How to Build a Fishway
A Collaboratively Organized Workshop Addresses Regional Information Gap

BY AMY MANDELBAM, NEW YORK SEA GRANT/LONG ISLAND SOUND STUDY; JULIE NACE, NEIWPCC/PECONIC ESTUARY PROGRAM; VICTORIA O'NEILL, NEIWPCC/LONG ISLAND SOUND STUDY

For hundreds of years, humans have manipulated New York’s waterways for their own interests and needs. Dams, weirs, and culverts have allowed humans to harness water power for mills, to create ponds, and to establish essential infrastructure such as roadways. While these changes have benefited people, they have had a negative impact on wildlife, and fish in particular, such as river herring (alewife and blueback herring) and American eel.

Many fish require access to all parts of rivers to complete stages in their life cycles, such as spawning and juvenile development. Impediments on rivers have severely impacted river herring and American eel populations in New York State.

According to a benchmark stock assessment by the Atlantic States Marine Fisheries Commission, yearly commercial landings of river herring before the early 1970s were around 50-60 million pounds, while after the 1970s, river-herring commercial landings dramatically declined to the 10-20 million pound range. In the early 2000s, commercially caught river herring dwindled further to 1 to 2 million pounds a year (see graph on page 4).

Luckily, there are ways of moving fish up, over, and through these impassable structures! Fishways, including ladders, lifts, bypasses, and ramps, can be designed and installed at barriers (such as dams, weirs, and culverts) to enable fish to move from one section of a river to another.

To date, a handful of fishways have been installed in New York and elsewhere in the region, but there are many more that could be designed and installed to help fish.

Fish Passage Workshop participants inspect a newly installed fishway at Argyle Lake in Babylon, New York. This type of fishway is called a Denil Pan. In 2014, alewife used this pass to enter Argyle Lake and reach a critical spawning habitat for the first time in more than 100 years.

Meeting the Most Important Needs
NEIWPCC Identifies Its Top Water Program Priorities

BY SUSY KING, NEIWPCC

At NEIWPCC, you will often hear us say that we operate under the philosophy that the states are our clients. With that in mind, we strive to focus our work on the topics that are of greatest importance to our member states.

However, with seven states and myriad water quality issues in the region, it can be challenging to determine just what those focus areas should be. Over several months in 2015, NEIWPCC staff and members of the Executive Committee and Commission discussed key topics to inform development of a list of NEIWPCC’s Water Program Priorities.

The resulting list represents issues that are of common concern to all of NEIWPCC’s member states and that we expect to be engaged in for the coming years. Inclusion of topics in the list indicates that we are committed to assisting the states individually as well as in regional efforts to address these issues.

Readers of the list may note the absence of items such as the Lake Champlain and Long Island Sound Total Maximum Daily Loads. These issues are certainly of great importance to us and a number of our states. However, only topics of concern for all seven of our states are included in the list.

The complete list of priorities includes 19 topics, ranging from staff development to water quality standards for viruses. Working with the states, a ranking process was used to determine that seven of these topics were of the highest priority for the region. The seven top issues, described below, came as little surprise to us, as these topics are often the focus of our day-to-day work.

Highest Tier Priorities:
Climate Change
The impacts of climate change on the water sector in the Northeast are clearly evident. Increasing frequency of intense storm events is just one of many potential future climate change projections for our region. Many of the challenges we already face, such as aging infrastructure, funding needs, nonpoint source pollution, and energy use, will be exacerbated by climate change. Moving forward, effective, sustainable water management must take climate change impacts into consideration. NEIWPCC facilitates dialogue and leads regional efforts on this topic through its climate change workgroup. We will continue to assist states and other partners to address the most critical climate change issues for the water sector.

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Nurturing the New Generation of Environmental Professionals

This summer, NEIWPCC coordinated its 23rd Youth and the Environment Program, which introduces inner-city young people from Lowell to career opportunities in the water and wastewater fields. Year after year, we are proud to facilitate the seven-week environmental job training program with help from EPA, the Lowell Regional Wastewater Utility, the City of Lowell, and the Career Center of Lowell. The program has never been more important than it is now. Youth make up about one third of the world’s population. Their early and ongoing engagement in environmental programs and environmental decision making is critical to the long term success of efforts to protect and sustain the planet. The water environment is such an important subject, and as tomorrow’s decision makers, young people need to understand the nature of the multitude of career opportunities accessible to them once their interest is awakened. At every opportunity, I urge young people to pursue an education focused on science and technology. Regardless of the kind of environmental jobs they choose to pursue—engineer, biologist, journalist, wastewater operator, advocate, lawyer, or hydrologist—they will benefit from a science and technology background.

Currently, young people hoping for a bright future in the environmental workforce have many fascinating factors working in their favor:

1. There is a growing need for changes in the national regulatory structure that created so many environmental jobs in the first place.
2. We have a Clean Water Act, Clean Air Act, Endangered Species Act, and Environmental Policy Act all in need of updating.
3. We have an enormous need to replace and repair environmental infrastructure throughout the United States and rest of the world.
4. We have rapid growth in areas of the green economy such as recycling, sustainability, alternative energy, conservation, green investing, ecotourism, and smart growth.

Opportunities abound throughout the environmental community. My message for the young people we have the pleasure of nurturing here at the Commission is always the same: View environmental work as a long-term career, get started now, pursue your education, don’t be waylaid from your goal, understand that you can make a difference, and get working!

Sincerely,

Ronald Poltak
NEIWPCC Executive Director

Welcome

We’re excited to introduce you to two individuals who have recently joined NEIWPCC’s senior staff.

Jane Ceraso, director of Water Resource Protection programs, provides leadership for programs related to water supply, nonpoint source pollution, climate change, research, and quality assurance. She also serves as the Lowell project officer for the Lake Champlain Basin Program. Jane joins NEIWPCC with more than 20 years of experience in the drinking-water field. She previously worked as environmental manager for the Acton Water District in Acton, Massachusetts, and program manager for Massachusetts Department of Environmental Protection and Washington State drinking-water programs. She holds a J.D. from the Massachusetts School of Law and an M.S. in Environmental Science from Yale University.

As director of communications, Adam Auster provides leadership to NEIWPCC’s communications mission, including the annual report, print and electronic newsletters, fact sheets, and other publications. He also guides the maintenance and design of the NEIWPCC website and other online media. Adam has more than 30 years of communications and outreach experience and is a former communications director of the Massachusetts Municipal Association. Most recently he worked for Resource Insight, a consumer-oriented energy-consulting firm. Adam holds a B.A. in Social Thought and Political Economy from the University of Massachusetts at Amherst.
Minding the Risks

What Is (and Isn’t) Being Done to Prevent Leaks from Aboveground Storage Tanks

By Monica Kacprzke, NEIWPCC

Imagine waking up one day to find out that you no longer have clean running water. Initially you may think you can get through your morning routine without it, but what about when you need to brush your teeth? You drive to the local convenience store to buy bottled water, only to find out that it’s sold out because the store wasn’t prepared for the sudden high demand. You drive to several grocery stores and finally pick up one case of bottled water to use at home. You brush your teeth with bottled water and quickly realize you don’t have enough to take a shower.

On your drive to work, you go to pick up your regular morning coffee and oatmeal but the local coffee shop is closed because of the water ban. You assume that the ban is only temporary, but it stretches over several days. When the ban is lifted, the water has a peculiar smell that makes you question if it’s safe to drink. You’re left frustrated and helpless, trying to cope with a problem that is out of your control.

This may sound like an imaginary worst-case scenario, but it is based on true events from the Elk River chemical spill that contaminated drinking water for over 300,000 West Virginians in January 2014. Complaints of a strong licorice smell in the air prompted the discovery of a leak coming from an aboveground storage tank (AST) containing crude 4-methylcyclohexanemethanol (MCHM).

Investigations determined that two corroded tanks owned by Freedom Industries were dumping thousands of gallons of an MCHM solvent mixture into the Elk River. The tanks were just a mile and a half upstream of the sole drinking-water intake for West Virginia American Water.

Residents around Charleston, West Virginia, lacked tap water for as long as 10 days and many businesses and critical services in the area were impacted by the water use restrictions. Even after the water ban was lifted, there were reports of the pervasive smell and discoloration of the water for months after the spill.

When our lives are organized around easy access to running water, the challenges are numerous during a widespread water contamination event. Fortunately, disasters like the Elk River chemical spill don’t happen often. But are we taking enough precautions to limit these events?

First Steps

Several initiatives in New England are encouraging prevention and preparedness. Three such projects focus on the Merrimack River, which provides drinking water to more than half a million people living in areas of Massachusetts and New Hampshire that are densely populated and highly industrialized. A total of 161 oil ASTs, 38 non-oil ASTs, and many smaller tanks lie within half a mile of the river in the Merrimack River’s drinking-water corridor, making the corridor an ideal place to raise awareness about the risk of a chemical release that could affect critical public water supplies.

In cooperation with the Massachusetts Department of Environmental Protection and the Massachusetts Department of Fire Services, NEIWPCC is helping to fill the information gap about ASTs that are small (containing fewer than 10,000 gallons) and unregulated. Through a project funded by EPA’s Healthy Communities grant program, the collaborators aim to improve the protection of public health and the environment by reducing and planning for chemical risks from small commercial ASTs along the part of the river that runs through Massachusetts.

Over the next year, NEIWPCC will work with local fire departments and public water utilities, facility owners and operators, and emergency responders to improve the protection of public drinking water for more than 294,000 people in five communities.

Along the same lines, the Drinking Water Program and the Oil Spill Response Program of EPA’s New England branch have reviewed the whole (bi-state) Merrimack drinking-water corridor to assess the risks from ASTs containing oil and non-oil. As part of this project, EPA produced a full inventory of what types of non-oil ASTs are upstream of drinking-water intakes. The inventory is designed to help tank owners determine which non-oil tanks to monitor and to ensure they are included in emergency-response lists and plans.

With an emphasis on spill prevention, EPA and state agencies also hosted a series of emergency-response workshops for public water suppliers, AST owners, local emergency responders, state agencies, and federal agencies. The workshops featured a tabletop exercise involving a hypothetical chemical spill in the Merrimack River.

Response plan maps were developed to identify precisely where spill prevention equipment—booms and absorptive materials—should be placed by emergency responders in the event of an actual spill. The workshops aimed to increase awareness and improve communication among all of the stakeholders.

There are also ongoing activities at the state level across New England that aim to provide clearer and more reliable information regarding existing tanks and their proximity to public water systems. For example, the New Hampshire Department of Environmental Services (NHDES) recently reviewed the state’s inventory of ASTs in surface water supply watersheds that contain at least 10,000 pounds of a hazardous substance or at least 500 pounds of an extremely hazardous substance, as reported by facilities to the state in compliance with the federal Emergency Planning and Community Right-to-Know Act. NEIWPCC continues to support this work.

Researchers from West Virginia’s Water Research Institute collect water samples from the Elk River in Charleston, West Virginia.
are still many rivers and creeks containing barriers that need fish passages. (There are so few constructed fishways in part because of rigorous requirements for altering a dam in New York State. In addition, diverse stakeholders have to agree on a project that, in some cases, will change the pattern of the river they’re accustomed to. As a result, projects can take many years to complete.)

Recognizing this need, several partners, including the Long Island Sound Study, Peconic Estuary Program, New York Sea Grant, and Seatuck Environmental Association, decided to organize a workshop to educate those interested in fish passage. There are many small efforts to install fish passages across Long Island. Consequently, the workshop was an opportunity to bring the partners together and provide them with the most up-to-date information.

On July 9–10, 2015, 45 people—including engineers, biologists, hydrologists, environmental scientists, and other practitioners from New York and New England—took part in the Fish Passage Workshop at Hofstra University in Hempstead, New York. Attendees were mainly from Long Island, but there were also workshop participants from New York City, the Hudson River region, Connecticut, and Maine.

Brett Towler, a hydraulic engineer, and Bryan Sojkowski, a civil engineer, served as the workshop’s expert instructors. Both work at the U.S. Fish and Wildlife Service’s Northeast Regional Office. Participants learned about all aspects of installing a fishway, including initial plans, construction, and monitoring.

On the first day of the workshop, Towler and Sojkowski discussed the design, operation, and oversight of fish-passage projects. As part of the instruction, the participants worked in small groups to complete a design exercise for a hypothetical fishway. The following day, participants visited a newly installed fishway at Argyle Lake and a future fish passage site at Southards Pond, both in Babylon, New York.

Follow-up surveys will be conducted to see if the workshop participants are identifying sites for fish-passage projects and embarking on design and installation. Initial feedback indicates that new partnerships have formed and that the participants are taking advantage of the expertise offered in the workshop.

Amy Mandelbaum is the New York Outreach Coordinator for the Long Island Sound Study. She works for New York Sea Grant in Stony Brook, New York.

NEIWPCC Environmental Analyst Julie Nace is the New York State Coordinator for the Peconic Estuary Program. She specializes in the implementation of habitat restoration projects, nonpoint source pollution control, and education and outreach.

Victoria O’Neill is a NEIWPCC Environmental Analyst and the New York Habitat Restoration Coordinator for the Long Island Sound Study. She is housed in the New York State Department of Environmental Conservation’s Bureau of Marine Resources in East Setauket, New York.
Modernization of the Clean Water Act Is Long Overdue

By Heather Radcliffe, NEIWPCC

October 2015 marks the 43rd anniversary of the Clean Water Act and 28 years since its last major amendments. While there is much to celebrate—undeniably, significant progress in water quality has been made since 1972—it is time to move forward from boasting that our rivers no longer catch fire.

Despite more than forty years of regulation, “the physical, chemical, and biological integrity of the Nation’s waters” have not, in the words of the Act, been “restored[ed] and maintain[ed],” and all our nation’s waters have not achieved the Act’s fishable, swimmable goal (33 U.S.C. § 125(a)). Instead, nearly two thirds of all waters assessed by the states are impaired, including nearly 68 percent of the area of assessed lakes, ponds, and reservoirs and 78 percent of assessed bays and estuaries.1

The Clean Water Act—originally known as the Federal Water Pollution Control Act—was written in response to egregious pollution from wastewater-treatment facilities and major industrial sources. Today, we face many complex challenges not anticipated by the original authors of the Act, which was written to address the demands of society and the environment as they existed in 1972.

While the Clean Water Act catalyzed the cleanup of the most obvious point sources of pollution from many of our nation’s waters, more work remains to be done, particularly on impairments resulting from nutrients and from pathogens like bacteria and viruses. Our commitment to protect and restore the physical, chemical, and biological integrity of our nation’s waters has stalled.

This is not to say that the Clean Water Act has failed; it has not. It succeeded in reducing the point sources it was meant to, namely, the direct discharge of raw sewage and other pollutants into our nation’s waters. Passed in 1972 and reauthorized in 1987, the Clean Water Act is reaching the limits of its potential. A new approach is required to regulate our water resources—one that takes into account the issues and needs that dominate present conditions.

The 1972 Clean Water Act has had major beneficial impacts on the quality of our nation’s waters, but it does not provide the tools to solve our nation’s twenty-first-century water challenges. A new Clean Water Act must address (1) jurisdiction, (2) aging water and wastewater infrastructure, (3) funding needs and affordability, (4) a watershed approach, (5) nonpoint-source pollution, (6) green infrastructure, (7) the energy-water nexus, and (8) climate change.2

Jurisdiction

The limits on the Clean Water Act’s jurisdiction should be revised to reflect the interrelated and interdependent nature of the hydrologic cycle.

The issue of which waters are protected by the Clean Water Act is critical to the Act’s entire functioning. The Clean Water Act regulates discharges to “navigable waters,” which is statutorily defined as “the waters of the United States, including territorial seas” (33 U.S.C. § 1362(7)). This single definition applies to all regulatory provisions of the Act, including permit programs for discharge of dredged or fill material (404 permits, § 1344)3 and other polluting discharges (NPDES permits, § 1342).

Jurisdiction overshadows the entire Act; it is a threshold issue for determining whether the Act applies to any given body of water. However, for decades after the enactment of the Clean Water Act, “waters of the United States” continued to be a heavily litigated and controversial phrase that was clouded by unclear, contradictory U.S. Supreme Court decisions and heavily criticized EPA guidance. It wasn’t until June of 2015 that a comprehensive rule was published to better define the term.4

While EPA and the U.S. Army Corps of Engineers intended to conclusively settle this issue in finalizing the Clean Water Rule, the rule instead sparked congressional action in opposition to the rule and a flurry of legal action from states and other stakeholders. With litigation and congressional challenges pending, the final fate of the rule remains uncertain; the question of jurisdiction may still be unanswered.

While the scope of the Act continues to be debated in the present, the Act’s legislative history makes it clear that Congress intended the Clean Water Act to have a broad geographic scope,5 with a distinct recognition of water’s ecological connectedness: “Water moves in hydrologic cycles and it is essential that discharge of pollutants be controlled at the source” (S. REP. NO. 92–414, at 77 (1977)). However, the Clean Water Act has limited jurisdiction, partly due to limiting judicial interpretations,6 which leaves interconnected groundwater and some sensitive waters outside the Act’s protection. The hydrological system relies on many healthy and resilient water types—including groundwater, wetlands, headwaters, and intermittent and ephemeral streams. However, the Clean Water Act fails to protect many of these essential elements.

A healthy water ecosystem is not possible under such limited jurisdiction when water-pollution control requires a broad and comprehensive approach based on the interconnectedness of water.

Without resolution on the definition of “waters of the United States,” regulatory uncertainty will continue, presenting a challenge in meeting the Clean Water Act’s overall objective and goals.

Heather Radcliffe is a NEIWPCC program manager and staff attorney. She serves as project manager for NEIWPCC’s Interstate Environmental Commission District and the Narragansett Bay Estuary Program in addition to advising staff on legislative and legal issues and overseeing all aspects of NEIWPCC’s contracts processes. This special report is based on Ms. Radcliffe’s 2012 paper, “Reauthorization of the Clean Water Act,” which is available online at http://www.neiwpcc.org/cwamod/CWAModernization.pdf. Ms. Radcliffe holds a J.D. and a Master of Environmental Law and Policy from Vermont Law School and has been with NEIWPCC since 2012.
Infrastructure

Water and wastewater infrastructure is aging rapidly and requires costly repair, upgrade, and rehabilitation to protect public health and safety and to achieve and maintain environmental standards.

Our physical water and wastewater infrastructure—our facilities for water collection, storage, treatment, and distribution, our flood levees and floodways, ports and harbors, locks and canals—is vital to the prosperity of our communities. High-quality drinking-water and wastewater systems are essential to the environment, public health, safety, and overall quality of life in the United States. Undeniably, clean water is necessary for life to exist.

Toward that end, some infrastructure protects our environment by addressing sewer overflows and stormwater runoff; other infrastructure protects our health by maintaining clean drinking water that is free of waterborne diseases and makes our waters safe for fishing and swimming; still more infrastructure ensures public safety by maintaining a sufficient water supply for fire suppression. Our water and wastewater infrastructure is also vital to our economy, providing water critical to the daily operations of existing businesses, new commercial enterprises, and residential developments.

Yet, the most recent American Society of Civil Engineers’ Infrastructure Report Card indicates that the United States is falling substantially behind in our water and wastewater infrastructure, which scored between “poor” and “failing” in the 2013 report. This negative assessment is unlikely to improve without significant investment in our water and wastewater infrastructure. In fact, the most recent EPA estimates depict a $682.3-billion shortfall in water-infrastructure funding over the next two decades, particularly because our infrastructure is aging and failing rapidly. The evidence for this includes 240,000 water-main breaks per year (with the number of breaks increasing substantially near the end of the system’s service life) and up to 75,000 sanitary sewer overflows per year in the United States, resulting in the discharge of three to ten billion gallons of untreated wastewater.

Broken water and sewer mains, sewage overflows, and other related issues cause significant losses and damages—as well as environmental-standards violations—that can and should be prevented through investments today. Aging infrastructure strains budgets beyond our ability to repair and replace before failure, which threatens water quality and public health.

Necessary capital investments today can prevent further infrastructure deterioration and create essential jobs. In fact, merely one dollar invested in water and wastewater infrastructure creates more jobs than in any other type of infrastructure. Each job created in the local water-and-sewer industry creates 3.68 jobs in the national economy. In addition, each public dollar invested in water infrastructure increases long-term GDP output by $6.35 and generates $2.62 in economic output in other industries.

However, lack of adequate funding impedes the ability of local, state, and federal government to address aging and failing infrastructure. Federal and state funding available to municipalities for water and wastewater infrastructure has steadily decreased since the 1970s, with line items that once funded infrastructure projects, provided rate relief, or funded low-interest loans cut dramatically or eliminated entirely. New initiatives such as the Water Infrastructure Finance and Innovation Act, EPAs Water Infrastructure and Resiliency Finance Center, and the President’s Build America Investment Initiative all aim to address these funding issues. Still, a far greater and more comprehensive commitment is needed to address the overwhelming gap between current needs and funding.

Meeting the nation’s needs to build, upgrade, rebuild, and repair water and wastewater infrastructure is a significant element in achieving the Clean Water Act’s water-quality objectives. Without a considerable and sustained increase in infrastructure investment, failure will become more frequent, serious, and obtrusive, and our water and wastewater services will deteriorate rapidly. A new Clean Water Act must authorize enough funds to assist local and state governments with financing needed repairs and upgrades to ensure a steady supply of safe, clean water for present and future needs.

Adequate Funding

Adequate funding is needed to ensure governments are able to reasonably and fully execute the Clean Water Act’s mandates and goals.

Without funding, the Clean Water Act is merely words on paper. The Act’s overall objective and goals will never be fully realized without proper funding to overcome current challenges. Yet, funding authorizations of some programs in the 1987 Clean Water Act amendments—such as grant assistance to states, research, and general wastewater treatment—expired in 1994. Although these programs continue to be funded on an ad-hoc yearly basis, competition exists with other national programs.

In addition to funding necessary for infrastructure repairs and upgrades as described above, a new Clean Water Act must also authorize funding for implementation of all enforcement, monitoring, research, and innovation under the Act. Without proper resources, innovative approaches will never be explored and validated. In addition, staff must be funded to enforce regulations and monitor the Act’s progress. Severe underfunding of the Clean Water Act’s mandates limits the effectiveness of its programs. Thus, a revised Act must increase federal support to adequate funding levels sufficient to ensure water-quality goals are achieved. Failure to provide enough resources correlates directly with failure to improve water quality.

In the face of limited funding, many municipalities have taken on increasing levels of debt to maintain their water and wastewater infrastructure and meet Clean Water Act mandates without federal assistance, which is a concern because different communities have different abilities to pay. When municipalities take on more debt, the cost of water service often increases at a rate that puts a financial strain on low-income residents, particularly given that there are no federal programs to assist them with water bills. On the other hand, voters often underestimate the value of water and are unaware of the true costs to fully support, operate, maintain, and invest in their own infrastructure, which makes it difficult for municipalities to invest in anything more than the present costs of operation.

Affordability protections must be incorporated into the Act, but the high value of our water services must also be taken into account. Funding deficiencies and costs need to be addressed and cannot be overlooked. Therefore, a new Clean Water Act must authorize funds to cover the necessary costs for reliable clean water, taking into account the affordability factor for state and local governments.

Watershed Approach

Under the Clean Water Act, water-quality management has been characterized by compartmentalization and the creation of artificial boundaries where a watershed approach would be more natural, sustainable, holistic, and comprehensive.

Activities that occur anywhere in a watershed inevitably have an impact on the water quality and quantity in the rest of the watershed. In fact, water quality of rivers, streams, lakes, wetlands, and groundwater is a reflection of each individual water body’s entire watershed. Yet watersheds often fall within multiple jurisdictions. Under the current regulatory framework, Clean Water Act enforcement and responsibility fall within political boundaries rather than watersheds, making it difficult to implement regional solutions, which have the potential to be more efficient and effective.

A preferred approach would instead use the natural hydrologic boundaries of watersheds to coordinate the protection and restoration of water resources. A watershed approach would include all stressors within the area rather than focusing on specific, individual sources of pollution, such as a sewage discharge pipe. In addition, whereas in the past, implementation has focused on chemical pollution, a comprehensive watershed approach would instead use the natural hydrologic boundaries of watersheds to coordinate the protection and restoration of water resources. A watershed approach would include all stressors within the area rather than focusing on specific, individual sources of pollution, such as a sewage discharge pipe. In addition, whereas in the past, implementation has focused on chemical pollution, a comprehensive watershed
Nonpoint Source Pollution
The Clean Water Act needs a mechanism to address nonpoint source pollution beyond the current voluntary program, which renders NPS pollution effectively unregulated despite being the leading cause of water pollution today.

Management of nonpoint-source (NPS) pollution is, undoubtedly, the issue in most dire need of attentive revision in the Clean Water Act. While many of our waters have improved since 1972—mainly due to the Act’s control of traditional point sources through technology-based limitations—remaining water-quality impairment is largely attributable to nonpoint sources of pollution that are not directly or adequately controlled through the Act. In fact, NPS pollution is the reason behind the impaired status of more than 33,000 U.S. water bodies. The Act’s success with controlling point sources contrasts starkly with its failure to address nonpoint sources such that NPS pollution has become the dominant cause of water pollution today.

The 1987 amendments established the first comprehensive program to address NPS pollution—though the term is not statutorily defined, nor has it been ever clearly defined since—in a new section 319 authorizing state planning and management programs. More than 560 water bodies impaired primarily by NPS pollution have been partially or fully restored as a result of section-319 projects, many of which are highlighted on EPA’s success stories web page. The web page offers well-deserved recognition and praise for restoration efforts that led to documented water-quality improvements. The success stories also serve as examples for other states to consider when dealing with their own NPS pollution.

Although section 319 leads the way in efforts to reduce NPS pollution, it is a voluntary, essentially unregulated program lacking mandatory compliance requirements and dependent on employment of unenforceable “Best Management Practices.” EPA has little authority to discourage ineffective approaches.

All states, territories, and many tribes have completed NPS assessments and management-program plans under section 319, but the Act does not require the plans to be revised, as a result, most are currently outdated. Very few of the 43,000 impaired water bodies in the United States will achieve water-quality standards without effective controls on nonpoint sources. Moreover, unimpaired waters are threatened by NPS pollution as new developments are built nearby. Therefore, a new Clean Water Act must more effectively address NPS pollution through a revision or complete overhaul of section 319.

Green Infrastructure
Many aspects of the Clean Water Act, particularly stormwater management, would benefit from green-infrastructure techniques, which should be fully and effectively incorporated into the Act.

Comprehensive water-resource management must incorporate efforts to restore the natural hydrology of our ecosystems, to mimic as much as possible the way hydrology functioned prior to development. The current Clean Water Act fails to take full advantage of the pollution-reduction benefits associated with green-infrastructure practices, such as preserving and restoring vegetated areas with rain gardens, roof gardens, and green swales; utilizing porous pavements; and creating riparian buffers, that mimic natural processes and allow rain to sink into the ground. Green infrastructure often offers cost-effective, sustainable methods for improving and maintaining the physical, chemical, and biological integrity of water that should be utilized by local, state, and federal governments.

Green infrastructure can provide multiple environmental benefits, such as air-quality improvements through filtering of particulate matter; reduced energy demands through cooling urban areas and shading building surfaces, and improved wildlife habitat. Most importantly, green infrastructure is particularly effective for dealing with stormwater because it facilitates the infiltration, evapotranspiration, and reuse of stormwater by taking advantage of nature’s own mechanisms.

Incorporating green infrastructure into stormwater management reduces stormwater discharges, which are often polluted by pathogens, nutrients, sediment, and heavy metal; mitigates flood risk by slowing and reducing stormwater volume; and recharges groundwater. A new Clean Water Act must more effectively incorporate green infrastructure into its programs and invest in these sustainable practices.

The Water-Energy Nexus
The Clean Water Act must address the close connection between water and energy as it relates to water use and water quality.

Without energy, there would be limited water treatment and distribution, and without water, there would be limited energy production. The water-energy nexus is a reciprocal loop whereby demand for one drives demand for the other. Generating energy consumes significant amounts of water to cool power plants, generate hydropower, and extract, refine, and produce fuel. Similarly, providing clean water consumes significant amounts of energy for extracting, moving, and treating water. According to EPA, water and wastewater services account for about three to four percent of total energy use in the United States, equal to approximately 56 billion kilowatts or $4 billion. This energy use is not only expensive, but it also adds about 45 million tons of greenhouse gas to the atmosphere each year.

Despite the clear inextricable connection between water and energy, the Clean Water Act fails to address the water use embedded in energy production or the energy use embedded in water and wastewater services. Sustainable management of water requires consideration of energy (and vice versa). Therefore, a new Clean Water Act should specifically recognize the energy-water nexus and incorporate policies on increased coordination between both sectors, energy and water efficiency, and minimizing negative impacts to water resources from energy production.

This is particularly crucial as climate change and our growing population put more stress on water resources, making increased energy needs—and, consequently, water needs—inevitable.
### Climate Change

The impacts of climate change, which threaten to stress existing water resources and the ecosystems that depend on them, must be taken into account in Clean Water Act programs.

Many of the problems of the current Clean Water Act, such as aging infrastructure, funding needs, nonpoint-source pollution, and energy use, will be exacerbated by climate change. Wetland losses and wetland water quality are actually among the most acknowledged of climate-change impacts. Climate change is expected to alter precipitation patterns and increase flooding and associated waterborne diseases, alter stream morphology, increase wet-weather pollution from stormwater overflows and overland runoff, and decrease overall water supplies in some parts of the country. All uses of water, including agricultural, municipal, industrial, and ecological, will be affected.

As these impacts change or weaken the health and stability of many ecosystems, water-quality standards will be increasingly violated and meeting the Clean Water Act’s overall objective of “restoring and maintaining the chemical, physical, and biological integrity of the Nation’s waters” (33 U.S.C. § 1251(a)) will become increasingly difficult.

As such, a new Clean Water Act should incorporate climate-change impacts into monitoring programs, water-quality standards, facility planning and design, wet-weather controls, and more. Effective, sustainable water management must not ignore climate-change impacts.

### Urgent and Essential Reform

The Clean Water Act is an extraordinary and valuable piece of legislation. By setting national goals and objectives, technology-based and water-quality–based standards, funding wastewater facilities and research, and creating an administrative and enforcement structure, the Act enabled our nation to address our polluted waters.

The Act has served us well, but in its current form it is simply no longer achieving the water-quality improvements as initially intended. The bedrock principles of the 1972 Act remain sound, but those principles have not been implemented totally or adequately. The outlined challenges are serious and highlight the immediate need for updates and revisions to the Clean Water Act that reflect the realities of today and tomorrow.

The Clean Water Act of the future must build upon its predecessor’s success with an eye toward the many challenges currently faced and those anticipated. If the Act is not modernized based on our changing environmental and societal circumstances, our nation’s water quality will suffer immensely.

Reform of the Clean Water Act is urgent and essential to ensure that clean water is available to sustainably meet economic, social, and environmental purposes today and in the future.
The four young adults who participated in this summer’s Youth and the Environment Program (YEP) set up a long-term experiment that uses wetland plants to remove nutrients from primary wastewater-treatment effluent, reducing the water’s biochemical oxygen demand and total suspended solids. The ongoing project is an expansion of a pilot study being conducted at a wastewater-treatment facility in Rochester, New Hampshire.

The program introduces inner-city youth from Lowell to careers in the water field and familiarizes them with water-related environmental issues. The young people visited the Rochester treatment facility to observe the treatment study and to take wetland plants back to Lowell’s Duck Island Wastewater Treatment Facility. The YEP group also went to a wetland in Dracut, Massachusetts, accompanied by three individuals from EPA’s New England branch—Jackie LeClair, Jay Pimpare, and Erica Sachs-Lambert—who taught them about wetland ecology and identified additional plants to take back to Lowell for the study.

The group suspended the plants on a lattice inside a 250-gallon tote and filled the tote with primary effluent wastewater. Over the next few weeks, they maintained the plants, circulated the water, and collected data on the system’s performance.

The wetland-plants project was one of two new curriculum modules, which complement the long-established components of YEP. The other new element this year was the young people’s participation in a volunteer effort to clear invasive water chestnuts from the Charles River.

Under the coordination of the Charles River Watershed Association, the group spent an afternoon canoeing along the river, pulling up the invasive weeds. (When not controlled, water chestnuts not only disrupt recreational activities on the river, but also harm the health of the river ecosystem by lowering the dissolved oxygen levels, creating a nutrient imbalance, and blocking sunlight to the bottom of the river.)

The field trip was different and exciting for the group, and more importantly, it was rife with the kind of hands-on learning opportunities that have made the Youth and the Environment Program so successful.

This year’s group spent most weekdays at Lowell’s Duck Island Wastewater Treatment Facility assisting with day-to-day operations, such as maintenance work and water testing in the laboratory. In addition to the field trips associated with the water-chestnut removal and the wetland-plants project, the group visited Squam Lake’s Science Center, the New England Aquarium, and greater Boston’s Deer Island Wastewater Treatment Plant.

NEIWPCC has coordinated YEP almost every summer since 1990, in conjunction with EPA, the Lowell Regional Wastewater Utility, and the Lowell Career Center.

Mike Gendron is an intern at NEIWPCC. He coordinated the 2015 session of the Lowell Youth and the Environment Program and assists NEIWPCC’s Wastewater and Onsite Systems Division with various projects.

YEP participants work with EPA staff to set up wetland plants to remove nutrients from wastewater.

At Lowell’s Duck Island Wastewater Treatment Facility, Tom Kawa, Lowell Regional Wastewater Utility operations manager (second from right) and Kevin Cavanaugh, a laboratory technician at the facility (far right) stand with (left to right) NEIWPCC intern Mike Gendron and YEP participants Liam McKenna, Jayvic Rosario, Alex Baez, and Kevin Ryan.

Floating on the Charles River, a YEP participant wrestles with an invasive water chestnut plant.
Meeting the Most Important Needs
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Harmful Algal Blooms
Cyanobacteria-associated harmful algal blooms (HABs) and their toxins are a growing concern in the Northeast. The frequency of HAB occurrence is on the rise and blooms have been associated with health impacts such as skin rashes, asthma exacerbation, gastrointestinal illness, and liver damage. Effects can be even more pronounced, sometimes even fatal, in animals ranging from cattle to dogs. HABs have direct implications for the use of water bodies for recreation and drinking, and for the overall degradation of aquatic resources. States are currently working to keep recreational and drinking waters safe through HAB monitoring programs, outreach and education, and official regulations and guidance prohibiting or advising against use of affected waters. To assist states, NEIWPCC is following the national HAB discussion, facilitating regional dialogue, and developing working documents through its HAB workgroup.

Nutrients
Nutrients are a leading cause of water body impairment in the Northeast. States are addressing nutrient pollution through a number of approaches, including development and implementation of numeric nutrient criteria, total maximum daily loads (TMDLs), watershed management plans, and establishment of water-quality-based effluent limits for wastewater treatment plants. Developing numeric nutrient criteria is challenging due to the varying effects of nutrients across different water bodies. EPA has expressed openness to flexibility in state approaches for developing and establishing criteria, and many Northeast states are moving closer to finalizing proposals. NEIWPCC has been engaged in this issue for many years and continues to follow it at a regional and national level and to facilitate dialogue through its nutrient criteria workgroup. Further, we are involved in ongoing, geographically-specific nutrient reduction efforts, including initiatives by the Lake Champlain Basin Program, the Long Island Sound Study, the Peconic Estuary Program, and the Narragansett Bay Estuary Program.

Storm Resiliency
In recent years, our region has been greatly affected by intense storm events—enduring flooding, power outages, infrastructure failures, and degraded water quality. As these experiences demonstrate, infrastructure for stormwater, drinking water, and wastewater are vulnerable to intense precipitation, high winds, and extreme temperatures. These risks require our states to respond to a range of complex challenges before, during, and after storms. NEIWPCC is helping the states to coordinate efforts and funding to ensure that they are capable of adapting to the complex challenges posed by intense storm events. The region must prepare to meet the immediate needs of the water sector during such crises, while also adequately planning for similar events in the future. Intelligent storm response and emergency preparedness efforts will foster resilience across the water sector, from natural systems to the built environment.

Support for Water Infrastructure Needs and the State Revolving Funds
The Clean Water State Revolving Fund (CWSRF) has provided Northeast states with over $6 billion in federal grant appropriations since 1989, but a provision in the Water Resources Reform and Development Act of 2014 could reallocate tens of millions of dollars a year away from the region. Historically distributed according to allotments statutorily set in the Clean Water Act, the method of distributing funds has the potential to change in the near future. The CWSRF is frequently on the chopping block in federal budget discussions, despite $344.8 billion in national needs documented for the next 20 years—including $52.4 billion needed in the Northeast. Continued funding is sorely needed in Northeast states, even more so as infrastructure nears replacement age.

The CWSRF’s partner program, the Drinking Water State Revolving Fund, while not undergoing a
Minding The Risks
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Know Act (EPCRA). NHDES also continues to collaborate with other state programs and EPA on prioritizing regulatory compliance of ASTs near water supply intakes.

In addition, NHDES awarded a source-water protection grant to the Granite State Rural Water Association to improve on the precision of the existing EP CRA inventory of ASTs near water supply intakes on the Merrimack River. This includes tanks within a six-hour time of travel zone, an area that extends south from Manchester to Nashua. The association is also working with local emergency and fire officials in the New Hampshire part of the corridor to identify businesses that are not reporting under EPCRA but should be, and to raise awareness about the risk of a chemical release into surface and groundwater that could affect public water supplies. Similarly, in Maine, the Maine Center for Disease Control and Prevention’s Drinking Water Program (DWP) has started a project conducting source-water susceptibility evaluations and preparing source water protection plans for community and non-transient non-community water systems that use using river intakes or riverbank wells. This involves mapping potential sources of contamination within the critical portion of the upstream watershed, and collecting more detailed location and storage information for significant ASTs. Similar to the projects in Massachusetts and New Hampshire, the improved information will be shared with water suppliers to foster better emergency response communication.

NEIWPCC supports AST work in all our member states by convening regular meetings of the regional Groundwater and Source Water Protection Workgroup. Through the meetings, source-water protection staff in the New England states and New York exchange information on new initiatives and work in partnership on common goals, optimizing the impact of their work.

National Conversation

Although progress is being made in the Northeast, there is still a need for better government oversight of public water supplies to ensure the safety and health of communities across the country. The Elk River chemical spill, West Virginia’s governor Earl Ray Tomblin signed a law to strengthen standards for new ASTs and to require inspections of existing ones. But less than a year later, West Virginia’s legislature passed a bill to significantly scale back the number of regulated ASTs (from 50,000 ASTs to about 12,000) and impose less stringent inspection requirements. The oil and gas industry claims the original act was over-burdensome, but others worry that the rollback removed important protections.

In the meantime, environmental advocates are suing for more oversight at the federal level. Recently, a lawsuit was filed to require EPA to issue regulations protecting communities from hazardous chemical spills at industrial facilities, including facilities that have ASTs. A national ruling in favor of the advocates could set a precedent for more AST regulation at the state and local level.

In Washington, a bill introduced in 2014 called the Chemical Safety and Drinking Water Protection Act proposed amendments to the Safe Drinking Water Act requiring all states (or EPA in some cases) to develop a “state chemical storage tank surface water protection program” for certain chemicals. The bill was not enacted, and no other proposed federal bills address AST spill prevention, despite innumerable ASTs’ proximity to vital drinking water sources.

Monica Kaczynski is a NEIWPCC environmental analyst. She serves as project manager for the Commission’s efforts related to groundwater and source-water protection, nonpoint source pollution, stormwater, and climate change adaptation.

Workshops and Courses

Do you work in the wastewater or drinking-water sectors? Do you plan to do so? Get the knowledge and skills you need from NEIWPCC’s training programs! We’re out with the new Fall 2015 lineup of classes from our regional training program, the Massachusetts Wastewater Operator Training program (which NEIWPCC conducts for Massachusetts), and JETCC (our training arm in Maine).

Special offerings this fall include workshops on phosphorus removal techniques and how to deal with non-dispersible wipes in a collection system. See the new schedules and register online at www.neiwpcc.org/training/calendar.asp.
Research-and-extension soil scientist George Loomis of the University of Rhode Island’s Coastal Institute is studying the nitrogen-removal performance of advanced septic systems. His goal is to identify which of the treatment systems’ operational variables have the greatest impact on effluent quality.

Last fall, Loomis’s project received a $238,000 grant through the Narragansett Bay Estuary Program (NBEP) with funding from EPA’s Southeast New England Program. Before data collection started, NEIWPCC (which manages the grant) helped develop a quality assurance project plan (QAPP) for the project. The QAPP describes how the project’s data are collected, analyzed, assessed, stored, and reported.

On August 10, Mike Jennings, NEIWPCC’s quality assurance program manager, conducted a field assessment of the project to verify compliance with approved procedures. He was joined by Tom Borden, director of the NBEP, and Heather Radcliffe, who serves as project manager for the NBEP.

Jennings, Borden, and Radcliffe accompanied the researchers as they gathered data from four advanced onsite wastewater-treatment systems in the Narragansett Bay watershed. This involved recording operational settings, collecting effluent samples, and running a series of field analyses; all of which the researchers completed in accordance with the approved QAPP.

At left, Kevin Hoyt (project field sampling manager, left) collects a sample and Ed Avizinis (project field sampling associate) runs a test.