We Energies
2010 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 August 1, 2010. 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 2010 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 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

Six purple loosestrife plants were observed along the shores of the White Rapids Reservoir project area. This is the first time since invasive species monitoring began at White Rapids that purple loosestrife was observed. 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 where the oldest plants appeared to be approximately 3 years old based on the presence of remnant dead stems. There was evidence that this point is 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.

Thirty-six stands of Eurasian water milfoil were observed to occur in 2010 at the White Rapids Reservoir project area (attached map), resulting in an increase of just 1 stand since 2009. The identified stands are distributed throughout the project area and range in size from 0.01-acre up to 10.48-acres.

Eurasian water milfoil is present in approximately 84-acres in the White Rapids Reservoir project area, an increase of over 16-acres from 2009. This is a reversal in what was observed between 2008 and 2009 when a decrease of 20-acres was observed. Cumulatively, the average stand size is 2.33-acres and has an average density rating of 1.83 per stand. In 2009, the average stand size was 1.76-acres and had an average density rating of 1.86 per stand. The increase in stand size is attributable to the overall increase of Eurasian water milfoil coverage. Two stands that were present in 2009 were not observed in 2010, while 7 stands were combined with other stands.

The observed average density rating per stand is more or less the same over the two year period. This is attributable to having 12 stands increase in density and 9 decrease along with the 7 new stands identified having an average density rating of just 1.29.

Twenty-one stands changed in spatial coverage between 2009 and 2010. The total gross change observed is 43.45-acres with an average gross change of 2.07-acres per stand. Of these, 7 stands accounted for over 34-acres that either increased or decreased in size (approximate 4.9-acre average change).

Out of the 36 observed, 7 stands (4, 5, 8, 9, 10, 18, and 21) have a high density (>75% cover). The number of high density stands remained stable between 2009 and 2010. They cover approximately 29.05-acres, which increased by almost 11-acres since 2009, and 18-acres since 2008.

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 64% (53.81-acres) of the total area observed to have Eurasian water milfoil present, a slight decrease from 70% in 2009.

Conclusions

In conclusion, the number Eurasian water milfoil stands remained constant in the White Rapids project area. However, there were notable increases in the total acreage and average stand size. There were increases observed in the average stand density with an increase in the total acres of milfoil observed at low densities. The increase acreage of low density stands is accounted for by the total increase 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 increased, some areas also experienced an increase in the density of Eurasian water milfoil. Of particular note is the dramatic increase of spatial coverage north of the large island and along the margins of the stands occurring along the west shorelines of the reservoir. There was also a spike in the acreage of dense stands occurring, increasing by just under 12-acres since 2009. Increases in spatial coverage, average stand density, and the acreage of dense stands are opposite of those trends observed between 2008 and 2009. Of those stands occurring in 2009 and still present in 2010, significant changes in the average stand size along with the increases previously described 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 summary report prepared by EnviroScience for further information about milfoil management activities that occurred in 2010.

The new location of purple loosestrife observed in 2010 is discouraging. Generally, a trend in increased purple loosestrife presence was observed in 4 of the 8 reservoirs monitored in 2010. There continues to be an influx of purple loosestrife occurring along public roadways leading to many of the reservoirs. In this instance, loosestrife appears to be increasing exponentially along CTH K leading easterly toward the Menominee River between the Chalk Hills and White Rapids project areas.

Table 1WR. 2010 White Rapids Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	3 (+2)	None	0.7 (+0.11)
2	1	None	3.39 (+3.19)
3	1 (-4)	None	3.54 (+2.35)
4	5 (+1)	None	5.11 (+2.33)
5	4 (+3)	None	6.6 (-0.62)
6	1	None	6.94 (-1.00)
7	1 (-3)	None	7.51 (-0.24)
8	5 (+1)	None	3.16
9	4 (+3)	None	3.00 (-0.57)
10	4 (+4)	None	0.25
11	1	None	1.3 (+1.3)
12	1 (-3)	None	1.11 (+1.1)
13	2 (+1)	None	0.59
14	1	None	0.45
15	1 (-1)	None	2.19
16	1 (-1)	None	1.56
17	2 (-2)	None	5.6 (-6.73)
18	4 (-1)	None	10.48 (+8.22)
19	Combined with 18	NA	NA
20	1 (-2)	None	9.59 (+8.38)
21	4 (+3)	None	0.44 (-0.15)
22	1	None	0.17 (+0.16)
23	1 (+1)	None	0.63 (+0.25)
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 (+1)	None	0.99 (+0.57)
30	Not Present	NA	NA
31	Not Present	NA	NA
32	Combined with 3	NA	NA
33	1 (+1)	None	0.16 (+0.15)
34	Not Present	NA	NA
35	1 (+1)	None	0.84 (+0.84)
36	Not Present	NA	NA
37	Not Present	NA	NA
38	2 (+1)	None	3.09 (+1.86)
39	1 (-3)	None	3.34 (+3.33)
40	Combined with 20 and 21	NA	NA
41	Combined with 20 and 21	NA	NA
42	1	None	0.01
43	Combined with 12	NA	NA
44	1	None	0.01
45	Combined with 20	NA	NA
46	1	None	0.01
47	1	None	0.63

Table 1WR. 2010 White Rapids Reservoir Eurasian Water Milfoil Stand Data.

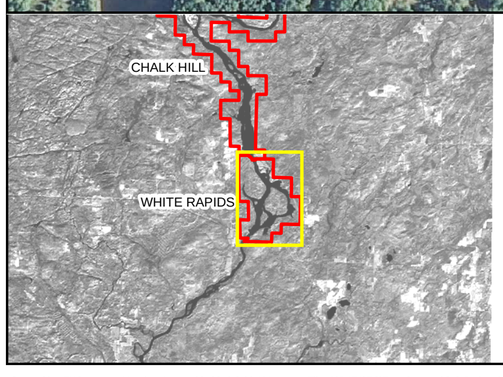
Stand Number	Density[1]	Mat Thickness	Stand Size[2]
48	1	None	0.03
49	3	None	0.30
50	1	None	0.01
51	1	None	0.10
52	1	None	0.01

1 – change in density rating from 2009 to 2010

2 – change in stand size from 2009 to 2010

Purple Loosestrife		
Stand Number	Infestation	acres
1	sparse	0.01

Eurasion Water Milfoil		
Stand Number	Infestation	acres
1	moderate	0.70
2	sparse	3.39
3	sparse	3.54
4	dense	5.11
5	moderate dense	6.60
6	sparse	6.94
7	sparse	7.51
8	dense	3.16
9	moderate dense	3.00
10	moderate sparse	0.25
11	sparse	1.30
12	sparse	1.11
13	moderate sparse	0.59
14	sparse	0.45
15	sparse	2.19
16	sparse	1.56
17	moderate sparse	5.60
18	moderate dense	10.48
20	sparse	9.59
21	moderate dense	0.44
22	sparse	0.17
23	sparse	0.63
29	sparse	0.99
33	sparse	0.16
35	sparse	0.84
38	moderate sparse	3.09
39	sparse	3.34
42	sparse	0.01
44	sparse	0.01
46	sparse	0.01
47	sparse	0.63
48	sparse	0.03
49	moderate	0.30
50	sparse	0.01
51	sparse	0.10
52	sparse	0.01



Public Boat Launch
FERC Hydro Project Boundary
Purple Loosestrife

Year 2010 Field Work
sparse
moderate sparse
moderate
moderate dense
dense

Feet
1,000 0 1,000

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White Rapids Hydro Project - Year 2010
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA -NAIP Imagery, 2009
GPS field data 08/01/2010

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