

Water Pages

Summer 2004
Edition

A Quarterly Newsletter Produced by the Rutgers Cooperative Extension Water Resources Program: Creating Solutions for Water Quality Issues in New Jersey

Water Resources Program Receives \$900,000 Targeted Watershed Grant

As part of its Targeted Watersheds Grant Program (formerly known as the Watershed Initiative Grant), the US Environmental Protection Agency (US EPA) granted \$15 million dollars in July, 2004 to 14 watershed areas across the nation to protect and improve 20,000 square miles of rivers, lakes, and streams. Started in 2003, the Targeted Watersheds Grant Program has been designed to encourage community-based approaches and management techniques to protect and restore the nation's waters.

One of these grants has been awarded to the Water Resources Program for \$900,000 to develop and begin implementing a phosphorous trading program in the Upper (non-tidal) Passaic River Watershed in central New Jersey. The non-tidal portion of the Passaic River Watershed covers 803 square miles and is home to approximately two million New Jersey residents and 23 drinking water reservoirs.

The project is headed by Dr. Christopher Obropta, Assistant Professor at the Department of Environmental Sciences, Cook College and the Water Resource Extension Specialist for Rutgers Cooperative Extension. Dr. Obropta will lead a coalition of experts from Rutgers University (i.e., Dr. Christopher Uchirin, Dr. Peter Strom, and Dr. William Goldfarb), Cornell University, the New Jersey Department of Environmental Protection (NJDEP) and the Passaic River Alliance, a nonprofit organization representing the wastewater treatment plants discharging into the



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upper portion of the Passaic River Basin. This coalition of experts will research and establish a trading system geared towards cost-effectively achieving water quality standards for phosphorus in the Upper (non-tidal) Passaic River Watershed.

The trading program will focus on point-to-point source as well as point-to-nonpoint source trading opportunities. More specifically, the three year project will:

1. Review literature and existing trading programs around the nation;
2. Evaluate trading scenarios, utilizing water quality models for the basin, to optimize water quality improvements;
3. Evaluate economic factors to optimize allocation of resources available to finance pollution controls;
4. Assess public policy and legal dimensions of trading, including



Photo L to R: Jeff Potent (USDA CSREES Regional Water Quality Program Coordinator and US EPA Region 2 / Cooperative Extension Liaison), Mayor Robert Detore (Township of Verona, NJ), Jane M. Kenny (EPA Regional Administrator), Commissioner Bradley M. Campbell (NJDEP), Essex County Executive Joseph DiVincenzo, Jr., Dr. Keith Cooper (Dean of Cook College), Dr. Chris Obropta (Extension Specialist, Water Resources and Assistant Professor, Department of Environmental Sciences), and Pat Matarazzo (Verona Wastewater Treatment Plant Superintendent); Photo Credits: Nina H. Spencer and Courtney Katz, EPA Region 2.

permitting and enforcement;

5. Develop a trading methodology tailored to the Passaic, and support local stakeholders in implementing a trading program;
6. Initiate a monitoring program to measure environmental and economic effectiveness; and
7. Report on results during initial project period and present plans for ongoing program implementation and evaluation.

The Passaic trading project grew out of discussions facilitated by the USDA Cooperative State Research, Education and Extension Service (CSREES), Regional Water Quality Program. Through its nutrient trading initiative, the Regional Program is engaging faculty and other stakeholders to identify watersheds where pilot trading projects may be feasible. Candidate watersheds are being identified based on water quality impairments and a mix of pollution sources with varying pollution control costs that could participate in nutrient reduction trades.

For more information on the Passaic project and the Targeted Watershed Grant Program please visit the Targeted Watershed Grant Program homepage at www.epa.gov/owow/watershed/initiative/index.html. For more information about this project, please contact Christopher Obropta, Ph.D., P.E. at obropta@envsci.rutgers.edu.

The Greening of New Jersey Lakes and Ponds

The summer months bring warm weather and a multitude of outdoor recreational activities to New Jersey's ponds and lakes. Swimmers, boaters, anglers, and outdoor enthusiasts welcome the summer months; however, those who manage ponds and lakes face issues with the onset of summer.

One of the biggest problems that pond and lake managers deal with is the greening of the water. What is the greening of a pond or lake? When a body of water "greens," the water actually turns green. The green hue is caused by an overabundance of algae. In some cases the algal growth is so dense it floats on the water surface as a mat.

When algal populations in a waterbody grow out of control it is called an algal bloom. Since algae are free floating and sometimes even free swimming, they are more difficult to target than rooted aquatic plants. Algal control therefore is usually a whole lake or pond effort. The most effective way to control algal blooms is through source control. Algal populations grow to nuisance proportions when there are excess nutrients (e.g., phosphorus and nitrogen) in the water. Excess nutrients typically enter a waterbody as runoff from nonpoint sources such as fertilized lawns, farms, and recreational fields.

Algal blooms are a tell tale sign of a nutrient enriched system. If the algae have nutrients and sunlight, then they will grow; therefore, the best way to manage the algae is to manage the nutrients. Since nutrients come from diffuse sources, it is sometimes difficult to identify an exact source. In residential areas, lawns are the greatest source of nutrients. Reducing fertilizer use on lawns is the most effective way to reduce nutrient inputs; however, it is more difficult to enforce. When excess fertilizer is carried to a waterbody in stormwater, it has the same effect as it does on a lawn and plant growth is increased. A management plan should establish guidelines for fertilizer use such as not applying fertilizers right before a rain event or on paved surfaces such as sidewalks and driveways. Landscaping that replaces lawn or turf areas with native plants to reduce the area of applied fertilizer should also be encouraged. Homeowners should be advised to

have their soil tested to determine if fertilizer is even needed. A buffer strip of tall grasses or other native plants should be planted between any fertilized lawn area and a waterbody. Leaves should be raked and removed because they also can contribute nutrients when they decompose. To prevent runoff from bringing nutrients into the pond or lake, boat landings and driveways should be left unpaved. Improperly maintained and poorly managed on-site wastewater treatment systems (i.e., septic systems) can also be a major contributor of nutrients to a waterbody. Sediments also contain nutrients; however, algae typically do not have access to these nutrients unless the bottom of the pond or lake is disturbed. Boat traffic can disturb these sediments; therefore, outboard motor restrictions can be useful in controlling nutrient inputs.



Photo Credits: Katie Buckley

If source control is not successful, there are other options available to control algae. Dyes are available that block sunlight and reduce growth in the same way that aquatic plants can be managed. Chemicals, such as buffered alum, can be applied to bind phosphorus in nontoxic precipitates so it is no longer available to the algae. Limestone and lime have also proven to be effective.

Aeration promotes artificial circulation that brings oxygen-poor water up to the surface. Surface agitators such as paddlewheel devices, bubblers, and fountain sprayers can be used to create substantial turbulence that dissolves oxygen from the air into the water. Fountains promote mixing if the water is drawn from the oxygen-poor layer of water at the bottom of the pond. Aeration and mixing are important because they do the following:

- Provide oxygen for aerobic bacteria to decompose organic matter;
- Trigger processes that control blue-green algae;
- Provide well-oxygenated water throughout the pond so that the pond is less likely to experience a fish-kill;
- Liberate dissolved gases, such as ammonia, carbon dioxide, hydrogen sulfide, and methane, into the air instead of allowing them to build to harmful levels in the pond.



Photo Credits: Katie Buckley

Barley bales have been on the forefront of algal control technology. As the barley straw decays when submerged in water, it releases a chemical that inhibits algal growth. The bales should be placed in the pond in early spring, kept close to the surface, and secured to allow removal prior to winter. As a rule of thumb 100 to 300 pounds of straw should be used per surface acre. Barley bales can be acquired from most plant suppliers.

The plants in biofilters can also be used to extract phosphorus from the water. Biofilters include wetlands, shallow detention ponds, and water gardens. Native plant nurseries can be of assistance in selecting appropriate plant species.

Algae can also be physically removed from the water body. Coagulation, a process that induces the algae to clump together, and filtration through microscreens and sand filters have been tried, but the technologies have not yet been fully developed.

For more information, please contact Eileen Althouse at eileena@eden.rutgers.edu.

Many Mind Creek Restoration Project

Many Mind Creek is a stream that flows from the Lenape Woods Nature Preserve through the Borough of Atlantic Highlands and eventually drains into Sandy Hook Bay. How did Many Mind Creek get its name? One story explains that early European settlers discovered that the headwaters of the stream started in the eastern hills, then went south for about ¾ of a mile, then turned west/north-northwest for about ½ mile, and then finally headed north for about ½ mile before draining into the bay. Since the stream appeared to change its "mind" about where to go so often, the settlers named it Many Mind Creek. The Atlantic Highlands Environmental Commission has been a strong defender of the integrity of Many Mind Creek, and kept it a priority as an important natural resource in Atlantic Highlands, New Jersey.

Although the headwaters of Many Mind Creek are located in a forested area, the stream takes a course through an area thick with residences and businesses. Over the years, the stream has been subject to channelization, contamination from coal-tar and its byproducts, siltation, runoff, and erosion. Many Mind Creek is also the recipient of the majority of the Borough of Atlantic Highland's stormwater. Within the past several years, efforts by the Atlantic Highlands Environmental Commission have encouraged the protection and enhancement of Many Mind Creek by educating the local community about stormwater, stream habitat and the importance of high water quality, as well as by developing the plan for Many Mind Creek Greenway and Bayshore Trail, which seeks to connect the Henry Hudson Trail in Leonardo and will extend to the Atlantic Highlands Harbor.

To improve the aesthetics of the stream corridor and promote habitat and water quality, the Atlantic Highlands Environmental Commission received additional funding from NOAA and Restore

America's Estuaries through the NY/NJ Baykeeper to design restoration plans along Many Mind Creek. The latest phase of this project is a Regional Stormwater Management Plan that will incorporate a model of the hydrology of the drainage area. The Water Resources Program has been working with other partners to provide a representation of the drainage basin to be used in determining appropriate restoration plans. Evaluation of the restoration plans and a clear understanding of the hydrology of the drainage area and hydraulics of Many Mind Creek will lead to a successful restoration project.

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With the cooperation of the academic and private sector, along with citizen support, Many Mind Creek, has the potential to be restored to a system containing diverse native vegetation and a creek channel that supports a healthy wildlife community. Many Mind Creek can continue to be a natural treasure long into the future.

For more information about Many Mind Creek, visit the official site of Atlantic Highlands, NJ at <http://www.ahnj.com/ManyMindCreek.htm>. For more information about the work being done by the Water Resources Program on the project, please contact Sandra Goodrow at sgoodrow@envsci.rutgers.edu.

RECENT PRESENTATIONS

June 23, 2004, Ocean County Municipal Roundtable: Dr. Obropta presented "Municipal Stormwater Management Planning".

June 28, 2004, Monmouth Coastal Watersheds Partnership Congress Meeting: Dr. Obropta presented "Regional Stormwater Management Planning and Lessons Learned".

June 29, 2004, Equine Informational Seminar, Rutgers Cooperative Extension of Salem County: Dr. Obropta presented "Identifying & Managing Non-point Source Pollution on Farms", and Lisa Galloway Evrard presented "Macroinvertebrates & Water Quality".

July 13, 20, and 29, 2004, NJDEP Stormwater Permits Courses: Dr. Obropta presented "Municipal Stormwater Management Planning", a presentation outlining the steps necessary to complete a municipal stormwater management plan as a part of this Continuing Professional Education series.

MARK YOUR CALENDARS

Sep. 17, 2004, Whippany River Action Committee's Annual Environmental Stewardship Award Ceremony at Veteran's Memorial Park, Parsippany-Troy Hills, NJ. Dr. Obropta will discuss findings of the Troy Brook Regional Stormwater Management Plan.

Sep. 23, 2004, NJ Onsite Wastewater Recycling Association (NOWRA) Organization Conference: Smart Wastewater - Smart Growth, NJ EcoComplex, Bordentown, NJ.

Oct. 15, 2004, ANJEC's Annual Environmental Congress, Mercer County College Conference Center, West Windsor, NJ.

Regional Water Quality Coordination Project Annual Meeting

Over 50 faculty members and professionals from the government and non-profit sectors met at Cornell University in May for two days dedicated to exploring Region 2 water quality issues. The USDA Cooperative State Research Extension and Education Service (CSREES), Regional Water Quality Program (RWQP), provides a forum for faculty from the region's Land Grant institutions and other universities to share information on current research with other professionals and develop collaborative projects aimed at solving water quality issues affecting Region 2. The USDA CSREES Regional Water Quality Program in Region 2 covers the geographic area of New Jersey, New York, Puerto Rico and the US Virgin Islands.

At the meeting, working sessions were conducted on three regional initiatives: Animal Waste Management for Small Farms, Nutrient Trading, and Onsite Wastewater Treatment System Management. The group discussed current research, work to date on the three initiatives, and opportunities for further collaboration. A scoping session on watershed planning and assessment was also convened to gather information and perspectives from the participants on effective watershed protection and opportunities for collaboration within our region. The State Water Quality Coordinators representing three of our partner institutions chaired the regional initiative sessions, and a trained facilitator from Cornell Cooperative Extension facilitated the watershed discussion.

In kicking off the event, Jeffrey Potent, the Regional Water Quality Program Coordinator, noted that "the regional program provides an important link between science and policy. We promote the sharing of

information and collaborate on projects that draw on current research and are grounded in addressing priority public policy issues." Working as a region allows us to share the expertise of our partner institutions, build on their substantial networks, and work on the same scale as our US Environmental Protection Agency, Region 2 (US EPA) colleagues. Capabilities at our universities are often complementary, and solutions found in one jurisdiction may have application in another, across the region, or nationally.

Presentations from the annual meeting, as well as descriptions of the regional initiatives and general information about the Regional Water Quality Program can be found at <http://rwqp.rutgers.edu>. For more information about the Regional Water Quality Program, please contact Fran Varacalli at fvaracalli@envsci.rutgers.edu.

LOG ON

New updates and recent presentations can be viewed and downloaded at the CSREES Regional Water Quality Coordination Program page for EPA Region 2.
<http://rwqp.rutgers.edu/>

Summary of the New Jersey Highlands Water Protection and Planning Act, a website created by the Rutgers University Cooperative Extension Natural Resources & Environment Program
<http://www.rce.rutgers.edu/highlands/>

US EPA Targeted Watersheds Grant Program and other grant recipient information
<http://www.epa.gov/owow/watershed/initiative/>



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