

**Wisconsin Valley Improvement Company**  
**2016 Purple Loosestrife Annual Monitoring Report**

## **Introduction**

In compliance with Wisconsin Valley Improvement Company's (WVIC) 1996 FERC license (Project No. 2113), the purple loosestrife control program became a part of WVIC's FERC approved 1997 Fish and Wildlife Management Plan (Article 413). The Fish and Wildlife Management Plan was updated in 2001, 2006, 2011, and 2016 in accordance with a five-year update requirement in WVIC's FERC license. WVIC submitted a Modified Purple Loosestrife Control Plan on November 26, 2008 as an amendment request to WVIC's Fish and Wildlife Management Plan. FERC issued an Order Amending the Plan June 16, 2009 and approved the Plan with minor reporting modifications. In accordance with the Five-Year Summary and Proposed Purple Loosestrife Monitoring Plan submitted December 30, 2013, WVIC's Annual Monitoring Report for 2016 follows. As proposed in the 2016 Fish and Wildlife Management Plan Update Report submitted July 15, 2016, the next annual monitoring report will be submitted in 2019.

## **2016 Field Monitoring Results**

**Willow Reservoir** – On August 18, 2016 WVIC with assistance from the Wisconsin Department of Natural Resources (WDNR) AIS Limited Term Employee (LTE) monitored the area of Willow Reservoir where purple loosestrife (PL) has historically occurred. Reservoir elevation was 1528.22 ft. NGVD (1.13 ft. below full). The area was accessed by boat and then surveyed by walking the islands and exposed shoreline and counting both immature and mature plants. GPS readings were taken every 100 ft. where plants were observed. The relative abundance of PL was recorded as A (1-5 plants), B (6-50 plants), or C (50+ plants). Figure 1 is a distribution and relative abundance map of recorded locations in 2016 and Table 1 lists GPS coordinates for each observation. There were 7 sites of 1-5 plants, 3 sites of 6-50 plants, and 1 site of 50+ plants identified in 2016. PL was not identified outside the historic range at Willow.

*Galerucella sp.* beetle activity and leaf damage was identified at 4 sites in 2016 which is an increase from 2015 where one site showed beetle damage. This is only the second year in which beetle activity has been observed on the Willow Reservoir. The percent of plants within the site exhibiting damage from beetle feeding was recorded using a 1-4 scale with the following representative values: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Using the same scale and values, the average level of leaf tissue area removed by beetle feeding per plant within each site was also recorded. Table 1 provides the percent range of plants damaged at the site and leaf tissue removed per plant within the site.

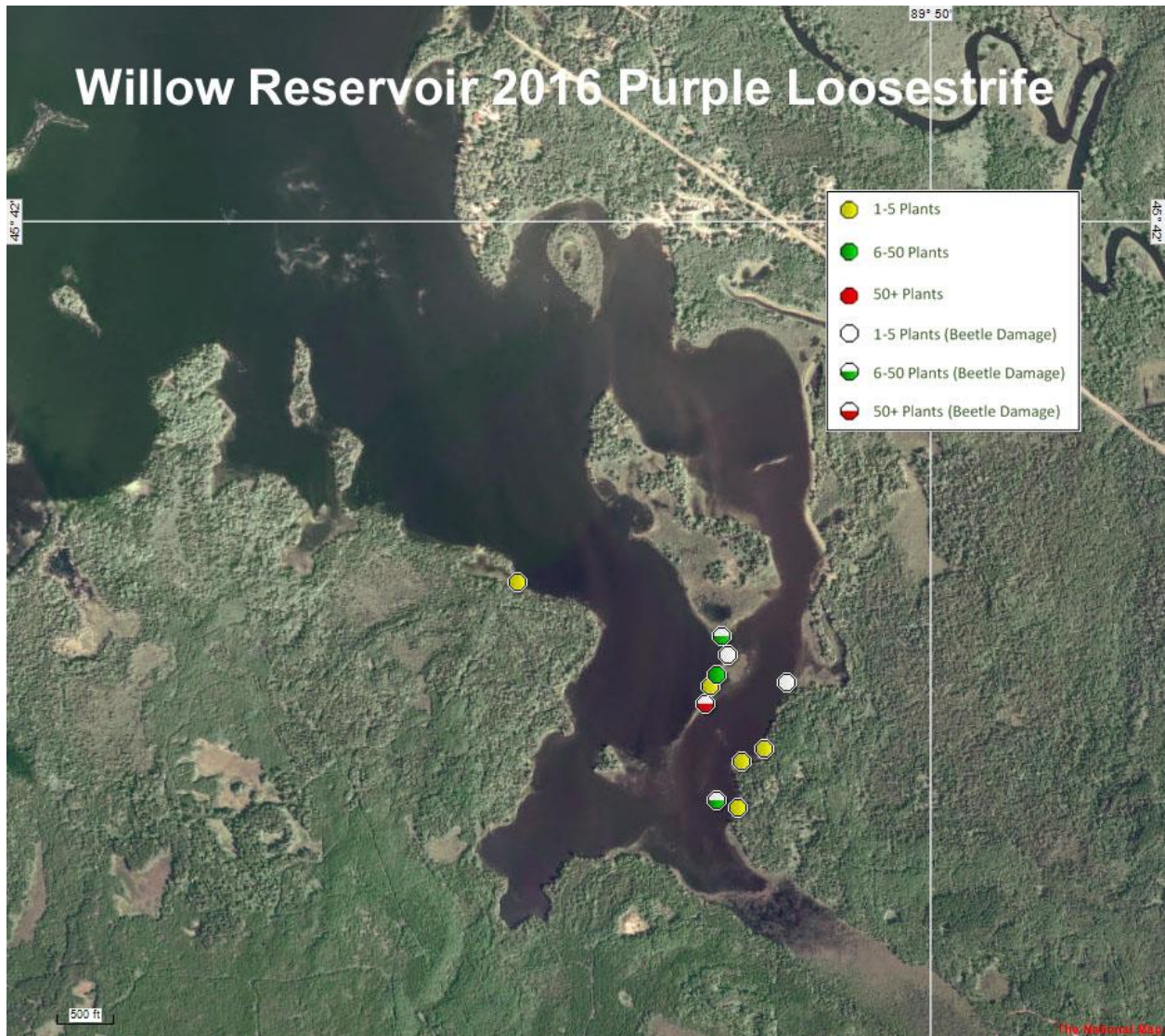
**Rice Reservoir** – On August 22 & 26, 2016 WVIC and the WDNR AIS LTE monitored the portions of Rice Reservoir where PL has historically occurred. Reservoir elevation was 1462.69 & 1462.60 ft. NGVD (0.56 & 0.65 ft. below full). Figure 2 is a distribution and relative abundance map of recorded PL and beetle activity locations in 2016 and Table 2 lists GPS coordinates for each observation. There were 75 sites of 1-5 plants, 34 sites of 6-50 plants, and 2 sites of 50+ plants identified in 2016. PL was not observed outside the historic range at Rice.

*Galerucella sp.* beetle activity and leaf damage was identified at 17 sites in 2016 marking a decline from 2015 (Figure 4). The decline in beetle activity is likely related to above average water levels throughout the season which also reduced the number of PL sites with 50+ plants. Beetle activity was found at 0 of 2 sites with 50+ plants, 12 of 34 sites with 6-50 plants, and 5 of 75 sites with 1-5 plants. 2016 was the third season in which vegetative damage assessments were conducted at each site where beetle activity was identified. Table 2 provides the percent range of plants damaged at each site and leaf tissue removed per plant within the site. Figure 5 displays the average damage scores (1-4 scale) for each of the PL relative abundance categories. The highest level of beetle activity was found at sites with 6-50 plants where more damage was observed throughout the site and within individual plants as compared to sites with only 1-5 plants.

**Spirit Reservoir** – On August 18, 2016 WVIC and the WDNR AIS LTE monitored the portion of Spirit Reservoir where PL has historically occurred. Reservoir elevation was 1431.64 ft. NGVD (6.24 ft. below full). Figure 3 is a distribution and relative abundance map of recorded PL locations in 2016 and Table 3 lists GPS coordinates for each observation. There were 11 sites of 1-5 plants, 3 sites of 6-50 plants, and no sites of 50+ plants identified in 2016. PL was not identified outside the historic range at Spirit. *Galerucella sp.* beetle activity has not been observed since 2011.

**Eau Pleine Reservoir** – WVIC used chemical control to combat PL populations on the Eau Pleine in 1998 and 1999. Only one plant was identified during post treatment monitoring in 2000 and it was removed by hand. Since that time there have been no reports of PL on the reservoir until staff from the Golden Sands Resource Conservation and Development Council (Golden Sands RC&D) discovered an isolated population in August of 2015 and contacted WVIC. WVIC staff is working with members of the Big Eau Pleine Citizens Organization (BEPCO) on potential monitoring and beetle release initiatives as part of BEPCO's ongoing lake management planning efforts.

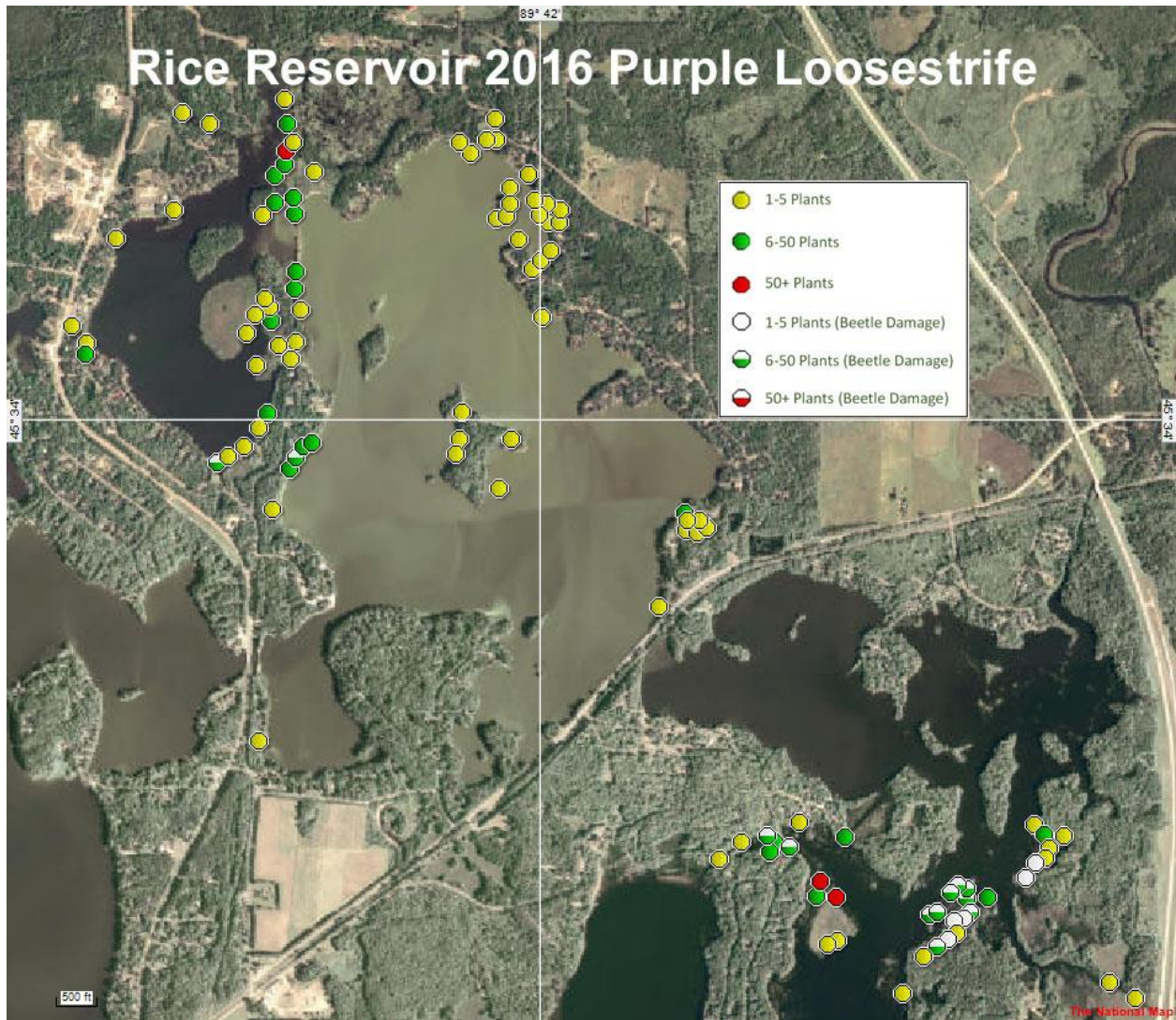
**Figure 1**



**Table 1**

Purple Loosestrife Survey - 2016								
Willow Reservoir								
Number	Latitude		Longitude		Amount	Beetle Activity	% of Damaged Plants Per Site	% Tissue Damage Per Plant
1	45°	41.478915	89°	50.847580	1-5 Plants	no		
2	45°	41.329947	89°	50.452073	1-5 Plants	no		
3	45°	41.154630	89°	50.395000	1-5 Plants	no		
4	45°	41.221473	89°	50.387597	1-5 Plants	no		
5	45°	41.239316	89°	50.339927	1-5 Plants	no		
6	45°	41.346628	89°	50.439108	6-50 plants	no		
7	45°	41.374037	89°	50.414401	1-5 Plants	yes	26-50	26-50
8	45°	41.334447	89°	50.293022	1-5 Plants	yes	1-25	1-25
9	45°	41.401441	89°	50.428542	6-50 plants	yes	1-25	26-50
10	45°	41.164830	89°	50.437358	6-50 plants	yes	1-25	1-25
11	45°	41.305294	89°	50.462573	50+ plants	yes	1-25	1-25

Figure 2



**Table 2**

Purple Loosestrife Survey - 2016

Rice Reservoir

Number	Latitude	Longitude	Amount	Beetles	% of Damaged Plants Per Site	% Tissue Damage Per Plant
1	45° 34.1688089	89° 42.8207057	1-5 plants	no		
2	45° 34.2055517	89° 42.7963303	1-5 plants	no		
3	45° 34.2374063	89° 42.7711503	1-5 plants	no		
4	45° 34.2191506	89° 42.7569285	1-5 plants	no		
5	45° 34.1437936	89° 42.7312207	1-5 plants	no		
6	45° 34.1071714	89° 42.7951791	1-5 plants	no		
7	45° 33.9811563	89° 42.7857398	1-5 plants	no		
8	45° 33.9469431	89° 42.8282796	1-5 plants	no		
9	45° 33.9254235	89° 42.8733092	1-5 plants	no		
10	45° 34.1499194	89° 43.2710394	1-5 plants	no		
11	45° 34.1836701	89° 43.3116735	1-5 plants	no		
12	45° 34.3568541	89° 43.1895344	1-5 plants	no		
13	45° 34.4129588	89° 43.0245294	1-5 plants	no		
14	45° 34.6030858	89° 43.0024571	1-5 plants	no		
15	45° 34.5827829	89° 42.9255536	1-5 plants	no		
16	45° 34.6311482	89° 42.7132314	1-5 plants	no		
17	45° 34.5452053	89° 42.6913203	1-5 plants	no		
18	45° 34.4028498	89° 42.7763903	1-5 plants	no		
19	45° 33.8227327	89° 42.7489986	1-5 plants	no		
20	45° 33.3663831	89° 42.7860522	1-5 plants	no		
21	45° 34.1171745	89° 42.6981451	1-5 plants	no		
22	45° 34.1528811	89° 42.6847230	1-5 plants	no		
23	45° 34.2160924	89° 42.6711897	1-5 plants	no		
24	45° 34.4865654	89° 42.6307411	1-5 plants	no		
25	45° 34.5455667	89° 42.2236718	1-5 plants	no		
26	45° 34.5236547	89° 42.1943479	1-5 plants	no		
27	45° 34.5510231	89° 42.1477697	1-5 plants	no		
28	45° 34.5924885	89° 42.1251643	1-5 plants	no		
29	45° 34.5510686	89° 42.1186468	1-5 plants	no		
30	45° 34.4250631	89° 42.0821419	1-5 plants	no		
31	45° 34.3991683	89° 42.0911992	1-5 plants	no		
32	45° 34.3938625	89° 42.1211015	1-5 plants	no		
33	45° 34.4546395	89° 42.0824988	1-5 plants	no		
34	45° 34.4811985	89° 42.0296899	1-5 plants	no		
35	45° 34.4311686	89° 42.0132403	1-5 plants	no		
36	45° 34.4015820	89° 41.9982187	1-5 plants	no		

**Table 2 (cont.)**

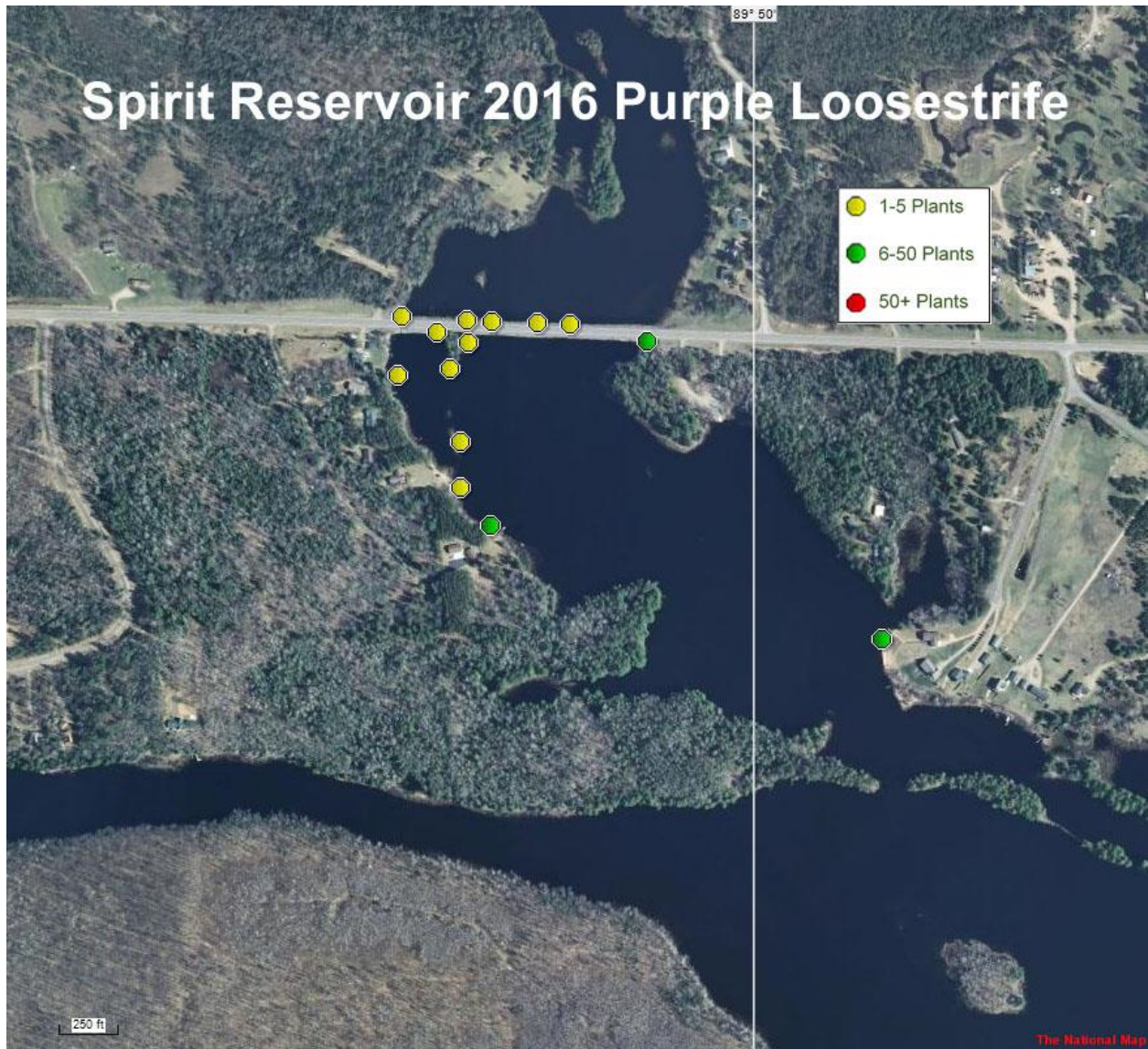
Number	Latitude	Longitude	Amount	Beetles	% of Damaged Plants Per Site	% Tissue Damage Per Plant
37	45° 34.4238210	89° 41.9796367	1-5 plants	no		
38	45° 34.4113188	89° 41.9418639	1-5 plants	no		
39	45° 34.3865849	89° 41.9434833	1-5 plants	no		
40	45° 34.3888332	89° 41.9754826	1-5 plants	no		
41	45° 34.3306913	89° 41.9676727	1-5 plants	no		
42	45° 34.3134263	89° 41.9969613	1-5 plants	no		
43	45° 34.2965585	89° 42.0199741	1-5 plants	no		
44	45° 34.3537098	89° 42.0594262	1-5 plants	no		
45	45° 33.9595755	89° 42.0772444	1-5 plants	no		
46	45° 33.8631464	89° 42.1138253	1-5 plants	no		
47	45° 33.9318148	89° 42.2342636	1-5 plants	no		
48	45° 33.9611596	89° 42.2244977	1-5 plants	no		
49	45° 34.0128898	89° 42.2179195	1-5 plants	no		
50	45° 34.2002554	89° 41.9931600	1-5 plants	no		
51	45° 33.8009607	89° 41.5830286	1-5 plants	no		
52	45° 33.7994871	89° 41.5489774	1-5 plants	no		
53	45° 33.7852797	89° 41.5294499	1-5 plants	no		
54	45° 33.7762629	89° 41.5569637	1-5 plants	no		
55	45° 33.7798935	89° 41.5885100	1-5 plants	no		
56	45° 33.6306890	89° 41.6625722	1-5 plants	no		
57	45° 33.1670420	89° 41.4336493	1-5 plants	no		
58	45° 33.1332512	89° 41.4929057	1-5 plants	no		
59	45° 33.2054191	89° 41.2692929	1-5 plants	no		
60	45° 32.9637082	89° 41.1917467	1-5 plants	no		
61	45° 32.9720164	89° 41.1625481	1-5 plants	no		
62	45° 32.8677014	89° 40.9786495	1-5 plants	no		
63	45° 32.9396840	89° 40.9204293	1-5 plants	no		
64	45° 32.9860322	89° 40.8279617	1-5 plants	no		
65	45° 32.8572002	89° 40.3265538	1-5 plants	no		
66	45° 32.8901763	89° 40.3987852	1-5 plants	no		
67	45° 33.1341859	89° 40.5790831	1-5 plants	no		
68	45° 33.1779241	89° 40.5259418	1-5 plants	no		
69	45° 33.1538749	89° 40.5667116	1-5 plants	no		
70	45° 33.1996352	89° 40.6113085	1-5 plants	no		
71	45° 34.2913085	89° 42.6831838	6-50 plants	no		
72	45° 34.2572212	89° 42.6859041	6-50 plants	no		
73	45° 34.1933308	89° 42.7527797	6-50 plants	no		

**Table 2 (cont.)**

Number	Latitude	Longitude	Amount	Beetles	% of Damaged Plants Per Site	% Tissue Damage Per Plant
74	45° 34.010934	89° 42.763532	6-50 plants	no		
75	45° 34.127404	89° 43.273991	6-50 plants	no		
76	45° 34.581058	89° 42.707342	6-50 plants	no		
77	45° 34.502206	89° 42.715208	6-50 plants	no		
78	45° 34.479007	89° 42.741474	6-50 plants	no		
79	45° 34.426885	89° 42.742309	6-50 plants	no		
80	45° 34.435816	89° 42.691567	6-50 plants	no		
81	45° 34.403574	89° 42.686578	6-50 plants	no		
82	45° 33.953828	89° 42.639825	6-50 plants	no		
83	45° 33.946963	89° 42.662696	6-50 plants	no		
84	45° 33.901177	89° 42.699971	6-50 plants	no		
85	45° 33.815837	89° 41.592779	6-50 plants	no		
86	45° 33.176426	89° 41.142357	6-50 plants	no		
87	45° 33.146805	89° 41.353166	6-50 plants	no		
88	45° 33.165408	89° 41.340247	6-50 plants	no		
89	45° 33.059992	89° 41.220864	6-50 plants	no		
90	45° 33.058115	89° 40.741277	6-50 plants	no		
91	45° 33.182048	89° 40.580224	6-50 plants	no		
92	45° 34.527814	89° 42.711124	6-50 plants	no		
93	45° 33.057135	89° 41.167406	50+ plants	no		
94	45° 33.087727	89° 41.211138	50+ plants	no		
95	45° 32.973264	89° 40.851261	1-5 plants	yes	1-25	76-100
96	45° 33.011736	89° 40.834218	1-5 plants	yes	26-50	76-100
97	45° 33.014884	89° 40.808152	1-5 plants	yes	1-25	26-50
98	45° 33.097056	89° 40.633174	1-5 plants	yes	1-25	1-25
99	45° 33.124284	89° 40.606772	1-5 plants	yes	1-25	26-50
100	45° 33.915279	89° 42.904569	6-50 plants	yes	1-25	26-50
101	45° 33.923829	89° 42.682058	6-50 plants	yes	1-25	76-100
102	45° 33.15643	89° 41.295911	6-50 plants	yes	1-25	51-75
103	45° 33.17885	89° 41.35906	6-50 plants	yes	51-75	51-75
104	45° 33.028543	89° 40.881932	6-50 plants	yes	26-50	26-50
105	45° 33.023475	89° 40.902893	6-50 plants	yes	51-75	76-100
106	45° 32.960132	89° 40.883547	6-50 plants	yes	1-25	51-75
107	45° 33.027669	89° 40.789334	6-50 plants	yes	1-25	26-50
108	45° 33.065845	89° 40.84596	6-50 plants	yes	76-100	76-100
109	45° 33.08136	89° 40.824884	6-50 plants	yes	26-50	51-75
110	45° 33.07364	89° 40.799664	6-50 plants	yes	76-100	51-75
111	45° 33.05553	89° 40.800141	6-50 plants	yes	51-75	76-100



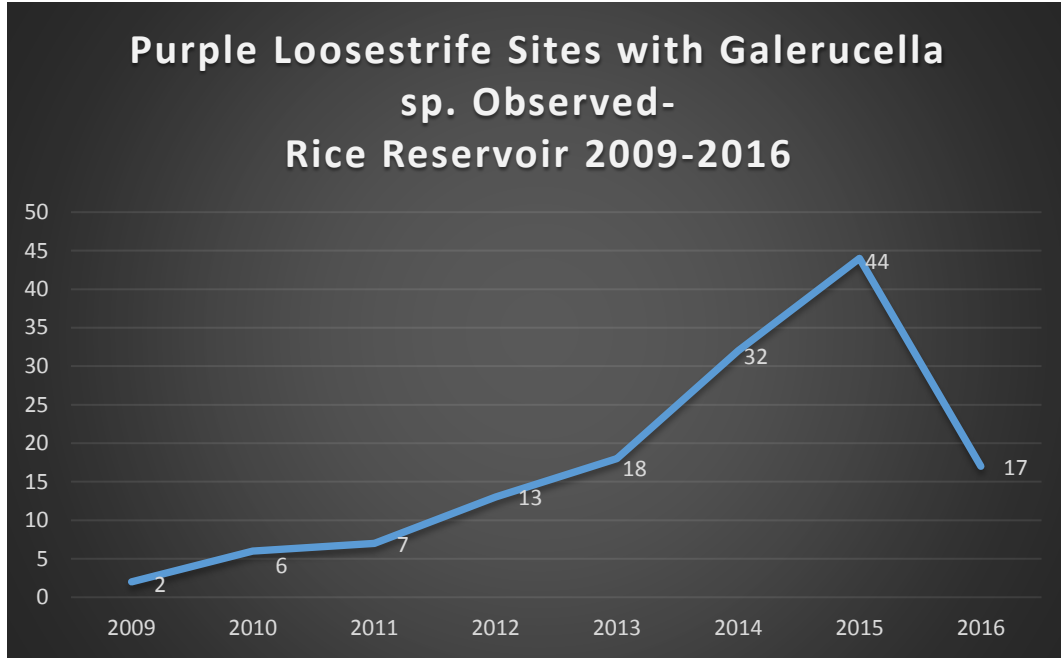
**Figure 3**



**Table 3**

Purple Loosestrife Survey - 2016						
Spirit Reservoir						
Number	Latitude		Longitude		Amount	Beetle Activity
1	45°	27.2770729	89°	50.174327	1-5 plants	no
2	45°	27.2781187	89°	50.206568	1-5 plants	no
3	45°	27.2788334	89°	50.252196	1-5 plants	no
4	45°	27.2797232	89°	50.276747	1-5 plants	no
5	45°	27.2827460	89°	50.341480	1-5 plants	no
6	45°	27.2644496	89°	50.275329	1-5 plants	no
7	45°	27.2716364	89°	50.306780	1-5 plants	no
8	45°	27.2463248	89°	50.293453	1-5 plants	no
9	45°	27.2423516	89°	50.345357	1-5 plants	no
10	45°	27.1956865	89°	50.283506	1-5 plants	no
11	45°	27.1636956	89°	50.282576	1-5 plants	no
12	45°	27.0591596	89°	49.867767	6-50 plants	no
13	45°	27.2657070	89°	50.099391	6-50 plants	no
14	45°	27.1375038	89°	50.253710	6-50 plants	no

**Figure 4**



**Figure 5**

