Science & the DWH-MC-252 OIL Spill

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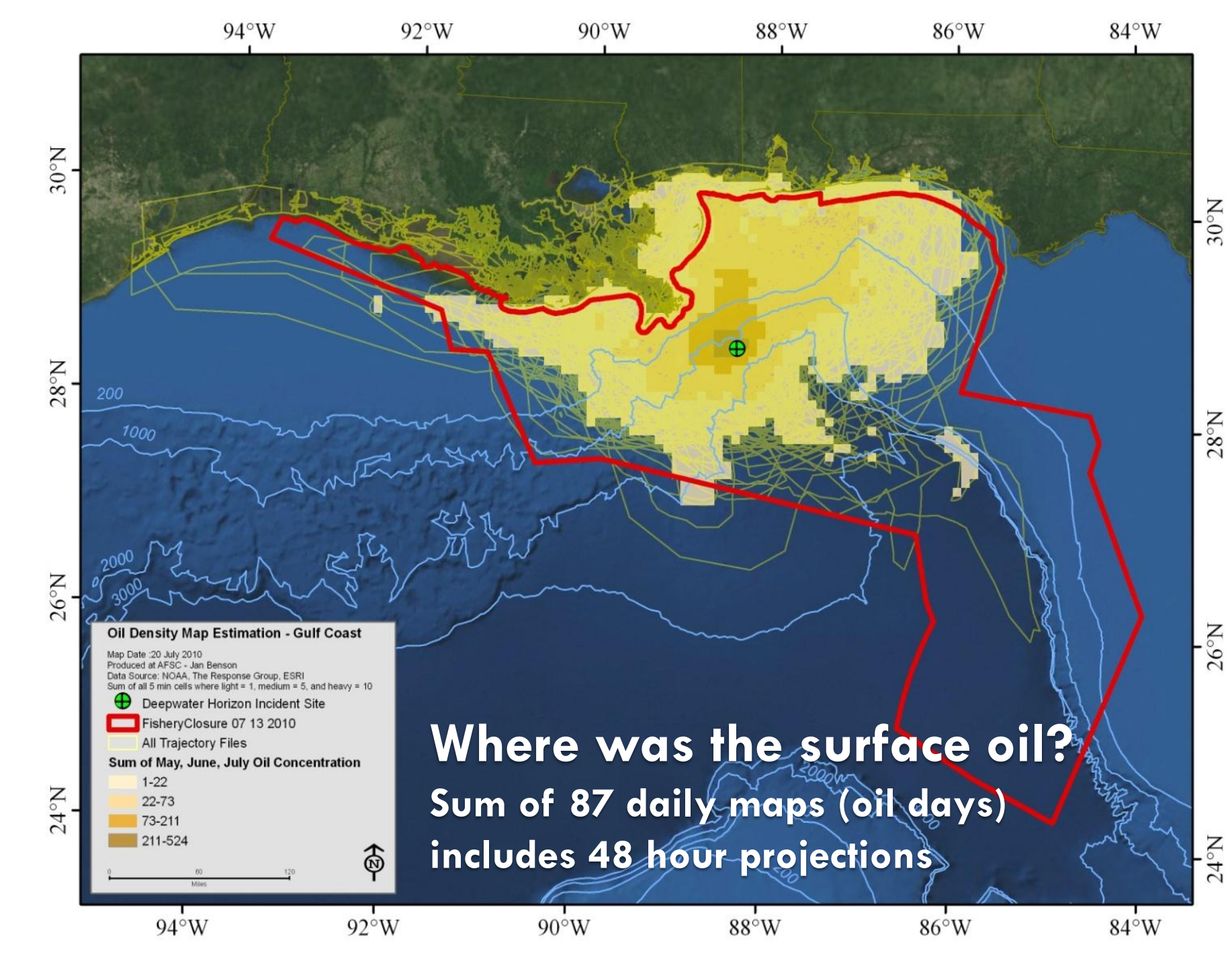
NOAA Science Lead – DWH
Oil Spill Commission Hearing
September 28, 2010

Outline – selected aspects of the spill….

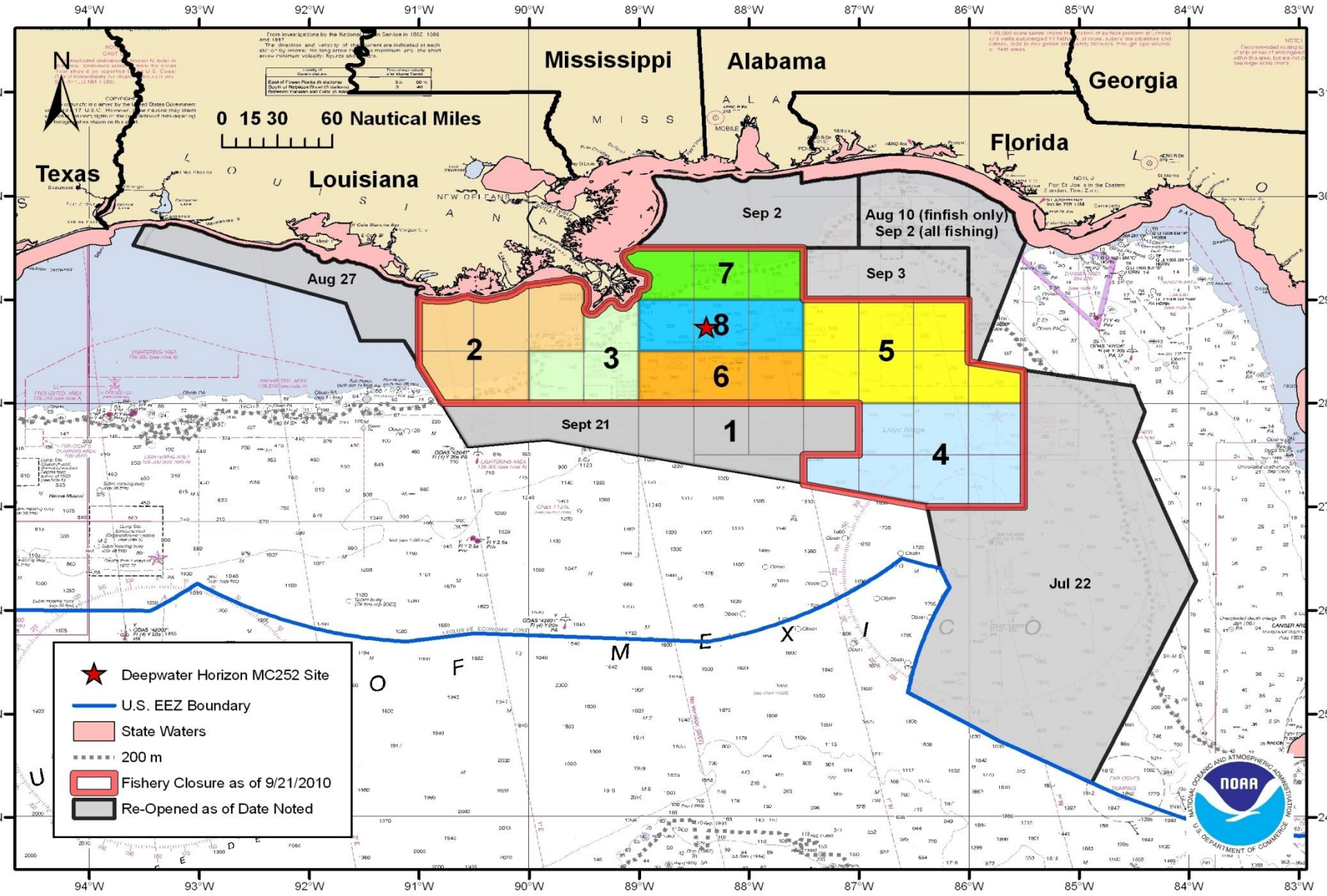
- Big Picture Science Questions
- Where was the surface oil?
- Seafood safety / LMRs
- Loop Current dynamics and importance
- Sub-surface oil & dispersant search
- Dissolved O_2
- Long-Term Science Support for the Gulf

Some DWH Science Questions

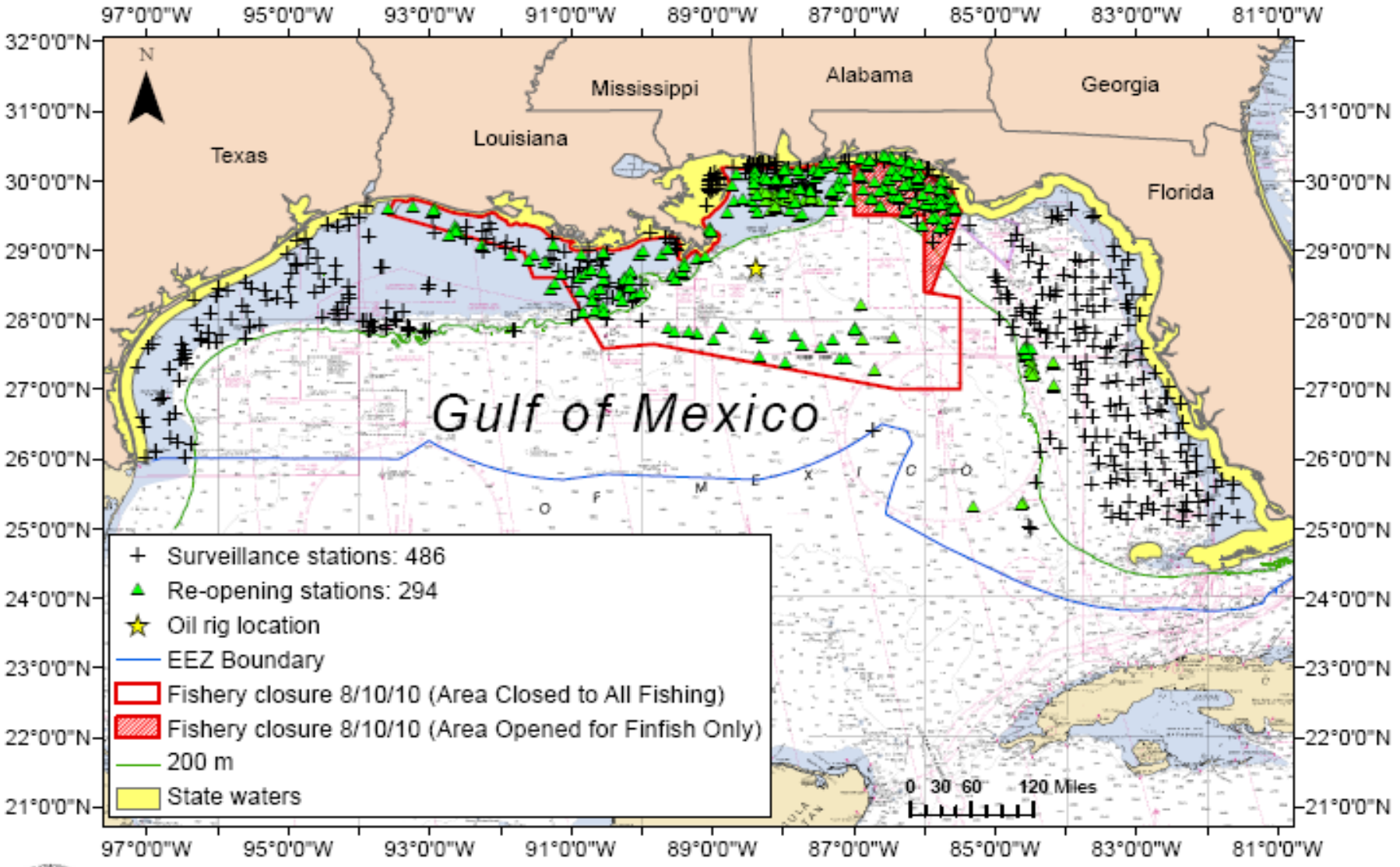
- What is the distribution, fate and impacts of oil & dispersants (release, distribution and movement, and degradation)?
- How does the concentration and distribution of oil impact the safety of seafood, and abundance/mortality of marine species such as fishes, turtles, dolphins, whales, birds and low trophic levels?
- What is the timing of reduction of oil impacts following permanent well capping (how fast will it degrade?)
- How does the presence of 200 million of gallons of reduced oil impact the GoM Large Marine Ecosystem?
- What are the short- and long-term impacts on coastal ecosystems and human dimensions?
- How and when will natural resource damages be restored, and how will science guide the process?


94°W
92°W
90°W
88°W
86°W
84°W
30°N
28°N
26°N
24°N
200
1000
2000
3000
Oil Density Map Estimation - Gulf Coast
Map Date :20 July 2010
Produced at AFSC - Jan Benson
Data Source: NOAA, The Response Group, ESRI
Sum of all 5 min cells where light = 1, medium = 5, and heavy = 10
Deepwater Horizon Incident Site
FisheryClosure 07 13 2010
All Trajectory Files
Sum of May, June, July Oil Concentration
1-22
22-73
73-211
211-524
0
60
120
Miles
N
Where was the surface oil?
Sum of 87 daily maps (oil days)
includes 48 hour projections

Tentative Sequence of Remaining Sampling Within the Federal Closed Area as of 09/22/2010



STATIONS SAMPLED FOR DEEPWATER HORIZON OIL SPILL RESPONSE FROM 4/28/2010 TO 8/16/2010: TOTAL 780 REPORTED STATIONS



NMFS/SEFSC – Mississippi Laboratories

Prepared by P. Moreno on 08/17/10

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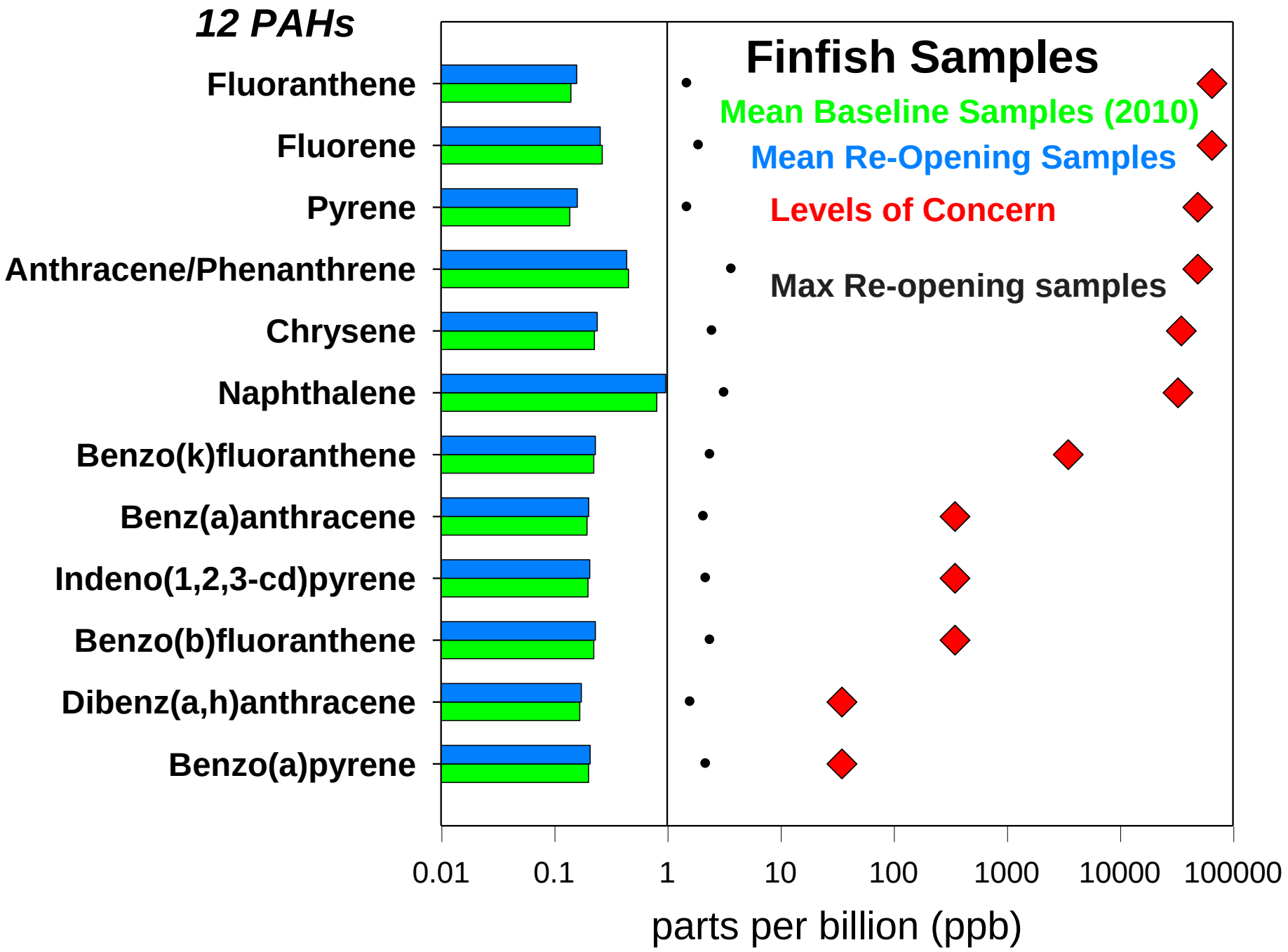
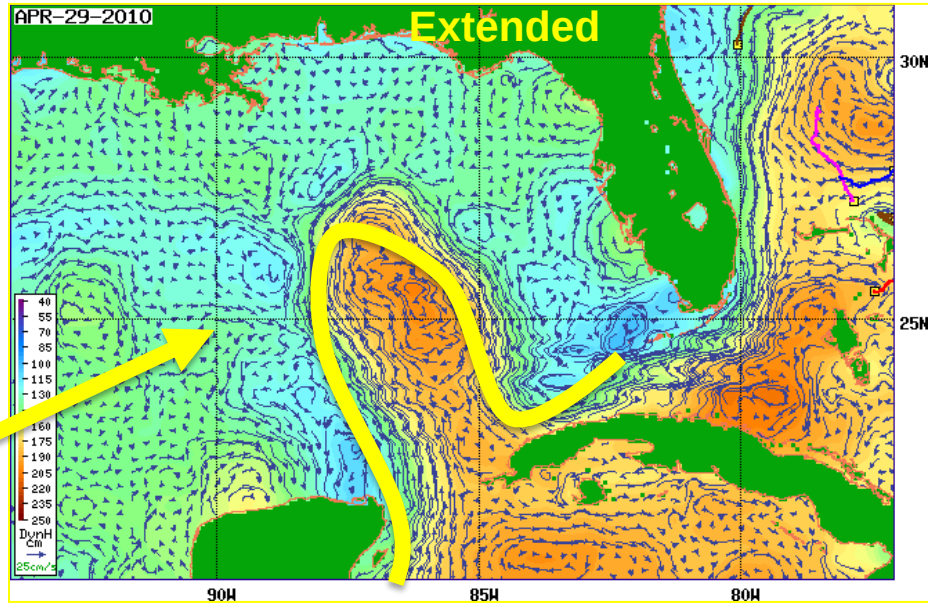
Note: Some stations may not have collected specimens for seafood inspection. Different reporting sources may account for number of stations differently. This is tallied based on the best available information.

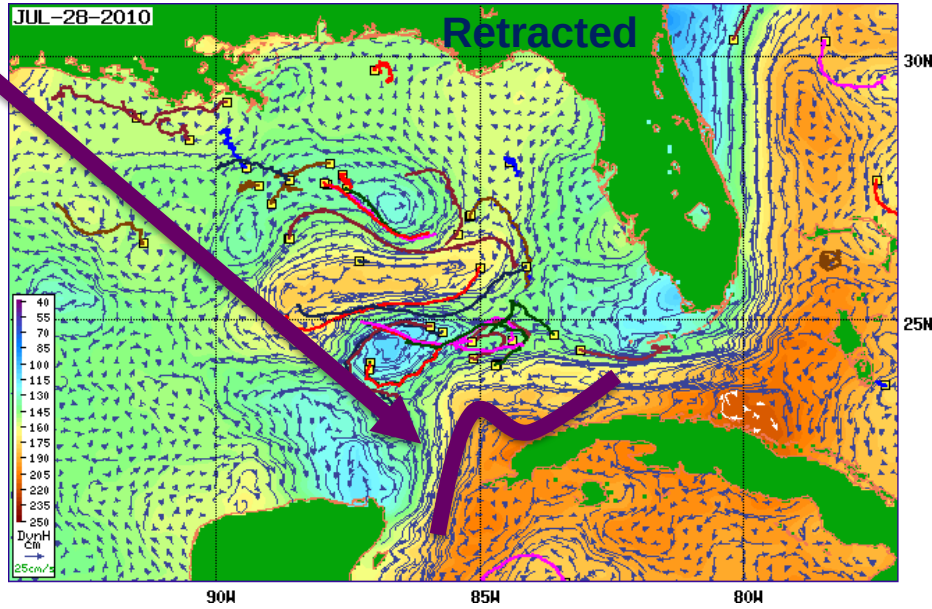

12 PAHs
Fluoranthene
Fluorene
Pyrene
Anthracene/Phenanthrene
Chrysene
Naphthalene
Benzo(k)fluoranthene
Benz(a)anthracene
Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene
Dibenz(a,h)anthracene
Benzo(a)pyrene
Finfish Samples
Mean Baseline Samples (2010)
Mean Re-Opening Samples
Levels of Concern
Max Re-opening samples
0.01
0.1
1
10
100
1000
10000
100000
parts per billion (ppb)

The Loop Current:

A large scale ocean current that transports water from the Yucatan to the Florida Straits often exhibits two states:

1. **Extended into the Gulf of Mexico and**
2. **Retracted – short circuiting the Gulf.**





When extending north, the Loop Current can collect water from the Northern Gulf of Mexico and transport it quickly to Florida and the Gulfstream. The same conditions could easily transport oil and dispersant to sensitive areas of the Florida Keys and Florida East coast, impacting ecosystems and coastal populations.

Sub-Surface Sampling for Oil, Dispersants & Impacts

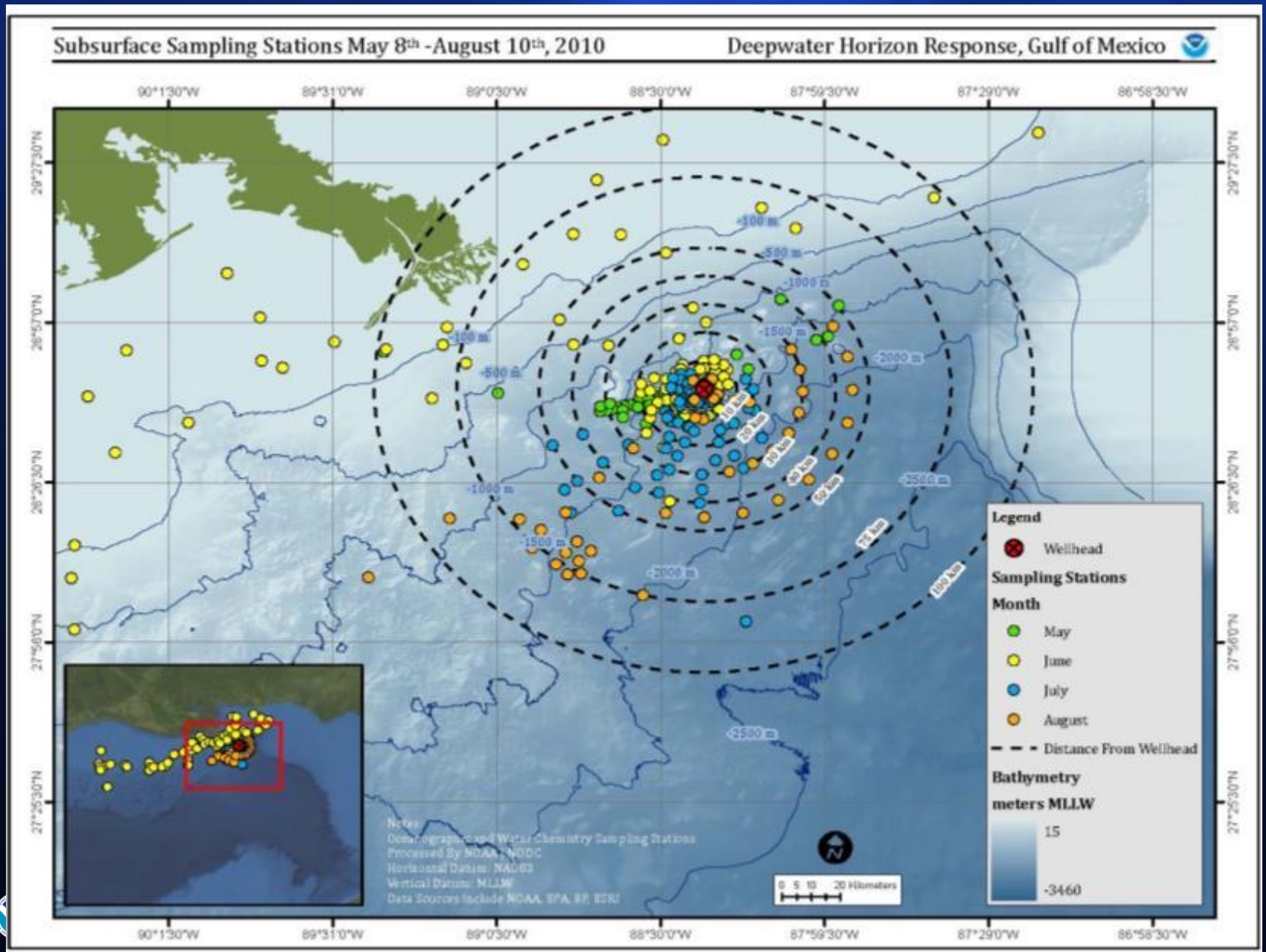
- Required Near-Field sampling for sub-surface dispersant application, & "Removal Actions" By RP with EPA/NOAA
- NOAA Research Vessels and NOAA-Sponsored Cruises
- Other sampling Efforts Sponsored by NSF & Universities

Many research vessels involved in collecting data using a variety of technologies including ship-board acoustics, fluorometry, water sampling using CTD, water sampling with AUVs, neuston, Mocness, trawling, and sediment samples – 28,000+ water samples so far.

Enhanced sampling announced by Dr. Lubchenco/Adm. Allen

Subsurface Monitoring Stations >100 km of the Well head

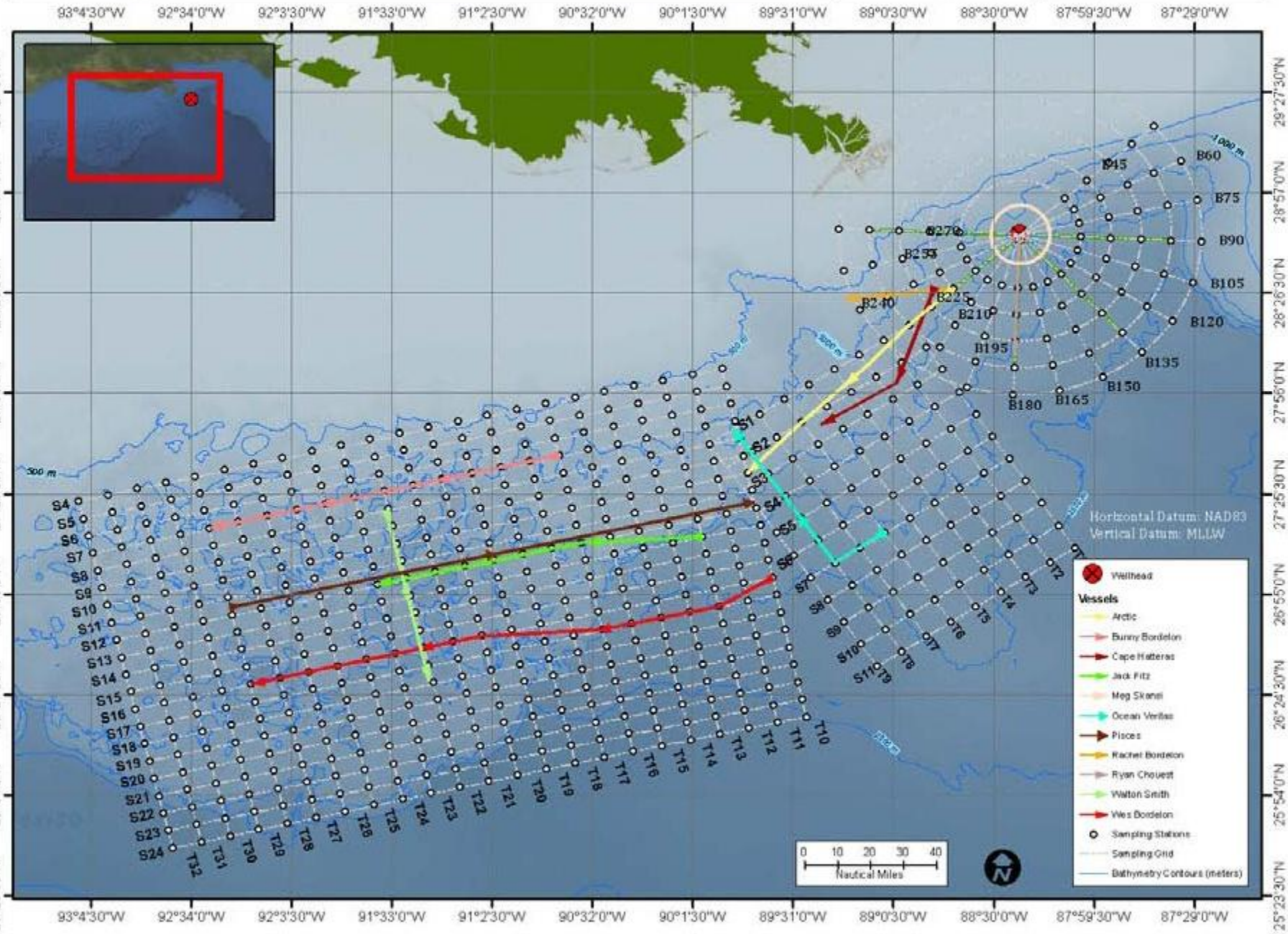
Detail of survey area and month of station occupation for monitoring for subsurface dispersed oil.



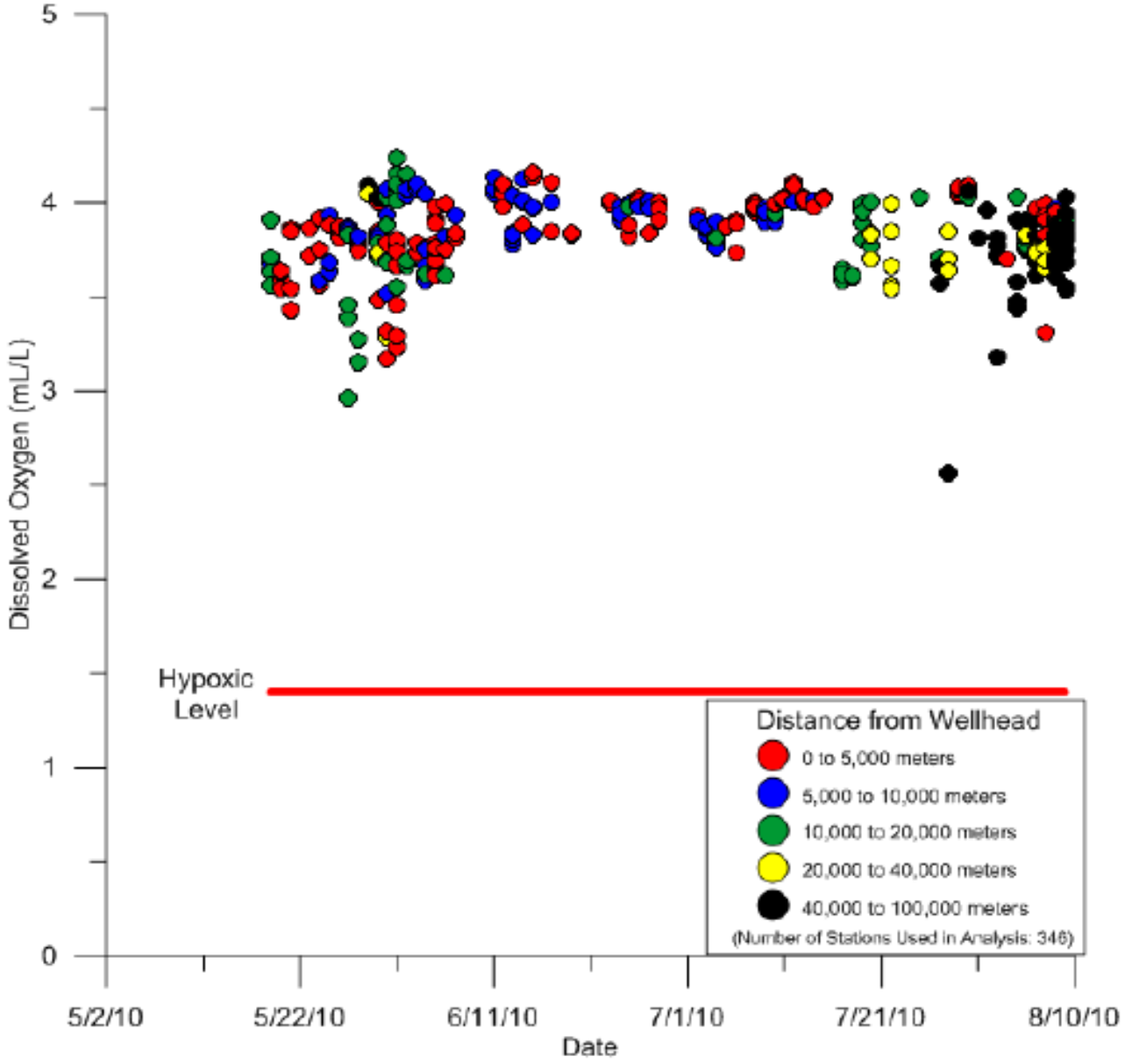
Date of map: 12-September-2010 **Subsurface Monitoring: Mission Guidance for 09/13/2010**

Mission Guidance

Deepwater Horizon Response, Gulf of Mexico



Minimum Dissolved Oxygen (mL/L) observed in the 1,000-1,300 m Depth stratum as a function of date and distance to the well head (m)



Long-term Ecosystems Effects: Science priorities (+Response & NRDA)

Scientific needs to assess the full impacts of DWH on Gulf of Mexico ecosystems:

- Plankton assessments
- Microbial-driven oil biodegradation rates
- Lab exposure studies of oil and dispersants
- Protected species (turtles, birds, & mammals)
- Fisheries abundance and distribution
- Wetlands impacts & nursery areas
- Hypoxia & carbon loading
- Socio-economic impacts
- Integrated ecosystem assessments

Critical Science Collaborations

- Interagency groups under the authorities of the National Incident Command and Unified Area Command – Sub-Surface Monitoring Group and the Joint Analysis Group
- Enhanced scientific outreach and discussion sessions concerning sub-surface monitoring (multiple workshops)
- Continued dialog and conferences to share results
- Interest in a more permanent structure to facilitate agency/academic/private research collaborations (Gulf Science Council)
- Continuing efforts to make information more available and usable by the public and scientists