GET WET!

Training Professionals

Teresa E. Thornton, M.S., Ph.D.

2012-2013
Threats to Groundwater

- Increasing development and demand
- Road salt, nitrates, historical contaminants, etc.
- Climate change
  - Precipitation changes
    - Saltwater intrusion in coastal communities
    - Chemically concentrated, scarce groundwater (decreased recharge)
- Natural contaminants

http://spacing.ca/votes/?cat=42
http://facstaff.unca.edu/chennon/images/ocean.jpg
Private Well Water

• More than 15.9 million groundwater wells in the United States (NGWA.ORG)

• Approximately 500,000 new residential wells are constructed annually (NGWA.ORG)

• Limited to no regulations or enforcement for water quality testing

• Little incentive for homeowners to test wells
The largest use for groundwater in the US is agriculture.
All well types can be affected.
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PROGRAM GOALS:

• Collect data on groundwater quality (students).

• Build interest in the community (schools).

• Educate public to the need for private well testing.

• Establish groundwater monitoring network.
  - Through random sampling of wells.
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EDUCATIONAL GOALS:

Students:

- Field sampling techniques
- Laboratory skills
- Computer competence in Excel, Word, PowerPoint and a GIS program
- Internet research capabilities
- Mapping abilities
- Water chemistry
- An understanding why conservation and commitment to a healthy environment takes an entire community
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The Numbers:

- 8 years old
- 7 states
- 44 towns, 23 schools
- 100+ teachers and pre-service teachers
- 1000’s of 5th-12th students
- 100’s of Professional and Community Volunteers
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- K-12 Students (and indirectly their household members)
- Teachers
- Administrators
- State Employees
- Watershed association representatives & ENGOs
- County or town employees
- Local business owners
- College professors & undergraduate students
- Parents, retirees, and other community members
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Locations

MAINE
- Penobscot Watershed (3 towns)
- Androscoggin Watershed (3 towns)
- Frenchman Bay Watershed (4 towns)
- Nezinscot River Watershed (3 towns)
- Acton Watershed
- Androscoggin County
- Sagadahoc County

NEW HAMPSHIRE
- Connecticut River Watershed (4 towns)
- Ossipee Watershed (6 towns)
- Wakefield Watershed

VERMONT
- Connecticut River Watershed (2 towns)

RHODE ISLAND
- Scituate Watershed (4 towns)

CONNECTICUT
- Pawcatuck Watershed (3 towns)

NEW YORK
- WallKill River Watershed (4 towns)

FLORIDA
- Okeechobee Watershed (3 towns)
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Step 1: Full day training for educators & local citizen volunteers
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Step 2: Educate and Train Students

http://www.usawaterquality.org/NewEngland/Focus_Areas/well/
Students pre-visit presentation includes:

• Drinking water sources
• Hydrologic cycle
• Private well types
• How a well can become contaminated
• Potential contamination sources
• Testing parameters
• Student’s role in GET WET!
• How to sample well water
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Step 3: Field sampling and testing
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Parameters Students Test for:

- Chloride
- Nitrates
- Total Metals
- Conductivity
- Hardness (CaCO₃)
- pH
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A seventh station is set-up in the classroom for
Data analysis and mapping
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Step 4: A Post visit is scheduled to discuss raw data with students and explain the presentation they will be creating with local professionals

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<th>Nitrate (mg/L)</th>
<th>pH</th>
<th>Hardness (mg/L CaCO3)</th>
<th>Total Metals (mg/L)</th>
<th>Conductivity (μS/cm)</th>
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Parameters of Community PowerPoint Presentation:

• Land-use issues

• Local geology

• Groundwater inputs

• Specific local water concerns

• Results in graph form and mapped in a GIS program

• Parameters we did NOT test
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Data analysis and mapping

Statistical Results of Chloride (mg/L)

- mean: 102
- median: 80
- mode: 80
- standard deviation: 88
- range: 20-480
- MAX SAFE LIMIT: 156
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Step 5: Students analyze results and create PowerPoint presentation with local professionals
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Step 6: Presentation at an evening public meeting
Date, time, and location determined by teacher

http://livingindryden.org/2005/03/
Activities and curriculum
• Forms and other state’s presentations
Any Questions?
HOW DO WE VALIDATE
GET WET!
Quality Assurance/Quality Control

- 10% of the bottles are returned to a local college or university to have the water tested in the lab.

- At UMaine, John Peckenham is responsible for this. If you require his assistance in this matter please call 207-581-3254

Director, Maine Water Resources Research Institute
Associate Director and Senior Research Scientist, Senator George J. Mitchell Center for Environmental & Watershed Research
pH Comparison

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Chloride Comparison

![Graph showing chloride comparison between lab and student samples. The graph has a scatter plot with points scattered around a linear trend line. The x-axis represents lab chloride values, and the y-axis represents student chloride values. The values range from 0 to 400 on the x-axis and from 0 to 180 on the y-axis.](image)
• Because of these kinds of initial results, new tests have been chosen to increase the validity of student data.

• Each year tests were under scrutiny until proper QA/QC results were verified.

Furthermore, research has been published that with greater than 5 consecutive years of QA/QC validation of student-generated data patterns are formed and results are considered reliable.

Further reading:
Any Questions?

Do you need a break?
Introductions

• Name

• Position and area of knowledge

• How do you fit into the GET WET! program?

• Is it preferable to assist in the classroom during testing or research?

• Is it possible to give a presentation to the students regarding your expertise?
Folder Contents

- Agenda
- Intellectual Property Sharing Agreement
  (All results published must refer to the \textit{GET WET!} program as the source of data collection)
- Copy of PowerPoint
- \textit{GET WET!} FLYER
- Contact Sheets
- Program Coordination Information
Folder (cont.)

- Calendars
- Classroom Set-up
- Station Set-up
- Sampling Procedures
- Survey Sheet for Parents
- Classroom Sampling Sheet
BREAK
15 Minutes
Begin Testing with Kits

Go through all of the testing stations so you are comfortable with the process
For further assistance please contact:

Teresa E. Thornton, M.S., Ph.D.
207-266-3682