

**We Energies**  
**2011 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. Scott Horzen, conducted a survey from a boat of the entire shoreline at the Michigamme Falls Reservoir project on August 1, 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 2009 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:

<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 and Discussion

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

Thirty stands of Eurasian water milfoil were observed at Michigamme Falls (attached map), a decrease of 7 stands from 2009. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 11.02-acres. Additionally, 3 stands merged with other stands, 16 stands were no longer present from 2009, and 8 stands were identified for the first time in 2011.

Eurasian water milfoil is present in approximately 20-acres at Michigamme Falls, a decrease of over 46-acres from 2009, and over 100-acres since 2007. Cumulatively, the average stand size is 0.67-acres and has an average density rating of 1.10 per stand. In 2009, the average stand size was 1.80-acres and had an average density rating of 1.73 per stand. Decreases in stand

densities were observed in 8 stands between 2009 and 20011, while no stands increased in density.

32 stands changed in spatial coverage from 2009 to 2011. The total gross change observed is 59.90-acres with an average gross change of 1.86-acres per stand. Of these, 4 stands accounted for over 26-acres that either increased or decreased in size.

Out of the 30 observed, no stands were observed to have a high density (>75% cover). 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*). 29 of the 30 stands have low densities (<25% cover) and account for 97% (19.45-acres) of the total area observed to have Eurasian water milfoil present.

### Conclusions

Purple loosestrife has yet to be observed at the Michigamme Falls project area since the nuisance plant surveys began. Diligent monitoring will continue to prevent an invasion of this species.

Substantial decreases in the number of stands (-19), total acres (-70%), ave. stand size (-63%), and average density rating per stand (-36%) were observed in the Michigamme Falls project area from 2009 to 2011. Sixteen stands observed in 2009 were not present in 2011, 8 stands that were present in 2009 decreased in density, and no stands increased. Additionally, no dense stands (>75% cover) were observed, and all but two of the stands were documented as very sparse stands (<5% cover). These are all positive trends from the perspective that the Eurasian water milfoil improved substantially between 2009 and 2011.

While most of the data indicated positive trends, one negative observation was made in 2011. Eight new stands were identified in 2011; however, each of these stands has a single stem or just a few scattered stems in a very small area.

Overall, the Eurasian water milfoil infestation in Michigamme Falls improved greatly between 2009 and 2011, a continued trend since 2007. 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 Michigamme Falls 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, or dramatically improve as observed at Michigamme Falls 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 1MF. 2011 Michigamme Falls Reservoir  
Eurasian Water Milfoil Stand Data**

<b>Stand Number</b>	<b>Density<sup>1</sup></b>	<b>Mat Thickness</b>	<b>Stand Size<sup>2</sup></b>
1	1	None	11.02 (+2.13)
2	Combined with 1	NA	NA
3	Combined with 1	NA	NA
4	2 (-1)	None	0.22
5	Combined with 6	NA	NA
6	1	None	0.53 (-1.81)
7	1 (-2)	None	0.88 (+0.36)
8	Not Present	NA	NA
9	1	None	0.56 (-1.44)
10	1 (-1)	None	0.60 (+0.19)
11	1	None	0.01
12	Not Present	NA	NA
13	Not Present	NA	NA
14	Not Present	NA	NA
15	1	None	0.04 (-12.08)
16	1 (-2)	None	0.17 (-9.8)
17	Not Present	NA	NA
18	Not Present	NA	NA
19	1	None	1.09
20	1	None	0.15 (-0.41)
21	Not Present	NA	NA
22	1	None	0.23 (+0.22)
23	Not Present	NA	NA
24	1	None	2.70 (+2.11)
25	3 (-1)	None	0.77 (-0.63)
26	Not Present	NA	NA
27	1	None	0.01
28	Not Present	NA	NA
30	Not Present	NA	NA
31	1 (-3)	None	0.13 (-0.66)
32	Not Present	NA	NA
33	1 (-3)	None	0.88 (+0.35)
34	Not Present	NA	NA
35	1 (-1)	None	0.04
36	1	None	0.01
37	Not Present	NA	NA
38	Not Present	NA	NA
39	1	None	0.01
40	1	None	0.01 (-0.06)
41	1	None	0.01 (-0.95)
42	Not Present	NA	NA
43*	1	None	0.10
44*	1	None	0.01
45*	1	None	0.01
46*	1	None	0.01
47*	1	None	0.01
48*	1	None	0.01

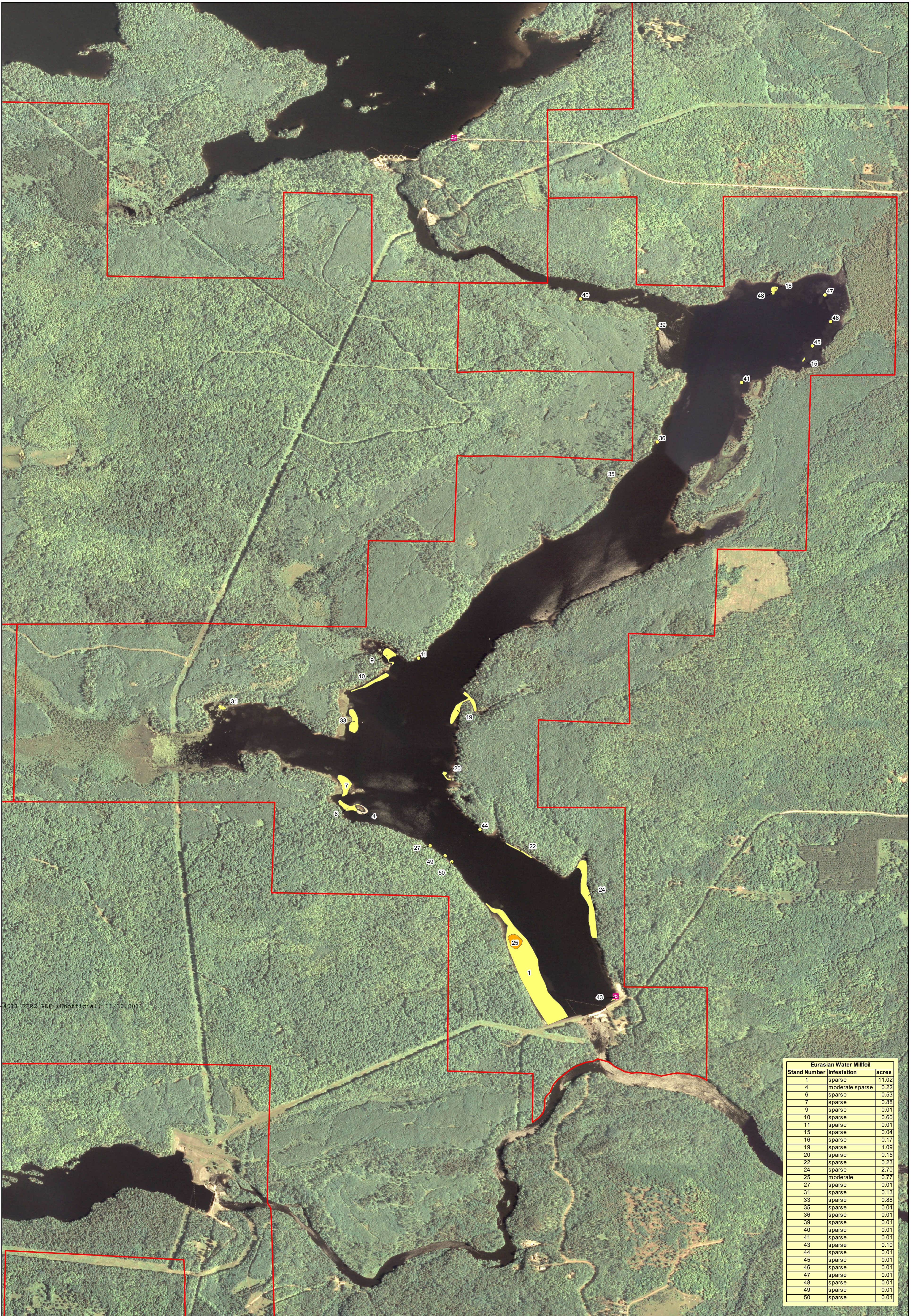
**Table 1MF. 2011 Michigamme Falls Reservoir  
Eurasian Water Milfoil Stand Data**

49*	1	None	0.01
50*	1	None	0.01

1 – (+/-) change in density rating from 2009 to 2011

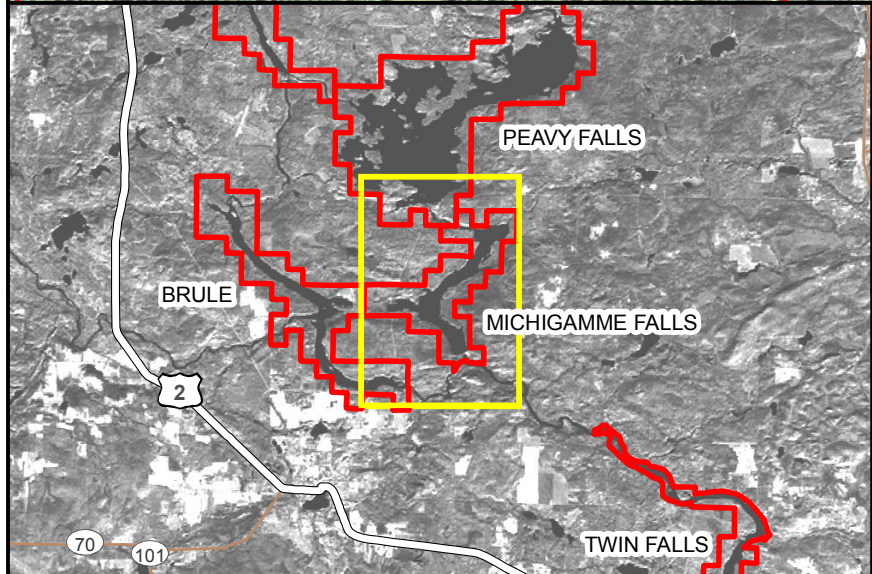
2 – (+/-) change in stand size in acres from 2009 to 2011

\* - new stand observed for the first time in 2011

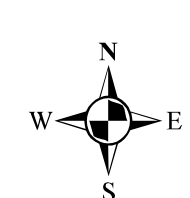
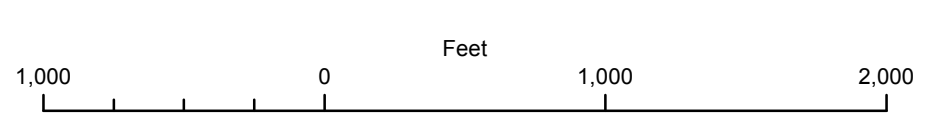


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Eurasian Water Milfoil		
Stand Number	Infestation	acres
1	sparse	11.02
4	moderate sparse	0.22
6	sparse	0.53
7	sparse	0.88
9	sparse	0.01
10	sparse	0.60
11	sparse	0.01
15	sparse	0.04
16	sparse	0.17
19	sparse	1.09
20	sparse	0.15
22	sparse	0.23
24	sparse	2.70
25	moderate	0.77
27	sparse	0.01
31	sparse	0.13
33	sparse	0.88
35	sparse	0.04
36	sparse	0.01
39	sparse	0.01
40	sparse	0.01
41	sparse	0.01
43	sparse	0.10
44	sparse	0.01
45	sparse	0.01
46	sparse	0.01
47	sparse	0.01
48	sparse	0.01
49	sparse	0.01
50	sparse	0.01



- Public Boat Launch
  - FERC Hydro Project Boundary
- Year 2011 Field Work
- sparse
  - moderate sparse
  - moderate
  - moderate dense
  - dense



**Michigamme Falls Hydro Project - Year 2011  
Eurasian Water Milfoil and Purple Loosestrife Survey**

Source: USDA - NAIP Imagery, 2010  
GPS field data 8/1/2011