The New England Interstate Water Pollution Control Commission Newsletter

Water Connection

Volume 16, Number 2
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Coastal Pollution Is Not Just "A Drop in the Ocean"

To some, coastal pollution is simply "a drop in the ocean." How could one small oil spill or sewer overflow harm something as vast as the Atlantic or as deep as Lake Superior? It is this attitude that makes coastal water protection particularly challenging.

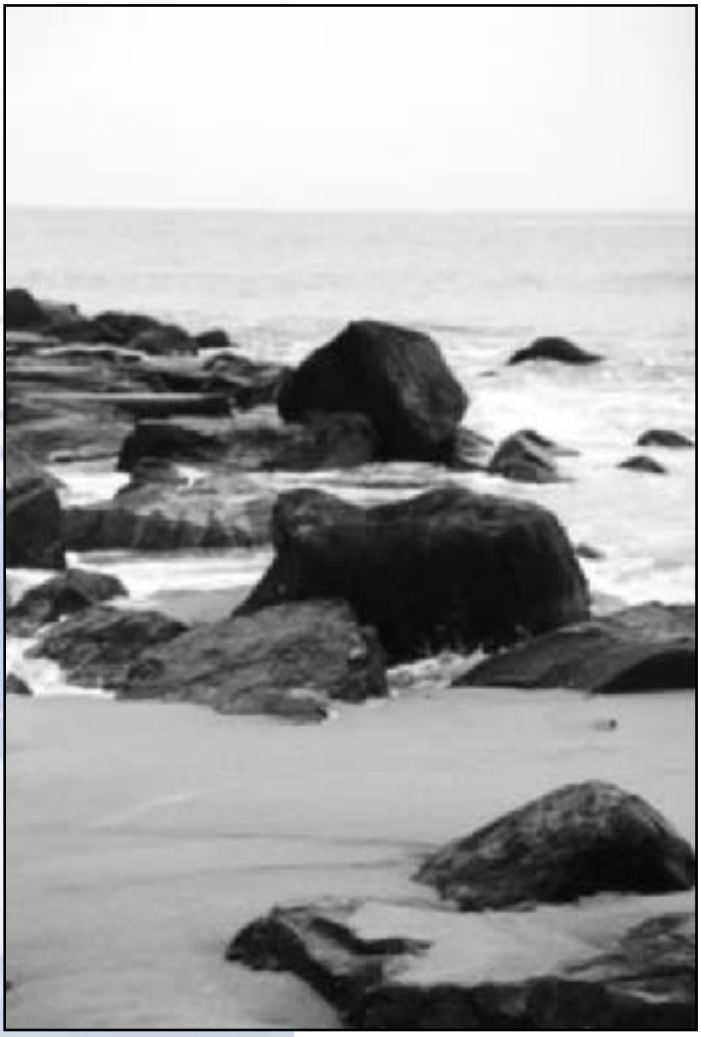
Recognizing this challenge, the EPA has been focusing its energies on a slate of policies and programs dedicated to protecting our coastal waters. These efforts include the Coastal Research and Monitoring Strategy, the Coastal 2000 National Estuary Survey, and the Beaches Environmental Assessment, Cleanup, and Health Act of 1999 (the "BEACH Bill").

The Coastal Research and Monitoring Strategy will review the existing programs related to coastal waters and habitats. Based on that review, a comprehensive report on the condition of the nation's coastal waters, along with priorities and recommendations for future programs, will be issued to the public by the end of 2000.

In the summer of 2000, the Coastal 2000 National Estuary Survey is scheduled to begin. The survey will assess the ecological condition of our estuarine resources, determine reference conditions for future studies, and help build state and federal infrastructures to conduct those future studies.

The BEACH Bill, currently under review by Congress, requires states to adopt water quality standards and to monitor coastal recreational waters.

To correspond with these initiatives, this issue of *Water Connection* offers a regional and national look at coastal water protection issues and efforts. Each of the articles herein serves to remind us that even our nation's great oceans and lakes have not been immune to the slow but steady damage wreaked by negligence, ignorance, and short-sightedness.



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- Training Environmental Professionals
- Providing Public Education & Outreach

New England Interstate Water Pollution Control Commission

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Who We Are

For more than 50 years, NEIWPCC has coordinated regional water pollution control programs, trained environmental professionals and raised public awareness of water quality issues in the six New England states and New York. NEIWPCC's Environmental Training Center provides training courses throughout the region to help communities meet their water pollution control goals.

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Water Connection

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Lifeguard on Duty: *EPA's BEACH Program*

Just about everybody enjoys going to the beach! Our lake, river, and ocean beaches are Americans' top vacation choices. Americans take almost two billion trips to the beach each year and spend billions of dollars in beach communities.

IS THE WATER AT YOUR BEACH SAFE?

The water at your beach looks clean, but is it? It may be worth your while to find out before you or your children go swimming. Each year states across the country report thousands of beach closings at rivers, lakes, and oceans due to disease-causing microorganisms that you cannot see. Many other beaches may also be polluted, but if the water is not monitored and the results are not posted, you won't know whether you run the risk of getting sick. The U.S. Environmental Protection Agency (EPA) with its new Beaches Environmental Assessment, Closure and Health Program ("BEACH Program") is working with state, tribal and local governmental partners to make sure you have beach water quality information before you swim.

WHAT IS POLLUTING OUR BEACHES?

The most frequent sources of disease-causing microorganisms (pathogens) are sewage overflows, polluted storm water runoff, sewage treatment plant malfunctions, boating wastes and malfunctioning septic systems.

ARE THERE PUBLIC HEALTH RISKS?

Swimming in unsafe water may result in minor illnesses, such as sore throats or diarrhea. It might also result in more serious illnesses such as meningitis, encephalitis, or severe gastroenteritis. Children, the elderly, and people with weakened immune systems have a greater chance of getting sick when they come in contact with contaminated water.

WHO IS MONITORING THE WATER AT MY BEACH?

Across the country, state, tribal, and local health and environmental protection agencies are responsible for monitoring the quality of water at beaches and posting warnings or closing beaches when pollutant levels in the water are too high. In practice, however, monitoring and beach posting programs are inconsistent. Some areas have good monitoring and posting programs; others have inadequate or no programs at all. EPA established the BEACH Program to provide a framework for local governments to develop equally protective and consistent programs across the country.

WHAT IS THE BEACH PROGRAM?

EPA's BEACH Program aims to protect the health of beach goers through assistance to state, tribal, and local health and environmental officials in designing, developing and implementing beach monitoring and advisory programs and by providing the public with information about the risks associated with swimming in contaminated water. Strong water quality standards, improved scientific methods, and providing information to the public are the key elements of the BEACH Program.

PRIMARY SOURCES OF POLLUTION

The majority of beach closings in the United States result from testing that indicates high levels of harmful bacteria, viruses, and other pathogens are present in beach water. High levels of these pathogens through ingestion, body contact and inhalation increases the public's risk of illness.

Before the passage of the Clean Water Act of 1972, water pollution from untreated sewage was common and widespread. This landmark legislation has dramatically reduced the amount of harmful pollutants entering U.S. waters, but the volume of wastewater continues to increase as our population grows. Recently collected beach water quality information shows the major sources of pathogens in beach water are untreated or partially treated sewage and storm water runoff spilling onto the beaches and from overflowing sewage collection and treatment facilities.

Sewer Overflows

EPA and state environmental protection agencies work with local communities to ensure that sewage collection and treatment systems are properly installed, operated, and remain functional. Under normal operating conditions, sewage from homes and businesses is carried to wastewater treatment facilities where it is properly treated and tested before it is discharged.

Older or malfunctioning sewer systems may have leaking or damaged pipes and connections. Some systems may be simply overloaded because they are serving communities larger than those for which they were designed. During storms or even under dry conditions these systems can spill or leak raw sewage into our waters.

About 900 cities in the United States have combined sewer systems. These systems were designed years ago to carry both raw sewage and storm water runoff (rain and snow melt) to a treatment plant. They were also designed to discharge excess wastewater into local waterways when the system became overloaded. During heavy rainstorms, for example, overloaded combined sewer systems may discharge a mixture of raw sewage, polluted runoff and litter from streets and, in some cases, industrial waste waters, into local waterways where it can contaminate downstream beaches and other areas. In 1994, EPA established a national strategy to greatly reduce the number of combined sewer overflows causing human health and environmental problems.

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***BEACH* PROGRAM** *from page 3*

Polluted Storm Water Runoff

In some cities in the United States, separate storm sewer systems collect and transport rainwater and snowmelt to treatment facilities before releasing it into a river, stream, or bay. When storm water sewers are overloaded they discharge directly into these waters. Rainwater also flows to our beaches after running off lawns, farms, streets, construction sites, and other urban areas, picking up animal waste, fertilizer, pesticides, trash, gasoline, oil, and many other pollutants.

In an effort to reduce health risks associated with the discharge of untreated storm water into local waterways, EPA and representatives from state and municipal government health and environmental protection agencies have been working collectively to increase the capacity of storm water collection systems and reduce discharges of untreated storm water into surface waters.

THE BEACH PROGRAM

Strengthening Beach Standards and Testing Programs

Strong health standards and testing programs, improved science, and informing the public are essential for protecting public health at beaches.

EPA is committed to helping the states and tribes protect public health at recreational beaches. Ensuring state and tribal adoption of strong water quality standards for recreational waters is an essential part of this commitment. States and tribes set beach water quality standards, based on pollutant levels ("criteria") developed by EPA. Local health officials then test their water to see if it meets the state standards. If tests show that pollutant levels are above the standard, then local agencies take appropriate action to inform beach goers through a swimming advisory or beach closure.

Unfortunately, not all states and tribes have adopted the latest criteria to protect public health at recreational beaches. EPA is working to ensure that those states and tribes that have not already done so adopt the updated water quality criteria for Escherichia (E-coli) and/or enterococcus bacteria as part of their water quality standards. EPA is using its current authority, and a variety of tools including technical and programmatic assistance, to ensure appropriate criteria are adopted into all state and tribal water quality standards.

MICROORGANISMS	SOME ILLNESSES AND SYMPTOMS
Bacteria	Gastroenteritis (includes diarrhea and abdominal pain), salmonellosis (food poisoning), cholera.
Viruses	Fever, common colds, gastroenteritis, diarrhea, respiratory infections, hepatitis.
Protozoa	Gastroenteritis, cryptosporidiosis and giardiasis (including diarrhea and abdominal cramps), dysentery.
Worms	Digestive disturbances, vomiting, restlessness, coughing, chest pain, fever, diarrhea.

Monitoring and advisory programs detect pollution and provide timely warnings to the public. Under the BEACH Program, EPA will develop national guidance as a model to state and tribal governments for developing successful monitoring and advisory programs. EPA will also provide information and guidance for implementing local programs.

Current monitoring and advisory programs range from good to non-existent. Under the BEACH Program, EPA, in conjunction with participating agencies, is:

- Providing technical guidance and training on new methods, sampling strategies and predictive models, and
- Sponsoring a national conference and other meetings to focus more scientific research on better detection tools and monitoring and advisory programs.

IMPROVING SCIENCE

Through the coordinated efforts of all levels of government, the BEACH Program is working to improve the scientific foundation for beach testing by providing faster laboratory test methods to predict pollution and making new investments in public health and beach testing methods research. These new scientific tools will help give health and environmental officials the ability to provide early warning about the potential for public health risks caused by swimming in polluted water.

Faster Laboratory Test Methods

Timing, both in detecting and reporting potentially harmful microorganisms, is critical to protecting public health. Current laboratory tests take too long to determine whether beach water is polluted. EPA has, however, developed and is making available a new laboratory test method that gives accurate results in half the time than current methods allow. This new, improved laboratory test method for enterococci produces results in 24 hours rather than 48 hours required by the current method. Local officials who use this new laboratory test method will be able to reduce unnecessary exposure of the public to disease-causing pathogens by more promptly issuing warnings to beach goers.

Predicting Pollution

Although some local beach officials can predict beach pollution through the use of computer models or other information, most local officials must wait for test results before they can take action, potentially exposing the public to disease causing organisms.

EPA is sponsoring research to develop and validate models that enable government officials to predict

pollution before the public is exposed. These models will identify, in advance, when closure of a specific beach is necessary (to protect public health). Predictive models use data such as rainfall rate, duration of pollution, and historical severity of pollution to calculate potential adverse water quality conditions. They are an effective initial warning device that local officials can use to alert beach goers of potential problems during and immediately following a rainstorm.

Typically, pollutants washed into rivers, lakes, and streams eventually make their way to recreational beaches. Local officials collect samples of water at downstream beaches and test them for the presence of contaminants. However, people swimming during the time between sample collection and test results may be unnecessarily exposed to microbial pollutants at peak contamination times. Predictive models are intended to reduce such exposures. EPA has begun an evaluation of existing models and will begin collecting modeling data from new sites. Once complete EPA will provide copies of the models and training in their use.

Investing in Health and Methods Research

As mentioned, current test methods cannot detect all disease-causing organisms or give us instantaneous results. To fill this gap, EPA has begun work on a multi-year research agenda. EPA, in conjunction with the scientific community, will develop new and better ways to assess viral and bacterial contamination in recreational waters.

Specifically, the BEACH Program research agenda includes, among other things, development of methods that will identify the presence of eye, ear, nose, throat, and skin disease-causing agents in recreational waters; development of an easy to use "dipstick" indicator method that can be used by local officials, private citizens, or lifeguards to instantaneously identify the potential for fecal contamination; and epidemiological studies to validate new methods and establish relationships between diseases and the presence of microorganisms in the water.

Implementation of the research agenda has begun and will continue at least through the year 2001. Additional monitoring and assessment tools will be made available as they are completed.

INFORMING THE PUBLIC

The BEACH Program is designed to improve public access to information about the quality of the water at their beaches and health risks associated with swimming in polluted water. As part of EPA's commitment to ensure the public right-to-know, EPA created an Internet website that explains the program. This will make it easier for everyone to find out about local beach water quality conditions, beach advisories, closures, and other pertinent information. In addition, EPA has gathered specific information on individual beaches that will be updated annually.

EPA's new website on the Internet, called "Beach Watch," is an on-line directory of information about the water quality at our nation's beaches, local protection programs, and other beach-related programs. The "Beach Watch" website is located on the Internet at *http://www.epa.gov/ost/beaches*. Beach closings and local contacts are listed by state where available. "Beach Watch" will be updated as new information becomes available.

Government agencies, tourism boards, environmental groups and others are encouraged to contact EPA about contributing health-related studies, reports, and appropriate questions and answers.

FOR MORE INFORMATION

For additional information on water quality at specific beaches, call the city, county, or state health or natural resource protection agency listed in your local telephone book.

You may also contact: U.S. Environmental Protection Agency Office of Water, Office of Science and Technology, 401 M St., S.W. (4301), Washington, D.C. 20460, E-mail: *owgeneral@epamail.epa.gov*.

Information reprinted from "BEACH Program," United States Environmental Protection Agency, EPA-820-F-002

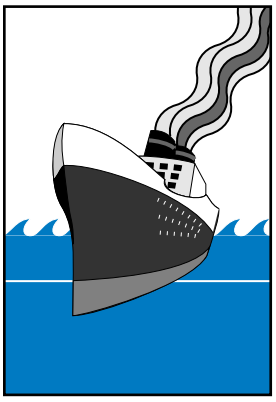
Questions to Ask Your Local Beach Health Monitoring Official

- Which beaches do you monitor and how often?
- What do you test for?
- Where can I see the test results and who can explain them to me?
- What are the primary sources of pollution that affect this beach?

What to Do if Your Beach is Not Monitored Regularly

- Avoid swimming after a heavy rain.
- Look for storm drains (pipes that drain polluted water from streets) along the beach. Don't swim near them.
- Look for trash and other signs of pollution such as oil slicks in the water. These kinds of pollutants may indicate the presence of disease-causing microorganisms that may also have been washed into the water.
- If you think your beach water is contaminated, contact your local health or environmental protection officials. It is important for them to know about suspected beach water contamination so they can protect citizens from exposure.
- Work with your local authorities to create a monitoring program.

Cruising for a Bruising: *Luxury Liners Fined Millions for Polluting*



To entice travelers onboard their luxurious ships, cruise lines fill their advertisements with images of sparkling ocean waters and pristine beaches. This has made the recent record fines assessed against several cruise lines for water pollution even more embarrassing to the industry.

This summer, Royal Caribbean Cruises Ltd. was fined $18 million, the largest ever to be paid by a cruise line on charges of polluting US waters, for 21 felony counts of dumping oil and hazardous chemicals. The fine is on top of the $9 million fine levied against the company last year for similar transgressions. In addition to the fines, Royal Caribbean will operate under a court approved environmental compliance plan for the next five years.

Since 1993 six other cruise lines, including Holland American Lines, have paid fines ranging up to $1 million after pleading guilty to illegal waste dumping, including pumping bilge water overboard without first filtering out oil as required by anti-pollution regulations.

"Royal Caribbean polluted the very environment on which its business relies," Attorney General Janet Reno said at a news conference announcing the charges. "They dumped everywhere; at sea, in port, at sensitive environmental areas . . . They didn't care."

According to the Justice Department's environmental crimes section, to save the cost of properly disposing of their waste, Royal Caribbean installed hidden bypass pipes in their ships to dump untreated bilge water contaminated by waste oil and hazardous materials overboard, often at night. Ship personnel would then falsify logbooks. Dry cleaning, photographic developing, and print shop activities on board the ships contributed to the hazardous chemicals contained in the bilge water.

Fines & Rewards

The hefty fines cruise lines are paying out are not being used solely to fatten government coffers. Much of the money has been earmarked to heal the damage caused by the cruise lines' negligence.

Of the $9 million fine paid by Royal Caribbean, $1 million has been set aside to benefit conservation projects in Florida and Puerto Rico. In addition to their $1 million fine, Holland America Line cruises are forking over an additional $1 million to a fund protecting the marine ecosystems of Alaskan national parks.

Conservation areas are not the only beneficiaries. Good Samaritans who have aided the Justice Department in their investigations have reaped windfalls for their vigilance. Pollution laws stipulate that fines for offenses be shared with those who aided in the case's prosecution. One couple vacationing aboard a cruise ship videotaped the crew dumping trash overboard into the ocean. The couple's reward for bringing the evidence of the infraction to the attention of the authorities—one-half of the $500,000 fine paid by the cruise line.

In the Holland America Line case, the crewmember who reported the dumping of unprocessed bilge water received one-half of the $1 million fine. His good deed did not come without a price, however. Ignored by his superiors when he initially brought their attention to the illegal dumping, he has since been hounded out of the industry and no longer pursues a career at sea.

The next time you're on a cruise, keep a sharp eye out and report any suspected environmental violation to the Coast Guard. You may do the ocean environment—as well as your own bank account—a big favor.

CONTAMINATED CARGO: THE HIDDEN DANGERS OF BALLAST AND BILGE WATER

Bilge water is the wastewater that accumulates in the bilge of ships; it can contain mechanical and chemical emulsions and contaminants. According to United States Coast Guard statistics, untreated bilge water accounts for a large part of 570,000 tons of oil that enters the marine environment annually.

The ballast water carried by ships can also harbor harmful contaminants. Aquatic organisms, scooped up when ballast water is taken onboard a ship, can be introduced into regions where they are not indigenous when the ship discharges the water.

Estimates indicate that ballast water may be transporting 3,000 species of animals and plants a day around the world. These non-native species can cause significant changes to ecosystems and threaten human health. One of the most infamous examples of this kind of organic contamination is the invasion of zebra mussels in the 1980s. This destructive bivalve arrived in American waters in the ballast water of European ships.

Red Tides: *A Deadly Bloom*

by Cathy Coniaris

Red tides are not necessarily red, nor are they associated with the tides. They are a bloom of microscopic algae that can cause such problems as poisoning shellfish, killing fish, decreasing dissolved oxygen in seawater, and discoloring coastal waters. A more appropriate term for these events is "harmful algal blooms" (HABs).

These blooms have been documented around the world for many centuries. Some scientists believe they have increased in occurrence and duration due to "human fertilization" of the ocean with such nutrient-containing pollution as sewage and the runoff of animal wastes and agricultural fertilizers. Ocean currents can carry harmful algal species great distances; this transport is accelerated by the common practice of discharging ship ballast water containing non-native organisms.

There are several types of algal blooms that can harm marine life and humans. Below are descriptions of several of the more well-known.

Pfiesteria piscicida. Also known as "cells from hell," *Pfiesteria* can occur from the Gulf of Mexico to Chesapeake Bay. This species has been called an "ambush predator" and "phantom-like" due to its cryptic behavior. This microscopic organism has 19 known life cycle stages. When it is dormant on the seafloor, it can sense the presence of live fish and shellfish. Morphing into another more toxic and mobile form, it excretes a toxin that sickens fish (in high enough concentrations, the toxin can kill fish). The organism then feeds on the weakened fish. Just as quickly as a *Pfiesteria* bloom appears, it can disappear, leaving behind dead and bleeding fish. *Pfiesteria* can also cause sores on fishermen's arms.

Ciguatera fish poisoning. Ciguatera toxins are produced by certain species of microscopic organisms in subtropic and tropic regions (there have been reported outbreaks in Hawaii, Florida, Puerto Rico, and the US Virgin Islands). Grazing fish consume organisms containing the Ciguatera toxin and predatory fish (such as barracudas, snappers, groupers, jacks and mackerel) eat the grazers. In this manner, the toxins become concentrated and can sicken humans who have eaten tainted fish. In humans, ciguatera toxin poisoning can cause gastrointestinal, neurological, and cardiovascular symptoms, but is rarely fatal.

Shellfish poisoning. There are various types of shellfish poisoning, including paralytic, amnesic, neurotoxic, and diarrhetic, caused by different species of algae. Though shellfish poisoning has the potential to be fatal, federal and state testing programs help keep tainted shellfish off the market. These same toxins can also affect fish and marine mammals.

Brown tides. Brown-colored algal blooms occur in coastal areas of Rhode Island, New York, New Jersey, and the Gulf of Mexico. These blooms occur in late spring and summer and are particularly harmful to sea grasses and bivalves (see "Eutrophication").

Eutrophication. Even non-toxic species of algae can be harmful if their blooms are large enough. Eutrophication is a blanket term for a set of "symptoms" in sheltered coastal areas affected by an excess of nutrients. These symptoms include reduced sea grass beds and hypoxia. The former is caused when large algal blooms block light to sea grasses below, killing them off. Sea grass habitats are important because they provide shelter and nursery habitat for fish. The latter symptom is caused when a large algal bloom dies and settles to the bottom. Bacteria help decompose the dead algae and in the process consume a lot of oxygen. This decrease in dissolved oxygen is known as hypoxia; it can kill bottom-dwelling organisms such as bivalves (e.g., clams and oysters) that can not swim elsewhere. The largest area of hypoxia in the United States is in the Gulf of Mexico, covering an expanse of approximately 7,000 square miles (its size varies from year to year). This area of hypoxia forms over the spring and summer months when the gulf waters are stratified, or layered, due to tem-

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HOW A TOXIC ALEXANDRIUM BLOOM OCCURS
The Life Cycle of One Cell

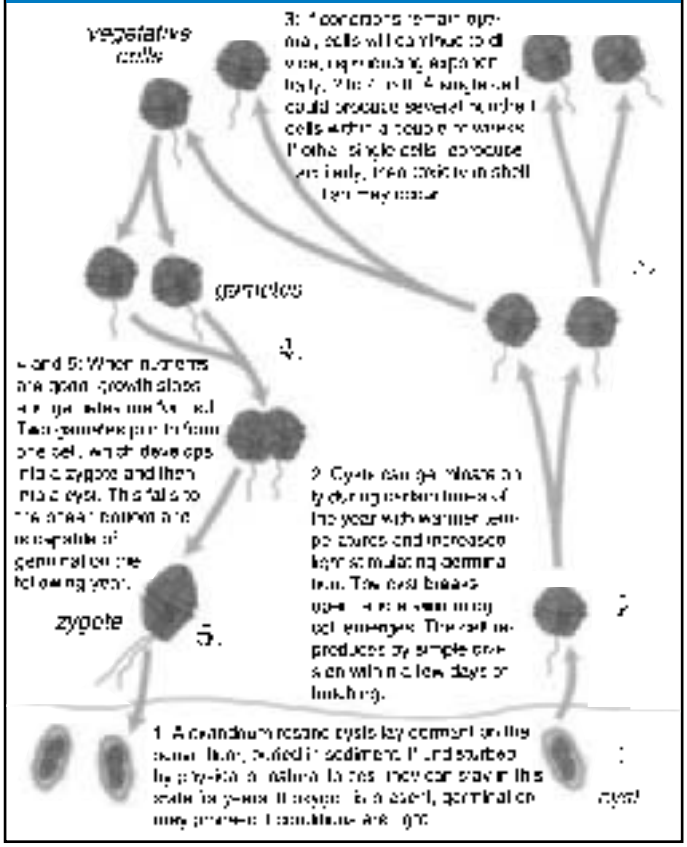

ILLUSTRATION BY JACK COOK, WHOI.

RED TIDE *from page 7*

perature and salinity differences between the surface and bottom waters. In the fall and winter, the water mixes and the area of hypoxia disappears until the spring.

Recent Legislative Action

The United States Congress recently passed a law entitled "The Harmful Algal Bloom and Hypoxia Research and Control Act of 1998." This act requires the establishment of the Inter-Agency Task Force on Harmful Algal Blooms and Hypoxia. It also requires that two national assessments be conducted on harmful algal blooms and hypoxia, as well as a specific assessment of the annual hypoxia in the Gulf of Mexico. The assessments are currently in draft form. They examine HAB/hypoxia ecology, impacts of blooms on the economy and society, and methods of mitigation. This legislation also authorizes additional funding for monitoring and research, including the ECOHAB project discussed below. For more information, go to *http://www.habhrca.noaa.gov*.

Red Tides and ECOHAB in the Gulf of Maine

Several species have been known to become a nuisance and even toxic in New England. The species of most concern in the Gulf of Maine is *Alexandrium tamarense*, a microscopic organism containing a toxin that can cause paralytic shellfish poisoning (PSP). Symptoms of PSP include tingling, numbness, burning sensations, and loss of muscle coordination. Paralytic shellfish poisoning has also been observed in other parts of the country, including the Pacific Northwest and Gulf of Alaska.

The first nationally coordinated multi-agency effort to study HABs began in 1995: the Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) Program. ECOHAB projects around the country will seek to learn more about the biology and behavior of harmful algae so that in the future blooms can be predicted and controlled. ECOHAB researchers in the Gulf of Maine are currently studying *Alexandrium* sources, distribution, and dynamics. For more information, go to *http://crusty.er.usgs.gov/ecohab*.

Are Red Tides a Concern in Massachusetts and Cape Cod Bays?

Alexandrium red tides were not recorded in Massachusetts Bay before 1972. In that year, a hurricane blew through the Gulf of Maine stirring up the waters and bringing the red tide organism into Massachusetts Bay. Since then, the organism has almost always been present in the water in very low numbers, blooming on occasion. When a bloom is blown onshore by the wind, it can be taken up by filter feeding shellfish. Concentrated in the shellfish tissue, the toxin is harmless to the shellfish but can cause PSP in humans who consume them.

The species of most concern in the Gulf of Maine is* Alexandrium tamarense*, a microscopic organism containing a toxin that can cause paralytic shellfish poisoning (PSP). Symptoms of PSP include tingling, numbness, burning sensations, and loss of muscle coordination.

The Massachusetts Division of Marine Fisheries (MADMF) has a PSP sampling program that samples mussels from April to November at 16 primary sampling stations. If PSP toxin is found in high concentrations, sampling is extended to additional stations and shellfish species. Sampling is initiated in the spring once the state of Maine detects PSP in their shellfish. This is because the general coastal current in the Gulf of Maine travels down the coast; Alexandrium blooms have been observed to be transported from Maine in this current.

Several environmental advocacy groups have shown concern towards the new Massachusetts Water Resources Authority (MWRA) treated effluent outfall tunnel, scheduled to go on-line in Spring 2000. The tunnel will discharge 9.5 miles from Boston into Massachusetts Bay.

Advocacy groups are worried that nutrients discharged from the outfall will "feed" any *Alexandrium tamarense* blooms carried down the coast and affect coastal shellfish beds or endangered species such as the northern right whale. They are also concerned that nutrients discharged from the new outfall will stimulate the growth of dormant *Alexandrium* cysts on the seafloor.

Some scientists feel the cysts located in Massachusetts Bay are not present in high enough concentrations to cause a bloom. Scientists involved with the design of the outfall contend that the effluent will be sufficiently treated and diluted through 54 diffusers on the seafloor. Furthermore, the outfall is built to discharge effluent in 100 feet of water; *Alexandrium* travelling in the coastal current will be located in the upper layers of the water column. The effluent will be trapped below the surface during the summer months, keeping outfall nutrients away from *Alexandrium*. There is some dispute as to whether this particular species *(A. tamarense)* swims down to utilize nutrients in deeper water.

During the outfall siting process, it was concluded that the new outfall would not contribute to an increase in red tides compared to the current outfall. However, those still concerned would like the recently formed Outfall Monitoring Science Advisory Panel (OMSAP) to convene a group of experts to determine if the MWRA should add additional monitoring locations to measure *Alexandrium* in Massachusetts and Cape Cod Bays. Currently, MWRA looks for *Alexandrium*, as well as other harmful algal species, in their water quality sampling. It also uses the MADMF PSP data.

Restoring Coastal Ecosystems—The Long Island Sound Example

by Mark A. Tedesco, Director, U.S. EPA Long Island Sound Study Office

While Long Island Sound is an uncommonly productive resource, funneling an estimated $5 billion annually into the regional economy from commercial and sport fishing, boating, swimming, and beach going, it shares many of the same problems and challenges as other estuaries: habitat loss and alteration, coastal development, nutrient enrichment, and toxic and pathogenic pollutants.

Estuaries are particularly vulnerable as they often serve as "sinks" for pollutants originating upstream. In addition, estuaries are directly impacted by human activity-well over half the people in this country live, work, or play near the coast.

The Environmental Protection Agency's National Estuary Program was established by Congress in 1987 to demonstrate a new framework for addressing serious environmental problems faced by these valuable ecosystems. The approach to managing these problems, modeled after the Chesapeake Bay and Great Lakes Programs, is to foster a collaborative, cooperative effort.

Termed a "Management Conference," this cooperative effort brings together representatives from the private sector, research institutions, individual citizens, and all levels of government. In a Management Conference, ecosystem health is emphasized and no new federal laws are mandated. Instead, participants attempt to build a consensus on actions and to coordinate implementation through existing regulatory programs, education, and voluntary agreements.

Long Island Sound became a charter member of the National Estuary Program in 1987, along with Buzzards Bay and Narragansett Bay. The program now includes twenty-eight estuaries around the country, including the New England sites of Massachusetts Bay, Casco Bay, and the New Hampshire Estuaries Project.

Sponsored by the Environmental Protection Agency (EPA), New York State Department of Environmental Conservation (NYSDEC), and the Connecticut Department of Environmental Protection (CTDEP), the Long Island Sound Study (LISS) Management Conference completed a $15 million Comprehensive Conservation and Management Plan in 1994 that was adopted by the Governors of New York and Connecticut and the EPA Administrator.

What lessons were learned from this effort? How does the 1994 plan compare to prior plans for Long Island Sound and with other estuary programs? And, in the five years since being adopted by EPA and states of New York and Connecticut, what are the results of the plan? Is the plan even being implemented? First some perspective.

In a Management Conference, ecosystem health is emphasized and no new federal laws are mandated. Instead, participants attempt to build a consensus on actions and to coordinate implementation through existing regulatory programs, education, and voluntary agreements.

Long Island Sound

Unlike most estuaries, Long Island Sound does not have one connection with the sea: it has two. Rather than having a major source of fresh water at its head, flowing into a bay that empties into the ocean, Long Island Sound

is open at both ends, to the Atlantic Ocean on the east and to New York Harbor on the west.

Most of its fresh water comes from a series of south-flowing rivers, including the Housatonic, Thames, Pawcatuck, and Connecticut rivers. With its tributaries cutting through portions of Connecticut, Massachusetts, Rhode Island, New Hampshire, and Vermont, the Sound is strongly and inextricably linked to New England.

The Sound's 16,000 square mile drainage basin also includes portions of New York City and of Westchester, Nassau, and Suffolk counties in New York state. The Sound combines this multiple inflow / outflow system with a highly convoluted shoreline and complex bottom topography. Taken together, these features produce unique and complex patterns of tides and currents.

The human element is also complex. The Sound lies in the midst of the most densely populated region of the United States. Always considered a desirable place to live and recreate, the area around Long Island Sound experienced a major population influx after World War II.

Residential, commercial, and recreational development increased pollution, altered land surfaces, reduced open spaces, and restricted access to the Sound. The use of the Sound as a place to dispose of human and other wastes increased dramatically. The "paving over" of the land increased runoff and reduced the filtration and processing

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LONG ISLAND SOUND *from page 9*

functions of natural landscapes. Habitat destruction and alteration throughout the watershed harmed native wildlife populations and reduced the breeding grounds and nursery areas for a variety of species.

In total, more than eight million people live in the Long Island Sound watershed and millions more flock yearly to the Sound for recreation. Residential development, both urban and suburban, dominates agricultural use, particularly in the New York and Connecticut portions of the watershed.

The Sound provides many other valuable uses, such as cargo shipping, ferry transportation, and power generation. With the number of resources and recreational opportunities it provides, Long Island Sound is among the most important estuaries in the nation and among the most burdened.

Restoring the Sound

Excess nutrients in the Sound have resulted in periods of eutrophication and hypoxia, or low dissolved oxygen. In general, the low levels of dissolved oxygen regularly observed during late summer in the Sound diminish its habitat value. This diminishment takes the form of a reduction in the abundance and diversity of adult finfish; a reduction in the growth rate of juvenile and larval stages, such as newly-settled lobsters and juvenile winter flounder; and the killing of species that cannot move or that move slowly, such as lobsters and juvenile and larval life stages.

The LISS supported development of a computer model in order to understand the relationship among natural variations, human-caused nutrient loadings, and dissolved oxygen levels. This computer model targeted excess nitrogen as a key contributor to low levels of dissolved oxygen in the Sound. Municipal sewage treatment plants are the dominant source of the nitrogen, reflecting the population density of the region. Atmospheric deposition of nitrogen from automobiles and power plant emissions is also a significant source to the Sound.

The LISS began implementing a phased approach to reducing nitrogen loadings to the Sound in 1990. Eleven management zones, delineated by natural drainage basin boundaries and political jurisdictions, were established to foster comprehensive watershed planning during each phase.

Phase I, announced in 1990, established a freeze on point and nonpoint nitrogen loadings to the Sound in critical areas. Phase II, announced in 1994, set commitments for low-cost actions, specifically the upgrading of municipal sewage treatment plants and the prevention of increases from nonpoint source loads. Finally, in 1998, EPA and the states of New York and Connecticut adopted Phase III, "Actions for Hypoxia Management." This phase set the aggressive long-term goal of reducing nitrogen loads by 58.5 percent over 15 years. Five and ten-year interim targets were also set. A key component of the agreement is a commitment to reevaluate the nitrogen reduction target every five years and to support work to advance the technical basis for decision-making.

If achieved, the reduction target is projected to reduce the area of the Sound affected by hypoxia by 75 percent and the duration of hypoxia by 85 percent. In the area of the Sound that typically experiences the most severe hypoxia, biological impacts are projected to be reduced by more than 90 percent. To fully protect aquatic life, management of more distant sources, including those contributing to atmospheric deposition, will also be pursued.

The states of New York and Connecticut will implement the nitrogen reduction target through section 303(d) of the Clean Water Act, which proscribes development of a *Total Maximum Daily Load* (TMDL) for areas not attaining water quality standards. While the TMDL offers advantages in providing an enforceable framework, particularly for point sources, it also removes some of the flexibility inherent to the estuary program while providing no additional regulatory control for managing nonpoint sources. The TMDL is under development and is expected to be released for comment in 1999.

The LISS has also set goals for other water quality and habitat initiatives. For example, in 1998 the LISS adopted a goal of restoring 2,000 acres of habitat and 100 river miles for anadromous fish passage within ten years. To address polluted runoff, the LISS is emphasizing watershed protection through local community-based planning efforts. Training and technical assistance is being provided to local decision-makers on planning and zoning tools and on approaches to protect resources and water quality. An active education and involvement program is being implemented to maintain communication and foster understanding among stakeholders.

The key to the estuary programs is not a final plan that culminates a set of studies. It is an ongoing management structure, an institutional framework, to coordinate implementation of the plan, as well as to refine, change, or add to it. This can be coordinated through a federal office, such as for Long Island Sound, Chesapeake Bay, and the Great

Lakes, or through a state or local office, as in many of the other estuary programs in New England.

This point was made for Long Island Sound in the not too distant past. In 1975, the New England River Basins Commission prepared a comprehensive plan for Long Island Sound, which was left mostly unimplemented. It languished because the program ended with the plan.

The comments of Dr. Howard Weiss, who was involved in the original study and was the initial co-chair of the LIS Citizens Advisory Committee, are insightful: "One of the things that disappointed me most about the NERBC study was, when the work was done, everybody went home. The NERBC was actually dissolved. Everybody stopped talking to each other. We need to put a mechanism into place to provide continued, coordinated management of Long Island Sound beyond the issues that we are focusing on now . . . Once we solve a couple of today's high priorities, others are going to bubble up to the top, either because of high-profile events, or because the state of our knowledge about the Sound expands."

Strong public involvement is a requisite for implementing, not just developing, restoration plans. In Long Island Sound, management is being coordinated and public involvement remains strong. Critical to the implementation progress has been the commitments made by the states of New York and Connecticut. New York State has approved $200 million for Long Island Sound as part of a $1.75 billion bond act. For 1999, $50 million has been set aside. Connecticut, a national leader on wetlands restoration, has awarded more than $200 million in the past three years to support upgrades at sewage treatment plants.

For copies of the Action Plan, fact sheets on implementation progress, or for more information, contact the EPA Long Island Sound Office, Government Center, 888 Washington Blvd., Stamford, CT 06904-2152, (203) 977-1541, or visit *www.epa.gov/region01/eco/lis*.

LONG ISLAND LOBSTERS THREATENED BY MYSTERY ILLNESS

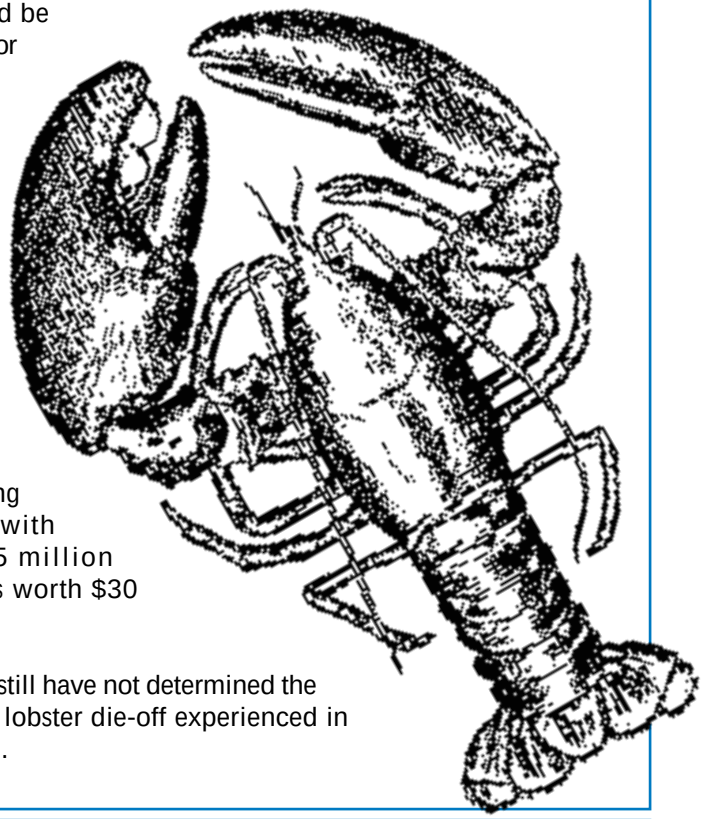
In Long Island Sound, tens of thousands of lobsters are dying off, puzzling conservation officials and threatening the livelihood of lobstermen. Although lobster die-offs have been reported in the area several times this decade, all during the autumn season, this year's has the makings to be the worst of them. The exact cause of the die-off is as of yet unknown.

Western Long Island Sound has been the area hardest hit by the die-off. As this part of the Sound is regularly plagued by hypoxia, a condition of reduced levels of dissolved oxygen in water that can be deadly to marine life, testing the water was the first order of business in pinpointing the cause of the die-off. Testing, however, revealed that oxygen levels were healthy.

Pollution and water temperature, also suggested as possible culprits, have been eliminated as causes. Testing has ruled out increased pollution levels, and the 200-foot depths that lobsters inhabit did not suffer nearly the same temperature variance as surface waters in this summer's drought and heat.

Although no evidence of gaffkemia, a common and often fatal bacterial infection in lobsters, has been found, evidence does seem to point to some variety of disease as the culprit. However, there have been no reports of anyone becoming ill after eating lobster as boiling the lobster kills off any pathogens.

With eight out of every 100 lobsters trapped coming up dead, this year's die-off could be financially ruinous for area lobstermen. Increased sales were expected to meet the worldwide demand for elegant lobster dinners this New Year's Eve. New York ranks behind Maine and Massachusetts as the nation's leading lobster producer with 1998 sales of 8.5 million pounds of lobsters worth $30 million.



Scientists in Maine still have not determined the cause for the large lobster die-off experienced in their waters last fall.

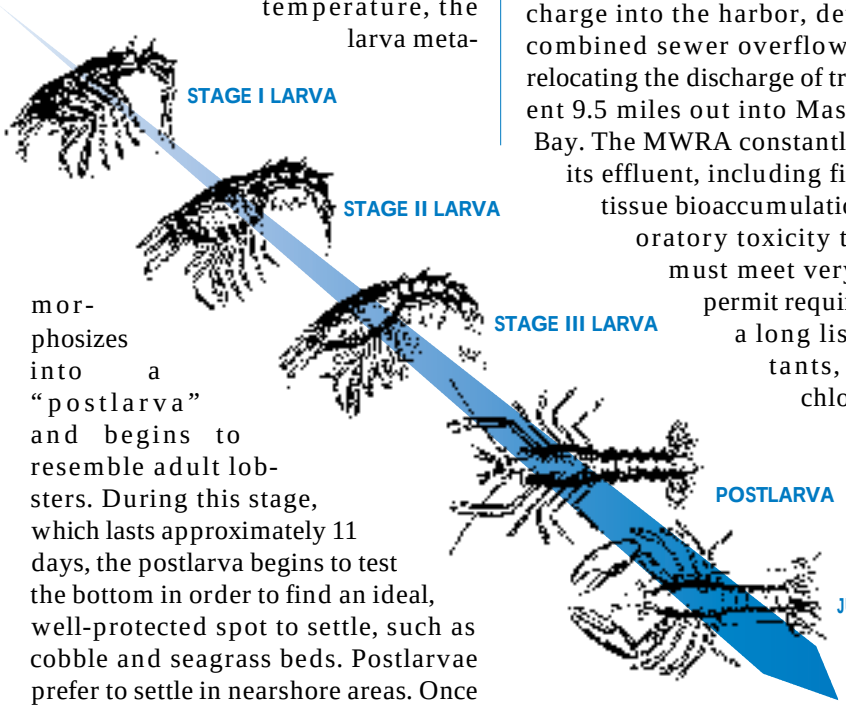
I Love That Dirty Water: *Can Lobsters Thrive in a Clean Boston Harbor?*

By Cathy Coniaris

Images of lobsters are synonymous with New England culture and heritage. The lobster fishery in New England is one of the last remaining productive fisheries along the northeastern coast. As the demand for lobster keeps increasing, so does the pressure on the fishery. Overfishing, loss of habitat, large storms, and diminished food sources are among the potential causes for lobster population declines. Some lobstermen in Massachusetts blame the cleaning of Boston Harbor for lower lobster catches in the harbor.

Life Cycle of the Lobster

Lobsters begin life as fertilized eggs attached to the abdomens of females for 9 to 12 months. Once hatched into the water, the lobster molts into several life stages as it grows. In its first few stages as a larva, it floats on the surface at the mercy of the currents. After anywhere from two to eight weeks, depending on the water temperature, the larva metamorphosizes into a "postlarva" and begins to resemble adult lobsters. During this stage, which lasts approximately 11 days, the postlarva begins to test the bottom in order to find an ideal, well-protected spot to settle, such as cobble and seagrass beds. Postlarvae prefer to settle in nearshore areas. Once settled, the juvenile lobster stays in a burrow until it is large enough to venture out safely. Adult lobsters migrate over large distances between nearshore and offshore. It takes seven years for a lobster to reach market size and they can live up to 30 years or more.



Concerns of Massachusetts Lobstermen Regarding the MWRA Outfall

Lobstermen work hard hours, compete for good lobster grounds, and must deal with state regulations which limit the number of traps they can fish. Though the Massachusetts catch has remained high, the effort in proportion to catch size has grown considerably in recent years.

Meanwhile, the Massachusetts Water Resources Authority (MWRA) has undertaken a $3.8 billion project to clean Boston Harbor. Efforts include improving sewage treatment, reducing illegal discharges, pre-treating industrial discharges, ceasing sludge discharge into the harbor, developing a combined sewer overflow plan, and relocating the discharge of treated effluent 9.5 miles out into Massachusetts Bay. The MWRA constantly monitors its effluent, including field mussel tissue bioaccumulation and laboratory toxicity tests. They must meet very stringent permit requirements for a long list of pollutants, including chlorine.

Boston Harbor lobstermen have slowly had to fish further and further offshore to catch enough lobsters. They feel this is because MWRA is "overcleaning" the harbor by adding too much chlorine for disinfection. They are also concerned that the effluent will harm valuable lobster fishing areas near the new outfall once it goes on-line.

When considering these concerns, other possible impacts to the lobster fishery must also be considered:

- Overfishing
- Habitat loss (for example, due to dredging)
- Pollution impacts (which kill sheltering sea grass beds).
- Illegal removal of eggs from females so they can be sold.
- Cessation of sludge discharge into Boston Harbor (a food source).
- Big storms in 1991 and 1992 stirred up the bottom possibly affecting the young lobster population (it takes seven years for a lobster to reach market size).
- Effects of bottom-dragging fishing gear.
- Bottom temperature fluctuations causing change in migration patterns.

It is extremely difficult to pinpoint which of these have had an effect on the lobster fishery in Boston Harbor.

MWRA Outfall

In order to determine the best possible means of addressing these concerns, the Outfall Monitoring Task Force (OMTF) convened several expert focus groups. Among several recommendations was to request that the MWRA develop a field sampling survey to determine if the new outfall area is a valuable nursery habitat.

The MWRA, with the advice of the OMTF and lobster biologists, developed a sampling strategy. The survey took place in early September 1998. The method used was suction sampling in which divers literally "vacuum" the seafloor in order to capture the cryptic tiny young lobsters. Nearshore control areas in Beverly / Salem Harbor were also sampled. Experts from the Bigelow Ocean Sciences Laboratory and the University of Maine conducted the sampling. In addition, MWRA also routinely monitors effluent by conducting laboratory toxicity tests on several species, including young mysid shrimp, which have been shown to be more sensitive to pollutants than young lobsters.

The Outfall Monitoring Science Advisory Panel, which replaced the OMTF, reviewed the results of the field survey and agreed that MWRA has done a commendable job of addressing the concerns raised regarding lobsters and the new outfall. They concluded that no further studies were needed at this time. The members agreed that the combination of dechlorination, increased residence time of effluent in the outfall pipe (which decreases chlorine residual), and increased dilution at the new outfall site, ensure that the chlorine residual will meet permit levels and be reduced to background levels very quickly. Thus, the OMSAP felt that the concerns about the effects of chlorine on egg-bearing female and larval lobsters were not warranted.

In addition, the OMSAP agreed that the MWRA sampling effort was sufficient to show that, despite substantial landings of adult lobsters in the vicinity of the new outfall site, recruitment of young lobsters at this site is significantly lower than at nearshore sites and thus the new outfall site does not coincide with an important nursery habitat.

Out of Sight, But Keep It in Mind:
Tips for Maintaining Groundwater Supplies

Weather-wise, this past summer was marked by nationwide extremes, with drought conditions prevalent in the northeast. Despite some helpful precipitation donated by the hurricane season, surface water levels remain below average throughout the region.

Although out of sight, groundwater levels also have suffered. How water levels in wells are affected by drought depends on a number of factors, including the depth of the well, the depth to the water table, and local geology. Some monitoring wells hit all time lows this summer. Many have ranged "below normal" (less than 25 percent of typical levels for any given month) for three or more months.

Fall is typically an important time for groundwater to "recharge" its reserves and make up for summer deficits. As temperatures fall and vegetation goes dormant, there is more opportunity for precipitation to percolate into the ground. One way to ensure percolation is to reduce runoff. Here are some steps to minimize runoff from yards and buildings.

- Direct rainwater from rooftops into graveled or vegetated areas where it can be absorbed into the ground.
- Choose "paving" materials that allow water to filter through them whenever possible. Examples include bricks, flagstone, bluestone, or granite, and pre-cast concrete lattice pavers. Wood decks constructed to allow water to run off onto the ground between planks work in a similar way.
- Plant trees, shrubs, and ground covers to reduce runoff and encourage excess rainwater to filter slowly into the soil. Plant moisture-tolerant plants in that low spot on your lawn to retain water on site and allow it to percolate into the ground.
- Keep lawn grass long. "Taller" lawns hold water in the ground better than "short" lawns and require less watering. Plant new lawns with slower growing grass varieties that require less water and less work.
- Use mulch to promote infiltration and reduce evaporation.
- Leave natural, undisturbed wooded areas between developed areas and lakeshores, rivers, streams, and ditches. They will act like sponges, promoting infiltration to groundwater.
- Think "runoff control" when developing or redeveloping a site. Grade land so that water is retained on site and allowed to filter into the soil.

Lower groundwater levels may signal only a temporary response to dry weather, but they also serve to remind us that we can't take water for granted. Not only is groundwater a source for public water supplies and private industrial, commercial, and residential drinking water supplies, it also provides our rivers and lakes with a continual inflow of water. Promoting infiltration, managing water wisely, and using it efficiently in your home, your yard, your school, and your business, make economic and ecologic sense for your community.

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The Narragansett Bay Estuary Program: *Coordinating Coastal Habitat Restoration in Rhode Island*

By Tom Ardito, Policy and Outreach Coordinator, Narragansett Bay Estuary Program

In 1793, Samuel Slater launched the American Industrial Revolution with the construction of a water-powered cotton mill on the banks of the Blackstone River in Pawtucket, Rhode Island. He could not have imagined the effect of his innovation on Rhode Island and, ultimately, the nation. The shift to a manufacturing and, eventually, a post-manufacturing economy utterly transformed New England's landscape. Nowhere is this more apparent than on the shores and in the watershed of Narragansett Bay.

In the two centuries since Slater built his mill, all of Rhode Island's significant rivers have been dammed at multiple points. Shipping channels have been dredged, marshes filled, wharves and seawalls constructed, forests cleared, streams piped, hillsides paved, and roads and highways built. As a result, fish and wildlife once plentiful in Narragansett Bay—flounder, scallops, black ducks, and many others—have become scarce. To heal the damage inflicted by centuries of coastal use and development, resource managers, scientists and community activists—in New England and nationwide—are increasingly turning toward the emerging technology of coastal habitat restoration.

Coastal habitat restoration includes such actions as returning tidal flushing to salt marshes constricted by roadways; installing fish ladders or breaching dams to re-enable riverine fish migrations; and planting eelgrass in areas where it has disappeared. Over the past decade or so, a number of projects have been carried out in Rhode Island—from pick-and-shovel efforts by the environmental group Save The Bay to a multi-million dollar state/federal/university partnership to restore the 128-acre Galillee Salt Marsh in Narragansett. In fact, the concept of coastal habitat restoration has gathered so much steam that when the Narragansett Bay Estuary Program sponsored a "Coastal Habitat Restoration" charrette, or workshop, last December, it was attended by nearly 100 people.

The charrette was held at the University of Rhode Island's Coastal Institute in Narragansett. Gathered were representatives from community and environmental groups, fishermen, lawmakers, researchers, and state and federal agency personnel. They presented information on restoration projects, developed maps of coastal restoration activities throughout the state, and participated in break-out sessions on "Planning," "Legislation," "Research and Monitoring," and "Permitting."

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In response to calls by scientists, natural resource managers, and environmental advocates, the Bay Program organized the meeting to coordinate and focus the efforts of groups throughout the state. With experience in coordinating diverse interests toward improving the Bay's environment as well as a history of involvement in restoration, the Bay Program was a natural choice to organize the Coastal Habitat Restoration Charrette.

There was remarkable consistency among the recommendations developed by the participants in the charrette's break-out sessions. A number of common threads emerged from the day's discussions, resulting in the following recommendations:

- Improve coordination: Establish a statewide coordinating body to

facilitate information exchange and technical support among agencies, community groups and researchers.

- Increase state funding: Develop a reliable source of state funding to match federal dollars and fund community-level projects.
- Increase public/political support: Educate policy-makers and the public about the ecological need and economic benefits of restoration.
- Initiate planning: Develop a restoration plan for Rhode Island's coastal habitats to help determine priorities, set goals, allocate resources, and inform federal agencies of the state's restoration needs.
- Improve information exchange: Improve communication between community groups, government agencies, and researchers regarding restoration.
- Define restoration: Develop a standard definition of "coastal habitat restoration."

In some cases, issues were identified but not resolved. For example, some participants suggested a need to streamline the permitting of restoration projects; others expressed support for the existing process. Discussions of this issue are continuing.

The Bay Program began the process of carrying out the charrette's recommendations on several fronts. In order to develop a source of state funding for restoration, the program worked with other state agencies, members of the Rhode Island General Assembly, the office of the lieutenant governor, and Save The Bay to collaboratively develop a bill to fund restoration. The legislation was not passed during the 1999 legislative session, but is expected to be reintroduced by the lieutenant governor in 2000.

In addition, the program is looking toward use of other potential funding mechanisms, including new and expanded federal sources such as Senator John Chafee's proposed Estuary Habitat Restoration Partnership Act. The Bay Program recently testified before Congress in support of that measure and similar House bills.

In April 1999, the Bay Program convened a Rhode Island Coastal Habitat Restoration Team. The team meets monthly or as needed to coordinate restoration efforts around the state. It includes representatives from state and federal agencies, universities, and environmental and community groups.

During the summer of 1999, the team coordinated development of the U.S. Army Corps of Engineers' Rhode Island Ecosystem Restoration Reconnaissance Study, a federal initiative to identify coastal restoration opportunities. The team currently is developing a coastal habitat restoration plan and database for Rhode Island; publishing a map of restoration project opportunities and accomplishments throughout the state; developing restoration outreach products; and strategizing for the next session of the Rhode Island General Assembly.

It took several centuries of development to produce the coastal environment we know today, and it will require a major collective effort to reestablish even a fraction of the biological value that's been lost on Narragansett Bay and elsewhere in Rhode Island's estuaries. Working collaboratively with its partners—governments, stakeholders and scientists—and applying the National Estuary Program model—coordination, communication, education and sound science—the Narragansett Bay Estuary Program is helping the state reclaim and preserve Rhode Island's coastal heritage.

A Great Start: *Nonpoint Source Pollution Project in the New Meadows Estuary Watershed*

by Stephanie Watson, Coastal Watershed Planner, Maine Coastal Program

Situated along the southeastern border of the larger Casco Bay watershed, the New Meadows River Estuary watershed includes a river, a road-impounded estuarine "lake," and an estuary proper. The coastal towns of Brunswick, Harpswell, Bath, West Bath and Phippsburg draw from this 23 square mile watershed.

The State of Maine has placed the New Meadows River Estuary on its list of priority coastal waters for nonpoint source pollution abatement activities. Water bodies on the list are those with significant resource value whose water quality is impaired or threatened by nonpoint source pollution. The list grants preference in state selection of project proposals attempting to benefit those waters.

The New Meadows River Estuary watershed is now a focus area of the Casco Bay National Estuary Project. The Casco Bay Estuary Project, established in 1990, is one of the U.S. Environmental Protection Agency's twenty-eight National Estuary Programs. The Casco Bay Estuary Project was established to preserve the ecological integrity of Casco Bay, while ensuring compatible human uses of the bay's resources through public stewardship and effective management.

In 1999, a Steering Committee formed the New Meadows River Watershed Project to further nonpoint source pollution abatement in the New Meadows River Estuary. The committee includes representatives from the Town of Brunswick, the Town of West Bath, the City of Bath, Bowdoin College, the Casco Bay Estuary Project, the Friends of Casco Bay, the U.S. Environmental Protection Agency, the New Meadows Lake Association, the MER Assessment Corporation, the Brunswick Zoning Task Force, the Maine Department of Environmental Protection, and the Maine Coastal Program / Maine State Planning Office.

In general the purpose and goals of the New Meadows River Watershed Project are as follows:

- To expand local awareness of the connection between land use and water quality through citizen involvement in a series of watershed and shoreline surveys around priority shellfish beds and the lake.
- To locate, characterize, and prioritize in a cost-effective way sources of bacteria, sediment, PAHs and stormwater.
- To make general recommendations to landowners for mitigating or removing those sources.
- To develop a cadre of trained and motivated local citizens to carry out watershed and shoreline surveys in other areas of the watershed and to share their skills with volunteers in other parts of Casco Bay.
- To begin, through the gathering of the information above, to build local support for a comprehensive watershed action plan and interlocal cooperation.

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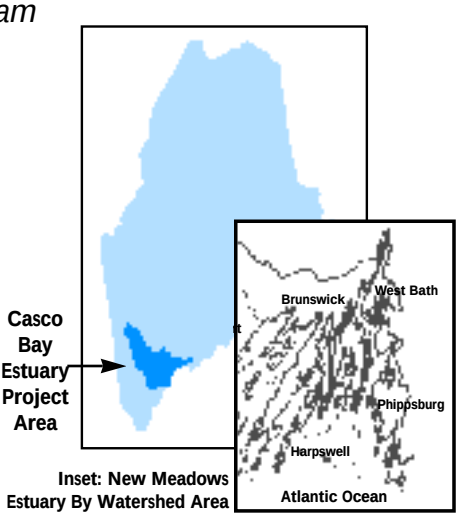


Inset: New Meadows Estuary By Watershed Area

- To continue to integrate these activities with the Casco Bay Estuary Project.

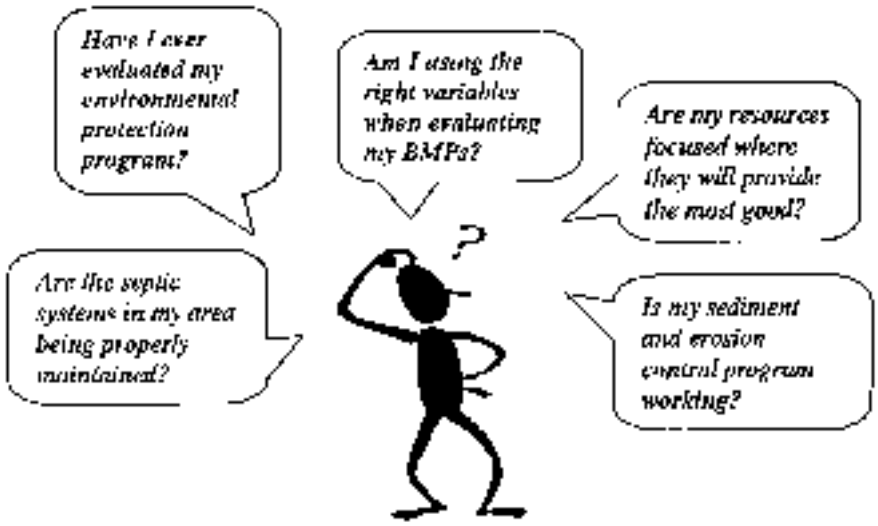
The Steering Committee has elected to approach nonpoint source abatement activities in the New Meadows River in multiple phases. The first phase started in the summer of 1999; it included the hiring of a project coordinator, a survey of potential pollution sources in the lake sections of the watershed, and the collection of scientific data on the waterway's water quality, flushing rates, depths, and oxygenated mud layer.

The second phase of the project includes a citizen volunteer survey of the New Meadows River for potential sources of pollution and an education program for landowners and other watershed residents. Other project phases will be determined as the work of the project committee progresses.

For more information about this New Meadows River Watershed Project, please contact Al Houston at the Town of Brunswick (207-725-6639), Don Kale at the Maine Department of Environmental Protection (Donald.Kale@state. me.us; 207-822-6319) or Stephanie Watson at the Maine Coastal Program (Stephanie.Watson@ state.me.us; 207-287-1482).

ANNOUNCEMENT

Attention county, city, and township Environmental Officials



If you would like help answering these and other BMP implementation questions, check out EPA's new guidance on *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures*. This manual can assist a community in determining whether their goals, standards, and management practices are being used as designed. It also can help officials assess and focus environmental protection programs.

This manual helps to establish a program to track the implementation, operation, and maintenance of specific water pollution control practices. It provides statistical approaches needed to properly collect and analyze data in an accurate and defensible manner. Its chapters contain valuable information on the following:

- ***Methods to Inventory BMP Implementation***
- ***Sampling Design and Variable Selection***
- ***Methods for Evaluating Data***
- ***Conducting the Evaluation***
- ***Presentation of Results***

Although this manual does not address monitoring the effectiveness of individual BMPs, it will help you design a ***BMP implementation monitoring program that can save time and money***. It will help you establish a statistical sampling of representative BMPs to yield conclusions at a fraction of the cost of a comprehensive inventory and allow you to effectively focus your limited resources!

Help field test the techniques:

EPA is looking for help from small communities (less than 50,000 residents) to field test these techniques for tracking, evaluating, and reporting BMP implementation. EPA will provide technical guidance and other support. To download the guidance manual, visit www.epa.gov/owow/info/PubList/publist4.html-it is under the technical documents section. For further information, please contact: ***Rod Frederick, U.S. Environmental Protection Agency, Nonpoint Source Pollution Control Branch, 401 M Street, SW, Washington, DC 20460, 202-260-7054, Frederick.Rod@epa.gov***

Water Quality at Home and Abroad

Trusting the Tap: A New Survey on Americans' Confidence in Their Water Supply

To mark the debut of the Consumer Confidence Reports, the National Envionmental Education & Training Foundation (NEETF)/Roper conducted a survey to gauge the confidence Americans have in their tap water.

The "right to know" provisions of the National Safe Drinking Water Act stipulate that every household connected to a public water supply receive a report from the supplier on the quality of that water. The first mailing of these reports comes at a time when, paradoxically, consumers are becoming ever more wary of their tap water even as public water supplies become increasingly safer.

Americans enjoy the highest quality public drinking water in the world. However, according to the (NEETF)/Roper survey, titled "Report Card on Safe Drinking Water Attitudes, Knowledge and Behaviors," 65% of Americans either treat the water they drink or drink bottled water at home, a marked increase from past years. Sixty-five million Americans, or 24%, report never drinking tap water at all.

With manufacturers of home water purifiers and suppliers of bottled water flooding the airwaves with the message that tap water may not be the safest choice for consumers, it is no surprise that many Americans are hesitant to fill their glasses at the sink. Seventy percent of those with qualms about their drinking water report being turned off by the taste and smell of their tap water.

"A Civil Action," the recent John Travolta movie based on the best-selling book about children contracting leukemia from tainted public water, has also helped raise public awareness on water safety to a high pitch. Fifty percent of those staying away from the tap point to media stories on water pollution as the source of their unease.

Bombarded as they are by so many conflicting messages about the safety of their water, the American public has become ravenous for more information on their public water supply. According to the survey, forty-percent of Americans report not being satisfied with the amount of information they receive about their tap water, and three quarters of those who do get information actually read it. With another twenty-five percent reporting that they have no idea where their tap water even comes from, the need for the Consumer Confidence Reports has never before been so clear.

As of now, nine out of ten Americans report either cooking with or drinking tap water. It will fall to future surveys to indicate whether the Consumer Confidence Reports increase or decrease that number.

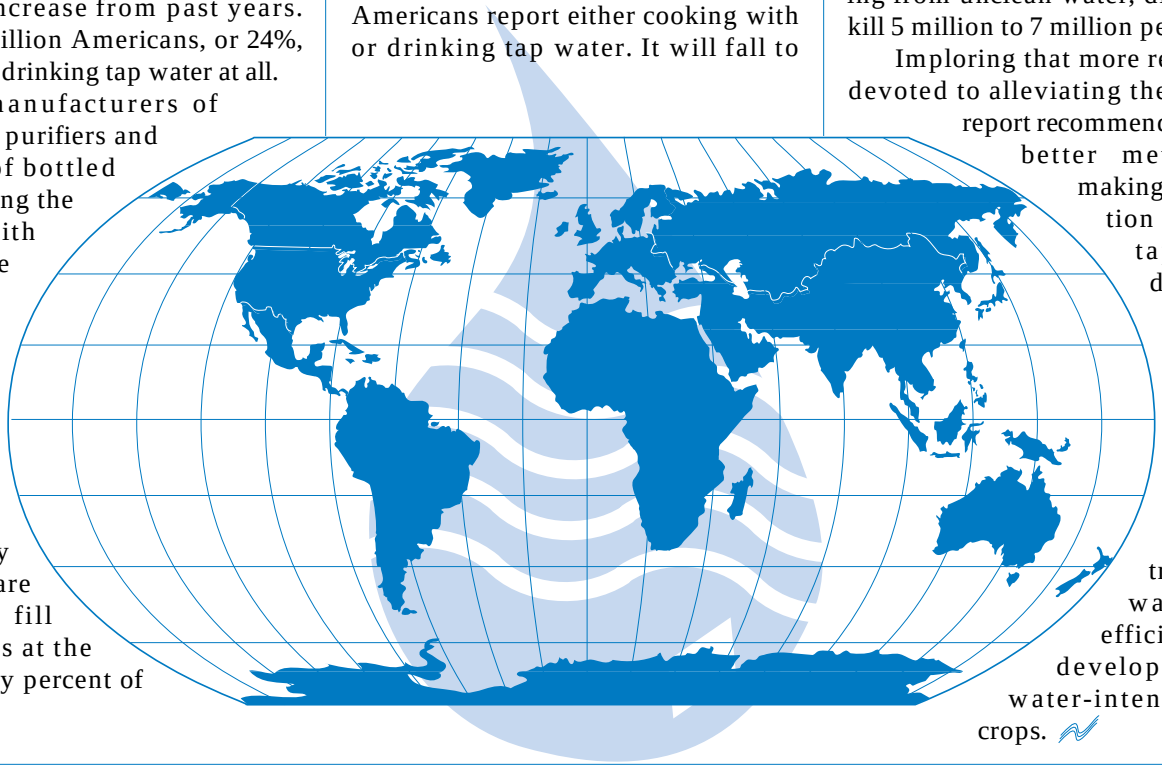
Safe Drinking Water: A Vanishing Resource

According to a United Nations report, nearly 20 percent of the world's population-1.4 billion people-has inadequate access to clean and safe drinking water. By 2025, the report estimates, that figure could rise to 30 percent of the population, a total of 2.3 billion people.

A large factor in the crisis is the fact that two-thirds of the world's population resides in areas receiving only one-fourth of the planet's rainfall. The regions where water shortages will become most acute over the next twenty-five years, according to the report, include Africa, the Middle East, India, China, Peru, England and Poland.

As would be expected, developing countries suffer the most from the lack of safe water resources. Half of the population of the developing world suffers at any given time from diseases resulting from unclean water, diseases that kill 5 million to 7 million people a year

Imploring that more resources be devoted to alleviating the crisis, the report recommends exploring better methods for making desalinization less costly, tapping undiscovered reservoirs of ground water, increasing the use of recycled water, transporting water more efficiently, and developing less water-intensive food crops.



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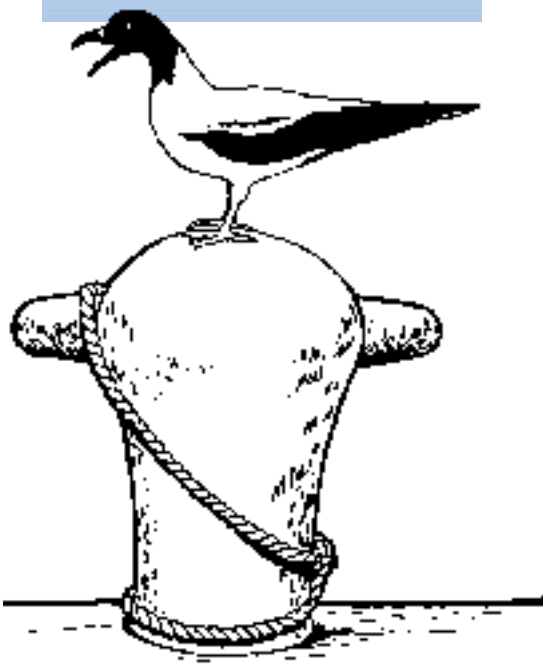
This issue of "Water Connection" offers a regional and national look at coastal water protection issues and efforts.



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