

We Energies
2011 Annual Report - Nuisance Plant Control Survey
Brule Reservoir
FERC Project #2431

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 Brule Reservoir project on July 29, 2011. 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 2011 surveys, the stand location and perimeter were compared and verified with the 2010 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 1BR. 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:

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

Results & Discussion

No purple loosestrife plants were observed along the shores of the Brule Reservoir project area. The removal of the plant observed in 2009 was successful with no reoccurrence of this plant in 2011.

Twenty-five stands of Eurasian water milfoil were observed at the Brule Reservoir project area in 2011 (attached map), a 50% decrease from 2010. No new stands were recorded. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 3.02-acres.

Eurasian water milfoil is present in approximately 7.43-acres in the Brule Reservoir project area, a decrease of about 88-acres from 2010, when the total spatial distribution peaked at over 95-acres. Cumulatively, the average stand size is 0.30-acres with an average density rating of 1.00 per stand. In 2010, the average stand size was 1.91-acres with an average density rating of 2.08 per stand.

Additionally, 50 stands changed in spatial coverage with a net change of -86.48-acres overall. The total gross change observed is 86.49-acres with an average gross change of 1.73-acres per stand. 7 stands accounted for about 41-acres that either increased or decreased in size.

The average stand density dropped dramatically to 1.00 in 2011 following the highest average density recorded at Brule (2.08 per stand) in 2010. 18 stands decreased in density between 2010 and 2011, while none increased. These 18 stands accounted for an average density decrease of 2.39 per stand.

Out of the 25 observed stands, none were observed with high densities (>75% cover), following a peak of 9 stands (26.76-acres) in 2010. All 25 stands had 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 100% of the total area observed to have Eurasian water milfoil present, up from 57% in 2010.

Conclusions

Generally, a decrease in observed purple loosestrife presence was documented at the We Energies reservoirs monitored in 2011. It was discouraging that a new location of purple loosestrife was observed in the Brule Reservoir for the first time in 2010. The entire plant was removed including the flowering heads, stems, and root mass. No purple loosestrife was found at Brule in 2011.

Substantial decreases in the number Eurasian water milfoil stands (-50%), total acres (-92%), average stand size (-84%), and average density rating per stand (-52%) were observed in the Brule project area from 2010 to 2011. No dense stands (>75% cover) were observed and all were documented as sparse stands (<25% cover). Eighteen stands decreased in density, while none increased. These are all positive trends from the perspective that the Eurasian water milfoil improved dramatically between 2010 and 2011. These dramatic decreases followed peak highs observed in 2009 and 2010.

The Eurasian water milfoil infestation in Brule improved greatly between 2010 and 2011. Consistently, changes in the number of stands, overall coverage, spatial distribution of individual stands, and stand densities continue to be observed on an annual basis in Brule and all of the We Energies reservoirs where Eurasian water milfoil is present throughout the Menominee River system. Conditions exhibit a majority of negative trends some years, remain relatively constant in others, and also dramatically improve as observed at Brule in 2011. Refer to the attached annual Eurasian water milfoil monitoring summary tables for a complete summary of data results since detailed observations were first recorded in 2006.

These trends indicate the Eurasian water milfoil population is in flux from year to year. 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, and others.

Annual fluctuations in the extent and density of Eurasian water milfoil appear to be due, in large part, to the presence of an indigenous weevil population occurring in the system. After four years of monitoring the weevil population, positive trends are being observed between weevil

population and Eurasian water milfoil population fluctuations. These trends indicate the indigenous weevil population tends to increase as the Eurasian water milfoil population increases. Evidence shows the milfoil populations ultimately spike before declining. The weevil populations tend to lag behind the milfoil population spike, and it spikes as the milfoil population begins declining and crashes as observed in some reservoirs. The weevil population spikes are followed by substantial decreases in the respective populations. It appears a cycle occurs between these two populations. See the attached results and discussion regarding the Eurasian water milfoil summary report prepared by EnviroScience for further information about milfoil management activities that occurred in 2011.

**Table 1BR. 2011 Brule Reservoir
Eurasian Water Milfoil Stand Data**

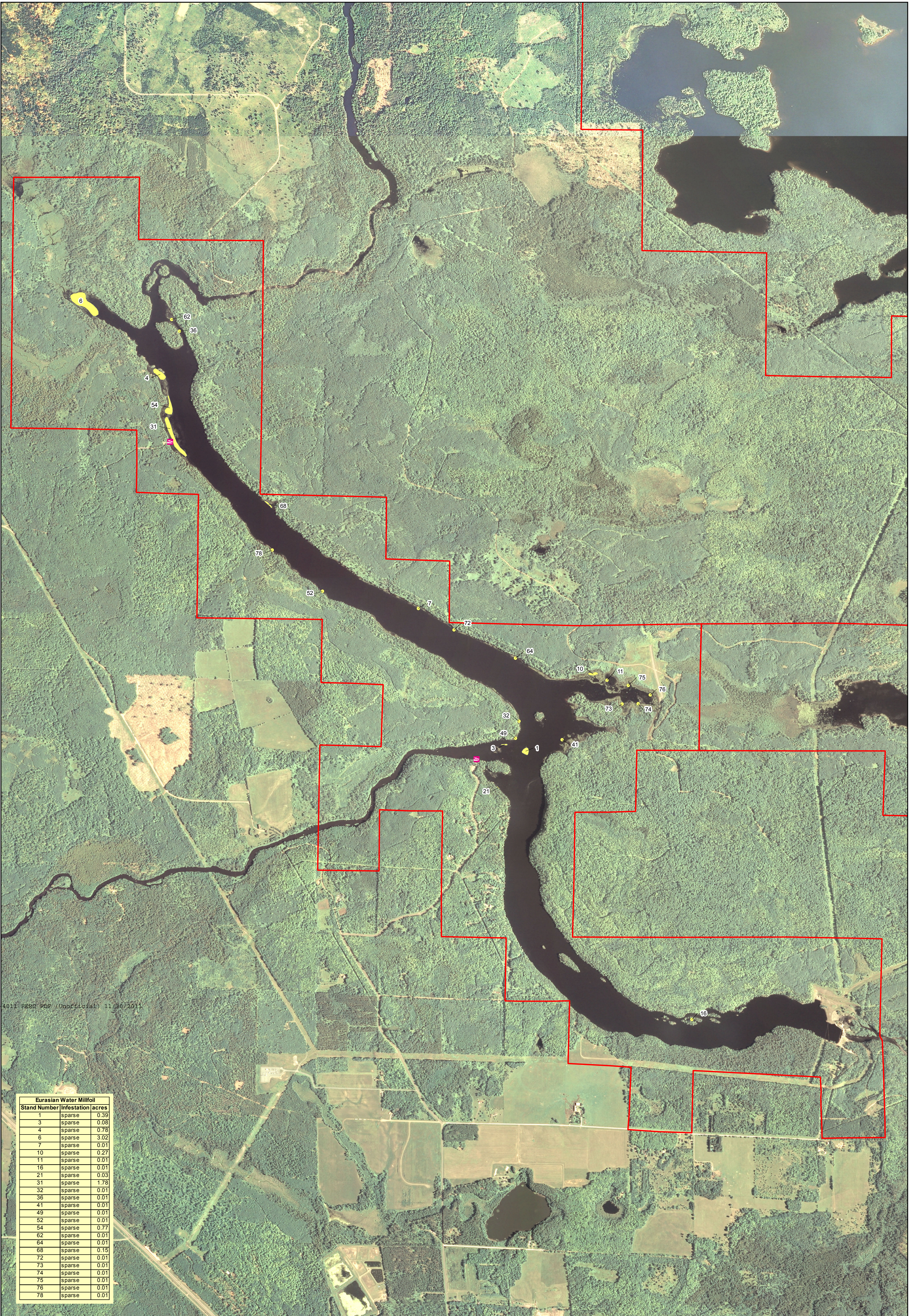
Stand Number	Density¹	Mat Thickness	Stand Size²
1	1 (-2)	None	0.39 (-3.65)
2	Not Present	NA	NA
3	1	None	0.08 (-0.48)
4	1 (-2)	None	0.78 (-5.88)
5	Combined with 6	NA	NA
6	1 (-2)	None	3.02 (-3.08)
7	1 (-3)	None	0.01 (-8.42)
8	Not Present	NA	NA
9	Not Present	NA	NA
10	1 (-2)	None	0.27 (-1.06)
11	1 (-3)	None	0.01 (-10.62)
12	Not Present	NA	NA
13	Not Present	NA	NA
14	Not Present	NA	NA
15	Not Present	NA	NA
16	1	None	0.01
17	Not Present	NA	NA
18	Not Present	NA	NA
19	Not Present	NA	NA
20	Not Present	NA	NA
21	1	None	0.03 (-6.28)
22	Not Present	NA	NA
23	Not Present	NA	NA
24	Not Present	NA	NA
25	Not Present	NA	NA
26	Not Present	NA	NA
27	number skip	NA	NA
28	Not Present	NA	NA
29	Not Present	NA	NA
30	Not Present	NA	NA
31	1 (-3)	None	1.78 (-2.29)
32	1	None	0.01 (-0.08)
33	Not Present	NA	NA
34	Not Present	NA	NA
35	Not Present	NA	NA
36	1 (-1)	None	0.01 (-2.43)
37	Not Present	NA	NA
38	Not Present	NA	NA
39	Not Present	NA	NA
40	Not Present	NA	NA
41	1 (-3)	None	0.01 (-0.29)
42	Not Present	NA	NA
43	Not Present	NA	NA
44	Not Present	NA	NA
45	Not Present	NA	NA
46	Not Present	NA	NA
47	Not Present	NA	NA

**Table 1BR. 2011 Brule Reservoir
Eurasian Water Milfoil Stand Data**

48	Not Present	NA	NA
49	1 (-1)	None	0.01 (-1.30)
50	Not Present	NA	NA
51	Not Present	NA	NA
52	1	None	0.01 (-0.17)
53	Not Present	NA	NA
54	1 (-1)	None	0.77 (-1.20)
55	Not Present	NA	NA
56	Not Present	NA	NA
57	Not Present	NA	NA
58	Not Present	NA	NA
59	Not Present	NA	NA
60	Not Present	NA	NA
61	Not Present	NA	NA
62	1 (-3)	None	0.01 (-0.55)
63	Not Present	NA	NA
64	1 (-4)	None	0.01 (-1.34)
65	Not Present	NA	NA
66	Not Present	NA	NA
67	Not Present	NA	NA
68	1 (-2)	None	0.15 (-0.20)
69	Not Present	NA	NA
70	Not Present	NA	NA
71	Not Present	NA	NA
72	1 (-2)	None	0.01 (-1.10)
73	1 (-4)	None	0.01 (-0.40)
74	1 (-4)	None	0.01 (-0.58)
75	1	None	0.01 (-0.24)
76	1	None	0.01 (-3.19)
77	Not Present	NA	NA
78	1 (-1)	None	0.01 (-1.07)
79	Not Present	NA	NA

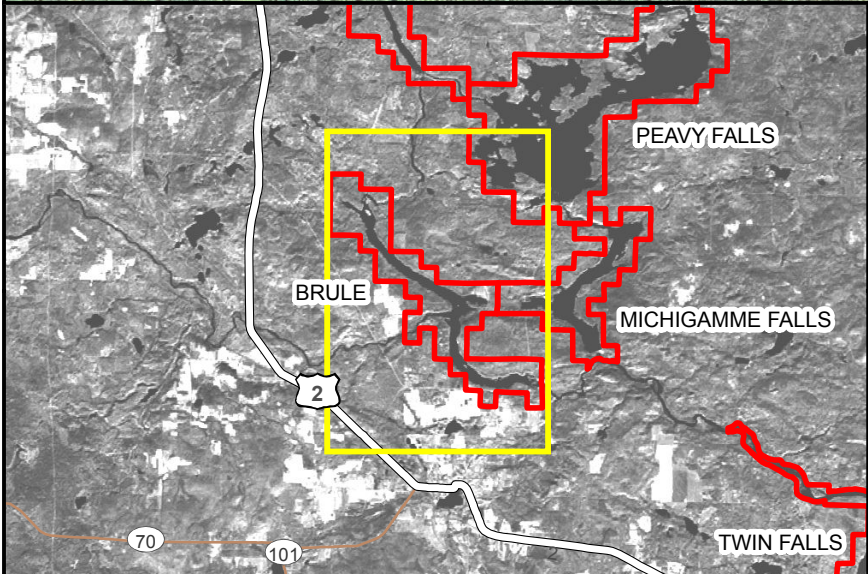
1 – (+/-) change in density rating from 2010 to 2011

2 – (+/-) change in stand size in acres from 2010 to 2011



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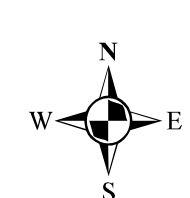
Stand Number	Infestation	acres
1	sparse	0.39
3	sparse	0.08
4	sparse	0.78
6	sparse	3.02
7	sparse	0.01
10	sparse	0.27
11	sparse	0.01
16	sparse	0.01
21	sparse	0.03
31	sparse	1.78
32	sparse	0.01
36	sparse	0.01
41	sparse	0.01
49	sparse	0.01
52	sparse	0.01
54	sparse	0.77
62	sparse	0.01
64	sparse	0.01
68	sparse	0.15
72	sparse	0.01
73	sparse	0.01
74	sparse	0.01
75	sparse	0.01
76	sparse	0.01
78	sparse	0.01



■ Public Boat Launch
 FERC Hydro Project Boundary

Year 2011 Field Work
 sparse
 moderate sparse
 moderate
 moderate dense
 dense

1,000 0 Feet 1,000 2,000



Brule Hydro Project - Year 2011
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2010
 GPS field data collected 7/29/2011