We Energies
2007 Annual Report - Nuisance Plant Control Survey
Brule Reservoir
FERC Project #2431

We Energies' Environmental department staff, Mr. Mike Grisar and Mr. John Hrobar, conducted a survey from a boat of the entire shoreline at the Brule Reservoir project on August 1, 2007. 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.

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

For each stand of Eurasian water milfoil encountered during the 2007 surveys, the stand location and perimeter were compared and verified with the 2006 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 1. 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%

Twenty-seven stands of Eurasian water milfoil were observed at the Brule Reservoir project area (see attached map), an increase of 5 stands from 2006. While there were 6 new stands recorded, Stand 14 was observed to be absent in 2007. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 8.98-acres.

Table 1. Eurasian Water Milfoil Stand Data.

Stand #	Stand/Mat Density[1]	Mat Thickness	Stand Size (acres)[2]
1	3	None	0.22
2	1	None	0.95
3	4	0-4	0.92
4	1	None	8.98
5	2 (-2)	None	0.41 (-0.02)
6	1	None	4.10 (-0.46)
7	1	None	8.11 (+6.14)

Stand #	Stand/Mat Density[1]	Mat Thickness	Stand Size (acres)[2]
8	1	None	0.29
9	1	None	0.18
10	4 (+3)	None	8.49
11	1 (-3)	None	6.67
12	1	None	3.93
13	1	None	0.09
14	Not Present		
15	1 (-2)	None	0.74
16	2 (+1)	None	0.13
17	2	None	0.33
18	2	None	0.05
19	1	None	0.01
20	3 (-2)	None	1.76
21	1 (-1)	None	4.91 (+0.98)
22	2 (+1)	None	0.72
23	1	None	0.15
24	1	None	6.47
25	1	None	0.01
26	1	None	0.01
27	1	None	0.01
28	1	None	0.01

1 – change in density rating from 2006 to 2007
2 – change in stand size from 2006 to 2007

Eurasian water milfoil is present in approximately 59-acres in the Brule Reservoir project area, an increase of approximately 14-acres from 2006. Cumulatively, the average stand size is 2.17-acres and has an average density rating of 1.56 per stand. In 2006, the average stand size was 2.05-acres and had an average density rating of 1.91 per stand. The slight increase in average stand size is attributable to increases in stands 7 and 21, but offset by the average stand size of the six new stands having an average size of 1.11-acre. The decrease in the average density rating is attributable to the six new stands observed at sparse densities and reduced densities in stands 5, 11, 15, 20, and 21. Conversely, stands 10, 16, and 22 increased in density from 2006 to 2007.

Out of the 27 observed stands, 2 have a high density (>75% cover), stands 3 and 10. This is reduced by two stands from 2006. These stands occur in the central portion of the reservoir, east of the boat landing. Cumulatively, these two stands cover approximately 16% (9.41-acres) of the total area observed to have Eurasian water milfoil present.

The majority of the stands have very low densities of Eurasian water milfoil with single stems growing sporadically among a lot of 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*). 23 of the 27 stands have low densities (<25% cover) and account for 80% (47.26-acres) of the total area observed to have Eurasian water milfoil present.

In conclusion, there was an increase in the number Eurasian water milfoil stands observed in the Brule project area. While the number of stands increased by approximately 23-percent, all but one (stand 24) were very small and observed at very low densities. This increase in the

number of stands was a similar trend observed in the White Rapids and Chalk Hill project areas, also monitored in 2006.

A notable difference in the water clarity was observed in 2007 during the annual nuisance plant control surveys. The improved water clarity can be attributed to the low levels of precipitation that fell in the months prior to the 2007 monitoring. Less precipitation also led to less current in the impoundments on the system. Less current and better light penetration appears to have promoted the establishment of the new stands as well as the increased stand size observed in stands 7 and 21. Additionally, better clarity also allowed for clearer visibility of Eurasian water milfoil.

Nearly one-third of the stands observed in 2006 were observed to have changed in density between 2006 and 2007. Additionally, stand 14 was not present in 2007. Based on the findings observed during the implementation of a biological control program, native milfoil weevils (*Euhrychiopsis lecontei)* were observed to be present within the Brule Reservoir. When considering these factors (changes observed in Eurasian water milfoil density and the presence of milfoil weevils), the hypothesis can be drawn that the changes in density of milfoil beds is the result of active herbivory by the milfoil weevils. A project to study this hypothesis is being developed and will be implemented beginning in 2008.