair tube data, it is not possible to know if the increase in distribution is the result of additional individuals, or utilization of additional hair snag tubes by the same individuals. Appendix IV Table 1 gives a more detailed look at the changes that occurred in four regions that have experienced change over the course of the two months of post-trapping monitoring. See Cheryl Fimble's attached report of June-September 2006 activities for details and results of the survey.
- Conducted directed visual surveys for both species of gray squirrels at five known WGS sites. This work is a continuation of past visual monitoring efforts. See Cheryl Fimble's attached report for June-September 2006 activities for details and results of the survey.
- Completed first draft of an article titled: *Monitoring western gray squirrels for management in western Washington*. The article presents information regarding the utility of hair snagging devices and the application of resulting data for resource management. This draft was

distributed within TNC for comments during this quarter. Comments will be solicited more widely during fall quarter.

WGS Collaring and Telemetry. The Washington Department of Fish and Wildlife is conducting a western gray squirrel study in preparation for an augmentation to occur in 2007. Towards the end of summer, 40 traps were set out in prime western gray squirrel habitat where squirrel tubes have documented presence. Several weeks of pre-baiting followed in preparation for fall trapping. See Appendix II Figure 4 for map of trap locations. (Oaks for Squirrels – 3875)

Upcoming Tasks.

- Conduct targeted EGS control.
- Assist with WGS telemetry as needed.
- Continue squirrel tube monitoring efforts.
- Follow up brush cutting and oak thinning for Pine and Oak project

NOXIOUS WEED MANAGEMENT

A summary of weed control actions is provided below. Specific GIS data is being compiled for the 2006 weed season and will be presented at the end of fall quarter. See Appendix III figures 5-7 for maps of major weed control efforts.

Upland Weed Control. Unless otherwise noted, upland weed control was conducted under the Training Lands task order (3873).

- Only a few knapweed areas were spot treated during summer. They were mostly small populations of diffuse knapweed in lower priority areas such as TA 7N, TA 5, and disturbed open areas in TA 12. Populations discovered late in the season were cut and bagged with follow up spraying of rosettes. Knapweed was controlled a solution of 2% Round-up with 0.2% Transline.
- A large road-side population (600 plants) of blueweed was sprayed in TA 7S. Nearly all of the plants were rosettes, with less than 20 mature and flowering. Blueweed was controlled with a solution of 2.5% Garlon 3A with 0.25% NuFilm IR
- One large population of sulfur cinquefoil (700 plants) was discovered in TA 14, but was not treated with herbicide due to training activities. Seed heads were cut and removed.
- Cliff Chapman presented research and results from sulfur cinquefoil control measures during the 2006 season at an invasive species conference for the Pacific Northwest in Seattle on September 20, 2006.

Aquatic Weed Control. Tremendous effort was put into control of aquatic weeds during the summer. All of the priority targets were treated. Aquatic weed control effort was conducted under the Water Howellia task order (3887).

- Yellow flag iris was controlled at Shaver Kettle, Shaver Marsh, Halverson Spring, Nixon Spring, American Lake, Muck Creek corridor along the "triangle", and two wetlands along Chamber's Lake. An approximate number of stems treated give an idea of each sites infestation: Shaver Kettle 7,000; Halverson Spring 3,000; American Lake 500; Shaver Marsh 500; Nixon Spring 20; Chambers kettles (2) 20; Muck Creek 100. Yellow flag iris was treated using a drip-less wick system, a rag-covered sponge adapter on a backpack sprayer dabbed iris stems after they were cut with hand pruners. This method proved slow, but effective as we were working in high quality wetland systems. A solution of 25% AquaMaster with 0.5% NuFilm IR adjuvant was applied to the cut surfaces.
- Purple loosestrife was controlled in Johnson Marsh (approximately 500 plants) and American Lake (approximately 200 plants). Purple loosestrife was cut and treated with a 25% AquaMaster/0.5% NuFilm solution applied from small dropper bottles to freshly cut surfaces.
- Fragrant water-lily was controlled at Chambers Lake. About 20 separate rhizomes were sprayed. Clones varied in size from one square meter to 20 square meters. This represents about $1/5^{th}$ of the eventual targeted control in this area. Fragrant water-lily was treated with foliar spray of 2% AquaMaster/0.25% NuFilm IR foliar solution.
- Japanese knotweed was treated at four small, discrete sites in TA 12, TA 15, and the RTA. Japanese knotweed was controlled both by direct injection and foliar spray. Canes of sufficient width were injected with 100% AquaMaster (3mm per cane) and smaller canes were foliar sprayed with a 2% AquaMaster/0.25% NuFilm IR solution.
- Reed canary grass was mowed with brush-cutters in four important wetland areas in preparation for fall spraying. These included Shaver Kettle (1 acre), Halverson Spring (3 acres), Nixon Spring (3 acres), and along Muck Creek in TA 15 (3 acres). Maps of treatment areas will be included in winter quarter report after they are sprayed.

Upcoming Tasks.

- Spray reed canary grass in several priority wetland sites in TA 6, 12, and 15.
- Follow-up treatment on yellow flag iris where appropriate
- Scotch broom mowing in areas within and adjacent to large sulfur cinquefoil infestations. These sites will be sprayed in spring of 2007.
- Spray tall oat grass with Poast in MP 13, Training Area 7S, and certain discrete sites in the RTA.

RIPARIAN ENHANCEMENT

No on-the-ground riparian work occurred during summer quarter.

Upcoming Tasks.

- Contract out in-stream enhancement projects in Muck Creek at Halverson Springs and near Chambers Lake. Work to be completed in fall quarter.

OTHER UPCOMING TASKS

Cavity Creation. An additional task order has been established for 2006 that involves creation of snags and cavities for the benefit of cavity nesting birds adjacent to prairies. Much of this work will be on a trial basis. Work is expected to begin in fall and be completed before mid-winter 2007.

Appendix I: Summary of 2006 Summer Quarter Activity by Task Order with TNC Center Numbers.

Pine and Oak Enhancement (TNC# 3867)

- *TA 8 Enhancement* – Mowed broom and small woody invasives and girdled fir over 5 acres.
- *TA 10 Enhancement* - Mowed broom and small woody invasives and girdled fir over 8 acres.
- *Seibert Staked TA 6* – Mowed and brushcut 12 acres.

Gophers (TNC# 3872)

- *Johnson Prairie Mowing.* Mowed about 14 acres of lower quality prairie and the entire outside perimeter of the prairie was mowed back about 10 feet along the road edge.
- *Upper Weir Mowing.* Mowed 21 acres on western edge under the oaks and a small 3 acre patch in the middle.

Training Land Weeds (TNC# 3873)

- *Miscellaneous Weed Control* – Treated several small populations of knapweed, a large population of blueweed and one of sulfur cinquefoil.
- *Presentation-* Cliff Chapman presented at regional weed control conference on cinquefoil control.

Prairies 2006 (TNC# 3874)

- *Muck Creek Triangle Area Broom Spraying* - Treated about 125 acres in core and buffer areas.
- *Johnson Prairie Broom Spraying* – Treated 132 acres throughout the prairie.
- *Upper Weir Prairie Broom Spraying* – Sprayed 59 acres in the southern portion of the prairie.
- *South Weir Broom Spraying* – Treated 10 acres on northeast side of pipeline.
- *Broom Spray Test Plots* – treated 10 100m^2 plots to test treatment rates and products.
- *Seedling Propagation* – Managed over 50,000 plug seedlings for planting in fall 2006.

Oaks for Squirrels (TNC# 3875)

- *TA 8 Mowing* – Treated 13 acres to control broom and fir.
- *TA 12 Mowing* – Treated 13 acres to control broom and fir.
- Conducted post EGS trapping tube monitoring.
- Conducted directed visual surveys for gray squirrels at five Fort Lewis sites.
- Produced first draft of hair snag tube monitoring paper.
- Assisted with WGS trapping for telemetry project.

Butterflies (TNC# 3876)

- Valley SIlverspot monitoring

Streaked Horned Lark (TNC# 3877)

- *Lark Plots* - Boom sprayed 16 experimental lark habitat plots with triclopyr ester (Tahoe 4e) at Pacemaker and Upper Weir Prairie.
- *Lark Plots* - Conducted vegetation measurements on all experimental lark plots.
- *Range 74/76 Broom Spraying* – Sprayed about 221 acres in streaked horned lark use area.
- *Pacemaker Area Broom Spraying* – Sprayed about 203 acres of broom in core lark habitat.
- *WDFW Regional Lark Study* – Contracted continued monitoring of lark populations in collaboration with WDFW.

Water Howellia Aquatic Weeds (TNC# 3887)

- *Yellow Flag Iris* – Controlled about 12,000 stems at Shaver Kettle, Shaver Marsh, Halverson Spring, Nixon Spring, American Lake, Muck Creek and along Chamber's Lake.
- *Purple Loosestrife* – Controlled over 700 plants at Johnson Marsh and American Lake.
- *Japanese Knotweed* – Controlled four small populations.
- *Fragrant Water Lilly* – Treated numerous plants at Chambers Lake.
- *Reed Canaryrgrass* – mowed and brushcut 10 acres in preparation for fall spraying at Shaver Kettle, Halverson Springs, Nixon Springs and along Muck Creek.

.

Appendix II: Enhancement Activity Maps

Figure 1: Scotch broom spraying locations for summer quarter 2006 at 13th Division Prairie on Fort Lewis.

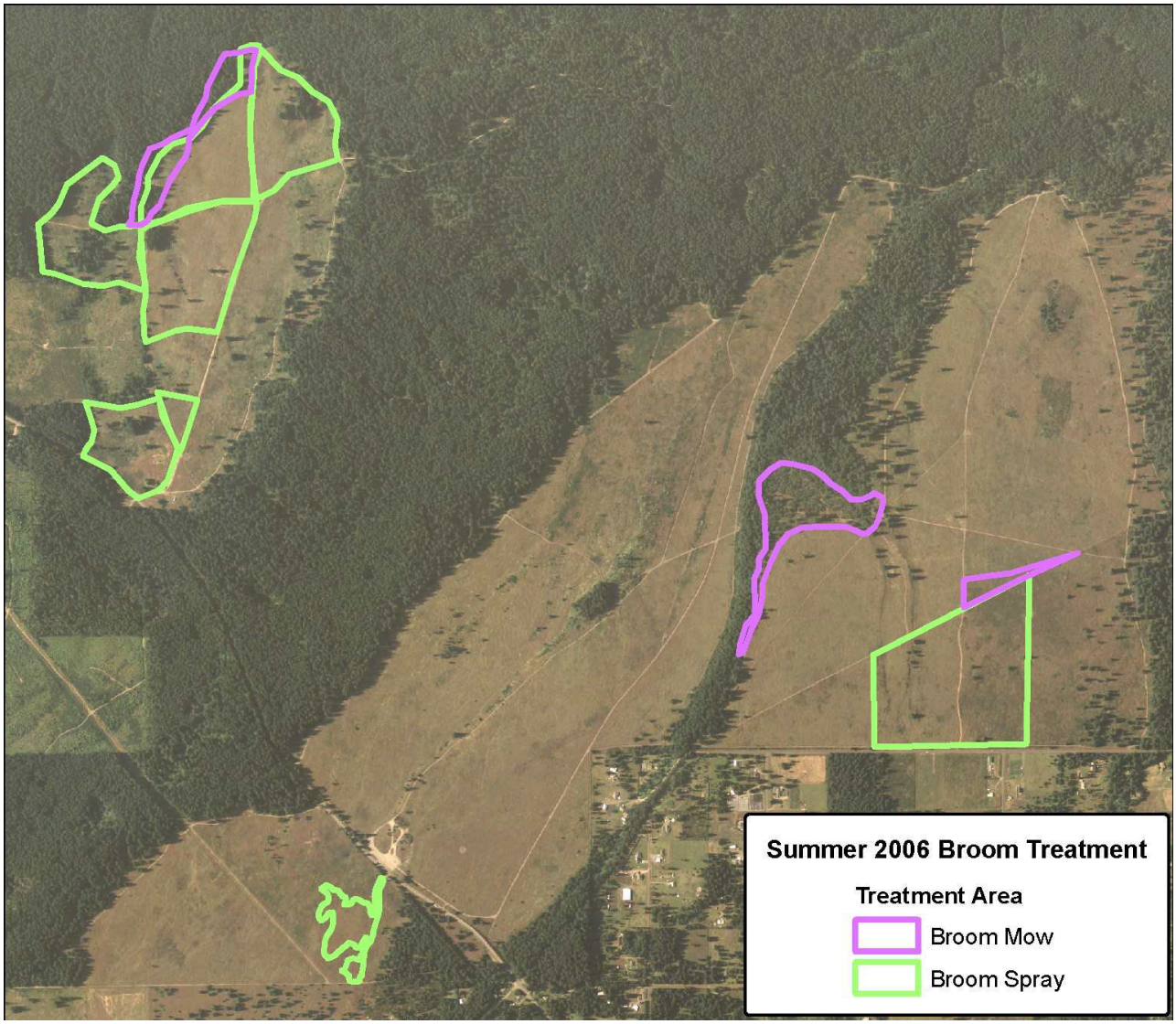


Figure 2: Scotch broom mowing and spraying for summer quarter 2006 at Johnson/Weir Prairies on Fort Lewis.

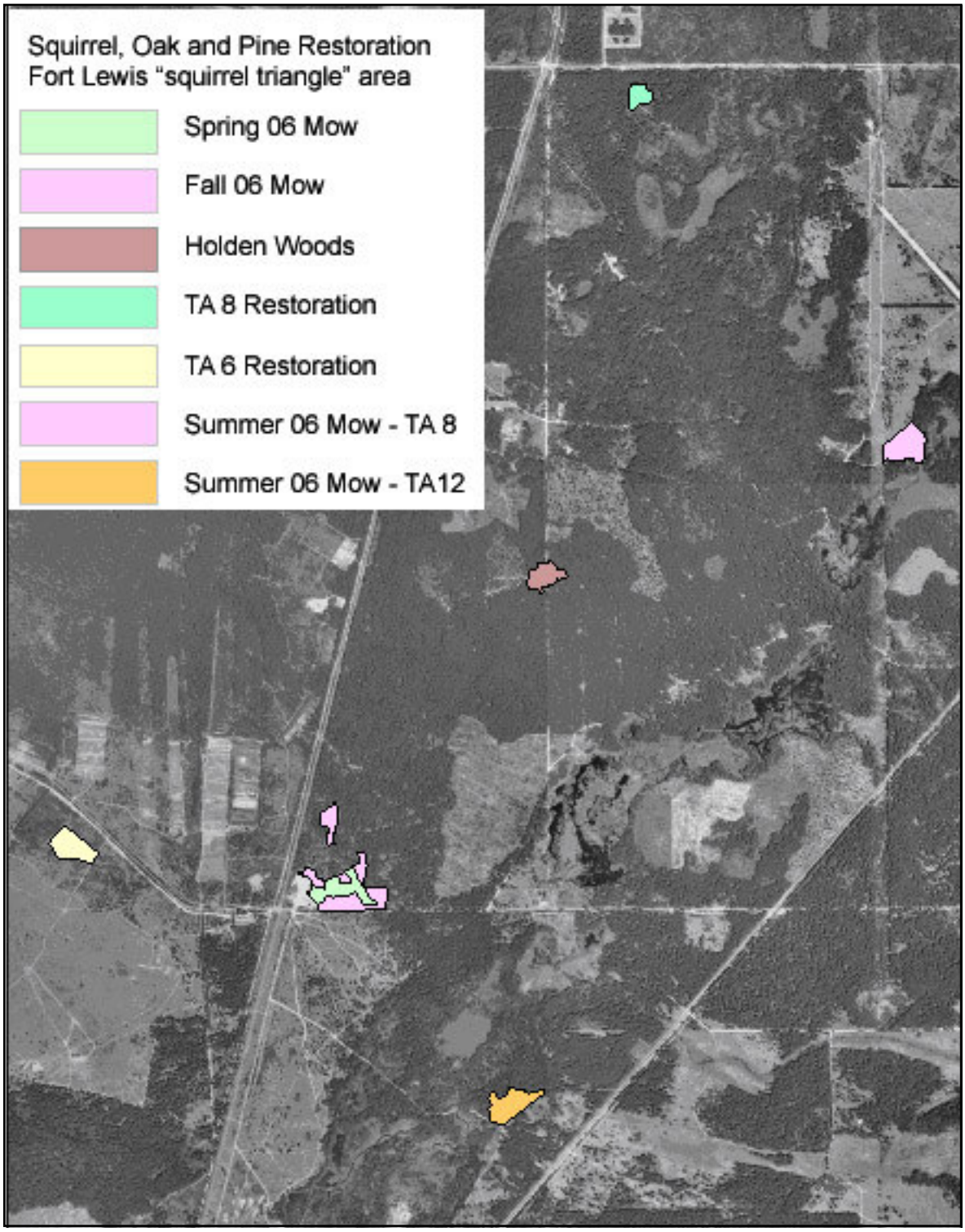


Figure 3: Squirrel, pine and oak habitat enhancement activity in the Fort Lewis "squirrel triangle" area.

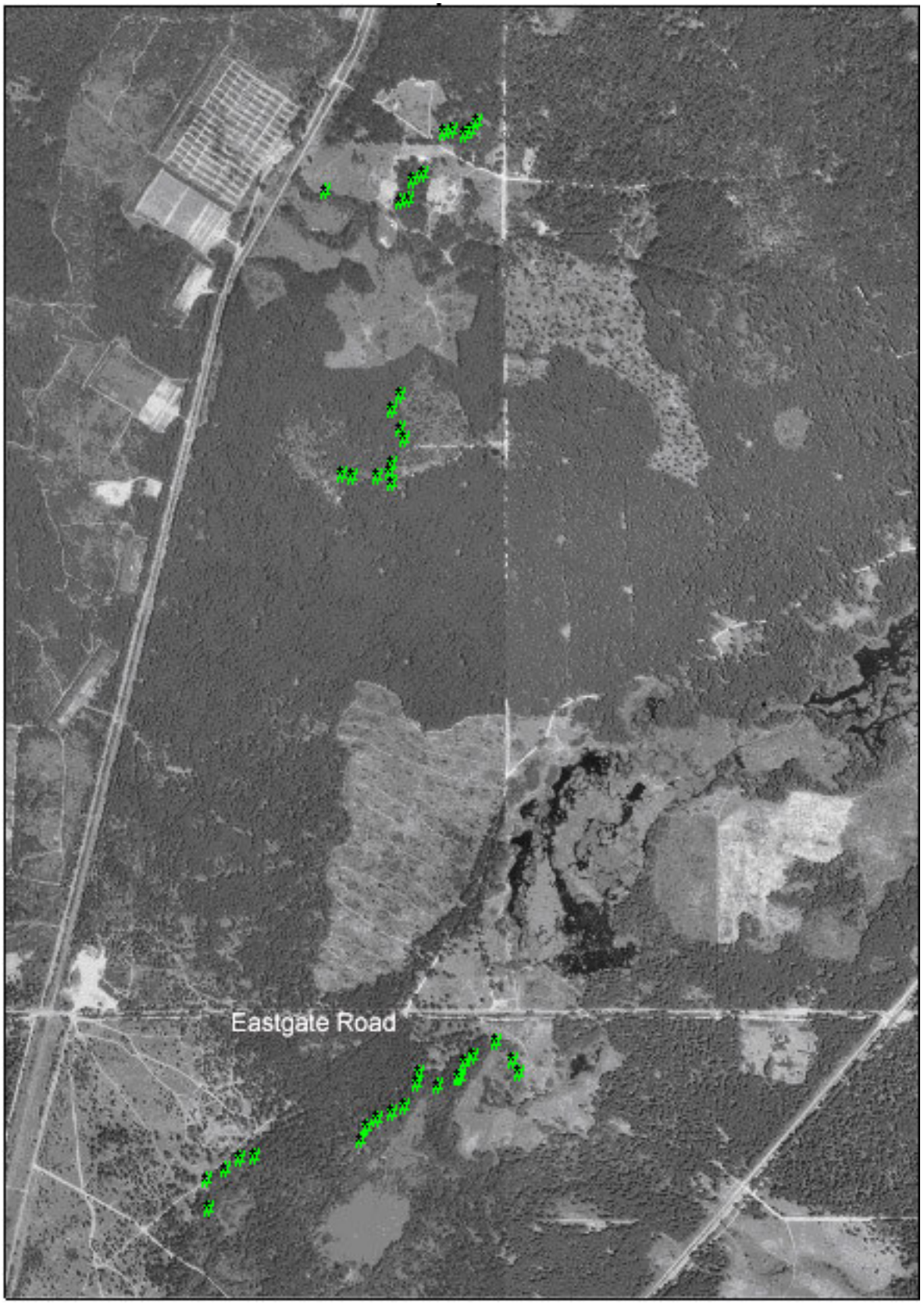


Figure 4: Trap locations for the western gray squirrel radio telemetry project.

Appendix III: Noxious Weed Control Activity Maps

Figure 5: Aquatic weed control activity in the Fort Lewis Muck Creek Triangle area. for summer 2006

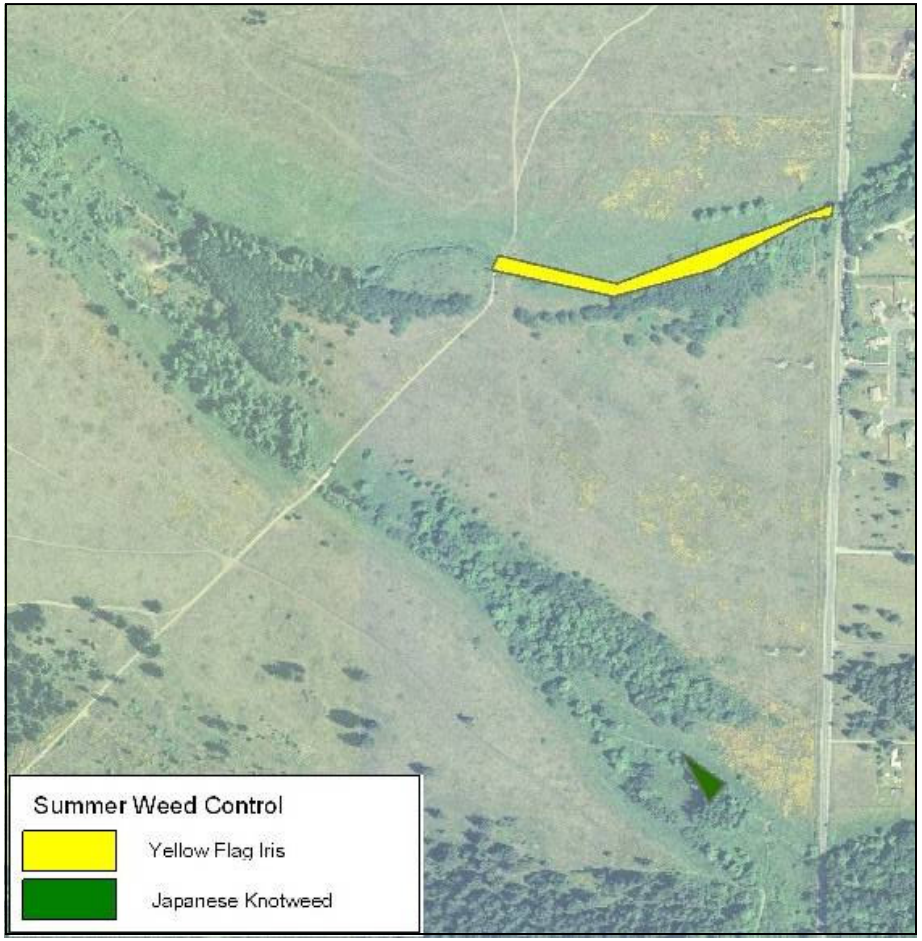
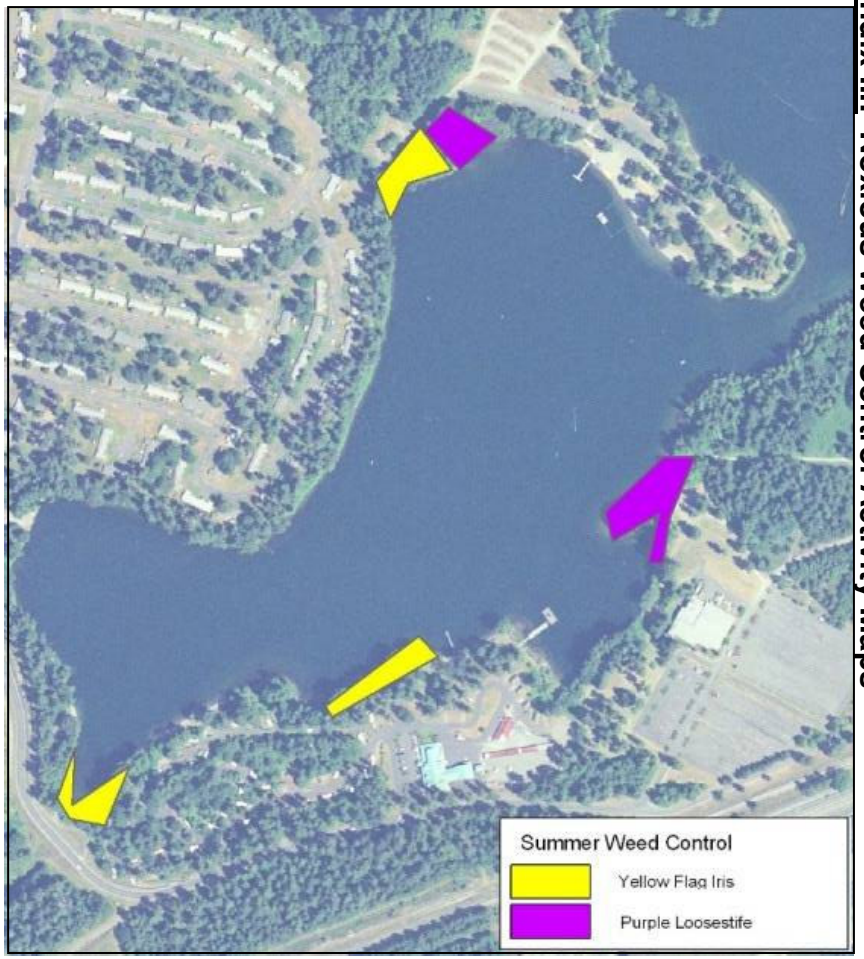


Figure 6: Aquatic weed control activity at American Lake at Fort Lewis for summer 2006.



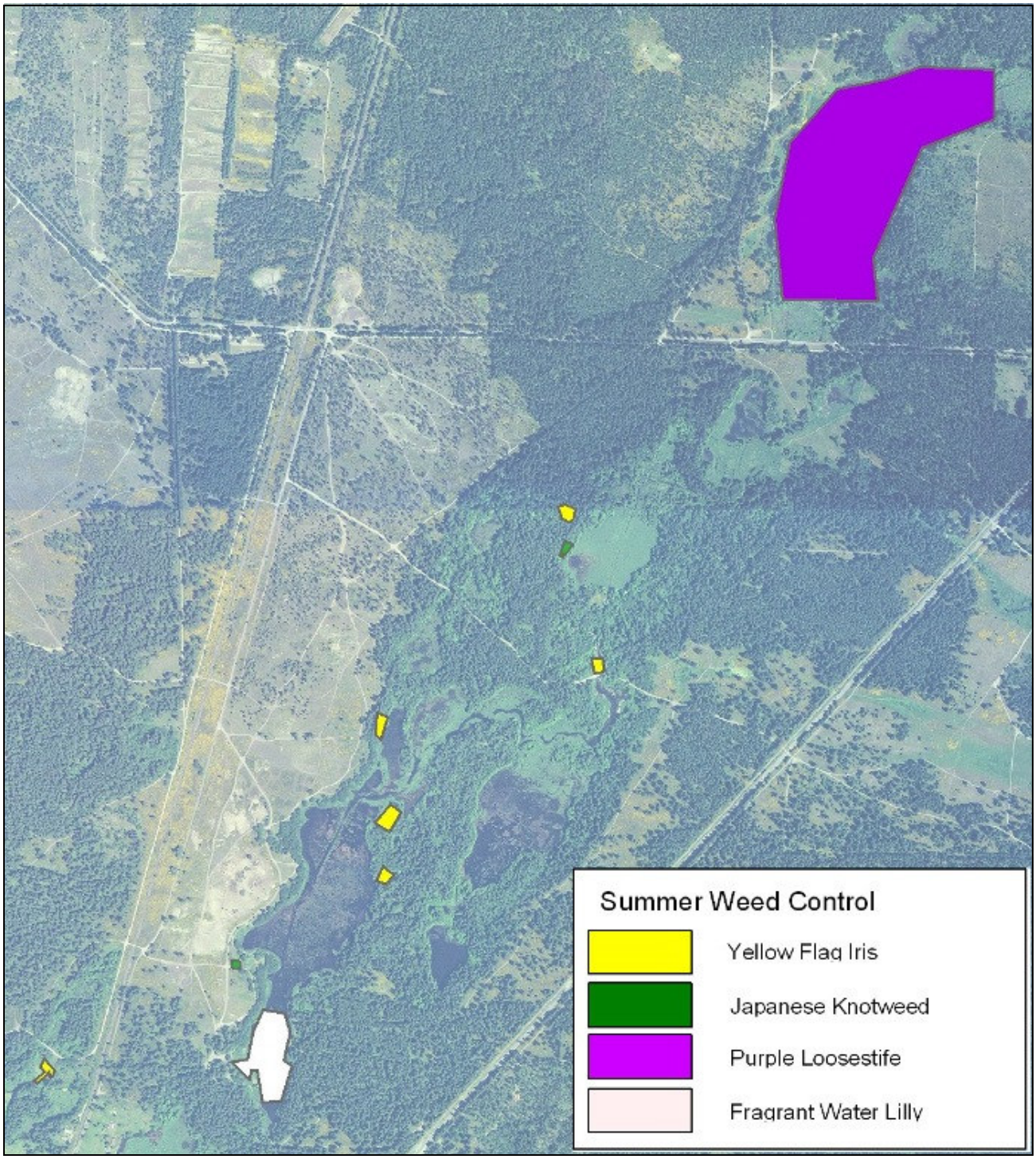


Figure 7: Weed control activities in the Johnson Marsh area of Fort Lewis for summer 2006.

Appendix IV:

Table 1. Results of hair snag monitoring for western gray squirrels (wgs) and eastern gray squirrels (egs) during May and June, 2006 at four different sites on Fort Lewis following eastern gray squirrel trapping.

	Monitoring Period						
Tube No.	early May	late May	early June	late June	July	August	September
A. Spanaway and Hardhack Marsh Area							
16							
19							
23							
25							
27							
30							
35							
37							
42							
45							
48							
55							
57							
59							
62							
66							
B. DeBalon Stand and Environs							
186							
192							
196							
198							
200							
C. South of Eastgate Rd.							
183							
185							
202							
203							
205							
207							
D. West side of Chambers Lake							
249							
254							
256							
261							
265							
268							
273							
275							
281							
287							
292							
295							
	S. griseus			*S. carolinensis*			both

Table 2: Seedling availability from Shotwell's Nursery

Species	Species Code	Ft Lewis Total Available
Aquilegia formosa	AQFO	200
Armeria maritima v.californica	ARMA	40
Aster curtus	ASCU	75
Balsamorhiza deltoidea	BADE	200
Camassia leichtlinii	CALE	0
Camassia quamash	CAQU	0
Carex inops	CAIN	0
Castilleja hispida	CAHI	1200
Danthonia californica	DACA	200
Delphinium menziesii	DEME	0
Deschampsia caespitosa	DECA	0
Elymus glaucus	ELGL	0
Erigeron speciousus	ERSP	700
Eriophyllum lanatum	ERLA	1400
Festuca idahoensis var. roemeri	FERO	40000
Fragaria virginiana	FRVI	1200
Fritillaria affinis	FRAF	0
Gaillardia aristata	GAAR	0
Hordeum brachyantherum	HOBR	0
Lilium columbianum	LICO	0
Lomatium nudicaule	LONU	150
Lomatium triternatum	LOTR	600
Lomatium utriculatum	**LOUT**	1200
Lupinus albicaulis	LUAL	500
Lupinus polyphyllus	LUPO	0
Luzula campestris	LUCA	15
Marah oreganos	MAOR	0
Microseris laciniata	MILA	1260
Perideridia gairdneri	PEGA	0
Potentilla glandulosa	POGL	0
Potentilla gracilis	POGR	300
Ranunculus occidentalis	RAOC	300
Sanicula crassicaulis v. tripartitia	SACR	0
Saxifraga integrifolia v. integrifolia	SAXIN	0
Silene scoluleri	SISC	43
Solidago canadensis	SOCA	0
Solidago missouriensis	SOMI	600
Solidago spathulata	SOSP	0
Viola adunca	VIAD	1065
Viola praemorsa	VIPR	0
Wyethia angustafolium	WYAN	0
Total		**51248**