We Energies
2010 Annual Report - Nuisance Plant Control Survey
Twin Falls
Project #2072-008

Background and Methods

We Energies' Environmental department staff, Mr. Mike Grisar and Mr. Scott Horzen, conducted a survey from a boat of the entire shoreline at the White Rapids Reservoir project on August 4, 2010. All waters and appropriate wetlands accessible from the boat were evaluated. Those species targeted for the survey included purple loosestrife (*Lythrum salicaria*) and Eurasian water milfoil (*Myriophyllum spicatum*). The visual meander survey included areas of shallow water adjacent to the shorelines. Shallow water was surveyed to a point where the water depth and clarity excluded visibility conducive to observing submerged vegetation. On average, this depth was at approximately 7-feet.

For each stand of Eurasian water milfoil encountered during the 2010 surveys, the stand location and perimeter were compared and verified with the 2008 monitoring data using a Trimble Geo XH GPS unit. Where the stand size was negligible, a single point in the center of the stand was located with the GPS. When significant changes in the stand perimeter were observed, these changes were marked with the GPS and reflected in the attached map. Changes in stand density were updated and are shown in Table 1TF. New stands not previously observed were mapped and recorded.

Various data were collected at each stand including stand/mat density and mat thickness (when present). The stand size was subsequently calculated from the collected GPS boundaries. A percent cover scale from 1-5 (sparse – dense) was used to accurately and consistently estimate stand densities:

Estimated Density Rating	% Cover
1 (sparse)	0 - 5%
2 (moderately sparse)	>5 - 25%
3 (moderate)	>25 - 75%
4 (moderately dense)	>75 - 95%
5 (dense)	>95%

Results and Discussion

No purple loosestrife plants were observed along the shores of the Twin Falls Reservoir project area.

Ninety stands of Eurasian water milfoil were observed to occur in 2010 at Twin Falls (attached map), an increase of 29 stands from 2008. While there were 25 new stands recorded, 3 were observed to be absent in 2009, and 5 stands were merged with other stands. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 44.90-acres.

Eurasian water milfoil is present in approximately 245.85-acres in the Twin Falls Reservoir project area, an increase of about 15-acres from 2008, and about 30-acres since 2006. Cumulatively, the average stand size is 2.73-acres and has an average density rating of 1.63 per stand. In 2008, the average stand size was 3.24-acres and had an average density rating of 1.41 per stand. While the number of observed stands increased, the stand size decreased.

Additionally, 32 stands changed in spatial coverage with a net change of -1.37-acres overall, meaning there was a net loss of acreage among those stands that changed in size. The total gross change observed is 131.19-acres with an average gross change of 4.10-acres per stand. 7 stands accounted for about 99-acres (40% of the total acreage) that either increased or decreased in size (approximate 14.2-acre average change).

The average stand density increased from 1.41 in 2008 to 1.63 in 2010. 13 stands increased in density between 2008 and 2010, while only 3 stands decreased.

Out of the 50 observed stands, 8 stands (stands 56, 60, 65, 69, 70, 73, 99, and 103) were observed with high densities (>75% cover). Of these, 5 of them increased by an average rating of 2. Combined, these stands account for about 13% (32.53-acres) of the total area observed to have Eurasian water milfoil present, which is up from under 3% in 2008.

70 of the 90 stands have very low densities (<25% cover) of Eurasian water milfoil with single stems growing sporadically among native species. The most common native species included northern water milfoil (*Myriophyllum sibiricum*), two-leaf water milfoil (*Myriophyllum heterophyllum*), a variety of pondweeds (*Potamogetan* sp.), common waterweed (*Elodea canadensis*), bladderwort (*Utricularia* sp.), coon's tail (*Ceratophyllum demersum*), water celery (*Vallisneria americana*), yellow pond lilies (*Nuphar* sp.), and white pond lily (*Nymphaea odorata*). These low density stands account for 59% (144.79-acres) of the total area observed to have Eurasian water milfoil present, down from 92% in 2009.

Conclusions

In conclusion, many of the changes exhibited in Twin Falls are a reverse in the trends observed between 2006 and 2008. Unlike the positive observations between 2006 and 2008, negative trends observed in 2010 included an increase in average stand density, the number of stands that increased in density, the number and acreage of high density stands, and the decrease in the acreage of stands with low densities. The most obvious changes occurred in the western portions of Badwater Lake where very low densities where observed in 2008 and a significant increase in densities were observed in 2010. Prior to 2008, large areas of very dense milfoil were observed in these same areas.

There was a positive trend in the number of sparse stands observed increasing from 40 to 76 stands over this 2-year period. Also, from a positive perspective, the increased milfoil observed in the upper river section of the reservoir in 2008 generally decreased in 2010.

Of particular note with respect to observed changes, the spatial distribution of the stands changed dramatically. While there was almost no net change in the acreage among stands that changed in spatial distribution, over 131-acres of spatial distribution occurred in 32 stands at an average change of just over 4-acres per stand.

These trends of changing spatial distribution, overall coverage, and stand densities indicate the Eurasian water milfoil population is in flux from year to year within the Menominee River system. Contributing factors include influences of local and annual climate variances (i.e. precipitation and temperature), the presence of the indigenous milfoil weevil population, extent of milfoil hybridization, fish predation, and others.

Annual fluctuations in the extent and density of Eurasian water milfoil may be due, in part, to the presence of an indigenous weevil population occurring in the system. See the attached discussion regarding the Eurasian water milfoil summary report prepared by EnviroScience for further information about milfoil management activities that occurred in 2010.

Table 1TF. 2010 Twin Falls Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	1	None	0.01
2	1	None	0.33
3	1	None	0.09
4	1	None	2.30
5	1	None	0.04 (+0.03)
6	1	None	0.52
7	1	None	0.76
8	1	None	0.48 (+0.17)
9	Not Present	NA	NA
10	1	None	14.82 (-1.04)
11	1	None	1.54
12	1	None	1.18 (+0.27)
13	1	None	0.78
14	1	None	0.80
15	Not Present	NA	NA
16	Not Present	NA	NA
17	1	None	0.18
18	Not Present	NA	NA
19	1	None	9.1 0 (-1.43)
20	3 (+1)	None	4.63 (+2.11)
21	1	None	0.43
22	1	None	0.94
23	1	None	7.85
24	1	None	0.01
25	1	None	0.53
26	1	None	0.49
27	1	None	0.11
28	1	None	0.25
29	Not Present	NA	NA
30	Not Present	NA	NA
31	1	None	0.43
32	1	None	1.06 (+0.31)
33	1	None	6.68 (+0.79)
34	1	None	12.58
35	3 (+2)	None	0.32 (+0.21)
36	1	None	0.14
37	1	None	0.38
38	2 (-1)	None	0.48
39	2 (+1)	None	1.37 (+0.65)
40	2 (-1)	None	7.02 (+0.05)
41	3 (-1)	None	1.52 (+0.13)
42	3	None	4.27
43	Not Present	NA	NA
44	1	None	0.37
45	1	None	10.41 (-9.84)
46	Combined with 49	NA	NA
47	Not Present	NA	NA

Table 1TF. 2010 Twin Falls Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
48	Not Present	NA	NA
49	3 (+3)	None	7.13 (+7.13)
50	1	None	5.76 (+1.05)
51	1	None	0.03
52	2	None	1.51 (-0.85)
53	Combined with 50	NA	NA
54	Combined with 50	NA	NA
55	3 (+2)	None	44.90 (-47.73)
56	4 (+1)	None	6.18 (+3.27)
57	Not Present	NA	NA
58	Not Present	NA	NA
59	Not Present	NA	NA
60	4 (+3)	None	4.51 (+4.51)
61	Combined with 60 and 55	NA	NA
62	3 (+2)	None	1.61 (+0.75)
63	1	None	8.91 (+8.02)
64	Not Present	NA	NA
65	4 (+3)	None	3.11 (-3.72)
66	Combined with 63	NA	NA
67	1	None	0.41
68	1	None	0.01 (-0.04)
69	5 (+1)	None	0.19 (-0.09)
70	4 (+2)	None	14.92 (+14.11)
71	2 (-1)	None	19.03 (+18.42)
72	2	None	0.81
73	4	None	0.04
74	3 (+1)	None	0.98
75	1	None	0.50 (+0.2)
76	1	None	1.06 (+0.33)
77	2 (+1)	None	3.57 (+2.15)
78	1	None	0.28
79	Not Present	NA	NA
80	1	None	0.01 (-1.01)
81	Not Present	NA	NA
82	1	None	0.01 (-0.55)
83	Not Present	NA	NA
84	1	None	0.72 (+0.25)
85	1	None	0.47
86	1	None	1.99
87	1	None	0.01
88	1	None	0.09
89	1	None	0.03
90	1	None	1.40
91	3	None	0.20
92	3	None	1.78
93	3	None	0.31
94	2	None	0.04

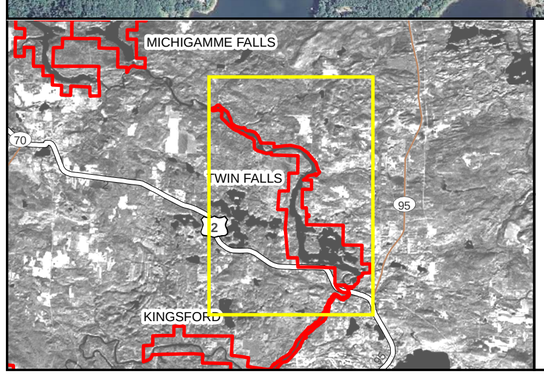
Table 1TF. 2010 Twin Falls Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
95	1	None	0.38
96	1	None	0.01
97	1	None	0.01
98	1	None	3.67
99	4	None	0.59
100	1	None	6.29
101	3	None	0.87
102	Number Skip	NA	NA
103	4	None	2.99
104	1	None	0.05
105	1	None	0.01
106	1	None	1.29
107	1	None	0.01
108	1	None	1.00
109	1	None	0.24
110	1	None	0.69
111	1	None	0.01
112	1	None	0.01

1 – change in density rating from 2008 to 2010

2 – change in stand size from 2008 to 2010

Stand Number	Infestation	acres
1	sparse	0.01
2	sparse	0.33
3	sparse	0.09
4	sparse	2.30
5	sparse	0.04
6	sparse	0.52
7	sparse	0.76
8	sparse	0.48
10	sparse	14.82
11	sparse	1.54
12	sparse	1.18
13	sparse	0.78
14	sparse	0.80
17	sparse	0.18
19	sparse	9.10
20	moderate	4.63
21	sparse	0.43
22	sparse	0.94
23	sparse	7.85
24	sparse	0.01
25	sparse	0.53
26	sparse	0.49
27	sparse	0.11
28	sparse	0.25
31	sparse	0.43
32	sparse	1.06
33	sparse	6.68
34	sparse	12.58
35	moderate	0.32
36	sparse	0.14
37	sparse	0.38
38	moderate sparse	0.48
39	moderate sparse	1.37
40	moderate sparse	7.02
41	moderate	1.52
42	moderate	4.27
44	sparse	0.37
45	sparse	10.41
49	moderate	7.13
50	sparse	5.76
51	sparse	0.03
52	moderate sparse	1.51
55	moderate	44.90
56	moderate dense	6.18
60	moderate dense	4.51
62	moderate	1.61
63	sparse	8.91
65	moderate dense	3.11
67	sparse	0.41
68	sparse	0.01
69	dense	0.19
70	moderate dense	14.92
71	moderate sparse	19.03
72	moderate sparse	0.81
73	moderate dense	0.04
74	moderate	0.98
75	sparse	0.50
76	sparse	1.06
77	moderate sparse	3.57
78	sparse	0.28
80	sparse	0.01
82	sparse	0.01
84	sparse	0.72
85	sparse	0.47
86	sparse	1.99
87	sparse	0.01
88	sparse	0.09
89	sparse	0.03
90	sparse	1.40
91	moderate	0.20
92	moderate	1.78
93	moderate	0.31
94	moderate sparse	0.04
95	sparse	0.38
96	sparse	0.01
97	sparse	0.01
98	sparse	3.67
99	moderate dense	0.59
100	sparse	6.29
101	moderate	0.87
103	moderate dense	2.99
104	sparse	0.05
105	sparse	0.01
106	sparse	1.29
107	sparse	0.01
108	sparse	1.00
109	sparse	0.24
110	sparse	0.69
111	sparse	0.01
112	sparse	0.01



Public Boat Launch

FERC Hydro Project Boundary

sparse

moderate sparse

moderate

moderate dense

dense

Feet

1,000 0 1,000 2,000

N

W E

S

Twin Falls Hydro Project - Year 2010
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2009
GPS field data 8/4/2010

Created by: TKS Monday, August 23, 2010 8:13 AM File: J:\DATA\FO\Env_Strategy\GIS Projects\Hydro_lands\Maps\2010_Reports\twin falls 2010 exotic monitoring.mxd