American Ground Water Trust

Ground Water Institute for Teachers™

Brooker Creek Preserve
Environmental Education Center
3940 Keystone Rd., Tarpon Springs, FL 34688

Register at www.agwt.org (Teacher Institutes)

(A two-day training program) Friday, April 24, and Saturday, April 25, 2009

Institute Sponsor:

Southwest Florida Water Management District

Contacts:
American Ground Water Trust: Andrew Stone (603) 228-5444 [astone@agwt.org]
U.S. Geological Survey: Ann Tihansky (727) 803-8747, ext. 3075 [tihansky@usgs.gov]
SWFWMD: Mary Alice Hogan: 1-800-423-1476, ext. 4771 [MaryAlice.Hogan@WaterMatters.org]

Background:
The aim of the Ground Water Institute for Teachers program is to increase water awareness of teachers, school students, citizens and communities so they may recognize the connected and integrated nature of the environment and be empowered to play an active role in protecting resources for sustainable use. The Trust believes that teachers who are excited about environmental education and who are provided with training in environmental principles will be more likely to effectively teach environmental concepts to their students. Students made aware of "cause and effect" related to water resources and aquatic habitat are likely to become motivated to protect and conserve resources. Increasing the environmental awareness of citizens and communities is a vital need worldwide and specifically in Florida because of the state's finite resources and increasing environmental pressures.

Grade Levels:
The Trust's Ground Water Institute for Teachers program is a content-focused training opportunity with applicability to many grades. The exciting and practical "science" of ground water can be applied to existing curriculum in many traditional subject areas. This training program has applicability beyond the typical "earth science" perspective. Institute presenters are all top experts with a wealth of expertise. The program provides real-life examples of the applications of science and technology to water issues. More than 60 Institutes have been completed in 17 states involving 1,500+ educators. Past Florida Institute programs have been held in Zephyrhills, St. Petersburg, Crystal River, Tampa, Sarasota, Fort Myers and Arcadia.

- ⇨ Instructors for the Institute are all experienced groundwater professionals and educators.
- ⇨ Professional continuing education credit is available for teachers.
- ⇨ There is no charge for teachers to attend this training program.
- ⇨ Payment for substitute teachers may also be available.

Institute Program – Friday, April 24

8:00 – 8:30

REGISTRATION – MEET and GREET

8:30 – 8:40

WHAT THE INSTITUTE IS ALL ABOUT

- American Ground Water Trust
- United States Geological Survey
- Southwest Florida Water Management District
- Brooker Creek Preserve Environmental Education Center

8:40 – 9:10

UNDERSTANDING THE DROUGHT AND HOW YOU CAN HELP

Mary Margaret Hull, Lead Communications Coordinator, SWFWMD, Brooksville, FL

- Overview of the Southwest Florida Water Management District (SWFWMD)
- Current hydrologic conditions in the SWFWMD
- What the SWFWMD has done to address long-term water needs and the short-term drought
- What you can do to help

9:10 – 9:55

HYDROLOGIC SYSTEM: BASICS OF HYDROLOGY AND ECONOMICS

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

- Things you didn't know about rocks and water (geology – hydrology)
- The hydrologic system in a geologic environment
- Geology fundamentals (rock types, geologic structure and aquifer geometry)
- Concept of water balance (hydrologic accounting at local and regional scales)
- Perceptions of water as a shared resource (who owns it?)
- Global and national economic realities of competing water demands

9:55 – 10:45

GEOLOGIC FRAMEWORK OF CENTRAL FLORIDA

Ann Tihansky, Hydrologist, U.S. Geological Survey, St. Petersburg, FL

- Overview of geology and hydrologic system of central Florida
- Special features of karst geology and hydrology
- Specific geologic phenomena in west-central Florida's watersheds

10:45 – 11:00 **BREAK**

11:00 – 12:00

CENTRAL FLORIDA'S WATER SUPPLY SITUATION

Wendy Nero, Vice President, CH2M HILL, Tampa, FL

- Historical perspective on central Florida's water supply
- Resource pressures from population, agriculture and industry
- The role of science and engineering consultants in solving water supply problems
- The potential sources of water available to supply the region's needs
- Water-saving potential from water conservation measures (Can the public help?)
- A review of the water manager's toolbox (dams, rivers, wells, artificial recharge, conjunctive use, etc.)

12:00 – 12:30

REVIEW OF BROOKER CREEK EDUCATION OPPORTUNITIES

Holly Shiralipour, Manager, Brooker Creek Preserve, Tarpon Springs, FL

- Brooker Creek environmental programs
- Overview of the Center's museum exhibits

12:30 – 1:00 **LUNCH**

1:00 – 2:00

STORMWATER MANAGEMENT:
ITS IMPORTANCE IN FLOOD CONTROL AND POLLUTION MINIMIZATION

Hank Higginbotham, P.E., Regulation Performance Management Department, SWFWMD, Tampa, FL

- Accuracy versus precision: how it relates to stormwater management
- Flooding – what are the issues?
- Stormwater pollution – what are the issues?
- Lesson plans to assist middle and high school science teachers
- Hydrology versus hydraulics – what is the difference?
- Stormwater ponds – what function do they serve?
- Types of surface water management systems
- Free GIS information from the SWFWMD for middle and high school science teachers
- Free web soil survey information from NRCS for middle and high school science teachers
- Extensive web links and free (or low cost) reference materials that will assist middle and high school science teachers

2:00 – 3:00

THE ROLE OF TAMPA BAY WATER IN THE REGION'S WATER SUPPLY

Chris Owen, Water Quality Assurance Officer, Tampa Bay Water, Tampa, FL

- Why Tampa Bay Water was formed and how TBW works with other water entities in the area
- Seasonal and long-term raw water source options
- The basic chemistry and biology of water treatment processes
- Infrastructure and engineering needs for water storage and transmission to end users
- Challenges for wastewater disposal and reuse in Tampa Bay
- Educational resources and opportunities available from TBW
- Water Quality background for field trip
- Water quality issues of groundwater supply from the Eldridge-Wilde well field

3:00 – 4:00

WATER SCIENCE CLASSROOM EXERCISES

Ann Tihansky, U.S. Geological Survey, St. Petersburg, FL
Andrew Stone, American Ground Water Trust, Concord, NH

- Build a limestone aquifer and turn it to karst in under five minutes
- How much water in groundwater storage?—Porosity demonstration and calculation
- Easy classroom demonstration—watch transpiration happen
- The meaning of numbers—how to demonstrate one part per million
- Showing topography to scale—the dangers of vertical exaggeration in sections and diagrams

4:00 – 4:30

USGS ONLINE - REAL-TIME HYDROLOGIC DATA

David Fulcher, Hydrologist, U.S. Geological Survey, St. Petersburg, FL

- An Internet trip around the country and the state for well and streamflow information
- Review of current status and recent flow and aquifer level records in west-central Florida
- How USGS live data can be used in the classroom

4:30 **END OF DAY ONE PROGRAM**

Institute Program – Saturday, April 25

8:30 – 9:15

GROUNDWATER TECHNOLOGY

Andrew Stone, American Ground Water Trust, Concord, NH

- How scientists explore for and assess groundwater resources
- Drilling of water wells (a well is much more than a hole in the ground)

9:15 – 10:00

PINELLAS COUNTY/TAMPA BAY WATER WELL FIELD http://pubs.usgs.gov/sir/2004/5268/

Ann Tihansky, U.S. Geological Survey, St. Petersburg, FL

Bruce Webber, Hydrogeologist, Pinellas County Utilities, Clearwater, FL

- Tools for understanding and managing groundwater supplies in west-central Florida
- Basic hydrogeology of the Eldridge-Wilde well field
- How and why saline water can intrude into coastal freshwater aquifers
- The meaning and significance of "aquifer heterogeneity"
- Some of the geeky geophysical and geochemical tools that provide data
- The importance of partners working together to manage our resources

10:00 – 12:00

FIELD TRIP: HANDS-ON AT THE WELL FIELD—looking at what we just talked about

- Water management challenges and solutions on the role of TBW
- Wellfield control room—how we route the water and where it goes
- Basic chemistry of the water treatment process
- Data collection from monitoring wells for water levels and salinity measurement
- The wellfield pumps – how they work and where the water goes
- Interactions of groundwater, surface water and wetlands (stomp around in a cypress dome)
- Evidence for and challenges of ecosystem changes

12:00 – 12:30 **LUNCH**

12:30 – 1:15

LOW IMPACT DEVELOPMENT (LID)

Jason Mickel, Senior Planner, Planning Department, SWFWMD, Brooksville, FL

- Background on LID and green infrastructure
- LID and our water resources
- Using Florida Yards & Neighborhoods (FYN) programs to complement LID initiatives
- Potential obstacles and perception
- Short exercise – community design using LID

1:15 – 2:00

STORMWATER EXERCISES THAN CAN BE ADAPTED FOR DIFFERENT GRADE LEVELS

Andrew Stone, American Ground Water Trust, Concord, NH

- Hydrologic budget concept (in – out +/– change in storage)
- How the suburban landscape functions hydrologically
- Identify site-specific land-use categories
- Follow the water drop—where and how storm water flows (direction, speed and destination)
- Where does it end up? And how long does it take to get there?

2:00 – 2:30

KEEPING UP WITH THE TRENDS IN ENVIRONMENTAL EDUCATION

Mary Alice Hogan, Youth Education Specialist, SWFWMD, Brooksville, FL

- What SWFWMD is doing to keep up with current trends
- SWFWMD teacher trainings
- Sunshine State Standards/Next Generation Standards
- How to develop a lesson plan for institute follow-up

2:30 – 3:00

EDUCATION RESOURCES AND IMPLEMENTATION

Mary Torrusio, Youth Education Specialist, SWFWMD, Brooksville, FL

- Set-up and operation of the aquifer and watershed models
- What students can learn from the models
- How the models relate to real hydrologic situations
- SWFWMD education materials and grants

3:00 – 3:30

TEACHING AND GROUNDWATER CONCEPTS

Andrew Stone, American Ground Water Trust, Concord, NH

- The difference between groundwater renewability and sustainability
- Integration of climate change issues in teaching
- Common misperceptions about ground water
- Water wells in Shakespeare's plays
- How to develop a poetry-based hydrologic cycle at almost any grade level

3:30 – 4:00

WHERE NOW? INTEGRATING INSTITUTE CONTENT INTO THE CLASSROOM

Facilitated group discussion and program wrap-up

- The concept of add-in rather than add-on to existing curriculum
- Potential lesson topics based on Institute presentations
- Completion of Ideas to Lessons form
- Completion of Institute evaluation form
- Lessons learned? Questions not answered?

4:00pm **ADJOURN**