Environmental sensor network at the LEC

Our new Environmental Sensor Network (funded through an NSF Field Stations and Marine Laboratory equipment award) is up and running! It is the first carbon, energy, and hydrologic flux network within the Great Lakes, providing data that will enable researchers to assess lake/bay/river changes and analyze key environmental patterns in the region. This research builds upon Dr. Jiquan Chen’s land-based sensor work.

The sensor network includes two permanent monitoring stations installed on existing structures in Lake Erie (the Toledo water intake crib and a NOAA buoy) and a shipboard station on the Lake Erie Center’s “Mayflier” vessel (see image below). The lake units are linked with flux towers in the terrestrial portions of the Maumee River Watershed -- in the Oak Openings Savannah, a coastal wetland at the Lake Erie Shoreline, and an agricultural field in Curtice, OH. These clustered towers provide data for understanding the water-land interactions at the watershed scale and provide key cross-discipline education and research opportunities.

Led by Dr. Carol Stepien, LEC Director, and Drs. Jiquan Chen, Richard Becker, Kevin Czajkowski, and Tom Bridgeman, the new sensor network provides key environmental data from one of the most important and dynamic ecosystems in the world -- our own western basin of Lake Erie. The data will contribute to the continued study of the impacts of global climate and ecosystem change, and findings will provide important comparison and exportation to aquatic systems worldwide. For more information and data access, visit: www.utoledo.edu/nsm/lec/sensor_network.

Table of Contents

Environmental sensor network at the LEC; Upcoming events............... 1
2011 Photo Contest Winners............................................................................... 2
Student spotlight: Jason Ross; Friends of the Lake Erie Center; Graduate student opportunities................................................................. 3
LEC research labs in brief; Gk-12 and Student Watershed Watch.............. 4

Upcoming Events

Public Lecture Series
*All talks will take place at the LEC, 6200 Bayshore Road, Oregon, OH, in room 155.

Thursday, January 19, 2012, 7:00 p.m.
Dr. G. Allen Burton, Jr., Director, Cooperative Institute for Limnology & Ecosystems Research, and Professor, University of Michigan
“Why we are failing to manage water quality”

Thursday, February 16, 2012, 7:00 p.m.
Dr. Von Sigler, Associate Professor, University of Toledo
“Agricultural application of municipal biosolids: what is the connection to environmental pollution?”

Thursday, March 22, 2012, 7:00 p.m.
Dr. Joseph Lucente, Assistant Professor and Extension Educator, Ohio State University and Ohio Sea Grant College Program
“Building Sustainable Communities in the Lake Erie Watershed”

Thursday, April 19, 2012, 7:00 p.m.
Dr. Scott Heckathorn, Associate Professor, University of Toledo
“Plants, temperature stress, and global environmental change”

Special Event: Art Gallery Public Talk, by Dr. Carol Stepien
The exhibit “Maumee Bay,” on display at the Walter E. Terhune Gallery at Owens Community College, is a merging of art and science. It includes scientific information produced by the Lake Erie Center, and several art exhibits. On Wednesday, January 25, at 3:30 p.m., Dr. Stepien will deliver a talk at the gallery: “Biology, problems, and solutions for Maumee Bay: A view from the Lake Erie Center.”

2012 “Nature of Maumee Bay” Art Contest Now Open!
Express your creativity in our annual Art Contest! Artists of all ages, and skill levels are invited to submit a piece of 2D or 3D art that fits our contest theme, “The Nature of Maumee Bay.” Prizes will be given in five age categories: adult, special needs adult, teen, youth and junior youth. For complete details, visit our website, www.utoledo.edu/nsm/lec.

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Web: www.utoledo.edu/nsm/lec
Winners of the 2011 "Nature of Maumee Bay" photo contest were recognized at an awards reception in November. Contest participants submitted original photos, competing in four age categories: junior youth (age 6 and under), youth (ages 7 - 12), teen, and adult. All contest entries are on display at the Lake Erie Center through April 2012; winning photos may also be viewed on our Facebook page: http://facebook.com/lakeeriecenter. Get your cameras ready for our 2012 contest! Entries are due by October 5. All ages and skill levels welcome. We love displaying your photos!
Student Research Spotlight: *Jason Ross and crew; Nearshore Sampling*

This past summer, researchers at the University of Toledo began a study in partnership with the Ohio Department of Natural Resources Division of Wildlife (ODNR-DOW) and the Ohio Environmental Protection Agency to develop a sampling design for Ohio's Lake Erie shoreline fish community. The ODNR-DOW has monitored offshore fish with extensive trawl samples for many years; however, managers and researchers now realize the increasing importance of the nearshore zone due to the effects of zebra and quagga mussels, human shoreline alterations, and land-use change. This study will help the management agency implement an annual assessment program of this critical habitat.

The UT research was led by Jason Ross, who is perusing a M.S. degree in the Department of Environmental Sciences (advisor: Dr. Christine Mayer). Jason and a crew of UT undergraduates (Kristen Woodling, Annie Doerr, and Mike Keubbeler) sampled 25 sites representing various habitat types spanning from Maumee Bay to Cleveland. They sampled the fish by electrofishing during both night and day and with trap nets. Electrofishing is a technique commonly used by fish biologists in which a generator on the boat is used to pass an electrical current through the water to temporarily stun fish so that they can be collected and safely handled. All fish that were collected were identified, counted, weighed, and examined for anomalies before being released unharmed back into the water. The season concluded with a total of 52 samples that captured 47 different species including: emerald shiners, mimic shiners, bluegill, white perch, white bass, largemouth bass, smallmouth bass, walleye, yellow perch, gizzard shad, northern pike, and bowfin. The researchers handled a total of 12,254 individuals that tallied up to 6,218 pounds (that’s 2.82 metric tons!).

Their preliminary results suggest that night electrofishing caught significantly more species than daytime electrofishing or trap netting. The researchers also gathered information on the physical habitat and the foodweb at each site. They will use these data to describe which shoreline features promote a diverse and abundant fish community. Next summer they will continue the survey with the same intensity to determine if findings vary from year to year. Residents who live near the shore may hear the electrofishing boat, which can be noisy! The research will help inform Lake Erie anglers and managers about where fish are located and how we can improve the health of the fish community in our important nearshore habitat.

Friends of the Lake Erie Center program

You can support student research at the LEC by joining FOLEC today! As a member, you will be invited to special LEC functions and all FOLEC events. You will also receive LEC merchandise. Membership is $15 for students, $30 for individuals, and $40 for families. Please contact Meredith Gray (419-530-8361 or meredith.gray@utoledo.edu) for more information. We thank all of our donors for their support over the years!

Graduate student opportunities

The Great Lakes Genetics Lab at the LEC is currently accepting new Ph.D. students, with assistantship funding available. Research assistants will develop a cutting-edge conservation genetics/genomics research Ph.D. project on nonindigenous species invasions or native fish populations of the Great Lakes.

We are also accepting applications for our NSF Gk-12 program. Graduate fellows earn $30,000/year plus tuition and fees. For more information on these opportunities, please visit our website: [www.utoledo.edu/nsm/lec](http://www.utoledo.edu/nsm/lec).
A new academic semester is upon us, and LEC faculty and students are back in full force after a brief holiday break. Research and academic pursuits continue and the LEC staff is busy planning and organizing our upcoming spring and summer events. Here are some updates and news from around the building:

Ph.D. student **Nathan Manning** (advisor: **Dr. Christine Mayer**) was awarded a $15,000 research grant from the Lake Erie Commission to analyze the relationship between recent land use alterations in the Maumee River watershed and fluctuations in the growth and abundance of yellow perch in the western basin of Lake Erie. Other members of the Aquatic Ecology Lab have been engaged in ongoing and new research projects, including the Bay Shore Power Plant project, seeking to quantify the environmental impact of the power plant’s operation, and a nearshore sampling study (see page 3, student research spotlight).

**Congratulations to Osvaldo Jhonatan Sepulveda Villet** (advisor: **Dr. Carol Stepien**) for successfully defending his Ph.D. dissertation, "Population genetic structure and biogeographic patterns in the yellow perch *Perca flavescens*." Dr. Sepulveda Villet (pictured above with his dissertation committee) is currently an Ohio SeaGrant research fellow at NOAA in Washington, D.C.

**Dr. Daryl Dwyer** and the **Environmental Remediation & Restoration Laboratory** welcome new students **Ryan Jackwood** and **Danielle Long**. Ryan comes to us from Ohio State University, where he earned his B.S. in biology. Here at the LEC, he is examining how pathogens from CAFOs (Concentrated Animal Feeding Operations) flow through wetland systems. We know that **Ryan** will bring plenty of energy and enthusiasm to the **ERRL**, as he is a marathon runner, with five 26.2 mile races already under his belt!

**Danielle** (pictured at right) received her B.A. in biology from Mercyhurst College in Erie, PA. At the **ERRL**, **Danielle** will be conducting a series of column studies to model the migration of organisms in human biosolids through a silt loam soil. After this she will construct large-scale test cells at the Stranahan Arboretum.

**Gk-12 and Student Watershed Watch 2011**

Our GK-12 fellows, teachers and their high school students were out in the field in October for Student Watershed Watch, analyzing and collecting ecosystem data from local streams. The students organized and presented their results at the SWW Summit, held at UT in November.

SWW teaches area teens about stream ecosystems through hands-on fieldwork and classroom learning. For the students and their teachers, the hands-on component is a unique and highly valuable learning experience. Working in their schoolyard streams, students tested the water temperature, turbidity, dissolved oxygen, pH, and many other parameters to determine overall quality. They collected benthic samples and examined macroinvertebrate communities -- many of them were surprised to find so many creatures living in the streams.

"SWW is a great hands-on experience for kids to get their feet wet and their eyes open to their local environment. Throughout our program, we have found that this experience changes students' lives," said Dr. Carol Stepien, Director of the LEC and head of our Gk-12 program.

At the SWW Summit, hosted by Chris Vickers, Meteorologist for WTOL 11 in Toledo, students gave poster and oral presentations and debuted creative movies detailing their findings. Our GK-12 groups won many of the awards:

- **Best Overall Presentation**: Toledo Early College High School (teacher: Tim Bollin; GK-12 fellow: Nate Manning)
- **Most Creative Presentation**: Start High School (teacher: Wendy Wilson; GK-12 fellow: Adam Szabo)
- **Best Overall Display**: Northview High School (teacher: Michelle Bouge; GK-12 fellow: Janet Traub)
- **Most Informative Display**: Clay High School (teacher: Caine Kolinski; GK-12 fellow: Justin Chaffin)
- **Most Creative Display**: Central Catholic High School (teacher: Ann Hajibrahim; GK-12 fellow: Chris Barr)