

We Energies
2011 Annual Report - Nuisance Plant Control Survey
Kingsford Reservoir
FERC Project #2131

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 Kingsford Reservoir project on August 2, 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 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 1KF. 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

No purple loosestrife plants were observed along the shores of the Kingsford Reservoir project area.

Thirty-five stands of Eurasian water milfoil were observed to occur in 2011 at the Kingsford project area (attached map), which is an increase of 1 stand from 2009. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 19.06-acres. Additionally, 3 stands merged with other stands, 11 stands were no longer present, and 12 stands were identified for the first time in 2011.

Eurasian water milfoil is present in approximately 71.56-acres in the Kingsford Reservoir project area, a decrease of nearly 60-acres since 2009, and 88-acres since 2007. Cumulatively, the average stand size is 2.04-acres with an average density rating of 1.11 per stand. In 2009, the average stand size was 3.87-acres and had an average density rating of 1.88 per stand.

Decreases in stand densities were observed in 9 stands between 2009 and 2011, while no stands increased in density.

Additionally, 33 stands changed in spatial coverage. The total gross change observed is 69.38-acres with an average gross change of 2.10-acres per stand. Of these, 7 stands accounted for over 39-acres that either increased or decreased in size (approximate 3-acre average change).

Out of the 35 observed stands, no stands were observed to have a high density (>75% cover). 34 of the 35 stands have very low densities of Eurasian water milfoil with single stems growing sporadically among native species. The most common native species included northern water milfoil (*Myriophyllum sibiricum*), two-leaf water milfoil (*Myriophyllum heterophyllum*), a variety of pondweeds (*Potamogeton* 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 97% (69.77-acres) of the total area observed to have Eurasian water milfoil present.

Conclusions

Purple loosestrife has yet to be observed at the Kingsford project area since the nuisance plant surveys began. Diligent monitoring will continue to prevent an invasion of this species.

Substantial decreases in the total acres (-46%), average stand size (-47%), and average density rating per stand (-41%) were observed in the Kingsford project area from 2009 to 2011. Eleven stands observed in 2009 were not present in 2011, 9 stands that were present in 2009 decreased in density, and no stands increased. Additionally, no dense stands (>75% cover) were observed, and all but three of the stands were documented as very sparse stands (<5% cover). These are all positive trends from the perspective that the Eurasian water milfoil improved substantially between 2009 and 2011.

While most of the data indicated positive trends, a couple negative observations were made in 2011. The total number of stands increased by one and 12 new stands were identified for the first time.

Overall, the Eurasian water milfoil infestation in Kingsford improved greatly between 2009 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 Kingsford 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, or dramatically improve as observed at Kingsford 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 1KF. 2011 Kingsford Reservoir
Eurasian Water Milfoil Stand Data**

Stand Number	Density¹	Mat Thickness	Stand Size²
1	Not Present	NA	NA
2	Not Present	NA	NA
3	Not Present	NA	NA
4	Not Present	NA	NA
5	Not Present	NA	NA
6	1 (-2)	None	5.27 (-7.10)
8	Not Present	NA	NA
9	1	None	0.01 (-0.67)
9b	Not Present	NA	NA
10	Combined with 11	NA	NA
11	1	None	1.26 (-1.94)
12	1	None	0.28 (-0.66)
13	Not Present	NA	NA
14	Not Present	NA	NA
15	1	None	8.61 (-0.76)
16	Combined with 15	NA	NA
17	Not Present	NA	NA
18	1 (-2)	None	0.74 (-0.77)
19	Not Present	NA	NA
20	Not Present	NA	NA
21	Not Present	NA	NA
22	1	None	2.66 (-1.06)
23	1	None	0.54 (+0.34)
24	Not Present	NA	NA
25	Not Present	NA	NA
26	1	None	0.16 (-0.83)
27	Not Present	NA	NA
28	1 (-1)	None	0.17
29	Not Present	NA	NA
30	1 (-3)	None	1.50 (+1.20)
31	Combined with 30	NA	NA
32	1	None	13.32 (-6.45)
33	1	None	1.15 (-8.45)
34	1 (-3)	None	0.14 (-1.85)
35	1 (-2)	None	5.57 (-8.24)
36	1	None	0.01 (-1.84)
37	1	None	3.16 (-3.61)
38	2 (-1)	None	19.06 (-3.27)
39	1	None	0.54 (+0.54)
40	1	None	2.40 (-2.15)
41	Not Present	NA	NA
42	Not Present	NA	NA
43	Not Present	NA	NA
44	Not Present	NA	NA
45	1	None	0.01 (-0.25)
46	1 (-2)	None	1.00 (-1.51)
47	3 (-1)	None	1.79 (1.48)

**Table 1KF. 2011 Kingsford Reservoir
Eurasian Water Milfoil Stand Data**

48*	1	None	0.28
49*	1	None	0.01
50*	1	None	0.01
51*	1	None	0.01
52*	1	None	0.22
53*	1	None	0.01
54*	1	None	0.01
55*	1	None	0.01
56*	1	None	0.01
57*	1	None	0.01
58*	1	None	1.31
59*	2	None	0.29

1 – (+/-) change in density rating from 2009 to 2011

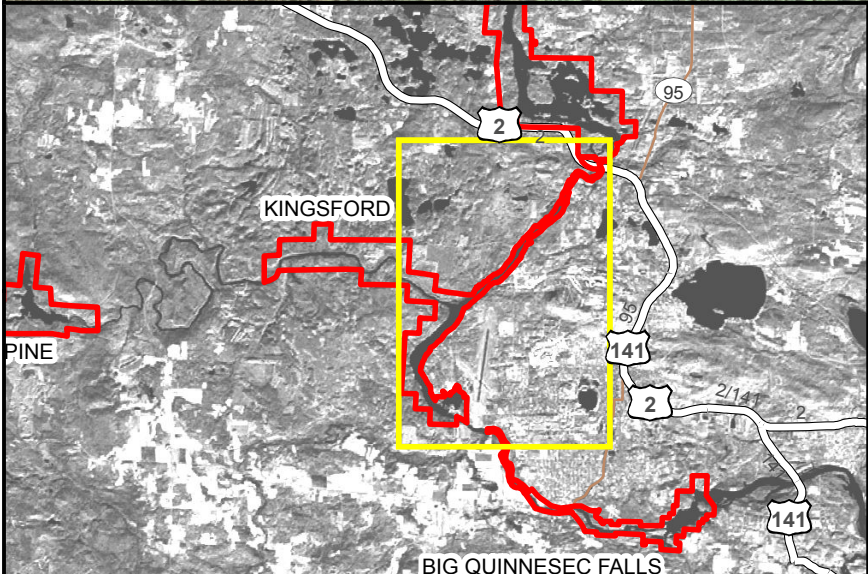
2 – (+/-) change in stand size in acres from 2009 to 2011

* - new stand observed for the first time in 2011



20111130-#011-FCR-EDR (Unofficial) 11/30/2011

Eurasian Water Milfoil		
Stand Number	Infestation	acres
6	sparse	5.27
9	sparse	0.01
11	sparse	1.26
12	sparse	0.28
15	sparse	8.61
18	sparse	0.74
22	sparse	2.66
23	sparse	0.54
26	sparse	0.16
28	sparse	0.17
30	sparse	1.50
32	sparse	13.32
33	sparse	1.15
34	sparse	0.14
35	sparse	5.57
36	sparse	0.01
37	sparse	3.16
38	moderate sparse	19.06
39	sparse	0.54
40	sparse	2.40
45	sparse	0.01
46	sparse	1.00
47	moderate	1.79
48	sparse	0.28
49	sparse	0.01
50	sparse	0.01
51	sparse	0.01
52	sparse	0.22
53	sparse	0.01
54	sparse	0.01
55	sparse	0.01
56	sparse	0.01
57	sparse	0.01
58	sparse	1.31
59	moderate sparse	0.29



Public Boat Launch

FERC Hydro Project Boundary

Year 2011 Field Work

sparse

moderate sparse

moderate

moderate dense

dense

Feet

1,000 0 1,000 2,000

N
W E
S

Kingsford Hydro Project - Year 2011
Eurasian Water Milfoil and Purple Loosestrife Survey

Source: USDA - NAIP Imagery, 2010
GPS field data collected 8/2/2011