GULF OF MEXICO RESEARCH INITIATIVE
SUMMER ISSUE 2016
NEWSLETTER

About the Gulf of Mexico Research Initiative

The Gulf of Mexico Research Initiative is a 10-year, $500 million independent research program established by an agreement between BP and the Gulf of Mexico Alliance to study the effects of the Deepwater Horizon incident and the potential associated impact of this and similar incidents on the environment and public health.

Would you like to know more about the GoMRI-funded research?

Check out our Research page on the website:

http://research.gulfresearchinitiative.org/research-awards/

Upcoming Events:

Gulf of Mexico Oil Spill and Ecosystem Science Conference

February 6-9, 2017
Hyatt New Orleans, New Orleans, Louisiana

Announcements:

An archive of the GoMRI eNews can now be found on the GoMRI website:

http://research.gulfresearchinitiative.org/eNews/

CONSORTIUM FOR RESILIENT GULF COMMUNITIES

Logo provided by CRGC.

CRGC Helps to Build Resiliency Among Gulf Coast Communities

Contributing Author: Elizabeth Thornton, CRGC Outreach Coordinator

Physophora hydrostatica

Photo Credit: DEEPEND Consortium and Dante Fenolio. Visit page 4 for more information!

The Consortium for Resilient Gulf Communities (CRGC) is unique among the GoMRI-funded consortia; their efforts primarily focus on assessing and addressing the social, economic, and public health impacts of the Deepwater Horizon oil spill by "helping communities across the Gulf Coast to more effectively understand, withstand, and overcome the multitude of stressors brought on by such disasters."

Consortium Director, Dr. Melissa Finucane, from the RAND Gulf States Policy Institute, says her team recognizes that major oil spills affect coastal communities in complex ways: "Disasters affect whole social-ecological systems, sometimes in unexpected and surprising ways. To help coastal communities be more resilient in the future, we need to understand how parts of the system are interlinked and which parts work best together in the face of a disaster."

CRGC draws on a mixed-methods approach to carry out its various research activities and achieve its three interrelated goals. First, CRGC hopes to build an improved knowledge base about how the local communities were impacted by the spill and what factors contributed to or diminished their resiliency in recovering from the spill. From this information, the Consortium plans to create evidence-based strategic planning and risk communication strategies for communities impacted by the spill and provide guidance for policymakers for mitigating the impacts of future spills more effectively.

Led by the RAND Gulf States Policy Institute, CRGC is a multi-discipline, collaborative effort among several institutions, including the Department of Sociology at Louisiana State University, the Disaster Resilience Leadership Academy and Department of Computer Science at Tulane University, the Coastal Resource and Resilience Center at the University of South Alabama, and the Louisiana Public Health Institute. The Consortium includes several graduate and undergraduate students, who work collaboratively on each of the smaller Consortium projects or "subteams," enabling them to play a prominent role in the research activities. A Technical Advisory Committee, made up of experts in the field of disaster resilience and recovery, also helps to provide scientific guidance on the Consortium's projects and outcomes.

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A Focus on the Local Communities

In order to accomplish their mission and address their research questions, many of CRGC's projects focus on three local Gulf Coast communities. Bayou La Batre, Alabama; Port Sulfur, Louisiana (in Plaquemines Parish); and Galliano, Louisiana (in Lafourche Parish) were carefully selected based on a variety of attributes, including level of oil spill exposure and socioeconomic reliance on the Gulf. Additionally, CRGC has created state-level Stakeholder Advisory Committees (SAC) in Alabama and Louisiana, composed of members of local government, community-based organizations, and local business owners. Similar to their Technical Advisory Committee, the SACs will provide guidance to CRGC and inform the direction of its research activities but on a more localized level.

CRGC's Projects

CRGC is currently working on six projects: Assessing the Health and Social Wellbeing Impacts of the Oil Spill; Assessing the Economic Impacts of the Oil Spill on Industry; Community Capacity Building; Generating Targeted Information for Disaster-Affected Communities; Mentoring the Next Generation; and Real-Time Program Self-Evaluation.

Assessing the Health and Social Wellbeing Impacts of the Oil Spill

The "Health Subteam" is led by Dr. Matthew R. Lee from Louisiana State University and Dr. Rajeev Ramchand from the RAND Gulf States Policy Institute, along with graduate students Vanessa Parks and Chelsea Adams from Louisiana State University. This project's primary initiative is to survey 2,500 residents along the coast in Texas, Louisiana, Mississippi, Alabama, and Florida about topics such as current health status, perspectives of the spill on their communities, and use of health and other social services in communities. The team is currently administering its telephone-based survey and hopes to have them completed by the fall of 2016. The ultimate objective of the project is to close current knowledge gaps by assessing the medium- and long-term social, economic, and public health effects of the oil spill. Check back in the fall for the results from this study!

Assessing the Economic Impact of the Oil Spill

The "Economics Subteam" is led by Dr. Craig Bond and Dr. Shanthi Nataraj from the RAND Gulf States Policy Institute, along with graduate student and research assistant Jacqueline Fiore from Tulane University. The goal of this project is to assess the economic impact of the oil spill on the fishing industry. The team is currently collecting and analyzing secondary data related to Gulf fisheries collected pre- and post-Deepwater Horizon. The "Economics Subteam" will soon begin developing strategies to use this data to understand the types, magnitudes, and distribution of impacts to help build resilience within local industry in the event of future disasters.

"The findings from the STRONG Survey will provide researchers and community leaders an opportunity to leverage existing capacities in Gulf Coast communities. CRGC's interdisciplinary environment is engaging and collaborative. As a graduate student, I've been mentored by researchers from a wide range of disciplines."

Vanessa Parks, Graduate Student & Research Assistant, Louisiana State University - Member of Health Subteam

Community Capacity Building

The "Community Subteam" is co-led by Dr. Keith Nicholls from the University of South Alabama's Coastal Resource & Resiliency Center (CRRC) and Ky Luu, J.D., from Tulane University's Disaster Resilience Leadership Academy (DRLA). The goal of this project is to build capacity for community resilience using research and findings with on-the-ground support from trained field teams, including community health workers, community leadership fellows, graduate students, and local organizations.

One of the primary components of this project consists of the placement of community health workers in community health clinics and community-based organizations within CRGC's three target communities (two per community). These community health workers, who live in the communities in which they work, are trained by CRRC and work though their host organizations to improve the overall health of community members, improve disaster preparedness, and implement resilience-building projects—an activity researchers from the RAND Corporation are providing training and mentoring for.

Another component of the project, led by DRLA, is the launch of a Disaster Resilience Leadership Fellowship Program in Louisiana and Alabama to address leadership challenges that face Gulf Coastal communities. Adapted from its global program curriculum, DRLA is currently recruiting emerging Gulf Coast leaders across the two states to equip them with the knowledge and tools needed to more effectively develop and implement plans that strengthen the resilience of their communities to future oil spills and other disasters.

CRGC's community health workers and their supervisors participate in community resilience training led by RAND. Photo Credit: CRGC.

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Generating Targeted Information for Disaster-Affected Communities

The "Risk Communications Subteam" is co-led by Dr. Kristen Brent Venable from Tulane University's Department of Computer Science and Dr. Melissa Finucane from the RAND Gulf States Policy Institute. The goal of this project is to build a website, tailored to the needs of communities in the Gulf region, to deliver targeted information about oil spills. The team has identified potential users of information, including people working in government and non-government organizations responsible for risk management, elected officials and their staff, business leaders, faith-based organizations, and other community leaders. In addition, the team has developed an interview protocol aimed at assessing the risk communication needs of community groups, policymakers, and risk managers, and researchers are currently meeting with key decision makers in the three CRGC target communities to learn more about their decision-making processes and what types of decision support information they need and use.

"I am thankful for the opportunity to be working with Dr. Bond and Dr. Nataraj of the RAND Corporation. For our research on the fisheries industry, we are applying a variety of econometric model specifications to assess the effect of the oil spill on landings in pounds and revenue for select fish species in the Gulf of Mexico. Our goal is to complement anecdotal accounts and time-trend analyses with findings from an assessment of routinely collected fisheries data submitted to the federal government."

Jacqueline Fiore, Graduate Student & Research Assistant, Tulane University - Member of Economics Subteam

Mentoring the Next Generation

The inclusion of graduate and undergraduate students in CRGC's projects is very important to the Consortium. There is an ongoing effort within CRGC, led by Dr. Tim Slack from Louisiana State University and Ky Luu, J.D., from Tulane University, to host workshops and trainings to provide students with professional development and mentorship opportunities. In addition, CRGC students play active roles on Consortium subteams, attend in-person meetings with project leads, and participate in weekly CRGC-wide conference calls. Louisiana graduate student, Leah Drakeford is CRGC Data Manager and liaises with the Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC). For more information about the current students involved in the Consortium, visit CRGC's website *here*.

Members of CRGC tour a seafood processing plant during their all-hands meeting. Photo Credit: CRGC.

Real-Time Program Self-Evaluation

In an effort to understand how effective CRGC is being at improving community resilience and to identify areas for improvement, the Consortium is continually evaluating its research activities using an algorithm created by the "Evaluation Subteam," which is co-led by Dr. Melissa Finucane from the RAND Gulf States Policy Institute and Dr. Holly Scheib from Tulane University. CRGC team members complete surveys to evaluate individual involvement with community stakeholders, areas for improvement, and more. The evaluation efforts are supported by graduate students Amanda Edelmen from the Paredee RAND Graduate School, and Allison Kalnick and Bert Cramer from Tulane University.

Looking Ahead

Twice a year, CRGC holds an all-hands meeting to bring together the principal investigators, research staff, and students working on CRGC projects. Most recently, the team met in Mobile, Alabama for their third all-hands meeting, which CRGC's Technical Advisory and Alabama Stakeholder Advisory Committees were also invited to attend. On the first day of the meeting, COMPASS provided a Message Box training to provide the team with tools and techniques for paring down messages and synthesizing results into effective products. On the second day of the meeting, CRGC team members and Technical Advisory Committee members took a "field trip" to Bayou La Batre, Alabama—one of CRGC's target communities—where SAC members Annette Johnson, the Mayor of Bayou La Batre, and Daniel Le, the Branch Manager of Boat People SOS, took the group on a tour of two seafood processing plants and a local shipbuilding facility.

The work CRGC is doing is vitally important to holistically assessing and addressing the impacts of the Deepwater Horizon oil spill on the health and socioeconomic wellbeing of communities in the Gulf of Mexico and helping build resilience to future oil spill disasters.

To learn more about CRGC, and to follow along as their teams share their projects' results, check out their website *http://www.resilientgulf.org* and their Facebook page *https://www.facebook.com/resilientgulf/*.

Smithsonian Institution Ocean portal
ocean.si.edu

Smithsonian Ocean Portal recently published an amazing slide show called *15 Creatures in the Gulf of Mexico that are Stranger Than Fiction*, featuring images and research findings by the *DEEPEND Consortium*. Check out the article and incredible images *here*!

Larval Plesiopenaeus armatus. Photo Credit: © 2015 DEEPEND & Danté Fenolio

Education Spotlight

ECOGIG brought their Ocean Discovery Zone Exhibit to the *2016 Atlanta Science Festival* which took place in the Olympic Centennial Park in Atlanta and had over 17,000 attendees. Visit ECOGIG's *Facebook page* for photos from the event and ECOGIG's *Vimeo page* for a fun video!

In May, ECOGIG attended a "*Science After Hours*" event in Philadelphia. The event was Pixar-themed, in honor of Pixar's new film "Finding Dory." ECOGIG scientist Dr. Erik Cordes attended the event and talked to attendees about his work on deepwater corals.

LADC-GEMM recently hosted their inaugural SeaGlide workshop. *SeaGlide* is an education tool geared towards students and educators, to teach them how to build their own gliders to better understand how they operate in the open ocean and can be a valuable tool for scientists. In partnership with Oregon Sea Grant, LADC-GEMM held their first workshop for educators who built their gliders out of water bottles. Visit LADC-GEMM's *website* for more information on the workshop and to learn more about the SeaGlide program.

Glider made from a water bottle, from LADC-GEMM's SeaGlide workshop. Photo Credit: LADC-GEMM.

In April, **RECOVER** attended *Ocean Kids*, an event sponsored by the University of Miami School of Marine and Atmospheric Science aimed at empowering at-risk youth by inspiring them to explore the marine sciences. The *RECOVER booth* included microscopes where visitors could view live mahi-mahi larvae, and featured games, trivia, and prizes.

Kids viewing live mahi-mahi larvae at Ocean Kids event. Photo Credit: RECOVER.

New Education Resources!

ACER has developed a series of educational blog posts. "Word Wednesday" features a new scientific term every Wednesday, along with its definition; "Tool Talk" describes some of the common tools and techniques ACER researchers use to conduct their research; and "Habitat Focus" talks about some of the habitats and ecosystems ACER research focuses on. Check out these excellent posts and resources on the ACER website *here*!

SAVE THE DATE!

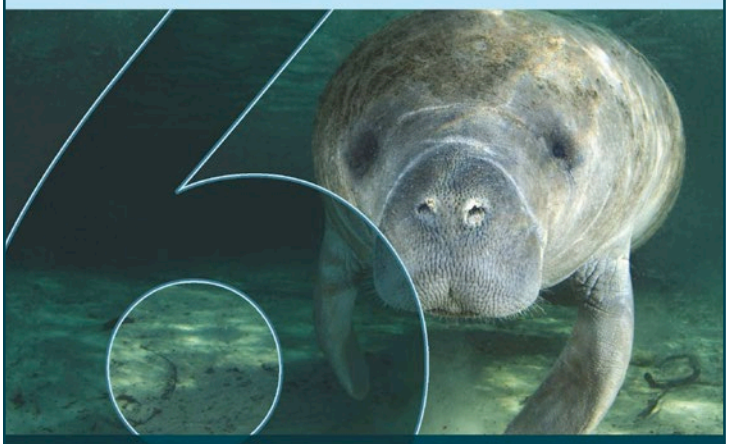
GULF OF MEXICO RESEARCH INITIATIVE

2018-2019

GoMRI RFP Announcement

The Gulf of Mexico Research Initiative (GoMRI) is pleased to announce the development of the GoMRI Request for Proposals for 2018-2019, to fund research activities for GoMRI Years 9-10 (1 January 2018–31 December 2019). This RFP-VI, to be released in October 2016, will build on previous RFPs, and will only fund two-year awards.

The total funds available for distribution through the 2018-2019 GoMRI RFP will be approximately $35 million per year. Please see the GoMRI RFP-VI webpage below for more detailed information!



http://gulfresearchinitiative.org/request-for-proposals/rfp-vi/

Keep up with the Consortia

Blog Roll and Social Media!

Some of the Consortia have updated their blogs. Check them out!

C-IMAGE *Blog*

CONCORDE *Blog*

CWC *Blog*

DEEPEND *Adults* and *Kids* Blogs

DROPPS *Blog*

RECOVER *Blog*

ECOGIG recently re-launched their website: ***check it out here!***

Many Consortia are active on social media, including Twitter, Facebook, and Instagram!

ACER: *Facebook*, *Instagram*

ADDOMEx: *Facebook*, *Twitter*, *Instagram*

CARTHE: *Facebook*, *Twitter*

C-IMAGE: *Facebook*, *Twitter*

CONCORDE: *Facebook*, *Twitter*, *Instagram*

CRGC: *Facebook*

CWC: *Facebook*, *Instagram*

DEEPEND: *Facebook, Twitter, Instagram*

DROPPS: *Facebook*, *Twitter*

ECOGIG: *Facebook*, *Twitter*, *Instagram*

RECOVER: *Facebook*, *Twitter*

Video Clip of the Quarter

CARTHE has shared several short videos and images from their recent LASER experiment on their Facebook page. Check out the video clips *here* and the photos *here*. The University of Delaware also shared *an interview* with CARTHE Co-PI Dr. Helga Huntley, in which she provides an excellent overview of the experiment.

RECOVER recently posted two new videos on satellite tagging mahi and what happens to a fish in the event of an oil spill. Check them out on their YouTube channel *here*.

C-IMAGE has released new podcast episodes. *Check them out here!*

Deployment of drifters for the LASER experimtent. Photo Credit: CARTHE.

GoMRI Attends 2016 National Marine Educators Association Conference in Orlando

Members of the GoMRI management team and several GoMRI Consortia outreach coordinators attended the 2016 National Marine Educators Association (NMEA) conference in Orlando, FL from June 27-July 1, 2016. GoMRI hosted a booth in the Exhibit Hall which was staffed by Katie Fillingham from the GoMRI Management Team and outreach coordinators from several GoMRI consortia, including Laura Bracken (CARTHE), Teresa Greely, Angela Lodge, Ben Prueitt, and Sherryl Gilbert (C-IMAGE), Dan DiNicola (RECOVER), and Sara Beresford and Emily Davenport (ECOGIG).

Katie Fillingham, in collaboration with GoMRI partners Emily Frost from Smithsonian Ocean Portal and Steve Sempier from the four Gulf Sea Grant programs, and Jessie Kastler from CONCORDE and Alex Turpin and Tracy Crews from LADC-GEMM and Oregon Sea Grant, presented a poster during the poster session on GoMRI's three-pronged approach to education and outreach activities.

The conference included a screening of Screenscope Inc.'s *Dispatches from the Gulf* documentary and drew more than 40 attendees. Each attendee received a copy of the documentary to use in their classrooms. Visitors to the GoMRI booth also were able to learn more about the documentary and receive a copy of the film to use in their classroom.

The NMEA conference provided a great opportunity for GoMRI to interact with marine educators and promote the education resources being developed through the GoMRI program!

Katie Fillingham and Tracy Crews presented a poster on GoMRI's approach to education and outreach activities during the poster session. Photo Credit: Dan DiNicola.

GoMRI hosted a booth at the 2016 NMEA conference. From left to right: Angela Lodge, Teresa Greely, Katie Fillingham, Laura Bracken, Dan DiNicola, Emily Davenport, and Sara Beresford. Not pictured: Sherryl Gilbert and Ben Prueitt. Photo Credit: Katie Fillingham.

Science Corner

Published Science Highlights from the GoMRI Program

Study Models Oil Aerobic Biodegradation Rates in Tidal Beaches

X.Geng, M.C. Boufadel, K. Lee, S. Abrams, M. Suidan

Water Resources Research, 2015, Vol. 51(5), pgs. 3193-3218

Study Estimates Beaked Whale Populations in Gulf of Mexico

J.A. Hildebrand, S. Baumann-Pickering, K.E. Frasier, J.S. Trickey, K.P. Merkens, S.M. Wiggins, M.A. McDonald, L.P. Garrison, D. Harris, T.A. Marques, L. Thomas

Scientific Reports, 2015, 5, Article Number: 16343

Study Improves Knowledge about Dispersants' Net Effect on Oil Fate

M. Zeinstra-Helfrich, W. Koops, A.J. Murk

Marine Pollution Bulletin, 2015, Vol. 100(1), pgs. 102-111

Study Shows Oiling Has Multiple Subtle Negative Effects on Submerged Vegetation

C.W. Martin, L.O. Hollis, R.E. Turner

PLoS ONE, 2015, 10(10): e0138797

Study Links Recovery of Oiled Marsh with Return of Salt Marsh Vegetation

J.W. Fleeger, K.R. Carman, M.R. Riggio, I.A. Mendelssohn, Q.X. Lin, A. Hou, D.R. Deis, S. Zengel

Marine Ecology Progress Series, 2015, Vol 536, pgs. 39-54

To see all GoMRI publications, please visit the GoMRI Publication Database.


Photo Credit: CC 4.0, no changes made.

Note from the Research Board Chair

Dr. Rita Colwell, University of Maryland & Johns Hopkins University

Women in Oil Spill Science and Those Recruited Through the GoMRI Program

Historically women have not played a major role in oceanography and oil spill research, mainly because of barriers and historically established gender roles. Many of the obstacles, fortunately, have begun to fade away, perhaps more rapidly during the past several decades in some areas of oceanographic research. Oil spill research in general has not been inclusive, not deliberately so, but rather as a function of opportunity. The Gulf of Mexico Research Initiative (GoMRI) brought a major change in the number of women actively participating in oil spill research, who serve as undergraduate and graduate students, as postdoctoral fellows, as Principal Investigators, and as faculty (mostly junior faculty but some senior professors as well). This augers well for the future, as it means the talented cadre of scientists now being highly educated and superbly trained, who are working in this area of science as physical, chemical, biological, and even socio-behavioral oceanographers, will become leaders in the future. We can point with pride not only at the lessons learned from GoMRI research that has been done and continues, but also at the learners, these students and faculty who will comprise a significant part of the GoMRI legacy.

There are many examples of outstanding women leaders in the science community today and now within the GoMRI program as well. Five of the twelve RFP-IV-funded GoMRI consortia directors are women. Approximately 41% of participants in the GoMRI program, including Principal Investigators and graduate and undergraduate students, are women. Many brilliant women graduate students are being trained in Universities participating in the GoMRI program. Forty-six percent of GoMRI's post-doctoral fellows, 49% of the PhD students, and 57% of the Master of Science degree students are women; these are the next generation of scientists and society leaders and most are located in the Gulf region. All of this is encouraging and inspirational, that we can look across this shining landscape of women in science. It makes one optimistic for the future!

As part of its outreach program, GoMRI contracted with Screenscope Inc. to produce documentaries of our scientists at work. Featured in these documentaries are some of the GoMRI-funded women, notably in the first documentary Dispatches from the Gulf, and also in *short videos* providing vignettes of the research underway. Furthermore, Smithsonian's Ocean Portal presents some of the science being done, with interviews of several of the GoMRI women scientists as part of the Smithsonian's recognition of women's history month. (Those interviews can be found *here*, *here*, and *here*.) In addition, several recipients of the James D. Watkins Student Award who have provided excellent student oral presentations at the Gulf of Mexico Oil Spill and Ecosystem Science Conference are women.

It is timely that we present this newsletter with a spotlight on women just at the time in our country a major political party has nominated a women for President of the United States. That glass ceiling has been shattered! As Chair of the GoMRI Research Board, I am proud to share with our readers some of what the GoMRI program has accomplished. Indeed, I am very pleased, as well, to note that the GoMRI program supports so many talented women in science. It is our hope that these women will be the leaders of the future in oceanography and oil spill science.

GoMRI Shares Annual Press Release in Honor of World Oceans Day

To celebrate World Oceans Day on June 8, 2016, GoMRI announced a press release titled "*An Ocean Oil Spill Science Legacy*," sharing how the GoMRI program has built a community of scientists who are ready and able to help respond to oil spills. Visit the GoMRI website to read the press release *here*.

Guest Frequently Asked Questions with Dave Westerholm

GoMRI is pleased to have Dave Westerholm, Director of NOAA's Office of Response and Restoration, answering a few Frequently Asked Questions (FAQs) about NOAA's role in oil spill response and how the science community can be involved in the response process. Mr. Westerholm was a Captain (ret.) in the United States Coast Guard and is Chair of the Executive Committee for the Gulf of Mexico Oil Spill and Ecosystem Science conference. We thank him for taking the time to answer a few questions about this important topic!

As Director of NOAA's Office of Response and Restoration, I've been asked to give my perspective on three questions some of you may have been wondering about.

Question: What is NOAA's role in the oil spill response process?

Answer: Under both the Oil Pollution Act of 1990 and the Clean Water Act, NOAA brings several regulatory roles, as well as additional scientific expertise, to an oil spill response. We maintain a response posture that allows our Scientific Support Coordinators to answer questions related to the science of oil spills -- ranging from chemistry and biology to oceanography and meteorology -- all tailored to help the U.S. Coast Guard and others in the Unified Command make informed decisions during a response. This key response advisory role draws on internal and external scientific and environmental expertise.

We also serve as the federal trustee for marine resources, including dolphins, salmon, and salt marshes. In this role, we assess the extent of any natural resource impacts from a spill and its response operations and work to ensure the appropriate type and amount of restoration takes place to make up for those damages. Our response and restoration work requires us to pull from the full bandwidth of NOAA expertise, which spans tides, currents, weather forecasts, and satellite imagery, as well as fisheries and protected species.

Question: In what format is scientific information most useful to the emergency response community?

Answer: During oil spills, NOAA works with information in a myriad of formats. We incorporate oceanographic, meteorological, and hydrographic data into various software tools we have developed that model the trajectory, fate, and behavior of oil. Before a spill happens, we collect biological, ecological, and archaeological data into maps showing coastal environmental sensitivity to oil. In addition, we have developed tools to help our scientists and others integrate and visualize environmental data into a single, shared map-based view during and after spills. This critical suite of tools enables our Scientific Support Coordinators to convey accurate information in a timely manner to a spill's Federal On-Scene Coordinator, empowering the best possible decisions for the public and the environment.

Question: How does NOAA incorporate outside science during an oil spill?

Answer: When possible, NOAA's oil spill scientists are eager to collaborate with other government, industry, and academic scientists in order to help us solve the complex problems presented in an emergency response setting. Such involvement is facilitated by relationships established and involvement in the planning process in advance of a spill. There have been multiple initiatives aimed at enhancing engagement with academic scientists during spill preparedness and response activities, which is important due to the lack of established funding available for pure research during an oil spill. At this point, however, there is no single model or approach to fostering these relationships, but, as various models are considered, we hope to see the involvement of academic scientists continue to scale up.

At the same time, NOAA has a long history of working with academics as we evaluate potential environmental harm during the NRDA (Natural Resource Damage Assessment) process that follows an oil spill. When working on larger or possibly contentious cases, we reach out to experts for help quantifying impacts to natural resources and the services they provide the public. This typically involves doing fieldwork to measure whether adverse changes have occurred to natural resources and services.

The scientists we work with in these cases depends on the location of the spill and the potentially impacted natural resources and services we are trying to measure. While we do work with academics that have previously collaborated with us, we also seek out those with particular expertise in the natural areas and marine resources commonly affected by pollution and we're always looking to identify new experts. Outside of spill scenarios, we also invite experts to help us develop scientific techniques and methods for future NRDAs.

As part of the 2017 Gulf of Mexico Oil Spill and Ecosystem Science Conference, we hope to discuss this topic in more depth and explore how some of the oil spill science that has been done over the last few years might influence policy, response decisions, and natural resource damage assessment.

GoMRI Researcher Interview with Dr. Frank Hernandez

Dr. Frank Hernandez. Photo provided by Dr. Hernandez.

Dr. Frank Hernandez from the University of Southern Mississippi answered a few questions about his RFP-II project, Resolving Deepwater Horizon Impacts on Highly Variable Ichthyoplankton and Zooplankton Dynamics in the Northern Gulf of Mexico, and his role as co-PI of the Consortium for Oil Spill Exposure Pathways in Coastal River-Dominated Ecosystems (CONCORDE).

1. **Thank you so much for talking with us! Tell us a bit about your research. What are the goals of your project?**
   The goals of my RFP-II project are to investigate possible impacts of the Deepwater Horizon oil spill on marine fish early life stages using a long-term data set. Most marine fish eggs and larvae are planktonic, and during the oil spill these "ichthyoplankton" life stages would have been particularly vulnerable. I was fortunate to have been a co-investigator on a long-term plankton survey that was initiated at the Dauphin Island Sea Lab in late 2004 and continued through 2011. These samples provided valuable baseline collections to examine pre-impact, impact, and post-impact estimates of larval fish abundance, distribution, and community composition. With the support of GoMRI, I was able to continue the plankton collections at the University of Southern Mississippi during the summer months of 2013, 2014, and 2015, and examine other factors that influence larval fish survival, including larval fish growth, diet, and body condition.

2. **What is your background and how did you get involved with this kind of work?**
   My background is in fisheries oceanography, with an emphasis on the biology and ecology of larval fishes. I first got involved with ichthyoplankton while working on my MS thesis at the University of North Carolina at Wilmington. I had always been a "fish guy," but these life stages were completely foreign to me. I had to forget about dichotomous keys and field guides because larval fishes look nothing like their adult forms. Each specimen I examined under the microscope was a puzzle, and I enjoyed the challenge of identifying them. The larval stage is a critical period in the life of fishes, and natural and anthropogenic processes that affect their survival often lead to variable year class success. So not only are larval fish fun, they are very informative! I therefore continued my studies of larval fishes through my PhD work at Louisiana State University and my subsequent research career.

3. **What are some of the most significant or exciting findings so far in your work with GoMRI?**
   To date, we've seen that the planktonic communities in the northern Gulf of Mexico appear to be relatively resilient to the impacts of the oil spill, at least in our study region. In terms of numbers of fish larvae, we do not see any significant drop in post-spill abundances for the species we have examined. Similarly, we see resiliency in many of the zooplankton taxa we have examined, which are larval fish food. A major challenge for anyone examining impacts is discerning between Deepwater Horizon effects versus the natural variability in the ecosystem. With Red Snapper larvae, for example, we have found that variable environmental conditions, particularly river discharge, are related to overall larval body condition. However, even after accounting for the effects of these environmental factors, we observed that larval Red Snapper collected during and after the oil spill are in generally poorer condition than larvae collected in years prior to the spill. Although we cannot definitively link poor larval condition of Red Snapper to the oil spill, we have ruled out many other factors, so more investigation is needed.

4. **You mention the challenge in differentiating between the impacts of the oil spill versus natural variability in the ecosystem; can you talk about some of the ways in which you are able to discern between the two?**
   This is a difficult task. One thing we try to do is estimate the amount of environmental "noise" in the patterns we observe by using time series data for variables such as river discharge, temperature, and salinity, among others. We can calculate the ranges of "normal" environmental conditions historically encountered for our sampling region, and compare these ranges with conditions encountered during Deepwater Horizon (2010). If any of the 2010 parameters are outside of our expected conditions, then we must consider that factor as a possible contributing cause.

5. **Do you see poorer conditions present in a single year, or do these conditions persist in years following the oil spill as well? If so, how long would you anticipate it would take for larval**

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health to return to "normal?"

For Red Snapper, we've observed relatively poor larval body condition for specimens collected in 2010, 2011, and 2013 (unfortunately we did not have data for 2012). We are currently identifying specimens from 2014 to include in our analysis. Again, there are a number of environmental and anthropogenic factors that may account for this, some we have not investigated. It could be due to other environmental factors that play a role in survival during the larval stage, such as predator and prey abundances (something we hope to address next). Or, it could be something that is impacting the spawning adults and affecting larval condition through "maternal effects." Our work on the larval stages is only one piece of the puzzle, and we hope to fully address some of these questions about long-term effects by combining our findings with those of GoMRI colleagues working with juvenile and adult Red Snapper, thus incorporating all life stages.

6. **You have been funded as an individual investigator through RFP-II and also as a co-PI on RFP-IV-funded consortium CONCORDE. Are there similarities between your RFP-II project and your work with CONCORDE? Differences?**

I am very fortunate and excited to be a part of CONCORDE. There are certainly similarities in that I am using some of the same approaches to investigate variability in larval fish growth, diet, and condition. For the RFP-II project, the questions were directly related to Deepwater Horizon impacts, and the historic baseline survey allowed me to examine those questions. With CONCORDE, the environmental driver of interest is river discharge. Nutrient inputs and productivity cycles pulse with variable river discharge, and these affect larval fish dynamics, so it's a very exciting system to examine. Another difference is the scale of the project. I was a single investigator on my RFP-II project, and was able to support a few technicians, a postdoc and graduate student to conduct the research. The exciting thing about CONCORDE is that we have a small army of investigators, postdocs, and graduate students from numerous institutions, and all of us are working toward a common set of goals and using some very sophisticated technology to address our hypotheses. It's been a very cool experience to say the least.

7. **If funding were not an issue, what would you add to your project?**

Time, time, and more time! As much as I enjoy larval fish taxonomy, it is a time-consuming task to sort through plankton samples and identify fish larvae. As a result, we often have to focus our efforts on a few target species, as we've done with our project (e.g., Red Snapper, Spanish Mackerel). But there are many other species that were present during the oil spill, and we've shown that they can have different responses, so doing similar analyses with more species would be informative. Also, we do not have descriptions for the larval stages of many fish species in the Gulf, so often our identifications are limited to the genus or family level. Molecular identification (e.g., DNA barcoding) of as many specimens as possible would be an extremely valuable contribution to the research effort. And lastly, in the years since the oil spill I have heard many plenary speakers and scientific presenters at conferences repeatedly extol the value of baseline data and monitoring efforts. And yet, there is no concerted effort or funding source to support these initiatives. I've been able to extend my original plankton time series for a few years with GoMRI support, but this summer is the first since 2005 that my lab is not on the water collecting plankton samples along our historic transects. I know scientists working in other aspects of the Gulf ecosystem are similarly frustrated, so this is not only a personal desire, but a cause that I think many would support. We must find a way to support baseline data collection and monitoring efforts in the Gulf of Mexico.

GoMRI Newsmakers

In recognition of the sixth anniversary of the Deepwater Horizon oil spill, some GoMRI Principal Investigators participated in interviews highlighting the knowledge that has been gained in the past six years through the GoMRI program on the Gulf of Mexico, recovery from the oil spill, and what comes next.

ACER Co-PI Ken Heck was interviewed by WBUR, Boston's local NPR station, about his work with GoMRI at the Dauphin Island Sea Lab; read the article *here*.

C-IMAGE Co-PI and Chief Scientist David Hollander spoke with WMNF, a local Tampa, FL radio station, on ecosystem recovery since the spill; read the article *here*.

C-IMAGE Principal Investigator Steve Murawski spoke with *Science Magazine* about his involvement with the GoMRI program and also with the *Dispatches from the Gulf* documentary; read the full interview *here*.

Congratulations Dr. Ardekani!

The GoMRI community *congratulates Dr. Arezoo Ardekani* on receiving the *Presidential Early Career Award for Scientists and Engineers (PECASE)*. Dr. Ardekani is an assistant professor at Purdue University's School of Mechanical Engineering and is Co-PI on the RFP-V project *Role of Microbial Motility for Degradation of Dispersed Oil*. The PECASE is given by the United States government to early career scientists who are innovators in their field and are also dedicated to giving back to their communities. This year's awardees spent two days in Washington, D.C. receiving their awards, sharing their research, and meeting with President Barack Obama.

GoMRI Scholars in Action


Photo Credit: Kim Nightingale

Grad Student Jaggi Seeks Solution to World's Clean Water Shortage

The Gulf of Mexico Research Initiative (GoMRI) is recognizing the graduate students whose vital research contribute to improving understanding about the damage, response, and recovery of the Deepwater Horizon oil spill. Candidates for this program must be graduate students who have participated in a GoMRI-funded project for at least one year, whose work is primarily funded by GoMRI, and who are working on a dissertation or thesis based on GoMRI-funded science.

Learn more about the scholars' research and career paths on the GoMRI website...

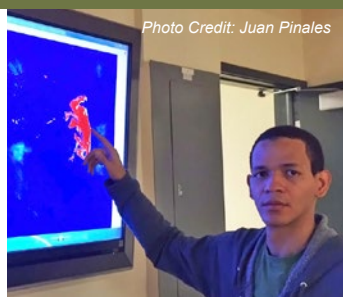
Photo Credit: Juan Pinales

Grad Student Pinales Designs "Smart" Oil-Spill Detection Tool


Photo Credit: Tingting Tang

Grad Student Tang Studies Whale Populations' Oil Spill Recovery


Photo Credit: Elizabeth Robinson

Grad Student Robinson Follows Little Blue Crabs for Bigger Food Web Picture


Photo Credit: Dr. Dante Fenolio

Grad Student Timm Tracks Crustacean's Oil Spill Recovery


Photo Credit: Kelsey Rogers, Courtesy of Deep-C

Grad Student Rogers Traces Gulf Oil as Scientific CSI

Sea Grant

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The Gulf Sea Grant team hosted two seminars in April and one in June. The seminar called *Chilling with your chums: How did the oil spill impact Gulf fisheries* featured scientists discussing how the oil spill impacted fisheries in the Gulf of Mexico following the oil spill. A summary of that seminar can be found *here*. The seminar called *Where did the oil go?* featured scientists discussing the fate and transport of oil following the spill. A summary of that seminar can be found *here*. The seminar called *Sharing Gulf Science Discoveries for Management* featured the latest oil spill discoveries applicable for resource managers. A summary of that presentation can be found *here*. For more information on seminar dates, topics, and registration information, and for summaries from previous seminars, please visit the Gulf Sea Grant presentations page on their *website*.

The Gulf Sea Grant team released a new publication on *Impacts From the Deepwater Horizon Oil Spill on Gulf of Mexico Fisheries*, highlighting how oil impacts fishes and how scientists are working to understand these impacts. The publication can be found *here*, and all other publications can be found *here*.

The Gulf Sea Grant Program's colleagues at the Mississippi-Alabama Sea Grant Legal Program recently published a bulletin on the current rules governing the use of dispersants. The publication also includes some changes proposed by the Environmental Protection Agency following Deepwater Horizon on the use of dispersants. The bulletin is available *here*.