

# Plant management strategies based on historic and current data for Rudd Pond in Taconic State Park, Dutchess County, New York

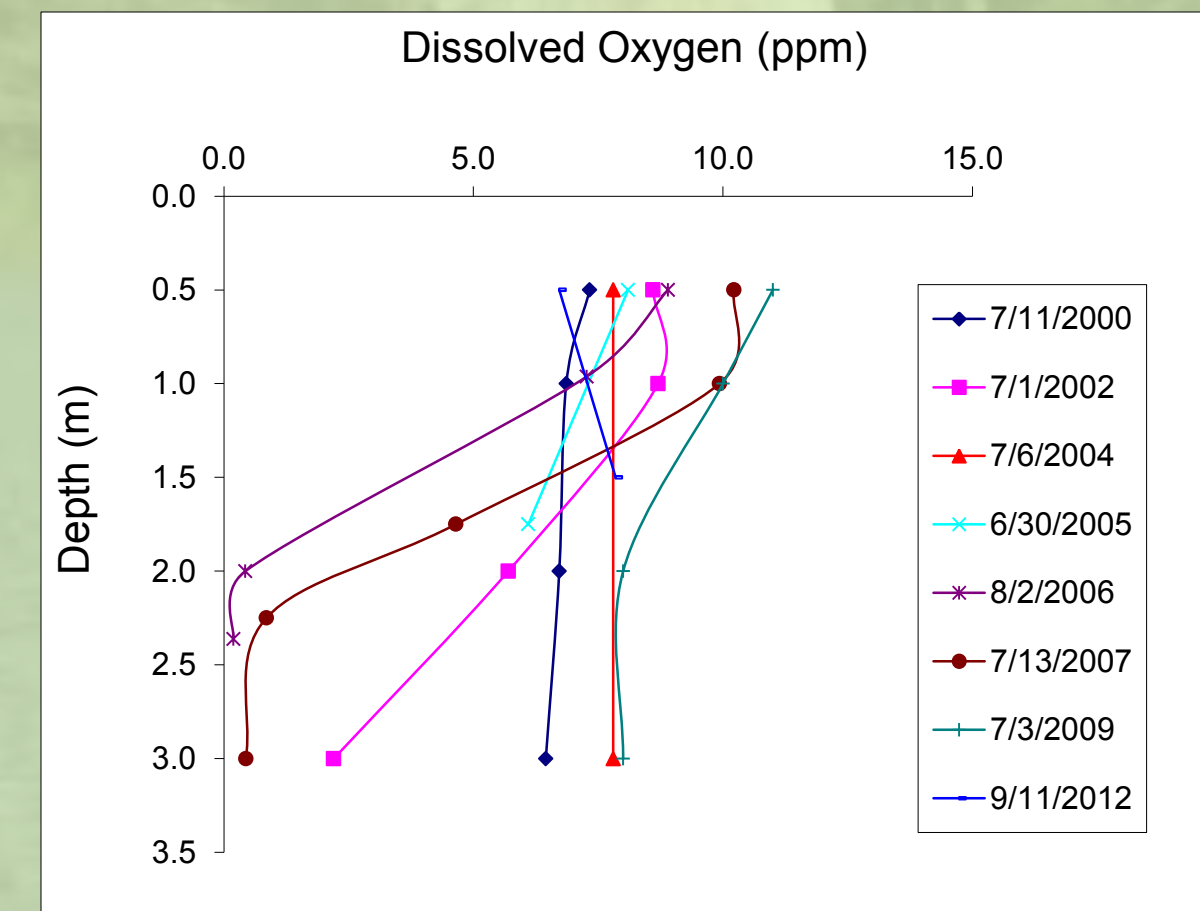
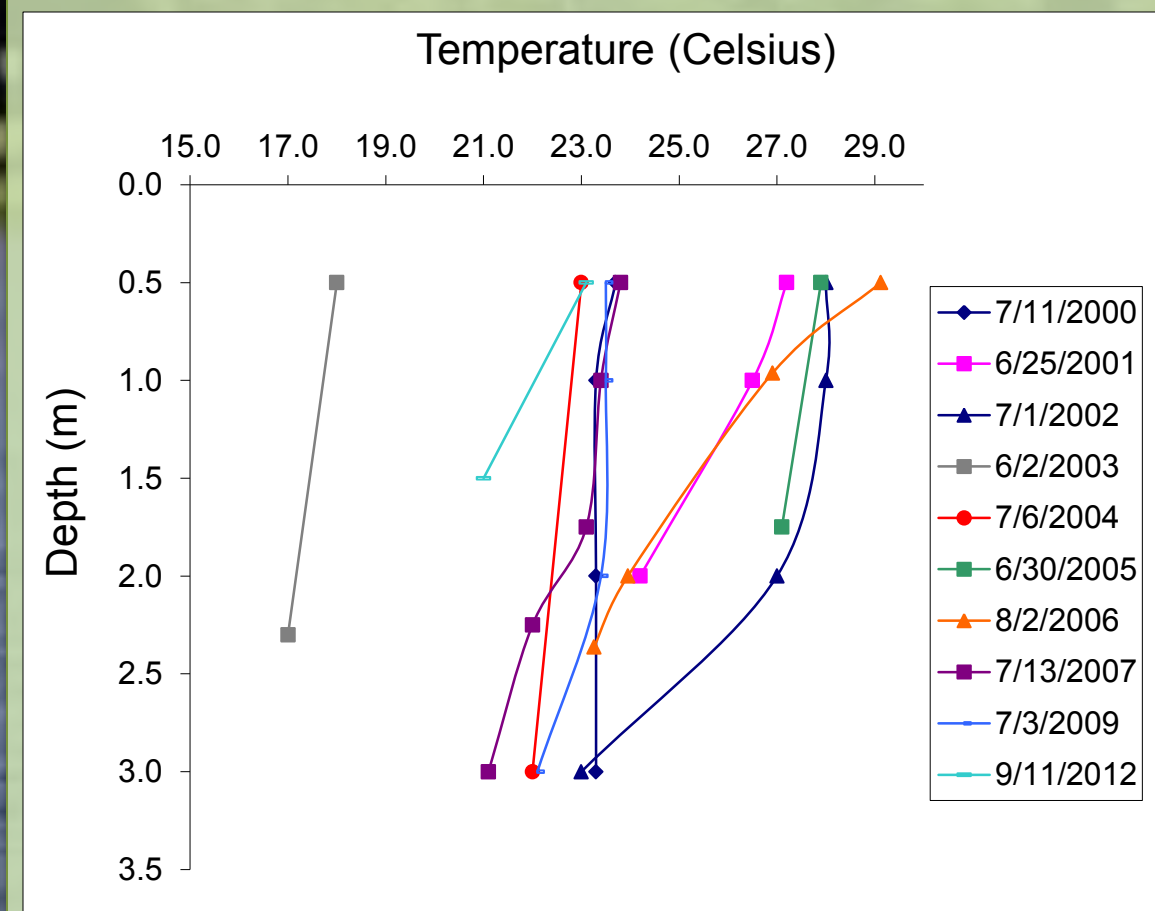
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New York State Office of Parks, Recreation, and Historic Preservation; Environmental Management Bureau



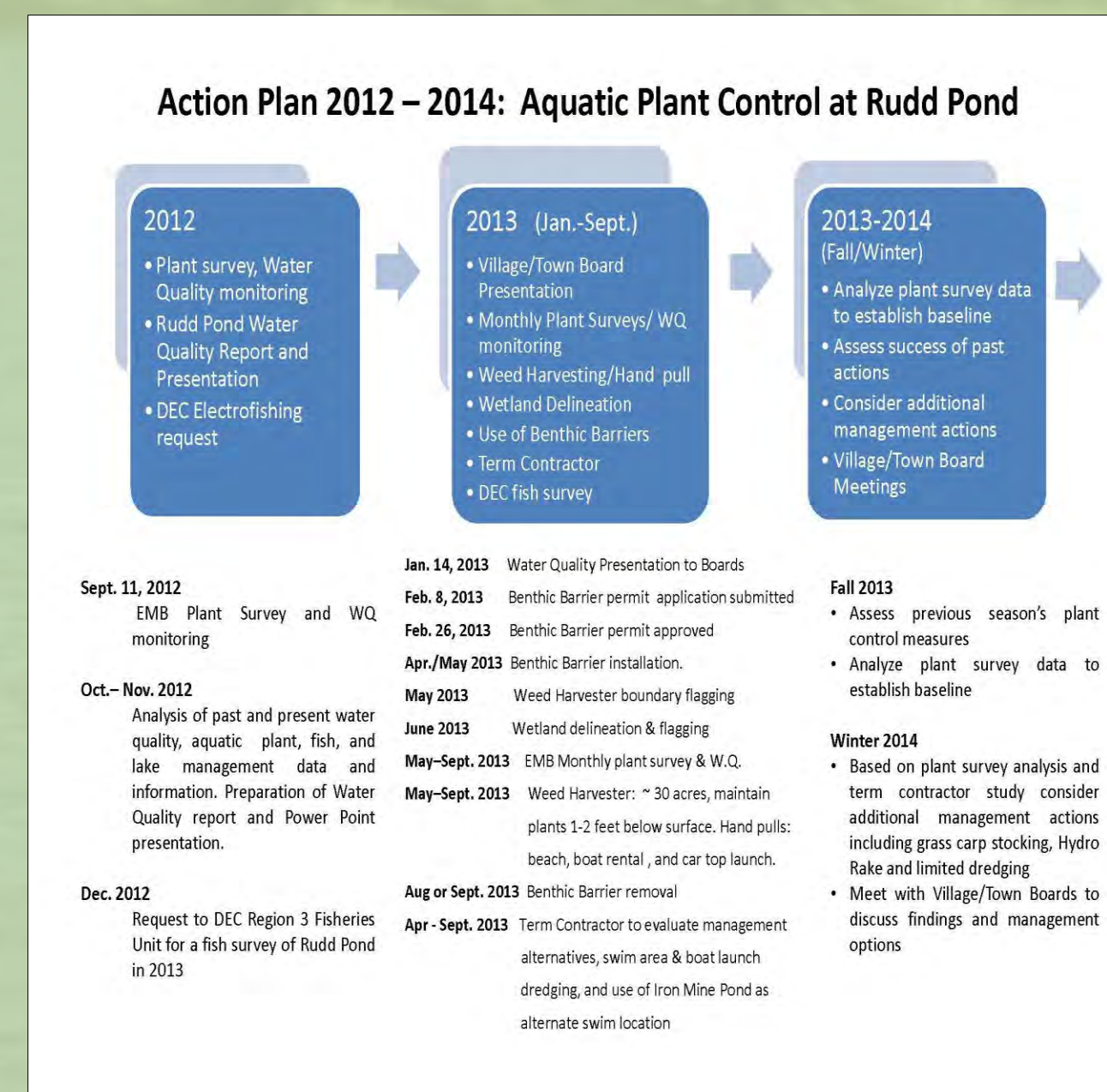
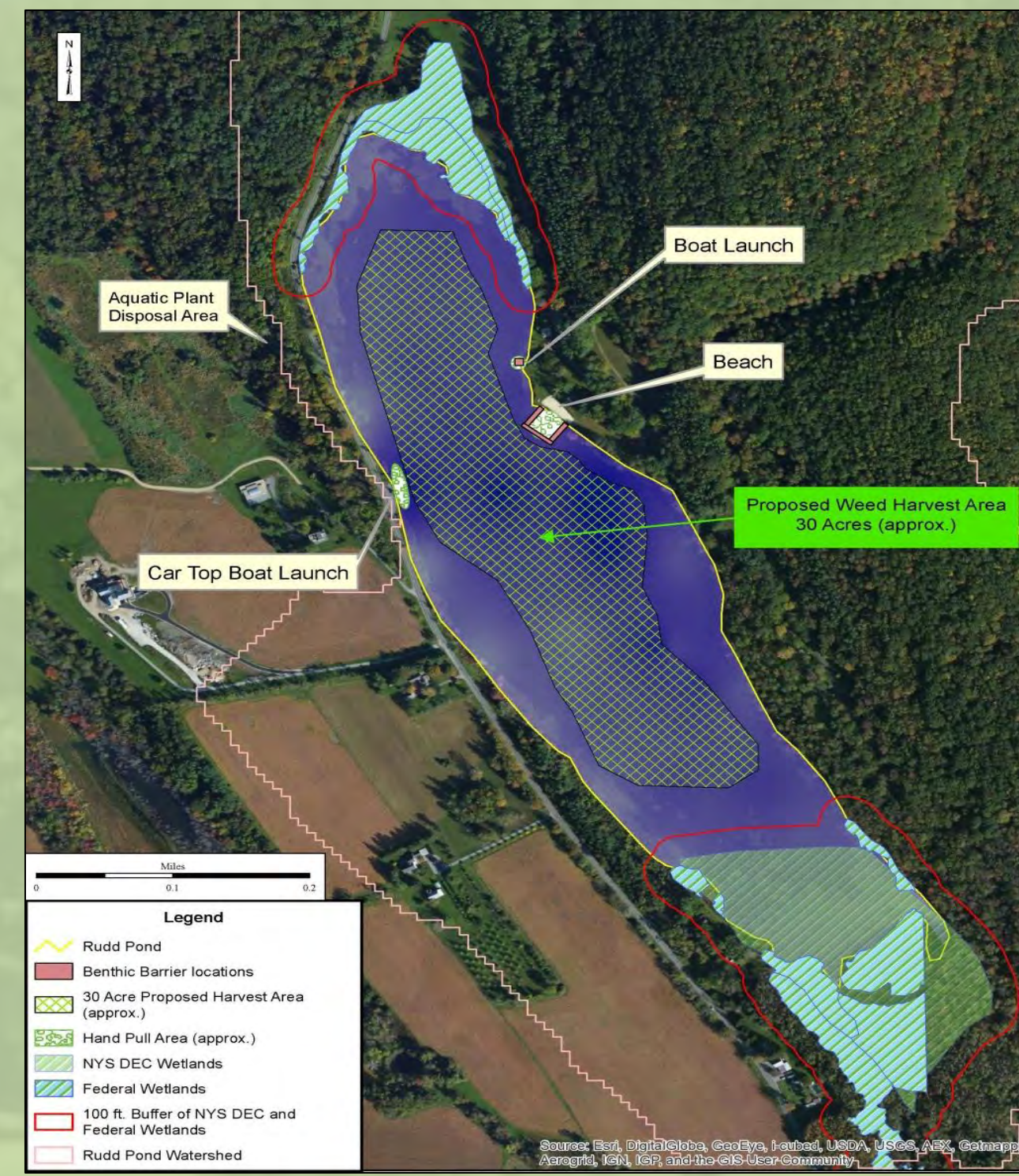
## Background

Rudd Pond is a 64 acre lake that serves as the main recreational and aesthetic feature of the Rudd Pond Area of Taconic State Park. Recreational uses of the lake include fishing, swimming, and non-motorized boating. The lake is relatively shallow, with a maximum recorded depth of 15 ft. and an average depth of six. Overabundant plant growth, identified as an issue since as early as 1943, has impaired both recreational uses and aesthetic enjoyment. Due to the pond's shallow nature it does not stratify and this lack of mixing, in addition to the high plant growth, has caused Dissolved Oxygen levels to fall, resulting in fish die-offs. NYS Parks is working with the local town and village to employ a suite of plant management strategies to improve recreational, aesthetic, and ecological conditions.



## Action Plan and Timeline

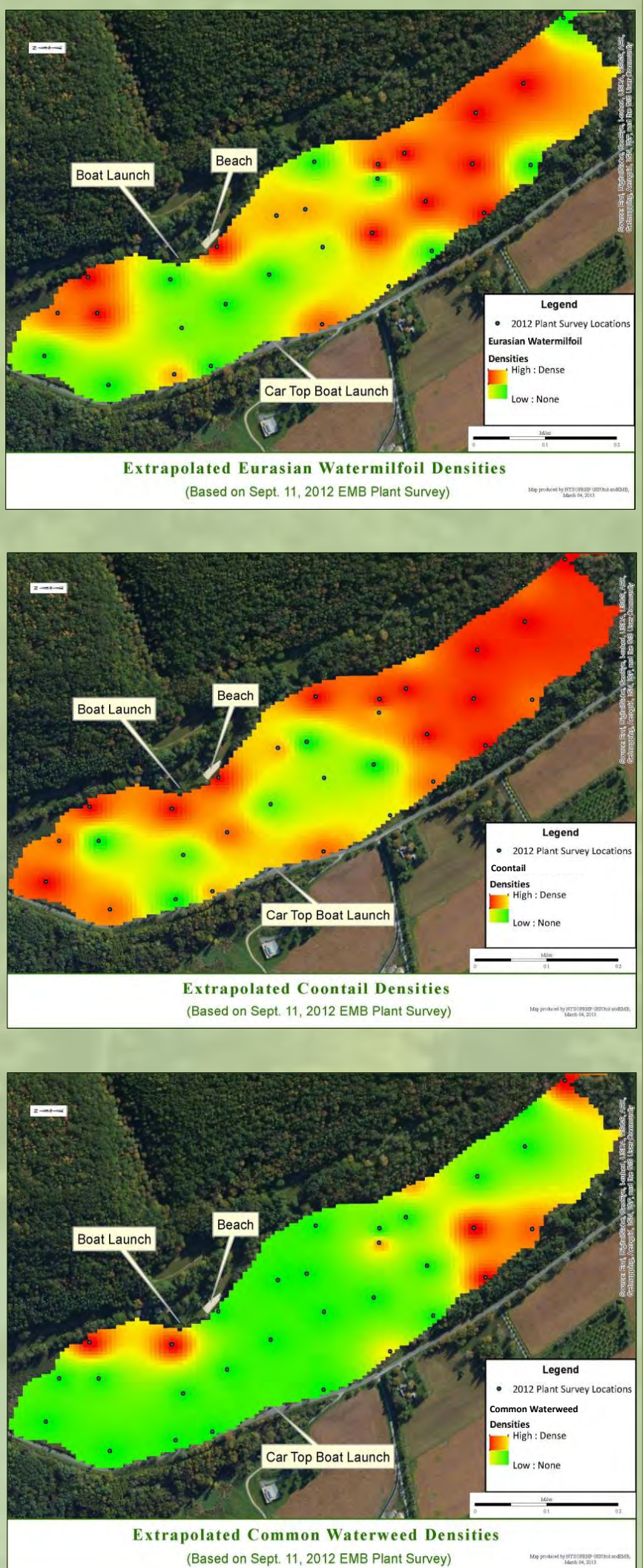
In 2012, EMB collected water chemistry data and conducted a full aquatic macrophyte survey at Rudd Pond. This data, in conjunction with historic data and past management actions, was used to define an aquatic invasive macrophyte action plan and timeline for Rudd Pond (see images to the right). A variety of aquatic invasive macrophyte management strategies were reviewed and it was determined that the best course of action would be to employ a suite of management techniques that would result in the highest effect on aquatic invasives with the lowest overall ecological impact. These strategies include: targeted hand-harvesting, use of benthic barrier mats, mechanical weed harvesting, grass carp, targeted dredging and use of a Hydro Rake. Additional full lake aquatic macrophyte surveys would also be conducted monthly in order to establish a baseline for assessment purposes.



- 2013**
- Benthic Barrier mats will be placed within the boat launch area and around the perimeter of the swim area to limit macrophyte encroachment.
  - Targeted hand pulling will occur in these areas as well as the car top boat launch area on the western shore.
  - Mechanical weed harvesting will occur in a roughly 30 acre area with a rotating 10 acre weekly harvest.
  - Wetland areas will be delineated and boundaries clearly marked.
  - Monthly macrophyte surveys conducted May – September.
  - Targeted dredging of the swim area and boat launch.
- 2014**
- Assessment of previous season's management actions.
  - Determine need for Hydro Rake and/or Grass Carp in 2014 season.

## Aquatic Plant Growth

A full lake aquatic macrophyte survey was conducted at Rudd Pond by EMB staff on September 11, 2012. 34 sample location points were identified using a 100 x 100 meter grid. Macrophytes were collected and densities recorded at each location using a Cornell rake-toss method, with samples analyzed by NYS DEC. Two aquatic invasives, Curly-leaf Pondweed (*Potamogeton crispus*) and Eurasian Watermilfoil (*Myriophyllum spicatum*), were found.



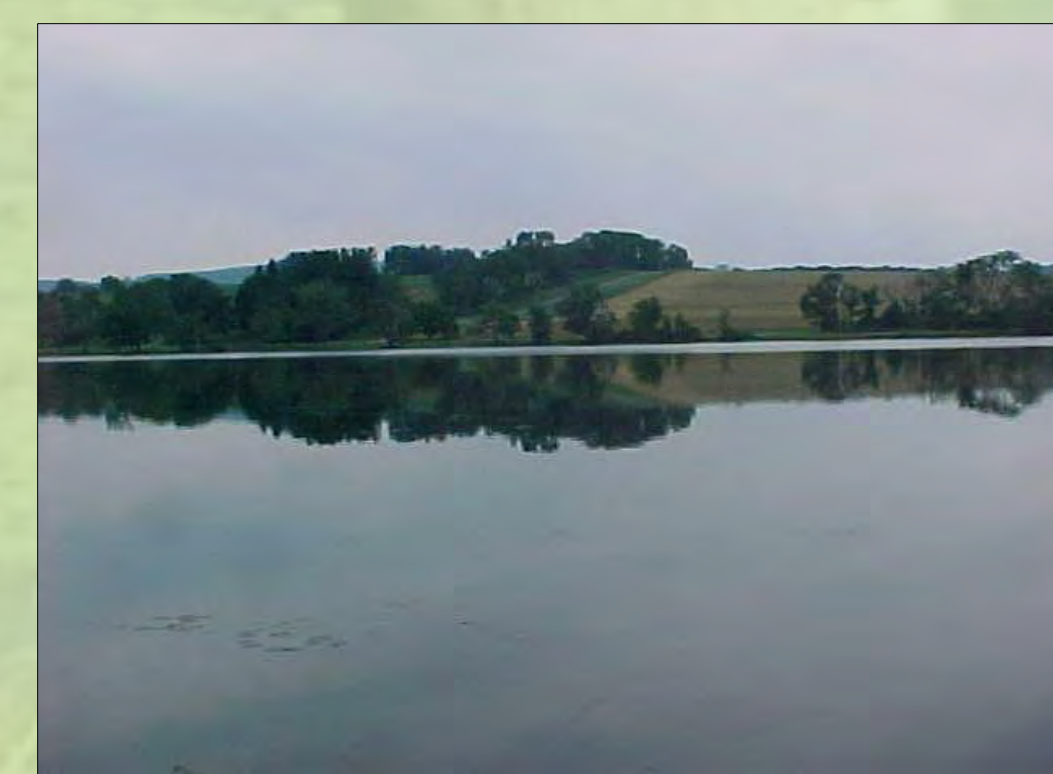
The most abundant plants identified were Eurasian Watermilfoil, Common Waterweed (*Elodea canadensis*), and Coontail (*Ceratophyllum demersum*). The abundance throughout the pond of these three species was projected (maps at right) using ArcGIS. Common Waterweed and Coontail are native plants that can grow excessively under the right conditions. The late plant survey date as well as GIS spatial analyst tools can skew macrophyte presence/abundance data. However, these maps help to identify general abundance, spatial distribution, and possible hot-spots.

## Past Management Actions

A review of historic documents dating back to 1943, substantiated by an extensive 1986 Department of Health report, indicate that excessive aquatic macrophyte (plant) growth has been negatively impacting Rudd Pond for at least the past 75 years. These documents identified agriculture within the watershed as the main contributing factor.



Past management actions to control excessive aquatic macrophyte growth have included use of a mechanical weed harvester, a water draw down, and introduction of triploid grass carp. Water draw down was shown to be ineffective and harmful, causing a large fish die off. Lack of monitoring, follow-up and inconsistent application made the effects of the carp and weed harvesting inconclusive, although ancillary information indicates these two strategies may have had moderate success.



Agriculture in the watershed



Rudd Pond Aquatic Plant Growth



Eurasian Watermilfoil



Rudd Pond Swim Area



Rudd Pond Weed Harvester



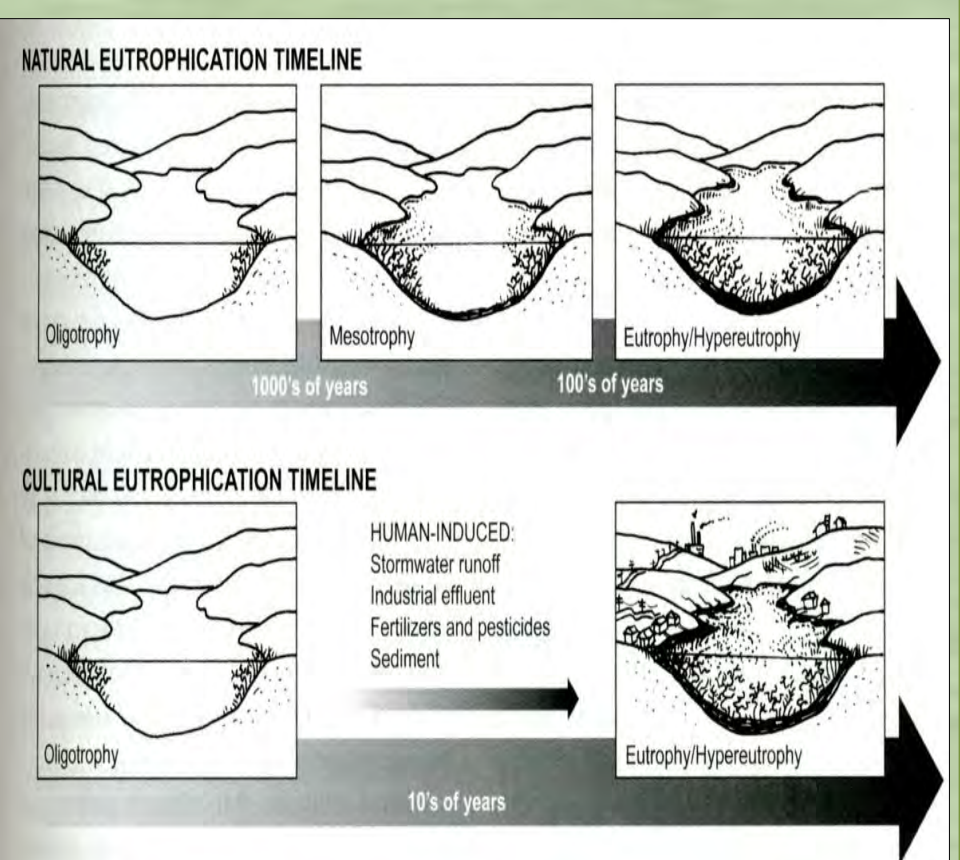
Benthic Barrier mat



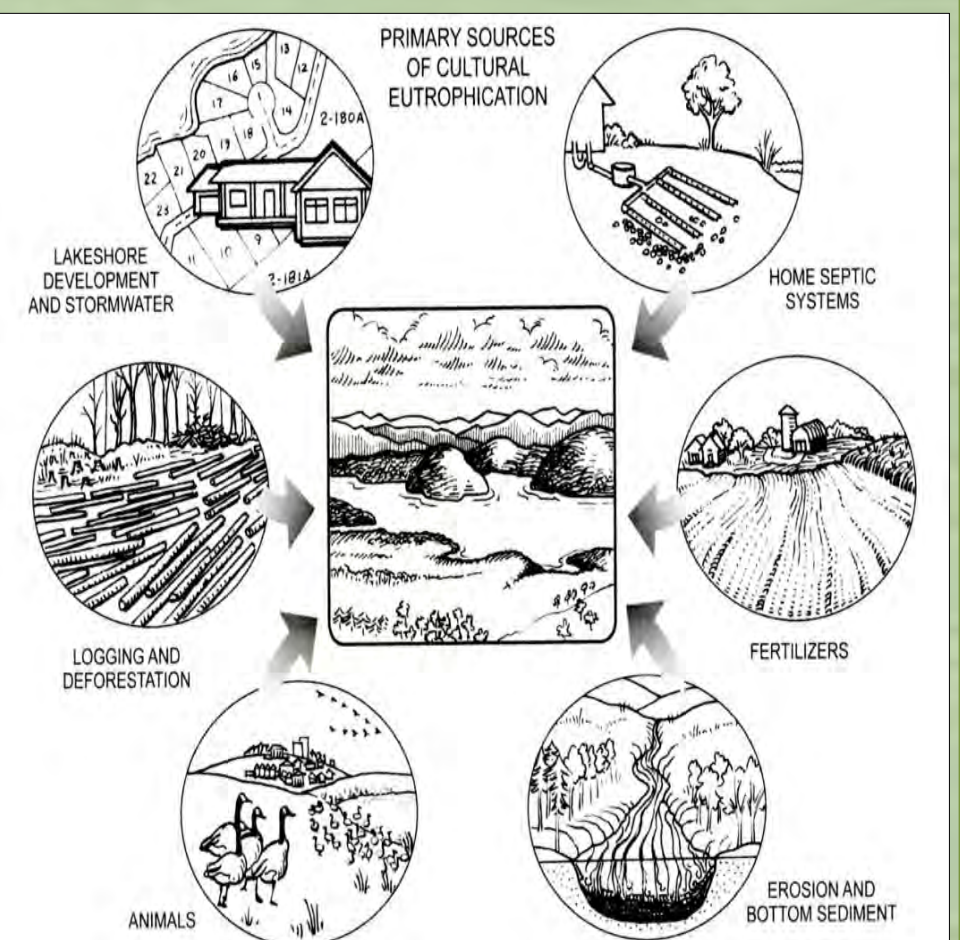
Aquatic Macrophyte Survey

## Trophic Status

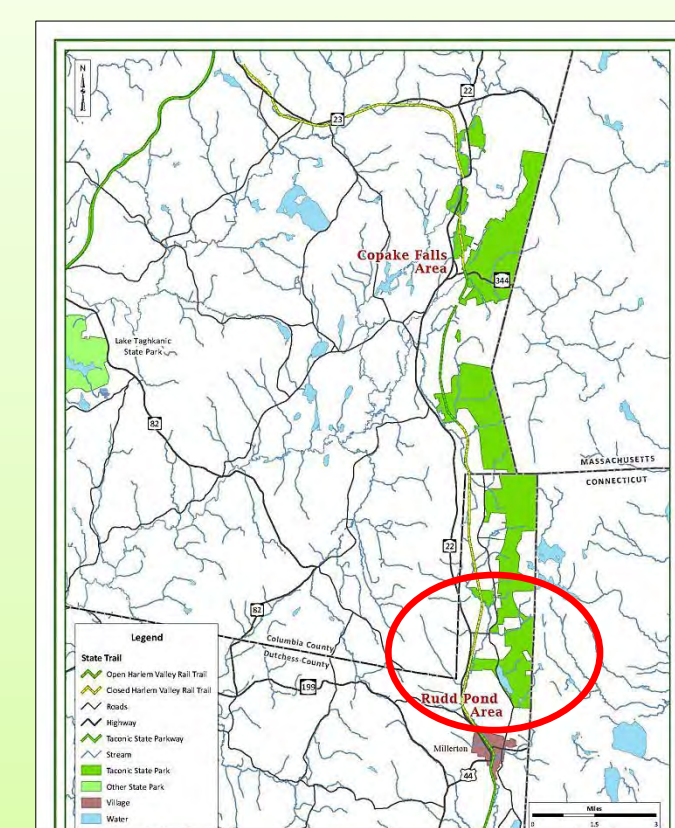
Trophic status is an indication of a water bodies productivity. Based on water chemistry data gathered by EMB in 2000 – 2007, 2009, and 2012, Rudd Pond's trophic status ranges from high mesotrophic to low eutrophic. Eutrophication is a natural process of lake progression, but it can be accelerated by cultural influences. For Rudd Pond, these influences include agriculture, erosion, shoreline development and stormwater runoff.



Parameter	Eutrophic	Mesotrophic	Oligotrophic	Rudd Pond Trophic Range
Phosphorus (µg/L)	> 20	10 - 20	< 10	7.3 - 24.5
Chlorophyll a (µg/L)	> 8	2 - 8	< 2	3.3*
Water Clarity (m)	< 2	2 - 5	> 5	1.2 - 2.7



## Site Location



## History

"Bezaleel Rudd, who served as an officer in the Continental Army, first settled the Rudd Pond area with his family in the early 1800s. The land remained sparsely inhabited and in 1924 was purchased by the Taconic State Park Commission, which built a bathing house, road, and campsites". <http://nysparks.com/parks/141/history.asp>

## NYS Parks' Lake Program

NYS Parks' Environmental Management Bureau – Water Quality unit has monitored Rudd Pond as part of a statewide lake monitoring program. The goal of the lake monitoring program is to collect sufficient water quality data to attain an accurate representation and classification of water bodies across the state. The program began in 2001 with data collected at Rudd Pond in 2000-2007, 2009 and 2012.

## Acknowledgements

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 NYS Parks staff: Edwina Belding, Linda Cooper, Ray Doherty, Kristen Husson, Jesse Jaycox, Nathan Krish, Tom Lyons, Chris Rickard, Melyssa Smith, Karen Terbush, and Lauren Townley. NYS DEC staff: Bob Anygal, Mike Flaherty, Scott Kishbaugh, Janet Swentusky, and Daniel Whitehead. NYS DOH staff: Debra Fusco and Dr. Lindsay Wood.

## Further Information

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