An Update on the Gulf of Mexico Oil Spill

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University of Southern Mississippi
2010 OCB Summer Workshop
7/21/2010


26 June 2010


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Overview

- Current status at the site
- Current distribution of oil and areas impacted
- Response efforts
- NRDA process
- Oil Spill Related Meetings and Symposia
- Science Initiatives
- Impact on Gulf Coast communities
- Informational Resources
- Role of OCB?

Current Status

- Wellhead capped July 15 and pressure continues to rise (6834 psi Tuesday afternoon)
- “Minor leaks” have been reported from cap and from a site two miles from wellhead
- Considering “static kill” to permanently shutdown well

Current distribution of oil and areas impacted

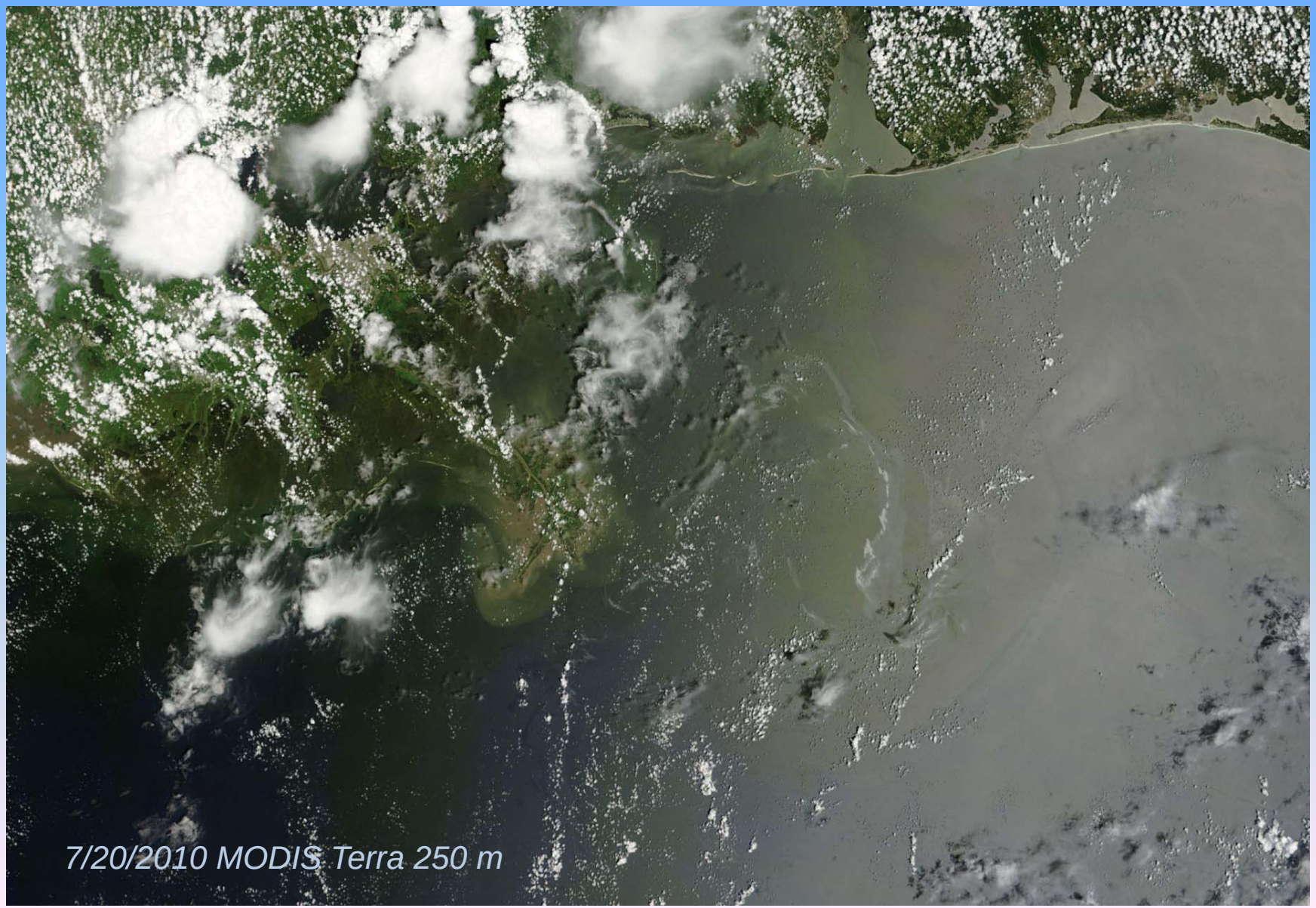
20 July 2010

- Estimate of Ixtoc 1 volume is ~140M gallons of oil (over nine months)
- Iraqi deliberate oil spill: 380 - 520M gallons
- Exxon Valdez: 10M gallons
- Release from natural seeps: 23-58M gallons per year
- Current estimates of Deepwater Horizon oil spill: 90 - 189M gallons over 86 days
  - Louisiana Sweet Light Crude Oil

7/20/2010 MODIS Terra 250 m

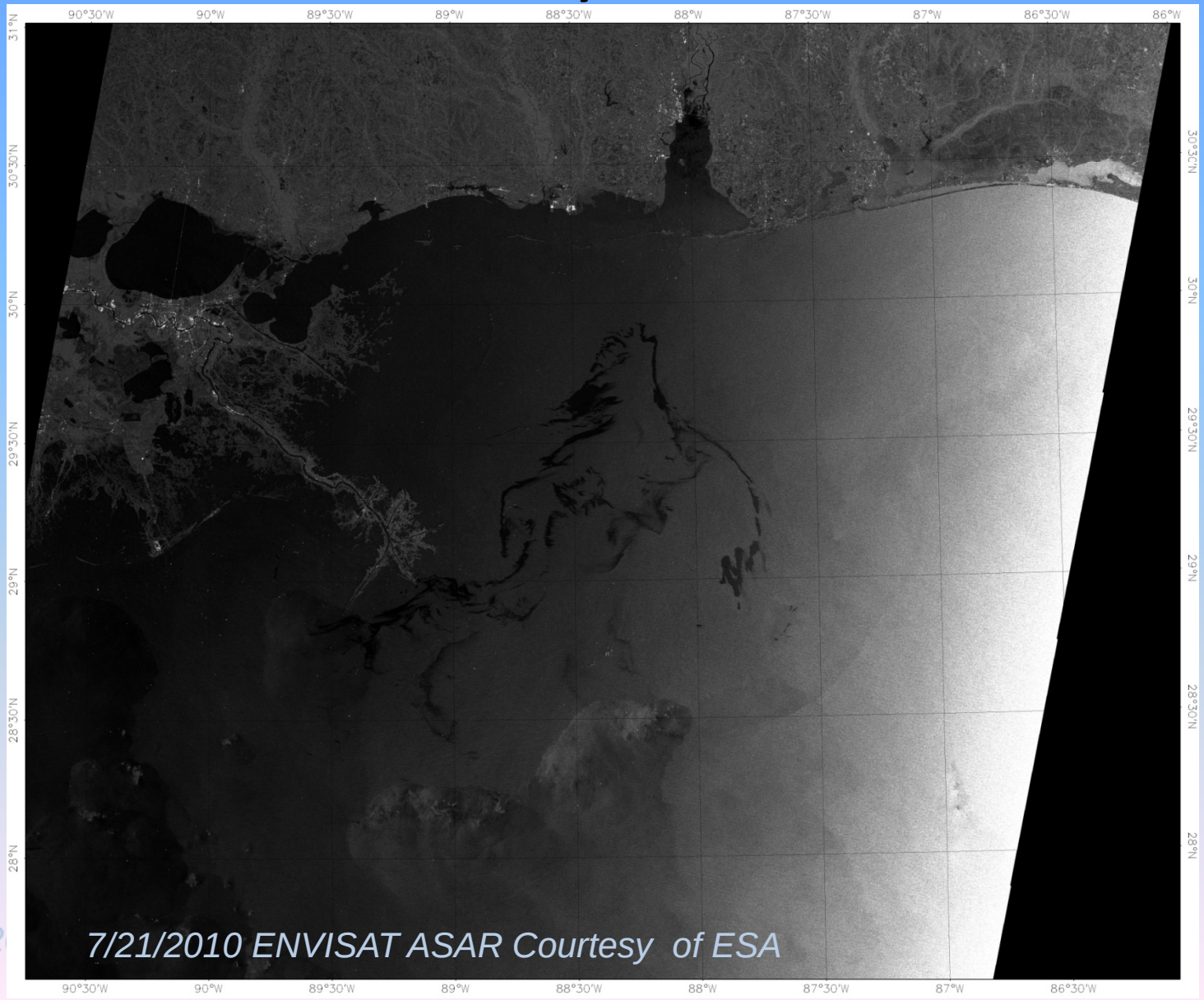
Current distribution of oil and areas impacted

20 July 2010



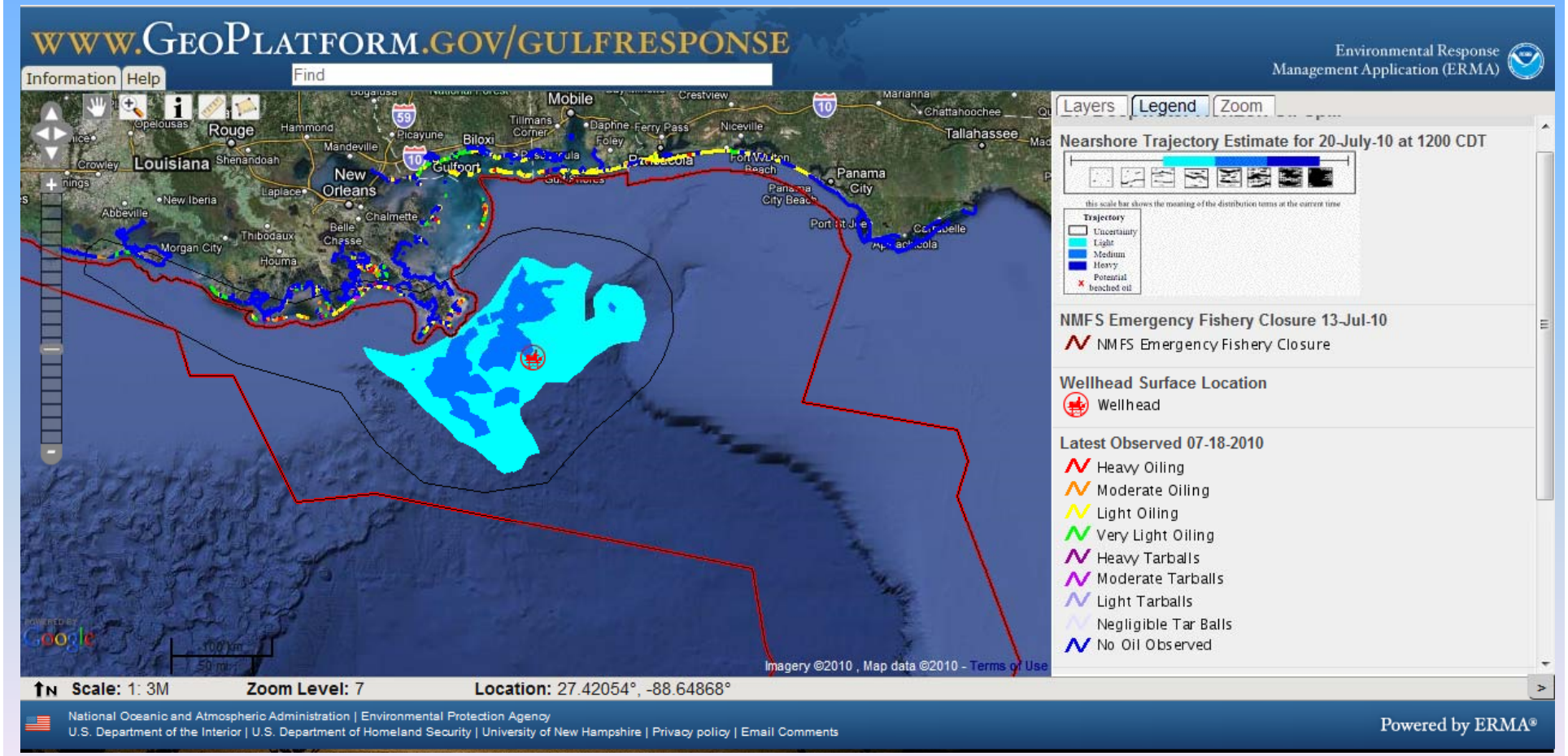
Current distribution of oil and areas impacted

21 July 2010



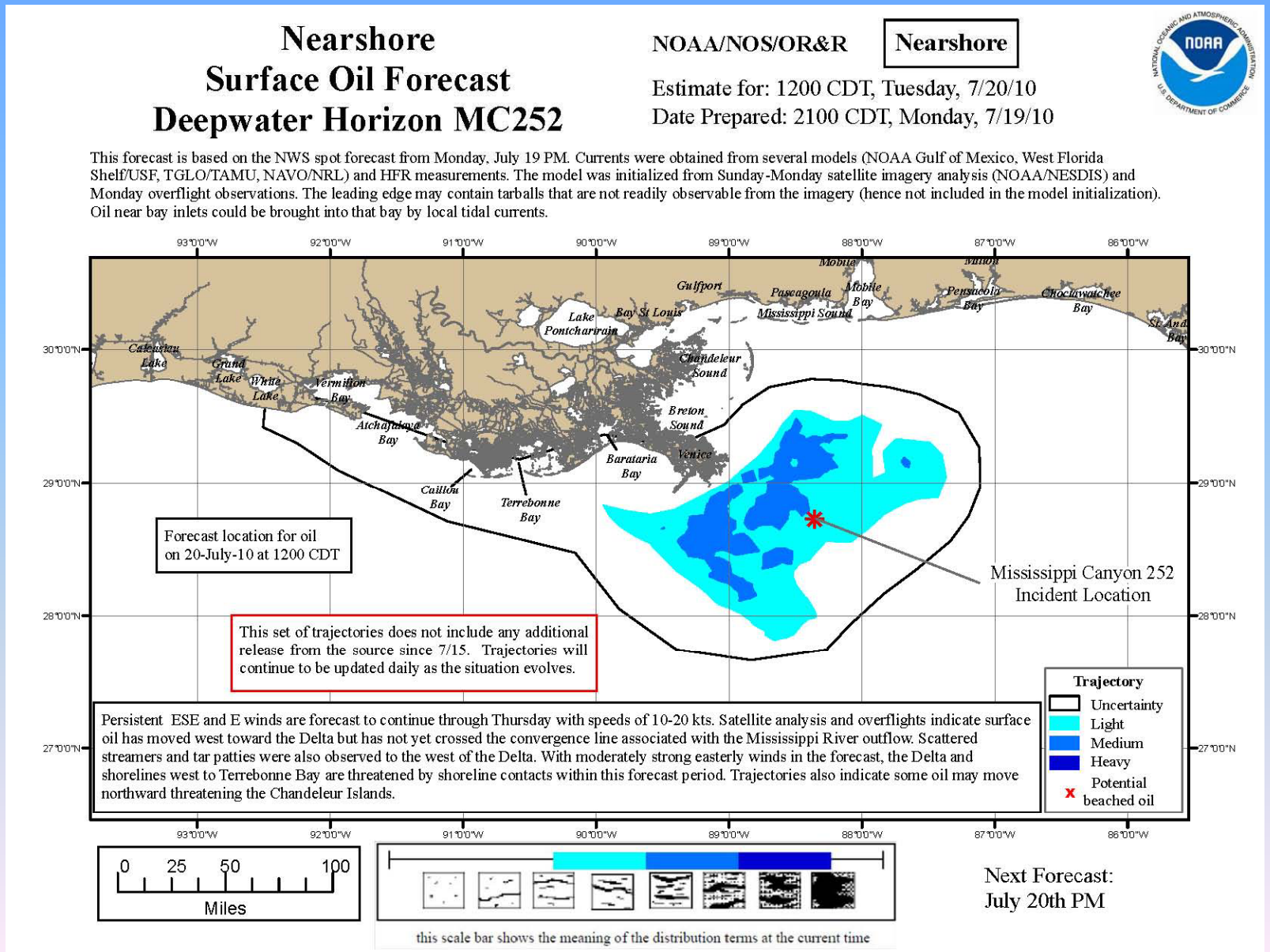
Current distribution of oil and areas impacted

20 July 2010



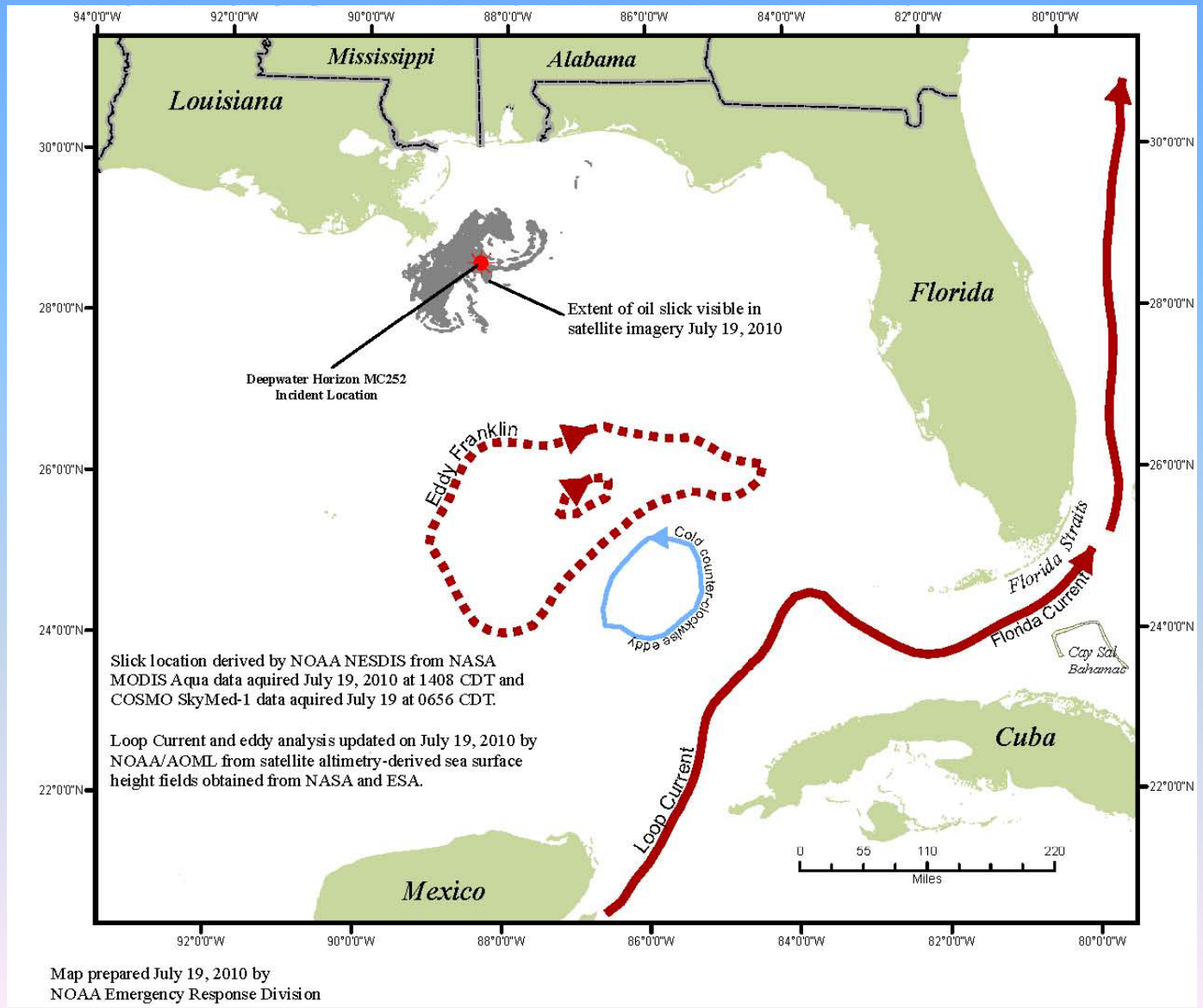
Current distribution of oil and areas impacted

Estimate for 20 July 2010



Current distribution of oil and areas impacted

19 July 2010



Response efforts

- The National Contingency Plan (NCP) is the federal government's blueprint for responding to both oil spills and hazardous substance releases
  - EPA or the USCG provide federal On-Scene Coordinators (FOSCs) for the inland and coastal zones, respectively
  - The NCP established the National Response Team (NRT), comprised of fifteen federal agencies, to assist responders
  - Under the NCP, the EPA or the USCG provide federal On-Scene Coordinators (FOSCs) for the inland and coastal zones, respectively, to direct or oversee responses to oil spills
  - Regional Response Teams (RRTs) coincide with each EPA region and USGC counterpart
  - Through the RRT, the FOSC can request and receive assistance on natural resource issues from the Department of the Interior (DOI), the Department of Commerce, and the States, or borrow specialized equipment from the Department of Defense or other agencies
- USCG is the incident-specific Chair for the response following the April 20, 2010 Deepwater Horizon explosion
  - USGC Chairs Unified Area Command and response efforts guided by direction from other agencies
  - Coast Guard lead with NOAA and EPA providing science support
  - Other agency efforts (NASA, USGS, MMS – now divided into three agencies, U.S. Navy)

Adapted from Statement of Lisa P. Jackson Administrator, U.S. Environmental Protection Agency , Legislative Hearing on Use of Dispersants in BP Oil Spill , Senate Committee on Appropriations: Subcommittee on Commerce, Justice, Science, and Related Agencies

Natural Resource Damage Assessment Process

- Under the 1990 Oil Pollution Act (OPA), a Natural Resource Damage Assessment (NRDA) is a legal process to determine the type and amount of restoration needed to compensate the public for harm to natural resources and their human uses that occur as a result of an oil spill
- NOAA's Damage Assessment Remediation and Restoration Program (DARRP) is coordinating this effort with natural resource trustees in four states (LA, MS, AL, FL), DOI (USFWS and NPS) and with BP (the Responsible Party or RP).
- NRDA Process: Through the NRDA process, DARRP and co-trustees conduct studies to identify the extent of resource injuries, the amount and type of restoration required to restore those resources to baseline conditions and compensate the public for interim losses. Natural resource trustee agencies (including NOAA, DOI, state agencies, and Indian tribes).
- Under the OPA NRDA regulations, there are 3 steps in a NRDA:
  - 1. **Preassessment**: Trustees determine whether injury to public trust resources has occurred. If resources are injured, trustees proceed to the next step.
  - 2. **Restoration Planning** (Including Injury Assessment): Trustees quantify injuries and identify possible restoration projects.
  - 3. **Restoration Implementation**: The trustees seek from the responsible party the costs of conducting the assessment and restoration planning – a process in which the responsible party often works cooperatively with the trustees. The trustees also seek damages to implement the restoration, unless restoration is implemented by the responsible party. If the responsible party does not agree to damages, the trustees may bring suit or submit a claim for damages to the Oil Spill Liability Trust Fund (Fund).
- The Preliminary Assessment Phase of the NRDA is being done cooperatively with BP.
- $20B Trust Fund to address "all justifiable claims"

http://www.response.restoration.noaa.gov/book_shelf/1959_deepwater-Horizon-NRDA-ORR-web-5-7-10.pdf

Oil Spill Related Meetings and Symposia

- Briefing in DC with Science Advisor John Holdren organized by Consortium for Ocean Leadership on May 19, 2010

- Baton Rouge Symposium
  - June 3

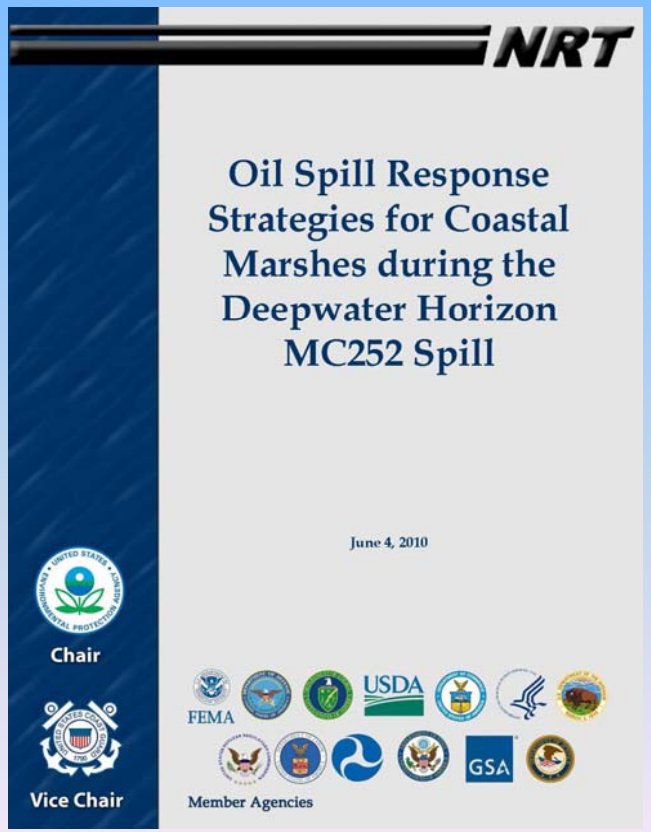
  - Additional meeting June 4 with BP Officials to discuss science initiative

Oil Spill Related Meetings and Symposia

- Identified Research Needs
  - To better understand and determine the magnitude of the spill, three dimensional assessments of the extent and characteristics of the oil
  - To track the fate and transport of the oil
  - To ascertain the ecological and human impacts of the spill including the toxicity and bioaccumulation of the oil, dispersants, drilling mud and volatile organic compounds

Oil Spill Related Meetings and Symposia

- EPA Meeting at Univ. New Orleans on Alternative Coastal Protection and Clean-Up Technology June 5 2010



Oil Spill Related Meetings and Symposia

- NOAA Miami Oil Spill Workshop
  - July 1-2, 2010

- The objectives of this first workshop were:
  - Review the needs of the operational community and decision makers,
  - Assess and communicate current efforts to monitor the oil spill, circulation and ecosystem in the Gulf of Mexico,
  - Coordinate several ongoing monitoring efforts,
  - Identify the short term, mid-term and long term (operational and scientific) goals, and
  - Define and recommend how to best accomplish these goals.

Recommendations of Miami Workshop

- Create five working groups:
  - Surface oil monitoring
  - Subsurface oil monitoring
  - Fluorometer data
  - Oceanographic monitoring
  - Pelagic ecosystem
- Coordinate extensive modeling efforts
- Subsurface oxygen measurements
- Create or extend monitoring of different ecosystems and ecological effects of oil
- Centralize distribution of data and information
- Improve predictions of storm surge and potential hurricane impacts

Proposed Follow-on Workshop in Northern Gulf Region

- To be organized by Northern Gulf Institute in conjunction with NOAA
- Include representation by NSF Rapid Response projects and other agencies
- August – September timeframe
- Role of OCB?

Science Initiatives

- Independent unfunded efforts - numerous
- NSF Rapid Response Projects ($6.5M to date)
- USGC Request for Technology Assistance – Broad Agency Announcement (BAA) HSCG32-10-R-R00019
- Mississippi Research Efforts
  - National Institute for Undersea Science and Technology (NIUST) – Methane Hydrates Consortium and Undersea Vehicle Technology Center
  - CenGOOS – IOOS – GCOOS: HF Radar, buoy observations, modeling, glider operations
  - USM/Northern Gulf Institute monitoring and assessment of coastal water quality, optical properties, integrated ecosystem assessment, and other
  - Support for National Marine Fisheries baseline sampling (SEAMAP and other activities)
  - USM Marine Science co-located with NOAA NDBC, NCDDC, and CSC offices at Stennis Space Center

Science Initiatives

- NSF Rapid Response Projects at USM
  - PI: Alan Shiller
  - RAPID: Deepwater Horizon Oil Spill Effects on Metal, Nutrient, and Organic Matter Distributions in the Water

  - PI: Laodong Guo
  - RAPID: Effect of Oil Spill on Organic Carbon Partitioning and Transformation in the Water Column in the Northern Gulf

  - PIs: Kevin Yeager, Charlotte Brunner, Laodong Guo and Kevin Briggs (NRL)
  - RAPID Deepwater Horizon Oil Spill: Responses of Benthic Communities and Sedimentary Dynamics to Hydrocarbon Exposure in Coastal Ecosystems of the northern Gulf of Mexico

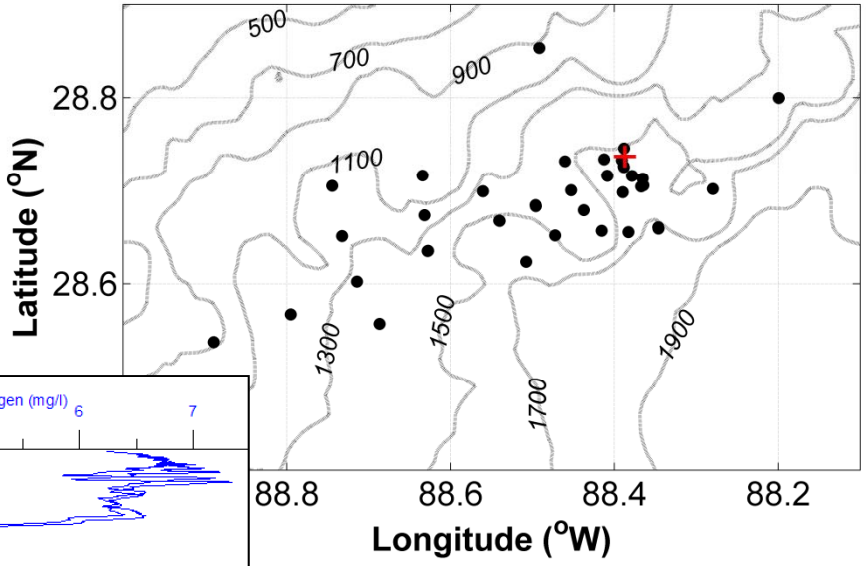
  - Pis: Vernon Asper and Arne Diercks
  - RAPID: Collaborative Research: Deepwater Horizon Oil Spill, Marine Snow and Sedimentation

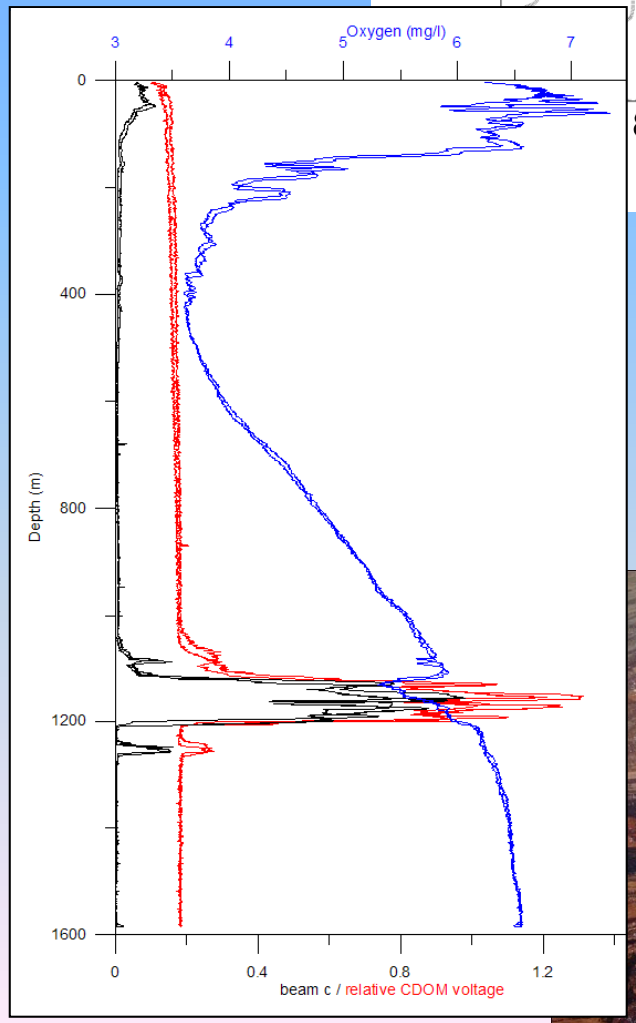
  - PI: Robert Lochhead
  - PFI (RAPID): A Rapid Response Proposal for Mitigating the Deposition of Oil on Gulf Shores via Oil Anti-deposition Strategies

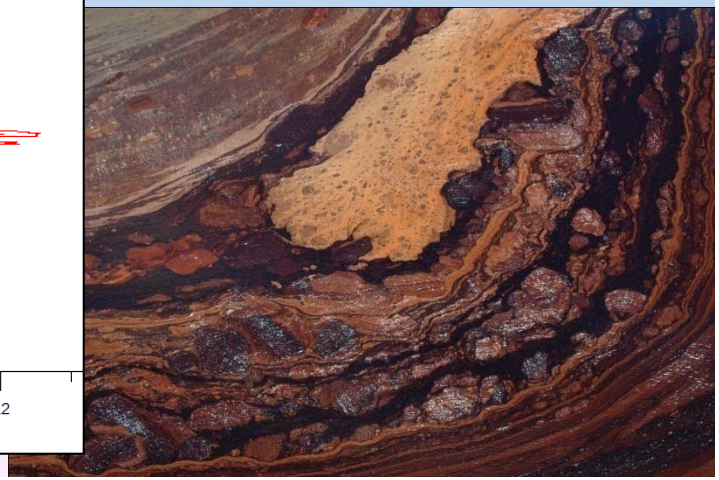
  - PI: Richard Fulford
  - RAPID: Assessment of the impacts of the Deep Horizon oil spill on Bluecrab, Callinectes sapidus, spawning and recruitment in the northcentral Gulf of Mexico

R/V Pelican cruise

- May 3-16 (13 days after the explosion)
- Discovered "plumes" of oil
  - Up to 15 km long x 5 km wide
  - Below 1,000 m
  - Discrete samples confirmed presence of oil components

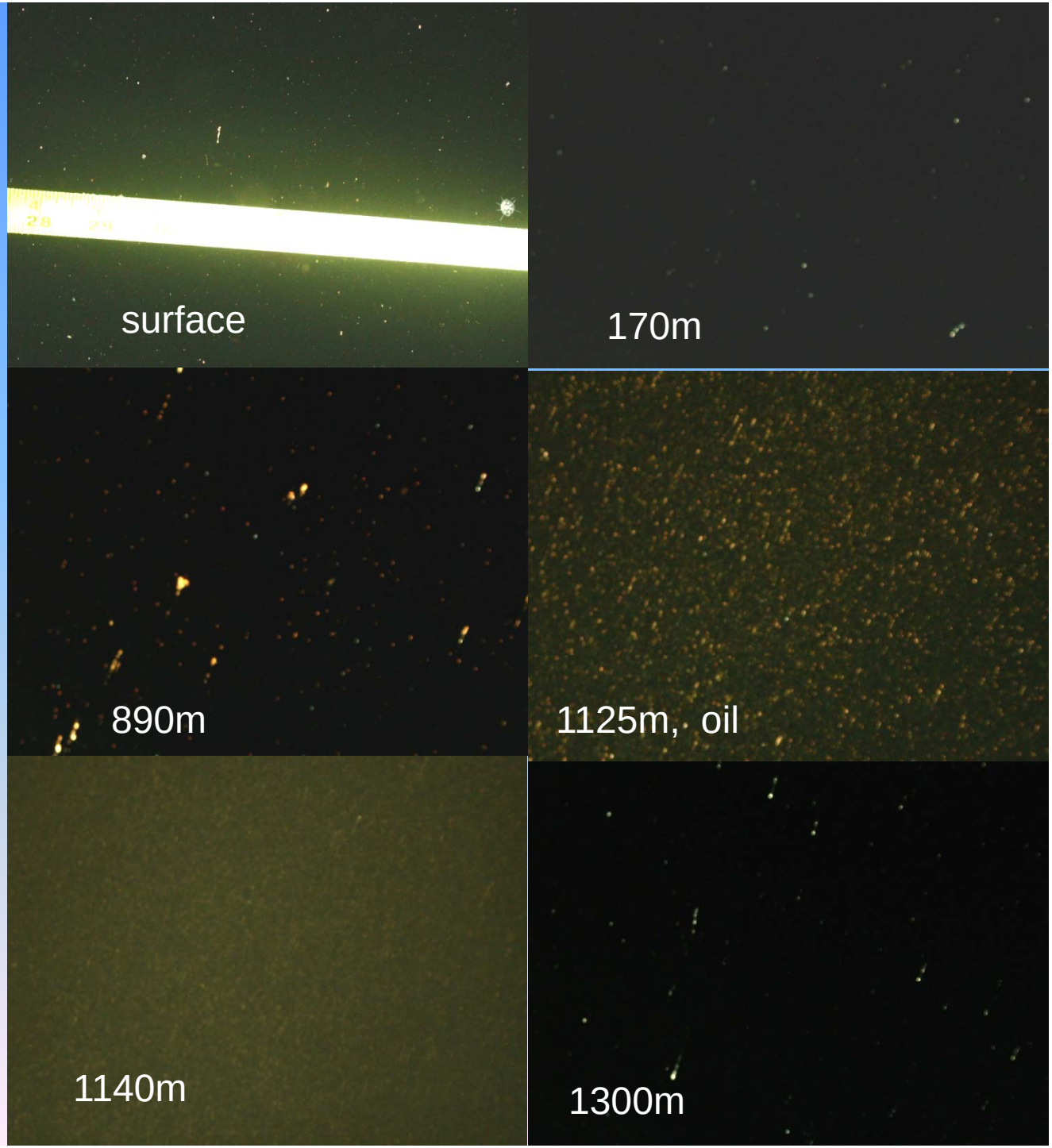






R/V Walton Smith, June 1

- NSF-funded cruise and most logistics
- First photographs of the contents of the plume at depth
- ~1 mile from well head



NGI Monitoring and Assessment of Northern Gulf Ecosystems & Central Gulf of Mexico Ocean Observing System

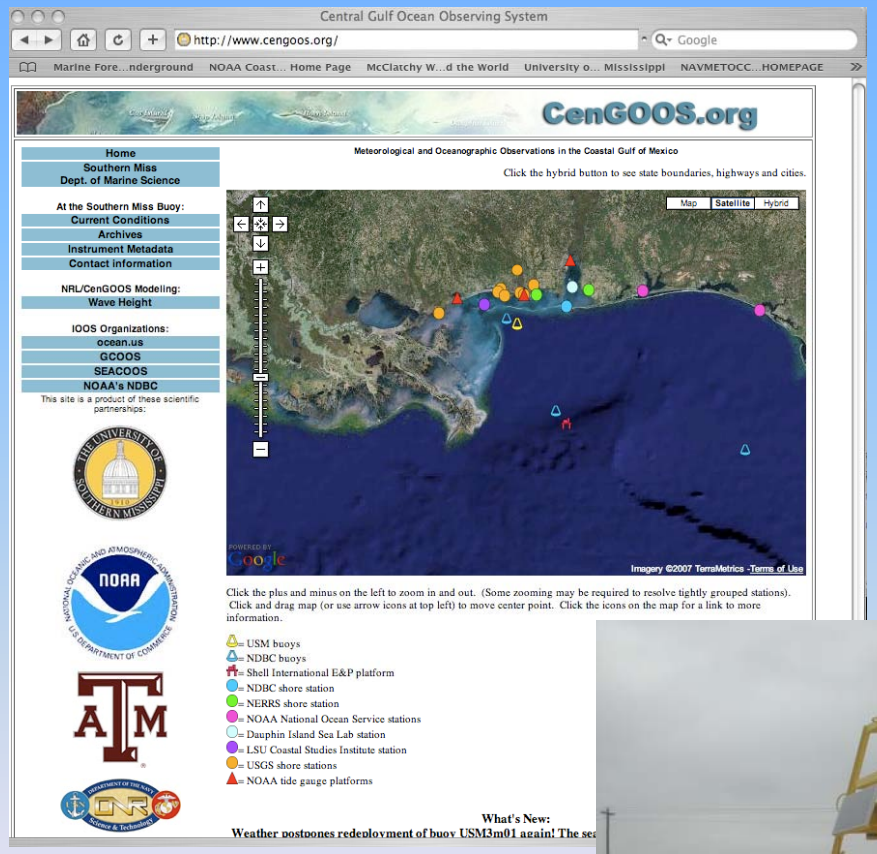
Monitoring of coastal water quality and optical properties

High frequency radar mapping of surface currents in support of oil forecasting

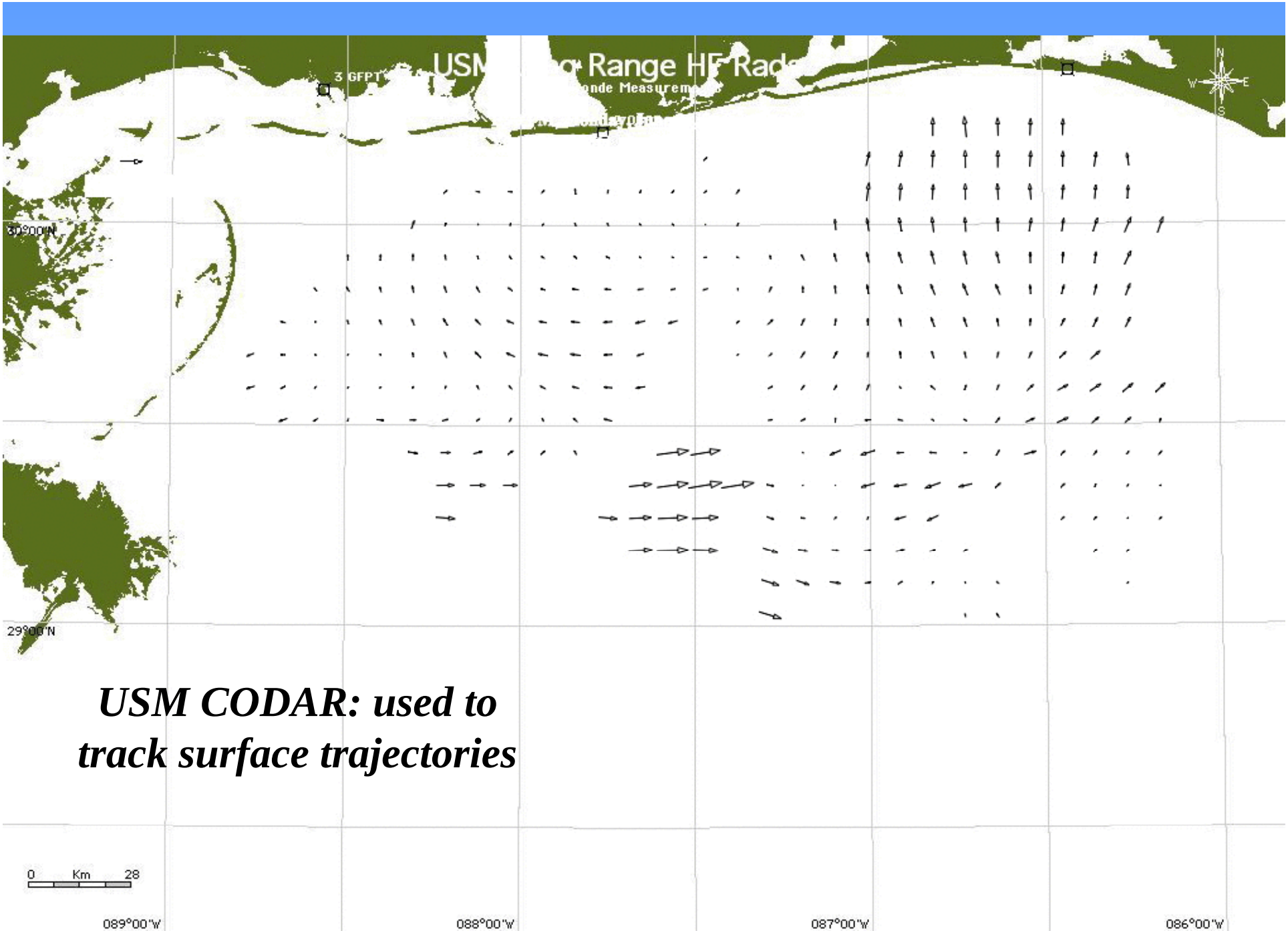
Buoy observations of currents, waves and meteorological variables

Expand buoy observations to include pCO_2 and other variables through collaboration with NOAA PMEL

Complements ongoing NASA- and NSF-funded research

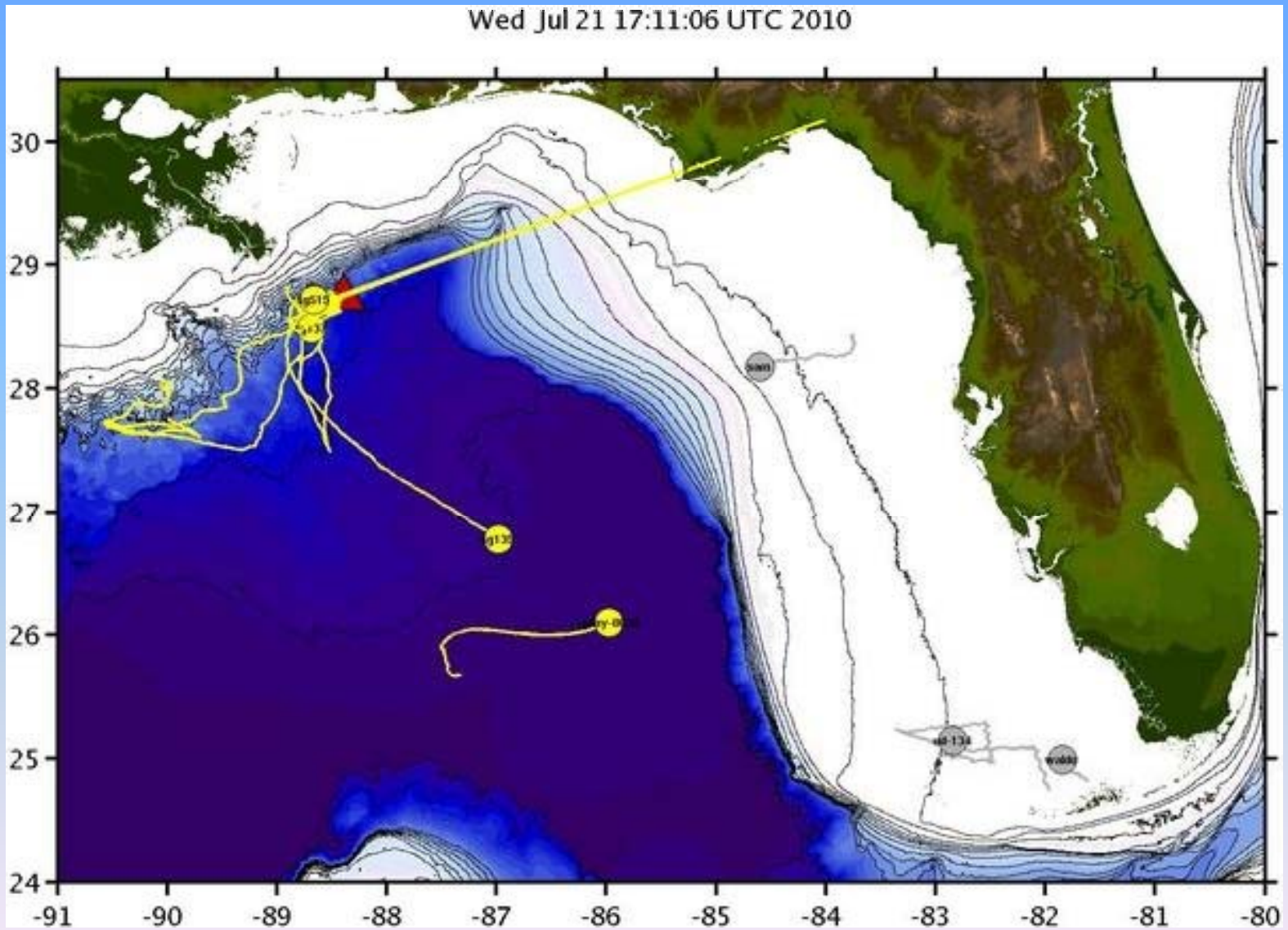


USM3m02



USM CODAR: used to track surface trajectories

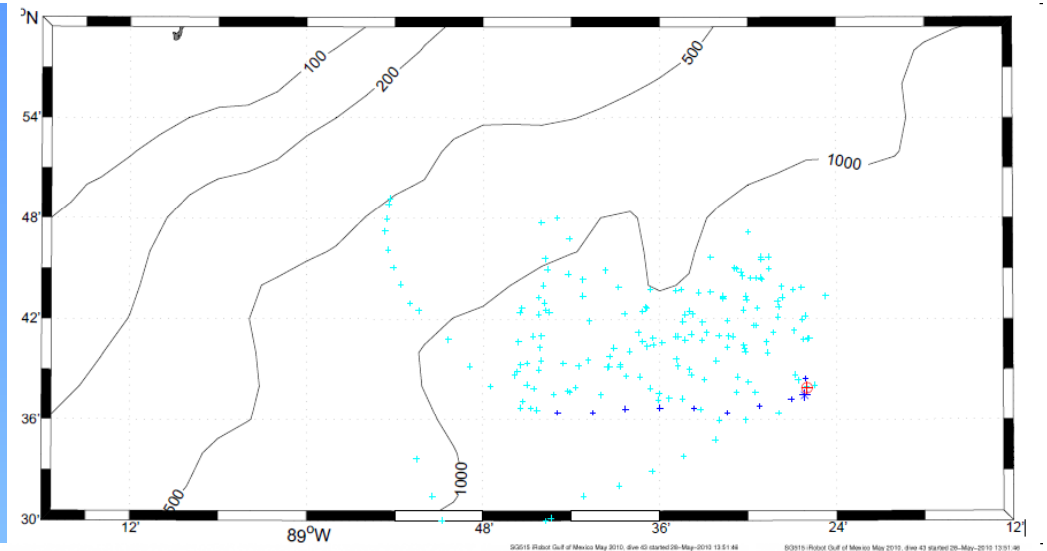
Gliders

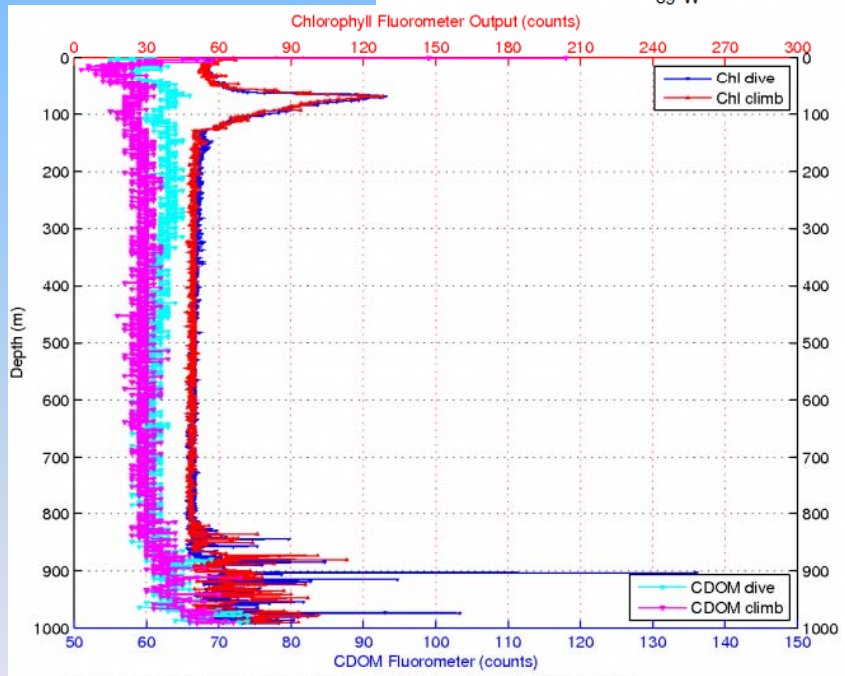


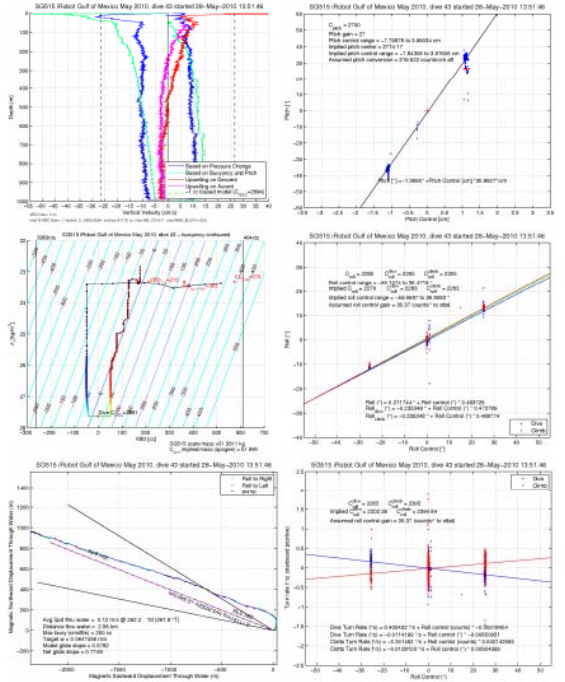
http://rucool.marine.rutgers.edu/deepwater/

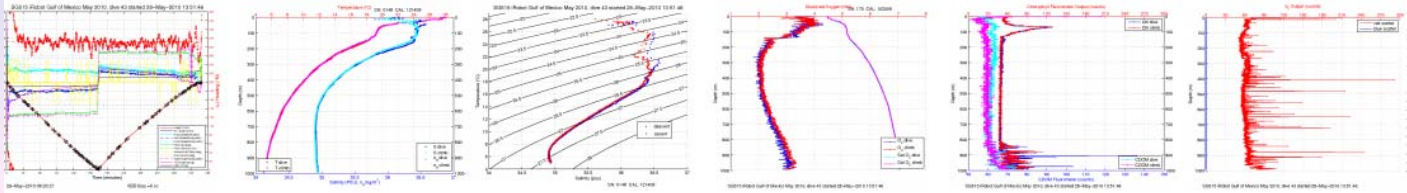
Gliders

- iRobot Seaglider
  - Deployed 5/21
  - 186 dives to date









BP Science Initiative

- $500M dollars for university research???
- $25M initially distributed to three sites
  - Florida Institute of Oceanography ($10M)
  - Northern Gulf Institute ($10M)
  - Louisiana State University ($5M)
- Additional $5M to Al
- Other agency funding?

BP Science Initiative

- Themes included the following:
  - Physical distribution, dispersion and dilution of contaminants under the action of ocean currents and tropical storms;
  - Chemical evolution and biological degradation of the oil/dispersant systems and subsequent interaction with the marine and coastal ecosystems;
  - Environmental effects of the oil/dispersant system on the sea floor, water column, coastal waters, shallow water habitats, wetlands, and beach sediments, and the science of ecosystem recovery
  - Technology developments for improved mitigation, detection, characterization and remediation of oil spills;
  - Fundamental scientific research integrating results from the other four themes in the context of public health.

Impacts on Gulf Communities

- Socioeconomic
  - 1.2 billion dollars in output and 17,000 jobs potentially lost
  - fishing and aquaculture industry seriously impacted along with related industries
  - More pessimistic scenario if moratium extends through year's end
- Public health impacts
- Mental health impacts
- Full impact still unknown
- Substantial impact on fishing industry, oil sector, tourism and recreation over large area

Other Informational Resources

- http://gulfseagrant.org/oilspill/database.htm
- http://response.restoration.noaa.gov/
- http://www.oceanleadership.org/gulf-oil-spill/
- http://www.bp.com/
- http://rucool.marine.rutgers.edu/deepwater/
- http://www.noaa.gov/sciencemissions/PDFs/JAG_Report_1_BrooksMcCall_Final_June20.pdf
- http://www.nola.com/

Role of OCB?

- Logistics support for workshop activities
- Other?

NEWS

Researchers including (left to right) Matt Lowe, Vernon Asper and Andy Gossett have been studying the impact of the oil spill on ocean chemistry.

M. SCHROPE