



[U.S. Geological Survey New York Water Science Center – http://ny.usgs.gov](http://ny.usgs.gov)

Message from Rafael W. Rodriguez, Director, New York Water Science Center

Since our last newsletter, a new Secretary of the Interior, Ken Salazar, was sworn in as the 50th Secretary of the Department of the Interior, replacing outgoing Secretary Dirk Kempthorne. As of this writing the Director of the U.S. Geological Survey (USGS) has not yet been nominated. Dr. Suzette Kimball has been Acting Director of the USGS since the departure of Dr. Mark Myers in November of 2008.

The new Director of the USGS will be asked to lead our agency in dealing with several new challenges facing the Nation. Among these, climate change and identifying new energy resources are likely to be of high priority in the foreseeable future.



Both of these issues are also being addressed here in the New York Water Science Center. We have met with local, State, and Federal partners to discuss climate change and its potential impact on the water resources of the State. Of critical importance to help address this topic is the long-term record provided by stream gages. Yet, as many as 56 streamgages in New York were slated to be discontinued because of budget shortfalls from our funding partners. Some of these gages in the Delaware and Susquehanna River basins have been collecting streamflow data for more than 90 years, information that is essential to understand the impact that changes in rainfall patterns could bring as a result of climate change. Thankfully an important agreement was reached that will help fund many of the gages and keep them operational for the foreseeable future ([see article below](#)).

On the issue of energy resources, the Marcellus Shale as a potential source of natural gas has been in the forefront of the news for the past several months. Extracting the gas will require millions of gallons of fresh water (mixed with sand and proprietary chemicals) that will be injected under pressure to fracture the rock and release the gas. Of concern is the impact that this type of mining will have on New York's water resources (both on quantity and quality) and on ecosystems. We are working with our partners to develop several studies to address some of these issues.

As always, I am interested in hearing from you. Please feel free to contact me about these or any other issues or program opportunities you may wish to discuss. I can be reached at (518) 285-5658 or rodrigu@usgs.gov.

Selected Projects – For information on all our active projects, visit our [project summary web page](#). For more information on the specific project, please click on the project title or email the contact person.

Monitoring Tidal Water Elevation and Water Quality in Four Embayments of Long Island Sound to Assess Tidal Wetland Loss

Recent trends analysis examining the effectiveness of tidal wetlands regulations and the regulatory program of the New York State Department of Environmental Conservation (NYSDEC) revealed that the regulations and regulatory program were highly effective in stemming the tide of historic "fill and build" activities. However, the trends also revealed that tidal wetlands—specifically, low marshes—were disappearing. To help determine the cause(s) of this loss, the NYSDEC, in collaboration with Stony Brook University's School of Marine and Atmospheric Sciences (SoMAS) and the U.S. Geological Survey (USGS), has begun a monitoring program which is to be conducted on and in the tidal wetlands of East Creek, West Pond, Frost Creek, and Flax Pond (fig 1). The sites were chosen due to the size similarity and degrees of disappearing vegetation (vegetative shift) between the years of 1974-2005. East Creek has shown very little vegetative shift and has been selected as a control marsh.



Figure 1. – Map, available from [USGS web page](#), showing real-time coastal-monitoring sites and wetland-embayment sites in southeastern New York

The NYSDEC is installing Surface Elevation Tables (SET's) in tidal wetlands throughout Long Island. After installation, marsh accretion and elevation measurements will be made 3 times a year at each of the four sites listed, to collect long term sedimentation data.

Scientists from SoMAS will be collecting pore water samples, to be analyzed for sulfides, nitrate, nitrite, ammonia, total dissolved phosphorus, pH and Eh. Cores will also be taken annually for two years from each marsh, with detailed ^{210}Pb chronologies being created in order to measure accretion rates for the past century.

Scientists from the USGS will be setting up continuous monitoring stations to collect information on water elevations and tidal dynamics in each of the four tidal wetlands, and information on water temperature, salinity, and other chemical parameters at selected sites. These continuous datasets are being made available [in real time via the Internet](#). Tidal and water-quality statistics also will be published annually in the USGS Water-Data Report for Long Island. For more information contact Chris Schubert (schubert@usgs.gov).

[Several High-Priority Streamgages to Remain Operational – Ten Still Threatened](#)

Funding from the U.S. Geological Survey will help keep at least eight critical streamgages operational. Along with the New York City Department of Environmental Protection, the New York State Department of Environmental Conservation, the Susquehanna Flood Forecast and Warning System and the U.S. Army Corps of Engineers, an important agreement was reached to keep certain sites operational that are critical for the National Weather Service to provide flood forecasts and warnings.

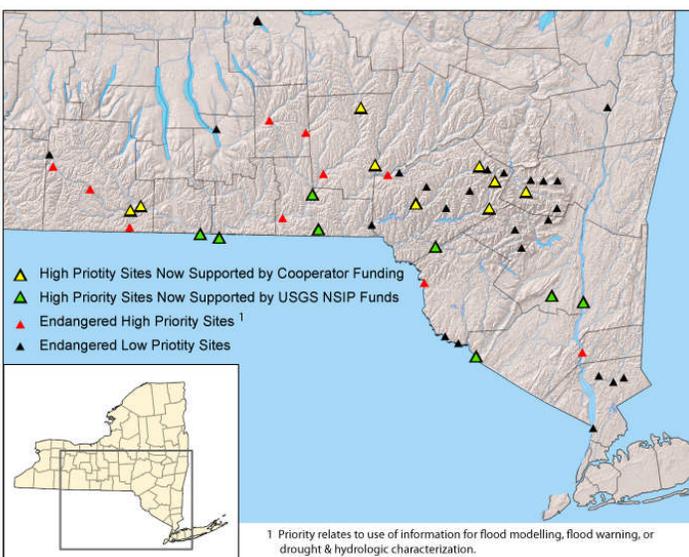


Figure 2 – Showing high-priority streamgages that will be funded by USGS/NSIP, the Cooperative Water Program, and partner agencies.

These partner agencies developed a plan to fund as many as 17 of the most critical streamgages that were slated to be discontinued (fig 2). Information from these gages is used by emergency managers and others to help protect lives and property.

“This is an excellent example of how federal, state, and local governments can work together to find solutions that help protect property and save lives,” said Rafael Rodriguez, Director of the USGS New York Water Science Center.

“This funding partnership is not only good for residents in New York, but it will also benefit those living in other states downstream.”

NY City officials agree. “We have kept open the lines of communication throughout this process and have worked cooperatively with elected officials, emergency managers and state, federal and local partners to ensure that funding for the most essential gages is continued,” said Paul Rush, Deputy Commissioner for Bureau of Water Supply, NYCDEP.

The USGS will continue to work with federal, state, and local government agencies to seek alternative funding sources for another ten high-priority streamgages (fig 2) as well as 29 lower priority streamgages that may be discontinued if a source of funds is not found. [Look here for a full list of threatened gages](#), for more information, contact Ward Freeman (wfreeman@usgs.gov).

[Aquifer Recharge in the Bedrock](#)

[Uplands of New York \(A Proposal\)](#)

Many communities in upland areas of New York obtain their water from wells drilled into till-mantled bedrock. The rate of recharge to the bedrock in these upland settings can be a major constraint on the sustainability of the water supply. Future planning for upland residential, commercial, and industrial development, and guidance for the sustainable density of the development, would benefit from a better understanding of the environmental factors affecting bedrock recharge.

Recharge rates vary throughout New York depending on many environmental factors including the characteristics of the underlying bedrock, and thickness and clay content of the till mantle. Recharge to bedrock aquifers traditionally has been estimated through techniques involving baseflow separation of stream hydrographs and commonly ranges from 8 to 15 inches per year. These may be an overestimation in many settings due to several reasons.

Baseflow includes some groundwater that discharges from shallow flow paths through till, which should not be included as recharge to bedrock. The presence of wetlands and impoundments also can bias recharge estimates upward. Finally, many streamflow gages used for baseflow-separation analysis measure large watersheds, which can make interpretation less reliable, as stormflow from distant areas may persist into the next storm event and most large watersheds include lowlands where sand and gravel mantles the bedrock and recharge is much greater than in upland areas.

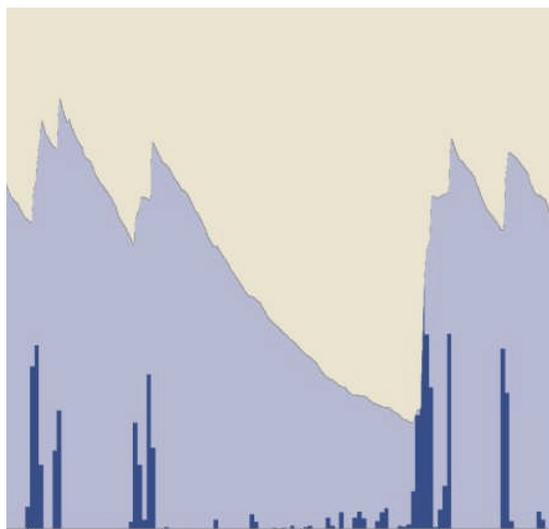


Figure 3. – Graph showing water levels in an upland bedrock well in Rockland County (light blue shaded hydrograph) along with the estimated recharge to the aquifer (blue bar chart).

Recent publications by the USGS describe new innovations and applications for the estimation of aquifer recharge. For example, [Heppner and Nimmo \(2005\)](#) present a computer program that constructs master recession curves and estimates recharge from long-term well hydrographs given aquifer storage values. The continuous groundwater-level data collected as part of the [NYSDEC-USGS observation well program](#) provides an excellent opportunity for the application of this method in a range of settings across the State.

[Randall and Finch \(2008\)](#) estimated recharge to a bedrock aquifer in eastern New York (Averill Park) by relating the area encompassed by the coalesced cones of depression from an upland development with the development's rate of ground-water withdrawal. Similar investigations in a range of other upland settings would allow for quantification of the environmental factors that control rates of recharge to bedrock, and development of regionalized estimates of those rates.

The USGS New York Water Science Center is seeking to put together a consortium of communities with residential, Commercial, or industrial developments (or anticipated developments) in upland areas to help fund a study of regional bedrock aquifer recharge rates around New York State. If your county or town is interested in participating in this consortium, please contact Paul Heisig for more information (pmheisig@usgs.gov).

[Water-Quality Monitoring in the NYC West-of-Hudson Watersheds](#)

The U.S. Geological Survey operates a network of 60 stream-flow gaging stations throughout the New York City Catskill/Delaware Water Supply System; the network is funded by New York City Department of Environmental Protection (NYC-DEP). In 1997, a subset of 13 stations was selected for a water quality network to provide water-quality samples at sites throughout the Catskill/Delaware Water Supply System as part of the City's comprehensive filtration avoidance plan for the U.S. Environmental Protection Agency. The network was designed as pairs of nested watersheds in which one forested watershed was nested within a larger watershed. The rationale for the design was to identify changes in water quality between the paired stations as affected by the intervening land use and external atmospheric deposition.

Four main tasks were defined for the network (1) collect stream water-quality samples, (2) analyze the water chemistry of the samples, (3) deliver the stream water quality data, and (4) evaluate the effects of land use and land cover on stream water quality in the region to identify potential sources of contamination, and quantify trends in water quality throughout the network. Although data collection, laboratory analyses, and data dissemination are essential components of the project, the goal of the program is to quantify the effect of NYC-DEP's watershed management program on surface-water quality and to determine the effects of land use on water quality in the region.

Because of budgetary cutbacks the 13-site water-quality network (along with some of the streamflow gages) will be discontinued on September 30, 2009. Although the NYC-DEP will continue its own water quality sampling efforts, the loss of this network will greatly diminish the amount of water quality data collected within the region and subsequently the ability to quantify the effect of NYC-DEP's watershed management program on surface-water quality as well as the effects of changes in land use and climate on water quality within the Catskill/Delaware Water Supply System. Contact Mike McHale (mmchale@usgs.gov) or Steve Wolcott (swolcott@usgs.gov).

[Troy Lab Provides Analyses For Low-Ionic-Strength-Water and Soil Samples](#)

The New York Water Science Center of the U.S. Geological Survey (USGS) in Troy, N.Y., operates a research laboratory specializing in the analysis of low-ionic-strength water and soil samples from forested and light agricultural areas. The laboratory analyzes major ions and other parameters of stream-water, soil-water, shallow groundwater, and soil samples. During its 25 years of operation, the laboratory has provided data for the USGS and many cooperators, including the U.S. Environmental Protection Agency, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, U.S. Forest Service, New York State Energy Research and Development Authority, and many academic and community groups.

Instruments in the laboratory include an ion chromatograph, an inductively coupled plasma spectrophotometer, a carbon analyzer, three flow-injection analyzers, a carbon-nitrogen analyzer, an auto-titrator, a turbidimeter and a spectrophotometer. Our services, which can be adapted to the specific needs of each project, include sample processing, sample analysis, and customized data reports.

The laboratory participates in several quality assurance programs, including the USGS Standard Reference Sample program, Environment Canada’s Long Range Transport of Airborne Pollutants program, and the New York State Department of Health’s Environmental Laboratory Approval Program. ELAP certification is pending. Our Standard Operating Procedures, and Quality Control Reports are available upon request.

For more information please contact either Tricia Lincoln (tarena@usgs.gov) at 518-285-5612, Greg Lawrence (glawrence@usgs.gov) at 518-285-5664, or Steve Wolcott (swolcott@usgs.gov) at 518-285-5676.



Hydrologic Conditions

[Surface Water in New York, August 2008 to March 2009](#)

Average streamflow conditions across New York State are at about normal over the last month as shown in the 45-day graph of index streamflow (fig. 5). Figures from the NOAA Regional Climate Center show that accumulated precipitation over the last 8 months in New York was near normal; with slightly above normal (2 to 5 inches) precipitation in western NY and the Lake Ontario drainage.

Hydrologic conditions are now (early April) moving into the below normal range. But based on the average monthly streamflow conditions over the last 8 months, conditions across the State have hovered in the normal to wet range as shown in figure 6. March monthly conditions show that both the Walkill River and the Ramapo River in southeastern NY are at 90 percent exceedance indicating well below normal conditions in that area.

[Groundwater in New York, August 2008 to March 2009](#)

Groundwater levels for the last 8 months were mostly normal across the State with some areas of below normal conditions in Rockland, Broome, and Fulton Counties as can be seen in figure 7. The NY WSC web page displays [real-time](#) and [historic](#) ground-water data for these and other wells, in addition to a [monthly summary](#) of hydrologic conditions. Another useful resource for hydrologic conditions in New York is the USGS [ground-water watch](#) page.

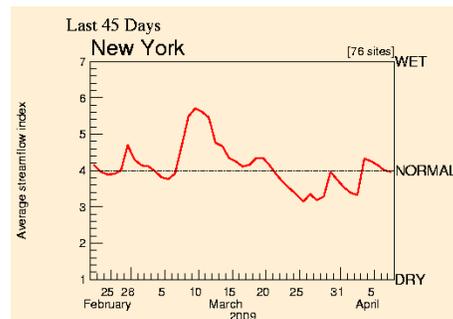


Figure 5. – Graph of index streamflow for NY, February to April 2009, from 78 sites with more than 30 years of record.

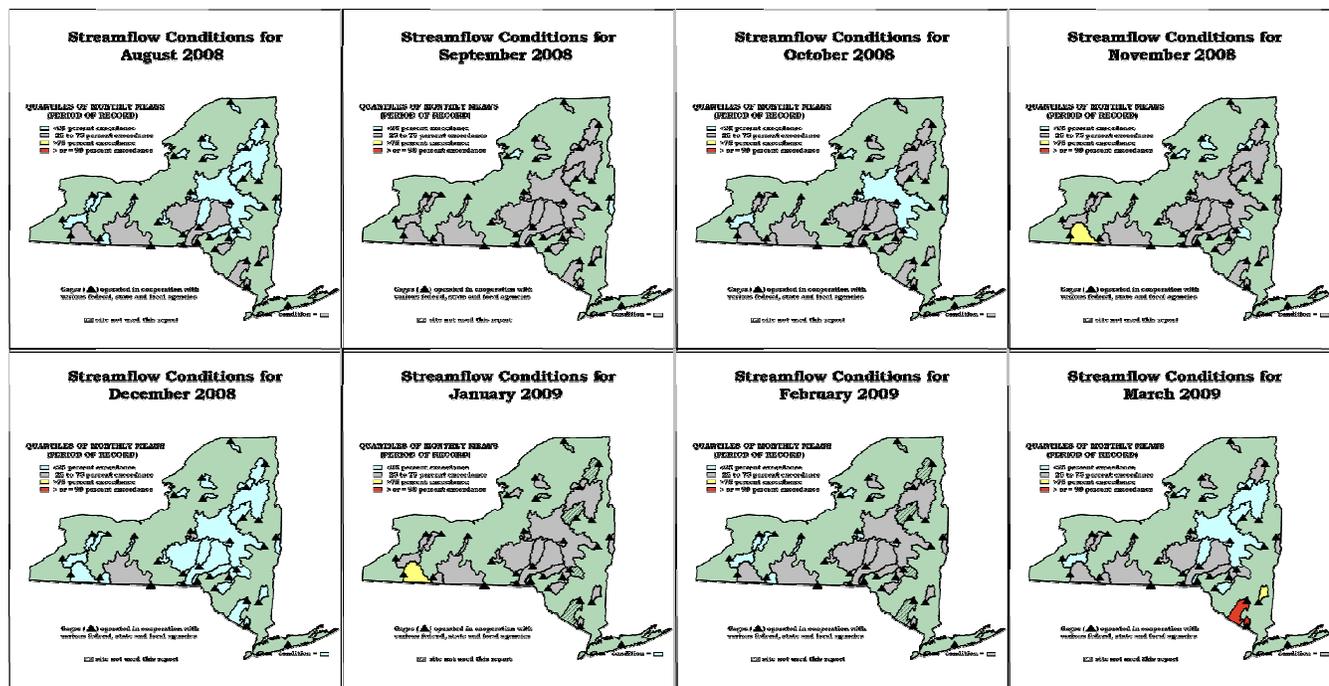
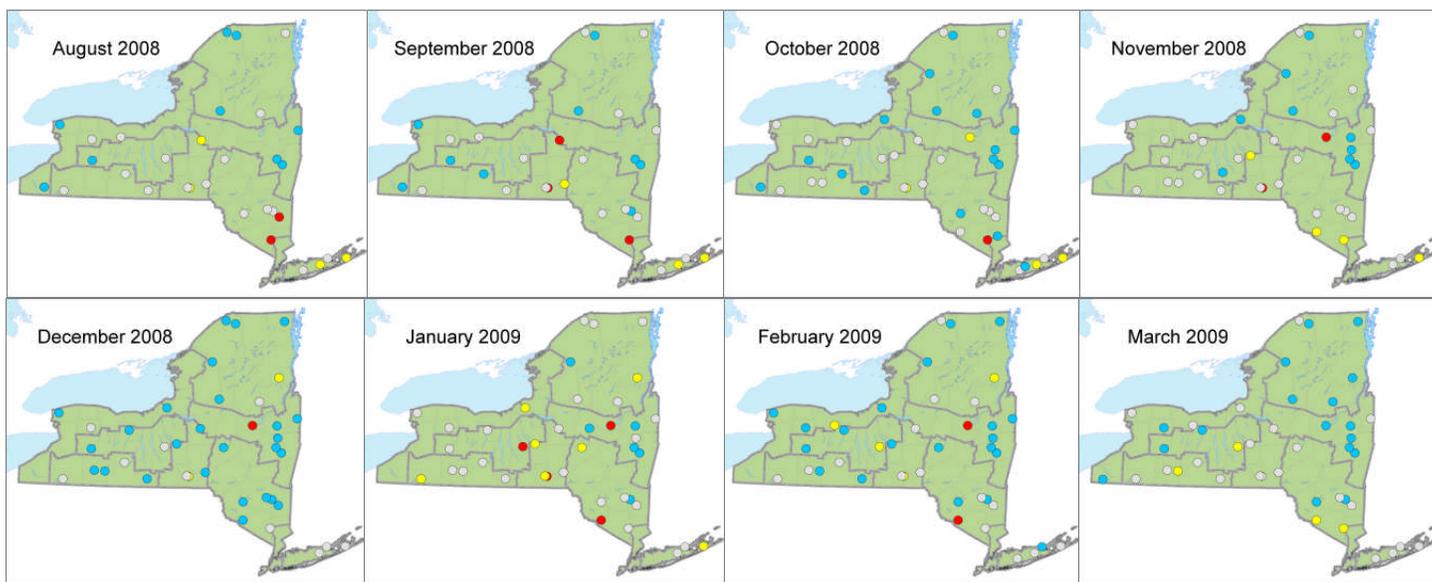


Figure 6. – Average monthly hydrologic conditions from August 2008 (upper left) to March 2009 (lower right) at selected surface-water sites in New York – where blue indicates wet conditions; gray indicates normal conditions; yellow indicates dry conditions; and red indicates very dry conditions. These maps are contained within the “End-of-Month Hydrologic Conditions” reports available at: <http://ny.water.usgs.gov/cgi-bin/eomreports>.



Exceedance

● 0.00 - 24.99 ● 25.00 - 75.00 ● 75.01 - 89.99 ● 90.00 - 100.00

Figure 7. – Monthly hydrologic conditions in selected groundwater wells in New York from August 2008 (upper left) to March 2009 (lower right), showing percent exceedance based on the period of record for the well. Blue dots indicate wet conditions, gray dots indicate normal conditions, yellow dots indicate dry conditions, red dots indicate very dry conditions.

New Reports from the New York Water Science Center –Listed below are some of the reports and abstracts written by scientists in the USGS New York WSC that were released in recent months. A complete list of New York WSC publications can be found on our [publication search page](#).

Baldigo, B.P., Warren, D.R., Ernst, A.G., and Mulvihill, C.I., 2008, [Response of fish populations to natural channel design restoration in streams of the Catskill Mountains](#), New York: North American Journal of Fisheries Management, v. 28, no. 3, p. 954-969.

Baldigo, B.P. and Warren, D.R., 2008, [Detecting the response of fish assemblages to stream restoration – Effects of different sampling designs](#): North American Journal of Fisheries Management, v. 28, no. 3, p. 919-934.

Baldigo, B.P., Gallagher-Ernst, A.S., Keller, Walter, Warren, D.R., Miller, S.J., Davis, Daniel, Baudanza, T.P., DeKoskie, Douglas, and Buchanan, J.R., 2008, [Restoring geomorphic stability and biodiversity in streams of the Catskill Mountains, New York, USA](#): in, J.L. Nielsen and coeditors, Proc of Fourth World Fish Cong: Reconciling fisheries with conservation, Symp 49, Am Fis Soc, Bethesda, MD p. 1777-1790.

Benotti, M.J., 2008, [Inventory of data sources used for watershed condition assessments of Fire Island National Seashore, Gateway National Recreation Area, and Sagamore Hill National Historic Site, New York and New Jersey](#): U.S. Geological Survey Open-File Report 2008-1298, 11 p., online only.

Capurso, D.W. and Busciolano, Ronald, 2008, [Real-time hydrologic monitoring by the U.S. Geological Survey on Long Island and in the five boroughs of New York City](#) (abs), in: Long Island Geologists' Conference, Stony Brook University, April 15, 2008.

Coon, W.F., 2008, [Hydrologic evidence of climate change in Monroe County, New York](#): U.S. Geological Survey Open-File Report 2008-1199, 12 p.

Coon, W.F., 2008, [Simulation of streamflow and selected water-quality constituents through a model of the Onondaga Lake basin, Onondaga County, NY--A guide to model application](#): U.S. Geological Survey Open-File Report 2008-1188, 27 p., online only.

Eckhardt, D.A., Reddy, J.E., and Tamulonis, K.L., 2008, [Ground-water quality in western New York, 2006](#): U.S. Geological Survey Open-File Report 2008-1140, 36 p., online only.

Heisig, P.M., 2008, [Croton terrestrial processes project--final report, volume 1, chapter 4, broad brush study](#): New York City Department of Environmental Protection, 105 p., online only.

Heisig, P.M., 2009, [Nutrients, dissolved organic carbon, color, and disinfection byproducts in base flow and stormflow in streams of the Croton watershed, Westchester and Putnam Counties, New York, 2000–02](#): U.S. Geological Survey Open-File Report 2009–1054, 105 p., online only

Lawrence, G.B., Baldigo, B.P., Roy, K.M., Simonin, H.A., Bode, R.W., Passy, S.I., and Capone, S.B., 2008, [Results from the 2003-2005 Western Adirondack stream survey](#): New York State Energy Research and Development Authority (NYSERDA) Final Report 08-22.141 p.

Lawrence, G.B., Roy, K.M., Baldigo, B.P., Simonin, H.A., Capone, S.B., Sutherland, J.W., Nierzwicki-Bauer, S.A. and Boylen, C.W., 2008, [Chronic and episodic acidification of Adirondack streams from acid rain in 2003-2005](#): Journal of Environmental Quality, v. 37, p. 2264-2274.

Miller, T.S., Bugliosi, E.F., and Reddy, J.E., 2008, [Geohydrology of the unconsolidated valley-fill aquifer in the Meads Creek valley, Schuyler and Steuben Counties, New York](#): U.S. Geological Survey Scientific Investigations Report 2008-5122, 32 p., online only.

Monti, Jack, Jr., 2008, A GIS approach to delineate areas prone to ground-water flooding on Long Island, NY: Sixteenth Annual Pennsylvania GIS Conference 2008, May 14-15, 2008, Camp Hill, PA.

Phillips, P.J. and Chalmers, Anne, 2009, [Wastewater effluent, combined sewer overflows, and other sources of organic compounds to Lake Champlain](#): Journal of the American Water Resources Association, v. 45, no. 1, p. 45-57.

Randall, A.D. and Finch, Anne, 2008, [Recharge to shale bedrock at Averill Park, an upland hamlet in eastern New York--an estimate based on pumpage within a defined cone of depression](#): U.S. Geological Survey Scientific Investigations Report 2008-5087, 78 p., online only.

The [USGS Water Resources Discipline](#) (WRD) has the principal responsibility within the Federal Government to provide the hydrologic information and interpretation needed by others to achieve the best use and management of the Nation's water resources. WRD actively promotes the use of its information products by decision makers to:

Minimize loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement.

Effectively manage ground-water and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses.

Protect and enhance water resources for human health, aquatic health, and environmental quality.

Contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

If you have an environmental or resource-management issue in which you would like to partner with the USGS to investigate, please contact any of our senior management staff (listed below). Projects are supported primarily through the [Cooperative Water Program](#). This is a program through which any State, County, or local agency may work with the USGS to fund and conduct a monitoring or investigation project.

Williams, J.H., Reynolds, R.J., and Nastev, Miroslav, 2008, [Hydrogeology of the Potsdam Sandstone aquifer and springs in the Chateaugay area, northern New York \(poster\)](#): GSA Spring 2008 (Very large file 59mb; Right-Click-->Save As or Save Target As).

Williams, J.H., Anderson, J.A., Lacombe, P.J., and Johnson, C.D., 2008, [Single- and cross-well flow analysis for flowpath characterization in a fractured mudstone](#) (abst.), in: 14th European Meeting of Environmental and Engineering Geophysics (EAGE-Near Surface 2008), September 15-17, 2008, Krakow, Poland.

Yager, R.M. and Misut, P.E., 2008, [Simulation of processes controlling migration of saline water and brine above a flooded salt mine in western New York](#), USA: 20th Salt Water Intrusion Meeting, June 23-27, 2008, Naples, Florida.

Yager, R.M., Southworth, Scott, and Voss, C.I., 2008, [Simulation of ground-water flow in the Shenandoah Valley, Virginia and West Virginia, using variable-direction anisotropy in hydraulic conductivity to represent bedrock structure](#): U.S. Geological Survey Scientific Investigations Report 2008-5002, 54 p.

Yager, R.M., Voss, C.I., and Southworth, Scott, 2009, [Comparison of alternative representations of hydraulic-conductivity anisotropy in folded fractured-sedimentary rock: modeling groundwater flow in the Shenandoah Valley](#): Hydrogeology Journal, doi 10.1007/s10040-008-0431-x

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SAVE THE DATE

Techniques for Evaluating Water Resources in the Finger Lakes

Tuesday, October 13, 2009

*Hobart and William Smith Colleges
Geneva, New York*

The United States Geological Survey, in partnership with the Finger Lakes – Lake Ontario Watershed Protection Alliance and the Finger Lakes Institute will be sponsoring a conference on October 13, 2009 in the Vandervort Room on the Hobart and William Smith Colleges campus in Geneva, New York. The conference will highlight techniques for evaluating water resources in the Finger Lakes and provide opportunities to share data and experiences with peers.