Applying knowledge to improve water quality
New England
Regional Water Program
A Partnership of USDA CSREES
& Land Grant Colleges and Universities

BUILDING ON EXPERTISE:

A Collaborative Spirit Empowers Water Programs in New England

CONNECTICUT ● MAINE ● MASSACHUSETTS ● NEW HAMPSHIRE ● RHODE ISLAND ● VERMONT

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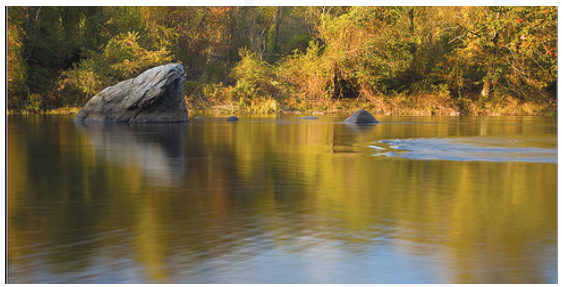
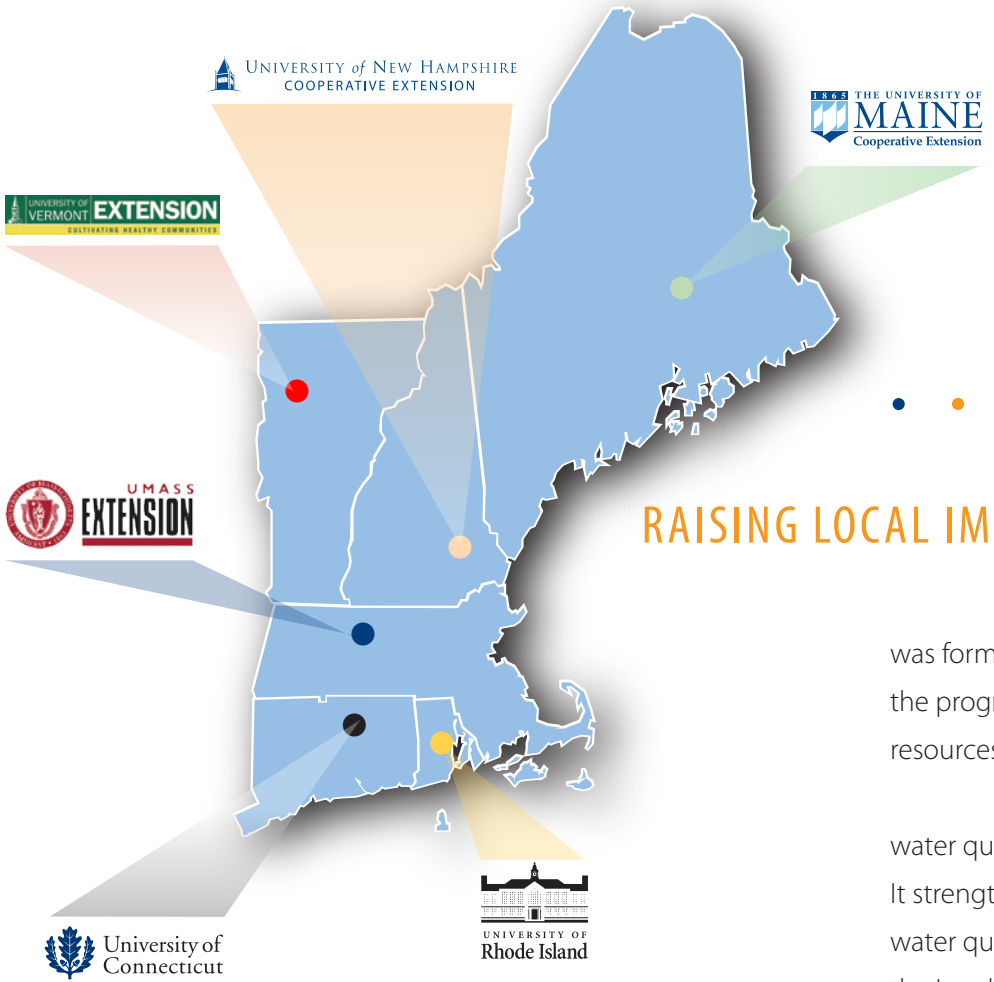


A PROUD NATURAL HERITAGE

A resplendent countryside reflects New England's proud natural heritage—a patchwork of farms, historic villages and greenways. In a compressed area, however, this rural landscape competes with urban sprawl and burgeoning development. Precious natural resources are being stretched to their limits, and water is no exception. Both water quality and quantity are at risk.

From maintaining shellfishing waters in Maine to well water quality in Rhode Island, the safety of New England's water resources ranks high on the priority list of local governments, residents, community groups and university researchers and Extension in each state. Historically, each of New England's states—Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island - had, for the most part, worked to solve water quality problems independently within their own boundaries. Expertise in water resources existed but no state had the capacity to fully address the spectrum of water issues facing its constituents.



The New England Water Quality Program strengthens the capacity of New England's six Land Grant Universities to deliver an integrated water quality program built within a national framework developed from the partnership of the Land Grant System and the National Integrated Water Quality Program (NIWQP) of USDA Cooperative State Research, Education and Extension Service (CSREES).

RAISING LOCAL IMPACTS TO THE REGIONAL SCALE

In response to this critical need, the New England Regional Water Program was formed in 2000. Encouraged and funded by the U.S. Department of Agriculture (USDA), the program offered Land Grant Universities a newfound opportunity to pool research and resources, share lessons learned and work collaboratively while streamlining their efforts.

Since its inception, the New England Program has improved and protected water quality in the region using an integrated approach of research, education and Extension. It strengthens the capacity of New England's six Land Grant Universities to deliver an integrated water quality program built within a national framework developed from the partnership of the Land Grant System and the National Integrated Water Quality Program (NIWQP) of USDA Cooperative State Research, Education and Extension Service (CSREES).

Program objectives strive to educate, empower and engage agricultural producers, residents and communities throughout New England to become effective stewards of their local water resources.

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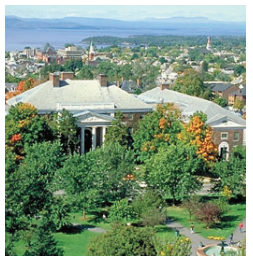


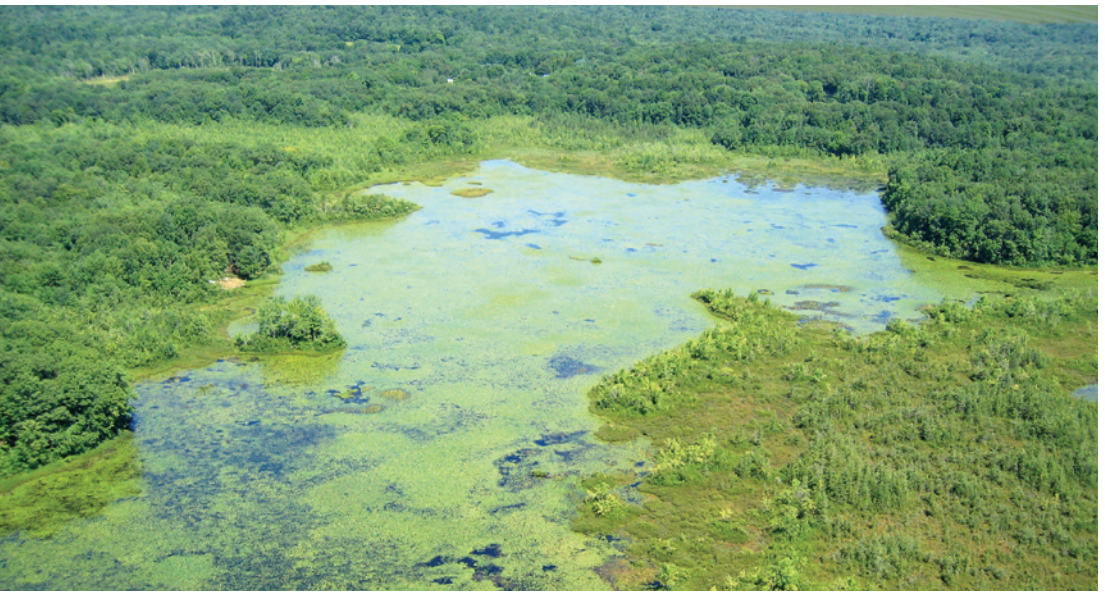
The New England Regional Water Program is unique because its efforts transcend state boundaries and focus on assisting local landowners and decision makers

to solve their local water resource problems. From citizen-based lake monitoring to road-stream crossing standards or improved nutrient management on farms, communities and individuals are searching for answers to local water quality problems. Moreover, these communities and individuals are willing and eager to formulate their own solutions. Working with the New England Regional Water Program makes this possible.

The program helps residents, farmers, nonprofit groups and community leaders solve problems by assessing their needs, introducing them to new strategies and partners and recommending pilot programs and research. In effect, the program offers its audiences a menu of possibilities that previously may have been out of their grasp or scope of expertise and, on a regional level, coordinates opportunities for these states to build on their strengths.

The tangible products of this endeavor happen locally—on the ground. Conservation methods and programs are piloted locally, refined and then tailored for delivery in other states. As a result of the program's novel approach, states and local communities have tapped into a larger pool of resources and expertise and have developed connections and partnerships with other states wrestling with the same water quality issues.

The New England Program harnesses the best available science and provides tools to help train audiences ranging from university students to Master Gardeners, farmers and decision makers. And, always, it has behind it the guidance of academic scientists, federal agencies such as the USDA Natural Resource Conservation Service (NRCS) and the U.S. Environmental Protection Agency (EPA), the benefits of regional management and the grassroots involvement of local community groups and residents. The Program disseminates knowledge, refines practices and changes behaviors, thereby enhancing and protecting water quality.



FOCUS AREAS: THE HEART OF THE PROGRAM

Focus areas stand at the heart of the New England Regional Water Program. These topical focus areas, based on themes of the NIWQP, are tailored to the water resource protection needs of New England and the strengths of the Region's Land Grant Universities' research, education and Extension programs. Activities in each focus area are a result of local and regional needs assessments and use of program planning and evaluation tools, including the logic model, a program planning and evaluation tool. Focus areas work with a "nested" logic model approach that allows us to create accountability and interconnectedness between the New England Regional Water Program, focus area activities, and specific projects that are either local or regional in nature. Focus area activities build on a proven track record of accomplishments and enhance the research and Extension efforts targeted to audiences and challenges at multiple landscape scales, including the watershed, community, farm/field and individual house lot.

New England Focus Area	National Theme
New England Private Well Initiative	Drinking Water and Human Health
New England NEMO	Watershed Management
Volunteer Water Quality Monitoring	Watershed Management
Sustainable Landscaping	Pollution Assessment and Prevention
Agricultural Nutrient and Pest Management	Nutrient and Pesticide Management and Animal Waste Management
Animal Waste Management	Nutrient and Pesticide Management and Animal Waste Management
River and Stream Restoration	Environmental Restoration
Green Valley Institute	Watershed Management
New England Onsite Wastewater Training Center	Pollution Assessment and Prevention

RESEARCH DRIVES EXTENSION AND EDUCATION

Research is a driving force behind all of the New England Regional Water Program's efforts. From the use of computerized methods that pinpoint lands posing risks to water quality to demonstration sites that test and exhibit the latest innovations in turf grass science, every accomplishment is supported by scientific evidence. The New England Regional Water Program builds on the research strengths of the six Land Grant Universities' water quality programs. Faculty at these institutions have regional and national expertise in natural resources, agriculture, water quality and soil science. And the Program's national ties make use of state-of-the-art technology, and expertise, readily available from other Land Grant Universities, federal agencies such as the U.S. EPA, USDA NRCS, U.S. Fish and Wildlife Service and the U.S. Geological Survey.

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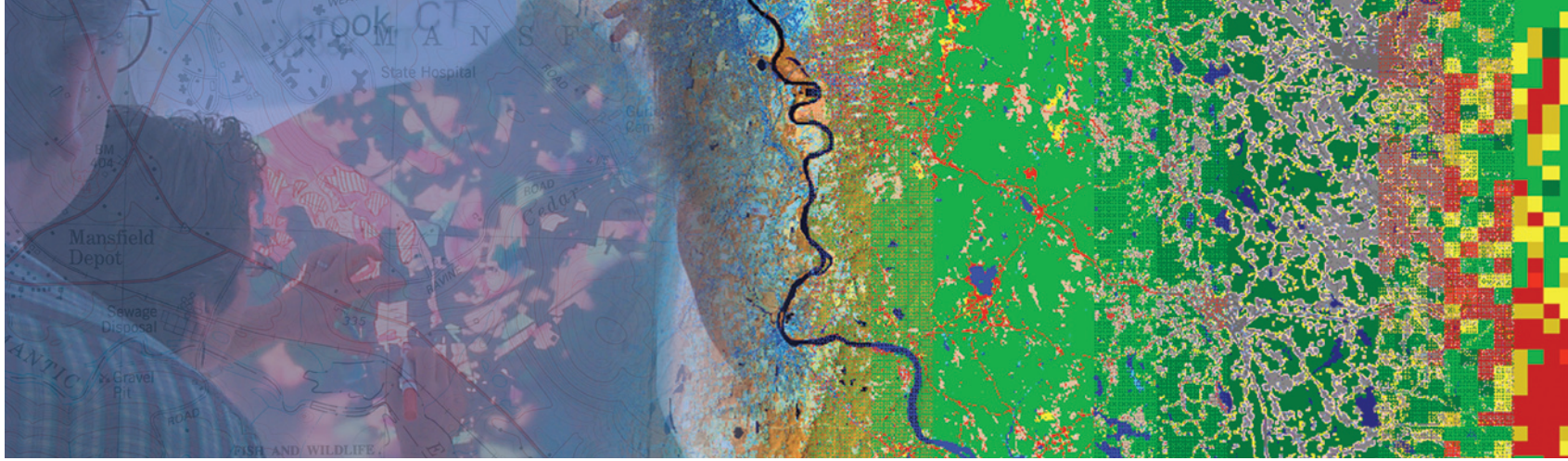


Innovative research and Extension programs made possible by the New England Regional Water Program strengthen the curricula for the next generation of practitioners. Faculty members now incorporate case study examples, assessment tools and training materials into labs and classroom lectures. At the University of New Hampshire, for example, students are trained in Geographical Information Systems (GIS) Watershed Analysis and Comprehensive Lake Inventories. The University of Maine's sustainable agriculture curriculum introduces students to research on non-chemical pest controls and risks to water quality and students attend sustainable agriculture field days. Undergraduate and graduate students take an active role in research and Extension via "for-credit" and paid internships. As interns, students work with focus areas on both state-based case studies and regional projects. The New England Program also has made possible the funding of student and faculty publications as well as support for collaborative projects presented at conferences.

Through partnerships and with funding from other agencies and organizations, each focus area builds on the resources from USDA CSREES. By pooling time, talent and funding across state borders, the inputs of each university and CSREES are cultivated and multiplied.

For example, the New England Program has provided new opportunities to use funding for research-based education initiatives in water resource protection in the agricultural community. The University of Massachusetts conducted a dozen seminars on best management practices for horses, including proper treatment of manure, pasture and feed management and received $150,000 from the U.S. EPA to develop an equine education program, which will serve as a model for the region.

Regional focus area coordination allows individual state programs to build capacity and compete for local resources. Another success made possible by sharing resources is a new project at the University of Connecticut. The coastal community of East Lyme, Connecticut invited the university to address water conservation through sustainable landscaping. The university's turf research program received $50,000 from the Connecticut Department of Environmental Protection for

A LEVERAGED INVESTMENT

The New England Regional Water Program's scope invites collaboration, whether several states cooperate on one project—or one state addresses the needs of individuals in multiple states.

education and training of professional lawncare and municipal employees throughout the southeastern coastal area of the state. Participating groups learned how to reduce nitrogen losses to waterways and how to promote water conservation. This project adapted materials from the University of Rhode Island's Healthy Landscapes Program, a CSREES NIWQP funded Extension Education project.

The New England Regional Water Program's scope invites collaboration, whether several states cooperate on one project—or one state addresses the needs of individuals in multiple states. For instance, research on rain gardens under way at the University of Connecticut proved invaluable to Extension programs in Maine and Rhode Island. And at the University of New Hampshire's Stormwater Center, participants from Connecticut, Vermont, Maine, and Rhode Island received training in low-impact stormwater management techniques.

NATIONAL CITIZENSHIP

The New England Regional Water Program promotes state and local programs that strengthen the National capacity of the Land Grant University and CSREES partnership. Members of the New England Program assume active roles as members of the National Committee for Shared Leadership and the National Regional Liaison Committee. The work of these committees fosters a dynamic relationship among federal, regional and local partners.

Two national facilitation grants funded by the CSREES' NIWQP are housed in New England - Volunteer Water Quality Monitoring and the National NEMO Network. Both serve as guides to the nation and have engaged colleagues within the New England Regional Water Program to pilot and develop new techniques and materials.

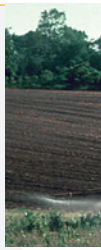
National Facilitation Grants, funded by the CSREES' NIWQP, have been instrumental in building the capacity of existing Extension programs. Two such grants that have enhanced national efforts in volunteer water quality monitoring and the National NEMO Network are based in New England.

Volunteer Water Quality Monitoring: This collaborative project between a team of scientists and Extension professionals at the Universities of Rhode Island and Wisconsin emerged from the expertise found in robust volunteer water quality monitoring programs throughout New England and Wisconsin. This National Facilitation project works closely with state and regional CSREES Water Programs to develop and maintain volunteer water quality monitoring programs that address local priorities. By interacting and communicating at national, regional and local scales the project increases visibility, understanding and credibility of volunteer water quality monitoring and its data. The project developed training materials that incorporate research results, strengthening the Extension volunteer monitoring knowledgebase.

With this support, Extension leaders have educated and motivated citizens for water quality protection. They heighten awareness of local water quality issues and motivate citizens to adopt best management practices for water quality protection. Volunteer monitoring programs throughout the country have trained 8,500 trained individuals in monitoring techniques and watershed science, creating "citizen scientists" in 29 states, several territories and internationally. New England's Volunteer Water Quality Monitoring focus area is linked to these National Facilitation efforts and benefits from the expertise, efforts, and resources created as a result of this project.

National NEMO Network: The National Network Hub, based at the University of Connecticut aids communication and networking between 32 NEMO programs in 31 states. National NEMO also coordinates with and incorporates the work of the New England NEMO focus area.

Modeled after the original program at the University of Connecticut, the programs within the Network place great emphasis on research-based education relating the impact of land use on natural resources—particularly water – for the target audience of local land use decision makers. NEMO messages emphasize natural resource-based local land use planning, and the programs use GIS, remote sensing, and other geospatial technologies to support and enhance the education. NEMO programs seek to motivate real changes to land use policies and practices. These Programs are seeing such changes nationwide in myriad ways ranging from the development of research gathering methods to the adoption of town ordinances that protect water resources.



New England Regional Water Program staff members created and routinely update the National Website (usawaterquality.org) that incorporates lessons learned and success stories of CSREES NIWQP-funded projects and highlights activities of National Themes from Programs and projects across the country. With easy-to-follow templates and identifiable logos provided by the New England Program, each region and facilitation project is able to develop a website linked from the National Website thereby projecting a unified image of regions working in concert with the National Water Program.

NINE FOCUS AREAS

1. New England Private Well Initiative
2. New England NEMO
3. Volunteer Water Quality Monitoring
4. Sustainable Landscaping
5. Agricultural Nutrient and Pest Management
6. Animal Waste Management
7. River and Stream Restoration
8. Green Valley Institute
9. New England Onsite Wastewater Training Center

CHANGING THE WAY WE PROTECT WATER RESOURCES

The New England Regional Water Program embodies a collaborative spirit that has set a standard of efficiency, eliminated redundancy and used funding and expertise with fiscal savvy and scientific planning. On the following pages you will find a brief description of each of the nine targeted focus areas highlighting accomplishments and tangible changes in water resource protection.

ONE New England Private Well Initiative

*For the 25 percent of New Englanders who rely on private wells for their drinking water, the quality of water in their own backyards is paramount. The New England Private Well Initiative, a product of multiple states and agencies and coordinated regionally, educates private well owners about potential man-made and naturally occurring contaminant risks to their wells and offers advice to protect against these risks. This focus area channels the Land Grant Universities' expertise housed in Home*A*Syst, Watershed Stewards and Master Gardener programs to private well owners. Team members work with residents, volunteers and professionals - including realtors and well contractors - to increase the ability of New Englanders to make informed decisions about the quality of water in their own backyards.*

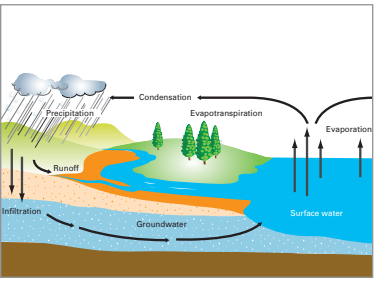
PARTNERSHIPS

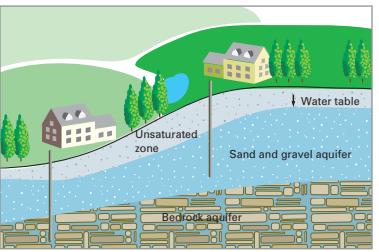
A DIVERSE ARRAY OF PARTNERS SHARE THE BELIEF THAT INFORMED RESIDENTS CAN MAKE EFFECTIVE DECISIONS TO PROTECT THE WATER IN THEIR OWN WELLS. EXPERTS FROM ORGANIZATIONS RANGING FROM THE U.S. EPA NEW ENGLAND TO DARTMOUTH COLLEGE'S TOXIC METALS RESEARCH PROGRAM AND THE WATER SYSTEMS COUNCIL POOL THEIR KNOWLEDGE AND RESOURCES TO BRING THE LATEST IN SCIENCE TO CONCERNED CITIZENS AND PROFESSIONALS.

Initially the U.S. EPA - New England provided a grant of $40,000 to the Initiative to begin coordination and the development and adaptation of educational materials. Additional funding has been leveraged for the support of the New England Private Well Water Symposium. More than $35,000.00 has been contributed to the 2005 and 2007 Symposium from U.S. EPA New England, the Water Systems Council, Dartmouth's Toxic Metals Research Program, Water Resources Research Centers, New England's Deans and Extension Directors, and the USDA Healthy Homes Program. In addition, New England's Land Grant Universities received over $200,000 to develop and sustain a private well protection program that includes the development of educational materials and training programs for private well owners.

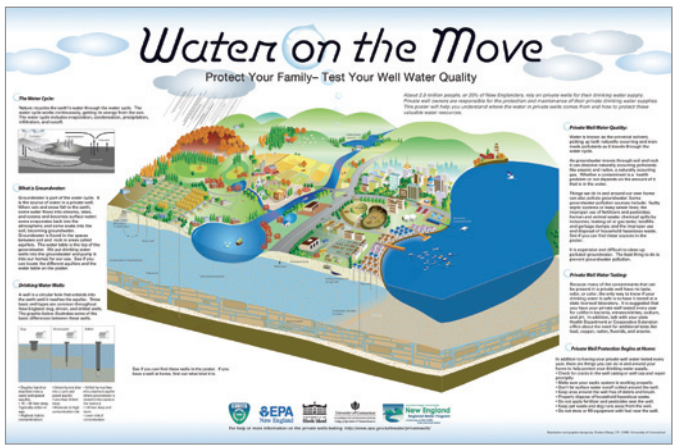
SELECTED ACCOMPLISHMENTS

WORKING WITH THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION AND U.S. EPA NEW ENGLAND, eight of the original private well protection factsheets developed at the University of Rhode Island have been adapted for Massachusetts and placed online for broad distribution. An additional 15 factsheets are currently being developed.





IN PARTNERSHIP WITH U.S. EPA NEW ENGLAND, THE WATER SYSTEMS COUNCIL, NEW ENGLAND'S STATE DRINKING WATER AGENCIES, DARTMOUTH COLLEGE AND OTHERS, the 2005 New England Private Well Water Symposium was held in Portsmouth, New Hampshire, and provided a forum for professionals to share current research, approaches and materials. Almost 100 individuals attended from a cross-section of federal, state, university, nonprofit and private sector groups. Ninety-five percent of 36 post-event survey respondents reported a significant increase in knowledge in at least one of the symposium topic areas. This event is planned again for December 2007 in Newport, Rhode Island.

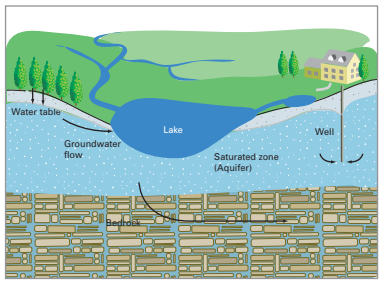


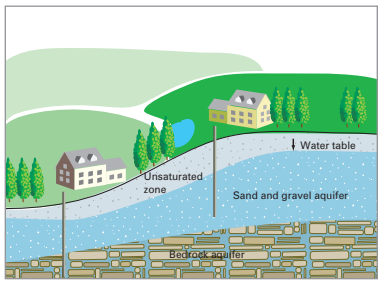
WITH FUNDING MADE POSSIBLE BY THE U.S. EPA NEW ENGLAND, not only homeowners, but volunteers like Master Gardeners, and professionals including realtors, are now well-versed in private well protection practices. Realtors, for example, can refer to the resource guide *What Every Realtor Should Know About Private Drinking Water Wells*, developed for the New England Region.

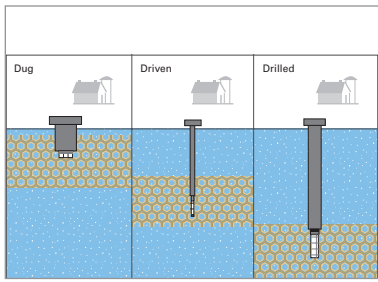
ADOPTED PRACTICES

NINETY-ONE PERCENT OF SURVEY RESPONDENTS FROM THE 2005 NEW ENGLAND PRIVATE WELL WATER SYMPOSIUM AGREED THAT IT HELPED THEM EFFECTIVELY EXCHANGE IDEAS ABOUT PRIVATE WELL WATER ISSUES. Eighty-four percent of these participants planned to contact at least one expert at the event within the year; and 97 percent wanted to see the symposium become a regular event.

THOUSANDS OF INDIVIDUALS HAVE HAD THEIR WELL WATER TESTED. Evaluations from the University of Rhode Island Home*A*Syst Program indicate that 55 percent of workshop attendees now test their water, and 63 percent share well program information with others. And in Massachusetts, more than 800 brochures provided by the University of Massachusetts were distributed by Massachusetts Boards of Health to private well owners. More than 20 percent of those who received Initiative brochures from the Massachusetts Boards of Health had their well water tested.







TWO Nonpoint Education for Municipal Officials (NEMO)

Local officials in New England make critical land use decisions. New England NEMO programs use a combination of geospatial technologies, educational programs, demonstrations and hands-on training to give local decision makers and citizens the most up-to-date research-based information. With this information, they can manage their watersheds as they work to improve and protect water quality.

New England NEMO works closely with the National NEMO Network, housed at the University of Connecticut. This close collaboration allows for successful pilot programs to be disseminated both within New England and throughout the Nation.

PARTNERSHIPS

NEMO INVOLVES A HOST OF FEDERAL, STATE AND LOCAL PARTNERS IN ALL OF ITS PROJECTS. REGIONAL SUPPORT IS MULTIPLIED BECAUSE NEMO PROGRAMS ALSO RECEIVE FUNDING FROM U.S. EPA'S NONPOINT SECTION 319 AND SOURCE WATER PROTECTION PROGRAMS, AS WELL AS THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S (NOAA'S) COASTAL NONPOINT 6217 AND SEA GRANT PROGRAMS.

For example, each year Connecticut NEMO receives $150,000 from various partners, including the Connecticut Department of Environmental Protection and the Connecticut Sea Grant Program. With these funds, Connecticut NEMO is helping communities address stormwater management problems. These innovative approaches are transferred to other New England NEMO programs.

SELECTED ACCOMPLISHMENTS

THE UNIVERSITY OF NEW HAMPSHIRE NEMO-BASED PROGRAM, NATURAL RESOURCES OUTREACH COALITION, developed an evaluation process for the National NEMO Network based on the logic model. This approach focuses on capturing the impact that NEMO programs across the country have at the local level and provided guidance in the development of the NEMO's web-based reporting form.

THE UNIVERSITY OF RHODE ISLAND NEMO CO-LED A REGIONAL CONFERENCE WITH U.S. EPA NEW ENGLAND highlighting the Rhode Island communities that have effectively implemented comprehensive onsite wastewater management programs to protect public health and sensitive water resources. The conference was attended by 60 local decision makers and state managers from southern New England.

COORDINATING WITH THE VOLUNTEER WATER QUALITY MONITORING FOCUS AREA, the University of Vermont NEMO held "Reducing and Preventing Beach Closures on Lakes and Rivers in Northern New England: Strategies for Detection, Correction and Financing" for decision makers in Maine, Vermont, and New Hampshire.

THE U.S. EPA AND NOAA, ALONG WITH REPRESENTATIVES FROM Maine, New Hampshire, Vermont, New York, Rhode Island and Connecticut, toured the University of New Hampshire's Stormwater Center Demonstration Site and learned how various changes could fit into their specific natural resource planning needs to benefit water quality protection.

THE UNIVERSITY OF RHODE ISLAND NEMO AND GEOSPATIAL TECHNOLOGY PROGRAMS adapted a Connecticut NEMO resource to a research-based web tool on remote sensing land cover change in Rhode Island.

ADOPTED PRACTICES

THE PUBLICATION OF AN EDUCATIONAL BROCHURE ON OPEN SPACE INSPIRED THE FIRST CONSERVATION WORKSHOP in the Town of Candia, New Hampshire. As a result the town raised $200,000 for conservation purposes. All of this was made possible with coaching and support from NEMO's sister organization in New Hampshire—the Natural Resources Outreach Coalition.

WOODSTOCK, CONNECTICUT, WITH ITS NEW DATABASE AND MAPPING SKILLS, posted a list of locator maps of its natural resources on a website. This information will aide the town's open space and conservation plan.

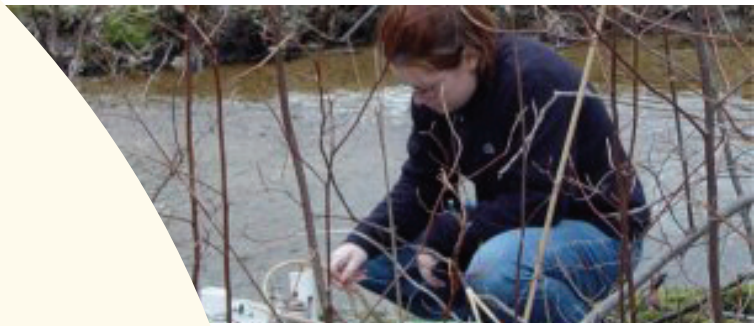
CHARLESTOWN, NEW SHOREHAM AND SOUTH KINGSTOWN, RHODE ISLAND UPDATED THEIR WASTEWATER MANAGEMENT ORDINANCES and strengthened provisions for mandatory septic inspection and repair. Here, NEMO worked in partnership with the New England Onsite Wastewater Training Center.

NONPOINT EDUCATION FOR MUNICIPAL OFFICIALS (NEMO)

THREE Volunteer Water Quality Monitoring

Volunteer water quality monitoring programs within the New England Regional Water Program often serve as the critical first link that engages the public in watershed stewardship. Volunteer monitoring programs improve understanding of local water resources, encourage individual and community involvement in water quality protection and restoration efforts, and help communities make informed decisions that improve water quality.

These long-lived New England programs monitor a host of water resources – lakes, rivers, streams, estuaries, wetlands, and private drinking water wells. They have a unique capacity to educate and motivate citizens for water quality and watershed protection. These programs also develop and assess monitoring methods and research how to use volunteer data to model or make informed decisions.



PARTNERSHIPS

THE VOLUNTEER WATER QUALITY MONITORING FOCUS AREA ENSURES THAT PARTNERS FROM FEDERAL, STATE AND LOCAL AGENCIES—AT PUBLIC AND PRIVATE LEVELS—WORK AS ONE UNIT TO CAPITALIZE ON THE ENORMOUS NUMBER OF VOLUNTEER HOURS AND SERVICES THAT SUPPORT PROGRAM EFFORTS.

For example, about $89,000 generated by New Hampshire's Lakes Lay Monitoring Program was matched by federal and state grants for the University of New Hampshire Water Resources Research Center, New Hampshire municipalities and New Hampshire Department of Environmental Services. And the more than 13,000 volunteer hours, valued in excess of $245,000 has ensured the longevity of the University of Rhode Island Watershed Watch Program by providing not only grant match, but reassurance to local and state officials of the value and interest in volunteer monitoring.

Programs obtain additional funding from University Sea Grant programs, Water Resources Research Center, watershed associations, Trout Unlimited, and Native American communities and guidance from national partners, including U. S. EPA and the U.S. Geological Survey.

SELECTED ACCOMPLISHMENTS

CONCERNS FROM U.S. EPA AND STATE AGENCIES ABOUT THE QUALITY ASSURANCE AND QUALITY CONTROL of volunteer monitoring data led to the Massachusetts Water Watch Partnership, housed at the University of Massachusetts, to develop and publish the *Massachusetts Volunteer Coastal Monitoring - General Quality Assurance Project Plan (QAPP)*, a generic QAPP offered online that contains baseline requirements providing a useful foundation for QAPP development by programs in Massachusetts and throughout the region.

EFFORTS TO SHARE SUCCESSES, STRATEGIES, AND LESSONS LEARNED with a diverse group of monitoring practitioners representing community-based, state, tribal, national, and international monitoring programs led to the presentation of "Getting Started in Volunteer Monitoring", an U.S. EPA Watershed Academy webcast.

IN 2005, "THE NEW ENGLAND MONITORING SUMMIT—SHARED WATERS" jointly convened by the focus area, the New England Interstate Water Pollution Control Commission, and U.S. EPA New England to reach a consensus on information and resources needed to further promote volunteer monitoring in New England. This initiative brought together not only volunteer monitoring program coordinators from throughout the region, but also a broad cross section of data users, including municipal officials, state and federal agency staff, as well as non-profit organizations. Priorities identified by participants have informed subsequent focus area work plans.

THE MAINE SHORE STEWARDS CONTRIBUTED IMPORTANT DATA AND INFORMATION to Maine's decision makers to help solve pollution problems, restore clam flats and encourage the ethic of caring for Maine coastal communities. Simply by providing data for areas where none had previously been available, volunteer monitors enabled the State to open 100,000 acres of clam flats.

THE LAKE EDUCATION AND ACTION PROJECT, LEAP, FUNDED BY CSREES' NIWQP has allowed The University of Maine Cooperative Extension to adapt programs from New Hampshire and Vermont. For example, they have adapted a watershed erosion survey method to use training materials from the University of New Hampshire's "following the flow" survey. In addition, Maine has adopted the University of Vermont's Watershed Alliance methods to partner with area schools.

ADOPTED PRACTICES

SEVERAL NEW HAMPSHIRE COMMUNITIES PRESENTED IDEAS FOR WATER RESOURCE PROTECTION to their local decision makers as a result of the information applied from the work of more than 500 volunteers in the New Hampshire Lakes Lay Monitoring Program monitoring more than 300 lakes and 370 tributaries.

THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT RELIES ON THE UNIVERSITY OF RHODE ISLAND WATERSHED WATCH PROGRAM as its sole source of data for the State's 305(b) report as well as data for seven lakes in its research-based study, "Urban Lakes Total Maximum Daily Load."

THE MAINE HEALTHY COASTAL BEACHES PROGRAM, a partnership between the University of Maine Cooperative Extension/Sea Grant, several state agencies, local municipalities and the beach-going public brings together fifteen coastal beach communities (representing 31 beaches), where municipalities, state parks and community groups are monitoring beach-water quality. They use standardized methods to take water samples at coastal swim beaches to monitor for bacteria, an indicator of recreational water-borne illnesses. They notify the public if health risks are detected and educate both residents and visitors on what can be done to avoid water-related illness at the beach.

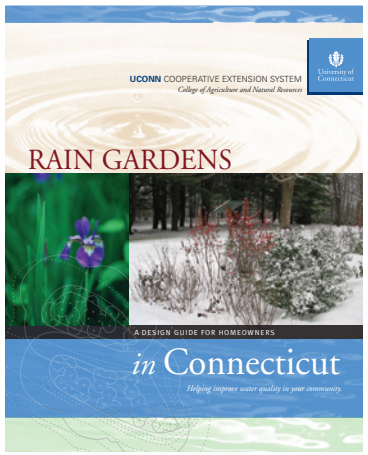
FOUR Sustainable Landscaping

New England's villages are dotted with green lawns and gardens. As the region's population grows, so does the demand for water, fertilizers, and pesticides for these lawns and gardens. Landscaping techniques promoted by Extension programs in New England address these needs with an overall "sustainable landscaping" approach designed to minimize the amount of water, nutrients and pesticides used in an effort to promote water resource protection.

Sustainable landscaping techniques require a strong research base. For example, the University of Connecticut conducts research on rain gardens, low-input lawns and optimal amounts and timing of fertilizer and encourages residents to adopt these techniques.

PARTNERSHIPS

RESEARCHERS, FEDERAL AGENCIES, VOLUNTEER GROUPS AND STATE AND LOCAL OFFICIALS WORK TOGETHER TO DEVELOP PROGRAMS THAT HIGHLIGHT ON-THE-GROUND EFFORTS. For example, research on rain gardens and residential turf management conducted at the University of Connecticut has been extended and incorporated into programs throughout New England via the Sustainable Landscapes and New England NEMO focus areas. Connecticut's rain garden research and education work was highlighted in a 2007 Sunday New York Time's article.



SELECTED ACCOMPLISHMENTS

FOCUS AREA MEMBERS PARTNERED WITH THE NORTHEAST IPM CENTER AND MID-ATLANTIC REGIONAL WATER PROGRAM to organize and present at the first Green-Blue Summit on residential pest management, nutrients, and water quality. People from across the Northeast attended the Summit.

THE UNIVERSITY OF CONNECTICUT HAS TRAINED MORE THAN 230 Master Gardeners in water quality and home landscaping. These volunteer ambassadors disperse this information to other community groups as part of their outreach efforts. And, the University of Rhode Island continues to support and mentor its Master Gardener Speakers Bureau which presented seven Healthy Landscapes workshops for more than 240 people in the state.

LED BY THE UNIVERSITY OF NEW HAMPSHIRE, THE FOCUS AREA WAS AWARDED A THREE YEAR $480,000 Integrated Research, Extension, Education grant by CSREES NIWQP to apply environmental and behavioral research results to Extension efforts to reduce the application of excess nutrients by homeowners (do-it-yourselfers) in targeted, urbanizing neighborhoods throughout New England with the ultimate goal of protecting surface and ground water quality.

THE UNIVERSITIES OF RHODE ISLAND AND CONNECTICUT PILOTED A TRAINING COURSE FOR RHODE ISLAND COASTAL REGULATORS CONCERNED WITH DEVELOPING SUSTAINABLE COASTAL BUFFERS. To follow up, the University of Rhode Island conducted two pilot training courses for more than 100 landscape professionals as part of a coastal landscape certification program.

healthy landscapes

By maintaining their landscape for clean water, people can make a difference in protecting and improving water quality. University of Rhode Island Extension and several partners developed **Healthy Landscapes**, an integrated project funded by CSREES NIWQP, brings together the state's leading voices in water quality education, community residents and state-of-the-art research to learn how to care for their landscape while also improving and preserving water quality. Working with the New England Program, Healthy Landscapes created a water quality education program tailored to a quasi-suburban/rural town in Rhode Island. With a simple message, "clean water starts at home," the program used science-based strategies to fill a research and education void to landowners in the community. Master Gardeners, university researchers, town officials, Extension staff, and landscape professionals collaborated to ensure that the public was educated and empowered to use newly learned skills and make a difference in their own backyards. Eighty percent of the individuals who participated in Healthy Landscapes indicated a willingness to change their yard care practices to better protect water quality. And more than half have adopted at least one sustainable landscaping technique.

SUSTAINABLE LANDSCAPING

FOUR Sustainable Landscaping

ADOPTED PRACTICES

SEVERAL LAKESIDE COMMUNITIES IN VERMONT HAVE DEVELOPED BEST MANAGEMENT PRACTICES FOR SMART LANDSCAPING for all new construction and two Vermont municipalities are applying sustainable landscaping awareness strategies for business property owners.

UNIVERSITY OF MAINE'S BUFFER BRIGADE INSTALLED ELEVEN BUFFERS, including one large-scale demonstration project. Landowners reported spending an average of $225 and 20 volunteer hours each on these projects.

UNIVERSITIES OF RHODE ISLAND AND CONNECTICUT ARE WORKING TOGETHER TO DEVELOP A TURF MANAGEMENT PROTOCOL FOR USE IN ENVIRONMENTALLY SENSITIVE AREAS. The Rhode Island Coastal Resources Management Council will adopt these protocols into regulations requiring their use in coastal areas.

Lakeside landowners become better caretakers of their natural resources

Lake Education and Action Project, LEAP, is a highly successful CSREES' NIWQP partnership coordinated by Extension programs at the Universities of Maine, New Hampshire, Vermont, and Lake Champlain Sea Grant. LEAP serves the special water quality needs facing lakeside property owners throughout the region. Conservation-minded lakeside landowners in Maine sought help from the University of Maine Cooperative Extension to develop outreach programs to educate other residents about water quality protection. Post-workshop surveys found that Maine lakeside landowners, who took advantage of the Watershed Stewards Program, were becoming better caretakers of their natural resources. In a survey of these watershed stewards versus lakeside landowners who had not participated in the program, the stewards knew significantly more about the lake as an ecosystem and its potential threats. These stewards also spent more time working to protect water resources. In addition, Stewards voiced a need for additional tools that would help them educate their neighbors in similar practices.

To meet this need, University of Maine Cooperative Extension and University of New Hampshire Cooperative Extension/Sea Grant joined forces to offer two outreach workshops for Watershed Stewards. Each participant left the workshop with a framework for educating the public in lake water quality issues. Ninety-six percent (25 of 26 participants) indicated that they would recommend this training to similar landowners. Two-thirds of the group planned to submit a proposal to University of Maine Cooperative Extension to obtain funding for their outreach plans. These newly empowered Watershed Stewards were now able to turn U.S. EPA and Maine Community Foundation funding into meaningful on-the-ground projects for lakeside landowners. These individuals have installed rain gardens, printed educational materials, met with town officials and have promoted the Maine Department of Environmental Protection's "LakeSmart" Program to other lakefront landowners in their area. As a result, Stewards are better able to communicate lake-related issues to their peers.

The positive response to this unique partnership spurred University of Maine Cooperative Extension to offer this workshop to all of its Watershed Stewards.

FIVE

Agricultural Nutrient and Pest Management

New England farms lie within compact, rural watersheds that contribute to drinking water supplies and an abundance of fresh and coastal water resources. Close proximity to high population densities, a high cost of living and limited land base have prompted New England farmers to intensify crop production, as well as diversify and adopt alternative crops, markets, and practices. Increases in organic agriculture have created new opportunities for eliminating pesticide use, as well as challenges for nutrient management. Focus area activities provide research and education on sustainable cropping systems and nutrient and pest management tools and technology that reduce pollution risks to ground and surface waters.

PARTNERSHIPS

PARTNERS INCLUDE USDA NRCS, USDA SUSTAINABLE AGRICULTURE RESEARCH AND EXTENSION (SARE), USDA AGRICULTURAL RESEARCH SERVICE (ARS), U.S. EPA, AGRICULTURE AND AGRI-FOOD CANADA, STATE AGENCIES, AGRICULTURAL SERVICE PROVIDERS AND FARMERS. Joint grants to multiple Land Grant Universities to support on-farm trials have been particularly helpful in improving water quality from organic dairy farms in the Region.

For example, on-farms trials in Maine and Vermont complemented trials at the Universities of Maine, New Hampshire and Vermont, and USDA ARS Maine. These trials yielded research results, educated growers and evaluated practices. In keeping with the needs of organic farmers, research was geared to eliminate pesticides, reduce risks of nutrient loss and improve soil health. Funding for these efforts has totaled over $975,000 from 2004 through 2009 and was received from the University of Maine, USDA Northeast SARE and USDA CSREES Integrated Organic Program.

SELECTED ACCOMPLISHMENTS

TO ENCOURAGE THE ADOPTION OF AGRICULTURAL BEST MANAGEMENT PRACTICES THAT PROTECT WATER QUALITY, the University of Maine Cooperative Extension conducts an annual Regional Inservice Training for Agricultural Service Providers and Certified Crop Advisors. At the 11th annual training in 2007, some 56 professionals attended from New England, New York and Canada. In addition, the University of Maine led a summer field training program for service providers while hosting the USDA Northeast SARE Professional Development Program summer tour in 2006. About 20 certified crop advisors from New England and 60 Northeast SARE representatives attended.

RESEARCH-BASED TRAINING AND EDUCATION TO NEW ENGLAND EXTENSION FACULTY AND STAFF, FARMERS AND PARTNERS included workshops on organic dairy forage and grains cropping systems throughout northern New England and presentations at regional and national conferences.

THE UNIVERSITY OF VERMONT (ALONG WITH OREGON AND ILLINOIS) IS SPEARHEADING THE DEVELOPMENT OF AN eORGANIC COMMUNITY of Practice for Extension through a more than $600,000 grant.

THE UNIVERSITIES OF MAINE AND MASSACHUSETTS DEVELOPED THE 2007 NEW ENGLAND GUIDE TO WEED CONTROL IN FIELD CORN, which incorporates research on non-chemical weed controls. In addition, the University of Maine produced the Potato Pest Management Guide which outlines both chemical and non-chemical control methods.

ADOPTED PRACTICES

IN 2006, A PILOT COURSE DEVELOPED AT THE UNIVERSITY OF VERMONT DEMONSTRATED THAT ENCOURAGING AND ENABLING FARMERS TO CREATE THEIR OWN NUTRIENT MANAGEMENT PLANS that meet the NRCS 590 standard has lead to increased plan implementation. Thirty farms have taken the five-week course and 28 farms have developed plans on 14,342 acres. As a result, 50 percent of the farmers expect to apply less nitrogen and phosphorus and 67 percent expect to save money. This curriculum, which fosters research-based education and cost-effectiveness, is available to all states involved in the New England Program. At least one other state (Rhode Island) plans to pilot a similar program in 2008.

PARTICIPANTS IN THE UNIVERSITY OF MAINE'S IN-SERVICE TRAINING PROGRAM assisted 328 farmers to implement ten pest management practices on 53,000 acres. Thirty-three percent of the farmers saved $6 to $50 per acre implementing these practices for a total savings of $300,000 to $2.6 million.

AGRICULTURAL NUTRIENT AND PEST MANAGEMENT

SIX Animal Waste Management

Economies of scale are forcing the livestock industry in New England to increase animal numbers and intensify the application of manure to agricultural lands, which also poses a threat to surface and ground water quality throughout New England. The New England Program's Animal Waste Management focus area and its collective partners are assisting farmers with research-based manure and feed management programs, tools, and technology that minimize impacts to ground and surface waters due to nutrients and pathogens.

PARTNERSHIPS

PARTNERS IN THIS FOCUS AREA INCLUDE NRCS, USDA SARE, STATE AGENCIES, THE NORTHEAST PASTURE CONSORTIUM, AGRICULTURAL SERVICE PROVIDERS AND FARMERS. FUNDING IS MADE POSSIBLE THROUGH U.S. EPA FUNDS, CSREES NIWQP, CSREES NATIONAL RESEARCH INITIATIVE AND OTHER ORGANIZATIONS.

For example, the University of Massachusetts received a joint Northeast SARE grant for more than $200,000 with the University of Vermont and USDA ARS Pennsylvania to conduct research on pasture forage varieties and blends. The research also will include on-farm trials in Massachusetts, Connecticut, New Hampshire and Rhode Island.

SELECTED ACCOMPLISHMENTS

PLANNING OF THE UNIVERSITY OF MASSACHUSETTS PASTURE RESEARCH AND LEARNING CENTER for New England and eastern New York spawned the formation of the Southern New England Grazing Network and a group website. Regional pasture walks are coordinated by Extension faculty, NRCS and other organizations. The Center received grants from USDA SARE, University of Massachusetts Extension and the Massachusetts Agricultural Innovations Center totaling more than $550,000 to support research and education activities.

WITH A CSREES NIWQP GRANT, the University of Rhode Island is developing a small- acreage livestock pollution prevention education program with 4-H volunteers.

RESEARCH-BASED TRAINING AND EDUCATION TO NEW ENGLAND EXTENSION FACULTY AND STAFF, FARMERS AND PARTNERS highlights regional work on practices and tools for nutrient management, including the use of cover crops for nutrient recovery in field corn production, the fecal phosphorus indicator test, and the refinement of the phosphorus index for local conditions in Massachusetts and Vermont.

THE UNIVERSITY OF RHODE ISLAND RECEIVED A CONSERVATION INNOVATION GRANT for $75,000 from Rhode Island NRCS to adapt and examine low-impact development bioretention filters for treating small-acreage livestock runoff. The university is collaborating with the University of Connecticut's NEMO program.

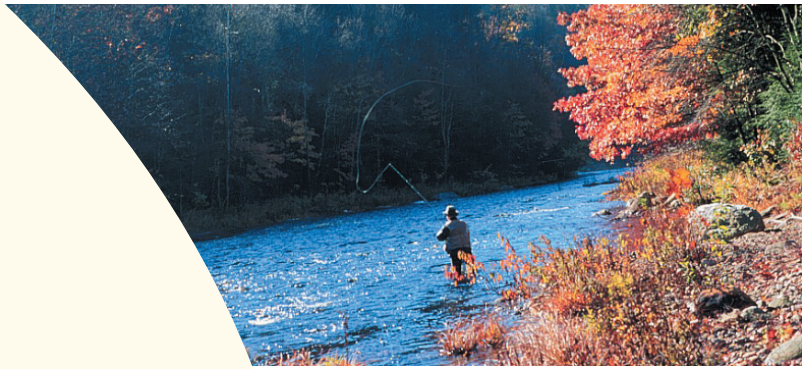
ADOPTED PRACTICES

THE UNIVERSITY OF MAINE'S IN-SERVICE TRAINING PROGRAM FOR AGRICULTURAL SERVICE PROVIDERS AND CERTIFIED CROP ADVISORS made an impact on the behavior of 93 percent of participants, who said they used knowledge gained from the training in their work. About 85 percent and 78 percent of these participants shared the knowledge with farmers and other professionals, respectively. About 67 percent incorporated their lessons learned into agricultural programs or policy. More than 200 farmers use nine manure management practices on more than 34,000 acres, and more than 400 farmers use 11 nutrient management practices on almost 70,000 acres. Sixty-three percent of the participants assisted farmers to reduce the overall amount of nitrogen applied and 78 percent assisted farmers to reduce the overall amount of phosphorus applied.

ANIMAL WASTE MANAGEMENT

SEVEN River and Stream Restoration

River and stream restoration establishes the general structure, function, and dynamic self-sustaining behavior of disturbed rivers and streams thereby reversing many negative human-induced impacts. Much of the focus area's efforts are led by the Northeast In-stream Habitat Program (NEIHP) at the University of Massachusetts. This program has a strong commitment to research and development, sustained outreach, training and technical assistance, and development of expanded graduate and undergraduate education. The program aims to improve the sustainable management of running waters in the Northeast by developing a research base and management tools incorporating quantitative computer simulation techniques.



PARTNERSHIPS

THIS FOCUS AREA THRIVES BECAUSE OF THE PARTNERSHIP BETWEEN THE UNIVERSITY OF MASSACHUSETTS, THE U.S. GEOLOGICAL SURVEY, U.S. FISH AND WILDLIFE SERVICE AND U.S. EPA NEW ENGLAND. MORE THAN $300,000 OF OUTSIDE FUNDING IS LEVERAGED FOR RESEARCH AND OUTREACH.

SELECTED ACCOMPLISHMENTS

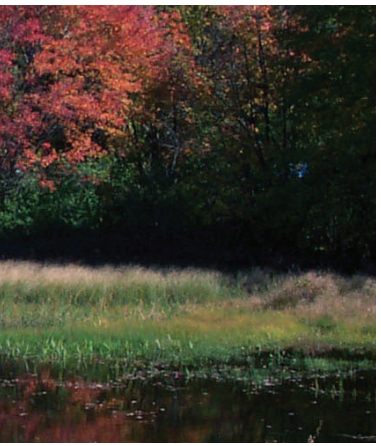
IN CONNECTICUT, NEW HAMPSHIRE AND MASSACHUSETTS, the departments of environmental protection have been better able to develop statewide minimum stream flow as a result of technical assistance from this focus area.

AN IMPROVED ONLINE DATABASE now encourages easier input of volunteer road-stream crossing surveys in Connecticut, Rhode Island, Vermont and New Hampshire.

ABOUT 1,250 PARTICIPANTS, including Massachusetts Conservation Commissioners, U.S. Army Corps of Engineers and state environmental protection departments attended 19 workshops on river and stream continuity and road crossing design.

ADOPTED PRACTICES

INFORMATION COMMUNICATED ABOUT ROAD CROSSING DESIGN AND STANDARDS as they affect river and stream continuity has driven the decisions of officials responsible for state and federal policy. In fact, elements of the River and Stream Crossing Standards are now used by the U.S. Army Corps of Engineers in the Programmatic General Permits for Massachusetts, Maine, Connecticut and Rhode Island. These standards will serve as models for the development of state standards in Connecticut and New Hampshire.



RIVER AND STREAM RESTORATION

EIGHT Green Valley Institute

The Green Valley Institute, working in partnership with the Quinebaug-Shetucket National Heritage Corridor, conducts research and education to enable local residents and municipal officials to preserve the Corridor's rural areas in eastern Connecticut and south-central Massachusetts that are under development pressure. The Green Valley Institute is operated under the leadership of the Universities of Connecticut and Massachusetts and the Nature Conservancy. Because private farm and forest owners control 80 percent of the land and municipal officials regulate most of the land use, these audiences benefit from information, tools and techniques in their efforts to safeguard the Corridor's open space.

PARTNERSHIPS

THE GREEN VALLEY INSTITUTE RELIES ON THE JOINT EFFORTS OF UNIVERSITY PROFESSIONALS, NONPROFIT ORGANIZATIONS, planning commissions, the Connecticut Department of Environmental Protection and NRCS. Since 2000, the Green Valley Institute has received over $1 million from the U.S. Department of Interior's Quinebaug-Shetucket National Heritage Corridor to support land and water resource protection and good land use planning in this region.

The Green Valley Institute is a cooperative venture of the Quinebaug-Shetucket National Heritage Corridor, the UConn College of Agriculture and Natural Resources, UMass Extension and numerous other partners. It is dedicated to:

- Improving the knowledge base from which land use and natural resource decisions are made, and
- Building local capacity to protect and manage natural resources as our region grows.

SELECTED ACCOMPLISHMENTS

GREEN VALLEY INSTITUTE VOLUNTEERS FROM LAND TRUSTS AND OTHER CONSERVATION ORGANIZATIONS attended a two-day global positioning systems (GPS) course to create stewardship maps to help maintain conservation efforts.

"PROTECTING FAMILY FARM" WORKSHOPS attracted 42 landowners in 15 towns, where farmsteads were in jeopardy of development.

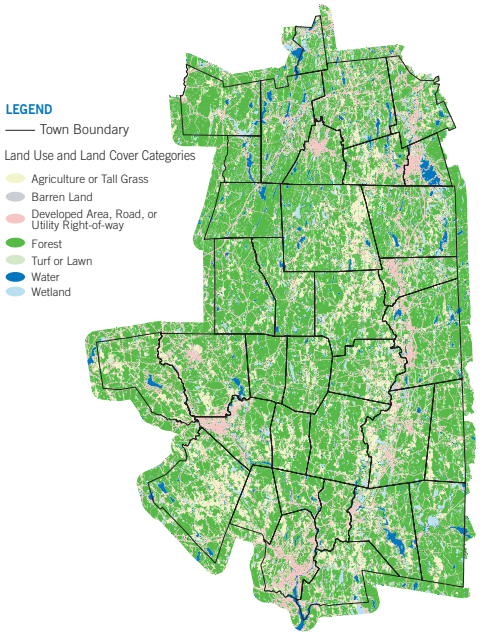
FIFTY-ONE GREEN VALLEY INSTITUTE SHORT COURSES, WORKSHOPS, RETREATS AND TRAINING SESSIONS were taught to 1,223 community leaders, landowners and other targeted audiences.

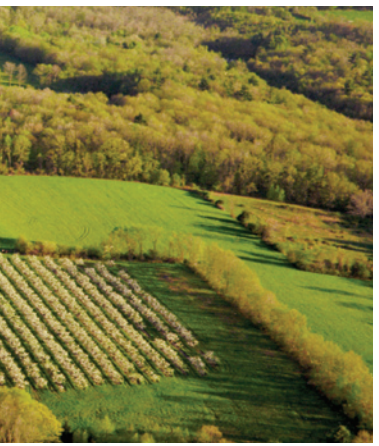
THE GENERATION OF A NEW AQUIFER DATA LAYER BY THE GREEN VALLEY INSTITUTE'S GIS SPECIALIST. The new digital aquifer data has been incorporated into natural resource inventories and used to make better land use decisions that are designed to protect water quality while promoting sensible community growth.

ADOPTED PRACTICES

LANDOWNERS ATTENDING "PROTECTING FAMILY FARM" workshops made a commitment to protect 5,156 acres of undeveloped land.

SIX COMMUNITIES, AFTER EXAMINING COMMON NATURAL RESOURCES, prioritized these resources and were successful in having that information incorporated in Corridor Plans of Conservation and Development.





GREEN VALLEY INSTITUTE

NINE New England Onsite Wastewater Training Program

In many rural areas of New England, where sewers and centralized treatments are not available, onsite wastewater systems often prove inadequate. When these systems fail, nitrogen, phosphorus and pathogens degrade water quality. The New England Onsite Wastewater Training Program (NEOWT) brings alternative wastewater treatment systems to the attention of communities, professionals and regulators throughout the region. Once implemented, these systems can improve and protect water quality. The program includes an onsite wastewater training center—one of eight regional centers in the nation.

PARTNERSHIPS

THE NEOWT PROGRAM IS A COLLABORATION OF STATE, UNIVERSITY AND FEDERAL COMPONENTS.

With over $1 million of U.S. EPA funding for 25 demonstration sites (of 56 in Rhode Island), the University of Rhode Island Cooperative Extension and Rhode Island Department of Environmental Management, Coastal Resources Management Council, and the Rhode Island Independent Contractors and Associates have worked with various organizations and private sector companies to coordinate the installation of demonstration sites where wastewater practitioners, regulators, community decision makers, and real estate professionals can learn first hand about alternative systems and then replicate these public health and water-quality-friendly techniques elsewhere.

For example, the University of Rhode Island received a NOAA Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) grant in 2004 for $232,000 to conduct research on an emerging innovative treatment system to improve water quality and hydraulic function in existing onsite wastewater treatment systems. This two year research project included instrumentation and evaluation of wastewater treatment system performance at several Rhode Island state-owned mental health group homes, and outreach education to practitioners on the results of the research.

SELECTED ACCOMPLISHMENTS

THE NEOWT PROGRAM PROVIDES OVER 20 COURSES with classroom and hands-on education for professionals, regulators, municipal and state officials, watershed groups, real estate agents and homeowners throughout New England.

MORE THAN 50 DEMONSTRATION AND RESEARCH SYSTEMS HAVE BEEN INSTALLED in six Rhode Island communities. Monitoring data from these systems are being reviewed to help evaluate their performance.

SOME 4,500 SOUTHERN NEW ENGLAND WASTEWATER PROFESSIONALS AND MUNICIPAL OFFICIALS COMPLETED CLASSES on topics such as nitrogen removal systems. About 2,300 wastewater professionals attended national and regional conferences.

ADOPTED PRACTICES

THE NEOWT PROGRAM, PARTNERING WITH NEW ENGLAND NEMO PROGRAMS, has been instrumental in offering assistance to ten towns in Rhode Island, two in Connecticut and two in Massachusetts for the development of local wastewater management plans. These new plans have resulted in town ordinance changes in Charlestown, New Shoreham and South Kingstown, Rhode Island.

MORE THAN 93 PERCENT OF HOMEOWNERS PARTICIPATING in demonstration sites expressed satisfaction with their new alternative system.

RESEARCH, DEMONSTRATION AND DEVELOPMENT OF BOTTOMLESS SAND FILTERS USED IN RHODE ISLAND resulted in the NEOWT Program's creation of a regulatory guidance document for the Rhode Island Department of Environmental Management. The document outlines design, siting, operation and maintenance of bottomless sand filters as drainfield options after advance treatment technologies. Many communities now use these sand filters as a drainfield option. Massachusetts and New York wastewater designers, bolstered from training at the NEOWT Program, have imported this guidance document and now design and use bottomless and filters.

NEW ENGLAND ONSITE WASTEWATER TRAINING PROGRAM

POISED TO MEET NEW WATER RESOURCE CHALLENGES

As the New England Program builds on its momentum from the past seven years, the possibilities for future collaboration to address water quality and quantity issues continue. New partners have joined forces with focus area and program teams to provide new opportunities to meet water quality and quantity challenges.

Now working as one, a cohesive corps of scientific professionals from a variety of disciplines has streamlined the way knowledge can be communicated about water resources conservation within New England. From U.S. EPA administrators to university professors and Extension faculty and staff, the New England Regional Water Program functions as a whole so that it can better serve the needs of the individuals who are counting on them. What affects agricultural production in Vermont may indeed affect Maine. What challenges the beaches of Rhode Island may be the same dilemma faced by Connecticut. But because of the New England Regional Water Program's cross-borders approach, the "best of the best" in water resources protection is now available easily and efficiently throughout the entire region.

ACKNOWLEDGMENTS

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www.usawaterquality/newengland


CONNECTICUT
MAINE
MASSACHUSETTS
NEW HAMPSHIRE
RHODE ISLAND
VERMONT

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Applying knowledge to improve water quality
New England Regional Water Program
A Partnership of USDA CSREES & Land Grant Colleges and Universities

CSREES USDA Education Research Extension

University of New Hampshire Cooperative Extension

University of Rhode Island

University of Connecticut

UMass Extension

University of Vermont Extension
Cultivating Healthy Communities

1865 The University of Maine Cooperative Extension