We Energies
2012 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. Bill Braunschweig, conducted a survey from a boat of the entire shoreline at the White Rapids Reservoir project on July 31, 2012. 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 2012 surveys, the stand location and perimeter were compared and verified with the 2011 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

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. Purple loosestrife was again observed in 2011 when a single, 1st-year plant was observed with just 2 stems. While the entire reservoir was monitored in 2012 for the presence of purple loosestrife, particular attention was paid to the location where purple loosestrife was observed in 2010 and 2011. Two second year plants were observed at the same location in 2012. These plants had 1 and 2 stems, respectively, and were manually removed.

Forty-three stands of Eurasian water milfoil were observed to occur in 2012 at the White Rapids Reservoir project area (attached map), resulting in an increase of 18 stands since 2011. The identified stands are distributed throughout the project area and range in size from 0.01-acre up to 11.88-acres.

Eurasian water milfoil is present in approximately 101-acres in the White Rapids Reservoir project area, an increase of over 31-acres from 2011. This is a reversal in what was observed between 2010 and 2009 when a decrease of over 13-acres was observed. Cumulatively, the average stand size is 2.35-acres and has an average density rating of 1.91 per stand. In 2011, the average stand size was 2.81-acres and had an average density rating of 1.64 per stand. The decrease in stand size is largely attributable to the 72% increase in total stands observed from 2011 to 2012. The average density rating per stand increased by 16% over the two year period from 1.64 to 1.91. This is attributable to having 16 stands increase at an average increase of 1.73 in density, while only 3 stands decreased in density at an average decrease of only 1.00 per stand.

Thirty stands changed in spatial coverage between 2011 and 2012, including 9 that were absent in 2011 and present in 2012. Two stands that were present in 2011 were not observed in 2012. The total gross change observed is 34.85-acres with an average gross change of 1.16-acres per stand. Of these, 10 stands accounted for approximately 25-acres that either increased or decreased in size (approximate 2.5-acre average change).

Out of the 43 observed, 6 stands have a high density rating (>75% cover). They cover approximately 12.83-acres, which is an increase of over 7-acres. This is reversal in the trend of decreasing acres of high density stands between 2010 and 2011. The number of high density stands increased by 5 stands between 2011 and 2012.

30 of the 43 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 72% (73.05-acres) of the total area observed to have Eurasian water milfoil present, an increase from 71% in 2011.

Conclusions

Generally, a decrease in observed purple loosestrife presence was documented at the We Energies reservoirs monitored in 2012. 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 2011, the population was managed early in its infestation. This stand was reduced to a single plant in 2011 and the population remained stable in 2012. 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. Some of these populations were managed in 2012, but the largest populations were not. Continued management by other parties is necessary to be beneficial in reducing the potential for purple loosestrife to spread in the Menominee River system.

Substantial increases in the number Eurasian water milfoil stands (+72%), total acres (+44%), average density rating per stand (+16%), total number of dense stands (+600%), and total spatial distribution of dense stands (+226%) were observed in the White Rapids project area from 2011 to 2012. Additionally, 350% and 63% increases in the percent of total number of high density stands and percent total acres of high density stands were observed, respectively. Finally, 12 new stands were observed for the first time in 2012, resulting in the largest number of stands recorded at White Rapids since 2006 when detailed monitoring first began. These are all negative trends from the perspective that the Eurasian water milfoil worsened substantially between 2010 and 2011. This is a complete reversal from the trends observed between 2010 and 2011.

While most of the data indicated negative trends, a couple positive observations were made in 2012. These included having 3 stands (4, 8, & 16) decrease in density and 3 stands (4, 7, & 47) decrease in spatial distribution. These 3 stands decreased by 3.09-acres. This 3+ acre decrease was offset, however, by a total increase of over 31-acres throughout all of White Rapids.

Overall, the Eurasian water milfoil infestation in White Rapids became much worse between 2011 and 2012. 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 positive trends some years, remain relatively constant in others, and also dramatically decrease as observed at White Rapids in 2012. 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 2012.

Table 1WR. 2012 White Rapids Reservoir Eurasian Water Milfoil Stand Data

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	Not Present	NA	NA
2	1	None	4.09 (+0.89)
3	2 (+1)	None	3.59 (+0.24)
4	4 (-1)	None	4.22 (-1.47)
5	3	None	9.65 (+2.17)
6	1	None	5.77 (+0.09)
7	1	None	7.76 (-0.2)
8	2 (-1)	None	4.64 (+1.93)
9	1	None	7.36 (+4.94)
10	Not Present	NA	NA
11	1 (+1)	None	1.74
12	1	None	1.76 (+1.31)
13	3 (+2)	None	0.93 (+0.34)
14	1	None	0.85 (+0.41)
15	1	None	2.02 (+1.04)
16	1 (-1)	None	4.38 (+2.82)
17	3 (+1)	None	3.41
18	1	None	2.85
19	4 (+1)	None	3.49
20	1	None	11.88 (+6.21)
21	4 (+4)	None	2.54
22	2 (+1)	None	0.2 (+0.11)
23	1	None	7.11 (+0.37)
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	1.76 (+0.77)
30	Not Present	NA	NA
31	Not Present	NA	NA
32	Not Present	NA	NA
33	1 (+1)	None	0.16
34	Not Present	NA	NA
35	Not Present	NA	NA
36	Not Present	NA	NA
37	Not Present	NA	NA
38	5 (+3)	None	2.13 (+1.26)
39	2 (+2)	None	0.90
40	Not Present	NA	NA
41	Not Present	NA	NA
42	1 (+1)	None	0.18
43	Not Present	NA	NA
44	1 (+1)	None	0.01
45	Not Present	NA	NA
46	1 (+1)	None	0.57
47	2 (+1)	None	0.63 (-1.42)

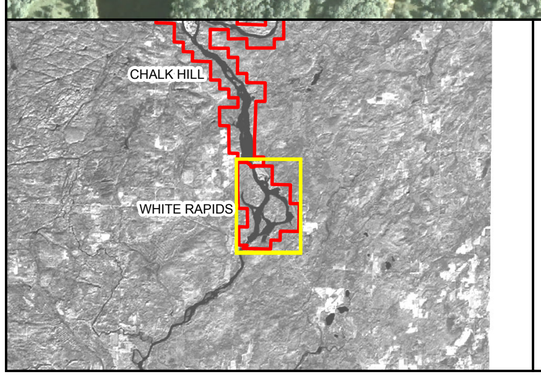
Table 1WR. 2012 White Rapids Reservoir Eurasian Water Milfoil Stand Data

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
48	4 (+4)	None	0.03
49	Not Present	NA	NA
50	1 (+1)	None	0.01
51	Not Present	NA	NA
52	Combined with 8	NA	NA
53	1	None	0.01
54	2	None	0.55
55	3	None	0.39
56	3	None	0.41
57	1	None	0.01
58	1	None	0.73
59	1	None	0.65
60	3	None	0.17
61	4	None	0.44
62	1	None	0.82
63	1	None	0.05
64	3	None	0.37

1 – (+/-) change in density rating from 2011 to 2012

2 – (+/-) change in stand size in acres from 2011 to 2012

Eurasian Water Millfoil		
Stand Number	Infestation	acres
2	sparse	4.09
3	moderate sparse	3.59
4	moderate dense	4.22
5	moderate	9.65
6	sparse	5.77
7	sparse	7.76
8	moderate sparse	4.64
9	sparse	7.36
11	sparse	1.74
12	sparse	1.76
13	moderate	0.93
14	sparse	0.85
15	sparse	2.02
16	sparse	4.38
17	moderate	3.41
18	sparse	2.85
19	moderate dense	3.49
20	sparse	11.88
21	moderate dense	2.54
22	moderate sparse	0.20
23	sparse	7.11
29	sparse	1.76
33	sparse	0.16
38	dense	2.13
39	moderate sparse	0.90
42	sparse	0.18
44	sparse	0.01
46	sparse	0.57
47	moderate sparse	0.63
48	moderate dense	0.03
50	sparse	0.01
53	sparse	0.01
54	moderate sparse	0.55
55	moderate	0.39
56	moderate	0.41
57	sparse	0.01
58	sparse	0.73
59	sparse	0.65
60	moderate	0.17
61	moderate dense	0.44
62	sparse	0.82
63	sparse	0.05
64	moderate	0.37



Year 2012 Field Work

- sparse
- moderate sparse
- moderate
- moderate dense
- dense
- Purple Loosestrife
- Public Boat Launch
- FERC Hydro Project Boundary

Feet
1,000 0 1,000

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White Rapids Hydro Project - Year 2012
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2010
GPS field data collected 07/31/2012

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