

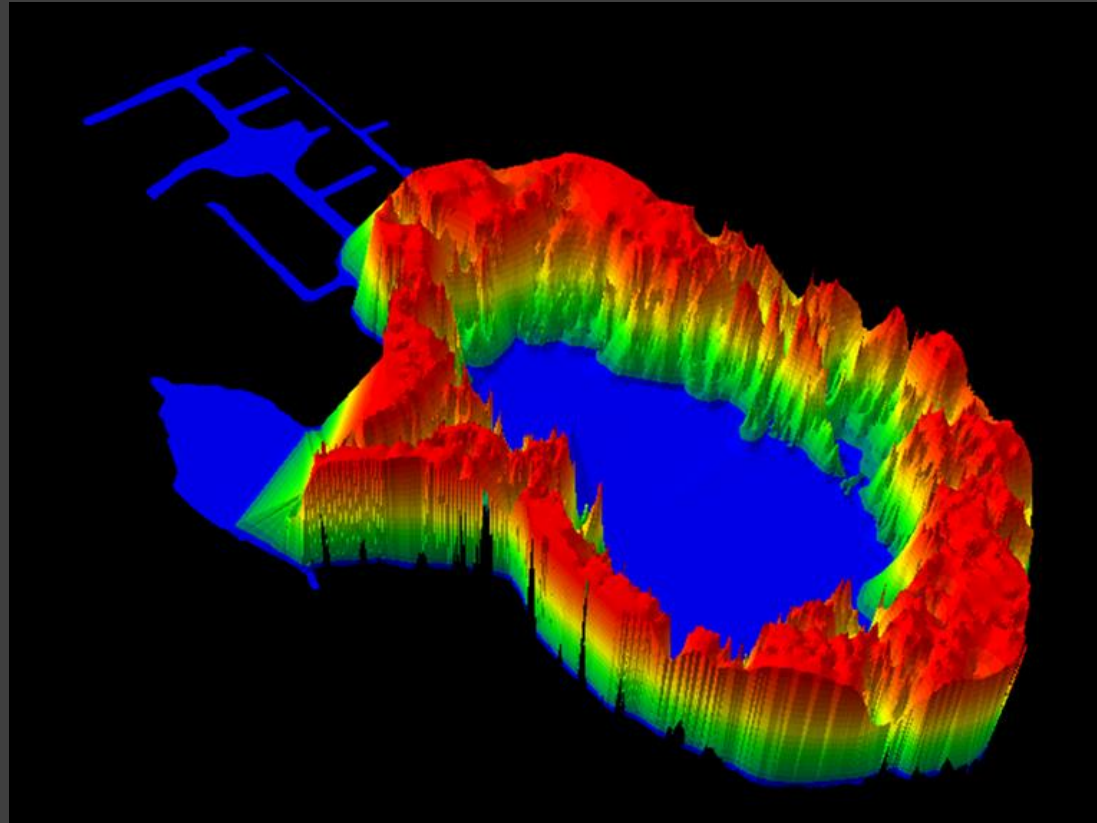
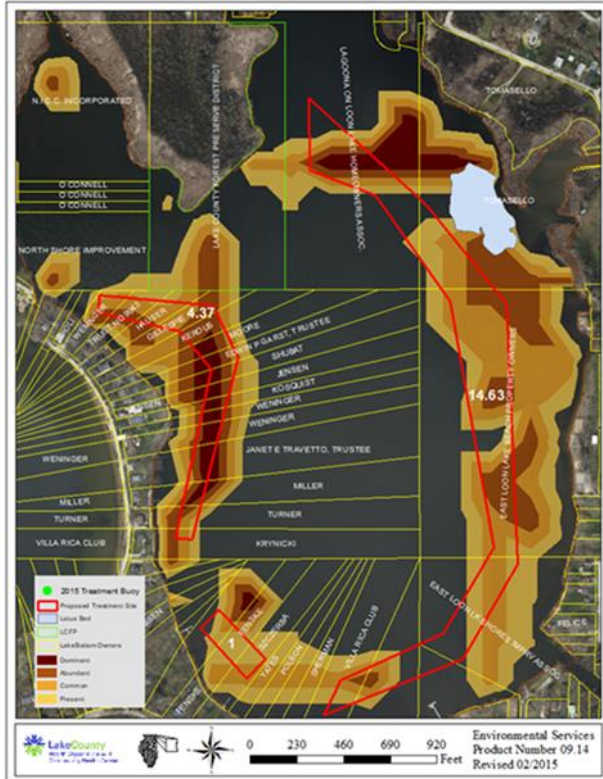


LakeCounty

Health Department and
Community Health Center

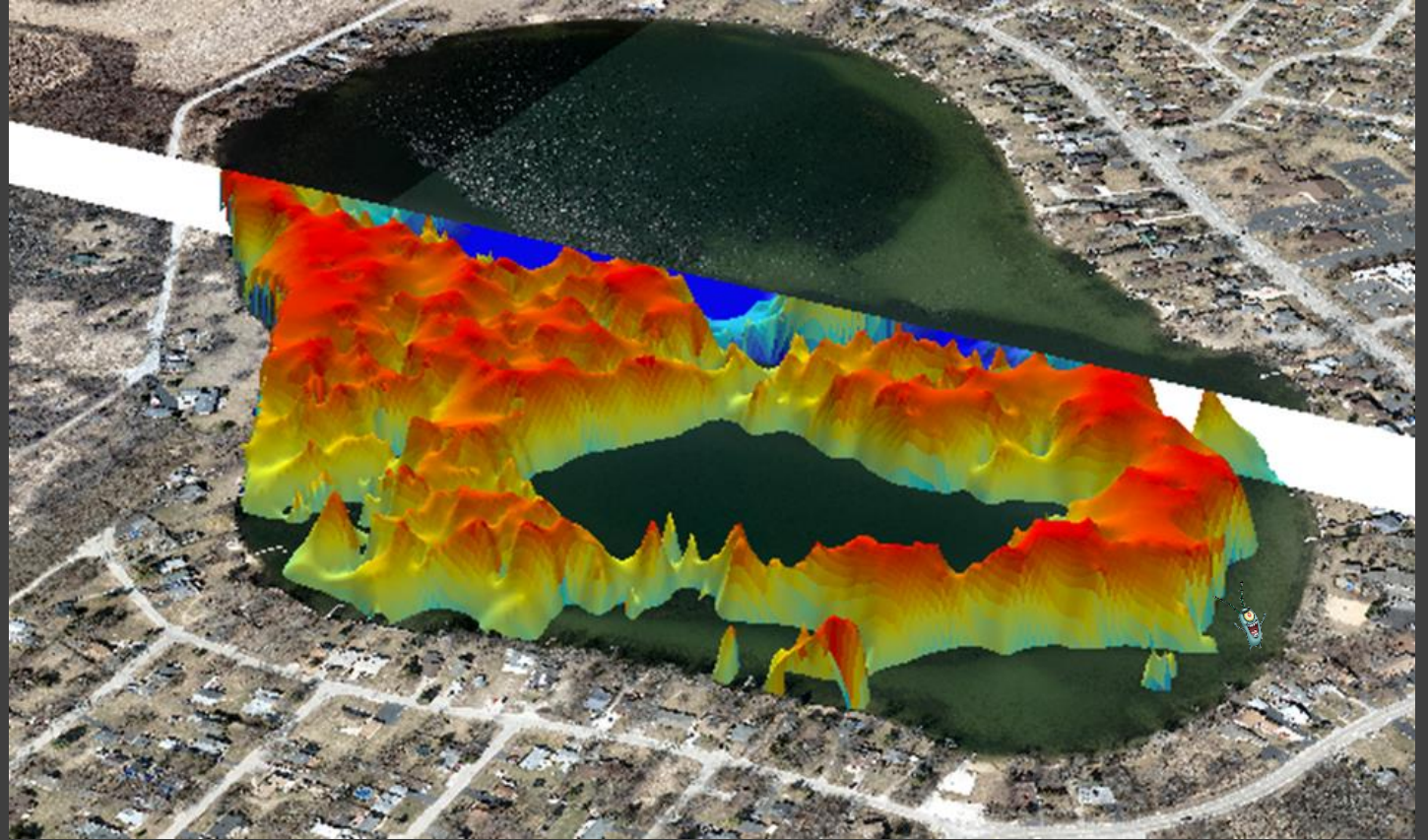
How Mapping your
Aquatic Plants Helps
You Better Manage
Your Lake

2015 East Loon Lake EWM Proposed Treatment Site



Aquatic Plant Management

- Aquatic Plant Management Plan Should be Based on what plants are found your lake.
- Create an invasive species management control plan.
- Evaluate the effectiveness of the plan.



Aquatic Plant Survey

- Create a Plant List
- Aquatic Plant Density
- Aquatic Plant Diversity
- Find Invasive Plants

Historical Plant List

- Richardson Pondweed (Upper Right)
- White-stem pondweed (Lower Left)
- Large-leaf Pondweed (Lower Right)

Pre-Survey and Learn the plants in your lake!

2002

Chara
Coontail
Eurasian Water Milfoil
Curlyleaf Pondweed
Illinois Pondweed
Sago Pondweed
Slender Naiad
Spiny Naiad
White Water Lily
Spatterdock
Water Star Grass
Water Shield

Chara sp.
Ceratophyllum demersum
Myriophyllum spicatum
Potamogeton crispus
Potamogeton illinoensis
Potamogeton pectinatus
Najas flexilis
Najas marina
Nymphaea tuberosa
Nuphar variegatum
Heteranthera dubia
Brasenia schreberi

2011

Chara
Illinois Pondweed
Slender Naiad
White Water Lily
Spatterdock
Water Star Grass

Chara sp.
Potamogeton illinoensis
Najas flexilis
Nymphaea tuberosa
Nuphar variegatum
Heteranthera dubia

2017

Chara
Floatingleaf Pondweed
Southern Naiad
Curlyleaf Pondweed
Illinois Pondweed
Sago Pondweed
Slender Naiad
Spiny Naiad
White Water Lily
Spatterdock
Water Star Grass
Watermeal

Chara sp.
Potamogeton natans
Najas guadalupensis
Potamogeton crispus
Potamogeton illinoensis
Potamogeton pectinatus
Najas flexilis
Najas marina
Nymphaea tuberosa
Nuphar variegatum
Heteranthera dubia
Wolffia columbiana



(C) Paul Skawinski, 2009



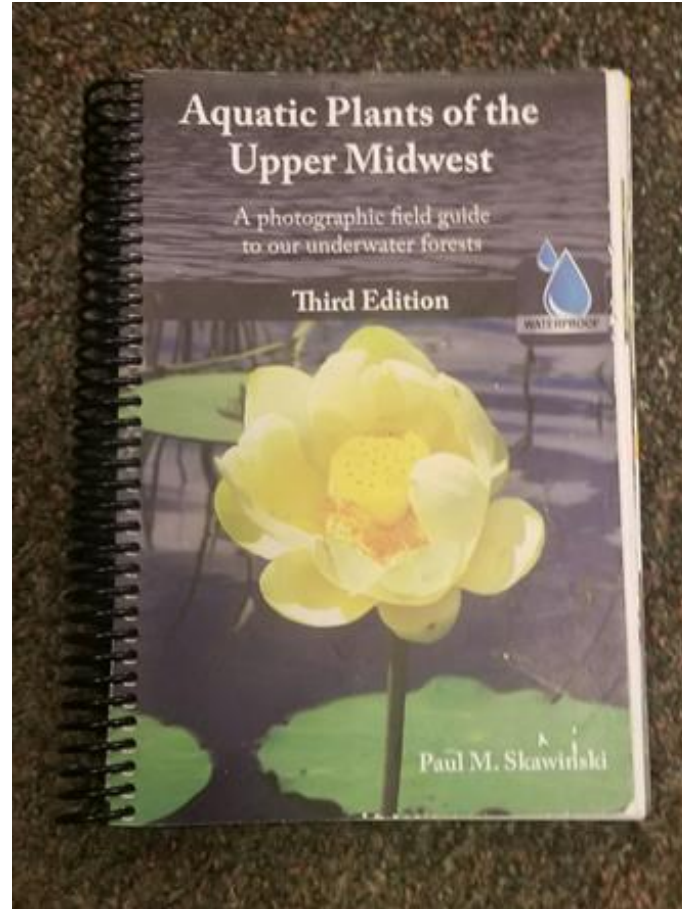
(C) Paul Skawinski, 2009



(C) Paul Skawinski, 2009



(C) Paul Skawinski, 2009



(C) Paul Skawinski, 2009

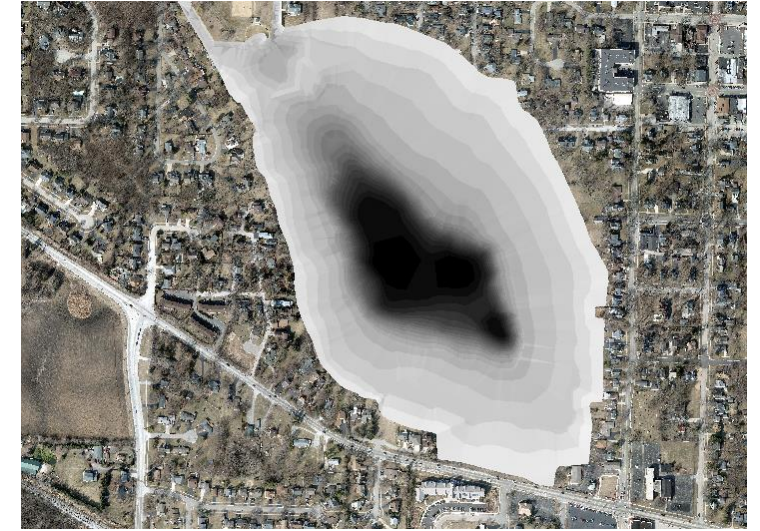
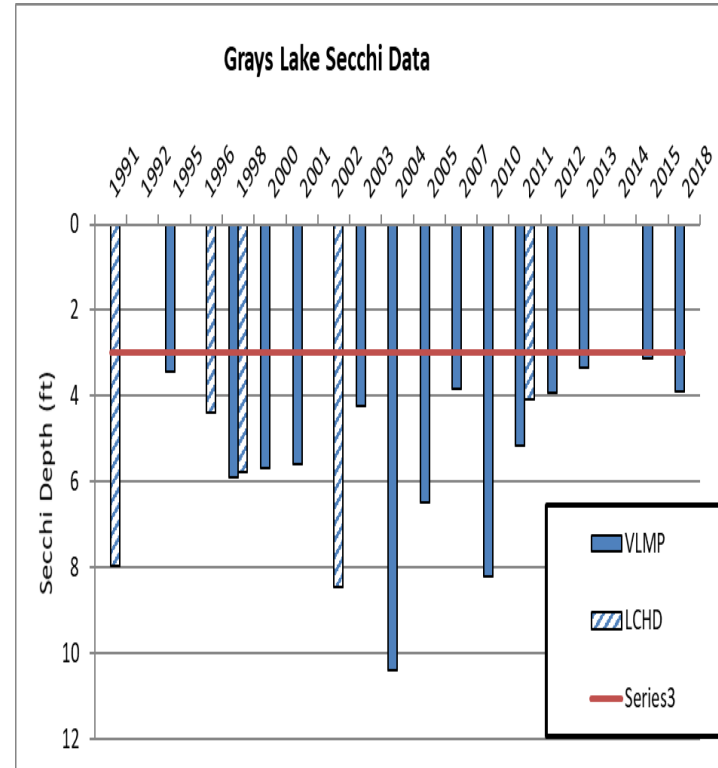


(C) Paul Skawinski, 2009

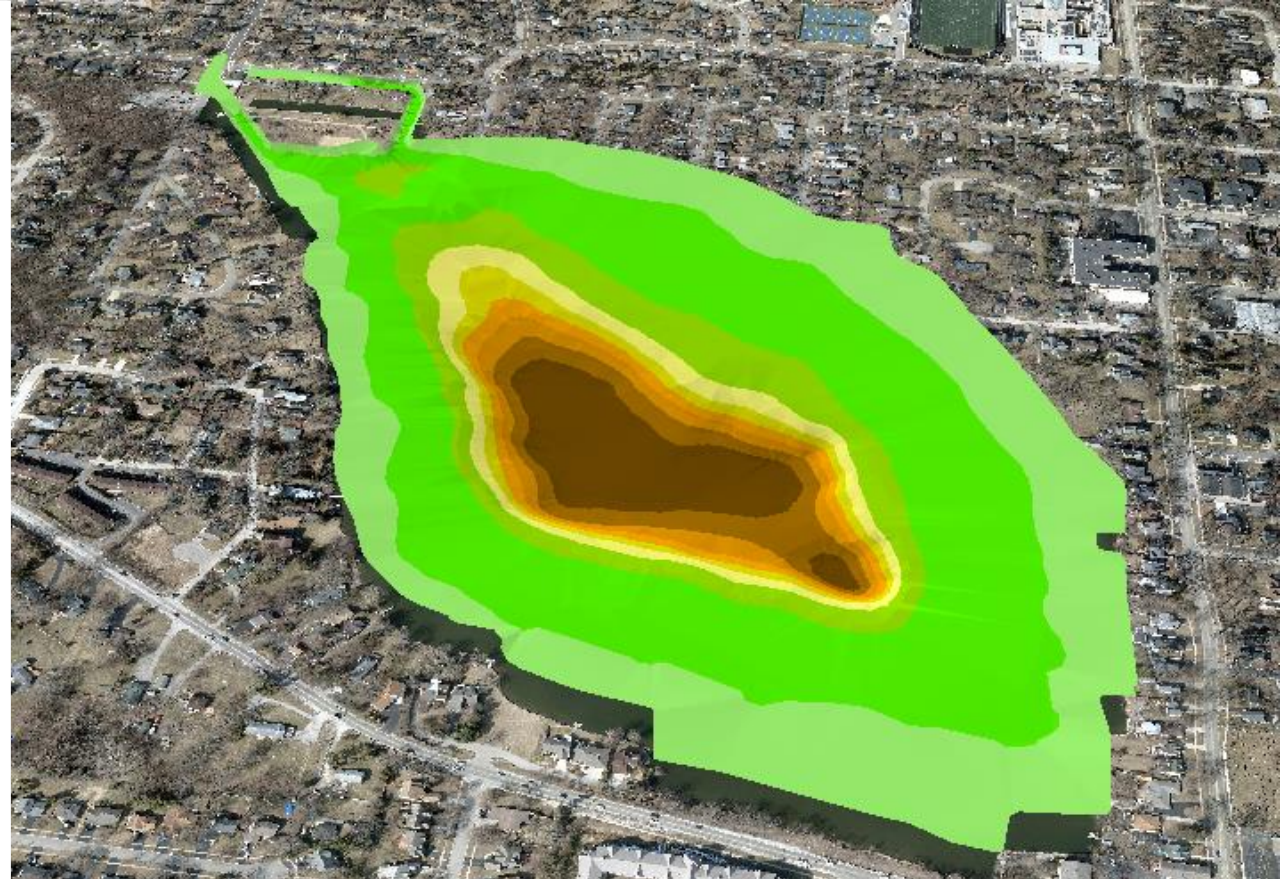
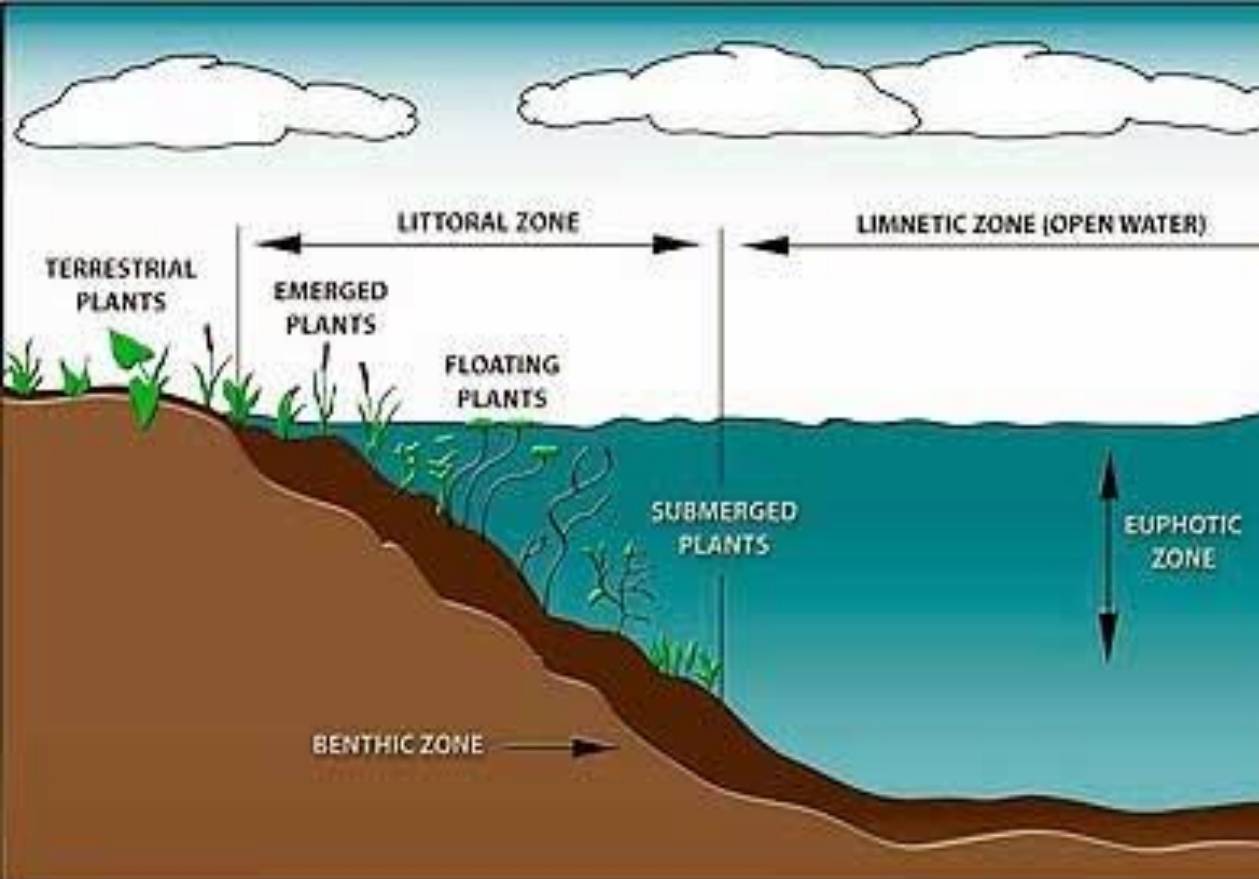


Plant Identification

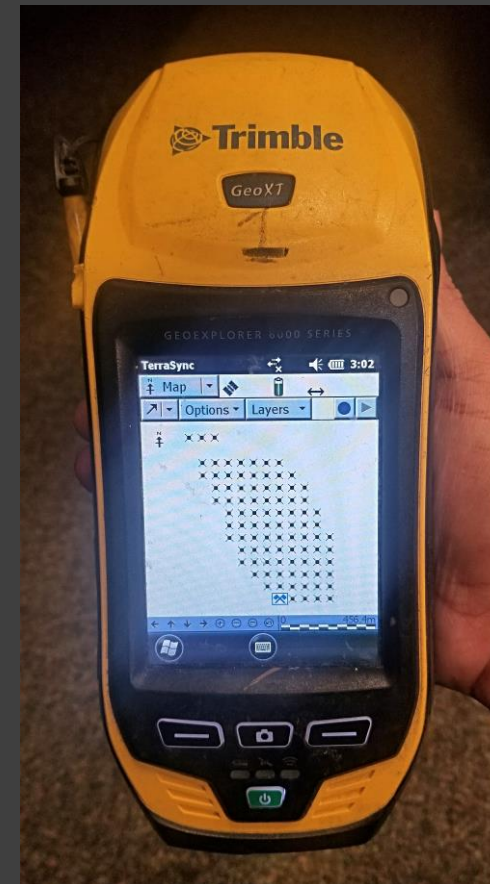
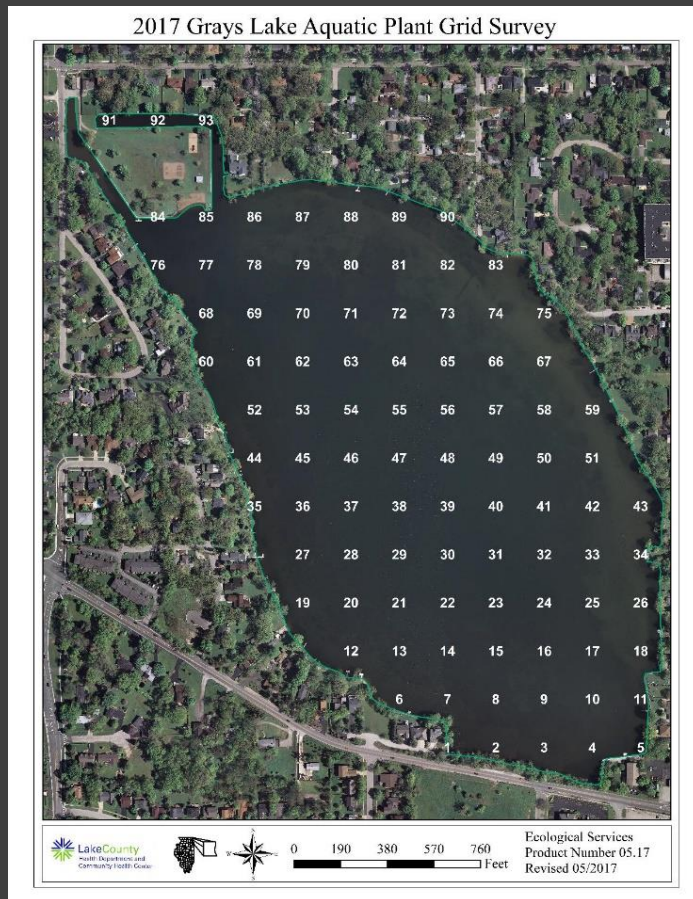
“it should be noted that all methods are meaningless if the aquatic plants are misidentified” (Hellquist 1993)



Determine where plants will be found.
 $2X \text{ Secchi Depth} = 1\% \text{ Light}$



Littoral Zone



Plant Grid Point-intercept Survey







- ArcMap 10.6 to create 30 or 60 meter grid pattern.
- Points may be added to capture data on areas of interest.
- Points are transferred to a GPS device.
- <https://s3.amazonaws.com/downloads.digitalmarine.com/CreatingTransectsGoogleEarth.pdf>



Aquatic Plant Rake

Figure 1. Abundance Ratings

Abundance ratings are given from 0-5. Conditions of the ratings are described below:

<u>Rating</u>	<u>Coverage</u>	<u>Description</u>
0		➤ No plants on rake head
1		➤ A few plants on rake head
2		➤ Obviously less than 1/2 ➤ Uniform cover toward base
3		➤ Rake head is about 1/2 full ➤ Can easily see top of rake head
4		➤ Obviously more than 1/2 full ➤ Not overflowing ➤ Can barely see top of rake head
5		➤ Overflowing ➤ Cannot see top of rake head

0=no plants, 1 =>0 - 10%, 2 =>10 - 40%, 3 =>40 - 60%, 4 =>60 - 90%, 5 =>90%.



Rake Density

- Measure overall density
- Quantify and Identify species present
- Floristic Quality Index



Check for other Aquatic Plants

GRAYS LAKE AQUATIC PLANT TABLE 2017

AQUATIC VEGETATION SPECIES FOUND AT THE 93 SAMPLING SITES ON GRAYS LAKE, MAY 2017

Rake Density (Coverage)	# of Sites	%	Plant Density	Chara	Curlyleaf Pondweed	Spatterdock	Water Stargrass
No plants	0	44.0	Absent	68	59	81	72
>0 to 10%	1	21.0	Present	11	13	0	9
>10 to 40%	2	16.0	Common	3	9	1	1
>40 to 60%	3	1.0	Abundant	0	1	0	0
>60 to 90%	4	0.0	Dominant	0	0	0	0
>90%	5	0.0					
Total Sites with Plants	15	16.1					
Total # of Sites	93	100.0	% Plant Occurrence	15.1%	24.7%	1.1%	10.8%

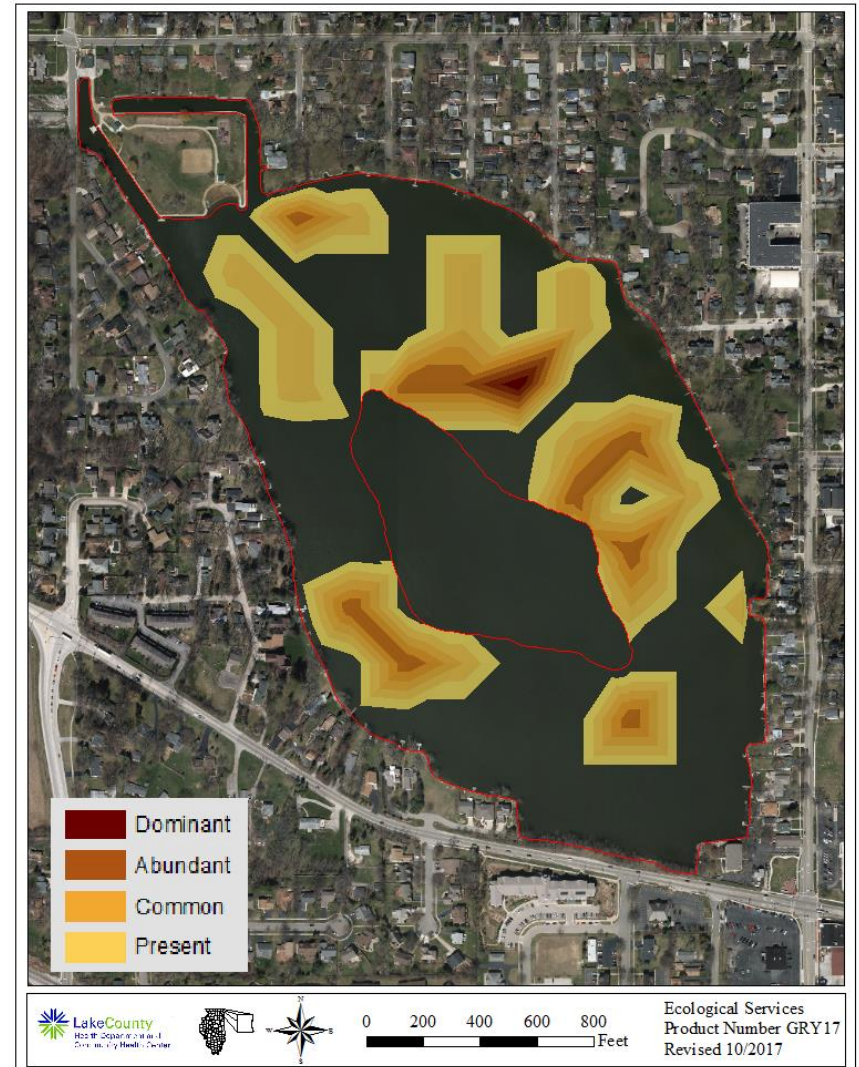
AQUATIC VEGETATION SPECIES FOUND AT THE 93 SAMPLING SITES ON GRAYS LAKE, AUGUST 2017

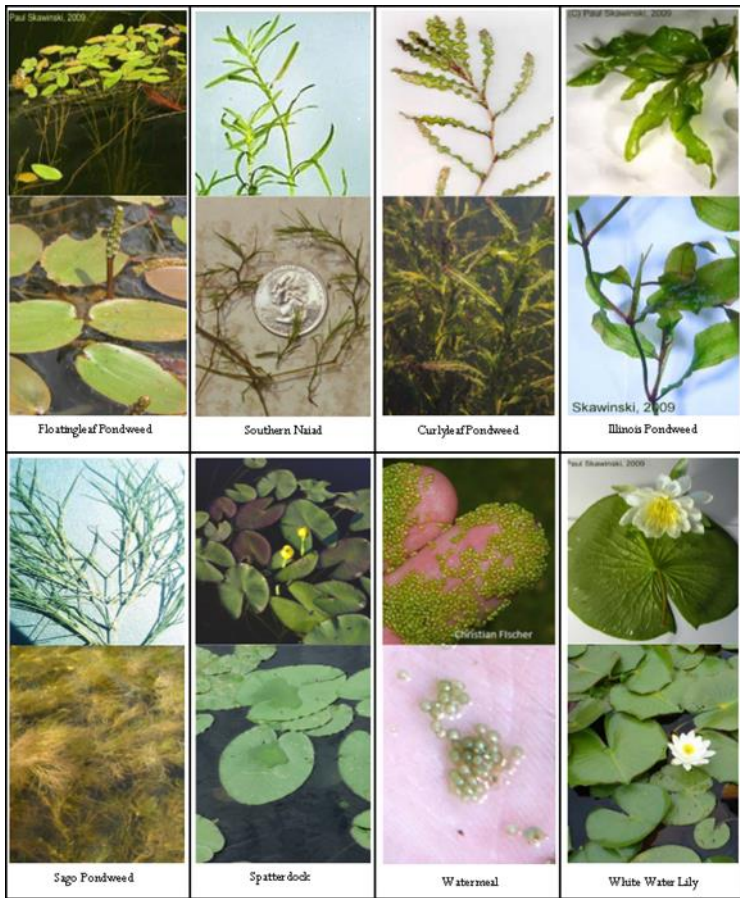
Rake Density (Coverage)	# of Sites	%	Plant Density	Chara	Curlyleaf Pondweed	Floatingleaf Pondweed	Illinois Pondweed	Sago Pondweed	Slender Naiad
No plants	30	32.3	Absent	76	74	77	75	69	60
>0 to 10%	14	15.1	Present	1	3	0	0	3	9
>10 to 40%	17	18.3	Common	0	1	1	2	6	7
>40 to 60%	5	5.4	Abundant	1	0	0	1	0	2
>60 to 90%	0	0.0	Dominant	0	0	0	0	0	0
>90%	0	0.0							
Total Sites with Plants	36	38.7							
Total # of Sites	93	100.0	% Plant Occurrence	2.2%	4.3%	1.1%	3.2%	9.7%	19.4%

Plant Density	Southern Naiad	Spatterdock	Spiny Naiad	Watermeal	Water Stargrass	White Water Lily
Absent	77	73	69	77	48	73
Present	0	1	3	1	11	3
Common	1	2	5	0	6	2
Abundant	0	1	1	0	10	0
Dominant	0	1	0	0	3	0
% Plant Occurrence	1.1%	5.4%	9.7%	1.1%	32.3%	5.4%

“aquatic plant sampling method collects data on the occurrence of aquatic plant species in lakes, but does not collect information on plant biomass”

Grayslake Curlyleaf Pondweed Rake Density 2017





2002

- Chara
- Coontail
- Eurasian Water Milfoil
- Curlyleaf Pondweed
- Illinois Pondweed
- Sago Pondweed
- Slender Naiad
- Spiny Naiad
- White Water Lily
- Spatterdock
- Water Star Grass
- Water Shield

- Chara sp.*
- Ceratophyllum demersum*
- Myriophyllum spicatum*
- Potamogeton crispus*
- Potamogeton illinoensis*
- Potamogeton pectinatus*
- Najas flexilis*
- Najas marina*
- Nymphaea tuberosa*
- Nuphar variegatum*
- Heteranthera dubia*
- Brasenia schreberi*

2011

- Chara
- Illinois Pondweed
- Slender Naiad
- White Water Lily
- Spatterdock
- Water Star Grass

- Chara sp.*
- Potamogeton illinoensis*
- Najas flexilis*
- Nymphaea tuberosa*
- Nuphar variegatum*
- Heteranthera dubia*

2017

- Chara
- Floatingleaf Pondweed
- Southern Naiad
- Curlyleaf Pondweed
- Illinois Pondweed
- Sago Pondweed
- Slender Naiad
- Spiny Naiad
- White Water Lily
- Spatterdock
- Water Star Grass
- Watermeal

- Chara sp.*
- Potamogeton natans*
- Najas guadalupensis*
- Potamogeton crispus*
- Potamogeton illinoensis*
- Potamogeton pectinatus*
- Najas flexilis*
- Najas marina*
- Nymphaea tuberosa*
- Nuphar variegatum*
- Heteranthera dubia*
- Wolffia columbiana*

Historical Plant List



Your Assessments

New Inventory

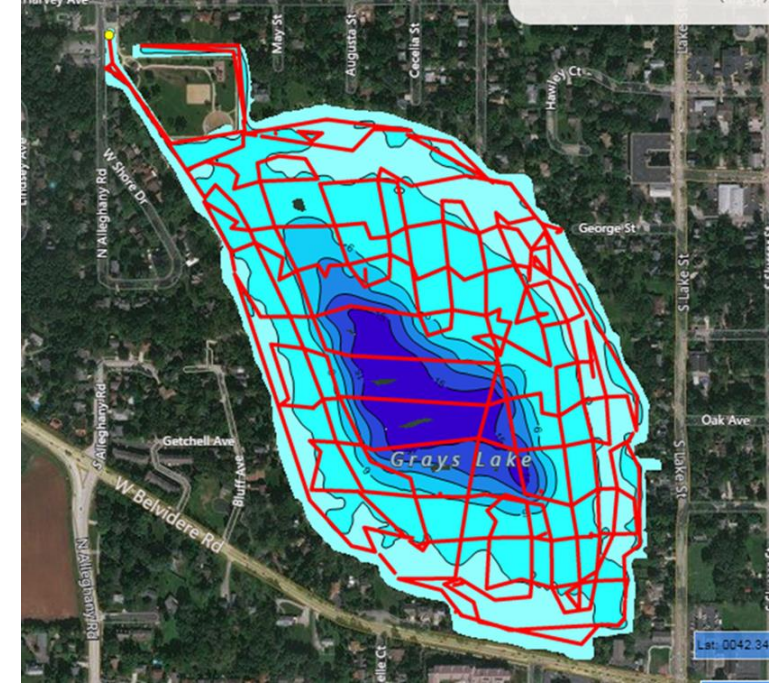
New Transect/Plot

Download Summary

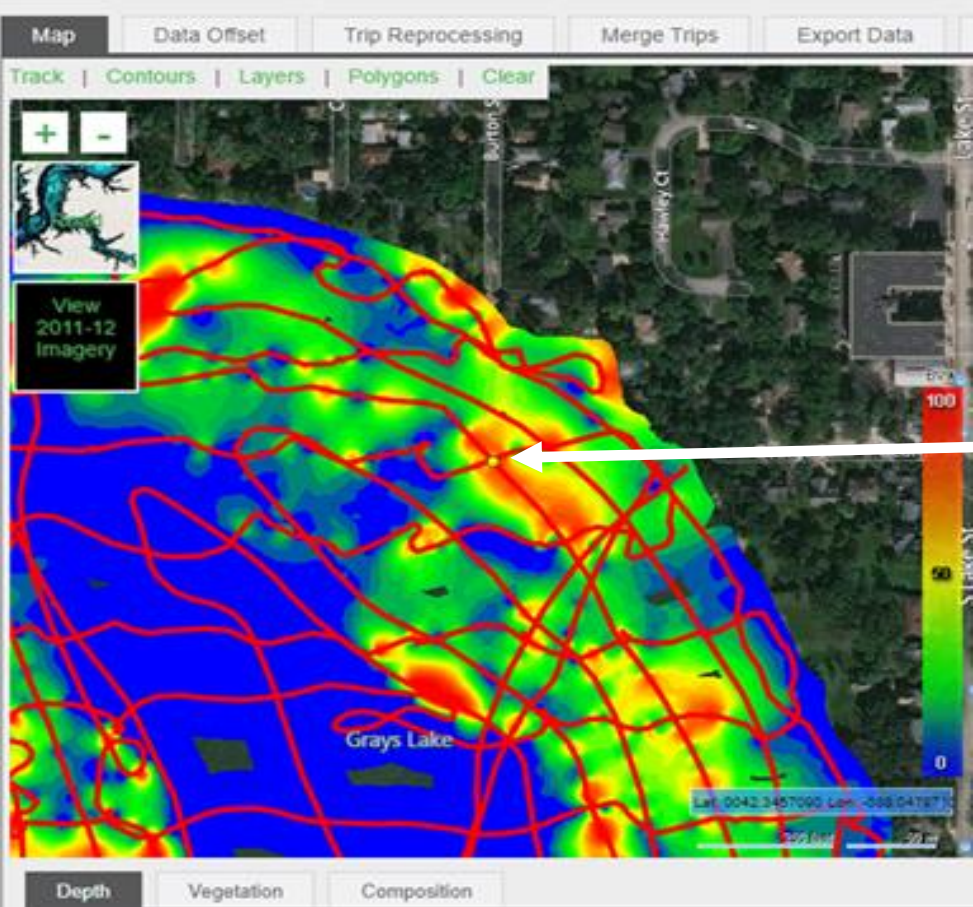
View All Public Assessments

Your Inventory Assessments

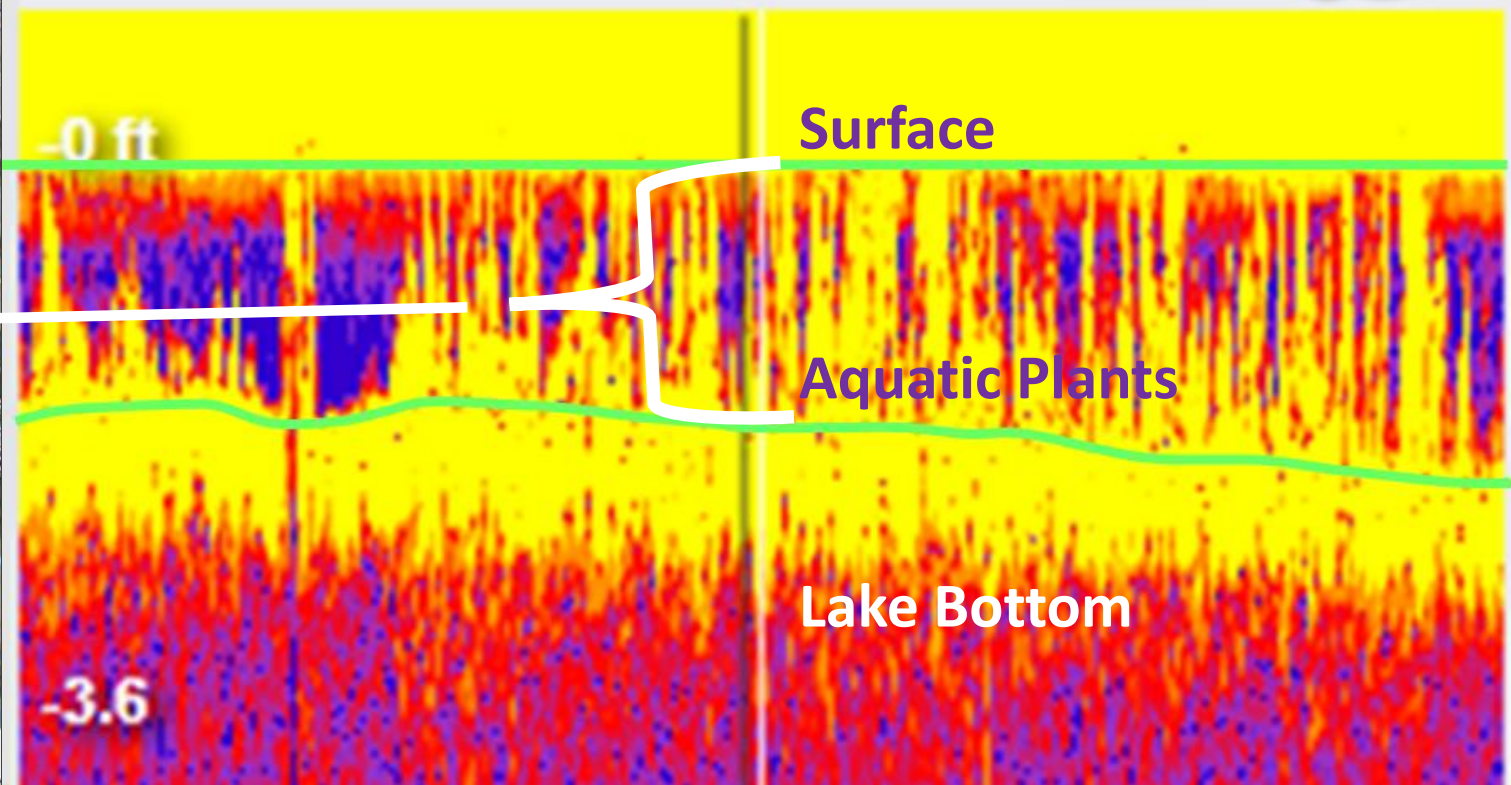
Assessment Name	Date	Site	Practitioner	FQA Database	Public / Private	Options
Acorn Pond	2019-12-04	Acorn Pond	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Big Bear Lake	2019-08-09	Big Bear Lake	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Beaver Pond	2019-08-05	Beaver Lake	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Heron Pond	2019-08-05	Heron Pond	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Little Bear Lake	2019-08-04	Little Bear Lake	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Fourth Lake 2018	2018-11-16	Fourth Lake	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete
Grayslake 2018	2018-11-16	Grays Lake	Gerard Urbanozo	Chicago Region USACE, 2014	public	View Edit Download Delete



Aquatic Plant Heat Map - BioVolume



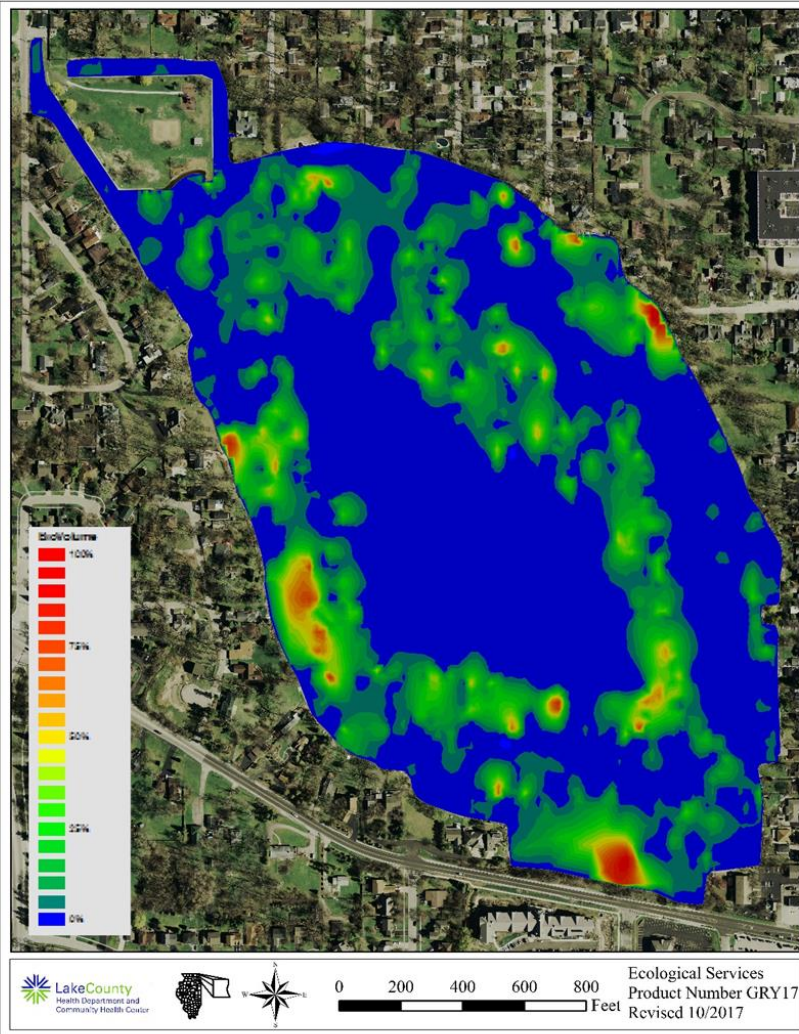
08/29/2017 17:45:48 (UTC)



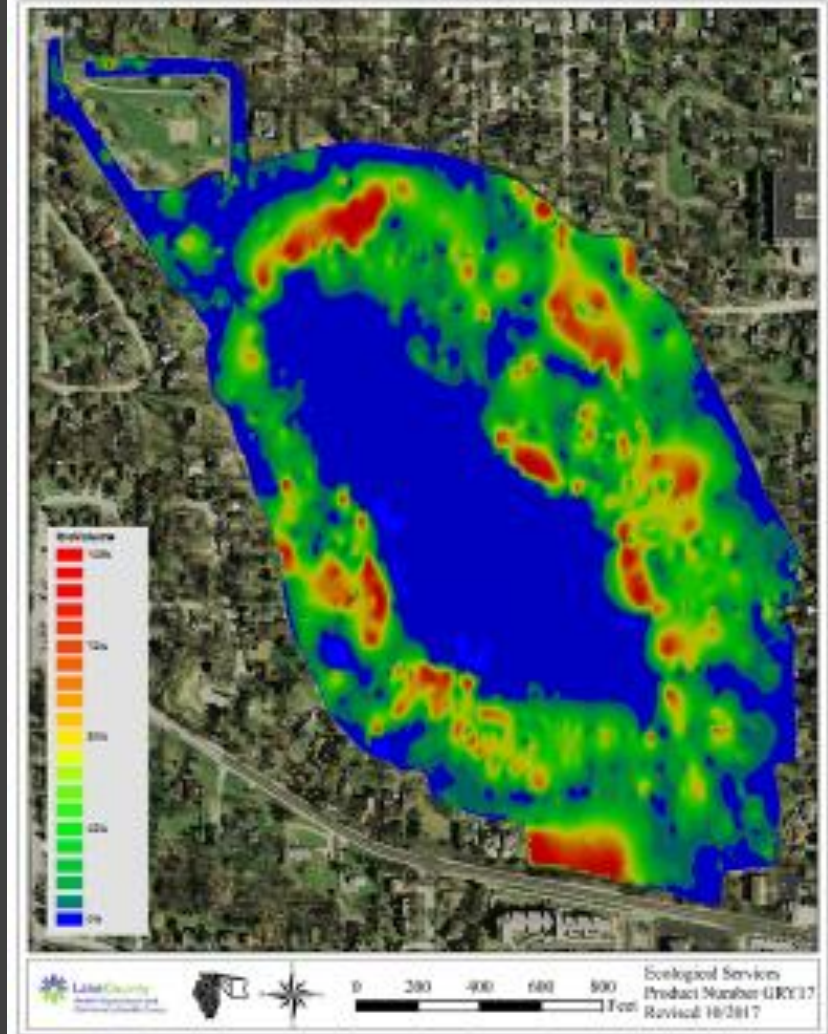
Row	Longitude	Latitude	BioVolume
1	-88.0509	42.34598	0.2783016
2	-88.051	42.34598	0.3690929
3	-88.0511	42.34598	0.3610182
4	-88.0512	42.34598	0.2162302
5	-88.0513	42.34598	0.1077656
6	-88.0508	42.34592	0.172948
7	-88.0509	42.34592	0.1762844
8	-88.051	42.34592	0.2937523
9	-88.0511	42.34592	0.561735
10	-88.0512	42.34592	0.09118619

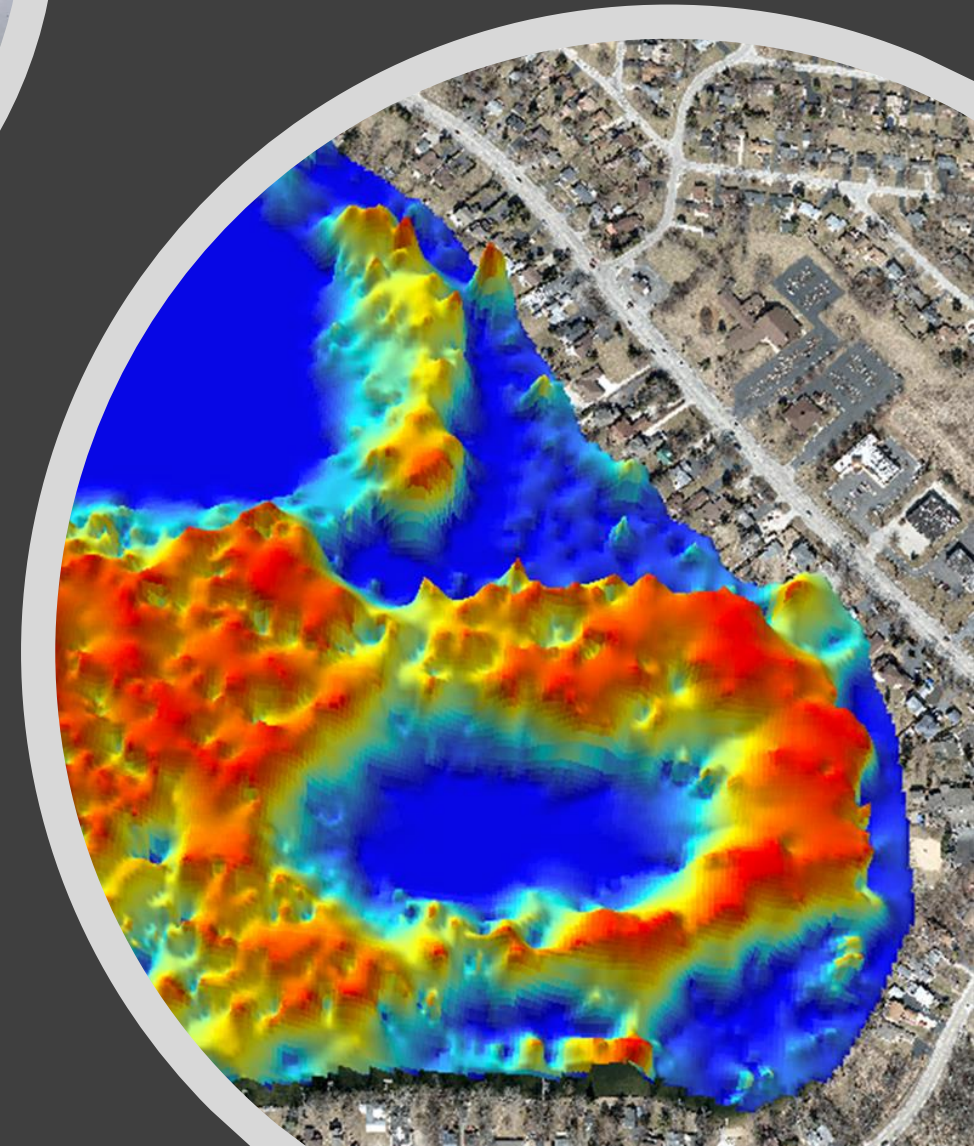
BioBase BioVolume

Grayslake May 2017 Aquatic Plant Bio-Volume



Grayslake August 2017 Aquatic Plant Bio-Volume



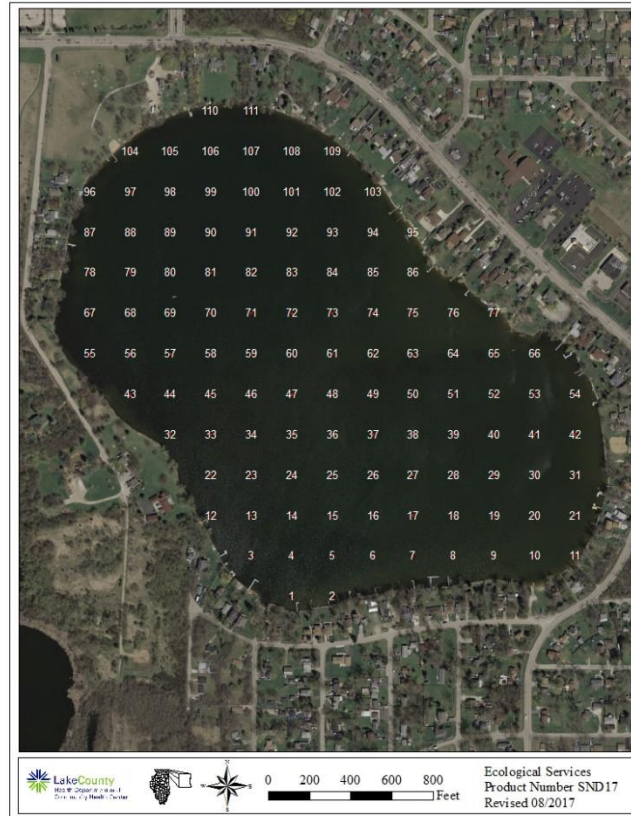


How can I use maps to manage aquatic plants in my lake?

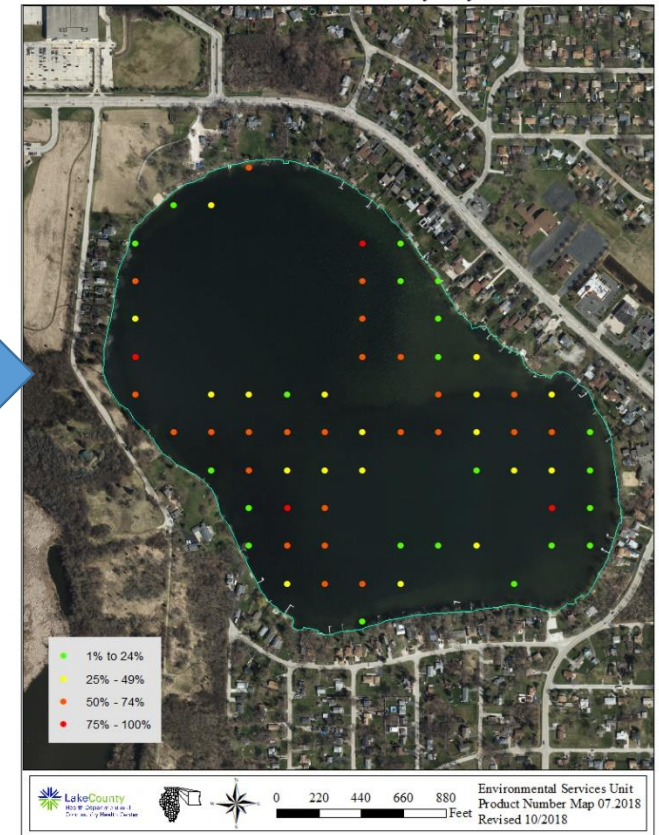
Sand Lake Elodea Rake Density 2018



Sand Lake Plant Grid 2017



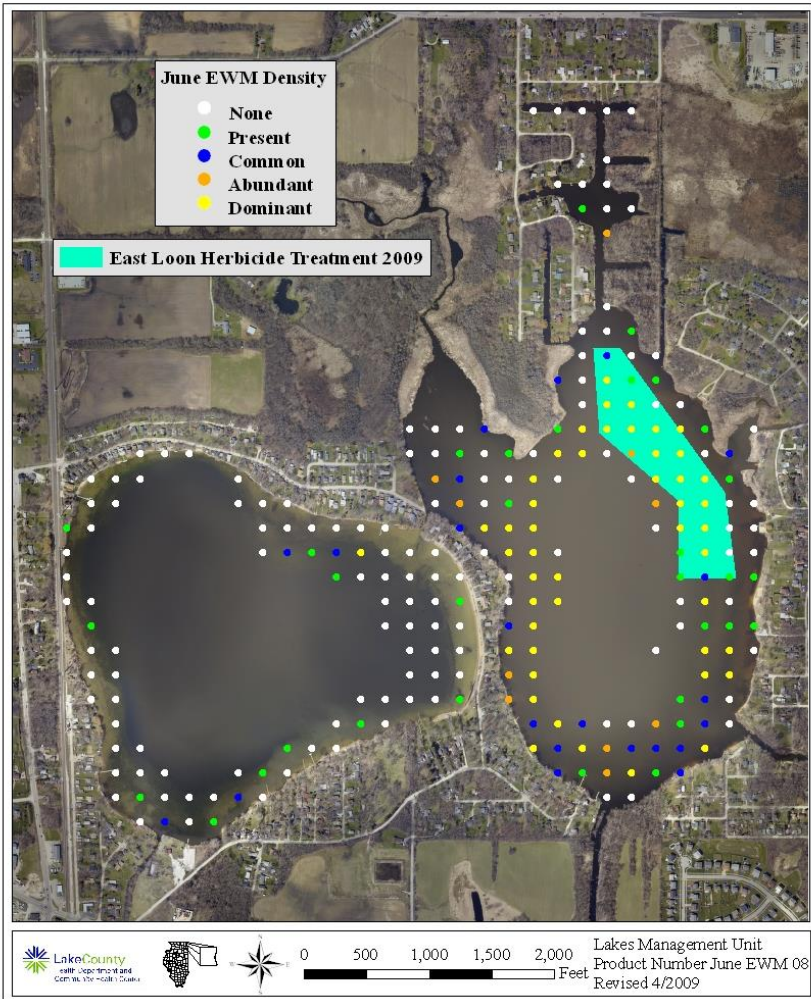
Sand Lake EWM Rake Density July 2018



Sand Lake Coontail Rake Density July 2018

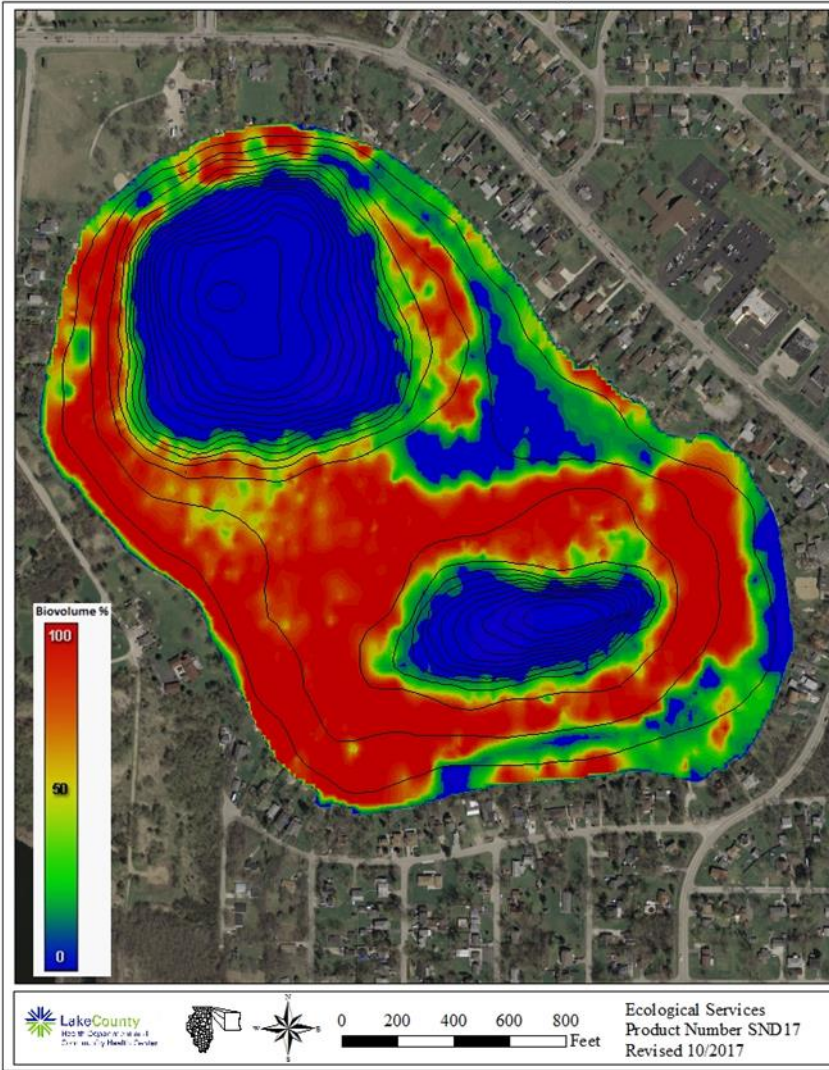


Point Intercept Plant Survey



Treatment Site based on Rake Density

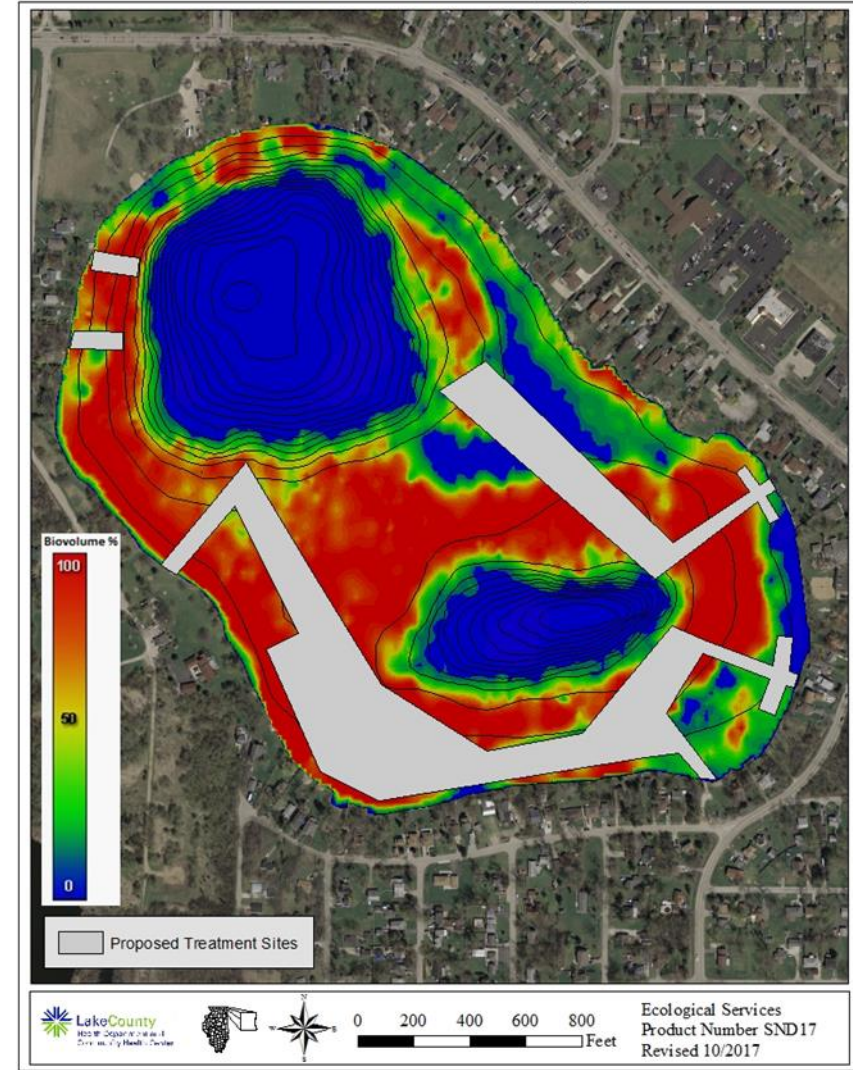
Sand Lake Plant Biovolume, September 2017



September 2017 BioVolume Survey

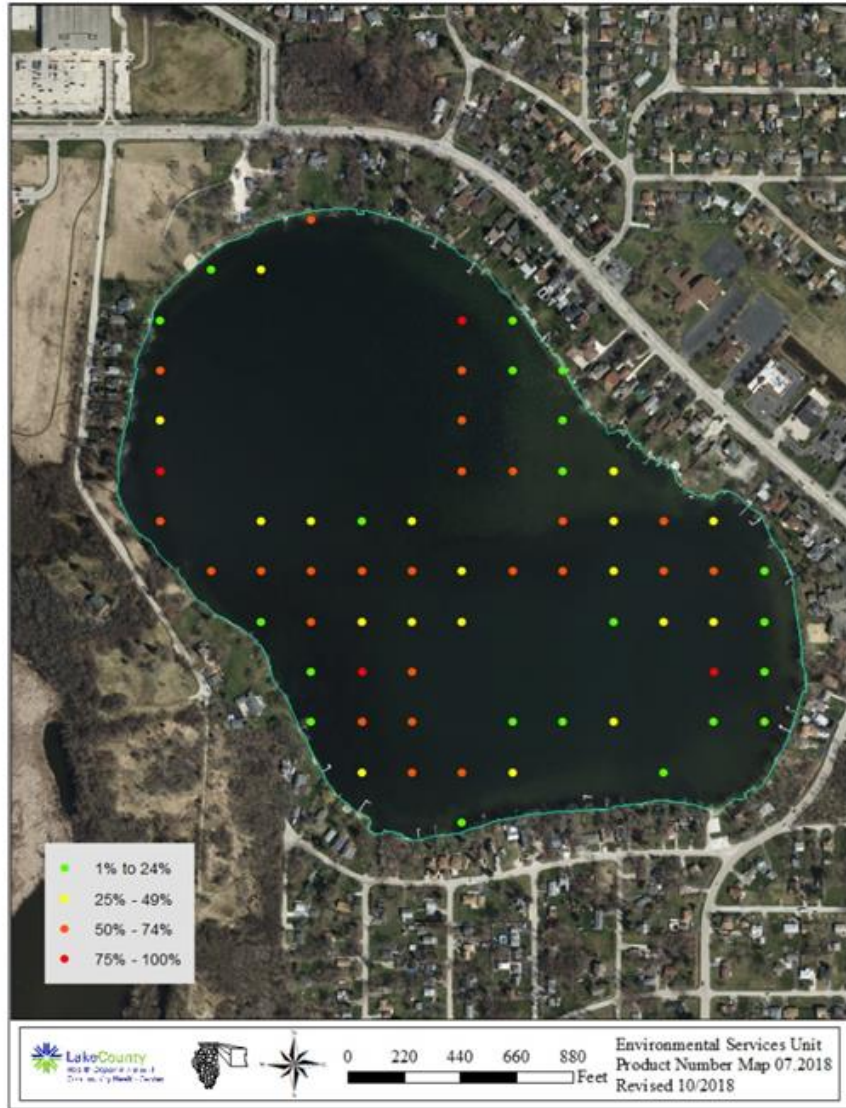


Sand Lake Plant Biovolume, September 2017



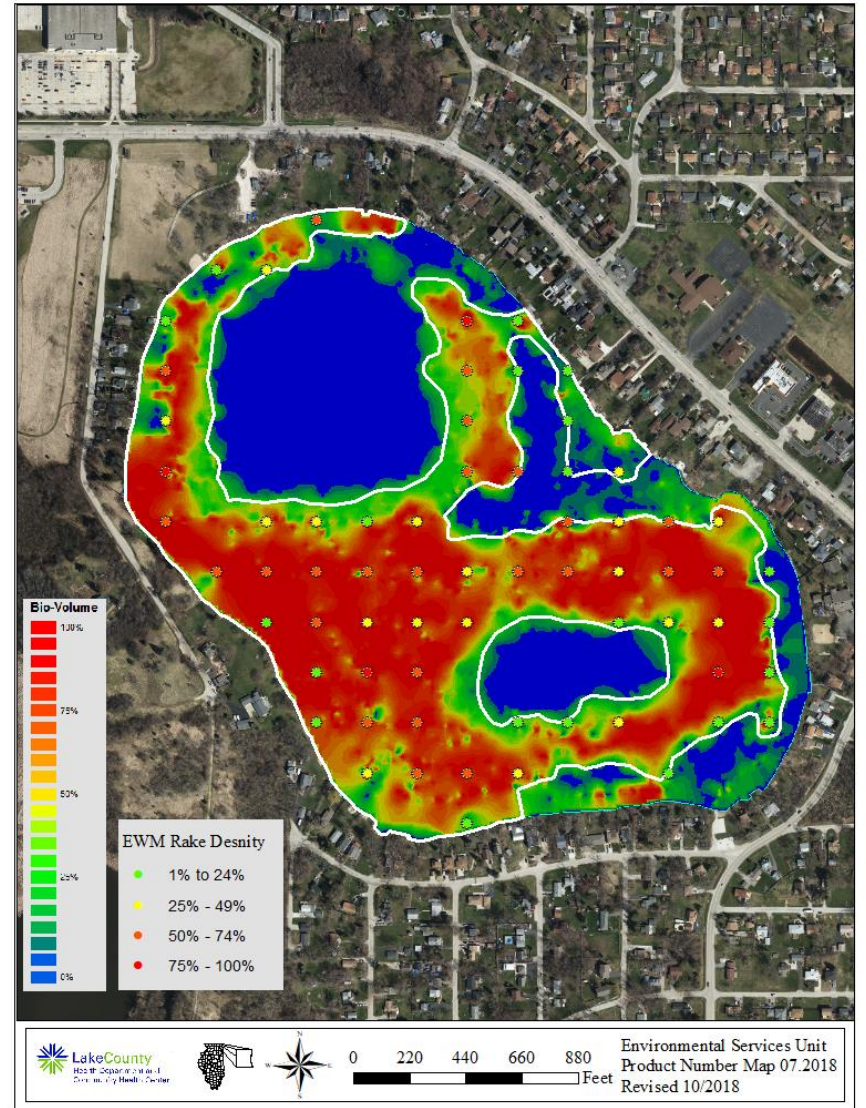
Proposed Treatment Site for Spring of 2018

Sand Lake EWM Rake Density July 2018



Combine Maps

Sand Lake BioVolume & EWM Rake Density July 2018



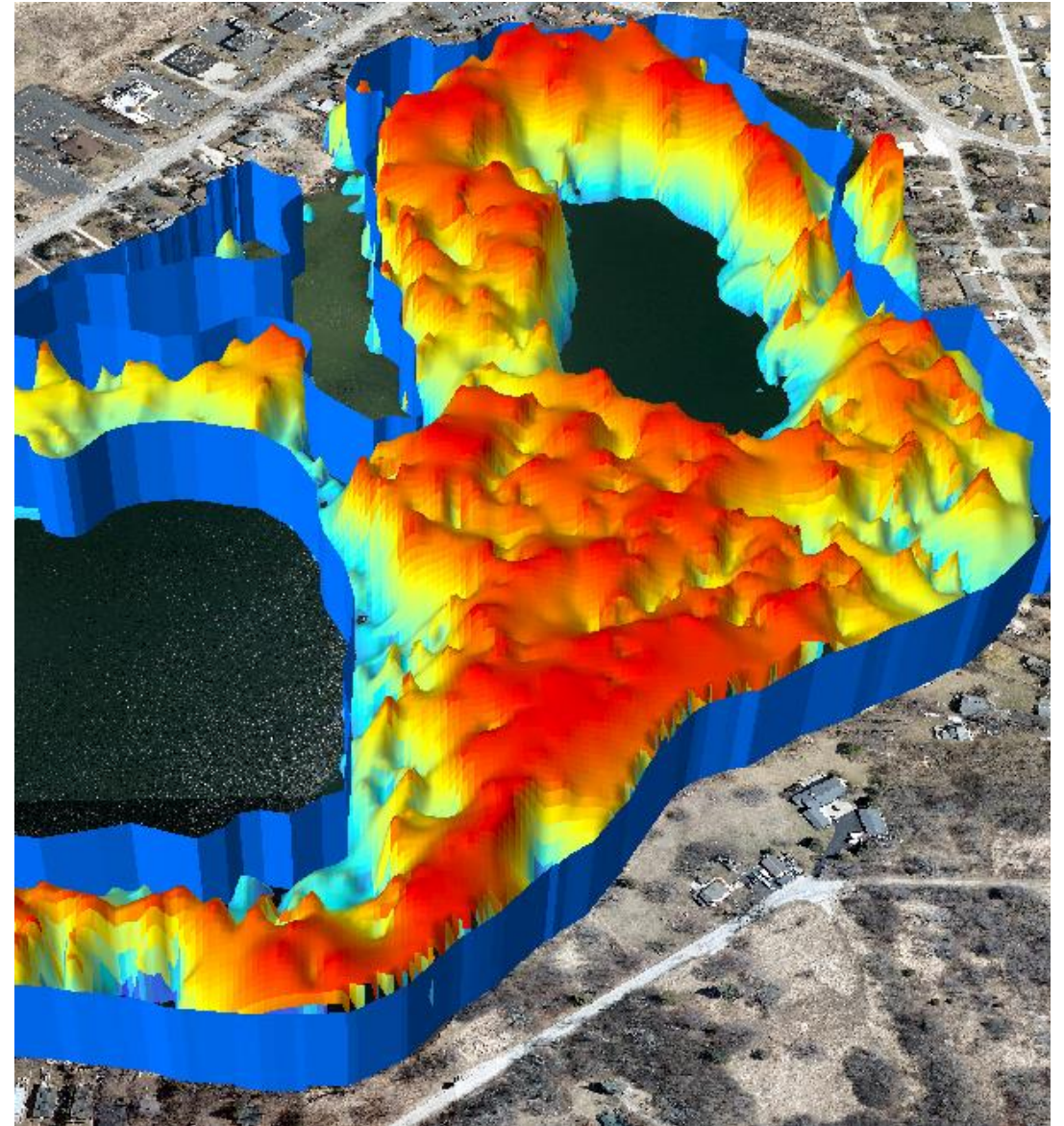
Sand Lake EWM Area Volume

Data From the July 2018 CIBiobase Aquatic Plant Survey Survey, LCHD Ecological Services

Contour (Feet)	Area Enclosed (Acres)	Percent of total acres	Volume (Acre-feet)	Depth Zone (Feet)	Area (Acres)	Percent (Depth zone to total acres)	Percent (Acre-feet to Total Volume)
0	61.19	100.0%	60.89	0 - 1	2.41	3.9%	22.1%
1	58.77	96.1%	57.38	1 - 2	4.37	7.1%	20.9%
2	54.41	88.9%	50.48	2 - 3	9.09	14.9%	18.4%
3	45.31	74.1%	39.46	3 - 4	12.54	20.5%	14.4%
4	32.78	53.6%	26.40	4 - 5	13.18	21.5%	9.6%
5	19.60	32.0%	15.96	5 - 6	7.77	12.7%	5.8%
6	11.83	19.3%	9.81	6 - 7	4.53	7.4%	3.6%
7	7.30	11.9%	6.10	7 - 8	2.80	4.6%	2.2%
8	4.50	7.3%	3.81	8 - 9	1.69	2.8%	1.4%
9	2.81	4.6%	2.30	9 - 10	1.22	2.0%	0.8%
10	1.59	2.6%	1.29	10 - 11	0.73	1.2%	0.5%
11	0.86	1.4%	0.65	11 - 12	0.47	0.8%	0.2%
12	0.39	0.6%	0.28	12 - 13	0.24	0.4%	0.1%
13	0.15	0.2%	0.09	13 - 14	0.11	0.2%	0.0%
14	0.04	0.1%	0.02	14 - 15	0.03	0.1%	0.0%
15	0.00	0.0%	0.00	15 - 16	0.00	0.0%	0.0%
			274.92		61.19	100%	100%

Maximum Depth of Lake: 32 Feet
 Average Depth of Lake: 9.07 Feet
 Volume of Lake: 909.49 Acre-Feet

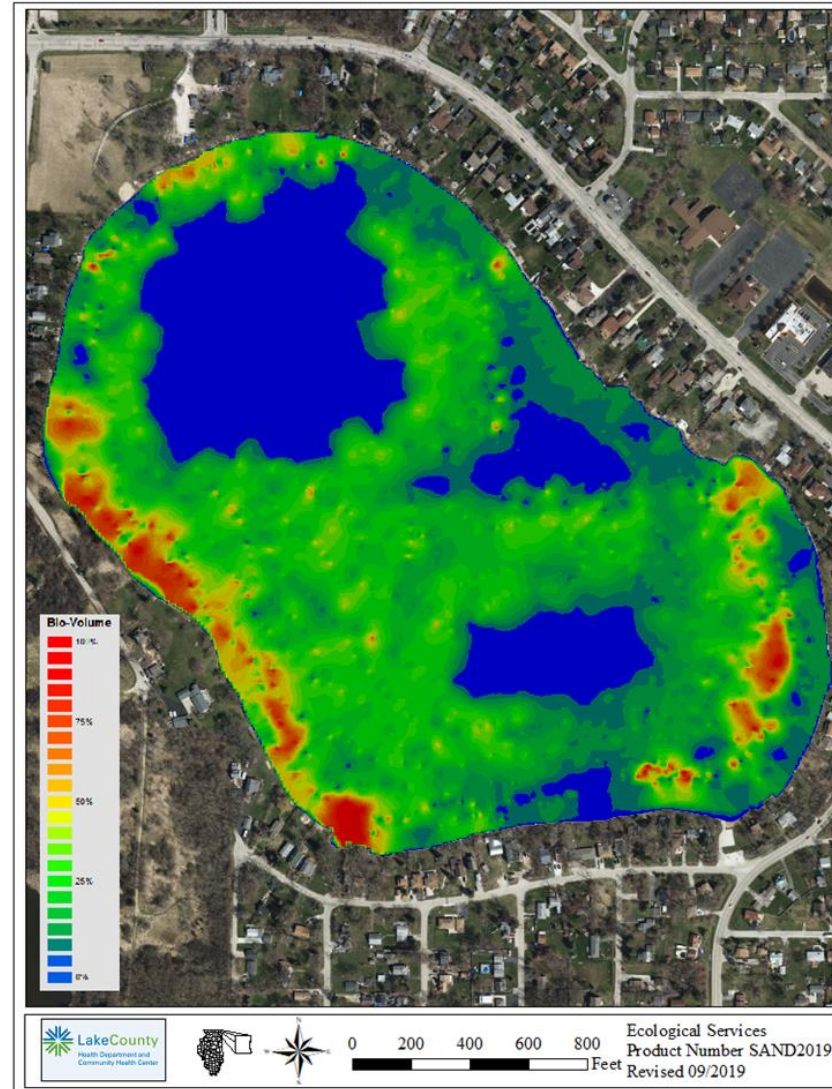
EWM Surface Area of Lake: 61.19 Acres
 EWM Treatment Zone Volume : 274.92 (Acre-Feet)



Sand Lake Post Treatment



Sand Lake BioVolume September 2019

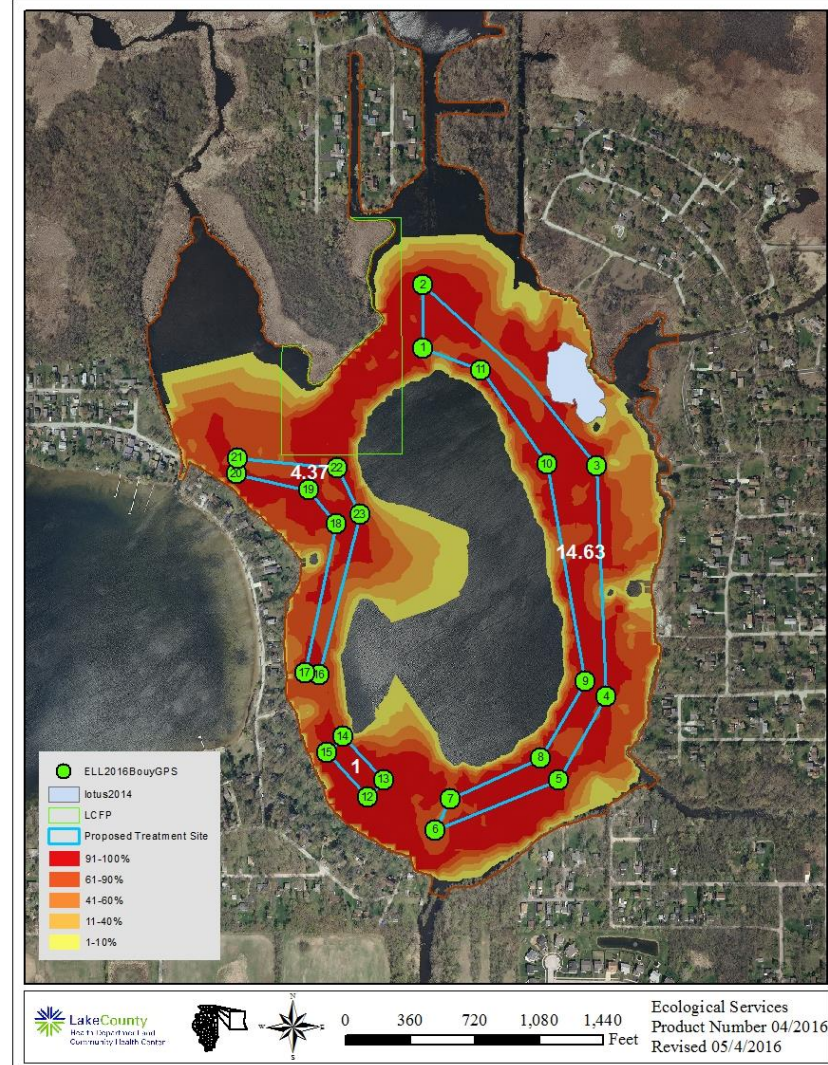




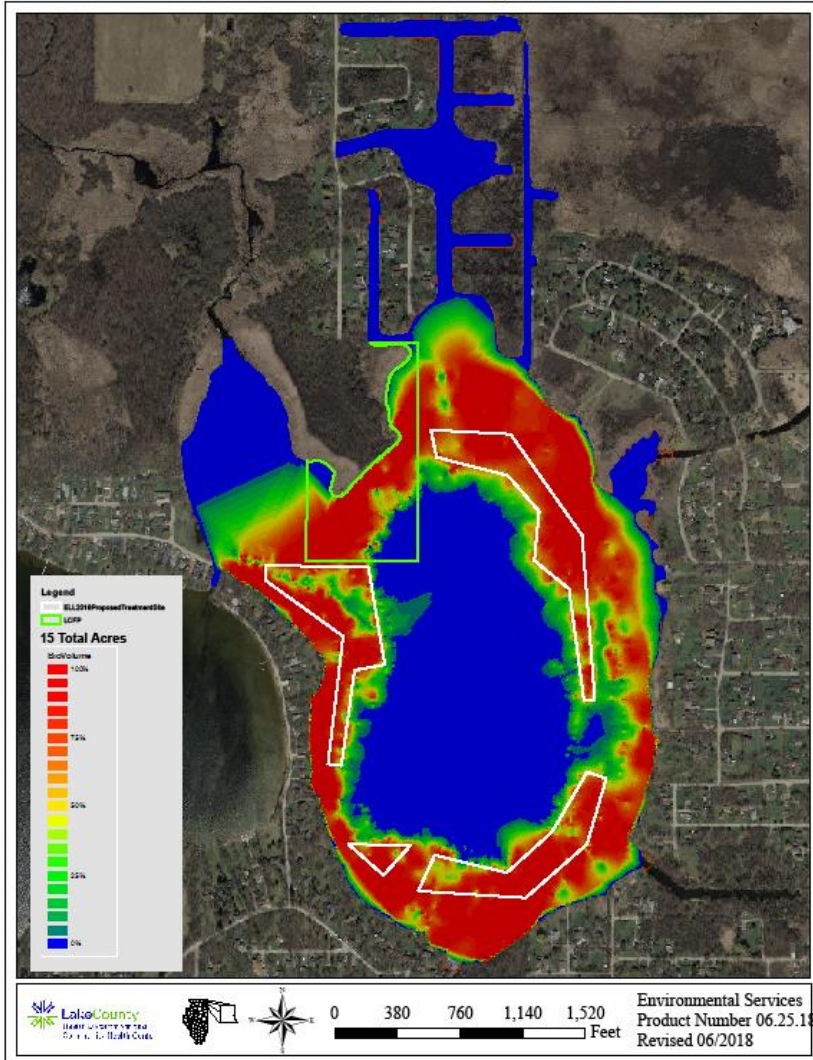
Early Season Plant Sampling
for Curlyleaf Pondweed and
Eurasian Watermilfoil



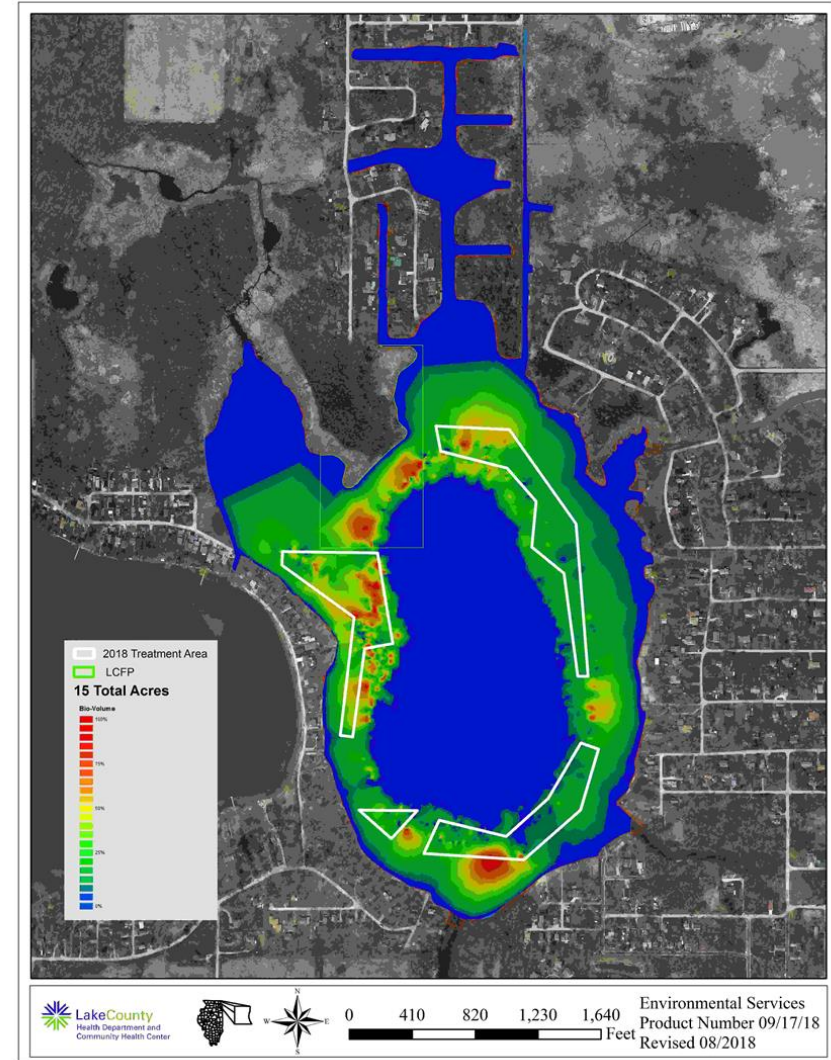
2016 East Loon Lake EWM Proposed Treatment Site



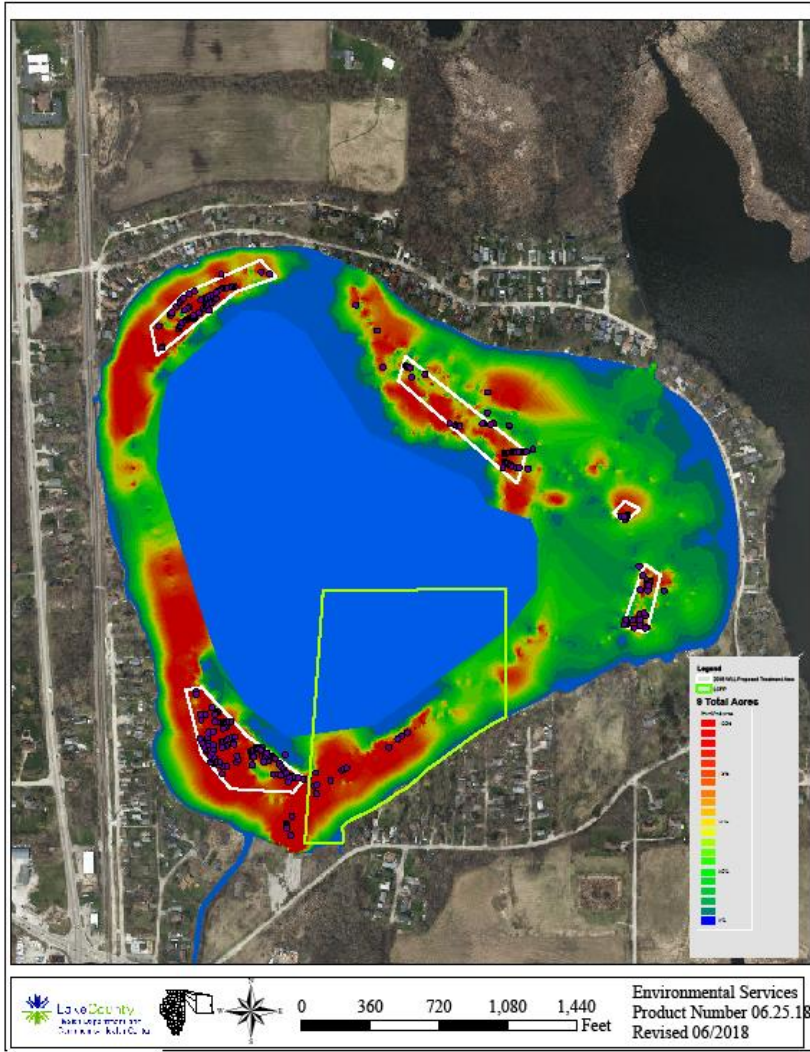
2018 East Loon Lake EWM Proposed Treatment Site



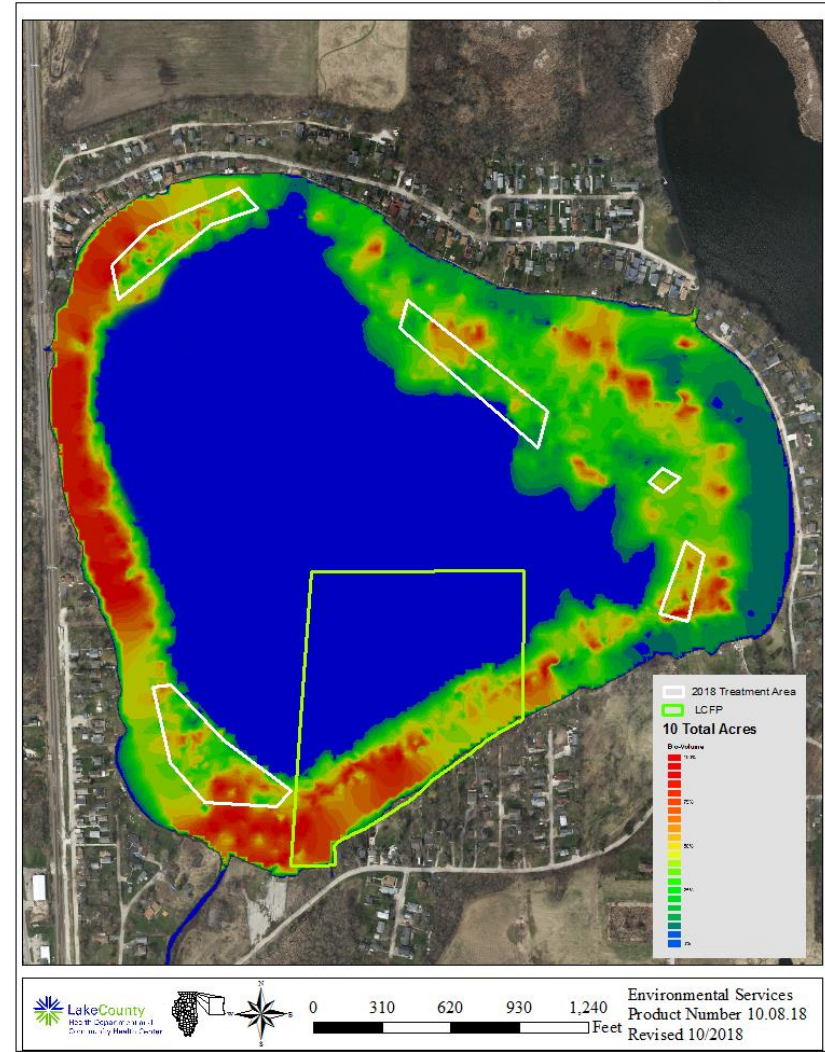
2018 East Loon Lake Post Treatment Bio Volume



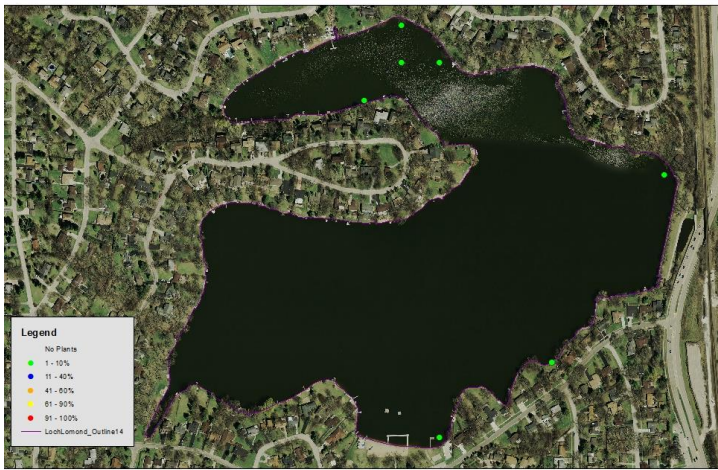
2018 West Loon Lake Proposed Treatment Site



West Loon Lake Post Treatment BioVolume Survey 2018



Loch Lomond Plant Rake Density July 2015



LakeCounty
Health Department and
Center of the Health Center



Ecological Services
Product Number 07/15
Revised 01/2015



Loch Lomond Aquatic Plant BioVolume Density September 2018

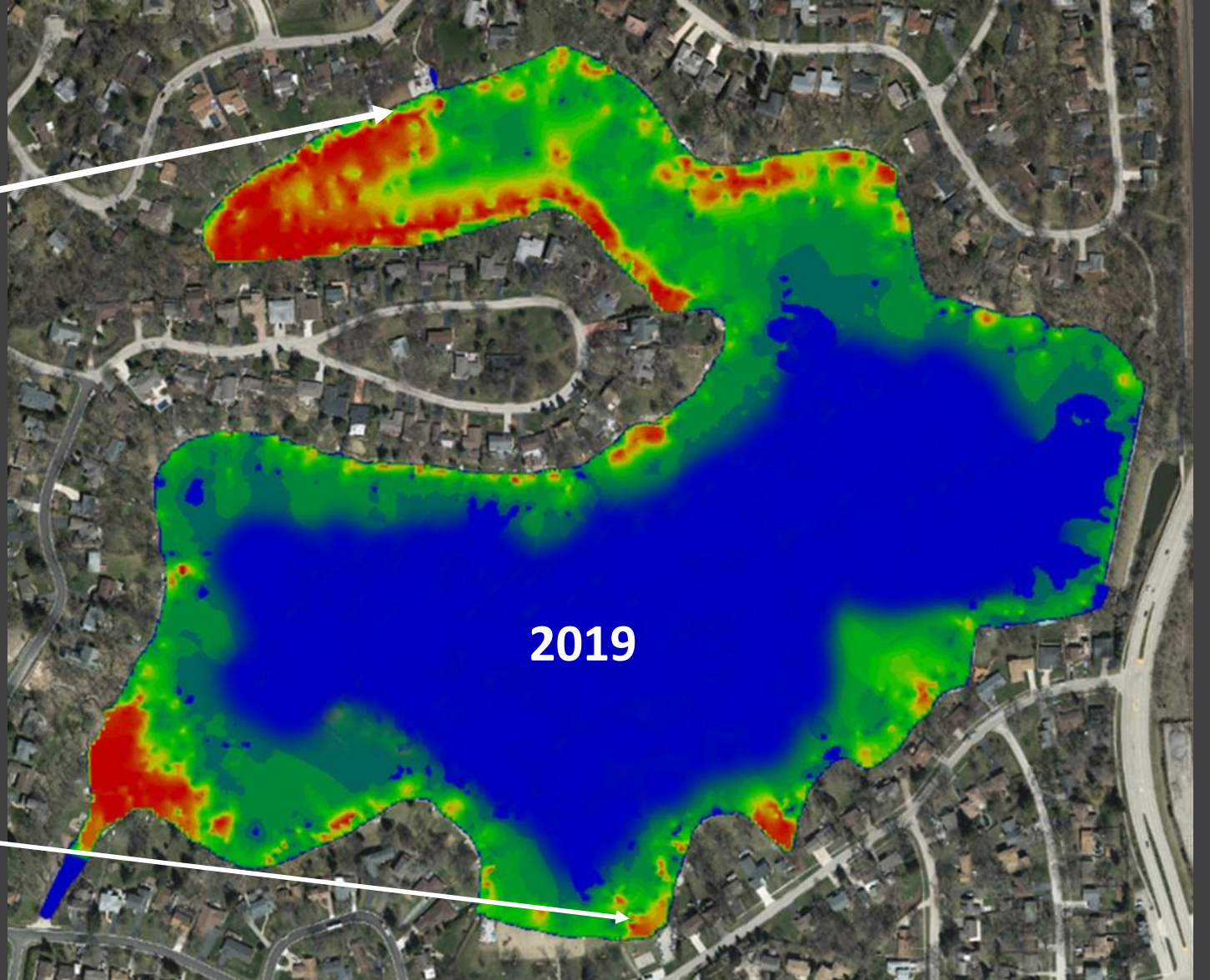
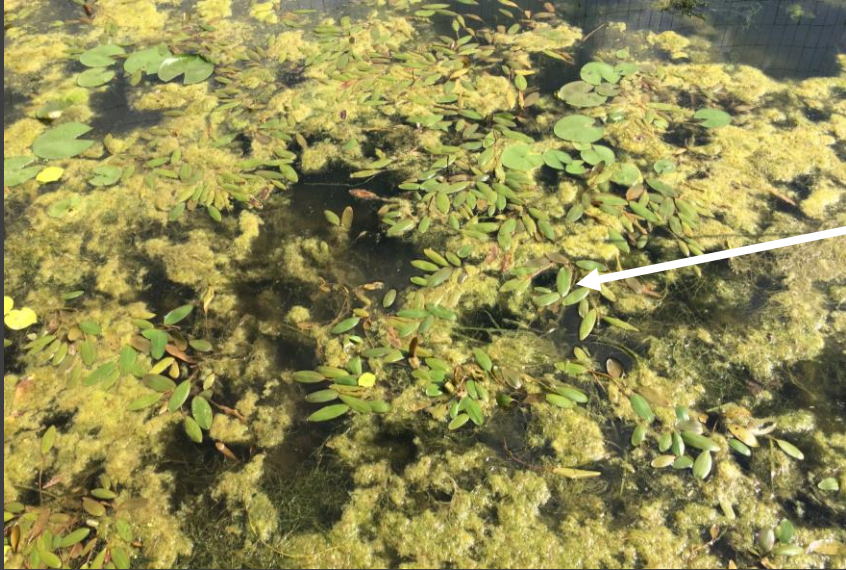


LakeCounty
Health Department and
Center of the Health Center



Ecological Services
Product Number 09/18
Revised 10/2018

What about lakes with no plants?





Survey

Rake Density (Coverage)	# of Sites	%	Plant Density	Clam	Curlleaf Pondweed	Floatingleaf Pondweed	Illinois Pondweed	Sago Pondweed	Slender Naiad
No plants	30	32.3	Absent	76	74	77	75	69	60
>0 to 10%	14	15.1	Present	1	3	0	0	3	9
>10 to 40%	17	18.3	Common	0	1	1	2	6	7
>40 to 60%	5	5.4	Abundant	1	0	0	1	0	2
>60 to 90%	0	0.0	Dominant	0	0	0	0	0	0
>90%	0	0.0	% Plant Occurrence	2.2%	4.3%	1.1%	3.2%	9.7%	19.4%
Total Sites with Plants	36	38.7	Plant Density	Southern Naiad	Spatterdock	Spiny Naiad	Watermeal	Water Star-grass	White Water Lily
Total # of Sites	93	100.0	Absent	77	73	69	77	48	73
			Present	0	1	3	1	11	3
			Common	1	2	5	0	6	2
			Abundant	0	1	1	0	10	0
			Dominant	0	1	0	0	3	0
			% Plant Occurrence	1.1%	5.4%	9.7%	1.1%	32.3%	5.4%

Rake Density /Plant List



Treatment Sites

REQUEST FOR PROPOSALS (RFP)
HERBICIDE APPLICATION FOR THE CONTROL OF EURASIAN WATERMILFOIL IN LEONARD LAKE
LAKE COUNTY, ILLINOIS

1. GENERAL DESCRIPTION OF WORK

The work described herein involves application of herbicide products in Leonard Lake where the invasive aquatic plant species, Eurasian Watermilfoil (EWM) has reached nuisance levels and is causing negative consequences to the lakes' native plant communities.

A 2018 study found EWM growing in approximately 61 acres of the 100 acre lake. The Leonard Lake Property Owners Association (LLPOA) seeks proposals to chemically control the EWM for the 2020 season.

2. DETAILED DESCRIPTION OF WORK

The successful contractor shall complete the following tasks:

A. Recommend an herbicide treatment (spot treatment or whole lake) and specify the product (i.e., 2,4-D, fluridone, triclopyr, fluroxypyr/2,4-dimethylglutathione-benzil [ProceltoCo], or another aquatic herbicide). Indicate cost, chemical brand name and how much product will be used per surface acre or on a volumetric rate, on proposal form. Price will include follow up assessments or tests of effectiveness. Price will include any follow up treatment if needed. Contractor will describe the mode of application treatment.

a. Include at least one treatment option of a whole lake treatment using fluridone

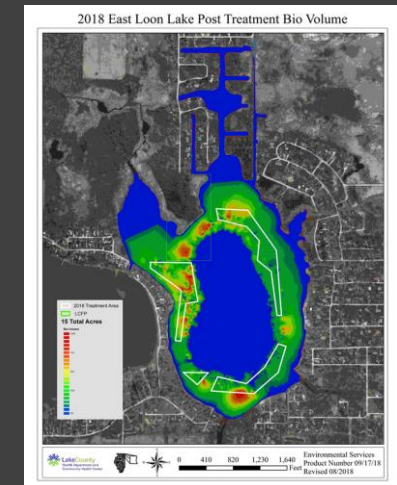
b. Include your company's experience with fluridone and the method(s) used to deploy the correct amount of treatment, i.e. how is your equipment calibrated, etc.

c. Describe the follow up testing methods and timing you use to check the fluridone treatment concentration

B. Contractor may be asked to attend SLPOA meeting to present the proposal to the association members.

C. Contractor will mutually agree with Leonard Lake Property Owners Association (SLPOA) when proposed treatment will take place.

Request for Service



Post-Treatment Map

