



Maryland Water Resources Research Center

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Please visit us at www.waterresources.umd.edu.

Mission

The MWRRC supports Maryland's water research and educational needs by funding high priority research projects and sponsoring educational programs and conferences on current water issues. Most of the research funding is directed toward supporting graduate students and young faculty members. The Center acts as a focal point on Maryland water issues with both Federal and State agencies.

Research

Most of the recent projects funded by the Center address water issues related to the Chesapeake Bay, but they also have regional and national relevance. For example: 1) A team is examining the impact of high road salt concentrations on denitrification in urban streams. 2) Bioengineers are measuring the reflectance of chlorophyll in wetland plants as indicators of point source nitrogen contamination. 3) Soil scientists have devised a method of identifying sources of sediments entering the Bay. Sediments damage the growth of submerged aquatic vegetation by filtering out sunlight needed for photosynthesis. 4) Biologists are assessing the impact on nearby stream ecology resulting from the large amounts of road salt used on Maryland highways this winter. High chloride concentrations could increase mortality, species abundance and community structure 5) Chemists are isolating and identifying potential endocrine disruptors in the upper Chesapeake Bay. These chemicals cause hormonal chaos in certain aquatic organisms at very low concentrations. Some male fish begin to form female traits which can result in adverse reproductive effects. 6) Chemists have detected high levels of zinc in in stormwater retention ponds near highways. The zinc comes from tire wear particles. 7) Environmental Engineers are developing a bioretention system that will promote the capture and biodegradation of pollutants in storm water runoff. These systems have been found to be very effective and can be employed in urban areas to help minimize environmental impacts of development.

Watch for the announcement of the Center's 2006 fall water research symposium. We are in the process of identifying a high impact topic for this year's symposium. As in the past, the symposium will address an important Maryland water issue. Again we look forward to co-sponsoring this symposium with the Maryland Sea Grant College. Last year's symposium on *The Effect of Urbanization on Maryland's Water Resources* was a great success! We look forward to seeing you in the fall!

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With a Chesapeake Bay focus, the Center supported the work of Dr. Eric Seagren to examine *Sustainable Oil and Grease Removal from Stormwater Runoff Hotspots using Bioretention*.

Symposia

The Maryland Water Resources Research Center has sponsored/cosponsored a major symposia in each of the past four years. The titles and a brief synopsis follow: [2002 Water Resources Research in Maryland: Highlights and Needs](#); [The University, Federal and State Agencies have substantial expertise in water science and policy. One of our greatest challenges is to coordinate research between these groups](#), [2003 Water Policy in Maryland-What Does The Future Hold?](#) Maryland is faced with a host of water quality and supply issues. Uncontrolled urban growth looms as a major problem. The State needs a comprehensive, long term water policy program to meet these future problems, [2004 Wastewater Treatment Plants and the Chesapeake Bay: Processes and Problems](#). The nutrients nitrogen and phosphorus pose the greatest threat to the health of the Chesapeake Bay. Wastewater treatment plants are a major source of these nutrients. [2005 Urbanization: Stresses on Maryland's Water Resources](#). As Maryland's population continues to grow, water supplies and natural water ecosystems are increasingly stressed. Novel ideas are needed to address increased demands on water use and impacts from land development due to urbanization. Attendees came from Academia, State and Federal Agencies, and the private sector.

Water Issues in Maryland

The Chesapeake Bay is the most valuable natural resource in the State, supporting an economy of billions of dollars. Numerous economic and environmental benefits are derived from the Bay and its tributaries. However, supporting a population of 15 million people in its watershed places significant stresses on the Bay ecosystems. Urban runoff, agricultural runoff, atmospheric deposition, and wastewater discharges continue to harm the Bay's water quality. The MWRRC continues to focus its limited resources to address these important issues.

Expertise

The University of Maryland, College Park, has a broad base of expertise in a large and diverse program on water science. A recent survey conducted by the Center identified about sixty University scientists in a dozen Departments, throughout six Colleges. These faculty teach and conduct research on wastewater management, nutrients, pesticide movement, water policy issues, remote sensing, wetlands, and modeling, to mention just a few areas of expertise.

Coordination

The Center has both external and internal advisory committees. The internal committees is composed from faculty from Civil and Environmental Engineering, Biology, and Biological Resources Engineering. The external committee is composed of high ranking officials in the Departments of the Environment, Natural Resources, and the U. S. Geological Survey.



Fear the Turtle



Road salts pose a major problem near streams. The National Research Council estimates that road salt in the U.S. ranges from 6 million to 12 million tons of NaCl annually. The recent heavy snowfalls in Maryland prompted the Center to fund several projects that will address the environmental impact of high chloride concentration on stream organisms.

Measuring the amount of atmospheric nitrogen entering the Bay has been difficult. Scientists have determined that atmospheric nitrate (aerosols) has a small ^{17}O excess ($\Delta^{17}\text{O}$) relative to nitrate from biological and agricultural sources. The nitrate concentrations and $\Delta^{17}\text{O}$ for rain events in the Bay ecosystem will be determined, along with concurrent analyses of $\delta^{18}\text{O}$ and $\delta^{15}\text{N}$ of nitrate. The measurement of isotopes of nitrogen and oxygen offers a unique way of measuring nitrate in air and determining source apportionment.

