



Curlyleaf Pondweed in a Sampling Quadrat in Fish Lake on April 27, 2010

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## **Fish Lake, Scott County, Curlyleaf Pondweed Assessment for 2010**

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**Assessment Date: April 27, 2010**

**Water Temperature: 58°F**

**Prepared for:**

**Prior Lake/Spring Lake Watershed District  
Prior Lake, Minnesota**

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**April 2010**

# Curlyleaf Pondweed Assessment and Management Options for 2010

## Summary

Based on curlyleaf pondweed data gathered on April 27, 2010 and considering sparse curlyleaf growth patterns in the early 2010 season and combined with lake sediment characteristics that were analyzed in 2006, no open water herbicide treatments are recommended for the areas that were treated from 2005-2008. The areas were along the west side of Fish Lake (area is shown in Figure 1). Lake residents have the option of treating for curlyleaf pondweed, but it appears curlyleaf growth will be mostly light in water 4 to 8 feet deep around the lake.

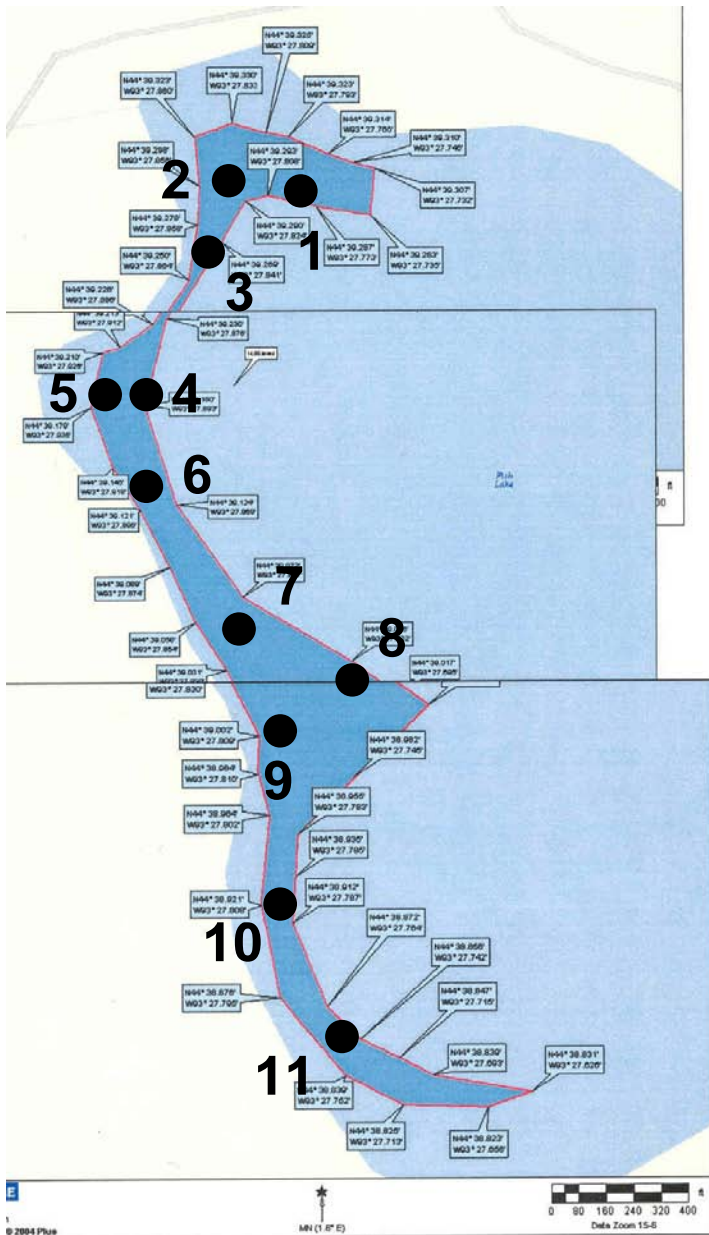


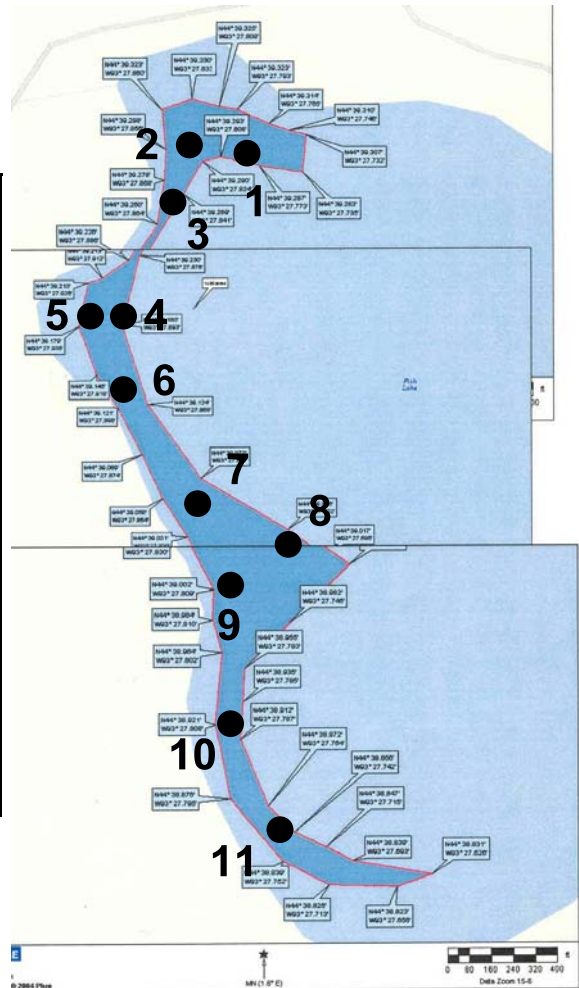
Figure 1. Map of treatment areas from 2005-2008 (4 years) are shown in dark blue shading.

# Early Season Curlyleaf Pondweed Assessment in Fish Lake

A total of 11 sites were monitored with rake sampling on April 27, 2010 in areas that previously had been treated for four consecutive years with an endothal herbicide. Curlyleaf was found at one sample site out of the 11 that were monitored (Table 1). It is concluded that curlyleaf is present in the treated area but is sparse in density and in distribution.

**Table 1. Aquatic plant abundance was based on rake sampling for April 27, 2010. Densities are based on a scale from 1 to 5 with 5 being the densest.**

Aquatic Plant Assessment (sampling with a rake)					
Site	Depth (ft)	April 27, 2010			
		Curly-leaf	Coon-tail	Northern Water-milfoil	FA (filamentous algae)
1	4	0	1	0	2
2	5	3 stems	2	0	2
3	6	0	2	1	0
4	8	0	2	0	2
5	5	0	3	0	2
6	6	0	3	1	2
7	6	1 stem	2	2	3
8	9	0	1/1	0	0
9	5	2 stems	2	1	2
10	8	0	3	2	3
11a	8	0	2	0	3
11b	7	0	1	0	3



**Figure 2. Map of sample locations for the April 27, 2010 curlyleaf assessment.**

## Curlyleaf Stem Densities at One Location, April 27, 2010

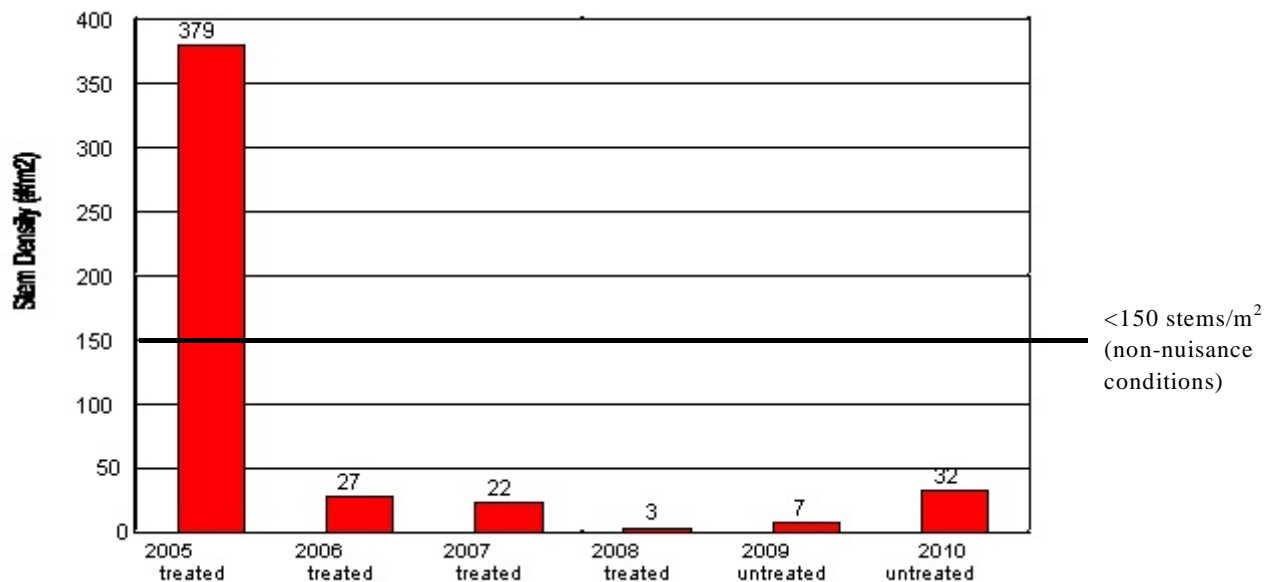
Curlyleaf stem densities were determined by scuba diving at a location between sample sites 4-5 (Figure 1). Ten quadrat samples were taken at this location. The results for 2010 show curlyleaf was found at low stem densities (Table 2) but has increased slightly since 2008 (Figure 3). These stem densities were higher compared to densities found in 2008, but are still very low compared to pre-treatment stem densities from 2005 (Figure 3).

**Table 2. Curlyleaf pondweed stem densities for April 27, 2010. Water temperature was 58°F.**

Scuba Diving - April 27, 2010			
Site 4 - 5 Quadrat	Curlyleaf (stems/m <sup>2</sup> )	Coontail (stems/m <sup>2</sup> )	Northern watermilfoil (stems/m <sup>2</sup> )
1	20	30	30
2	60	30	30
3	60	20	40
4	80	20	20
5	0	20	0
6	40	20	0
7	40	20	20
8	20	20	0
9	0	20	0
10	0	20	0
<b>Ave</b>	<b>32</b>	<b>22</b>	<b>14</b>

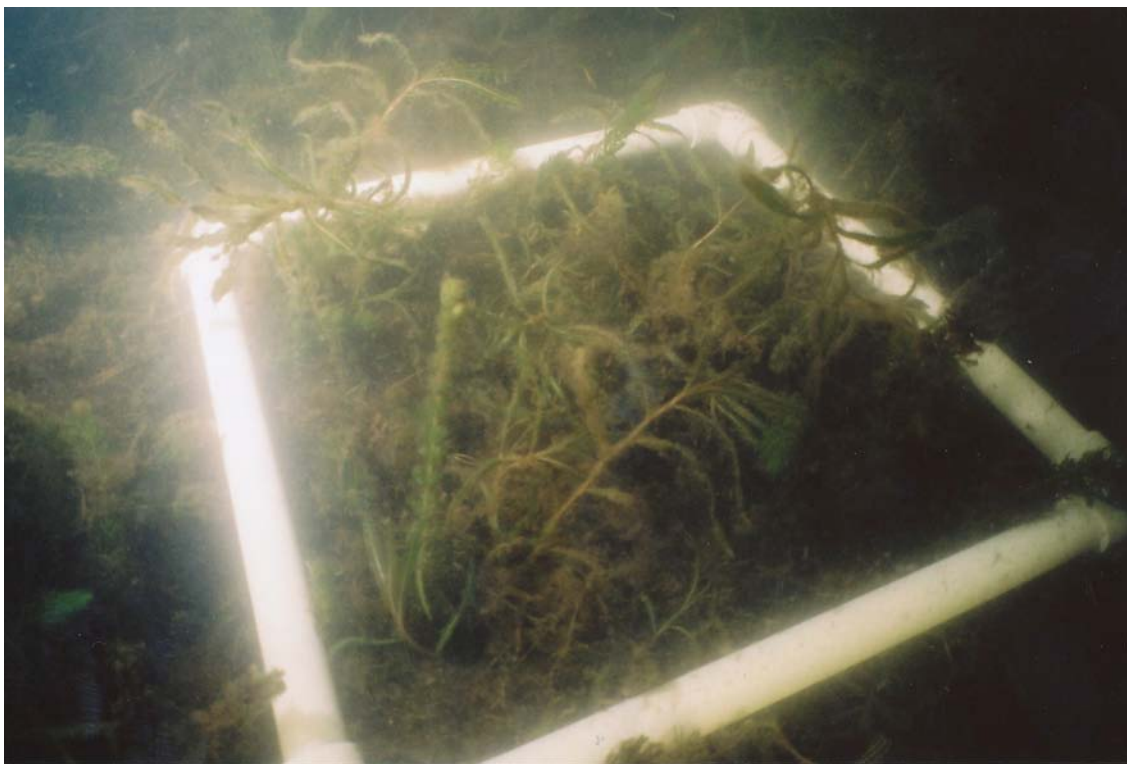


Coontail



**Figure 3. Curlyleaf stem densities for early season monitoring (using scuba diving) for 2005-2010.**

## Curlyleaf Conditions in Fish Lake, April 27, 2010



[top] The white frame is a quadrat sampler. All stems within the quadrat are counted. Curlyleaf was sparse at the sample sites monitored by scuba diving.

[bottom] Curlyleaf pondweed and coontail were found together at 7 out of 10 quadrat samples at Site 4.

## Fish Lake Predicted Curlyleaf Growth Potential Based on Lake

**Sediment Characteristics:** A Fish Lake sediment survey was conducted on September 1, 2006. Lake sediment sampling results from 2006 have been used to predict lake bottom areas that have the potential to support nuisance curlyleaf pondweed plant growth. Based on the key sediment parameters of pH, sediment bulk density, organic matter, and the Fe:Mn ratio (McComas, unpublished), the predicted growth characteristics of curlyleaf pondweed are shown in Figure 4.

Curlyleaf pondweed growth is predicted to produce mostly light to moderate growth at sample locations in Fish Lake (Figure 4)(a key to growth characteristics is shown on the next page) .

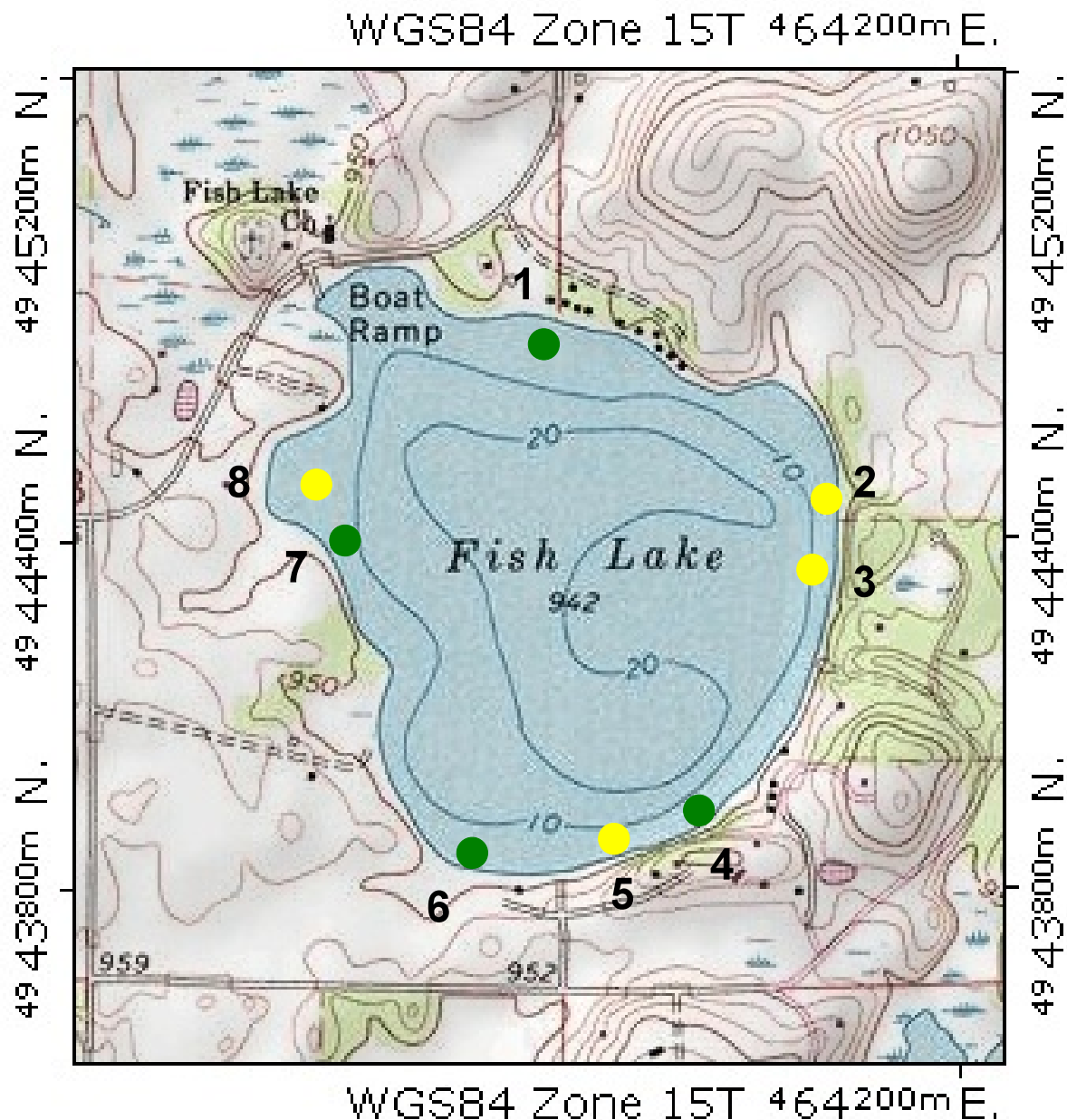


Figure 4. Sediment sample locations are shown with a circle. The circle color indicates the potential for nuisance curlyleaf pondweed growth to occur at that site. Key: green = light; yellow = moderate; red = heavy potential.

# Curlyleaf Pondweed Growth Characteristics

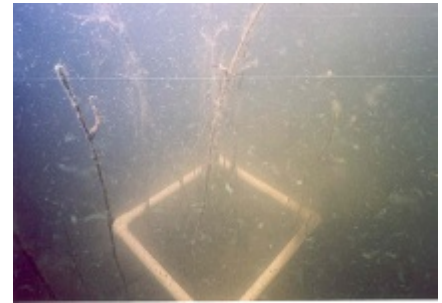
(source: Steve McComas, Blue Water Science, unpublished)

## Light Growth Conditions

Plants rarely reach the surface.

Navigation and recreational activities are not generally hindered.

Stem density: 0 - 160 stems/m<sup>2</sup>  
Biomass: 0 - 50 g-dry wt/m<sup>2</sup>  
Estimated TP loading: <1.7 lbs/ac



*MnDNR rake sample density equivalent for light growth conditions: 1, 2, or 3.*

## Moderate Growth Conditions

Broken surface canopy conditions.

Navigation and recreational activities may be hindered.

Lake users may opt for control.

Stem density: 100 - 280 stems/m<sup>2</sup>  
Biomass: 50 - 85 g-dry wt/m<sup>2</sup>  
Estimated TP loading: 2.2 - 3.8 lbs/ac



*MnDNR rake sample density equivalent for moderate growth conditions: 2, 3 or sometimes, 4.*

## Heavy Growth Conditions

Solid or near solid surface canopy conditions.

Navigation and recreational activities are severely limited.

Control is necessary for navigation and/or recreation.

Stem density: 400+ stems/m<sup>2</sup>  
Biomass: >300 g-dry wt/m<sup>2</sup>  
Estimated TP loading: >6.7 lbs/ac



*MnDNR rake sample density has a scale from 1 to 4. For certain growth conditions where plants top out at the surface, the scale has been extended: 4.5 is equivalent to a near solid surface canopy and a 5 is equivalent to a solid surface canopy. Heavy growth conditions have rake densities of a 4 (early to mid-season with the potential to reach the surface), 4.5, or 5.*