

White Island Pond TMDL

Massachusetts
Dept. of
Environmental
Protection

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Clean Water Act Requires . . .

- As enacted in 1972, §303(d) of the Clean Water Act requires States to:
 - Monitor
 - List polluted waters -- §303(d) list
 - Develop a TMDL
 - EPA to approve or act in lieu of State

What is a Total Maximum Daily Load (TMDL)?

A “pollutant budget” and a “plan” designed to restore the health of an impaired waterbody!

Impaired Waters List.

- The East White Island Pond (segment # 95166) is listed for nutrients, organic enrichment/low DO, noxious aquatic plants and turbidity as well as for exotic species (not a pollutant). West White Island Pond (segment #95173) is listed for nutrients, organic enrichment/low DO, noxious aquatic plants as well as for exotic species.

Then and Now.

- Previously sampled in late 1970's – found to be impaired, algal blooms some fish kills but transparency was still fairly good at 10 feet and surface TP=0.030 mg/l.
- Sampled again in 2000 and again in 2007 – conditions much worse, transparency now less than 4 foot swimming standard and TP average of 0.057 mg/l

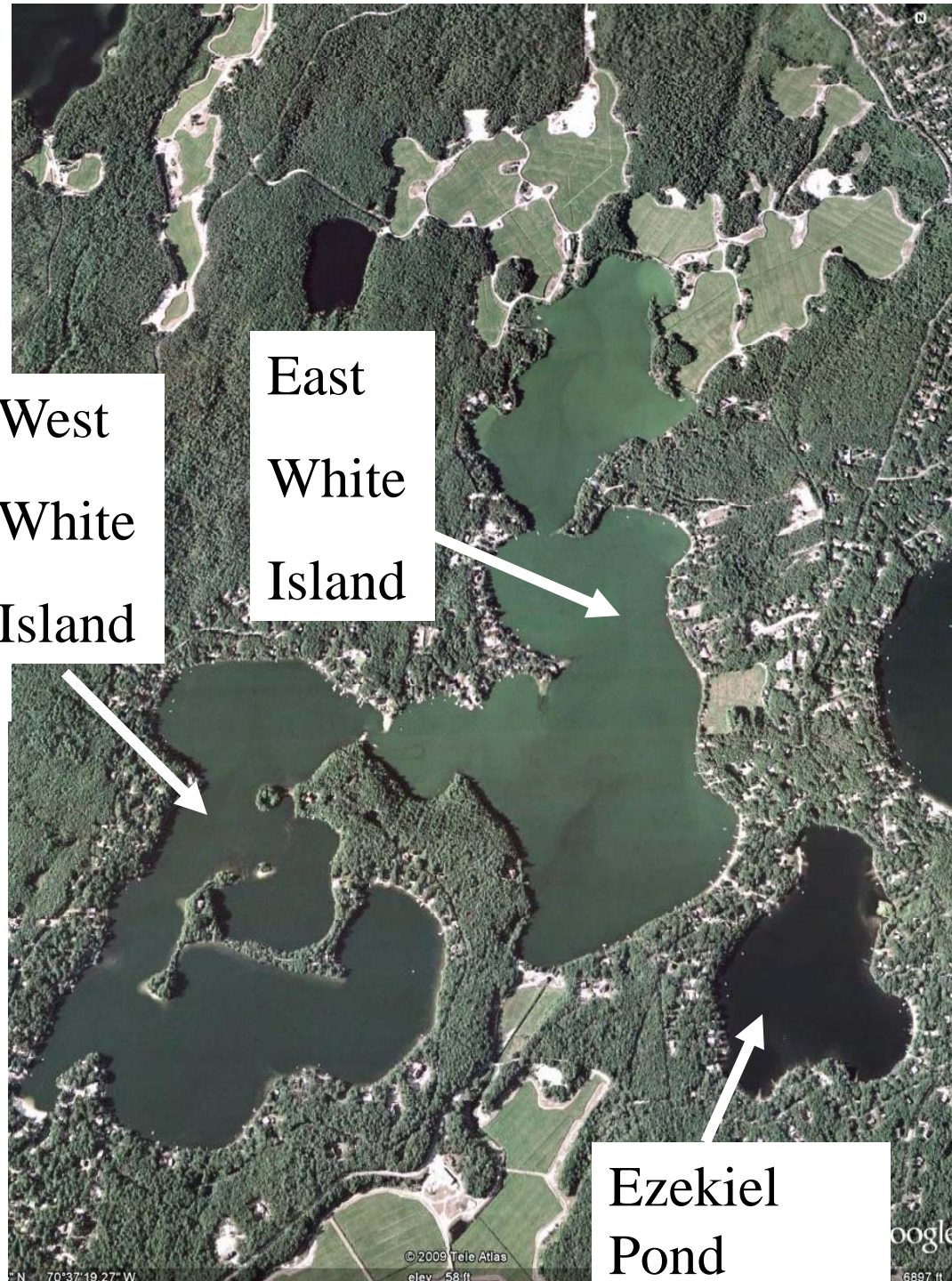
Potentially toxic
cyanobacterial

Blooms (blue-
green blooms)
located in the
east & north

Anabaena sp.
700,000
cells/ml

May have
anatoxin (nerve
toxin or

Microcystin
(liver toxin)

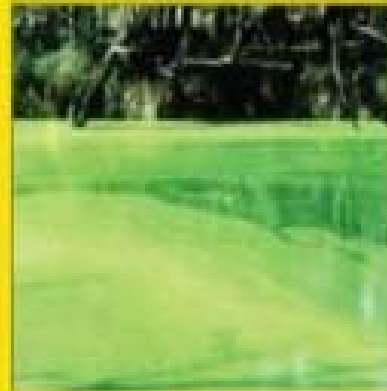






CAUTION

POSTED _____ : Based on counts of the cyanobacteria (blue-green algae), MDPH thresholds for recreational waters have been exceeded.



- Water which looks like the pictures above may contain algae capable of producing toxins that can be dangerous to humans and pets.
- People and pets should avoid contact in areas of algae concentration
- Do not swallow water and rinse off after contact

For further information call:

MA Department of Public Health at 617-624-6757



Aerials Only Gallery (508) 295-5551
4088D Plymouth, MA, Ezekiel Pond

Ezekiel
Pond

White Island Pond

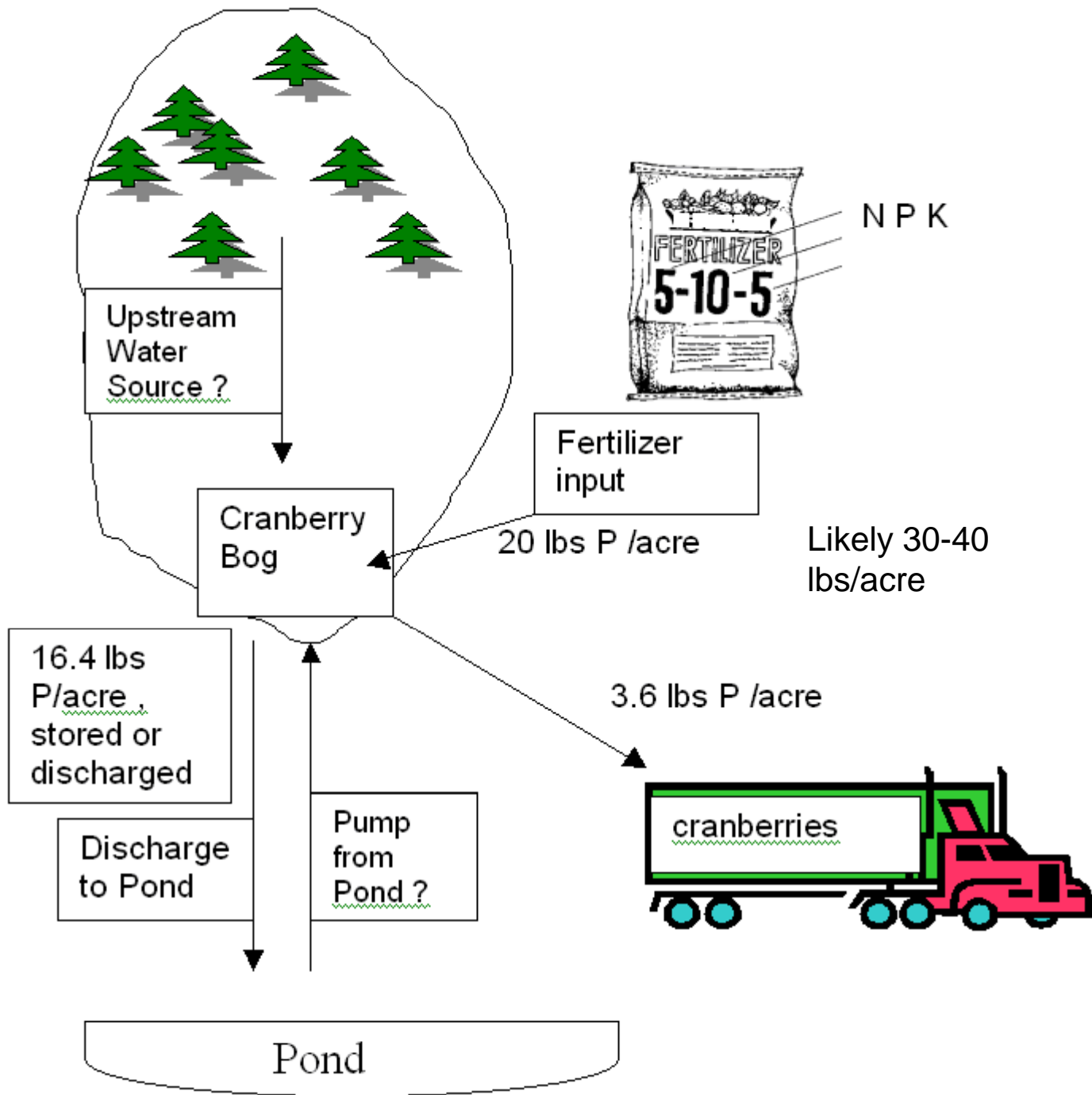
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Ten Years of Study

- 1999 MassDEP, UMass Cranberry Station, CCCGA, DFA discuss TMDL.
- 2000 Sampled White Island Pond
- 2001-2005 MassDEP Sponsored UMass Cranberry /SMAST Study on cranberry bogs
- 2007-Water Quality Study of White Island Pond
- 2009 Draft TMDL released.
- 2009 MOA agreement on cranberry BMP study
- 2010 Final TMDL submitted to EPA



Upstream
Water
Source ?



NPK

Fertilizer
input

20 lbs P /acre

Likely 30-40
lbs/acre

Cranberry
Bog

16.4 lbs
P/acre,
stored or
discharged

3.6 lbs P /acre

Discharge
to Pond

Pump
from
Pond ?

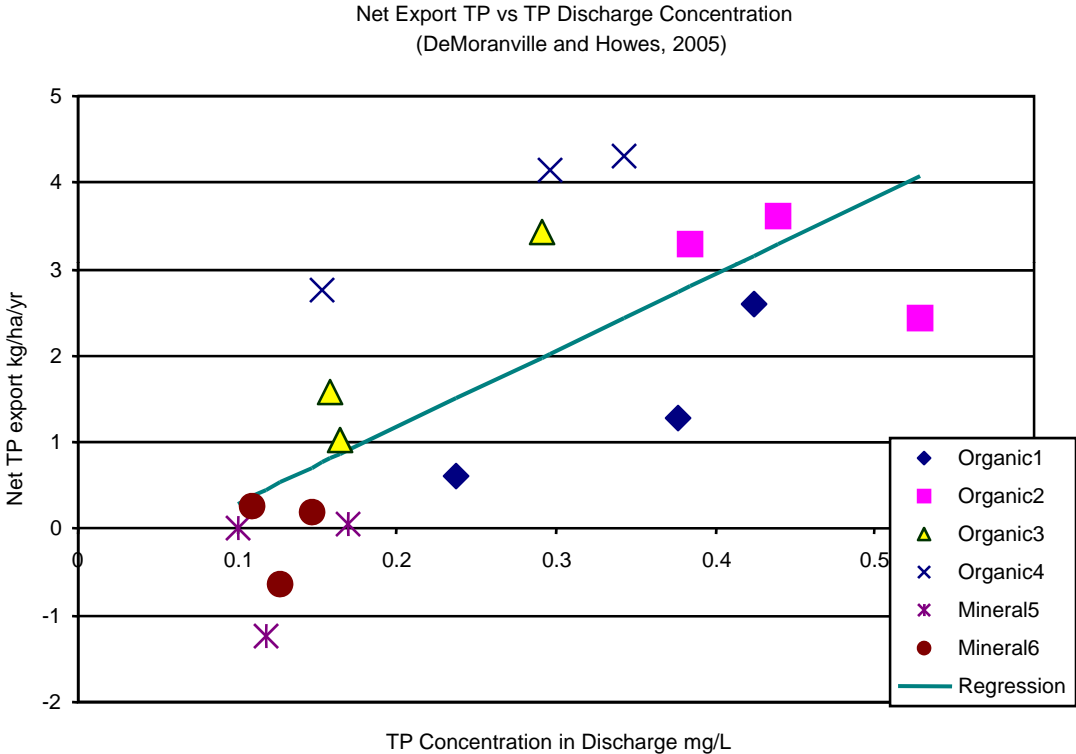


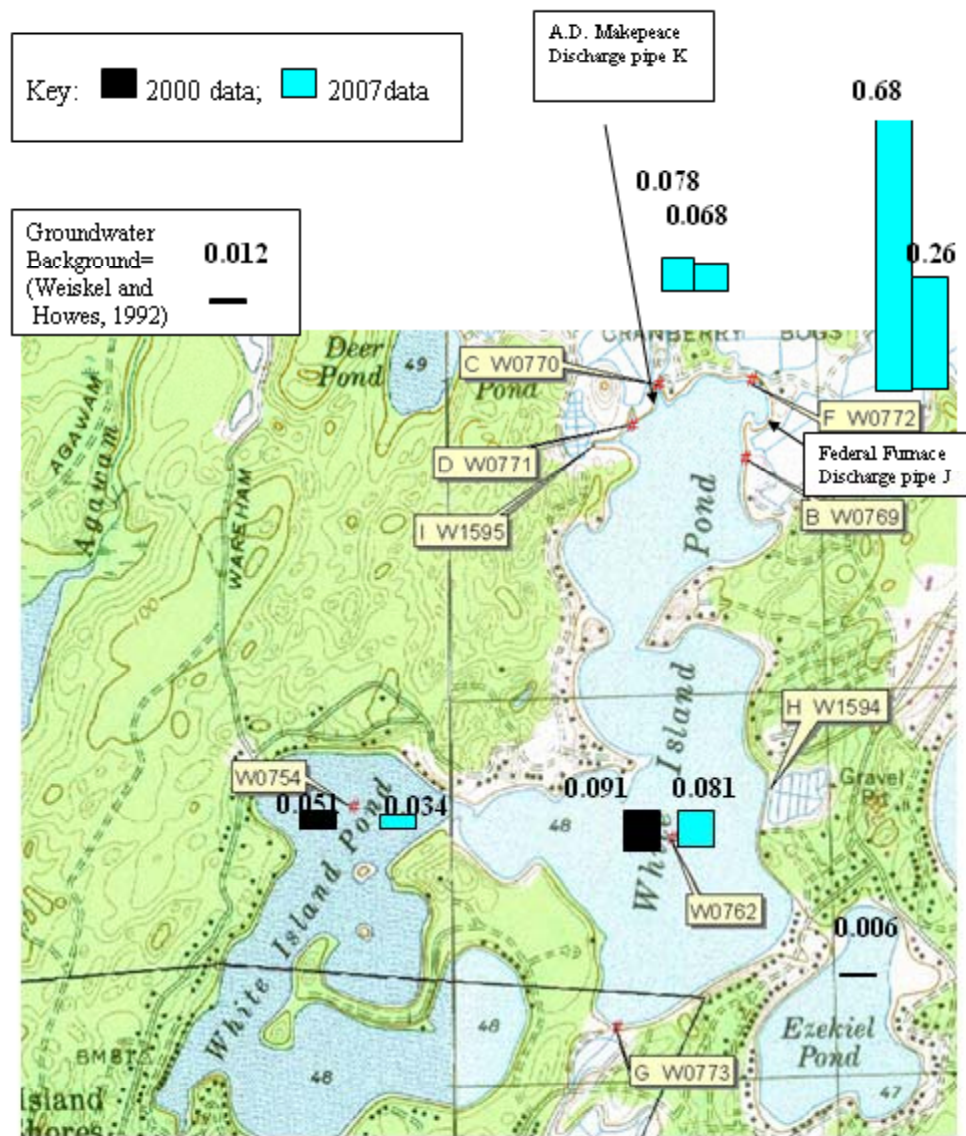
Pond

9.9 kg P/ha/yr



Flow-thru bog Howe and Teal, 1995





Total Phosphorus concentrations (mg/L) in the area.

The Target 19 ppb. 67% reduction.

Total Phosphorus Targets

Segment ID	Lake Name	Lake Area	Current Total Phosphorus (mg/l)	Target Total Phosphorus (mg/l)
MA95166	White Island Pond East basin	167 ac	0.081	0.019 (whole lake average)
MA95173	White Island Pond West basin	124 ac	0.034	

Implementation

- Reduce homeowner septic inputs over time as Title 5 requires.
- Reduce both concentration and volumes from cranberry bogs
- Reducing P fertilizers
- Redirecting discharge away from lake (either retention pond or pump to uplands).
- Other water practices, filtration.
- Alum or other treatment of sediments

Cooperative approach to Implementation

- Use low P fertilizers (UMass Study)
- Use water storage and pump discharge water away from lake (both A.D. Makepeace and Federal Furnace Cranberry companies)
- Monitor results with DFA, CCCGA and UMass Cranberry Station with MassDEP funding.
- Report to MassDEP

Is the MOA working?

- Baseline load: 539kg → 62ppb
- TMDL load: 147 kg → 19 ppb
- No summer/fall discharges summer 2009
- Reduced summer load predicts → 43 ppb
- This years average was in fact 46ppb
- Lake concentrations were increasing suggesting sediment or GW source.
- This winter/spring heavy rains → large discharges from bogs.