



1999 Invasive Exotic Plant Activity Report

by

**Miles Falck
Wildlife Biologist**

**Elizabeth A. Bunch
Education Outreach Specialist**

**Kendall Holmes
Wildlife Aid**

**Administrative Report 00-01
August 8, 2000**

**Great Lakes Indian Fish
& Wildlife Commission
Biological Services Division
P.O. Box 9
Odanah, WI 54861
(715) 682-6619**

TABLE OF CONTENTS

Introduction.....	2
Exotic plant survey	3
Purple loosestrife control in the Bad River / Chequamegon Bay watershed	15
Purple loosestrife monitoring and control on the Chippewa Flowage	18
Exotic plant education and outreach activities	23
Interagency coordination on exotic plant issues	29
Literature Cited.....	30
Appendix A.....	31
List of Tables	
Summary of purple loosestrife sites located during the 1999 survey.....	7
Summary of leafy spurge sites located during the 1999 survey.....	12
Summary of spotted knapweed sites located during the 1999 survey.....	14
Summary of purple loosestrife sites inventoried by year on the Chippewa Flowage.....	18
Summary of monitoring sites on the Chippewa Flowage, Sawyer County, WI.....	22
Materials developed or purchased for exotic plant educational outreach activities.....	24
Summary of educational outreach engagements during the summer of 1999.....	25
Summary of brochure, locator card, and slide show distribution in 1999.....	28
List of Figures	
Location of GLIFWC member tribes and ceded territories.....	2
Routes surveyed for non-native plants during 1999	5
Purple loosestrife sites located in 1999 survey.....	6
Leafy spurge sites located in 1999 survey.....	11
Spotted knapweed sites located in 1999 survey.....	13
Loosestrife control activities in the Bad River/Chequamegon Bay watershed in 1999.....	16
Purple loosestrife locations inventoried on the Chippewa Flowage 1997-1999.....	19
Loosestrife control activities on the Chippewa Flowage in 1999.....	20
Purple loosestrife monitoring sites on the Chippewa Flowage.....	21

INTRODUCTION

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an organization exercising delegated authority from 11 federally recognized tribes in Minnesota, Wisconsin, and Michigan (Figure 1). These tribes retain hunting, fishing, and gathering rights in the territories ceded to the United States through various treaties (Figure 1). The exercise of these rights may be threatened by the degradation of native ecosystems by invasive non-native plants.

This report summarizes the activities undertaken by GLIFWC staff during 1999 to address the spread of invasive non-native plant species in the ceded territories. GLIFWC staff have conducted annual inventory and control work on purple loosestrife (*Lythrum salicaria*) since 1988 (Gilbert and Parisien 1989, Edblom et al. 1995, Gilbert et al. 1995, Gilbert et al. 1998, Falck et al. 1999). In 1999, GLIFWC staff recognized the need to 1) assess the threats of other invasive exotic plants, 2) develop an educational program aimed at preventing the introduction and spread of additional exotic plants, and 3) coordinate activities with other resource agencies, universities, NGO's, and the general public.

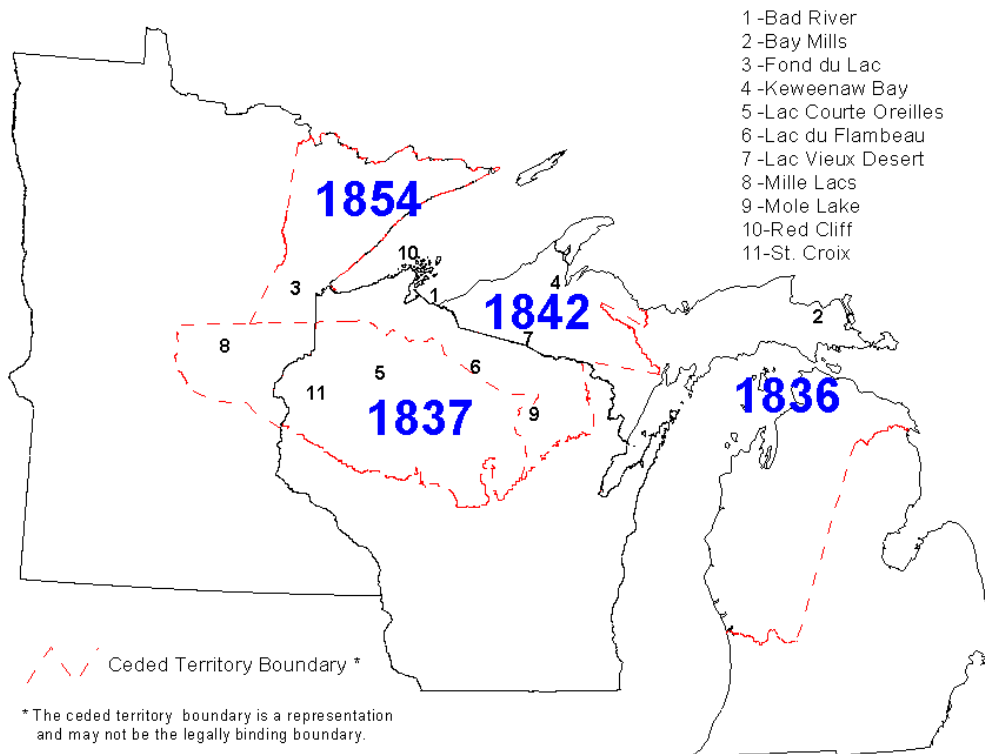


Figure 1. Location of GLIFWC member tribes and ceded territories.

SURVEY OF NON-NATIVE INVASIVE PLANTS IN THE WESTERN PORTION OF THE 1842 CEDED TERRITORY IN WISCONSIN

The primary objectives of the 1999 non-native invasive plant inventory were to 1) supplement existing distribution and abundance data for purple loosestrife, 2) develop survey methods for other exotic plant species, and 3) determine the current distribution and abundance of other invasive exotic plant species.

METHODS

In addition to purple loosestrife, spotted knapweed (*Centaurea maculosa*), leafy spurge (*Euphorbia esula*), garlic mustard (*Allaria petiolata*), buckthorn (*Rhamnus* spp.), and several exotic honeysuckles (*Lonicera* spp.) were targeted for surveys based on anecdotal information on their local distributions. Field surveys were made from a truck traveling at 5-35 mph along primary roads and aided by binoculars when necessary. A more intensive survey using secondary roads was conducted around any newly discovered populations. New populations were further inspected by foot to identify potential dispersal routes and nearby native plant communities perceived to be at risk of colonization. Additional locations for purple loosestrife were provided by staff from the USFS, WIDNR, TNC, and private individuals via a locator postcard distributed with educational brochures.

Data collected included species, habitat, location, areal extent, number of plants, and land ownership. Location was determined using a hand-held GPS unit, an odometer reading from a known point was also recorded for back-up purposes. Habitat was recorded as either roadside, shoreline, wetland, or upland. Areal extent was estimated and placed in 1 of 3 familiar size categories: (1) living room [~ 0.01 acres], (2) baseball diamond [0.20 acres] or (3) football field [1.00 acres] and a size multiplier was used if needed (e.g. 2(3) = 2 football fields [2.0 acres]). Number of plants was also recorded in 3 categories: (1) < 50 , (2) 50-1000, and (3) > 1000 . Land ownership was recorded as either public, private, right-of-way, mixed (e.g. spanning public and private), or unknown. Additional notes were also recorded to assist in relocating each site.

Data were entered into a Paradox database for use in ArcView GIS software. Locations were mapped in ArcView GIS using the GPS coordinates or, where GPS coordinates were unavailable, hand digitized from field notes and odometer readings.

After the survey was initiated it became apparent that most spotted knapweed infestations consisted of linear stretches of roadway, often extending for many miles. Hence, the entire stretch was mapped as a line feature rather than a single point location. Where knapweed was found in isolated clumps, it was recorded as an individual point location.

RESULTS

Survey methods used for loosestrife proved effective for spotted knapweed and leafy spurge because they are easily observed from the road in the open habitats and roadsides they initially colonize. However, garlic mustard, buckthorn, and honeysuckle were difficult to detect from the road because they are shade-tolerant and grow well in the forest interior. Buckthorns and honeysuckles were initially introduced on old homesteads and are now widely dispersed by birds and other wildlife. In addition, garlic mustard and honeysuckle both flowered in May and early June, prior to the start of our surveys.

Approximately 1550 miles of roadsides were surveyed (Figure 2) over 23 days, between 16 June 1999 and 26 August 1999. A total of 139 new loosestrife populations (Figure 3) comprising ~ 62 acres of purple loosestrife were discovered during this survey. GLIFWC staff located 117 sites (52 acres), WIDNR staff reported 9 sites (2 acres), TNC staff reported 1 site (< 1 acre), and postcard returns accounted for the remaining 12 sites (7 acres). Figure 3 illustrates the distribution and Table 1 summarizes the attributes of loosestrife colonies located during the 1999 survey.

A total of 38 leafy spurge populations (Figure 4) were discovered comprising ~ 28 acres. GLIFWC staff located 33 sites (22 acres) and USFS staff reported 5 sites (3 acres). Table 2 summarizes the leafy spurge sites located during this survey and provides a key to the sites illustrated in Figure 4.

Roadside surveys for spotted knapweed discovered 207 miles of infested right-of-ways and 22 discrete populations comprising a minimum of 110 acres in total (Figure 5). Table 3 summarizes the spotted knapweed sites located during this survey and provides a key to the sites illustrated in Figure 5.

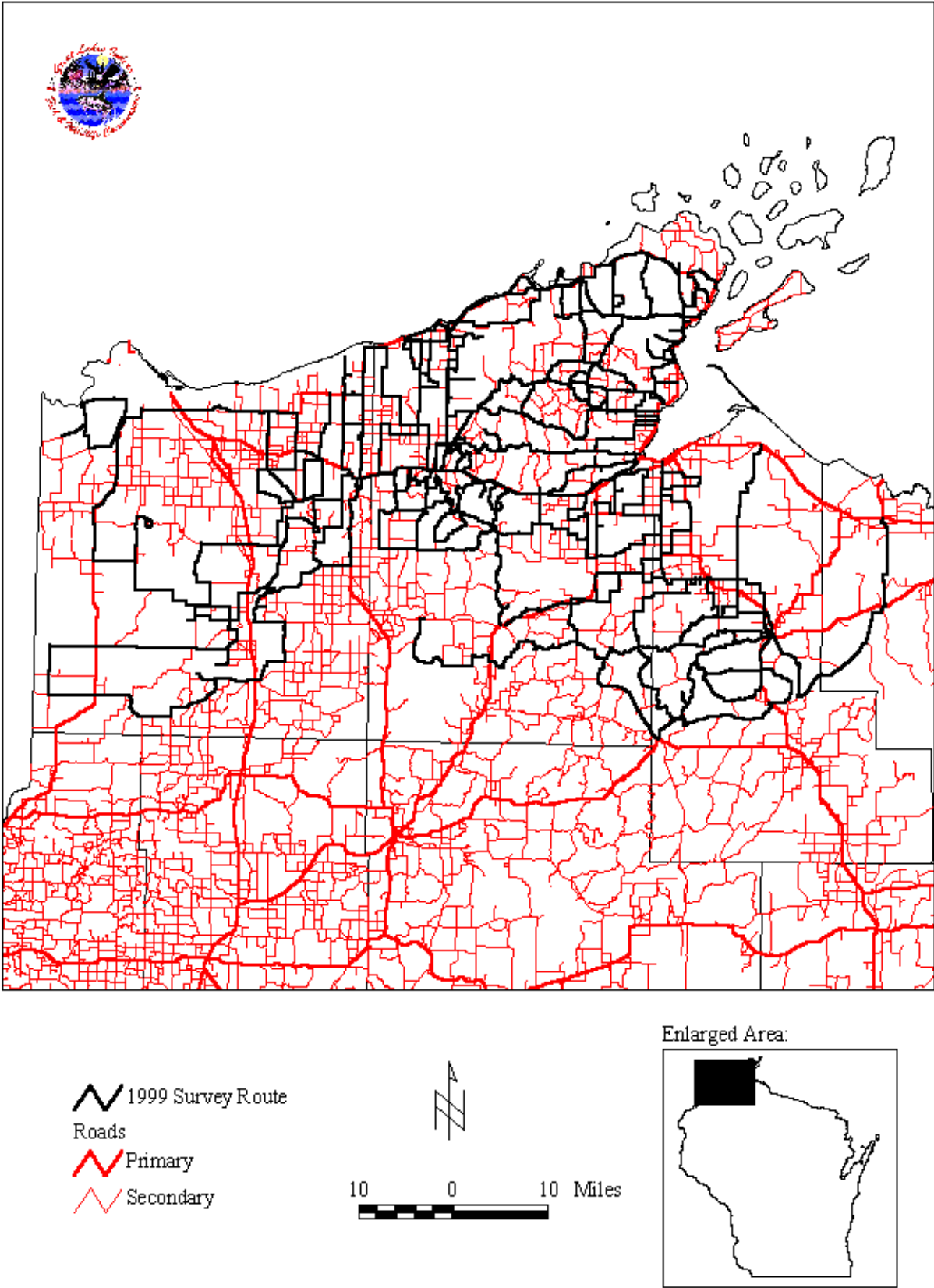
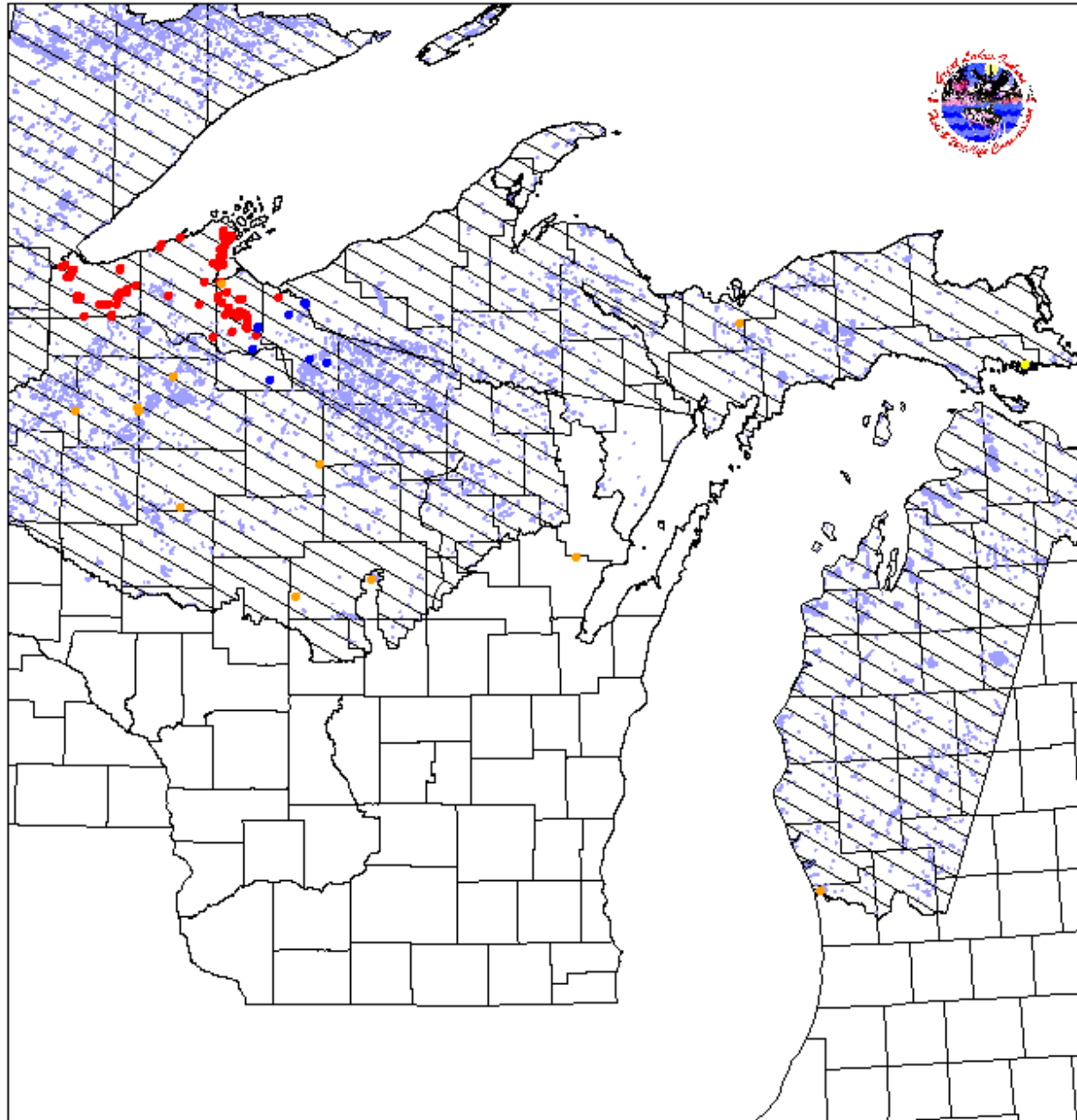



Figure 2. Routes surveyed for non-native plants during 1999.



Purple Loosestrife Sites by Source

- GLIFWC
- Locator Card
- TNC
- WIDNR

 Ceded Territory*

 Lakes

* The ceded territory is a representation and may not be the legally binding boundary.

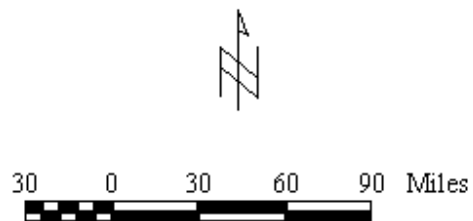


Figure 3. Purple loosestrife sites located in 1999.

Table 1. Summary of 139 purple loosestrife sites located during the 1999 survey.

ID No.	T	R	S	No. Plants	Acres	Habitat	Ownership	Data Source
7	50N	4W	22	50-1000	0.01	ditch	right-of-way	GLIFWC
18	49N	4W	16	>1000	1.00	wetland	state	GLIFWC
19	50N	4W	22	>1000	0.20	ditch	right-of-way	GLIFWC
80	44N	2W	6	50-1000	0.01	ditch	right-of-way	GLIFWC
81	45N	3W	9	<50	0.20	ditch	private	GLIFWC
85	51N	4W	35	>1000	3.00	ditch	right-of-way	GLIFWC
86	50N	4W	2	<50	0.01	ditch	right-of-way	GLIFWC
87	50N	4W	2	>1000	0.20	ditch	right-of-way	GLIFWC
88	50N	4W	1	<50	0.01	ditch	right-of-way	GLIFWC
89	50N	4W	12	<50	0.01	ditch	right-of-way	GLIFWC
90	50N	4W	2	50-1000	0.40	sandpit	private	GLIFWC
91	50N	4W	2	>1000	5.00	shoreline	private	GLIFWC
92	50N	4W	2	50-1000	0.01	ditch	right-of-way	GLIFWC
93	50N	4W	10	<50	0.01	ditch	right-of-way	GLIFWC
94	50N	4W	9	>1000	2.00	ditch	right-of-way	GLIFWC
95	50N	4W	4	<50	0.01	ditch	right-of-way	GLIFWC
96	51N	4W	28	50-1000	0.20	ditch	right-of-way	GLIFWC
97	51N	4W	28	50-1000	1.00	ditch	right-of-way	GLIFWC
98	51N	4W	21	<50	0.01	ditch	right-of-way	GLIFWC
99	50N	4W	27	>1000	1.00	ditch	right-of-way	GLIFWC
100	50N	4W	14	50-1000	1.00	ditch	right-of-way	GLIFWC
101	50N	4W	15	>1000	1.00	ditch	right-of-way	GLIFWC
102	50N	4W	15	>1000	0.01	ditch	right-of-way	GLIFWC
103	50N	4W	15	>1000	2.00	ditch	right-of-way	GLIFWC
104	50N	4W	11	50-1000	0.01	ditch	right-of-way	GLIFWC
105	49N	4W	18	<50	0.20	ditch	right-of-way	GLIFWC
106	50N	4W	32	<50	0.01	ditch	right-of-way	GLIFWC
107	50N	4W	33	<50	0.01	ditch	right-of-way	GLIFWC
108	50N	4W	28	>1000	0.40	ditch	right-of-way	GLIFWC
109	49N	4W	31	50-1000	0.20	ditch	right-of-way	GLIFWC
110	49N	4W	31	<50	0.01	ditch	right-of-way	GLIFWC
111	47N	5W	5	<50	0.01	ditch	right-of-way	GLIFWC
112	46N	6W	23	>1000	1.00	ditch	right-of-way	GLIFWC
113	44N	2W	22	50-1000	1.00	shoreline	mixed	GLIFWC
114	46N	1E	6	>1000	1.00	wetland	right-of-way	GLIFWC
115	50N	4W	15	<50	0.01	ditch	right-of-way	GLIFWC
116	50N	4W	15	50-1000	0.01	ditch	right-of-way	GLIFWC
117	50N	4W	15	<50	0.01	ditch	right-of-way	GLIFWC
118	50N	4W	15	<50	0.01	ditch	right-of-way	GLIFWC

Table 1. (Continued)

ID No.	T	R	S	No. Plants	Acres	Habitat	Ownership	Data Source
119	50N	4W	10	<50	0.01	ditch	right-of-way	GLIFWC
120	50N	4W	21	<50	0.01	ditch	mixed	GLIFWC
121	47N	4W	31	<50	0.01	ditch	right-of-way	GLIFWC
122	46N	4W	7	<50	0.01	ditch	right-of-way	GLIFWC
123	46N	4W	17	<50	0.01	ditch	right-of-way	GLIFWC
124	50N	8W	28	<50	0.01	wetland	right-of-way	GLIFWC
125	50N	8W	29	>1000	2.00	ditch	right-of-way	GLIFWC
126	47N	10W	14	<50	0.01	ditch	right-of-way	GLIFWC
127	50N	7W	3	<50	0.01	ditch	right-of-way	GLIFWC
128	46N	11W	3	50-1000	1.00	shoreline	right-of-way	GLIFWC
129	46N	11W	10	<50	0.01	shoreline	county	GLIFWC
130	46N	11W	10	<50	0.01	shoreline	right-of-way	GLIFWC
131	46N	11W	21	<50	0.01	ditch	right-of-way	GLIFWC
132	47N	11W	34	<50	0.01	ditch	right-of-way	GLIFWC
133	47N	11W	35	50-1000	0.20	ditch	right-of--way	GLIFWC
134	47N	11W	35	>1000	1.00	shoreline	mixed	GLIFWC
135	47N	11W	36	50-1000	1.00	shoreline	town	GLIFWC
136	47N	11W	25	>1000	1.00	ditch	mixed	GLIFWC
137	47N	10W	30	<50	0.01	shoreline	state	GLIFWC
138	47N	10W	30	<50	0.01	wetland	unknown	GLIFWC
139	48N	11W	15	>1000	1.00	ditch	right-of-way	GLIFWC
140	48N	11W	15	<50	0.01	ditch	right-of-way	GLIFWC
141	48N	11W	15	<50	0.01	ditch	right-of-way	GLIFWC
142	49N	4W	31	<50	0.01	ditch	right-of-way	GLIFWC
143	49N	5W	35	>1000	1.00	ditch	right-of-way	GLIFWC
144	46N	8W	2	<50	0.01	ditch	right-of-way	GLIFWC
145	48N	14W	22	50-1000	0.20	ditch	mixed	GLIFWC
146	48N	14W	22	<50	0.01	ditch	right-of-way	GLIFWC
147	48N	14W	22	<50	0.01	ditch	right-of-way	GLIFWC
148	48N	14W	22	50-1000	1.00	ditch	right-of-way	GLIFWC
149	48N	14W	27	50-1000	0.20	ditch	right-of-way	GLIFWC
150	48N	14W	33	50-1000	0.01	ditch	right-of-way	GLIFWC
151	48N	14W	33	50-1000	0.01	ditch	right-of-way	GLIFWC
152	47N	14W	6	<50	0.01	ditch	right-of-way	GLIFWC
153	48N	15W	12	<50	0.01	shoreline	state	GLIFWC
154	48N	14W	7	>1000	3.00	ditch	right-of-way	GLIFWC
155	46N	14W	14	50-1000	0.02	shoreline	right-of-way	GLIFWC
156	46N	14W	12	<50	0.01	shoreline	state	GLIFWC
157	46N	14W	12	50-1000	1.00	shoreline	mixed	GLIFWC

Table 1. (Continued)

ID No.	T	R	S	No. Plants	Acres	Habitat	Ownership	Data Source
158	46N	13W	7	50-1000	0.20	wetland	right-of-way	GLIFWC
159	46N	13W	18	50-1000	0.20	shoreline	right-of-way	GLIFWC
160	46N	13W	18	<50	0.01	ditch	right-of-way	GLIFWC
161	46N	13W	7	50-1000	0.03	ditch	right-of-way	GLIFWC
162	45N	13W	20	50-1000	0.03	wetland	right-of-way	GLIFWC
163	46N	12W	21	<50	0.01	ditch	right-of-way	GLIFWC
164	46N	12W	22	50-1000	0.01	ditch	right-of-way	GLIFWC
165	46N	12W	25	<50	0.01	ditch	right-of-way	GLIFWC
166	45N	11W	17	>1000	3.00	wetland	state	GLIFWC
167	45N	11W	17	>1000	5.00	wetland	state	GLIFWC
168	45N	3W	4	<50	0.01	ditch	right-of-way	GLIFWC
169	45N	3W	3	<50	0.01	ditch	right-of-way	GLIFWC
170	45N	3W	3	<50	0.01	wetland	private	GLIFWC
171	45N	3W	3	<50	0.03	wetland	right-of-way	GLIFWC
172	45N	3W	12	50-1000	0.20	ditch	right-of-way	GLIFWC
173	45N	3W	13	<50	0.20	ditch	right-of-way	GLIFWC
174	45N	2W	30	<50	0.01	ditch	right-of-way	GLIFWC
175	44N	2W	6	<50	0.01	ditch	right-of-way	GLIFWC
176	44N	3W	1	50-1000	0.20	ditch	right-of-way	GLIFWC
177	44N	3W	1	50-1000	0.01	ditch	right-of-way	GLIFWC
178	44N	3W	18	<50	0.01	ditch	right-of-way	GLIFWC
179	44N	5W	26	<50	0.01	shoreline	USFS	GLIFWC
180	45N	4W	10	<50	0.01	ditch	right-of-way	GLIFWC
181	45N	4W	2	<50	0.01	ditch	right-of-way	GLIFWC
182	45N	4W	1	50-1000	0.02	ditch	right-of-way	GLIFWC
183	45N	3W	6	<50	0.01	ditch	right-of-way	GLIFWC
184	45N	3W	4	<50	0.01	ditch	right-of-way	GLIFWC
185	45N	3W	4	<50	0.01	ditch	right-of-way	GLIFWC
212	45N	3W	8	>1000	1.00		right-of-way	GLIFWC
213	45N	3W	9	>1000	1.00		right-of-way	GLIFWC
214	46N	4W	26	<50	0.01		right-of-way	GLIFWC
215	47N	4W	27	>1000	2.00		right-of-way	GLIFWC
216	47N	4W	5	50-1000	0.01		private	GLIFWC
217	46N	3W	11	<50	0.01		tribal	GLIFWC
218	46N	3W	3	<50	0.01		tribal	GLIFWC
219	48N	4W	6	50-1000	0.01		right-of-way	GLIFWC
220	48N	4W	6	50-1000	0.20		right-of-way	GLIFWC
221	48N	4W	6	>1000	0.20		right-of-way	GLIFWC
222	49N	4W	33	>1000	2.00			GLIFWC

Table 1. (Continued)

ID No.	T	R	S	No. Plants	Acres	Habitat	Ownership	Data Source
223	42N	4E	8	50-1000	2.00	shoreline		WIDNR
224	42N	3E	6	<50	0.01	shoreline		WIDNR
225	44N	2W	2	<50	0.00	ditch		WIDNR
226	46N	2E	14	<50	0.00	ditch		WIDNR
227	46N	2E	13	<50	0.01	ditch		WIDNR
228	45N	1E	11	<50	0.01			WIDNR
229	43N	2W	16	50-1000	0.00	shoreline		WIDNR
230	44N	2W	2	<50	0.01	ditch		WIDNR
231	41N	1W	22		0.00	field		WIDNR
232	41N	01E	6	50-1000	0.00			TNC
234	33N	7W	35	50-1000	0.01	ditch		Postcard
235				>1000	1.00	wetland		Postcard
236	27N	2E	21		0.00	ditch		Postcard
237	35N	3E	2		0.00	ditch		Postcard
238	41N	7W	8		0.00	shoreline		Postcard
239	28N	7E	22	>1000	4.00	ditch		Postcard
240	39N	10W	13	50-1000	0.01	shoreline		Postcard
241	39N	10W	24	>1000	0.20	shoreline		Postcard
242	47N	4W	8	<50	0.01	wetland		Postcard
243	39N	14W	26	>1000	2.00		private	Postcard
244	45N	19W	14	50-1000	0.20	shoreline	private	Postcard
245	29N	20E	2		0.00	ditch	private	Postcard

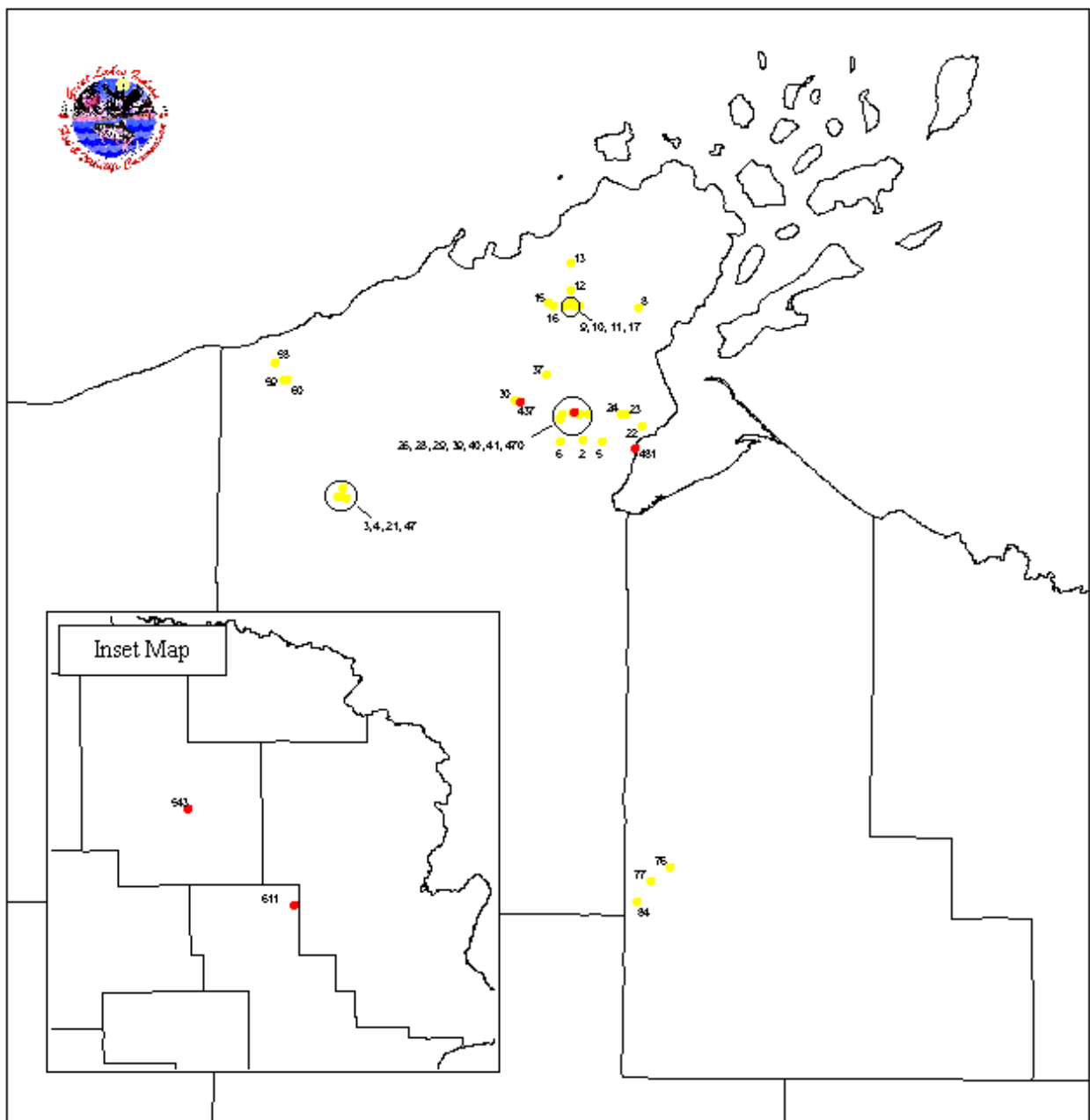


Figure 4. Leafy spurge sites located in 1999 survey.

Table 2. Summary of 38 leafy spurge sites located during the 1999 survey.

ID No.	T	R	S	No. Plants	Acres	Notes
2	48N	5W	9		0.005	Wanabo Rd. @box49M
3	48N	8W	34		1.000	red pine plantation; sandy soil/openings
4	48N	8W	34		0.200	0.5 miles south of 99003
5	48N	5W	10		0.005	Jct Wanabo & Ondosagon E of electric box
6	48N	5W	7		1.000	Jct Wanabo & Pajala
8	50N	4W	19		0.005	S side of Cnty J on roadside
9	50N	5W	16		0.200	N side Cnty J
10	50N	5W	20		0.005	Not apparent in field
11	50N	5W	17		0.005	Above culvert
12	50N	5W	8	<50	0.005	7 plants in clay
13	51N	5W	32		0.200	Above culvert
15	50N	5W	18		1.000	
16	50N	5W	18		1.000	0.3 miles along both sides of road
17	50N	5W	20		1.000	All along road
21	48N	8W	33		0.200	
22	49N	4W	31		0.200	Along roadside and into fir grove
23	49N	5W	25		0.005	At mailbox rf#30855 not in field
24	49N	5W	25		0.005	
26	49N	5W	33		1.000	Jct of Maple Hill & Church Corner Rds. ½ mile S
28	49N	5W	33		0.200	Continues along road for 1.7 miles
29	49N	5W	29		10.000	10A field full
30	49N	6W	27		1.000	Known site on forest
37	49N	6W	13		0.200	2 sites 40-80m N of jct Cnty C & FR 256
39	49N	5W	31		0.005	Several small pops along rd for 50m
40	49N	5W	31		0.005	30m N of 99039
41	49N	5W	32		0.005	100m S of jct 697/Maple Hill Rd
47	48N	8W	34		0.005	1x6m W side recently graded
58	49N	9W	10		0.200	W side 1x3m E side 2x12m
59	49N	9W	14		1.000	N and S side of Rd for 100m
60	49N	9W	14		0.200	S side 10x1m more on N side
76	43N	4W	15		0.200	Along Cnty GG 10x25m very heavy coverage 75-100%
77	43N	4W	20		0.400	Both sides of Cnty GG 1.2miles W of Twin L. campground
84	43N	4W	31		2.000	Both sides of Cnty GG and bridge at Day L. outlet
437	49N	6W	26	>1000	1.000	
470	49N	5W	32			
481	48N	4W	7		0.025	
543	36N	14E	36			
611	33N	17E	24	>1000	2.000	

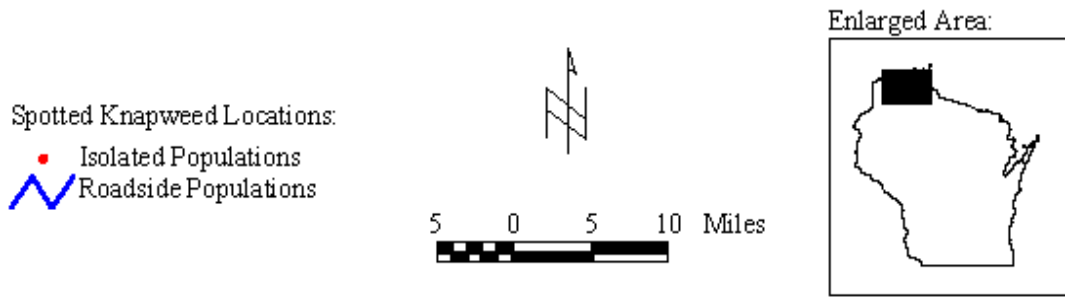
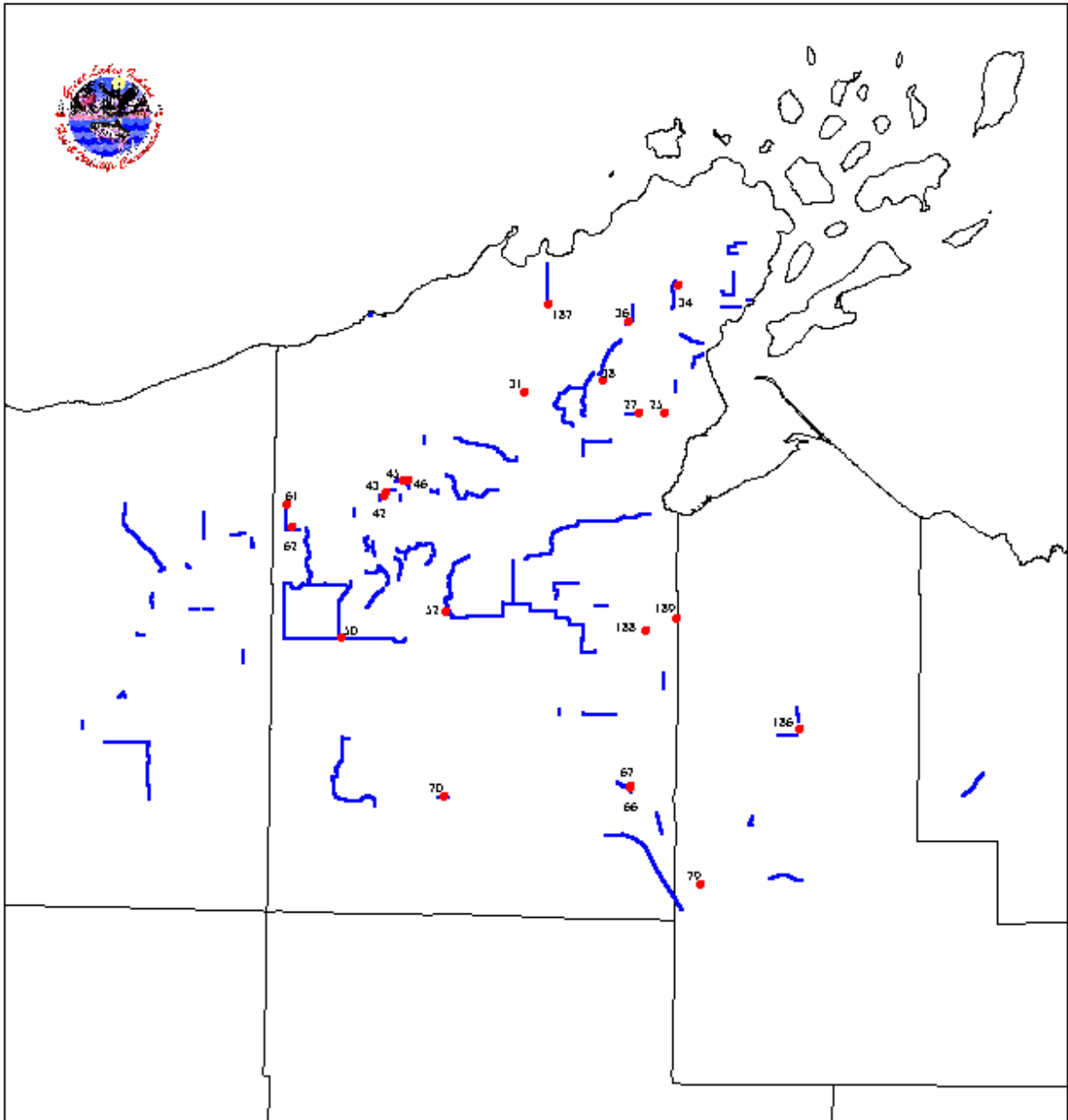


Figure 5. Spotted knapweed sites located in 1999 survey.

Table 3. Summary of 22 spotted knapweed sites located during the 1999 survey.

ID No.	T	R	S	No. Plants	Acres	Notes
25	49N	5W	26		0.005	1 plant in graveled lot
27	49N	5W	33		0.200	40x40m at corner continues 100m W
31	49N	6W	19		0.200	Brinks station
34	50N	5W	12	>1000	1.000	10x63m up old road
36	50N	5W	28		0.005	
38	49N	5W	18	>1000	1.000	Valhala parking/chalet/sliding area
42	48N	8W	33		0.200	60m along W side of Battle Axe
43	48N	8W	33	>1000	1.000	100+ m along pipeline each way pipeline #338
45	48N	8W	27		0.200	60x60m
46	48N	8W	27		0.005	
50	46N	9W	24	>1000	1.000	10x120m heavy on S side
52	46N	7W	7		0.005	White River headwaters / Delta L boat launch
61	47N	9W	6	>1000	1.000	Along Rd.200x1m
62	47N	9W	8		0.005	On Rd. & in gravel pits, 1 pit active
66	44N	5W	16		0.200	S side of FR 198 12x6m in opening
67	44N	5W	16	>1000	1.000	Marengo R. parking lot and nearby gravel pit 50x50
70	44N	7W	19		0.200	W side of Hwy 63 under powerline
79	43N	4W	20		0.200	100m W of 99076
186	45N	3W	16	>1000	4.000	Gravel / asphalt storage area
187	50N	6W	20	>1000	5.000	Throughout 5 Acre sandpit
188	46N	5W	22	>1000	10.000	Throughout 10A junkyard
189	46N	5W	12	>1000	2.000	N side of road

CONTROL ACTIVITIES IN THE BAD RIVER-CHEQUAMEGON BAY WATERSHED

Purple loosestrife populations within the Bad River - Chequamegon Bay watershed were inventoried in 1994, 1995, and 1999 (Gilbert et al. 1995, Edblom et al. 1995). Spatial data from these surveys were used to prioritize control efforts based on the size of loosestrife populations, location within the watershed, and their potential to infest undisturbed wetlands. Based on these criteria, the Highbridge area, and the highway 13 corridor between Highbridge and Washburn were assigned high priority for control.

METHODS

Prior to conducting field applications of herbicide, all loosestrife control workers attended a 1 day training workshop conducted by GLIFWC staff. Participants learned and/or reviewed safe handling, storage, and application procedures, applicable state and federal regulations, and received training on equipment operation and maintenance.

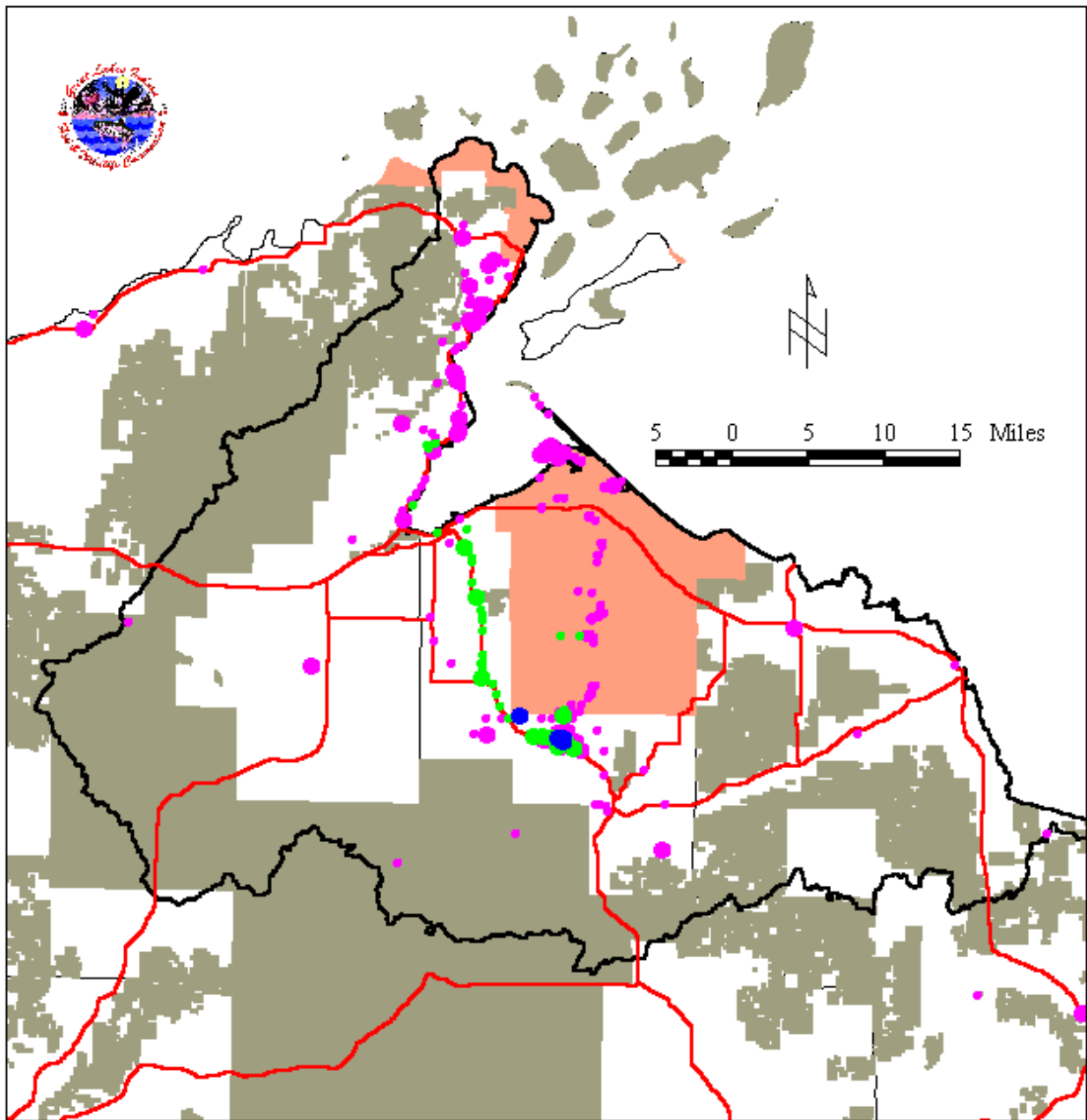
Herbicides were applied to loosestrife stands using back pack sprayers. Glyphosate was used in very dense stands or over-water, while triclopyr was used on road-side ditches and some old fields. Efforts were focused primarily on Fish Creek Sloughs, Whittlesey Creek, and the highway 13 right-of-ways between Highbridge and Washburn. Private uplands in the Highbridge area were treated primarily by staff from TNC with assistance from the GLIFWC crew after consent forms were signed by the landowner.

Spatial data collected during annual surveys were used to quantify the progress of control efforts. Treated loosestrife patches were identified on maps and coded for control in 1999. Summary statistics of treated patches were determined with ArcView GIS.

RESULTS

A total of 58 sites comprising 180 acres of purple loosestrife were treated with herbicide in 1999 (Figure 6). A partnership between the Natural Resources Conservation Service (NRCS), The Nature Conservancy (TNC), and GLIFWC helped provide funding for control work on private lands near Highbridge. GLIFWC crews treated 46 loosestrife sites comprising 60 acres and TNC crews treated 12 sites comprising 120 acres (Figure 6).

Control crews initiated work in mid July and worked through the end of September. However, frequent rains during this period reduced the area that could have been treated by approximately 50% because herbicides could not be effectively applied in the rain. In addition, low water levels allowed new loosestrife plants to flourish from a dormant seed bank along the Lake Superior shoreline.



Purple Loosestrife Acreage

- <1 Acre
- >1 Acre

Key:

- Treated by GLIFWC
- Treated by TNC
- Untreated

Focus Watershed

Roads

Ownership*

Tribal Lands

Public Lands

Private Lands

* Ownership boundaries are representations and may not be the legally binding boundaries.

Enlarged Area:



Figure 6. Control activities in the Bad River / Chequamegon Bay watershed in 1999.

FUTURE WORK

Beginning in 2000, GLIFWC will attempt to increase the area treated annually by releasing biological controls (*Galerucella* spp.) at select sites in the watershed. The focus of biological control efforts will take place on the Bayfield peninsula where most of the untreated loosestrife populations occur on private lands. In an effort to increase public participation in control efforts, GLIFWC will help 4H groups, lake associations, and others to rear and release the *Galerucella* beetles in select loosestrife-infested wetlands within the watershed.

MONITORING AND CONTROL ACTIVITIES ON THE CHIPPEWA FLOWAGE, SAWYER COUNTY, WISCONSIN

Technical assistance was provided to the Lac Courte Oreilles Band of Lake Superior Ojibwa for controlling purple loosestrife within and around the Chippewa Flowage in Sawyer County, WI. Work began with an inventory in 1997, followed by the establishment of several monitoring plots and the initiation of chemical and biological control in 1998 (Falck et al. 1999). In 1999, monitoring plots were revisited for control and/or inspection, the remaining sites were treated with chemical controls (Rodeo), and new sites were mapped and added to GLIFWC's GIS database.

A total of 59 new sites were added to the inventory (Figure 7 and Table 4), however, these sites comprised less than 1 acre of purple loosestrife. Rodeo was applied to 108 sites (Figure 8) comprising 21 acres, this accounts for 54% of all known loosestrife sites on the flowage and 55% of the known acreage.

In 1998, 4 monitoring sites were established (Figure 9) to compare the biological control agent *Galerucella* to conventional chemical control methods. These sites were revisited in 1999 to gauge their progress and 2 additional monitoring sites were added. *Galerucella* beetles were found flourishing at 2 sites and absent from 2 sites where they had been released in 1998 (Table 5). At the 2 sites where *Galerucella* persisted, they had expanded their range well into the chemical control plots so chemical controls were discontinued at these sites in 1999 to allow the beetles to continue their range expansion. *Galerucella* were absent from 2 floating bog sites where they were released in 1998. Although fewer beetles were released at these sites, it is suspected that they were unable to overwinter in the saturated soil conditions found on the floating bogs. *Galerucella* persisted and expanded their range where dry soils were available for overwintering, extensive damage was observed on purple loosestrife plants within the *Galerucella* sites, and no damage to non-target plants were noted in 1999. This monitoring effort will continue for 3 more years.

Table 4. Summary of purple loosestrife sites inventoried by year on the Chippewa Flowage.

Year	No. of Sites Found	Total Acres
1997	136	37.01
1998	4	0.02
1999	59	0.56
Total	199	37.59

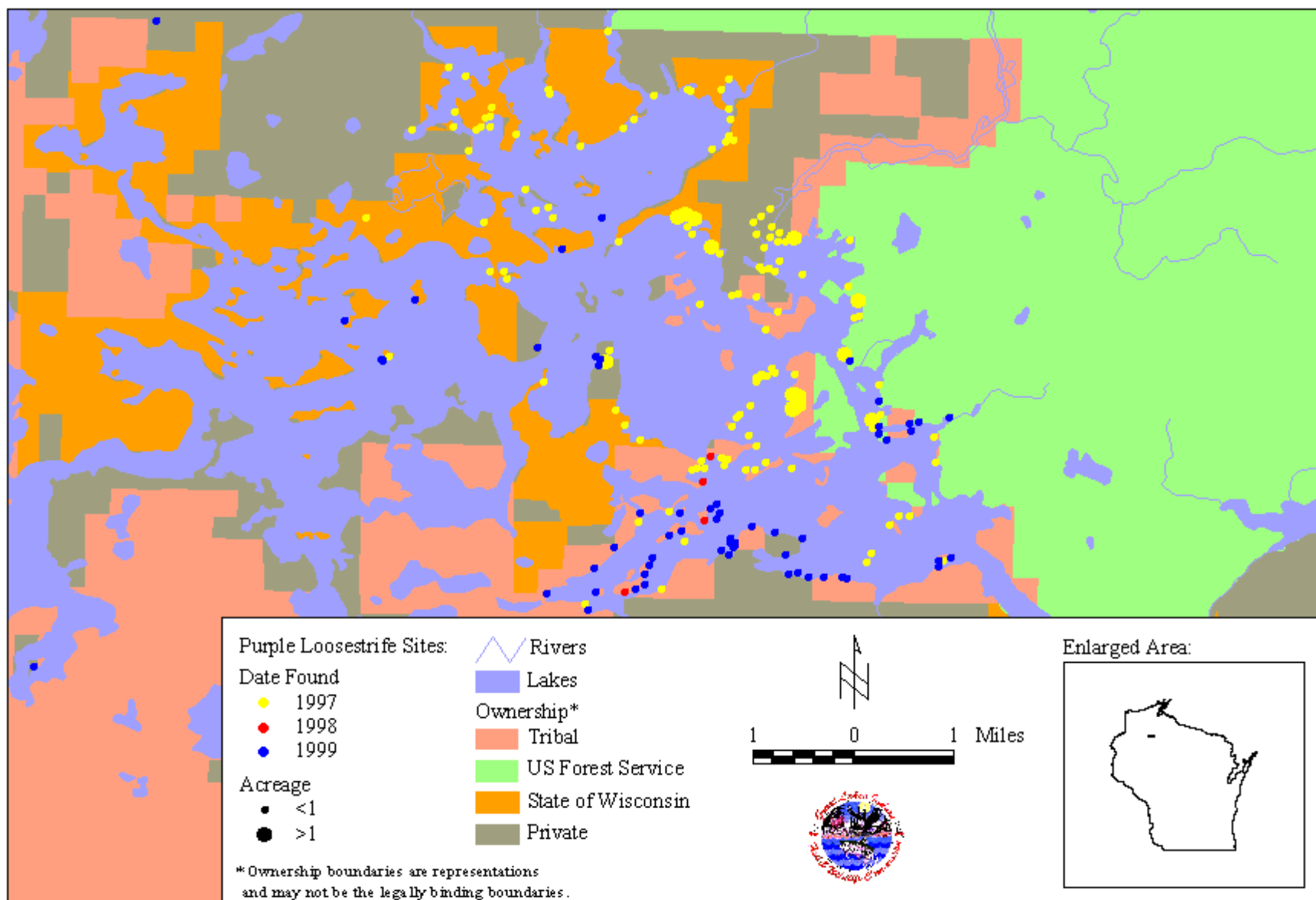


Figure 7. Purple loosestrife distribution on the Chippewa Flowage, Sawyer County, WI.

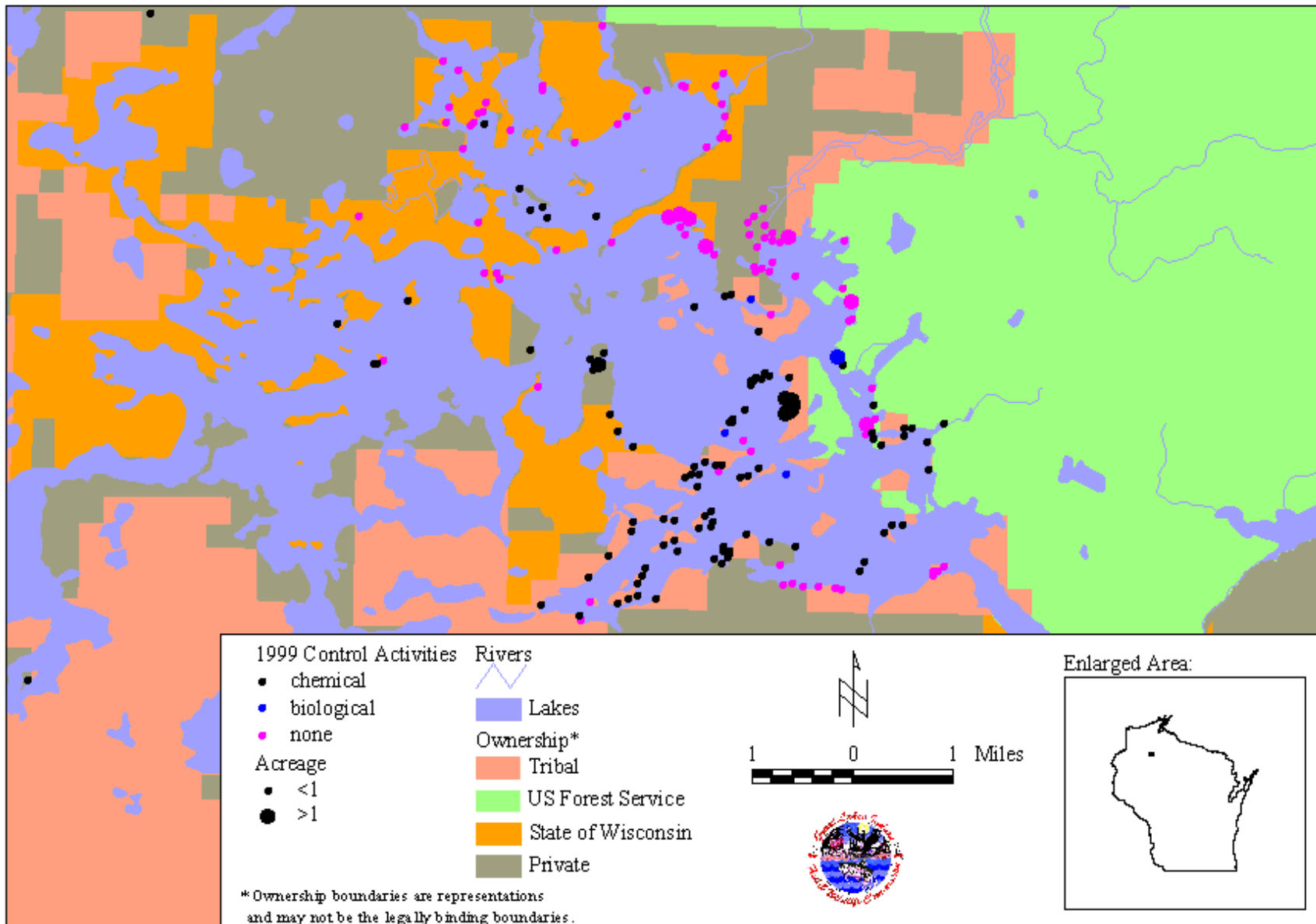


Figure 8. Purple loosestife control activities on the Chippewa Flowage, Sawyer County, WI in 1999.

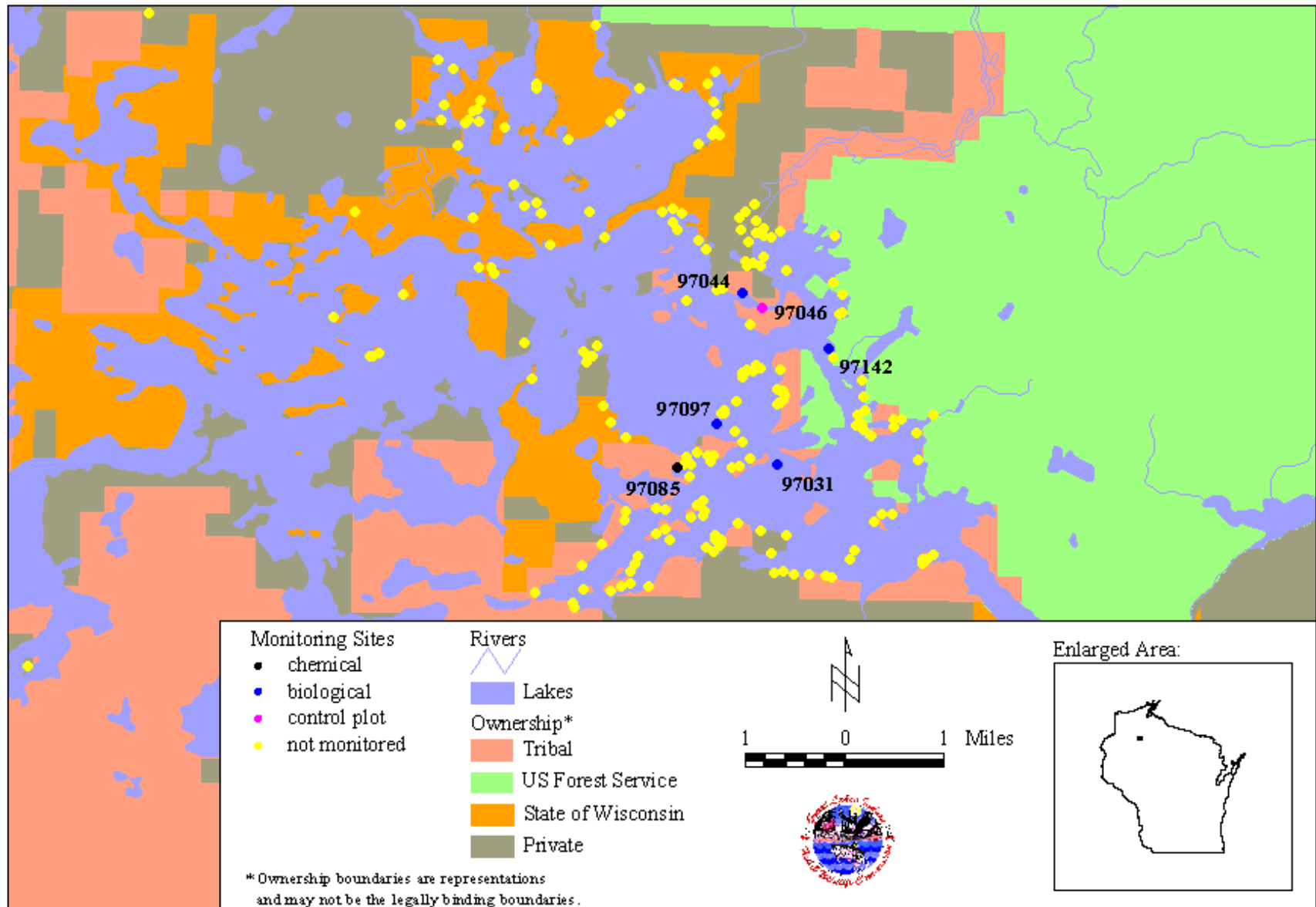


Figure 9. Purple loosestrife monitoring sites on the Chippewa Flowage, Sawyer County, WI.

Table 5. Summary of monitoring sites on the Chippewa Flowage, Sawyer County, WI

Site No.*	Habitat	Treatment	Notes
97031	Floating Bog	<i>Galerucella</i> (~500 released 1998)	<i>Galerucella</i> absent in 1999
97044	Shoreline	<i>Galerucella</i> (~1000 released 1998)	<i>Galerucella</i> expanding range in 1999
97046	Shoreline	Control	No treatment applied
97085	Shoreline	Chemical (Rodeo applied 1999)	
97097	Shoreline	<i>Galerucella</i> (~1500 released 1998)	<i>Galerucella</i> expanding range in 1999
97142	Floating Bog	<i>Galerucella</i> (~500 released 1998)	<i>Galerucella</i> absent in 1999

* Refer to Figure 9.

EXOTIC PLANT EDUCATION AND OUTREACH ACTIVITIES

BACKGROUND

With few exceptions, the general public is unaware of the magnitude of negative impacts caused by non-native exotic plants on the environment. Consequently, numerous invasive exotic plants are inadvertently dispersed across the landscape by people enjoying outdoor activities. Therefore, effective weed prevention and control is dependent upon the cooperation and assistance of an informed public. To address this problem, GLIFWC implemented an educational outreach program that provides current and relevant information to inform the general public of this important issue and the steps they can take to minimize the spread of exotic plants.

PROGRAM DEVELOPMENT

A suite of educational materials utilizing multiple media formats were developed and/or purchased to reach a diverse public (Table 6). A brochure developed by the Ontario Federation of Anglers and Hunters was purchased and the GLIFWC logo and contact information were added. A business reply postcard was developed as an insert to this brochure for the purpose of soliciting additional purple loosestrife distribution and abundance data. The postcard provided a picture to aid with identification and a set of attributes to fill out describing the location and abundance of purple loosestrife populations.

A slide presentation entitled *What You Should Know About Purple Loosestrife* was developed to inform a general audience about the introduction, identification, ecological, impacts, and control of purple loosestrife. Using much of the same information and photographs, a poster presentation about purple loosestrife was developed for use at county fairs, visitor centers, and similar events. A similar display on exotic plants in general was also developed.

A web page on purple loosestrife was developed and published on GLIFWC's web site (www.glifwc.org). The web site consists of 6 basic sections that provide information for a broad range of knowledge levels:

- 1) General Information
- 2) *Loosestrife Café* (interactive GIS map server for data sharing)
- 3) Photo Gallery
- 4) Slide Show *What You Should Know About Purple Loosestrife*
- 5) Links to related internet resources
- 6) Bibliographical references to GLIFWC reports and other scientific publications

Table 6. Materials developed or purchased for exotic plant educational outreach activities.

Title	Format	Status
<i>What You Should Know about Purple Loosestrife</i>	slide show	complete
<i>Purple Loosestrife: What You Should Know, What You Can Do</i>	brochure	purchased
<i>Loosestrife Locator Card</i>	postcard	complete
<i>Purple Loosestrife</i>	poster presentation	complete
<i>Purple Loosestrife</i>	web site	complete
<i>Loosestrife Café</i>	internet map server	complete
<i>The Wetland Web</i>	game	complete
<i>The Wetland Invasion</i>	game	complete
<i>Biodiversity Bags</i>	game	complete
<i>Not in My Garden</i>	brochure	draft
<i>What Is Growing in Your Garden</i>	brochure	draft
<i>Newest Weeds on the Block: Exotic Plants in the Upper Midwest</i>	brochure	draft
<i>Plants out of Place</i>	brochure/poster	draft

The interactive GIS map server *Loosestrife Café* was developed in cooperation with Northland College as part of the loosestrife web site. Utilizing ESRI's "Map Café" software, the internet-based application allows users to view, query, and print maps depicting GLIFWC's current inventory of loosestrife data. In addition, users can submit new observations, update data records, and download information. *Loosestrife Café* empowers the public and cooperating agencies to effectively collaborate on purple loosestrife management by making relevant information readily accessible in an interactive environment.

Three youth activities were created in response to a request from the Ashland County 4-H Board and implemented at the 1999, Ashland County Fair. *The Wetland Web* is an interactive game for kids (2nd - 8th grade) to help them learn how organisms within a wetland community are interconnected, and how purple loosestrife impacts each of them. *The Wetland Invasion Game* is a game (for students in upper elementary through junior high) designed to teach how purple loosestrife displaces native plants and animals in a wetland system. *Biodiversity Bags* is a simple activity for all ages designed to teach how purple loosestrife displaces native plants and animals in a wetland community.

Working drafts for 1 purple loosestrife handout, 2 invasive, exotic weed brochures, and 1

combination brochure/poster on invasive exotic plants were also developed. *What is Growing in Your Garden?* is a one-page handout on purple loosestrife cultivars that identifies 35 alternative names that purple loosestrife is sold under by the nursery industry and includes a summary of Wisconsin's statute outlawing possession, cultivation, and sale of purple loosestrife. *Newest Weeds on the Block: Exotic Plants in the Upper Midwest* presents general information on exotic plants, internet resources, and brief summaries on select species. *Not in MY Garden* contains a general introduction to exotic plants, directed towards hobby gardeners. It also includes a compiled list of invasive exotic plants commonly planted for gardening and landscape purposes. *Plants out of Place* contains general information on the impacts of invasive exotic plants, what you can do to alleviate the problem, and highlights 6 plants that are problematic in the Upper Great Lakes region.

OUTREACH

Over 200 people attended educational outreach programs conducted in Ashland and Bayfield counties during the summer of 1999 (Table 7). Most of the presentations consisted of the slide show *What You Should Know About Purple Loosestrife* followed by a 15 minute discussion period. A purple loosestrife display was also set up at many of the engagements and the brochure *What You Should Know About Purple Loosestrife* was made available for participants to take with them. Educational activities for children on the impact of purple loosestrife were designed and implemented for the Ashland County Fair at the request of the Ashland County 4-H Board. In addition, a specialized talk on new exotic plants in our area was given at the Cable Lake Association's annual meeting at the request of its members.

Table 7. Summary of educational outreach engagements during the summer of 1999.

Event	Date	Attendance
Wisconsin Association of Lakes Annual Lake Fair	6/30	150
Cable Lake Association Annual Meeting	7/3	25
GLIFWC / TNC / LCO loosestrife control crew training workshop	7/13	25
Northern Great Lakes Visitor Center	7/17	15
Chequamegon Chapter of the Audubon Society	8/10	10
Bayfield County Fair	8/12-8/15	NA
Northern Great Lakes Visitor Center	8/13	12
Ashland County Fair	8/21-8/22	NA
Total		237+

Approximately 3500 copies of the brochure *Purple Loosestrife: What You Should Know, What You Can do* were distributed to regional visitor centers and resource management agency offices (Table 8). Purple loosestrife locator cards were also distributed along with the brochures. Eight copies of the slide presentation *What You Should Know About Purple Loosestrife* were also distributed to several cooperating agencies (Table 8).

DISCUSSION

In general, it was discovered that audiences had little previous knowledge of or exposure to noxious weed issues. Most audiences were able to recognize purple loosestrife as a familiar roadside or garden flower, however few attendees were able to name it correctly or identify it as an invasive exotic. When informed of the invasive nature of many exotic plants and their impacts on native ecosystems, participants were generally enthusiastic to learn, ask questions, and help out wherever possible. Those in attendance were also eager to share what they had learned, often taking extra brochures to give to friends and neighbors.

The slide presentation *What You Should Know About Purple Loosestrife* proved to be an effective educational tool. Presentations were typically followed by several relevant questions from the audience. The majority of questions concerned biological control. Citizens were especially interested in non-chemical control alternatives and were eager to learn more details about the use of *Galerucella* beetles. Almost every engagement also included questions regarding control methods for small populations on private lands. When appropriate, control methods were suggested. Questions regarding large stands of loosestrife were deferred so that a proper on-site assessment could be made prior to any control recommendations being given.

Overall, the 1999 purple loosestrife educational outreach program was successful in educating the public. There are 2 major improvements that may enhance control and management efforts: 1) utilizing student groups to disseminate information and boost biological control efforts and 2) an intensive effort to target the gardening/landscaping community in northern Wisconsin to educate them about invasive weeds.

Students and teachers alike are beginning to adopt a more environmentally based curriculum. State extension programs such as Water Watch and Loon Watch have been providing area schools and community groups with new environmental educational opportunities. A similar program on exotics would complement these existing programs. GLIFWC can serve as an information center for regional educators, supplying them with basic information, as well as directing them to more established curriculum (e.g. Michigan State University's Purple Loosestrife Project) available through other agencies and the internet. Such a clearing-house could be established with a web page that educators and students can access via the internet. Such a program could also enhance local and regional coordination of biological control efforts (a method dependent upon the assistance of volunteers) through the proposed

adopt-a-site program. Area schools and youth groups have already demonstrated an interest in being involved in such a program.

Purple loosestrife is still heavily cultivated as a garden plant by private citizens in northern WI and MI. An attempt was made to raise awareness within this segment of the community, however, only a small portion was reached. After learning how loosestrife threatens native wetland communities, most gardeners seemed willing to cease growing the plant and to encourage neighbors and friends to do likewise. Many of the people encountered simply were not familiar with the threats purple loosestrife poses, or were unaware that plants growing in their yards could escape from cultivation to the detriment of nearby native plant communities. Gardeners had many responsible questions and were generally willing to work towards a favorable compromise. A large public campaign in the area, especially if supported by local nurseries (e.g. providing native replacements), could probably prove successful at reducing local domestic populations. A more concentrated effort to reach the nursery industry in following years is recommended.

Table 8. Summary of brochure, locator card, and slide show distribution in 1999.

Organization	No. Brochures	No. Locator Cards	No. Slide Programs
NRCS	100	200	
Army Corps of Engineers	100	300	
Hiawatha National Forest	200	350	1
Ottawa National Forest	200	350	1
Chequamegon-Nicolet National Forest	200	350	1
WIDNR-Madison	300	500	2
WIDNR-Mercer	300	600	
WIDNR-Superior	50	50	
WIDNR-Rhineland	25	25	
Lac Courte Oreilles Band	200	300	1
Cable Natural History Museum	100	200	
Apostle Islands National Lakeshore	200	300	
Northern Great Lakes Visitor Center	750	1150	
Hayward Visitor Center	200	300	
The Nature Conservancy	50	50	
Wisconsin Association of Lakes	100	125	
Cable Lakes Association	100	125	
Two Rivers Lake Association	150	250	
Inland Sea Society	25	50	
Sigurd Olson Environmental Institute	25	50	
Hayward High School	50	100	
Ashland County Fair	40	46	
Bayfield County Fair	45	52	
Spooner Agricultural Research Station	0	0	1
Total	3510	5823	8

COORDINATION WITH OTHER AGENCIES AND ORGANIZATIONS

An ad hoc forum called the “Northwoods Weed Initiative” has met regularly to share information, coordinate activities, and discuss future collaborations to address invasive non-native plants in northern Wisconsin and Michigan. Participants include GLIFWC, Lac Courte Oreilles Band of Lake Superior Ojibwa, the Chequamegon-Nicolet National Forest, the Ottawa National Forest, The Nature Conservancy, PRI-RU-TA, the Natural Resources Conservation Service, and the WI DNR. The Northwoods Weed Initiative recognizes the inherent problems (i.e. labor intensive, cross jurisdictional boundaries, etc.) associated with managing invasive exotic plants and strives to address these obstacles by working together in a coordinated manner (see Appendix A). Plans are currently being developed to host a regional conference and publish a combination brochure/poster (*Plants out of Place* described in Educational Outreach above) to raise awareness of this important issue among land managers and interested publics.

In addition to the activities listed above, additional inventory data has been contributed to GLIFWC’s database as noted in the “Exotic Plant Survey” section above with contributions coming from USFS, WIDNR, TNC, and the general public via the postcard locator cards. In addition, the *Loosestrife Café* provides a means for anyone to access this data and has been utilized by WIDNR staff to identify good release sites for *Galerucella* in northeast Wisconsin.

LITERATURE CITED

- Edblom, T., J. Gilbert, L. Dlutkowski, and S. Peterson. 1995. Purple loosestrife surveys in Wisconsin and Michigan during 1995. Great Lakes Indian Fish and Wildl. Comm. Admin. Rep. 95-11. 30pp.
- Falck, M., J. Gilbert, and O. Gonzalez. March 1999. 1998 purple loosestrife survey and control activities. 99-07. 18pp.
- Gilbert, J.H., B. Carlson, and R. LaRue. 1995. Purple loosestrife survey of the Bad River Watershed, 1994. Great Lakes Indian Fish and Wildl. Comm. Admin. Rep. 95-01. 27pp.
- Gilbert, J., K. Linder, and M. Falck. 1998. 1996 Purple loosestrife survey and control activities. Great Lakes Indian Fish and Wildl. Comm. Admin. Rep. 98-6. 19pp.
- Gilbert, J. and R. Parisien. 1989. Purple loosestrife control efforts of the Great Lakes Indian Fish and Wildlife Commission 1988-1989. Great Lakes Indian Fish and Wildl. Comm. Admin. Rep. 89-13. 16pp.

Appendix A

Northwoods Weed Initiative

*An interagency forum to protect the integrity of native ecosystems
in northern Wisconsin and Michigan*

Participants:

*Chequamegon - Nicolet National Forest
Great Lakes Indian Fish & Wildlife Commission
Lac Courte Oreilles Band of Lake Superior Ojibwe
Leech Lake Band of Ojibwe
Natural Resources Conservation Service*

*Ottawa National Forest
PRI-RU-TA
The Nature Conservancy
Wisconsin DNR*

Invasive non-native plants can have devastating impacts on native plant communities, fish and wildlife habitat, agricultural yields, recreational and subsistence opportunities, and ultimately, local economies. Purple loosestrife, reed canary grass, spotted knapweed, Canada thistle, Eurasian water milfoil, and common buckthorn are examples of invasive non-native plants that negatively impact local natural areas and agricultural lands.

Because these plants disperse widely across the landscape and administrative boundaries, it is advantageous to work cooperatively towards management and control objectives. In addition, the number of new exotics being introduced into local ecosystems continues to out-pace control activities, and is too much for any one agency to manage alone.

The present status of the Northwoods Weed Initiative is an informal consultative body with formal partnerships developed on a project specific basis. The Northwoods Weed Initiative provides a forum to share information and collaborate on planning initiatives for exotic plant issues in northern Wisconsin and Michigan. Initial plans for the Northwoods Weed Initiative include 1) planning a regional conference that will present information on local exotic plant issues, provide a forum for sharing information, and identify common objectives and 2) development and distribution of an informational poster to raise public awareness of this important issue.

For more information, please contact:

Mariquita Sheehan
Plant Ecologist
Chequamegon-Nicolet National Forest
P.O. Box 1809
Eagle River, WI 54521
(715) 479-2827
quita/r9_cheni@fs.fed.us

Miles Falck
Wildlife Biologist
Great Lakes Indian Fish & Wildlife Commission
P.O. Box 9
Odanah, WI 54861
(715) 682-6619
miles@glifwc.org

