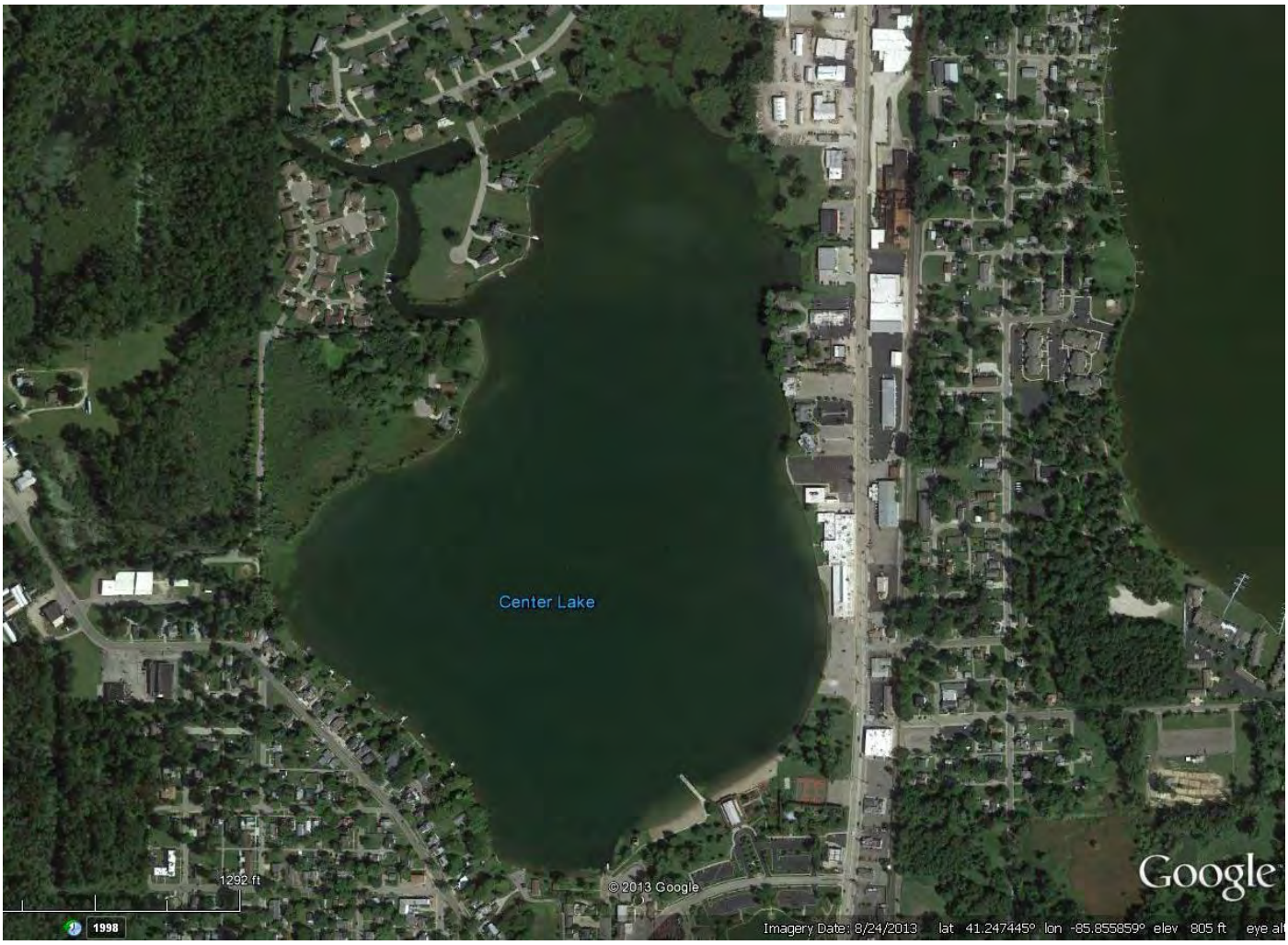
# Center Lake Aquatic Vegetation Management Plan

## 2016 Update

## Kosciusko County, Indiana




Prepared for:

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**Executive Summary**

Center Lake is located in central Kosciusko County, within the town limits of Warsaw, Indiana. Center Lake has 120 surface acres with a maximum depth of 42 feet and an average depth of 20 feet. Eurasian watermilfoil (*Myriophyllum spicatum*) is abundant in nuisance quantities in many areas of the lake in depths less than 6 feet. The following report summarizes Eurasian watermilfoil (EWM) control practices implemented on Center Lake through the Lake and River Enhancement Program (LARE) and outlines a continued management strategy to control exotic species in Center Lake.

Center Lake has a long history of EWM infestation. The entire lake was treated with Sonar herbicide for EWM control in 1996. EWM had re-established itself in the lake by 2001 based on IDNR survey data. Another whole lake Sonar treatment was conducted in spring of 2005. Since 2007, a treatment strategy using DMA-4 herbicide at a rate of 2 ppm has been used to treat areas of EWM infestation on Center Lake. The DMA-4 treatments generally provide good season-long control for EWM. These treatments improve lake use and do not appear to be negatively affecting the native plant community.

A visual survey was conducted on May 19, 2016. This survey marked EWM locations with GPS and recommended that 28.6 acres be treated for EWM control. This is down from 45 acres in 2015. There were several acres of historical EWM beds in the north end of the lake that did not treatment, which is encouraging.

On May 25, 2016 28.6 acres on Center Lake were treated for EWM control with liquid 2, 4-D at 2.0 ppm. Based on the results of the summer tier II vegetation survey on July 19, 2016 these treatments were very successful. EWM was not collected in the tier II survey and was not even found visually. It is likely that EWM will return to many treatment areas in 2017, but the control in 2016 seemed to be excellent.

This same treatment strategy is recommended for Center Lake in 2017. Areas of EWM infestation should be treated with liquid 2, 4-D at a rate of 2.0 ppm. Assuming EWM is found in very similar locations in 2017, the same average depths used for beds in the 2016 treatment should be used. It is also recommended that the timing be very similar (around the last week or May or first week of June).

While selectively treating EWM is not likely to eradicate EWM from Center Lake, it may help native plants compete with it and also provide seasonal recreational improvement in areas that are infested with EWM.

A visual survey should be sufficient in spring of 2017 to verify EWM locations with gps prior to any herbicide treatments. A summer (post treatment) tier II survey should be used to monitor both invasive and native plant populations.

**Problem Statement**

Eurasian watermilfoil (EWM) is impacting the use of Center Lake in many areas. The EWM forms dense mats in shallow areas, which can inhibit fishing, swimming, and boating. Dense EWM beds may also prevent the growth of beneficial native species which often provide less recreational interference and more desirable fish habitat. The north end of Center Lake has historically been the most severely impacted location on the lake although EWM abundance in the north end was down in 2016.

**Objectives:**

The following specific, quantifiable objectives have been recommended to evaluate the success of EWM management at Center Lake

1. Limit the frequency of occurrence of Eurasian watermilfoil based on summer tier II sampling to 10 percent or less.

2. Maintain a minimum of 7 native species collected each year in Center Lake in the summer tier II sampling (IDNR, 2014).

3. Maintain a native plant diversity of at least 0.78 each year in summer tier II sampling (IDNR 2014).

4. Maintain a minimum of 70% coverage of native plants based on summer tier II sampling (IDNR, 2014).

Treating EWM will not eradicate it from Center Lake. However, if these objectives are met each year, the indication would be that EWM is being controlled effectively on a seasonal basis, without causing significant damage to the native plant community.

Based on the results of the post-treatment tier II survey, all of the plant management objectives were met in 2016. EWM was not collected in the summer tier II survey, 10 species of native plants were collected, native diversity was 0.84, and native plants were found at 84% of sample locations.

## Aquatic Vegetation Management History

Table 1 summarizes the management history of EWM at Center Lake from 1996 to the present. EWM treatments have been common on Center Lake for many years.

**Table 1: Center Lake EWM Management History**

| Year | Target species | Action | Acres | Herbicide | Rate |
|---|---|---|---|---|---|
| 1996 | EWM | Herbicide Treatment | Whole lake | Sonar | 12 ppb |
| Late 90's | EWM | Mechanical Harvesting | NA | NA | NA |
| 2000 | EWM | Milfoil Weevil Stocking | Whole lake | NA | NA |
| 2001 | EWM | Milfoil Weevil Stocking | Whole lake | NA | NA |
| 2003 | EWM | Milfoil Weevil Stocking | Whole lake | NA | NA |
| 2005* | EWM | Herbicide Treatment | Whole lake | Sonar | 6.0 ppb (6 bump 6) |
| 2006* | EWM | Herbicide Treatment | 20 acres | Renovate | 1.0 ppm |
| 2007* | EWM | Herbicide Treatment | 5.75 acres | DMA-4 | 2ppm |
| 2008* | EWM | Herbicide Treatment | 22.5 acres | DMA-4 | 2ppm |
| 2009 | EWM | Herbicide Treatment | 30 acres | DMA-4 | 2ppm |
| 2010 | EWM | Herbicide Treatment | 30 acres | DMA-4 | 2ppm |
| 2011 | EWM | Herbicide Treatment | 30 acres | DMA-4 | 2ppm |
| 2012 | EWM | Herbicide Treatment | 30 acres | DMA-4 | 2ppm |
| 2013* | EWM | Herbicide Treatment | 44.45 acres | DMA-4 | 2ppm |
| | EWM/natives with private funding | Herbicide Treatment | 5.06 acres (channels) | Diquat (privately funded) | 2 gal/surface acre |
| 2014* | EWM | Herbicide Treatment | 39.4 acres | DMA-4 | 2ppm |
| | EWM/natives with private funding | Herbicide Treatment | 5.06 acres (channels) | Diquat (privately funded) | 2 gal/surface acre |
| | EWM re-treatment | Herbicide Treatment | 11.43 acres | 2, 4-D | 2ppm |
| 2015* | EWM | Herbicide treatment | 45.31 | 2, 4-D | 2ppm |
| | | Herbicide Treatment | 5.06 | Diquat (privately funded) | 2 gal/surface acre |
| 2016* | EWM | Herbicide Treatment | 28.6 | 2, 4-D | 2.0 ppm |

*LARE funded

## 2016 Vegetation Treatments

A visual survey was conducted on May 19, 2016. This survey marked EWM locations with GPS and recommended that 28.6 acres be treated for EWM control. This is down from 45 acres in 2015. There were several acres of historical EWM beds in the north end of the lake that did not treatment, which is encouraging.

On May 25, 2016 28.6 acres on Center Lake were treated for EWM control with liquid 2, 4-D at 2.0 ppm. Based on the results of the summer tier II vegetation survey on July 19, 2016 these treatments were very successful. EWM was not collected in the tier II survey and was not even found visually. It is likely that EWM will return to many treatment areas in 2017, but the control in 2016 seemed to be excellent.

Treatment information for each 2016 treatment area is found in Table 2. The areas in this table correspond to the labeled treatment areas in Figure 1.

**Table 2: Center Lake 2016 LARE Treatment Details**

| Area | Acres | Average Depth | Herbicide | Concentration |
|---|---|---|---|---|
| **1** LARE funded | 1.14 | 5 ft. | DMA-4 | 2 ppm |
| **2** LARE funded | 11.52 | 3 ft. | DMA-4 | 2 ppm |
| **3** LARE funded | 11.16 | 6 ft. | DMA-4 | 2 ppm |
| **4** LARE funded | 4.81 | 5 ft. | DMA-4 | 2 ppm |

**Figure 1: Center Lake May 25, 2016 Eurasian Watermilfoil Treatment Areas**

## Tier II Survey Results

The summer 2016 tier II aquatic vegetation survey on Center Lake took place on July 19, 2016. Aquatic plant sampling methods used for surveys on Center Lake are outlined in the Tier II Aquatic Vegetation Survey Protocol (IDNR 2014). Previous sampling locations established by the IDNR were used to help provide consistency in data. The sample sites used in 2013 through 2016 should continue to be used in future years to maintain consistency. Common and scientific names for aquatic plants are consistent with those listed in the original AVMP and are listed in the appendix to this report. Fifty sample sites are spaced throughout Center Lake. These sites are described in Figure 2.

**Figure 2: Center Lake Tier II Sample Locations**

## Exotic Species

Eurasian watermilfoil (EWM), curly-leaf pondweed (CLP), and brittle naiad are the three exotic species known to be present in Center Lake. Of these three species EWM is the most problematic in Center Lake because of its abundance and density.

## Eurasian Watermilfoil

Eurasian watermilfoil was found only in the spring visual survey. The full extent of EWM distribution in Center Lake in 2016 is described in Figure 1. There were no collections or visual sightings of EWM in the summer 2016 tier II survey.

## Curly-Leaf Pondweed

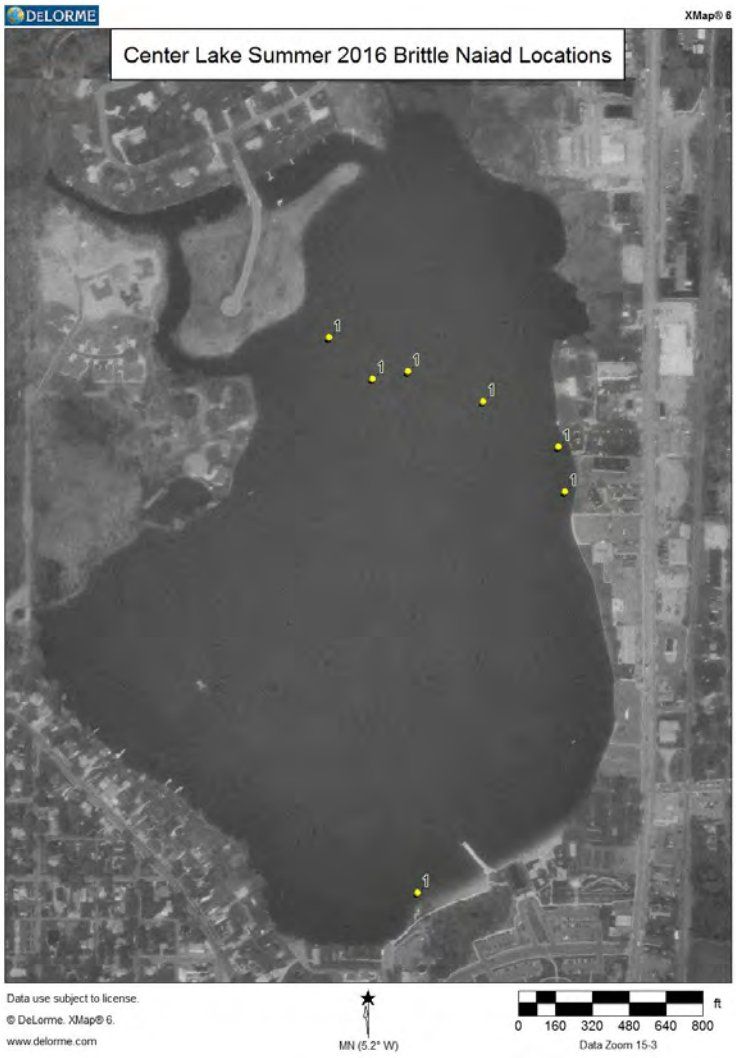
Curly-leaf pondweed was collected at one sample location in the July 19, 2016 tier II survey for a site frequency of 2.0 percent. CLP is common in the spring on Center Lake as evidenced by its site frequency of 20.0 percent in spring of 2012. Curly-leaf pondweed dies out naturally as water temperatures rise in summer so it is generally not abundant in July and August. The one sample location where CLP was collected on July 19, 2016 is described in Figure 3.

**Figure 3: Center Lake 2016 Curly Leaf Pondweed Tier II Location**

Brittle Naiad

Brittle naiad was found at 14.0 percent of sample locations in the 2016 tier II survey. This was a higher frequency than has been observed in the past in Center Lake. While brittle naiad does not seem to be impairing lake use, its population should be monitored in future years. Sites where brittle naiad was collected in the 2016 tier II survey are described in Figure 4.

**Figure 4: Center Lake 2016 Tier II Brittle Naiad Locations**




## Tier II Survey Data

Results from the July 19, 2016 tier II survey on Center Lake are summarized in Table 3. Site frequency, dominance, diversity, and other metrics are shown for the entire survey (overall) and also for each 5 foot depth contour where plants were present. In this survey, plants were found to a maximum depth of 12 feet.

**Table 3: Big Long Lake Summer 2016 Data Analysis**

**Occurrence and Abundance of Submersed Aquatic Plants in Center Lake**

| | | | | | |
|---|---|---|---|---|---|
| County: | Kosciusko | Secchi (ft): | 14.5 | Mean species/site: | 2.20 |
| Date: | 7/19/2016 | Sites with plants: | 42 | SE Mean species/site: | 0.22 |
| Littoral Depth (ft): | 12.0 | Sites with native plants: | 42 | Mean native species/site: | 2.04 |
| Littoral Sites: | 44 | Number of species: | 12 | SE Mean natives/site: | 0.21 |
| Total Sites: | 50 | Number of native species: | 10 | Species diversity: | 0.86 |
| | | Maximum species/site: | 6 | Native species diversity: | 0.84 |

| All Depths | Frequency of | Rake score frequency per species | | | | Plant |
|---|---|---|---|---|---|---|
| Species | Occurrence | 0 | 1 | 3 | 5 | Dominance |
| Chara | 52.0 | 48.0 | 12.0 | 16.0 | 24.0 | 36.0 |
| Coontail | 38.0 | 62.0 | 8.0 | 18.0 | 12.0 | 24.4 |
| Small pondweed | 32.0 | 68.0 | 24.0 | 8.0 | 0.0 | 9.6 |
| Large-leaved pondweed | 26.0 | 74.0 | 6.0 | 16.0 | 4.0 | 14.8 |
| Sago pondweed | 22.0 | 78.0 | 10.0 | 12.0 | 0.0 | 9.2 |
| Slender naiad | 16.0 | 84.0 | 12.0 | 4.0 | 0.0 | 4.8 |
| Brittle naiad | 14.0 | 86.0 | 14.0 | 0.0 | 0.0 | 2.8 |
| Illinois pondweed | 8.0 | 92.0 | 6.0 | 2.0 | 0.0 | 2.4 |
| Richardson's pondweed | 6.0 | 94.0 | 2.0 | 4.0 | 0.0 | 2.8 |
| Canada waterweed | 2.0 | 98.0 | 2.0 | 0.0 | 0.0 | 0.4 |
| Curly-leaf pondweed | 2.0 | 98.0 | 2.0 | 0.0 | 0.0 | 0.4 |
| Water stargrass | 2.0 | 98.0 | 2.0 | 0.0 | 0.0 | 0.4 |
| Filamentous Algae | 6.0 | | | | | |

**Occurrence and Abundance of Submersed Aquatic Plants in Center Lake**

| | | | | | |
|---|---|---|---|---|---|
| County: | Kosciusko | Secchi (ft): | 14.5 | Mean species/site: | 2.65 |
| Date: | 7/19/2016 | Sites with plants: | 23 | SE Mean species/site: | 0.31 |
| Littoral Depth (ft): | 12.0 | Sites with native plants: | 23 | Mean native species/site: | 2.48 |
| Littoral Sites: | 23 | Number of species: | 10 | SE Mean natives/site: | 0.29 |
| Total Sites: | 23 | Number of native species: | 9 | Species diversity: | 0.85 |
| | | Maximum species/site: | 6 | Native species diversity: | 0.83 |

| Depths: 0 to 5 ft | Frequency of | Rake score frequency per species | | | | Plant |
|---|---|---|---|---|---|---|
| Species | Occurrence | 0 | 1 | 3 | 5 | Dominance |
| Chara | 73.9 | 26.1 | 8.7 | 26.1 | 39.1 | 56.5 |
| Large-leaved pondweed | 39.1 | 60.9 | 13.0 | 21.7 | 4.3 | 20.0 |
| Slender naiad | 34.8 | 65.2 | 26.1 | 8.7 | 0.0 | 10.4 |
| Small pondweed | 30.4 | 69.6 | 17.4 | 13.0 | 0.0 | 11.3 |
| Sago pondweed | 21.7 | 78.3 | 13.0 | 8.7 | 0.0 | 7.8 |
| Brittle naiad | 17.4 | 82.6 | 17.4 | 0.0 | 0.0 | 3.5 |
| Coontail | 17.4 | 82.6 | 4.3 | 4.3 | 8.7 | 12.2 |
| Illinois pondweed | 13.0 | 87.0 | 8.7 | 4.3 | 0.0 | 4.3 |
| Richardson's pondweed | 13.0 | 87.0 | 4.3 | 8.7 | 0.0 | 6.1 |
| Water stargrass | 4.3 | 95.7 | 4.3 | 0.0 | 0.0 | 0.9 |
| Filamentous Algae | 8.7 | | | | | |

**Occurrence and Abundance of Submersed Aquatic Plants in Center Lake**

| | | | | | |
|---|---|---|---|---|---|
| County: | Kosciusko | Secchi (ft): | 14.5 | Mean species/site: | 2.59 |
| Date: | 7/19/2016 | Sites with plants: | 16 | SE Mean species/site: | 0.30 |
| Littoral Depth (ft): | 12.0 | Sites with native plants: | 16 | Mean native species/site: | 2.41 |
| Littoral Sites: | 17 | Number of species: | 9 | SE Mean natives/site: | 0.31 |
| Total Sites: | 17 | Number of native species: | 7 | Species diversity: | 0.81 |
| | | Maximum species/site: | 5 | Native species diversity: | 0.78 |

| Depths: 5 to 10 ft | Frequency of | Rake score frequency per species | | | | Plant |
|---|---|---|---|---|---|---|
| Species | Occurrence | 0 | 1 | 3 | 5 | Dominance |
| Coontail | 82.4 | 17.6 | 17.6 | 41.2 | 23.5 | 51.8 |
| Small pondweed | 47.1 | 52.9 | 41.2 | 5.9 | 0.0 | 11.8 |
| Chara | 41.2 | 58.8 | 11.8 | 11.8 | 17.6 | 27.1 |
| Sago pondweed | 35.3 | 64.7 | 11.8 | 23.5 | 0.0 | 16.5 |
| Large-leaved pondweed | 23.5 | 76.5 | 0.0 | 17.6 | 5.9 | 16.5 |
| Brittle naiad | 11.8 | 88.2 | 11.8 | 0.0 | 0.0 | 2.4 |
| Canada waterweed | 5.9 | 94.1 | 5.9 | 0.0 | 0.0 | 1.2 |
| Curly-leaf pondweed | 5.9 | 94.1 | 5.9 | 0.0 | 0.0 | 1.2 |
| Illinois pondweed | 5.9 | 94.1 | 5.9 | 0.0 | 0.0 | 1.2 |
| Filamentous Algae | 5.9 | | | | | |

**Occurrence and Abundance of Submersed Aquatic Plants in Center Lake**

| | | | | | |
|---|---|---|---|---|---|
| County: | Kosciusko | Secchi (ft): | 14.5 | Mean species/site: | 0.50 |
| Date: | 7/19/2016 | Sites with plants: | 3 | SE Mean species/site: | 0.31 |
| Littoral Depth (ft): | 12.0 | Sites with native plants: | 3 | Mean native species/site: | 0.40 |
| Littoral Sites: | 4 | Number of species: | 4 | SE Mean natives/site: | 0.22 |
| Total Sites: | 10 | Number of native species: | 3 | Species diversity: | 0.72 |
| | | Maximum species/site: | 3 | Native species diversity: | 0.63 |

| Depths: 10 to 15 ft | Frequency of | Rake score frequency per species | | | | Plant |
|---|---|---|---|---|---|---|
| Species | Occurrence | 0 | 1 | 3 | 5 | Dominance |
| Chara | 20.0 | 80.0 | 20.0 | 0.0 | 0.0 | 4.0 |
| Brittle naiad | 10.0 | 90.0 | 10.0 | 0.0 | 0.0 | 2.0 |
| Coontail | 10.0 | 90.0 | 0.0 | 10.0 | 0.0 | 6.0 |
| Small pondweed | 10.0 | 90.0 | 10.0 | 0.0 | 0.0 | 2.0 |

Tier II data for all surveys conducted on Center Lake during its involvement in the LARE program is included in Table 4 and Table 5. This summarization helps to track plant trends from year to year.

**Table 4: Center Lake Historical Tier II Data - Spring**

| Center Lake Multi-Year Data Presentation- Spring | | |
|---|---|---|
| Date: | 5/11/2005 | 5/23/2012 |
| Total Sites: | 60 | 50 |
| Secchi (ft): | 5.0 | NA |
| Number of Species: | 7 | 8 |
| Number of Native Species: | 6 | 6 |
| Sites with Plants | 55 | 48 |
| Sites with Native Plants | 35 | 46 |
| Maximum Plant Depth | 13.0 | 15.0 |
| Species Diversity: | NA | 0.82 |
| Native Species Diversity: | NA | 0.74 |
| Mean Native Species/Site: | NA | 1.64 |
| Surveying organization | IDNR | IDNR |
| Species Frequency of Occurrence - All Depths | | |
| Chara | 8.0 | 34.0 |
| Eurasian watermilfoil | 80.0 | 32.0 |
| Illinois pondweed | 0.0 | 24.0 |
| Sago pondweed | 0.0 | 42.0 |
| Eel grass | 13.0 | 0.0 |
| Coontail | 38.0 | 60.0 |
| Slender naiad | 2.0 | 2.0 |
| American pondweed | 0.0 | 2.0 |
| Flat-stemmed pondweed | 2.0 | 0.0 |
| Curly-leaf pondweed | 0.0 | 20.0 |
| Large-leaved pondweed | 7.0 | 0.0 |
| Species Frequency of Occurrence - 0 to 5 ft | | |
| Chara | NA | 56.5 |
| Illinois pondweed | NA | 39.1 |
| Eurasian watermilfoil | NA | 26.1 |
| Sago pondweed | NA | 60.9 |
| American pondweed | NA | 4.3 |
| Coontail | NA | 43.5 |
| Curly-leaf pondweed | NA | 17.4 |
| Species Frequency of Occurrence - 5 to 10 ft | | |
| Chara | NA | 23.5 |
| Eurasian watermilfoil | NA | 47.1 |
| Sago pondweed | NA | 41.2 |
| Illinois pondweed | NA | 17.6 |
| Coontail | NA | 64.7 |
| Curly-leaf pondweed | NA | 23.5 |
| Species Frequency of Occurrence - 10 to 15 ft | | |
| Eurasian watermilfoil | NA | 20.0 |
| Coontail | NA | 90.0 |
| Slender naiad | NA | 10.0 |
| Curly-leaf pondweed | NA | 20.0 |

## Table 5: Center Lake Historical Tier II Data - Summer

| Center Lake Multi-Year Data Presentation- Summer | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date: | 8/24/2004 | 8/2/2005 | 7/31/2006 | 7/25/2007 | 8/26/2008 | 8/7/2013 | 7/25/2014 | 7/23/2015 | 7/19/2016 |
| Total Sites: | 41 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 |
| Secchi (ft): | NR | 5.0 | 5.0 | 4.0 | 12.0 | 9.0 | 10.1 | 4.9 | 14.5 |
| Number of Species: | 9 | 10 | 15 | 6 | 6 | 10 | 10 | 10 | 12 |
| Number of Native Species: | 7 | 8 | 13 | 5 | 6 | 8 | 7 | 8 | 10 |
| Sites with Plants | 30 | 51 | 37 | 21 | 36 | 37 | 45 | 42 | 42 |
| Sites with Native Plants | NA | 50 | 37 | 21 | 36 | 37 | 43 | 42 | 42 |
| Maximum Plant Depth | 14.0 | 9.5 | 8.0 | 7.0 | 9.0 | 15.0 | 15.0 | 13.0 | 12.0 |
| Species Diversity: | NA | NA | 0.98 | NA | 0.98 | 0.82 | 0.82 | 0.82 | 0.86 |
| Native Species Diversity: | NA | NA | 0.98 | NA | 0.98 | 0.81 | 0.78 | 0.81 | 0.84 |
| Mean Native Species/Site: | NA | NA | 1.22 | NA | 1.70 | 1.28 | 1.5 | 1.52 | 2.04 |
| Surveying organization | Weed Patrol | IDNR | V3 | V3 | V3 | AWC | AWC | AWC | AWC |
| | Species Frequency of Occurrence - All Depths | | | | | | | | |
| Chara | 46.0 | 35.0 | 8.0 | 12.0 | 54.0 | 28.0 | 38.0 | 12.0 | 52.0 |
| Eurasian watermilfoil | 71.0 | 8.0 | 2.0 | 0.0 | 0.0 | 4.0 | 12.0 | 2.0 | 0.0 |
| Illinois pondweed | 0.0 | 3.0 | 8.0 | 2.0 | 0.0 | 2.0 | 4.0 | 12.0 | 8.0 |
| Sago pondweed | 25.0 | 15.0 | 66.0 | 20.0 | 38.0 | 30.0 | 26.0 | 20.0 | 22.0 |
| Eel grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Coontail | 36.0 | 20.0 | 2.0 | 20.0 | 20.0 | 32.0 | 46.0 | 50.0 | 38.0 |
| Slender naiad | 32.0 | 0.0 | 2.0 | 0.0 | 36.0 | 14.0 | 8.0 | 16.0 | 16.0 |
| Variable pondweed | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Brittle naiad | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 14.0 |
| American pondweed | 0.0 | 0.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Richardson's pondweed | 4.0 | 0.0 | 0.0 | 0.0 | 8.0 | 0.0 | 0.0 | 0.0 | 6.0 |
| Flat-stemmed pondweed | 14.0 | 0.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Small pondweed | 0.0 | 2.0 | 0.0 | 0.0 | 12.0 | 2.0 | 4.0 | 10.0 | 32.0 |
| Bladderwort | 0.0 | 7.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Curly-leaf pondweed | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| Canadian waterweed | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 0.0 | 0.0 | 2.0 |
| Water stargrass | 0.0 | 28.0 | 6.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 |
| Large-leaved pondweed | 7.0 | 10.0 | 0.0 | 0.0 | 0.0 | 14.0 | 24.0 | 30.0 | 26.0 |
| | Species Frequency of Occurrence - 0 to 5 ft | | | | | | | | |
| Chara | NA | NA | NA | 26.0 | 78.3 | 52.2 | 60.9 | 26.1 | 73.9 |
| Illinois pondweed | NA | NA | NA | 4.0 | 0.0 | 4.3 | 8.7 | 8.7 | 13.0 |
| Eurasian watermilfoil | NA | NA | NA | 0.0 | 0.0 | 8.7 | 8.7 | 0.0 | 0.0 |
| Sago pondweed | NA | NA | NA | 39.0 | 60.9 | 34.8 | 30.4 | 8.7 | 21.7 |
| Slender naiad | NA | NA | NA | 0.0 | 52.2 | 17.4 | 17.4 | 17.4 | 34.8 |
| Variable pondweed | NA | NA | NA | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Brittle naiad | NA | NA | NA | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 |
| Richardson's pondweed | NA | NA | NA | 0.0 | 17.4 | 0.0 | 0.0 | 0.0 | 6.0 |
| Coontail | NA | NA | NA | 21.0 | 21.7 | 17.4 | 21.7 | 30.4 | 17.4 |
| Canadian waterweed | NA | NA | NA | 0.0 | 0.0 | 8.7 | 0.0 | 0.0 | 2.0 |
| Curly-leaf pondweed | NA | NA | NA | 0.0 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 |
| Small pondweed | NA | NA | NA | 0.0 | 17.4 | 0.0 | 0.0 | 4.3 | 30.4 |
| Southern naiad | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Large-leaved pondweed | NA | NA | NA | 0.0 | 0.0 | 21.7 | 30.4 | 47.8 | 39.1 |
| Water stargrass | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 4.3 |
| | Species Frequency of Occurrence - 5 to 10 ft | | | | | | | | |
| Chara | NA | NA | NA | 0.0 | 52.9 | 5.9 | 29.4 | 0.0 | 41.2 |
| Eurasian watermilfoil | NA | NA | NA | 0.0 | 0.0 | 0.0 | 23.5 | 5.9 | 0.0 |
| Sago pondweed | NA | NA | NA | 6.0 | 29.4 | 35.3 | 29.4 | 47.1 | 35.3 |
| Eel grass | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Illinois pondweed | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 23.5 | 5.9 |
| Coontail | NA | NA | NA | 30.0 | 29.4 | 52.9 | 76.5 | 76.5 | 82.4 |
| Slender naiad | NA | NA | NA | 0.0 | 29.4 | 11.8 | 0.0 | 17.6 | 0.0 |
| Richardson's pondweed | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.0 |
| Small pondweed | NA | NA | NA | 0.0 | 11.8 | 0.0 | 11.8 | 17.6 | 47.1 |
| Large-leaved pondweed | NA | NA | NA | 0.0 | 0.0 | 5.9 | 23.5 | 23.5 | 23.5 |
| Canadian waterweed | NA | NA | NA | 0.0 | 0.0 | 5.9 | 0.0 | 0.0 | 5.9 |
| Curly-leaf pondweed | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 | 5.9 |
| Brittle naiad | NA | NA | NA | 0.0 | 0.0 | 0.0 | 5.9 | 0.0 | 11.8 |
| | Species Frequency of Occurrence - 10 to 15 ft | | | | | | | | |
| Chara | NA | NA | NA | 0.0 | 0.0 | 10.0 | 0.0 | 0.0 | 20.0 |
| Coontail | NA | NA | NA | 0.0 | 0.0 | 30.0 | 50.0 | 50.0 | 10.0 |
| Brittle naiad | NA | NA | NA | 0.0 | 0.0 | 10.0 | 0.0 | 0.0 | 10.0 |
| Slender naiad | NA | NA | NA | 0.0 | 0.0 | 10.0 | 0.0 | 10.0 | 0.0 |
| Small pondweed | NA | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 |
| Large-leaved pondweed | NA | NA | NA | 0.0 | 0.0 | 10.0 | 10.0 | 0.0 | 0.0 |
| Small pondweed | NA | NA | NA | 0.0 | 0.0 | 10.0 | 0.0 | 10.0 | 0.0 |

## Water Clarity and Water Quality

Table 6 summarizes the Secchi readings taken in each tier II survey on Center Lake since 2005. Water clarity can fluctuate greatly based on weather, rain events, and algal blooms. Water clarity was greater in 2016 than in had been in the past 10 years.

**Table 6: Center Lake Secchi History**

| **Date** | 5/11/05 | 8/2/05 | 7/31/06 | 7/25/07 | 8/26/08 | 8/7/13 | 7/25/14 | 7/23/15 | 7/19/16 |
|---|---|---|---|---|---|---|---|---|---|
| **Secchi Depth (ft.)** | 5.0 | 5.0 | 5.0 | 4.0 | 12.0 | 9.0 | 10.1 | 4.9 | 14.5 |

During the summer 2016 tier II survey, Aquatic Weed Control collected data to construct dissolved oxygen and temperature profiles for Center Lake. These profiles are described in Figure 5 and Figure 6. At the time of the tier II survey, Center Lake had adequate oxygen to support fish down to about 20 feet. Temperature or thermal stratification was present at the time of the survey, with a thermocline starting at a depth of 10 feet. Surface temperature on the survey date was 79.8 degrees. The water temperature dropped to 48.9 at a depth of 30 feet.

**Figure 5: Center Lake 2016 Dissolved Oxygen Profile**

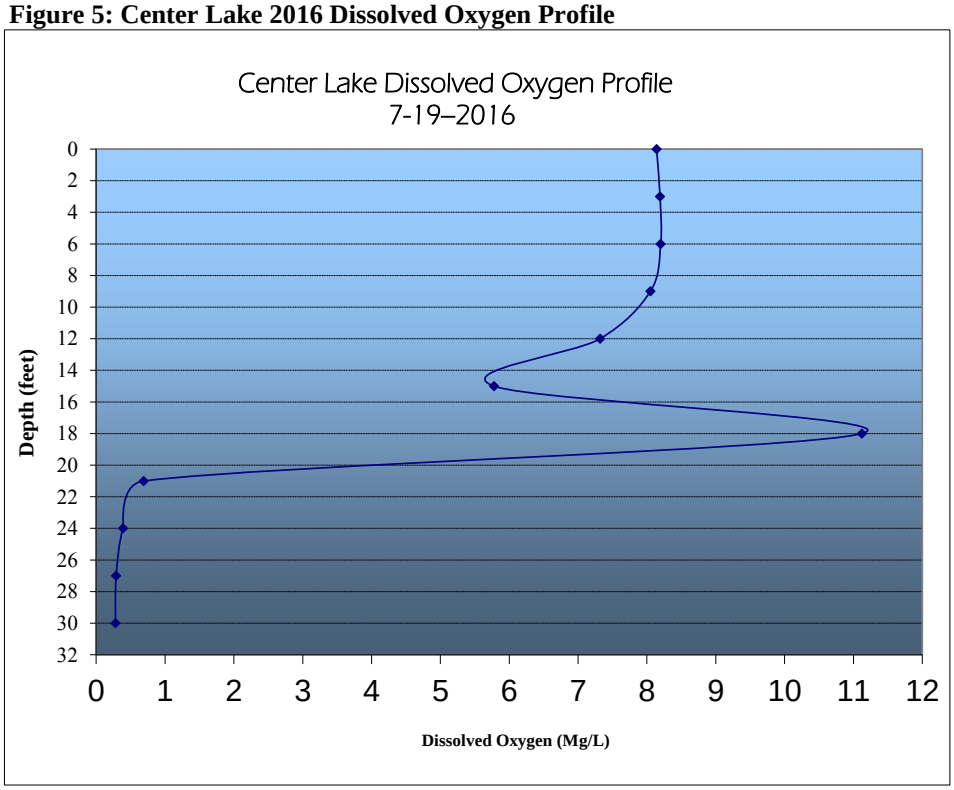
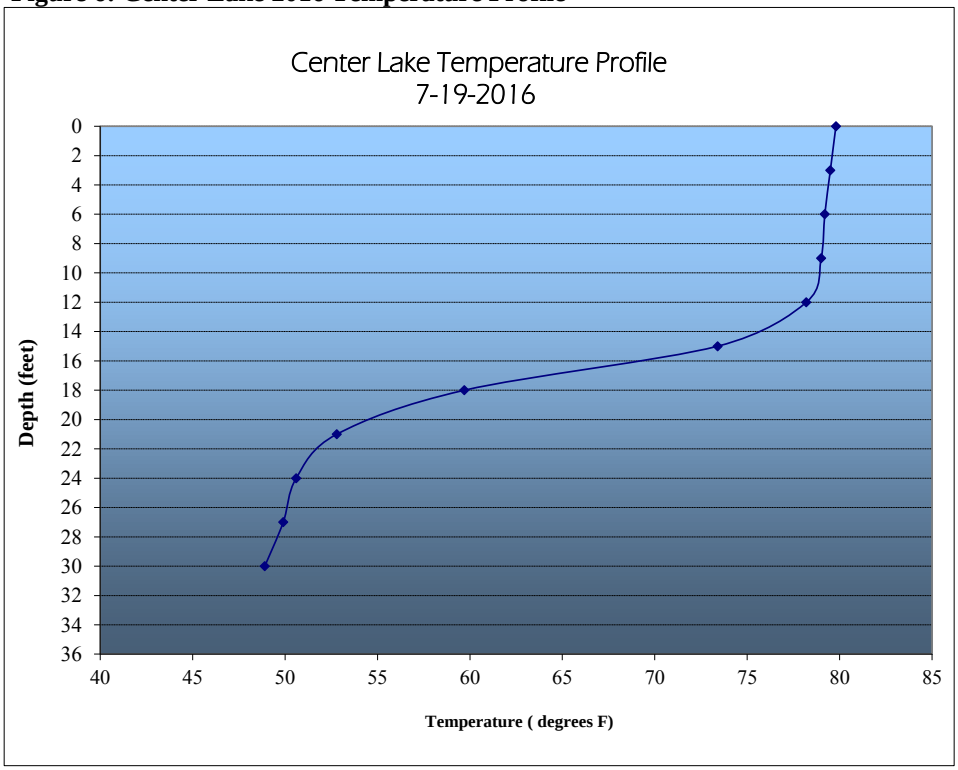



**Figure 6: Center Lake 2016 Temperature Profile**



**Tier II Discussion**

The plant community of Center Lake remains stable, with 10 native plant species found in the 2016 tier II survey with a native diversity of 0.84. There were 3 exotic plant species found in Center Lake in 2016. These species were Eurasian watermilfoil, curly-leaf pondweed, and brittle naiad. Only Eurasian watermilfoil (EWM) seems to be causing lake use problems in Center Lake although the other two species should continue to be monitored.

Summer EWM frequency in Center Lake after treatment has historically been low. In the 2016 post-treatment survey, EWM was not found or observed. This is also similar compared to 2015 when EWM frequency was just 2.0 percent (1 site). It would appear that the current EWM control strategy is effective in significantly reducing EWM abundance on an annual basis and may be contributing to a more long term reduction in EWM in the north end of the lake over the last few years.

The native plant data collected in 2016 met each of the target objectives outlined in the objectives section of this report. While these objectives may not be the only measure of plant management success, it seems a good indication that the current management strategy is on target. This strategy should provide increased utility of the lake by reducing EWM abundance, while maintaining a healthy native plant community.

**Action Plan**

In 2017 all areas of EWM infestation in Center Lake should be treated with liquid DMA-4 herbicide at a rate of 2 parts per million. Total main lake EWM acreage on Center Lake has varied between 28 to 45 acres. It is recommended that funding be set aside to treat up to 45 acres of EWM in 2017. In the past few years this EWM treatment has taken place in the last week of May or first week of June and it is recommended that this same treatment timing continue.

**Surveys and Planning**

A viusal survey should be sufficient in spring of 2017 to verify EWM locations prior to any herbicide treatments. A summer (post-treatment) tier II survey should be used to monitor both EWM and native plant populations.

**2016 Budget**

| | |
|---|---|
| Treat up to 45 acres of EWM with liquid 2, 4-D at 2 ppm (up to 6 ft avg depth) | $ 15,750 |
| Spring visual survey, summer Tier II survey and plan update | $ 5,000 |
| Total cost estimate | $ 20,750 |
| LARE share (80%-subject to availability) | $ 16,600 |
| Assocaitions share (20%) | $ 4,150 |

**Public Involvement**

Parties interested in the improvement of Center Lake include members of the Center Lake Conservation Association as well as others who access the lake at the IDNR owned access site or the City Park at the south end of the lake. The most common and often most effective methods for keeping the public informed about aquatic vegetation management practices are lake association meetings as well as periodical newsletters sent out by the association. It is recommended that association members encourage neighbors and other lake users to attend lake association meetings so that interested parties are well informed about the LARE program. Making sure that meetings are well advertised and planned well in advance of the meeting dates are ways to help ensure good attendance. Carry-in dinners, door prizes, contests, guest speakers, and discussion panels are all excellent ways to boost attendance, encourage involvement, and keep association members informed about lake management activities.

The Center Lake Conservation Association held a public meeting on September 26, 2016 to discuss issues related to the LARE program. Jim Donahoe of Aquatic Weed Control attended this meeting to summarize LARE activities on the lake. There are relatively few homes on Center Lake and there were 5 people in attendance at the meeting. The responses to the public survey are summarized in Figure 7. Residents were in favor of continuing EWM control.

**Figure 7: Center Lake 2016 Public Questionnaire**

Lake Use Survey Lake name Center Lake

Are you a lake property owner? Yes 5 No 0

Are you currently a member of your lake association? Yes 5 No 0

How many years have you been at the lake? 2 or less 0
2 – 5 years 0
5-10 years 1
Over 10 years 4

How do you use the lake (mark all that apply)

| | |
|---|---|
| 4 Swimming | 5 Irrigation |
| 4 Boating | 0 Drinking water |
| 4 Fishing | 1 Other wildlife |

Do you have aquatic plants at your shoreline in nuisance quantities? Yes 4 No 1

Do you currently participate in a weed control project on the lake? Yes 5 No 0

Does aquatic vegetation interfere with your use or enjoyment of the lake? Yes 2 No 3

Does the level of vegetation in the lake affect your property values? Yes 4 No 0

Are you in favor of continuing efforts to control vegetation on the lake? Yes 5 No 0

Are you aware that the LARE funds will only apply to work controlling invasive exotic species, and more work may need to be privately funded? Yes 5 No 0

Mark any of these you think are problems on your lake:

___ Too many boats access the lake
___ Use of jet skis on the lake
___ Too much fishing
___ Fish population problem
___ Dredging needed
___ Overuse by nonresidents
4 Too many aquatic plants
___ Not enough aquatic plants
___ Poor water quality
___ Pier/funneling problem

Please add any comments:
A lot of lilly pads are developing in channel mouth of lake.
Weed treatment has been effective! It needs to be continued.
I believe we have an invasive fish problem-snakeheads.

**References Cited**

IDNR, 2014. Tier II Aquatic Vegetation Survey Protocol. IN Department of Natural Resources. Indianapolis, Indiana.

**Appendix**

Common and scientific plant names found in this report

| Common Name | Scientific Name |
|---|---|
| American pondweed | *Potamogeton nodosus* |
| Bladderwort | *Utricularia sp.* |
| Brittle naiad | *Najas minor* |
| Chara | *Chara sp.* |
| Coontail | *Ceratophyllum demersum* |
| Curly-leaf pondweed | *Potamogeton crispus* |
| Eelgrass | *Vallisneria americana* |
| Canadian waterweed | *Elodea canadensis* |
| Eurasian watermilfoil | *Myriophyllum spicatum* |
| Flat -stemmed pondweed | *Potamogeton zosteriformis* |
| Illinois pondweed | *Potamogeton illinoensis* |
| Large-leaved pondweed | *Potamogeton amplifolius* |
| Richardson's pondweed | *Potamogeton richardsonii* |
| Sago pondweed | *Potamogeton pectinatus* |
| Slender naiad | *Najas flexilis* |
| Small pondweed | *Potamogeton pusillus* |
| Variable pondweed | *Potamogeton gramineus* |
| Water stargrass | *Heteranthera dubia* |

# Data Sheet and GPS Coordinates

| Center Lake | | 19-Jul-16 | secchi 14.5 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Latitude | Longitude | depth | Site | algae | Eurasian watermilfoil | Curly-leaf pondweed | Brittle naiad | Sago pondweed | Coontail | Chara | Large-leaved pondweed | Slender naiad | Small pondweed | Illinois pondweed | Water stargrass | Richardson's pondweed | Canada waterweed |
| 41.24227 | -85.857 | 4 | 1 | | | | | 3 | 3 | | 1 | | 1 | | 1 | | |
| 41.24274 | -85.8583 | 9 | 2 | | | | | | | | | | | | | | |
| 41.24363 | -85.8592 | 3 | 3 | | | | | | | 1 | 3 | | | 1 | | | |
| 41.24406 | -85.8595 | 13 | 4 | | | | | | | | | | | | | | |
| 41.2444 | -85.8603 | 5 | 5 | | | | | 1 | | 5 | | 1 | 3 | | | | |
| 41.24512 | -85.8605 | 13 | 6 | | | | | | | | | | | | | | |
| 41.24522 | -85.8608 | 10 | 7 | | | | | | 1 | | | | 1 | | | | |
| 41.24556 | -85.8613 | 6 | 8 | p | | | | | 3 | | | | 1 | | | | |
| 41.2459 | -85.8616 | 4.5 | 9 | p | | | | | 1 | | | | | | | | |
| 41.2462 | -85.861 | 6 | 10 | | | | | | 3 | 5 | | | | | | | |
| 41.24637 | -85.8602 | 15 | 11 | | | | | | | | | | | | | | |
| 41.24697 | -85.86 | 3 | 12 | | | | | | | 3 | | 3 | | | | | |
| 41.24719 | -85.8591 | 6 | 13 | | | | | 1 | | 1 | 3 | | 1 | | | | |
| 41.24756 | -85.8588 | 12 | 14 | | | | | | | 1 | | | | | | | |
| 41.24795 | -85.8587 | 4 | 15 | | | | | | | 5 | | | | 3 | | | |
| 41.2483 | -85.8583 | 5.5 | 16 | | | | | 3 | 3 | | | | 1 | | | | |
| 41.24855 | -85.8582 | 4.5 | 17 | | | | | 1 | | 5 | | | 1 | | | | |
| 41.24879 | -85.8576 | 9.5 | 18 | | | | | | 3 | 5 | | | 1 | | | | |
| 41.24884 | -85.8568 | 12 | 19 | | | | 1 | | | 1 | | | 1 | | | | |
| 41.24893 | -85.8563 | 9 | 20 | | | | 1 | 3 | 1 | 5 | | | | | | | |
| 41.24933 | -85.8575 | 5 | 21 | | | | 1 | | | 5 | | | | | | | |
| 41.24998 | -85.8576 | 4 | 22 | | | | | | | 3 | 3 | 1 | | | | | |
| 41.24979 | -85.8566 | 4 | 23 | | | | | | | 5 | | 1 | | | | | |
| 41.25035 | -85.8561 | 4 | 24 | | | | | | | 5 | | | | | | | |
| 41.25135 | -85.8561 | 3 | 25 | | | | | | | 5 | | | | | | | |
| 41.25032 | -85.8546 | 3.5 | 26 | | | | | | | 5 | | | | | | | |
| 41.25 | -85.8551 | 4.5 | 27 | p | | | | | | 3 | | | | | | | |
| 41.24967 | -85.8543 | 4 | 28 | | | | | | | 3 | 1 | 1 | 1 | | | | |
| 41.2494 | -85.8549 | 5.5 | 29 | | | | | 3 | 3 | 3 | | | 1 | | | | |
| 41.2487 | -85.8557 | 13 | 30 | | | | | | | | | | | | | | |
| 41.24857 | -85.8551 | 9 | 31 | | | | 1 | | | 3 | | | | | | | |
| 41.2485 | -85.8543 | 5 | 32 | | | | | | | 5 | | | 3 | | | | |
| 41.24808 | -85.8545 | 6.5 | 33 | | | | | 1 | 5 | | | | 1 | | | | |
| 41.24786 | -85.8547 | 11.5 | 34 | | | | | | 3 | | | | | | | | |
| 41.24751 | -85.8538 | 3.5 | 35 | | | | 1 | | | 1 | 3 | 1 | | | | 3 | |
| 41.24697 | -85.854 | 6 | 36 | | | | | | 5 | | 3 | | 3 | 1 | | | 1 |
| 41.24641 | -85.8535 | 3 | 37 | | | | | 1 | | | | | | | | | |
| 41.24608 | -85.8533 | 14 | 38 | | | | | | | | | | | | | | |
| 41.24571 | -85.8534 | 8 | 39 | | | | | | 3 | 1 | 3 | | | | | | |
| 41.24512 | -85.8532 | 4.5 | 40 | | | | | 3 | 5 | | 1 | | 1 | 1 | | 3 | |
| 41.24477 | -85.8534 | 11 | 41 | | | | | | | | | | | | | | |
| 41.24431 | -85.8536 | 9 | 42 | | | | | 3 | 3 | | | | | | | | |
| 41.24384 | -85.8539 | 4.5 | 43 | | | | | | 5 | | 3 | 3 | | | | | |
| 41.2438 | -85.8542 | 6 | 44 | | | 1 | | | 5 | | | | | | | | |
| 41.24332 | -85.8551 | 6 | 45 | | | | | | 1 | | 5 | | | | | | |
| 41.24277 | -85.8561 | 2 | 46 | | | | 1 | | | | 5 | | | | | 1 | |
| 41.24281 | -85.8564 | 14 | 47 | | | | | | | | | | | | | | |
| 41.24262 | -85.8566 | 9 | 48 | | | | | | 5 | | | | | | | | |
| 41.24412 | -85.86 | 3 | 49 | | | | | | | 3 | | 1 | | | | | |
| 41.24804 | -85.8539 | 4.5 | 50 | | | | 1 | | | 3 | 3 | | 3 | | | | |

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**Center Lake LARE Permit**

Page 1 of ____

## APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT

State Form 26727 (R5 / 9-13)
Approved by State Board of Accounts, 2013

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
ATTN: COMMERCIAL LICENSE CLERK
402 W. Washington Street, Rm W273
Indianapolis, IN 46204
Telephone Number: (317) 232-4102
Fax Number: (317) 232-8150

**FEE $5.00**

Check type of permit: ☐ Whole Lake ☒ Multiple Treatment Areas

*INSTRUCTIONS:* 1. *Please print or type information.*
2. *Applicant must sign the application and is the only signature required. If applicant is also the certified chemical applicator that will be performing the treatment(s), he/she will also sign as the Certified Applicator.*

| Applicant Name | Lake Association Name | |
|---|---|---|
| Center Lake Association | Center Lake Conservation Association | |
| Street or Rural Route | | Telephone Number |
| City and State | | ZIP Code |
| Certified Applicator Name | Company or Corporation Name | Certification Number |
| Street or Rural Route | | Telephone Number |
| City and State | | ZIP Code |
| Water Body Name (One application per water body) | Nearest Town | County |
| Center Lake | Warsaw | Kosciusko County |
| Is the body of water a water supply or does it flow into a water supply? | ☐ Yes | ☒ No |

**Please complete one section for *EACH* treatment area. Attach lake map showing treatment area and denote location of any water supply intake.**

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 1 | on map | 1.42 | 597 | 150 |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: | | | | |
|---|---|---|---|---|---|---|
| 6 | early June | ☒ Chemical | ☐ Physical | ☐ Biological Control | ☐ Mechanical | |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: ☐ Rake ☒ Visual ☐ Other (*specify*) _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ✓ | 30 | | | |
| Chara | | 30 | | | |
| Sago Pondweed | | 20 | | | |
| Coontail | | 20 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Aquatic Weed Control

Page 2 of ____

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 2 | on map | 2.27 | 639 | 175 |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: |
|---|---|---|
| 6 | Early June | ■ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: ☐ Rake ■ Visual ☐ Other (*specify*) _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ✓ | 30 | | | |
| Chara | | 30 | | | |
| Sago Pondweed | | 20 | | | |
| Coontail | | 20 | | | |
| | | | | | |

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 3a and b | on map | 31.06 | bay | bay |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: |
|---|---|---|
| 7 | May | ■ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: ☐ Rake ■ Visual ☐ Other (*specify*) _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ✓ | 30 | | | |
| Chara | | 30 | | | |
| Sago pondweed | | 20 | | | |
| Coontail | | 20 | | | |
| | | | | | |

**AGREEMENT**

I have read and understand the Indiana Aquatic Vegetation Control Permit Laws and agree to abide by them. Under the penalties of perjury (IC 35-44-2-1), I affirm the information supplied by me is true and correct to the best of my knowledge.

Signature of Applicant _____ Date (*month, day, year*) _____

Signature of Certified Applicator _____ Date (*month, day, year*) _____

**Make check or money order payable to DNR - Division of Fish and Wildlife in the amount of $5.00**
**Return completed application with the $5.00 permit fee to the address shown on page 1.**

**OFFICE USE ONLY**

| Permit Number | Check Number | Other |
|---|---|---|
| | | |

☐ Denied ☐ Approved ☐ Approved w/Conditions | Fisheries Section Approval

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 4 | on map | 1.5 | channel | channel |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: ☑ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical |
|---|---|---|
| 6 | early june | |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2,4-D

Plant survey method: ☐ Rake ☑ Visual ☐ Other *(specify)* _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ☑ | 30 | | ☐ | |
| Chara | ☑ | 30 | | ☐ | |
| Sago Pondweed | ☑ | 20 | | ☐ | |
| Coontail | ☑ | 20 | | ☐ | |
| | ☐ | | | ☐ | |

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 5 | on map | 3.56 | channel | channel |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: ☑ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical |
|---|---|---|
| 6 | early june | |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2,4-D

Plant survey method: ☐ Rake ☑ Visual ☐ Other *(specify)* _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ☑ | 30 | | ☐ | |
| Chara | ☑ | 30 | | ☐ | |
| Sago Pondweed | ☑ | 20 | | ☐ | |
| Coontail | ☑ | 20 | | ☐ | |
| | ☐ | | | ☐ | |

| Treatment area number: | Latitude / Longitude or Universal Transverse Mercator (UTM): | Total acres to be controlled: | Proposed shoreline treatment length (ft): | Perpendicular distance from shoreline (ft): |
|---|---|---|---|---|
| 6 | on map | 5.5 | 1509 | 336 |

| Maximum depth of treatment (ft): | Expected date(s) of treatment(s): | Treatment method: ☑ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical |
|---|---|---|
| 6 | early june | |

Based on treatment method, describe chemical to be used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2,4-D

Plant survey method: ☐ Rake ☑ Visual ☐ Other *(specify)* _____

| Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community | Aquatic Plant Name | Check if Target Species | % Relative Abundance of Community |
|---|---|---|---|---|---|
| Eurasian watermilfoil | ☑ | 30 | | ☐ | |
| Chara | ☑ | 30 | | ☐ | |
| Sago Pondweed | ☑ | 20 | | ☐ | |
| Coontail | ☑ | 20 | | ☐ | |
| | ☐ | | | ☐ | |

**Center Lake 2017 Permit Map**

The red and blue areas marked on this map are potential treatment areas for 2017. A spring visual survey will be used to map actual EWM abundance in 2017. A map will be submitted to the IDNR for approval prior to any treatment.