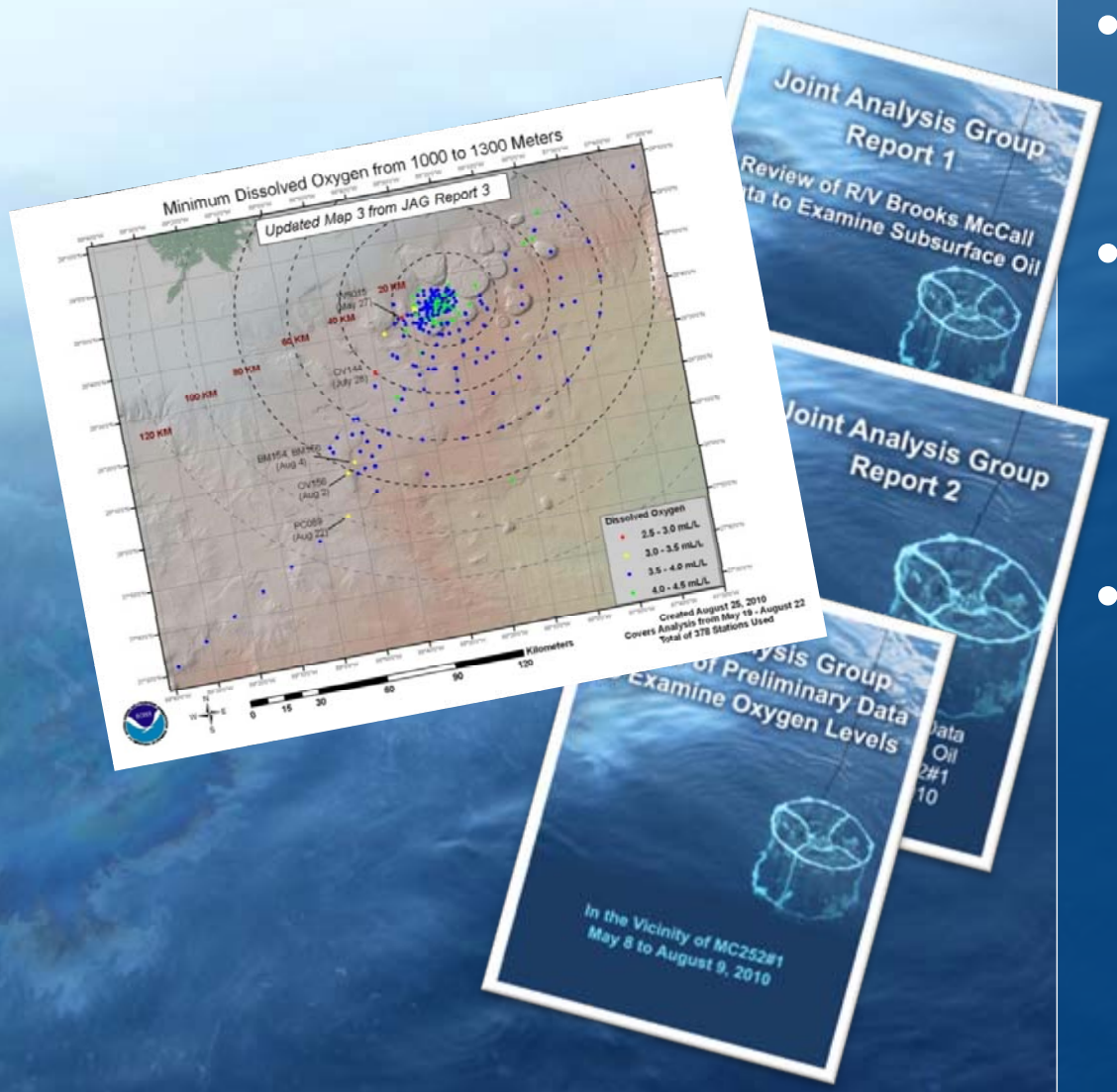
MC252/
DEEPWATER HORIZON
JOINT ANALYSIS GROUP
Subsurface Monitoring Data and Analysis

The Joint Analysis Group
December 14, 2010

Interagency Charge to JAG



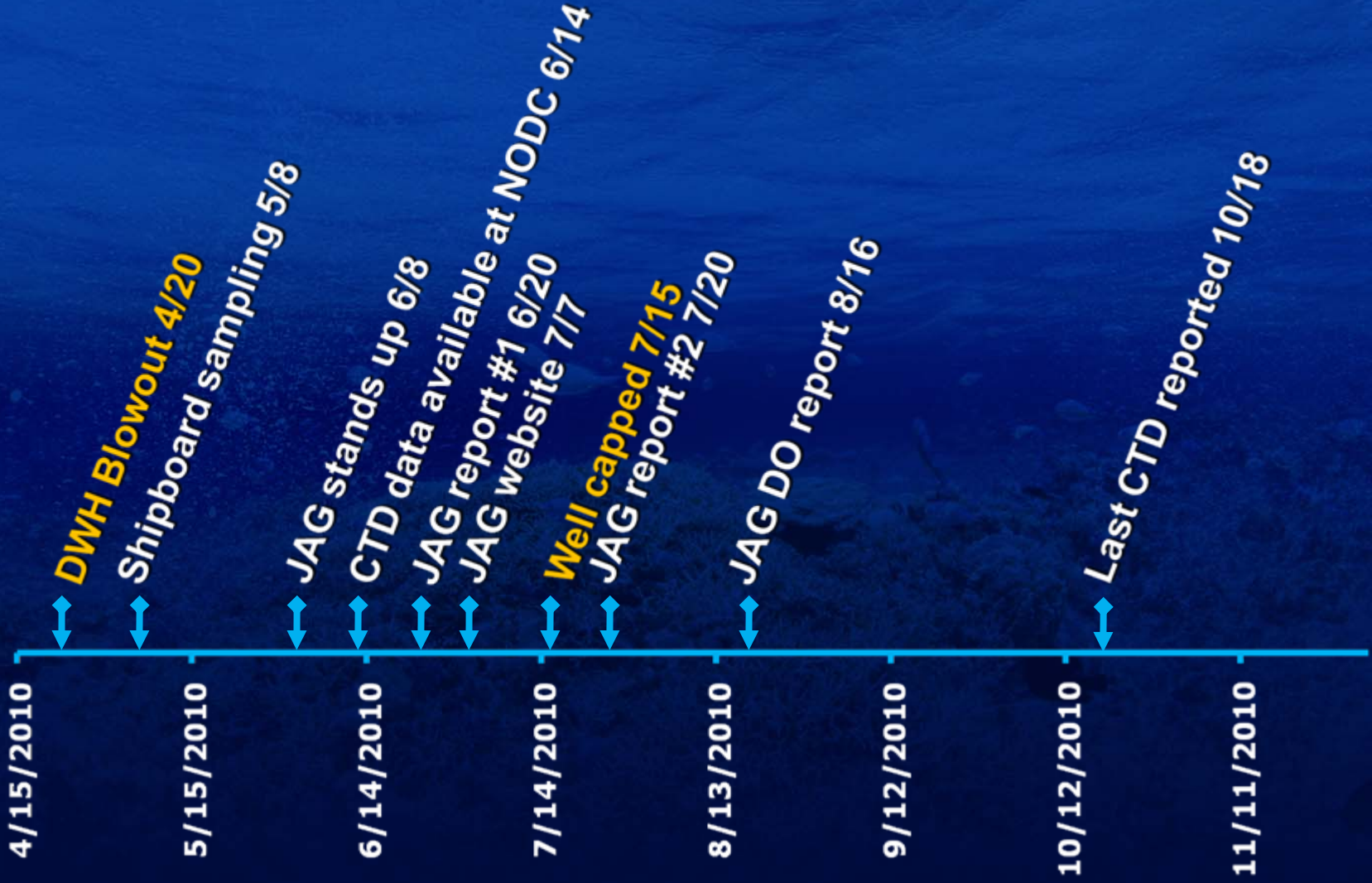
- Working group of scientists from EPA, NOAA, OSTP, Academia, BP
- Analyze an evolving database of subsurface oceanographic data developed for the response effort
- Actions:
  - Assemble and analyze data
  - Describe the distribution of oil and dissolved gas, and the oceanographic processes affecting their transport
  - Recommend and oversee additional response actions needed

DWH Response Water Profiling

- SeaBird SBE-9/11 + CTD
- WET Labs CDOM Fluorometer
- Chelsea Aquatrack-a Fluorometer
- SeaBird SBE-43 Dissolved Oxygen Sensor
- Sequoia LISST
- Rosette with Niskin bottles
  for water sampling, analyzed
  for: PAHs
  Methane
  TPH, BTEX
  Rotifer toxicity (rototox)
  DO – Winkler titrations

- 23 vessels, 85 cruises, ~1600 CTD casts, several thousand water samples

Timeline


4/15/2010
5/15/2010
6/14/2010
7/14/2010
8/13/2010
9/12/2010
10/12/2010
11/11/2010
DWH Blowout 4/20
Shipboard sampling 5/8
JAG stands up 6/8
CTD data available at NODC 6/14
JAG report #1 6/20
JAG website 7/7
Well capped 7/15
JAG report #2 7/20
JAG DO report 8/16
Last CTD reported 10/18

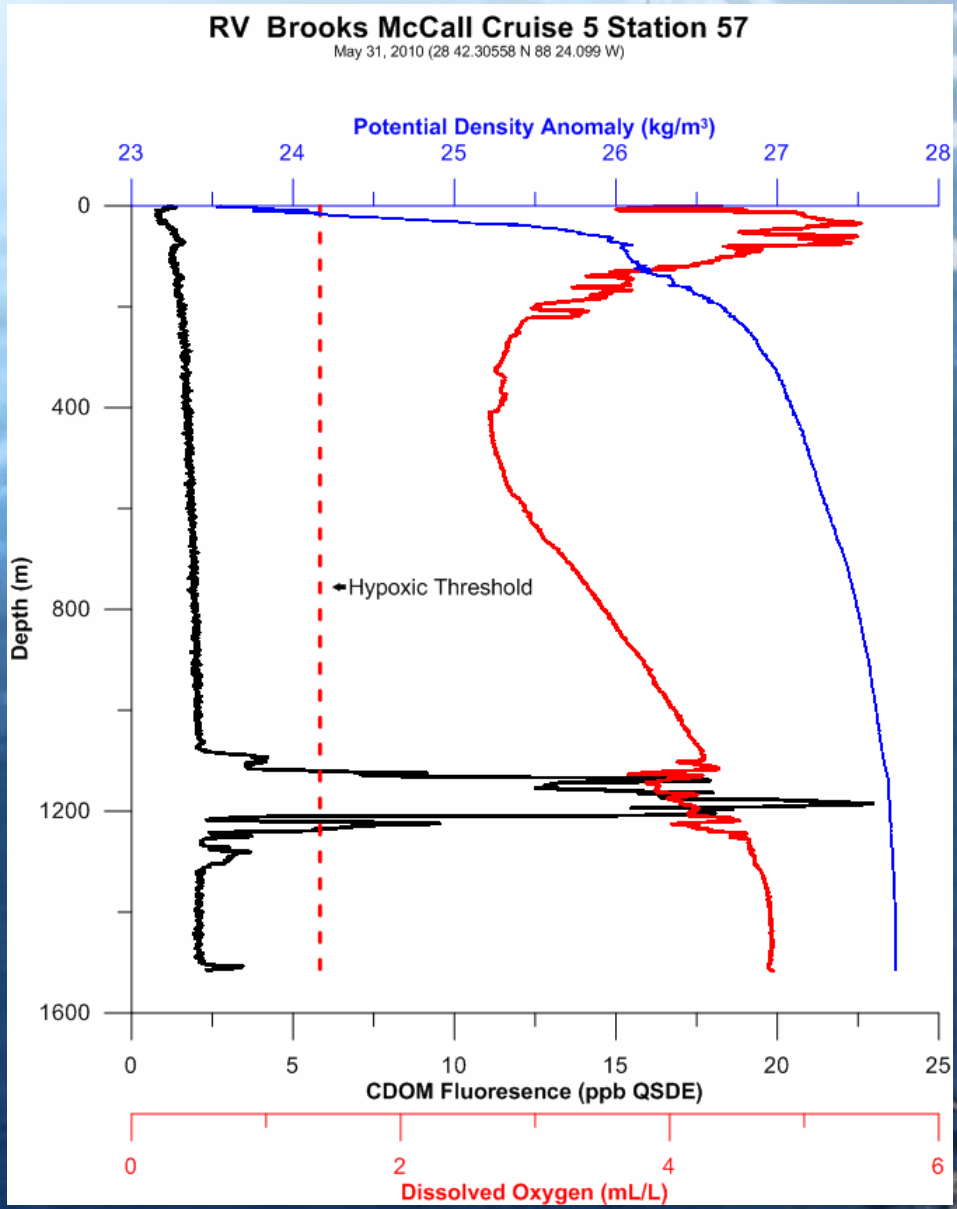
CDOM Fluorometer

Vertical profile showing fluorescence peaks between 1100 and 1300 m, coincident with DO depression.

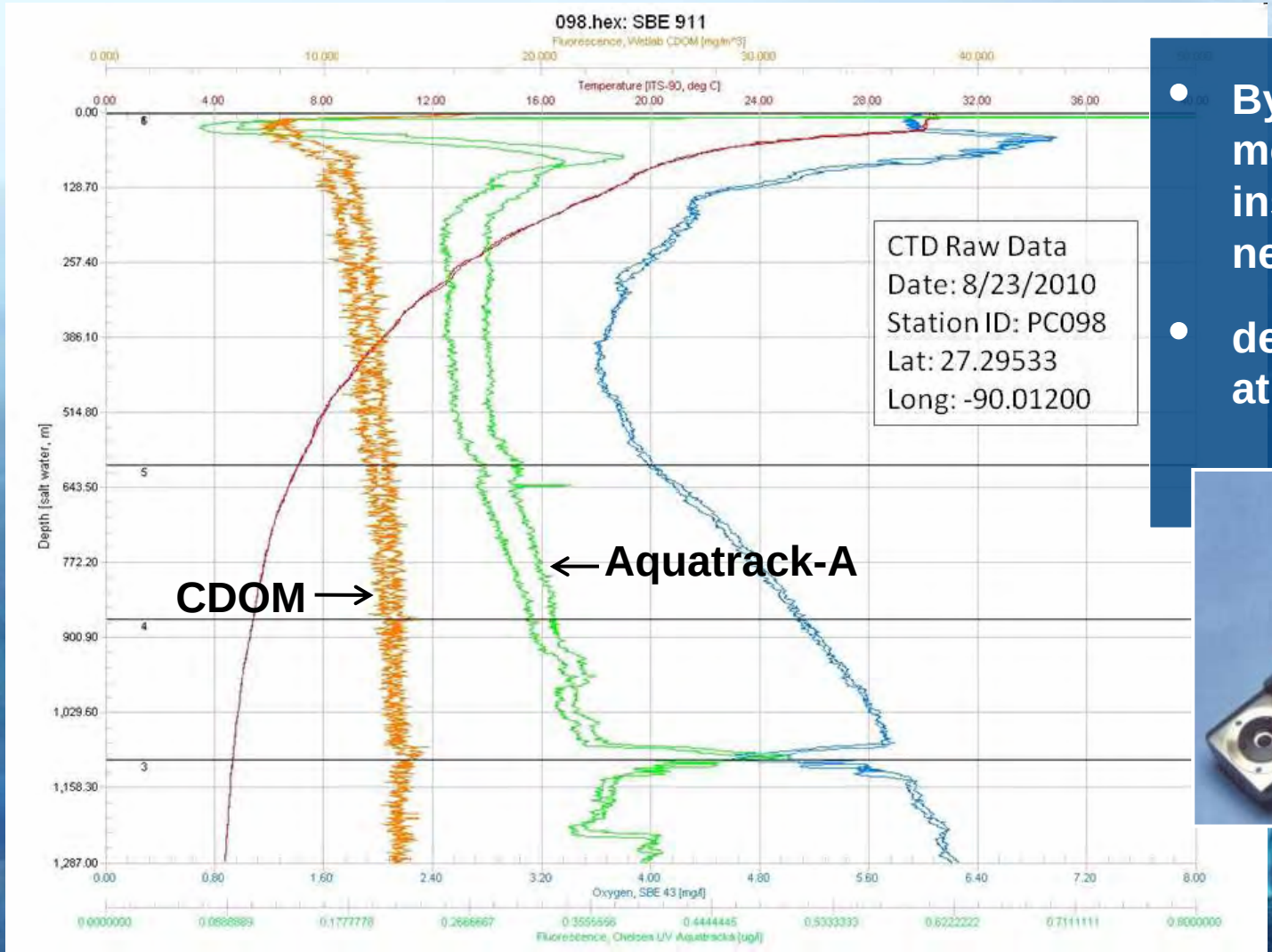
Fluorescence peaks did not extend to the seafloor, indicating a plume of oil.

Maximum concentration observed was 34 ppm above background.

Minimum detection limit is 1 ppm



Chelsea Aquatrack- a



- By the end of Aug. more sensitive instruments were needed
- detecting a peak at 0.35 - 0.5 ug/L

Preliminary Conclusions from Spill Response CDOM Fluorometry

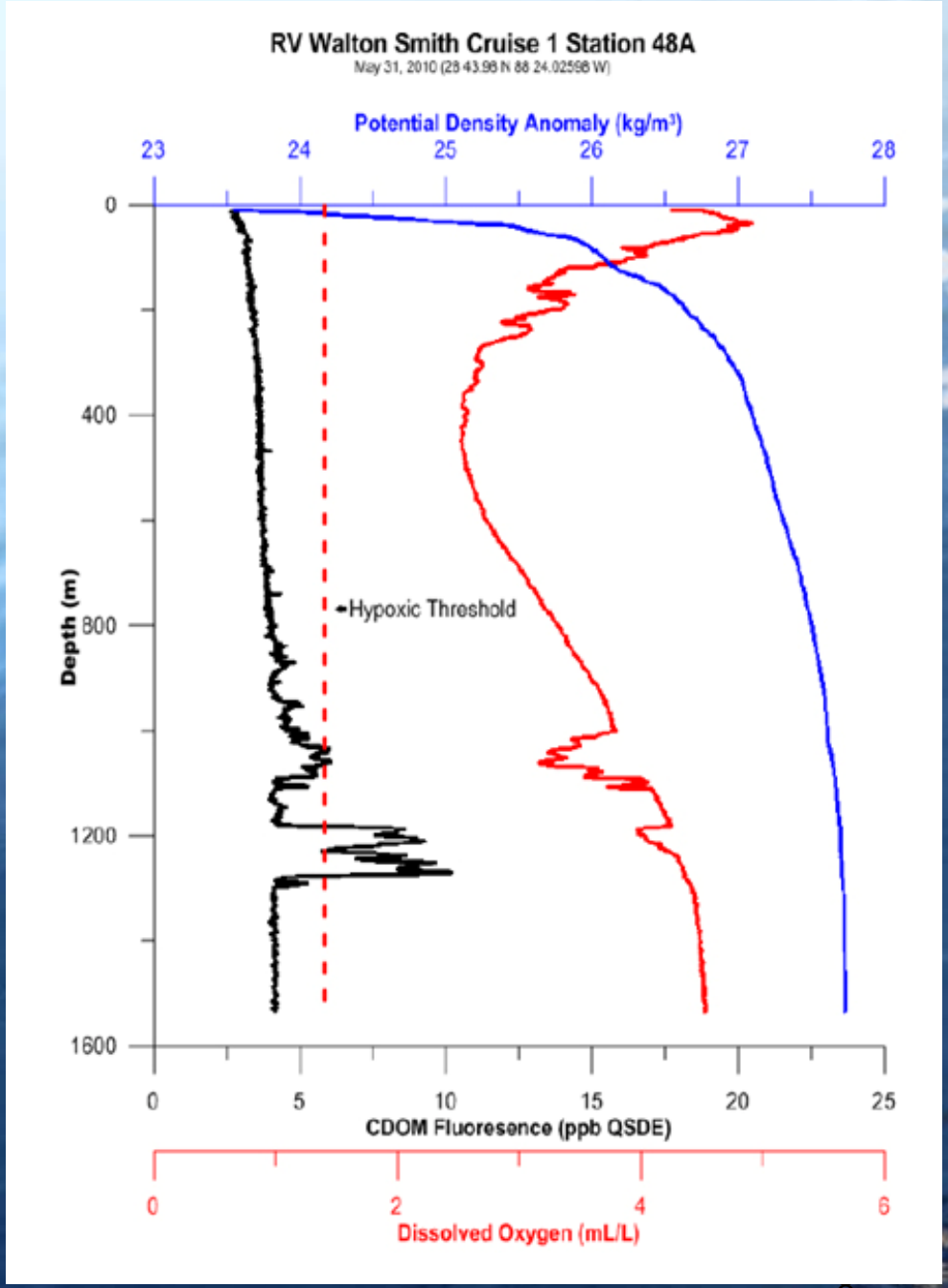
- **Fluorometry shows recurring anomaly at 1000 to 1300 m**
  - **Strongest near wellhead, decreases with distance**
  - **Trending WSW to NE direction consistent with water movement along isobath**
  - **Active natural seeps mapped ~12 km SW and 17 km NE of wellhead, which could contribute to the signal**
  - **Natural Organic Matter contributes to fluorescence signal, so the fluorescence observed is not solely due to oil**

SeaBird SBE-43 Dissolved Oxygen Sensor

Vertical profile showing 2 DO depressions coincident with CDOM fluorescence peaks

Various handheld probes were used on ship to validate the SBE-43 sensor, since polarographic membrane technology had not been certified at depths below 1000m

Automated Winkler titrations were added later in the response effort

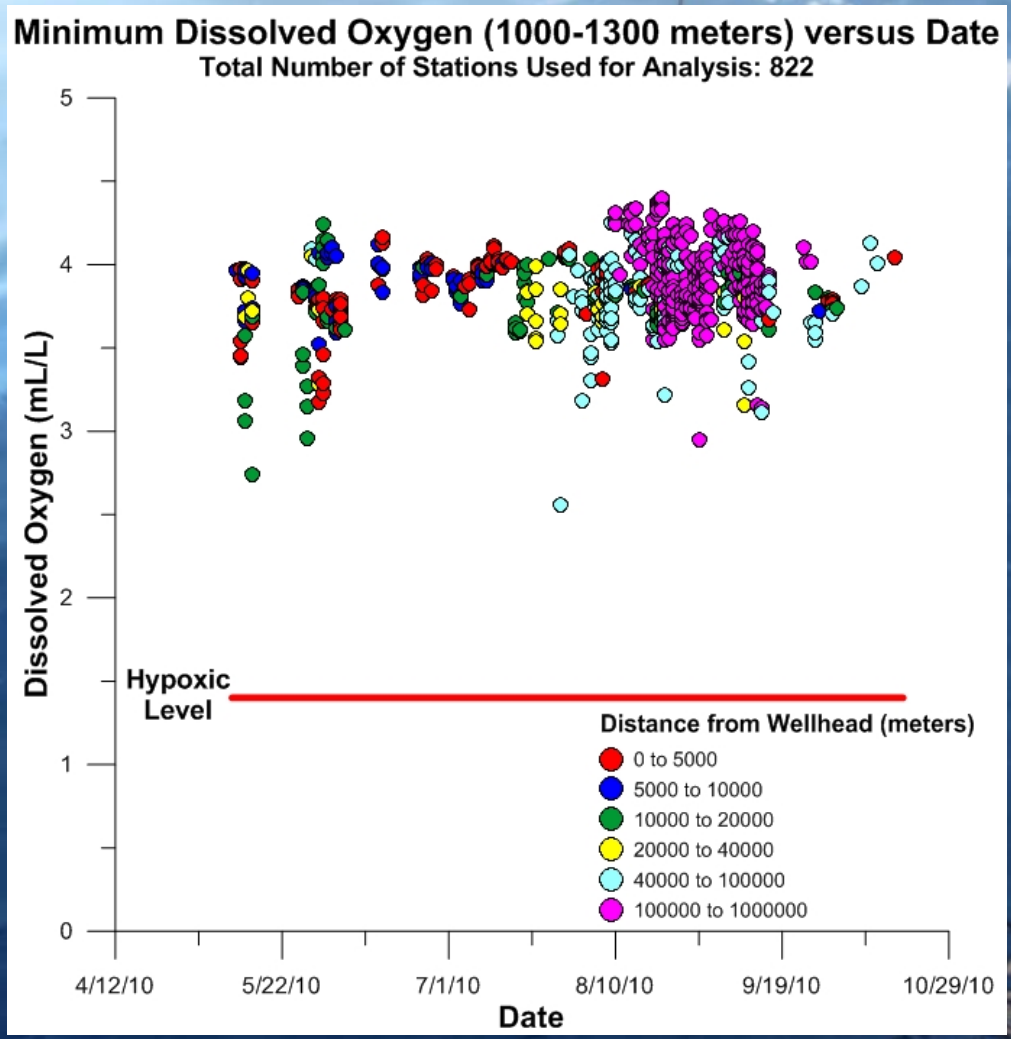


Deep Dissolved Oxygen Minimum: Time Evolution

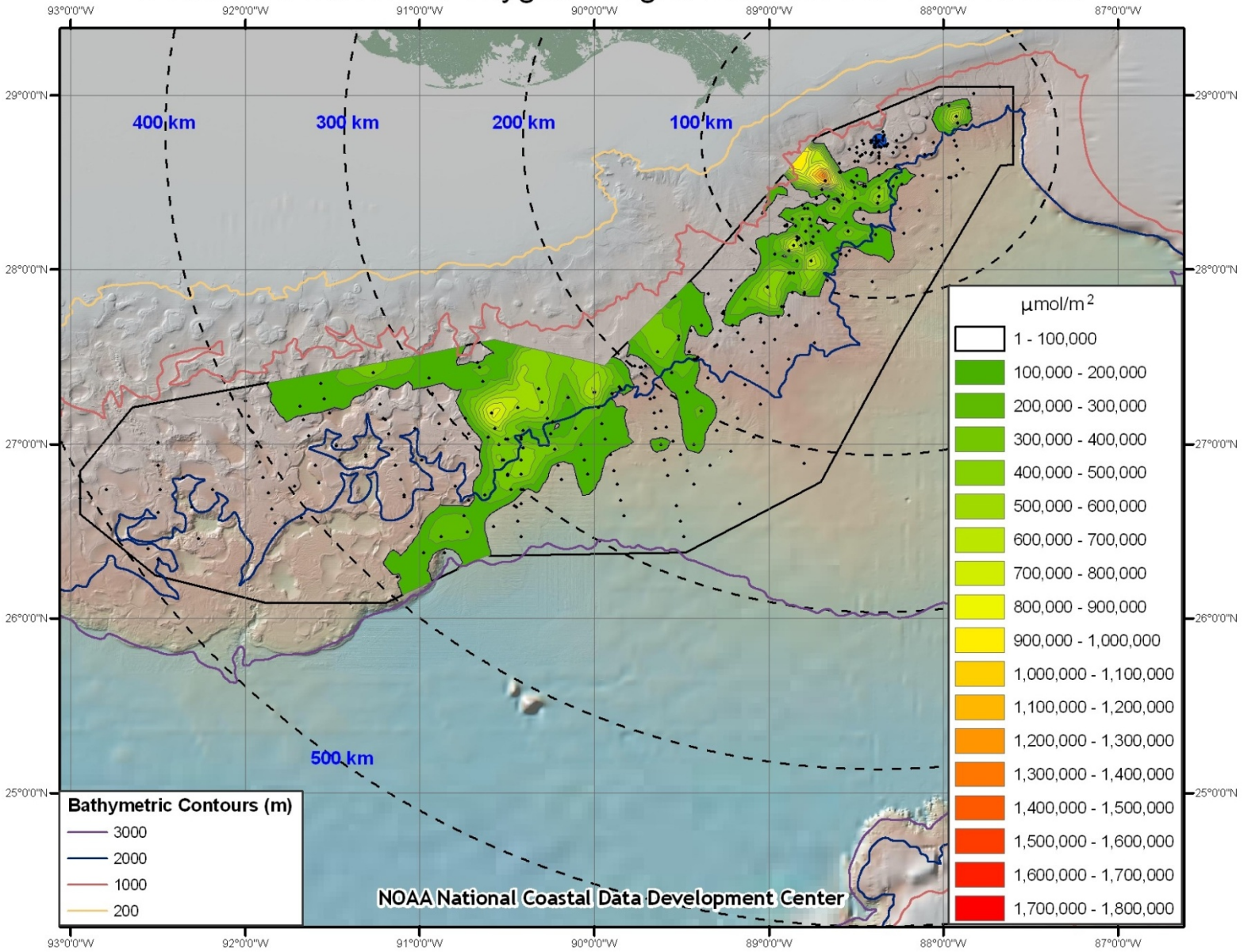
Plot showing minimum SBE43 DO in the depth range 1000-1300 m, versus distance from wellhead (x-axis) and time (colors). Red line indicates nominal hypoxia (1.4 mL/L)

Deep DO depressions continued to occur in the far field into September, however…

…at no time or location did measured deep DO approach hypoxic levels



Detrended Dissolved Oxygen Integral from 1000 to 1300 Meters



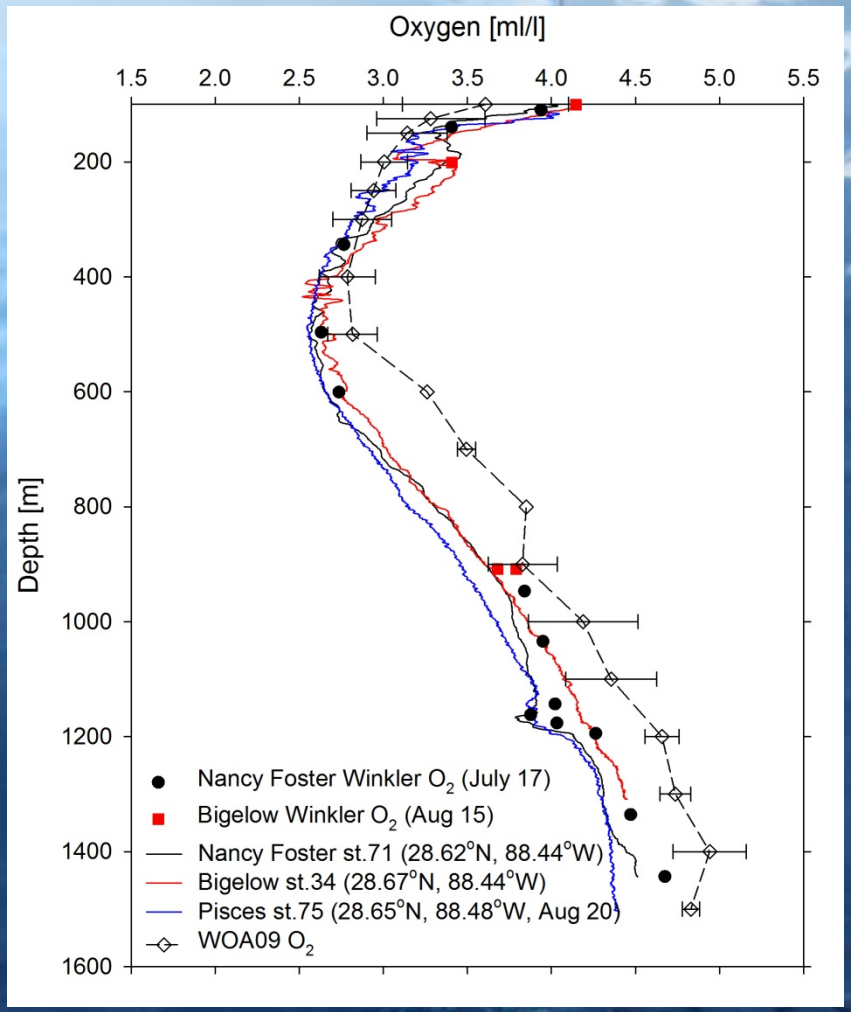
N
W E
S

0 50 100 200 Kilometers

Created Dec. 10, 2010
Covers Analysis from July 22 - Oct. 16
Total of 484 Stations Used

Conclusions from Spill Response Dissolved Oxygen

- DO depressions were found relative to background concentrations
- Lowest concentrations were 2.56 ml/L and 2.96 ml/L, compared to a spring climatological mean of 4.8 ml/L
- DO depressions did not approach hypoxic levels (approximately 1.4 ml/L)
- Depressions were observed at stations and depths where oil was observed (coincident with fluorescence signal indication of oil)



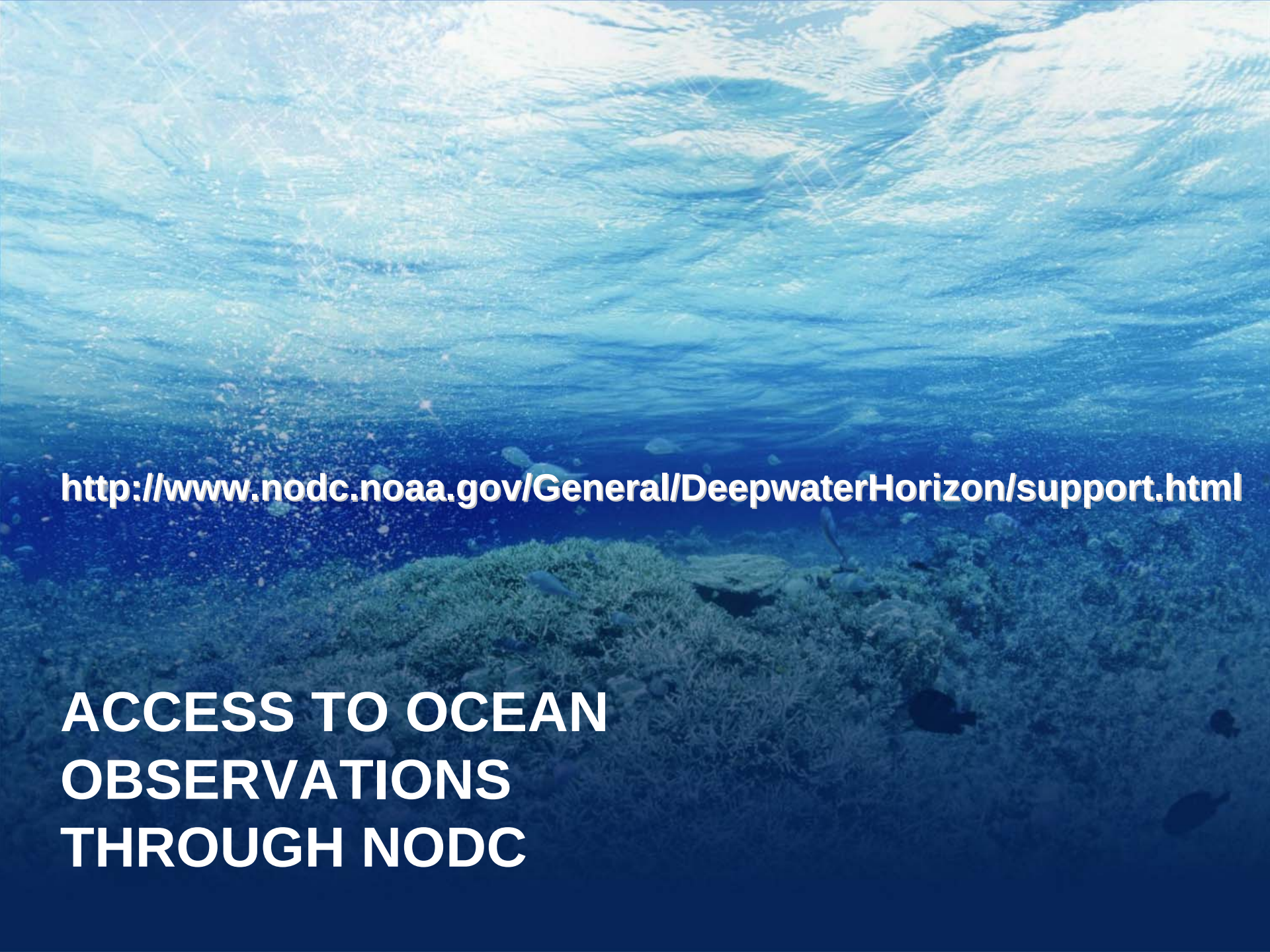
SBE 43 dissolved oxygen compared against Winkler titration values and climatological values from the World Ocean Atlas

Summary of Preliminary Chemistry Information

Number of results in concentration ranges; n = 2779 individual samples (from 1000-1300 m)

Concentration	Total VOA	TPH
<10 µg/L	1,484	1,836
10 – 100 µg/L	104	33
100– 1,000 µg/L	129	0
> 1,000 µg/L	16	0

- Highest level of semivolatiles at depth = 78 µg/L
- Highest level of TVOAs = 1800 µg/L
- PAHs being assessed currently
- QA/QC of data and metadata development is ongoing


http://www.nodc.noaa.gov/General/DeepwaterHorizon/support.html
ACCESS TO OCEAN OBSERVATIONS THROUGH NODC

Ocean Profile Data

- Processed, ascii (csv)
- Processed, netCDF-CF
- Unprocessed, hex files
- OPeNDAP web services

ACCESS TO OCEAN OBSERVATIONS THROUGH JAG WEBSITE

JAG website

- JAG reports
- CTD data via OPeNDAP/THREDDS
- Links to NOAA, EPA, interagency sites

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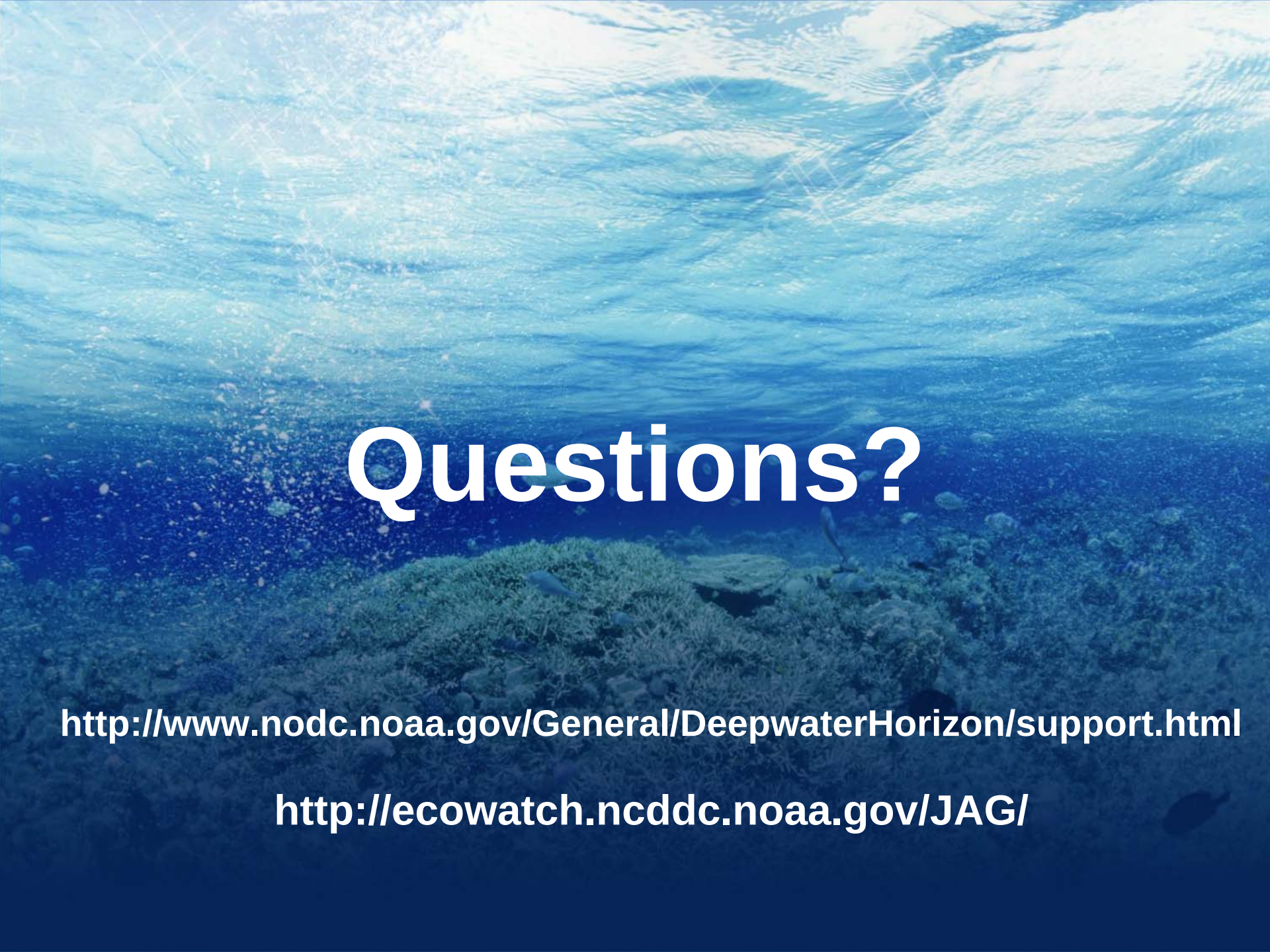
Questions?
http://www.nodc.noaa.gov/General/DeepwaterHorizon/support.html
http://ecowatch.ncddc.noaa.gov/JAG/

Additional websites of interest

http://www.noaa.gov/deepwaterhorizon/

http://www.geoplatform.gov/response

http://www.data.gov

http://www.epa.gov/BPSpill/