WELCOME

Deepwater Horizon Dispersant Data Webinar

Hosted by NRT and Coastal Response Research Center

July 13, 2010

Deepwater Horizon Dispersant Data Webinar

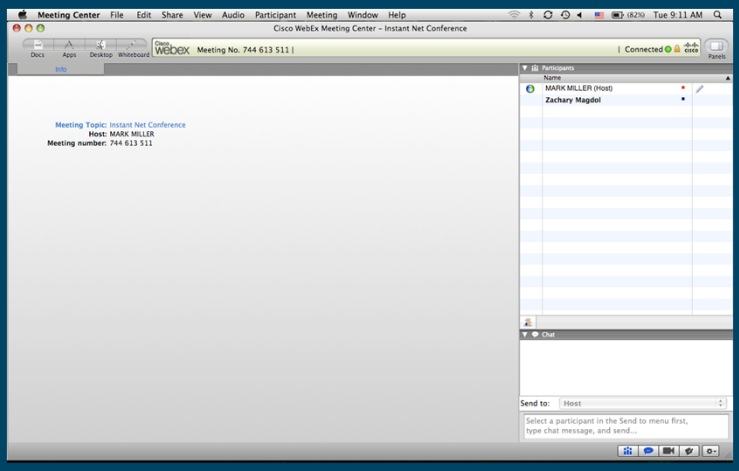
July 13, 2010

Nancy E. Kinner, Facilitator
Coastal Response Research Center (CRRC)
UNH Co-Director

LOGISTICS

- MUTE PHONE
- DO NOT PUT PHONE ON HOLD
- Goal to keep meeting within 4 hours
  - If operational demands limit participation and you must drop off line, report will be available in early August
- One 15 minute break; working through lunch

WEBINAR DISPLAY



PARTICIPANT INTRODUCTIONS

- **Name**
- **Affiliation**
- **Current location**

- Nancy Kinner, Coastal Response Research Center, Coast Guard HQ

PARTICIPANT REPRESENTATION

- Diverse group participating:
  - Responders
  - Scientists
  - Planners
  - Coordinators
- Federal and state partners
- Focus of webinar is on data and NOT response operations

CRRC ROLE IN TODAY'S MEETING

- CRRC Facilitation Experience
- CRRC History With Dispersants R&D
- CRRC Leadership of DWG
- CRRC: Independent and Honest Broker
  - NH not oil-producing state
  - UNH independent academic affiliation
  - Strong record of peer review
  - Known for bringing all stakeholders into discussions

KEY PERSONNEL

- Facilitator: Nancy Kinner, CRRC Co-Director
- Assistant facilitator: Zachary Magdol, CRRC Research Engineer
- Logistics POC: Kathy Mandsager, CRRC Program Coordinator, kathy.mandsager@unh.edu, 603-498-8010
- Note takers: CRRC Staff and Students at UNH

MEETING PURPOSE

- Determine data available on:
  - Effectiveness
  - Effects
- For surface and subsurface dispersant application
- Context is efficacy and safety of dispersant use for Deepwater Horizon (DWH) response
- Goal is data coordination from all response partners

DATA AVAILABILITY

- What data exist? (e.g., data of dispersant effectiveness)
- Who has that data?
  - Where do the data reside?
  - Who has access to the data? (e.g., Agency X, FTP Site Y, All members of the Unified Command)
- What type of data is it? (e.g., LISST droplet size distribution data)
- What is the spatial and temporal extent of the data?
- Are there any data gaps or inconsistencies with this data? (e.g., due to poor weather, one location (x,y,z coordinates) could not be sampled on June 20, 2010)

MEETING GOALS

1. What data are available regarding the effectiveness and effects of the surface application of dispersants?
2. What data are available regarding the effectiveness and effects of the subsurface application of dispersants?
3. Are there any issues with the data (e.g., spatial or temporal inconsistencies)?
4. Are there significant gaps in the data?

Webinar will NOT involve discussion of policy, strategy, or risk assessment related to dispersant use.

MEETING GOALS

- Is data sufficient to support conclusions regarding effectiveness and effects of: (a) surface and (b) subsurface application of dispersants?
- Can inconsistencies in data be addressed?
- How can data gaps be filled?

MEETING REPORT

- Report will be produced by CRRC
- Report will include:
  - Source, location, access and type of data
  - Inconsistencies associated with data
  - Data gaps
  - Summary of discussion/synthesis
  - Appendices:
    - Agenda, Participants, Presentations
- Report <u>will not</u> be posted on CRRC website

MEETING REPORT

- Report will be produced by CRRC
- Report will be reviewed by the presenters and the DWH Interagency Solutions Group (representing the NRT)
- Report will be distributed to all participants
  - Via email as PDF
- Anticipated release early August

AGENDA

10:30	**Welcome**	**Nancy Kinner, CRRC (Facilitator)**
10:35	Comments from NRT Agency Leads	**Bob Pond, USCG** **Roberta Runge, EPA**
10:45	Ground Rules, Participant Introductions	**Nancy Kinner**
11:00	Flow Rate Data	**Mark Sogge, USGS**
11:15	Oil Budget Tool	**Lt. Amy McElroy, USCG**
11:20	Surface Dispersant Data	**Marc Greenberg, EPA** **Craig Carroll, EPA/RRT 6 Co-Chair**
11:40	Subsurface Dispersant Data/Toxicity Data	**Greg Wilson, EPA**
12:00	***BREAK***	

AGENDA

12:15	**Operational Data**	**Jordan Stout, NOAA/ORR/SSC**
12:35	NRDA Generated Data	**Debbie French McCay, ASA**
12:50	Seafood Safety	**John Stein, NOAA/NWFSC**
13:05	"Plume" Science	**Sam Walker, NOAA/IOOS**
13:20	Other NOAA Data	**Ann Hayward-Walker, SEA**
13:35	**Other Data Sources**	

AGENDA

13:45	**Discussion/Synthesis** **1) Is this data sufficient to support any conclusions regarding the effectiveness and effects of: (a) surface and (b) subsurface application of dispersants?** **2) Are there significant data gaps that need to be filled? Can they be filled?** **3) Are there inconsistencies in the data that need to be addressed?**	
14:30	Closing Remarks	**Bob Pond, USCG** **Roberta Runge, EPA** **Nancy Kinner, CRRC**

QUESTIONS ABOUT MEETING FORMAT AND GOALS?

GROUND RULES

- Use the mute button
- One person speaking
- Introduce yourself each and every time you start speaking
- Minimize distraction and background noise
- Mobile phones are not preferred (but we understand sometimes necessary)

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12:00	***BREAK***	

PRESENTATIONS

Flow Rate Data

Mark Sogge, USGS

Coastal Response Research Center

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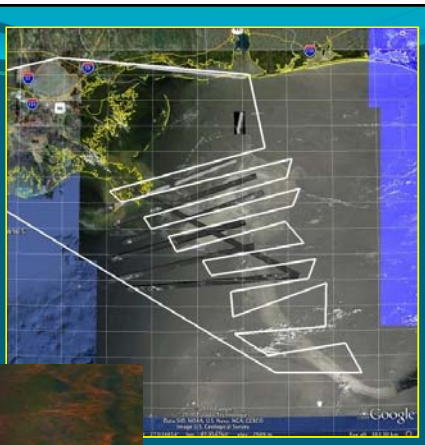
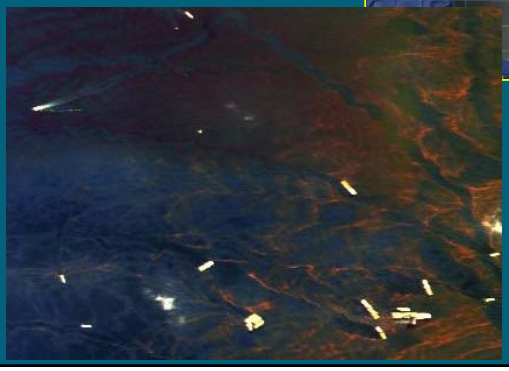
Flow Rate Technical Group

- Chartered by the National Incident Command
- Federal scientists, independent experts, university representatives
- Four independent teams developing best methods to estimate oil spill flow
  - Mass Balance Team
  - Plume Analysis Team
  - Reservoir Analysis Team
  - Nodal Analysis Team
- BP provided some raw data
- Providing preliminary and updated assessments since May 27

USGS

Flow Rate Technical Group
Mass Balance Team





USGS

Mass Balance – Discharge Rate Calculation

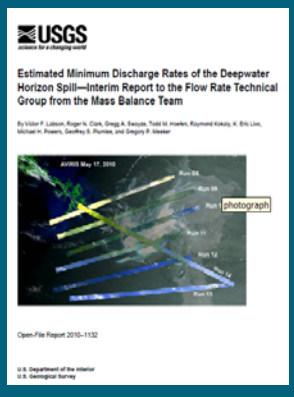
- Start with a measured sea-surface oil volume
- Add collected, burned, skimmed, evaporated, dispersed, etc.
- Divide by number of days of oil discharge

RESULT = Average Daily Discharge Rate

Flow Rate Technical Group

Mass Balance Team Preliminary Results

- Assessment formed from data collected May 17
- Calculated average minimum flow:
  12,600 to 21,500 barrels a day
- Report peer reviewed and published
  http://pubs.usgs.gov/of/2010/1132/

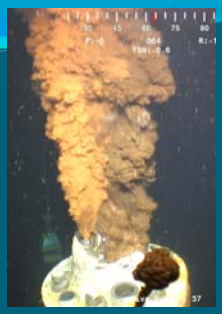


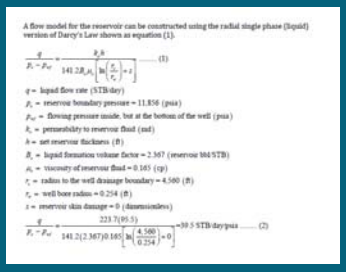
USGS

Flow Rate Technical Group
Plume Analysis Team

- Analyze video provided by BP
- Modeled via

  Particle Image Velocimetry (PIV)



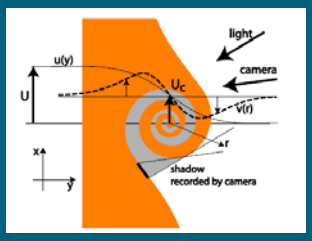


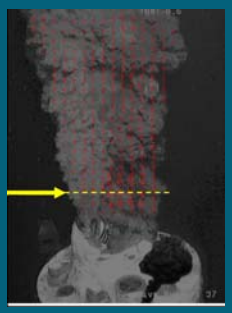
A flow model for the reservoir can be constructed using the radial single phase (liquid) version of Darcy's Law shown as equation (1).

$$\frac{q}{P_r - P_{wf}} = \frac{k_f h}{141.2 B_f \mu_f \left[\ln\left(\frac{r_r}{r_w}\right) + s\right]} \quad \text{..... (1)}$$

q = liquid flow rate (STB/day)
P_r = reservoir boundary pressure = 11,856 (psia)
P_{wf} = flowing pressure inside, but at the bottom of the well (psia)
k_f = permeability to reservoir fluid (md)
h = net reservoir thickness (ft)
B_f = liquid formation volume factor = 2.367 (reservoir bbl/STB)
μ_f = viscosity of reservoir fluid = 0.165 (cp)
r_r = radius to the well drainage boundary = 4,500 (ft)
r_w = well bore radius = 0.254 (ft)
s = reservoir skin damage = 0 (dimensionless)

$$\frac{q}{P_r - P_{wf}} = \frac{223.7(95.5)}{141.2(2.367)0.165\left[\ln\left(\frac{4,500}{0.254}\right) + 0\right]} = 39.5 \text{ STB/day/psia} \quad \text{..... (2)}$$





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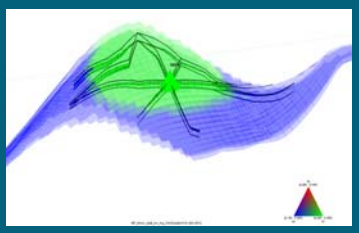
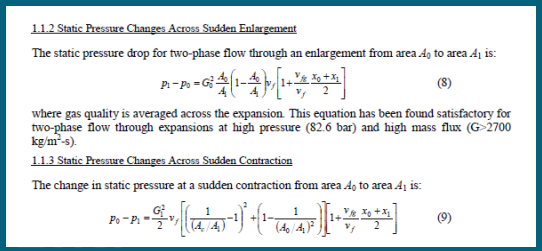
USGS

Flow Rate Technical Group
Nodal and Reservoir Teams

- Reservoir Team investigate characteristics of oil field/reservoir
- Nodal Team uses Reservoir Team and other data to model potential flow from well





1.1.2 Static Pressure Changes Across Sudden Enlargement

The static pressure drop for two-phase flow through an enlargement from area A_0 to area A_1 is:

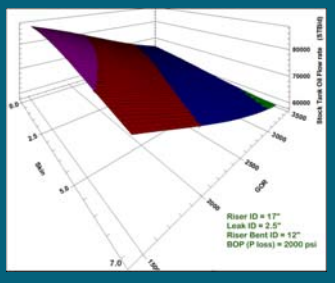
$$p_1 - p_0 = G_0^2 \frac{A_0}{A_1}\left(1 - \frac{A_0}{A_1}\right) v_f \left[1 + \frac{v_{fg}}{v_f}\frac{x_0 + x_1}{2}\right] \quad (8)$$

where gas quality is averaged across the expansion. This equation has been found satisfactory for two-phase flow through expansions at high pressure (82.6 bar) and high mass flux (G>2700 kg/m^2-s).

1.1.3 Static Pressure Changes Across Sudden Contraction

The change in static pressure at a sudden contraction from area A_0 to area A_1 is:

$$p_0 - p_1 = \frac{G_1^2}{2} v_f \left[\left(\frac{1}{(A_c/A_1)} - 1\right)^2 + \left(1 - \frac{1}{(A_0/A_1)^2}\right)\right]\left[1 + \frac{v_{fg}}{v_f}\frac{x_0 + x_1}{2}\right] \quad (9)$$



Current Government Flow Estimate

- Based on updated Plume Team analyses and collaboration with DOE science team
- Estimate released to public June 15
- Flow rate estimated at 35,000 – 60,000 BPD

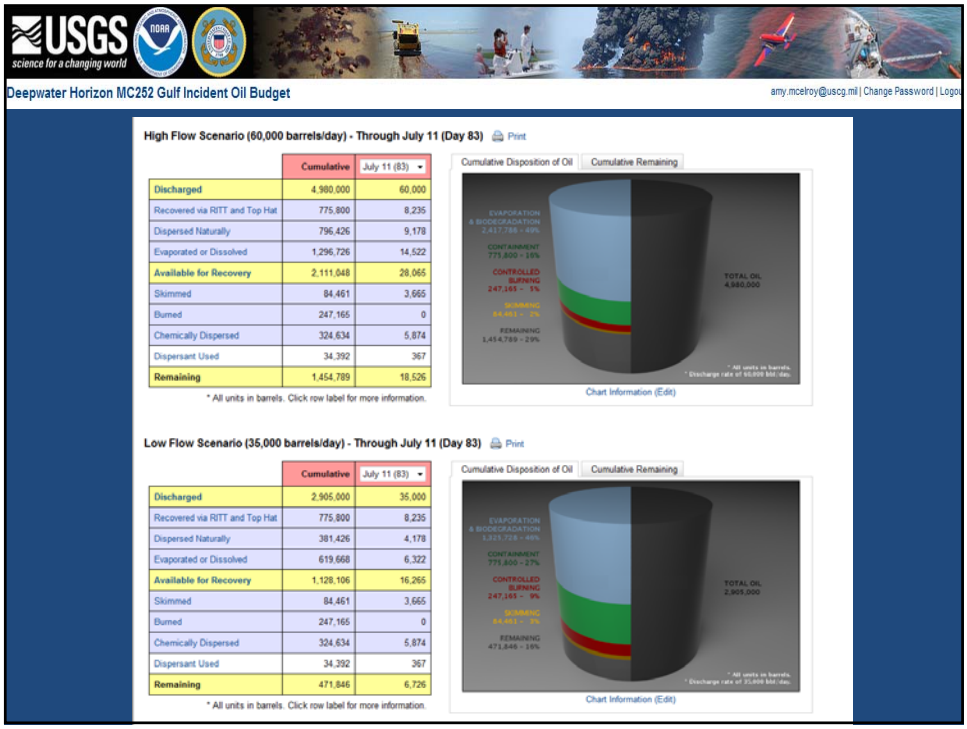
Next steps:

- Finalize analyses and estimates
- Produce FRTG Final Report

USGS

Oil Budget Data

Lt. Amy McElroy, USCG



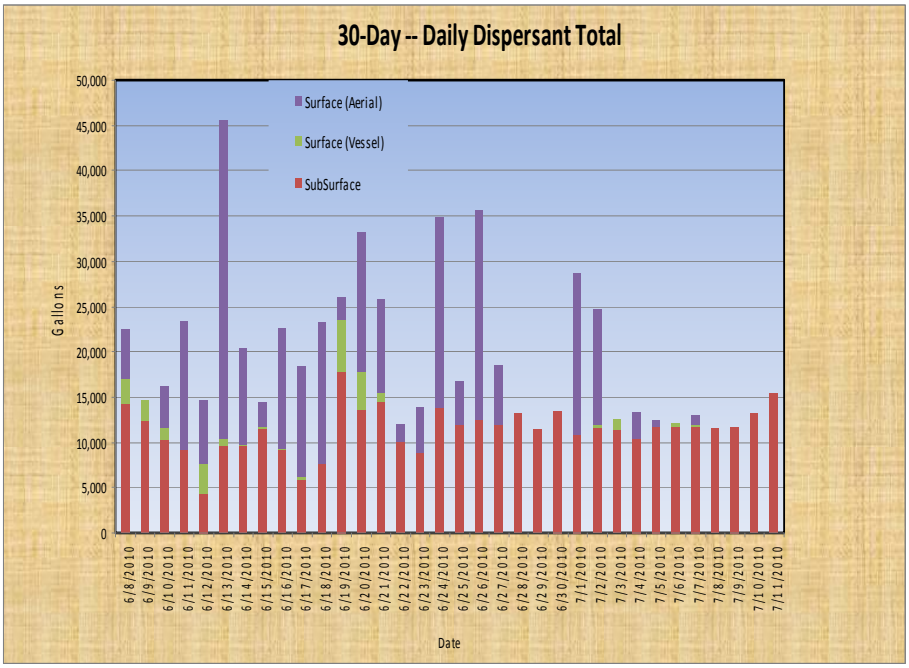
Surface Dispersant Data

Marc Greenberg, EPA
Craig Carroll, EPA/RRT 6 Co-Chair

EPA Presentation on Surface Applied Dispersant

Surface Dispersant Application

- Per RRT guidance application occurs >3 miles offshore and water depth of > 10 meters
- Applied primarily via aircraft
- As of 07/12/10
  - 404 sorties flown
  - 975,038 gallons sprayed
  - 305 sq miles covered (195,008 acres)



Surface Water and Air Monitoring and SMART Data

Data availability:

- Summary results: http://www.epa.gov/bpspill/dispersants-testing.html
  http://www.epaosc.net/deepwatersmart
  ftp://sftp.orr.noaa.gov

Data issues: none

Surface Water Sampling and Monitoring

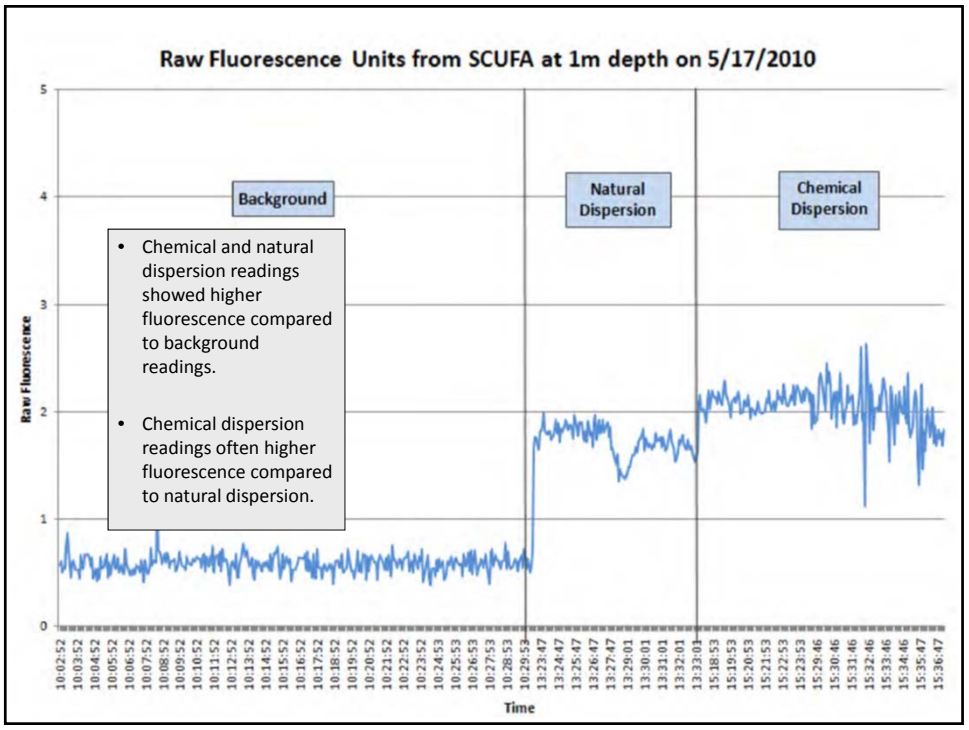
- Initiated 05/21/10 to date
- To date 508 samples have been tested for dispersant analytes
  - 2-Butoxyethanol
  - 2-Ethylhexanol
- In addition, over 50 of these have been tested for Dioctlylsulfosuccinate sodium salt (DOSS)
- Standard water quality parameters also measured.
- All samples to date have returned as Non-Detect for all analytes

Air Sampling

- TAGA analyzed for dispersant-related compounds on May 18, 2010 through June 10, 2010. No Dispersant-related compounds were detected.
- 101 PUF samples were analyzed for SVOCs since June 3, 2010. No dispersant-related compounds were found.

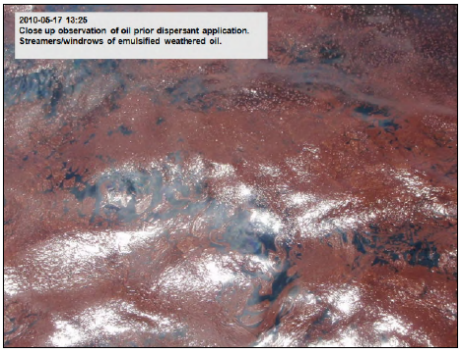
SMART Tier II/III Fluorometry

- 22 SMART monitoring sampling events from April 28 to June 13, 2010 were reviewed.
- SMART Teams measured background, natural dispersion, and chemical dispersion using fluorometry.



SMART Tier II/III Fluorometry

- Within each measurement category (*i.e.,* back-ground, natural dispersion, chemical dispersion) fluctuations in fluorescence were observed
- No depth trends were observed upon visual inspection of the fluorescence readings
- No time trends were observed upon visual inspection of the fluorescence readings



Data to date show dispersant effectiveness is consistent with our expectations

Summary of EPA Toxicity Studies on Dispersants

Comparative Toxicity of 8 Dispersants

Tests completed with 8 dispersants:
- acute toxicity tests were conducted with two Gulf of Mexico species
- *in vitro* endocrine activity and cytotoxicity were tested using mammalian cell lines

Data availability:
- Summary results: http://www.epa.gov/bpspill/dispersants-testing.html

Data issues: none

Future testing:
- oil only tests are being conducted with Louisiana Sweet Crude with two Gulf species
- oil+dispersant tests are currently being conducted with 8 dispersants with two Gulf species

Results of 48 hour acute toxicity tests of 8 dispersants to the Gulf of Mexico invertebrate, mysid shrimp (*Americamysis bahia*)

Dispersant	This Study LC50 (ppm) [95% CI]	Toxicity Category	NCP Product Schedule LC50 (ppm) [95% CI]
Dispersit SPC 1000	12 [10-14]	Slightly Toxic	16.6 [14.1-19.6]
Nokomis 3-AA	30 [27-34]	Slightly Toxic	20.2 [17.4-22.8]
Corexit 9500A	**42 [38-47]**	**Slightly Toxic**	**32.2 [26.5-39.2]**
Nokomis 3-F4	42 [38-47]	Slightly Toxic	32.2 [28.4-36.5]
ZI -400	55 [50-61]	Slightly Toxic	21.0 [17.9-24.5]
Sea Brat #4	65 [57-74]	Slightly Toxic	14.0 [±10.4]
Saf-Ron Gold	118 [104-133]	Practically Non-Toxic	63.0* [52.9-75.1]
JD-2000	788 [627-946]	Practically Non-Toxic	90.5* [76.1-108]

*Classified as slightly toxic according to values provided in NCP Product Schedule

http://www.epa.gov/bpspill/dispersants-testing.html

Results of 96 hour acute toxicity tests of 8 dispersants to the Gulf of Mexico fish, inland silverside (*Menidia beryllina)*

Dispersant	This Study LC50 (ppm) [95% CI]	Toxicity Category	NCP Product Schedule LC50 (ppm) [95% CI]
Dispersit SPC 1000	2.9 [2.5-3.2]	Moderately Toxic	3.5 [3.1-4.0]
Nokomis 3-F4	19 [16-21]	Slightly Toxic	29.8 [24.0-35.4]
Nokomis 3-AA	19 [17-21]	Slightly Toxic	34.2 [29.2-37.95]
ZI -400	21 [18-23]	Slightly Toxic	31.8 [28.7-35.1]
Saf-Ron Gold	44 [41-47]	Slightly Toxic	29.4 [25.2-34.3]
Sea Brat #4	55 [49-62]	Slightly Toxic	30.0 [±16.2]
Corexit 9500A	**130 [122-138]**	**Practically Non-Toxic**	**25.2* [13.6-46.6]**
JD-2000	>5,600	Practically Non-Toxic	407 [330-501]

*Classified as slightly toxic according to values provided in NCP Product Schedule

http://www.epa.gov/bpspill/dispersants-testing.html

In Vitro Testing for Potential Endocrine Related Activity and Cytotoxicity

Battery of mammalian cell line assays:

- Endpoints included cytotoxicity and the potential interaction with estrogen and androgen receptors

All dispersants showed cytotoxicity at concentrations between 10-1000 parts per million (ppm)

None of the 8 dispersants tested displayed biologically significant endocrine disrupting activity

Similar results to ecotoxicology tests

- generally low toxicity

References: Judson et al. (2010) "Analysis of Eight Oil Spill Dispersants Using Rapid, In Vitro Tests for Endocrine and Other Biological Activity" *Environmental Science and Technology* (http://pubs.acs.org/doi/abs/10.1021/es102150z

Subsurface Dispersant Data/Toxicity Data

Greg Wilson, EPA

Subsurface Dispersant Data for the DWH OIL SPILL

U. S. Environmental Protection Agency

July 13, 2010

What EPA is doing

- Collecting samples along the shoreline and beyond for chemicals related to oil and dispersants in the air, water and sediment
- Closely monitoring the effects of dispersants in the subsurface environment
- http://www.epa.gov/bpspill/epa.html

EPA's Dispersant Monitoring and Assessment Directive for Subsurface Dispersant Application

- Directive (May 10) requires BP to implement a monitoring and assessment plan for subsurface and surface applications of dispersants as part of the BP oil spill response
- Addendum 1 (May 14) provides for additional data collection and reporting requirements.
- Addendum 2 (May 20) addresses dispersant toxicity and effectiveness
- Addendum 3 (May 26) requires BP to limit the total amount of surface and subsurface dispersant applied each day to the minimum amount possible
- http://www.epa.gov/bpspill/dispersants.html#directives

Data Collection – What data exist?

- Type of dispersant
- Rate of dispersant injection
- CTD – Conductivity, Temperature, and Depth
- CDOM Fluorometer
- Dissolved Oxygen (e.g., SBE 43, handheld probes)
- Rototox toxicity

Data Collection – What data exist?

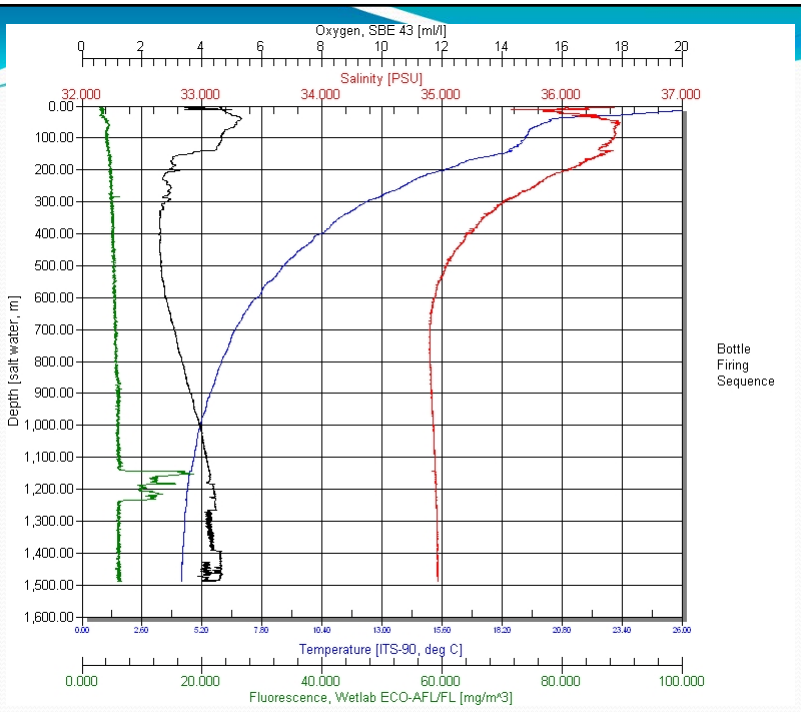
- Laser In-Situ Scattering and Transmissometry (LISST)
  - Particle Analysis (2.5 – 60 microns)
- Total Petroleum Hydrocarbons (TPH)
- Volatile Organic Analysis (VOA)
- UV-Fluorescence testing
- http://www.epa.gov/bpspill/dispersants.html#bpdata

Daily reports

- Examples of daily cruise reports EPA receives
  - Brooks McCall, Ocean Veritas (BP or BP contract vessels)
  - Thomas Jefferson, Gordon Gunter, Nancy Foster (NOAA)
- Typical Brooks McCall cruise report may include:
  - Sample locations (distance and direction from the wellhead)
  - Number of casts
  - Type of data collected (e.g., TPH, VOA, CTD fluorometry, dissolved oxygen and LISST analysis) and number of samples
  - Visual observations
  - Preliminary assessment of CDOM fluorescence signals, dissolved oxygen
  - Operational issues (e.g., equipment malfunction)

Data Website for Subsurface Dispersants

- EPA OSC - Deepwater Subsurface Data
  - http://www.epaosc.org/site/doc_list.aspx?site_id=6077
  - ZIP files uploaded daily to epaosc.org website
  - Brooks McCall, Ryan Chouest, Delaware II, Endeavor, Ferrel, Jack Fitz, Nancy Foster, Gordon Gunter, Thomas Jefferson, Ocean Veritas, Walton Smith
- Typical Brooks McCall/Ocean Veritas zip file contains:
  - Daily report cruise report
  - CTD Raw data image file
  - Excel Spreadsheet with sample ID, location, depth, time, date, sample team, field description.
  - Daily report for tracking dispersed oil using particle size distribution measurements and fluorescence intensity ratios
  - Rototox data



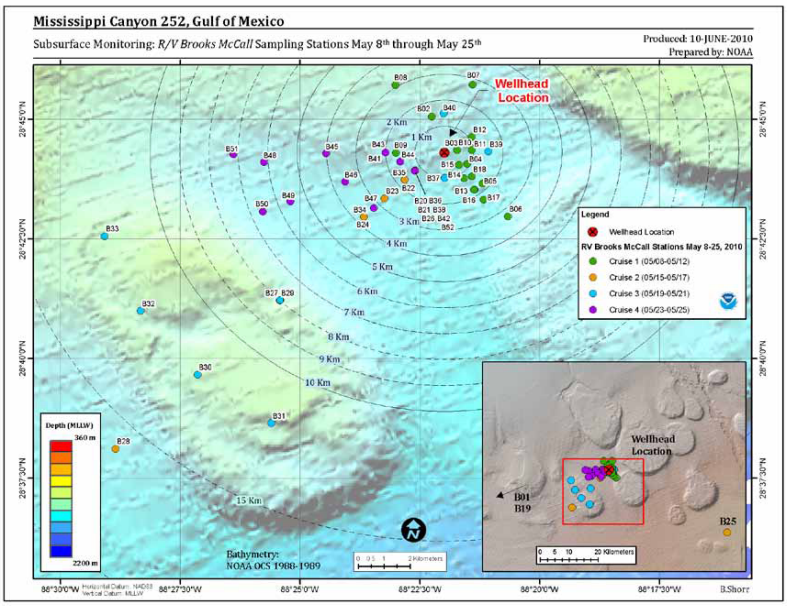
Joint Analysis Group (JAG) for Surface and Subsurface Oceanography, Oil, and Dispersant Data

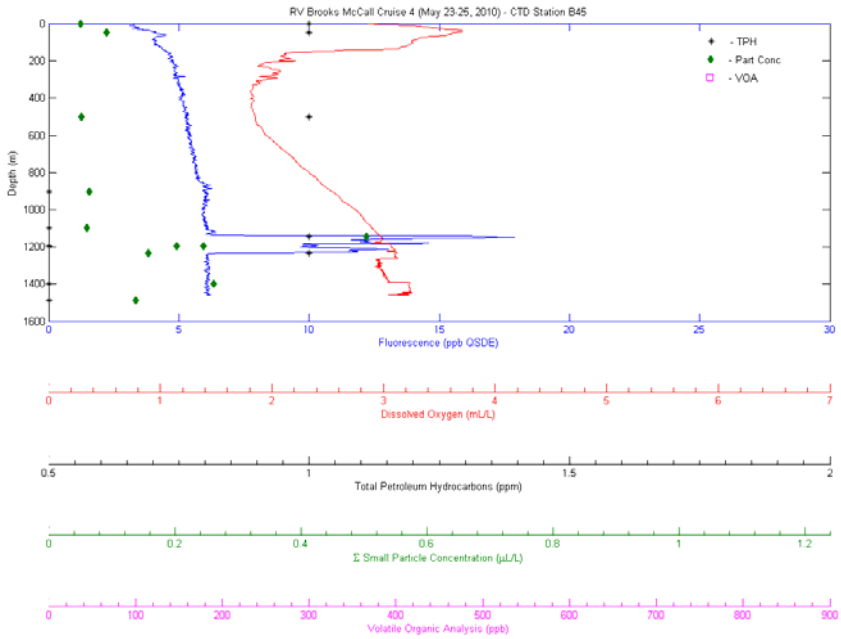
- Joint working group among EPA, NOAA, USGS and the Office of Science and Technology Policy (OSTP)
- Analyze an evolving database of sub-surface oceanographic data being derived from the coordinated sampling efforts of vessels contracted for or owned by BP, NOAA and academic scientists
- Near term actions:
  - Integrate the data spatially and temporally to allow their visualization and analysis
  - Analyze the data to describe the distribution of oil and the oceanographic processes affecting its transport
  - Issue periodic reports to the National Incident Command (NIC), the Unified Command, the public and other researchers that includes visualization, analysis, and synthesis products

Joint Analysis Group (JAG) for Surface and Subsurface Oceanography, Oil, and Dispersant Data

- Review of *R/V Brooks McCall* Data to Examine Subsurface Oil
  - The report presents a preliminary analyses of data collected by the R/V *Brooks McCall* near the site of the Deepwater Horizon MC252 (DWH-MC252) wellhead between May 8 and May 25, 2010
  - http://ecowatch.ncddc.noaa.gov/jag/JAG_report_1.pdf
  - Includes consideration of the spatial and temporal data
- JAG group is currently working on other data products that consider other ships and cruises with more recent data

Sample locations of *R/V Brooks McCall* Data in first JAG report





Future Analyses for Consideration

- Cruise coordination with other monitoring vessels
- Improved sampling methods
- Data visualization analysis
- Glider and AUV data
- Biological sampling
  - Subsurface oil degraders

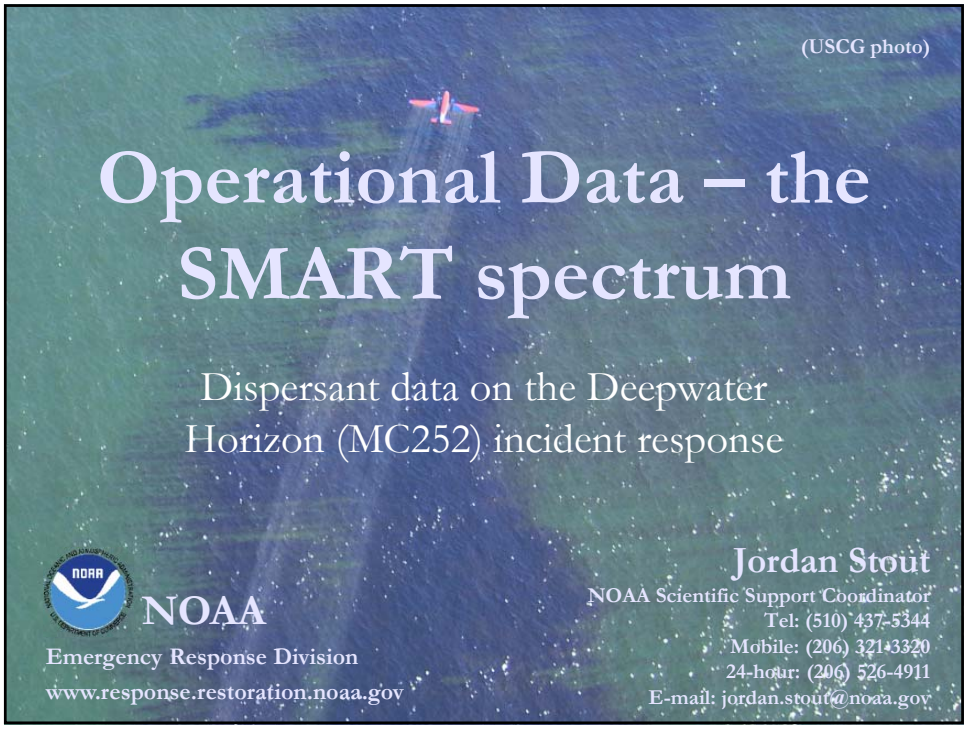
BREAK

AGENDA

12:15	**Operational Data**	**Jordan Stout, NOAA/ORR/SSC**
12:35	NRDA Generated Data	**Debbie French McCay, ASA**
12:50	Seafood Safety	**John Stein, NOAA/NWFSC**
13:05	"Plume" Science	**Sam Walker, NOAA/IOOS**
13:20	Other NOAA Data	**Ann Hayward-Walker, SEA**
13:35	**Other Data Sources**	

Operational Data

Jordan Stout, NOAA/ORR/SSC



SMART Overview

- Key operational feedback for effectiveness
- Normally a USCG mission
- Pre & post treatment observation
- Aerial (observations) & on-water (sampling)
- Fluorometry below un-oiled areas as well as untreated & treated oil
- Chemical analysis
- 1 & 10 meter depths

USCG Missions

- SMART I
  - Primary tactical feedback (same day)
  - Qualitative measure of effectiveness
  - Photos & descriptions (via helo)
  - Occurring throughout aerial applications
- SMART II & III
  - Secondary feedback (days)
  - Fluorometry (qualitative; see posters)
  - Chemical analysis (quantitative)
  - Occurred thru early June

Other Operations

- Dispersant Assessment Group
- Alternative dispersant evaluation
- Aboard the *M/V International Peace*
  - Boat & aerial spray monitoring
  - Fluorometry, chemistry & toxicity testing
    - Continuation of SMART posters
    - Acute tests w/fish, shrimp, algae (May report)
    - Acute fish, chronic shrimp & algae (June report in draft)
  - Current mission includes: dual fluorometers, particle size (LSST) & viscosity

Other Operations (cont'd)

- Nearshore water sampling for oil & dispersant constituents
- IH monitoring for aerial & boat spray operations
- Biodegradation just started

NRDA Generated Data

Debbie French-McCay, ASA

DEEPWATER HORIZON OIL SPILL: NRDA DATA RELATED TO SUBSURFACE DISPERSANT EFFECTIVENESS AND EFFECTS

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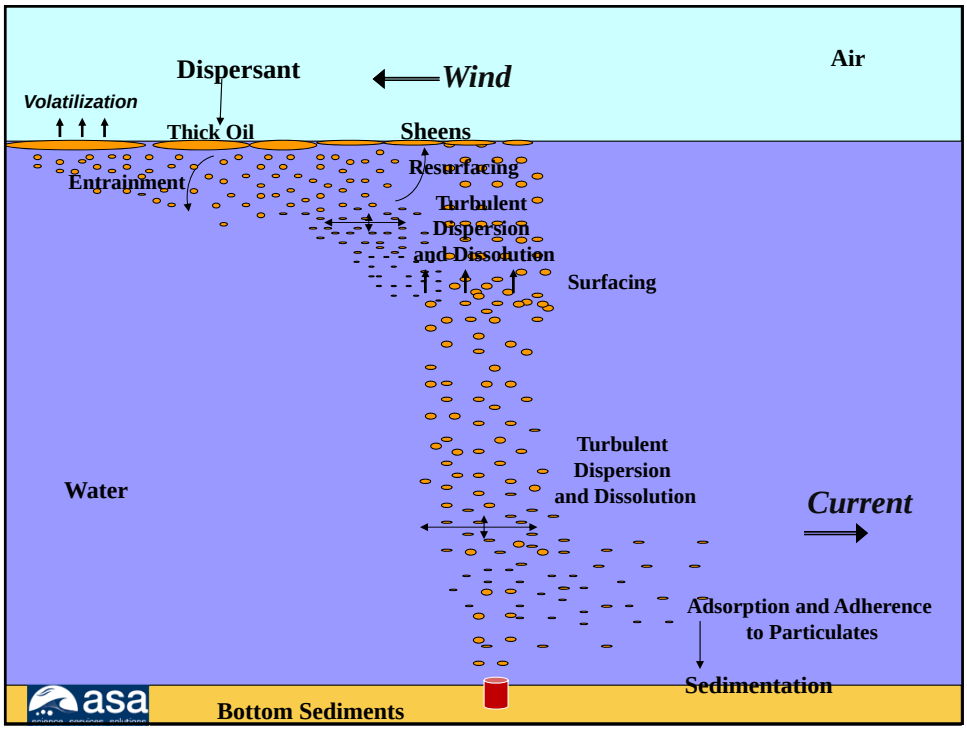
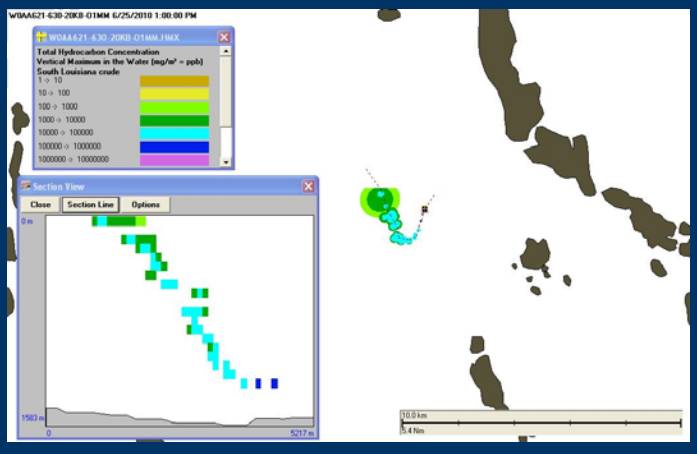


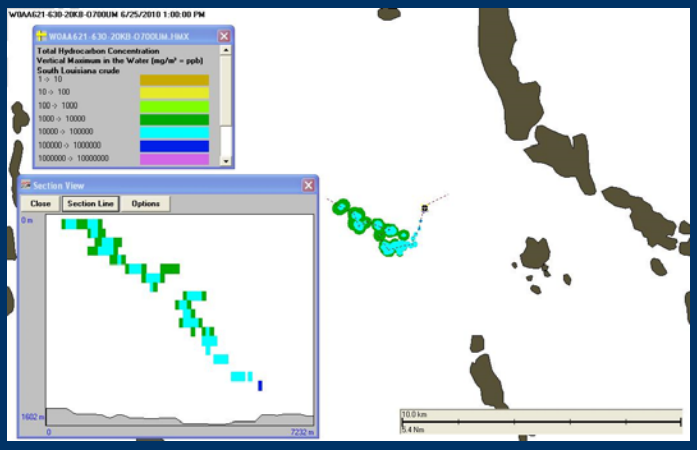
Sampling Strategy

- On Jack Fitz cruises 1, 2, and 3
- Sampling locations (x, y, z) determined by use of transport modeling (SIMAP)
  - Currents = f(depth, time) as measured by the ADCP at the Wellhead
  - Modified Stokes Law for droplet rise rate
  - Rise rate = f(droplet size) – larger rise faster
- Determine direction from wellhead where
  - Various droplet sizes should occur
  - Dissolved BTEX and PAHs should be highest

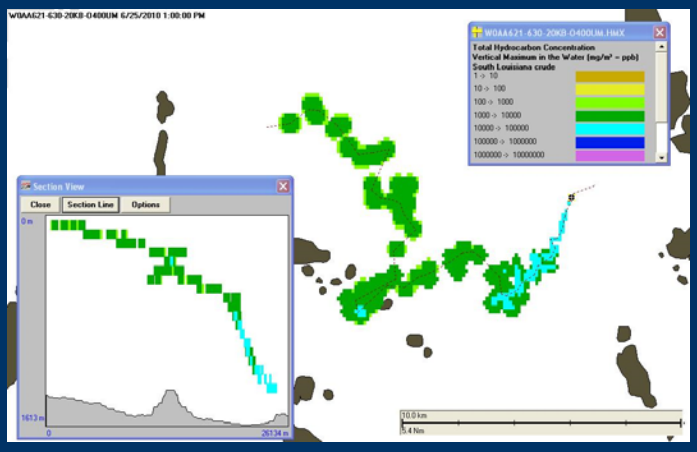
Example: Jun 25 – 1 mm



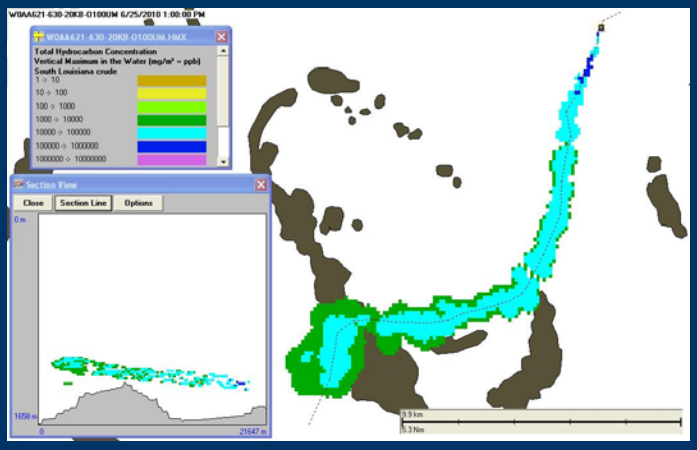
Example: Jun 25 – 700 um



Example: Jun 25 – 400 um



Example: Jun 25 – 100 um



Measurements of Droplet Size: LISST-100

- All LISSTs used can only measure < 250 – 500 um droplets
- Discrete samples – measure on deck on a water sample brought up from depth
  - Takes >1 hour to bring up and take sample
  - Only droplets <100 um measured

Droplet Diameter	Rise Rate (m/hour)
100	2
200	7
500	35
1000	93
5000	430

Measurements of Droplet Size Frequency Distribution (Jack Fitz 2)

- In situ LISST-100 for < 500 um droplets in surface waters (Y. Kim, ASA)
- DIPSTIC – high definition video in surface samples captured in situ, image analysis (Y. Kim, ASA)
- ROV video (in situ): TV camera with UV/Black Lights and BFDFOQMark oil grid (Payne et al.)
  - UV/Black light made oil fluoresce and visible
  - Oil droplets impinged on horizontal plate
  - Used grid to estimate sizes (>0.5mm)
- Water samples filtered for dissolved and particulate/oil phase measurements of PAHs (J. Payne)

Measurements of Droplet Size Frequency Distribution (Jack Fitz 3)

- In situ LISST-100 for < 500 um droplets (Kim)
- DIPSTIC (Kim)
- ROV video for > 500 um droplets (Payne et al.)
- Holocam – Holographic image (C. Davis, WHOI)
  - Entire size spectrum
  - Can identify particles: oil, marine snow, oil-suspended particulate matter aggregates
- Water samples filtered for dissolved and particulate/oil phase measurements of PAHs (Payne)

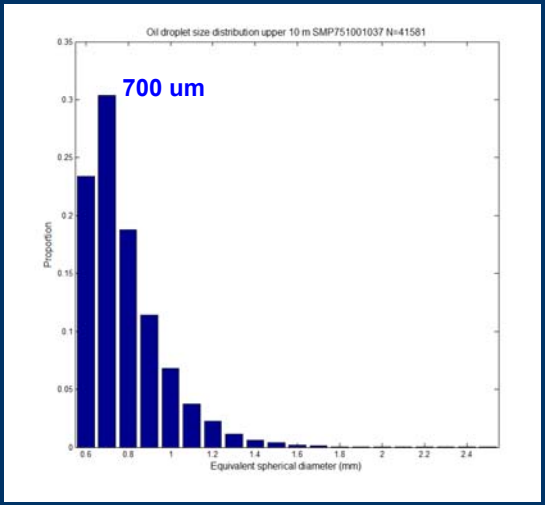
Measurements of Droplet Size Frequency Distribution – Image Analysis Systems

- SIPPER = Shadowed Image Particle Profiling and Evaluation Recorder – Andrew Remsen (USF)
  - in-situ suspended particle imaging system
  - Oil droplets > ~300 um
  - Towed – transects
  - Weatherbird II
- Holocam (Davis) on Ocean Veritas and American Diver cruises
- Digital-Automatic Video Plankton Recorder (DAVPR) – Cabell Davis (WHOI)
  - Size range of 50 microns to several cm
  - American Diver cruises

Preliminary Results – Droplet Sizes

- Environment Canada confirmed the presence of <100um chemically-dispersed oil droplets [Brooks McCall and Ocean Veritas cruises]
- ROV TV/video camera confirmed droplets >500 um rising to surface up to ~4km from wellhead
- Holocam on Jack Fitz 3 – preliminary, counting visible sizes by eye:
  - 3307 ft: mean 393 um, sd 99 um
  - 3413 ft: mean 212 um, sd 99 um
  - 3507 ft: mean 169 um, sd 60 um

SIPPER, Weatherbird II, May 15



- Measuring >500 um
- Peak at 700 um
- All <2mm

- May 15 operational subsurface dispersant operations began

Limitations – Droplet Size Measurements

- LISST-100 on discrete samples
  - Only droplets <100 um
  - Useful to indicate oil was dispersed
- LISST-100 in situ
  - Only droplets <500 um
  - Useful in surface waters
- SIPPER, DAVPR, DIPSTIC
  - Useful in surface waters
  - One SIPPER cruise to date
  - DIPSTIC samples from 2 Jack Fitz cruises
- No deepwater LISST measurements to date
- Holocam
  - Samples full depth range and complete size range
  - Just one cruise to date

Data Needs

- Measure
  - Droplet Sizes
  - Dissolved vs Particulate Oil (toxicity implications)
- Surface waters
  - In rising plume to indicate size distribution of release
    - No dispersant added
    - With injected dispersant (at wellhead)
  - Measure droplet sizes after aerial dispersant applications (no measurements to date)
- Deep waters
  - In released oil plume
  - In subsurface layers of oil advecting away from wellhead (smallest droplets at depth)

Seafood Safety

John Stein, NOAA/NWFSC

Science, Service, Stewardship

Seafood Safety Program

John Stein
NMFS Seafood Safety Program
Northwest Fisheries Science Center

NOAA FISHERIES SERVICE

NOAA FISHERIES SERVICE

NMFS Seafood Safety Program

- **Purpose:** To ensure that tainted or contaminated seafood does not reach the marketplace.
- Seafood collected in the Gulf of Mexico is assessed by both sensory and analytical methodologies
  - Sensory—olfactory evaluation of seafood
  - Analytical—evaluation of polycyclic aromatic hydrocarbons (PAHs) concentrations by GC/MS
- Seafood samples that pass BOTH the sensory and analytical tests are considered safe
- Results are used to make decisions on reopening areas in the Gulf of Mexico

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Dispersants

- FDA has concluded that dispersants have a low potential for bioaccumulation in seafood and there is minimal health risk from consumption
- Development of methods to monitor dispersants is under development.

There is concern over the use of dispersants following the Deepwater Horizon incident.

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Current research on dispersants

- For seafood safety, NMFS is investigating the uptake, distribution, and clearance (depuration) of dispersants in the edible tissues of shellfish and finfish
- Studies are underway to expose animals to dispersants
  - NWFSC currently developing methods to analyze dispersants, including HPLC MS/MS and GC/MS
  - Initial studies on Corexit 9500 with brown shrimp. To provide samples for method development
  - Additional exposure studies are planned for fish

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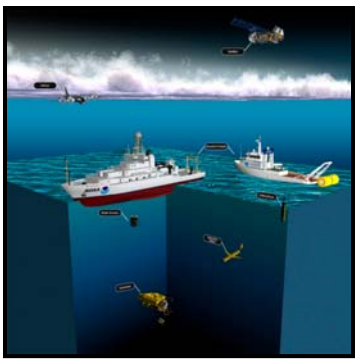
“Plume” Science

Sam Walker, NOAA/IOOS

Integrated Sub-Surface Monitoring of the Deepwater Horizon Release



Deepwater Horizon Dispersant Data Webinar
13 July 2010, Durham, NH
Samuel Walker and Robert Pavia
NOAA IOOS Program and NOAA OR&R

Objectives and Responsibilities

In support of the Unified Command response:

1. Characterize and determine the distribution of any subsurface oil beyond the immediate area of the release;
   - Presence/Absence (Where/Extent)

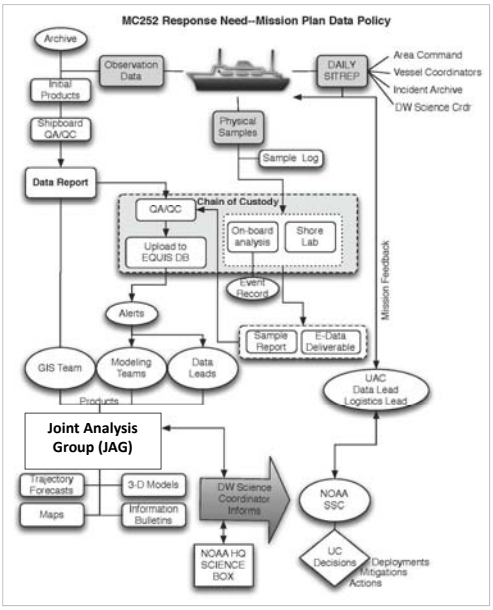
2. Identify changes in oil characteristics and transport associated with response measures at the release point;
   - Characteristics (What/Source)

3. Support verification of oil fate and transport models; and
   - Fate/Transport (When/Forecast)

4. Provide context for longer-term integrated ecosystem assessment of oil spill impacts.
   - Impacts/Assessment

Composition and Operations

- Direct representation from NOAA, USCG, EPA, ASA on operational team
- Team centered in Houma, LA
- Using a NOAA-support wiki to manage (very dynamic) effort
- Daily sitreps (internal), vessel calls, SIMOPS call participation, NOAA operations call
- Feedback loop with NOAA modeling team to drive missions
- Data management and integration
- Mission guidance and information relay to Joint Analysis Group (JAG)



Principal Monitoring Assets

Sub-surface assets:

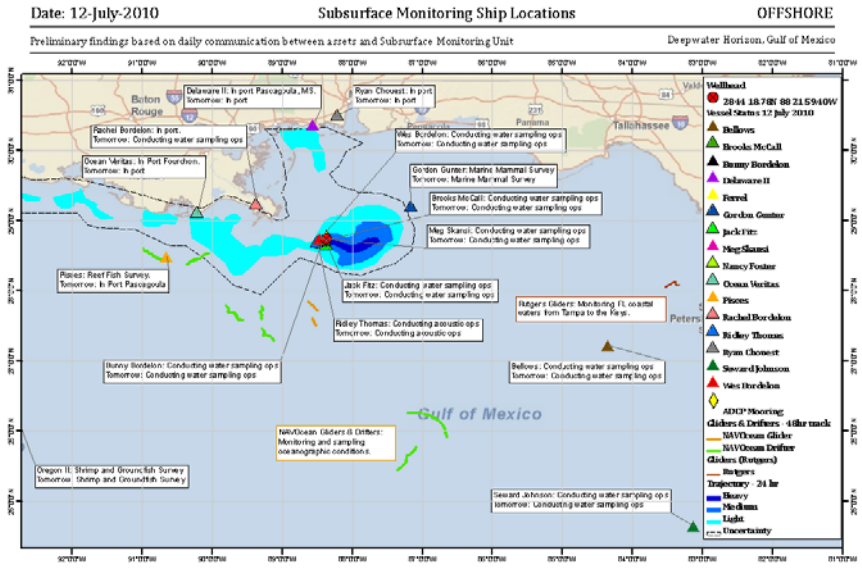
- Surface vessels
- Ocean gliders
- Air-dropped profilers
- ADCPs
- Acoustic profilers

Surface assets:

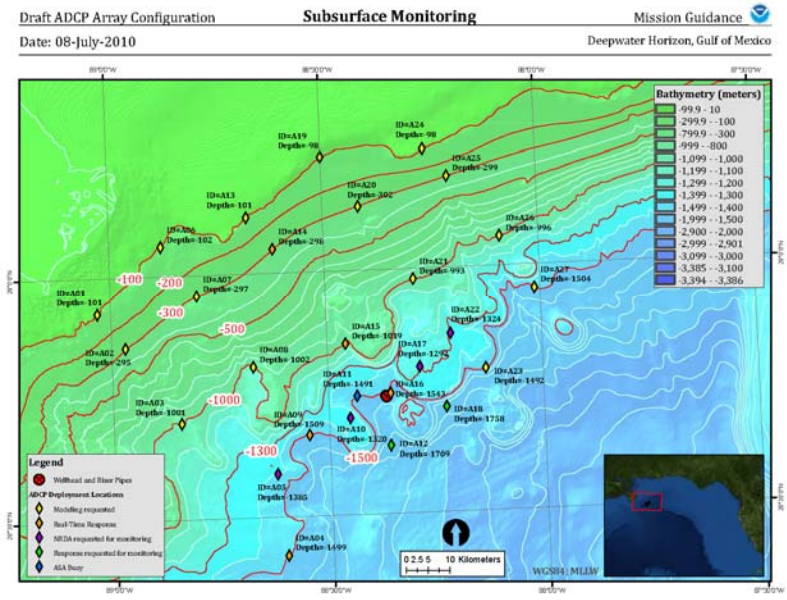
- High frequency radar
- Drifting buoys
- Remote sensing
- Moored buoys

- Fluorescence
- Temperature
- Conductivity/Salinity
- Dissolved Oxygen
- LISST Particle Sizing
- TPH, TPAH, VOA

Disposition of Sampling Assets

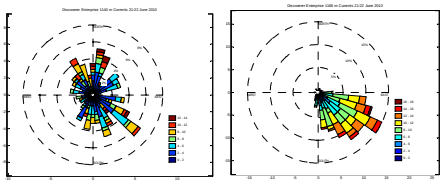


Phased ADCP Deployment

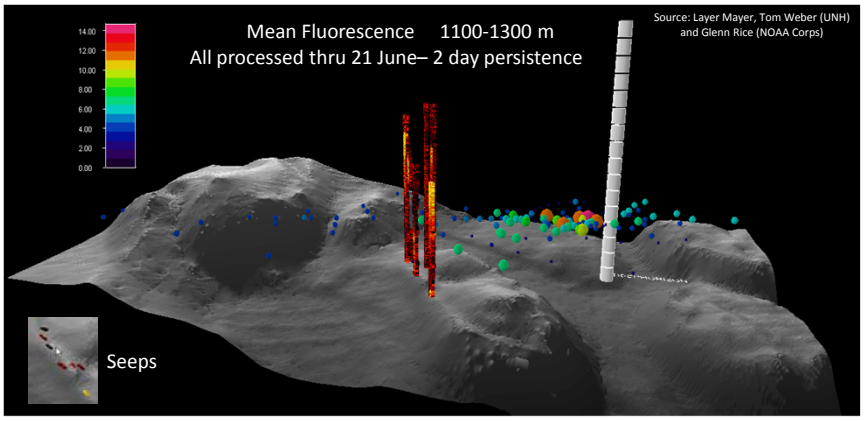


Products and Information

- Focus is on Actionable Information for the UC and other stakeholders
- Visualizations from NCDDC, OR&R, NDBC, and UNH
- Increased 3- and 4-D renderings



Discoverer Enterprise (wellhead)1134m and 1166 m



Key Resources

Sub-Surface Monitoring Branch Wiki:
https://www.st.nmfs.noaa.gov/confluence/display/OOP/Home
NOAA Staff: Use your NOAA LDAP credentials to access
(Partners may use: username: oilspill.response and pword: WikiWelcome!)

IOOS Community Activities Site:
http://rucool.marine.rutgers.edu/deepwater/

EPA OSC Data Access Site:
http://www.epaosc.org/site/login.aspx

POCs:
Samuel Walker, PhD – UAC Liaison (sam.walker@noaa.gov, 803-807-1189)
CAPT. Mark Ablondi– ICP-Houma (chief.smu@noaa.gov, 301-787-5799)

Other Data Sources
Microbial Data

Terry Hazen, DOE

Other Data Sources

Discussion and Synthesis

AGENDA

13:45	Discussion/Synthesis 1) Is this data sufficient to support any conclusions regarding the effectiveness and effects of: (a) surface and (b) subsurface application of dispersants? 2) Are there significant data gaps that need to be filled? Can they be filled? 3) Are there inconsistencies in the data that need to be addressed?	
14:30	Closing Remarks	Bob Pond, USCG Roberta Runge, EPA Nancy Kinner, CRRC

DISCUSSION/SYNTHESIS

- Is data sufficient to support conclusions regarding effectiveness and effects of: (a) surface and (b) subsurface application of dispersants?
- Can inconsistencies in data be addressed?
- How can data gaps be filled?

Webinar will NOT involve discussion of policy, strategy, or risk assessment related to dispersant use.

MEETING REPORT

- Report will be produced by CRRC
- Report will include:
  - Source, location, access and type of data
  - Inconsistencies associated with data
  - Data gaps
  - Summary of discussion/synthesis
  - Appendices:
    - Agenda, Participants, Presentations
- Report will not be posted on CRRC website

MEETING REPORT

- Report will be produced by CRRC
- Report will be reviewed by the presenters and the DWH Interagency Solutions Group (representing the NRT)
- Report will be distributed to all participants
  - Via email as PDF
- Anticipated release early August

Coastal Response Research Center Website

www.crrc.unh.edu