

We Energies
2011 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. Scott Horzen, conducted a survey from a boat of the entire shoreline at the White Rapids Reservoir project on July 28, 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 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:

<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

In 2010, purple loosestrife was observed for the first time on the White Rapids reservoir. Six purple loosestrife plants were observed with the oldest plants determined to be approximately 3 years old based on the presence of remnant dead stems. The plants were found on the west point along the south side of the channel bisecting the large island in the middle of the reservoir. They were set back off the shoreline approximately 15-20-feet behind alder brush. There was evidence that this point was being utilized by waterfowl hunters who likely introduced the loosestrife to this location. The entire plants were removed including the flowering heads, stems, and root mass. While the entire reservoir was monitored in 2011 for the presence of purple loosestrife, particular attention was paid to the location where purple loosestrife was observed in 2010. A single, 1st-year plant was observed with just 2 stems. This entire plant was removed.

Twenty-five stands of Eurasian water milfoil were observed to occur in 2011 at the White Rapids Reservoir project area (attached map), resulting in a decrease of 11 stands since 2010. The

identified stands are distributed throughout the project area and range in size from 0.01-acre up to 7.96-acres.

Eurasian water milfoil is present in approximately 70-acres in the White Rapids Reservoir project area, a decrease of over 13-acres from 2010. This is a reversal in what was observed between 2009 and 2010 when an increase of over 22-acres was observed. Cumulatively, the average stand size is 2.81-acres and has an average density rating of 1.64 per stand. In 2010, the average stand size was 2.33-acres and had an average density rating of 1.83 per stand. The increase in stand size is attributable to the 31% decrease in total stands observed and only a 16% decrease in total acres from 2010 to 2011. The observed average density rating per stand decreased by 11% over the two year period from 1.83 to 1.64. This is attributable to having 6 stands decrease at an average decrease of 2.17 in density, while only 2 stands increased in density at an average increase of only 1.00 per stand.

Thirty-three stands changed in spatial coverage between 2010 and 2011, including 12 that were present in 2010 and absent in 2011. One stand that was absent in 2010 was observed in 2011, while 3 stands observed in 2010 were combined with other stands in 2011. The total gross change observed is 37.74-acres with an average gross change of 1.18-acres per stand. Of these, 8 stands accounted for approximately 26-acres that either increased or decreased in size (approximate 3.3-acre average change).

Out of the 25 observed, only 1 stand (stand 4) has a high density rating (>75% cover). It covers approximately 5.68-acres, which is a total decrease of over 23-acres. This is reversal in the trend of increasing acres of high density stands between 2008 and 2010. The number of high density stands decreased by 6 stands between 2010 and 2011.

20 of the 25 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 71% (50.22-acres) of the total area observed to have Eurasian water milfoil present, an increase from 64% 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 White Rapids for the first time in 2010. By removing the plants in this stand in 2010, the population was managed early in its infestation. This stand was reduced to a single plant in 2011. Continued active removal of these plants will help to prevent expansion of this infestation in White Rapids.

An influx of purple loosestrife occurring along public roadways leading to many of the reservoirs was reported in 2010. Purple loosestrife infestations were documented to be increasing exponentially along CTH K leading easterly toward the Menominee River between the Chalk Hills and White Rapids project areas. It appears these populations were managed in 2011 as the populations were very much reduced. This continued management by other parties should prove to be beneficial in reducing the potential for purple loosestrife to spread in the Menominee River system.

Substantial decreases in the number Eurasian water milfoil stands (-31%), total acres (-16%), average density rating per stand (-11%), total number of dense stands (-86%), and total spatial distribution of dense stands (-23%) were observed in the White Rapids project area from 2010 to 2011. Additionally, 6% and 10% increases in the percent of total number of low density stands and total acres of low density stands were observed, respectively. These are all positive trends from the perspective that the Eurasian water milfoil improved substantially between 2010 and 2011.

While most of the data indicated positive trends, a couple negative observations were made in 2011. These included having 2 stands (16 & 52) increase in density and 7 stands (1, 4, 5, 7, 23, 47, & 52) increase in spatial distribution. These 7 stands increased by 10.34-acres, with stand 23 accounting for a majority of the total (6.11-acres). This 10+ acre increase was offset, however, by a total decrease of 13-acres throughout all of White Rapids.

Overall, the Eurasian water milfoil infestation in White Rapids 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 White Rapids 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 White Rapids 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 1WR. 2011 White Rapids Reservoir
Eurasian Water Milfoil Stand Data**

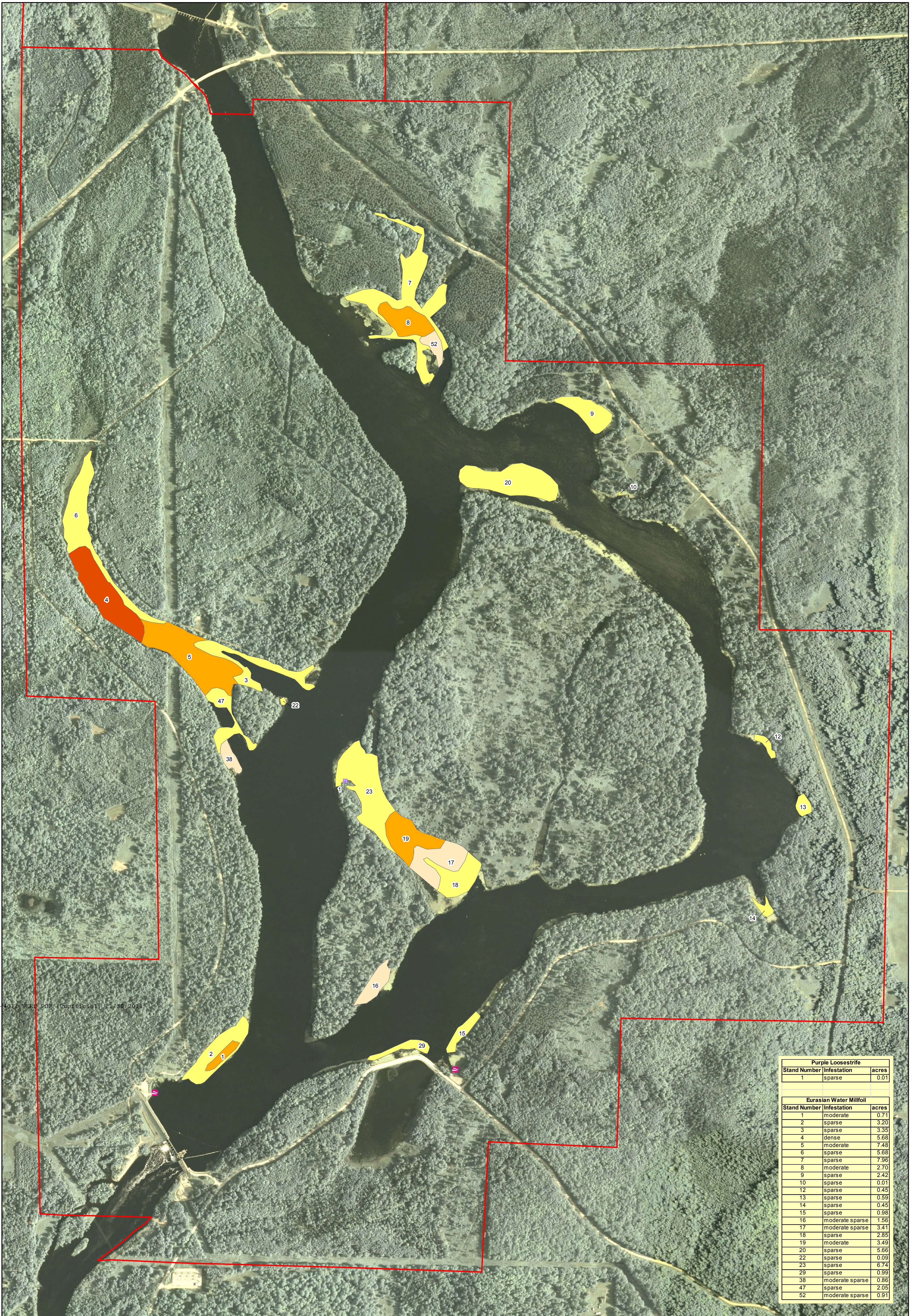
Stand Number	Density¹	Mat Thickness	Stand Size²
1	3	None	0.71 (+0.01)
2	1	None	3.2 (-0.19)
3	1	None	3.35 (-0.18)
4	5	None	5.68 (+0.57)
5	3 (-1)	None	7.48 (+0.88)
6	1	None	5.68 (-1.27)
7	1	None	7.96 (+0.45)
8	3 (-2)	None	2.7 (-0.45)
9	1 (-3)	None	2.42 (-0.58)
10	1 (-3)	None	0.01 (-0.24)
11	Not Present	NA	NA
12	1	None	0.45 (-0.66)
13	1 (-1)	None	0.59
14	1	None	0.45
15	1	None	0.98 (-1.21)
16	2 (+1)	None	1.56
17	2	None	3.41 (-2.19)
18	1 (-3)	None	2.85 (-7.63)
19	3	None	3.49
20	1	None	5.66 (-3.92)
21	Combined with 20	NA	NA
22	1	None	0.09 (-0.08)
23	1	None	6.74 (+6.11)
24	Not Present	NA	NA
25	Not Present	NA	NA
26	Not Present	NA	NA
27	Not Present	NA	NA
28	Number Skip	NA	NA
29	1	None	0.99
30	Not Present	NA	NA
31	Not Present	NA	NA
32	Not Present	NA	NA
33	Not Present	NA	NA
34	Not Present	NA	NA
35	Not Present	NA	NA
36	Not Present	NA	NA
37	Not Present	NA	NA
38	2	None	0.86 (-2.23)
39	Not Present	NA	NA
40	Not Present	NA	NA
41	Not Present	NA	NA
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	1	None	2.05 (+1.42)

**Table 1WR. 2011 White Rapids Reservoir
Eurasian Water Milfoil Stand Data**

48	Combined with 47	NA	NA
49	Combined with 7	NA	NA
50	Not Present	NA	NA
51	Not Present	NA	NA
52	2 (+1)	None	0.91 (+0.9)

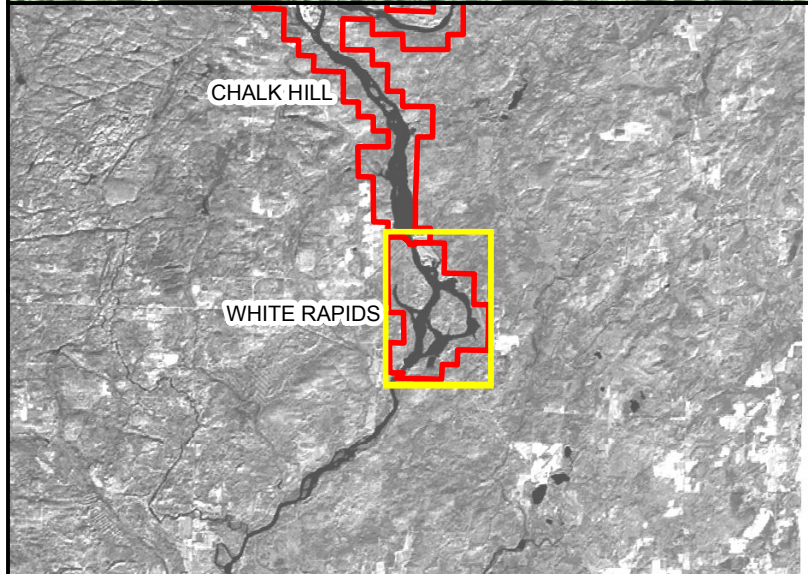
1 – (+/-) change in density rating from 2010 to 2011

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



20111130 4011 5240 PDR (07/28/2011) 11/30/2011

Purple Loosestrife		
Stand Number	Infestation	acres
1	sparse	0.01
Eurasian Water Milfoil		
Stand Number	Infestation	acres
1	moderate	0.71
2	sparse	3.20
3	sparse	3.35
4	dense	5.68
5	moderate	7.48
6	sparse	5.68
7	sparse	7.96
8	moderate	2.70
9	sparse	2.42
10	sparse	0.01
12	sparse	0.45
13	sparse	0.59
14	sparse	0.45
15	sparse	0.98
16	moderate sparse	1.56
17	moderate sparse	3.41
18	sparse	2.85
19	moderate	3.49
20	sparse	5.66
22	sparse	0.09
23	sparse	6.74
29	sparse	0.99
38	moderate sparse	0.86
47	sparse	2.05
52	moderate sparse	0.91



Public Boat Launch

FERC Hydro Project Boundary

Year 2011 Field Work

sparse

moderate sparse

moderate

moderate dense

dense

1,000 Feet 1,000

0

White Rapids Hydro Project - Year 2011

Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA - NAIP Imagery, 2010
GPS field data 07/28/2011