

Aquatic Vegetation Management Plan Update 2012
Beaver Dam and Loon Lakes, Kosciusko County, Indiana



Prepared for:

The Beaver Dam and Loon Lake Conservation Club
7283 W. Raccoon Lane
Claypool, Indiana 46510

December 1, 2012

Prepared by:

Aquatic Weed Control
P. O. Box 325
Syracuse, IN 46567

Table of Contents

Executive Summary	3
Problem Statement	4
Aquatic Vegetation Management History	4
2012 Vegetation Treatments	4
Tier II Survey Results	6
Discussion	12
Action Plan.....	12
Public Involvement	14
15.0 References Cited	16
Appendix.....	17
Data Sheets and GPS Coordinates	18

List of Tables

Table 1: Beaver Dam and Loon Lakes Treatment History	4
Table 2: Beaver Dam and Loon Lakes 2012 EWM Treatments.....	4
Table 3: Beaver Dam Lake Tier II Data Analysis	8
Table 4: Loon Lake 2012 Tier II Data Analysis	9
Table 5: Beaver Dam Lake Multi-Year Data Presentation.....	10
Table 6: Loon Lake Multi-Year Data Presentation.....	11
Table 7: 2013 Potential Treatment Areas	13

List of Figures

Figure 1: Beaver Dam and Loon Lakes 2012 EWM Beds	5
Figure 2: Beaver Dam and Loon Lakes Tier II Sample Sites	6
Figure 3: Beaver Dam and Loon Lakes EWM Locations 8-28-2012.....	7
Figure 4: Beaver Dam and Loon Lakes - Lake Use Survey	15

Executive Summary

Beaver Dam Lake and Loon Lake are located in southwest Kosciusko County, Indiana. Beaver Dam Lake has 146 surface acres with a maximum depth of 61 feet and an average depth of 15.6 feet. Its hydraulic retention time is approximately 1.4 years. Loon Lake has 43 surface acres with a maximum depth of 40 feet and an average depth of 16.7 feet. Its hydraulic retention time is 4 months (J.F.New, 2009). Eurasian watermilfoil (*Myriophyllum spicatum*) is abundant in nuisance quantities in many areas of both lakes with depths less than 6 feet. The following report summarizes Eurasian watermilfoil (EWM) control practices implemented on Beaver Dam Lake and Loon Lake through the Lake and River Enhancement Program (LARE).

In 2007, J.F. New Inc. surveyed Beaver Dam and Loon Lake as part of the Yellow Creek Lakes Watershed Diagnostic Study. Recommendations were made to treat areas of EWM infestation in Beaver Dam Lake. No specific measurable objectives were outlined in the original plan, but the following objectives are being recommended to define management success for these lakes in the future.

1. Limit the frequency of occurrence of Eurasian watermilfoil based on summer tier II sampling to ten percent or less in both lakes.
2. Maintain a minimum of 5 native species collected each year in tier II surveys in both lakes.

In 2005, 35 acres on Beaver Dam Lake were treated for control of EWM using Renovate Herbicide. Since then, spot treatments for EWM have taken place each year. These treatments range from 2 acres in 2008 to 23.76 acres in 2012.

A visual survey took place on May 24, 2012 to map EWM beds. This map was the basis for the EWM spot treatments. On June 12, 2012, 23.76 acres of EWM were treated on Beaver Dam Lake. On this same day, 3.47 acres in Loon Lake were treated for EWM. These areas were treated with DMA-4 herbicide at 2 parts per million. Average depth of treatment areas was estimated to be 3 feet.

A tier II survey was conducted on August 28, 2012 (post-treatment) to monitor both EWM and native plant populations. The survey found that EWM frequency in Beaver Dam Lake was 4.0 percent. Loon Lake EWM frequency in Loon Lake was 43.3 percent. Species diversity in Beaver Dam Lake was 0.71 and species diversity in Loon Lake was 0, as EWM was the only species collected in the lake.

For 2013, it is recommended that the entire acreage (up to 45.51 acres) of EWM infestation be treated with DMA-4 herbicide at a concentration of 2 ppm. While selectively treating EWM is not likely to eradicate EWM from Beaver Dam Lake and Loon Lake, it may help native plants compete with it, and also provide seasonal recreational improvement in areas that are infested with EWM. In addition to the treatment, a summer tier II survey should be performed on Beaver Dam Lake and Loon Lake. The cost of all proposed management activities in 2013 is estimated to be \$ 17,653.

Problem Statement

Eurasian watermilfoil (EWM) is impacting the use of Beaver Dam Lake and Loon Lake in many areas. The EWM forms dense mats in shallow areas, which can inhibit fishing, swimming, and boating. Dense milfoil beds may also prevent the growth of beneficial native species which often provide less recreational interference and more desirable fish habitat.

Objectives:

The following specific, quantifiable objectives are recommended to evaluate the success of EWM management activities at Beaver Dam and Loon Lakes:

1. Limit the frequency of occurrence of Eurasian watermilfoil based on summer tier II sampling to ten percent or less in both lakes.
2. Maintain a minimum of 5 native species collected each year in Beaver Dam Lake.

Treating EWM is not likely to eradicate it from Beaver Dam Lake and Loon 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.

Aquatic Vegetation Management History

Table 1 summarizes the treatment history of EWM at Beaver Dam Lake from 2004 to the present. EWM treatments have been common on Beaver Dam Lake although treatments on Loon Lake have not been common.

Table 1: Beaver Dam and Loon Lakes Treatment History

Year	Target species	Month	Acres	Herbicide	Rate
2004	EWM,CLP	June 2	35	Aquathol K	NA
2005*	EWM,CLP	June 9	35	Renovate	NA
2007	EWM	October	4 ac	Aquathol K	2 ppm
2008	EWM	July 18	2 ac	DMA-4	2ppm
2009	EWM	June 25	16 ac	DMA-4	2ppm
2010	EWM	August 1	2.75 ac	DMA-4	2ppm
2011	EWM	June 13	3.8 ac	DMA-4	2ppm
2012*	EWM	June 12	23.76 ac	DMA-4	2ppm
2012*	EWM (Loon)	June 12	3.47 ac	DMA-4	2ppm

*LARE Funded

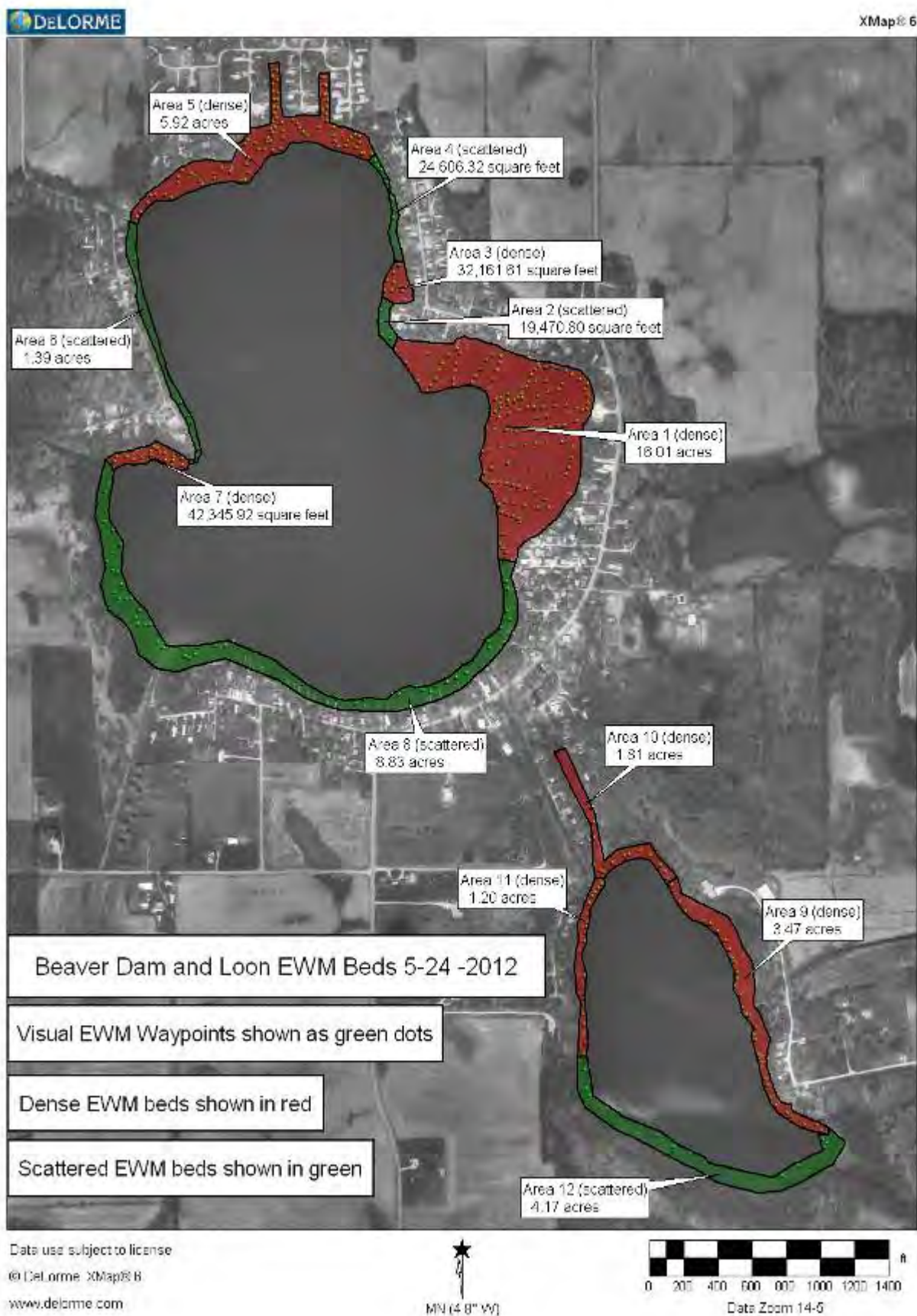
2012 Vegetation Treatments

A visual survey on May 24, 2012 used GPS coordinates to mark the locations of all EWM beds in Beaver Dam Lake and Loon Lake. Treatment areas were then chosen. More detailed information about acreage, depth, volume, and herbicide concentrations for each bed are found in Table 2. The areas in this table correspond to the labeled EWM areas in Figure 1.

Table 2: Beaver Dam and Loon Lakes 2012 EWM Treatments

Area	Acres	Avg Depth	Acre-feet	Gallons DMA-4
1	16.01	3 feet	48.03	67.24
3	0.73	3 feet	2.19	3.07
5	5.92	3 feet	17.76	24.86
7	0.97	3 feet	2.91	4.07
9 (Loon)	3.47	3 feet	10.41	14.57
Total	27.1	3	81.3	113.81

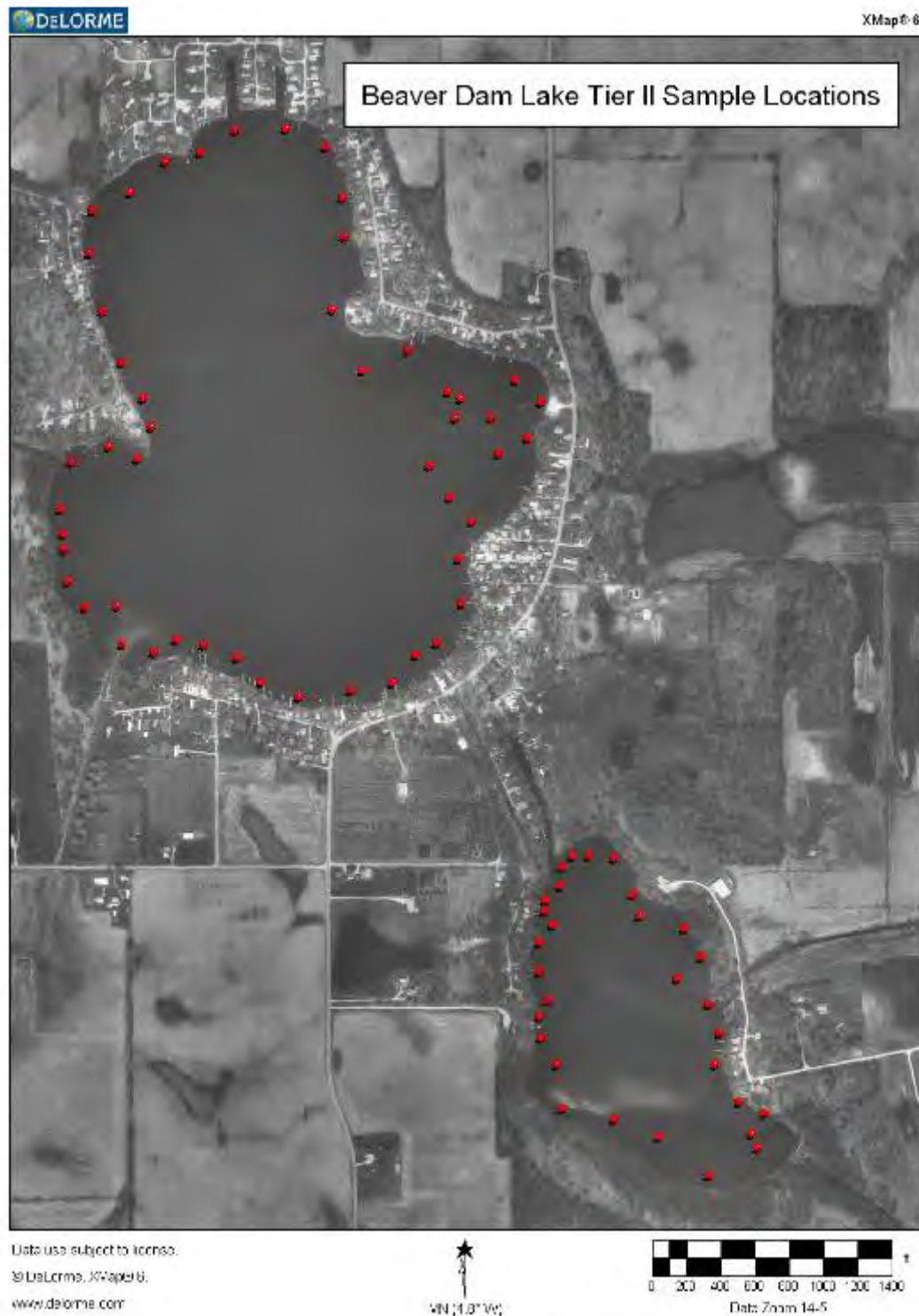
Figure 1: Beaver Dam and Loon Lakes 2012 EWM Beds



Tier II Survey Results

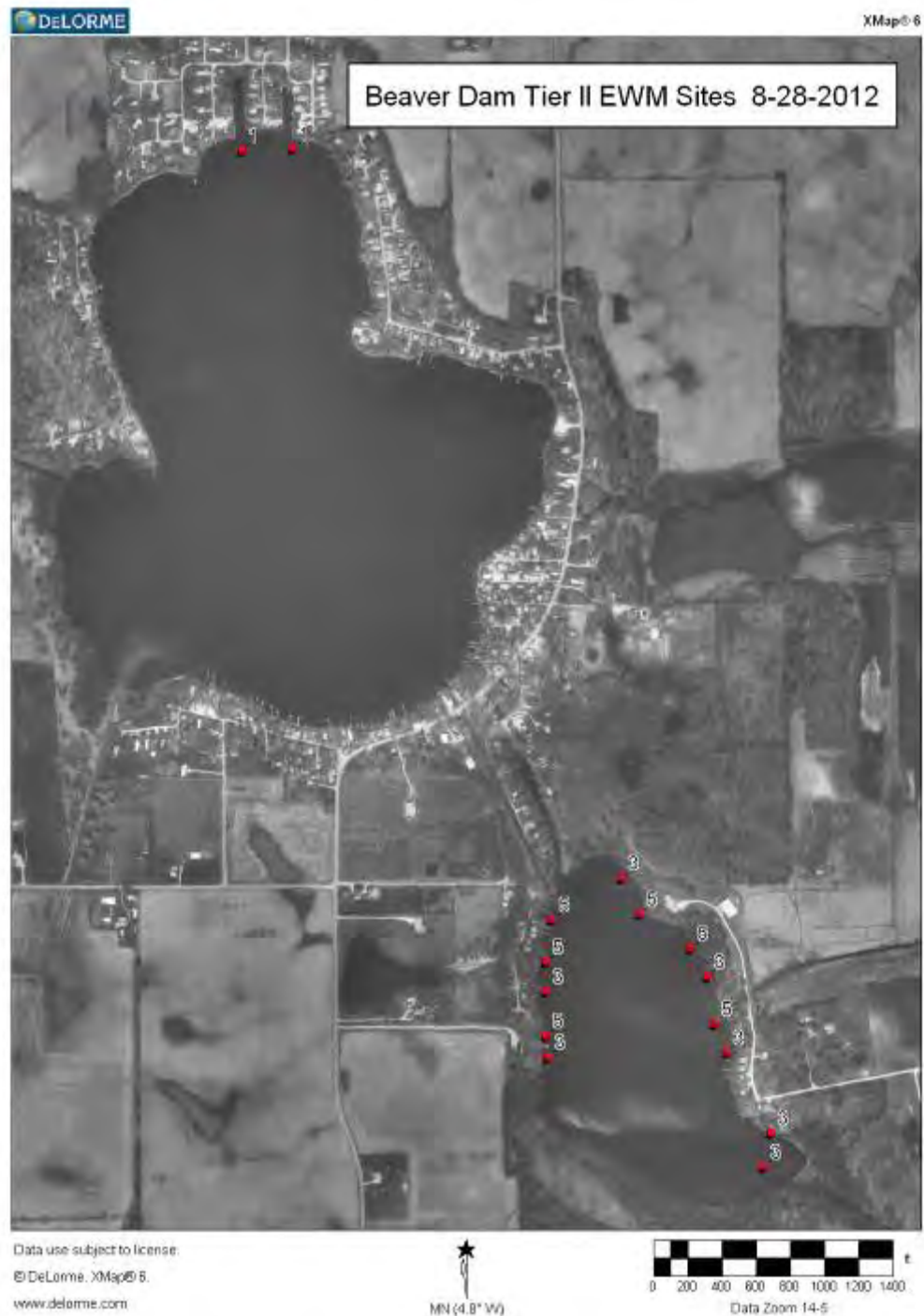
Aquatic plant sampling methods used for surveys on Beaver Dam Lake and Loon Lake are outlined in the Tier II Aquatic Vegetation Survey Protocol (IDNR 2010). Previous sampling locations for surveys in 2005 and 2007 were not used. The sample sites established in 2012 will continue to be used in future years to provide consistency in data. Common and scientific names for aquatic plants are consistent with those listed in the original Yellow Creek Lakes Watershed Diagnostic Study. Fifty sample sites are spaced throughout Beaver Dam Lake and 30 sites are distributed in Loon Lake. These sites are described in Figure 2.

Figure 2: Beaver Dam and Loon Lakes Tier II Sample Sites



In the summer 2012 tier II survey, Eurasian watermilfoil was found at 2 of the 50 sample sites for a site frequency of 4.0 percent in Beaver Dam Lake. EWM frequency was much higher in Loon Lake at 43.3 percent. These sites are labeled in Figure 3 along with the EWM rake-score at each site. No other invasive species were found in these surveys.

Figure 3: Beaver Dam and Loon Lakes EWM Locations 8-28-2012



Results from the August 28, 2012 tier II survey on Beaver Dam 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 no plants were found deeper than 8 feet. Instead of ten sample locations between 5 and 10 feet of depth, 11 were taken as the number of these sites was under-counted by one in the field.

Table 3: Beaver Dam Lake Tier II Data Analysis

Occurrence and Abundance of Submersed Aquatic Plants - Overall								
Lake:	Beaver Dam Lake	Secchi(ft):	11.0	SE Mean species / site:				0.10
Date:	8/28/2012	Littoral sites with plants:	26	Mean natives / site:				0.58
Littoral Depth (ft):	8.0	Number of species:	6	SE Mean natives / site:				0.09
Littoral Sites:	50	Maximum species / site:	3	Species diversity:				0.71
Total Sites:	50	Mean species / site:	0.62	Native diversity:				0.68
Species	Frequency of Occurrence	Score Frequency	0	1	3	5	Dominance	
Coontail	24.0	76.0	0.0	10.0	14.0	20.0		
Sago Pondweed	20.0	80.0	6.0	14.0	0.0	9.6		
Illinois Pondweed	10.0	90.0	4.0	6.0	0.0	4.4		
Eurasian milfoil	4.0	96.0	4.0	0.0	0.0	0.8		
Eelgrass	2.0	98.0	2.0	0.0	0.0	0.4		
Small Pondweed	2.0	98.0	2.0	0.0	0.0	0.4		
Filamentous Algae	28.0							
Occurrence and Abundance of Submersed Aquatic Plants - 0 to 5 ft.								
Lake:	Beaver Dam Lake	Secchi(ft):	11.0	SE Mean species / site:				0.12
Date:	8/28/2012	Littoral sites with plants:	23	Mean natives / site:				0.67
Littoral Depth (ft):	8.0	Number of species:	6	SE Mean natives / site:				0.11
Littoral Sites:	39	Maximum species / site:	3	Species diversity:				0.73
Total Sites:	39	Mean species / site:	0.72	Native diversity:				0.69
Species	Frequency of Occurrence	Score Frequency	0	1	3	5	Dominance	
Coontail	25.6	74.4	0.0	10.3	15.4	21.5		
Sago Pondweed	23.1	76.9	7.7	15.4	0.0	10.8		
Illinois Pondweed	12.8	87.2	5.1	7.7	0.0	5.6		
Eurasian milfoil	5.1	94.9	5.1	0.0	0.0	1.0		
Eelgrass	2.6	97.4	2.6	0.0	0.0	0.5		
Small Pondweed	2.6	97.4	2.6	0.0	0.0	0.5		
Filamentous Algae	28.2							
Other species noted:								
Occurrence and Abundance of Submersed Aquatic Plants - 5 to 10 ft.								
Lake:	Beaver Dam Lake	Secchi(ft):	11.0	SE Mean species / site:				0.14
Date:	8/28/2012	Littoral sites with plants:	3	Mean natives / site:				0.27
Littoral Depth (ft):	8.0	Number of species:	2	SE Mean natives / site:				0.14
Littoral Sites:	6	Maximum species / site:	1	Species diversity:				0.44
Total Sites:	11	Mean species / site:	0.27	Native diversity:				0.44
Species	Frequency of Occurrence	Score Frequency	0	1	3	5	Dominance	
Coontail	18.2	81.8	0.0	9.1	9.1	14.5		
Sago Pondweed	9.1	90.9	0.0	9.1	0.0	5.5		
Filamentous Algae	27.3							

Results from the August 28, 2012 tier II survey on Loon Lake are summarized in Table 4. 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, no plants were found deeper than 8 feet. No other species besides EWM were collected in Loon Lake in 2012.

Table 4: Loon Lake 2012 Tier II Data Analysis

Occurrence and Abundance of Submersed Aquatic Plants - Overall							
Lake:	Loon Lake	Secchi(ft):	6.0	SE Mean species / site:	0.09		
Date:	8/28/2012	Littoral sites with plants:	13	Mean natives / site:	0.00		
Littoral Depth (ft):	8.0	Number of species:	1	SE Mean natives / site:	0.00		
Littoral Sites:	30	Maximum species / site:	1	Species diversity:	0.00		
Total Sites:	30	Mean species / site:	0.43	Native diversity:	0.00		
		Frequency of		Score Frequency			
Species		Occurrence		0	1	3	5
Eurasian milfoil		43.3		56.7	0.0	23.3	20.0
Filamentous Algae		36.7					
Occurrence and Abundance of Submersed Aquatic Plants - 0 to 5 ft.							
Lake:	Loon Lake	Secchi(ft):	6.0	SE Mean species / site:	0.15		
Date:	8/28/2012	Littoral sites with plants:	7	Mean natives / site:	0.00		
Littoral Depth (ft):	8.0	Number of species:	1	SE Mean natives / site:	0.00		
Littoral Sites:	10	Maximum species / site:	1	Species diversity:	0.00		
Total Sites:	10	Mean species / site:	0.70	Native diversity:	0.00		
		Frequency of		Score Frequency			
Species		Occurrence		0	1	3	5
Eurasian milfoil		70.0		30.0	0.0	30.0	40.0
Filamentous Algae		50.0					
Occurrence and Abundance of Submersed Aquatic Plants - 5 to 10 ft.							
Lake:	Loon Lake	Secchi(ft):	6.0	SE Mean species / site:	0.16		
Date:	8/28/2012	Littoral sites with plants:	6	Mean natives / site:	0.00		
Littoral Depth (ft):	8.0	Number of species:	1	SE Mean natives / site:	0.00		
Littoral Sites:	9	Maximum species / site:	1	Species diversity:	0.00		
Total Sites:	10	Mean species / site:	0.60	Native diversity:	0.00		
		Frequency of		Score Frequency			
Species		Occurrence		0	1	3	5
Eurasian milfoil		60.0		40.0	0.0	40.0	20.0
Filamentous Algae		50.0					

Tier II data for all surveys conducted on Beaver Dam Lake during its involvement in the LARE program is included in Table 5.

Table 5: Beaver Dam Lake Multi-Year Data Presentation

Date:	5/23/2005	7/25/2005	8/28/2007	8/16/2012	8/28/2012
Total Sites:	60	60	50	50	50
Secchi (ft):	3.0	2.8	4.5	5.0	11.0
Number of Species:	5	3	13	5	6
Number of Native Species:	4	3	12	3	5
Species Diversity:	0.42	0.29	0.84	0.62	0.71
Native Species Diversity:	0.72	0.29	0.84	0.49	0.68
Mean Native Species/Site:	0.1	0.2	1.06	0.53	0.58
Surveying organization	IDNR	IDNR	JF New	IDNR	AWC
Species Frequency of Occurrence - All Depths					
Coontail	3.3	16.7	14.0	38.0	24.0
Sago Pondweed	0.0	0.0	32.0	8.0	20.0
Illinois Pondweed	0.0	0.0	2.0	0.0	10.0
Eurasian milfoil	30.0	0.0	2.0	6.0	4.0
Eelgrass	0.0	0.0	2.0	0.0	2.0
Small Pondweed	0.0	0.0	6.0	0.0	2.0
Chara	0.0	1.7	18.0	0.0	0.0
Southern Naiad	0.0	0.0	10.0	0.0	0.0
Longleaf Pondweed	0.0	0.0	10.0	0.0	0.0
Grassy Pondweed	0.0	0.0	4.0	0.0	0.0
Leafy Pondweed	0.0	0.0	4.0	10.0	0.0
Slender Naiad	1.7	1.7	2.0	0.0	0.0
Water Stargrass	0.0	0.0	2.0	0.0	0.0
Northern milfoil	3.3	0.0	0.0	0.0	0.0
unknown pondweed	1.7	0.0	0.0	0.0	0.0
Curlyleaf pondweed	0.0	0.0	0.0	4.0	0.0
Species Frequency of Occurrence - 0 to 5 ft					
Coontail	5.3	20.9	17.5	44.8	25.6
Sago Pondweed	0.0	0.0	40.0	13.8	23.1
Illinois Pondweed	0.0	0.0	2.5	0.0	12.8
Eurasian milfoil	44.7	0.0	2.5	10.3	5.1
Eelgrass	0.0	0.0	2.5	0.0	2.6
Small Pondweed	0.0	0.0	7.5	0.0	2.6
Southern Naiad	0.0	0.0	10.0	0.0	0.0
Longleaf Pondweed	0.0	0.0	12.5	0.0	0.0
Grassy Pondweed	0.0	0.0	5.0	0.0	0.0
Leafy Pondweed	0.0	0.0	5.0	3.4	0.0
Slender Naiad	2.6	2.3	2.5	0.0	0.0
Water Stargrass	0.0	0.0	2.5	0.0	0.0
Chara	0.0	2.3	20.0	0.0	0.0
Curly-Leaf Pondweed	0.0	0.0	0.0	6.9	0.0
Species Frequency of Occurrence - 5 to 10 ft					
Coontail	0.0	7.1	0.0	14.3	18.2
Sago Pondweed	0.0	0.0	0.0	0.0	9.1
Southern Naiad	0.0	0.0	10.0	0.0	0.0
Chara	0.0	0.0	10.0	0.0	0.0
Northern milfoil	10.0	0.0	0.0	0.0	0.0
Eurasian milfoil	5.0	0.0	0.0	0.0	0.0

Tier II data for both surveys conducted on Loon Lake during its involvement in the LARE program is included in Table 6.

Table 6: Loon Lake Multi-Year Data Presentation

Loon Lake Multi-year Data Presentation						
Date:	8/28/2007	8/28/2012				
Total Sites:	31	30.0				
Secchi (ft):	4.5	6.0				
Number of Species:	6	1				
Number of Native Species:	5	0				
Species Diversity;:	0.42	0.0				
Native Species Diversity:	0.32	0.0				
Mean Native Species/Site:	0.71	0.0				
Surveying organization	JF New	AWC				
Species Frequency of Occurrence - All Depths						
Eurasian milfoil	6.45	43.3				
Coontail	58.1	0.0				
Small Pondweed	3.2	0.0				
Southern Naiad	3.2	0.0				
Northern watermilfoil	3.2	0.0				
Chara	3.2	0.0				
Species Frequency of Occurrence - 0 to 5 ft						
Eurasian milfoil	14.3	70.0				
Coontail	92.9	0.0				
Small Pondweed	7.1	0.0				
Southern Naiad	7.1	0.0				
Northern watermilfoil	7.1	0.0				
Chara	7.1	0.0				
Species Frequency of Occurrence - 5 to 10 ft						
Eurasian milfoil	14.3	60.0				
Coontail	38.5	0.0				

Discussion

Summer EWM frequency in Beaver Dam Lake has remained relatively stable in past surveys although no spring surveys have taken place since 2005. Spring surveys may give a more accurate picture of EWM abundance. In Beaver Dam Lake EWM was found at one sample site in 2007 and at 2 sample sites in 2012. However, EWM frequency in Loon Lake has risen drastically from 6.5 percent in 2007 to 43.3 percent in 2012. Native plant species in Loon Lake are also a concern. Five native plant species were found in 2007, while native plants were not collected at all in the 2012 tier II survey. Species diversity is low in both lakes when compared to other Northern Indiana lakes (Pearson 2004). Water clarity could be a limiting factor that inhibits growth vegetation. Increased water clarity 2012 likely helped EWM in both lakes to re-grow in late summer. Management practices chosen on these lakes should be geared toward helping native plants compete with EWM, as well as increasing use of the lake in severely infested areas. Meeting the management objectives outlined in this plan should provide reasonable access for lake users while seasonally controlling the exotic EWM population.

Changes over Time

Surveys by both AWC and the IDNR have yielded fairly consistent results in the past with 3 to 6 species being found in each survey since 2005. A survey conducted by J.F. New in 2007 yielded quite different results with 13 species being collected. Differences in this survey result could be due to surveying organization or above average plant diversity in 2007. Coontail is consistently the most abundant plant in summer surveys on Beaver Dam Lake, with other natives being collected in low abundances each year.

Loon Lake EWM is thought to have increased in recent years. In 2012, EWM was the only plant collected in Loon Lake. This is concerning as 5 native plant species were collected in 2007. It is unclear if EWM treatments in Loon Lake will provide any benefit to a native plant population as natives are very scarce. However, EWM treatments may increase utility of the lake.

Action Plan

Areas of EWM infestation in Beaver Dam Lake and Loon Lake should be treated with liquid DMA-4 herbicide at a rate of 2 parts per million. Total EWM acreage between Beaver Dam Lake and Loon Lake is estimated to be approximately 45.51 acres. Average depth of treatment areas is estimated to be 3 feet (Table 7). The treatment would ideally take place early in the season, around the early part of May, depending on water temperature and weather conditions.

Funding was awarded for EWM treatment in 2011 based on EWM acreage estimates. However, the total EWM acreage was greater than expected and there was not enough funding available to treat all areas of EWM. Extensive mapping in 2012 should help to more accurately estimate EWM acreage in future years.

Re-growth of EWM was observed in Beaver Dam Lake and Loon Lake in September of 2012. This may have been due in part to above average water clarity. If possible, funds should be set aside for treatment of re-growth. The year of 2013 will be the last year of treatment funding priority status for Beaver Dam Lake. In 2014, treatment funding for EWM may not be available from the LARE program.

Table 7: 2013 Potential Treatment Areas

Area	Acres	Avg Depth	Acre-feet	Gallons DMA-4
1	16.01	3 feet	48.03	68.2
2	0.45	3 feet	1.35	1.9
3	0.73	3 feet	2.19	3.10
4	0.56	3 feet	1.68	2.38
5	5.92	3 feet	17.76	25.2
6	1.39	3 feet	4.17	5.9
7	0.97	3 feet	2.91	4.1
8	8.83	3 feet	26.49	37.6
9 (Loon)	3.47	3 feet	10.41	14.78
10(Loon)	1.81	3 feet	5.43	7.7
11(Loon)	1.2	3 feet	3.6	5.1
12(Loon)	4.17	3 feet	12.51	17.76
Total	45.51		136.53	193.72

Surveys and Planning

A visual survey should be sufficient in spring of 2013 to verify EWM locations prior to any herbicide treatments. A summer (post –treatment) tier II survey should be used to monitor both EMW and native plant populations.

2013 Budget

Cost Estimate

Treat up to 45.51 acres (3 ft avg depth) of EWM with DMA-4 at 2 ppm	\$ 13,653
Spring visual survey, summer Tier II survey and plan update	\$ 4,000
Total cost estimate and grant request	\$ 17,653
LARE share (80%-subject to availability)	\$ 14,122.40
Associations share (20%)	\$ 3,530.60

Public Involvement

Parties interested in the improvement of Beaver Dam Lake and Loon Lake include members of the Beaver Dam and Loon Lake Conservation Club as well as others who access the lake at the IDNR owned access site on Beaver Dam 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 Beaver Dam and Loon Lake Conservation Club held a public meeting on July 21, 2012 to discuss issues related to the LARE program. Jim Donahoe of Aquatic Weed Control attended this meeting to summarize LARE activities on the lake. Association members were satisfied with treatment results, although areas of re-growth were observed later on in September of 2012. Fourteen lake use surveys were returned, and the results of those survey responses are summarized in Figure 4.

Figure 4: Beaver Dam and Loon Lakes - Lake Use Survey

Lake Use Survey Lake name Beaver Dam/Loon

Are you a lake property owner? Yes 13 No 1

Are you currently a member of your lake association? Yes 14 No 0

How many years have you been at the lake? 2 or less 2
 2 – 5 years 0
 5-10 years 3
 Over 10 years 9

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

<u>13</u> Swimming	<u>1</u> Irrigation
<u>14</u> Boating	<u>0</u> Drinking water
<u>11</u> Fishing	<u>0</u> Other _____

Do you have aquatic plants at your shoreline in nuisance quantities? Yes 4 No 9

Do you currently participate in a weed control project on the lake? Yes 11 No 2

Does aquatic vegetation interfere with your use or enjoyment of the lake? Yes 7 No 7

Does the level of vegetation in the lake affect your property values? Yes 7 No 4

Are you in favor of continuing efforts to control vegetation on the lake? Yes 14 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 10 No 2

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

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

Please add any comments:
none

15.0 References Cited

J.F. New, 2009. Yellow Creek Lakes Watershed Diagnostic Study. J.F. New. 708 Roosevelt Road, Walkerton, IN 46510.

IDNR. 2006. Procedure Manual for Surveying Aquatic Vegetation: Tier II Reconnaissance Surveys. IN Department of Natural Resources. Indianapolis, Indiana.

Pearson, 2004. A Study of 21 Northern Indiana Lakes. Indiana Department of Natural Resources. Indianapolis, Indiana.

Appendix

Common and scientific plant names

Common Name	Scientific Name
American Pondweed	<i>Potamogeton nodosus</i>
Bladderwort	<i>Utricularia sp.</i>
Brittle Naiad	<i>Najas minor</i>
Cabomba	<i>Cabomba sp.</i>
Chara	<i>Chara sp.</i>
Coontail	<i>Ceratophyllum demersum</i>
Curly leaf Pondweed	<i>Potamogeton crispus</i>
Eelgrass	<i>Vallisneria americana</i>
Elodea	<i>Elodea canadensis</i>
Eurasian Watermilfoil	<i>Myriophyllum spicatum</i>
Flat Stem Pondweed	<i>Potamogeton zosteriformis</i>
Floating-leaf Pondweed	<i>Potamogeton natans</i>
Forked or Star Duckweed	<i>Lemna trisulca</i>
Illinois Pondweed	<i>Potamogeton illinoensis</i>
Lake Cress	<i>Armoracia lacustris</i>
Largeleaf Pondweed	<i>Potamogeton amplifolius</i>
Leafy Pondweed	<i>Potamogeton foliosus</i>
Nitella	<i>Nitella sp.</i>
Northern Watermilfoil	<i>Myriophyllum sibiricum</i>
Richardson's Pondweed	<i>Potamogeton richardsonii</i>
Sago Pondweed	<i>Potamogeton pectinatus</i>
Slender Arrowhead	<i>Sagittaria teres</i>
Slender Naiad	<i>Najas flexilis</i>
Small Pondweed	<i>Potamogeton pusillus</i>
Variable Pondweed	<i>Potamogeton diversifolius</i>
Warer Stargrass	<i>Heteranthera dubia</i>
Water Buttercup sp.	<i>Ranunculus sp.</i>
Whitestem Pondweed	<i>Potamogeton praelongus</i>
Whorled Milfoil	<i>Myriophyllum verticillatum</i>

Data Sheets and GPS Coordinates

Aquatic Vegetation Random Sampling (Tier 2)

Waterbody Cover Sheet

Surveying Organization:

Contact Information:

Waterbody Name: Lake ID:

County(s): Date:

Habitat Stratum: Avg. Lake Depth (ft): Lake Level:

GPS Metadata

Crew Leader: Datum: Zone: Accuracy:

Recorder: Method:

Secchi Depth (ft): Total # of Points Surveyed: Total # of Species:

Littoral Zone Size (acres): Littoral Zone Max. Depth (ft):

Measured Estimated

Measured Estimate (historical Secchi) Estimated (current Secchi)

Notable Conditions:

12

Beaver Dam Lake

11.0 Seelye - Brounck
Lana Seelye - G.O. 12
8-28-2011

Depth	Site	EWM	Coontail	Sago	POSTL	CHNL	Est											
0-5	2 A1	-																
0-5	3 A2		3															
5-10ft	7 3	-																
0-5	3 A4			3														
0-5	4 5			1														
0-5	5 6			1	1													
0-5	6 7																	
5-10ft	10 8																	
0-5	3 9																	
0-5	2 10	-																
0-5	4 11	-			1													
0-5	7 12																	
0-5	4 13																	
5-10ft	8 14		5															
0-5	4 15				3													
0-5	4 16																	
0-5	3 17	-																
0-5	4 18	-																
5-10ft	10 19	-																
0-5	4 20	-																
0-5	3 A21		3															
0-5	4 A22	-																
0-5	3 A23	-																
5-10ft	6 A24		3															
0-5	4 A25	-																
0-5	3 26			5														
0-5	3 27	-																
0-5	4 28			5														
5-10ft	9 A29	-																
0-5	3 A30		5															
0-5	3 A31		5															
0-5	4 32			1														
0-5	5 33				1													
5-10ft	9 34	-																
0-5	2 35				3													
0-5	4 36			3														
0-5	4 37																	
0-5	3 38			3														
5-10ft	10 39	-																
0-5	4 40	-																


Depth	Site	EWM	Coontail	Sago	Small														
0-5	41	-																	
0-5	42			3	1														
0-5	43																		
5-10ft	44																		
5-10ft	45																		
0-5	46																		
0-5	47		3																
0-5	48																		
0-5	49																		
0-5	50																		
0-5ft	51	3																	
5-10ft	52																		
10-15ft	53																		
0-5ft	54	3																	
5-10ft	55	5																	
10-15ft	56																		
0-5ft	57	3																	
5-10ft	58	5																	
10-15ft	59																		
0-5ft	60	5																	
5-10ft	61	3																	
10-15ft	62																		
0-5ft	63																		
5-10ft	64																		
10-15ft	65																		
0-5ft	66	5																	
5-10ft	67																		
10-15ft	68																		
0-5ft	69	5																	
5-10ft	70	3																	
10-15ft	71																		
0-5ft	72	5																	
5-10ft	73	3																	
10-15ft	74																		
0-5ft	75																		
5-10ft	76																		
10-15ft	77																		
0-5ft	78																		
5-10ft	79	3																	
10-15ft	80																		

Tier II GPS Coordinates

Beaver Dam - 8-28-2012	Secchi 11.0	Depth	Site
41.093626	-85.97037	2	1
41.093978	-85.970933	3	2
41.093778	-85.972351	7	3
41.094447	-85.97319	3	4
41.094124	-85.974153	4	5
41.095104	-85.974803	5	6
41.096259	-85.974545	5	7
41.096893	-85.974596	10	8
41.097705	-85.974945	3	9
41.097992	-85.975793	2	10
41.09797	-85.97687	4	11
41.097616	-85.977619	3	12
41.097462	-85.978364	4	13
41.09697	-85.979099	8	14
41.096681	-85.979882	4	15
41.095993	-85.979962	4	16
41.095075	-85.979695	3	17
41.094257	-85.979283	4	18
41.093675	-85.978818	10	19
41.093227	-85.978642	4	20
41.092723	-85.978949	3	21
41.09291	-85.979548	4	22
41.092664	-85.980339	3	23
41.091911	-85.980572	6	24
41.091505	-85.980507	4	25
41.091269	-85.980492	3	26
41.090755	-85.980407	3	27
41.090336	-85.980058	4	28
41.090355	-85.979379	9	29
41.089742	-85.979266	3	30
41.089613	-85.978591	3	31
41.089818	-85.978112	4	32
41.089728	-85.977527	5	33
41.089524	-85.976821	9	34
41.089144	-85.976311	5	35
41.088913	-85.975519	4	36
41.089014	-85.974421	4	37
41.089133	-85.973529	3	38
41.089569	-85.973042	10	39
41.089762	-85.9726	4	40
41.090402	-85.972064	5	41
41.091116	-85.972116	5	42
41.09172	-85.971853	2	43
41.092096	-85.972311	8	44
41.092602	-85.972739	6	45
41.092788	-85.971275	5	46
41.093039	-85.970671	4	47
41.093375	-85.971429	6	48
41.093364	-85.972207	5	49
41.093676	-85.972076	4	50

Loon Lake	8/28/2012	Secchi: 6.0	
latitude	longitude	depth	site
41.08224	-85.96563	4	51
41.08241	-85.96617	6	52
41.08303	-85.9667	11	53
41.08353	-85.96658	4	54
41.08399	-85.96683	6	55
41.0844	-85.96748	12	56
41.08473	-85.96699	4	57
41.0852	-85.96734	6	58
41.08541	-85.96828	13	59
41.08574	-85.96841	3	60
41.08632	-85.96882	6	61
41.08636	-85.96936	12	62
41.08637	-85.96971	5	63
41.08619	-85.96993	6	64
41.08587	-85.96996	14	65
41.08566	-85.97028	5	66
41.08547	-85.9703	9	67
41.08525	-85.97012	15	68
41.08498	-85.97042	4	69
41.0845	-85.97042	6	70
41.08404	-85.97023	13	71
41.0838	-85.97042	5	72
41.08346	-85.97038	7	73
41.08303	-85.97004	13	74
41.08232	-85.96993	3	75
41.08215	-85.96883	6	76
41.08187	-85.96787	14	77
41.08125	-85.96681	3	78
41.08169	-85.96579	8	79
41.08191	-85.96591	11	80

This page intentionally left blank

	APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT	FOR OFFICE USE ONLY	Return to:	Page 1 of	
	State Form 26727 (R4 / 2-04) Approved State Board of Accounts 2004	License No.	DEPARTMENT OF NATURAL RESOURCES		
	<input type="checkbox"/> Whole Lake <input checked="" type="checkbox"/> Multiple Treatment Areas	Date Issued	Division of Fish and Wildlife Commercial License Clerk		
	Check type of permit	Lake County	402 West Washington Street, Room W273 Indianapolis, IN 46204		
<i>INSTRUCTIONS: Please print or type information</i>			FEE: \$5.00		

Applicant's Name Jim Donahoe	Lake Assoc. Name Beaver Dam and Loon Lake Conservation Club
Rural Route or Street P. O. Box 325	Phone Number 1-574-533-2597
City and State Syracuse, IN	ZIP Code 46567
Certified Applicator (if applicable) Jim Donahoe	Company or Inc. Name above
Rural Route or Street P. O. Box 325	Phone Number 1-574-533-2597
City and State Syracuse, IN	ZIP Code 46567

Lake (One application per lake) Beaver Dam	Nearest Town Claypool	County Kosciusko
Does water flow into a water supply <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 #	1	LAT/LONG or UTM's	N41° 5.621 W85° 58.285	
Total acres to be controlled	16.01	Proposed shoreline treatment length (ft)	2542	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s) May		
Treatment method: <input checked="" type="checkbox"/> Chemical <input type="checkbox"/> Physical <input type="checkbox"/> Biological Control <input type="checkbox"/> Mechanical				
Based on treatment method, describe chemical 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: <input type="checkbox"/> Rake <input checked="" type="checkbox"/> Visual <input type="checkbox"/> Other (specify)				

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	70
Sago		20
coontail		10

Treatment Area #	2	LAT/LONG or UTM's	N41° 5.698 W85° 58.479		
Total acres to be controlled	0.45	Proposed shoreline treatment length (ft)	198	Perpendicular distance from shoreline (ft)	100
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical	
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify)		
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community		
Eurasian Milfoil		x	70		
Sago			20		
coontail			10		
Treatment Area #	3	LAT/LONG or UTM's	N41° 5.740 W85° 58.465		
Total acres to be controlled	0.73	Proposed shoreline treatment length (ft)	293	Perpendicular distance from shoreline (ft)	185
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical	
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify)		
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community		
Eurasian Milfoil		x	70		
Sago			20		
coontail			10		

						Page 3 of
Treatment Area #	4		LAT/LONG or UTM's N41° 5.813 W85° 58.460			
Total acres to be controlled	0.56	Proposed shoreline treatment length (ft)	619	Perpendicular distance from shoreline (ft)	70	
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s) May or June				
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical		
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify) _____			
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community			
Eurasian Milfoil		x	70			
Sago			20			
coontail			10			
Treatment Area #	5		LAT/LONG or UTM's N41° 5.882 W84° 58.618			
Total acres to be controlled	5.92	Proposed shoreline treatment length (ft)	2150	Perpendicular distance from shoreline (ft)	200	
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s) May or June				
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical		
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify) _____			
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community			
Eurasian Milfoil		x	70			
Sago			20			
coontail			10			

Treatment Area #	6	LAT/LONG or UTM's	N41° 5.710 W85° 58.785		
Total acres to be controlled	1.39	Proposed shoreline treatment length (ft)	1508	Perpendicular distance from shoreline (ft)	75
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical	
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify)		
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community		
Eurasian Milfoil		x	70		
Sago			20		
coontail			10		

Treatment Area #	7	LAT/LONG or UTM's	N41° 5.572 W85° 58.74		
Total acres to be controlled	0.97	Proposed shoreline treatment length (ft)	482	Perpendicular distance from shoreline (ft)	103
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical	
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify)		
Aquatic Plant Name		Check if Target Species	Relative Abundance % of Community		
Eurasian Milfoil		x	70		
Sago			20		
coontail			10		

Treatment Area #	8	LAT/LONG or UTM's	N41° 5.339 W85° 58.447		
Total acres to be controlled	8.83	Proposed shoreline treatment length (ft)	4106	Perpendicular distance from shoreline (ft)	185
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical <input type="checkbox"/> Physical <input type="checkbox"/> Biological Control <input type="checkbox"/> Mechanical				
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake <input checked="" type="checkbox"/> Visual <input type="checkbox"/> Other (specify)				

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	70
Sago		20
coontail		10

INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

Applicant Signature	Date
Certified Applicant's Signature	Date

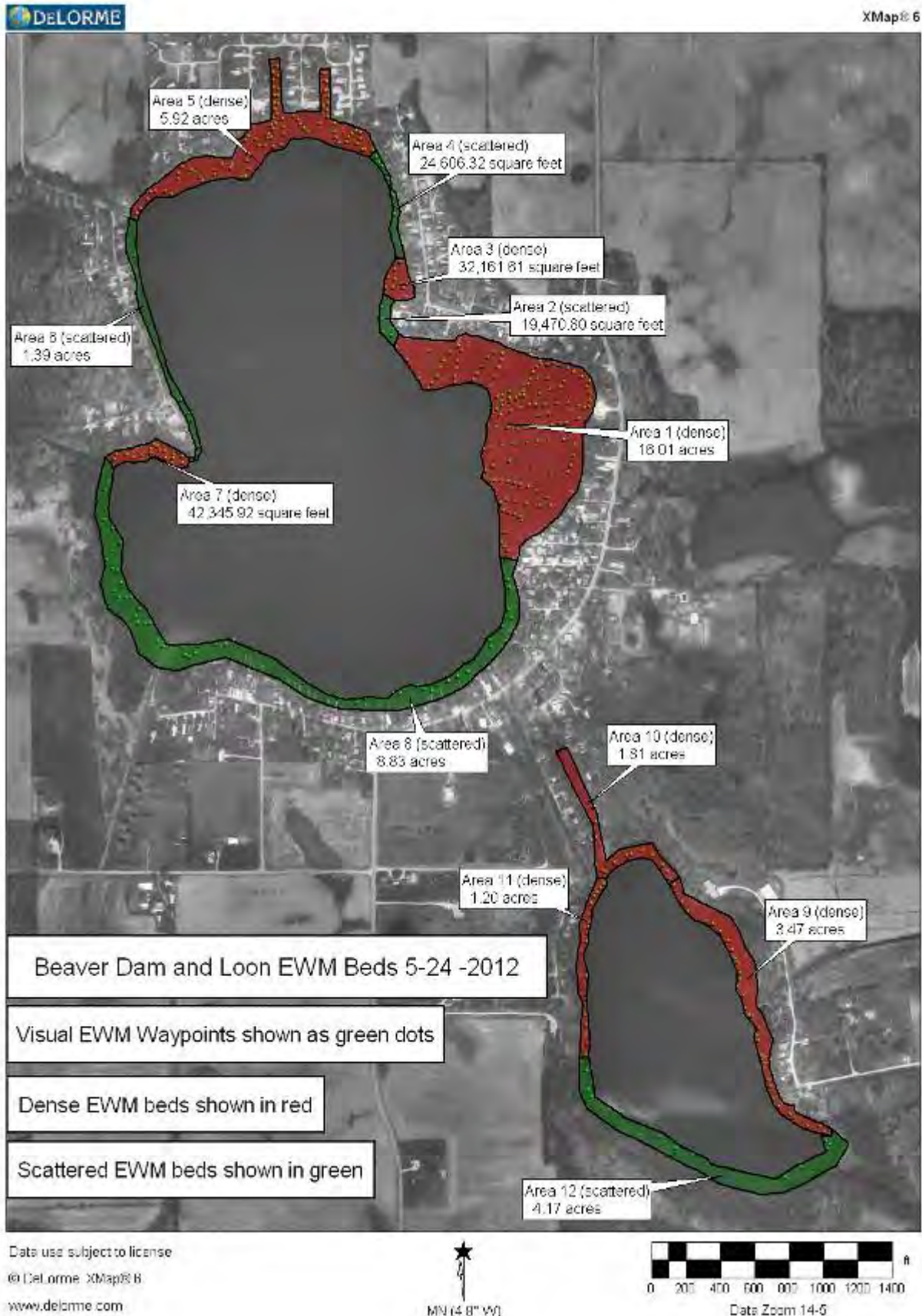
FOR OFFICE ONLY

<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Fisheries Staff Specialist
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Environmental Staff Specialist


Mail check or money order in the amount of \$5.00 to:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
COMMERCIAL LICENSE CLERK
402 WEST WASHINGTON STREET ROOM W273
INDIANAPOLIS, IN 46204

Beaver Dam and Loon Permit Map



Loon Lake Permit

 APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT State Form 26727 (R4 / 2-04) Approved State Board of Accounts 2004 <input type="checkbox"/> Whole Lake <input checked="" type="checkbox"/> Multiple Treatment Areas Check type of permit	FOR OFFICE USE ONLY		Return to: _____ Page 1 of _____
	License No.	DEPARTMENT OF NATURAL RESOURCES	
	Date Issued	Division of Fish and Wildlife	
	Lake County	Commercial License Clerk 402 West Washington Street, Room W273 Indianapolis, IN 46204	
INSTRUCTIONS: Please print or type information			FEE: \$5.00

Applicant's Name Jim Donahoe		Lake Assoc. Name Beaver Dam and Loon Lake Conservation Club	
Rural Route or Street P. O. Box 325		Phone Number 1-574-533-2597	
City and State Syracuse, IN		ZIP Code 46567	
Certified Applicator (if applicable) Jim Donahoe		Company or Inc. Name above	
Rural Route or Street P. O. Box 325		Phone Number 1-574-533-2597	
City and State Syracuse, IN		ZIP Code 46567	

Lake (One application per lake) Loon Lake	Nearest Town Claypool	County Kosciusko
Does water flow into a water supply <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 #	9	LAT/LONG or UTM's	N41° 5.097 W 85° 58.039
Total acres to be controlled	3.47	Proposed shoreline treatment length (ft)	1799
Perpendicular distance from shoreline (ft)	145	Maximum Depth of Treatment (ft)	8
Expected date(s) of treatment(s)	May		
Treatment method:	<input checked="" type="checkbox"/> Chemical <input type="checkbox"/> Physical <input type="checkbox"/> Biological Control <input type="checkbox"/> Mechanical		

Based on treatment method, describe chemical 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
Eurasian Milfoil	x	70
Sago		20
coontail		10

Treatment Area #	10	LAT/LONG or UTM's	N41° 5.179 W85° 58.200		
Total acres to be controlled	1.81	Proposed shoreline treatment length (ft)	2000	Perpendicular distance from shoreline (ft)	100
Maximum Depth of Treatment (ft)	8	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical <input type="checkbox"/> Physical <input type="checkbox"/> Biological Control <input type="checkbox"/> Mechanical				
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake <input checked="" type="checkbox"/> Visual <input type="checkbox"/> Other (specify)				
Aquatic Plant Name	Check if Target Species		Relative Abundance % of Community		
Eurasian Milfoil	x		70		
Sago			20		
coontail			10		

Treatment Area #	11	LAT/LONG or UTM's	N41° 5.12 W85° 58.227		
Total acres to be controlled	1.2	Proposed shoreline treatment length (ft)	996	Perpendicular distance from shoreline (ft)	70
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical <input type="checkbox"/> Physical <input type="checkbox"/> Biological Control <input type="checkbox"/> Mechanical				
Based on treatment method, describe chemical 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:	<input type="checkbox"/> Rake <input checked="" type="checkbox"/> Visual <input type="checkbox"/> Other (specify)				
Aquatic Plant Name	Check if Target Species		Relative Abundance % of Community		
Eurasian Milfoil	x		70		
Sago			20		
coontail			10		

Treatment Area #	12	LAT/LONG or UTM's	N41° 4.900 W85° 58.097		
Total acres to be controlled	4.17	Proposed shoreline treatment length (ft)	2250	Perpendicular distance from shoreline (ft)	110
Maximum Depth of Treatment (ft)	6	Expected date(s) of treatment(s)	May or June		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> Mechanical	

Based on treatment method, describe chemical 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
Eurasian Milfoil	x	70
Sago		20
coontail		10

INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

Applicant Signature	Date
Certified Applicant's Signature	Date

FOR OFFICE ONLY

<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Fisheries Staff Specialist
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Environmental Staff Specialist

Mail check or money order in the amount of \$5.00 to:

DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF FISH AND WILDLIFE
 COMMERCIAL LICENSE CLERK
 402 WEST WASHINGTON STREET ROOM W273
 INDIANAPOLIS, IN 46204

Beaver Dam and Loon Permit map

