

# DWH Principal Investigator Workshop

A summary of findings and one-year updates

**Paul A. Sandifer, Ph.D., Co-Chair**

Subcommittee on Ocean Science and Technology  
of the National Science and Technology Council




## Workshop Objective

Bring together scientists from academic institutions, private research institutes, state and Federal agencies, and other important organizations, and stakeholders active in the Gulf of Mexico to report recent scientific advances, explore scientific data and information needs, and further develop collaborative partnerships.





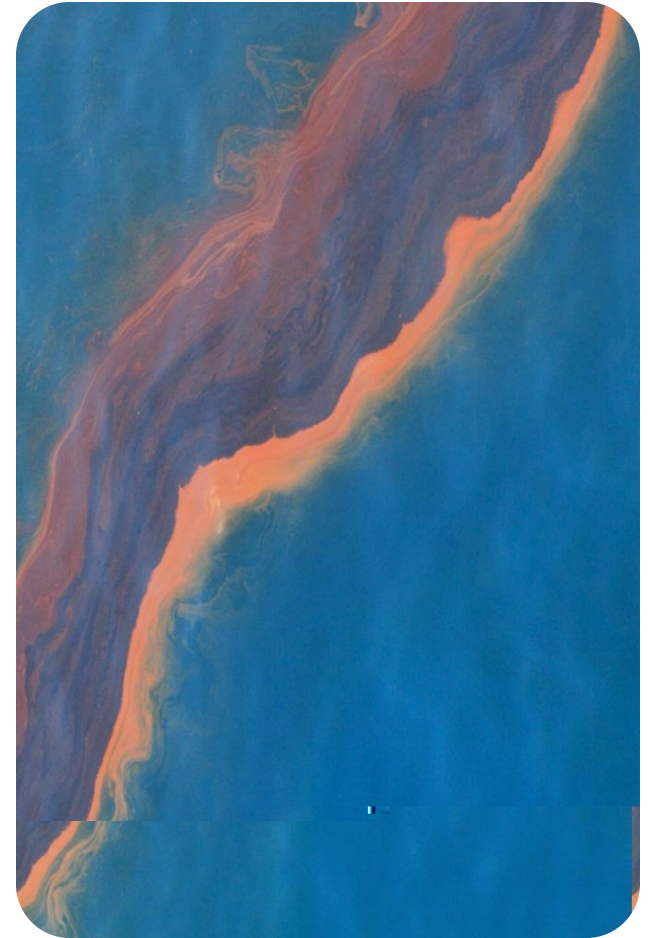


During two days encompassing *61 oral presentations*, *13 poster presentations*, and *6 breakout sessions*, we learned the current state of knowledge of:

- The **Extent and fate** of oil and dispersants;
- Their impacts and mitigation on **coastal environments**; **offshore environments**; and on **living marine resources**;
- The interaction of oil and dispersants with **human health and socio-economic systems**; and
- The use of **in situ and remote sensors, sampling and systems** for assessing extent, fate, impacts and mitigation of oil/dispersant in these environments.

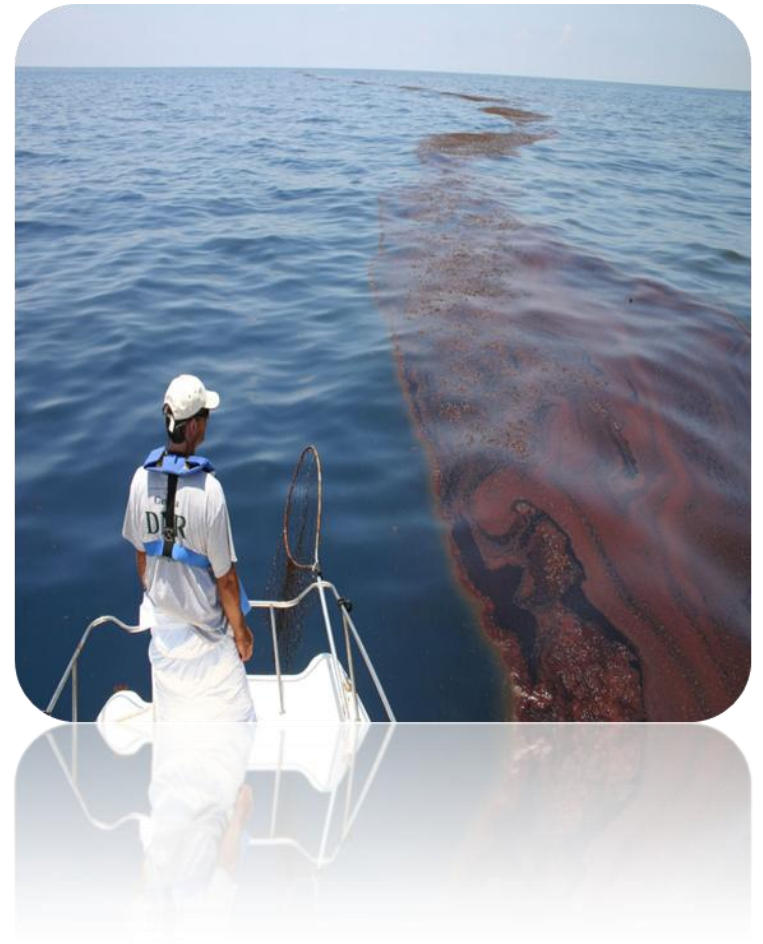
## Significant Scientific Findings

***Extent of Oil Spreading:*** Wind forced ocean currents dominated the oil transport away from the spill site. A hurricane or other low pressure system could have dramatically altered ocean pathways of oil. (*Smith, et al.; Fitzpatrick, et al.; Hamilton, et al.; Paris, et al.*)



# Significant Scientific Findings

***Oceanic Fate of Oil:*** High microbial respiration and oxygen consumption rates reflected degradation of released methane by bacteria and the possibility of using naturally occurring marine microbes for bioremediation. (*Kessler, et al.; Du, et al.; Sobecky, et al.; Van Mooy, et al.; Huettel, et al.; Mortazavi, et al.*)



# Significant Scientific Findings

*Oceanic Fate of Oil:* Analyses revealed chemical changes, dramatic increases in sediment accumulation (“Dirty Blizzard”), and the likelihood that hydrocarbons will persist in poorly oxygenated swamps, beaches, and benthic areas for many years (*Deocampo, et al.; Flower, et al.; Srinivasan, et al.; North, et al.*)



## Significant Scientific Findings

*Atmospheric Fate of Oil:* Ship and aircraft data revealed that there was no measureable loss of methane to the atmosphere and that 40% of surface oil evaporated within 2 days, leading to minimal downwind impact from aerosol plume landings (*Kessler, et al.*; *Du, et al.*; *De Gouw, et al.*).



# Significant Scientific Findings

## *Impacts on Living Marine*

**Resources:** Researchers found tissue damage in fish, contamination of coastal beach communities, toxicity-induced changes in microbial and plankton communities, and injuries to deep corals. (*Galvez, et al.; Bell, et al.; Jeffrey, et al.; White, et al.; Graham, et al.; Montoya, et al.*)



# Significant Scientific Findings

## *Impact on Human Health & Socio-*

*Economics:* Early results suggest direct and indirect impacts on human health and socio-economic characteristics of Gulf Coast communities, including the aggregated impact of natural and man-made disasters over the last decade (*Peters, et al. Abramson, et al.; Grattan, et al.; Lovelace, et al.*)



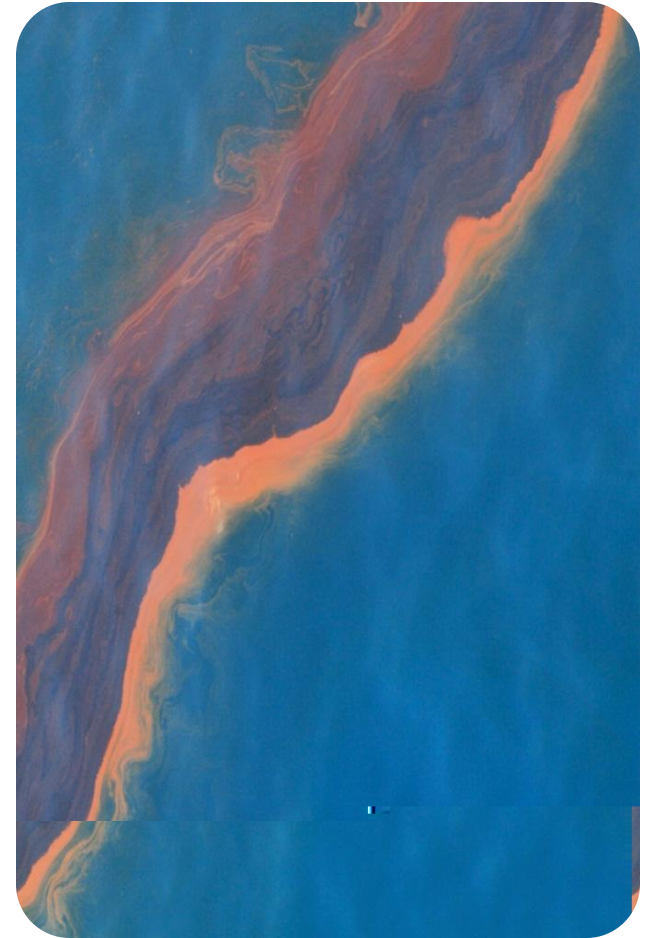
# Significant Scientific Findings

*Use of In Situ Sensors and Systems:* A critical need is for robust, integrated observing systems to provide continuous data streams for multiple users and produce automated, user-friendly fusion products. Calibration of sensors is necessary. (*Roffer, et al.; Abercrombie, et al.; Howden, et al.; Smith, et al.*)



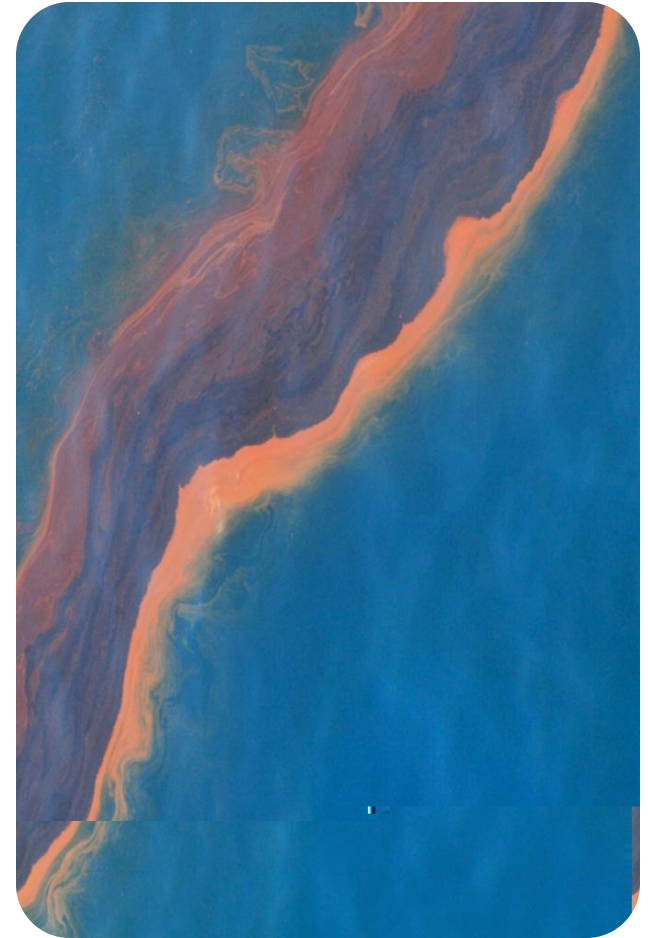
## Extent and Fate: Progress

- **Systematic validation & uncertainty estimation for ocean circulation and oil transport models**
- **Methods for collecting water samples and measuring flow rates for oil and oil detection**
- **Detection of subsurface oil via in situ techniques**



## Extent and Fate: Gaps

- **Interactions of dispersed/non-dispersed oil with marine snow and re-suspended sediments**
- **Effect of dispersant on deposition, partitioning, toxicity, and degradation**
- **Federal database for chemical composition of oil and natural gas from wells**



# Coastal Environments: Progress

- **Baselines for animal tissue contamination**
- **Improving remediation techniques**
- **Monitoring and detection of contaminants in different coastal environments**
- **Modeling to understand long-term impacts**



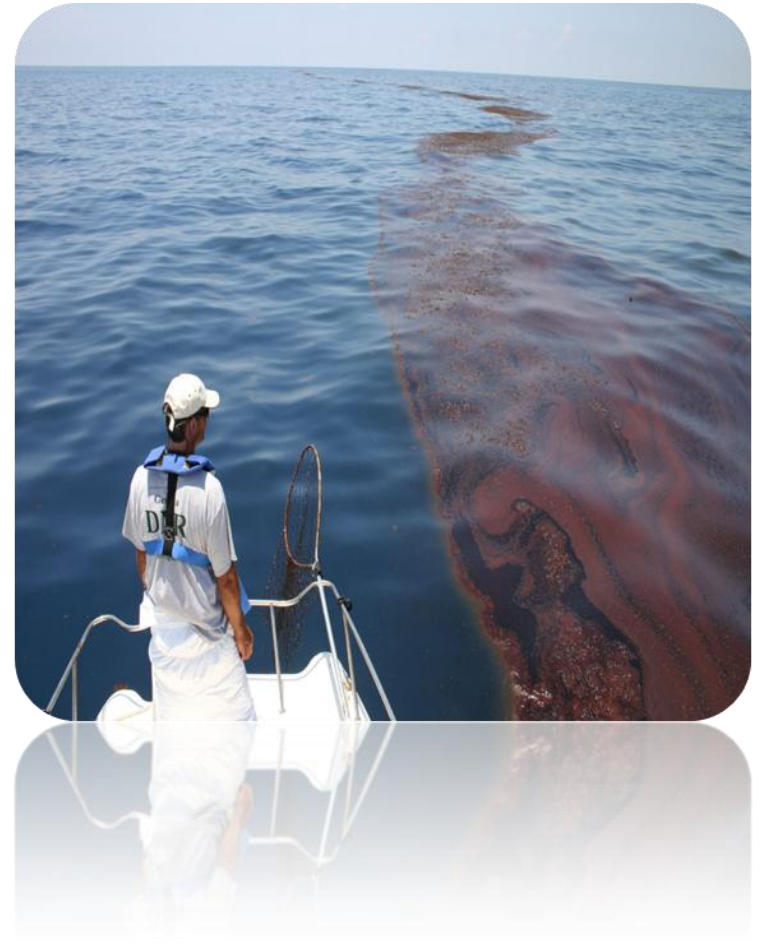
# Coastal Environments: Gaps

- **Improve data-sharing and communication between federal and non-federal scientists**
- **Rapid response scientists**
- **Rapid response disaster funding**
- **Disaster legislation should include science**



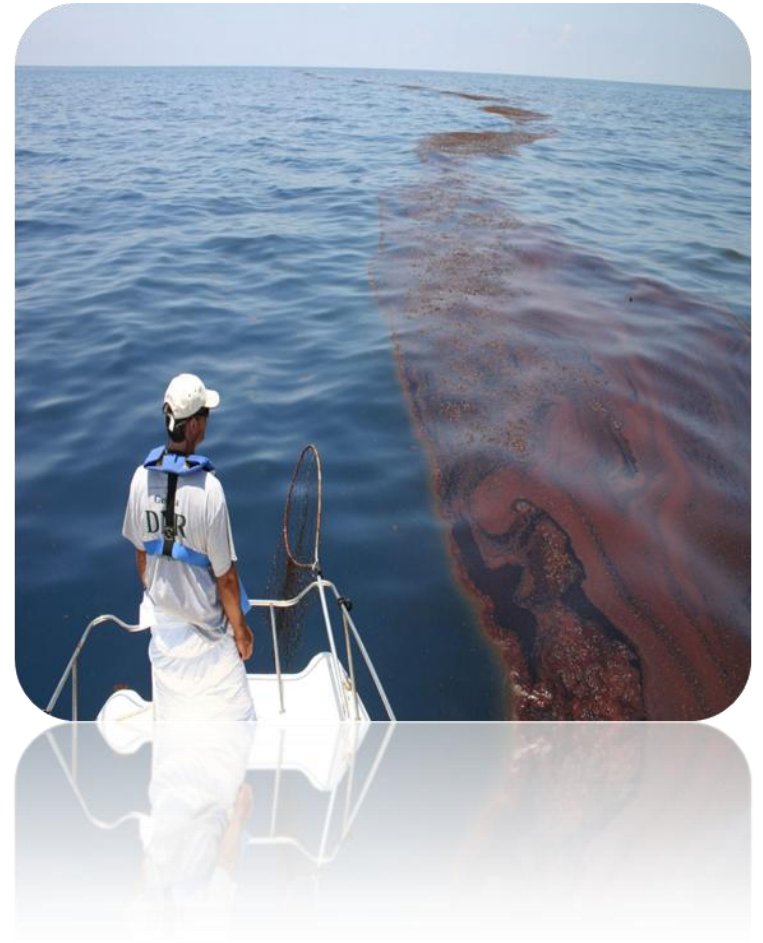
# Offshore Environments: Progress

- **Repeated characterization of petroleum fractionation and partitioning into different compartments in the water column and benthos.**
- **Lots of sampling, analyses are ongoing.**
- **Information about offshore environments and oil is steadily increasing.**



# Offshore Environments: Gaps

- **Neuston impacts**
- **Plankton communities / young squid**
- **Sedimentary fates / long term, metals as well as HC.**
- **Ecosystem modeling not yet at “system level”**
- **No action or consensus on Observatories**



# Living Marine Resources: Progress

- **Baseline information is improving (but gaps remain)**
- **Improved data collection and modeling**
- **Data collection for single species and archival of samples via NRDA process.**
- **Collaboration across sectors.**



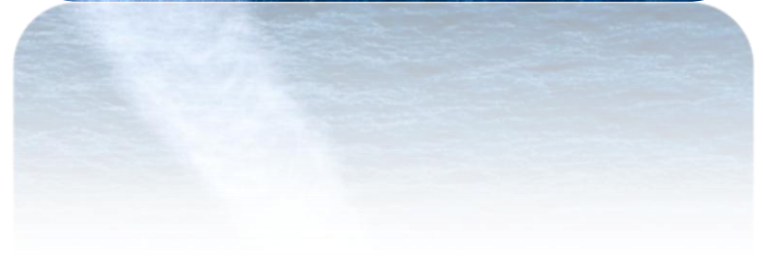
## Living Marine Resources: Gaps

- **Collaboration between economists and for ecosystem services valuation**
- **International coordination and sampling of LMR data**
- **Expedient sampling and monitoring permitting**
- **Organization of ecological modeling Gulf-wide**
- **Research at population and ecosystem levels for response to oil spill (e.g. behavior, resiliency)**



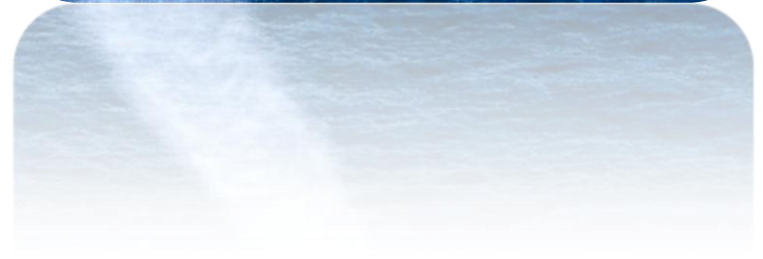
# Human Health & Socio-Economics: Progress

- **Toxicity testing - animal models**
- **Genetic toxicity/gene environment interaction /mental health effects**
- **Health impacts to disproportionately affected populations**



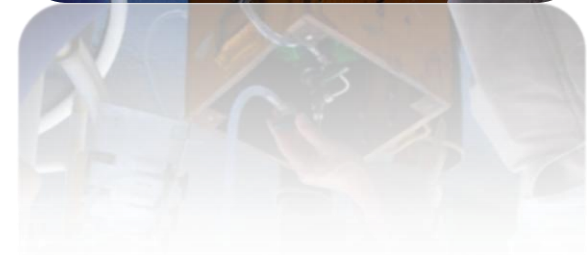
# Human Health & Socio-Economics: Gaps

- **Impacts to GOM subsistence uses (informal economy)**
- **Clinical evaluations, diagnostics, documentation**
- **Research on physical health effects**
- **Individual and community vulnerability/resistance and adaptation to adverse health outcome**
- **Attitudes, perceptions, beliefs of GOM tourism, recreation, beach use, and seafood safety**



# Sensors, Sampling, and Systems: Progress

- **Coordination between government, academia & industry in carrying out observations**
- **Modest improvements in ocean observing system capabilities for monitoring ecosystem changes**
- **Good utilization of existing remote sensing assets despite decline in quantity and access**



# Sensors, Sampling, and Systems: Gaps

- **Baseline information is lacking for several parameters**
- **More multi-parameter & multi-wavelength data collection is needed to both calibrate methods/develop instrumentation & actively track spill products**
- **Need robust observing system with sensors that can function in oil contaminated environments**



# Overall Lessons Learned

*We are doing good work*

*Gaps are closing but many still remain*

*New gaps have emerged as a result of ongoing research*

*Resources have been used effectively*

*Long term monitoring, observations, and research are critical for full understanding of DWH effects*



# Looking Ahead

- Workshop summary report
- Continued scientific discussion at future science meetings (e.g. GRI/GOMURC)
- Implementation of identified goals and actions through Sea Grant workshops scheduled to occur over the next 3 years
- Incorporation into future SOST plans and priorities documents?





## Special Thanks:

- Jerry Miller, David Conover, Lora Clarke, Margarida Yuan
- Alan Leonardi, Allen Dearry, Don Rice, Eric Miller, John Haines, Kevin Reynolds, Robert Dickey, Rudy Schuster, Sara Booth, Walter Johnson
- Mike Allen, Julien Lartigue, Cathy Tortorici, John Lamkin, Beth Lumsden, Steve Sempier, Rebecca Green, Kandis Binkley
- Bill Hogarth, Carol Ballew, Cam Ngo



Copies of many of the workshop presentations will soon be available on the workshop website (<http://http://www.marine.usf.edu/conferences/fio/NSTC-SOST-PI-2011/>) and the abstracts will be included in the workshop report proceedings due out in early 2012.