

We Energies
2011 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. Scott Horzen, conducted a survey from a boat of the entire shoreline at the Chalk Hill 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 2010 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:

<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

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 2011.

Forty-one stands of Eurasian water milfoil were observed at the Chalk Hill Reservoir project area in 2011 (attached map), a decrease of four stands from 2010. 8 new stands were documented for the first time in 2011. The identified stands are distributed throughout the project area and range in size from <0.01-acre up to 28.98-acres.

Eurasian water milfoil is present in approximately 95.40-acres in the Chalk Hill Reservoir project area, a decrease of approximately 42-acres from 2010. Cumulatively, the average stand size is 2.33-acres with an average density rating of 1.34 per stand. In 2010, the average stand size was 3.05-acres with an average density rating of 1.51 per stand. The decrease in stand size is attributable to the 9% decrease in total stands observed and 31% decrease in total acres from 2010 to 2011. The decrease observed in the average density rating is attributable, in part, to the decrease in stand densities observed in 6 stands, an average decrease of 1.33 per stand. It is also attributable to the 14 stands with an average density rating of 1.71 no longer present in 2011. Only two stands increased in stand density between 2010 and 2011, with an average increase of 1.50.

Forty stands changed in spatial coverage between 2010 and 2011, including the 14 that were present in 2010 and absent in 2011. Two stands that were absent in 2010 were observed in 2011, while 2 stands observed in 2010 were combined with other stands in 2011. The total gross change observed was nearly 69-acres with an average gross change of 1.72-acres per stand. Of these, 9 stands accounted for over 45-acres that either increased or decreased in size (approximate 5-acre average change). The largest changes were observed in stands 5, 23, 26, & 58.

For the first time since detailed observations were recorded in 2006, there were no stands observed in 2011 with a high density rating (exceeding 75% cover) in Chalk Hill. Only 5 stands were recorded as being moderate (rating 3) comprising less than 10% of the total Eurasian water milfoil spatial coverage in 2011.

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 (*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*). 36 of the 41 stands have low densities and account for approximately 91% (86.95-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 2011. 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 was not observed in 2011. 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. This continued management by other parties should prove to be beneficial in reducing the potential for purple loosestrife to spread in the Menominee River system.

Substantial decreases in the number Eurasian water milfoil stands (-9%), total acres (-31%), average stand size (-24%), and average density rating per stand (-11%) were observed in the Chalk Hill project area from 2010 to 2011. Additionally, no dense stands (>75% cover) were

observed and the proportion of the number and acres of sparse stands (<25% cover) increased by 6% and 5%, respectively. These are all positive trends from the perspective that the Eurasian water milfoil improved substantially between 2010 and 2011.

While most of the data indicated positive trends, a couple negative observations were made in 2011. Eight new stands were observed for the first time in 2011; however, these stands accounted for only 0.78-acre, less than 1% of the total. Stands 1 & 2 had a slight increase in density, and stands 2, 11, 29, 46 and 58 increased in spatial distribution for a total of 8.59 acres. These increases were offset, however, by 6 stands decreasing in density and 18 stands decreasing in spatial distribution by 40.82 acres.

Overall, the Eurasian water milfoil infestation in Chalk Hill improved greatly between 2010 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 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 2011.

**Table 1CH. 2011 Chalk Hill Reservoir
Eurasian Water Milfoil Stand Data**

Stand Number	Density¹	Mat Thickness	Stand Size²
1	3 (+1)	None	1.89
2	3 (+2)	None	3.82 (+0.13)
3	Combined with 2	NA	NA
4	Not Present	NA	NA
5	1	None	28.98 (-8.65)
6	Combined with 5	NA	NA
7	1	None	0.17
8	1	None	7.08 (-0.11)
9	1	None	0.32 (-0.14)
10	2 (-1)	None	0.65
11	1 (-1)	None	7.76 (+0.96)
12	Not Present	NA	NA
13	Not Present	NA	NA
14	1	None	0.01 (-1.46)
15	Not Present	NA	NA
16	Not Present	NA	NA
17	Not Present	NA	NA
18	Not Present	NA	NA
19	Not Present	NA	NA
20	1	None	2.02 (-2.17)
21	Not Present	NA	NA
22	1	None	0.22 (-0.24)
23	1	None	14.32 (-18.55)
24	Not Present	NA	NA
25	Not Present	NA	NA
26	1	None	1.18 (-3.66)
27	1	None	0.59
28	1	None	2.83 (-1.51)
29	2 (-1)	None	0.61 (+0.18)
30	Not Present	NA	NA
31	1	None	0.01 (-0.22)
32	1	None	0.01 (-0.09)
33	1 (-2)	None	0.20
34	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	None	0.01 (-0.37)
41	Not Present	NA	NA
42	1	None	0.16
43	Not Present	NA	NA
44	1	None	0.05 (-0.28)
45	2 (-1)	None	8.95
46	1	None	1.06 (0.89)
47	Not Present	NA	NA

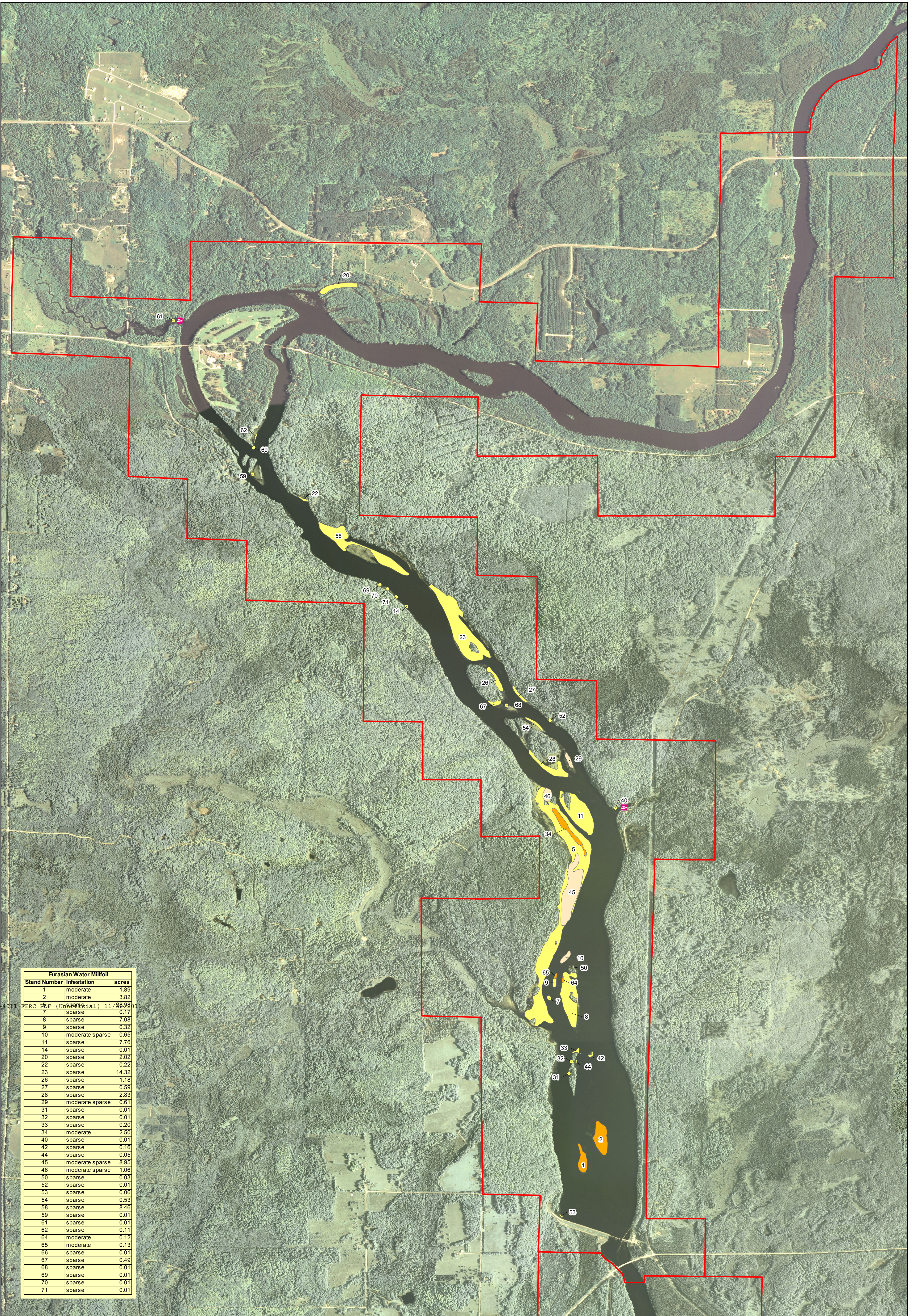
**Table 1CH. 2011 Chalk Hill Reservoir
Eurasian Water Milfoil Stand Data**

48	Not Present	NA	NA
49	Not Present	NA	NA
50	1	None	0.03
51	Not Present	NA	NA
52	1	None	0.01 (-0.20)
53	1	None	0.06 (-0.26)
54	1	None	0.53
55	Not Present	NA	NA
56	Not Present	NA	NA
57	Not Present	NA	NA
58	1 (-2)	None	8.46 (+6.44)
59	1	None	0.01 (-1.57)
60	Not Present	NA	NA
61	1	None	0.01 (-1.19)
62	1	None	0.11 (-0.14)
63	Not Present	NA	NA
64*	3	None	0.12
65*	3	None	0.13
66*	1	None	0.01
67*	1	None	0.49
68*	1	None	0.01
69*	1	None	0.01
70*	1	None	0.01
71*	1	None	0.01

1 – (+/-) change in density rating from 2010 to 2011

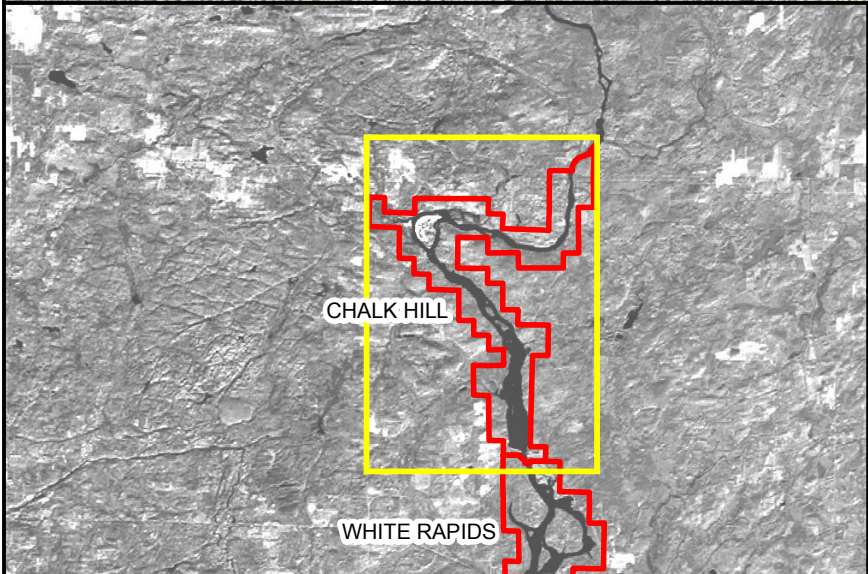
2 – (+/-) change in stand size in acres from 2010 to 2011

* - new stand observed for the first time in 2011



Stand Number	Infestation	acres
1	moderate	1.89
2	moderate	3.82
3	sparse (special)	28.95
4	sparse	0.17
8	sparse	7.08
9	sparse	0.32
10	moderate sparse	0.65
11	sparse	7.76
14	sparse	0.01
20	sparse	2.02
22	sparse	0.22
23	sparse	14.32
26	sparse	1.18
27	sparse	0.59
28	sparse	2.83
29	moderate sparse	0.61
31	sparse	0.01
32	sparse	0.01
33	sparse	0.20
34	moderate	2.50
40	sparse	0.01
42	sparse	0.18
44	sparse	0.05
45	moderate sparse	8.95
46	moderate sparse	1.06
50	sparse	0.03
52	sparse	0.01
53	sparse	0.06
54	sparse	0.53
58	sparse	8.46
59	sparse	0.01
61	sparse	0.01
62	sparse	0.11
64	moderate	0.12
65	moderate	0.13
66	sparse	0.01
67	sparse	0.48
68	sparse	0.01
69	sparse	0.01
70	sparse	0.01
71	sparse	0.01

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Public Boat Launch

FERC Hydro Project Boundary

Year 2011 Field Work

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

1,000 0 Feet 1,000 2,000

we

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

Source: USDA - NAIP Imagery, 2010
 GPS field data collected 8/03/2011