

# ECOHAB: *Karenia*

## PUBLICATIONS AND PRESENTATIONS

### Harmful Algae, Special Issue 2014

**Heil, C., Bronk, C., Dixon, L. K., Hitchcock, G., Kirkpatrick, G., Mulholland, M., O'Neil, J., Walsh, J., Weisberg, R., and Garrett, M.** The Gulf of Mexico ECOHAB: *Karenia* Program 2006–2012. Harmful Algae (38), pp. 3-7.

**Dixon, L. K., Kirkpatrick, G., Hall, E., and Nissanka, A.** Nitrogen, phosphorus and silica on the West Florida Shelf: Patterns and relationships with *Karenia* spp. occurrence. Harmful Algae (38), pp. 8-19.

**Mulholland, M., Bernhardt, P., Ozmon, I., Procise, L., Garrett, M., O'Neil, J., Heil, C., and Bronk, D.** Contribution of diazotrophy to nitrogen inputs supporting *Karenia brevis* blooms in the Gulf of Mexico. Harmful Algae (38), pp. 20-29.

**Dixon, L. K.,** Murphy, P., Becker, N., and Charniga, C. The potential role of benthic nutrient flux in support of *Karenia* blooms in west Florida (USA) estuaries and the nearshore Gulf of Mexico. Harmful Algae (38), pp. 30-39.

**Killberg-Thoreson, L., Sipler, R., Heil, C., Garrett, M., Roberts, Q., and Bronk, D.** Nutrients released from decaying fish support microbial growth in the eastern Gulf of Mexico. Harmful Algae (38), pp. 40-49.

**Bronk, D., Killberg-Thoreson, L., Sipler, R., Mulholland, M., Roberts, Q., Bernhardt, P., Garrett, M., O'Neil, J., and Heil, C.** Nitrogen uptake and regeneration (ammonium regeneration, nitrification and photoproduction) in waters of the West Florida Shelf prone to blooms of *Karenia brevis*. Harmful Algae (38), pp. 50-62.

Walsh, B., and **O'Neil, J.** Zooplankton community composition and copepod grazing on the West Florida Shelf in relation to blooms of *Karenia brevis*. Harmful Algae (38), pp. 63-72.

**Killberg-Thoreson, L., Mulholland, M., Heil, C., Sanderson, M., O'Neil, J. and Bronk, D.** Nitrogen uptake kinetics in field populations and cultured strains of *Karenia brevis*. Harmful Algae (38), pp. 73-85.

**Heil, C., Bronk, D., Mulholland, M., O'Neil, J., Bernhardt, P., Murasko, S., Havens, J., and Vargo, G.** Influence of daylight surface aggregation behavior on nutrient cycling during a *Karenia brevis* (Davis) G. Hansen & Möestrup bloom:  
Migration to the surface as a nutrient acquisition strategy. Harmful Algae (38), pp. 86-94.

**Hitchcock, G., Kirkpatrick, G., Lane, L., and Langdon, C.** Comparative diel oxygen cycles preceding and during a *Karenia* bloom in Sarasota Bay, Florida, USA. Harmful Algae (38), pp. 95-100.

Sipler, R., McGuinness, L., **Kirkpatrick, G.**, Kerkhof, L. and Schofield, O. Bacteriocidal effects of brevetoxin on natural microbial communities. Harmful Algae (38), pp. 101-109.



**Meyer, K., O'Neil, J., Hitchcock, G. and Heil, C.** Microbial production along the West Florida Shelf: Responses of bacteria and viruses to the presence and phase of *Karenia brevis* blooms. Harmful Algae (38), pp. 110-118.

**Weisberg, R.**, Zheng, L., Liu, Y., Lembke, C., Lenes, J., and **Walsh, J.** Why no red tide was observed on the West Florida Continental Shelf in 2010. Harmful Algae (38), pp. 119-127

**Heil, C., Dixon, L. K., Hall, E., Garrett, G., Lenes, J., O'Neil, J., Walsh, B., Bronk, D., Killberg-Thoreson, L., Hitchcock, G., Meyer, K., Mulholland, M., Procise, L., Kirkpatrick, G., Walsh, J. and Weisberg, R.** Blooms of *Karenia brevis* (Davis) G. Hansen & Moestrup on the West Florida Shelf: Nutrient sources and potential management strategies based on a multi-year regional study. Harmful Algae (38), pp. 127-131.

## Publications

### **In Press, In Revision, Submitted**

Al-Rshaidat, M. and **Mulholland, M.** In Prep. N<sub>2</sub> fixation and *nifH* gene diversity on West Florida Shelf.

Alvera-Azcárate, A., Barth, A., and **Weisberg R.** 2009. The surface circulation of the Caribbean Sea and the Gulf of Mexico as inferred from satellite altimetry. Jour. Phys. Oceanogr., 39, 640-657.

Alvera-Azcárate, A., Barth, A., Sirjacobs, D., Lenartz, F., and Beckers, J.-M. Submitted. Data Interpolating Empirical Orthogonal Functions (DINEOF): a tool for geophysical data analyses. Information Sciences.

Anderson, D., Burkholder, J., Cochlan, W., Glibert, P., Gobler, C., **Heil, C.**, Kudela, R., Parsons, M., Rensel, J., Townsend, D., Trainer, V., and Vargo, G. Submitted. Harmful algal blooms and eutrophication: Examples of possible linkages from selected coastal regions of the United States. Harmful Algae.

Barth, A., Alvera-Azcárate, A., Beckers, J.-M., **Weisberg, R.**, Vandenbulcke, L., Lenartz, F., and Rixen, M. Submitted. Dynamically constrained ensemble perturbations – application to tides on the West Florida Shelf. Ocean Science.

Berges, J. A. and **Mulholland, M.** 2008. Enzymes and cellular N cycling. In: Capone, D. G., **Bronk, D., Mulholland, M** and Carpenter, E. (eds.), Nitrogen in the Marine Environment. Elsevier Press. pp. 1361-1420.

**Bronk, D.** and Steinberg, D. 2008. Nitrogen regeneration. In: Nitrogen in the Marine Environment. Capone, D. G., **Bronk, D. A., Mulholland, M.** and Carpenter, E. (eds.). Elsevier Press. pp. 385-468.

Cannizzaro, J., Hu, C., English, D., Carder, K., **Heil, C.**, and Müller-Karger, F. In Press. Detection of *Karenia brevis* blooms on the west Florida shelf using *in situ* backscattering and fluorescence data. Harmful Algae.



Chassinet, E., Hurlbert, H., Metzger, E., Smedstad, O., Cummings, J., Halliwell, G., Bleck, R., Baraille, R., Wallcraft, A., Lozano, C., Tolman, H., Srinivasan, A., Hankin, S., Cornillon, P., **Weisberg, R.**, Barth, A., He, R., Werner, C., and Wilkin, J. 2009. U.S. GODAE: Global Ocean Prediction with the HYbrid Coordinate Ocean Model (HYCOM). *Oceanogr.*, 22, 48-59.

Comny, R. N., Coble, P., Cannizzaro, J. and **Heil, C.** In Revision. Influence of extreme storm events on west Florida shelf CDOM distributions. *J. Geophys. Res. Special Issue: ORGANMAT1- Organic Matter Fluorescence in Marine and Freshwater Environments: Chemical Evidence of Biogeochemical Processes.*

**Dixon, L. K.**, Vargo, G., Johansson, J., Montgomery, R, and Neely, M.B. 2009. Trends and explanatory variables in major phytoplankton groups for two southwestern Florida estuaries, U.S.A. *J. Sea Res.*, 61:95-102.

Dyble, J., Bienfang, P., Dusek, E., **Hitchcock, G.**, Holland, F., Laws, E., Lerczak, J., McGillicuddy, D., Minnet, P., Moore, S., Kelly, C., Solo Gabrielle, S., and Wang, J. 2008. Environmental controls, oceanography and populations dynamics of pathogens and harmful algal blooms: Connecting sources to human exposure. *Environ. Health Perspectives.* 7, S5. doi:10.1186/1476-069X-7-S2-X5

Fleming, L., Bean, J., Kirkpatrick, B., Sung Cheng, Y., Pierce, R., Naar, J., Nierenberg, K., Backer, L., Wanner, A., Reich, A., Zhou, Y., Watkins, S., Henry, M., Zaias, J., Abraham, W., Benson, J., Cassedy, A., Hollenbeck, J., **Kirkpatrick, G.**, Clarke, T., and Baden, D. 2009. Exposure and effect assessment of aerosolized red tide toxins (brevetoxins) and asthma. *Environ. Health. Perspect.* doi: 10.1289/ehp.0900673.

Gannon, D., Berens McCabe, E., Camilleri, S., Gannon, J., Brueggen, M., Barleycorn, A., Palubok, V., **Kirkpatrick, G.**, and Wells, R. 2009. Effects of *Karenia brevis* harmful algal blooms on nearshore fish communities in southwest Florida. *Mar. Ecol. Prog. Ser.* 378: 171-186.

Gannon, J. et al. Submitted. Apparent sub-lethal effects of a harmful algal bloom on bottlenose dolphins in Sarasota Bay, Florida. *Mar. Ecol. Prog. Ser.*

Glibert, P., Azanza, R., Burford, M., Furuya, K., Abal, E., Al-Azri, A., Al-Yamani, F., Anderson, P., Beardall, J., Berg, G., Brand, L., **Bronk, D.**, Brookes, J., Burkholder, J., Cembella, A., Cochlan, W., Collier, J., Collos, Y., Diaz, R., Doblin, M., Drennen, T., Dyhrman, S., Fukuyo, Y., Furnas, M., Galloway, J., Graneli, E., Ha, D., Harrison, J., Harrison, P., **Heil, C.**, Heimann, K., Howarth, R., Jauzein, C., Kana, A., Kana, T., Kim, H., Kudela, R., Legrand, C., Mallin, M., **Mulholland, M.**, Murray, S., **O'Neil, J.**, Pitcher, G., Qi, Y., Rabalais, N., Raine, R., Seitzinger, S., Solomon, C., Stoecker, D., Usup, G., Wilson, J., Yin, K., Zhou, M., and Zhu, M. Ocean urea fertilization for carbon credits poses high ecological risks. *Marine Pollution Bulletin.* 56: 1049-1056.

Glibert, P., Boyer, J., **Heil, C.**, Madden, C., Sturgis, B., and Wazniak, C. Blooms in Lagoons: Different from those of river-dominated estuaries. In Press. In: M. Kennish and H. Paerl, eds, *Coastal Lagoons: Critical habitats of environmental change*. Taylor and Francis.

**Garrett, M.**, Wolny, J., E. TrubyE., Heil C., and Kovach C. 2010. Harmful algal bloom species and phosphate-processing effluent: Field and laboratory studies. *Marine Pollution Bulletin.* 62: 596-601.



Halliwell, G.R., Barth, A., **Weisberg, R.**, Hogan, P., Smedstad, O., Cummings, J. 2009. Impact of GODAE Products on Nested HYCOM Simulations of the West Florida Shelf, *Ocean Dynamics* (special issue GODAE Coastal and Shelf Seas Working Group), doi:10.1007/s10236-008-0173-2, 59(1).

Havens, H., Luther M., Meyers, S. and **Heil, C.**. Submitted. Lagrangian particle tracking of a toxic dinoflagellate bloom within the Tampa Bay estuary. *J. Coast. Sys.*

Haywood, A.J., Scholin C., R. Marin III, Petrik K., Pigg, R., **Garrett, M.**, Steidinger, K. A., and **Heil, C.**. 2009. Detection of *Karenia brevis* in Florida coastal waters using sandwich hybridization assays in two formats. pp. 95-100. In: Proceedings of the 6th International Conference on Molluscan Shellfish Safety. Royal Society of New Zealand Miscellaneous Series 71. Blenheim, Marlborough, New Zealand. 355 pp.

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**Heil, C., Bronk, D., Mulholland, M., O'Neil, J., Bernhardt, P.**, Murasko, S., Havens, J., Vargo, J. 2014. Influence of daylight surface aggregation behavior on nutrient cycling during a *Karenia brevis* (Davis) G. Hansen & Mo' estrup bloom: Migration to the surface as a nutrient acquisition strategy. *Harmful Algae* (in press)

**Heil, C.**, Revilla M., Glibert P., Murasko S., and Alexander J. 2007. Nutrient quality drives phytoplankton community composition on the southwest Florida shelf. *Limnology and Oceanography*, 52:1067-1078.

**Heil, C.**, Truby E., Wolny, J., Pigg, R., B. Richardson, B., **Garrett, M.**, Haywood, A., Petrik, K., Flewellings, L., Stone, E., Cook, S., Scott, P., Steidinger K., and Landsberg J. In press. The multi-species nature of the 2005 *Karenia* bloom in the eastern Gulf of Mexico. *Proceedings of the 12th International Conference on Harmful Algae*, September 4-9, 2006, Copenhagen.

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**Hitchcock, G., Kirkpatrick, G.**, Minnett, P., Palubok, V. 2010. Net community production and dark community respiration in a *Karenia brevis* (Davis) bloom in West Florida coastal waters, USA. *Harmful Algae*, 9(4), 351-358, DOI: 10.1016/j.hal.2010.01.002

**Hitchcock, G., G. Kirkpatrick**, and Langdon, C. In prep. Diel patterns of net oxygen production and consumption in surface waters of a subtropical lagoon, Sarasota Bay, Florida. *J. Exp. Mar. Biol. Ecol.*

**Hitchcock, G.** and Vargo, G. In prep. Production and respiration rates in the dinoflagellate *Karenia brevis* as a function of light intensity. *J. Phycol.*

Hoagland, P., Jin, L., Polansky, Y., Kirkpatrick, B., **Kirkpatrick, G.**, Fleming, L., Reich, A., Watkins, S., Ullmann, S., and Backer, L. 2009. The costs of respiratory illness arising from Florida Gulf Coast *Karenia brevis* blooms. *Environ. Health Perspect.* doi: 10.1289/ehp.0900645.



Hutchins, D., **Mulholland, M.** and Fu, F. 2009. Nutrient cycles and marine microbes in a CO<sub>2</sub>-enriched ocean. *Oceanography* 22: 88-105.

Lenes, J., Darrow, B., **Walsh, J.**, Prospero, J., He, R., **Weisberg, R.**, Vargo, G., and **Heil, C.** 2008. Saharan dust and phosphatic fidelity: A three-dimensional biogeochemical model of *Trichodesmium* as a nutrient source for red tides on the west Florida shelf. *Continental Shelf Research*, 28:1091-1115.

Lenes, J.M., Darrow, B., and **Mulholland, M.** In Prep. Nutrient controls of the red tide dinoflagellate, *Karenia brevis*, in the Gulf of Mexico: A simulation analysis of the

Lester, K., **Heil, C.**, Neely, M., Spence, D., Murasko, S., Hopkins, T., Sutton, T., Burghart, S., Bohrer, R., Remsen, A., Vargo, G., and **Walsh, J.** 2008. Zooplankton and *Karenia brevis* in the Gulf of Mexico. *Cont. Shelf Res.*, 28, 99-111.

Liu, Y., **Weisberg, R.**, Merz, C., Lichtenwalner S., and **Kirkpatrick, G.** Submitted. HF-radar performance on a low energy environment: CODAR SeaSonde experience on the West Florida Shelf. *J. Atm. Ocean Tech.*

Luo, Y. W., S. C. Doney, L. A. Anderson, M. Benavides, A. Bode, S. Bonnet, K. H. Boström, D. Böttjer, D. G. Capone, E. J. Carpenter, Y. L. Lee Chen, M. J. Church, J. E. Dore, L. I. Falcón, A. Fernández, R. A. Foster, K. Furuya, F. Gómez, K. Gundersen, A. M. Hynes, D. M. Karl, S. Kitajima, R. J. Langlois, J. LaRoche, R. M. Letelier, E. Marañón, D. J. McGillicuddy Jr., P. H. Moisander, C. M. Moore, B. Mouriño-Carballido, **Mulholland, M.**, J. A. Needoba, K. M. Orcutt, A. J. Poulton, P. Raimbault, A. P. Rees, L. Riemann, T. Shiozaki, A. Subramaniam, T. Tyrrell, K. A. Turk-Kubo, M. Varela, T. A. Villareal, E. A. Webb, A. E. White, J. Wu, J. P. Zehr. 2012. Database of diazotrophs in the global ocean: Abundance, biomass and nitrogen fixation rates. *Earth Syst. Sci. Data*, 5, 47-106, doi:10.5194/essdd-5-47-2012.

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**Mulholland, M.** and Lee C. 2009. Peptide hydrolysis and dipeptide uptake in cultures and natural communities dominated by phytoplankton mixotrophs. *Limnol. Oceanogr.* 54: 856-868.

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**Mulholland, M.** et al. In Prep. A nitrogen budget for the 2002 *Karenia brevis* bloom on the West Florida shelf: contribution of N<sub>2</sub> fixation.

**Mulholland, M., O'Neil, J., Bronk, D., Heil, C., and Bernhardt, P.** In Prep. The effect of community structure on trophic transfer of N between the N<sub>2</sub> fixing cyanobacteria *Trichodesmium* spp. and the planktonic community? *Limnol. Oceanogr.*

**O'Neil, J.** and Capone, D. 2008. Nitrogen Cycling on Coral Reefs. Chapter X, In: Capone, D.G., Carpenter, E.J., Bronk, D.A. & Mulholland, M.R. (Eds.) Nitrogen in the Marine Environment. Elsevier Press. pp. 937-977.



**O'Neil, J., Heil, C., Mulholland, M. and Bronk, D.** In. prep. Regulation of alkaline phosphatase and peptide hydrolysis activity in the cyanobacterium *Trichodesmium* spp grazers. Mar. Biol.

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**Procise, L. and M. Mulholland.** Mixotrophic grazing by *Karenia brevis* (in preparation).

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Sipler, R. E., Seitzinger, S., Lauch, R., McGuinness, L., **Kirkpatrick, G., Bronk, D., Heil, C.**, Kerkhof, J., and Schofield, O. Submitted. Relationship between dissolved organic matter, bacterial community composition and rapid growth toxic red-tide *Karenia brevis*. Mar. Ecol. Prog. Ser.

Steidinger, K. A., Tustison, J., **Weisberg, R.**, Barth, A., and **Heil, C.** 2008. Retrospective GIS Analyses of the Florida Red Tide Database. In: Moestrup, O. et al. (eds.), Proceedings of the 12<sup>th</sup> International Conference On Harmful Algae, International Society for the Study of Harmful Algae and Intergovernmental Oceanographic Commission of UNESCO, Copenhagen, pp. 93-95.

Ulrich, R., Casper, E., Campbell, L., Richardson, B., **Heil, C.**, and Paul, J.: Detection and quantification of *Karenia mikimotoi* using real-time nucleic acid sequence-based amplification with internal control RNA (IC-NASBA). Harmful Algae.

Vargo, G.A., **Heil, C.**, Fanning, K., **Dixon, L. K.**, Neely, M.B., Lester, K., Ault, D., Murasko, S., Havens, J., **Walsh**, J., and Bell, S. 2008. Nutrient availability in support of *Karenia brevis* blooms on the central west Florida shelf: What keeps *Karenia* blooming? Continental Shelf Research, 28:73-98.

**Walsh, J. J., Weisberg, R.**, Lenes, J., Chen, F., Dieterle, D., Zheng, L., Carder, K., Vargo, G., Havens, J., Peebles, E., Hollander, H., He, R., **Heil, C.**, Mahmoudi, B. and Landsberg, J. 2009. Isotopic evidence for dead fish maintenance of Florida red tides, with implications for coastal fisheries over both source regions of the West Florida shelf and within downstream waters of the South Atlantic Bight. Prog. in Oceanog., 70, doi:10.1016/j.pocean.2008.12.005.

**Walsh, J. and Kirkpatrick, G.** 2008. Ecology and oceanography of harmful algal blooms in Florida, guest editors – Special Issue. Cont. Shelf Res., 28, 1-214.

**Walsh, J.**, Lenes, J., Darrow, B. and Chen, F. In press. Forecasting and modeling harmful algal blooms in the coastal zone. In: Baird, D and A. Mehta (eds.), Treatise on Estuarine and Coastal Science, Vol. 9, Elsevier.

Wawrik, B., Callaghan, A., **Bronk, D.** Submitted. Inorganic and organic nitrogen use by *Synechococcus* and diatoms on the West Florida Shelf measured using stable isotope probing.

**Weisberg, R.**, Barth, A., Alvera-Azcarate, A., and Zheng, L. 2009. A coordinated coastal ocean observing and modeling system for the West Florida continental shelf. Harmful Algae 8, 585-597.



**Weisberg, R.**, Liu, Y., and Mayer, D. Submitted. Mean circulation on the West Florida Continental Shelf observed with long-term moorings. *Geophys. Res. Lett.*

Zheng, L. and **Weisberg, R.** In press. Rookery Bay and Naples Bay circulation simulations: applications to tides and fresh water inflow regulation. *Ecological Modelling*.

## Presentations

### 2014

**Ozmon, I. M.** 2014. Implications of climate change for cyanobacteria over the western Florida Shelf in the Gulf of Mexico. MS Thesis (Old Dominion University).

### 2013

**Dixon, L.K., Nissanka, A.,** Lenes, J., Vreeland, J., and **Kirkpatrick, G.** 2013. *Karenia* sp. in SW Florida – Trajectories of nitrogen, silica, other water quality, and taxonomic components during two extended blooms. Poster presented at the 7th Symposium on Harmful Algae in the US, October 2013, Sarasota, FL.

**Nissanka, A., Dixon, L.K., and Hall, E.** 2013. Nutrient strategies of *Karenia brevis* at elevated cell densities along the west central Florida coast. Poster presented at the 6<sup>th</sup> Symposium on Harmful Algae in the US, October 2013, Austin, TX.

### 2012

**Bronk, D. A., R. E. Sipler, L. Killberg-Thoreson, M. P. Sanderson, Q. N. Roberts, and M. R. Mulholland.** 2012. Nitrogen fixation - a new source of nitrogen in the changing western Arctic? AGU/ASLO 2012 Ocean Sciences meeting, Salt Lake City, Utah. February 20-24, 2012.

**Procise, L. A.** 2012. Grazing on *Synechococcus* spp. by the red-tide dinoflagellate *Karenia brevis*: Implications for bloom dynamics in the Gulf of Mexico. PhD Dissertation (Old Dominion University).

**Procise, L.A. and M.R. Mulholland.** 2012. Autotrophic, osmotrophic, and phagotrophic carbon uptake by the red-tide dinoflagellate *Karenia brevis*. AGU/ASLO 2012 Ocean Sciences meeting, Salt Lake City, Utah. February 20-24, 2012.

**Walsh, B.** 2012. Zooplankton population dynamics in relation to the red tide dinoflagellate *Karenia brevis* on the West Florida Shelf of the Gulf of Mexico. Masters thesis. University of Maryland College Park. 152 pp; 1529431.

**Roberts, Q., Killberg-Thoreson, L., Sanderson, M., Mulholland, M., Bernhardt, P., Heil, C., Garrett, M., O'Neil, J., Bronk, D.** Nitrogen uptake in the Eastern Gulf of Mexico during *Karenia brevis* blooms. ASLO Meeting, San Juan, Puerto Rico, February 13-18, 2011



Sipler, R., **Killberg-Thoreson, L., Bronk, D.** ASLO Summer 2012. The use of Fourier Transformation Cyclotron Resonance Mass Spectrometry (FT-ICR MS) to sturdy the biochemical link between dissolved organic matter and harmful algal blooms.

## 2011

**Dixon, L.K., Heil, C., Kirkpatrick, G., Garrett, M.,** Lenes, J., and **Weisberg, R.** 2011. A summary of the complexities of Florida's Harmful Algal Blooms. Presentation at the EPA Phosphate Conference, April 2011, Punta Gorda.

**Dixon, L.K., Hall, E., Nissanka, A.,** and Dobrzeniecka, M. 2011. Nutrient short stories of the West Coast of Florida. Presentation to the ECOHAB PI Meeting, March 2011, St. Petersburg, FL.

**Dixon, L.K.** and Murphy, P. 2011. The role of benthic nutrient flux in support of *Karenia brevis* blooms off of west central Florida, U.S.A. Presentation at the 6<sup>th</sup> Symposium on Harmful Algae in the US, October 2013, Austin, TX.

**Dixon, L.K., Nissanka, A., Hall, E.** 2011. Data Integration - Coastal chemistry : 2007-2010 Similarities and differences – Sediment Flux: Potential contributions to *K. Brevis*. Presentation at the ECOHAB PI Meeting, May 2011, Norfolk, VA.

**Dixon, L.K.** 2011. Status of NOAA projects: EcoHAB *Karenia* nutrient dynamics. Presentation to Asst Secty for Oceans and Atmosphere, Dr. Larry Robinson, April 2011, Sarasota, FL.

**Killberg-Thoreson, L.** 2011. A tale of two blooms: Dynamics of nitrogen uptake by harmful algae in the Eastern Gulf of Mexico and York River, Virginia, USA. Ph.D. Dissertation. The College of William & Mary, School of Marine Science. pp. 220.

**Roberts, Q. N., L. M. Killberg-Thoreson, M. P. Sanderson, M. R. Mulholland, P. W. Bernhardt, C. Heil, M. Garrett, J. O'Neil, and D. A. Bronk.** 2011. Nitrogen uptake in the Eastern Gulf of Mexico during *Karenia brevis* blooms. Meeting of the American Society of Limnology and Oceanography, San Juan, Puerto Rico (13-18 Feb 2011).

**Walsh, B., O'Neil, J.** Zooplankton abundance in relation to *Karenia brevis* on the West Florida Shelf of the Gulf of Mexico. MEES Graduate Colloquium. UMCES Appalachian Laboratory, Frostburg, MD. October 14-October 15.

**Walsh, B., O'Neil, J.** Zooplankton abundance in relation to the red tide dinoflagellate *Karenia spp.* on the West Florida Shelf of the Gulf of Mexico. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.

## 2010

**Dixon, L.K.** 2010. *Karenia brevis* at the State Fair: Eat before you go or have dinner there? Presentation at the HAB Control and Mitigation Workshop, February 2010, Sarasota, FL.

**Dixon, L.K.** EcoHAB: *Karenia* dynamics data compilation. 2010. Web presentation to the ECOHAB PIs. September, 2010, St. Petersburg, FL.



**O'Neil, J., Meyer, K., Heil, C., Bronk, D., Killberg-Thoreson, L., Roberts, Q., Mulholland, M.**  
Microzooplankton grazing inside and outside blooms of the toxic dinoflagellate, *Karenia spp.* using the dilution method. Ocean Sciences Meeting, Portland, Oregon Feb.22-26, 2010.

## **2009**

**Bronk, D. A.** Role of DON in the Open and Coastal Ocean. Talk presented at Princeton University, Princeton, NJ.

**Bronk, D. A.**, M. Sanderson, P. Bradley, L. Kerkhof, and L. McGuinness. 2009. Autotrophic versus heterotrophic nitrogen uptake - who is doing what? Talk at the ASLO meeting in Nice, France.

**Bronk, D., L. Killberg, Q. Roberts, P. Bernhardt and M. Mulholland.** Inorganic and organic nitrogen uptake and regeneration. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**Bronk, D. A.** Guest instructor. Center for Microbial Oceanography: Research and Education (CMORE), Microbial Oceanography: Genomes to Biomes. University of Hawaii, Manoa.

**Dixon, L. K., Kirkpatrick, G.,** Pederson, B., and **Hall, E.** ECOHAB: *Karenia brevis* Nutrient Dynamics: The 2008 field season in the context of a time series of phytoplankton community; discontinuity between coastal and estuarine nutrients. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**Hall, E., Pederson, B., Dixon, L.K., and Kirkpatrick, G.** 2009.

Phytoplankton communities of the west coast of Florida – Response to nutrient enrichment. Poster presented at the 5<sup>th</sup> Symposium on Harmful Algae in the US, November 2009, Ocean Shores WA.

**Heil, C. A.** ECOHAB: *Karenia* Nutrient Dynamics in the Eastern Gulf of Mexico: Introduction. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**Heil, C. A.**, K. Miller, S. Murasko, A. Yunker and M. Garrett. Inorganic & Organic Phosphorus Dynamics of *Karenia brevis*: Why Phosphorus Matters in a Phosphorus Rich Environment. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**Heil, C. A.** HABs of the Gulf of Mexico. Talk presented at the 2009 Gulf of Mexico Alliance/Gulf Coastal Ocean Observing System Harmful Algal Bloom Workshop, St. Petersburg, Fl, April 21-24, 2009.

**Heil, C. A.** HAB Prediction and Detection. Talk presented at the 2009 Gulf of Mexico Alliance/Gulf Coastal Ocean Observing System Harmful Algal Bloom Workshop, St. Petersburg, Fl, April 21-24, 2009

**Heil, C. A.** State of Florida HAB Monitoring: An update. Talk presented at the 2009 Gulf of Mexico Alliance/Gulf Coastal Ocean Observing System Harmful Algal Bloom Workshop, St. Petersburg, Fl, April 21-24, 2009

**Heil, C. A., J. M. O'Neil, M. Mulholland, D. Bronk, G. Hitchcock.** The role of the microbial loop in blooms of the toxic dinoflagellate *Karenia brevis* in the eastern Gulf of Mexico. Paper presented at the 2009 Aquatic Sciences Meeting in Nice, France, Jan. 26-30, 2009.



**Heil, C., D. Bronk, M. Mulholland, J. O'Neil, P. Bernhardt**, S. Murasko, and J. Havens. Submitted. Effects of daylight surface aggregation behavior on nutrient dynamics of a *Karenia brevis* bloom. Talk presented at the ASLO Ocean Sciences meeting, March 2–7, 2008, Orlando, FL.

**Heil, C. A., J. M. O'Neil, M. R. Mulholland, D. A. Bronk, and G. Hitchcock**. 2009. Shifts in nutrient sources and processing in coastal *Karenia brevis* blooms. Presented at the US Harmful Algal Bloom Symposium, Ocean Shores, Washington (15-18 Nov 2009).

**Hitchcock, G., G. Kirkpatrick, C. Heil**, F. Van Dolah and C. Langdon. Net Production and Respiration in *Karenia brevis*: Relevance to bloom dynamics. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**Killberg-Thoreson, L., D. A. Bronk, C. A. Heil and M. Garrett**. Periodicity in inorganic and organic N uptake by *Karenia brevis*: Results from field and culture experiments. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA

**Killberg-Thoreson, L.M., D.A. Bronk, C.A. Heil, M. Garrett**. 2009. Diel variability of nitrogen uptake by cultured clones of *Karenia brevis*. Poster presented at the American Society of Limnology and Oceanography aquatic sciences meeting, January 25-30, 2009, Nice, France.

**Kirkpatrick, G.** Detection and Tracking of the Florida Red Tide. Florida Marine Science Educators Association, Sarasota, FL. May 16, 2009.

Lenes, J. M., **J.J. Walsh**, B.P. Darrow, F.R. Chen, and **C.A. Heil**. Toward an operational model of Harmful Algal Blooms in the Gulf of Mexico. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

Meyer, K. and **O'Neil, J.M.** Bacterial production, microzooplankton grazing and nutrient dynamics with *Karenia brevis* blooms along the west Florida Shelf. Center for Microbial Oceanography: Research and Education (CMORE), Microbial Oceanography: Genomes to Biomes. University of Hawaii, Manoa; June 2009.

**Mulholland, M. R.**, P. W. Bernhardt, L. Procise and I. Ozmon. Sources of N fueling red tides: N<sub>2</sub> fixation, organic matter mobilization, and grazing. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

**O'Neil, J. M.** and K. Meyer. Bacterial enumeration, productivity and microbial grazing. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

Procise, L. A., and **M. R. Mulholland**. Grazing by recently isolated and natural populations of *Karenia brevis* from the Gulf of Mexico on *Synechococcus*. Poster presented at the 2009 Aquatic Sciences Meeting in Nice, France, Jan. 26-30, 2009.

Procise, L. R. and **M. R. Mulholland**. Grazing by the red tide dinoflagellate *Karenia brevis*. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

Sanderson, M.P., **D.A. Bronk**, L.M. Killberg-Thoreson, Q.N. Roberts, **M.R. Mulholland**, P.W. Bernhardt, **C.A. Heil**. Which forms of nitrogen fuel *Karenia brevis* blooms in the Gulf of Mexico? Poster presented at the American Society of Limnology and Oceanography aquatic sciences meeting, January 25-30, 2009, Nice, France.

Sipler, R., E. O. M. Schofield, **G. J. Kirkpatrick** and K. Walters. The effects of brevetoxin on bacterial abundance and community composition. Poster presented at the 2009 Aquatic Sciences Meeting in Nice, France, Jan. 26-30, 2009.



**Weisberg, R. H.**, L. Zheng and Y. Liu. Why the red tide over the West Florida Shelf in 2008 is mild: A view from ocean circulation. Talk at ECOHAB: *Karenia* PI meeting, May 21-22, 2009, VIMS, Gloucester, VA.

## **2008**

Barth, A., A. Alvera-Azcárate, L. Zheng, and **R. H. Weisberg**. 2008. A Nested Model of the West Florida Shelf: Assimilation of High-Frequency Radar Currents and study of Loop Current generated flow, in Geophys. Res. Abs., vol. 10, 4th EGU General Assembly.

Barth, A., A. Alvera-Azcárate, and **R. H. Weisberg**. 2008. Assimilation of High-Frequency Radar Currents in a Nested Model of the West Florida Shelf, in Eos Trans. AGU, vol. 88, Fall Meeting Supplement, Abstract OS52A-02.

**Bronk, D. A.** Invited talk. DON bioavailability in the ocean. Oral presentation, Princeton University, Princeton, NJ.

Conmy, R. N., **C. A. Heil** and P. Coble. Estimating Dissolved Organic Nitrogen from CDOM on the West Florida Shelf. Paper presented at American Geophysical Meeting, San Francisco, Fall 2008.

Hall, E. R., **Dixon, L. K.**, A. Nissanka and **G. J. Kirkpatrick**. A long-term monitoring program of red tide and nutrients along the west central Florida coast. Gulf Coast Alliance Meeting 2008:

**Heil, C.** Introduction to the HAB Monitoring Session. Gulf of Mexico Alliance first annual monitoring meeting, June 3-5, 2008, St. Petersburg, FL.

**Heil, C.** Monitoring of *Karenia brevis* in Florida: Application of Red Tide Extended Monitoring and New Technology State Funding. Poster presented at the Gulf of Mexico Alliance first annual monitoring meeting, June 3-5, 2008, St. Petersburg, FL.

**Heil, C.** Water quality: HAB and Red Tide links in Florida. Invited talk. Manatee County Water School, IFAS County Extension Service, May 29, 2008, Palmetto, FL.

**Heil, C. A., D. Bronk, M. Mulholland, J. M. O'Neil, P. Bernhardt**, S. Murasko, and J. Havens. 2008. Effects of daylight surface aggregation behavior on nutrient dynamics of a *Karenia brevis* bloom. Presented at the 14<sup>th</sup> Ocean Sciences Meeting in Orlando, FL (2-7 Mar 2008).

**Heil, C.A., D. Bronk, M. Mulholland, J.M. O'Neil**, P. Bernhardt, M. Sanderson, S. Murasko, and J. Havens. Effects of daylight surface aggregation behavior on nutrient dynamics of a *Karenia brevis* bloom. Presented at the American Society of Limnology and Oceanography Ocean Sciences meeting, March 3-7, 2008, Orlando, FL.

Liu, Y., C.R. Merz, and **R.H. Weisberg**. 2008. HF-radar performance on a low energy environment as found using CODAR SeaSonde on the West Florida Shelf., 2008 Fall Annual Meeting of the American Geophysical Union, San Francisco, CA.

Lenes, J.M., **J.J. Walsh, R.H. Weisberg**, D.A. Dieterle, **C.A. Heil**, R. Chen, R., J.K. Jolliff, A. Barth, R. He, J. Prospero. A *Karenia* odyssey: Model implications for current and future understanding. Presented at the American Society of Limnology and Oceanography Ocean Sciences meeting, March 3-7, 2008, Orlando, FL.



**Mulholland, M.R.**, P.W. Bernhardt, D.A. Hutchins, F.X. Fu, Y. Feng, M.E. Warner, Y. Zhang, K. Portune. Does CO<sub>2</sub> play a role in controlling N<sub>2</sub> fixation across systems? Presented at the American Society of Limnology and Oceanography Ocean Sciences meeting, March 3–7, 2008, Orlando, FL.

Neely, M.B., and **C.A. Heil**. Coupling an *in situ* autonomous platform and a monitoring program in the Caloosahatchee River, Florida to better understand nutrient dynamics of coastal harmful algal blooms. Presented at the American Society of Limnology and Oceanography Ocean Sciences meeting, March 3–7, 2008, Orlando, FL.

Procise, L.A., and **M.R. Mulholland**. Grazing by the red tide dinoflagellate, *Karenia brevis*: Implications for bloom dynamics. Presented at the American Society of Limnology and Oceanography Ocean Sciences meeting, March 3–7, 2008, Orlando, FL.

**Weisberg, R.H., J.J. Walsh, C. Heil**, R. He., L. Zheng. 2008. SECOORA Success Story: Red-tide studies linking the SECOORA region. SECOORA workshop, May 2008.

**Weisberg, R.H.** 2008. Lessons learned from a coordinated observing and modeling program on the West Florida Shelf, 2008 Fall Annual Meeting of the American Geophysical Union, San Francisco, CA, invited presentation.

Zheng, L.Y. and **R.H. Weisberg**. Rookery Bay and Naples Bay estuarine circulation simulations: applications to tides and fresh water regulations. Presented on 11/19/08, Coastal Cities Summit, St. Pete Beach, Florida.

Zheng, L.Y. and **R.H. Weisberg**. The application of FVCOM to estimate the flushing time for Snug Harbor project in Tampa Bay, Florida. Presented on 6/12/08 at Third Institute of Oceanography, State Oceanic Administration, Xiamen, Fujian, China.

Zheng, L.Y. and **R.H. Weisberg**. Rookery Bay and Naples Bay estuarine hydrodynamic circulation simulations: applications to tides and fresh water inflow regulation. Presented on 6/16/08 at International Symposium on Jiulong river watershed and Xiamen Bay ecological system management, Third Institute of Oceanography, State Oceanic Administration, Xiamen, Fujian, China.

Zheng, L.Y., **R.H. Weisberg**, A. Barth, and A. Alvera (2008), Circulation influences on west Florida shelf red-tide events: Finite volume model applications to shelf-estuary interactions, Poster on 3/3/08 at 2008 Ocean Science Meeting, Orlando, FL.

## 2007

**Bronk, D.A.**, S. Henderson, Q. Roberts, L. Killberg, **M. Mulholland**, and N.G. Love. Photochemical release of labile nitrogen from natural and effluent organic nitrogen. Virginia and West Virginia Water Resources Symposium, September 2007, Blacksburg, VA.

**Heil, C.** Marine harmful algal blooms in Florida. Presentation to the Florida Section, American Water Works Association/Biological Contaminants Committee, Tarpon Springs, FL. Workshop entitled The Public Health and Environmental Effects of Toxins from Harmful Algal Blooms, Brooker Creek Environmental Preserve, August 24, 2007, Tarpon Springs, FL.

Neely, M.B. and **C. Heil**. Comparison of nitrate sensor data from two stations in the Caloosahatchee River, FL. Presentation at the Biosense meeting, Mote Marine Laboratory, June 16, 2007, Sarasota, FL.



Neely, M.B., **C.A. Heil**, S. Murasko, B. Bendis, and J. Leard. Evaluation of the phytoflash instrument vs. traditional sampling techniques in the Caloosahatchee River, FL. Poster presented at the Biosense meeting, Mote Marine Laboratory, June 16, 2007, Sarasota, FL.

## **2006**

Steidinger, K.A., J.A. Tustison, **R.H. Weisberg**, A. Barth, and **C.A. Heil**. In press. Retrospective GIS analyses of the Florida red tide database. Proceedings of the 12th International Conference on Harmful Algae, September 4–9, 2006, Copenhagen.

