We Energies
2009 Annual Report - Nuisance Plant Control Survey
White Rapids Reservoir
FERC Project #2357

Background and Methods

We Energies' Environmental department staff, Mr. Mike Grisar and Mr. John Hrobar, conducted a survey from a boat of the entire shoreline at the White Rapids Reservoir project on August 2, 2009. 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 2009 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 1WR. 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 White Rapids Reservoir project area.

Thirty-five stands of Eurasian water milfoil were observed to occur in 2009 at the White Rapids Reservoir project area (attached map), resulting in no change from 2008. The identified stands are distributed throughout the project area and range in size from 0.01-acre up to 12.33-acres.

Eurasian water milfoil is present in approximately 62-acres in the White Rapids Reservoir project area, a decrease of over 20-acres from 2008. Cumulatively, the average stand size is 1.76-acres and has an average density rating of 1.86 per stand. In 2008, the average stand size was 2.35-acres and had an average density rating of 1.37 per stand. The decrease in stand size is attributable to the overall reduction of Eurasian water milfoil coverage and eight new stands having an average size of 0.33-acre.

The increase observed in the average density rating is attributable to the increase in stand densities in stands 4, 8, 9, 18, and 21 as well as the new stands having an average rating of 1.38. Stand 4 was not present in 2008, however it is present in 2009 with a density rating of 5. Stands 8 and 21 have continued to increase since 2007. Conversely, only 3 stands decreased in density from 2008. In total, 9 stands that were present in 2008 are no longer present in 2009.

Additionally, 20 stands changed in spatial coverage. The total gross change observed is 30.83-acres with an average gross change of 1.54-acres per stand. Of these, 8 stands accounted for over 24-acres that either increased or decreased in size (approximate 3.1-acre average change).

Out of the 35 observed, 7 stands (4, 5, 8, 13, 18, 19, and 40) have a high density (>75% cover). The number of high density stands increased from 5 to 7 between 2008 and 2009. They cover approximately 17.64-acres, which increased by almost 7-acres since 2008. Greater than 22-acres were classified with a high density rating in 2007.

27 of the 35 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*). These low density stands account for approximately 70% (43.37-acres) of the total area observed to have Eurasian water milfoil present.

Conclusions

In conclusion, the number Eurasian water milfoil stands remained constant in the White Rapids project area. However, there were notable decreases in the total acreage and average stand size. There were increases observed in the average stand density with a drop in the total acres of milfoil observed at low densities. The reduced acreage of low density stands is accounted for by the total reduction of Eurasian water milfoil acreage in White Rapids. These are mixed results with respect to whether the conditions are improving or on a negative trend.

While the spatial coverage continues to decrease, some areas are experiencing an increase in the density of Eurasian water milfoil. Of particular note is the dramatic reduction of spatial coverage north of the large island while at the same time, relative density increased (stands 8, 21, and 40) in smaller components of these milfoil beds. Additionally, the total acres of high density stands continue to decrease. Of those stands occurring in 2008 and still present in 2009, significant changes in the average stand size further indicate annual changes in the extent of milfoil populations.

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.

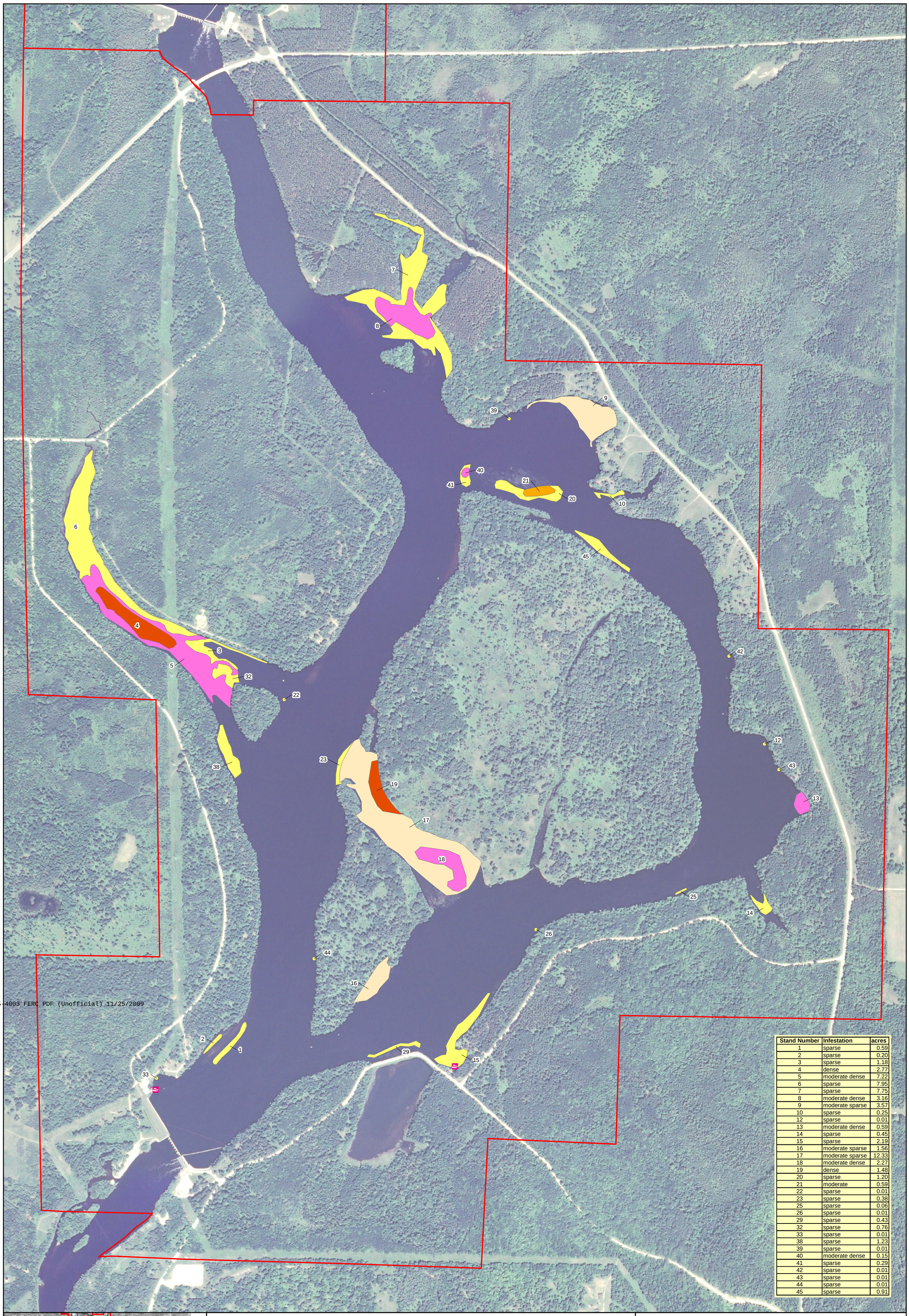
Annual fluctuations in the extent and density of Eurasian water milfoil may be due, in part, to the presence of an indigenous weevil population occurring in the system. See the attached discussion regarding the Eurasian water milfoil management plan and the summary report prepared by EnviroScience for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

Table 1WR. 2009 White Rapids Reservoir Eurasian Water Milfoil Stand Data.

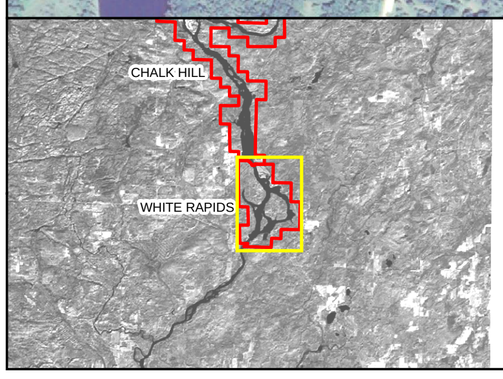
Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	1 (-3)	None	0.59 (-0.11)
2	1	None	0.2 (-3.19)
3	1 (-2)	None	1.18 (+0.85)
4	5 (+5)	None	2.77 (+2.77)
5	4	None	7.22 (+0.20)
6	1	None	7.95 (-2.62)
7	1	None	7.75 (-3.43)
8	4 (+1)	None	3.16 (-0.46)
9	4 (+2)	None	3.57 (+0.11)
10	1	None	0.25 (-0.53)
11	Not Present	NA	NA
12	1	None	0.01 (-1.10)
13	4	None	0.59
14	1	None	0.45
15	1	None	2.19
16	2	None	1.56
17	2	None	12.33 (-3.10)
18	4 (+2)	None	2.27 (+1.35)
19	5	None	1.48
20	1	None	1.2 (-4.01)
21	3 (+1)	None	0.59 (-2.98)
22	1	None	0.01 (-0.16)
23	1	None	0.38 (-0.61)
24	Not Present	NA	NA
25	1	None	0.06
26	1	None	0.01 (-0.21)
27	Not Present	NA	NA
28	numbering skip	None	NA
29	1	None	0.43
30	Not Present	NA	NA
31	Not Present	NA	NA
32	1	None	0.76 (-2.75)
33	1 (-1)	None	0.01 (-0.28)
34	Not Present	NA	NA
35	Not Present	NA	NA
36	Not Present	NA	NA
37	Not Present	NA	NA
38	1	None	1.23
39	1	None	0.01
40	4	None	0.15
41	1	None	0.29
42	1	None	0.01
43	1	None	0.01
44	1	None	0.01
45	1	None	0.91

1 – change in density rating from 2008 to 2009

2 – change in stand size from 2008 to 2009



Stand Number	Infestation	acres
1	sparse	0.59
2	sparse	0.20
3	sparse	1.18
4	dense	2.77
5	moderate dense	7.22
6	sparse	7.95
7	sparse	7.75
8	moderate dense	3.16
9	moderate sparse	3.57
10	sparse	0.25
12	sparse	0.01
13	moderate dense	0.59
14	sparse	0.45
15	sparse	2.19
16	moderate sparse	1.56
17	moderate sparse	12.33
18	moderate dense	2.27
19	dense	1.48
20	sparse	1.20
21	moderate	0.59
22	sparse	0.01
23	sparse	0.38
25	sparse	0.06
26	sparse	0.01
29	sparse	0.43
32	sparse	0.76
33	sparse	0.01
38	sparse	1.23
39	sparse	0.01
40	moderate dense	0.15
41	sparse	0.29
42	sparse	0.01
43	sparse	0.01
44	sparse	0.01
45	sparse	0.91



Public Boat Launch

FERC Hydro Project Boundary

Year 2009 Field Work

- sparse
- moderate sparse
- moderate
- moderate dense
- dense

Feet
1,000 0 1,000

N
W E
S

White Rapids Hydro Project - Year 2009
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2008
GPS field data 08/02/2009