Introduction

The Virginia Water Resources Research Center (VWRRC) was established at Virginia Tech in 1965 as a federally authorized program. In 1982, the Virginia General Assembly authorized the VWRRC as a state agency under the Code of Virginia (§23-135.7:8).

MISSION

The VWRRC provides research and educational opportunities to future water scientists; promotes research on practical solutions to water resources problems; and facilitates timely transfer of water resources information to policy- and decision-makers and the general public.

MISSION ELEMENTS

Research

- Assisting university researchers in securing research support funds from public and private sources.
- Assisting university researchers in initiating and executing water resources research.

Education

Advancing educational opportunities for students in water-resources fields by helping university researchers provide undergraduate and graduate research experiences in water resources.

Outreach

- Maintaining and making available via the VWRRC website a publication series that synthesizes and reports on water resources science, engineering, and policy.
- Securing academic advisors to work in an advisory capacity with public and private sectors as requested.
- Initiating and participating in the development and execution of conferences and symposia on Virginia, regional, and national water issues.

Program Administration

Administrative oversight is provided by the Dean of the College of Natural Resources and Environment. A Statewide Advisory Board appointed by the Governor advises the VWRRC director on state water research and information priorities. Because of its multiple legislative authorities and administrative responsibilities, the VWRRC has a number of reporting responsibilities. In addition to the annual reporting requirements to the USGS and the National Institutes for Water Resources (NIWR), it presents an annual report to the Virginia Tech administration and the College of Natural Resources and Environment. Five-year reports and reviews are presented to the U.S. Geological Survey (USGS) and the State Council on Higher Education for Virginia (SCHEV).

National Affiliations

The VWRRC is affiliated with NIWR and the Universities Council on Water Resources (UCOWR).
**Programs of the VWRRC**

**Introduction**

Programs are structured to meet strategic goals of the VWRRC and are consistent with the VWRRC mission as authorized by the U.S. Congress through the Water Resources Research Act of 1984 (Public Law 98-242), and the Code of Virginia (§23-135.7:8). Programs in research and education are available to students and faculty at all Virginia colleges and universities. Outreach and collaborative programs include information transfer to policy/decision makers and citizens, and collaborative partnerships with state agencies and other water-interest groups.

**A. Research Programs**

- The VWRRC's statewide competitive grants program provides research funds to find practical solutions to water problems in Virginia and the region. The grant period begins July 1 and ends June 30 of the following year. The review criteria include (a) technical merit of the proposed project, (b) relevance to Virginia and the region, (c) relevance to contemporary water issues, and (d) ability to provide research opportunities for graduate and undergraduate students. A priority listing of water research needs for this competitive grants program is updated annually in consultation with the VWRRC State Advisory Board. These grants are designed to initiate research efforts with a high potential for expanded funding from additional sources.

- The VWRRC applies for external grants and conducts in-house research.

- The VWRRC facilitates research team building and interdisciplinary, multi-institute collaborative research.

- The VWRRC facilitates research opportunities to other university faculty and external contractors through a partnership with federal agencies that provides targeted funding from the USGS.

**B. Educational Programs**

- The VWRRC provides research opportunities to undergraduate students and assistantships to graduate students who participate in sponsored research. Also, numerous graduate and undergraduate students are supported through the VWRRC's competitive grants program in Virginia Tech academic departments, and at Virginia's other colleges and universities.

- In 1999, the VWRRC established the William R. Walker Graduate Research Fellowship to honor the many contributions of Dr. William R. Walker, the VWRRC's first director. The annual monetary award is intended for individuals preparing for a professional career in water resources and is provided to a new graduate student each year. Details of the program can be found on the VWRRC website: [http://www.vwrrc.vt.edu/walker_fellowship.html](http://www.vwrrc.vt.edu/walker_fellowship.html)

- The VWRRC coordinates the interdisciplinary Watershed Management Undergraduate Minor and a Watershed Management Graduate Certificate Program in collaboration with five colleges and ten departments at Virginia Tech.

- The VWRRC supports and advises the Virginia Tech Chapter of the American Water Resources Association.

**C. Outreach and Collaborative Programs**

**Introduction**
• The VWRRC provides administrative support for the Virginia Water Monitoring Council.

• The VWRRC publishes research reports, symposia proceedings and citizen education booklets. It provides funding for the publication of outreach efforts.

• The VWRRC publishes a quarterly newsletter, *Virginia Water Central*. It features scientific and educational articles, legislative information, and water news of interest. The newsletter is available to the public at [http://www.vwrcc.vt.edu/watercentral.html](http://www.vwrcc.vt.edu/watercentral.html) and electronic copies are provided via email to more than 680 people.

• The VWRRC sponsors or co-sponsors symposia, workshops, and seminars addressing contemporary water resources issues.

• The VWRRC facilitates peer reviews for state programs when requested.

• The VWRRC website ([http://www.vwrcc.vt.edu/](http://www.vwrcc.vt.edu/)) serves as a repository of the Center’s publications, houses an academic expert database, provides updated news and information relevant to water resources, and manages website links for several collaborative partners, including the Virginia Water Monitoring Council, the Virginia Department of Conservation and Recreation Stormwater BMP Clearinghouse, and the Clinch Powell Clean Rivers Initiative.

• The VWRRC has Twitter and Facebook sites to facilitate information exchange related to water resources and related news at the VWRRC.
Research Program Introduction

Research Program

The research program of the VWRRC is supported through

- its annual appropriation from the Commonwealth of Virginia,
- external funding through grants and contracts, and
- a portion of overhead generated by external funding.

The USGS 104B Federal funds provided to the VWRRC are not allocated to support research, but are used to support the outreach and information dissemination programs of the VWRRC.

During FY2010, the VWRRC did not fund any new research projects through its state-supported competitive grant program because of decreases in the state budget allocation. For this USGS reporting period (March 2010 - February 2011), funding for four facilitated grants, including one USGS 104G grant, passed through USGS to the VWRRC and were managed by the VWRRC. Basic information regarding these four grants and resulting products are described in the following section.
Denitrifying bacterial community structure and diversity, and denitrification potential as affected by hydrologic design and soil properties in wetlands created in Chesapeake Piedmont, USA

Basic Information

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Publications

There are no publications.
Interim report on the progress of the project

May 12, 2011

Title of the project: Denitrifying Bacterial Community Structure and Diversity, and Denitrification Potential as Affected by Hydrologic Design and Soil Properties in Wetlands” (USGS Award # G10AP00139, Duration 09/01/1 – 08/31/11)

PI: Dr. Changwoo Ahn, Environmental Science and Policy, George Mason University

Co-PI: Dr. Mary Voytek, USGS.

The project has been supporting a Master’s student, Rita Peralta who has been working on the lab analyses of soil samples. Rita is majoring in Environmental Science and Policy.

Wetland soils have been collected for the months of October, December 2010 and April 2011. DEA assays were completed within a week of each sampling. For the April 2011 DEA measurements of nitrous oxide emissions, using the Shimadzu 8A electron capture detector gas chromatograph (ECD GC), were delayed due to possible contamination of the column and detector by other products emitted in the samples. Troubleshooting of the ECD GC required heating of the detector and column overnight and adjustment of the settings to processes samples at a higher temperature (320C).

DNA extractions have been completed through December 2010 samples. April 2011 soils will be processed beginning on May 11, 2011. Molecular analysis for October 2010 soils is complete. The qPCR procedure was completed for all samples through December 2010. Fingerprinting of the denitrifying bacterial communities using TRFLP was completed for October 2010 samples. Fingerprinting of Dec 2010 soils was delayed initially due to mechanical problems with the sequencer.

Soil moisture, pH, SOM and CHN analysis was completed for all soils through December 2010. Bulk density samples were collected and processed in November 2010. Soils collected on April 2011 have been air dried and will be processed for pH, SOM and CHN in the coming weeks.

The analyses have taken much longer time than we expected. Thus, we will be requesting a no-cost extension of the project soon.
The VWRRC supports timely dissemination of science-based information to policy and decision-making bodies and citizens. The VWRRC used its USGS 104B funds to support expert personnel with responsibilities related to the VWRRC's outreach and collaborative programs. In FY 2010, the USGS 104B funds supported:

- Preparation and electronic publication of the newsletter Virginia Water Central.

- Partial support for organizing the 2010 Virginia Stormwater Symposium.

- Partial administrative support for the Virginia Water Monitoring Council.

- Partial support for production and management of the VWRRC webpage, VWRRC Facebook, VWRRC Twitter, and Virginia Water Radio.
Information Dissemination

Basic Information

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Publications

1. THESIS AND DISSERTATIONS


2. JOURNAL ARTICLES


3. CONFERENCE PROCEEDINGS


Eisenbies, M.H. 2006. Silviculture and flooding. Class lecture provided to class on Forest Soils and Hydrology at Virginia Tech. Fall Semester, 2006

4. VWRRC SPECIAL REPORTS


5. VIRGINIA WATER CENTRAL


Virginia Water Central, June 2006 (No. 38), 34 pp.

6. VIRGINIA WATER CENTRAL

Virginia Water Central, December 2007 (No. 43)

Virginia Water Central, September 2007 (No. 42)

Virginia Water Central, May 2007 (No. 41)

7. CONFERENCE PROCEEDINGS


Publications 3
http://www.vwwrrc.vt.edu/special_reports.html#2009


http://www.vwwrrc.vt.edu/nsf_reu.html


26. Virginia Water Central

Virginia Water Central, April 2008 (No. 44), 36pp.

Virginia Water Central, June 2008 (No. 45), 42pp.
Information Dissemination

Virginia Water Central, September 2008 (No. 46), 34pp.


55. *Virginia Water Central*, November 2009 (No. 51), 48 pp. plus 15-page news supplement.


57. *Virginia Water Central*, May 2010 (No. 53), 48 pp. plus 17-page news supplement

58. *Virginia Water Central*, August 2010 (No. 54), 32 pp. plus 7-page news supplement

59. *Virginia Water Central*, February 2011 (No. 55), 35 pp


Outreach and Information Transfer Accomplishments

Newsletter

Email distribution to approximately 680 recipients and announcement/availability on VWRRC website.

Special Notifications via VWRRC Listserv

Notice about online water bills inventory from 2011 Virginia General Assembly (1/25/11)

Notifications via Virginia Water Monitoring Council (VWMC) Listserv

Weekly water-related announcements are provided to approximately 530 members of the VWMC. Announcements include information about conferences, workshops, total maximum daily load (TMDL), public meetings in Virginia, job openings, newly published reports, information posted on websites, and other pertinent information.

VWRRC Website (www.vtrrc.vt.edu)

The VWRRC website is updated at least weekly and supports a Water News Grouper page, which is updated several times each week. The VWRRC website also currently serves as the portal for three other websites the VWRRC manages:

1. Virginia Water Monitoring Council (http://www.vwrrc.vt.edu/vwmc/default.asp)
2. Virginia Department of Conservation and Recreation Stormwater BMP Clearinghouse (http://www.vwrrc.vt.edu/swc/)

VWRRC is on Twitter at http://twitter.com/VaWaterCenter and Facebook (http://www.facebook.com/pages/Blacksburg-VA/Virginia-Water-Resources-Research-Center/186479556264?v=wall)

Virginia Water Radio (www.virginiawaterradio.org)

The VWRRC produces and hosts a weekly 5-minute radio show featuring summaries of recent water news, upcoming water events, and water-related sounds or music.
2010 Virginia Stormwater Symposium

The 2010 Virginia Stormwater Symposium: Navigating Changes in Stormwater Technology and Policy was co-sponsored by the VWRRC and the Rice Center for Environmental Sciences at Virginia Commonwealth University (VCU) and held on the campus of VCU October 21. The theme of the symposium focused on understanding and managing stormwater. Invited experts from Virginia and beyond provided new insights into the technologies, policies, and economics of stormwater control. The symposium offered a poster session on basic and applied research related to stormwater. Symposium participants had opportunities to ask questions and contribute to group discussions. The symposium featured a one-day plenary session with seven invited speakers and a poster session with 28 volunteered posters, including 17 student posters. The symposium was attended by 188 participants.

International Outreach Activities

2. Co-organized international workshop on Hydrological Responses to Climate Change, August 29-September 1, 2010, Avimore, Scotland.
3. Invited to visit with faculty at Costa Rica Institute of Technology to discuss a water resources exchange program and water resources research needs, August, 2010.
USGS Summer Intern Program

None.
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Notable Awards and Achievements