

SOUND OUTLOOK

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

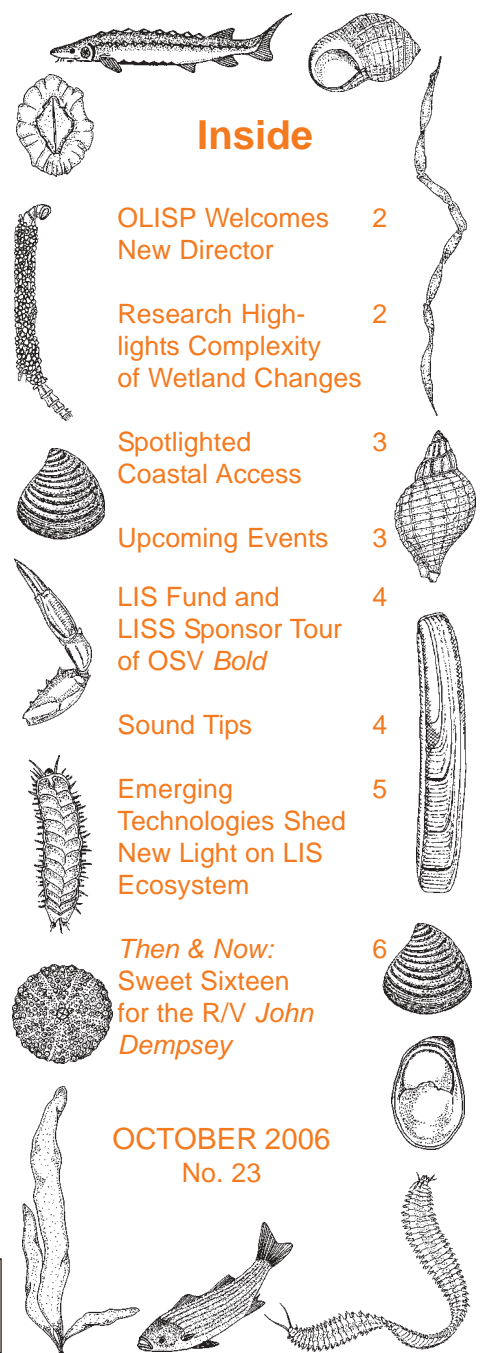
Effective Coastal Management Depends on Scientific Research

A healthy and productive Long Island Sound is important to Connecticut's economy and to maintaining the quality of life for its citizens. However, we are faced with many challenges in our efforts to protect the Sound, including urbanization of watersheds, nutrient enrichment, low dissolved oxygen, invasive species and pathogens. These and other threats make it essential that we have the information needed to make critical management decisions. Scientific research is the vehicle that must be used for gathering, analyzing and interpreting the data necessary to support good coastal management.

Many studies have been conducted in Connecticut in an effort to meet this goal. In 1999, state and federal funds were provided to study the lobster die-off in the Sound. That research showed that several factors (a coastal storm, warmer than normal water temperatures, low oxygen and a parasite) likely combined to cause the die-off. In 2002 the Preserve the Sound license plate program funded a study of rain gardens – vegetated areas that filter pollutants, especially nitrogen, from rain water running off of buildings. These and many other research projects are described at the DEP website www.ct.gov/dep (search Protecting Our Environment) and at the Long Island Sound Resource Center website www.lisrc.uconn.edu/lisrc/index.asp.

Grant funds are available to Connecticut scientists from Connecticut Sea Grant, the DEP Long Island Sound Fund (license plate program) and the federal EPA Long Island Sound Study. Each program offers annual or biannual small (\$500-\$25,000) to medium-sized (\$50,000-\$100,000+) grants. However, these "pots" of money are limited, and cannot fund all of the research needed in the Sound.

Another avenue for attaining our research goals is to designate a National Estuarine Research Reserve (NERR) in Connecticut. Established by the federal Coastal Zone Management Act, the NERR System partners the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding and guidance, while each reserve is managed by a lead state agency or a university with input from local partners. NERR program goals include addressing coastal management issues through coordinated research and enhancing public understanding of estuaries through education. Currently Connecticut is one of only three coastal states that do not have a NERR. Although NOAA currently lacks funding for designation and operation of a new reserve, NOAA has agreed to assist Connecticut in the site selection process. The next step is to establish a site selection committee of all interested parties, including non-profit environmental organizations, marine trades and fishing interests, state and federal agencies, and local communities. For information about the NERR program and other research efforts, contact Lori Benoit at 860-424-3034 or lori.benoit@po.state.ct.us.



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The theme of this issue of *Sound Outlook* is **Science in the Sound**. On these pages you will find articles describing the importance of scientific research to the health of Long Island Sound, as well as discussions detailing ongoing scientific activities in LIS.

OLISP Welcomes New Director

We are pleased to welcome Brian Thompson as Director of the DEP Office of Long Island Sound Programs (OLISP), which administers Connecticut's Coastal Management Program. Brian comes to DEP with a broad range of experience that will support continuation of OLISP's ongoing activities, and that will benefit the public in their relations with DEP. Brian is originally from Branford and has enjoyed a lifelong association with Long Island Sound. He earned an undergraduate degree in geology from St. Lawrence University and a Master of Arts degree in Marine Affairs from the University of Rhode Island, where he studied dredging policy.

Brian began his professional career in the U.S. Environmental Protection Agency's (EPA) Wastewater Program, where he reviewed applications for advanced wastewater treatment facilities. He dealt with wastewater disinfection and reuse policy for implementation by states and with federal funding of wastewater treatment plants. He subsequently spent 15 years with Aquarion Water Company in Bridgeport, formerly Bridgeport Hydraulic Company where he was Manager of Watershed and Environmental Management. His responsibilities included watershed and land management, reservoir and aquifer protection, aquifer mapping and environmental compliance. Brian replaces Charlie Evans, who retired this past July after 33 years of service to the Department (see the June 2006 issue of *Sound Outlook* at www.ct.gov/dep - search Protecting our Environment and then Office of Long Island Sound Programs).

As also described in that issue, OLISP, in May 2006, became part of the DEP Bureau of Water Protection and Land Reuse. As Director of OLISP, Thompson will coordinate programs within the DEP that have an impact on Long Island Sound and related coastal land and water resources. OLISP manages programs to protect and restore coastal resources and habitat, helps coastal towns to plan and implement programs to protect coastal resources and encourage water-dependent uses of the shorefront, and oversees and enforces the state's coastal laws and regulations. 



*OLISP Director
Brian Thompson.*

Research Highlights the Complexity of Wetland Changes

Observations in recent years have begun to reveal complex changes in the tidal marshes of southern New England. In the late 1980s, OLISP received a report of a "dying" marsh on the Fivemile River in Darien. The impacted "low marsh" (low-elevation marsh) had supported a monoculture of saltwater cord-grass, *Spartina alterniflora*, which typically grows there to a height of 7 feet. The plants were, instead, sparse and uniformly stunted (less than one foot tall). While an oil or chemical spill or grazing by Canada Geese were dismissed as causes, this type of stunting had been observed in freshwater marshes when excessive spring rainfall raised the water table and reduced soil oxygen levels. It thus appeared that the marshes were becoming wetter, and in fact "drowning," which scientists call submergence. Subsequent analyses by Connecticut College scientists, the U.S. Fish & Wildlife Service and the DEP

Office of Long Island Sound Programs (OLISP) using historic charts and aerial photography shows that submergence has been occurring for over 100 years, as low marsh habitat has gradually converted to intertidal flat.

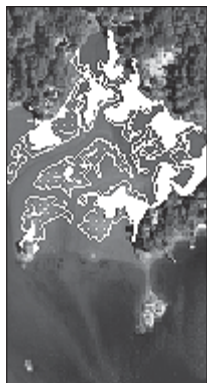
We now know that submergence is occurring in the Sound from New Haven west, with the largest losses in the cattail dominated low marshes of the Quinnipiac River. Scientists have developed various hypotheses for these losses, with the most common explanation being a reduction in the amount of sediment available for deposition on the marsh surface due to reforestation. Yet, studies by Wesleyan University scientists showed that no increase in sedimentation was apparent during the previous period of deforestation, and that sedimentation rates in tidal coves have in fact been tracking sea level rise for 10,000 years. Wesleyan scientists also note that sea level has been rising at an accelerated rate for the last 200 years, with tide gage records showing that the rates of sea level rise are higher in western LIS.

Since the 1980s, scientists have predicted that sea level rise will increase as a result of global warming, with early models suggesting a one meter rise by 2100 as compared to the 0.2 meter rise in the last century. This year, scientists learned that ice is melting far more rapidly than previous models had forecast, which could further accelerate sea level rise. At these increased rates, once expansive marshes will contract into narrow bands and "march" across the uplands seeking higher ground. Indeed, at Hammonasset State Park, tidal marsh grasses are already growing in the mowed "lawns" landward of the shrubby marsh elder border!

In contrast to the gradual process of submergence, wetland loss can also occur rapidly, as in the case of "sudden wetland dieback." In 2002, Dr. Scott Warren from Connecticut College and OLISP wetland ecologist Ron Rozsa



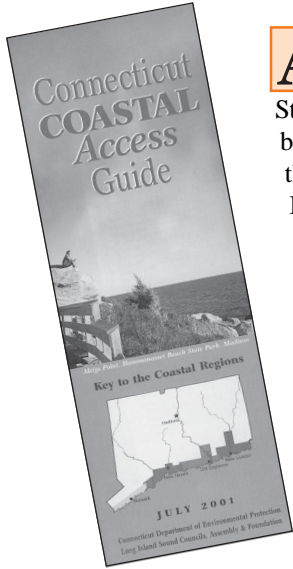
White stippling shows the extent of tidal wetland in 1888 at Scott Cove, Darien.



Combined stippling and white shading show the extent of tidal wetland in 1974. White shading alone shows tidal wetland remaining in 2004.

Continued on page 5

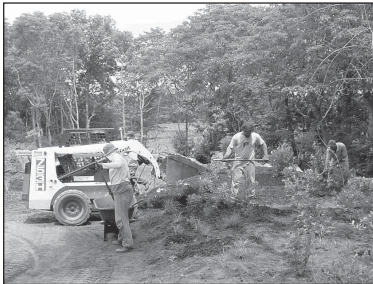
SPOTLIGHTED Coastal Access: A New View in Stonington



A new public access opportunity has been created at the DEP's Barn Island Wildlife Management Area in Stonington. A Marsh Overlook and Demonstration Garden has been constructed providing an outstanding panoramic view of the Barn Island marshes and Little Narragansett Bay. Interpretive signs will describe the ecology and natural history of the marshes, the successful restoration of the wetlands, and the uses of the wildlife management area. The project was an outgrowth of the acquisition of 144 acres of coastal forest in 2004, making Barn Island Connecticut's largest coastal wildlife management area with a total of 1,013 acres. To commemorate this addition, a sign has been placed on the trail to the new property describing the acquisition process and acknowledging funding sources.

The project site also features a demonstration garden of native coastal upland plants designed to provide examples of species that coastal residents may use to landscape their own properties. The garden and the observation area together offer a handicapped accessible gathering area for visitors, as well as a starting point for more extensive exploration of the Management Area. Please help to keep the garden attractive for all visitors by not allowing dogs to disturb the planting beds.

Activities available at Barn Island include trail walking and running, snowshoeing and cross-country skiing, and wildlife observation. The Management Area is also a popular hunting area – hikers and other non-hunters should wear protective orange clothing during hunting seasons, which are posted on the DEP website at www.ct.gov/dep. Search Recreation and Natural Resources.



DEP staff planting Barn Island Demonstration Garden.



Completed Demonstration Garden with gathering area and view of Barn Island marshes.

Funding for the construction of the project site and production of the informational signs was provided by the National Fish and Wildlife Foundation, the Connecticut Corporate Wetlands Restoration Partnership, and the Long Island Sound Fund. DEP is grateful for the partnership of Connecticut College Arboretum and the Denison-Pequotsepos Nature Center in the design, construction and maintenance of the garden. Follow the directions on the Connecticut Coastal Access Guide website (www.lisrc.uconn.edu/coastalaccess) and look for the entrance gate and parking area located on Palmer Neck Road about 100 yards before the entrance to boat launch parking area.

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 your address to laurie.valente@po.state.ct.us.

LOOK OUT for upcoming events!!

Norwalk Maritime Aquarium

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

Fall Foliage Cruises

Saturdays and Sundays in October, Depart 1:00 for 2-1/2 hour voyage.
Collect and observe marine animals; view autumn's hues from the water.

Winter Creature Cruises

Weekends, December-January; dates & times tide dependent; 2-1/2 hr.
View seals and winter waterfowl. Bring binoculars and dress warmly.

LIS Biennial Research Conference

U.S. Coast Guard Academy,
New London, CT

Contact Susan McNamara at
susan.mcnamara@uconn.edu to register.

On the Science and Management of Long Island Sound, a Multi-stressed Ecosystem

October 26-28

Joint meeting of the Long Island Sound Foundation and the New England Estuarine Research Society (NEERS).

Long Island Sound Study Citizens Advisory Committee Meeting

Univ. of Connecticut, Stamford Campus
Call 203-977-1541 to register.

Thursday, December 14

DEP Environmental Educator Workshops

Kellogg Environmental Center
500 Hawthorne Ave., Derby, CT
Call 203-734-2513 to register.

Healthy Waters and Healthy People Thursday, Nov. 16, 9 AM-3 PM

Teachers of grades 4-6
Help students understand the science of water quality measurement and issues surrounding local habitats and reservoirs.

November: Harbor seals arrive in LIS from northern New England; winter flounder move into shallower water.

December: Bald eagles return to Connecticut for the winter. Call 1-800-368-8954 after December 8th for reservations at the Shepaug Eagle Observation Area.

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

LIS Fund and LISS Sponsor Tour of OSV *Bold*

In July 2006, at the invitation of the DEP's Long Island Sound Fund Coordinator and the Environmental Protection Agency's (EPA) Long Island Sound Study (LISS) Office, the EPA's Ocean Survey Vessel (OSV) *Bold* returned to the State Pier at Fort Trumbull, New London after eight months at sea. Educational groups from the area and the general public were welcomed aboard for an educational tour of the vessel, where they met with on-board scientists and learned about some of the sampling equipment that EPA uses to assess the health of the oceans. Students attending included representatives from Camp Rotary in New London, part of the Connecticut Pre-Engineering Program (CPEP), a statewide organization that encourages young students to pursue careers in mathematics, science, engineering and technology, and from the New London Community Sailing Program. The OSV *Bold* is a 224-foot converted U.S. Navy ocean surveillance ship specifically designed to help EPA conduct water sampling and perform data analysis of coastal environments.


Demonstrations included the use of a grab sampler, a clamshell device dropped to the Sound bottom to scoop up mud and sand for analysis of living organisms and other organic matter. Staff from DEP's Long Island Sound Water Quality Monitoring Program explained how a CTD (conductivity/temperature/density) monitor measures the salinity, temperature, dissolved oxygen content, and density of water at different depths. DEP Office of Long Island Sound Programs (OLISP) staff discussed clean boating practices at marinas, Connecticut's No Discharge Zone program for elimination of sewage discharges from boats on the Sound, coastal land protection programs, and the Preserve the Sound license plate program. Staff from DEP's



OSV Bold visits State Pier, New London.

Boating Division provided information on boating safety in LIS. DEP's Affirmative Action Office described various career opportunities at DEP and distributed information about job opportunities in the field of environmental protection. The ship's laboratories featured observation tanks containing native plants and animals including hermit crabs and blue crabs, and a variety of fish. EPA staff provided microscopes enabling participants to study tiny aquatic isopods swimming in drops of water. DEP

staff displayed an oyster toadfish caught in Clinton Harbor. A native of LIS, the oyster toadfish can withstand the harsh environmental conditions that sometimes occur in the Sound.

The visit of the OSV *Bold* highlights the partnership of EPA and DEP in preserving, protecting and educating the public about the water quality and natural resources of Long Island Sound. DEP looks forward to future collaborative events with EPA to help educate the public, and particularly the young people who will be the next generation of environmental stewards, about the importance of our marine environment and the programs that protect it. 

LIS Futures Fund: Request for Proposals

The EPA's Long Island Sound Study, in cooperation with The National Fish and Wildlife Foundation, is issuing a request for proposals (RFP) for projects to restore and protect the health and living resources of the Sound through the Long Island Sound Futures Fund. See the LIS Study's Grants at-a-Glance website www.longislandsoundstudy.net/grants to learn more about this funding opportunity and to find links to the Fund's web site.

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

Sound Tips

Connecticut River Video Available

With a grant from the Long Island Sound Fund, the Connecticut River Museum has created a new educational movie on DVD that will be distributed to school groups prior to their visits to the museum. The movie, entitled "The River That Connects Us," describes the rich maritime history of the Connecticut River, the various uses of the river and the resulting environmental impacts over time, and the important relationship between the river and Long Island Sound.

This new movie provides a valuable context for visitors to the museum, including stunning aerial photography of the Connecticut River from its headwaters to its mouth where it meets the Sound.

Stewardship of Connecticut's landscape, particularly of the critical habitats that exist in the Connecticut River Valley, is a priority for DEP. Supporting quality environmental education opportunities for Connecticut's youth is an important component of the agency's conservation effort.

Copies of the movie can be obtained at public libraries throughout Connecticut. For more information, contact the Connecticut River Museum at 860-767-8269, or visit their website at www.ctrivermuseum.org

Purchase of an LIS License Plate supports the LIS Fund



As of May 31, 2006:

- Plates sold: 132,050
- Funds raised: Over \$4.7 million
- Projects funded: 283

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.

discovered that there had been sudden diebacks of vegetation at marshes in Chatham and Harwich, MA on Cape Cod. Dr. Warren hypothesized that a new disease may have caused the diebacks. This type of sudden dieback had never been observed in New England, and none of the typical causes of dieback (e.g., wrack or ice damage, geese grazing) could explain their observations. Louisiana and Georgia had experienced similar diebacks in 2000 and 2002, respectively, both during periods of drought. It was subsequently determined through forensic ecology that dieback is present in Connecticut and began in 1999, also a year of drought. Connecticut scientists had missed the arrival of dieback because the dieback zones along low marsh creek margins were very narrow. While dieback areas in Louisiana have recovered, many such areas in New England are still devoid of vegetation. It appears that these marshes are losing elevation due to the loss of living marsh grass roots.

Louisiana pathologists identified a fungus of the genus *Fusarium* that caused the death of *Spartina alterniflora* and *Spartina patens* (respectively, the predominant low marsh and high marsh grasses) when the plants were inoculated and subsequently stressed. In the Caribbean, scientists are looking at African dust as the source of pathogens causing both terrestrial and marine diebacks. African dust events have increased in the last 30 years due to global climate change, and U.S. Geological Survey studies have identified *Fusarium* in African dust found in the Virgin Islands. The first tidal wetland dieback was reported in Florida in 1990, and while *Fusarium* was determined to be present, it is not known


whether it was the disease causing agent. Could an introduced fungus such as *Fusarium* be infecting New England's wetland grasses, as Dr. Warren hypothesized? Dr. Wade Elmer, a *Fusarium* expert at the Connecticut Agricultural Experiment Station, has isolated a number of fungal species from soil and plant samples from Connecticut and Cape Cod, one of which



Sudden Wetland Dieback: Healthy tall cord-grass grows to the edge of the creek in the lower left corner of this photo. In the upper left and on the right side, cord-grass is absent, exposing the dark underlying soil known as peat.

best matches a species from Sudan, Africa.

In the absence of drought, dieback continues on Cape Cod and apparently unhealthy plants are present at the margins of dieback areas in Connecticut. It is too early to know what the long-term significance of sudden dieback is to tidal wetlands, or whether these marshes will recover. Because there are latitudinal differences

in marsh response to dieback, scientists are interested in collaborating on a region wide study of this phenomenon. To learn more about dieback, visit the New England Sudden Wetland Dieback website (<http://wetland.neers.org>). To learn more about the tidal marshes of Connecticut, read *The Tidal Marshes of Long Island Sound* (<http://camel2.conncoll.edu/ccrec/greenet/arbo/publications/34/FRAME.HTM>). 


Emerging Technologies Shed New Light on LIS Ecosystem

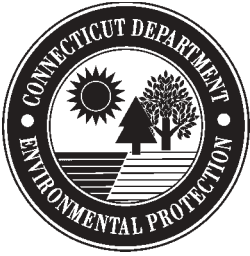
Long Island Sound is a large and complex ecosystem, covering 1,320 square miles and containing 18 trillion gallons of water. Consequently, scientists and researchers are continually seeking new technologies, such as those described below, to better understand the Sound's dynamic environmental conditions and to more effectively manage and protect its vital natural resources.

Ocean Observing Systems: Beginning in 1999, the University of Connecticut Department of Marine Sciences set up an observing system called MySound, which operates buoys at several locations in the Sound. The buoys collect real time data on water temperature, salinity, dissolved oxygen, weather conditions, and wave heights, all of which support key parts of DEP's water quality monitoring efforts (see www.mysound.uconn.edu). Today, LIS observing is conducted under the direction of LISICOS (Long Island Sound Integrated Coastal Observing System), created in 2003 as part of a national effort to bring marine observing theories, techniques, and technology from the open oceans to the coastal areas (see <http://lisicos.uconn.edu/index.php>). An example of this new type of observing technology is the installation of CODAR (Coastal Ocean Dynamics Application Radar) systems in Block Island and Western Long Island Sounds. CODAR is a unique, high frequency radar system that maps surface currents. It is currently assisting the U.S. Coast Guard in search and rescue operations and can be used to help predict oil and hazardous material spill trajectories. For more information on ocean and coastal observing systems in general, please visit www.ocean.us.



Recording data from Surface Elevation Table (SET), Barn Island marshes.

Surface Elevation Tables: A major interest of environmental scientists and coastal ecologists is tracking changes in tidal marsh surface elevations. With funding from the EPA's Long Island Sound Study, DEP has installed a series of Surface Elevation Tables (SETs) in coastal marshes across the state to measure surface elevation changes. Some of the possible causes for such changes include sea level rise, freshwater runoff and subsidence. SETs are portable mechanical instruments that are read by observers 3-4 times per year. Initially employed in Louisiana marshes, SETs were first installed in Connecticut wetlands in 2002. DEP's goal is to establish a comprehensive statewide network of SETs that will provide continual, long-term monitoring capability. To learn more about SETs, see www.pwrc.usgs.gov/set. 



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Then & Now: Sweet Sixteen for the R/V John Dempsey

In this issue of *Sound Outlook*, we begin a new column highlighting notable changes that have taken place in Long Island Sound or in related resources, uses or management activities.

The DEP Research Vessel (R/V) *John Dempsey* arrived in Long Island Sound waters sixteen years ago this past August after cruising 2,000 miles from it's birthplace on the Gulf Coast. The 50-foot long ship has served the monitoring and research needs of the DEP, federal agencies, and academic researchers since 1990 (see *Sound Outlook* issue No. 8, www.ct.gov/dep. Search Protecting Our Environment and then Office of Long Island Sound Programs). The intended function of the boat was to perform bottom fish trawling, sediment and water sampling, and deployment of larger sampling devices and acoustic equipment in Long Island Sound. The DEP's goal was to enable technical staff to assess the impacts of hypoxia and other water quality conditions in the Sound, and to continue a living marine resources survey begun by the Department's Bureau of Fisheries and Wildlife in 1979. That vision has been successfully met.

Today the R/V *John Dempsey* continues to be used to conduct the DEP's spring and fall fish trawl surveys and monthly water quality sampling cruises,



R/V *John Dempsey*

and to support the LIS research activities of University of Connecticut faculty and students. Deck machinery added to the ship's original equipment includes a side-station A-frame boom and winch, a pair of main trawl winches, and a stern net drum/hydrographic winch for trawl net and water quality monitoring equipment. With the development of satellite based global positioning

system (GPS) technology, the *John Dempsey* has added electronic navigation systems and the ability to continuously and precisely record its position, course and speed while conducting resource surveys including fish trawls and side-scan sonar bottom mapping. For more information on the R/V *John Dempsey* and related research activities, contact Dave Simpson of the DEP Marine Fisheries Division at david.simpson@po.state.ct.us.

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

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