We Energies
2009 Annual Report - Nuisance Plant Control Survey
Michigamme Falls Reservoir
FERC Project #2073

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 1, 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 2007 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 1MF. 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 Michigamme Falls Reservoir project area.

Thirty-seven stands of Eurasian water milfoil were observed at the Michigamme Falls Reservoir project area (attached map), an increase of 13 stands from 2007. 4 stands (stands 17, 19, 21, and 23) previously observed in 2007 are no longer present in 2009. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 18.31-acres.

Eurasian water milfoil is present in approximately 67-acres at Michigamme Falls, a decrease of over 54-acres from 2007. Cumulatively, the average stand size is 1.80-acres and has an average density rating of 1.73 per stand. In 2007, the average stand size was 5.02-acres and had an average density rating of 2.04 per stand. The decrease in stand size is attributable to the overall reduction of Eurasian water milfoil coverage and 17 new stands having an average size of 1.39-acre.

The decrease observed in average density rating is attributable to the rating decreases observed in 7 stands, while an increase was observed in only 1 (stand 3). Additionally, the average density rating of the 17 new stands is 1.71, which is about a 16% reduction from 2007 values.

Additionally, 18 stands changed in spatial coverage. The total gross change observed is 85.84-acres with an average gross change of 4.77-acres per stand. Stands 1 and 15 accounted for 60.58 acres, approximately 71% of the total that either increased or decreased in size

Out of the 37 observed, only 4 stands (3, 25, 31, and 33) have a high density (>75% cover). The number of high density stands increased from 1 to 4 between 2007 and 2009. They cover approximately 2.77-acres (4% of the total area). All four stands are relatively small areas embedded within larger beds of less dense Eurasian water milfoil.

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*). 28 of the 37 stands have low densities (<25% cover) and account for 79% (52.50-acres) of the total area observed to have Eurasian water milfoil present.

Conclusions

In conclusion, the total number of stands at Michigamme Falls increased substantially (~35%). This was in part due to dividing a number of stands into smaller stands as a result of less spatial coverage of Eurasian water milfoil. While the number of stands increased, the total acreage, average stand size, average stand density, the number of stands with high densities, and total acreage of high density stands all decreased. Total loss of acreage was largely due to dramatic decreases in stands 1 and 20 (combined ~ 61-acres). Furthermore, the number of low density stands more than doubled between 2007 and 2009. Also, high density stands remain low when compared to the total number of stands observed and total acreage of high density stands, 11% and 4% of the total, respectively.

All of these changes indicate an improved condition of Eurasian water milfoil at Michigamme Falls. In summary, there is much less Eurasian water milfoil observed at lower densities than what was present in 2007.

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.

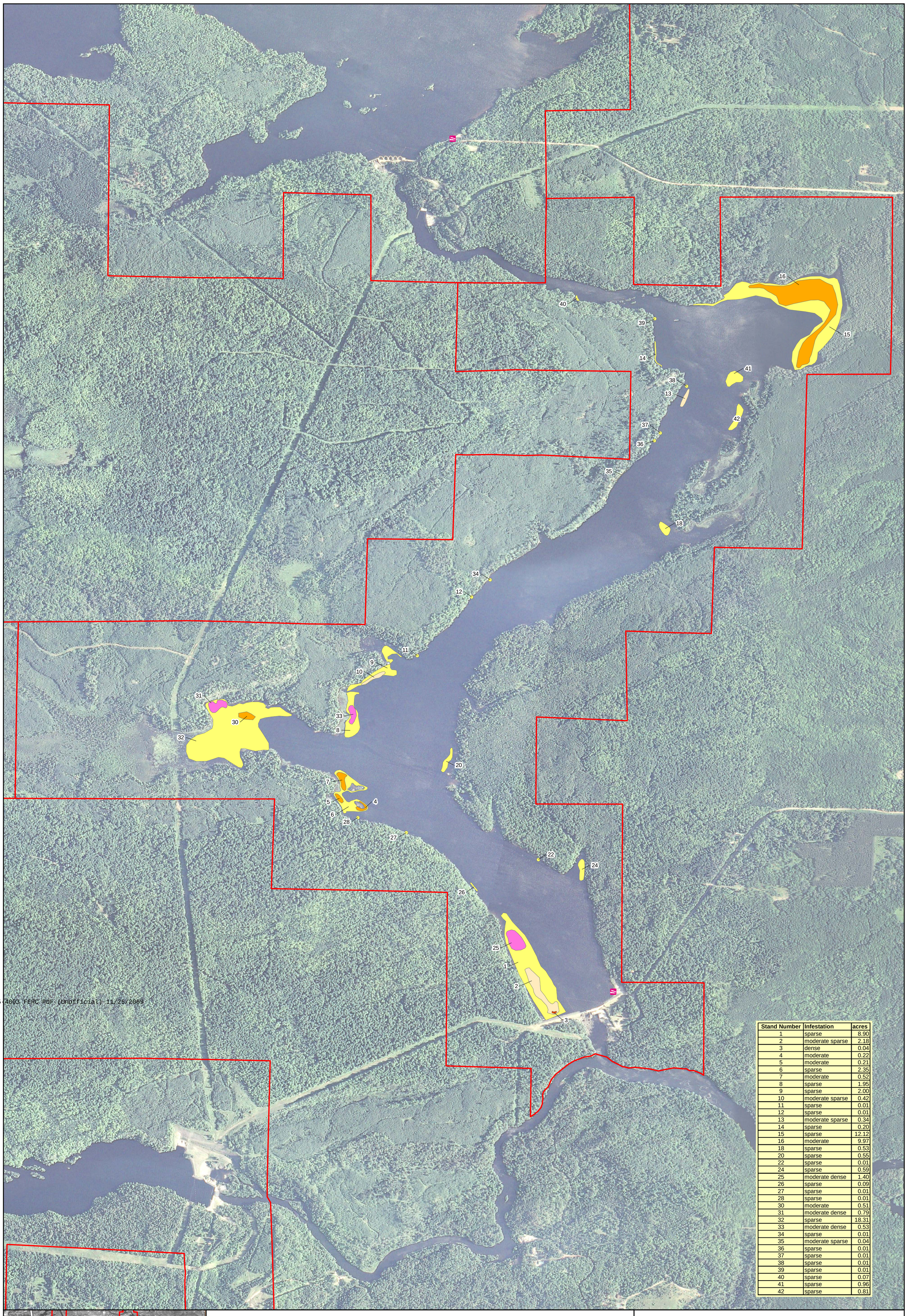
Annual fluctuations in the extent and density of Eurasian water milfoil may be due, in part, to the presence of an indigenous weevil population occurring in the system. See the attached discussion regarding the Eurasian water milfoil management plan and the summary report prepared by EnviroScience for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

Table 1MF. 2009 Michigamme Falls Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	1	None	8.9 (-40.9)
2	2 (-1)	None	2.18 (-3.52)
3	5 (+1)	None	0.04 (-0.06)
4	3	None	0.22 (+0.02)
5	3	None	0.21 (+0.01)
6	1 (-2)	None	2.35 (+2.32)
7	3	None	0.52 (-0.18)
8	1 (-2)	None	1.95 (-0.55)
9	1	None	2 (-1.1)
10	2 (-1)	None	0.42 (+0.02)
11	1	None	0.01 (-0.19)
12	1	None	0.01 (-2.79)
13	2	None	0.34 (-0.16)
14	1	None	0.20
15	1 (-1)	None	12.12 (-19.68)
16	3	None	9.97 (+8.57)
17	Not Present	NA	NA
18	1 (-2)	None	0.53 (+0.03)
19	Not Present	NA	NA
20	1 (-2)	None	0.55 (-0.65)
21	Not Present	NA	NA
22	1	None	0.01
23	Not Present	NA	NA
24	1	None	0.59 (-5.11)
25	4	None	1.40
26	1	None	0.09
27	1	None	0.01
28	1	None	0.01
30	3	None	0.51
31	4	None	0.79
32	1	None	18.31
33	4	None	0.53
34	1	None	0.01
35	2	None	0.04
36	1	None	0.01
37	1	None	0.01
38	1	None	0.01
39	1	None	0.01
40	1	None	0.07
41	1	None	0.96
42	1	None	0.81

1 – change in density rating from 2007 to 2009

2 – change in stand size from 2007 to 2009



Stand Number	Infestation	acres
1	sparse	8.90
2	moderate sparse	2.18
3	dense	0.04
4	moderate	0.22
5	moderate	0.21
6	sparse	2.35
7	moderate	0.52
8	sparse	1.95
9	sparse	2.00
10	moderate sparse	0.42
11	sparse	0.01
12	sparse	0.01
13	moderate sparse	0.34
14	sparse	0.20
15	sparse	12.12
16	moderate	9.97
18	sparse	0.53
20	sparse	0.55
22	sparse	0.01
24	sparse	0.59
25	moderate dense	1.40
26	sparse	0.09
27	sparse	0.01
28	sparse	0.01
30	moderate	0.51
31	moderate dense	0.79
32	sparse	18.31
33	moderate dense	0.53
34	sparse	0.01
35	moderate sparse	0.04
36	sparse	0.01
37	sparse	0.01
38	sparse	0.01
39	sparse	0.01
40	sparse	0.07
41	sparse	0.96
42	sparse	0.81

Public Boat Launch

FERC Hydro Project Boundary

Year 2009 Field Work

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

Feet

1,000 0 1,000 2,000

N W E S

Michigamme Falls Hydro Project - Year 2009
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2008
GPS field data 8/1/2009

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