



# PLANKTON NEWS

THE NEWSLETTER OF THE VOLUNTEER PHYTOPLANKTON MONITORING NETWORK

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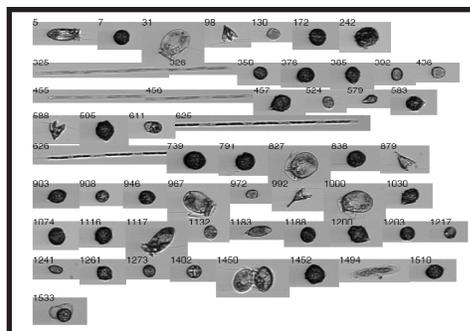
## Toxic *Dinophysis acuminata* Bloom in Texas

~ By Meridith Byrd, HAB Response Coordinator for [Texas Parks and Wildlife](#)

Texas recently experienced its first toxic bloom of the dinoflagellate *Dinophysis acuminata*. Though local oyster populations were affected, early notification and consistent monitoring resulted in no cases of diarrhetic shellfish poisoning being reported.

On February 14, 2008 Dr. Lisa Campbell, an oceanography researcher at [Texas A&M University](#), noticed some interesting images being taken by an instrument, the [Imaging Flow CytoBot](#), deployed at Port Aransas, Texas. An undetermined species of *Dinophysis* was beginning to show up in increasing numbers. She notified state officials and others about the potential bloom and soon after sent a water sample to the FDA to test for the toxin okadaic acid.

Three weeks later the event had become a full-fledged bloom. A report of discolored water in the Port Aransas marina on March 3 led to a water sample containing such high concentrations of *Dinophysis* spp. (later identified as *D. acuminata*) that counting cells via microscope was impossible. By the next day the report was in: the FDA had found okadaic acid in Dr. Campbell's water sample. The Texas Department of State Health Services immediately began collecting water samples from area oyster reefs (one of which contained 3.3 million cells/liter of *D. acuminata*) and by the end of the week a [press release](#) was issued announcing the closure of Corpus Christi, Aransas and Copano bays to the harvest of oysters, clams and mussels as well as a recall of those shellfish harvested on or after March 1. This marks the first time the Texas shellfishery has been closed due to okadaic acid. Within one week the bay closures were expanded to include 7 additional bays pending the results of the okadaic acid tests.



Images of phytoplankton from the Imaging Flow Cytobot during the time of the bloom.

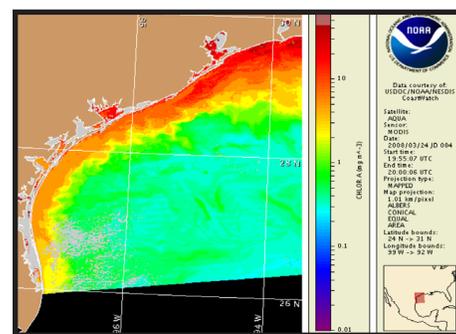
Throughout March a handful of entities monitored the waters for the algae: the Texas Parks and Wildlife Department, Texas A&M University, the University of Texas Marine Science Institute and the Texas Department of State Health Services. PMN volunteers were also asked to be on the lookout for any *Dinophysis* spp. in their samples. Volunteers did find a high abundance of *Dinophysis* spp. in Christmas Bay, an area north of the main bloom. As the event progressed, levels of *D. acuminata* dropped while those of *Prorocentrum* spp., another potential okadaic acid-producer, were on the rise. However, this did not result in sustained oyster toxicity. Though the oysters did accumulate okadaic acid quickly at the onset of the bloom, the toxin levels had declined dramatically before the end of March. By April 1 the state health department had begun to reopen certain bays to shellfish harvesting; all bays were reopened by April 12.

This event was especially notable for two reasons. First, a toxic *D. acuminata* bloom has never before been documented in Texas and second, there has never been a closure of shellfish beds due to okadaic acid. *Karenia brevis* has traditionally been the cause of past shellfish closures due to the risk of neurotoxic shellfish poisoning. Volunteer monitoring is a great addition to the event monitoring done by state agencies and universities because many times the resources are not available to allow for a large-scale survey of coastal waters. Texas is fortunate to have such wonderful volunteers!

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Gulf of Mexico Harmful Algal Bloom Bulletin for March 25, 2008



## Update from Dr. Morton

I hope everyone has had a productive spring and for the teachers in the group a great summer without classes.

Since the last newsletter, the network has been involved with two major blooms along the Texas coast. The first was a "red tide" of the heterotrophic dinoflagellate *Noctiluca scintillans*. This dinoflagellate is known for its ability to bioluminesce. The second event was the *Dinophysis* bloom which closed the shellfish beds in Texas. I would like to thank Meridith Byrd for writing the featured article on the *Dinophysis* bloom.



On a personal note, I was awarded by NOAA in April 2008 with the United States Department of Commerce Bronze Metal Award for "leadership in implementing the network to enhance observations and awareness of harmful algal blooms." It has been a real pleasure working with you all on this project and I would like to thank all of the volunteers for making this program the success that it is!

The staff of the network has been busy moving into our newly renovated laboratory space in the CCHEBR building. This move unites the network with my research program by being in the same building. We also took delivery of a new microscope camera which is web enabled. Thus, you can examine your samples along with us just by logging onto a web site. During the summer we will be working out the bugs in the system and should have an update for the next newsletter.

Happy Bloom Hunting!

## News and Notes



### First Flight High School Students Receive Governor's Award

Students from First Flight High School in Kitty Hawk, NC were honored in March for their discovery of a bloom of toxic *Pseudo-nitzschia pseudodelicatissima*, the first reported case in the Southeastern United States. At a banquet in Raleigh, NC they received the Youth Conservationists of the Year Award for their findings. This group, fondly nicknamed the Phytohunters, is led by teacher Katie Neller and samples every Wednesday from the U.S. Army Corps of Engineers Field Research Facility in Duck, NC. Congratulations Phytohunters!



### PMN Takes Sail

In March, PMN took sail with James Island Charter High School on the Spirit of SC. Sampling the Charleston Harbor from this 140 ft. long tall ship was quite an experience! PMN plans to work with the crew of the Spirit of SC this fall so they can begin monitoring regularly. James Island Charter High School students, led by teacher Sue Morrison, currently sample at Bowens Island Dock on James Island, SC. (Right photo: David Williams)



**Plankton News** ~ Published by the Volunteer Phytoplankton Monitoring Network

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## Q & A with Aquatic Microbial Toxicologist, Dr. Mike Twiner

**Education:** BS Honors, Toxicology with Environmental Science, University of Western Ontario, Canada  
PhD, Environmental Toxicology, University of Western Ontario, Canada

**Favorite Subject(s):** Science and Math. I just loved doing little experiments all the time. When I was quite young, I can't remember how many times I added vinegar to baking soda with red food coloring to make little volcanoes.

**Best Part of Job:** The satisfaction of learning something new everyday that no one else on Earth has ever observed before!

**Q: How did you become involved in marine science?**

**A:** The inspiration was fostered by watching a 1980s TV show called "Danger Bay" that was all about a marine biologist who worked at the Vancouver Aquarium in Canada. Then, when I was an undergraduate, one of my favorite professors gave a lecture on "Marine Toxins." From then on out, I was hooked!

**Q: What are your current research areas?**

**A:** My first project deals with the impact of how algal toxins affect marine mammals such as bottlenose dolphins. The second project I have is exploring the biochemical and molecular effects of a marine toxin (called azaspiracid) on humans and marine life. And my third project looks at the microbiology of harmful algal blooms, in particular the bacteria that are associated with cells of the dinoflagellate *Karenia brevis*.

**Q: What is next with your career?**

**A:** Currently I am very happy working at NOAA where I am surrounded by many colleagues that are considered among the world's experts on marine toxins and HABs. However, I think in the long-term I will eventually pursue an academic position at a university. I find the interaction with students to be highly invigorating and inspiring.

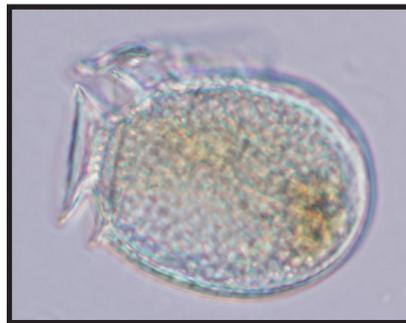
### Recent Publications:

Fire, S.E., Flewelling, L.J., Naar, J., Twiner, M.J., Henry, M.S., Pierce, R.H., Gannon, D.P., Wang, Z., Davidson, L., and Wells, R.S. (accepted). Prevalence of brevetoxins in prey fish of bottlenose dolphins in Sarasota Bay, Florida. *Marine Ecology Progress Series*.

Twiner, M.J., Rehmann, N., Hess, P., Doucette, G.J. (2008). Azaspiracid Shellfish Poisoning: A review on the ecology, chemistry, toxicology and human health impacts. *Marine Drugs* (Special issue on Marine Toxins) 6, 39-72.

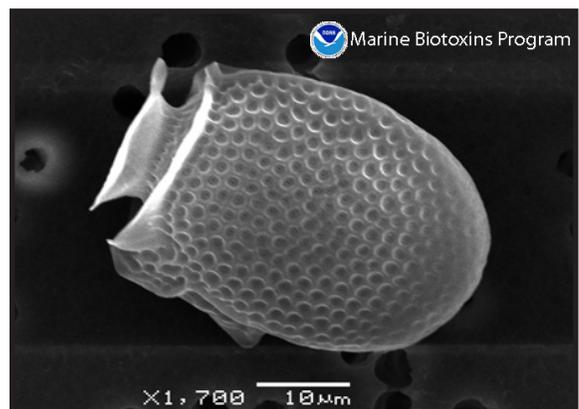
## Species Spotlight: *Dinophysis acuminata*

*Dinophysis* is a globally distributed genus of marine and estuarine dinoflagellates. Often misidentified as *Phalacroma* species, *Dinophysis* species are distinguishable by their epitheca's height and shape along with the direction in which their cingulum forms. Additionally, the presence or absence of chloroplasts and the formation of an apical pore by two distinct apical plates aids in proper species identification. *D. acuminata* is small to medium in size with an oval shape and a length of 38-58  $\mu\text{m}$  and a width of 30-38  $\mu\text{m}$ . If viewed posteriorly, *D. acuminata* can be perceived as round in shape. The well developed sulcal region begins on the left side and runs past the center of the cell. Surface morphology ranges from pores to depressions to scattered aerolae with pores.



*Dinophysis* has been linked with the human syndrome "diarrhetic shellfish poisoning" or DSP. DSP is caused by the consumption of shellfish contaminated with okadaic acid or pectenotoxin. Until recently, this linkage was not firmly established

since this species was not able to be cultured. However, at the 12th International Meeting on Harmful Algae held in Copenhagen, Denmark, a research group from the Republic of Korea reported the first culture of *D. acuminata*. They succeeded by feeding the *D. acuminata* cells the ciliate *Myrionecta rubra*, which was feeding on the algae *Tetraulax*. So, this dinoflagellate feeds on a ciliate which feeds on different species of microalgae. Recently, cultures of *D. acuminata* have been shown to produce both okadaic acid and pectenotoxin in culture.



## Volunteer Spotlight: Bob Neville & Sunnie Jones, Folly River (SC)

It has been almost six years now since Nancy Smith and the Folly Beach Turtle Watch Program asked their volunteers if anyone was interested in being trained to look at phytoplankton. A handful of people took the training, four became phytoplankton regulars, but over the years those four have been whittled down to two: Sunnie Jones and Bob Neville. Sunnie and Bob monitor the waters of Folly River, just a few miles inland from the Atlantic Ocean, on the other side of Folly Beach, next door to Charleston, South Carolina.

Bob was an outdoor kid growing up. For the past 27 years, his day job has kept him inside as the Assistant Dean at the College of Charleston's Library. However, to this day, he still enjoys spending much of his "free time" outdoors. Bob loves to bird watch and he has been with the Folly Beach Turtle Team for 7 years ([www.follyturtles.com](http://www.follyturtles.com)). As part of the turtle team, volunteers receive training from the SC Department of Natural Resources, walk over 5 miles of beach everyday looking for turtle tracks from May to mid-August, aid in nest relocations, and dispose of turtle strandings.



While he has had no formal training as a scientist, he has always been interested in science. Bob enjoys participating in programs like the PMN and Turtle Watch since they are "longitudinal studies" where "in a small way, I feel like I am contributing to something. And I've loved to watch the program (PMN) grow."

Bob and Sunnie collect their phytoplankton samples at the Folly River public boat ramp. Five years ago, they started sampling at the Folly Beach Pier. There they would get lots of people asking questions about what they were doing with that "windsock." However, as volunteers left the Folly Beach group, as the winters began to get really cold on the pier, and as they noticed very little difference between the phytoplankton found at the two sites, they decided to sample only at the boat ramp.

While they do not get as many questions as at the pier, Bob and Sunnie like to sample at the boat ramp because it is used a lot by recreational boaters and the citizens of Folly Beach. They enjoy meeting people "who don't know what they're doing." This gives them the chance to talk with them about the important role phytoplankton play in the marine ecosystem. Bob has noticed that most of the people he comes across have heard of Red Tide before.

After collecting the sample, they look at it back as Bob's Folly Beach house. When they first started with the PMN, they bought and used an inexpensive light microscope, but have been using the MIC-D ever since. The MIC-D is the "best thing that has happened" for our monitoring. It typically takes about 40 minutes for Bob and Sunnie to do a count. Over the years, they haven't seen "too many of the bad bugs" while monitoring Folly River. However, they have reported a few blooms, including *Rhizosolenia* and *Skeletonema*. Bob recalls how hard it was in the beginning to identify the phytoplankton, since "everything looked alike." But after a couple of months, they began to learn the different kinds of phytoplankton and it started to get easier to ID "most of them."



"Aside from general curiosity I initially became interested in the PMN because I was interested in the quality of the ocean environment for sea turtle populations. I really got hooked after reading *And the Waters Turned to Blood* by Rodney Barker which I found frightening and too close to home. Working with PMN has really reinforced how interconnected everything in our environment and how the health of any given species affects the whole ecosystem."

All of us at the PMN are thankful for your long-term monitoring that you are doing. We are extremely glad "science is something you enjoy," and that the monitoring network is a "great hobby" for you. Thanks Bob and Sunnie for keeping an eye on the waters at Folly Beach.

## PMN Expansion:

### Moving into the Largest State, Largest Estuary and Largest Marine Sanctuary

Monitoring the health of the Chesapeake Bay, the largest estuary in the United States, has been a top priority for various agencies and organizations in Maryland and Virginia. From temperature to salinity, the data gathered provides important information to maintain a healthy habitat for animals and plants that live in the bay. Thanks to the hard work and determination of Dr. Doug Levin with the NOAA Chesapeake Bay Office in Oxford, Maryland, and Ann Marie Chapman with Nauticus, volunteers will now monitor the bay for Harmful Algal Blooms. In collaboration with the NOAA Oxford Lab, Nauticus, and the Virginia Institute of Marine Science, a workshop was held on March 15 to train 21 teachers how to monitor phytoplankton in the southern bay area. PMN now has ten sampling sites in the Chesapeake Bay and plans to add more this fall.

In addition to the continental U.S. expansion into the Chesapeake Bay and Alaska (Below), we have established a sampling site at NOAA's Hawaiian Islands Humpback Whale National Marine Sanctuary. This sanctuary is part of the largest marine sanctuary in the world and home to over 10,000 Humpback whales during the summer. We are excited to welcome our first National Marine Sanctuary to the Network!



## Alaska Harmful Algal Bloom Workshop: A New Frontier

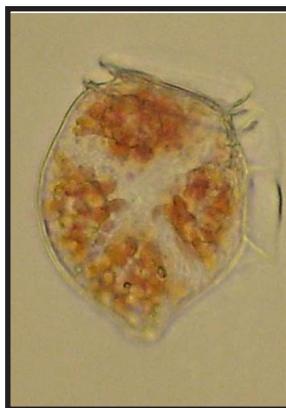


In late April, the Volunteer Phytoplankton Monitoring Network participated in a Harmful Algal Bloom (HAB) Monitoring Workshop held for Alaskan shellfish growers. This workshop was sponsored by the University of Alaska Southeast (UAS) - Ketchikan and held on their campus.

This two day workshop provided training to shellfish growers on collection and identification of phytoplankton. Monitoring these microscopic organisms can help shellfish farmers better understand bloom dynamics as they relate to shellfish production. Relatively little is known about harmful algal blooms in Southeast Alaska and increased knowledge related to blooms will provide useful information to shellfish growers and harvesters.

Dr. Steve Morton from PMN and Dr. Vera Trainer from the Northwest Fisheries Science Center in Seattle are NOAA researchers that led the workshop along with Kate Sullivan from UAS, Dr. Ginny Eckert from the University of Alaska - Fairbanks, Keri Baugh from the Northwest Fisheries Science Center, and Allison Sill from the PMN.

Much to the excitement of participants, sampling equipment, filtering apparatus and microscopes were provided to six groups. PMN looks forward to assisting UAS in learning about HABs in Southeast Alaskan waters and expanding the program into Northwest Alaska this fall by assisting with an HAB workshop for shellfish growers in Homer.



## PMN Volunteer Snapshots



**Left:** A budding volunteer checks out the sample from the Ft. Johnson Marina at the 2008 S.C. Department of Natural Resources Open House. After this view, she was hooked!

**Right:** Chris S'gro and John Kiser, sampling in Ketchikan, Alaska. Both attended the April HAB Monitoring Workshop for commercial shell fishermen at the University of Alaska Southeast.



**Right:** TJ Fox, a Texas Master Naturalist, samples at Copano Bay Causeway and has a great trick to improve his microscope skills. TJ wears an eye patch to make viewing samples through one eye piece easier. What a great idea!



**Left:** Homer Singleton, volunteer with the Wolf Bay Watershed in Alabama, attended the Alabama training with his new PMN issued Olympus Mic-D Digital Microscope. Homer monitors Arnica Bay, Cooks Dock and Fish Trap Park.



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