

Water Pages

Winter 2005
Edition

A Quarterly Newsletter Produced by the Rutgers Cooperative Research & Extension Water Resources Program: Creating Solutions for Water Quality Issues in NJ

A Brief Overview of the RCRE Water Resources Program



NJ AGRICULTURAL EXPERIMENT STATION
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A little over two and half years ago I was invited to join Rutgers University to develop a Water Resources Program for Rutgers Cooperative Research and Extension. A program that provides solutions to help the stakeholders of New Jersey solve their water resources problems. A multi-disciplinary program that integrates teaching, research, and extension and develops strong partnerships. A program that has impact. I would like to give you a brief overview on our program.

I currently have four program associates working with me, three Bioresource Engineering graduate students, and several part-time undergraduate students. We are currently preparing three regional stormwater management plans to serve as models for the rest of the State, evaluating the effectiveness of stormwater best management practices, and working with municipalities to address new stormwater management regulations. We continue to include onsite wastewater treatment management programs as an additional measure for municipalities to further protect water quality and public health. Additionally, we are conducting research to identify the impact of agricultural operations on water quality and developing management practices to help farmers minimize these impacts. In support of all of these goals, I have been participating as the chair for the Total Maximum Daily Load (TMDL) Advisory Panel to NJDEP, providing scientific input to the NJDEP to aid in the development of TMDLs. I am also leading an effort to develop a water quality trading program for phosphorus in the Upper Passaic River Watershed.

Outreach activities of the Water Resources Program include working with the EcoComplex to establish a K-12 environmental education program. Additionally, we are providing training sessions for the Master Environmental Stewardship pilot program being offered through Rutgers Cooperative Research and Extension of Essex County and Gloucester County. We are also working with Rutgers Cooperative Research and Extension of Union County to teach an advanced course for the Master Gardeners called "Stormwater Management in Your Own Backyard." Furthermore, we are providing support to Rutgers Cooperative Research and Extension of Ocean County to help launch a Nonpoint Education of Municipal Officials (NEMO) program.

I continue to serve as the State Water Quality Coordinator in conjunction with the USDA CSREES Water Quality Project for USEPA Region 2. We have submitted a proposal to receive another three years of funding for this grant to expand our efforts in Watershed Management, Agricultural Water Management, Water Conservation, and Water Quality Trading. As an extension of our Agricultural Water Management responsibilities and furthering our goals for water quality protection, we are expecting to begin designing and implementing stormwater best management practices at the Cook College Equine Science Center (ESC). This work will help transform the ESC into a model farm where research and educational activities can be integrated to help the horse farmers, as well as the small animal farm operations in New Jersey, minimize their impact to the environment.

We are excited about having the opportunity to work with the various stakeholders of the State, and we hope that we can continue to serve you and help you address your water resources needs. We are constantly looking for new partners to team with so we can pool our resources, thereby resulting in a more significant impact for New Jersey. Join our team, and together we can make a difference in the quality of life for all of New Jersey's residents.

Thank you,

A handwritten signature in black ink, appearing to read "Chris Obropta".

Christopher C. Obropta, Ph.D., P.E.
Assistant Extension Specialist



Water Research and Restoration in Teaneck, Bergen County

The New Jersey Agricultural Experiment Station (NJAES) does more than study agricultural issues; NJAES conducts applied research to solve many of New Jersey's environmental problems. The Water Resources Program has joined a unique team that has been formed to study the wetlands at Teaneck Creek Park, Teaneck, Bergen County, NJ and to develop a plan for restoring these urban wetlands. The team consists of the Teaneck Creek Conservancy (TCC), Rutgers University, Bergen County, United States Geological Survey (USGS), and TRC Omni Environmental Corporation. Successful restoration projects require a multi-disciplinary team. In many cases, the best teams include representatives from academia, nonprofit groups, federal agencies, local government, and the private sector. Under the leadership of Mary Arnold, Executive Director of the TCC, the TCC has secured \$300,000 in funding from the New Jersey Wetlands Mitigation Council. Rutgers' share of this funding is being used to fund stipends for two graduate students each for two years with Cook College providing tuition remission as a match.

The Teaneck site is located at the intersection of Interstate Routes 80 and 95 within 10 miles of midtown Manhattan. The marsh was originally part of the Hackensack River estuary, but due to hydrological alteration after stream channelization and installation of a tide gate, the site is now an impaired upland freshwater wetland consisting of a combination of *Phragmites australis* and forested areas. The site is a receiving basin for urban stormwater runoff and is also a recipient of wet and dry atmospheric deposition of nitrogen due to the site adjacency to the New Jersey Turnpike. The TCC is securing funding to break through an existing berm, which will increase the flooding regime, as part of a project to restore 20 acres of freshwater wetlands.

The specific goal of Rutgers' effort is to maximize the denitrification potential following restoration. Water quality and air sampling is being conducted to determine the amount of nitrogen entering and leaving the pre-restoration urban wetland system and to determine the denitrification potential of the existing system. Additionally, an "urban model" will be developed to link the changes in hydrology to changes in denitrification potential. Ultimately, the monitoring will continue to collect post-restoration data that can be used to verify the model.

The Water Resources Program will continue to develop projects with strong partnerships to conduct the applied research needed to solve New Jersey's water resources problems. It is often said that New Jersey is where much of the country is headed in terms of urbanization. Therefore, any research that we conduct here can ultimately be used to help the rest of the country as they continue on their rapid pace of urbanization. For more information on this project, please contact Dr. Christopher Obropta at obropta@envsci.rutgers.edu.



USGS personnel Eric Vowinkel, Mike Deluca, and Jason Lewis inspecting piezometer installation and peristaltic pump along the Teaneck Creek. Photo provided by Dr. Peter Kallin.

Decentralized Wastewater Training Workshops

The Consortium of Institutes for Decentralized Wastewater Systems (Consortium) is a collaboration of more than 30 universities across the United States that provides decentralized wastewater system (septic) training. The two major focus areas of the Consortium include education and research. The Consortium is currently developing a curriculum for Decentralized Wastewater Treatment Systems Training that is aimed for use nationwide. As part of the regional focus on on-site wastewater treatment systems (OWTS), the Region 2 Regional Water Quality Project collaborated with the Consortium to pilot their curriculum with professional audiences in workshops hosted by the University of Puerto Rico (UPR) and Dr. Rafael Davila-Lopez, and the University of Virgin Islands (UVI) and Dale Morton in December of 2004. Deb Grantham from Cornell University participated, along with Katie Buckley of Rutgers University.

The objectives of the workshops were to:

- increase the capacity of the land-grant universities to deliver high-quality training on design, installation, maintenance, and management of OWTS, and
- provide opportunities for land-grant faculty to work with agency partners on identifying training needs in their respective jurisdictions.

LOG ON
The Water Resources Program stores presentations and project updates at the following website:
<http://water.rutgers.edu>

The Consortium of Institutes for Decentralized Wastewater Systems website is the following:
<http://www.onsiteconsortium.org>

Consortium representatives presenting at the workshops were the following:

- Dr. Kitt Farrell-Poe, University of Arizona,
- Dr. David Gustafson, University of Minnesota,
- Lorraine Joubert, University of Rhode Island,
- Dr. Bruce Lesikar, Texas A&M,
- Dr. George Loomis, University of Rhode Island.

Each workshop consisted of a full day of presentations and discussion on the following topics:

- Regulatory Update and Review;
- Soils of the Region;
- Conventional Septic System Overview;
- Wastewater Treatment in Soils;
- Alternative and Innovative Systems: Pumps and Controls;
- Alternative and Innovative Systems: Media Filters;
- Alternative and Innovative Systems: Extended Aeration;
- Alternative and Innovative Systems: Constructed Wetlands;
- Final Treatment and Dispersal;
- Introduction to Wastewater Management.

A total of 56 participants attended the workshops in Puerto Rico, including private industry OWTS installers and government regulators, including those involved in watershed management, solid waste, and the Department of Natural Resources.

More than 57 people participated in the Virgin Islands workshops, representing the Virgin Islands Division of Planning and Natural Resources, private sector engineers and architects, decentralized wastewater installers and pumpers, US Environmental Protection Agency personnel for the US Virgin Islands Territory, the Virgin Islands Housing Authority, and representatives from resorts and recreational facilities on the islands.

At the workshops held in Puerto Rico, many of the discussions centered on education and information dispersion. Also, many of the interests surrounded the opportunities to install alternative treatment units and the capacity of regulations to guide and support this issue.

In the Virgin Islands, participants were particularly interested in alternative technologies that would suit the limitations, needs, and economics of wastewater treatment for the islands. According to the USDA-NRCS, more than 95% of soils in the islands are severely limited for decentralized wastewater treatment by steep slopes, soil permeability, depth to water, and depth to bedrock. In a region where homes have already been constructed on slopes greater than 25%, wastewater treatment by OWTS is a critical issue. Many participants expressed interest in bottomless sand filters, constructed lagoons, and recirculating systems and the design standards for these alternative treatment units. Furthermore, many discussions related to management strategies and the potential for island communities

to inventory decentralized wastewater treatment systems were held.

Surveys were distributed to evaluate the participants' reactions to the presentations and applicability of material presented. Results were overwhelmingly positive, reflecting the participants' continued interest in the topics surrounding decentralized wastewater systems.

For more information on the Decentralized Training Workshop, please contact Katie Buckley at kbuckley@envsci.rutgers.edu. In addition, Fact Sheets have been prepared by the Water Resources Program that address OWTS maintenance, care, and permitting, among other topics; these are available for download at www.rcrc.rutgers.edu/pubs/.



From Left to Right: Rafael Davila-Lopez, Dave Gustafson, Yamil Toro, Katie Buckley, Lorraine Joubert, Stu Poe, Kitt Farrell-Poe, Bruce Lesikar, Deb Grantham, and George Loomis at the University of Puerto Rico Botanical Garden.

MARK YOUR CALENDARS

May 2-6, 2005, NJ Water Environment Association Annual Conference, Atlantic City, NJ. Dr. Christopher Obropta will present "How to Comply with NJDEP's Stormwater Regulations - A Practical View" on May 3.

May 4, 11, & 18, 2005, Cook College Continuing Professional Education Course, Onsite Wastewater Disposal Systems - What You Need to Know to Remain Competitive! More information on this revised course can be found at www.cookce.rutgers.edu.

May 5, 2005, Burlington County Stormwater Forum, Rutgers EcoComplex. Dr. Christopher Obropta will speak on Regional Stormwater Management Plans at this full-day event.

May 16 and 17, 2005, USEPA P3 Award Competition, a Student Design Competition for Sustainability, Washington, D.C. Students of the Bioresource Engineering Program will be in the competition. More details can be found at www.epa.gov/P3.

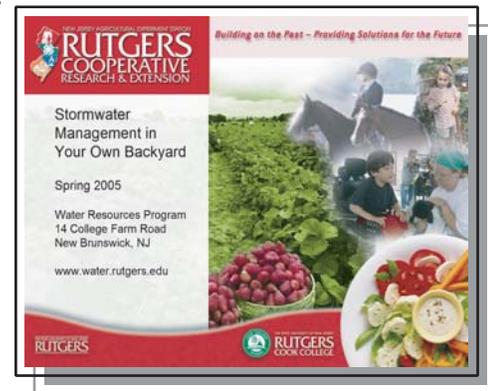
May 24 and 25, 2005, USDA-CSREES Region 2 Regional Water Quality Program Annual Conference, USEPA Region 2 Office, New York, NY. Contact Dr. Christopher Obropta for more information at (732) 932-4917.

Environmental Steward Training

The Water Resources Program is currently participating in the Environmental Stewards Training program being offered through Rutgers Cooperative Research and Extension of Essex County and Gloucester County. One of the courses that we are teaching is entitled **Stormwater Management in Your Backyard for Environmental Stewards**, which consists of two three hour classes. This course provides a detailed overview of stormwater management and New Jersey's efforts to require major development to implement new practices to minimize the impacts from stormwater runoff. The course introduces the factors that affect stormwater runoff, point and nonpoint source pollution, the impact of development (particularly impervious cover) on stormwater runoff, and the pollutants found in stormwater runoff. The course includes a thorough discussion of different types of best management practices (BMPs) that can be implemented to control stormwater runoff and how these BMPs can be used to achieve the quality, quantity and groundwater recharge requirements of New Jersey regulations. The BMPs discussed include bioretention systems (i.e., rain gardens), sand filters, stormwater wetlands, extended detention basins, infiltration basins, manufactured treatment devices, vegetated filters, and wet ponds. The course also discusses the various management practices that the homeowner can install including dry wells, rain gardens, rain barrels, and alternative landscaping. The protocol for designing these systems is presented so that homeowner can actually implement these management strategies. The course concludes with a brief discussion of BMP maintenance focusing on the homeowner BMPs.

Other courses we are offering include **New Jersey Water Regulations** where New Jersey's Stormwater Management Regulations and Stormwater Permitting Regulations are discussed in detail including what the regulations require and who do they regulate. The Federal Clean Water Act is also covered in this course with a detailed discussion on Total Maximum Daily Loads (TMDLs) and the Integrated List of Water Quality Impaired Waters. Our **Stream and Pond Restoration** course focuses on solving problems such as excessive nutrient enrichment of a pond, shoreline erosion and stream bank erosion, sedimentation of a pond, goose control issues and lack of riparian buffers. The **Water Monitoring and Stream Health: Physical, Chemical, and Biological Sampling and Data Interpretation** course is intended to empower students to take action by collecting stream data, interpreting these data and presenting these data to support needs.

For more information on the Environmental Stewards Program, please contact Bruce Barbour, Environmental Program Leader, at barbour@rcrc.rutgers.edu.



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