MINUTES
TEXAS HARMFUL ALGAL BLOOM WORKGROUP
September 10, 2009
10:00 a.m. – 12:15 p.m.

Geochemical and Environmental Research Group (GERG) Conference Room
Texas A&M University

Attending via phone were Barbara Dorf (TPWD), Cindy Contreras (TPWD), Melissa Tidmore (TPWD), Shelly Tomlinson (NOAA), and Janet Nelson (TPWD).

Attending in person were Meridith Byrd (TPWD), Luci Cook-Hildreth (TPWD), Winston Denton (TPWD), Natalie Thompson (TAMU), Reagan Errera (TAMU), Darren Henrichs (TAMU), Christine Kolbe (TCEQ), Tony Reisinger (Texas Sea Grant/Extension), Rob Hetland (TAMU), Lisa Campbell (TAMU), and Norman Guinasso (TAMU).

The agenda was changed to allow the TAMU presenters to go first.

Rob Hetland began by detailing the projects he is involved in.

The first is a hypoxia modeling study of the Louisiana shelf led by Steve DiMarco of TAMU. The study will look at the formation of the hypoxic area and includes the Mississippi and Atchafalaya river drainages. Plans are for the study to extend down to the Texas-Mexico border.

The TGLO coastal surface current forecast model can be viewed at http://seawater.tamu.edu/tglo. The model incorporates predicted winds to get a forecast of surface currents and will ultimately include the new hypoxia domain that extends from Mississippi River to the Rio Grande.

There are two projects designed to look at HAB prediction. Hetland will look at all products that NOAA uses to (1) determine will a bloom will go and (2) backtrack to find out where it came from.

- Downwelling winds blow along the shore from the northeast and push the surface water against the coast.
- Rates of increase in bloom concentration can be as fast as cell growth rates.
- Hypothesis: models can be used to identify scenarios that could be more conducive to bloom formation.
- Loop currents will not be included in the model for the time being because of the off-and-on nature of these currents.
- The models are checked against the TABS buoys, which can be seen at http://tabs.gerg.tamu.edu/tglo/.

Lisa described her Imaging Flow CytoBot (IFCB) project funded by NOAA. Rob Olson of Woods Hole will build a second IFCB to house in Lisa's lab. The second instrument would be available to run live samples submitted by outside agencies for bloom confirmation and monitoring. The IFCB deployed at Port Aransas will continue to run, but Campbell must find new funding to allow the project to continue. Texas Sea Grant has agreed to fund one project to look at organisms that graze on *Karenia brevis*; these organisms are small and fragile and tend to crumple when preserved, so the IFCB will be able to view them live.

- In the last week IFCB has seen *Karenia brevis* in low levels (1/ml) at Port Aransas. This was reported to NOAA, who also saw a chlorophyll feature off the Texas mid-coast.
- Ed Buskey of the Mission-Aransas NERR did a plankton net tow on Tuesday, Sept 8 in the morning and afternoon. He did not find anything in these tows but will look again.
- Tony Reisinger asked if the cells being seen by the IFCB could be related to the event in August, when there was a report of respiratory irritation off the Brazos-Santiago Pass. NOAA satellite imagery did pick up a chlorophyll feature south of the Rio Grande, and samples were collected around the South Padre Island area, but no *Karenia brevis* cells were ever found.

Darren Henrichs is exploring whether Texas blooms are related to Florida blooms, including the following questions:

- Why are Texas' blooms sporadic?
- Do blooms originate in Florida and get transported to Texas?
- Could there be more than one seed population in the Gulf of Mexico?

Darren is looking for genetic differentiation, specifically differences in allele frequency distribution. His study used samples from Brownsville (2005), Corpus Christi Bay (2005), and a Florida cruise (2006). The Texas samples were all accrued over several weeks, while the Florida samples were all taken within one week. He has found that the blooms have high genetic variation and that cells are not all identical. In addition, the field samples are more diverse than those in culture. So far his results indicate that:

- it cannot be said that Texas has a separate population from Florida.
- Texas blooms might originate from Florida.
- *Karenia brevis* in the Gulf of Mexico might originate from one large population rather than separate seed populations.
- high genetic diversity suggests high physiological diversity between clones.

Reagan Errera's study is titled "Toxin production between different *Karenia brevis* clones based on environmental conditions." It looks at environmental influences on *Karenia brevis* brevetoxins and brevenal production. A paper is available on Toxicon, Errera et al 2009. Reagan exposed 8 *K. brevis* clones (7 from Texas and 1 from Florida) to salinities of 27 ppt (representing coastal conditions) and 35 ppt salinities (Gulf of Mexico conditions). Results were:

- 4 clones increased growth in 27 ppt, 4 decreased growth in 27 ppt
- Toxins are significantly different between salinities
- Brevenal, which inhibits the effects of brevetoxin, decreased at 27 ppt. This could mean that higher toxicity can occur at lower salinities.
- The SB3 clone creates more PBTX-1 (the most toxic brevetoxin) than PBTX-2, which is considered the most abundant brevetoxin.
- When light was increased, toxin and brevenal production decreased but growth increased.

Reagan has also done baseline studies at 40 ppt.

Natalie Thompson's study is to determine the synthesis of brevetoxin. She used the Wilson, TSP3, and SP1 clones and is seeing differential expression between clones. The next step is to look at toxin production changes at different salinities. Natalie also wants to look at gene expression over time during a bloom.

Updates

Golden alga has been pretty quiet over the summer. This week a bloom was detected at Midland's Beal Park Pond with high cell counts and high toxicity.

A freshwater dinoflagellate, *Thompsodinium intermedium*, was found Sunday July 26 to be the cause of dark, muddy-looking water at Blieders Creek in New Braunfels. TPWD, TCEQ, and USFWS have all been notified of the bloom. Meridith contacted Dr. Susan Carty of Heidelberg University asking about any potential concerns. Dr. Carty felt that aesthetics would be the biggest concern, along with the possibility of cysts that could seed a future bloom.

The San Marcos River made the news in early September after two dogs got sick after swimming in the river. *E. coli* and nontoxic cyanobacteria were found in water samples.

Lisa Campbell's IFCB has found low numbers of *Karenia brevis* cells (approximately 1/ml) coming through Aransas Pass. TPWD and DSHS have been notified and everyone is keeping their eyes and ears open. *K. papillonaceae* and *K. mikimotoi* are also being seen. As a side note, Carm Tomas cultured *K. papillonacea* from last year's bloom at Port Aransas (to compare with the New Zealand culture).

TPWD has produced a fish kill information card similar to the red tide and golden alga cards. Anyone who wants distribute the cards or put them on display can contact Meridith Byrd at 361-575-6306 or meridith.byrd@tpwd.state.tx.us for free copies.

TPWD and the Harte Research Institute for Gulf of Mexico Studies are co-hosting a Texas Wildlife Action Plan workshop November 11-12. The Plan is required for

Texas to receive State Wildlife Grant money and the workshop is to incorporate HABs into the plan. More information will be available soon.

Deana Erdner and Lisa Campbell submitted a request to host the next national HAB Symposium meeting in Austin. A question was raised of whether TPWD and/or Sea Grant might be able to contribute any funding.

Sampling Protocol for TAMU Research

Lisa has funding for a study of downwelling winds and *K. brevis* blooms that will begin next summer. She floated the idea to the workgroup of members collecting samples for her study and distributed several sampling kits (containing bottles and styrofoam coolers) to Meridith. The protocol, which will be distributed again prior to the beginning of the study next summer, is as follows:

- Samples need to be shipped same day (if possible) via Lisa's FedEx account.
- Collect samples in 1 liter bottles, filled completely – no air.
- Collect a second liter of water in glass bottles for toxin testing.
- Wrap sample bottles in wet newspaper or paper towels prior to shipment. No ice.

Lisa will provide sampling kits to staff of other agencies if interested. Static sampling locations will be around Galveston, Corpus Christi and Brownsville.

Next Meeting

The next meeting will be December 11 at TAMU-Galveston.