We Energies
2009 Annual Report - Nuisance Plant Control Survey
Chalk Hill Reservoir
FERC Project #2394

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 Chalk Hill Reservoir project on August 3, 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 2008 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 1CH. 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 Chalk Hill Reservoir project area. The single plant observed at the north end of Miscauno Island in 2008 was effectively removed.

Forty-one stands of Eurasian water milfoil were observed at the Chalk Hill Reservoir project area in 2009 (attached map), a decrease of 1 stand from 2008. While there were 9 new stands documented, 9 previously identified stands were not present in 2009. An additional 4 stands merged into other stands for a combined net decrease of 13 stands. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 29.34-acres.

Eurasian water milfoil is present in approximately 120-acres in the Chalk Hill Reservoir project area, a decrease of over 17 acres from 2008. Cumulatively, the average stand size is 2.94-acres with an average density rating of 1.85 per stand. In 2008, the average stand size was 3.27-acres with an average density rating of 1.69 per stand. The decrease in average stand

size is attributable to the overall reduction of Eurasian water milfoil coverage and eight new stands having an average size of 0..25-acre.

The increase observed in the average density rating is attributable to the increase in stand densities observed in stands #11, 44, and 45 as well as the new stands having an average rating of 2.11. In addition to having a net loss of 13 stands, 6 additional stands decreased in density from 2008 levels.

Eighteen stands changed in spatial coverage. The total gross change observed exceeded 54-acres with an average gross change of 3.02-acres per stand. Of these, 7 stands accounted for over 50-acres that either increased or decreased in size (approximate 7.2-acre average change). Some of the largest changes were observed in stands 5, 6, 23, 28, 34, & 45. The decreases observed in stands 5 & 34 are essentially offset by the gains in stands 6 & 45 due to changes in spatial distribution of these more dense stands. Stand 23 experienced a large increase as a result of combining this stand with 2 other previously mapped stands that were historically denser than stand 23. The overall boundary of stand 28 receded substantially.

Out of the 41 observed, 5 stands (9, 10, 11, 45, and 49) have a high density (>75% cover). Each of these stands occur along the west shoreline in the southern portion of the reservoir. Cumulatively, these stands cover approximately 13% (15.34-acres) of the total area observed to have Eurasian water milfoil present.

The majority of the stands have very low densities (<25% cover) 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 41 stands have low densities and account for approximately 63% (76.17-acres) of the total area observed to have Eurasian water milfoil present.

Conclusions

In conclusion, the number Eurasian water milfoil stands remained constant in the Chalk Hill project area. Nine stands previously observed are no longer present, while no new stands were identified. There were notable decreases in the total acreage and average stand size. A slight increase was observed in the average stand density while a sharp increase in the total acreage of dense stands occurred. The reduced acreage of low density stands is accounted for by this as well as the total reduction of Eurasian water milfoil acreage in Chalk Hill. These are mixed results with respect to whether the conditions are improving or on a negative trend.

While the spatial coverage continues to decrease, some areas are experiencing an increase in the density of Eurasian water milfoil particularly at the south end. Increased densities are occurring in stands 11, 44, and 45. Stands 44 and 45 also increased substantially in spatial coverage. Conversely, there is a trend in receding strand boundaries and average density decreases in the northern portions of the project. Of those stands occurring in 2008 and still present in 2009, significant changes in the average stand size 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 management plan and the summary report prepared by EnviroScience for further information about milfoil management activities.

Table 1CH. 2009 Chalk Hill Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	2	None	1.89 (+0.39)
2	1	None	3.69 (-0.13)
3	2 (-2)	None	0.13
4	Not Present	NA	NA
5	1	None	25.82 (-7.04)
6	3	None	10.39 (+4.8)
7	1 (-3)	None	0.17 (+0.05)
8	3	None	7.19 (-0.36)
9	4	None	0.46
10	4	None	0.65 (+0.27)
11	4 (+1)	None	6.80
12	1	None	0.46
13	Not Present	NA	NA
14	1	None	0.90
15	Not Present	NA	NA
16	Not Present	NA	NA
17	1	None	0.75 (+0.74)
18	Combined into 17	NA	NA
19	2	None	0.11
20	1 (-1)	None	4.19
21	1	None	0.92 (-0.79)
22	1 (-1)	None	0.46
23	1	None	29.34 (+15.5)
24	Combined into 23	NA	NA
25	Combined into 23	NA	NA
26	1	None	2.11 (-1.09)
27	1	None	0.01 (-2.79)
28	1	None	2.8 (-6.48)
29	3	None	0.43
30	1	None	0.21
31	1 (-1)	None	0.23
32	1 (-2)	None	0.10
33	1	None	0.04
34	3	None	9.69 (-6.33)
35	Not Present	NA	NA
36	Not Present	NA	NA
37	Not Present	NA	NA
38	Not Present	NA	NA
39	Not Present	NA	NA
40	1	None	0.29
41	Combined into 6	NA	NA
42	2	None	0.16 (+0.03)
43	1	None	0.25
44	2 (+1)	None	0.32 (+0.31)
45	4 (+3)	None	7.26 (+7.25)
46	3	None	0.17
47	3	None	0.09

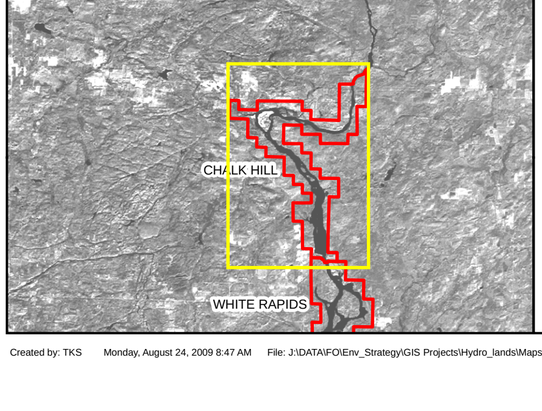
Table 1CH. 2009 Chalk Hill Reservoir Eurasian Water Milfoil Stand Data.

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
48	3	None	0.96
49	4	None	0.17
50	2	None	0.03
51	1	None	0.01
52	1	None	0.01
53	1	None	0.24
54	1	None	0.53

1 – change in density rating from 2008 to 2009

2 – change in stand size from 2008 to 2009

Stand Number	Infestation	acres
1	moderate sparse	1.09
2	sparse	3.69
3	moderate sparse	0.13
5	sparse	25.82
6	moderate	10.39
7	sparse	0.17
8	moderate	7.19
9	moderate dense	0.46
10	moderate dense	0.65
11	moderate dense	6.80
12	sparse	0.46
14	sparse	0.90
17	sparse	0.75
19	moderate sparse	0.11
20	sparse	4.19
21	sparse	0.92
22	sparse	0.46
23	sparse	29.34
26	sparse	2.11
27	sparse	0.01
28	sparse	2.80
29	moderate	0.43
30	sparse	0.21
31	sparse	0.23
32	sparse	0.10
33	sparse	0.04
34	moderate	9.69
40	sparse	0.29
42	moderate sparse	0.16
43	sparse	0.25
44	moderate sparse	0.32
45	moderate dense	7.26
46	moderate	0.17
47	moderate	0.09
48	moderate	0.96
49	moderate dense	0.17
50	moderate sparse	0.03
51	sparse	0.01
52	sparse	0.01
53	sparse	0.24
54	sparse	0.53



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

Chalk Hill Hydro Project - Year 2009
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA - NAIP Imagery, 2008
GPS field data collected 8/03/2009

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