



***Industry-funded Academic Research
that Informs Response***

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www.gulfresearchinitiative.org

After the Deepwater Horizon oil spill...



Credit: AP Photo/Charlie Riedel

GoMRI is ***not*** part of the Natural Resource Damage Assessment, the Clean Water Act Penalties, the National Academy's Gulf Research Program, or the National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund.

GoMRI was established as an independent 10-year \$500M research program, funded voluntarily by BP.



Credit: SAUL LOEB/AFP/Getty Images

Mission and Goal

MISSION: to implement an independent research program that will

- (1) Study the effects of the *Deepwater Horizon* incident and the potential associated impacts of this and similar incidents on the environment and public health and
- (2) Develop improved methods for spill mitigation, oil detection and characterization, and advanced remediation technologies.

GOAL: to improve society's ability to understand, respond to, and mitigate the impacts of petroleum pollution and related stressors of the marine and coastal ecosystems

Five Research Themes

1. **PHYSICAL DISTRIBUTION**, dispersion, and dissolution of petroleum, its constituents, and associated contaminants under the action of physical oceanographic processes, air-sea interactions, and tropical storms
2. **CHEMICAL EVOLUTION and BIOLOGICAL DEGRADATION** of the petroleum/dispersant system and subsequent interactions with coastal, open-ocean, and deep-water ecosystems
3. **ENVIRONMENTAL EFFECTS** of the petroleum/dispersant system on the sea floor, water column, coastal waters, beach sediment, wetlands, marshes and organisms, and the science of ecosystem recovery
4. **TECHNOLOGY DEVELOPMENTS** for improved response, mitigation, detection, characterization, and remediation associated with oil spills and gas releases
5. **PUBLIC HEALTH** impacts of oil spills including behavioral, socioeconomic, environmental risk assessment, community capacity, and other population health considerations and issues

Research Board

- Rita Colwell – UMD & JHU
- Margaret Leinen – UCSD/SID
- Debra Benoit – Nicholls State
- Peter Brewer – MBARI
- Richard Dodge – NOVA SE
- John Farrington – WHOI
- Kenneth Halanych – Auburn
- David Halpern – NASA
- William Hogarth – FIO
- Cecilie Mauritzen – NIVA, Norway
- Raymond Orbach – UT Austin
- Jürgen Rullkötter – University of Oldenburg, Germany
- David Shaw – MSU
- Rick Shaw – LSU
- John Shepherd – University of Southampton, UK
- Bob Shipp – University of South Alabama
- Burton Singer – University of Florida
- Ciro Sumaya – Texas A&M
- Dennis Wiesenburg – USM
- Dana Yoerger – WHOI
- Michael Carron – GOMA PD*
- Charles Wilson – GOMA CSO*

**Ex Officio*

Scientific Integrity

- **National Science Board peer evaluation protocols to select funded research**
- **Independent reviews by scientific peers not affiliated with institutions leading proposed projects to avoid conflict of interest in selecting funded research**
- **RB and staff members and peer reviewers sign conflict of interest and non-disclosure statements**
- **Researchers comply with National Academies of Science standards**
- **Researchers conduct independent, objective work with no influence from BP and GOMA**
- **Researchers independently publish results in peer-reviewed scientific journals with no requirement for BP approval**

Funded Research to Date >\$400M

Alternating RFPs for consortia (> 3 institutions) and small research teams (1-4 investigators)*

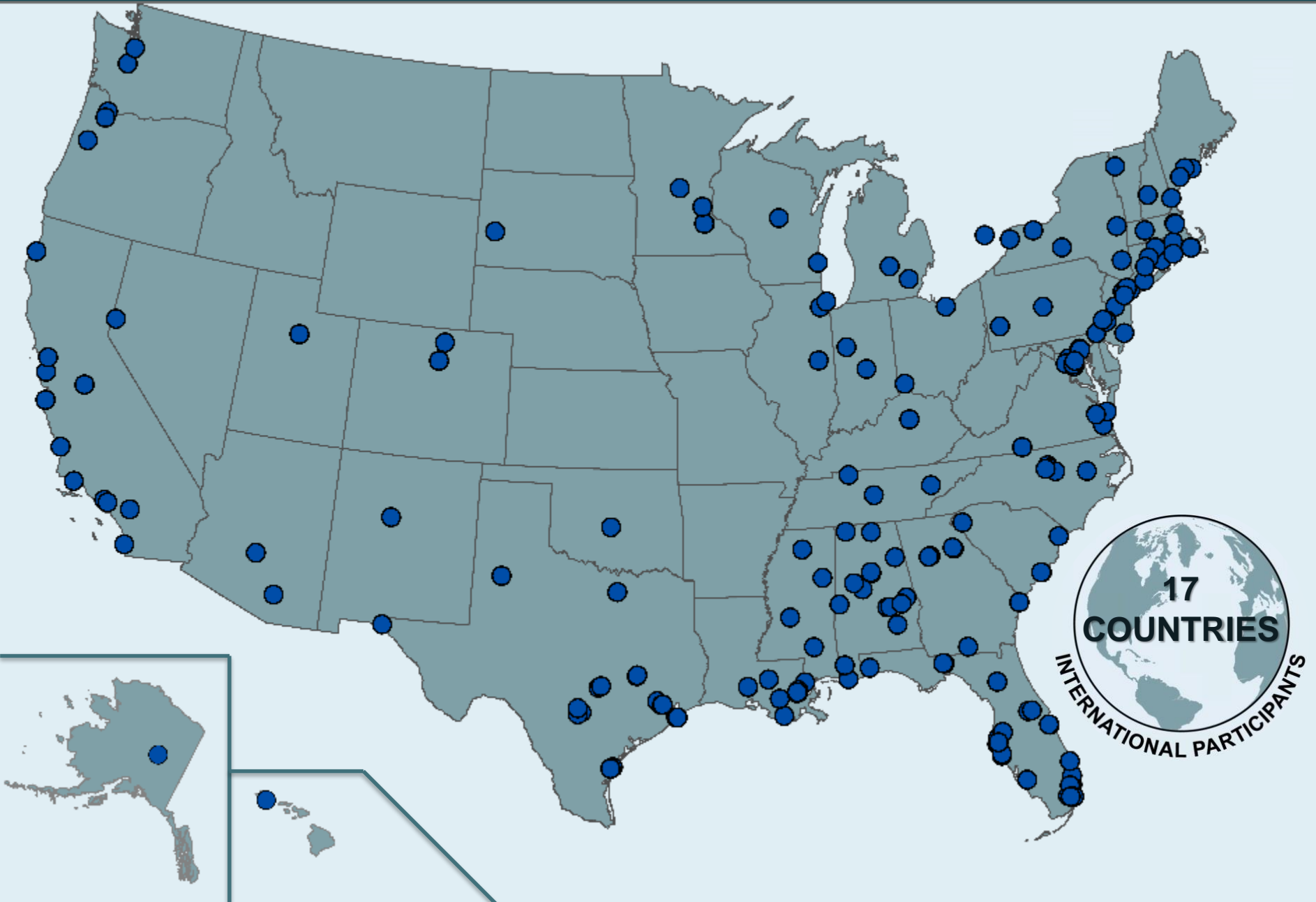
- 42 states
- 278 academic institutions
- 17 countries

As of September 2017:

- 954 scientific peer-reviewed publications, book chapters
- 3650 scientific presentations and posters
- 3674 people: 295 Post Docs, ~1000 grad students

** These data do not include RFPVI – awards in progress*

Grants Distribution



Data Management

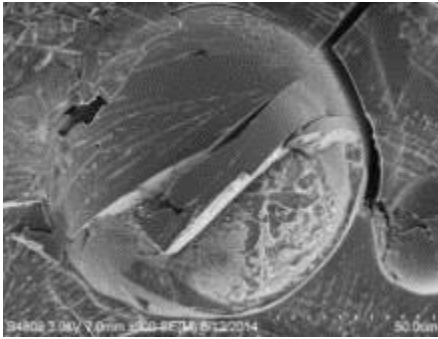
Gulf of Mexico Research Initiative

Information & Data Cooperative

(GRIIDC)

- **GRIIDC mission: to ensure an open-access data and information legacy that promotes continual scientific discovery and public awareness of the the impacts of oil spills on Gulf of Mexico ecosystem and public health**
- **GRIIDC maintains the scientific datasets resulting from GOMRI-funded research and assists researchers with data archiving and data interoperability among GOMRI and other datasets.**

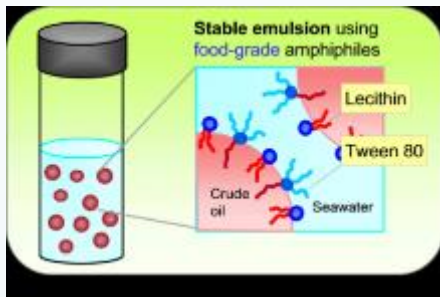
Published Science includes >100 articles involving Dispersants



Study Finds Ecofriendly Clay Delivers and Improves Oil Spill Treating Agents

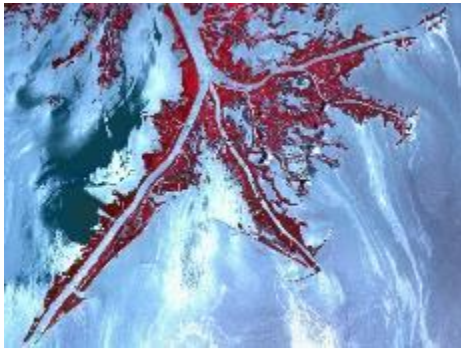


Carbon Black Particles as an Alternative or Supplement for Oil Dispersants



Food-Grade Emulsifier as an Efficient Dispersant Alternative

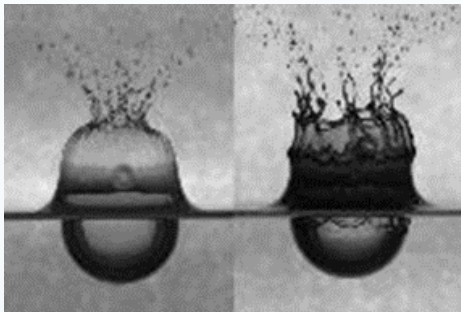
Research Projects on Oil Transport



Substantial Role of Mississippi River in Oil Transport

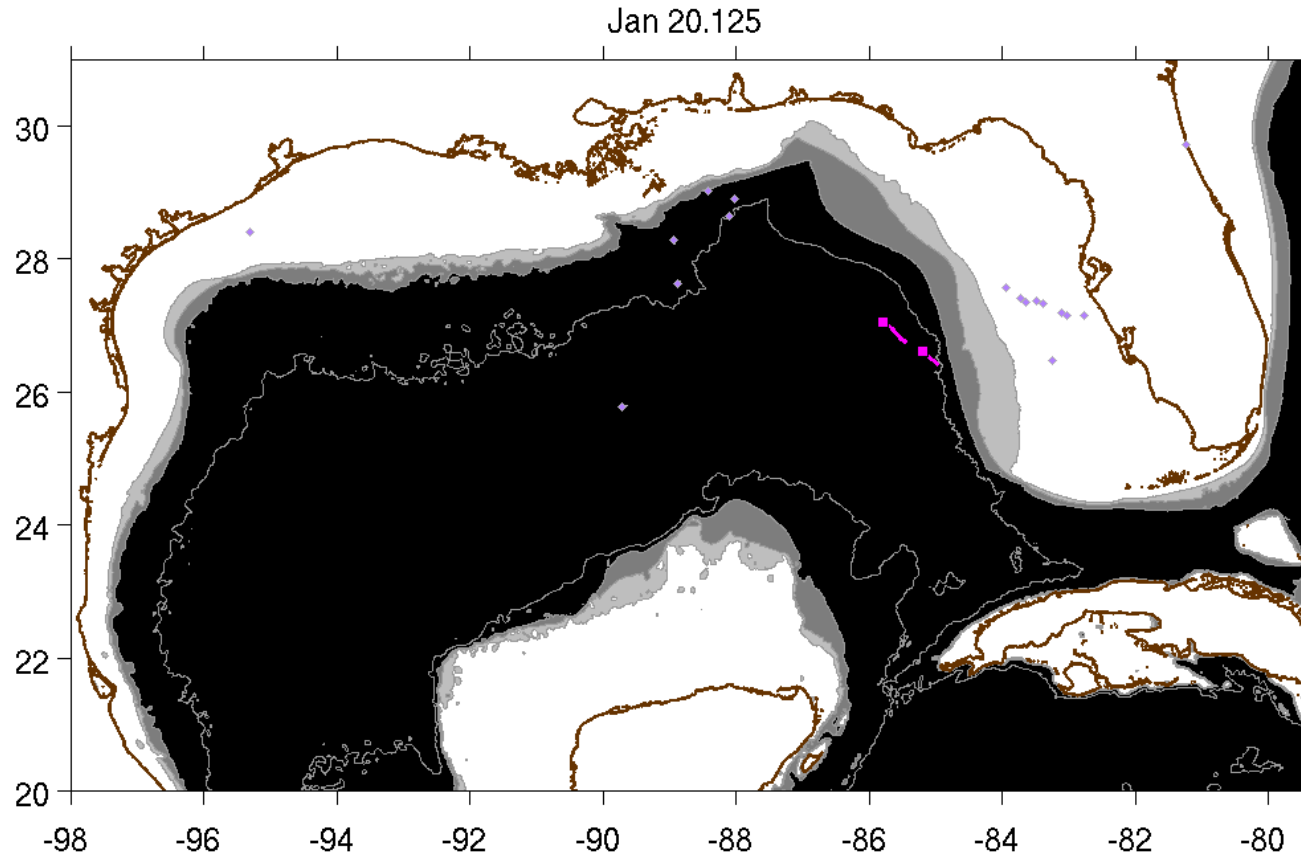


Pathways for Oiled Marine Snow (MOSSFA) Formation

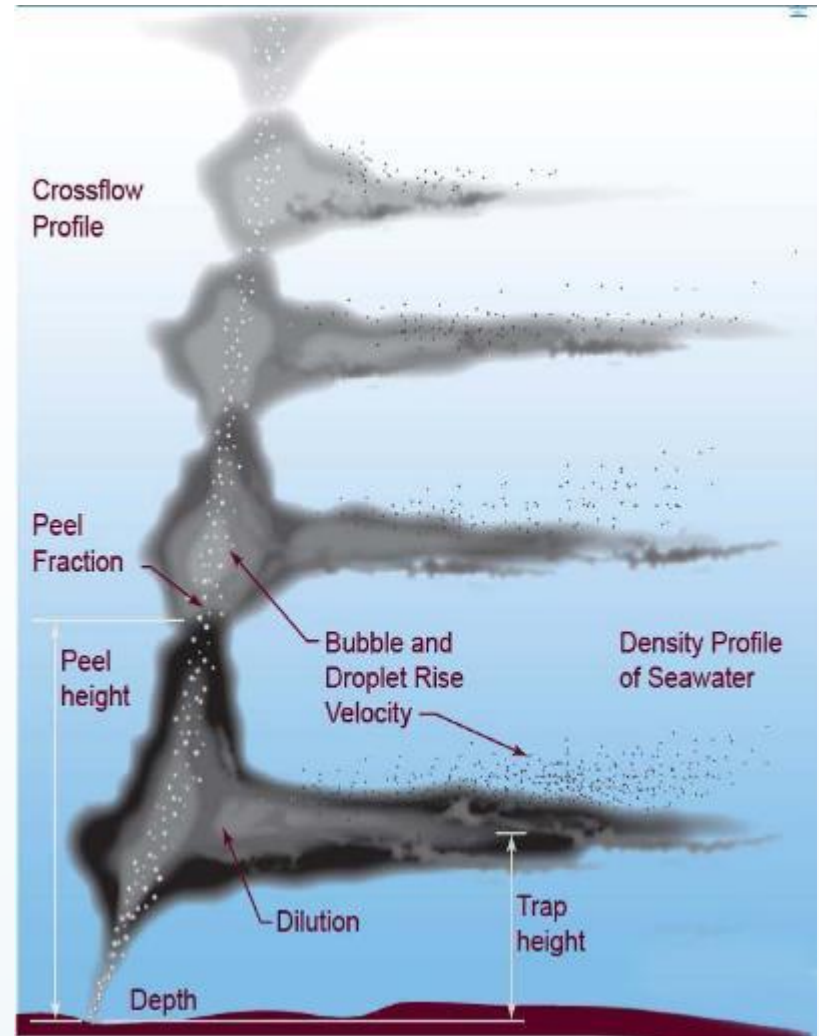
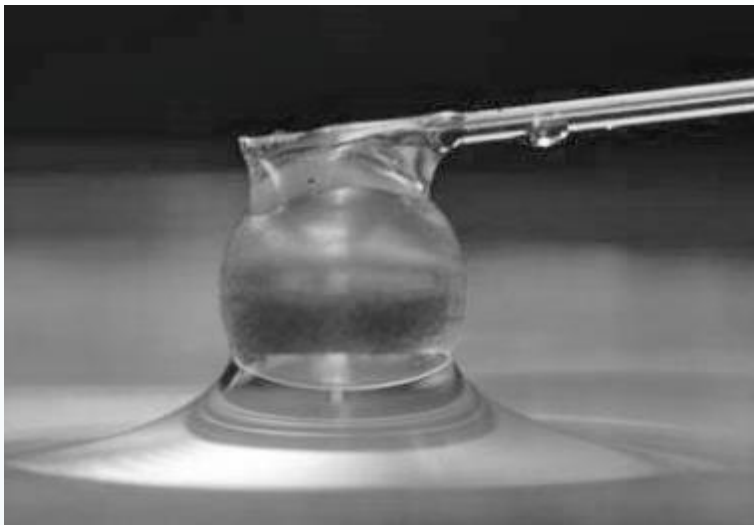


Raindrops can Push Oil and Dispersed Oil into Air and Below Sea Surface

CARTHE II "LASER" EXPERIMENT 2016



Fine-Scale Oil Behavior



Oil Fate in Land and Sea



Science that Informs Spill Response



Oil Transport



Effects and fate of Dispersants



Oil Biodegradation and Monitoring

Synthesis of Results is a work in progress...

several special journal issues so far
more planned during final phase (RFP6)

- **Bioscience (2014):**
- **Journal of Geophysical Research Oceans (2016)**
- **Oceanography Magazine (2016)**
- **Currents (under development)**
- **Elemental (under development)**
- **NASEM-NRC Dispersants study (co-funding; under development)**

Some Important Issues Relevant to ITAC

- What is an adequate/required “baseline” of knowledge and information for ecosystems that might be affected by an oil spill?
- *NB: “Ecosystem” includes human aspects!*
- How to utilise sampling and measurement technologies deployed at various times during the DWH spill to assemble better future systems for response & assessments?

Some Important Ongoing High Priority Efforts for GOMRI

- **Interfacing GOMRI research knowledge with needs of Oil Spill Response and Remediation Communities.**
 - Examples in USA are US Coast Guard, US NOAA Oil Spill Response Groups.
 - Similar entities in other countries.
 - Industry Groups – e.g. ITAC
- **Research transparency & accessibility**
- **Data Archiving:** Appropriate, Reliable, Easy to Access, and Long-lasting
- **Synthesis & Legacy** activities

GoMRI Synthesis & Legacy: Proposed Workshops Areas

Bridging the Gap between Academic & Operational Communities

- 1. Operational Plume & Circulation Observations & Modeling**
- 2. Fate of Oil & Weathering: Biological & Physical-chemical Degradation**
- 3. Ecological/Ecosystem Impacts: Adequate Baselines & Observational Needs**
- 4. Human Health & Socioeconomics Impacts**
- 5. Ecosystem Services, Human Health & Socioeconomics Impacts: (later)**
- 6. Microbiology, Metagenomics & Bioinformatics**
- 7. Integrated Modelling**
 - Physics + Chemistry + Biology + Ecology + Public Health
- 8. Legacy Steering Group: Knowledge Exchange with User Communities: Lessons Learned & Operational Advice**

NB: GoMRI Theme 4 (Technology Developments) is embedded within all Workshops as one of their objectives

2018 Gulf of Mexico Oil Spill & Ecosystem Science Conference

“One Gulf”

Healthy Ecosystems, Healthy Communities



February 6 - 8, 2018 in New Orleans, Louisiana

Sponsors and Partners

GOMRI, NAS(Gulf of Mexico
Program), NOAA, EPA, BOEM,
GOMURC, GOMA, COL