WINTER 2015-2016

SOUND UPDATE

NEWSLETTER OF THE LONG ISLAND SOUND STUDY

Citizen Science Around the Sound

By Amy Mandelbaum

Are you concerned about beach closures at your local beach? How about horseshoe crabs spawning along Long Island Sound? If you're interested in solving an environmental problem in your community or studying the world around you, then citizen science is for you. According to the Environmental Protection Agency (EPA), "citizen science is a vital, fast-growing field in which scientific investigations are conducted by volunteers."

Citizen projects can include monitoring water quality, habitats, wildlife, or even soil and air quality. Citizen science projects generally consist of a group of volunteers working under the guidance of a citizen and/or scientific organization to investigate and ultimately solve an environmental problem. Volunteers are usually trained in how to collect the data and how to report it to the group.

This issue of *Sound Update* presents citizen science projects from both Connecticut and New York that investigate various aspects of Long Island Sound.

If you are interested in joining an existing citizen science project around the Sound, contact one of the organizations in this newsletter or visit ***www.lisvolunteer.net*** for a complete listing.

—Mandelbaum is the New York Long Island Sound Study Outreach Coordinator at New York Sea Grant

T. Deer-Mirek

ADAM RUDMAN AND SACRED HEART UNIVERSITY STUDENTS answering questions of students from Unquowa School.

Save the Sound

CITIZEN SCIENTISTS AND SAVE THE SOUND STAFF work together to take water samples at beaches and in tributaries of Long Island Sound.

Kings Park High School

KINGS PARK HIGH SCHOOL STUDENTS monitor water quality, observe marine life, and document their surroundings.

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Sound Update provides readers with news about the Sound and the Long Island Sound Study.

Find the Long Island Sound Study on Facebook.

Tagging Along for 15 Years: Project *Limulus* and the Importance of Citizen Science for Horseshoe Crab Conservation in Long Island Sound

By Jennifer Mattei, PhD and Mark Beekey, PhD

Every spring, the American horseshoe crab, *Limulus polyphemus*, comes up to spawn along hundreds of miles of coastline in Connecticut and New York. Over a million people encounter this ancient species when they visit the beaches of Long Island Sound (LIS). If we had a way to collect their observations, our understanding of horseshoe crab ecology would be greatly enhanced. However, horseshoe crabs have an image problem. When people see them they are usually repulsed by their long stinger-like telson, armored shell, and weaponized claws. As such, education is imperative for our citizen science program to succeed. As soon as students/volunteers understand that horseshoe crabs are the most benign creatures they will see at the ocean, that can neither sting nor pinch, and when they realize their importance to the ecology of LIS and to their own health, they immediately ask how they can help.

Over the past 15 years, hundreds of K-12 and college students, members of non-profit organizations, and local aquariums have contributed thousands of hours to Project *Limulus.* By tagging over 88,000 horseshoe crabs, resighting more than 20,000 individuals, and conducting more than 1,800 spawning surveys, they have helped researchers understand the population ecology of the American horseshoe crab in LIS. This amazing effort has enabled Drs. Jennifer Mattei and Mark Beekey from Sacred Heart University to answer a number of questions such as:

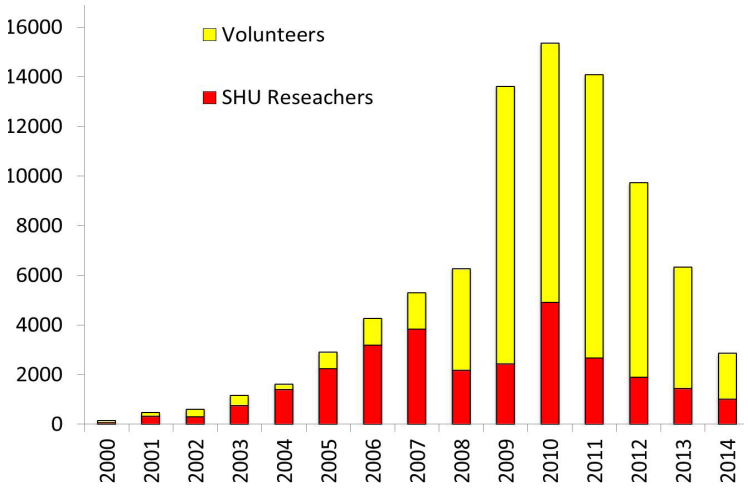
1) What are the general movement patterns of horseshoe crabs in LIS?
Within a spawning season, 73% of recaptured crabs are recaptured on the same beach where they were tagged. Beyond that initial spawning season, only 22% of crabs were recaptured on the same beach where they were originally tagged. About 3% of the crabs tagged on the Connecticut coastline are recaptured on the north shore of Long Island and an additional 3% are recaptured outside the Sound in Rhode Island and Massachusetts. A few crabs tagged in LIS have been reported in New Jersey, Delaware, and Virginia, although we surmise that these crabs had assistance in traveling to these states.

2) What are the characteristics of the LIS horseshoe crab population?
Females are 25-30% larger than males and their relative body sizes have not changed in LIS during our 15 years of measures. Male to female sex ratios have decreased slightly since 2006. Alarmingly, the number of single females (no attached male or satellite males nearby) appearing on beaches during spawning seasons has been on the rise since 2007. This increase corresponds with a decrease in mating pairs of horseshoe crabs and multiple mating groups (one female with two or more males attempting to mate with her). Finally, the number of new recruits into the adult spawning population is much lower than one would expect for a stable or increasing population.

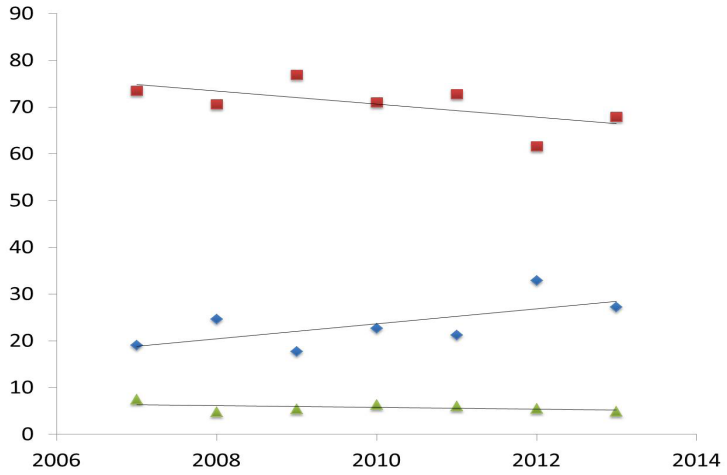
3) Is the LIS population increasing, decreasing, or stable?
Based on the tagging and spawning survey data, we have concluded that the population density of horseshoe crabs in LIS is so low that we are beginning to see a serious shift in population characteristics indicative of a severely degraded population. Further decreases due to over-harvesting or habitat loss could push the LIS population over the threshold where recovery would be a significant challenge.

Citizen science, outreach, and education along with habitat conservation and restoration are imperative to the survival of this species. The data collected by citizen scientists associated with Project *Limulus,* ***www.projectlimulus.org***, are communicated to state managers and federal management agencies in addition to being published. Our most recent publications are two chapters in a new book on horseshoe crab conservation entitled: *Changing Global Perspectives on Horseshoe Crab Biology, Conservation and Management*. Our latest work includes an investigation of juvenile horseshoe crab habitat needs and coastal habitat restoration.

—Mattei and Beekey are both Biology Professors at Sacred Heart University



NUMBER OF HORSESHOE CRABS TAGGED PER YEAR by volunteers and researchers from Sacred Heart University.



PERCENTAGE OF MATING PATTERNS FOR FEMALES tagged from 2007 through 2013. Paired females (red squares), single females (blue diamonds), and females with multiple mates including amplexed male and additional satellite males (green triangles).

Growing Seaweed in the South Bronx

By Sam Marquand

Joaquin Cotten

ROCKING THE BOAT ENVIRONMENTAL JOB SKILLS APPRENTICES use scissors and shears to trim the *Gracilaria* bundles at the two-week mark. After the bundles have been trimmed, they are placed in containers, seen on the left, to be taken back to shore for weighing. Dry samples are also preserved for lab analysis.

Outside of agricultural communities or family-run farms, it is rare to find high school students farming in 2015. But, in the name of citizen science, eleven Rocking the Boat teens are doing just that! This past year, they worked to grow and measure a bumper crop of nitrate-filtering seaweed in the middle of the Bronx River!

The youth, all high school juniors and seniors from the South Bronx, are Environmental Apprentices at Rocking the Boat, a renowned local youth development program that teaches kids to build wooden boats and use them to row, sail, and do environmental research on their local waterway, the Bronx River. The River, once notorious for its pollution, is making a strong comeback, but still suffers disproportionately from the effects of stormwater events: there are three combined sewer outflows (CSOs) within a one-mile stretch that release untreated sewage into the water whenever it rains more than ¼ inch. The Apprentices participated in a host of hands-on restoration and monitoring projects after school and throughout the summer, and are trained in all the necessary techniques and protocols by scientists at partner organizations; in this case, the University of Connecticut's Department of Ecology and Evolutionary Biology and Department of Marine Sciences (UConn).

Following a false start last year (The filtration and UV light sterilization systems at UConn's aquaculture lab broke down, causing the seedstock tanks that were incubating the seaweed to become contaminated.), the project got underway in spring 2015. The first task the Apprentices took on was sitting down together at long tables to build the infrastructure being submerged: a pair of 150-foot lengths of rope with, every 30 feet, buoys bobbing on the surface and three-to-six-foot-long sections of rope dangling in the water, each one with a metal swivel and holding a bundle of the red seaweed, *Gracilaria tikvahiae*. On and off over the course of three weeks, they learned to securely splice, or unweave and reweave, the nylon rope rather than attaching the buoys and swivels using knots which might come undone in the swift current. Closely resembling a string of bright red Christmas tree lights, the jumble of ropes and buoys were then brought by powerboat to the mouth of the Bronx River and anchored into a neat rectangle.

Starting in July, the Apprentices began checking the farm site once a week, a schedule they maintained during the first two cycles of growth and then reduced to bi-weekly monitoring in September. To measure growth, at every other visit, the Apprentices pulled up the suspended lines of seaweed, trimmed them back to their original size, and weighed the harvest both wet and dry. At the same time, they collected five different parameters of water quality data including dissolved oxygen levels and temperature, and took light readings using a hobo data logger. Rocking the Boat shared this data with its partners, who themselves analyzed the samples to learn about the nutrients—nitrates, phosphates, among others—that the seaweed has absorbed. Based on past experience (this is the third year Rocking the Boat and UConn have teamed up to grow seaweed), planting seaweed in the Bronx River, within sight of one of the area's CSOs, yields outstanding results!

The Environmental Apprentices are excited to be a part of this cutting-edge research project, which ties in so closely with other CSO-related work on Rocking the Boat's docket, and uses a combination of native species and new technology to solve manmade problems. When the experiment comes to an end, they look forward to spreading the seaweed on the shoreline and seeing if it takes hold so that it may continue to help clean the water for years to come.

—Marquand is the Environmental Job Skills Program Director at Rocking the Boat

Joaquin Cotten

GRACILARIA AFTER TWO WEEKS of growing in the Bronx River. They increase their size tenfold during this short time span due to the sun, warm water, and abundant nitrogen.

Harbor Watch Studies Norwalk Harbor with the Help of Citizen Scientists

By Nicole Cantatore and Sarah Crosby, PhD

Just as the oyster and clamming boats are starting up their engines to begin harvesting for the day, and the recreational rowers are finishing up their early morning workouts, the *Research Vessel (RV) Annie* can be seen anywhere on Norwalk Harbor, Connecticut, from the upper end to out past the mouth. At 7:00 am, citizen scientist volunteers board the research vessel, a converted oyster scow, with oxygen, temperature, and salinity probes. They visit multiple sites in the Harbor, where they lower the probes into the water and take readings at the surface, at a half meter below the surface, and at each subsequent meter until the harbor bottom is reached. Norwalk Harbor is an estuary with both residential and commercial infrastructure along its shoreline. At each site, volunteers can determine where the salt wedge lies, how oxygen is dispersed throughout the water column, and how temperature changes from upriver to the harbor mouth and from the surface to the bottom.

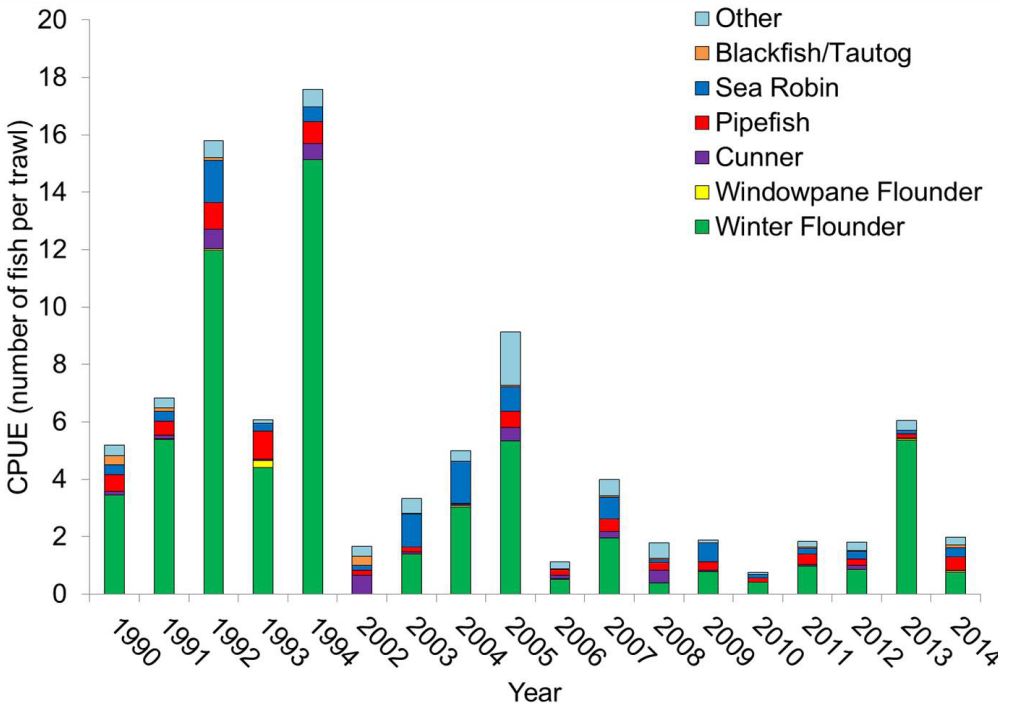
Later that same day, the *RV Annie* can be spotted again, flying a black hourglass-shape flag above the cabin to signal that something is astern of the vessel in the water. As the trawl buoy bounces along the surface, a group of Wilton High School (WHS) Marine Biology Club members clad in life preservers take GPS readings, monitor boat speed, and alert the captain when the three-minute trawl is complete. The net is retrieved and the student volunteers take turns sorting and identifying the catch. These student volunteers are examining the juvenile benthic species composition and abundance of Norwalk Harbor. The WHS Marine Biology Club is the largest contributor of volunteer crew members for this project, which runs from May through October annually. Every two years, the student crew members present their findings at a National Oceanic and Atmospheric Administration (NOAA) Flatfish Biology Conference. They are consistently the youngest presenters and are always well received among the career scientists present.

Since its inception in 1987, Harbor Watch, the water quality research program at Earthplace in Westport, Connecticut, has used citizen scientists ranging in age from high school sophomores through senior citizens to monitor sites for a variety of physical and biological parameters. Hundreds of volunteers, approximately 60 per year, have traipsed from site to site donned with oxygen and conductivity meters to conduct weekly research on waterways throughout Fairfield County, with the Norwalk River and Harbor being our longest data set. Many volunteers assist on multiple projects throughout their tenure with Harbor Watch and return year after year. Through letters and social media, we have been able to stay in contact with many of our volunteers who have credited their experiences with Harbor Watch as a catalyst to pursue careers in science. We plan to continue building our data sets and explore how species composition has changed and how shifts in the community may be related to environmental changes. All of this critical research of Norwalk Harbor would not be possible without dedicated citizen scientist volunteers!

—Cantatore is the Harbor Watch Lab Director at Earthplace and Crosby is the Harbor Watch Director at Earthplace

Harbor Watch

VOLUNTEERS KAREN AND GERRY LAROCQUE aboard the *RV Annie*.



JUVENILE BENTHIC SPECIES COMPOSITION and abundance in Norwalk Harbor from 1990 to 2014 is shown as catch per unit effort (CPUE), or the number of individuals caught divided by the number of trawls conducted in that year. Bar color indicates the species composition for each year.

Citizen Scientists Track-Down Pollution with Harbor Watch

By Nicole Cantatore and Sarah Crosby, PhD

At Harbor Watch, we believe that people learn best through hands-on experiences. Students come to Harbor Watch for just that; a place to apply classroom concepts to real-world pollution issues. Through our comprehensive training methods, volunteers develop translatable research and critical thinking skills through data analysis and gain an appreciation of the environment. Over the last six years, twenty eager high school and college interns have undertaken the task of conducting track-down surveys on the Pequonnock River, which runs from Monroe through Trumbull and discharges to Long Island Sound in Bridgeport, Connecticut.

Working alongside staff, volunteers collect dissolved oxygen, conductivity, and water temperature data as well as a water sample. Back in the Harbor Watch laboratory, volunteers don gloves and goggles and begin the process of membrane filtration to analyze the samples for fecal coliform and *Escherichia coli* bacteria, the indicator bacteria of choice by the Connecticut Department of Energy and Environmental Protection (CTDEEP) because its presence indicates the potential for more harmful bacteria. Monitoring began at ten sites in the river in 2009. Since then, volunteer teams and staff have identified areas of elevated bacteria counts, established additional sites upstream, and are working on tracking down the pollution sources. In addition to indicator bacteria, the 2015 monitoring season has been augmented to include nutrient testing for ammonia, phosphorous, and iron, due to sites that have visible indicators of pollution such as plant growth and orange slimes caused by iron bacteria.

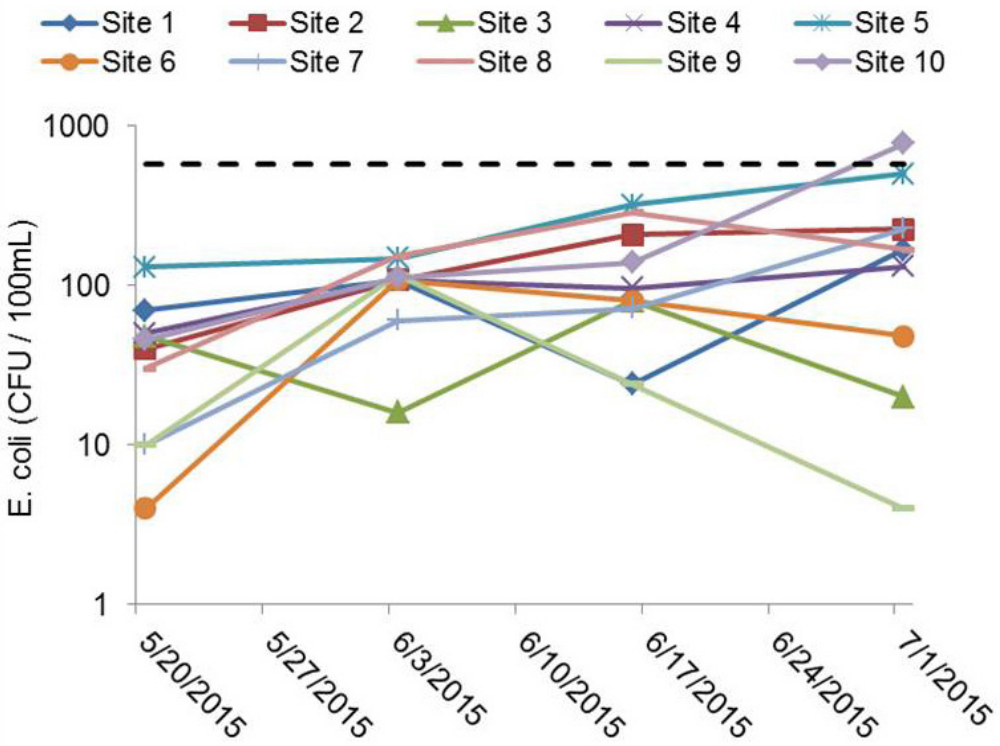
Technical reports are written at the end of each monitoring season, distributed to local and state government officials, and made available to the public on our website, ***www.harborwatch.org***. Data from early in the 2015 monitoring season for the Monroe section of the river show generally low levels of indicator bacteria and additional data collection is ongoing.

The Pequonnock River is a unique case study due to the variety of land use areas throughout the watershed. Our citizen scientist volunteers are given the opportunity to sample in natural, residential, and commercial settings, which give them a clearer understanding of how human actions can directly impact the waterway. Volunteers have to use critical thinking skills to analyze the data and make hypotheses about where pollution sources are located. Bacterial pollution sources are most often tracked to leaking cesspools or broken sewer lines. Nutrient sources have been most often traced back to over-fertilized yards, and possibly a transfer station that was discovered upstream from one of the sampling sites. Investigations are still ongoing, and Harbor Watch is in the process of seeking funding to grow the scope of this research project. We believe future testing is necessary to identify point sources entering the River and our goal is to be able to use track down surveys to pinpoint these sources for remediation.

—Cantatore is the Harbor Watch Lab Director at Earthplace and Crosby is the Harbor Watch Director at Earthplace

Harbor Watch

STUDENT INTERN LIZ PERRY collects a water sample.



E. COLI BACTERIA LEVELS WERE QUANTIFIED at 10 sites in the Monroe section of the Pequonnock River by Harbor Watch and citizen scientists early in the 2015 field season (shown in logarithmic scale). Most sites' bacteria levels fell below the State of Connecticut single sample maximum of 576 Colony Forming Units (CFU) in 100mL (black dashed line). Only one failing sample was observed at a single site during this time period.

A Day in the Life of the Nissequogue River

By Rob Gelling

Kings Park High School participated in the Day in the Life of the Nissequogue River project instituted by the Central Pine Barrens Commission, Brookhaven National Laboratory, New York State Department of Environmental Conservation (NYSDEC), and the Suffolk County Water Authority. Twenty-two ninth-through-twelth grade students from the high school participated. All data collection took place at the mouth of the Nissequogue River in Kings Park, New York. At the Nissequogue River, surveys were taken of physical data, site characteristics, chemical factors of the water, and biological species.

Abiotic factors that were recorded included wave height, direction, and speed in addition to air temperature and wind speed. The chemical analysis of the water included testing for temperature, dissolved oxygen levels, pH, salinity, turbidity, and fecal coliform.

Biotic factors included a sampling of the aquatic wildlife. Species such as silverside fish, hermit crabs, and grass shrimp were collected in numbers that ranged from 1-180 organisms. Aquatic vegetation levels were measured ranging from 50-75% at the bottom and 0-25% at the top of the river.

Kings Park High School students shared their results at the Day in the Life of the Nissequogue River wrap-up meeting and at the Long Island Natural History Conference at Brookhaven National Laboratory.

Overall, the students had an exciting time at the Nissequogue River and thoroughly enjoyed the experience. Many students were found having fun treading knee-deep through the water to observe marine life, while other students were found along the sand dunes taking pictures for documentation.

In the future, Kings Park High School plans to return to the Nissequogue River again to observe a wider range of abiotic and biotic factors. Testing the water in years to come will allow for the comparison of the data to the previous years. Also, an analysis of the changes taking place along the Nissequogue River over time will allow us to take action when major environmental changes occur.

—Gelling is an Earth Science Teacher at Kings Park High School and the SEAS Club Advisor

Monica Marlowe

Students Monitor Sunken Meadow Creek

By Monica Marlowe

Sunken Meadow Creek, located within Sunken Meadow State Park in Kings Park, New York, was a free flowing tidal tributary to the Nissequogue River and Long Island Sound before it was impounded by a dike in the 1950s, with two culverts restricting flow. To restore tidal flow, New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP), along with funding from the U.S. Environmental Protection Agency, planned to remove the restrictive culverts and allow for natural ecosystem restoration to 132 acres of former estuarine habitat that had transitioned to a freshwater marsh environment. In Fall 2012, Hurricane Sandy naturally restored tidal flow to Sunken Meadow Creek.

NYSOPRHP partnered with New York Sea Grant, NYSDEC, and local schools, including Sachem North High School and Suffolk County Community College, to develop a long-term, habitat monitoring program to document changes in Sunken Meadow Creek, before and after tidal flow restoration. Both baseline data, collected years before the Hurricane Sandy breach, and ongoing, post-restoration monitoring data have been collected.

The results show that since the restoration, the Creek has experienced an expected significant increase in salinity and an unanticipated significant increase in nitrates. The increased tidal flow and salinity served to remove the invasive *Phragmites australis,* or common reed. The freshwater species of fish that once utilized the Creek are now absent and have been replaced by marine organisms, including winter flounder, oyster toadfish, American eel, and sea robin. This habitat restoration project has improved fish access to spawning areas, provided important nursery habitat for estuarine-dependent, economically important species, increased the abundance of prey fish, and improved habitat for migratory birds. These documented changes are the beginning stages to a successful salt marsh restoration. The one concerning result was the significant increase in nitrates after the restoration. A logical explanation for the increase was the loss of common reed.

In an effort to mediate the increased nutrient levels, associated harmful algal blooms, and eutrophic events, native *Spartina alterniflora*, or smooth cordgrass was planted in June 2015. Along with nitrogen absorption, the smooth cordgrass will help manage stormwater, promote sediment accretion, and provide improved habitat. The planting was a collaborative effort, led by Connecticut Fund for the Environment/Save the Sound with funding received by the U.S. Department of the Interior for the Hurricane Sandy Coastal Resiliency Competitive Grant Program administered by the National Fish and Wildlife Foundation, and included many state and local organizations, community members, and student volunteers.

The ongoing restoration of Sunken Meadow Creek has not only served to restore vital ecosystem services of a Long Island Sound estuary, but has also helped to raise awareness and provide environmental education opportunities to local high school and community college students. From my personal experience, as well as the enthusiastic testimonials of students, I am confident that these hands-on experiences are the most effective way to inspire young people to continue environmental advocacy and scientific research in their future.

—Marlowe is a Science Teacher at Sachem North High School and an Oceanography Professor at Suffolk County Community College

Students Assist in Monitoring Oyster Bay/Cold Spring Harbor

By Christopher Hoppner

In the summer of 1975, Steven Spielberg released *Jaws*, the blockbuster movie version of the *New York Times* bestseller by Peter Benchley. And while you have a greater chance of being killed by dogs, mosquitoes, or falling coconuts, the idea of being eaten alive by a great white shark kept millions of people out of the water. Beaches rarely close due to shark attacks, but the real culprits, and much scarier, can be any one of the numerous microorganisms, such as *Escherichia coli*, *E. coli* for short, that can ruin an otherwise perfect beach day.

The quality of water around beaches, in harbors, and bays where people fish, clam, and recreate needs to be closely monitored for pathogens as well as making sure that the quality is maintained for local wildlife. In addition to the monitoring of the bathing beaches by the Nassau County Public Health Department, the Oyster Bay/Cold Spring Harbor area is also monitored by the volunteers and student citizen scientists of Friends of the Bay. Established in 1987, the organization has been a strong voice for the protection and preservation of the waters in the area at both the local, state, and national level.

The Locust Valley School District has been fortunate to share a partnership with Friends of the Bay for many years. During the summer months, students from grades 9 to 12, and teachers from Locust Valley High School take part in the weekly testing of the water. The students are members of the Science Research Program and use the collected data for projects and papers. These projects are submitted to various competitions such as the Siemens Competition and the Intel Science Talent Search.

A total of 19 sites, strategically chosen for their location by possible problem areas, are sampled for numerous factors. Water temperature, pH, salinity, dissolved oxygen, and turbidity are all measured along with air temperature and wind speed. While some parameters, such as water color and wave height are measured visually, others are measured by means of a Quanta device, a multi-meter with attached probes that are lowered to desired depths. Students are trained in the use of the Quanta, along with standard titration techniques as a means of double-checking the results of the Quanta. Along with the multiple readings taken at each site, water samples are collected for coliform counts to be conducted at an independent lab in Hempstead, New York. All measurements taken are shared via the Friends of the Bay website as well as reported to local officials who in turn, can use the data as a means of deciding whether or not to close beaches or shellfish beds.

Christopher Hoppner

EMILY SCHLICT taking water readings at the Waterfront Center sampling location in Oyster Bay, New York.

The weekly trips offer many positive educational experiences that can be built on later in the classroom. First, the trips offer students the ability to do hands-on research and relate to scientists who conduct field research as part of their careers. The trips also help to foster teamwork between students and adults in an atmosphere where all participants are on equal footing and show mutual respect. Last, but certainly not least, students gain a more profound knowledge and respect for the health of their local waters. They learn that the slightest actions by a population can have huge effects on water quality later down the line. The students enjoy the seasonal work with Friends of the Bay, the stories from "Captain Hank," and the knowledge gained through their work, which will last far beyond the classroom walls.

—Hoppner is a Science Research Teacher at Locust Valley High School

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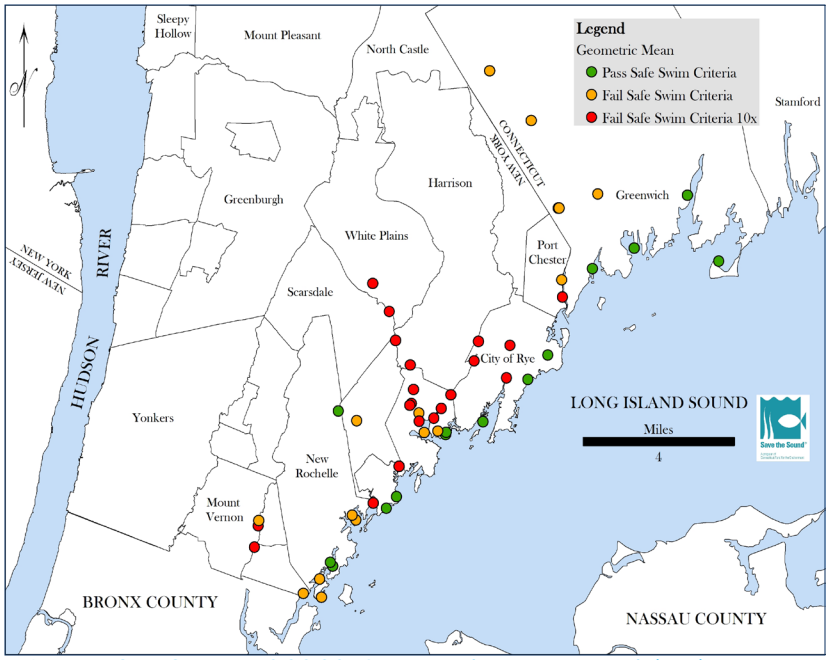
Save the Sound Studies Western Long Island Sound Waterways

By Tracy Brown

It's hot out, but there's no air conditioning in sight for Joann Rooney. As a volunteer citizen scientist, her morning routine doesn't allow an escape from the heat. She's out on the beaches of New Rochelle, working alongside Save the Sound staffer Peter Linderoth to take water samples. Peter tests the water for the bacteria *Enterococcus* as well as dissolved oxygen, pH, and other indicators of water quality.

Joann decided to volunteer with Save the Sound after decades of swimming and boating on the Sound. She's seen what can happen when water quality isn't up to snuff. While growing up swimming in the Sound, she rarely thought about its safety, but while training for a long-distance swim, she found she perpetually had a rash. Now she worries whether her grandson is safe swimming in the Sound.



MAP DEPICTING *ENTEROCOCCUS* geometric means, or weighted averages, at Save the Sound water quality sample sites. *Enterococcus* is a genus of bacteria used to detect fecal matter and associated pathogens in water.

And she's right to be concerned. Skin irritation is a common effect of swimming in sewage-contaminated water, but less fortunate swimmers can develop pink eye, ear infections, diarrhea, or serious illnesses. That's why local health departments often close beaches to swimming after rainstorms, and why Save the Sound tests to track down pollution hotspots.

Save the Sound expanded our water quality monitoring program from the Mamaroneck Harbor subwatershed in 2013 and 2014, to 52 sites in Westchester County and Greenwich this summer. We found that beaches tend to have the cleanest water, while streams are typically more polluted. Of the 52 sites monitored, only four passed EPA guidelines for safe swimming every time they were tested: Byram Beach, Greenwich Cove, and Indian Harbor Yacht Club in Greenwich, CT; and Mamaroneck Harbor at Taylor Lane in Mamaroneck, NY. Sixty percent of samples exceeded EPA safe swimming guidelines and over a quarter had *Enterococcus* levels greater than ten times the EPA standard. The highest bacteria levels were found in the Hutchinson River as it travels through Mount Vernon and Pelham, NY. We plan to continue building our model of testing combined with advocacy, which has proven valuable in identifying pollution problems and spurring action to fix them.

In addition to regular testing in Westchester and Greenwich, we're looking at historical data from around the entire Sound. Our Sound Health Explorer, launched in July, is an interactive online map that shows state and local testing data from the last decade for every beach on Long Island Sound. It grades beaches based on their performance relative to others, to help swimmers choose the safest beaches to enjoy and to help municipal leaders spot potential problems in their towns. The project is open-source, so researchers can download the extensive data tables to use in their own work. Next, we plan to add information on dissolved oxygen and hypoxic conditions around the Sound. We encourage residents, scientists, and decision makers to check it out at ***www.SoundHealthExplorer.org***.

—Brown is the Director of Western Sound Programs at Save the Sound

SOUND UPDATE
LISS NEWSLETTER

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