We Energies
2012 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. Bill Braunschweig, conducted a survey from a boat of the entire shoreline at the Chalk Hill Reservoir project on August 1, 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 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

Purple loosestrife was observed at a new location in the south end of the Chalk Hill Reservoir in 2010. A single plant was located in the back of a secluded bay along the west side. The plant was found immediately adjacent to a wood duck house that was installed by a third party a few years ago. The entire plant was 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 it was observed in 2010 and the south end of Miscuono Island where it was last observed in 2008. No purple loosestrife was found at Chalk Hill in 2012.

Thirty-six stands of Eurasian water milfoil were observed at the Chalk Hill Reservoir project area in 2012 (attached map), a decrease of five stands from 2011, and nine stands since 2010. 4 new stands were documented for the first time in 2012. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 34.35-acres.

Eurasian water milfoil is present in approximately 96.44-acres in the Chalk Hill Reservoir project area, a slight increase of approximately 1-acre from 2011. Cumulatively, the average stand size is 2.68-acres with an average density rating of 1.33 per stand. In 2011, the average stand size was 2.33-acres with an average density rating of 1.34 per stand. The increase in stand size is attributable to the 13% decrease in total stands observed and stable levels of total acres from 2011 to 2012. The average density rating being stable between the two years is attributable, in part, to nearly an equal decrease in both total stands (-5) and low density stands (-4). There were 16 stands that increased in stand density, but with an average increase of only 1.38 per stand. 5 stands decreased in stand density at an average decrease of 1.40, offsetting to some extent the increases observed in 16 stands. This, combined with 4 new stands being observed for the first time with a 1.50 average density rating, results in the average density rating for all stands being stable between 2011 & 2012.

Thirty stands changed in spatial coverage between 2011 and 2012, including the 14 that were present in 2011 and absent in 2012. Four stands that were absent in 2011 were observed in 2012. The total gross change observed was over 28-acres with an average gross change of 0.77-acre per stand. Of these, 6 stands accounted for 21-acres that either increased or decreased in size (approximate 3.5-acre average change). The largest changes were observed in stands 5 & 58.

For the first time in 2011, there were no stands observed with a high density rating (exceeding 75% cover) in Chalk Hill. This trend continued in 2012 with no stands being observed with a high density rating. Only 4 stands were recorded as being moderate (rating 3) comprising just 3% of the total Eurasian water milfoil spatial coverage in 2012.

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*). 32 of the 36 stands have low densities and account for approximately 97% (93.15-acres) of the total area observed to have Eurasian water milfoil present.

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 Chalk Hill for the first time in 2010. By removing the plant in 2010, the population was managed early in its infestation. This stand has not been observed since 2010. Continued active removal of observed purple loosestrife will help to prevent the infestation from spreading in Chalk Hill.

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.

A substantial decrease in the number Eurasian water milfoil stands (-13%) was observed between 2011 & 2012. The total acres (+1.01%) and average density rating per stand (-0.08%) were observed to be relatively stable in the Chalk Hill project area from 2011 to 2012. Additionally, no dense stands (>75% cover) were observed and the proportion of the acres of sparse stands (<25% cover) increased by 6% up to 97% of all areas with Eurasian water milfoil. These are all positive trends from the perspective that the Eurasian water milfoil improved or were stable between 2011 and 2012.

While most of the data indicated positive trends, a couple negative observations were made in 2012. Four new stands were observed for the first time in 2012; however, these stands accounted for only 1.04-acre, only 1.01% of the total. 16 stands increased in density while only 5 decreased. Although, the average increase of the 16 stands increased by an average of 1.38. 13 stands increased in spatial distribution for a total of 13.46-acres. However, this increase in acreage was offset by 6 stands that decreased in acreage by 10.93-acres.

The Eurasian water milfoil infestation in Chalk Hill improved in several calculated values, remained stable in others, while having negative trends in a few others between 2011 and 2012. Overall the milfoil population remained stable or trended positively. The improved trends were observed over a 2-year period between 2010 through 2012, following a 2-3-year period of generally negative trends. 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 Chalk Hill 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 Chalk Hill 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 2012.

Table 1CH. 2012 Chalk Hill Reservoir
Eurasian Water Milfoil Stand Data

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
1	1 (-2)	None	1.77 (-0.12)
2	1 (+1)	None	6.49 (+2.67)
3	Combined with 2	NA	NA
4	Not Present	NA	NA
5	1 (+1)	None	34.35 (+5.37)
6	3 (+2)	None	0.60
7	1	None	0.17
8	1	None	7.19 (+0.12)
9	1 (-1)	None	0.45 (+0.13)
10	1	None	0.78 (+0.13)
11	2 (+2)	None	6.8 (-0.96)
12	Not Present	NA	NA
13	Not Present	NA	NA
14	Not Present	NA	NA
15	Not Present	NA	NA
16	Not Present	NA	NA
17	1 (+1)	None	0.01
18	Not Present	NA	NA
19	Not Present	NA	NA
20	1 (+1)	None	2.11 (+0.09)
21	Not Present	NA	NA
22	1	None	0.01 (-0.21)
23	1 (+1)	None	14.43 (+0.12)
24	Not Present	NA	NA
25	Not Present	NA	NA
26	Not Present	NA	NA
27	Not Present	NA	NA
28	1 (-1)	None	0.01 (-2.82)
29	1 (+1)	None	2.59 (+1.98)
30	1	NA	0.63 (+0.63)
31	Not Present	NA	NA
32	1	None	0.01
33	1 (-2)	None	0.20
34	3 (+3)	None	2.50
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 (+1)	None	0.41 (+0.4)
41	Not Present	NA	NA
42	1 (+1)	None	0.16
43	Not Present	NA	NA
44	1 (-1)	None	0.05
45	2	None	8.95
46	Combined with 5	NA	NA
47	Not Present	NA	NA

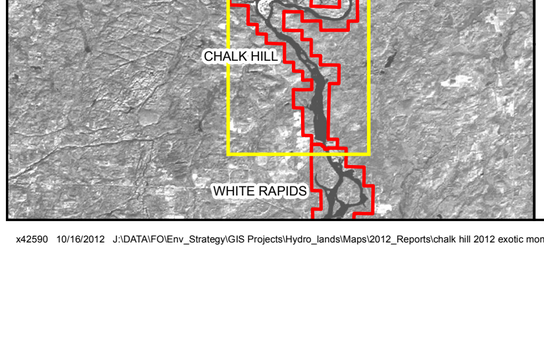
Table 1CH. 2012 Chalk Hill Reservoir
Eurasian Water Milfoil Stand Data

Stand Number	Density[1]	Mat Thickness	Stand Size[2]
48	Not Present	NA	NA
49	1	None	0.01
50	1 (+1)	None	0.03
51	Not Present	NA	NA
52	Not Present	NA	NA
53	Not Present	NA	NA
54	1 (+1)	None	0.53
55	Not Present	NA	NA
56	Not Present	NA	NA
57	Not Present	NA	NA
58	2 (+1)	None	1.74 (-6.72)
59	Not Present	NA	NA
60	Not Present	NA	NA
61	1	None	1.44 (+1.43)
62	1	None	0.01 (-0.1)
63	3 (+3)	None	0.07
64	Combined with 8	NA	NA
65	Combined with 9	NA	NA
66	Combined with 67	NA	NA
67	1	None	0.73 (+0.24)
68	2 (+1)	None	0.17 (+0.16)
69	Not Present	NA	NA
70	Not Present	NA	NA
71	Not Present	NA	NA
72	3	None	0
73	1	None	0
74	1	None	1
75	1	None	0

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
1	sparse	1.77
2	sparse	6.49
5	sparse	34.35
6	moderate	0.60
7	sparse	0.17
8	sparse	7.19
9	sparse	0.45
10	sparse	0.78
11	moderate sparse	6.80
17	sparse	0.01
20	sparse	2.11
22	sparse	0.01
23	sparse	14.43
28	sparse	0.01
29	sparse	2.59
30	sparse	0.63
32	sparse	0.01
33	sparse	0.20
34	moderate	2.50
40	sparse	0.41
42	sparse	0.16
44	sparse	0.05
45	moderate sparse	8.95
49	sparse	0.01
50	sparse	0.03
54	sparse	0.53
58	moderate sparse	1.74
61	sparse	1.44
62	sparse	0.01
63	moderate	0.07
67	sparse	0.73
68	moderate sparse	0.17
72	moderate	0.12
73	sparse	0.36
74	sparse	0.55
75	sparse	0.01



Year 2012 Field Work

- sparse
- moderate sparse
- moderate
- moderate dense
- dense

- Public Boat Launch
- FERC Hydro Project Boundary

Feet: 1,000 0 1,000 2,000

N W E S

Chalk Hill Hydro Project - Year 2012
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA - NAIP Imagery, 2010
GPS field data collected 8/01/2012