



Current Water Quality Conditions and Initial Documentation of Hydrilla (*Hydrilla verticillata*) in Harveys Lake, Luzerne County, PA

**New York State Federation of Lake Associations
4th – 5th May 2018**

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Harveys Lake, Luzerne County, PA

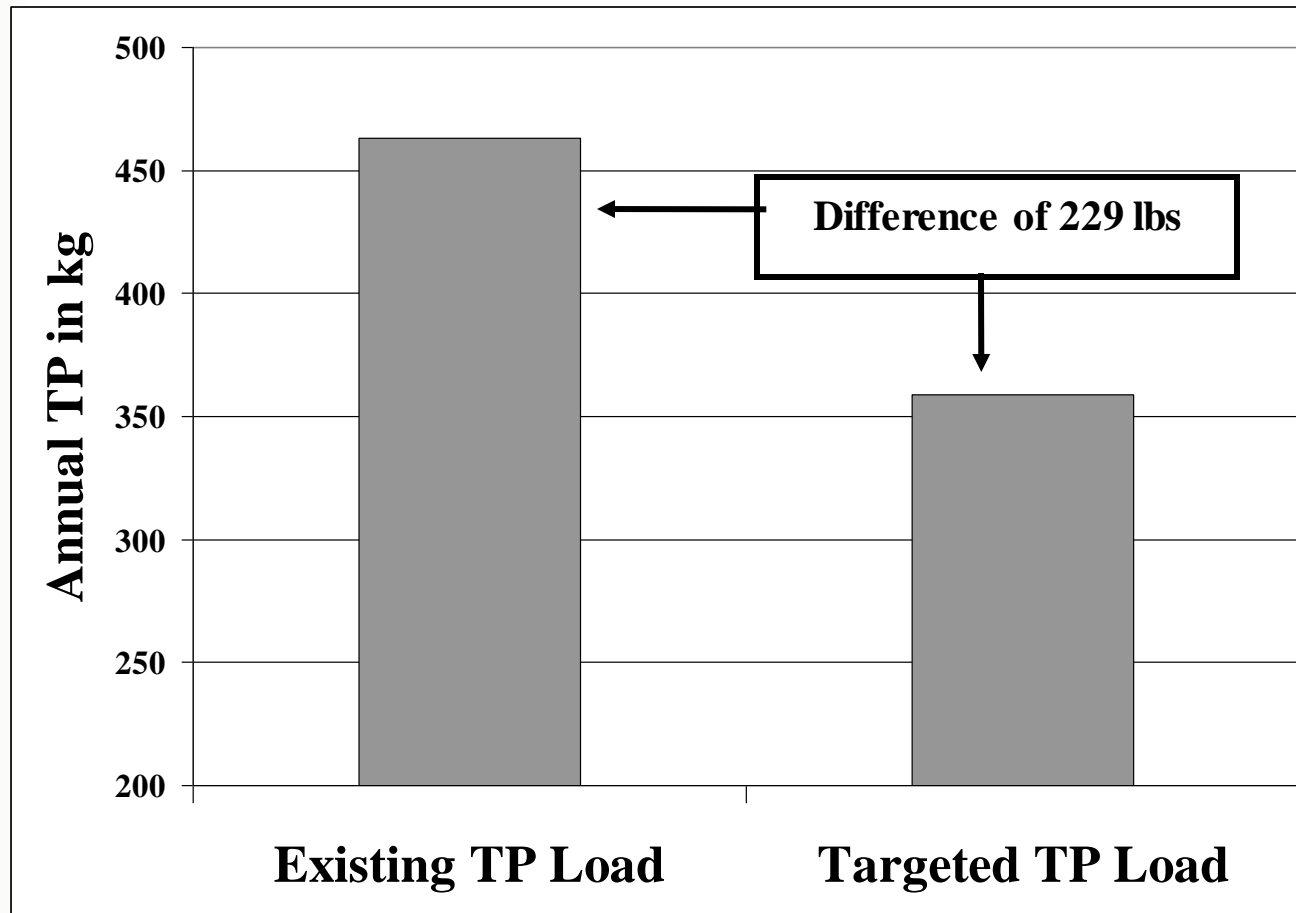


Harveys Lake, Luzerne County, PA

- Largest natural lake, by volume, entirely located in Pennsylvania.
- Surface area: 621.5 acres
- Watershed area: 3,627 acres
- Mean depth: 36 ft
- Maximum depth: 96 ft
- The lake and a portion of Harveys Creek, just below the outlet, are designed as cold water — high quality water resources.



The Total Maximum Daily Load (TMDL) Approach (Harveys Lake, PA)





Harveys Lake – Projects Implemented to Date

Implemented Stormwater or In-Lake Project	Total Phosphorus Removed in kgs (lbs)
Two streambank / shoreline stabilization projects	10.0 (22)
Hemlock Garden Nutrient Separating Baffle Box	13.6 (30)
Series of small, catch basin retrofits	6.1 (13.4)
Wood Street Nutrient Separating Baffle Box	3.0 (6.6)
Old Lake Road Nutrient Separating Baffle Box	3.0 (6.6)
Floating Wetland Islands (Five); 2014	22.7 (50)
Large Nutrient Separating Baffle Box system (PA F&BC); early 2017	24.1 (53)
TOTAL	82.5 (181.6)

By the end of 2020, the TMDL should be in compliance for total phosphorus



Installation of 3-Chambered Baffle Box at Wood Street in December 2011



Installation of 3-Chambered Baffle Box at Old Lake Road completed in September 2013



PA F&BC Boat Launch Stormwater Project (2016)



PA F&BC Boat Launch Stormwater Project (2017)



PA F&BC Boat Launch Riparian Buffer (2017)



Installation of five Floating Wetland Islands (FWIs) in 2014



Supplemental Planting in 2015



August 2017



Plants of Concern at Harveys Lake



**Grassy (variable)
pondweed**



Vasey's pondweed

2012 SAV Survey Locations



2012 SAV Results

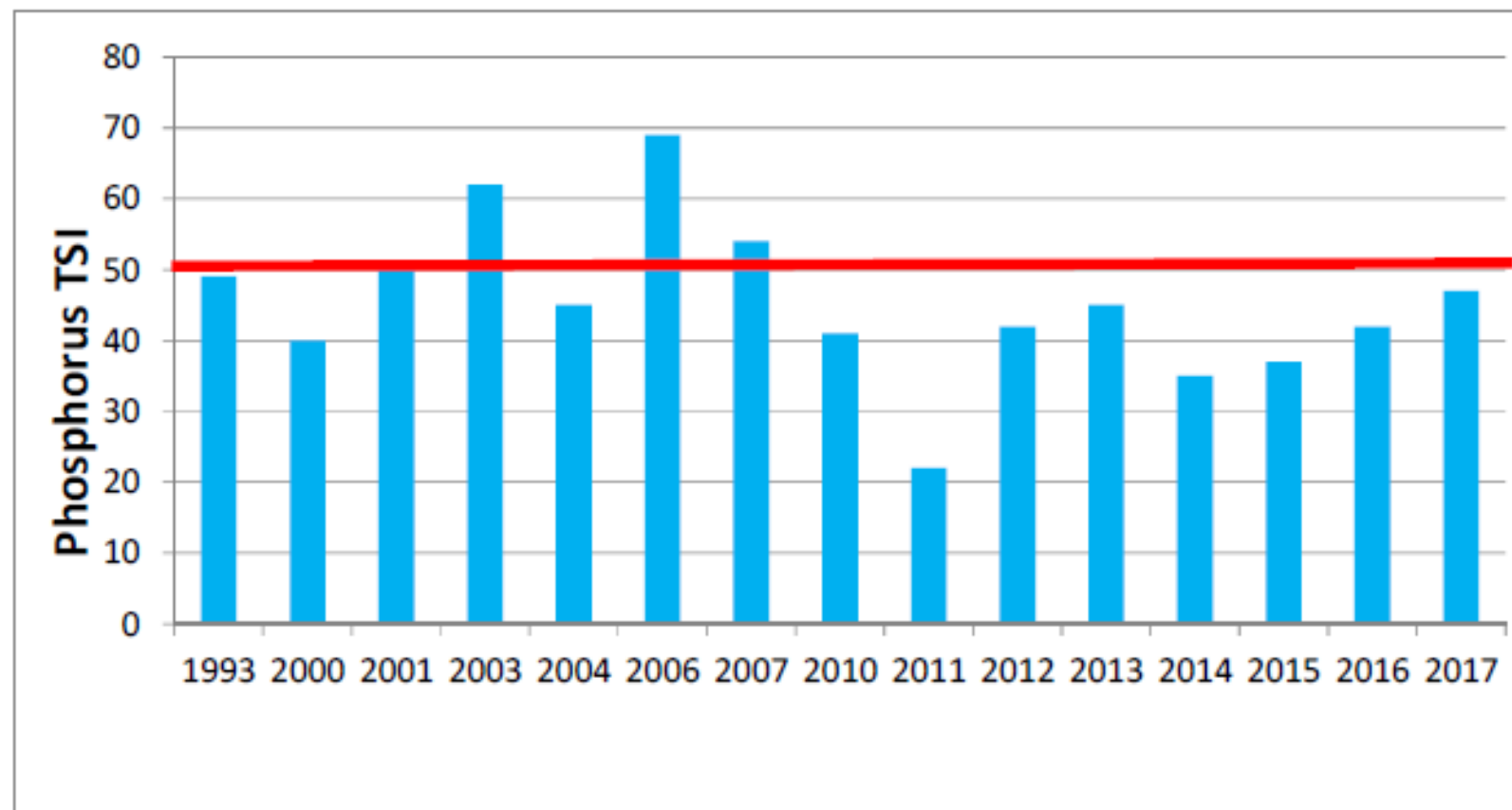
Harveys Lake - Botanical Survey - 26 June 2012							
Station	Lat	Long	Secchi (m)	Common	Scientific	Abundance	Sediments
1	41.365564°	-76.044781°	2.3	n/a	n/a	n/a	Rocky
2	41.360669°	-76.041927°	2.1	Grassy pondweed	<i>Potamogeton gramineus</i>	Abundant	Rocky
				Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Common	
				Coontail	<i>Ceratophyllum demersum</i>	Present	
3	41.355480°	-76.040095°	2.3	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Abundant	Rocky
				Grassy pondweed	<i>Potamogeton gramineus</i>	Common	
				Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Present	
				Coontail	<i>Ceratophyllum demersum</i>	Present	
				Elodea	<i>Elodea canadensis</i>	Common	
				Small pondweed	<i>Potamogeton pusillus</i>	Present	
				Tape grass	<i>Vallisneria americana</i>	Present	
4	41.360813°	-76.034652°	1.1	Quillwort	<i>Isoetes</i> sp.	Common	Rocky
				Grassy pondweed	<i>Potamogeton gramineus</i>	Common	
				Small pondweed	<i>Potamogeton pusillus</i>	Common	
5	41.362654°	-76.035748°	2.5	Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Common	Rocky
				Grassy pondweed	<i>Potamogeton gramineus</i>	Common	
				Elodea	<i>Elodea canadensis</i>	Common	
6	41.377307°	-76.027538°	2.1	Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Common	Rocky
				Grassy pondweed	<i>Potamogeton gramineus</i>	Common	
7	41.380724°	-76.026793°	1.2	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Common	Compacted organics
				Tape grass	<i>Vallisneria americana</i>	Common	
				Ornamental Lily	<i>Nymphaea</i> sp.	Present	
				Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Present	
				Coontail	<i>Ceratophyllum demersum</i>	Present	
				Elodea	<i>Elodea canadensis</i>	Present	
8	41.373844°	-76.044204°	1.3	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Common	Rocky
				Tape grass	<i>Vallisneria americana</i>	Common	
				Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Common	
				Grassy pondweed	<i>Potamogeton gramineus</i>	Present	
9	41.365775°	-76.057358°	1.5	Elodea	<i>Elodea canadensis</i>	Abundant	Rocky
				Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Common	
				Clasping-leaf pondweed	<i>Potamogeton perfoliatus</i>	Present	
10	41.364643°	-76.057396°	0.8	Elodea	<i>Elodea canadensis</i>	Abundant	Rocky/gravel
				Coontail	<i>Ceratophyllum demersum</i>	Present	
				Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Present	
11	41.363363°	-76.057328°	0.6	Tape grass	<i>Vallisneria americana</i>	Common	Compacted organics
				Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Common	



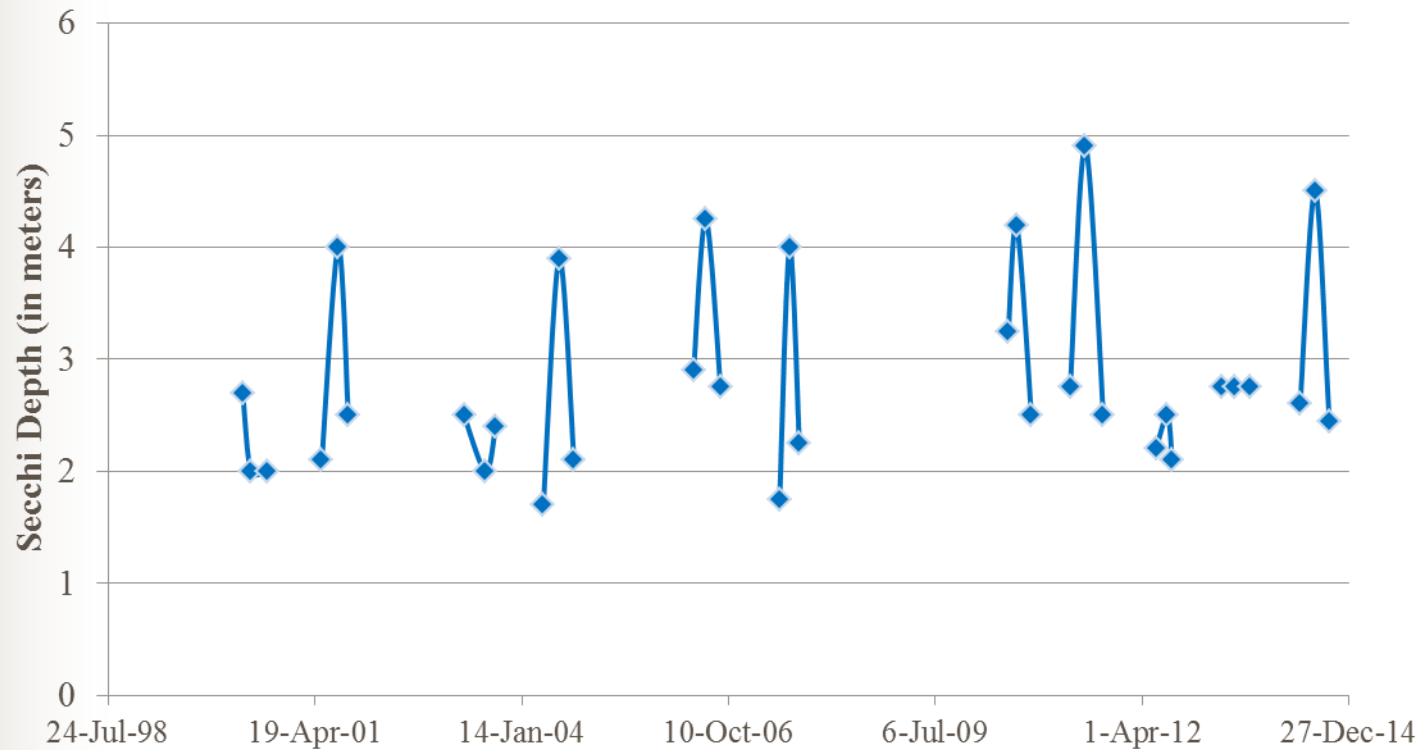
2012 Survey

- SAV community was comprised of several native *Potamogetons*, coontail, elodea and tape grass. Invasives consisted of Eurasian watermilfoil and ornamental lilies
- State T&E Grassy pondweed was found at 6 of the 11 transects.
- No hydrilla was noted during this survey

Figure 3.13: Station 1 - Total Phosphorus Mean Trophic State Index



**Figure 1 - Secchi Depth (in meters) at Harveys Lake,
Luzerne County, PA (Station-1)**



Hydrilla Found!

- July 16, 2014 – Hydrilla identified during standard water quality monitoring



SAV Survey - September 4-5, 2014

Phase I





SAV Results

- 20 Species identified; Twice number as in 2012
- Grassy pondweed found in 10 of the 13 transects
- Vasey's pondweed found in 2 of the 13 transects

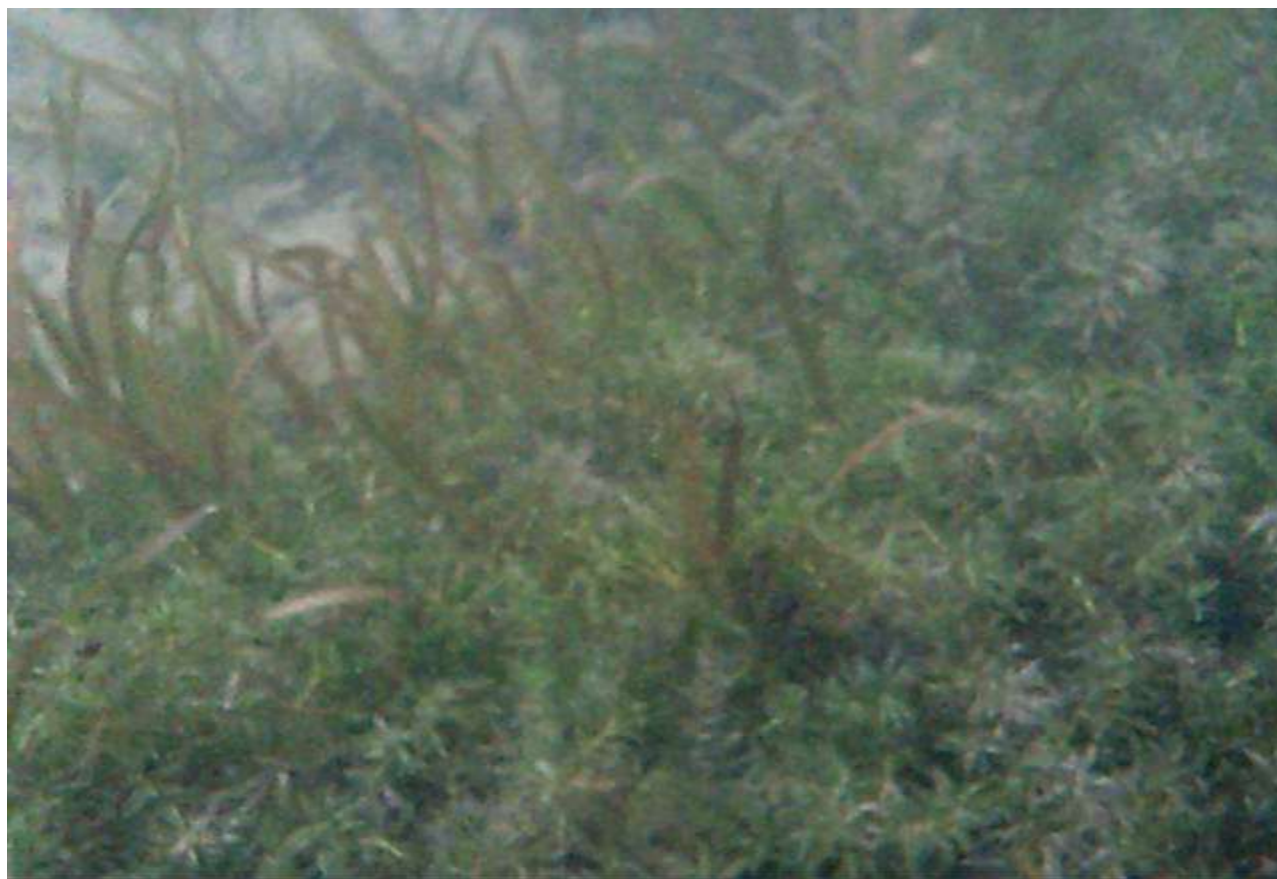


SAV Results

- Three exotics present
- Eurasian watermilfoil at 8 of the 13 transects
- Ornamental lily throughout shoreline
- Hydrilla at 5 of the 13 transects
 - All instances in Northern end of lake
 - Heaviest infestation where major boat launch is located

Diving Survey – Sept. 11-12, 2014

Phase II







Hydrilla Eradication Plan

- Princeton Hydro teamed with the SePRO Corporation to develop a fluridone based treatment regiment.
- Utilize Sonar PR and Sonar H4C at tailored dosages to eradicate hydrilla while minimizing impacts to non-target species
- Total area of treatment is estimated to be approximately 49 acres (three targeted areas)



Moving forward with the Plan

- Representatives from SePRO joined Princeton Hydro during its spring water quality monitoring event at Harveys Lake (April 2015) to obtain some more site-specific information for the development of the treatment program and associated costs.
- Submitted a Growing Greener grant application for the treatment and monitor the eradication program



Notes on the General Ecology of Hydrilla in Harveys Lake

- Was not identified in the lake in 2012 but was identified in 2014.
- More than likely, it came in from a boat with a fragment of the plant on the boat or trailer.
- Limited to the northern end of the lake, away from the outlet of the lake.



Notes on the General Ecology of Hydrilla in Harveys Lake

- Hydrilla was found in 38% of the transect locations
- Hydrilla was found in waters as shallow as 2 feet but tended to be most abundant in depths of 4 feet and greater and dominant in waters deeper than 12 – 15 feet.
- Hydrilla is known to grow in waters as deep as 20 ft but was found in Harveys Lake as deep as 25 ft



Notes on the General Ecology of Hydrilla in Harveys Lake

- Extremely high growth rate but limited to the northern end and the moderate to deeper waters of Harveys Lake.
- In PA it is fairly abundant in scattered sites in the Delaware and Schuylkill Rivers.
- It has been identified in the Chesapeake Bay and some of its lower tributaries
- According to PA Sea Grant, it has been sighted in the Susquehanna River Basin.



Impacts of Hydrilla

- Can outcompete other native plants for space and light (can grow approx. an inch a day)
- Clog boat propellers and negatively impact boating
- Has been known to enhance bass fishing in shallow lakes in Florida
- However, can also foster habitat for nuisance mosquitoes



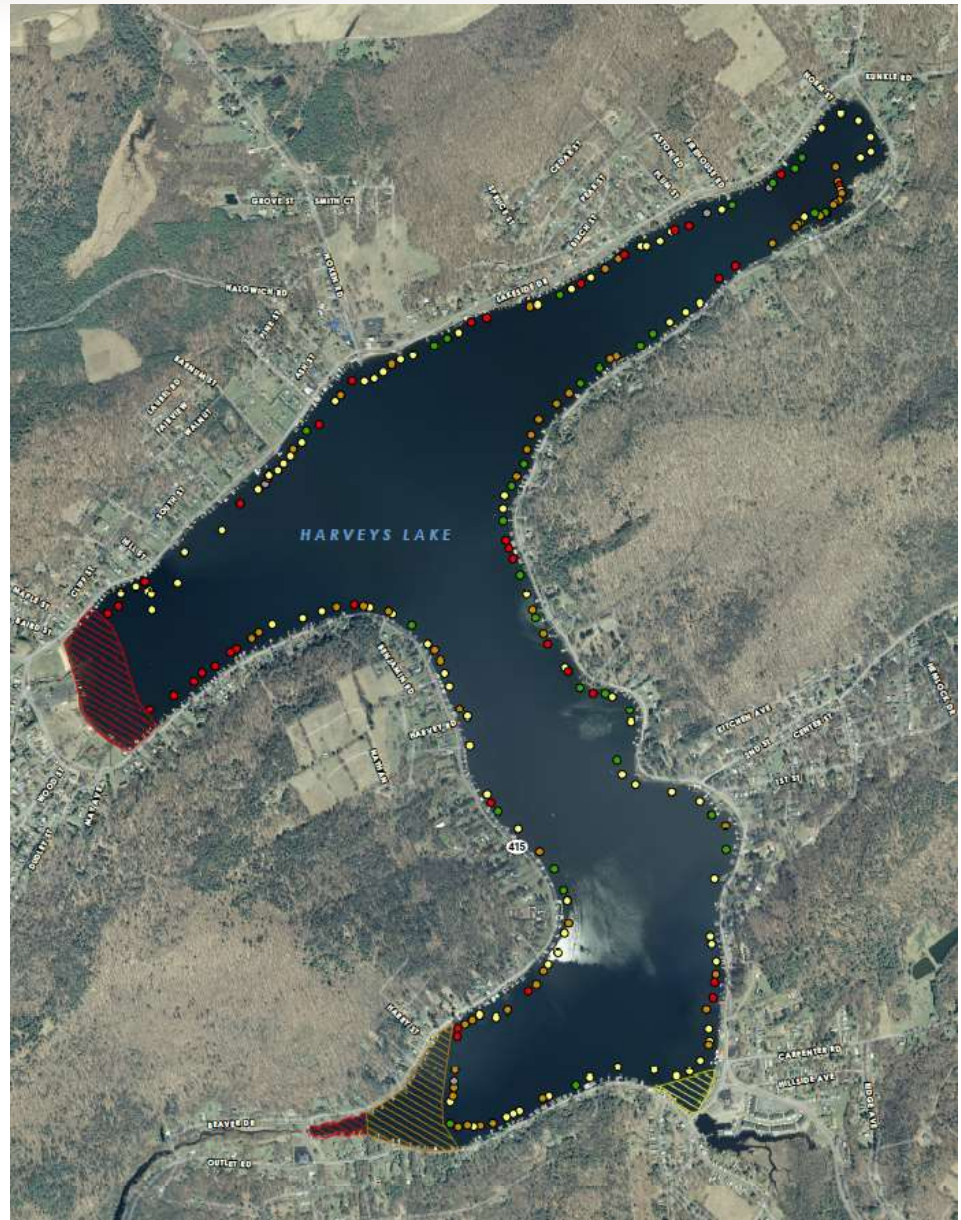
July 2016

- Gave a formal presentation on hydrilla and its impacts to the public, PA DEP, US EPA, Luzerne County Conservation District and local / State politicians.
- Presentation given near to PA F&BC Boat Launch.
- Decided to check the outlet of the lake.

26 July 2016 - Outlet



September
2016





Small-scale Treatment

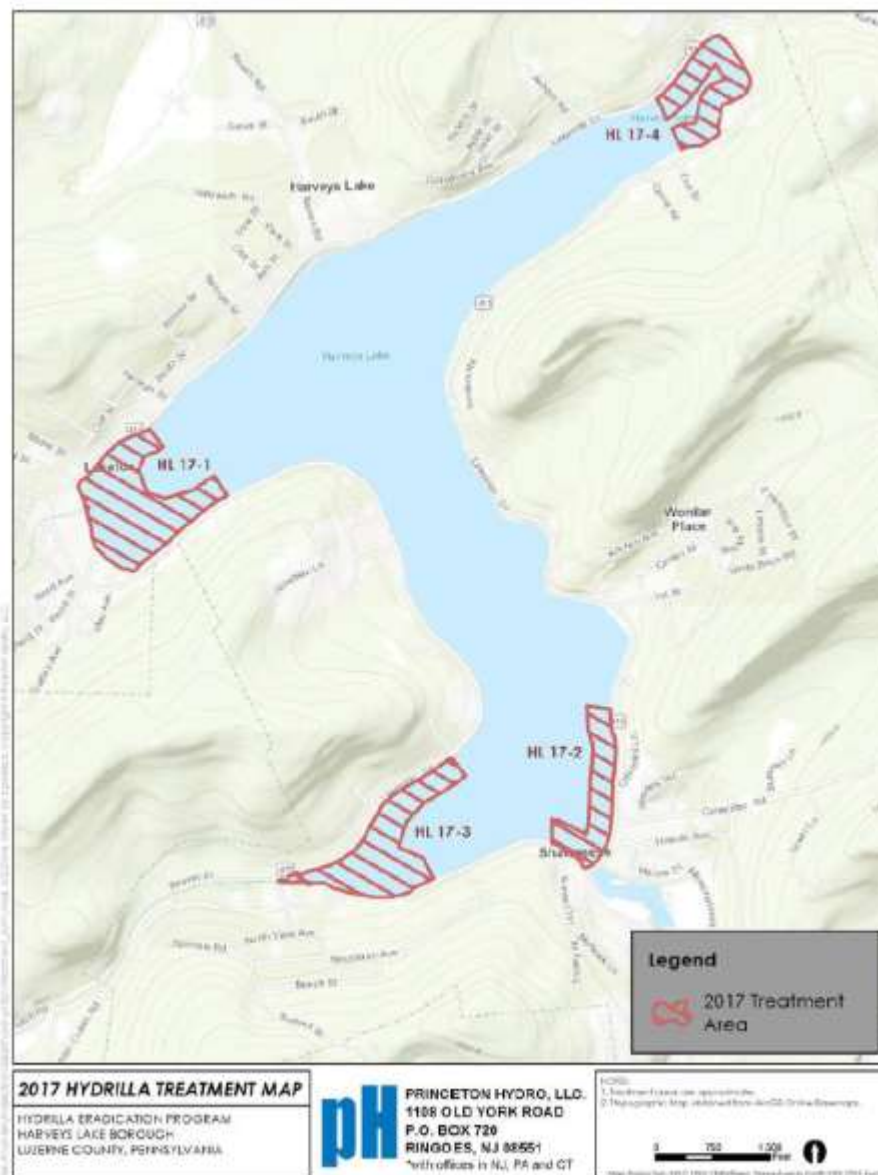
- Treated 9 acres at the outlet for hydrilla
- The Borough of Harveys Lake paid for it
- Minimize the moving of hydrilla down stream of the lake
- Treatment conducted in September 2016

October 2016 – outlet treated



October 2016 – boat launch untreated









Summary of 2017 Treatment

- Treated approximately 105 acres of hydrilla
- Fairly late in the season (August 2017)
- Some control but not optimal
- Need to treat earlier to contribute toward expending all energy that would otherwise go toward tuber production.
- In process of assessing tuber results; need to collect more samples in 2018.
- Approximately 200 acres will be treated this year.



THANK YOU

