

# Deepwater Horizon Disaster: NIEHS Response

**Request for Applications (RFA) ES-11-006  
Deepwater Horizon Research Consortia: Health  
Impacts and Community Resiliency (U19)**

National Institute of Environmental Health Sciences  
Oil Spill Cleanup Initiative

**Safety and Health Awareness for  
Oil Spill Cleanup Workers**







**GuLF STUDY**

*A health study for oil spill clean-up workers and volunteers*



**National Toxicology Program**  
Department of Health and Human Services

## NIH Partners

Institute/Center/Office	Contribution*
NIEHS	2.0M
NCI	1.0M
NHBLI	1.0M
NIAMS	0.25M
NIMH	0.40M
NIMHD	0.10M
NINR	0.10M
NCRR	0.20M
OBSSR	0.25M

**Total Contribution – \$5.3M/year**

## Request for Applications (RFA) ES-11-006

# Deepwater Horizon Disaster Research Consortia: Health Impacts and Community Resiliency

### Purpose:

- Create one or more Community-based participatory research consortia to:
  - Address health issues of concerns to residents
  - Develop community-based strategies to improve preparedness and response aimed at minimizing health effects in this and future disaster contexts

### Outcome:

- To better understand the interplay and effects of multiple stressors, including potential exposure to chemical mixtures, dispersants, etc., on human health and well-being of residents in the Gulf region affected by the DWH disaster
- To establish the evidence base needed to inform recovery and develop strategies to promote health and well-being of populations facing this and future man-made and natural disasters

Research activities are expected to be highly responsive to the needs of local communities in the Gulf Coast regions affected by the DWH disaster

The focus is on the general population

## **Community-based participatory model**

- Community organizations located in the Gulf states representing citizens affected by the DWH disaster in collaboration with academic partners are involved in the process of planning, implementing and communicating research

## **Multi-project program** (minimum of 3 Research Projects) including:

- Health effects research both population and laboratory-based
- Community vulnerability and resilience research

**PLUS**

- Administrative Core
- Community Outreach and Dissemination Core
- Optional Facility Cores

# Specific Research Initiatives

## Health Effects Research.

- Reproductive
- Mental health and behavioral
- Respiratory and cardiovascular
- Dermal
- Immune
- Cancer
- Neurological

## Interest on the Health of Vulnerable Populations.

- Pregnant women
- Infants, young children, adolescents
- Subsistence fisherman and families
- Immigrants, racial and ethnic minorities

## Exposure Assessment and Biomonitoring Research

- Analysis of environmental samples and biospecimens
- Methods to predict exposure concentrations
- Characterize exposure pathways including dietary sources

## Community Vulnerability and Resilience Research

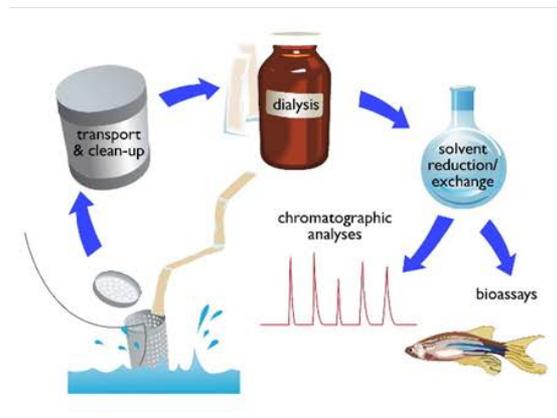
- Methods to understand causes and consequences
- Assess role of culture and social networks
- Risk perception and effect on health

# **DWH- Related Research Activities Conducted by NIEHS Grantees:**

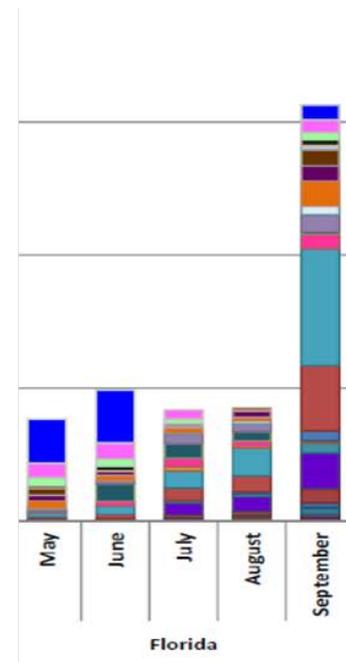
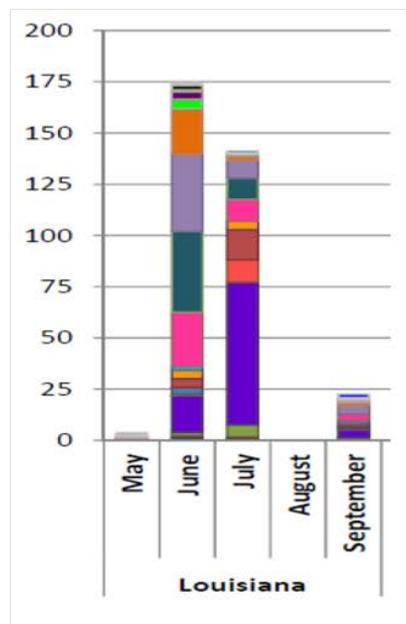
## Polycyclic Aromatic Hydrocarbons (PAHs): Gulf of Mexico

*Kim A. Anderson, Environmental and Molecular Toxicology, Oregon State*

- Passive Sampling Devices measure bioavailable environmental exposure
- Field sites in LA, MS, AL, and FL both air and water, pre-and post-shore oiling
- Sum of 35 PAHs (ea color = a PAH), LA and FL different scales
- LA PAHs increased in June, decreased some in fall, still ABOVE spring levels
- Further east (e.g. FL) PAHs increased in late summer



- 1,200 chemicals screened
- Extracts tested in bioassays bridging environmental exposure to a biological response



# Community Engagement Carried Out Related to the DWH Disaster

*Sharon Croisant and John Sullivan*

*The University of Texas Medical Branch at Galveston*

## Initial town hall meetings held to assess community needs/concerns

### Social Impacts

- PTSD from Katrina, Rita, Gustav and Ike compound social/economic consequences of BP Oil disaster
- Disruption/dislocation of family life, sleep patterns
- Individual psychosomatic symptoms
- Further erosion of coastal fishing culture
- Despair as hurricane season moves in

### Ecosystem & Health Concerns

- Integrity of coastal marshes
- Acceleration of land-loss
- Subsidence
- Fragile habitat destruction
- Exposure to oil residue by regional flora/fauna
- Collapse of estuarine systems

### Economic Concerns

- Disruption of shrimping/fishing season
- Loss of investment in small commercial fishing enterprise
- Equipment damage
- Impact on fishery reputation
- Long-term impact on fishery productivity
- Will BP actually pay

# The Effects of the DWH Oil Spill on Seafood Quality in the Gulf of Mexico: A Before-After Comparison of PAHs in Recreationally Consumed Species

*Jim Shine, Dept of Env'tl Hlth., Harvard School of Public Health*

*Ed Chesney, Louisiana Universities Marine Consortium*

**Previous Research: Effect of Hypoxia on Mercury Dynamics in the Northern Gulf of Mexico:  
Implications for Human Health (NOAA OHHI NA04OAR4600207)**

## **Work Included:**

- Extensive Sampling of Fish at all trophic levels (2005 – 2007)
- Fish Consumption Surveys of Recreational Fishermen
- FISH SAMPLES ARCHIVED



## **Current Study Planned:**

- Re-analyze archived samples for PAHs, including alkylated homologues
- Re-sample and analyze fish from the area of the oil spill
  - Sample weighting based on fish consumption survey
- Calculate PAH Exposure/Risks in Recreational Fishermen
  - Before and after spill
  - Use species specific consumption rates from prior survey
- Examine changes in PAH profiles in fish (petrogenic vs. pyrogenic)
  - Evidence of a new 'spill' signature?



## Gulf Coast Beach Microbial Observatory

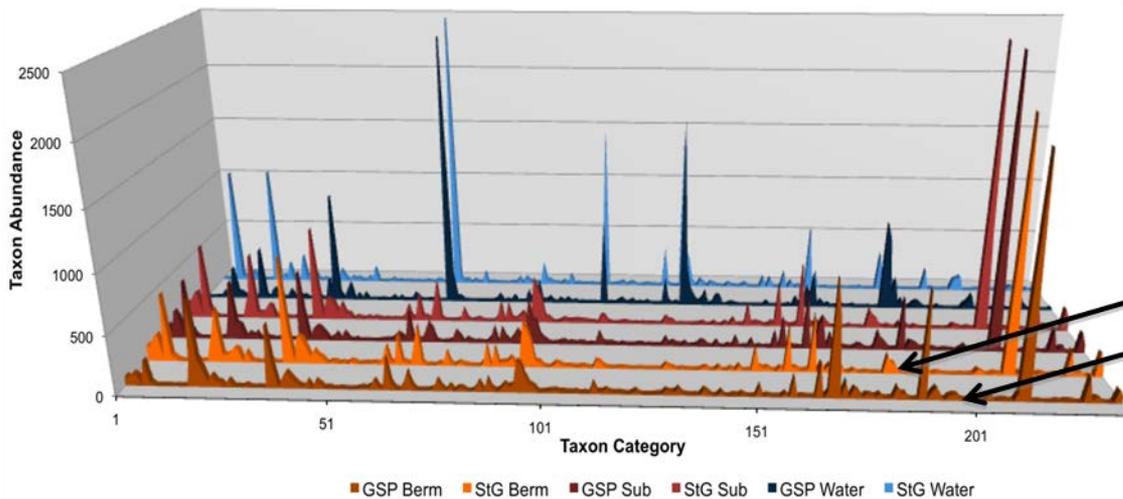
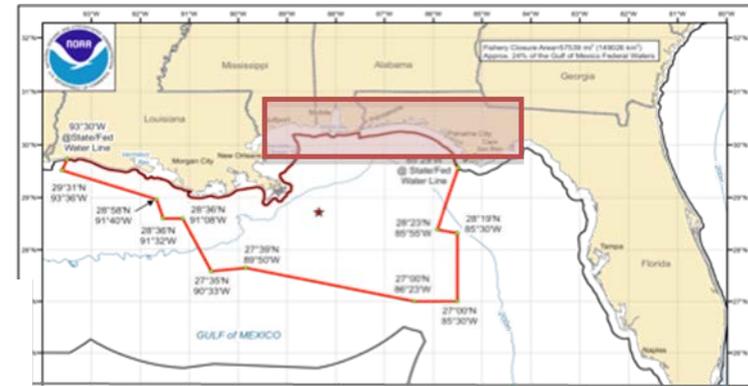
*S.L. McLellan, E. W. Alm, M.L. Sogin,*

*UW-Milwaukee Children's Environmental Health Sciences Core Center*



Comprehensive microbial profiles can be used as biomarkers of oil impacts and potential human exposure

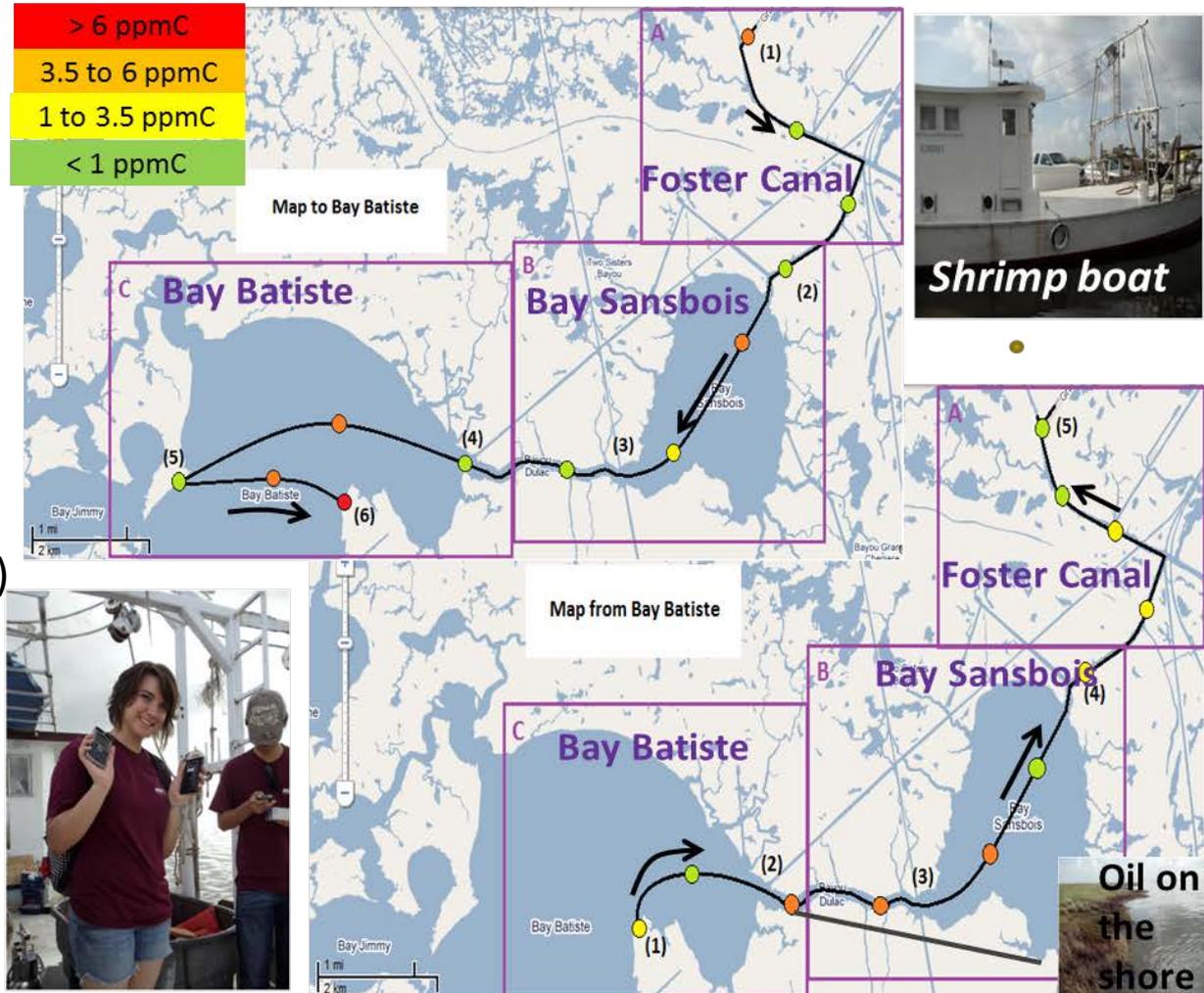
400 miles of coast are sampled every 6-8 weeks  
Pilot project using next generation sequencing shows changes in microbial taxa at impacted beaches



St. George Island (not impacted)  
Gulf Shores (impacted)

## Application to the DWH Disaster

*Nongjian Tao, Arizona State University, NIEHS - U01 ES016064-01*



- Selective detection of VOCs (hydrocarbon and acid vapors)
- Sensitive: ppb – ppm
- Real-time: sec. – min.
- Spatially Resolved
- Wearable: cell phone size
- Cell phone based interface



# GuLFSTUDY

*A health study for oil spill clean-up workers and volunteers*



Chronicle / Kurt Rogers

Dale Sandler, Richard Kwok, Lawrence Engel  
Epidemiology Branch  
Division of Intramural Research

# Primary objectives

Assess short-and long-term health effects associated with oil spill clean-up following Deepwater Horizon disaster - April 20, 2010

Create a resource for future collaborative research

- Focused hypotheses
- Specific subgroups



# Health Outcomes of Interest

## Primary outcomes

- Respiratory
- Genotoxic, hematologic, immunologic
- Psychological/mental health
- Neurologic (neurobehavioral testing for subset)

## Other outcomes

- Renal, hepatic function
- Cardiovascular disease
- Cancer



# Study Design – Eligible Cohort

Identify all workers and potential workers

- Combine training and service lists from multiple sources
  - **Petroleum Education Council (PEC), NIOSH Roster**, Parish training lists, boat captain and crew lists, Federal workers
- Minimize self-selection by working from known population list
- Final tally expected to be about ~130,000
  - Professionals, locals, Federal workers
  - 95% from 5 gulf states
  - English, Spanish
  - Few Vietnamese or other



# Study Design- Enrolled Cohort

Enroll cohort of ~55,000

- Telephone interview (In-person as needed)
  - Characterize clean-up activities
    - Exposure classification
    - Subcohort selection
  - Collect health information
    - Cross-sectional analyses linking clean-up/exposures to outcomes
    - Interpret symptoms in light of past history; inform follow-up analysis

# Study Design – Active Subcohort

Select stratified random sample for active sub-cohort (~27,000)

- Most likely to have chemical exposures
- Represent all clean-up tasks, Federal workers
- “Unexposed” referents
- Maximize communities close to spill
- Gulf state residents (unless highly exposed)

Flag **potential** biomedical surveillance subcohort (n=~6250)

- LA, MS, AL, FL
- Identify group for special sample handling
  - Fresh samples for CBC, complete urinalysis, (CLIA laboratory)
  - Extraction of lymphocytes for cryopreservation

# Study Design – Baseline Data Collection

## Conduct home visit

- Complete informed consent
- Collect additional questionnaire data
- Collect biologic and environmental samples
  - Blood, urine, toenails, dust (saliva if no blood)
- Measure height, weight, blood pressure
- Measure pulmonary function (close to Gulf)
- Report BMI, glucosuria, BP, lung function, CBC (subgroup)
- Provide health care referrals as needed

Follow-up via biennial questionnaires

# Study Design – Biomedical Subcohort

## Biomedical Surveillance Subcohort (n~5,000)

- Separate consent for additional visits (home or central site)
- Design protocol (separately reviewed) with university collaborators
  - Collect additional biological and environmental samples for biomarker studies
  - Assess neurologic and respiratory function
- Repeat assessments over time to evaluate persistence and late effects

# Scientific and Public Review

Webinars to vet study concept and draft protocol

- Draft protocols, webinar comments, responses posted on line

NIEHS scientific review process

Multiple Federal agency reviews

- Concept (Interagency meetings) and protocol draft

Institute of Medicine

- Full day review by panel of experts
- Meeting Report
- Written responses posted

# Ongoing Oversight and Support

## Scientific Advisory Board

- Subcommittee of NIEHS BSC; Andrew Liu, Chair
- Scientists, community representatives, Federal representatives

## Community Advisory Board

- Local representation, special populations
  - Recruitment and retention
  - Communications

## Exposure Classification Working Group

Institute of Medicine – at least two more reviews

# Outreach

## Local

- Community groups
- Local and state health departments
- Workers

## Federal agencies

- Advice on available exposure data and exposure characterization strategies
- Collaboration – enrolling Federal workers

## Accomplishments and Timetable

Protocol reviewed by IRB (11/9)

- Some changes required
  - Increase incentives
  - Reading level of consent document and other materials

Submitted to OMB

Emergency and regular track

Pilot testing questionnaires, procedures – December

Run-in phase – January

Full scale enrollment - February

# Thank You

