

## INTRODUCTION

Beaver Dam Lake, Dodge County, is an approximate 6,718-acre drainage lake with a maximum depth of seven feet. Curly-leaf pondweed (*Potamogeton crispus*, CLP) and Eurasian water milfoil (*Myriophyllum spicatum*, EWM) are known to be present within the lake.

In 2014 the Beaver Dam Lake Improvement Association (BDLIA) initiated a project aimed at producing a comprehensive management plan for Beaver Dam Lake. The project was partially funded through a Lake Management Planning Grant funded during the February 2014 grant cycle. During the encumbrance process, the WDNR requested that the Early-Season Aquatic Invasive Species (ESAIS) survey contained within the project budget be dropped because curly-leaf pondweed (CLP), the target species of the survey, was not documented within the lake. The BDLIA agreed to drop the survey based upon the advice of the department.



**Photo 1. Beaver Dam Lake, Dodge County, Wisconsin.**

Unfortunately, CLP was found to exist in the lake and in 2014 was documented at over 4% of littoral points during the mid-July point-intercept survey conducted by Onterra, LLC. In early-summer 2015, the BDLIA reported dense stands for CLP throughout much of the lake. The WDNR also received many calls relating to these nuisance levels of CLP. In fall 2015, the Beaver Dam Lake Comprehensive Management Plan was finalized with Management Goal 5 calling for the monitoring of existing AIS within the lake. Due to the life-cycle of CLP, an ESAIS survey was conducted in 2016. This report discusses the CLP monitoring in 2016 on Beaver Dam Lake and the control options.

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## EARLY SEASON AIS SURVEY RESULTS

On May 24 through May 26, 2016, Onterra ecologists conducted an ESAIS survey on Beaver Dam Lake. The Onterra field crew noted good conditions for the survey with lots of sun and very little wind. Using sub-meter GPS technology, the CLP population was mapped by using either 1) point-based or 2) area-based methodologies. Large colonies >40 feet in diameter are mapped using polygons (areas) and were qualitatively attributed a density rating based upon a five-tiered scale from *Highly Scattered* to *Surface Matting*. Point-based techniques were applied to EWM locations that were considered as *Small Plant Colonies* (<40 feet in diameter), *Clumps of Plants*, or *Single or Few Plants*.

During the ESAIS survey, CLP was observed to occur around the entire littoral zone and was mapped mainly with polygons (Map 1). Point-based EWM occurrences including *single or few plants*, were present in one small northern section of Beaver Dam Lake. The results of the May 2016 survey were provided to the BDLIA at an AIS wrap-up meeting in August 2016.

## **AIS WRAP UP MEETING**

On August 20, 2016 Tim Hoyman and Emily Henrigillis spoke at the Beaver Dam Conservation Club about the 2016 AIS Monitoring Project and its results. Tim started the meeting by talking about CLP, its life cycle, and previous data collected by Onterra. Emily then spoke about AIS monitoring methodology, describing the methods and scales Onterra uses to visually depict the AIS present in the lake. Tim concluded with the results of the ESAIS survey and possible action plans.

## **CONCLUSIONS AND DISCUSSION**

Overall, the 2016 survey mapped an incredibly large amount of colonized CLP within Beaver Dam Lake. There was a total of 3,480 acres of CLP mapped in May 2016 (Map 1). Due to the size of the lake and the extent of the CLP infestation, control on a lake-wide scale is impossible and methods of localized control are relatively limited. In the case of Beaver Dam Lake, localized control would be used to allow riparian access to open water areas, not to control CLP to restore ecological function. Herbicide control and mechanical harvesting are the most commonly used control methods for nuisance aquatic plants and each is discussed below. Another option is to do nothing to control the CLP. CLP dies back in mid to late June, so the nuisance brought on by it is typically short-lived, so the “do nothing” option is realistic on Beaver Dam Lake.

The greatest difficulty in controlling CLP for increased navigability on Beaver Dam Lake will be dealing with the tendency of CLP, like all aquatic plants, to fluctuate in its density from year-to-year. As a result, the BDLIA, should it elect to move forward with a control program, will need to experiment the first few years to find a method and timing that meets riparian needs, both in terms of increase navigation and in cost. In both options below, common use navigation lanes are utilized to provide riparian access to open water and a WDNR permit is required. The lanes represented in Maps 2 and 3 are not meant to be absolute, but as an example of how they may be placed to optimize access with control. As mentioned above, the impacted areas are likely to change over the years, so the association and its members will need to be flexible on a year-to-year basis. The association will need to assesses what worked and what did not work with the control plan and integrate changes based upon those findings in future treatments.

### **Mechanical Harvesting Option**

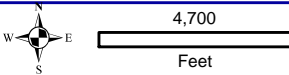
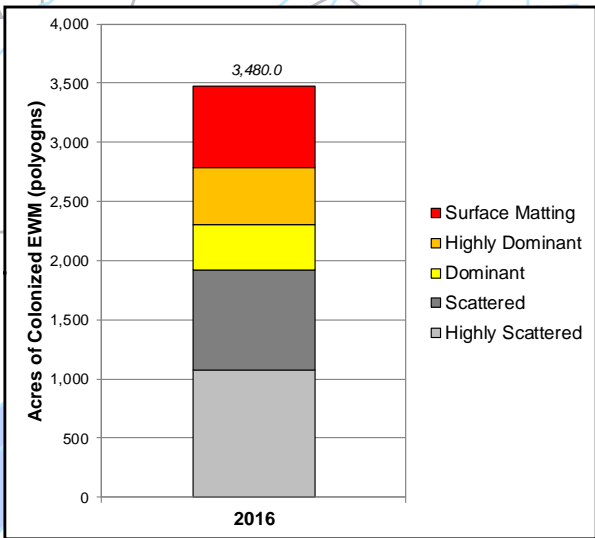
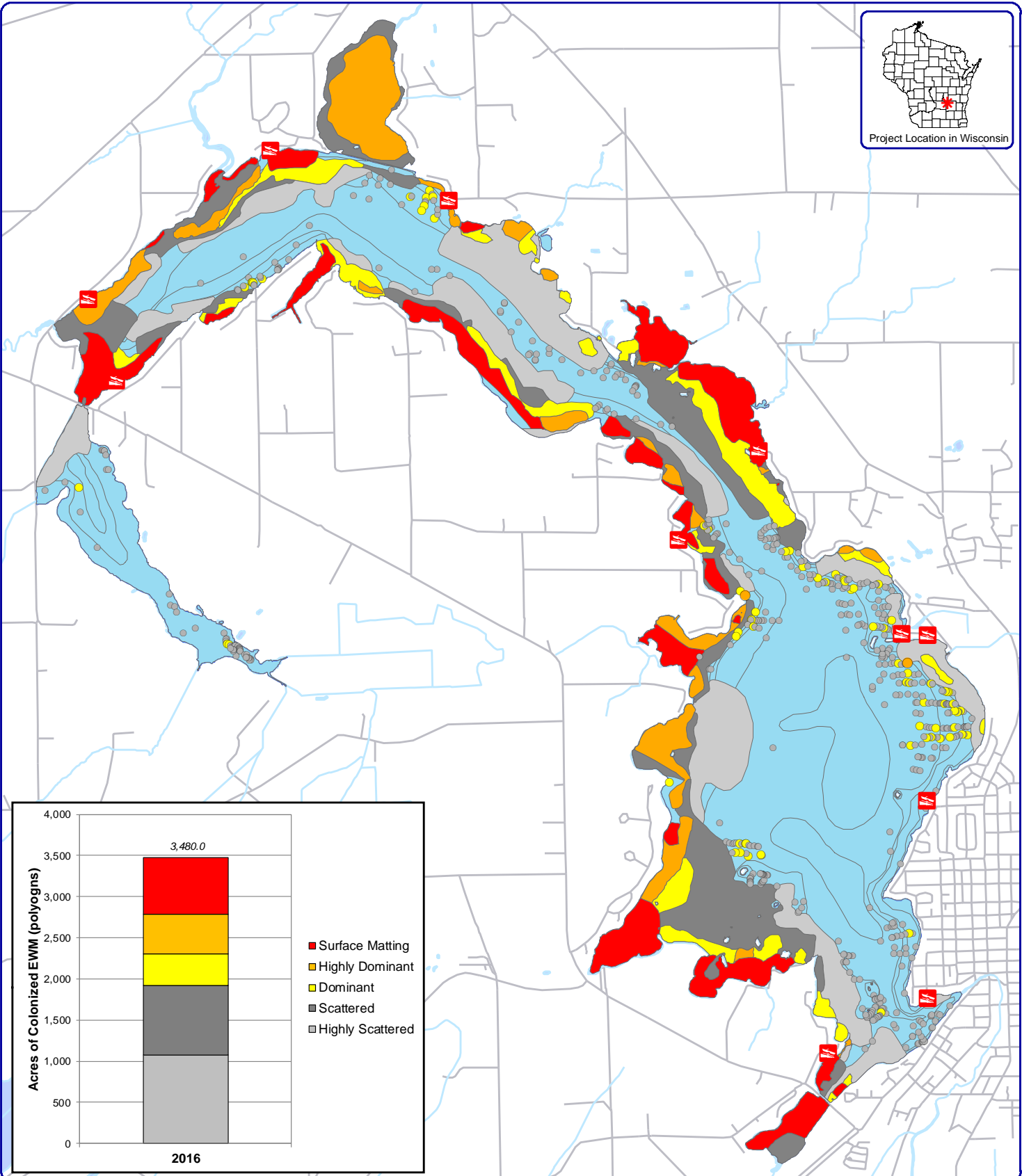
Map 2 depicts potential harvest areas consisting of 30-foot wide lanes totaling approximately 46 acres. If the harvesting were to be completed by a contract harvester, costs for the full acreage would likely approach or exceed \$15,000. Harvesting would be difficult and should not occur in under 3-feet of water; therefore, the exact placement of lanes should be determined with depth in mind. Harvesting should be completed in early June before the plant reaches nuisance conditions.

### **Herbicide Treatment Option**

Herbicide treatment is another option for CLP control. Navigation lane treatments, to help control nuisance plants, are applicable for Beaver Dam Lake (Map3). The herbicide, endothall, would be applied later in the year (early-June) than a typical CLP herbicide treatment (May). Application should occur during the first or second week of June or when the CLP is at or near the surface. Because this method is not used as often as mechanical harvesting for lanes and because of CLP’s cyclic life-cycle, the first year of treatment should be considered a test year. If this option is chosen, stakeholders should evaluate the treatment to determine if the navigation lane treatments adequately gave them access to open water

while CLP was at its peak. The herbicide test area could also encompass a smaller area, for example, one or two lanes, in the first years at the discretion of the association.

The cost of treating the full 46 acres at a concentration of 2.5 ppm a.i. endothall would likely approach \$25,000-\$29,000. While this cost is higher than the mechanical harvesting option, if the treatment areas were to be reduced in acreage, the cost of an herbicide treatment would likely be less than the same size area being mechanically harvested. This is the case because many harvesting contractors would have a minimum charge that may approach \$8,000-\$10,000.



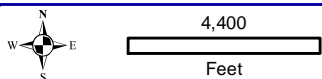
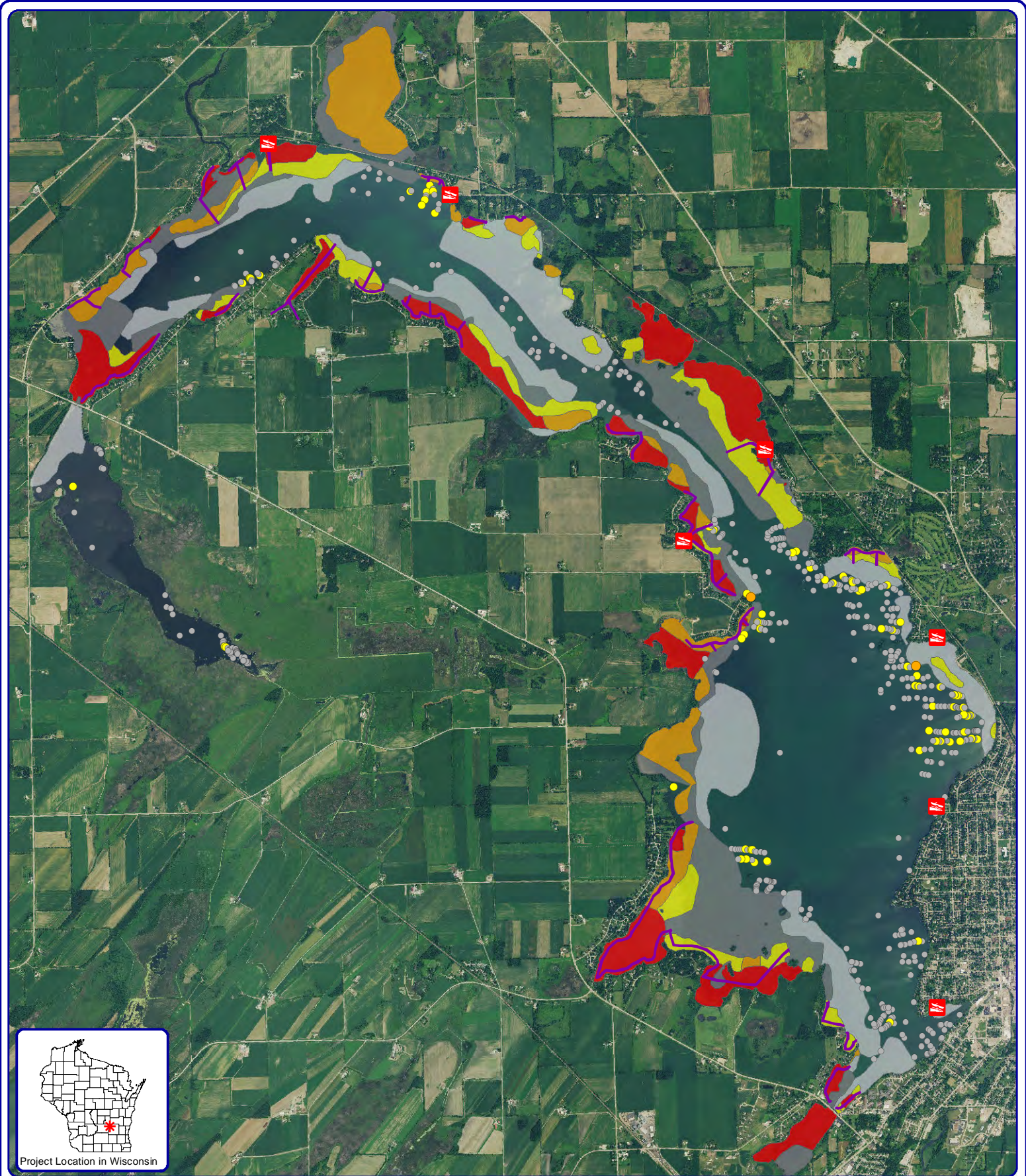
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Sources:  
 Roads and Hydrd: WDNR  
 Bathymetry: WDNR - digitized by Onterra  
 Plant Survey: Onterra, 2016  
 Map Date: June 6, 2016  
 Filename: BeaverDam\_CLP\_June16.mxd

**Legend**

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

Map 1  
 Beaver Dam Lake  
 Dodge County, Wisconsin  
**May 2016 CLP  
 Survey Results**

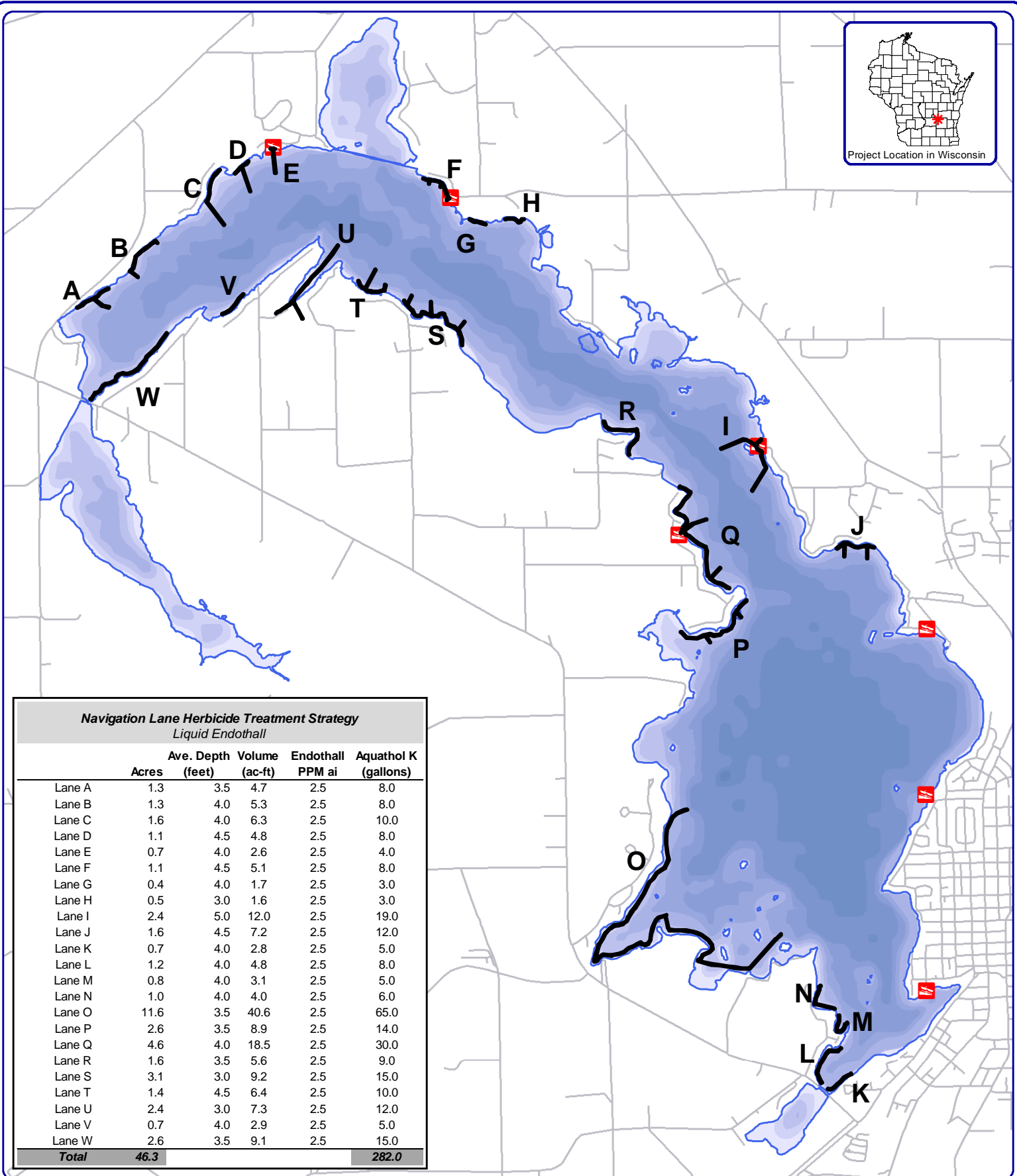


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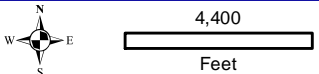
Sources:  
 Ortho: NAIP, 2013  
 Hydro: WDNR  
 Map Date: July 22, 2016  
 Filename: BeaverDam\_CLP\_Harvesting\_2016\_Prelim.mxd

- | CLP Survey Results: June 2016 |                  | Mechanical Harvesting Plan |  |
|-------------------------------|------------------|----------------------------|--|
|                               | Highly Scattered |                            | Common Use Lanes (30ft diameter)<br>= 46.3 acres |
|                               | Scattered        |                            |  |
|                               | Dominant         |                            |  |
|                               | Highly Dominant  |                            |  |
|                               | Surface Matting  |                            |  |

Map 2  
 Beaver Dam Lake  
 Dodge County, Wisconsin  
**Preliminary Mechanical  
 Harvesting Plan v1**



Navigation Lane Herbicide Treatment Strategy					
Liquid Endothall					
	Aves	Ave. Depth	Volume	Endothall	Aquathol K
	(acres)	(feet)	(ac-ft)	PPM ai	(gallons)
Lane A	1.3	3.5	4.7	2.5	8.0
Lane B	1.3	4.0	5.3	2.5	8.0
Lane C	1.6	4.0	6.3	2.5	10.0
Lane D	1.1	4.5	4.8	2.5	8.0
Lane E	0.7	4.0	2.6	2.5	4.0
Lane F	1.1	4.5	5.1	2.5	8.0
Lane G	0.4	4.0	1.7	2.5	3.0
Lane H	0.5	3.0	1.6	2.5	3.0
Lane I	2.4	5.0	12.0	2.5	19.0
Lane J	1.6	4.5	7.2	2.5	12.0
Lane K	0.7	4.0	2.8	2.5	5.0
Lane L	1.2	4.0	4.8	2.5	8.0
Lane M	0.8	4.0	3.1	2.5	5.0
Lane N	1.0	4.0	4.0	2.5	6.0
Lane O	11.6	3.5	40.6	2.5	65.0
Lane P	2.6	3.5	8.9	2.5	14.0
Lane Q	4.6	4.0	18.5	2.5	30.0
Lane R	1.6	3.5	5.6	2.5	9.0
Lane S	3.1	3.0	9.2	2.5	15.0
Lane T	1.4	4.5	6.4	2.5	10.0
Lane U	2.4	3.0	7.3	2.5	12.0
Lane V	0.7	4.0	2.9	2.5	5.0
Lane W	2.6	3.5	9.1	2.5	15.0
<b>Total</b>	<b>46.3</b>				<b>282.0</b>



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Sources:  
 Roads and Hyrdro: WDNR  
 Bathymetry: WDNR - digitized by Onterra  
 Plant Survey: Onterra, 2016  
 Map Date: November 11, 2016  
 Filename: BeaverDam\_CLP\_HerbNuisanceLanes.mxd

**Legend**

Common Use Lanes (30ft diameter)  
 = 46.3 acres

Map 3  
 Beaver Dam Lake  
 Dodge County, Wisconsin  
**Potential CLP**  
**Nuisance Control Strategy**