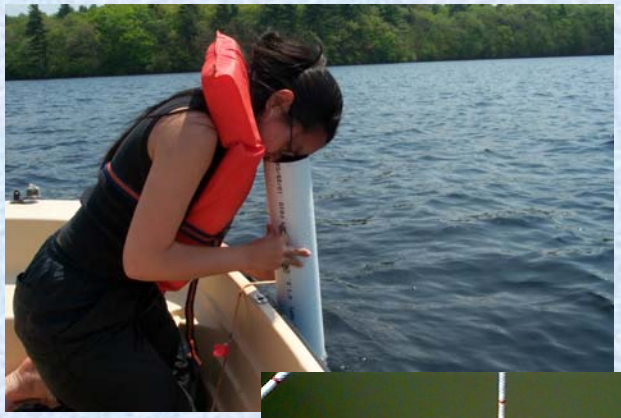
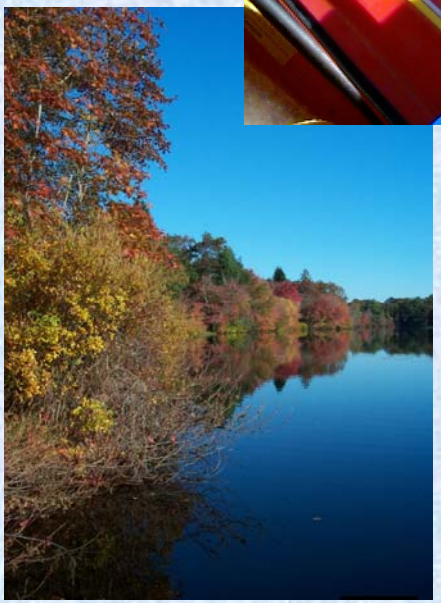




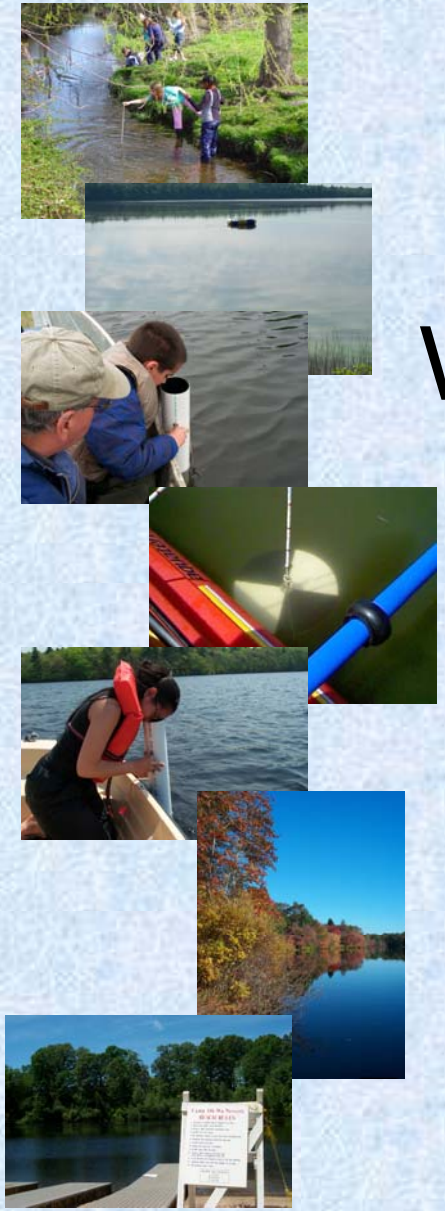
QA/QC Assessment of Lay Monitoring in Rhode Island

Elizabeth M. Herron,
Linda T. Green &
Arthur J. Gold

URI Watershed Watch

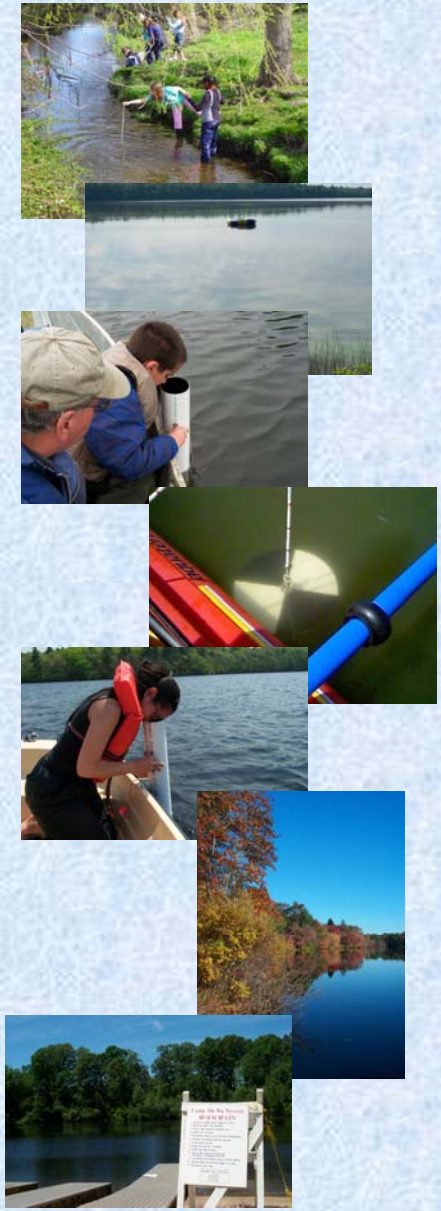
University of Rhode Island

Kingston, RI



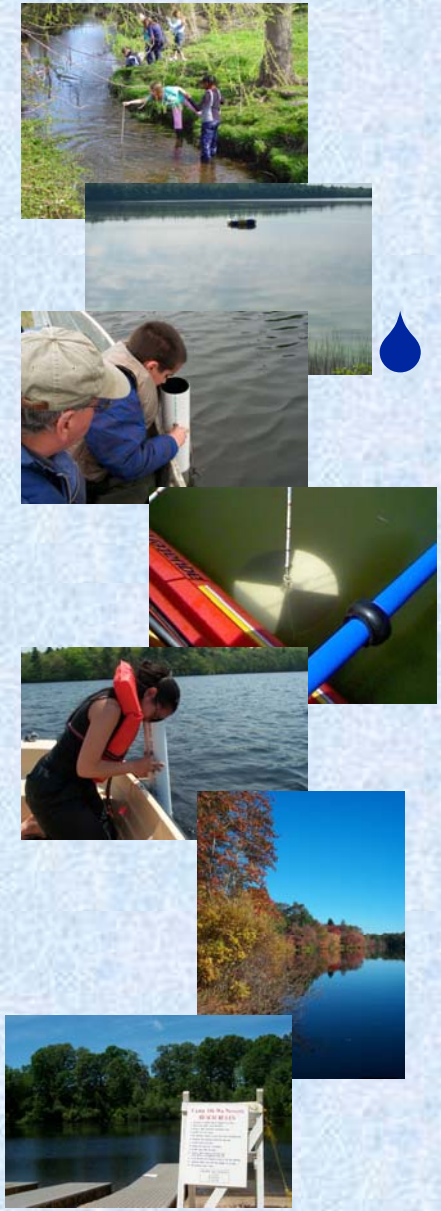
University of Rhode Island Cooperative Extension Watershed Watch Program

- Begun in 1988 with 14 lakes
- Now monitors +200 sites on +100 waterbodies with ~350 volunteers
- Provides +90% of RI's lake multi-year baseline data



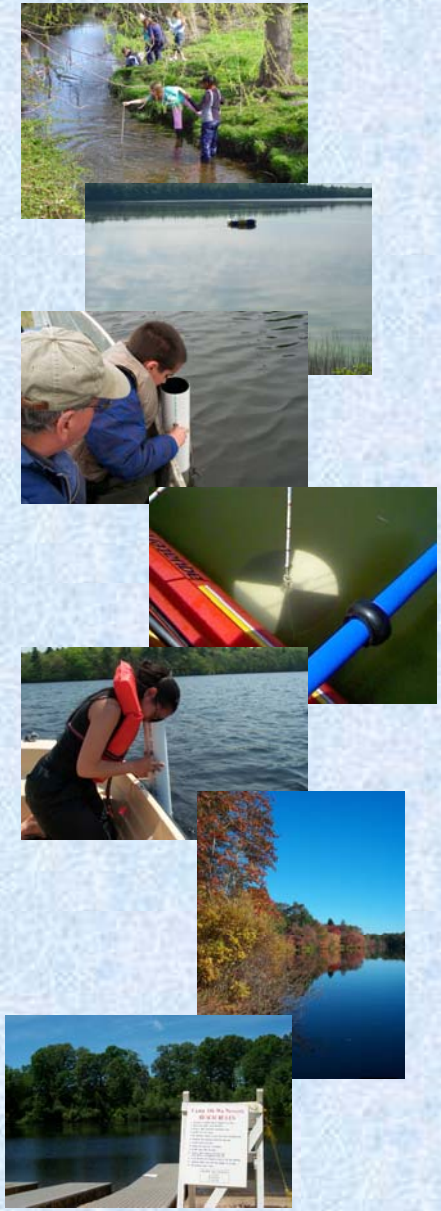
Volunteer Monitoring Program for Lake Water Quality Assessment

Rigorous assessment of lay monitoring data to justify inclusion in 305(b) Report



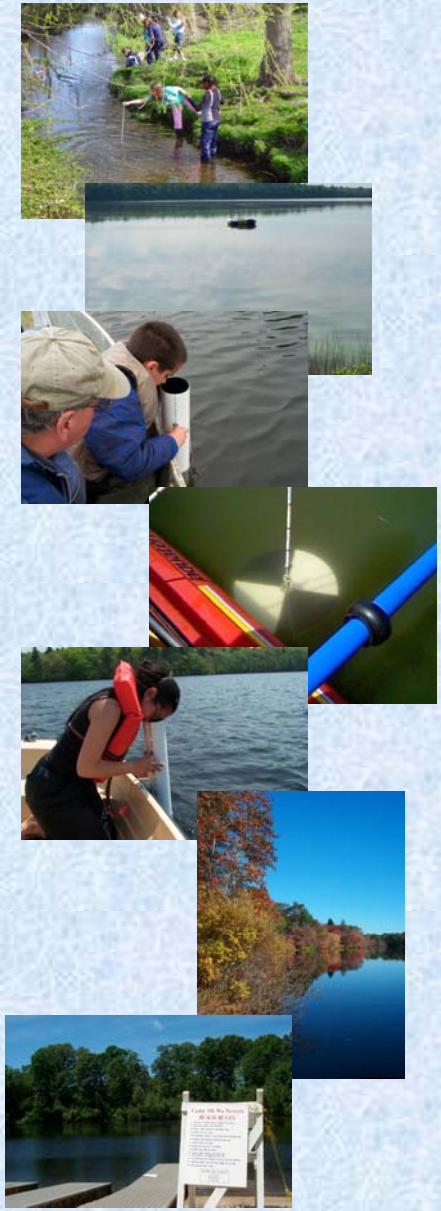
Objectives:

- To determine if volunteers collect data statistically similar to professionally collected data
- To determine if the URI Watershed Watch protocol produces data as representative of water quality as US EPA approved protocol



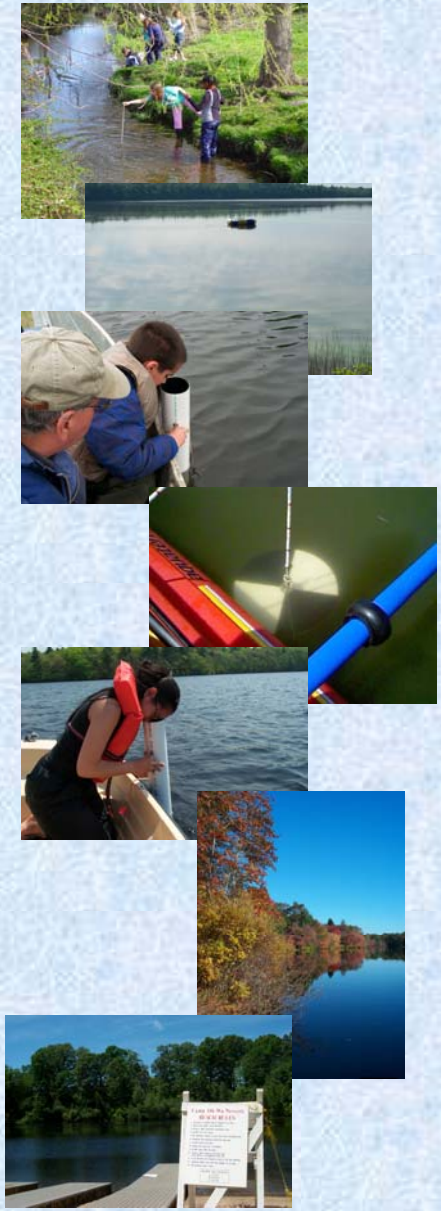
Field QA/QC Visits

- 21 Lay-monitored public lakes
- Observation of all monitoring activities
- Collection and analysis of water samples



Methods:

- Volunteer collected water samples following URIWW protocol
- Staff collected water samples following URIWW protocol with the volunteers' equipment
- Staff collected duplicate samples following EPA approved protocol



Protocol differences:

URIWW protocol: Discrete single samples collected at 1M and 5M depths; dissolved oxygen determined with kits.

EPA protocol: Integrated duplicate epilimnetic and discrete duplicate mid-hypolimnetic samples collected; dissolved oxygen/temperature profiles determined with a meter.

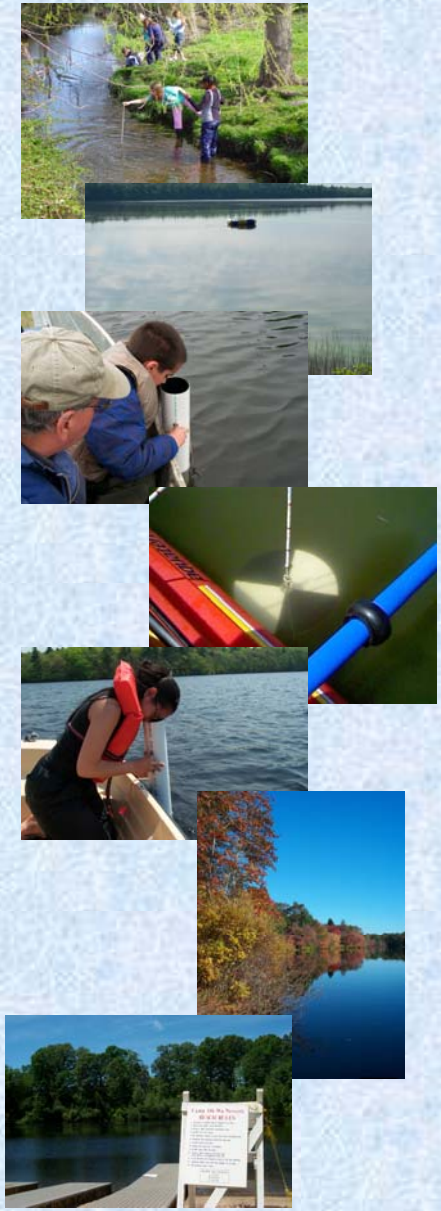
Field Analyses

Secchi Depth

Water Temperature

Dissolved Oxygen

Chl. - a Processing



Laboratory analyses

Alkalinity

pH

Total Phosphorus

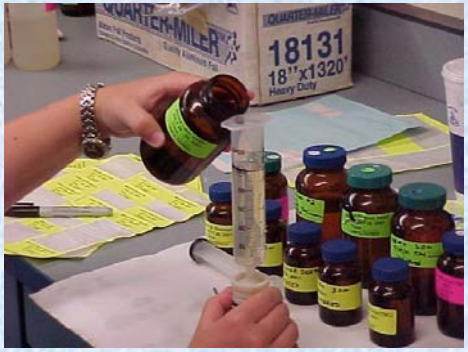
Chlorophyll - a

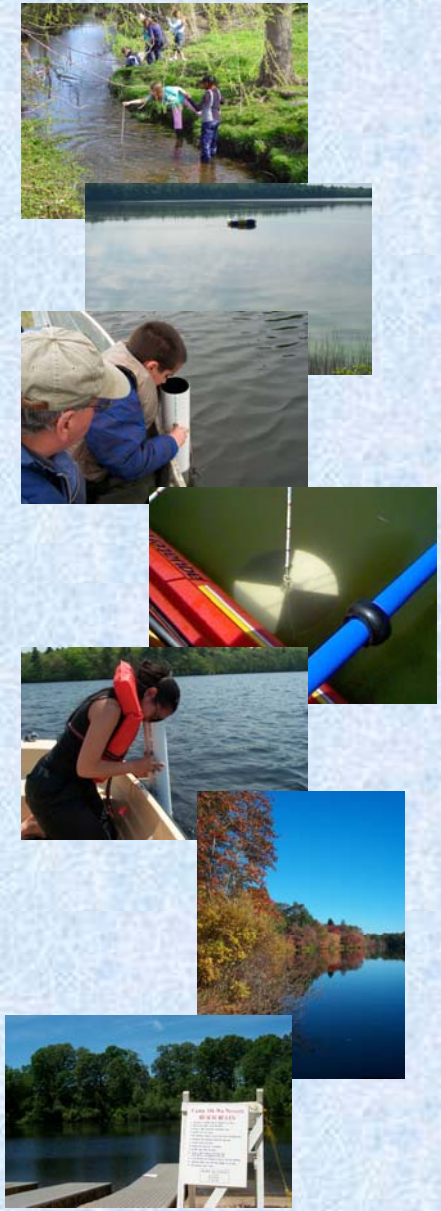
Sodium

Chlorides

Calcium

Magnesium





Statistical Analyses

Mean difference

Standard deviation of the mean difference

Standard error of the mean difference

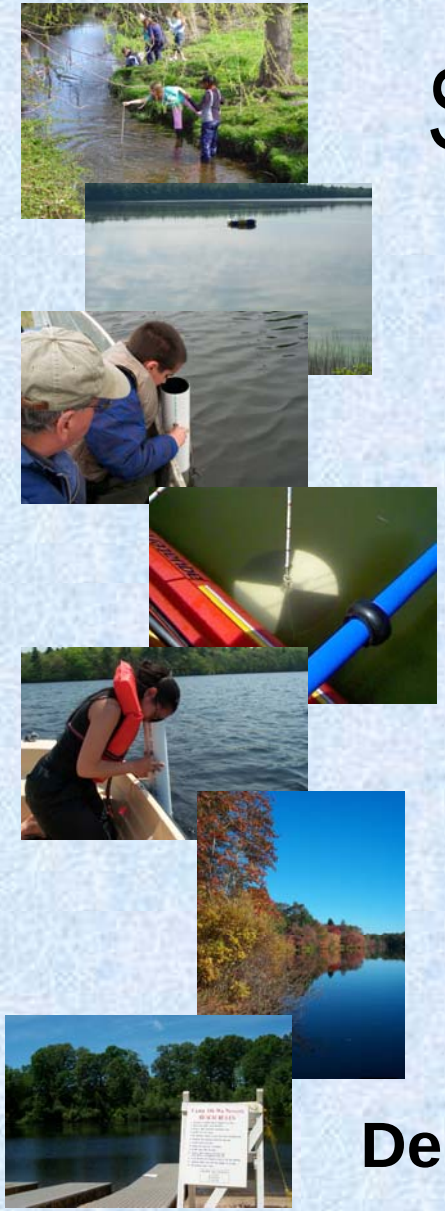
95% Confidence Interval of mean difference

Quartiles

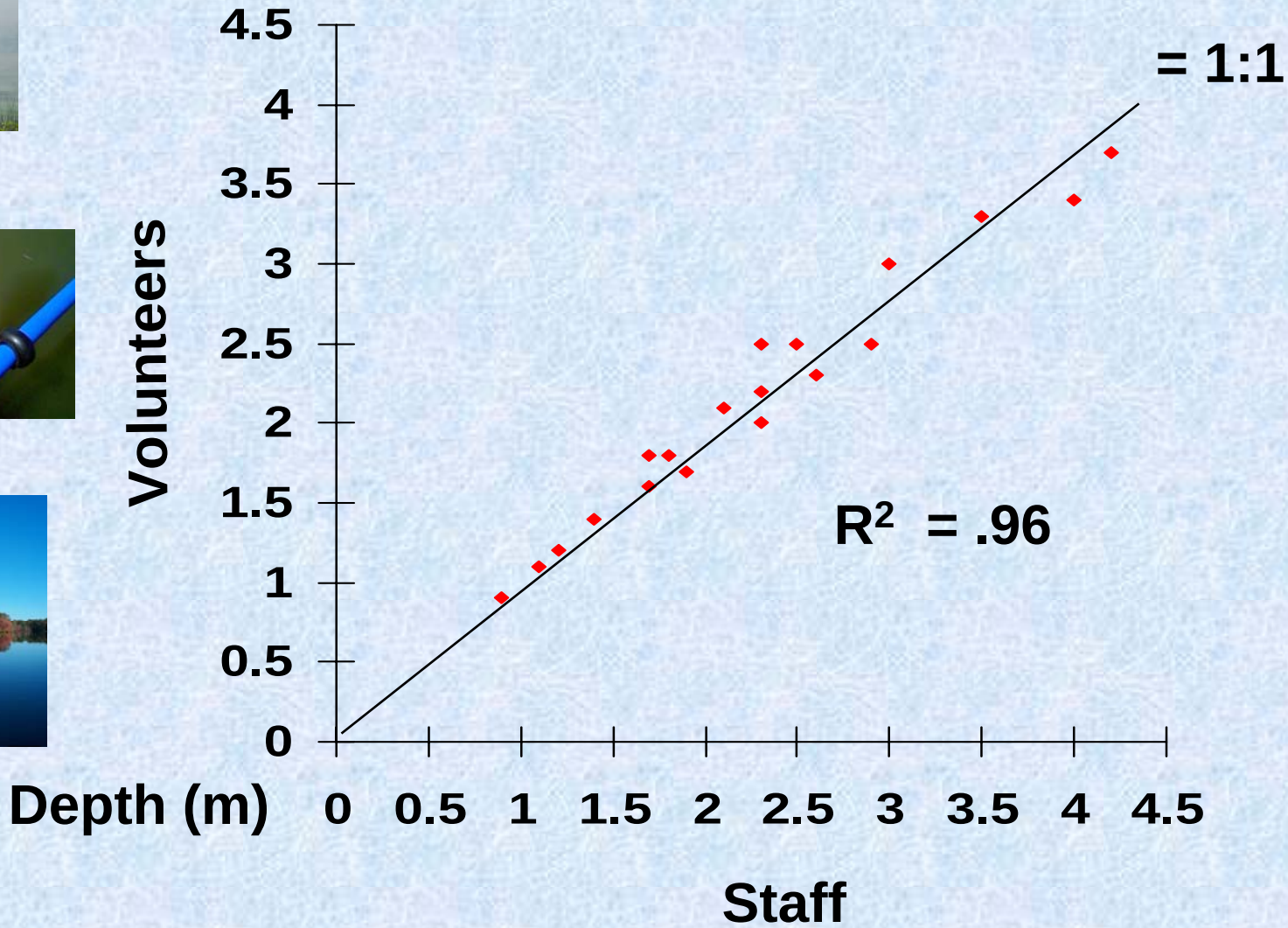
Range

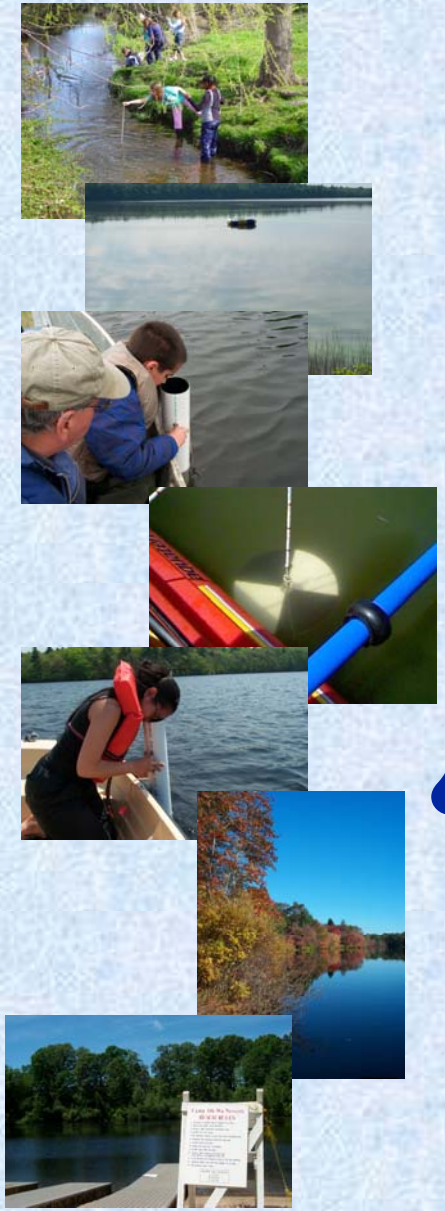
Regression

Percent error



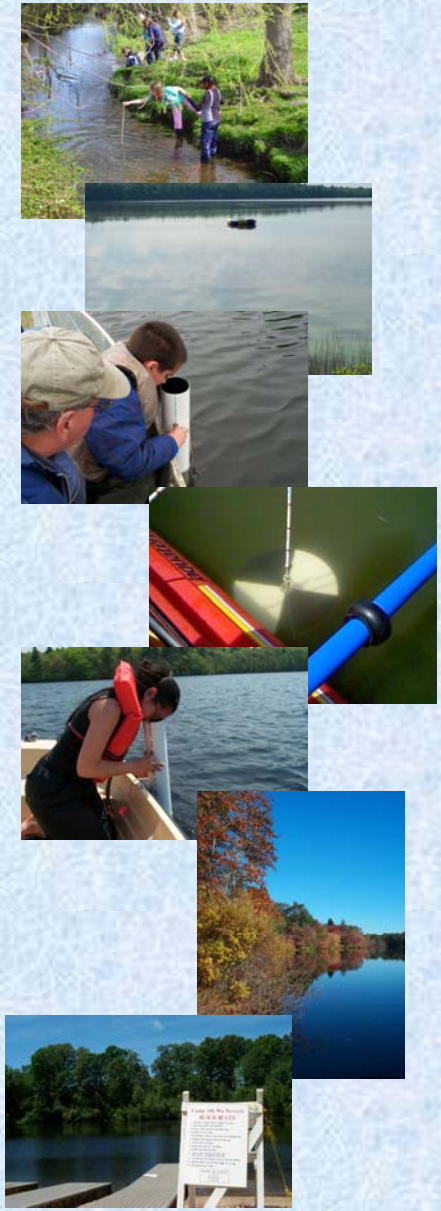
Secchi Comparison Plot





Results Summary

- No statistically significant differences for parameters monitored
- Soluble constituents were least variable
- Particulate based constituents were more variable
- The degree of variability was approximately the same for each protocol for a given parameter



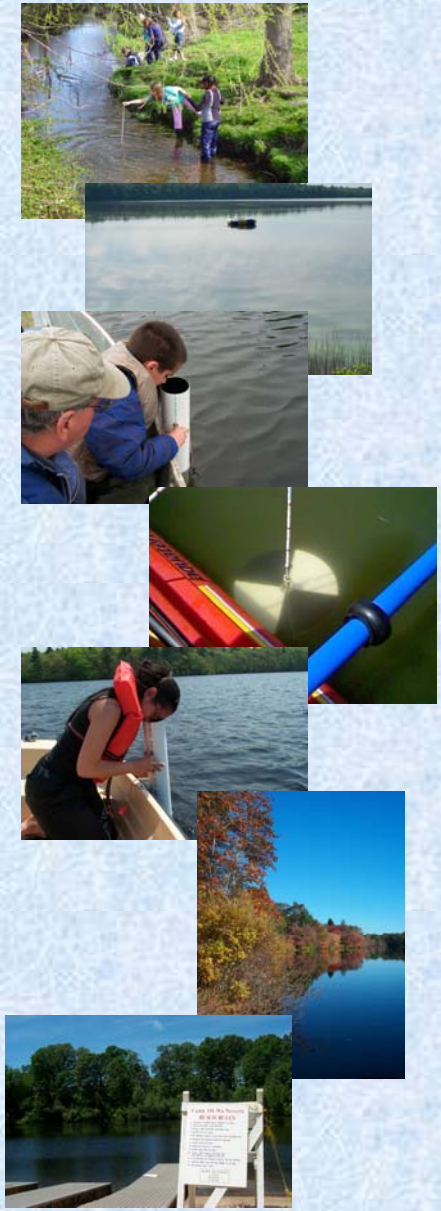
Implications

- URIWW data is of sufficient quality to be included in the 305(b) as **Monitored** data
- The time and cost of duplicate water sampling may not be justified for most parameters
- Duplicate sampling for chlorophyll may be justified

☺ Trained volunteers following the URIWW protocol collect data as representative of lake water quality as do professionals following a US EPA approved protocol

Resulting Program Changes

- Moved deep sampling depth from 5M to 1M <u>from the lake bottom</u>
  - Replicate filters from duplicate samples for chlorophyll - a analysis



305 (b) Implications

- URIWW data is used as "Monitored" data in the 305 (b)
- URIWW data indicating declining water quality has initiated 319 and TMDL studies
- URIWW collaborates with numerous groups and agencies including US EPA, NWS, USGS, and NRCS

Thank-you for your attention!
Questions??