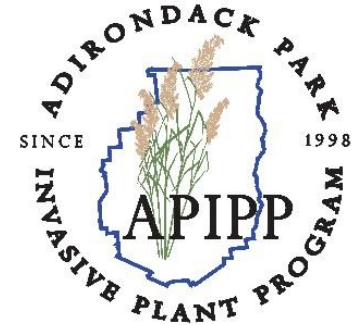




**Adirondack
Park Agency**



Lake Management Tracker Survey

A Citizen Scientist Approach

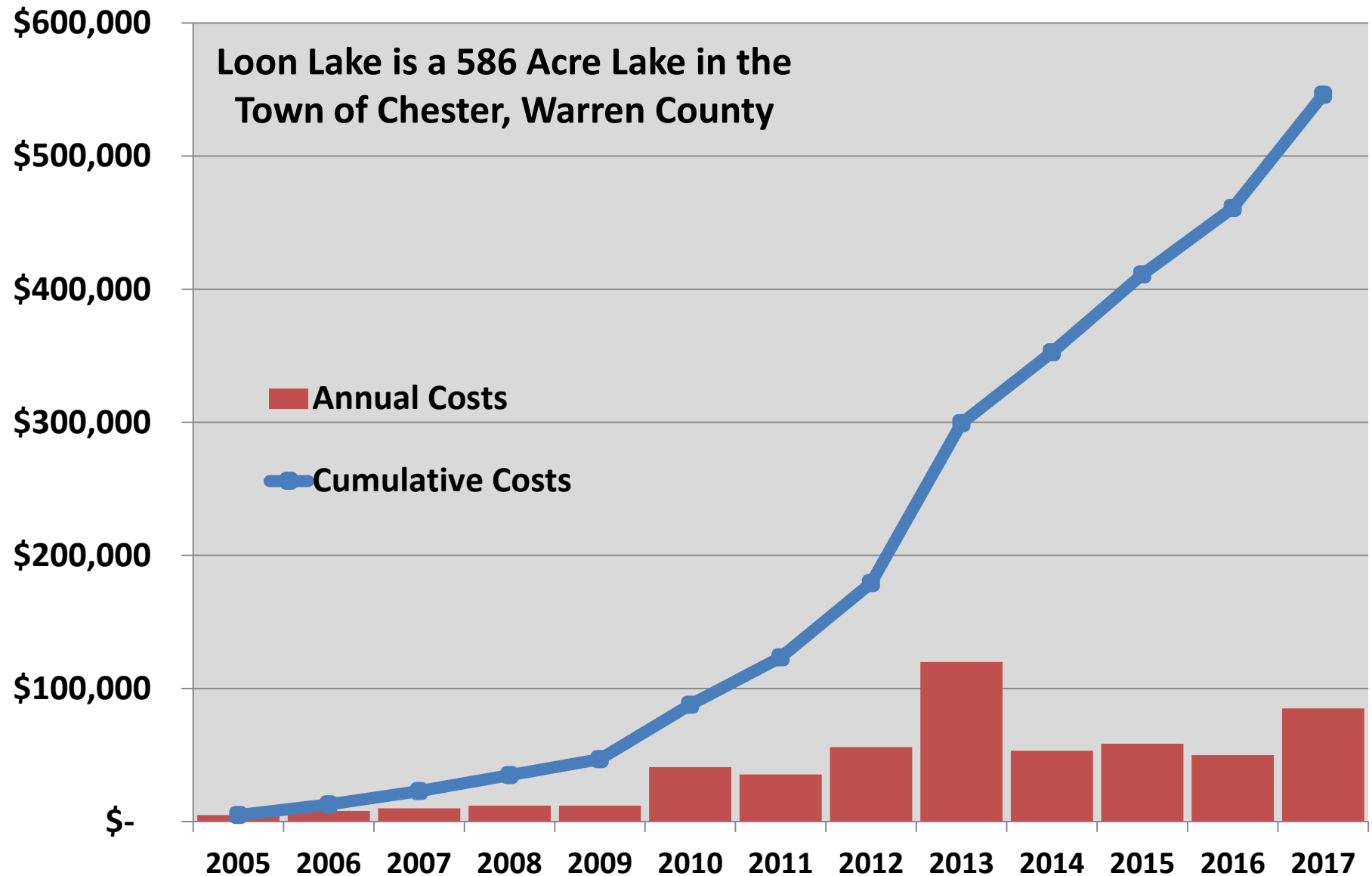
May 8, 2019

Erin Vennie-Vollrath
AIS Project Coordinator
The Nature Conservancy's APIPP

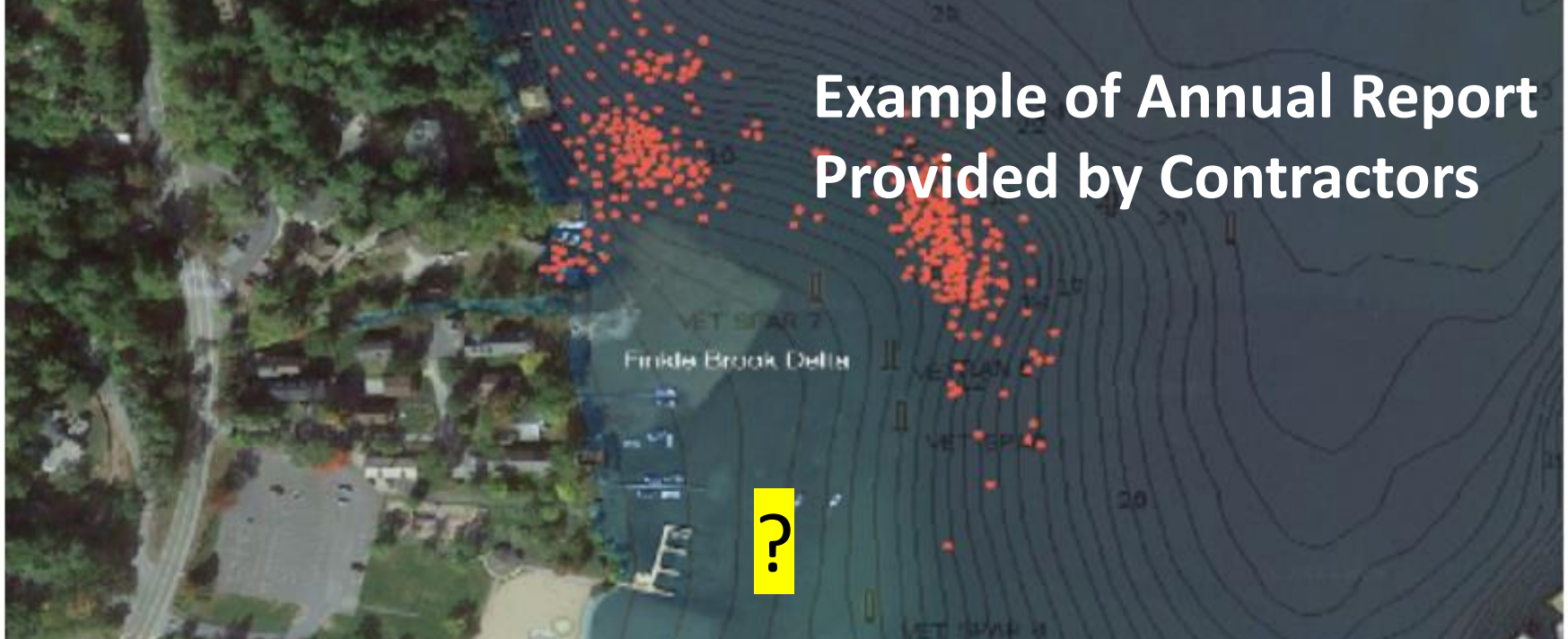
Leigh Walrath
Freshwater Analyst
Adirondack Park Agency

Adirondack Lakes Alliance and the Loon Lake Park District Association Asked:

“How do we know if we’re making progress?”



Example of Annual Report Provided by Contractors



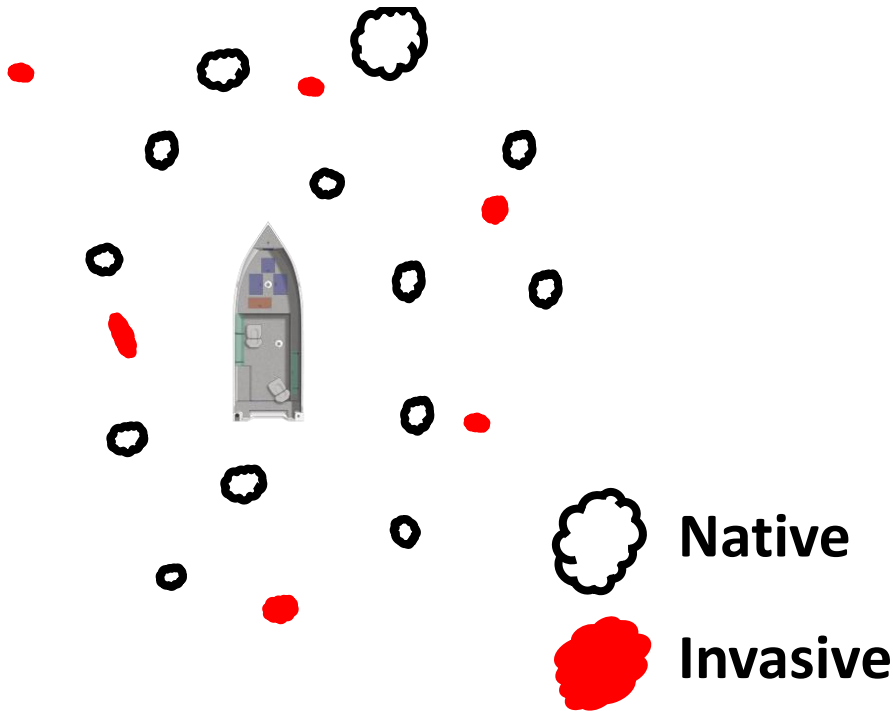
In general, harvest reports only report where activities have occurred and amount of material harvested. Severity, areal extent, and progress in managing an infestation can only be inferred.

Site #	Site Name	# of Days	2018	2017	2016	2015
1	North West Bay	14	1050 bks 36,750 lbs	224 bgs	1005 bgs	310.5 bgs
4	Huddle Bay			2 bgs	-	265 bgs
5	W. Green Island					70.84 bgs
6	Sunset Bay	21	22,720 lbs			261 bgs
7	LG Village			-	21 bgs	840 bgs

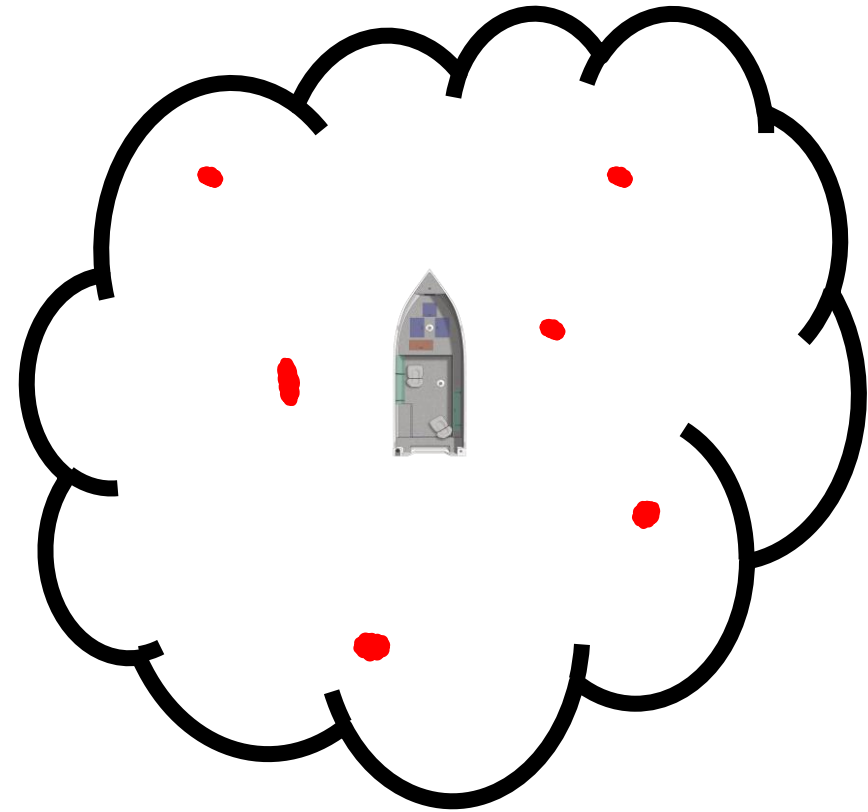
1 Bucket = Approximately 1.5 Bags

Grid-Based Survey Assesses Natives and Invasives Together

Trace to Sparse Native,
Few Plants Widely Scattered
Invasive

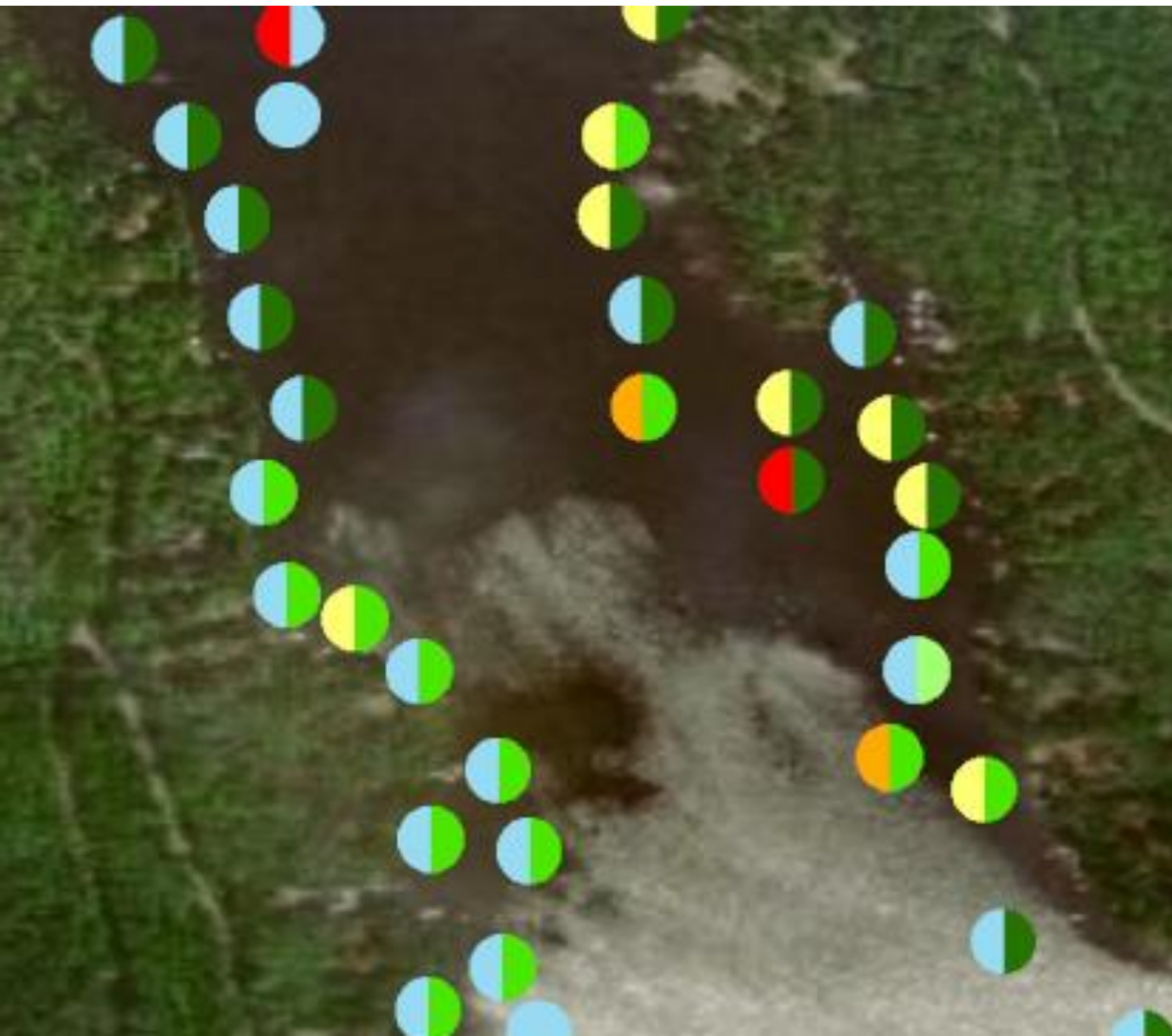


Moderate to Dense Native,
Few Plants Widely Scattered Invasive







Survey Designed to Rapidly Assess Invasive and All Native Plant Distribution and Qualitative Abundance





- Allows Assessment of Change Over Time -



Native Vegetation Abundance

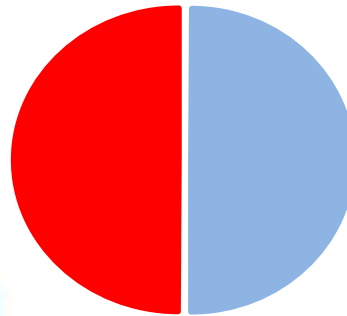
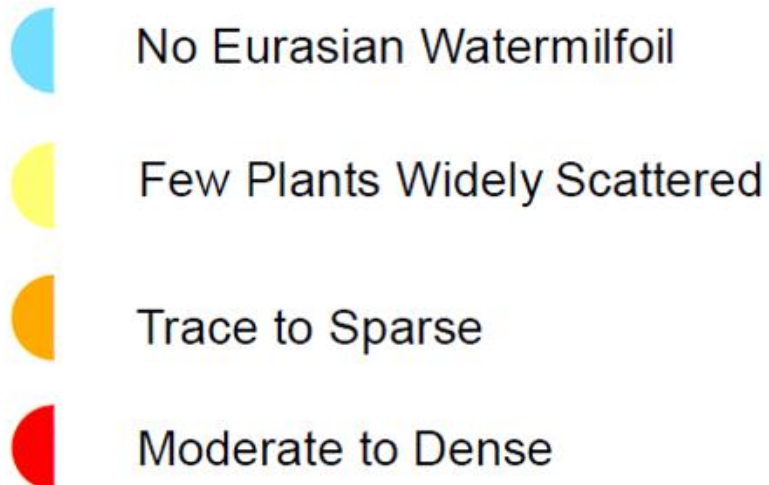
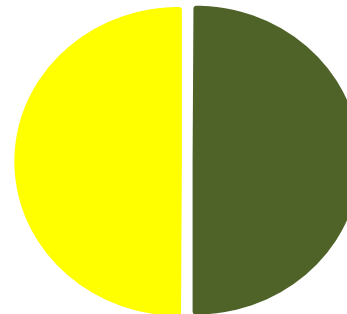
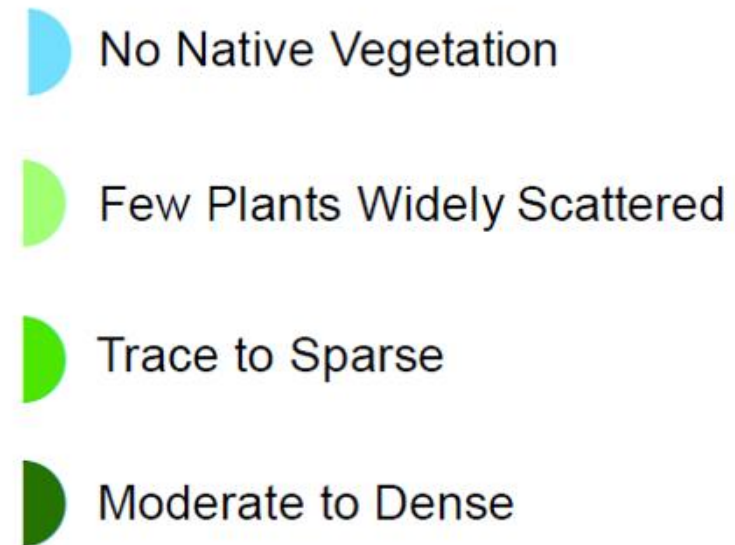
-  No Native Vegetation
-  Few Plants Widely Scattered
-  Trace to Sparse
-  Moderate to Dense

Eurasian Watermilfoil Abundance

-  No Eurasian Watermilfoil
-  Few Plants Widely Scattered
-  Trace to Sparse
-  Moderate to Dense



**Adirondack
Park Agency**

Eurasian Watermilfoil AbundanceNative Vegetation Abundance

Loon Lake Results

Waypoint Number	Survey Type	What is the overall appearance of the area?	Native Vegetation	Eurasian Watermilfoil	Date	Latitude	Longitude
0	Visual	1	2	1	2018-10-05 4:00	43.66214	-
1	Visual	2	3	2	2018-09-20 4:00	43.6625204	-
2	Visual	2	3	1	2018-09-20 4:00	43.66284942	-
3	Aquascope	2	3	1	2018-09-20 4:00	43.66292838	-
4	Visual	2	3	2	2018-09-20 4:00	43.66325086	-
5	Aquascope	2	3	1	2018-09-20 4:00	43.66395807	-
6	Visual	2	3	1	2018-09-20 4:00	43.66469336	-
7	Visual	2	3	1	2018-09-20 4:00	43.6645508	-
8	Visual	2	3	1	2018-09-20 4:00	43.66452371	-
9	Aquascope	2	3	1	2018-09-20 4:00	43.66517316	-
10	Aquascope	2	3	0	2018-09-20 4:00	43.66507512	-
11	Visual	2	3	1	2018-09-20 4:00	43.66513622	-
12	Visual	2	3	1	2018-09-20 4:00	43.66606374	-
13	Aquascope	2	3	0	2018-09-20 4:00	43.665674	-
14	Aquascope	2	3	0	2018-09-20 4:00	43.66554074	-
15	Aquascope	2	3	2	2018-09-20 4:00	43.66560562	-
16	Visual	2	3	0	2018-09-20 4:00	43.66635933	-
17	Visual	2	3	0	2018-09-20 4:00	43.66640656	-
18	Aquascope	2	3	2	2018-09-20 4:00	43.66621345	-
19	Aquascope	2	3	2	2018-09-20 4:00	43.66642432	-
20	Aquascope	2	3	2	2018-09-20 4:00	43.66637361	-
21	Aquascope	2	3	1	2018-09-20 4:00	43.66615122	-
22	Visual	2	3	2	2018-09-20 4:00	43.66638047	-
23	Rake	3	1	0	2018-09-20 4:00	43.66645888	-
24	Rake	3	1	0	2018-09-20 4:00	43.66654912	-
25	Aquascope	2	3	1	2018-09-20 4:00	43.66659646	-
26	Aquascope	2	1	0	2018-09-20 4:00	43.66565366	-
26	Visual	3	2	1	2018-09-23 4:00	43.6655954	-
27	Aquascope	2	2	0	2018-09-28 4:00	43.6651692	-
28	Visual	2	3	0	2018-09-28 4:00	43.6651063	-

Loon Lake 2018 Results

	Native		Eurasian Watermilfoil	
None	18	7%	162	66%
Few Plants Widely Scattered	17	7%	63	26%
Trace/Sparse	61	25%	16	7%
Moderate/Dense	149	61%	4	2%
Total	245	100%	245	100%

Each survey site represents approximately 1 acre.

- **4 Acres of Moderate to Dense Eurasian watermilfoil**
- **16 Acres of Trace to Sparse Eurasian watermilfoil**

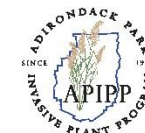
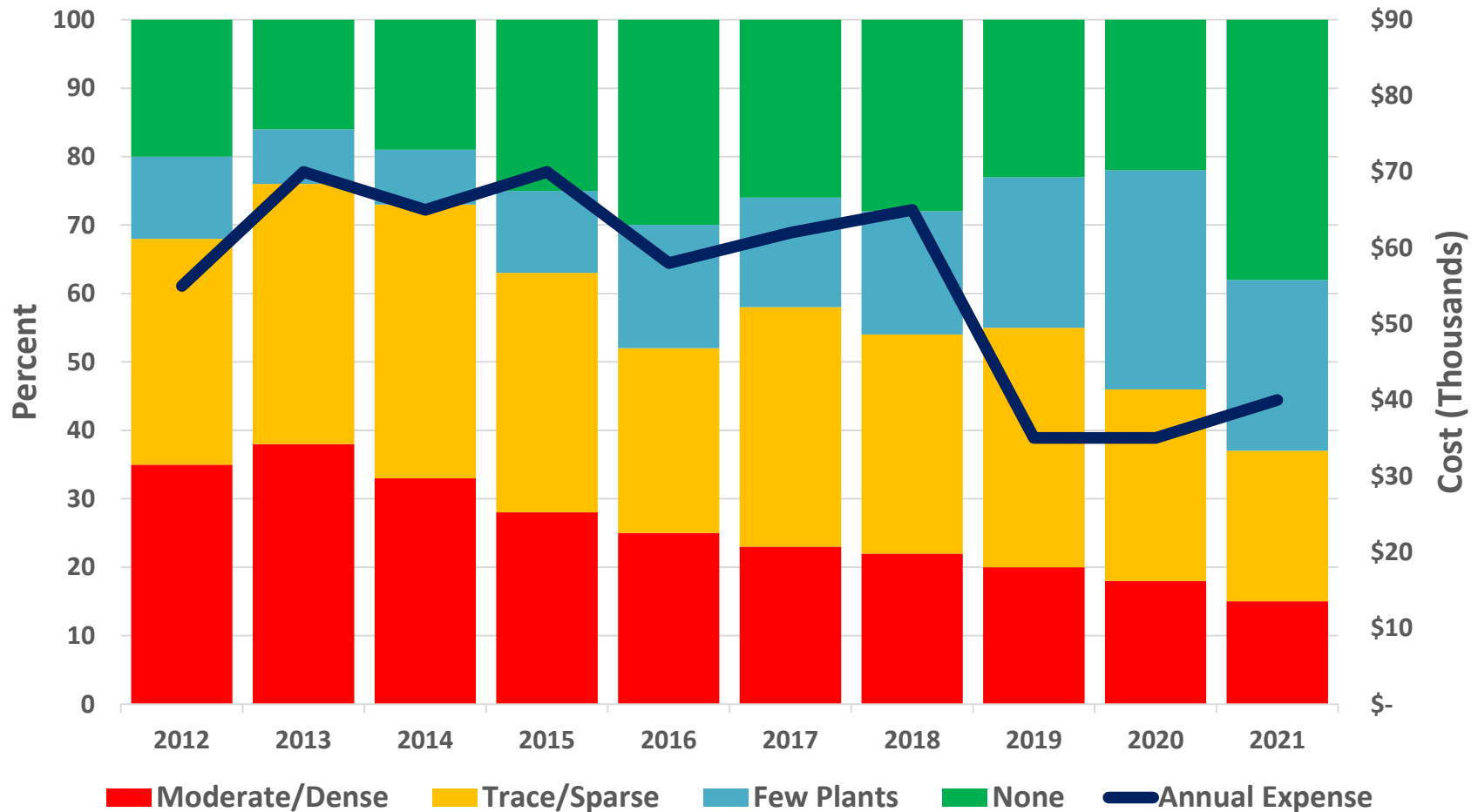
35% of Survey Sites found to have Eurasian watermilfoil



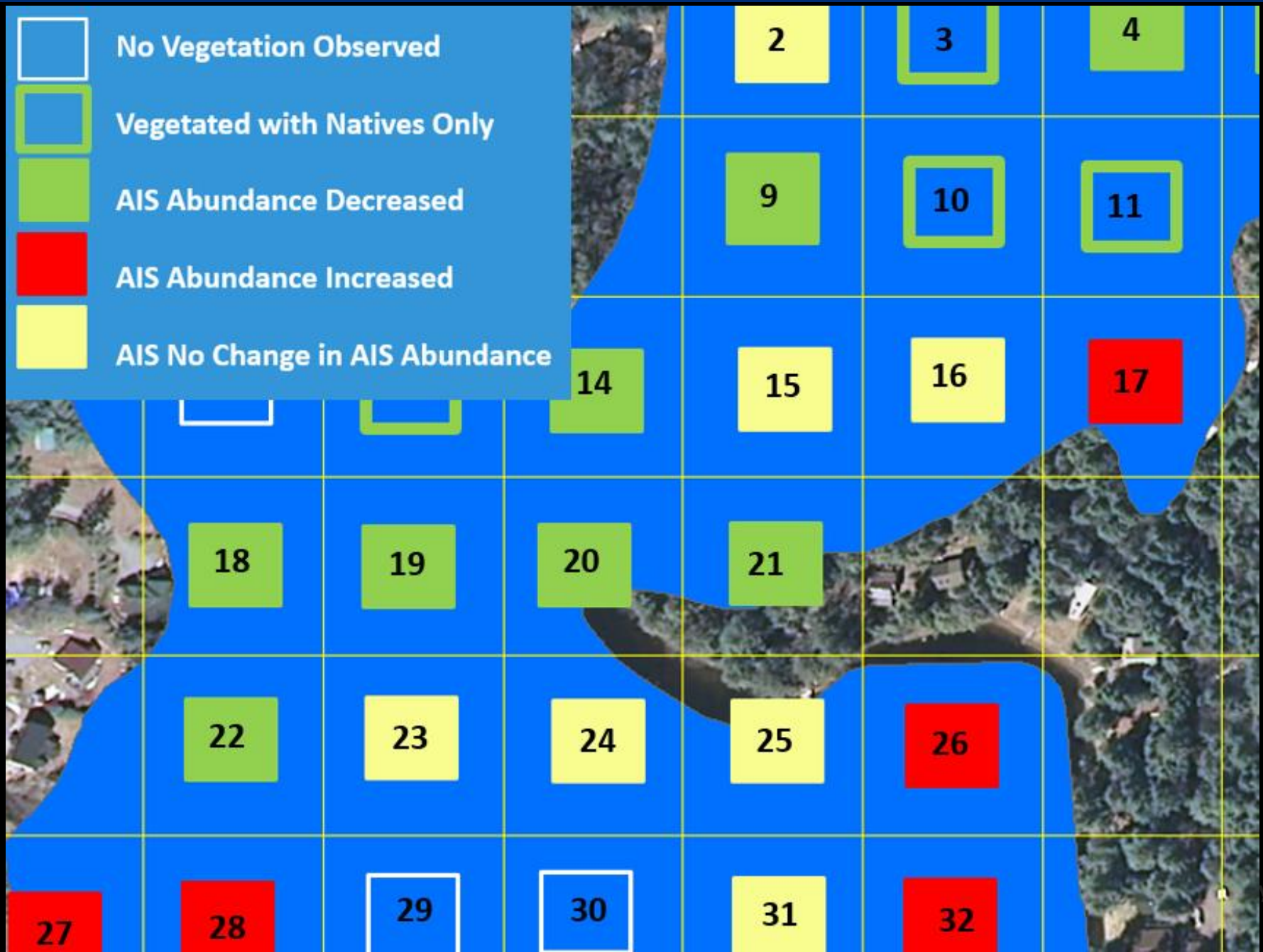
**Adirondack
Park Agency**

Hypothetical Example

Assessment Over Time – Lake-wide Results



**Adirondack
Park Agency**



The Survey

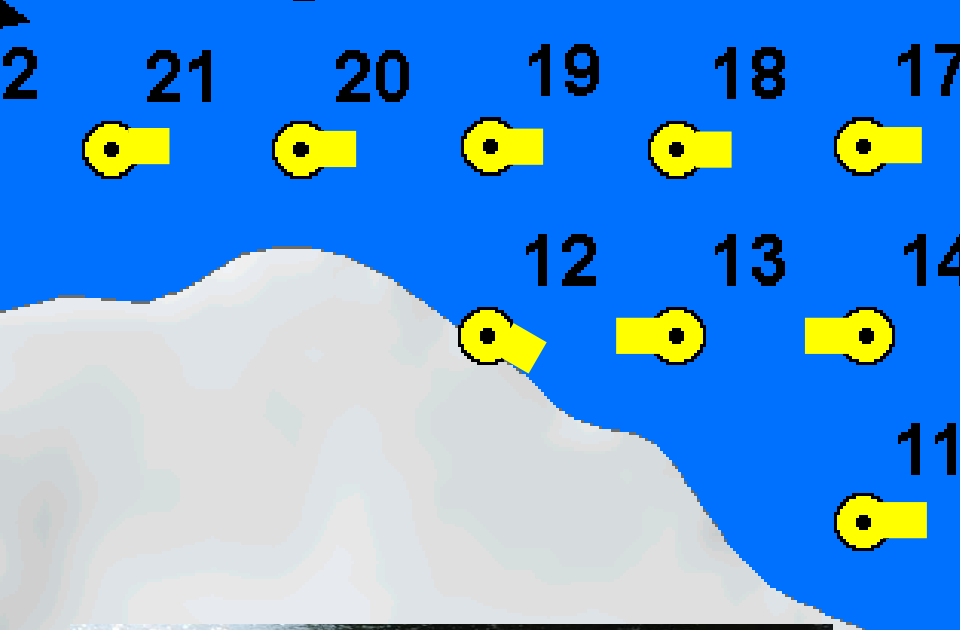
What's needed:

Lake with dedicated group of trained volunteers,

Aquascope, Survey Rake, Polarized Sunglasses,

Two portable devices (tablet or phone) with decent gps and compass.





The Survey:

Use GPS Waypoint Finder app to navigate to each site using the boat's lowest throttle setting.

Once you navigate to within 150 feet of the way point observe native and invasive species abundance.



Survey rapidly assesses invasive and native plant distribution and abundance.

**Survey Technique Hierarchy:
Visual Assessment,
Aquascope if Necessary,
Rake Toss as a Last Resort**



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GPS Waypoint Finder



Lake Management Tracker

Site (Waypoint)
Number *

Survey Type (select all
that apply) *

- ☒ Visual
- ☐ Aquascope
- ☐ Rake

Site Vegetated? *

- ☐ Vegetation
Completely Absent
- ☒ Vegetation Present

Lake Management Tracker

Select All That
Describe the Survey
Area *

- ☐ No Vegetation
- ☐ Few Plants Widely
Scattered
- ☐ Trace to Sparse
Vegetation
- ☒ Moderate to Dense
Vegetation
- ☒ Partially Inaccessbile
(Shallow, Rocky, other
Restricted)
- ☐ Areas Too Deep to
See (Large Change in

Native Vegetation Abundance *

- ☐ None
- ☐ Few Plants Widely Scattered
- ☒ Trace to Sparse
- ☐ Moderate to Dense

Select All Invasive Species Present

- ☒ Eurasian watermilfoil
- ☐ Variable-leaf milfoil
- ☐ Curly-leaf pondweed
- ☐ Water chestnut



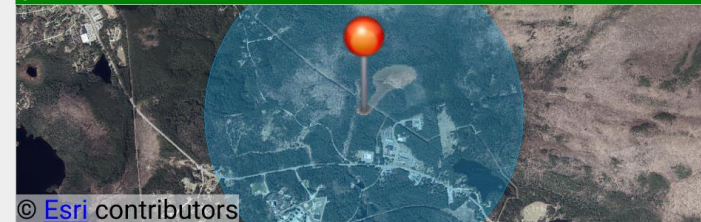
Describe Eurasian Watermilfoil Abundance *

- ☐ Few Plants Widely Scattered
- ☐ Trace to Sparse
- ☒ Moderate to Dense

Location

44°18'N 74°5'W ± 1470 m

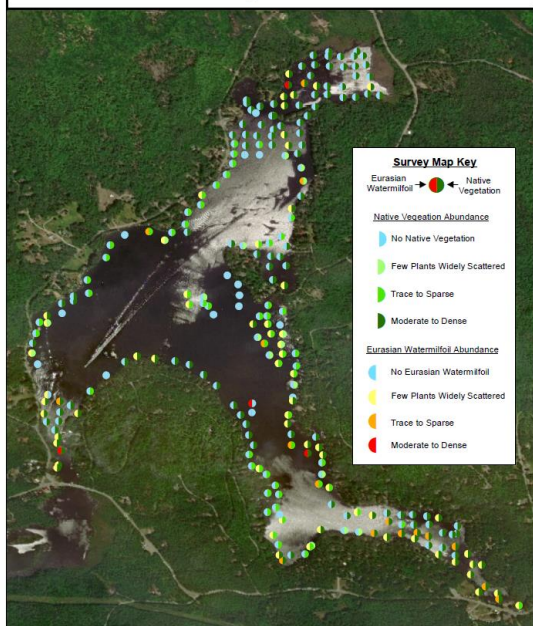
Averaged 403 of 403 positions (348 seconds)



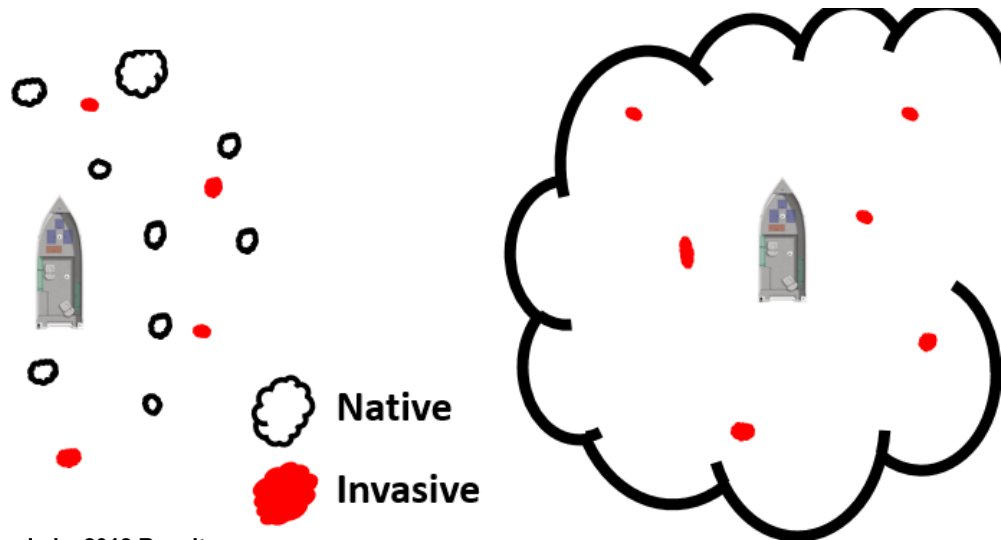
© Esri contributors



- **Volunteers averaged 10.6 survey points per hour.**
- **Volunteers surveyed between 25 and 80 points on any given day.**
- **Three-person teams operating on a pontoon boat was effective, shallow areas could be assessed by a single volunteer in a kayak.**
- **It pays to conduct the survey when the weather is decent, and the lake visibility allows you to do a visual assessment.**
- **Aquascope and rake are both inferior to the visual assessment and they take longer.**
- **Volunteers found the survey easy to conduct and it was easy to categorize plant abundance.**



Questions?



Survey point number	Survey Type	What is the overall appearance of the area?	Native Vegetation	Eurasian Watermilfoil	Date	Latitude
0	Visual	1	2	1	2018-10-05 4:00	43.666
1	Visual	2	3	2	2018-09-20 4:00	43.666
2	Visual	2	3	1	2018-09-20 4:00	43.662
3	Aquascope	2	3	1	2018-09-20 4:00	43.662
4	Visual	2	3	2	2018-09-20 4:00	43.663
5	Aquascope	2	3	1	2018-09-20 4:00	43.663
6	Visual	2	3	1	2018-09-20 4:00	43.664
7	Visual	2	3	1	2018-09-20 4:00	43.666
8	Visual	2	3	1	2018-09-20 4:00	43.664
9	Aquascope	2	3	1	2018-09-20 4:00	43.665
10	Aquascope	2	3	0	2018-09-20 4:00	43.665
11	Visual	2	3	1	2018-09-20 4:00	43.665
12	Visual	2	3	1	2018-09-20 4:00	43.666
13	Aquascope	2	3	0	2018-09-20 4:00	43.666
14	Aquascope	2	3	0	2018-09-20 4:00	43.665

Loon Lake 2018 Results

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Each survey site represents approximately 1 acre.

- 4 Acres of Moderate to Dense Eurasian watermilfoil
- 16 Acres of Trace to Sparse Eurasian watermilfoil

35% of Survey Sites found to have Eurasian watermilfoil



Adirondack Park Agency

No Vegetation: No vegetation observed within the survey area.

Few Plants Widely Scattered: Plants are widely scattered with at least 15 feet separating each plant or very small groupings of plants (only few individual plants growing together). One may only see one or two individual plants in any given view.

Trace to Sparse: Individual plants are spaced somewhat close to one another, though there may be large areas between vegetation. Small patches can be present though they should generally be widely spaced. **For invasives species ask: “If untreated, could the area easily and/or relatively quickly expand such that it could be classified as Moderate to Dense in the not too distant future?”** Trace to Sparse is a combination of the values used in the USACE/Cornell Scale.

Moderate to Dense: Individual plants may be almost touching each other. There may be large areas where little or no lake bottom can be observed. **For invasives species ask: “Would a reasonable person typically associate the abundance great enough to cause impairments to swimming, boating, or other water contact recreation?”** Moderate to Dense is a combination of the values used in the USACE/Cornell Scale.



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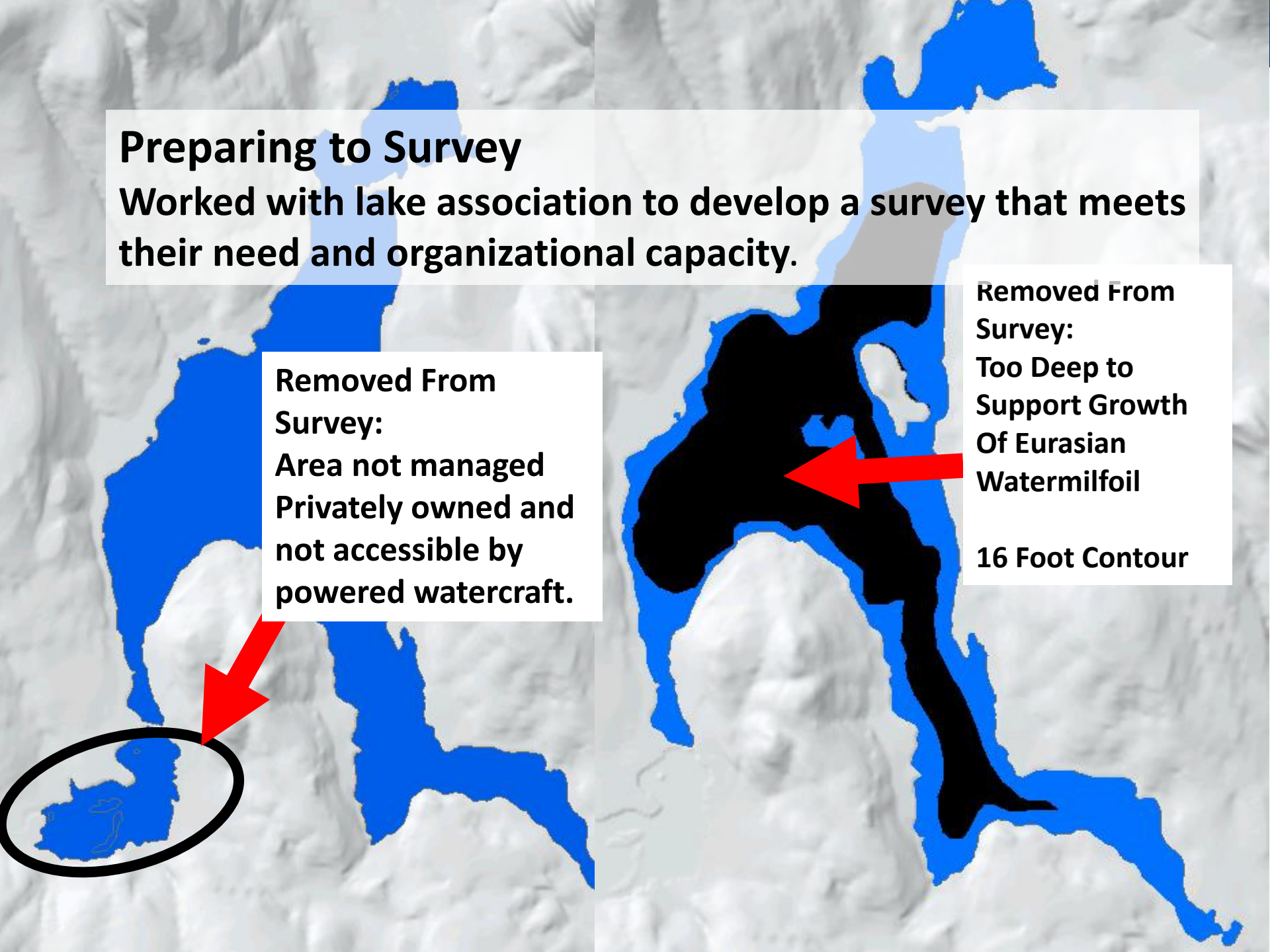
Preparing to Survey

Worked with lake association to develop a survey that meets their need and organizational capacity.

Removed From Survey:
Area not managed
Privately owned and
not accessible by
powered watercraft.

Removed From Survey:
Too Deep to
Support Growth
Of Eurasian
Watermilfoil

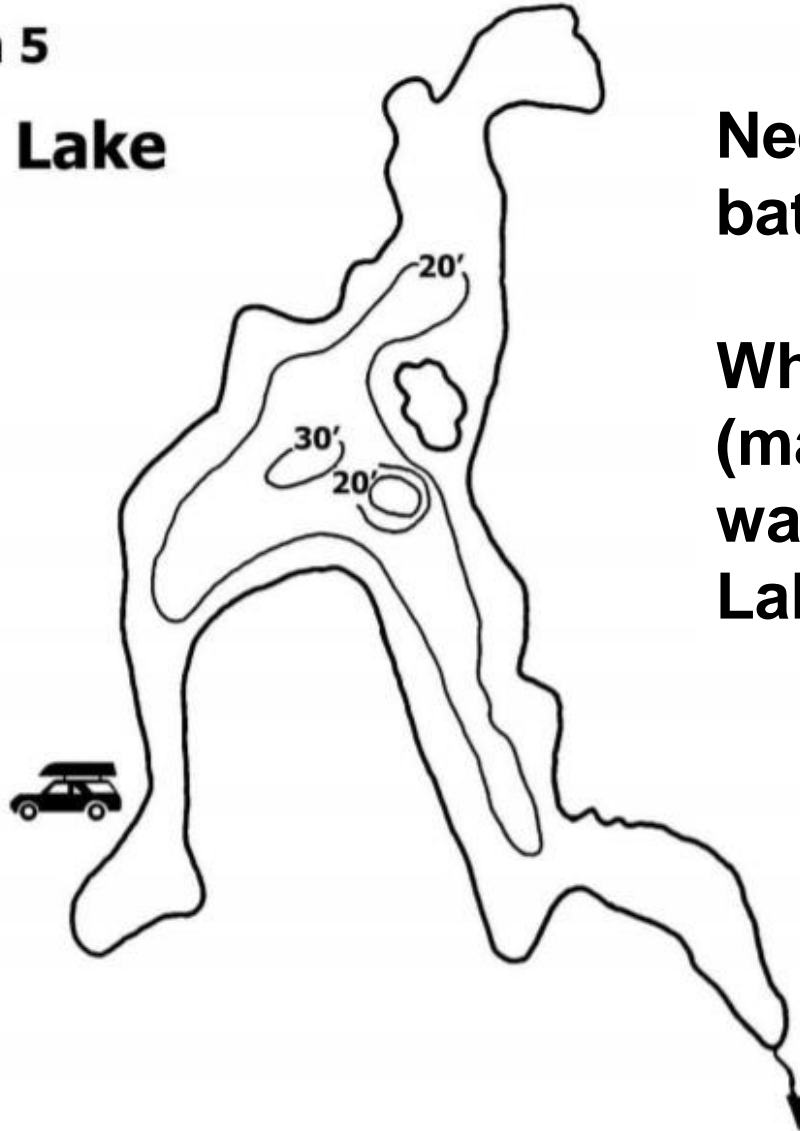
16 Foot Contour



New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources
Lake Map Series

Region 5

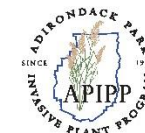
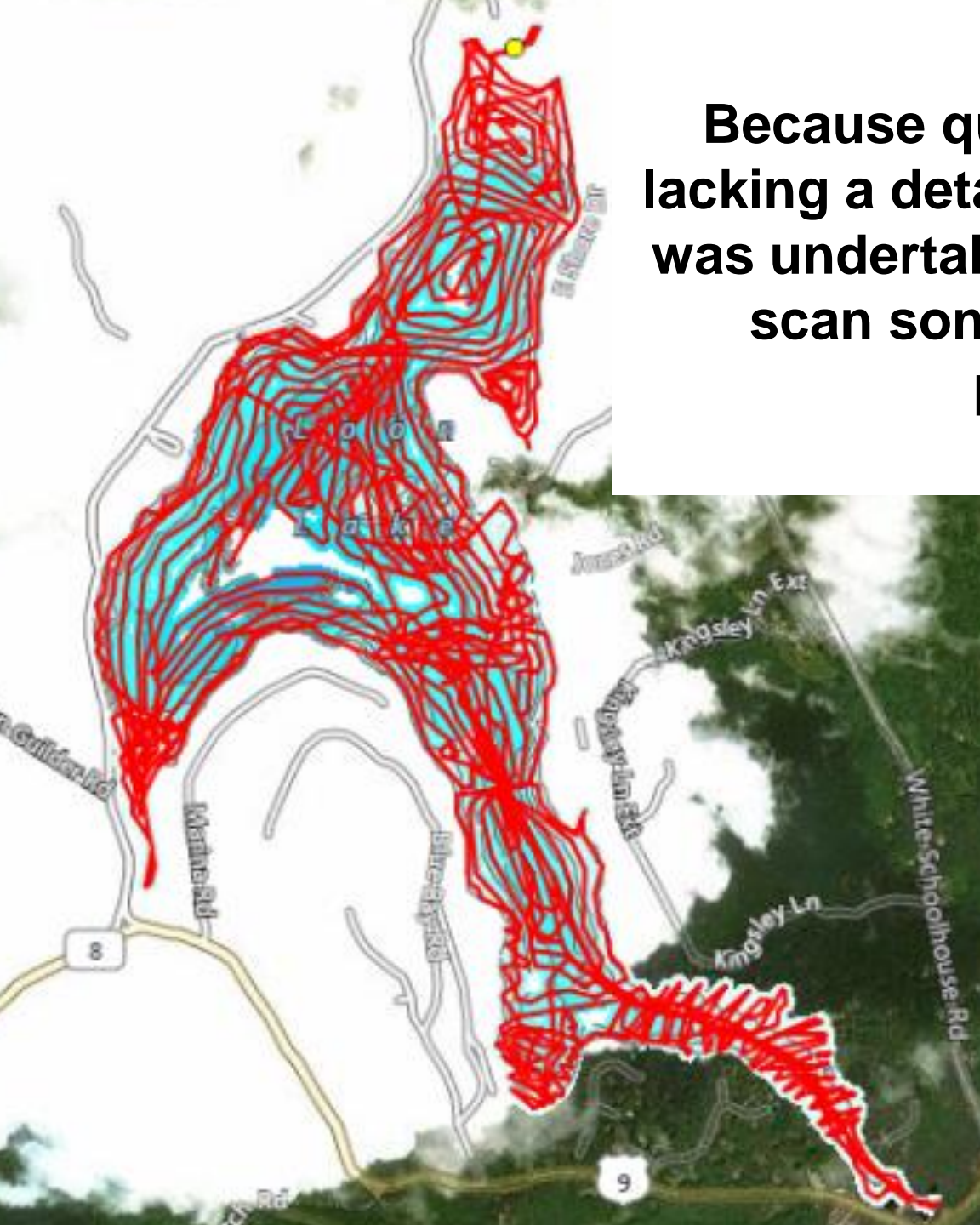
Loon Lake



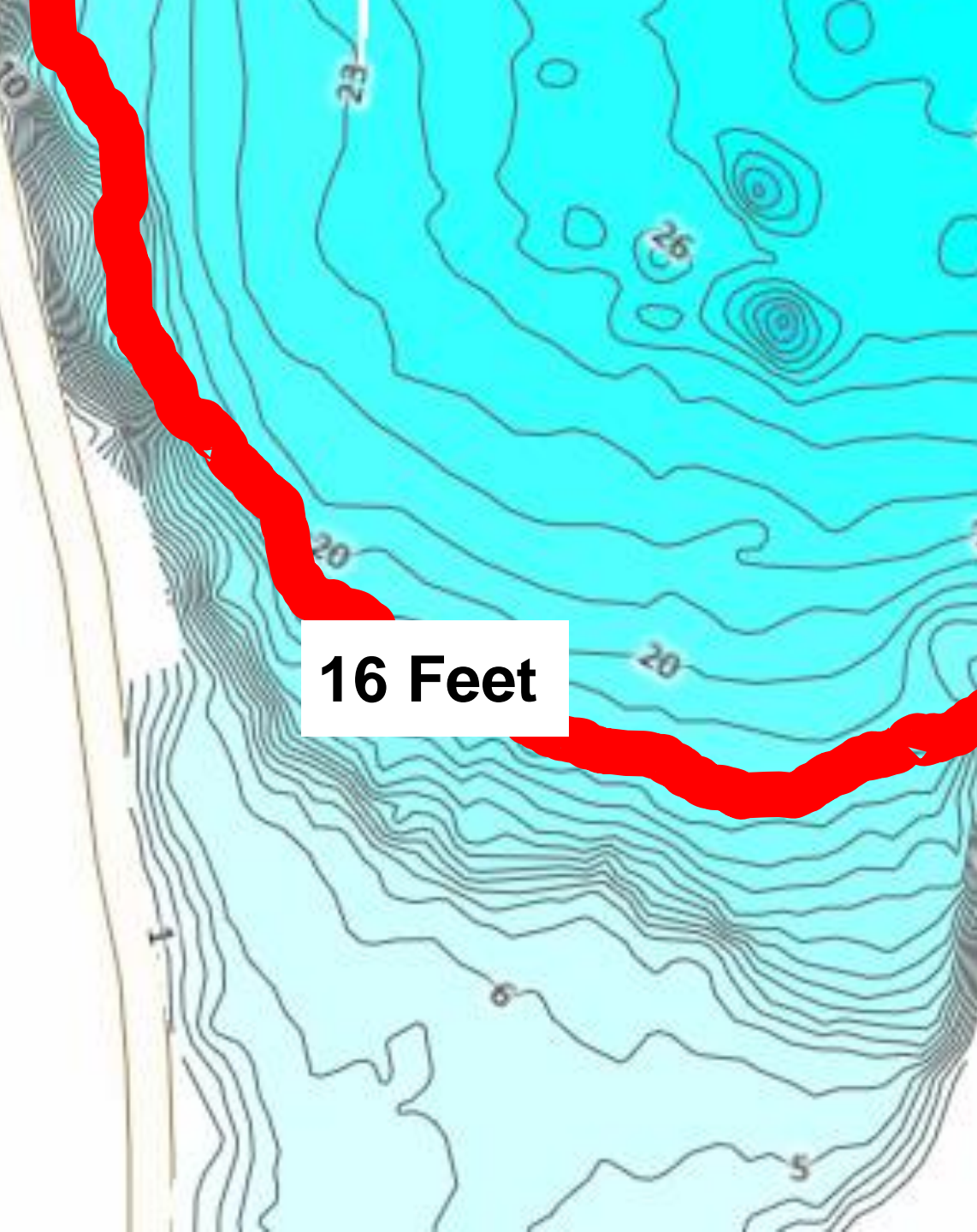
**Need an accurate
bathymetric map.**

**Where is the 16 foot
(maximum depth Eurasian
watermilfoil grows in Loon
Lake) depth contour?**

Because quality information was lacking a detailed bathymetric survey was undertaken by APIPP using side scan sonar and Biobase data processing.



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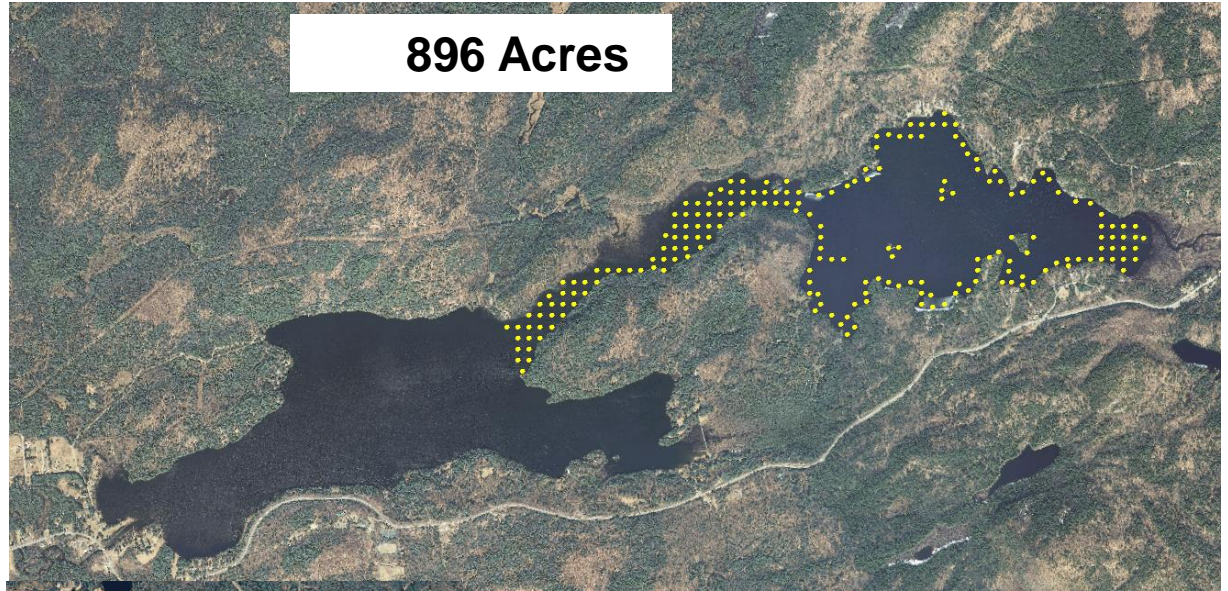
**Adirondack
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Challenges Developing Surveys for 2019

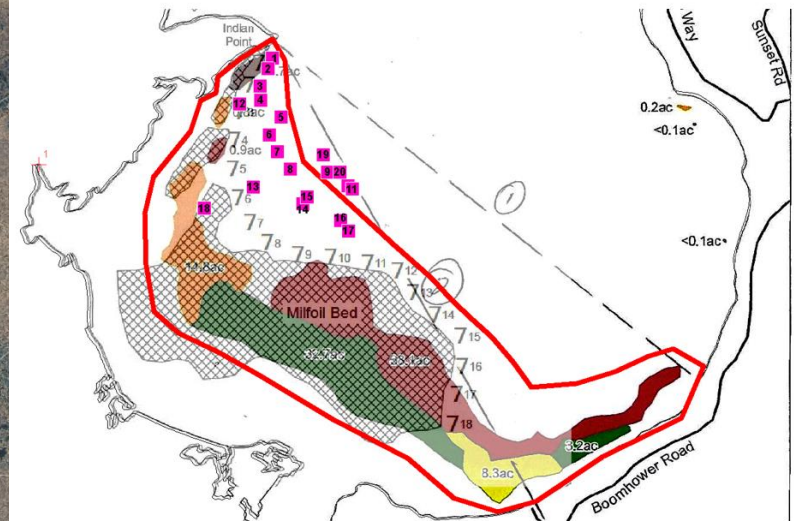
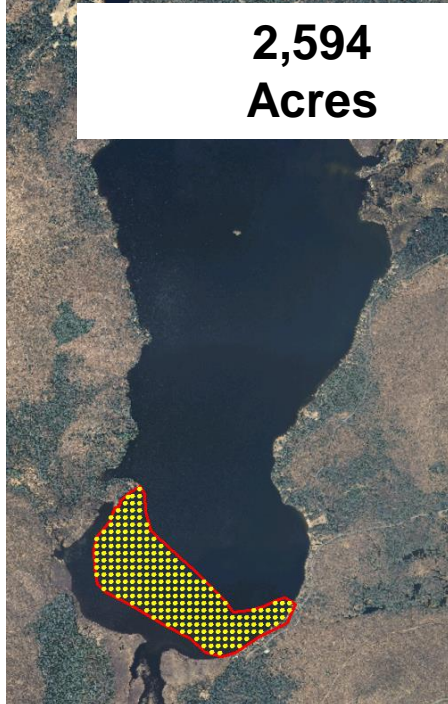
Lack of Accurate
Mapping

Lakes Too Large for
Volunteer Capacity.

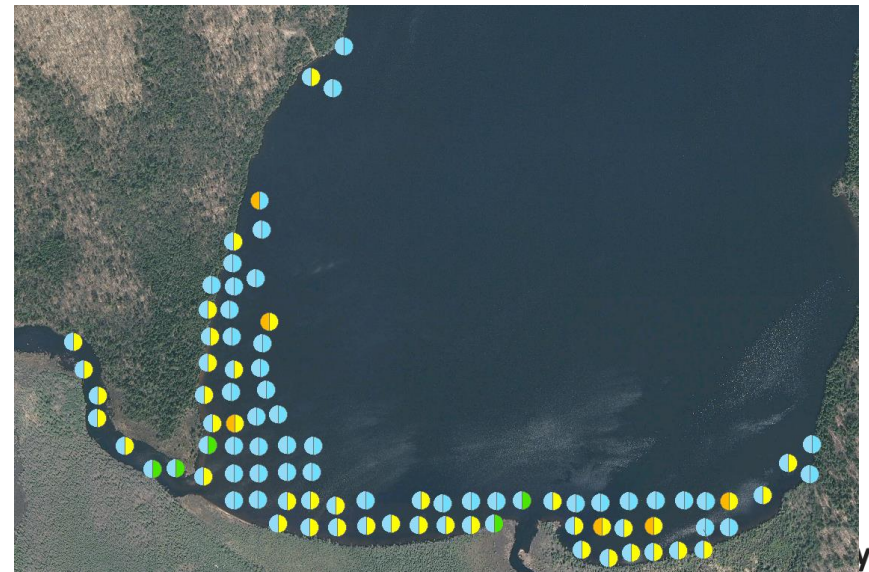
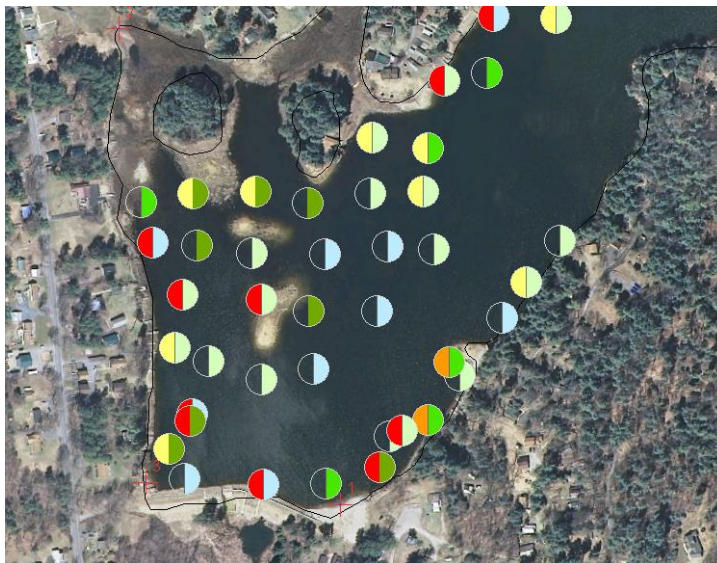
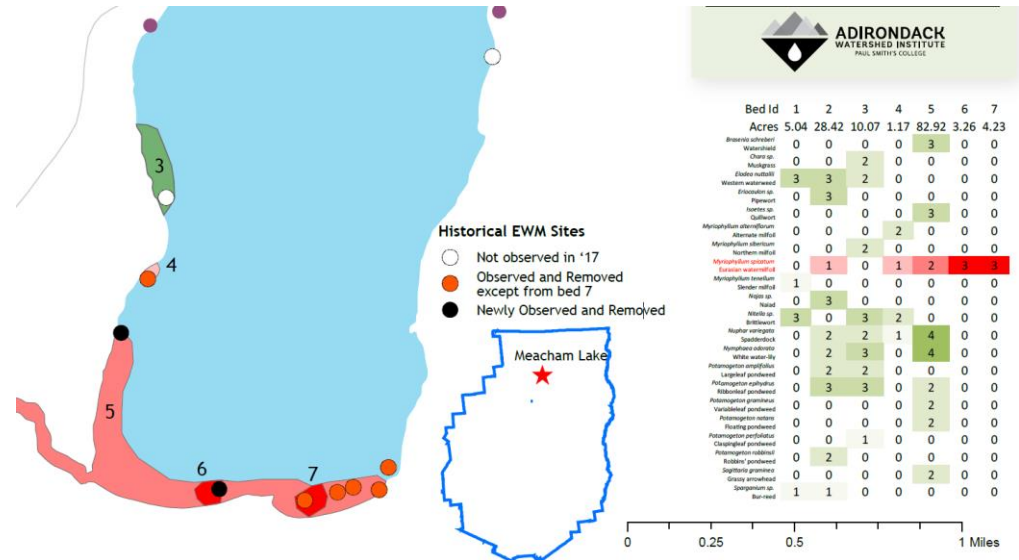
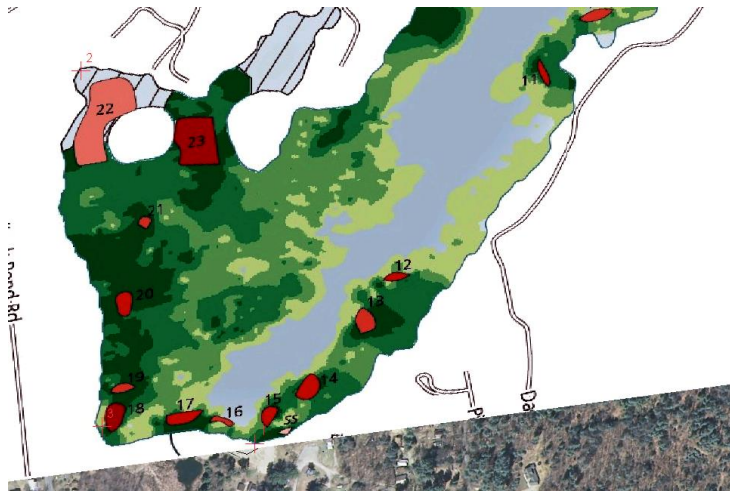
896 Acres



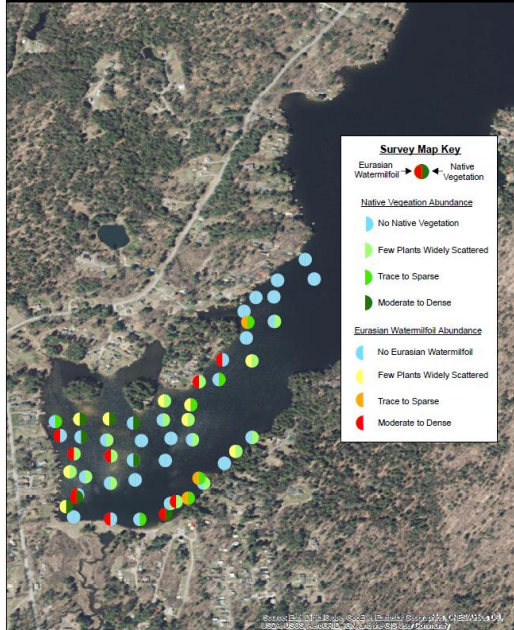
2,594
Acres



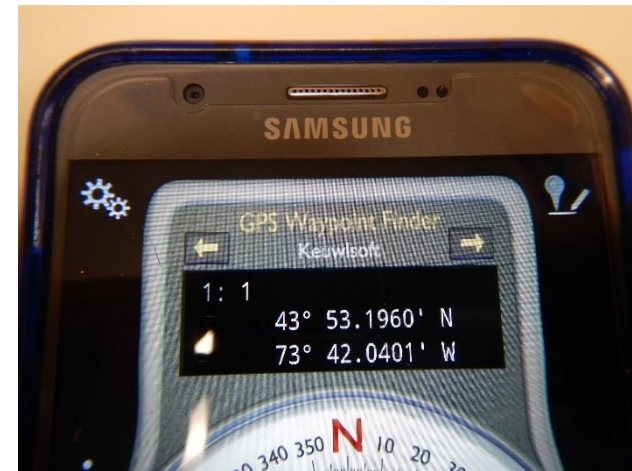
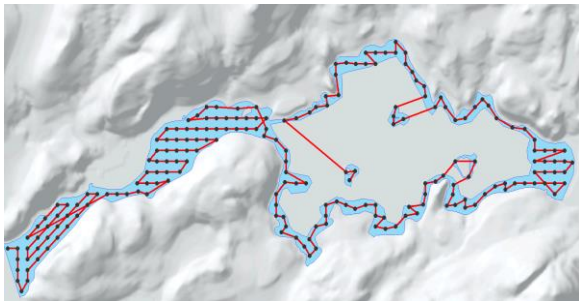
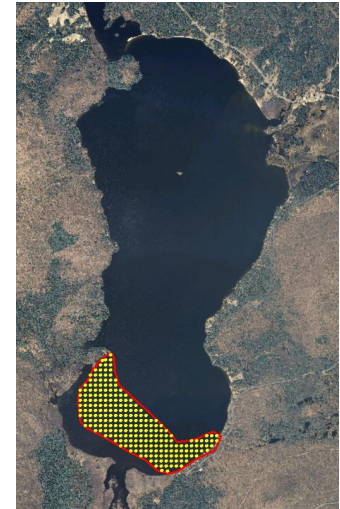
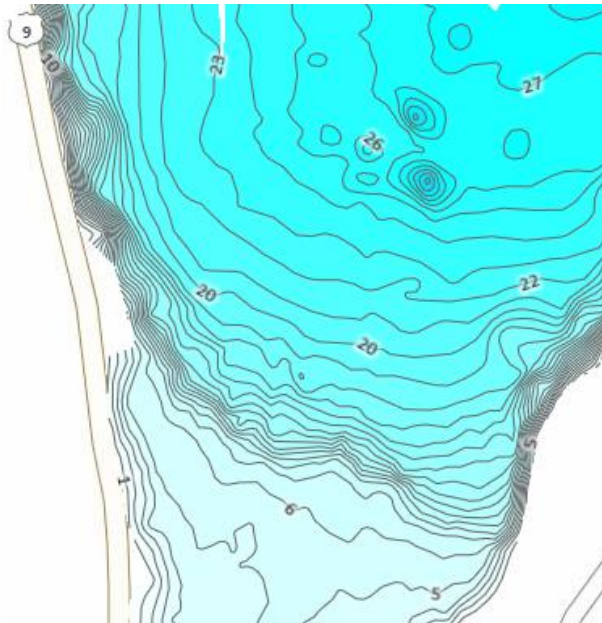
Assessment of Results



Lake Hadlock AIS Management Assessment 2018



Questions?



**Adirondack
Park Agency**