



*Messer Pond
VLAP Water Quality
Where do we go from Here?*

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NH DES Volunteer Lake Assessment Program Coordinator

Topics of Discussion

- VLAP Overview
- Messer Pond Water Quality
- Recommended Actions



What is VLAP?

- Began in 1985
- Cooperative program between volunteer monitors, lake associations and DES
- Volunteer monitors are trained how to sample lakes, ponds, and tributaries for water quality
- Program leads to local awareness of land uses and human practices that may be detrimental to lake quality
- Empowers communities in their decision-making regarding lake management issues



Jill Ramsier (VLAP Intern) and Tom Newcombe (volunteer)
Granite Lake, Stoddard

Why is Volunteer Lake Monitoring Important?

- As mentioned, there are more than 900 publicly-owned lakes and ponds in NH!
- Volunteers are the ears and eyes for DES Lake Biologists
- Volunteer monitoring efforts supplement DES monitoring efforts
 - Volunteers help to protect the quality of NH lakes and ponds
 - Helps secure federal lakes funding
 - Data is used to assess the quality of NH's lakes and ponds (report to EPA and Congress)



Barbara Pearson and Joe Farrelly
Pleasant Lake, Deerfield

Messer Pond Deep Spot

Overall Water Quality

Chlorophyll: Variable trend; no significant increase or decrease



Transparency: Significant decreasing trend (3.64% per year since 1996)



Total Phosphorus:

- Eplimnion: Increasing trend
- Hypolimnion: Increasing trend



Conductivity:

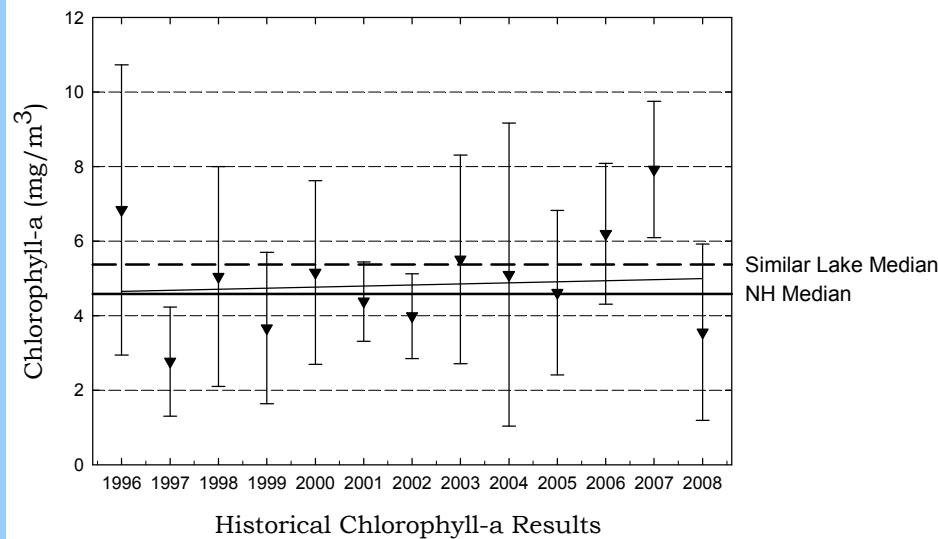
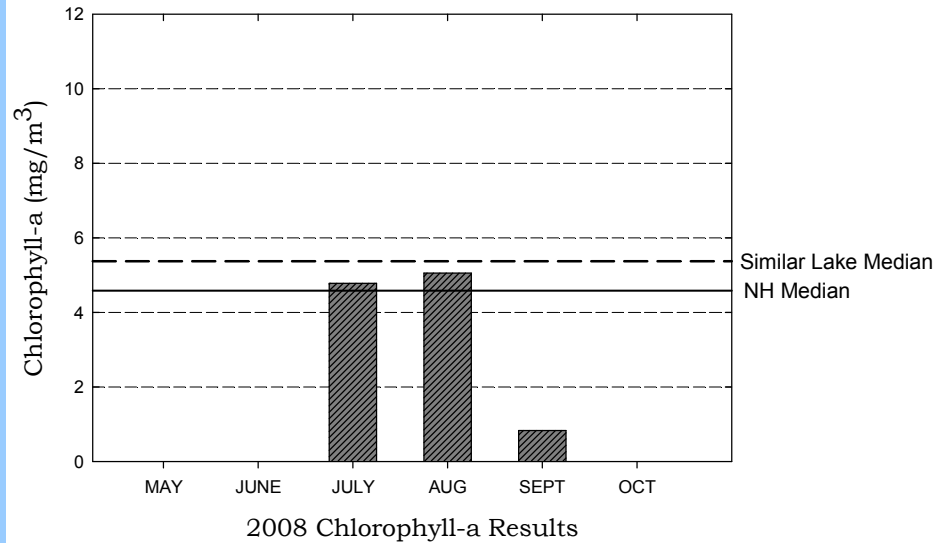
- Epilimnion: Variable Trend



Chlorophyll-a

Messer Pond, New London

Figure 1. Monthly and Historical Chlorophyll-a Results

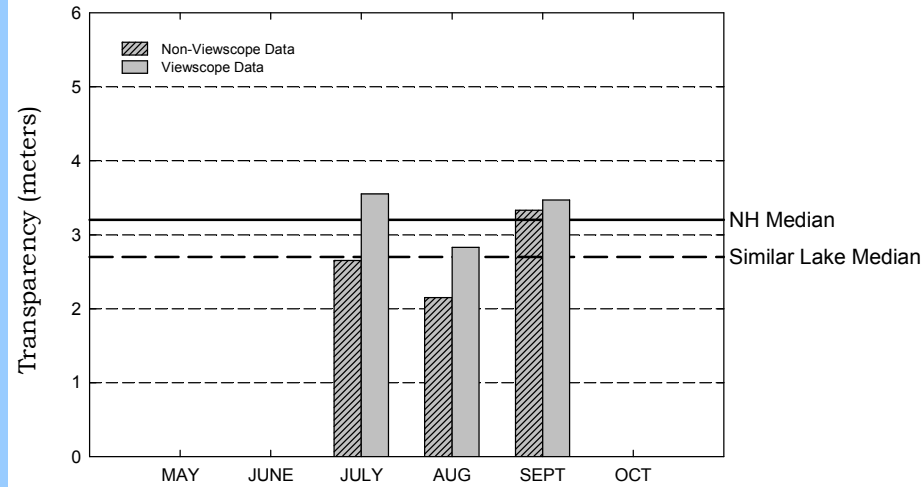


The median chlorophyll-a value for NH lakes is 4.58 mg/m³

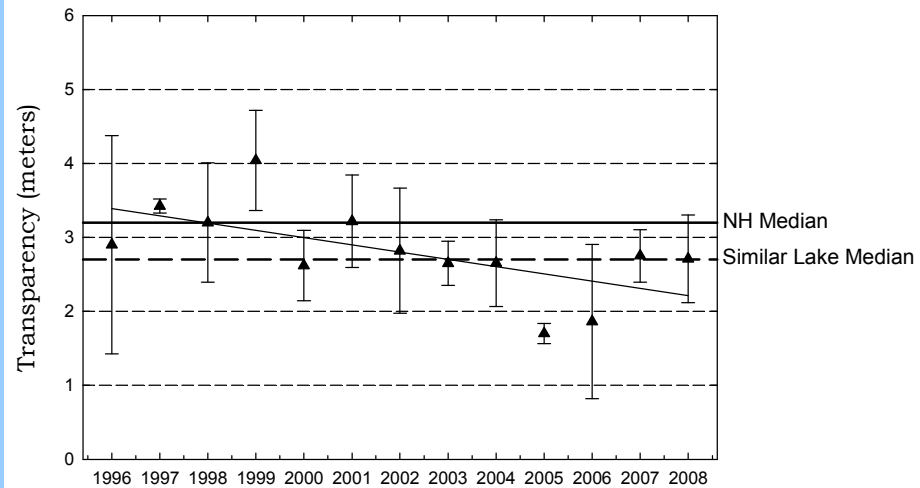
Clarity

Messer Pond, New London

Figure 2. Monthly and Historical Transparency Results



2008 Transparency Viewscope and Non-Viewscope Results



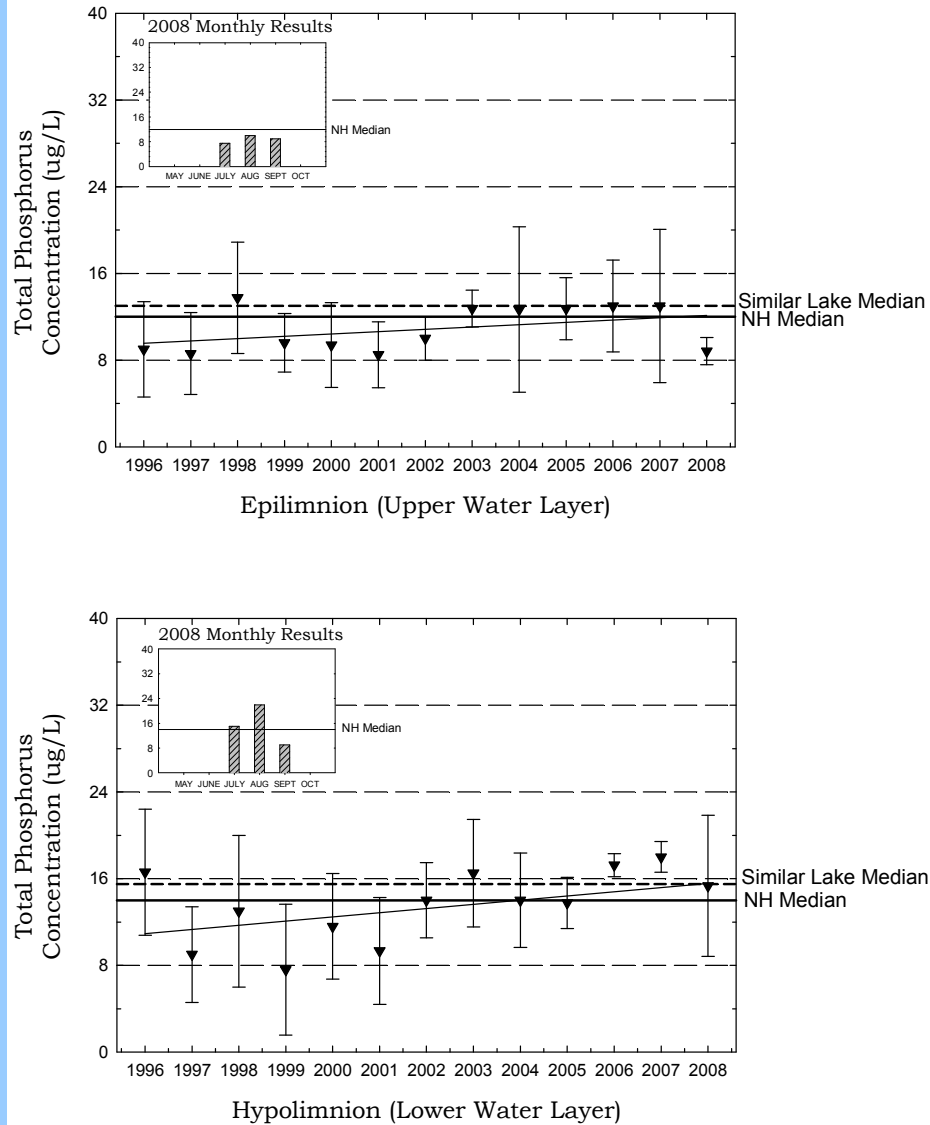
Historical Transparency Non-Viewscope Results

The median transparency value for NH lakes is 3.2 meters

Total Phosphorus

Messer Pond, New London

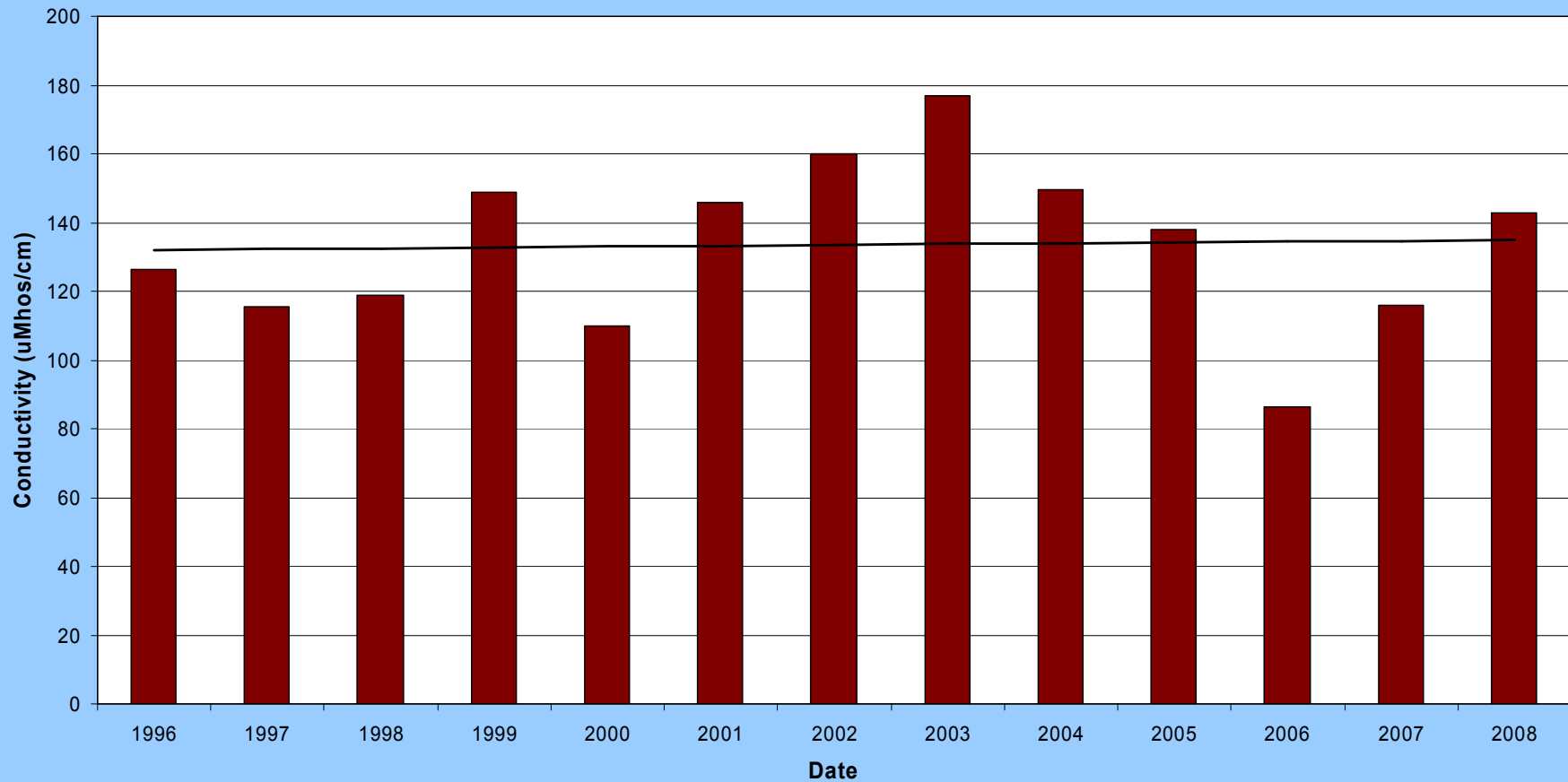
Figure 3. Monthly and Historical Total Phosphorus Data



The median epilimnetic phosphorus value for NH lakes is 12 ug/L
The median hypolimnetic phosphorus value for NH lakes is 14 ug/L

Conductivity

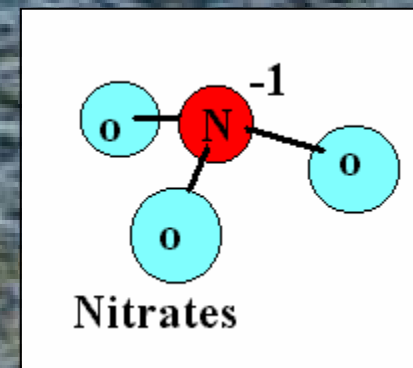
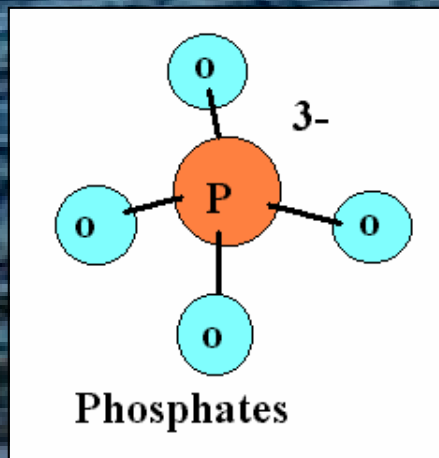
Messer Pond Average Epilimnetic Conductivity



The median conductivity value for NH lakes is 40 uMhos/cm

Nutrients

- Nutrients drive the growth and productivity of a lake system
- Just like people need nutrients, plants, algae, and other organisms in the lake need nutrients too





Algae

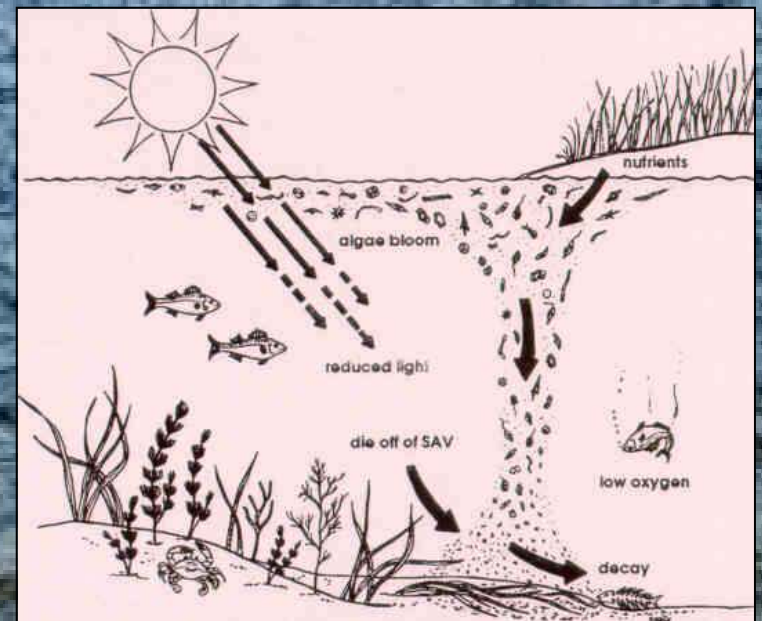
- Algae are the base of the aquatic food web
- Too many nutrients can lead to increases in algae

Clarity

- Clarity is a measure of how clear the water is
- The highest clarity in New Hampshire was recorded at Nubanusit Lake and was 11.6 meters
- Clarity is measured by using a Secchi disk

Nutrients : Algae : Clarity Relationships

- Increases in nutrients
- Increases in algae
- Decreases in lake clarity
- Decreases in property values!



What does this Mean?

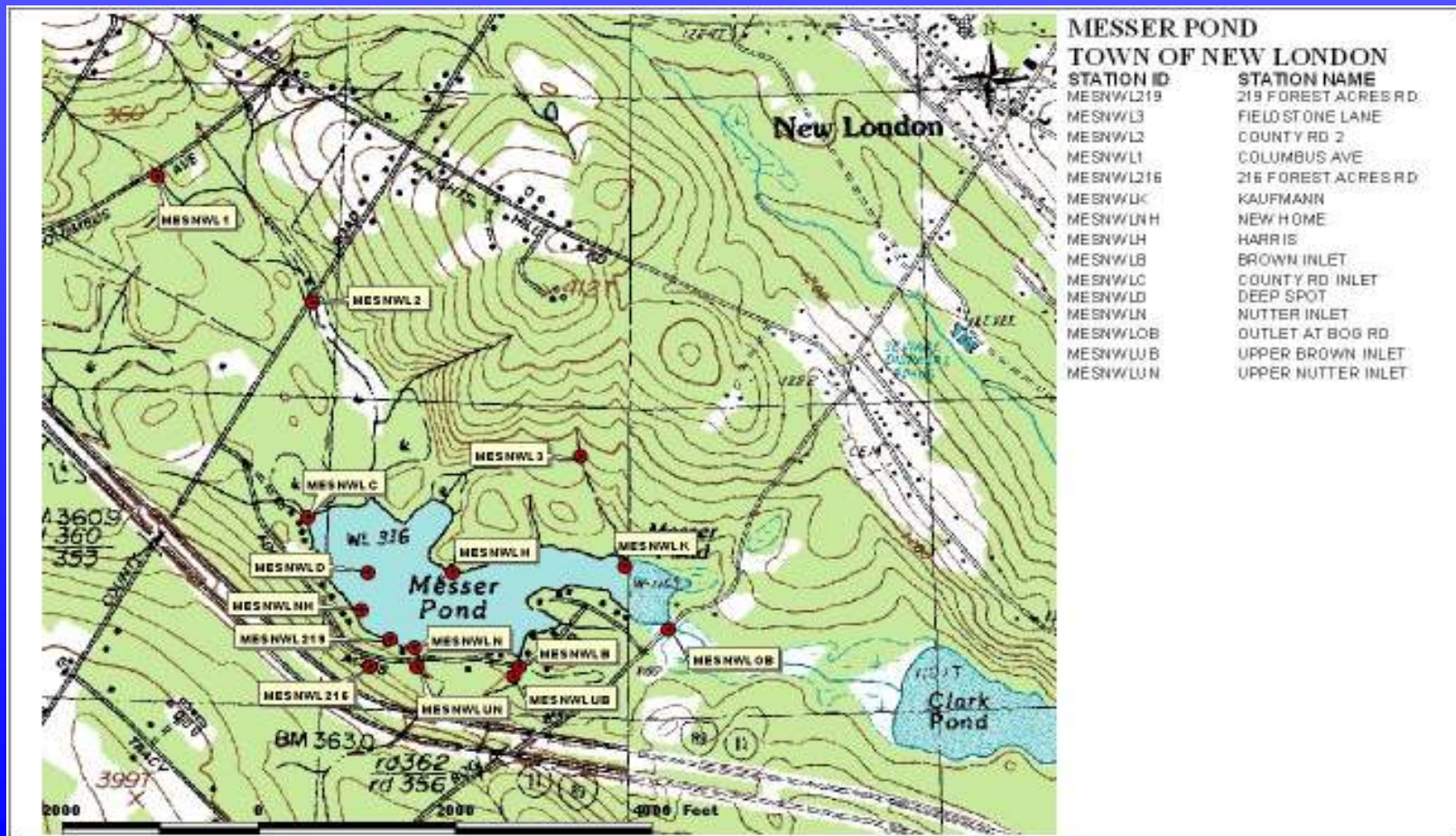
- Decreasing transparency means either an increase in algal growth or runoff.
 - Limit amount of phosphorus entering the lake (watershed erosion, stormwater runoff).
- Increased phosphorus can promote algal and plant growth.



Nancy Stetson and Terri Bingham

What Can We Do?

- Continue monitoring the lake deep spot.
- Identify and monitor all tributaries that enter the lake.



What Can We Do?

- Monitor the amount of phosphorus and chloride entering the lake.
 - Sample tributaries on a monthly basis during the summer months.
 - Sampling May – September will determine how the lake responds to spring and fall turnover, rain events, and summer fluctuations.
- Tributary monitoring and stream surveys will help determine where the phosphorus and conductivity is coming from.



Nancy Stetson and Terri Bingham

What Can We Do?

- Education and Outreach
 - Educate lake front property owners and watershed residents about land use activities that could negatively impact the pond
 - Mailings, brochures
 - Educate lake front property owners about what they CAN do



Activities and Factors in the Watershed that Can Affect Water Quality

- Construction
- Road Runoff
- Shoreline Erosion
- Forestry Activities
- Fertilizing
- Washing Cars
- Septic System Failure/leaking
- Herbicide Application
- Sediment Disruption
- Farming/Animals
- Gasoline Spills
- Urban Development
- Commercial Development
- Improperly Constructed Beaches

What Can We Do?

- Consult Messer Pond Watershed Study
 - Several recommendations for follow-up
 - Road Maintenance (both DOT and Town)
 - Collaborating with town on road maintenance
- Great Planning tool and supporting document



This is what we don't want to see



Lake Impacts



How Can We Prevent These Problems?

- **Good planning**
 - Work with the surrounding towns to assess watershed development
- **Low Impact Development**
 - Implement LID practices where possible in the watershed
- **Best Management Practices**
 - Implement BMPs in the watershed



(Image Courtesy of University of Maryland)

What is a Watershed Ordinance/District?

- A method of zoning that recognizes watershed boundaries (instead of political boundaries) as a means of regulating land uses that may affect surface water quality.
- Regulations may include :
 - Setback restrictions
 - Buffer requirements
 - Land use restrictions
 - Implementation of Best Management Practices
 - Low Impact Development techniques
- Can be tailored to suit a particular watershed (each watershed is different!)



**Watershed encompassing
FIVE towns**



*It is easier to prevent a problem,
than to fix a problem!*

Lake Protection Tips:

- **Proper septic system management.**
- **Don't bathe, wash pets, automobiles or boats with soap or phosphorus-containing detergents in or near the lake.**
- **Keep land clearing to a minimum.**
- **Plant or keep native, natural vegetation near the shore front.**
- **Try not to feed wild ducks or geese.**
- **Don't allow people, pets or livestock to urinate or defecate in the lake or in an area where rain could wash wastes down to the lake.**
- **Don't use powerful outboard motors in shallow areas.**