

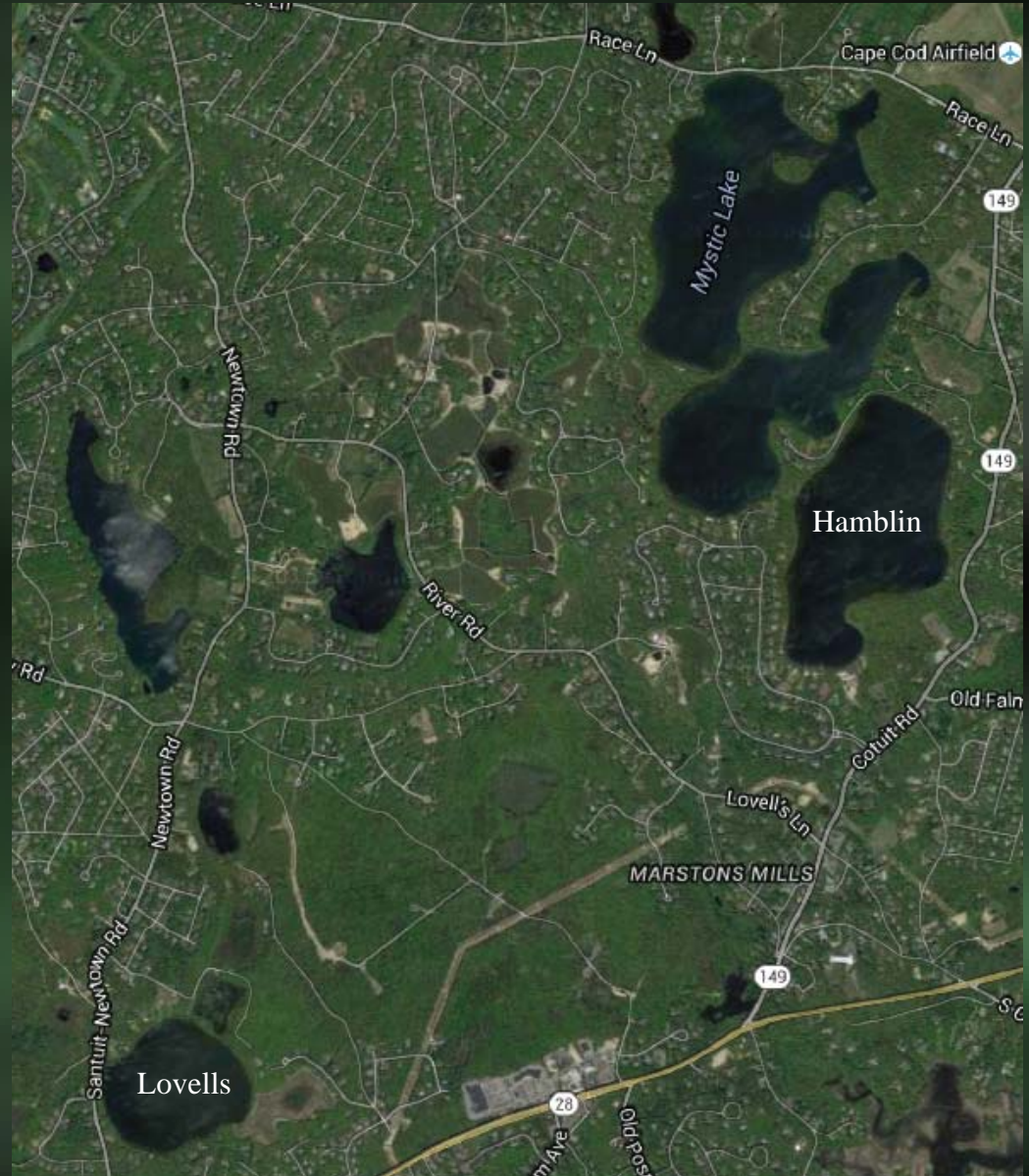
Managing Barnstable Ponds with Aluminum Treatments

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The Ponds

- Hamblin, Mystic and Lovells Ponds have been treated with aluminum to reduce internal P recycling
- Hamblin has been treated twice
- 7 other ponds treated in other towns
- All but initial treatment by ACT (now SOLitude)



Hamblin

Blooms of cyanobacteria plagued Hamblin Pond for decades until 1995 treatment (45 g/m²), recurred in late 2013 and summer 2014, treated again in 2015 (45-70 g/m²).



Hamblin

The barge treats over a pre-determined path to cover all target area at prescribed dose



Hamblin

Treatment clears the water of algae and inactivates P in surficial sediments; some water column P also removed (less efficient)



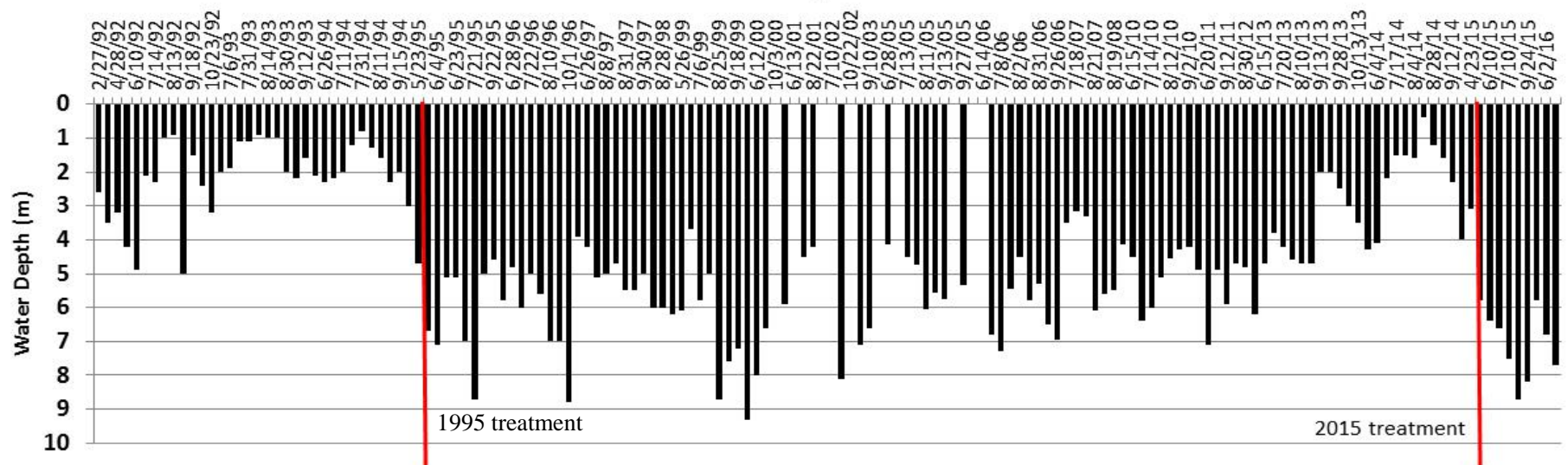
Essential to maintain pH between 6 and 8 to avoid toxicity during treatment, but minimal risk after reactions complete

Hamblin

Secchi transparency record clearly demonstrates success of the program and limits to duration of benefits from each treatment.

Loss of benefits is a function of watershed and internal processes.

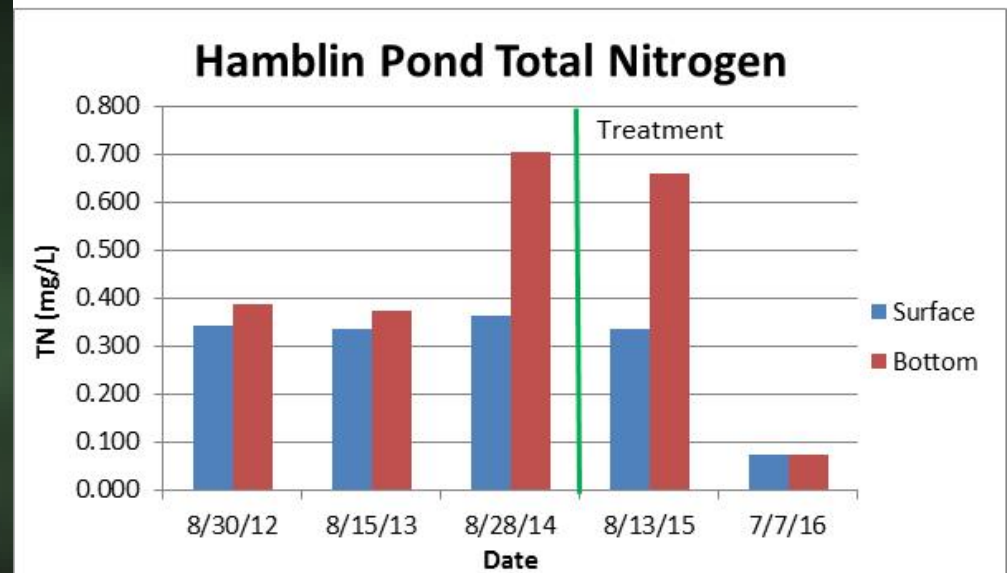
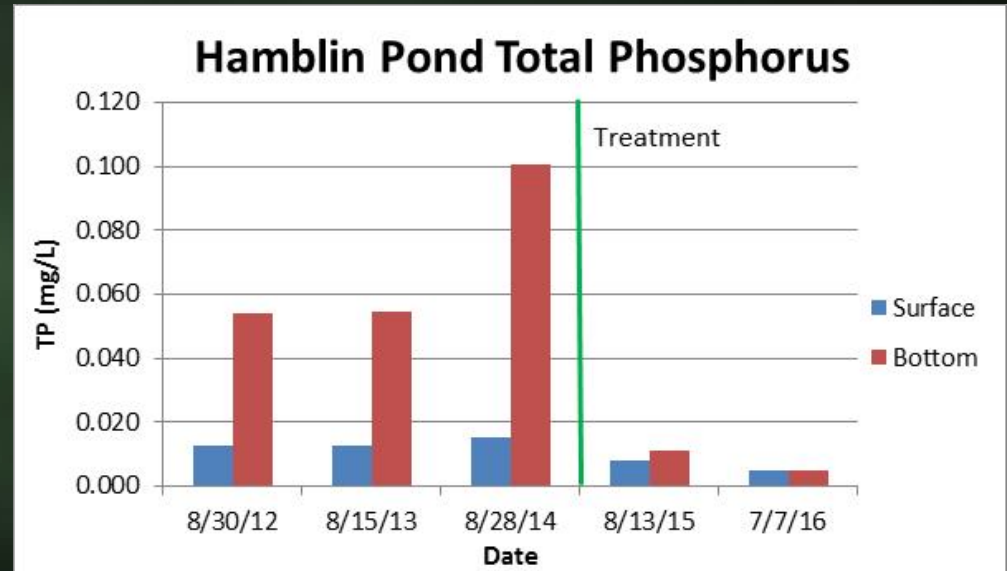
Secchi Disk Transparency in Hamblin Pond, 1992-2016,
Before and After Phosphorus Inactivation



Hamblin

Treatment lowers P dramatically, less impact on N.

Deep water P is most affected, relates to shallow water P and directly to algae through benthic growth and N:P ratios

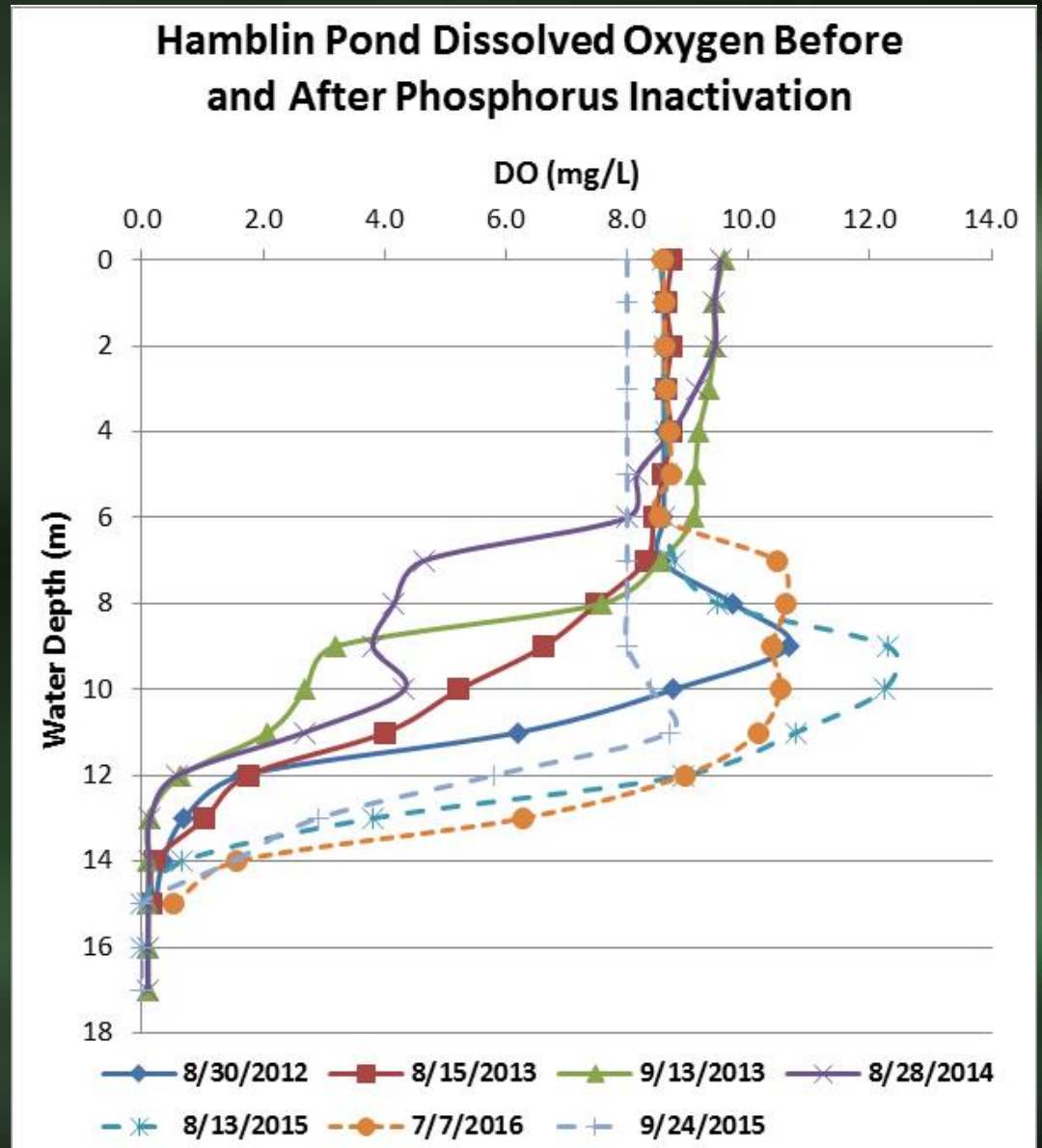


Hamblin

Oxygen is increased by lowered algae production and related decay

Regaining 10+ feet of water suitable for summer trout support

Allows for holdover trout



Lovells

Cranberry bog inputs
over decades and
development since
1980s overloaded
pond with P

Oxygen depression
and algae blooms

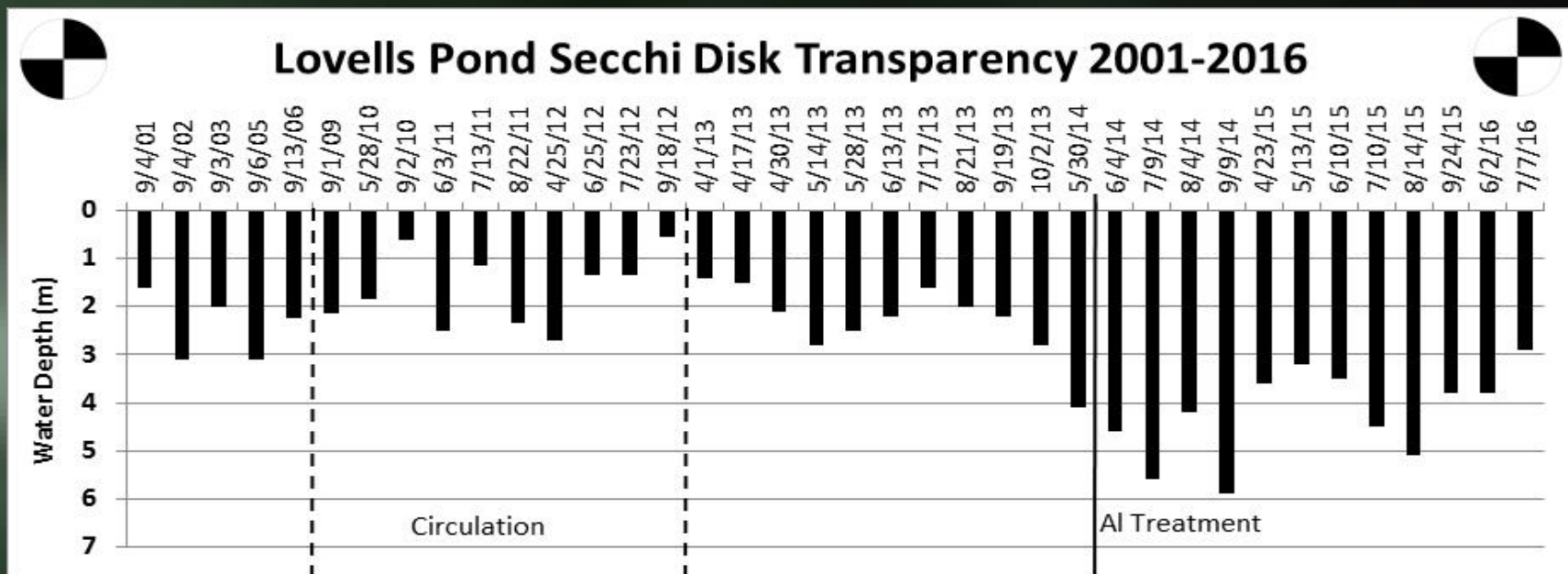
Bogs now out of
service

Treated with Al in
2014 (50 g/m²)



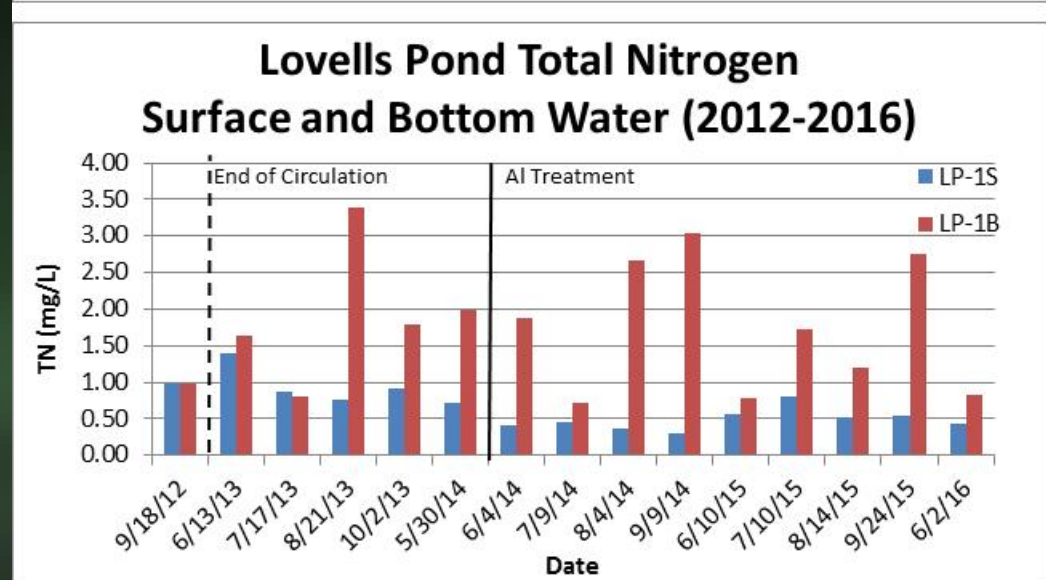
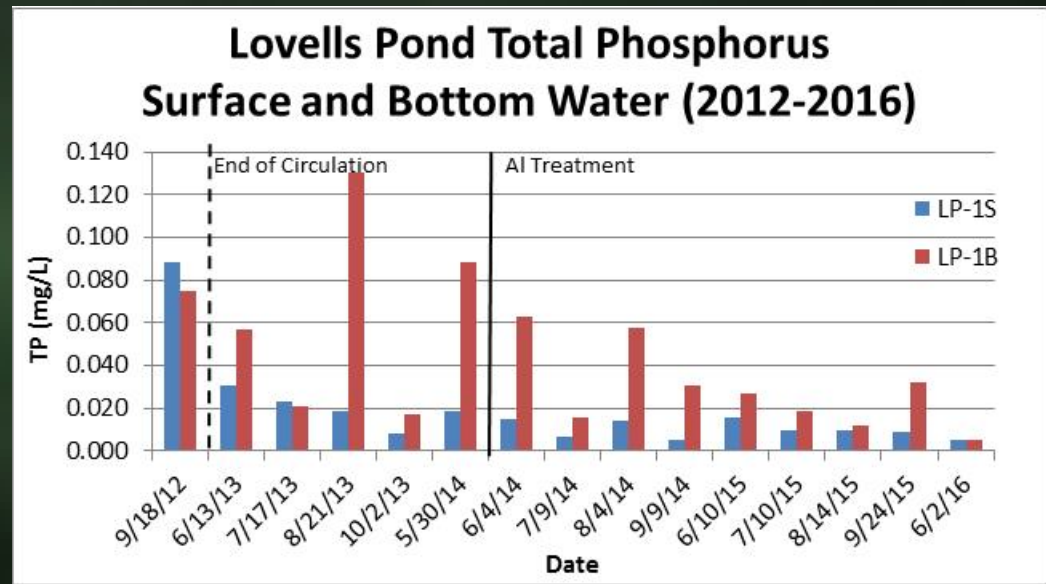
Lovells

- Pre-2009 conditions poor
- Operation of circulation system problematic – conditions worse than without circulation
- Aluminum treatment improved clarity, but declining after 2 years



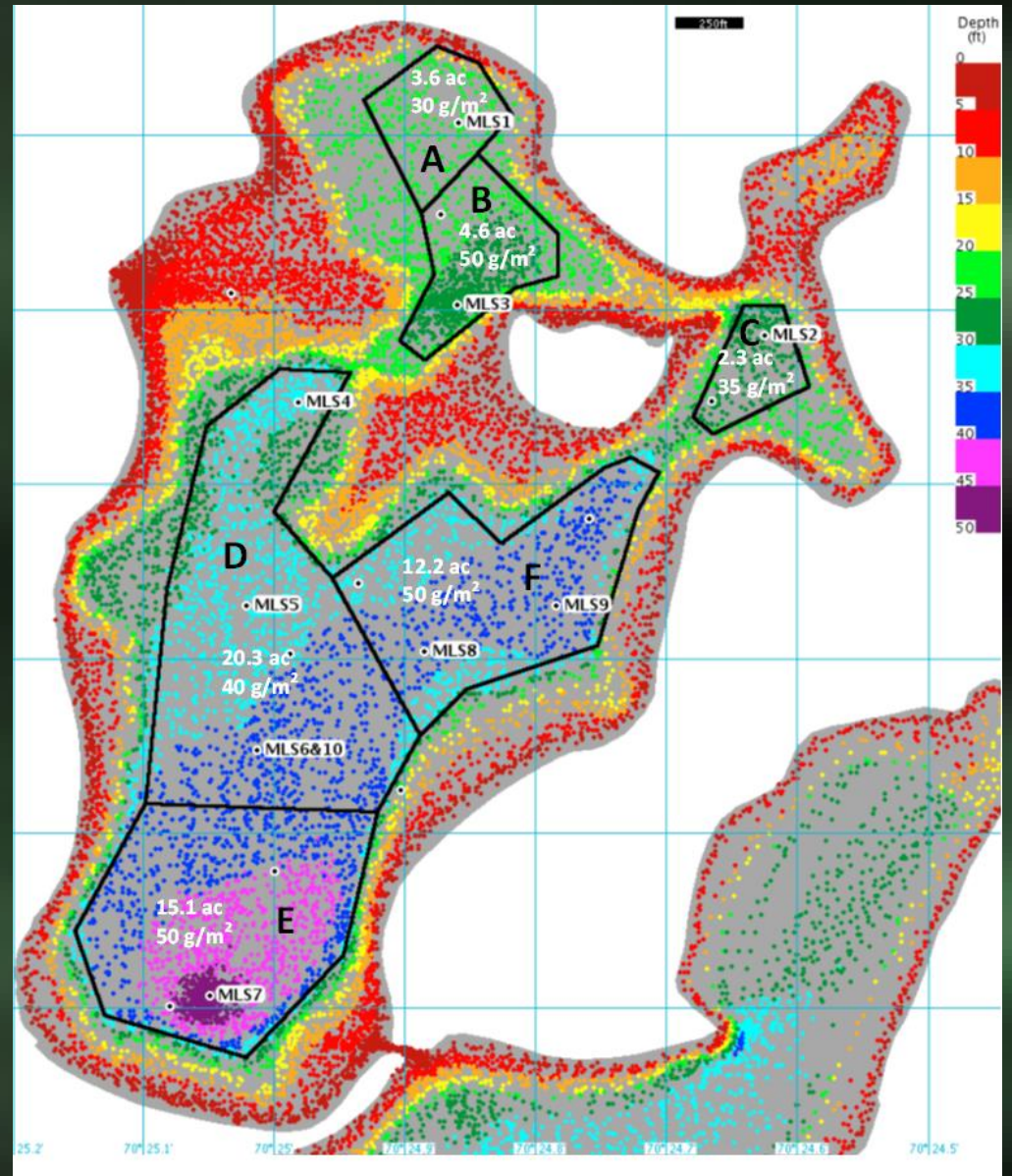
Lovells

- Al treatment reduced P with little change in N
- Still low P with increased algae in 2016
- Possible shallower water sediment source



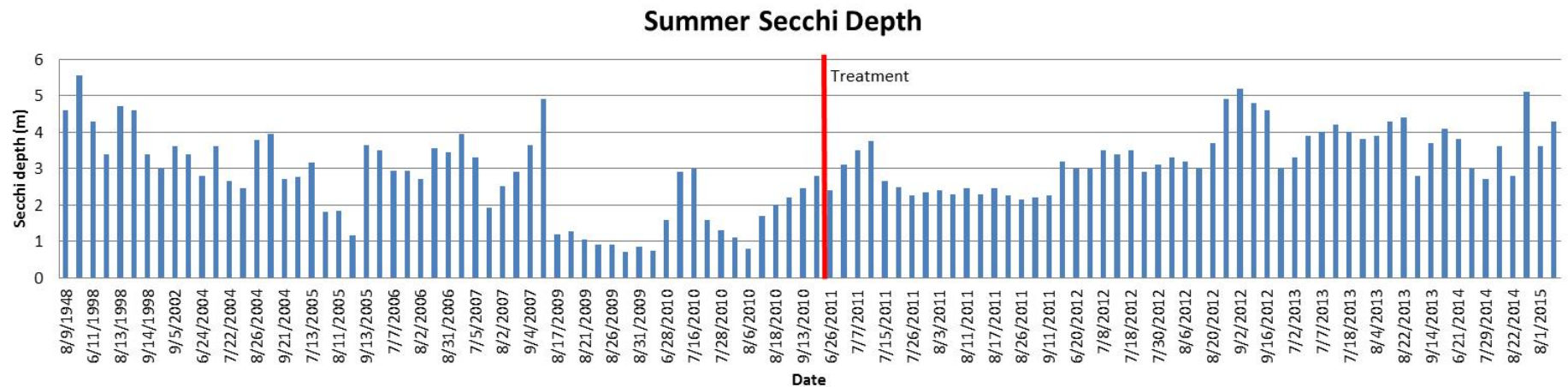
Mystic

- Lowered clarity in 2000s
- Major bloom in summer 2009 with apparent toxicity and 95% mussel kill
- Treated at 30-50 g/m² aluminum in fall of 2010



Mystic

- Improved Secchi after treatment, but less dramatic than other ponds
- Believed linked to “leftover” P in water column after 2009 mussel kill
- Gradual improvement over time as P sequestered
- Hydrilla and sporadic algae blooms now issues



Any Questions?



**One more and I think
this will all make sense...**