

# White Pond Preliminary Results



Presentation to

**Town of Concord and the  
White Pond Advisory  
Committee**  
Concord, Massachusetts

Carl Nielsen, CLM  
Matt Ladewig, CLM

March 26, 2014



[www.essgroup.com](http://www.essgroup.com)

# Overview of Presentation

In the following presentation, we will discuss:

- Summary of preliminary results from field/desktop studies
- Initial thoughts about management recommendations
- Approach to complete outstanding tasks or portions of tasks
- Open to questions/feedback



# Existing Data Review

- Outstanding items for discussion
  - BOH septic records through 2006 – would be preferable to have latest
  - Some parcel information available – a few parcels outstanding
  - WhitePond.org website down for extended period immediately following kick-off meeting – now back up

Aicher, J. 2007. White Pond Total Phosphorous, Fall 2006. Prepared for Judith Sprott, White Pond Lake Association. Upstate Freshwater Institute.

Blair, K. 2012 July 26. White Pond cove in danger. The Concord Journal; Guest Commentary.

Brain, J. W. 1989 March 30. White Pond, a resource threatened: Why should it be rescued? The Concord Journal, Page 7.

Brain, J. W. 1989. White Pond and its Surrounding Woods, Its Historic Significance and Scenic Worth (Preliminary Draft) March 20, 1989.

Secretary of the Commonwealth of Massachusetts. 1912. Public Documents of Massachusetts: Being the Annual Reports of Various Public Officers and Institutions for the Year 1911. Vol. I. Boston, MA: Wright and Potter Printing Co., State Printers.

Dewar, R. 1991 January 10. Unisys discusses plan to clean Sudbury site. Middlesex News.

Dwight, V. 1991 January 31. Town offered Unisys property for \$1.8M. The Sudbury Town Crier.

Dwight, V. 1991 September 25. Sudbury board delays gravel mining decision. Middlesex News.

Heaney, S. 2006 June 22. Pond Lovers Alarmed by Rail Trail. The Boston Globe; Concord, Page 6.

Jewell, G. 1994. Westborough Fisheries and Wildlife – Letter to Dan Monahan with Attachments. June 10, 1994.

Kaye, D. June 26, 2007. Personal Communication. White Pond Access from Plainfield Road. Sent via email June 26, 2007.

Massachusetts Department of Environmental Protection. 2012. Massachusetts Year 2012 Integrated List of Waters.

Monahan, D. 1982. White Pond Conservation Land Parking – Memorandum to Town of Concord Natural Resources Commission. October 20, 1982.

Monahan, D. 1993. White Pond Reservation "Tour" – Friday, July 23<sup>rd</sup> – Memorandum with attachments to Chris Whelan. July 20, 1993.

Natural Resources Commission, Town of Concord. 2003. Natural Resource Commission Response to White Pond Task Force's Recommendation on the Permanent Preservation of the White Pond Reservation – Memorandum to White Pond Task Force and Town of Concord Officials. January 8, 2003.

Quitclaim Deed. 1992. Town of Concord and Unisys Transaction for Sperry Land. January 31, 1992.

Scibetta, J. 2005. Open Letter to the Town of Concord. August 23, 2005

Shattuck, L. 1830. Plan of the Town of Concord, Mass, in the County of Middlesex. Surveyed by John G. Holes.

Schussler, R. M. 1992 July 7. Unisys will foreclose on 25 acres in Sudbury. Middlesex News, Page 3B.

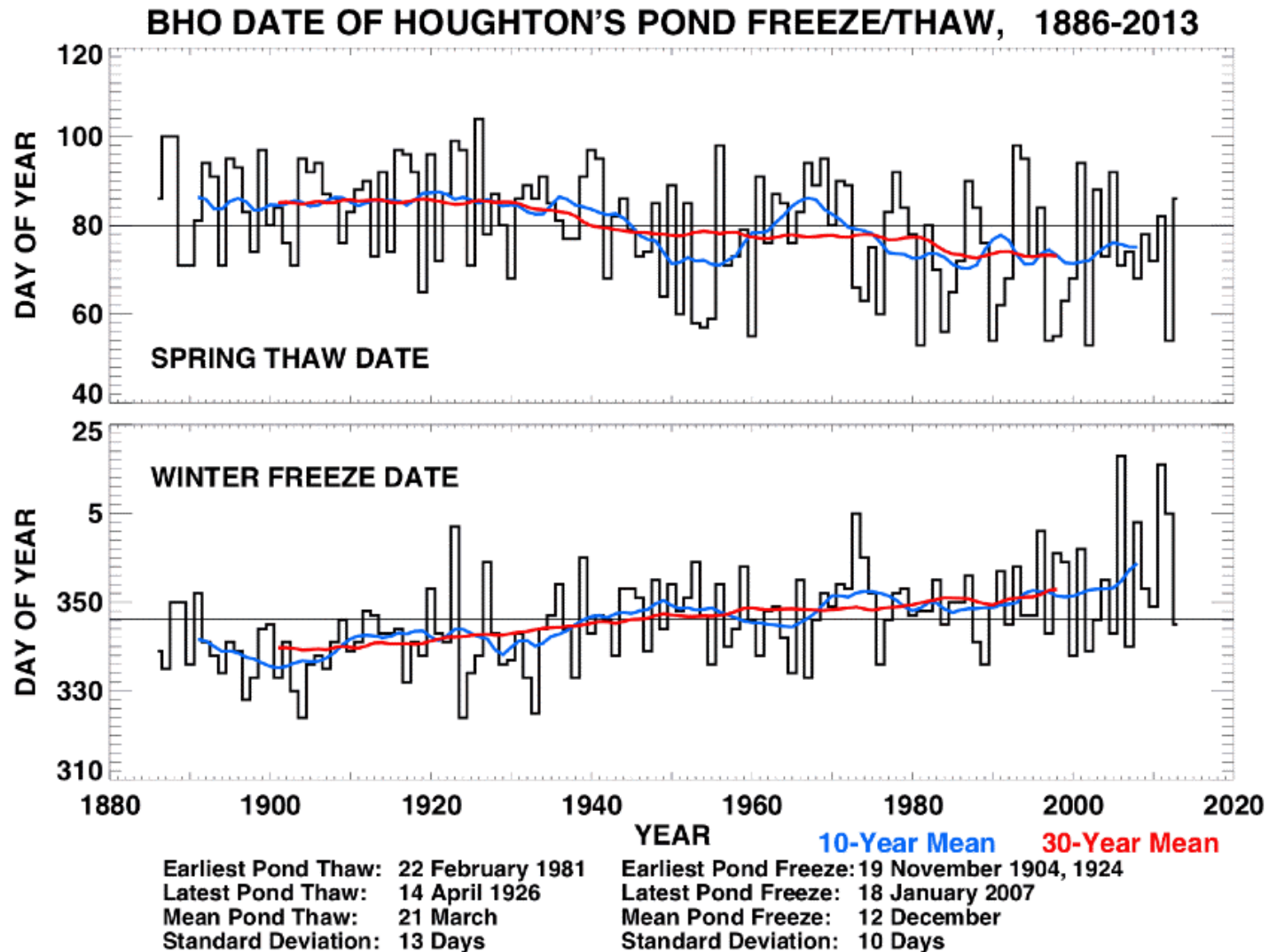
Sprott, J. 1991. White Pond 1991. December 12, 1991.

Sprott, J. 2005. Article 24, the White Pond Wastewater Plan and the Willard School Site – Letter to Margaret B. Briggs, Chair, Board of Selectmen, Town of Concord. March 15, 2005.

Town of Concord. 2000. White Pond Reservation Regulations – Adopted by the Town Manager upon a Vote of the Board of Selectmen. July 10, 2000.



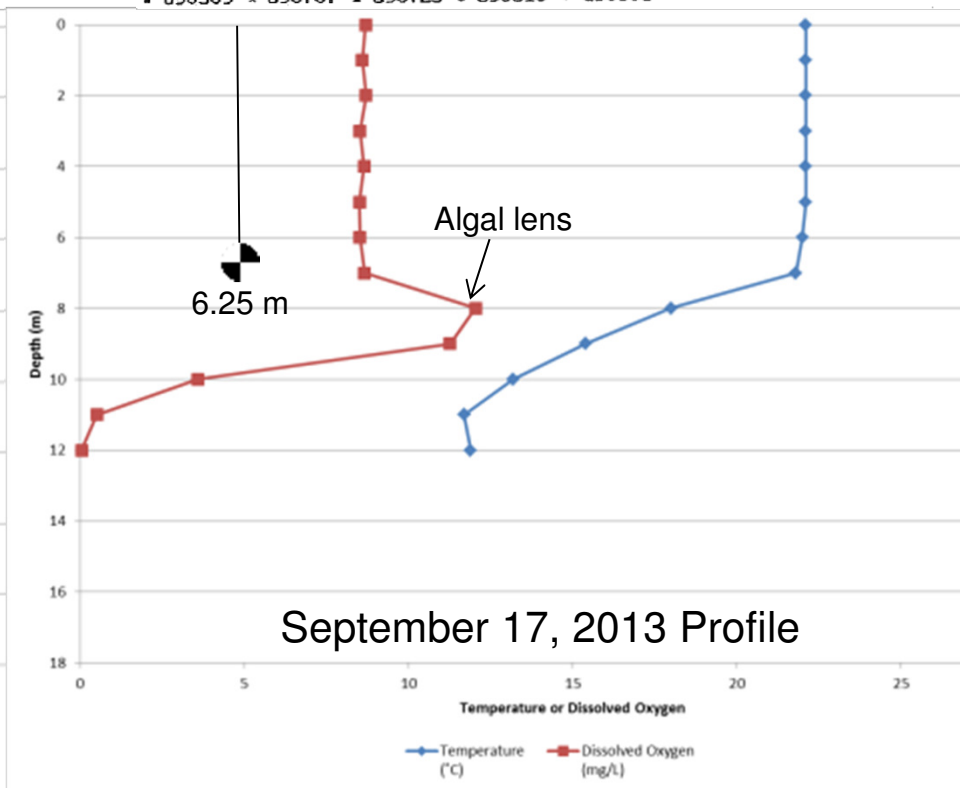
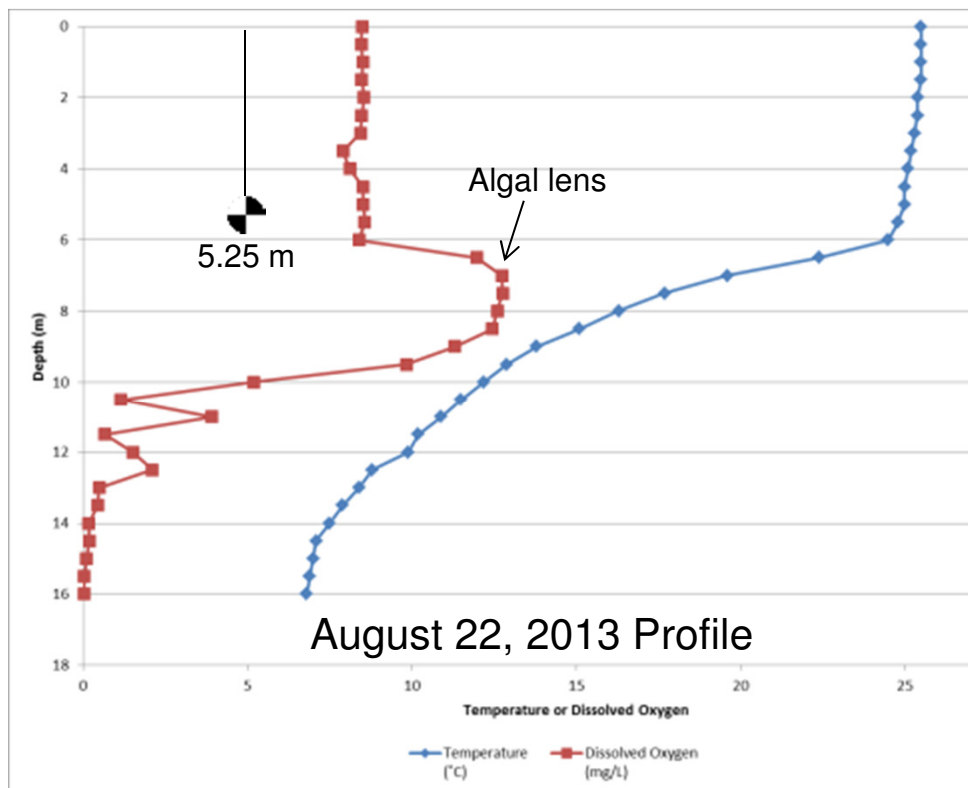
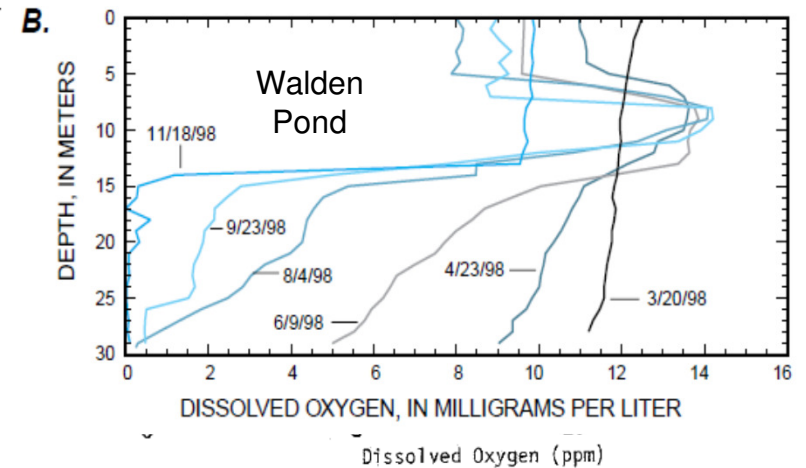
# Existing Data Review



- Temperature trend? Probably, but tough to tell from these data alone. What does a really good long term dataset suggest?

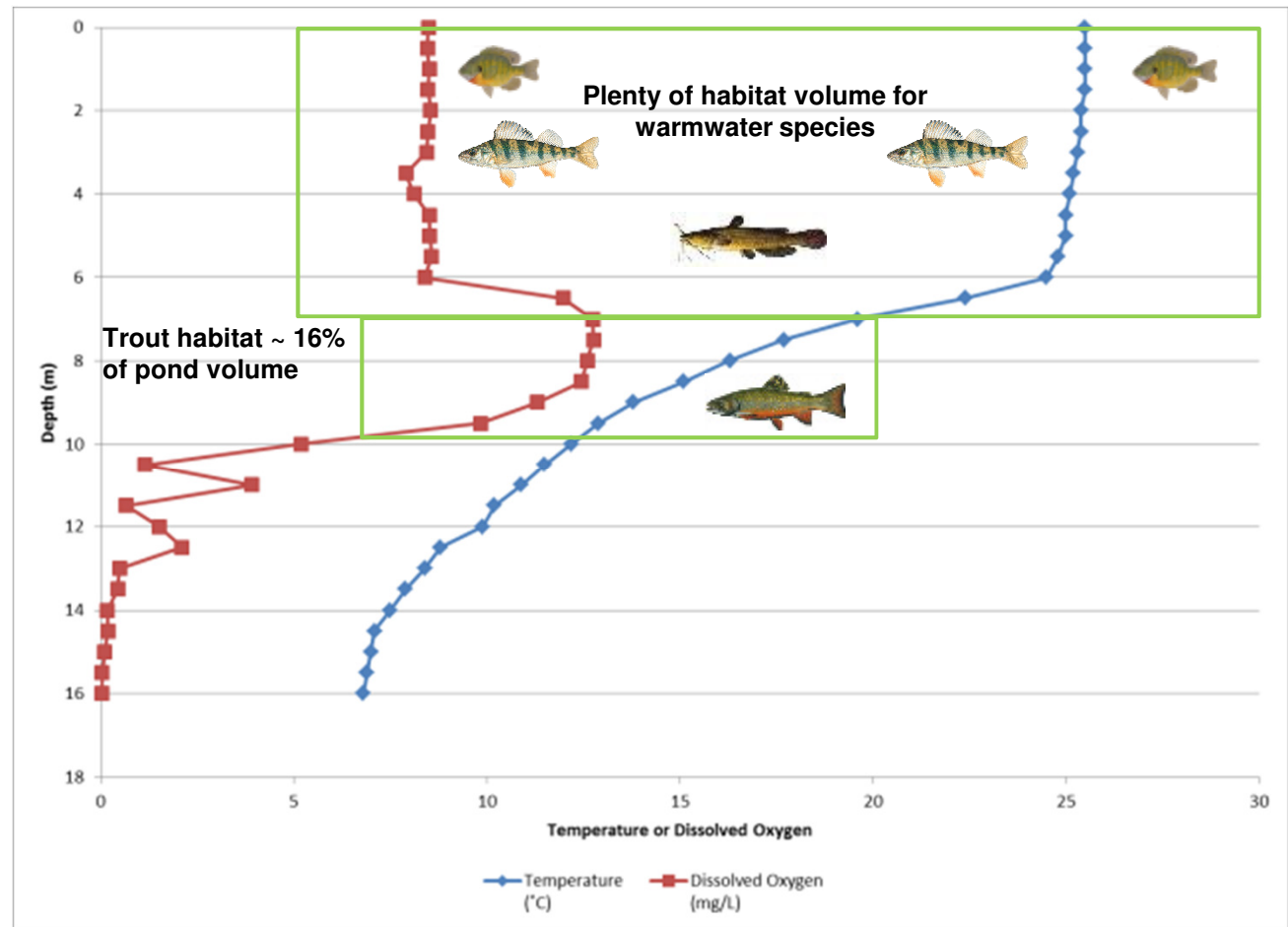
# In-pond WQ Sampling

- DO/temperature profile stratified at ~ 6 m
- Water clarity good (Secchi/turbidity) but possibly hindered by algal lens at thermocline
- Phosphorus/nitrogen minimal at top and bottom of water column



# In-pond WQ Sampling

- What does this mean for aquatic life?
- Plenty of space for warmwater fish spp., less for trout
- Trout habitat volume has shrunk to 16% from 35% in early 60s
  - Rate of change has apparently declined – was 19% in 1977

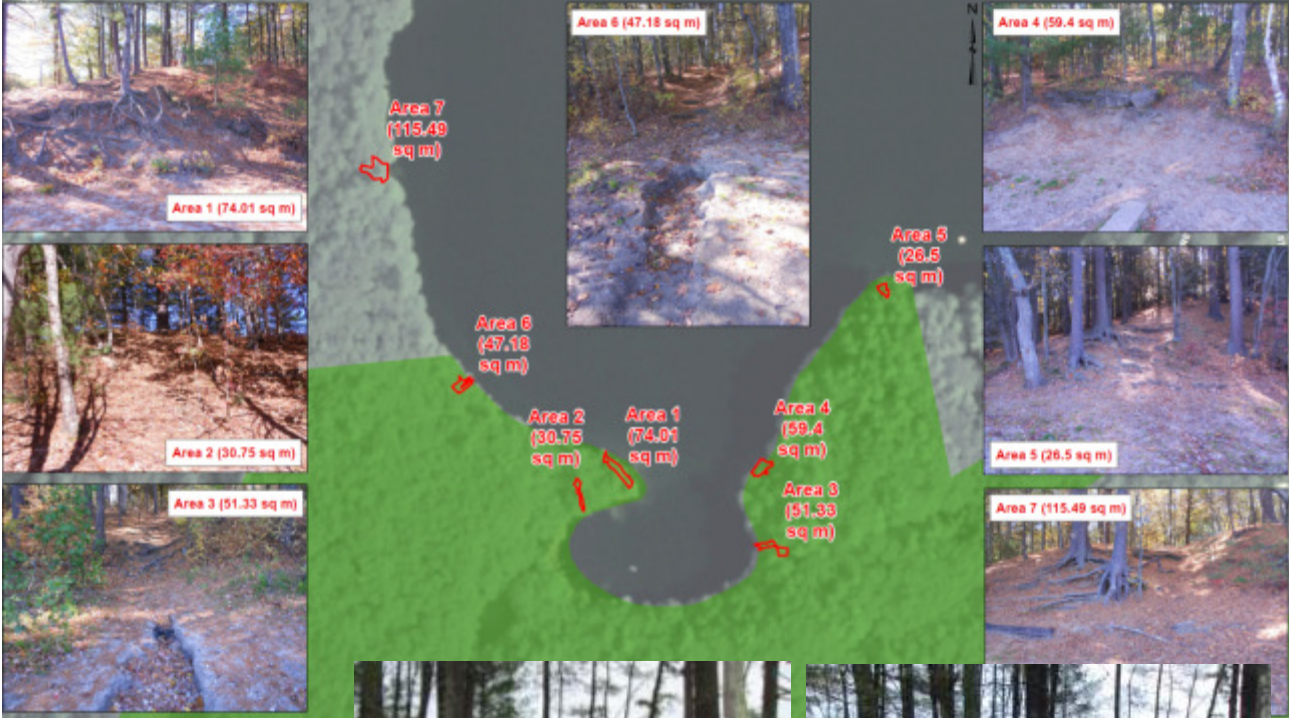


# Sediment Sampling

- Sample composited from three sediment grabs in deep (anoxic) waters
- Results not suggestive of significant internal nutrient loading
  - Phosphorus – 96 mg/kg
    - Sounds high but actually low compared to ponds with internal loading problems (600 to 2,000 mg/kg)
  - Iron to phosphorus ratio - ~17:1
  - Other phosphorus-binding metals present at significant levels, esp. aluminum (1,400 mg/kg)

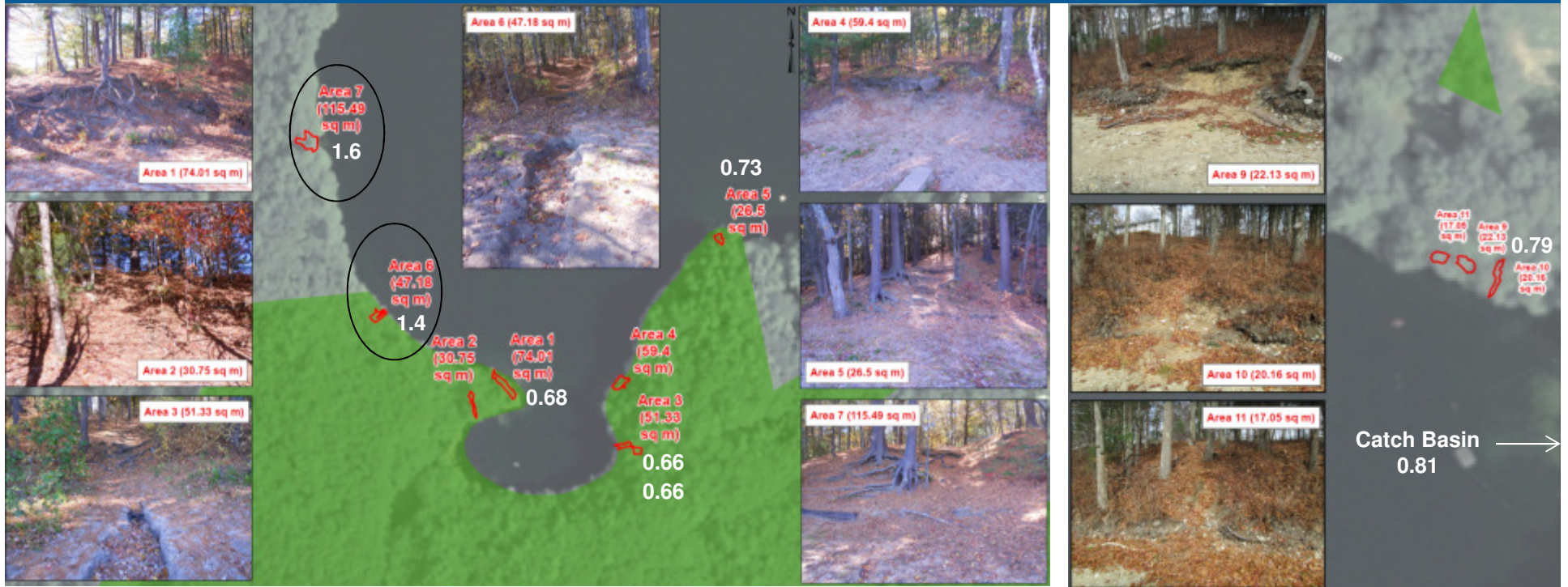


# First Flush Sampling





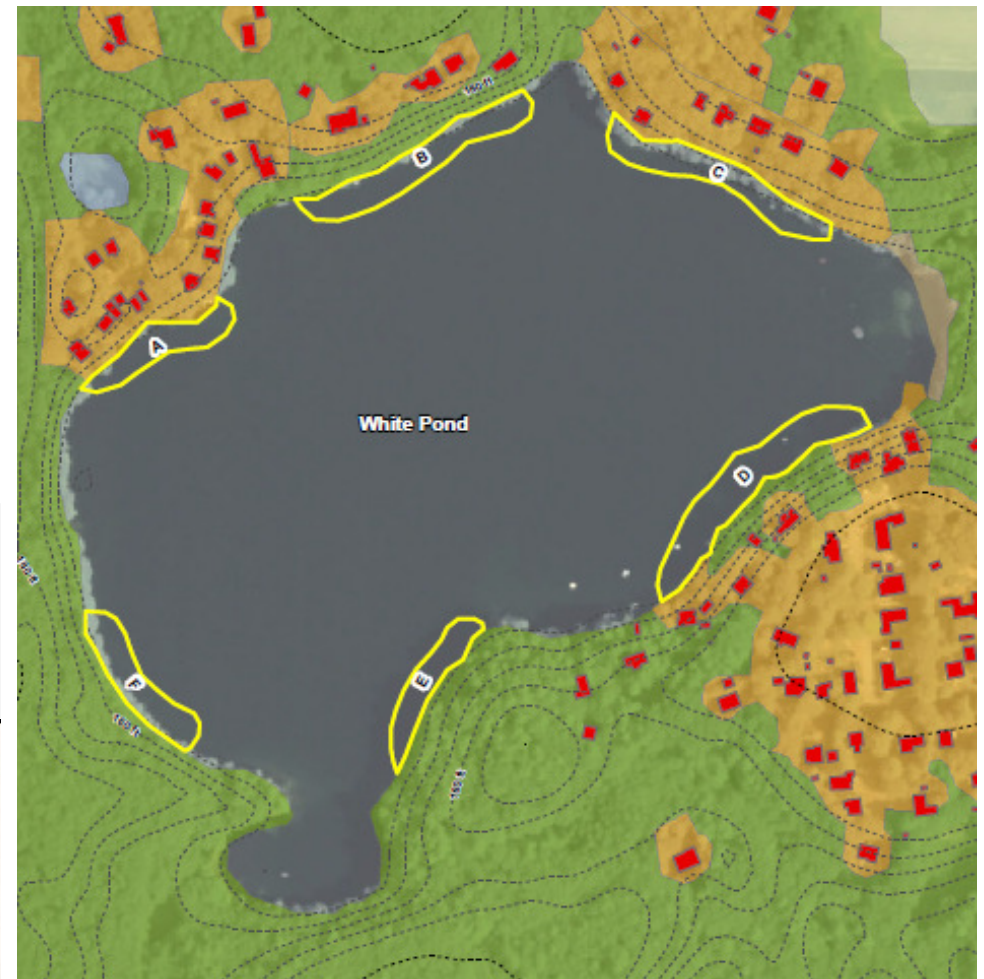
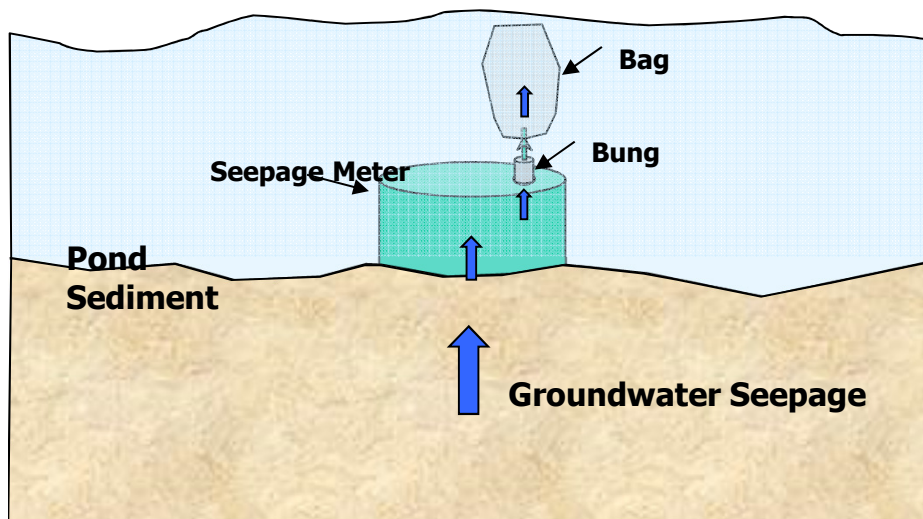
# First Flush Sampling Results



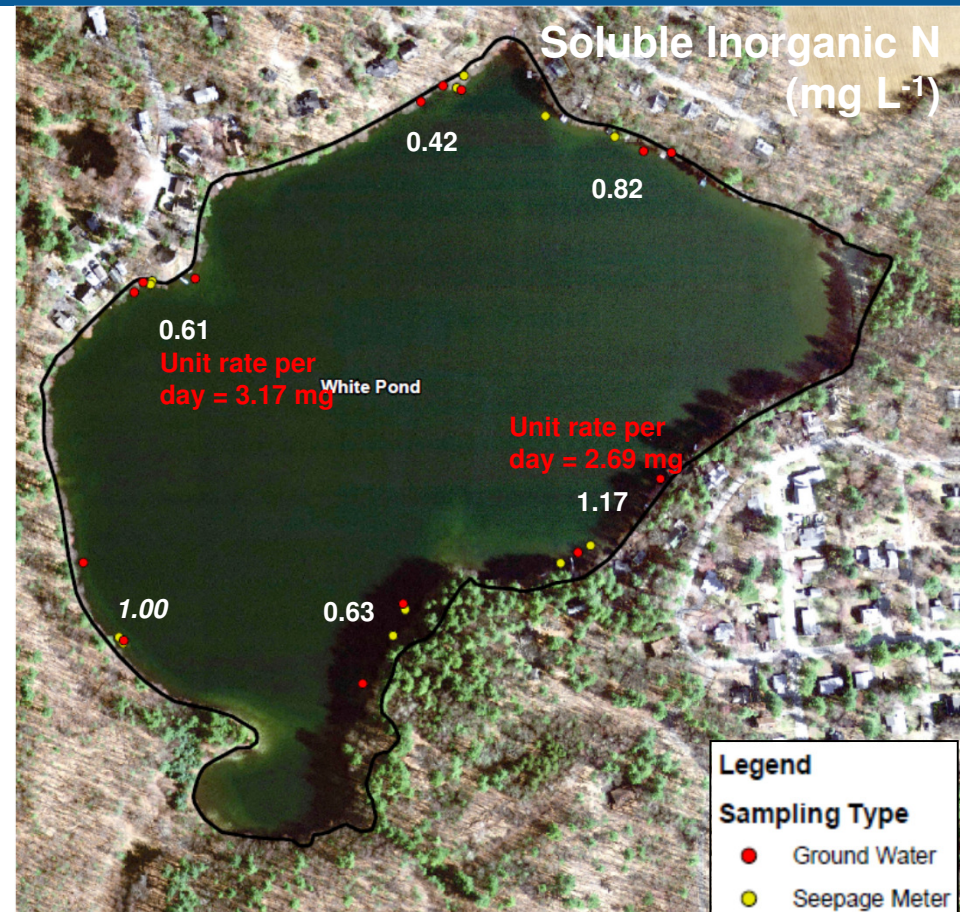
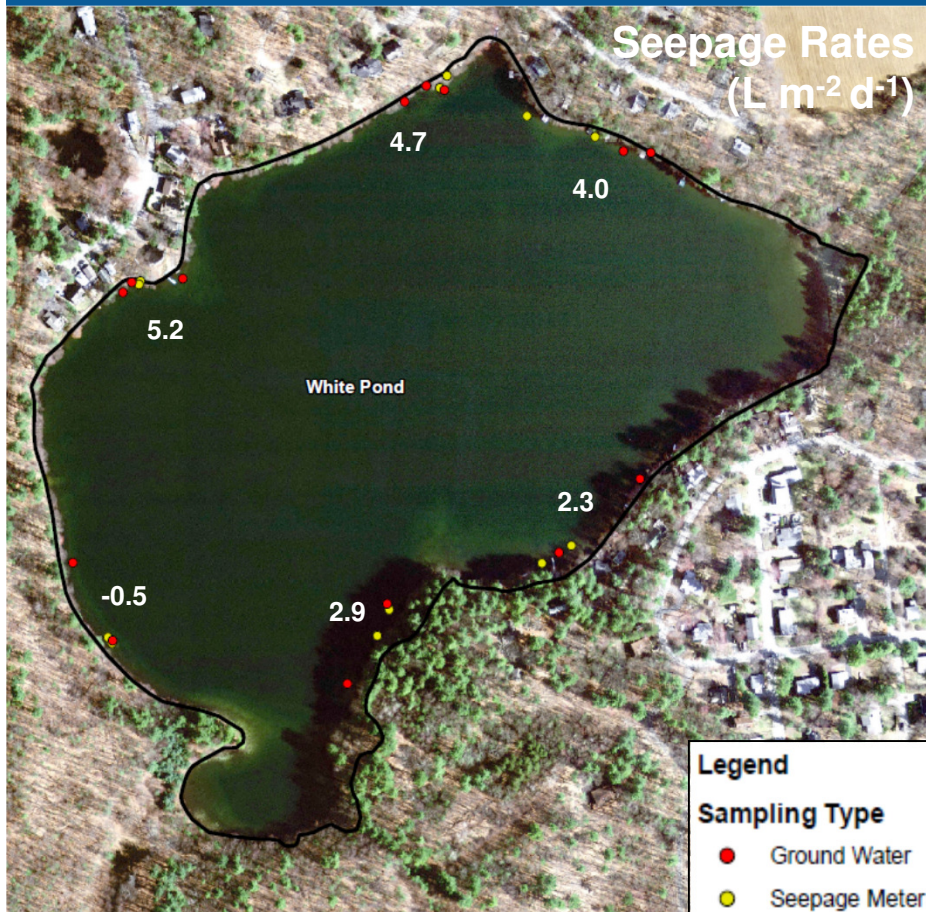
- Smoking gun? Phosphorus concentrations very high at all locations
  - Highest at Areas 6 and 7 - coincided with elevated TSS (erosion)
  - Seems like a lot but we don't have a context yet
- Nitrogen (mostly TKN) high - highest at Area 10 (11+ mg/L)
- Overflowing catch basin - low concentrations of sediments/N but does still generate high P

# Groundwater Sampling

- Seepage meters installed and groundwater samples collected in six shoreline segments.
  - Measure rates of in/outflow
  - Look for contaminants, esp. septic



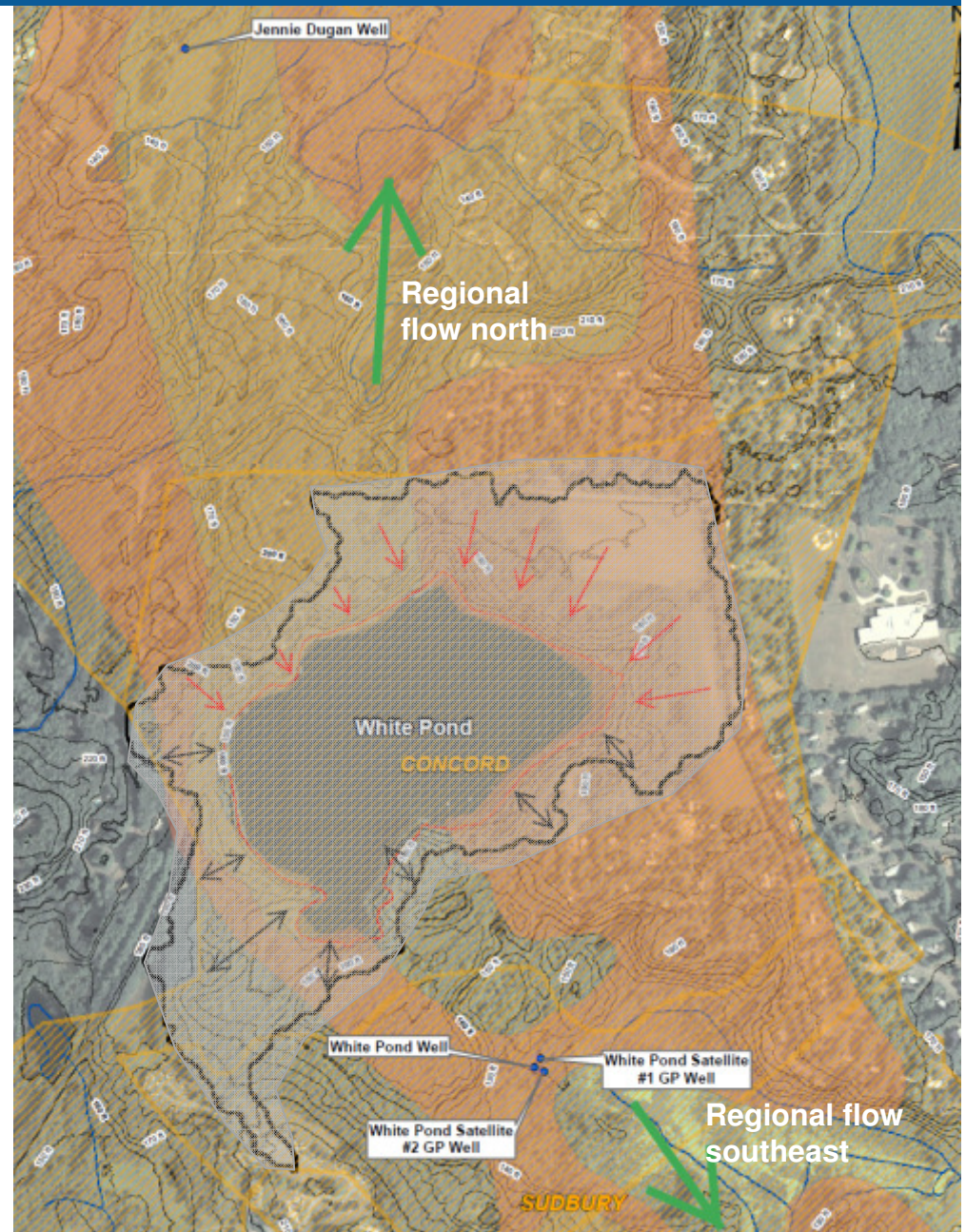
# Groundwater Sampling



- In September, in-seepage present along most of the shoreline, except southwest
- Some nitrogen present but phosphorus/VOCs not detected
- Additional sampling this spring will help confirm whether phosphorus has seasonal pulses with water table rise/fall

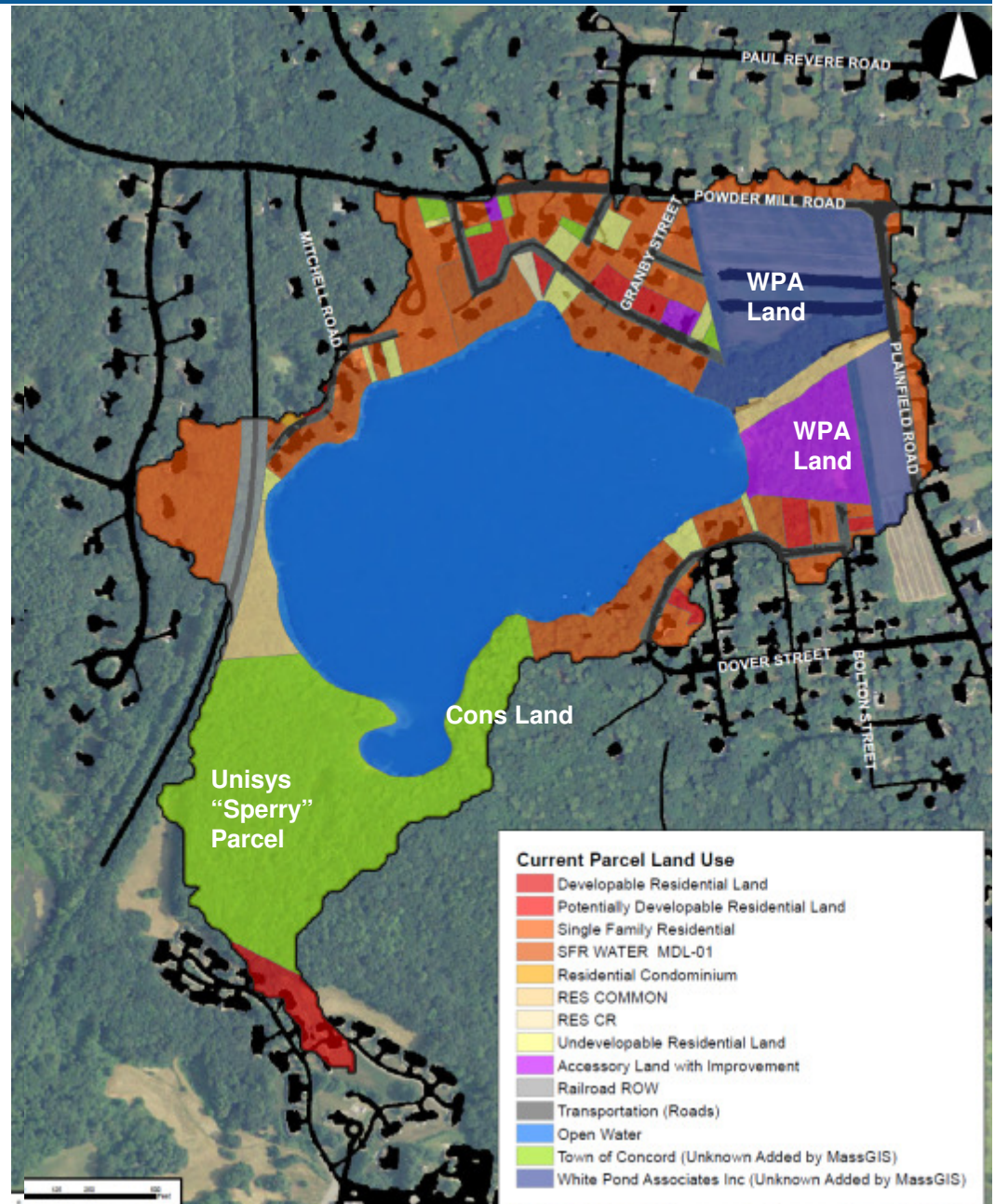
# Conceptual Groundwater Model

- Nearby drainage network and glacial deposits suggest
  - Regional flow away from pond toward surface drainage
  - Gw contributions to White Pond are from area similar to surface watershed
- Within watershed
  - Inflow of gw from north and east
  - Gw may flow both ways on south and west shorelines



# White Pond Watershed

- Surface watershed  $\approx$  groundwater contributing area
- Watershed is already relatively “built-out” despite appearance of this map to the contrary
- Handful of postage-stamp developable lots
- Primary focus might be better placed on large Town & WPA parcels
  - Projects here could result in new roads and significant land use changes



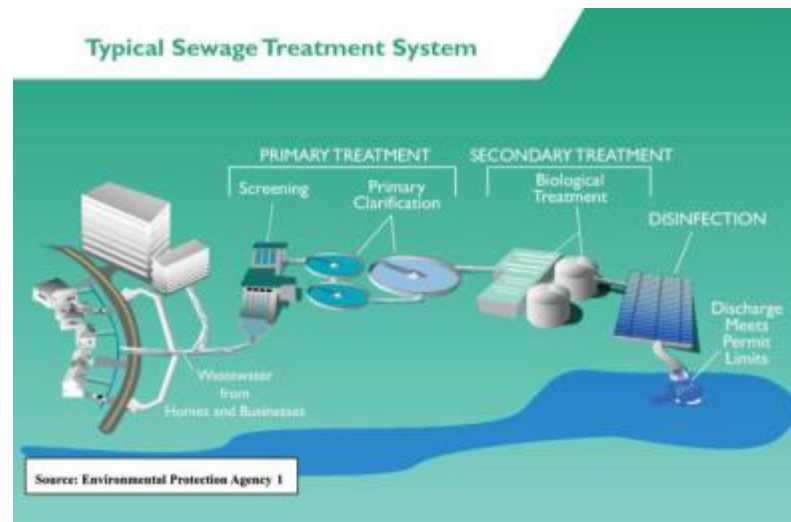
# Town Land Scenarios

- Solar Installation
  - 3 to 5 MW project (Solar Siting Committee 2011)
  - Would require extensive removal of trees, essentially converting land from forest to open land
    - Land use export coefficient models would generate additional phosphorus loading from the parcel due to conversion alone (typically a six-fold increase)
  - Some permanent increase in impervious surface (maintenance routes, semi-impervious panel arrays) also expected
    - Potentially increases nutrient transport by providing a more direct route to the pond
    - However, could be mitigated through stormwater management techniques and appropriate site design

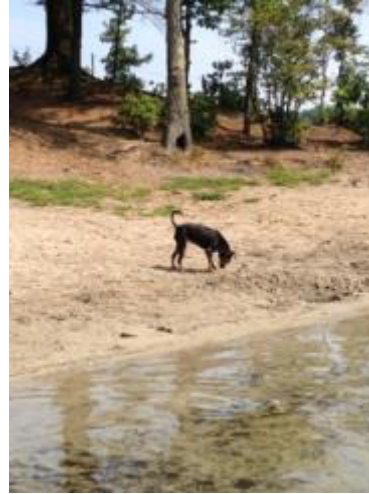


# Town Land Scenarios

- Wastewater Treatment
  - 2003 Comprehensive Wastewater Management Plan identified need for package treatment plant/disposal field in White Pond area.
  - Some tree clearing
    - 23,000 square foot leach field (per 2003 CWMP)
    - Land use export coefficient models would generate additional phosphorus loading from a portion of the parcel due to conversion alone (typically a six-fold increase)
  - Unspecified increase in impervious surface
    - Access road(s)
    - Foundations/structures



## Recreation – Current Use Problems

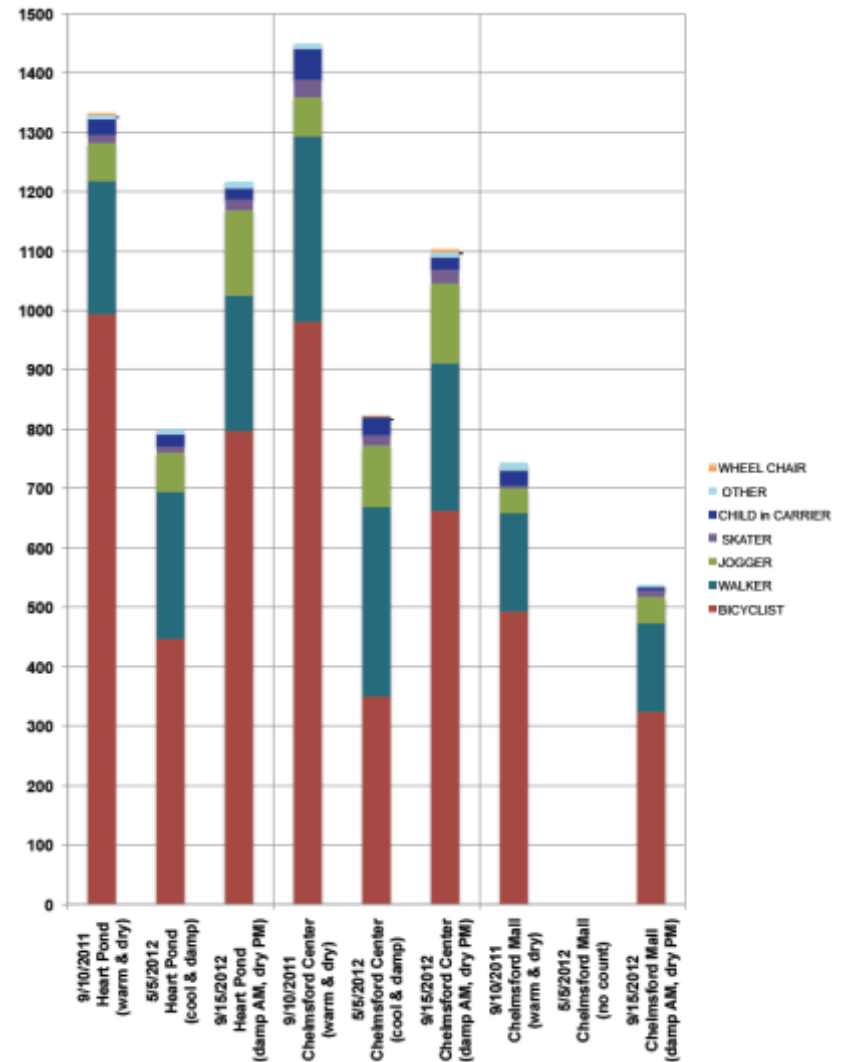


- Illegal wading/swimming
  - ESS observed swimmers in Sachem Cove during each visit in late summer early autumn
    - Number varied from 6 to 25 depending on day of the week and weather
  - A number of dogs also noted along the shoreline each day (up to 9!)
  - Primary area of unauthorized swimming was Sachem Cove
    - Accessed through Town land
    - Also noted some watercraft from public access paddling to Sachem Cove for a dip
- Public access parking area is also used as a public toilet



# Bruce Freeman Rail Trail

- Saturday trail use counts on existing BFRT ranged from approximately 525 to > 1,400 trail users (2011/12)
  - The majority were cyclists but pedestrians exceeded 200 per day for each count
- Assuming similar use in Concord, has **potential** to increase visitation to (and illegal swimming in) White Pond
  - Could lead to accelerated erosion, particularly near Sachem Cove, where there are already numerous eroded areas



# Preliminary Options - “People Management” Sachem Cove

A non-exhaustive list:

1. Minimize area impacted by pedestrians - improve trail system
  - New signage (directional, educational and cautionary)
  - Footpath improvements
  - Erosion controls
  - Landscaping/fencing to prevent straying off trail
  - Enforcement?
2. Exclude all public access to Sachem Cove through Town land
  - Signage
  - Enforcement
  - Barriers
3. Legitimize public beach at Sachem Cove
  - All aspects of Option 1
  - Refuse receptacles
  - Life guard
  - Public health monitoring
4. Others?



# Preliminary Options – In-Pond/Watershed Management

Based on what we know:

1. Stabilize areas of recurring erosion
2. Enhance stormwater treatment along public access road
3. Provide public sanitary solution and waste receptacle at public access point for users not affiliated with White Pond Associates

Other possible actions, depending on outcome of remainder of study:

1. Upgrade wastewater treatment for residences within the watershed – onsite, community or sewer
2. Seek/strengthen restrictions/easements on potentially high-impact parcels
3. Address in-pond water quality with carefully targeted alum or copper treatments
4. Others may yet emerge...



# What's Next?

- Fill in remaining data gaps
  - Second seepage survey in April/May
  - Biological resources (watershed invasives)
  - Septic records, etc. and any missing documents/photos
- Complete nutrient and hydrologic budgets
- Develop more detailed recommendations with cost estimates
- Create educational materials regarding abutter responsibilities
- Incorporate all of the above into Watershed Management Plan



Questions?

