



## Coast Watch...

Sara DeLeon, a grad student at Cornell University's Laboratory of Ornithology, studied birdsong as an indicator of effects of exposure to sublethal levels of contaminants such as PCBs (polychlorinated biphenyls) in the environment of the Hudson Valley. Photos courtesy of Sara DeLeon

### Are Birds Singing a Different Tune?

Picture a hushed woodland along a Hudson riverbank. The silence is broken by a tiny black-capped chickadee calling "fee-bee, fee-bee," the spring song familiar to hikers and birders alike. Could this bird ever sing a different tune? A researcher at Cornell University's Laboratory of Ornithology has found that in some environments the chickadee's song has become variable and the sound of the first note inconsistent. The hypothesized cause of such variability may be non-lethal levels of contaminants that persist in the Hudson River region.

As a grad student at Cornell University's Laboratory of Ornithology, Sara DeLeon's interest in bird behavior got her involved with a NY Sea Grant funded project to study birdsong as an indicator of effects of exposure to sublethal levels of contaminants such as PCBs (polychlorinated biphenyls) in the environment. Principal investigator **Dr. Timothy J. DeVoogd**, with a specialty in neuroanatomy and histology, really helped her "test her wings" as she learned about the intricacies of a bird's brain. Co-investigator **Dr. André A. Dhondt**, Sara's advisor, encouraged her to find ways to best study birds both in the wild and in the lab.

Songbirds such as black-capped chickadees, red-winged blackbirds and song sparrows are common to New York State. Many nest

along the Hudson River valley, a region with legacy levels of PCBs as a result of decades of electronics manufacturing upriver. During the last century, PCBs emerged as harmful, worldwide chemical pollutants. Most research on their biological consequences emphasized impacts on mortality, survival, and growth. Less studied has been the impact of prolonged exposure to sublethal levels of PCBs on animals.

Songbirds feed their chicks aquatic insects as a main food source, some of which may be contaminated by PCBs. Some birds continue eating insects throughout life, thus increasing PCB ingestion if they live in contaminated areas. In preliminary lab studies, the Cornell group found that PCBs interfere with the development of brain systems involved in producing song, and that some song characteristics are altered in birds living near Hudson River areas contaminated with PCBs.

Because of the chemical structure and physiological effects of PCBs, one sublethal consequence could be alterations to bird behaviors. There are 209 different PCB molecules based on where the chlorine atoms are attached to each benzene ring. Different PCBs may have different effects on brain structures responsible for song in songbirds.

# ...Coast Watch

Continued from page 1



Sara DeLeon in the field along the Hudson records the songs of black-capped chickadees (*Poecile atricapillus*) and song sparrows (*Melospiza melodia*).

Photo courtesy of Sara DeLeon

Armed with binoculars and recording equipment, Sara set out into locations along the Hudson to record the songs of black-capped chickadees (*Poecile atricapillus*) and song sparrows (*Melospiza melodia*). She also compared PCB concentrations in the birds using non-destructive techniques by taking samples of blood and feathers. Results showed that black-capped chickadees and song sparrows from regions with higher historic PCB contamination have higher blood PCB loads. Those regions with higher PCB levels showed a higher proportion of black-capped chickadees with variable songs and a higher proportion of song sparrows with high performance trills.

Black-capped chickadees have a basic two-note song consisting of just one high note (“fee”) and lower note (“bee”) Analysis of blood samples from black-capped chickadees showed that they have more PCB molecules with a high number of chlorine atoms and show greater variability in song with a change in the “glissando” ratio of the first note.

Song sparrows have a very long song with trills. The ‘high performance trills’ in song sparrows may be the result of other types of PCB molecules that are less toxic and act more like hormones. Some of the song sparrows with higher PCBs had slower trills. So those showing the high performance trills must have offset the slow trill rate with a larger bandwidth to get that high performance trill.

To corroborate results, DeLeon’s field studies were compared to controlled laboratory

experiments to show the effect of PCBs on song using zebra finches (*Taeniopygia guttata*). Zebra finches were dosed with minute quantities of PCB 52 (a known estrogenic mimic) and Aroclor 1242 (a commercial PCB mixture that was released on the Hudson River). “In the lab, zebra finches got a fraction of the PCBs they might be exposed to in the field, yet small amounts of contaminants were enough to have an effect.”

Results indicate that PCBs affect song characteristics, mating behavior, reproduction, song preference, and brain anatomy. Therefore, PCBs are changing a vital component of communication and reproductive success in birds, their song. (Listen to actual birdsongs on our Web site.)

What result is of the most interest to people? “Contaminants last a long time and are pervasive,” says DeLeon. “We have to take that into account when we study species in these disturbed environments and be aware of how environmental changes are affecting them.”

Several papers resulting from this project are in the works.

After seven years working on birdsong and behavior, Sara is now a post-doc at Drexel University in Philadelphia where she will continue working on bird behavior, this time on interactions between tropical birds and army ants.

—Barbara A. Branca

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Eileen Keenan, manager of the New York Sea Grant NEMO (Nonpoint Education for Municipal Officials) Program addresses coastal managers, engineers, construction industry executives, media, and interested citizens at the first annual Long Island Green Infrastructure Conference held at Brookhaven National Laboratory in June 2012. Photo by Rory MacNish

## New York Sea Grant at the Forefront of First Annual Long Island Green Infrastructure Conference

New York Sea Grant was one of several cosponsors of the June 2012 First Annual Long Island Green Infrastructure Conference & Expo organized by the Nassau and Suffolk County Soil and Water Conservation Districts and hosted by Brookhaven National Laboratory (BNL). The conference provided municipal officials and engineers, planners, consultants, property owners, landscape architects, and business leaders with information on how green infrastructure can be an effective means of protecting Long Island's valuable groundwater and coastal resources.

NYSG Director **Jim Ammerman** noted, "This conference was an important vehicle for disseminating the up-to-date technical information that is needed by the land use decision makers and engineers whose responsibility it is to stay current with the latest approaches to water resource protection."

One of several key speakers, NYSG's **Eileen Keenan** gave a presentation on improving water quality with green infrastructure. As program manager of New York Sea Grant's Nonpoint Education for Municipal Officials (NEMO) Program, Ms. Keenan works with over 100 Long Island municipalities and assists them in complying with state and federal municipal (MS4) stormwater regulations. Showing examples of various green infrastructure practices, Ms. Keenan explained how such practices can be used to mitigate the impacts of polluted storm water. Such impacts include closure of shellfishing beds, poor water quality, declining shoreline aesthetics, reduced navigability, impaired recreational opportunities, and degraded wetlands and wildlife habitats.

Ms. Keenan emphasized how green infrastructure practices such as riparian buffers, rain gardens, and

porous pavement can help capture and reuse stormwater, preserve natural vegetative features and be used to retrofit facilities and achieve required pollutant discharge limits known as Total Maximum Daily Loads, or TMDLs.

Following Ms. Keenan was **Kathryn Macri**, Environmental Policy Coordinator of the NYS Environmental Facilities Corporation, who discussed the various grant programs that are available for green infrastructure projects and why such practices are a priority for New York State.

Additional speakers included **Lanny Bates** and **Sam Aronson** of BNL; **Andrew Mellina**, USEPA Region 2 Senior Policy Advisor; **Brian Schneider** of the Nassau County DPW; **David Kvinge** of Westchester County Department of Environmental Protection; **Neil Rosen**, Director of Sustainable Development at North Shore LIJ Hospital; **George Proios**, Chairman of the NYS Soil and Water Conservation Committee, and **Margot Walker** of the NYC Department of Environmental Protection Green Infrastructure Division.

In addition to New York Sea Grant, other cosponsors included the Hempstead Harbor Protection Committee, the Long Island Chapter of the United States Green Building Council, the Manhasset Bay Protection Committee, Cornell Cooperative Extension of Suffolk County, and the Oyster Bay / Cold Spring Harbor Protection Committee.

Continuing education credits were offered by both Cornell Cooperative Extension of Suffolk County and the Long Island Chapter of the United States Green Building Council.

Having had a very responsive turnout in 2012, plans are underway already for the second annual (2013) Long Island Green Infrastructure Conference.

—Barbara A. Branca

## Sea Grant Helps Cornell Document Change, Develop Educational Curricula for NYC Sites

Since 2008, Cornell Institute for Resource Information Sciences (IRIS) and New York Sea Grant (NYSG) have been developing stewardship education materials to help educators better understand and teach students about coastal change over time in our NY-NJ Harbor-Hudson region's urban coast and the resulting impacts to its coastal environments. To further these efforts, NYSG Hudson Estuary Specialist **Nordica Holochuck** hosted a Cornell University College of Agriculture and Life Sciences (CALS)-sponsored undergraduate intern, **Bryan Chan**, this past summer in her Kingston office.

"Based on our experience in previous workshops, we knew we had educational materials that engage teachers," said **Susan Hoskins**, Geospatial Program Lead at Cornell IRIS. But, with the help of Chan and NYSG's Web Content Manager **Paul C. Focazio** a digital version of the resources will launch in early 2013, serving as the basis for teacher training workshops such as one in late-January at Queens College.

Materials collected by Chan—historic and current aerial imagery, printed maps, video footage and Web-based geospatial resources—are from a variety of sites

around metro New York. These coastal wetland areas which have been identified for restoration by the NY-NJ Harbor & Estuary Program include the iconic Liberty State Park; Staten Island's Arlington Marsh, a haven for harbor herons; and Sound View Park, home to the 24-mile Bronx River, NYC's only fresh water river. With its south end offering a connection to Long Island Sound, the Bronx River serves as a reminder that "we're all connected," said Holochuck.

Through collaborative efforts with Cornell and Sea Grant staff as well as targeted Hudson River Estuary stakeholders, "Bryan brought a whole new perspective to educator engagement with his skill set in video communications," said Hoskins. His video blog posts (Vlogs) – to be featured along with an extended version of this article via NYSG's Web site – "provide a look at his internship experience, and a view of the dynamic Hudson River resource that we can share with educators," adds Hoskins.

In the end, the key is to provide accessible mapping resources from relatable areas that will interest the widest array of educators. "For someone who may be new to geospatial learning, it's helpful to include relevant and important, even iconic imagery,



Each year, Cornell's intern program matches students with on-campus faculty mentors and extension programs. This past summer, (l-r) Cornell CALS intern Bryan Chan joined NYSG's Paul C. Focazio and Nordica Holochuck on Liberty Island, one of several sites for a Web-based mapping project on coastal change over time in NY's urban environment. After superstorm Sandy hit in late October, both Liberty and Ellis Islands were closed while the National Park Service assessed the damages.

such as the Statue of Liberty, that make the materials accessible to people outside of our immediate region," said Holochuck.

— Paul C. Focazio and Nordica Holochuck



...for an expanded version of this article, including more pictures and Bryan Chan's video blog.

## Stony Brook Hosts 5th Annual NYMSC Research Symposium

The swath of ocean stretching from the eastern tip of Long Island to New Jersey's Cape May, known as the New York Bight, was the subject of a brisk-paced conference that convened in September at Stony Brook University's Wang Center. The New York Marine Sciences Consortium (NYMSC) met for its Annual Conference in order to review the research priorities for implementing ecosystem-based management (EBM) in the New York Bight. **Matt Gove**, of the Bureau of Marine Resources at the New York State Department of Environmental Conservation (NYSDEC), led the conference proceedings, which began with a morning of short presentations from New York and New Jersey scientists on various environmental topics on the history, current status, and future conservation concerns for the New York Bight. After a short lunch break, the Consortium split into discussion groups, and spent the afternoon discussing and refining the research needs for EBM. The release of that final list of research needs will somewhat be delayed due to the aftermath of Hurricane Sandy.

A highlight of the morning presentations was that of **Larry Swanson** from Stony Brook's School of Marine and Atmospheric Sciences (SoMAS) who discussed a lot of the history of environmental activity in NY Bight. He showed photos of dumping refuse and sludge in the NY Bight until bad publicity and public outrage led to the Ocean Dumping Ban Act of 1988 and other environmental legislation.

**John Marra** of Brooklyn College discussed the physical oceanography of the Bight, and its effects on nutrient cycles from the mouth of the Hudson River out to the continental shelf. From Hunter College, **Karl Szekiolda** explained how remote sensing is used to recognize algal blooms and other ocean phenomena, depending on the resolution and time scale of the image set.

SoMAS scientist, **Charlie Flagg** (see links to his photos of Fire Island damage caused by Sandy), described the Oleander Project, the result of a partnership that takes advantage of the weekly round-trip trek from New York to Bermuda for valuable data collection. The *M.V. Oleander* has collected temperature and salinity measurements

weekly since 1978, and has provided an invaluable historic dataset which details the movement of the Gulf Stream through the year.

Another SoMAS scientist, **Mike Frisk**, reported on the recent telemetry research illuminating previously unknown facets of the Atlantic Sturgeon's life history. Using an array of acoustic telemetry receivers along the Long Island coast, Frisk's lab has gained new insight into the location and timing of spawning aggregations in this threatened species.

From Rutgers University, **Doug Ofiara** examined the effect of floatable waste on public use of New York and New Jersey's beach and coastal areas, and the subsequent economic losses in those areas. This research provides key calculations of the social value of damage due to pollution. **Christa Farmer**, an expert from Hofstra University of the New York Bight's paleotempestology – the study of ancient storms – described her research of how storm tracks have changed over millennia. Understanding patterns and how they are shifting with climate change is vital for developing long-term coastal management plans.

— Sharon Benjamin and Barbara A. Branca



# Last Wave

## Ordering Publications

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## Journal Reprints

Grocock, G.H. et al. Iodophor Disinfection of Walleye Eggs Exposed to Viral Hemorrhagic Septicemia Virus type IVb. 2012. *North American Journal of Aquaculture*. 75(1):25-33.

Hafliker P, M. Schwarzlaender, and B. Blossey. 2005. Biology of *Platycephala planifrons* (Diptera : Chloropidae) and its potential effectiveness as biological control agent for invasive *Phragmites australis* in North America. *Biological Control*. 34: 302-311.

Munch, S.B., M.R. Walsh, and D.O. Conover. 2005. Harvest selection, genetic correlations, and evolutionary changes in recruitment: One less thing to worry about? *Canadian Journal of Fisheries and Aquatic Sciences*. 62:802-810.

Scott, V.N., M. Wiedmann, D. Hicks, R. Collette, M.L. Jahncke and K. Gall. 2005. Guidelines for Listeria testing of environmental, raw product and finished product samples in smoked seafood processing facilities. *Food Protection Trends*. 25(1):23-34.

## Fact Sheets

Editors: Rochelle Sturtevant, NOAA/Great Lakes Sea Grant Network and Helen Domske, New York Sea Grant. *International Association for Great Lakes Research (IAGLR) 2012. Large Lakes of the World*. 2 pages.



...for more on this issue's stories, other news items, and links to our Facebook, Twitter, YouTube pages and RSS feed.

## New Great Lakes Coastal Stewardship How-To Resources

New York Sea Grant's new Great Lakes coastal stewardship how-to resources focus on slowing the spread of aquatic invasive species (AIS). In a brochure entitled *Stop Aquatic Hitchhikers: How-To Tips for Slowing the Spread of Aquatic Invasive Species*, Great Lakes boaters can learn how to inspect watercraft and protect NY's waters from AIS. This brochure and accompanying video prepared by the 2012 New York Sea Grant Launch Stewards, offer how-to tips for slowing the spread of Hydrilla, composting AIS, learning and practicing watercraft inspection, and for practices that kayakers and canoeists can use to slow the spread of AIS. In addition, these resources show how to organize a water chestnut pull with local community associations, scouts, schools and environmental groups.

Information on NY's first, fixed-crest low-head sea lamprey barrier, being constructed by the Great Lakes Fisheries Commission on Orwell Brook in Oswego County to reduce the populations of the parasitic fish in Lake Ontario, and a watercraft inspection how-to video are also part of the resources online at [www.nyseagrant.org/ccd](http://www.nyseagrant.org/ccd).

New York Sea Grant Community Development Specialist **Mary Penney** said, "The Stewards addressed timely, need-to-know issues of local interest by providing science-based facts and how-to information that the public can apply to help maintain and improve New York's Great Lakes aquatic and shoreline habitats."

— Kara Lynn Dunn



**New York Sea Grant Launch Steward Shelby Persons educates boaters about the importance of watercraft inspection. The other 2012 Launch Stewards are Matthew Brincka, Julia Gilbert, Ashley Regan, Nicholas Spera, and Kyle Teufel.**

Photo by Matthew Brincka

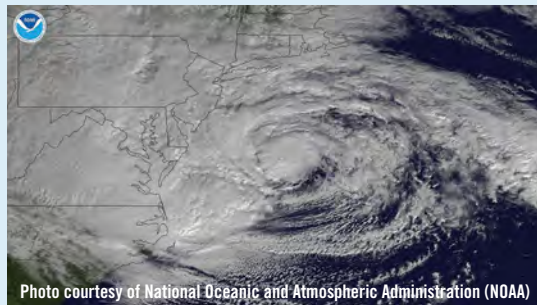


Photo courtesy of National Oceanic and Atmospheric Administration (NOAA)

## WWWhat's Trending?

### Scientists Go 'Social' with Sandy

Before, during and after landfall of Sandy in late October, NYSG-funded Stony Brook University (SBU) School of Marine and Atmospheric Sciences researchers kept close tabs on the storm.

SBU Storm Surge Research Group members **Drs. Malcolm Bowman** and **Brian Colle** provided their results via E-mail, the Group's Web site, and NYSG's Web site. During the height of the storm, NYSG's Twitter and Facebook feeds were the primary avenues for providing information as many (including the University) lost power and network connections. In some cases, the group was able to correct some of the storm-related inaccuracies reported about coastal flooding in lower Manhattan.

Once Sandy retreated, NYSG Coastal Processes and Facilities Specialist **Jay Tanski** surveyed many of the areas hit hardest on Long Island's South Shore. His report is featured at [www.nyseagrant.org/hurricane](http://www.nyseagrant.org/hurricane). This site also includes an array of pre- and post-storm resources, including educational materials and volunteer opportunities.

### Currents, NYSG's E-Newsletter, Makes Waves

The inaugural issue of *Currents*, NYSG's e-newsletter supplement to *NY Coastlines*, made its debut in late August. Both *NY Coastlines*, our flagship coastal science newsletter, and *Currents* will each be e-distributed 3-4 times a year. Sign up for both at either [www.nyseagrant.org/coastlines](http://www.nyseagrant.org/coastlines) or [www.nyseagrant.org/ecurrents](http://www.nyseagrant.org/ecurrents), both of which also feature archives of these respective publications.

### Community Supported Fisheries Concept Simmers

This past summer, NYSG partnered with Northwest Atlantic Marine Alliance and GrowNYC/ Greenmarket as well as Cornell University Cooperative Extension of Suffolk County for two separate Seafood Throwdowns. These unique cooking competitions showcase the importance of local seafood in restoring a healthy ocean ecosystem.

Through events like these, NYSG works to increase awareness about the role of fishermen in feeding New Yorkers. NYSG Fisheries Specialist **Antoinette Clemetson** said, "Fishermen share many commonalities with small farmers and we are seeking ways to work with fishing businesses to establish community supported fisheries programs such as those models that have been successfully applied on small farms."

An informative postcard and YouTube clip are just some of the related materials you'll find in the "News/Topics" section at [www.nyseagrant.org/marinefish](http://www.nyseagrant.org/marinefish)

— Paul C. Focazio



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## From the Director...

As this issue goes to press, Hurricane Sandy is still dominating the news as shoreline areas of metropolitan New York struggle to recover from this devastating October 29th superstorm. NYSG's website and social media have provided frequent updates on the storm and its aftermath, thanks to our Web Content Manager, **Paul Focazio**. Paul summarizes a number of NYSG outreach efforts on page 5, including information from the Stony Brook Storm Surge Research Group whose modeling research began with NYSG funding and whom we continue to support. NYSG storm information has also been featured on the Stony Brook University homepage. We are responding to the storm by supporting new studies of the impacts of barrier island breaches on the south shore of Long Island and expect to continue supporting research and outreach on Sandy's aftermath for some time.

This issue's cover story describes a NYSG-funded research study about the songs of Hudson Valley birds which may be altered by chronic sublethal exposure to the environmentally persistent organic chemicals known as PCBs. Researchers from the Cornell University Laboratory of Ornithology have demonstrated that PCBs affect song characteristics as well as bird behavior.

One of several other articles in this issue details NYSG's cosponsoring of the first-ever Long Island Green Infrastructure Conference. NYSG's water quality specialist, **Eileen Keenan** was both an organizer and speaker. The conference panelists and exhibitors were very well received and planning is already underway for a second conference in 2013.

During summer of 2012, an undergraduate intern worked with NYSG's **Nordica Holochuck** and Paul Focazio to develop video and other resources about changing coastal areas around New York City to be used for upcoming teacher workshops. **Mary Penney** also led the NYSG (Boat) Launch Stewards in educational efforts regarding invasive species in the Great Lakes. In a final article, Stony Brook hosted the 5th Annual Research Symposium of New York Marine Science Consortium in September with significant participation from NYSG.

Almost all of these stories are in some way affected by Hurricane Sandy. We continue to welcome small proposals to investigate the important impacts of Sandy on New York coastal areas. Please check our website for details.



NYSG Assistant Director Cornelia Schlenk (r.) leads a breakout group at the NY Marine Consortium conference along with SoMAS Associate Director William Wise while Sea Grant Scholars record.



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