

SOUND OUTLOOK

A NEWSLETTER OF THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING LONG ISLAND SOUND – ISSUES AND OPPORTUNITIES

Connecticut Faces Increasing Threats from Coastal Hazards

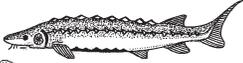
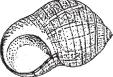
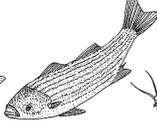
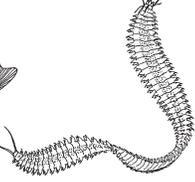
One of the most significant issues facing coastal resource users and managers alike is the increasing threat from coastal hazards. In this issue of *Sound Outlook*, we will examine the physical characteristics of the most prevalent hazards along the New England coast, their impacts and management needs.

The four common coastal hazards are wind, wave, flood and fire, the first three of which frequently occur together as hurricanes or nor'easters. The Great New England Hurricane of 1938 caused damage estimated at \$6 billion, and the cost of damage from a similar storm today could reach \$40 billion. Connecticut has not seen a major hurricane since the 1950s. Hurricane Gloria in 1985 struck at low tide, and is best remembered for its wind component, which downed numerous trees and required a lengthy period for restoration of electrical service. In contrast to short lived hurricanes, the persistent winds of stationary nor'easters create ideal conditions for coastal flooding. The last major nor'easter hit in December 1992, with flood levels equaling a 50-year event and destroying several homes in Stratford.

Even more insidious than storms, and an increasingly significant cause of coastal flooding, is sea level rise, a process that has been occurring for thousands of years and that each year erodes the footprint of the Nutmeg State. In the last century, sea level rise averaged 2 millimeters per year but that rate has doubled since 1980 and is likely the result of climate change. DEP receives many complaints regarding shoreline flooding of lawns that have now become tidal wetlands. Rhode Island recently developed a sea level rise policy, based upon current scientific data, which projects a rise of 3 to 5 feet in 90 years. Scientists forecast that climate change will bring more nor'easters to the northeast and hurricanes that are more intense.

Last but not least, there are many places where humans have reduced or eliminated tidal flow to tidal wetlands. Following coastal flooding in the 1950s, the Town of Fairfield built flood control dikes around low-lying coastal lands. While this has protected residences from coastal flooding, the invasion of a tall woody grass known as *Phragmites*, or common reed, has created a new hazard. Fires are common in reed marshes because of the large amounts of combustible material that quickly accumulates there. Marsh fires are so intense that fire fighters can do little to suppress them. In the future, as sea level continues to rise, diked and drained marshes may require the installation of pump stations to prevent flooding from rainstorms, as is common practice in New Orleans lowlands.

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State and Regional Planning Initiatives for Coastal Hazards

The DEP Office of Long Island Sound Programs (OLISP) is actively involved in planning to address coastal hazards and sea level rise. Shorelines depicted on historic 1880s Coast and Geodetic Survey charts are being re-evaluated to determine rates of shoreline erosion since that time. Separately, shoreline locations of mean high water elevations have been determined for eastern Connecticut in 2006 and central Connecticut in 2007 by the National Oceanic and Atmospheric Administration's (NOAA) National Geodetic Survey, and can be downloaded from the NOAA Shoreline Data Explorer (www.ngs.noaa.gov/newsys_ims/shoreline/index.cfm). The next step is to use digital shoreline analysis tools to automate the calculation of shoreline change rates utilizing these new data sets.

In 2006, under the Federal Emergency Management Agency (FEMA) map modernization program, high resolution topography was acquired for Connecticut's 100-year coastal

floodplain. OLISP is evaluating means of using these data to develop inundation scenarios for sea level rise. Typical but simple inundation scenarios simulate a rise in the average water level of the sea, called mean sea level (MSL), in increments of feet. At Bridgeport, which is representative of western Long Island Sound, mean high water (the line on the shore established by the average of all high tides) and spring high tides (higher high tides which occur twice monthly in response to the alignment of the earth, moon and sun), are 2.5 and 5 feet higher than MSL respectively. Therefore, a more informative inundation scenario for these locations would show the area of land flooded at times of both mean high water and spring high tide in response to rising sea level.

The Northeast Regional Ocean Council (NROC; <http://community.csc.noaa.gov/nroc>) is a new initiative led by the Governors of the New England states to foster regional management of New England's oceans and coast.

One of NROC's priority focus areas is the evaluation of coastal hazards and accelerated sea level rise resulting from climate change. The newly formed Coastal Hazards Standing Committee is finalizing a 2009 work plan that will focus on: 1) determining data management tools; 2) determining the necessary components of an ocean observing system that would measure ocean and climatological conditions for use in identifying hazardous coastal conditions or events, and in planning appropriate responses to those situations; and 3) creating a directory of the major agencies and organizations in New England with responsibilities in these areas, and of related programs and projects that have been or are being developed and that could be utilized throughout the region. The committee plans to post links on the website above regarding hazards information and pilot projects.

For more information on coastal hazards analysis and planning, contact Ron Rozsa at 860-424-3616 or [ron.rozsa@ct.gov](mailto:rozsa@ct.gov).

CHAMP Compiles Coastal Hazards Information

In the Fall of 2007 the DEP Office of Long Island Sound Programs welcomed Joel Johnson, a Coastal Management Fellow from the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center. Joel's fellowship project is the Coastal Hazards Analysis and Management Program (CHAMP). The project has three components and will be completed by the fall of 2009.

The first component is a comprehensive report, *Coastal Hazards in Connecticut: The State of Knowledge, Policy, and Planning in 2009*. This report will synthesize and provide a guide to a wide range of documents and existing knowledge related to coastal hazards. Examples include Army Corps of Engineers beach studies and erosion control projects, historical storm and flood data, the State Natural Disaster Plan, the State Natural Hazards Mitigation Plan, population growth and development data, Connecticut's legal framework and governance structure, and the latest scientific studies and information about sea level rise and changing storm activity associated with climate change.

The second component is the Connecticut Coastal Hazards Data Portal and Visualization Tool, a website currently under construction at <http://depweb.dms.uconn.edu> that provides a foundation for more comprehensive coastal hazards management planning by centralizing, analyzing and displaying information about coastal hazards and coastal hazards management. The portal will contain the *State of Knowledge* report described above, resources for mitigation and adaptation efforts, photo galleries, links to buoys, webcams, storm prediction centers and a coastal hazards primer.

The website will provide a mapping and visualization application that will feature two forms of inundation modeling along the coast. One model estimates relative inundation under various scenarios of sea level rise. Another model estimates the extent of inundation from storm surges associated with various hurricane or extra-tropical storm scenarios. Both of these modeling and mapping

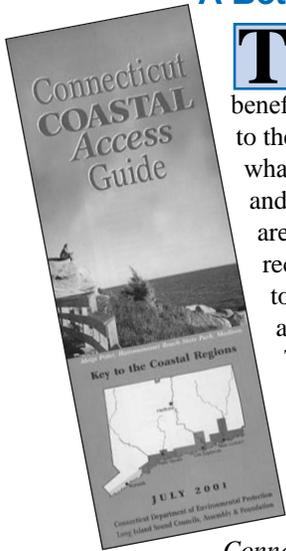
efforts incorporate high-resolution LiDAR (Light Detection And Ranging) elevation data. The storm surge modeling effort is made possible by a partnership with the UConn Department of Marine Sciences. The digital map will feature other spatial data such as aerial photography, land-use, historic shorelines, critical infrastructure, FEMA flood zones, etc.

The final project component will be an outreach initiative to educate coastal planners, municipal officials and the public about the CHAMP project and how the information it provides can help them become more aware of existing and potential hazards to their communities. Visit the CHAMP website and use the "contact" link to direct questions, comments, and ideas to Joel – with your help we can make this outstanding effort even better.



Preliminary CHAMP product depicting hypothetical 4.5-foot sea level rise in 2100 at Groton-New London Airport, based on data from Rahmstorf, 2007.

SPOTLIGHTED Coastal Access: A Better Use for Coastal Hazard Areas



The occurrence of coastal disasters, the most notable being the Great Hurricane of 1938, has produced some long-term benefits for residents of and visitors to the Connecticut shore. Some of what are today our most significant and valuable shoreline natural areas, public access points and recreational amenities were, prior to that storm, sites of residential and commercial development. Two prominent examples are Ocean Beach Park in New London and Bluff Point State Park and Coastal Reserve in Groton. Both sites are described in the online



Ocean Beach Park boardwalk and administration building.

Connecticut Coastal Access Guide, available at www.lisrc.uconn.edu/coastalaccess.

Ocean Beach was a heavily populated community before the 1938 hurricane. Aerial photographs taken in 1934 show more than 100 houses and large buildings packed side-by-side along the entire length of the beach. Written accounts report that the hurricane winds and storm surge readily removed all of those structures, which were described as poorly constructed. While many communities along the coast that were similarly damaged were rebuilt after the storm, Ocean Beach Park instead became a popular recreational destination with a boardwalk, pavilion and pool where homes once stood. A nature walk and a wildlife observation platform overlook Alewife Cove, and visitors can view the New London Ledge Lighthouse and nearby Fishers Island. A fee is charged for access to the site - please check the current fee schedule at www.ocean-beach-park.com.



Aerial photograph of Ocean Beach taken in 1934.

Bluff Point, a peninsula located between the Poquonnock River and Mumford Cove, has a long history of human settlement beginning with Native Americans. Bluff Point was a popular vacation destination in the 1920s and 1930s, with numerous houses, cabins and cottages, and even a small amusement park, lining the shore. Most of the buildings were destroyed by the Great Hurricane, although open grasslands remain as evidence of that settlement. Through various State property purchases since 1938, and with the demise of once-planned recreational enhancements, the 800-acre peninsula is today one of the largest natural areas in Connecticut. The property consists of a low-impact state park, adjoined by the 684-acre combined Bluff Point Coastal Reserve and Bluff Point Natural Area Preserve. Bluff Point, home to a variety of wildlife, also features a barrier beach, steep cliffs, coastal forest and tidal wetlands. Visitors can paddle from north of the abandoned railroad bridge that crosses the Poquonnock River downstream to Bushy Point Beach. Hiking and running trails, many of them former horse-cart roads, offer vistas of Long Island Sound, Mumford Cove and the River. Public parking is available, providing convenient boating and fishing access.

For more information about Connecticut's coastal public access program, contact Dave Kozak at 860-424-3608 or at dave.kozak@ct.gov.

LOOK OUT for upcoming events!

Norwalk Maritime Aquarium

10 North Water St., Norwalk, CT
Call 203-852-0700 x2206 for information, costs and registration:

Toy Boat-making Workshop
**Saturdays and Sundays in Feb.,
11:00 AM-3:00 PM**
Build a toy sailboat to take home.

Winter Creature Cruises
**Most weekends through April (dates
and times TBD); 2-1/2 hr cruises.**
View seals and winter waterfowl. Passengers
must be 42 inches tall.
Bring binoculars and dress warmly.

March: Migrating osprey return to CT.

April: Striped bass migrate north to CT.

Connecticut Audubon Coastal Center

Milford Point, Milford, CT
Call 203-878-7440 for info. and registration.

The Return of the Piping Plovers!
Saturday, March 21, 10:30 AM
Learn about endangered piping plovers and how
to protect them.

*Sweep the Shores - Earth Day Beach
Clean-up Competition*
Saturday, April 25, 10:00 AM-2:00 PM
Fundraiser to support Coastal Center
environmental education programs.

Charles Island Explorations
Saturday, April 18, 12:15-1:45 PM
Friday, April 24, 5:00-6:30 PM
Saturday, May 2, 12:00-1:30 PM
Friday, May 8, 5:00-6:30 PM
Discover natural history and folklore. Wear boots
or sneakers that can get wet.

Spring Discovery Walks
Saturdays, Apr. 11, 18 and May 2, 9.
10:00-11:00 AM
Hike Milford Point. Themes vary by date,
including birds, wildflowers, trees and insects.

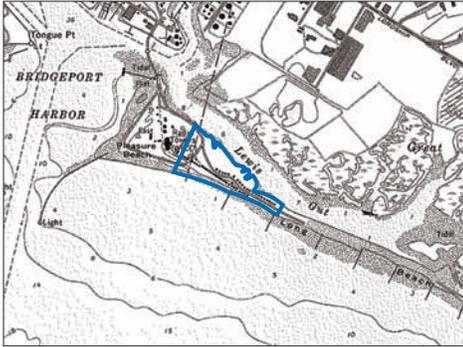
Tidepool Explorers
**Saturdays, May 16, 10:00-11:00 AM,
May 23, 3:30-4:30 PM**
Learn about seaweeds, hermit crabs, slipper
snails, sea stars and more.

**Please be sure to check the Calendar of
Events listed on DEP's website:
www.ct.gov/dep**

Putting Your LIS Plate Money to Work: Restoration of Stratford Barrier Beach

During the 2008 Long Island Sound Fund grant cycle, The Trust for Public Land (TPL) was awarded a challenge grant for \$50,000 to deconstruct 41 uninhabited cottages at Long Beach West in Stratford. Deconstruction is an environmentally sensitive process in which still-functional materials such as hardware and plumbing fixtures are removed and sold for reuse.

Long Beach West is a barrier beach located between Long Island Sound and Lewis Gut and owned by the Town of Stratford. The TPL project will restore habitat for native beach-nesting birds (including piping plovers and least terns), horseshoe crabs



TPL Project Area, Long Beach West, Stratford.

and other wildlife, as well as rare and endangered barrier beach plants. The beach will be preserved in perpetuity for these purposes and for improved public access. The project will also assist the Town of Stratford in minimizing risks from coastal hazards along Long Beach West, which is designated by the Federal Emergency Management Agency (FEMA) as a V-Zone, a coastal area subject to both inundation by the 1-percent-annual-chance flood event and to associated storm-induced wave damage. Due to these conditions, the

cottages pose a potential threat as they deteriorate, creating a source from which significant quantities of debris may enter the marine environment.

TPL will need to raise significant additional funds to complete the deconstruction and demolition, which is anticipated to cost at least \$400,000. Salvageable materials



Cottages to be removed for beach restoration.
(Photo from maps.live.com).

will be sold to offset the costs of the project activities. So far, TPL has received one additional grant of \$52,000 from the National Fish and Wildlife Foundation's Dissolved Oxygen Environmental Benefit Fund to remove cottage septic systems. Fund-raising activities for the remaining funding balance are ongoing. Other challenges facing TPL include acquisition of permits for any removal-associated activities to be conducted

waterward of the high tide line or in tidal wetlands. Separately, the Mayor of Stratford recently signed an option agreement, as authorized by voters in last November's election, that will eventually lead to the transfer of the beach from the Town to the U.S. Fish and Wildlife Service for incorporation into the Stewart B. McKinney National Wildlife Refuge.

This project is a great example of how the Long Island Sound Fund can provide seed money for complex projects to help minimize coastal hazards while preserving and protecting the critical natural habitats and shoreline public access that make Connecticut such a great place to live. DEP staff are actively working with TPL and the Town of Stratford to make this project a success.

To learn more about how to purchase your LIS license plate, call 1-800-CT-SOUND, or visit www.ct.gov/dep/lislicenseplate. To obtain information about the Long Island Sound Fund and its grant opportunities, contact the LISF Coordinator Kate Brown at 860-424-3652 or kate.brown@ct.gov.

If you did not receive this issue of *Sound Outlook* in the mail and would like to be placed on the mailing list, please send your name and address to: *Sound Outlook*, Connecticut DEP, Office of Long Island Sound Programs, 79 Elm Street, Hartford, CT 06106-5127; or email tom.ouellette@ct.gov.

Sound Tips Know Your Coastal Evacuation Route

Back in the mid 1990s, the DEP undertook an initiative that is even more relevant today to the safety of Connecticut's coastal residents and visitors. With a \$30,000 grant from FEMA, coastal evacuation routes were designated in 25 shoreline communities, 15 of which volunteered to participate in a hurricane evacuation route signage program. The routes were selected based on the Army Corps of Engineers' Evacuation Route Study and the National Hurricane Center's SLOSH (Sea, Lake and Overland Surges from Hurricanes) computer modeling.

A total of 300 evacuation signs were placed on poles, accompanied by staff gages that show local water depths above mean sea level that would be expected to occur during hurricane and winter storm-caused flooding. The tallest signs show water levels that would result from storm surge during a Category 4 hurricane. The signs provide directions inland away from impending wave inundation and storm surges.

If you are not sure whether your town has designated coastal evacuation routes, you may call your local Planning or Emergency Preparedness office, or contact Douglas Glowacki of the Connecticut Department of Emergency Management and Homeland Security at 860-256-0917.

Purchase of an LIS License Plate supports the LIS Fund



As of 11/31/08:

- Plates sold: 138,317
- Funds raised: Over \$4.9 million
- Projects funded: 314

The LIS Fund supports projects in the areas of education, public access to the shoreline, habitat restoration and research.

For information on ordering a Long Island Sound license plate, call 1-800-CT-SOUND.

View past issues of *Sound Outlook* at
www.ct.gov/dep/lis

SPOTLIGHTED Coastal Resource: Coastal Permitting and Sea Level Rise

Our climate is changing and sea level is rising. Although no hard and fast numbers have been determined for the rates at which these changes will occur over the next century or even the next decade, there is general agreement that as a result of these conditions, coastal storms may become increasingly more frequent and erosive. Many of Connecticut's coastal resources are vulnerable to loss or damage by storms, including bluffs and escarpments, beaches and dunes, intertidal flats, and tidal wetlands. These resources provide critical habitat value while also serving to buffer the coast against storms. While the loss of natural resources may not be preventable, the Department of Environmental Protection has the responsibility to protect these resources from human activities that may cause or exacerbate erosion. In particular, coastal residents' efforts to armor their properties against the rising tide could lead to permanent and detrimental impacts if the effects of such

activities on wave dynamics, sediment transport and other natural coastal processes are not carefully considered.

State law requires a permit to erect a structure or to place fill in the tidal, coastal, or navigable waters of the state, and for nearly any activity in a tidal wetland. And while permits are usually granted for repairs to existing authorized structures such as seawalls or revetments, the modification of such structures to provide increased flood and erosion control, and the placement of new structures, are restricted except in very narrowly defined situations.

All permit decisions made by the Department must be consistent with the Connecticut Coastal Management Act (CCMA), which requires that coastal hazard areas be managed to ensure that as development proceeds, hazards to life and property are minimized. Nonstructural solutions to flood and erosion problems are to be promoted except in those instances where structural alternatives

prove to be unavoidable and necessary to protect existing inhabited structures, infrastructural facilities or water dependent uses. An existing inhabited structure is one that was built prior to the implementation of the CCMA in 1980. Examples of infrastructural facilities include public water lines and roadways. A water dependent use is a use or facility that requires location in, or direct access to, the marine environment, such as a marina or a commercial fishing facility. By contrast, protection of trees, lawns, pools and patios is not exempt from the required use of nonstructural alternatives.

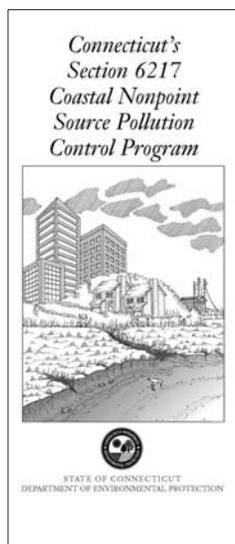
Connecticut's coastal regulatory program provides necessary and prudent protection from coastal hazards, while ensuring that as its first priority, disruption of natural coastal processes, even as they are driven by ongoing climate change, is prevented or minimized. For more information on the coastal permit program, contact Cheryl Chase at 860-424-3860 or cheryl.chase@ct.gov.

Three New Resource Management Brochures Published

The DEP Office of Long Island Sound Programs is pleased to announce the publication of two new informational brochures, both funded in part by NOAA: **Connecticut's Section 6217 Coastal Nonpoint Source Pollution Control Program** addresses the management of polluted

stormwater runoff discharged to Long Island Sound from a variety of sources including urban areas, agriculture, marinas and recreational boating, and streambank erosion.

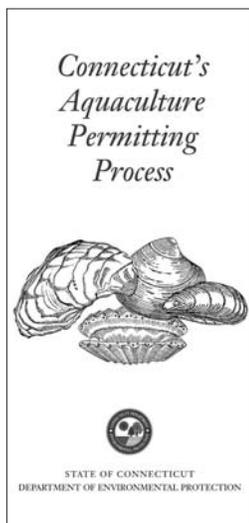
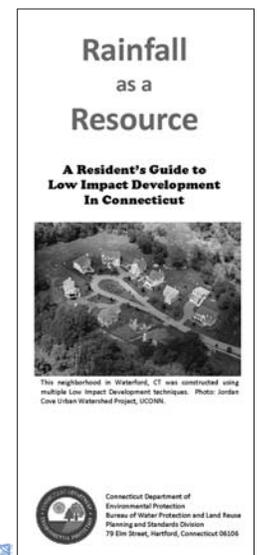
Connecticut's Aquaculture Permitting Process describes the regulatory authorities and requirements pertinent to the pursuit of aquaculture activities in Connecticut. These new brochures accompany previously published



brochures on *Connecticut's Coastal Management Program*, *Coastal Habitat Restoration Programs*, *Coastal Permit Program*, and *Residential Dock Guidelines*. To obtain copies of any of these brochures, contact Tom Ouellette at 860-424-3612 or tom.ouellette@ct.gov.

The DEP Bureau of Water Protection and Land Reuse, Planning and Standards Division, Watershed Management and Low Impact Development programs, recently finalized a new informational brochure:

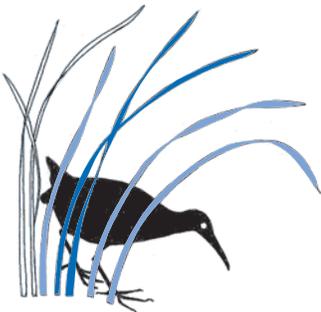
Rainfall as a Resource: A Resident's Guide to Low Impact Development in Connecticut overviews the benefits of LID and describes some LID opportunities for Connecticut residents and communities. To obtain copies of this brochure, contact David Dembosky at 860-424-3078 or Jessica Morgan at 860-418-5994, both with DEP's Low Impact Development program, or search "LID brochure" on DEPs web site.





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Then & Now: Coastal Hazard Protection

The damage and death wrought by the Great Hurricane of 1938, referenced in other articles in this issue of *Sound Outlook*, resulted in part because of the absence of some of the local, state and federal regulations and guidance that today govern shoreline development in Connecticut and elsewhere. Failure to plan for such an event was also due to the fact that memories of the previous major hurricane to hit the southern New England region in 1878 had long since faded. The economic damage from the 1938 storm was exacerbated by the increase in coastal development that had taken place during that period, with the total estimated property damage of \$39.2 billion in 2005 dollars ranking the hurricane as the 6th costliest in U.S. history. The time interval between the 1878 and 1938 hurricanes has already been exceeded by that since 1938, accentuating the vulnerability of the New England coast to another major hurricane event.

In 1968 the National Flood Insurance Program (NFIP) was established, providing for the mapping of flood-prone areas. The NFIP has been controversial because it subsidizes reconstruction in flood zones, but it also mandates that communities adopt specific floodplain management practices, such as elevating new and rebuilt coastal structures above potential flood levels to better withstand wave impacts and storm surge. Following the Great Blizzard of 1978, which severely battered the coasts of Long Island and Southern New England, the federal Coastal Barrier Resources Act of 1982 stiffened protection of coastal lands from development. In 1979 Connecticut passed the Coastal Management Act, which forms the basis for management of development and other activities in the state's coastal zone, including priority emphasis on non-structural coastal flood protection measures. Today, thanks to these federal and state initiatives and to the oversight of DEP's Office of Long Island Sound Programs, tidal areas and coastal lands are managed not only to protect their ecological value, but also to prevent against the dangers of coastal hazards to human health and property.

Visit the DEP website at www.ct.gov/dep.

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