

## Welcome to the USGS NAWQA Program Quarterly Highlights, January 2011

Highlights are from the USGS [National Water-Quality Assessment Program](#) (NAWQA), which has assessed the physical, chemical and biological characteristics of streams, rivers, and groundwater across the Nation since 1991.

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### In this quarter's highlights:

**1. Potentially harmful arsenic levels in domestic wells in Maine** – Access the report, [Assessment of Arsenic Concentrations in Domestic Well Water, by Town, in Maine, 2005–09](#), [maps](#), and [press release](#) online. For information on the study, contact: [Martha Nielsen](#), (207) 622-8201, ext 116.

USGS findings and maps, developed in cooperation with the Maine Center for Disease Control, show potentially harmful arsenic levels in private water wells in towns across Maine where elevated arsenic risks were not previously suspected. Arsenic levels ranged from less than the detection limit of 0.5 to 3,100 micrograms per liter. The federal safety standard for public drinking water is 10 micrograms per liter.

**2. Coal-tar sealant largest source of polycyclic aromatic hydrocarbons (PAHs) in urban lakes** - Access the full report in the journal [Science of the Total Environment](#) and [press release](#) (December 1, 2010) online. For information on the study, contact [Barb Mahler](#), (512) 927-3566. Learn more about other [contaminants in lake sediments](#).

The presence of PAHs in the environment is widespread and USGS research has recently demonstrated that coal-tar-based pavement sealant is the largest sources of PAHs to urban lakes. Sealcoat products are widely used in the U.S., both commercially and by homeowners. The products are commonly applied to commercial parking lots (including strip malls, schools, churches and shopping centers), residential driveways, apartment complexes and playgrounds. PAHs are an environmental health concern because several are probable human carcinogens, they are toxic to fish and other aquatic life, and their concentrations have been increasing in urban lakes in recent decades. NOTE: The NAWQA Program is planning a congressional briefing in Washington D.C. on March 4<sup>th</sup>, 2011 at 10:00 a.m. on the presence, sources, and impacts of polycyclic aromatic hydrocarbons (PAHs) found in urban lakes and streams across the Nation (exact location TBD).

**3. Altered flows lead to ecological degradation in streams across the U.S.** – Access the [full study](#), published in the Ecological Society of America journal *Frontiers in Ecology and the Environment* and [press release](#) online. For more information on the study, contact [Daren Carlisle](#), (703) 648-6890. Learn more about other [national ecology studies](#).

Most river flows across the U.S. are altered by land and water management activities (such as related to reservoirs, diversions, subsurface tile drains, groundwater withdrawals, wastewater inputs, and impervious surfaces), leading to ecological degradation and loss of native species. USGS findings show that the amount of water flowing in streams and rivers has been significantly altered in nearly 90 percent of waters that were assessed across the Nation. Altered river flows lead to the loss of native fish and invertebrate species whose survival and reproduction are tightly linked to specific flow conditions. For example, in

streams with severely diminished flow, native trout, a popular sport fish that requires fast-flowing streams with gravel bottoms, are replaced by less desirable non-native species, such as carp.

**4. Explaining mercury in selected watersheds across the Nation.** [New studies](#) build an understanding of how natural features and human activities affect the transformation, transport, and bioaccumulation of mercury in stream ecosystems.

- [Hydrological mobilization of mercury and dissolved organic carbon in a snow-dominated, forested watershed - conceptualization and modeling](#), by Schelker and others in the Journal of Geophysical Research (vol. 116, G01002). (USGS Contact: [Doug Burns](#), phone: 518-285-5662). *Available for free download via Author Choice.*
- [Flood hydrology and methylmercury availability in Coastal Plain rivers](#): by Bradley and others, in the journal, Environmental Science and Technology (v. 44, p. 9285-9290). *Available for free download via Author Choice.* (USGS Contact: [Paul Bradley](#), phone: 803-750-6125)
- [Simulation of streamflow in the McTier Creek watershed, South Carolina](#): by Feaster and others, in a U.S. Geological Survey Scientific Investigations Report (2010-5202). (USGS contact: [Toby Feaster](#), phone: 803-750-6103)
- [Total mercury, methylmercury, and selected elements in soils of the Fishing Brook watershed, Hamilton County, New York, and the McTier Creek watershed, Aiken County, South Carolina, 2008](#): by Woodruff and others, in the U.S. Geological Survey Data Series (516). (USGS contact: [Laurel Woodruff](#), 763-783-3291)

**5. Models help to estimate nitrate concentrations in private wells in the glacial aquifer system in the U.S.** – Access the [USGS report](#) (and other information on the glacial aquifer system) online. For more information on the glacial studies, contact [Kelly Warner](#), 217-328-9739, ext. 9727.

An estimated 17 million people use private wells that tap the glacial aquifer system. USGS glacial studies include modeled estimates on the probability of nitrate concentration above various thresholds. Modeled findings demonstrated significant predictors for nitrate concentration above 4 mg/L as nitrogen, including well characteristics such as open-interval diameter, open-interval length, and depth to top of open interval.

**6. Key landscape characteristics affect stream ecosystems in urbanizing regions of the Delaware River Basin** – Access the [full study](#), published in the journal Landscape Ecology, along with other ecosystem studies in urban areas. For more information, contact [Karen Riva-Murray](#), (518)285-5617.

Identifying relations between stream ecological condition and characteristics (or indicators) related to urbanization such as impervious surface provides important information to effectively address stream management and protection. Findings show that percent of urban land with tree cover, forest fragmentation and aggregation, percent tree cover, and urban aggregation are key factors affecting stream ecological condition, along with impervious surface.

**7. Substantial nutrients and sediment carried from Iowa basins into the Mississippi River during floods of 2007 and 2008** - The full study, by Hubbard and others, is published in the Journal of Environmental Quality and accessible at: <https://www.agronomy.org/publications/jeq/articles/40/1/166>. For more information, contact [Laura Hubbard](#), (319) 358- 3638.

A combination of above-normal precipitation during the winter and spring of 2007–2008 and extensive rainfall during June 2008 led to severe flooding in many parts of the mid-western United States. This resulted in transport of substantial nutrients and sediment from Iowa basins into the Mississippi River. Estimates of loads for the 16 day period during the flood were calculated for four major tributaries, accounting for about 22 and 46 percent of the total average annual nitrogen and phosphorus yield, respectively.

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