Volunteer Monitoring Network Expands to Ga., N.C.

In just over four years, the Southeast Phytoplankton Monitoring Network (SEPMN) has grown from a program with volunteers sampling in coastal South Carolina to expanding its coverage along the Georgia and North Carolina coasts. The SEPMN maintains a partnership with education specialists at the Center for Ocean Sciences Education Excellence—SouthEast, and this has allowed the network to add 12 sites in Georgia and 14 sites in North Carolina for a total of 60 sampling sites in the tri-state region.

In North Carolina, monitoring sites include areas near Nags Head, Beaufort, Morehead City, and Wilmington. Georgia volunteers are sampling sites in Savannah, Tybee Island, Sapelo Island, Brunswick, St. Simons Island, Jekyll Island, and St. Mary's.

The SEPMN is a community outreach program that pairs scientists with volunteers to increase awareness about harmful algal blooms and phytoplankton along the Southeast coast. The monitoring network, which began in 2001, is coordinated by staff at NOAA National Ocean Service Marine Biotoxins Program in Charleston, S.C.

The SEPMN has helped scientists identify five potentially toxic species not previously known to exist in tri-state coastal waters. These include representatives of the genera *Dinophysis*, *Prorocentrum*, *Pseudo-nitzschia*, *Heterosigma*, and *Akashiwo*.

SEPMN groups are given a variety of tools to help them with their sampling and identification efforts, including a teacher training manual, the publication “Algae: A Sourcebook for Teaching about Harmful Algal Blooms,” a plankton net, a phytoplankton I.D. key, a thermometer, and a refractometer. In addition, volunteer groups that consistently send in data are loaned a MIC-D digital microscope.

North Carolina groups began monitoring for the SEPMN in February 2005. On April 6, 2005, First Flight High School in Kill Devil Hills reported a bloom of *Pseudo-nitzschia pseudodelicatissima*, a potentially toxic species to marine mammals, birds, and humans. This report has prompted the SEPMN and Marine Biotoxins Program to conduct further studies of water and shellfish in the area. According to Wendy Wicke, SEPMN program coordinator, “This event helped emphasize the importance of linking the general public and scientists together on various environmental issues. Without the assistance of these students, we would have never known about the bloom that occurred in the Nags Head area.”

To participate in the SEPMN, contact Wendy Wicke at (843) 762-8656 or wendy.wicke@noaa.gov. For more information, including site data, back issues of *The Plankton News*, a listing of volunteer groups, and helpful links, visit http://www.chbr.noaa.gov/CoastalResearch/SEPMN.
Member Focus

Alan Lewitus is a research associate professor at the University of South Carolina Belle W. Baruch Institute and associate marine scientist at the S.C. Department of Natural Resources. Alan is also the director of the S.C. Algal Ecology Laboratory (SCAEL) located in Charleston. He has a Ph.D. in biological oceanography from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution. Alan’s research interests include the ecology and physiology of harmful algae, the effect of nutrients on microbial foodwebs, and eutrophication.

Q: Tell us about the S.C. Algal Ecology Lab—how many people work here and what do they do?
A: We have a staff of 16, including three faculty members of USC, College of Charleston and MUSC grad students, and technicians from USC and SCDNR. We’re pretty diverse in what we do, but we pride ourselves on basic research of both good and bad algae. We have people who specialize in molecular biology, taxonomy, chemical analyses, field research, database management, and microbiology. We also monitor waterways for HABs, have a fish kill and algal bloom response team that works cooperatively with SCDHEC, research the factors contributing to harmful bloom formation and the impacts on natural resources, plus we’re getting into human health issues.

Q: What is some of the basic research being done by the SCAEL?
A: Currently, there is a pretty strong effort toward understanding the taxonomy of a potentially harmful group of algae called raphidophytes: What species are here, basic ecology, and how viruses and bacteria can control populations. We’re also trying to understand what conditions are favorable for algal growth. We do a lot of nutrient analyses to determine the species nutrient uptake and metabolism.

Q: What potentially harmful species are most prevalent?
A: It depends on the environment. In brackish ponds, four raphidophytes stand out: *Heterosigma akashiwo*, *Chattonella subsalsa*, *Chattonella cf. verruculosa*, and *Fibrocapsa japonica*. *Pfiesteria* and *Karlodinium micrum* are common in the ponds, but usually not abundant. In tidal creeks, we find *Kryptoperidinium* sp. (the S.C. “red tide”) and *Scripsiella* sp. In mid-to-low brackish ponds and freshwater, we find cyanobacteria, like *Microcystis*, *Anabaena* sp., and *Anabaenopsis* sp.

Q: What other research projects are you working on?
A: Certainly Avian Vacuolar Myelinopathy (AVM), a brain lesion disease affecting waterbirds and bald eagles, is a hot topic. We’re also involved with research on constructed wetlands as a way to improve stormwater best management practices. And we’re looking at the relationship between toxic algal blooms and human health, with a focus on the freshwater/brackish toxin microcystin.
REAL-TIME REMOTE MONITORING (RTRM) SYSTEM

What is a RTRM system? A platform outfitted with several sensors, or probes, that monitor water quality and weather-related data.

Who developed the RTRM system? The prototype was developed in 2000 by scientists at North Carolina State University’s Center for Applied Aquatic Ecology. The RTRM was first used to monitor water quality in the Neuse River, which has a history of fish kills and harmful algal blooms.

What does it measure? Hydrological data: water level, water temperature, salinity, pH, dissolved oxygen, chlorophyll, and turbidity. Meteorological data: air temperature, wind speed and direction, barometric pressure, rainfall, relative humidity, and sunlight intensity.

How does it work? The solar-powered RTRM automatically collects hydrological and meteorological data from sensors at specified times. The data are stored in the onboard computer, and then transmitted via a modem back to a computer in the lab. Here the data are analyzed, compiled into easy-to-understand graphic formats, and uploaded to NCSU’s Center for Applied Aquatic Ecology Web site. Meteorological sensors are located at the top of the system and an underwater sonde unit takes hydrological measurements.

What are the advantages of using RTRM? Compared to traditional field sampling, the RTRM system allows for rapid detection of and response to potentially harmful algal bloom events. Water quality conditions can be monitored constantly, and early warning can be given to state and community resource managers as well as public health agencies. Consistent, long-term observations are now possible, and the RTRM may also be used to predict HABs.

Where are RTRM systems currently set-up? 10 sites in North Carolina’s Neuse estuary, and one RTRM each in the Falls Lake reservoir (Wake Forest, N.C.) and Kiawah Island, S.C. Data gathered from a Kiawah Island stormwater detention pond are available in real-time on-line at http://ncsu.edu/wq/RTRM/kiawah/dp13cc.html.

How much does a RTRM system cost? The RTRM system pictured costs about $30,000.

In Brief

■ In December 2004, Task Group members hosted a site visit for Dennis Christianson, deputy chief of the Health Studies Branch at the Centers for Disease Control and Prevention, and Lauren Lewis, medical epidemiologist with the CDC Division of Environmental Hazards and Health Effects. The Task Group presented progress-to-date on research, surveillance, public health, and outreach efforts.

■ The Southeast Phytoplankton Monitoring Network recently hired Julie Cahill as outreach specialist. Julie has a bachelor’s degree in marine biology from Roger Williams University in Rhode Island and 10 years experience as a marine educator. Previously, she worked as an educator for the Louisiana University Marine Consortium.

■ Dan Hitchcock joined the S.C. Sea Grant Extension Program as coastal environmental quality specialist. Dan has a B.S. in zoology from the University of Tennessee and a Ph.D. in biological and agricultural engineering from the University of Georgia. Dan previously worked for the USDA Forest Service in Charleston, S.C.
Information and Resources

Web sites

S.C. Algal Ecology Lab:
http://links.baruch.sc.edu/scael
Southeast Phytoplankton Monitoring Network:
http://www.chbr.noaa.gov/
CoastalResearch/SEPMN
NOAA Marine Biotoxins Program:
http://www.chbr.noaa.gov/
CoastalResearch
NOAA Coastal Services Center’s
Harmful Algal Bloom Project:
http://www.csc.noaa.gov/crs/habf
Florida Fish and Wildlife Research Institute, featuring “red tide” information:
http://www.floridamarine.org
Centers for Disease Control and Prevention, Health Studies Branch:
http://www.cdc.gov/nceh/hsb

Publications

Harmful Algae News. The Intergovernmental Oceanographic Commission (IOC) newsletter on toxic algae and algal blooms, Tim Wyatt, Editor:
http://www.ioc.unesco.org/hab/news.htm

Harmful Algae. Sandra Shumway and Theodore Smayda, Editors-in-Chief:
http://www.elsevier.com/locate/hal


International Directory of Experts in Harmful Algae, an IOC publication:
http://ioc.unesco.org/hab/data.htm

To report an algal bloom or fish kill, call SCDHEC at (888) 481-0125 or SCDNR at (800) 922-5431. You may also contact Lara Mason, SCDNR HAB and fish kill coordinator, directly at (843) 953-9077, or visit http://links.baruch.sc.edu/scael/report.htm.

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