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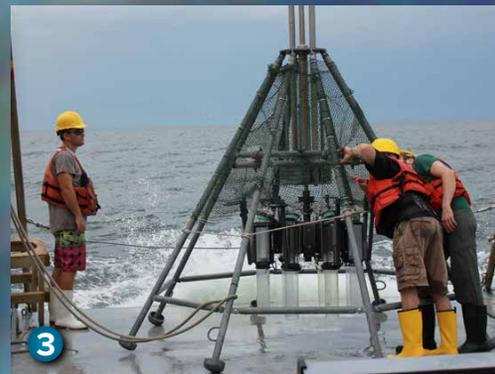
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Foreword

By Rita R. Colwell

The Deepwater Horizon oil spill represents one of the most significant ecological events in the United States in recent time. It was defined by release of more than 133 million gallons of crude oil, followed by treatment of the spill with the addition of 1.8 million gallons of dispersants. Oil mixed with dispersant ultimately settled on wetlands, beaches, and deep-sea sediments of the Gulf of Mexico. As severe as this ecological event was, the significance was overshadowed by the loss of 11 lives. These were the oil rig workers in the Gulf on the platform at the time of the spill. Hundreds of oil spill emergency responders, coastal inhabitants, and visitors were exposed to the oil and dispersants, another sad aspect of the tragedy. The total cost of this oil spill to the entire Gulf of Mexico ecosystem, both human and environmental, may never be fully determined. In an immediate response, the scientific community mobilized and began to work diligently after the spill to provide information and support to protect and begin restoration of the Gulf ecosystem.

Another immediate response was the commitment by BP to fund a \$500 million 10-year oil spill research program. The focus of the fund is on the impact and

long-term ecological effects of the oil and on mechanisms for better global preparation in the event of any future oil or gas releases to the environment. Though BP established the Gulf of Mexico Research Initiative (GoMRI), it operates independently of BP to provide leadership and to administer the \$500 million research fund. This special issue of *Oceanography* presents findings from the research funded by GoMRI to date as well as overviews of the GoMRI program.

To describe its operation, it is important to point out that GoMRI adheres to the principles set forth in the Master Research Agreement (MRA, <http://gulfresearchinitiative.org/wp-content/uploads/Annotated-GoMRI-Master-Research-Agreement-2.pdf>) with BP. The mission of GoMRI, as stated, is to investigate the impacts of oil, dispersed oil, and dispersant on the ecosystems of the Gulf of Mexico and affected coastal states, with the objective of improving understanding of environmental stresses and public health implications of oil spills in general, and the consequences of the Deepwater Horizon incident on the Gulf of Mexico specifically (<http://gulfresearchinitiative.org/about-gomri/gri-mission>). A significant

GoMRI goal is to improve society's capability to understand, respond to, and mitigate the impacts of petroleum pollution and related stressors on marine and coastal ecosystems, with emphasis on the Gulf of Mexico.

In accordance with the MRA, GoMRI established five programmatic research areas: (1) physical distribution, dispersion, and dilution; (2) chemical evolution and biological degradation; (3) environmental effects; (4) technology developments; and (5) impact of oil spills on public health. These research areas enable scientific and technological experts from different disciplines to collaborate to gain an understanding of Gulf ecosystem complexity. GoMRI-funded research consortia and the individually funded projects address the themes, allowing the scientific research to progress more rapidly and effectively than would otherwise be possible. Selection and funding of research consortia and individual projects are accomplished under the aegis of the GoMRI Research Board, with the assistance of the GoMRI Management Team.

Because it operates completely independently, the GoMRI Research Board acts with full authority for the program and adheres to the established and highly



PHOTOS. (1) Researchers Jacob Price, Brian Wrenn, and Xiaolong Geng in 2011 set transects on beaches in Fort Pickens, Florida, to evaluate oil biodegradation. *Photo credit: Michel Boufadel* (2) Sleep Dragon seep site in the Gulf of Mexico. *Photo by Ocean Exploration Trust/GISR* (3) C-IMAGE researchers prepare a Multi-Corer during research cruise. *Photo Credit: C-IMAGE Consortium, USF* (4) The Coastal Waters Consortium hosted a booth with face painting and educational children's activities at La Fête D'Ecologie. *Photo Credit: CWC Consortium, LUMCON* (5) Dispersed oil droplets bound to marine detritus and plankton collected in northern Gulf of Mexico waters during Deepwater Horizon (2010). *Photo courtesy of David Littschwager* (6) Paola Lopez-Duarte and Brian Roberts use a seine to collect nekton next to a marsh. *Photo provided by CWC* (background photo) Oil sampling location during research cruise off Louisiana coast on May 26, 2010. *SkyTruth photo, public access by NOAA*

respected standards of the National Academy of Sciences and the National Science Foundation with respect to conduct of scientific research. Thus, based on the well-recognized experience of both of these scientific organizations, the Research Board established its operating procedures for requesting and selecting the best science and also for communicating scientific findings accurately and responsibly. The intricacies of the GoMRI operating framework and GoMRI's dedication to scientific integrity are described in detail in this issue.

The GoMRI Research Board fully endorses transparency and has acted to ensure the availability and preservation of scientific results generated by all of the programs and projects that have been funded. The resulting science is robust, and the scientists are highly productive. To date, over 3,000 GoMRI-funded researchers representing 278 institutions in 42 states and 17 countries have produced almost 800 peer-reviewed publications. To ensure data availability now and into the future, GoMRI established the Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), described in this special issue by James Gibeaut. This team of

researchers, data specialists, and computer system experts developed a data management system for storing and distributing all of the scientific data generated by the GoMRI researchers. This initiative comprises an essential component of GoMRI's legacy. The GoMRI Research Board commitment to outreach is equally strong, ensuring the science resulting from the GoMRI investment is made available to the public on a timely basis through its many outreach programs involving partner organizations. GoMRI's outreach activities have been very effective in transforming scientific results into information for the public. Debra Benoit and colleagues describe the outreach program in detail in this issue.

The GoMRI Research Board is mindful of the importance of a GoMRI legacy. Many discoveries have already been made, and the continuing productivity of the scientific teams and individuals will ensure scientific contributions long after the GoMRI program is completed. Critical measures of the success of GoMRI are not only the number of scientific publications, but even more importantly, the young oil spill scientists who are now being trained, and the compilation and accessibility of big data maintained at

GRIIDC. Journal special issues, film documentaries, and partnerships with outreach organizations also comprise the GoMRI legacy. The Research Board continues to explore ways for GoMRI science to be useful for the broader community and the public after the program has ended, especially since the human and ecological impacts of the Deepwater Horizon oil spill on the Gulf of Mexico region will persist when GoMRI has completed its mission. Thus, it may well be most important that GoMRI has provided an excellent model for how industry can play a significant role in supporting independent, open, scientific research to address challenges and help solve societal problems, inform decision-making, and address future environmental and public health challenges. ☑

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