

Distribution and Concentrations of Petroleum Hydrocarbons Associated with The BP/Deepwater Horizon Oil Spill, Gulf of Mexico



http://www.eoearth.org/files/142601_142700/142604/dispersants7.jpg

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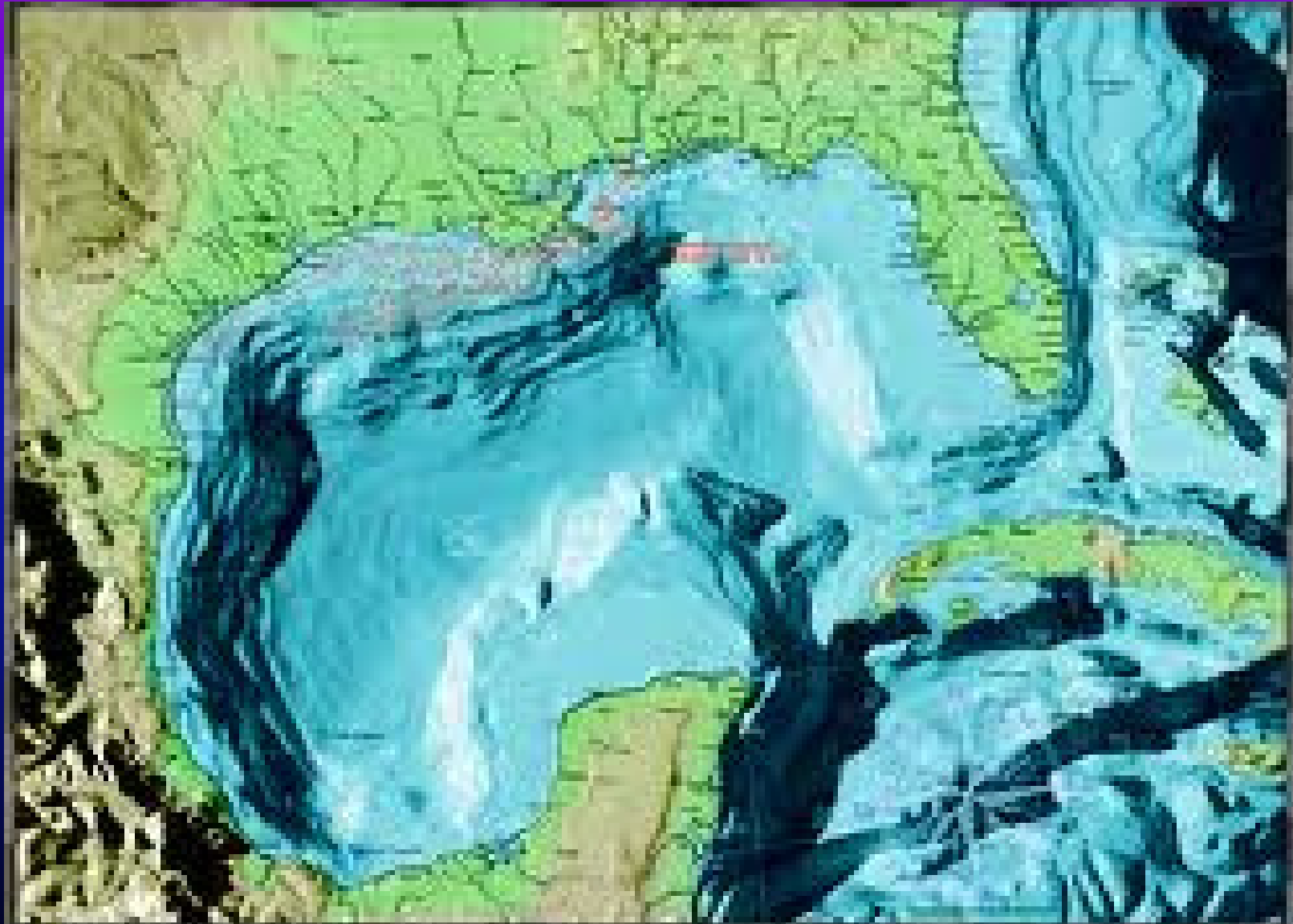
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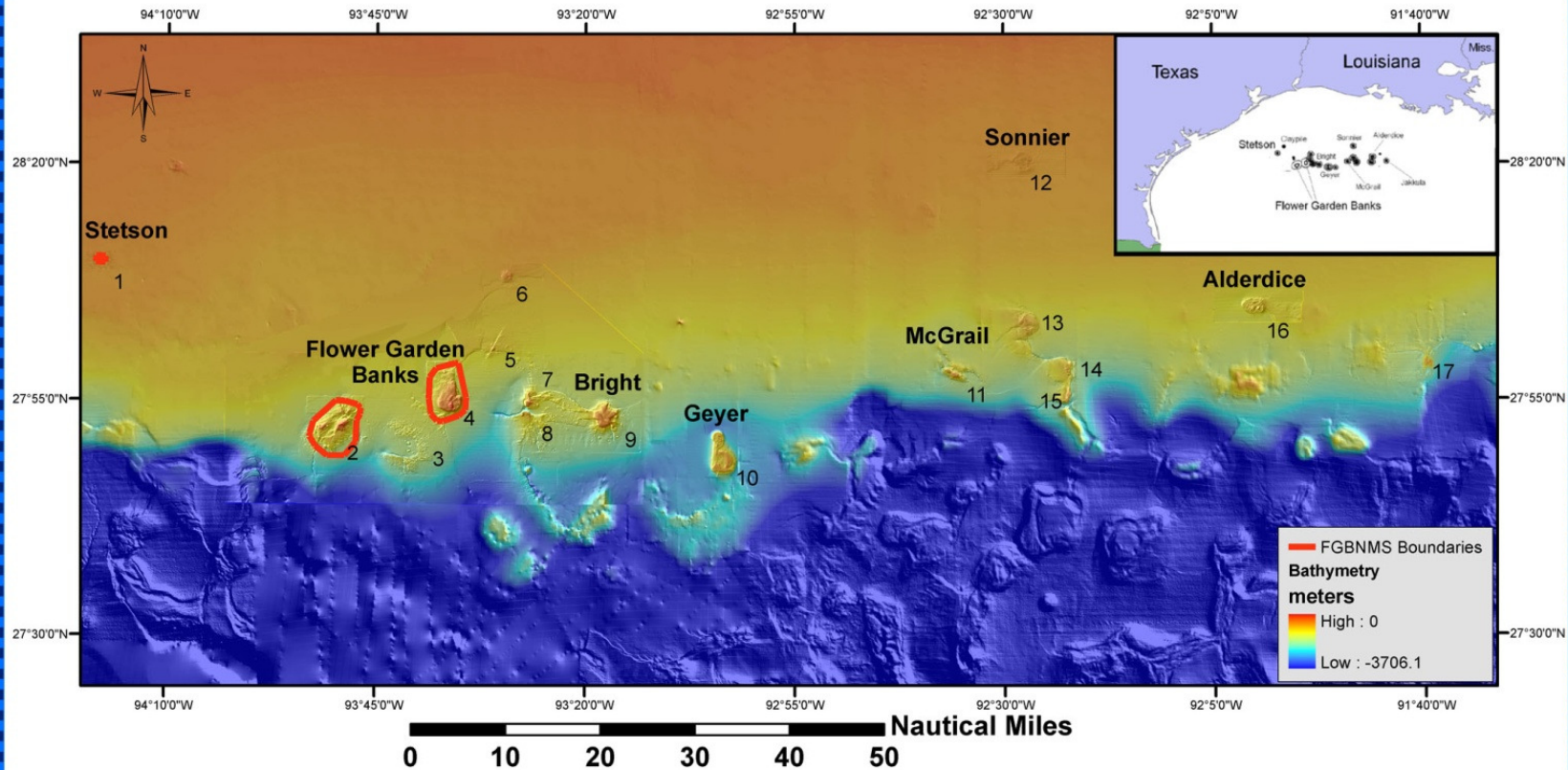
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http://www.lib.utexas.edu/maps/map_sites/country_sites.html

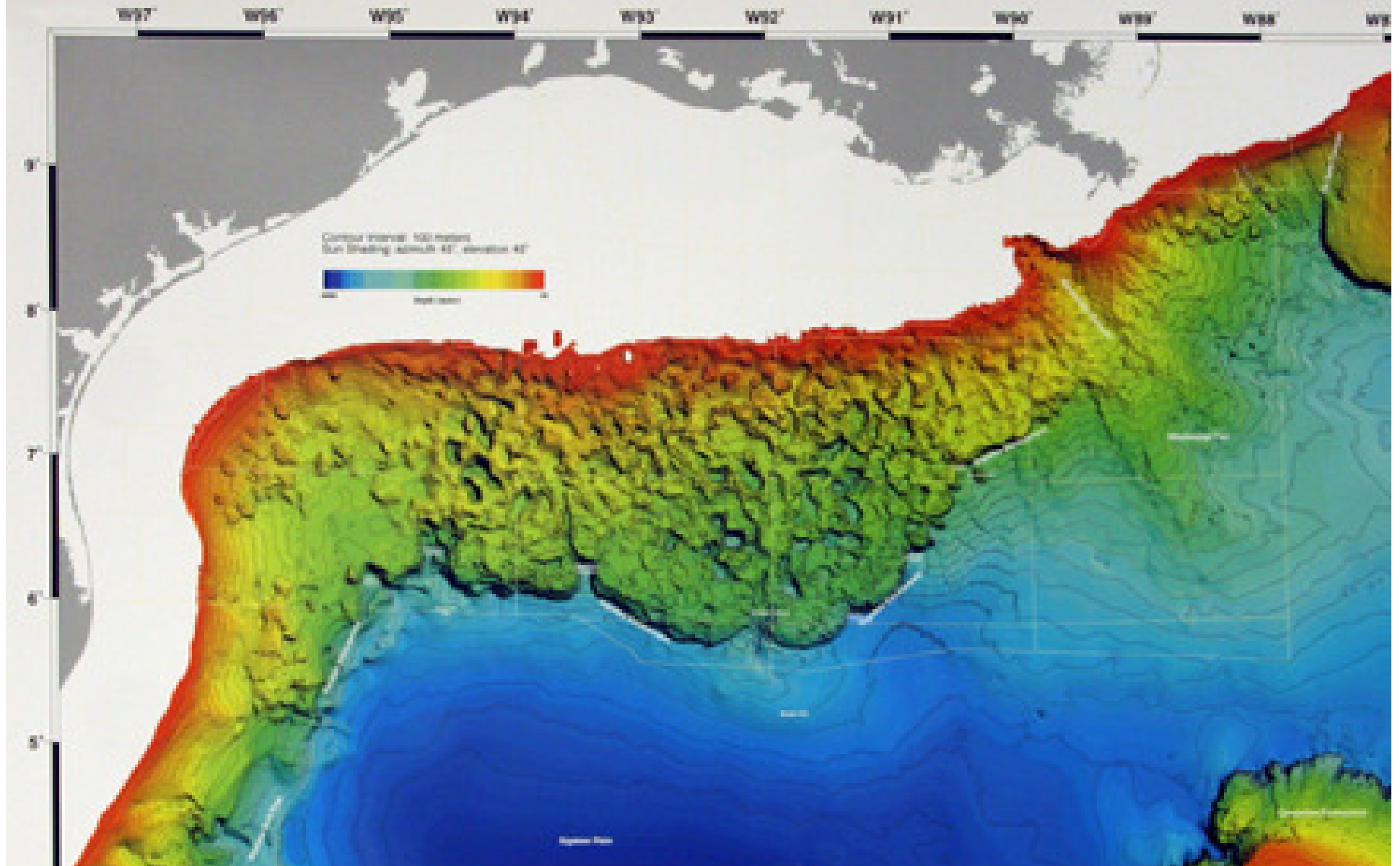
Reefs and Banks of the Northwestern Gulf of Mexico



1. Stetson Bank, 2. West Flower Garden Bank, 3. Horseshoe Bank, 4. East Flower Garden Bank, 5. MacNeil Bank, 6. 29 Fathom Bank, 7. Rankin Bank, 8. 28 Fathom Bank, 9. Bright Bank, 10. Geyer Bank, 11. McGrail Bank, 12. Sonnier Bank, 13. Bouma Bank, 14. Rezak Bank, 15. Sidner Bank, 16. Alderdice Bank, 17. Jakkula Bank

Bathymetry courtesy of USGS, UNH, Gardner and NOAA

Banks off the Continental Shelf, Northern Gulf of Mexico



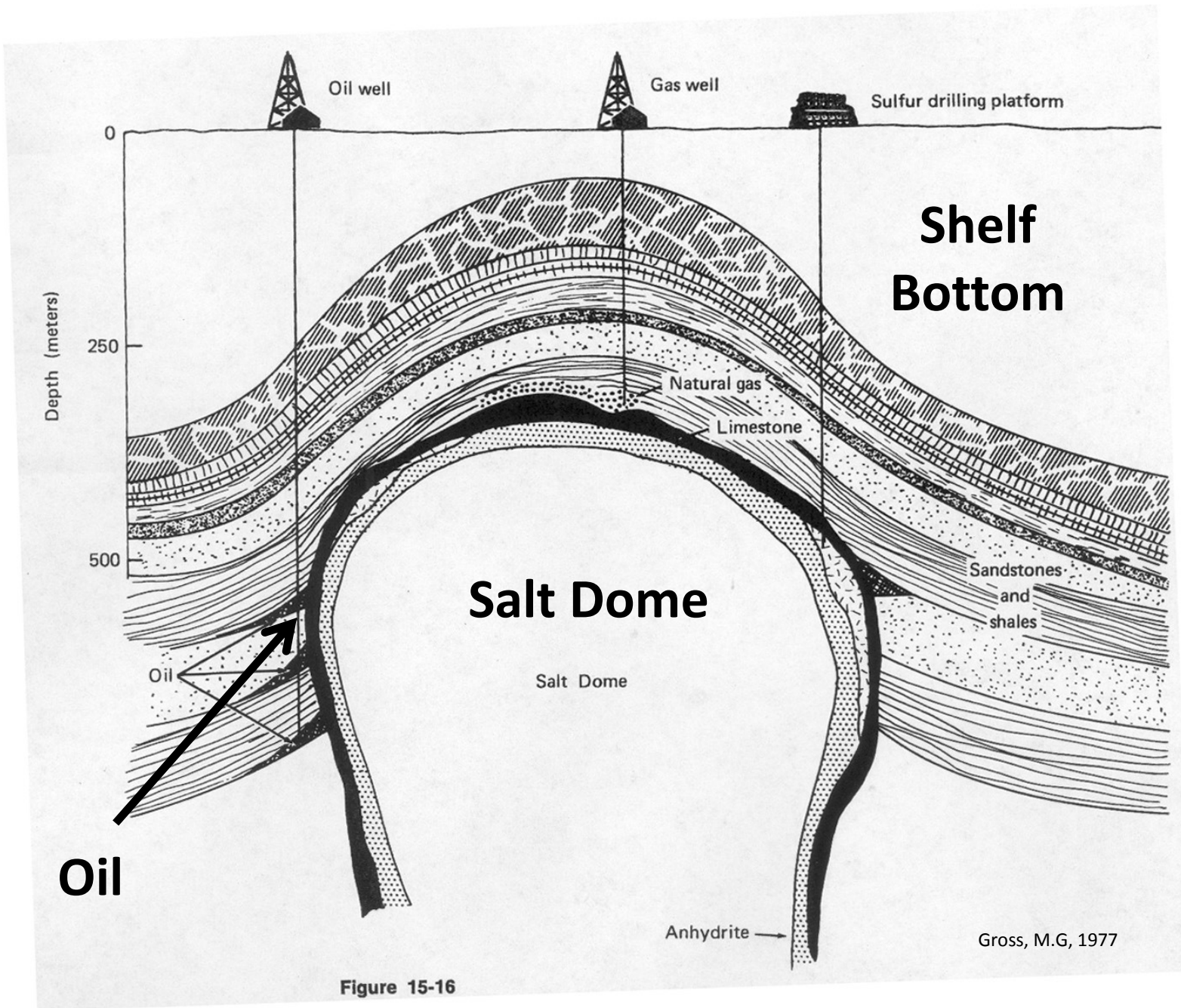


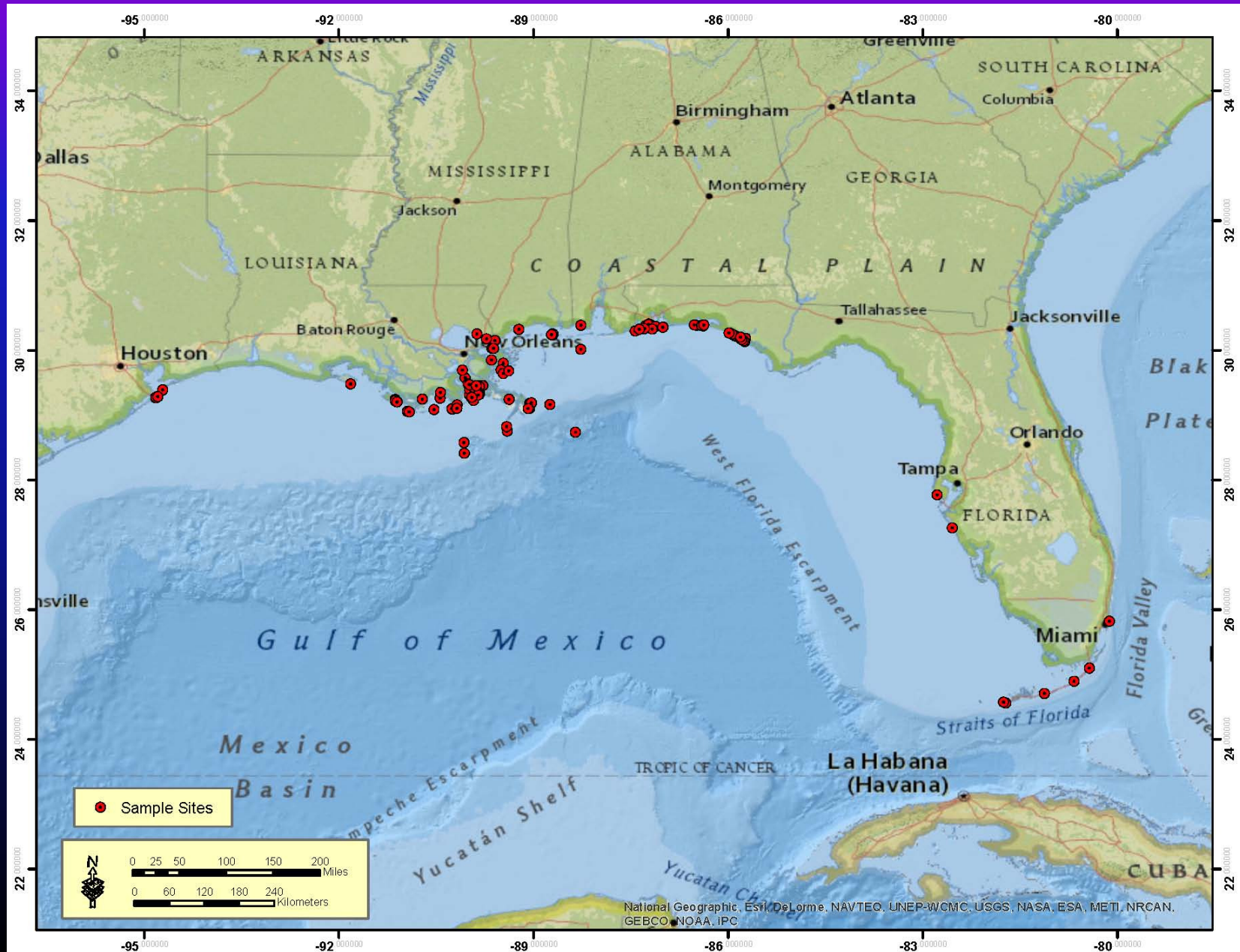
Figure 15-16



<http://plotmistress.com/wp-content/uploads/bp-oil-spill-2010-f-Copy.jpg>



Sampling Sites



Compounds Examined

- . TPH – C8-C40
- . Total PAHs
- . C-3 Napthalenes
- . C-2 Phenanthrenes/anthracenes
- . C-4 Phenanthrenes/anthracenes
- . C-1 Benzo(a)anthracenes/chrysenes.

Also -

- . C-2 Dibenzothiophenes
- . C-3 Dibenzothiophenes
- . C-4 Dibenzothiophenes
- . C-2 Napthalenes
- . C-4 Napthalenes
- . C-3 Fluorenes
- . C-1 Phenanthrenes/anthracenes
- . C-2 Sub'd B9a)/chrysenes

Media Examined

- **Sediment**
- **Seawater**
- **Marine Fauna and Flora**
- **Commercial Seafood Species**

Sediment



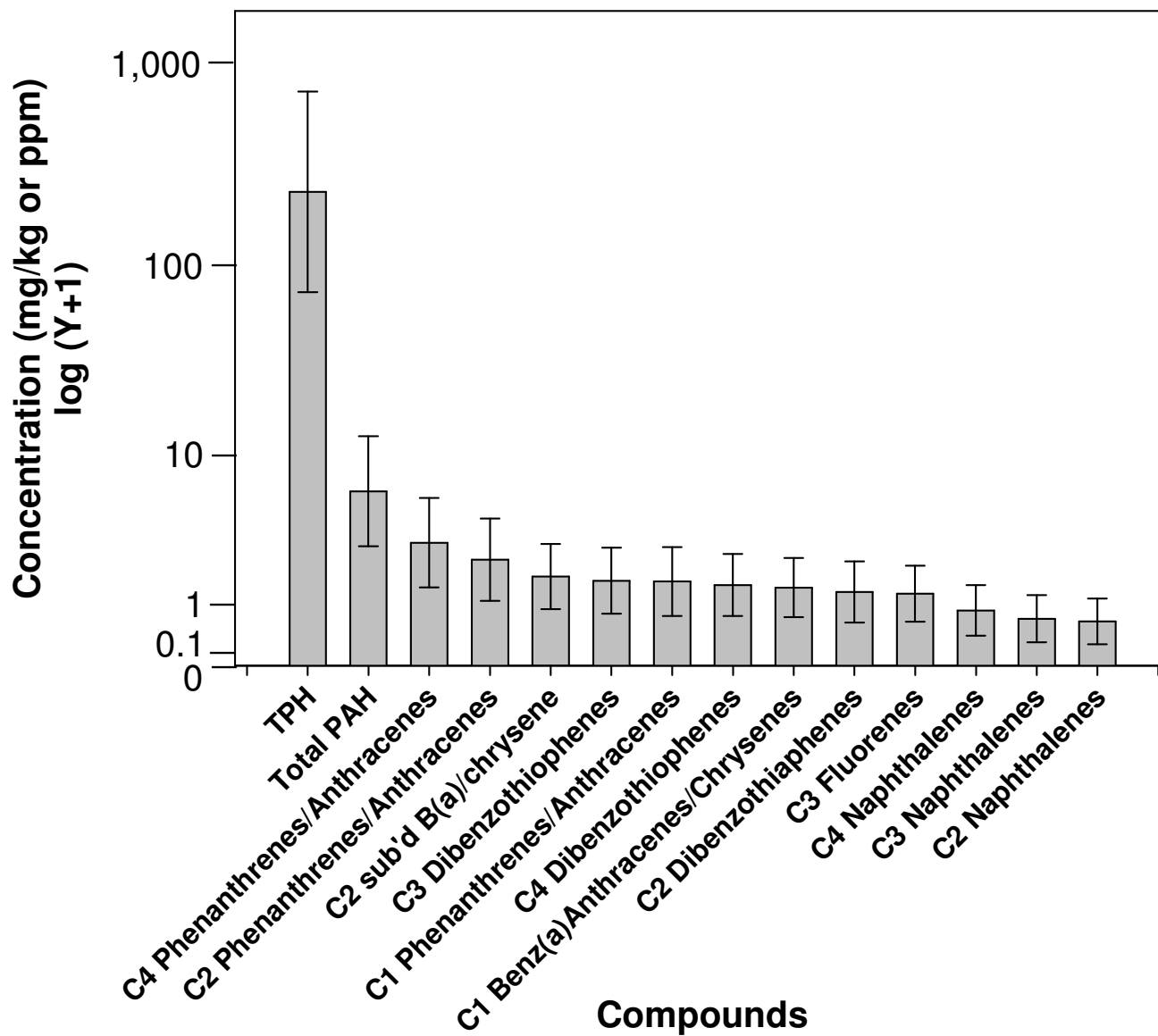
JEFF HUTCHENS/REPORTAGE FOR CNN

<http://www.cnn.com/2013/01/11/us/gulf-oil-spill-settlement/>

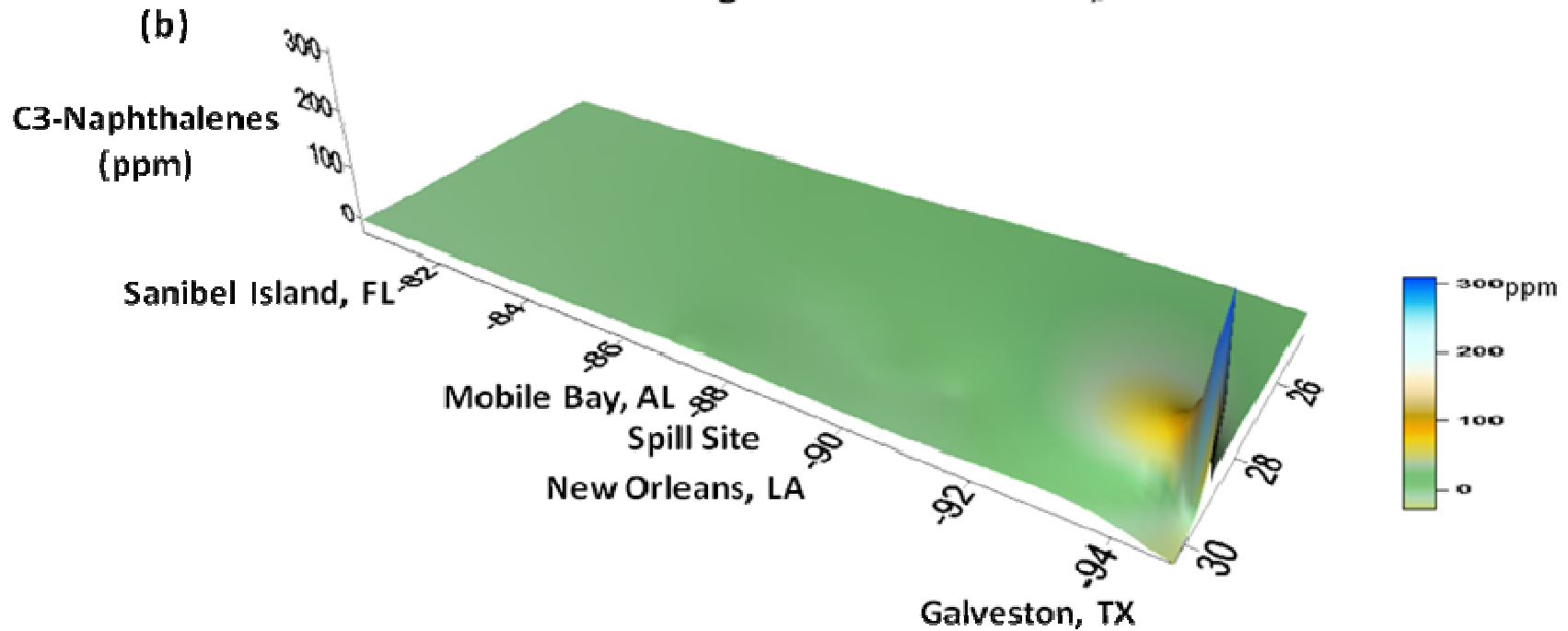
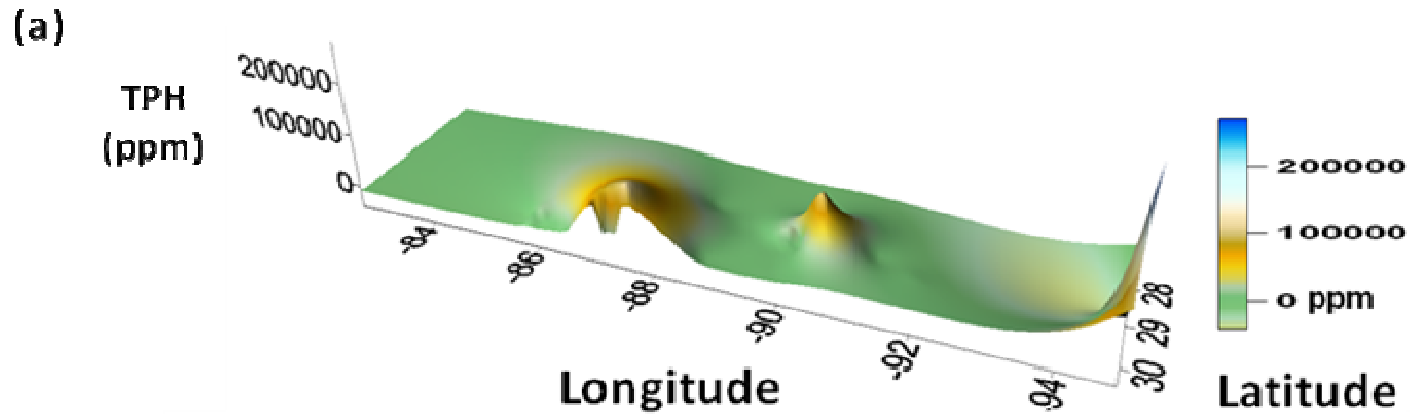
Sediment Techniques

- **TPHs - GC-FID Scan, Method Reference EPA 3550/8000-GC-FID**
- **PAHs and Alkylated PAHs**
 - **Method Reference EPA 3540/8270 GC/MS**
- **Also by GC/MS – Method Reference EPA 8015**
 - **Modifications – 6010, 7471, & 8260**

Petroleum Hydrocarbon Concentrations in Sediment



Petroleum Hydrocarbon Concentrations Sediment





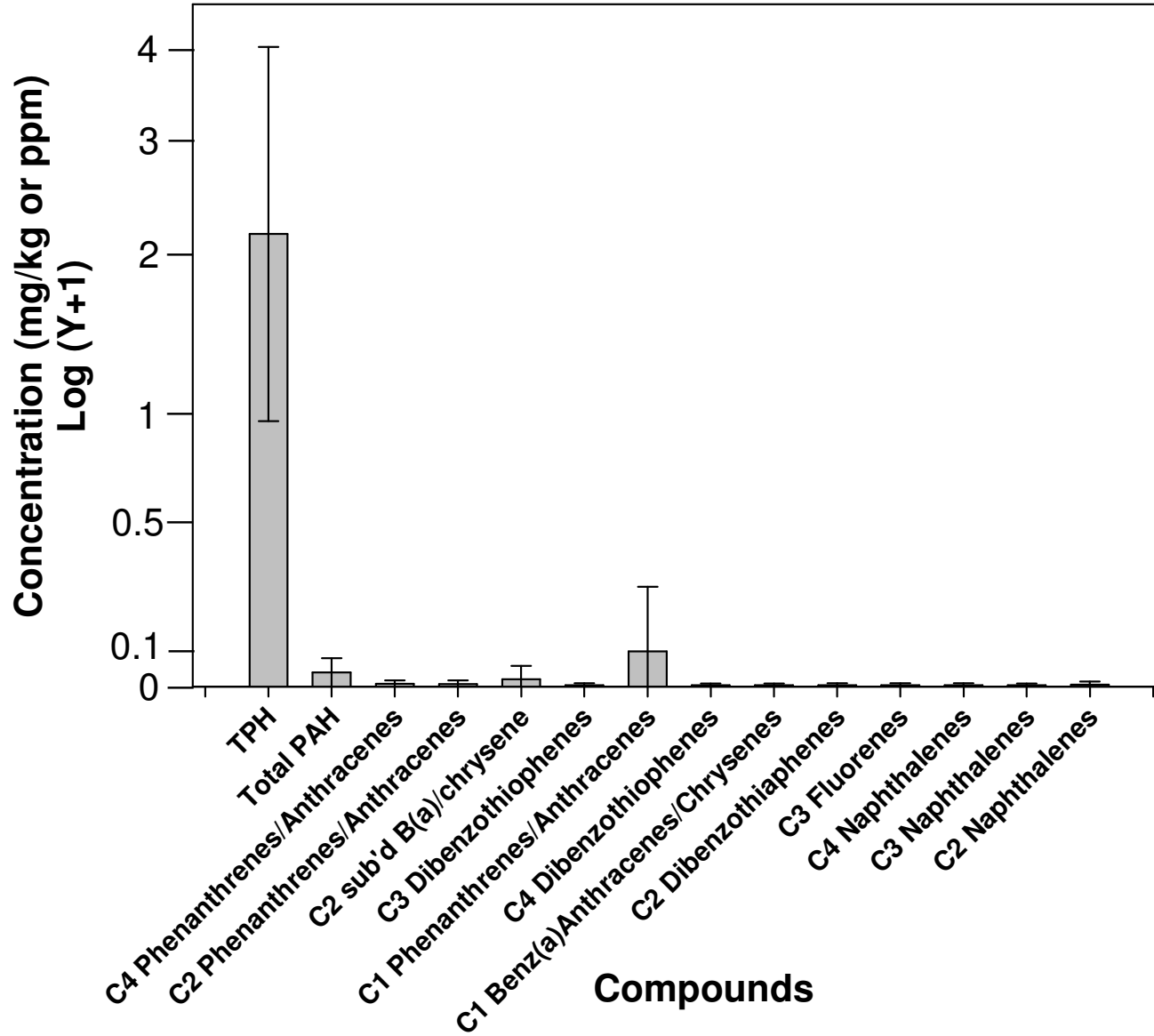
Seawater

<http://www.deepwaterclaims.net/wp-content/uploads/2013/06/bp-oil-spill-2.jpg>

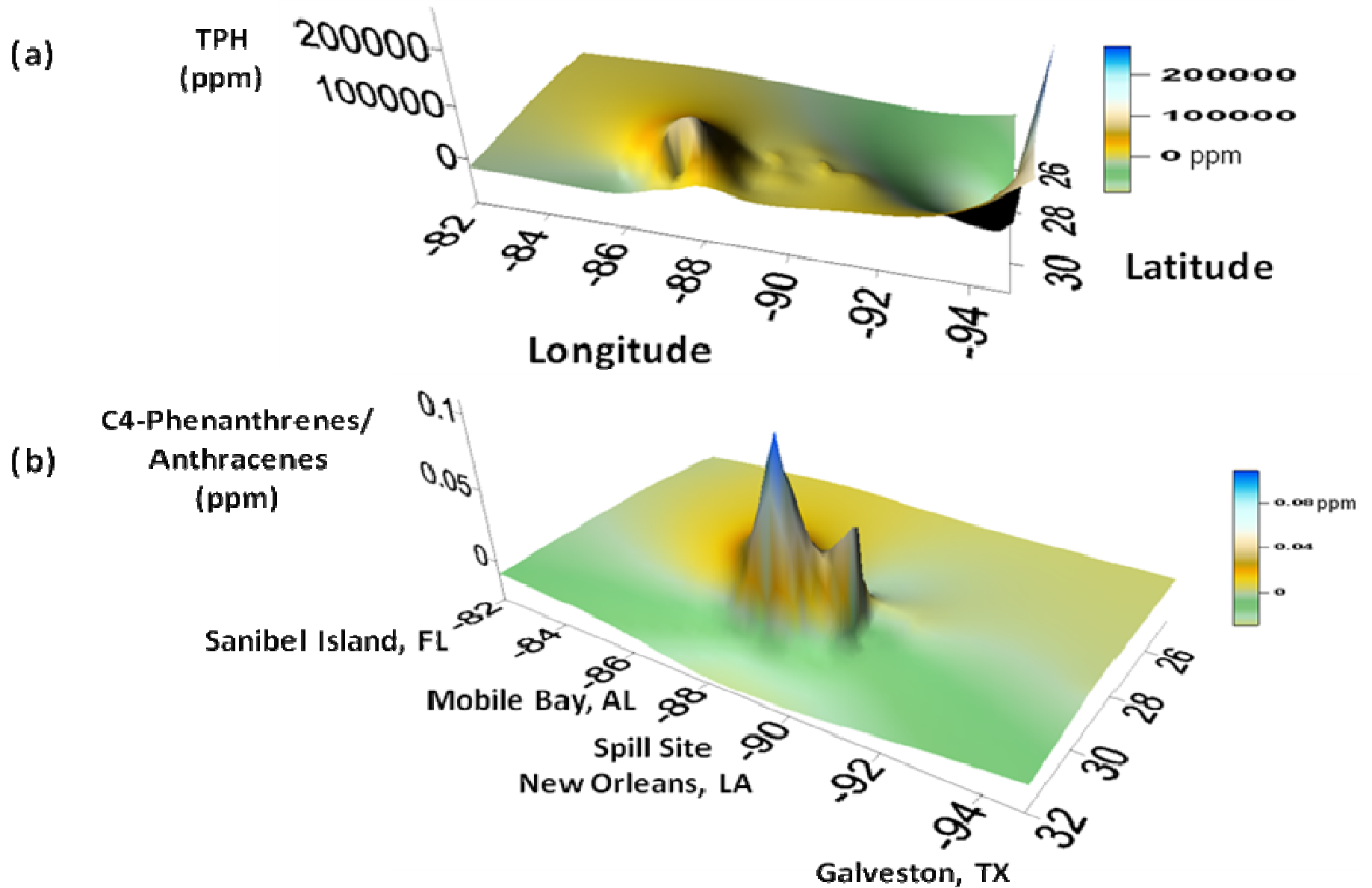
Seawater Techniques

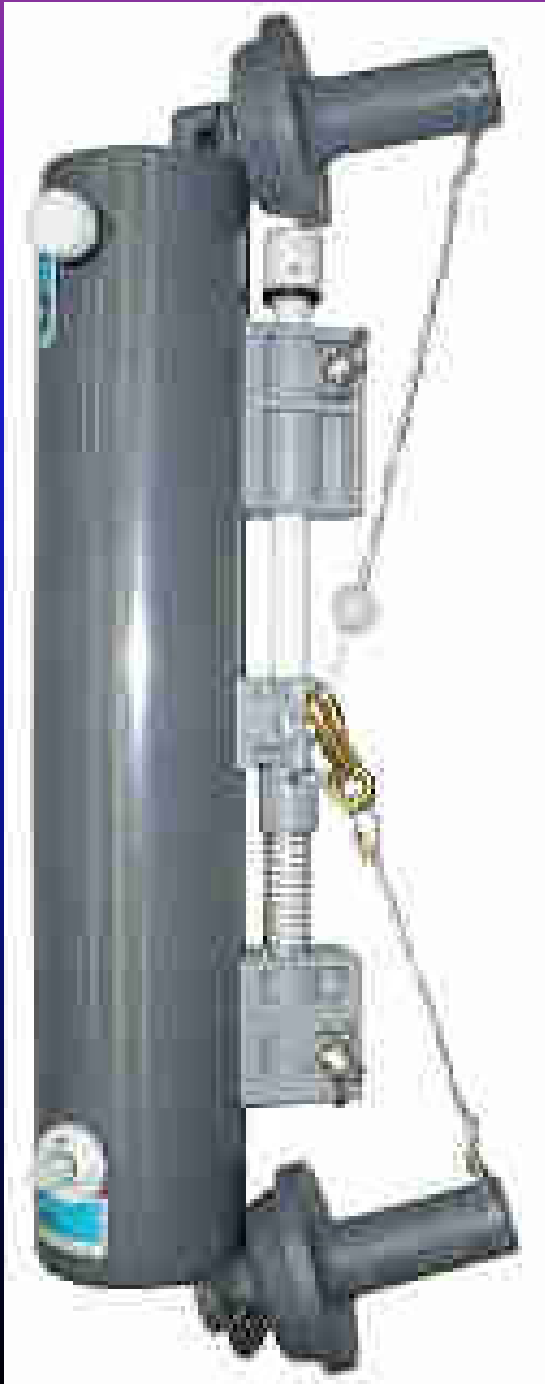
- **Wildco vertical PVC seawater sampler**
- **Dynasorb adsorbent cloth – state-of-the-art oil adsorbent**
- **Processed by EPA laboratories for TPH, Total PAH, and PAH components, by GC/MS**

Petroleum Hydrocarbon Concentrations Seawater



Petroleum Hydrocarbon Concentrations Seawater





Niskin Bottle

RQ4541 Silence Force
2100 Watt Vacuum Cleaner

Rowenta



Fauna and ...



http://bluelifeconservation.files.wordpress.com/2010/06/oiled-pelican-queen-bess-islandjpg-3f2c59e5902e116c_large.jpg

Flora

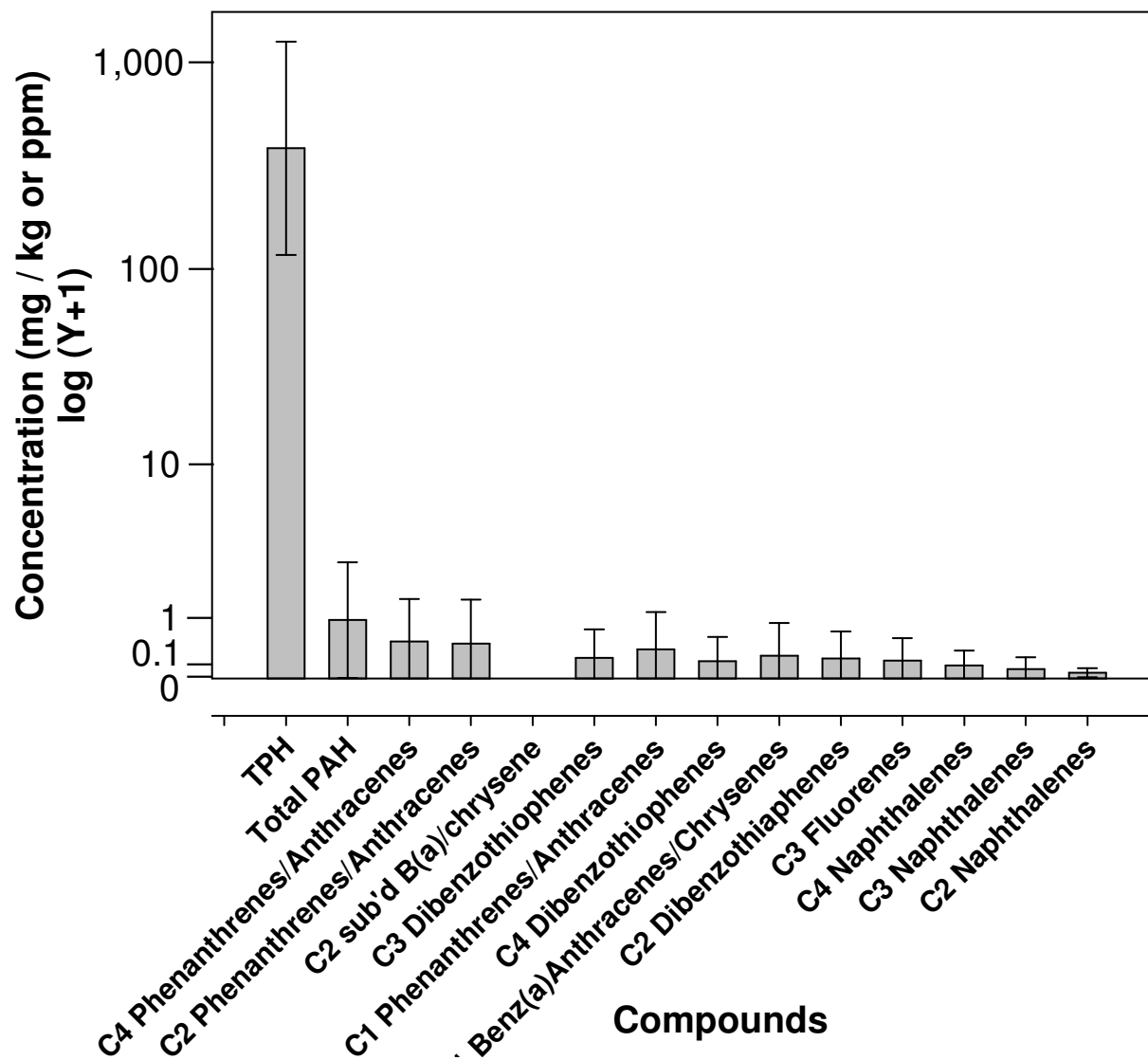


<http://phys.org/news/2012-02-mitsui-fine-gulf-oil.html>

Fauna and Flora

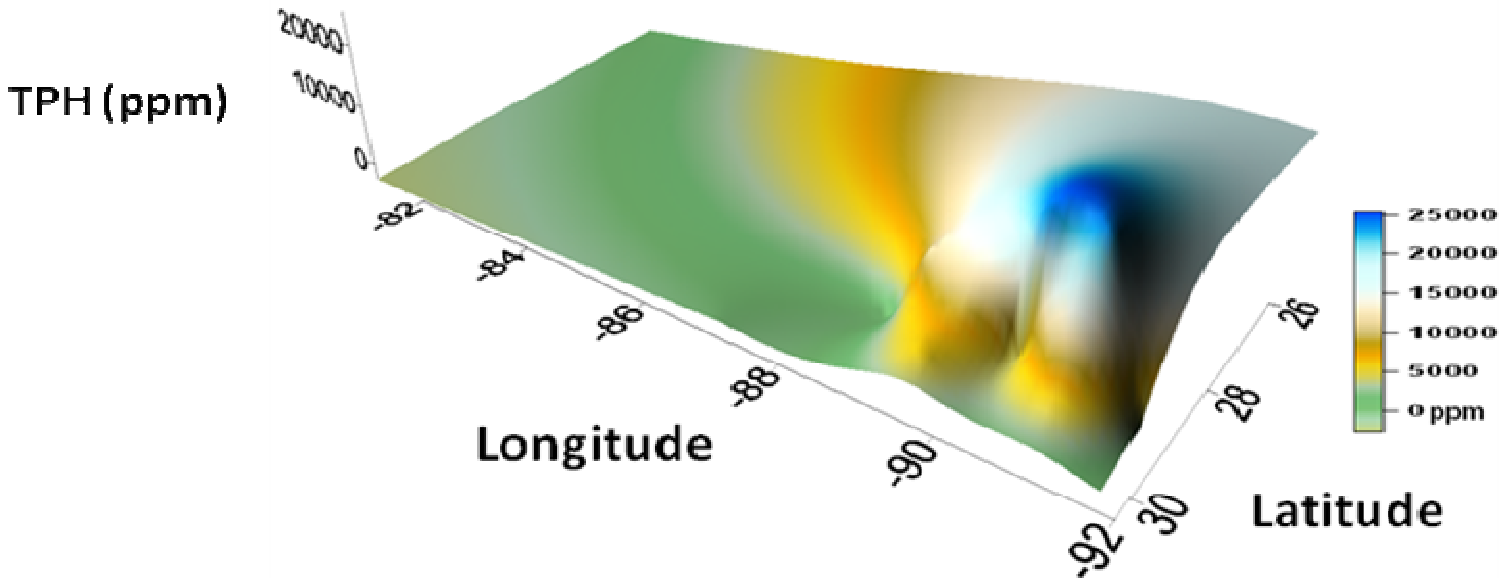
- Seagrass (*Ruppia maritima*)
- Marshgrass (*Spartina alterniflora*)
- Algae (*Sargassum* spp.)
- Coral (*Tubastraea coccinea*)
- Encrusting Bryozoans (*Membranipora*, *Aeverilla*,
and *Parasmittina* spp.)

Petroleum Hydrocarbon Concentrations Fauna and Flora



Petroleum Hydrocarbon Concentrations Fauna and Flora

(a)



(b)

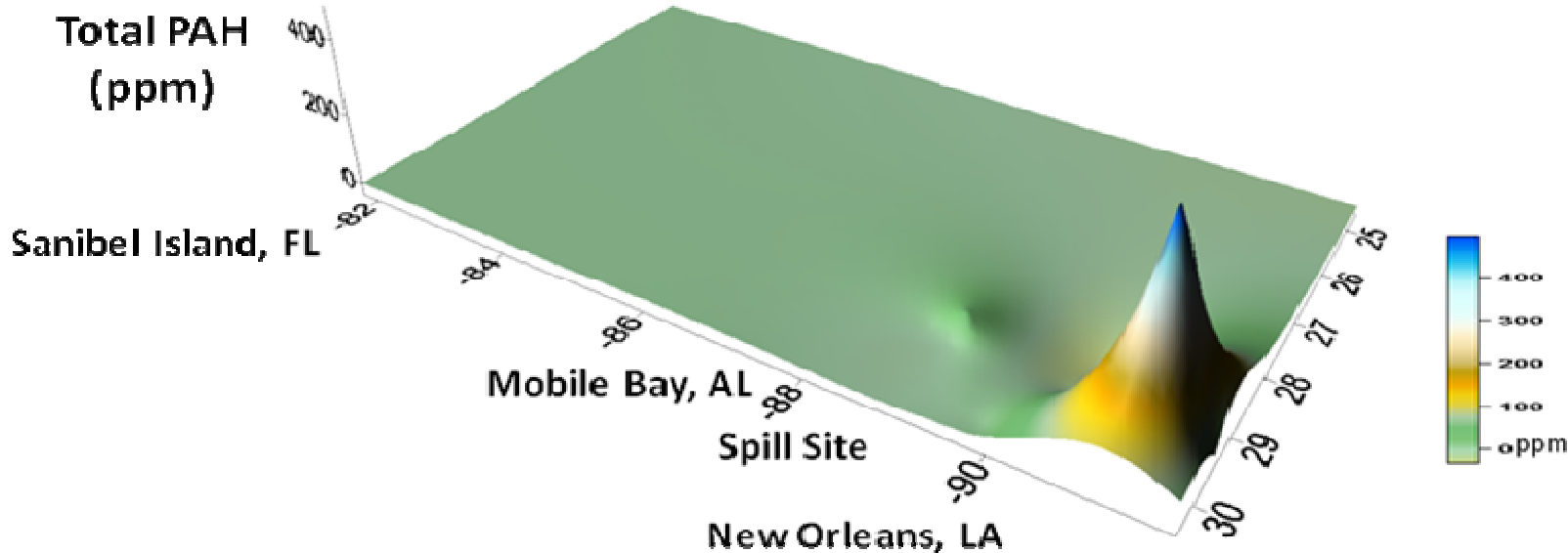
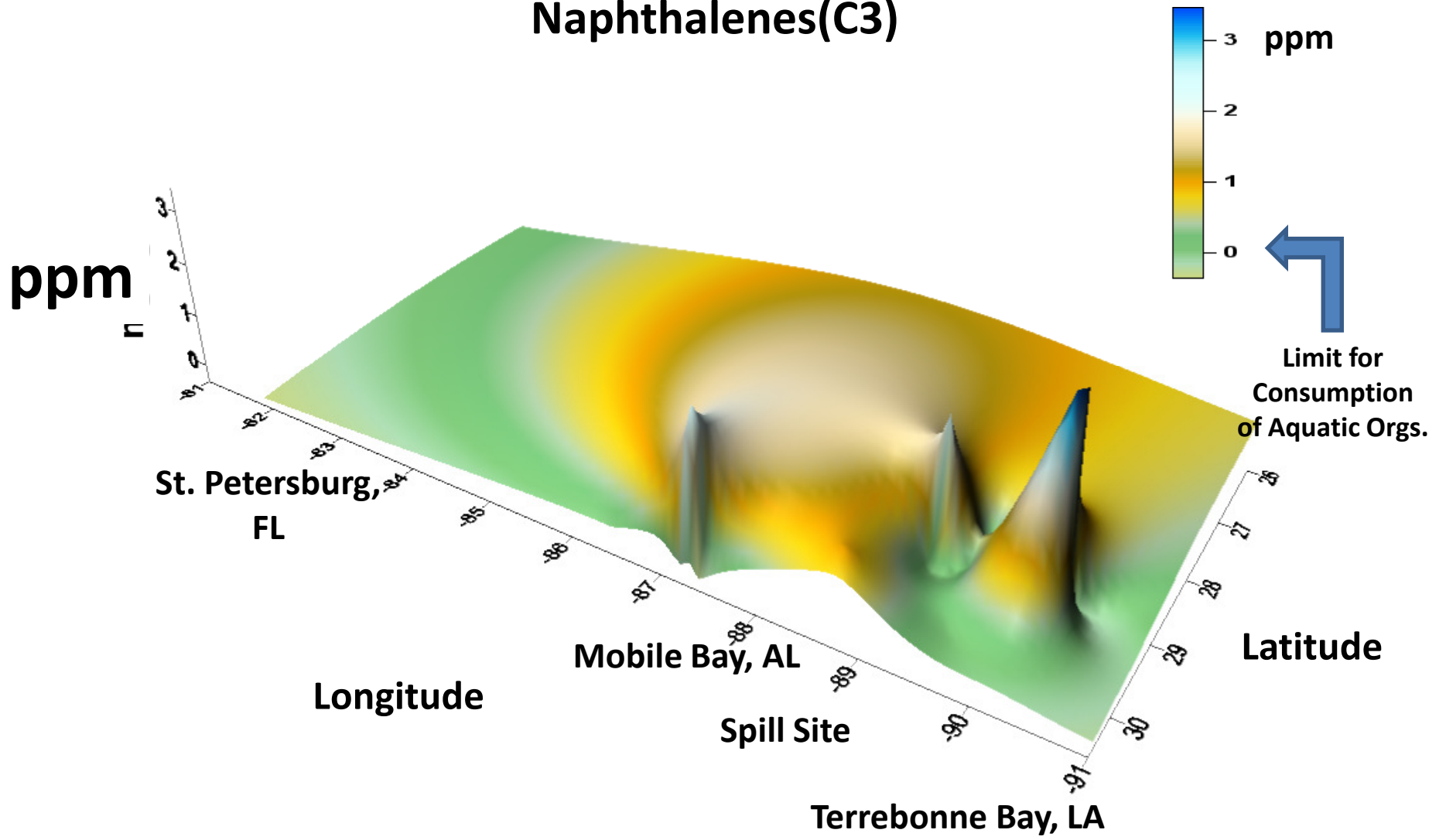


Fig. 2.

Fauna and Flora (combined) Naphthalenes(C3)



Commercial Seafood

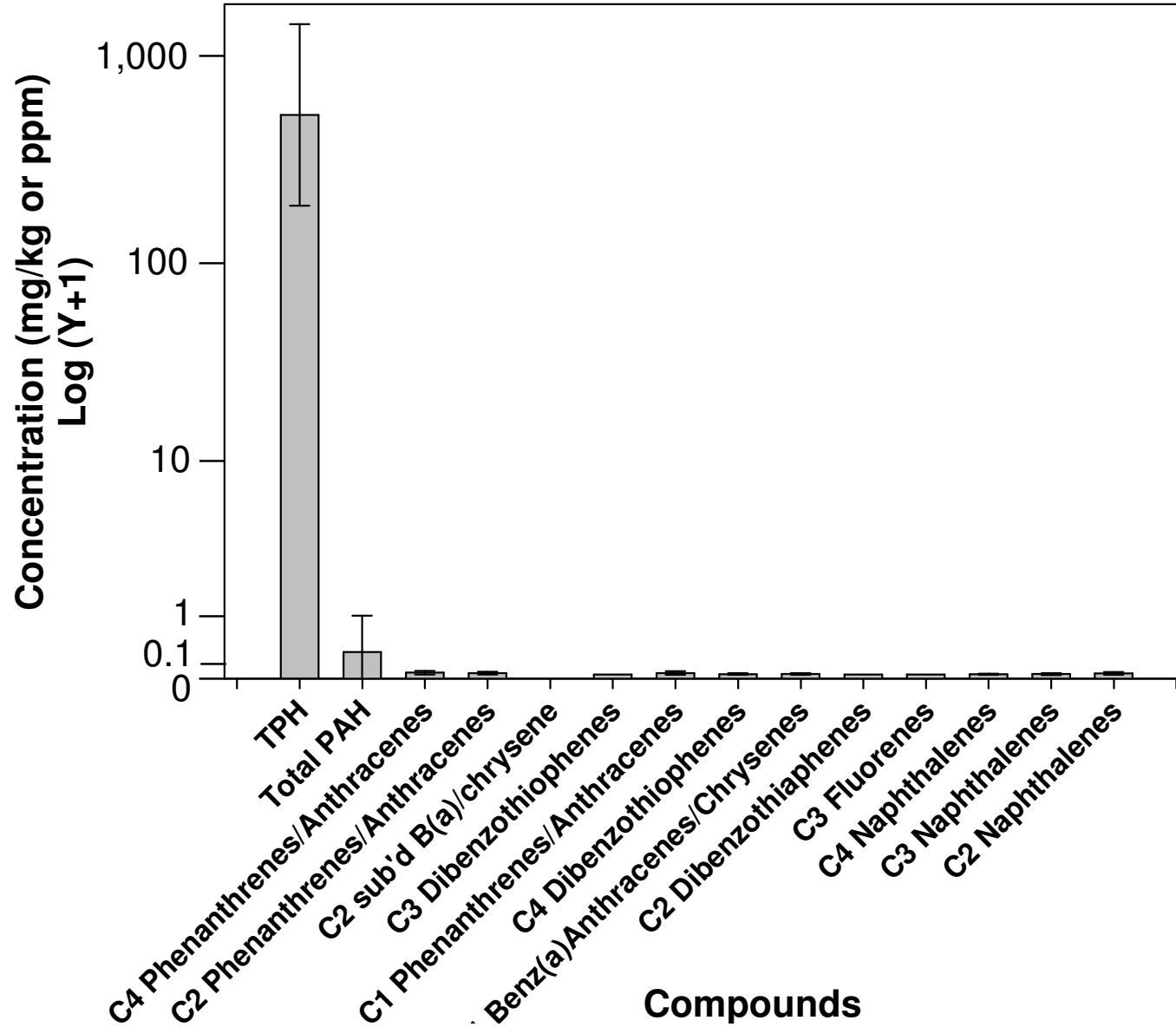


<http://www.businessinsider.com/lessons-from-deepwater-horizon-oil-spill-2012-12>

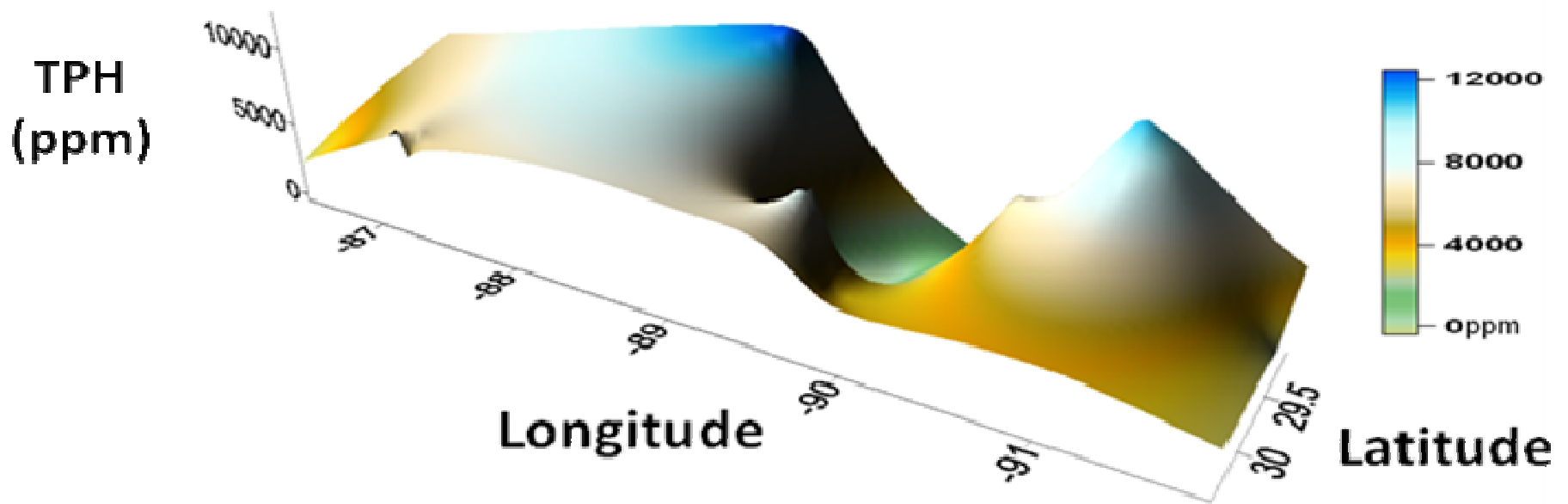
Commercial Seafood Species

- Shrimp (*Penaeus* spp.)
- Blue crab (*Callinectes sapidus*)
- Oysters (*Crassostrea virginica*)
- Red snapper (*Lutjanus campechanus*)
- Speckled trout (*Cynoscion nebulosus*)
- Flounder (*Paralichthys lethostigma*)
- Sheephead (*Archosargus probatocephalus*)

Petroleum Hydrocarbon Concentrations Commercial Seafood



Petroleum Hydrocarbon Concentrations Commercial Seafood



Commercial Seafood (combined) Total PAHs

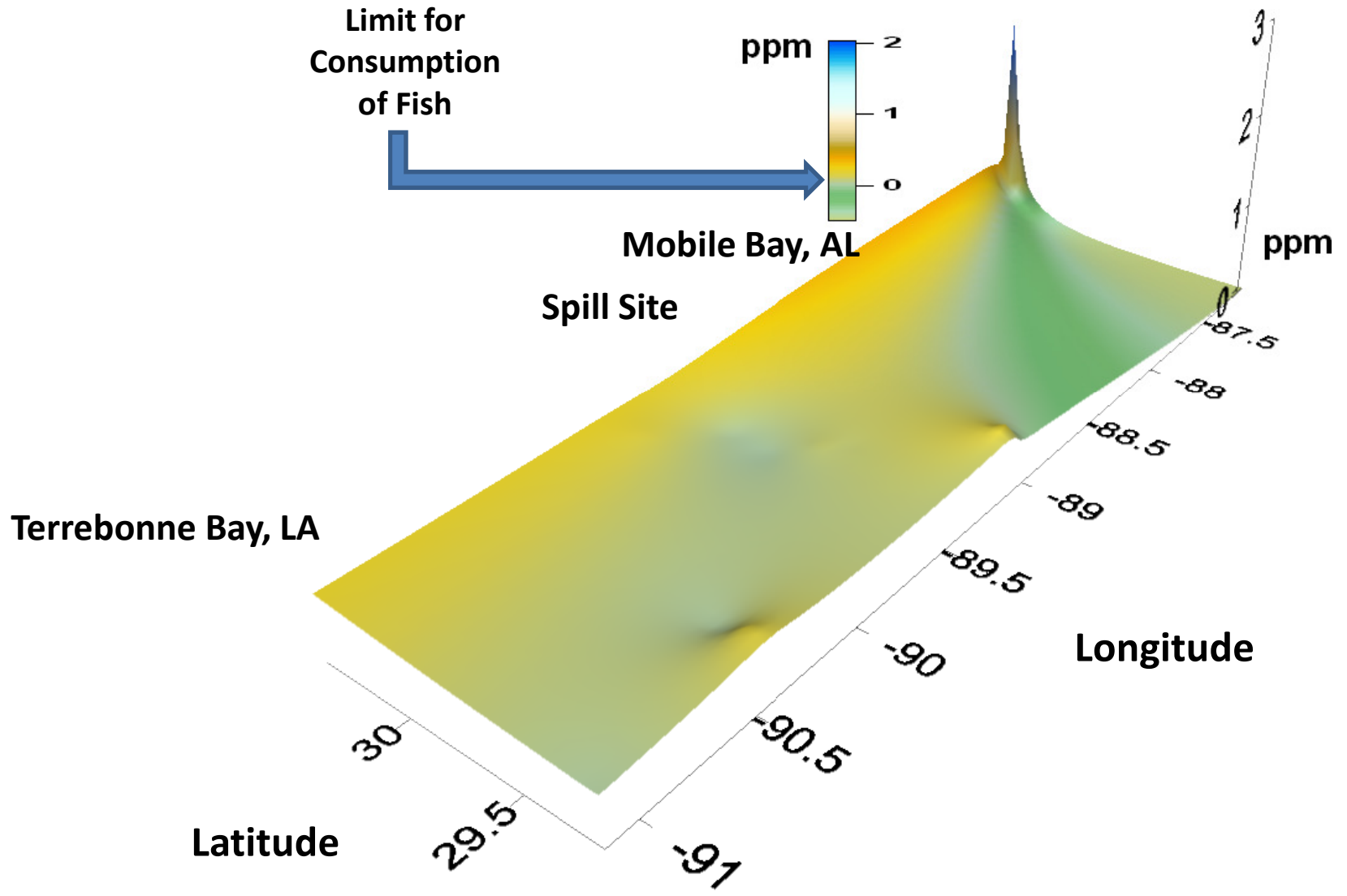
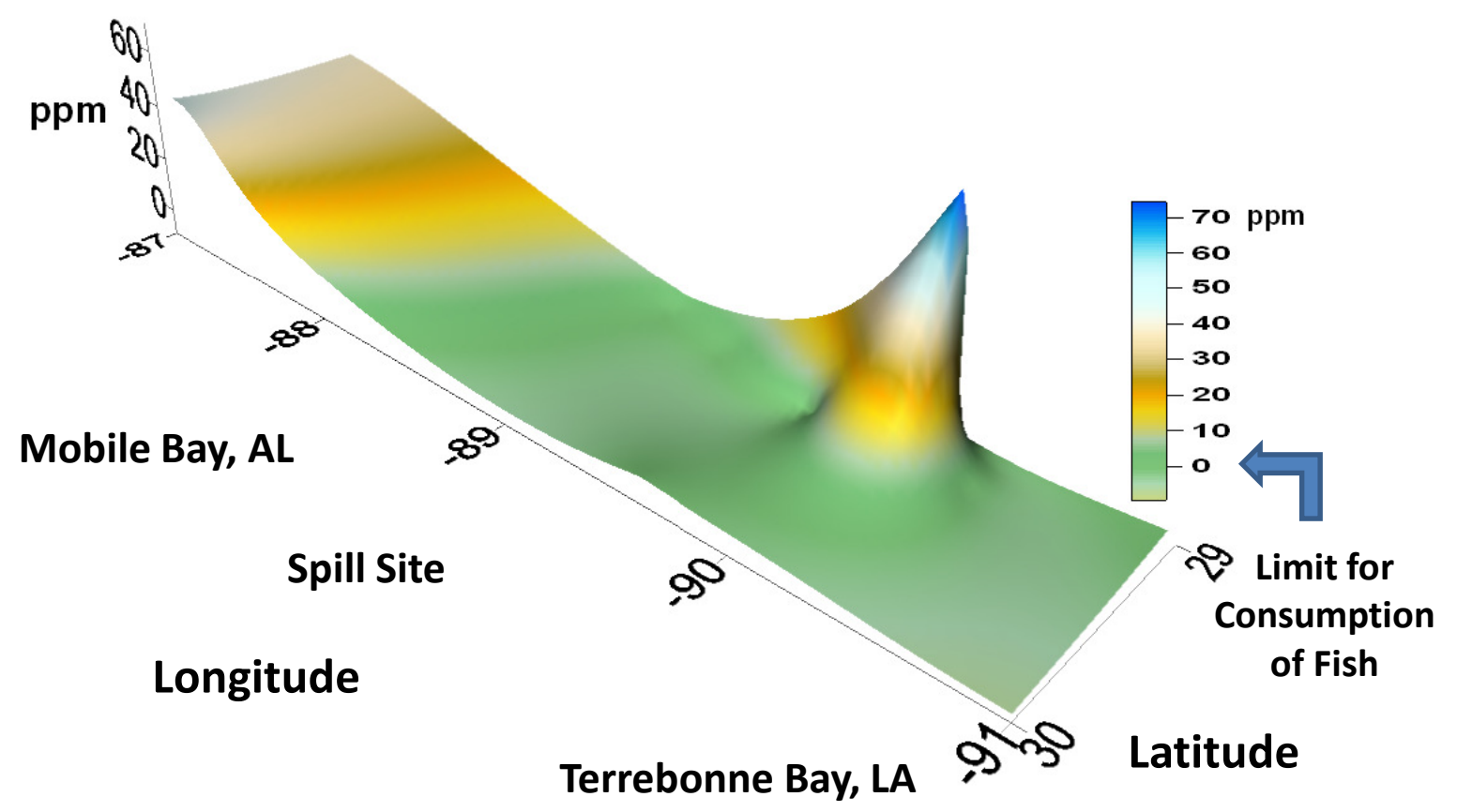


Fig. 1.

Commercial Seafood (combined) Phenanthrenes/Anthracenes(C2)





Conclusions

- In sediment, TPH, PAHs, and all chemical classes examined here peaked in concentration near Pensacola, FL and Galveston, TX
- In seawater, TPH concentrations peaked off Pensacola, FL, and all classes examined peaked off of the Mississippi River mouth, LA, and Galveston, TX
- In marine fauna and flora, TPH and PAHs peaked near the Mississippi River mouth. C-3 naphthalenes peaked near the spill site.

Conclusions

- **In commercial seafood, TPH peaked near the spill site. PAHs and all classes examined peaked near Pensacola, FL**
- **Oil concentrations should be monitored in these media well after the spill has ceased – and prior to fisheries being opened. Hydrocarbon levels should be deemed at appropriate levels prior to fisheries openings.**

Thank you.



Acknowledgments

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and McKee, Attorneys-at-Law, Fort Lauderdale, FL**
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- **Barbara Wiseman, President, The Lawrence Anthony Earth Organization (LAEO)**
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- **Michael Boatright, EcoRigs.org**
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University of North Carolina at Wilmington**
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Human Blood



<http://www.nytimes.com/2013/02/24/business/energy-environment/bp-and-gulf-coast-states-jockey-over-settlement-on-deepwater-horizon-oil-spill.html?pagewanted=all>

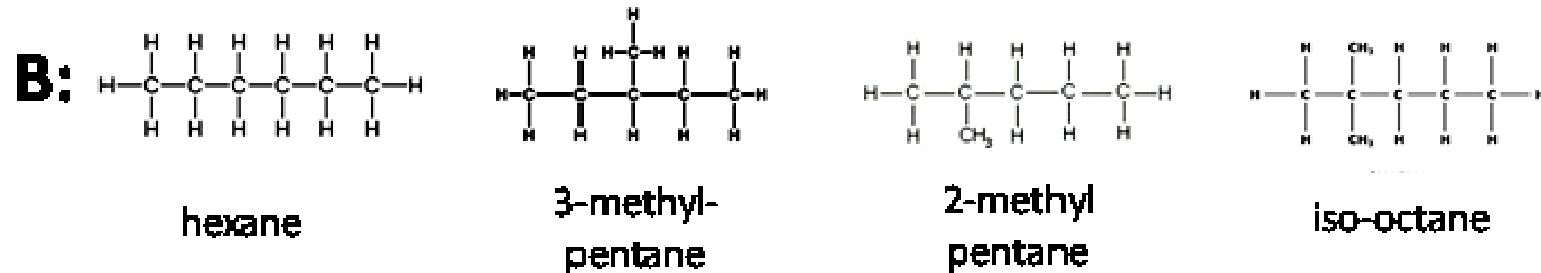
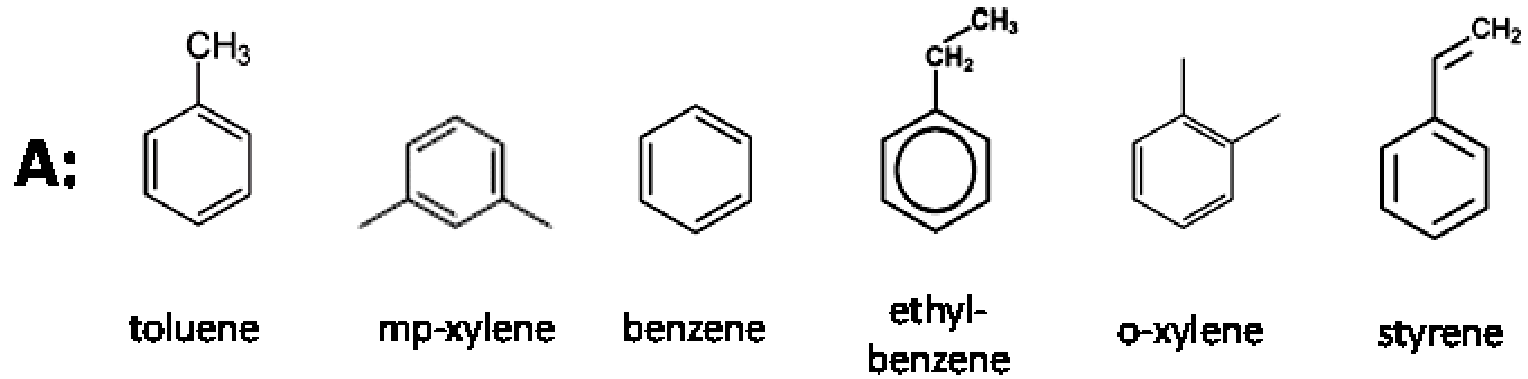
Human Blood



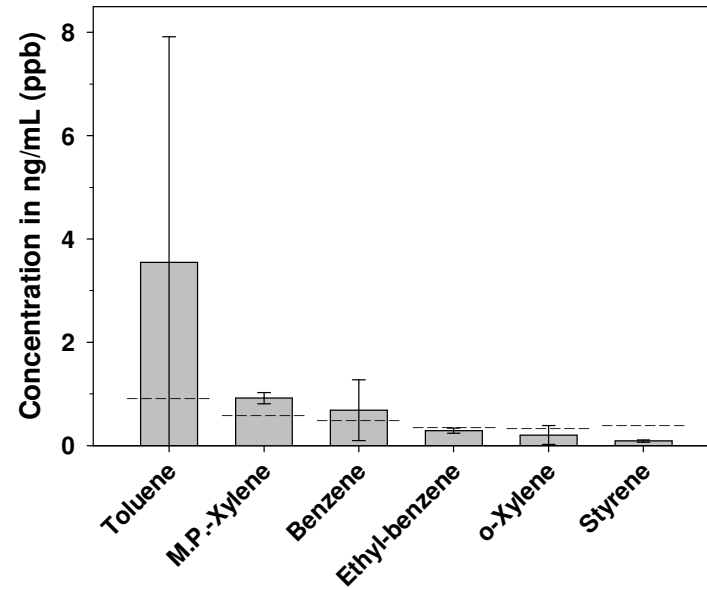
<http://www.rsc.org/chemistryworld/News/2010/August/03081001.asp>

Petroleum Hydrocarbons in Human Blood

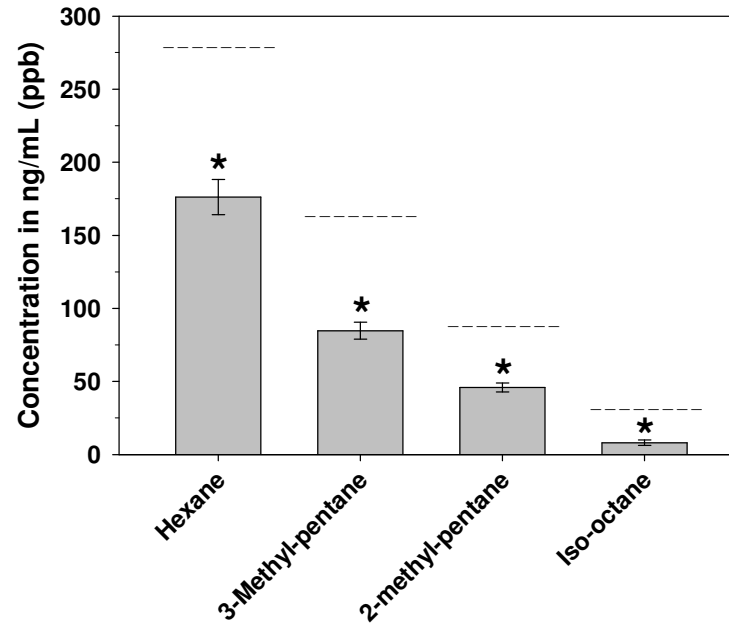
Structure of Volatile Organic Compounds Found



Volatile Organic Compounds - Human Blood



Ring Compounds



Chain Compounds

Time to toss out our old ideas of ignoring species invasions



Fig. 3

Sediment Total Petroleum Hydrocarbons (TPHs)

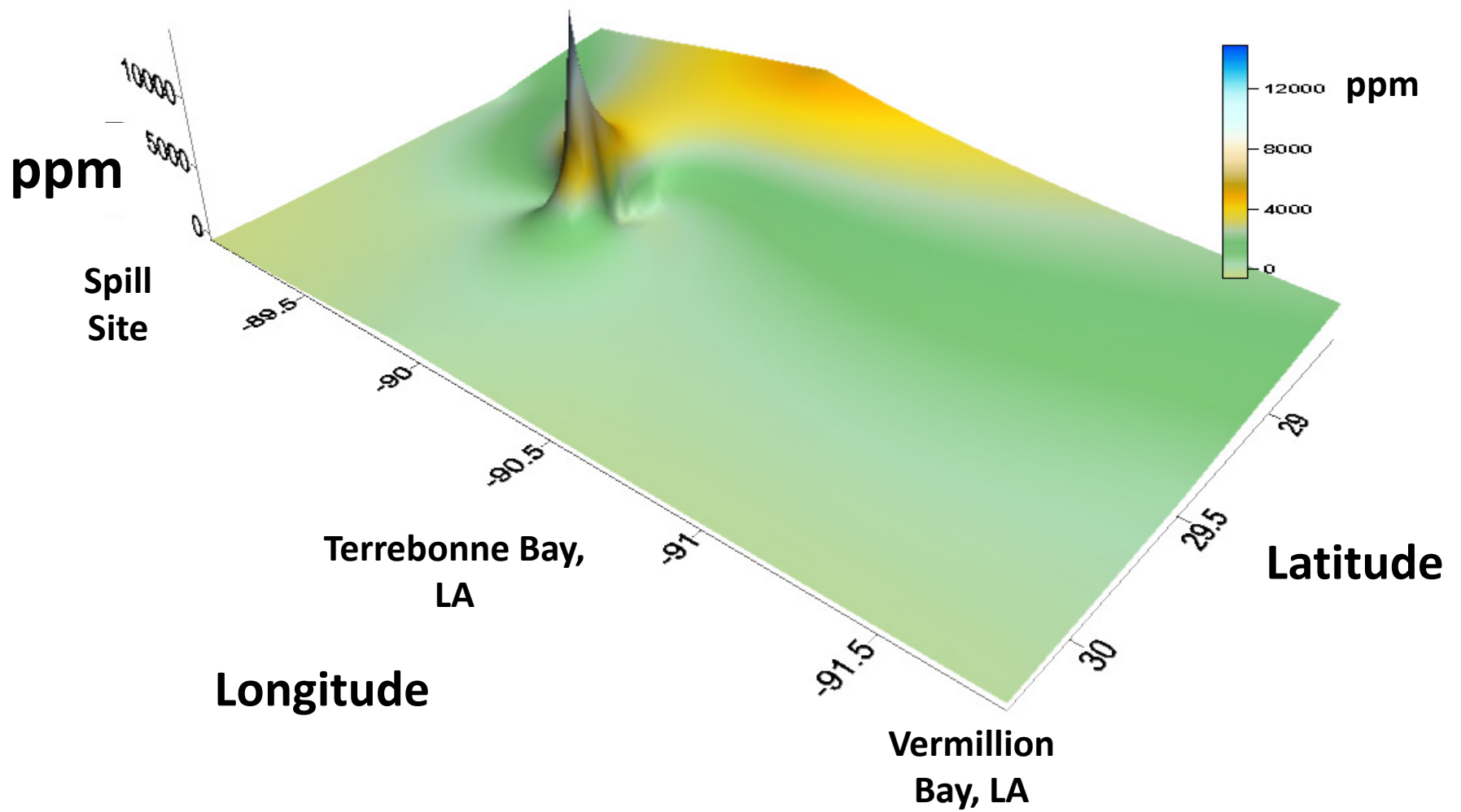
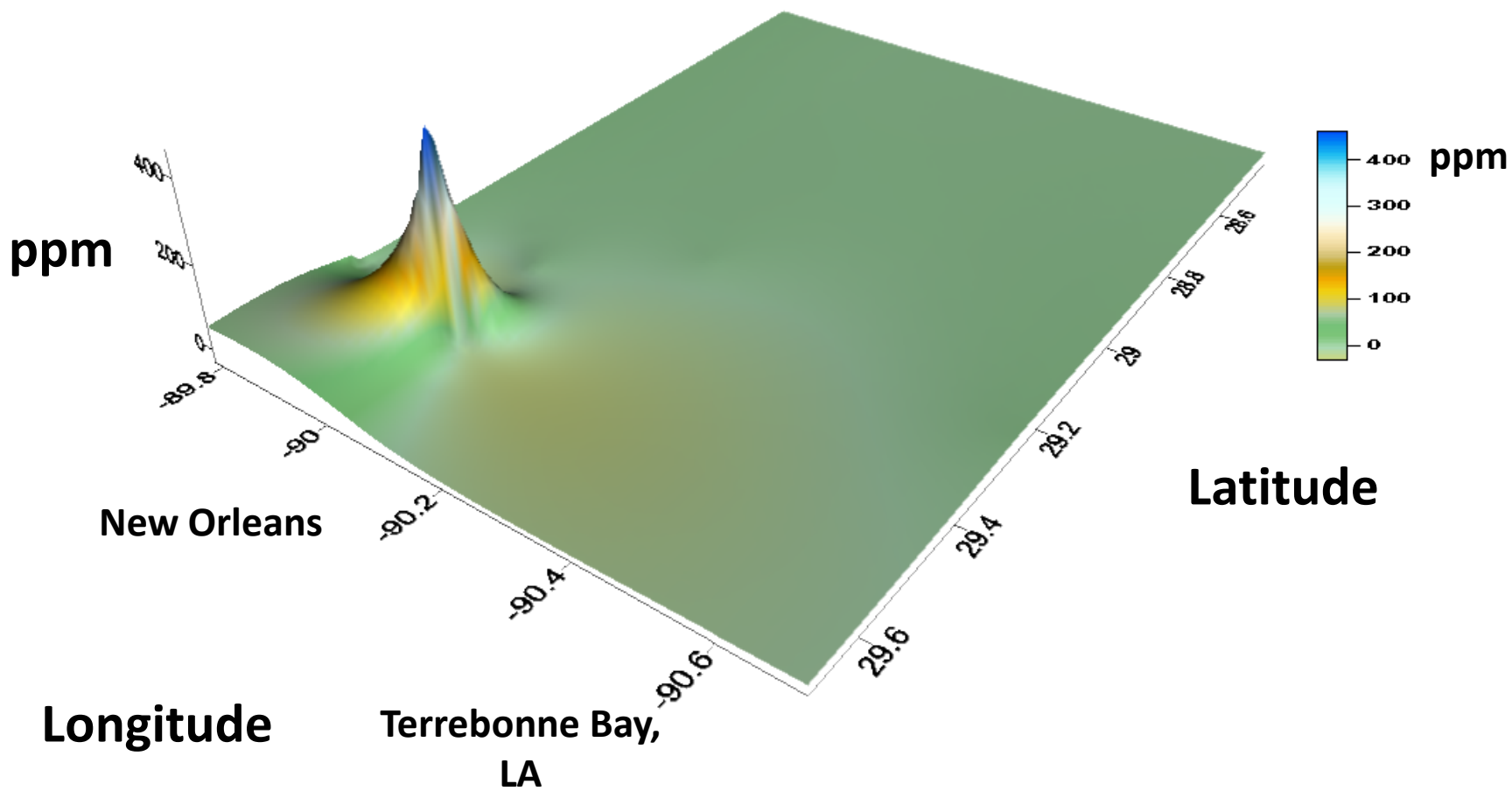


Fig. 4.

Water Samples Total Petroleum Hydrocarbons (TPHs)

mg/L

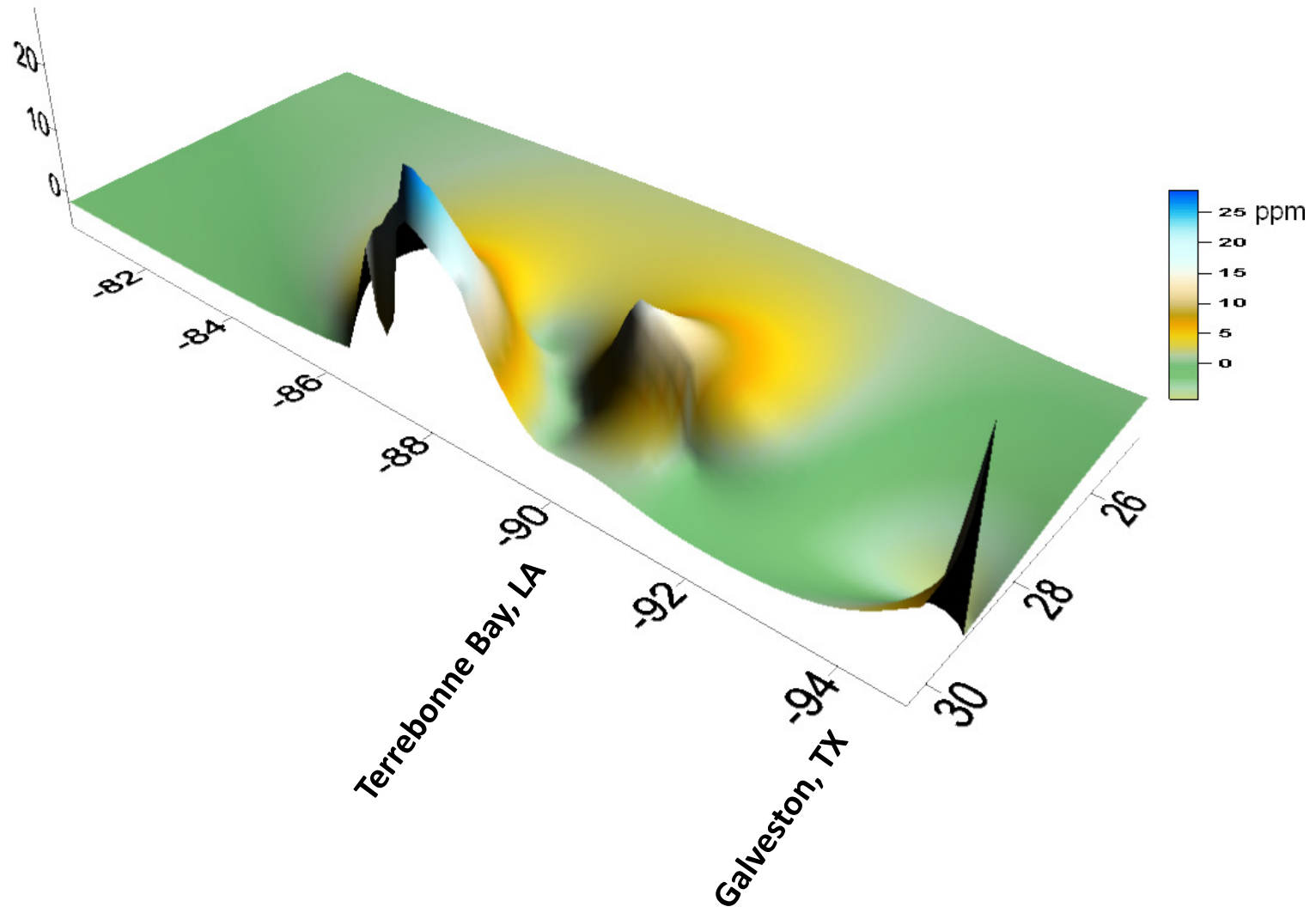




Treat your food to something good



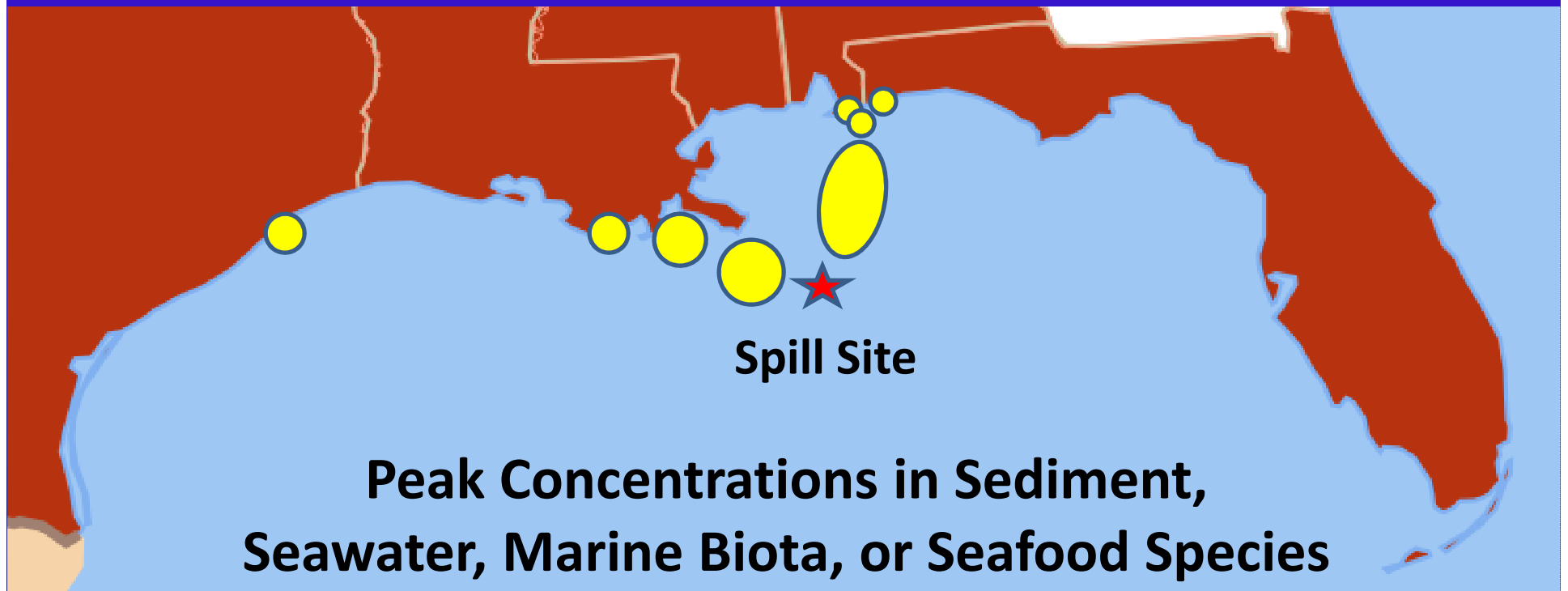
<http://www.billpressshow.com/2010/05/17/president-obama-discusses-the-gulf-oil-spill/>





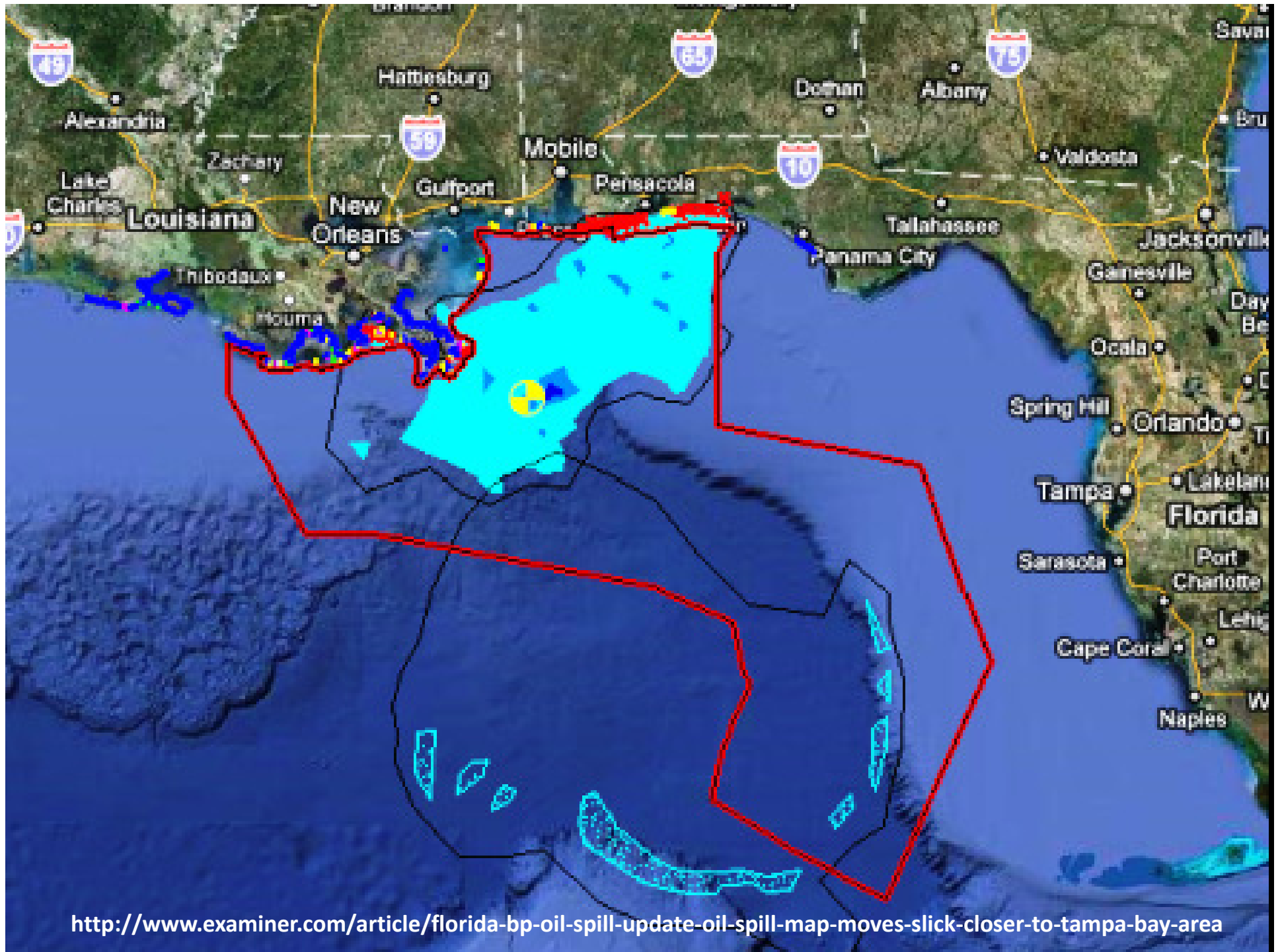
<http://www.bbc.com/news/business-21609888>

Petroleum Hydrocarbon Concentrations during and after The BP/Deepwater Horizon Oil Spill - 2010



Thank you





<http://www.examiner.com/article/florida-bp-oil-spill-update-oil-spill-map-moves-slick-closer-to-tampa-bay-area>

