



# An FOSC's Guide to NOAA Scientific Support



Your Scientific Support Coordinator is:

Name:

Cell Phone:

Email:

or

**Call the NOAA Emergency Response Division  
24-hour duty phone (206) 526-4911**

First edition, February 2007

## Dedication

NOAA's Emergency Response Division (ERD) envisions a healthier environment for an improved quality of life wherever it may work.

Its mission is to develop, communicate, and apply practical and credible science in responding to risks and mitigating the consequences from spills and other hazards threatening coastal environments and communities.

This "FOOSC's Guide to NOAA Scientific Support" is dedicated to all the ERD personnel who constantly demonstrate their dedication to our mission by applying objectivity, innovation, commitment, accountability, teamwork, and professionalism in their actions.

This guidebook is a product of the combined efforts of the entire ERD staff. In particular, I would like to thank John Tarpley, Ed Levine, Steve Lehmann, Vicki Loe, Donna Faiferlick, and Kristina Worthington for their significant contributions to its production.

*Jim Jeansonne, Editor*

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*Cover photo: Bayou Perot, La. oil well blowout, January 21, 2007, just prior to the wild well team shutting in the well on January 25, 2007. Photo by Gary Shigenaka, NOAA Scientific Support Team.*

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# 1 PURPOSE AND USE OF THIS GUIDE

## Purpose

This “FOSC’s Guide to NOAA Scientific Support” provides a quick reference to the range of scientific support services available through NOAA’s Office of Response and Restoration, Emergency Response Division (ERD, commonly called “NOAA HAZMAT”).

Through the NOAA Scientific Support Coordinator (SSC), a full NOAA Scientific Support Team (SST) experienced in incident response science support is available to the Federal On-Scene Coordinator (FOSC), day or night. The NOAA SSC is one of the special technical advisors within the Incident Command System (ICS), as specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR § 300.145).

This guide describes the components of the NOAA SST, the duties and composition of the team elements, and their value to the FOSC and Unified Command. For a quick orientation to NOAA Science Support, Section 4 gives a description of what to expect from the NOAA Scientific Support Team once you contact the SSC and the response progresses.

## Using this Guide

This guide is provided in hard copy and electronic versions.

- **Hard Copy** – This handy sized guide is designed to keep at the duty station and with response gear. Use it when you don’t have quick access to a computer.
- **Electronic Versions** – The electronic versions are more powerful than the hard copy. They contain the full text of a host of response related materials, including many fillable response forms and drill or training request forms, as well as useful links to additional response information.
  - **The CD** – This has all the associated electronic documents and direct file links. Load the CD onto your computer for “stand alone” access when the Internet is not available.
  - **The Internet Version** – This will be the most up-to-date version of the guide. For quick access, place the Web site link on your desktop. <http://response.restoration.noaa.gov/foscguide>.

## Questions or Comments

If you have questions or comments about this guide, contact Jim Jeansonne, NOAA Natural Resource Scientist, at Office: (727) 551-5714, Cell: (206) 276-5308, or E-mail: [Jim.Jeansonne@noaa.gov](mailto:Jim.Jeansonne@noaa.gov).

## 2 THE SCIENTIFIC SUPPORT COORDINATOR AND TEAM

The NOAA SSC is the FOSC's gateway to the whole NOAA Scientific Support Team (SST).

### SSC Roles

Scientific Support Coordinators (SSCs), per the National Contingency Plan (NCP), may be designated by the FOSC as principal advisors for:



- Scientific issues,
- Communication with the scientific community and Natural Resource Trustee agencies (the "Trustees"), and
- Coordination of requests for assistance from state and federal agencies regarding scientific issues.

Typical SSC response functions, at the request of the FOSC, include:

- Leading a scientific team – such as serving as the Environmental Unit Leader,
- Providing scientific support for operational decisions – such as the tradeoffs for use of alternative countermeasures,
- Coordinating on-scene scientific activity – Such as field sampling and integrating ongoing academic environmental studies into the response needs,
- Integrating expertise from governmental agencies, universities, community representatives, and industry to assist the FOSC in evaluating the hazards and potential effects of releases and in developing response strategies,
- Facilitating the FOSC/Unified Command's communication with the Lead Administrative Trustee (LAT) for natural resources to ensure coordination between damage assessment data collection efforts and data collected in support of response operations, and
- Coordinating required emergency consultations for protected resources (such as threatened and endangered species, cultural resources, sensitive habitats, etc.).

### Always Available to the FOSC

The NOAA SSC and the scientific support team are available to the FOSC 24 hours a day simply by calling the assigned NOAA SSC directly.

## Directly Serving the FOSC

The NOAA SSC is one of the special technical advisors within the Incident Command System (ICS), as specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR § 300.145). Though often seated with the Environmental Unit of a Unified Command to support and liaison with the overall response effort, the NOAA SSC has a primary responsibility to serve the FOSC directly as a member of their staff.



## NOAA SSC Support to the Coast Guard

NOAA generally assigns SSCs to the Coast Guard Districts in support of Sector planning and response needs. (See Appendix 1 for list of SSCs, their locations and contact information.) Each individual SSC is supported by a complete Scientific Support Team that includes expertise in:

- Oil slick trajectory forecasting and monitoring
- Pollutant transport modeling
- Environmental chemistry
- Chemical hazard assessment
- Health and safety
- Information management
- Resources at risk
- Biological assessments
- Environmental tradeoffs of cleanup strategies
- Natural Resource Trustee Issues

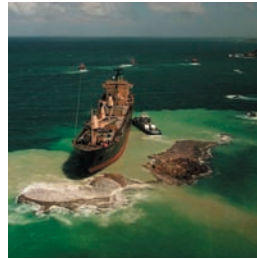


## NOAA SSC Support to Other On-Scene Coordinators

NOAA SSC support, and the complete NOAA Scientific Support Team, may be available to other federal and state responders or Trustee agencies if requested. NOAA SSCs are not currently assigned to EPA regional emergency response offices or other federal agencies.

## NOAA SSC Support for Special Incidents

NOAA science support is for “all hazards.” The NOAA SSC experience can benefit an FOSC during emergency responses to natural disasters, ship groundings, significant national events, terrorist incidents, etc. For example, following the devastation from Hurricanes Katrina and Rita in 2005, NOAA Scientific Support Teams played major roles in rescue support, response to the multiple large oil spills, chemical container location and cleanup, and debris removal. The NOAA SSC also frequently supports vessel salvage operations.



## Building Scientific Consensus and Dealing with Uncertainty

The NOAA SSC strives for a consensus on scientific issues affecting the response, but also ensures that differing opinions within the scientific community are communicated to the FOSC. By applying this available depth of scientific knowledge and the NOAA ERD experience to response issues, the FOSC receives the best scientific support available.

All scientific information has inherent limitations and uncertainty, and the sciences used during incident response have an abundance of both. An important duty of the NOAA SSC is to understand and clearly communicate the limitations and uncertainty associated with field data, trajectory forecasts, and other technical information provided to the FOSC and Unified Command.

## The NOAA Scientific Support Team

Working closely with the NOAA SSC is an extensive team of NOAA scientists and technicians as both a home team at ERD headquarters in Seattle and other offices, and the on-scene team.



The home team typically includes:

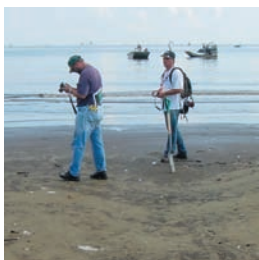
- A weather team working with NWS Incident Meteorologists/forecasters to provide incident specific spot forecasts,
- Oceanographer modelers running the computer models to generate trajectories, spill fate forecasts, and similar products,



- A chemistry team to advise on chemical reactivity, hazards, oil identification, and toxicology,
- Biologists to assist with natural resource protection strategies, and
- An industrial hygienist to provide health and safety and toxicology consultation to the NOAA team and to consult with the Unified Command's Safety officer.

On-scene personnel are requested as needed, and may include:

- Additional SSCs and Natural Resource Scientists to assist and back-up the primary SSC during larger and more complex incidents,
- Information Management Specialists to manage the intense data flow generated by a response, and support planning and operations by preparing and presenting information as GIS maps and large format displays,

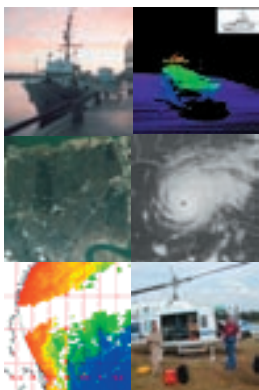


- Shoreline Cleanup Assessment Technique (SCAT) specialists to coordinate, lead, and conduct both aerial and ground level SCAT surveys,
- Aerial observation specialists trained and equipped to help track oil movement,
- Sampling teams and supplies if needed to collect source or environmental samples to support the response,

- Natural Resource Damage Assessment (NRDA) specialists, available to assist in coordinating response-Trustee issues and fieldwork, and

All NOAA on-scene personnel become part of the NOAA SST and are coordinated by the NOAA SSC, the NOAA team leader. The NOAA SSC is responsible for the overall NOAA team safety and ensures full coordination of NOAA activities with the Unified Command.





## Access to all of NOAA's Resources

Through the NOAA SSC, the FOSC can quickly access the myriad of resources available throughout NOAA. NOAA, as the nation's premier oceanic and atmospheric science agency, can provide and coordinate a broad range of scientific resources during a response. For example, the SSC routinely requests the NOAA National Weather Service (NWS) to provide incident specific spot weather forecasts once or twice a day. The NOAA SSC may also request special satellite data, aerial photography, navigation

response teams, or vessel support from other NOAA line offices in special cases.

## Customized Science Support

By discussing the needs of the specific incident with the NOAA SSC, an FOSC will get science support tailored to the requirements of that particular incident in coordination with the local scientific and technical expertise available.



## RRT Science Integration and Coordination

The NOAA SSC for an area frequently serves as either the primary or alternate Regional Response Team (RRT) representative for the Department of Commerce (a role delegated to NOAA). The NOAA RRT representative provides leadership for the synthesis and integration of environmental information required for spill response decisions in support of the FOSC (§300.145(c)(4)). Note, however, if there is a potential conflict of interest between the NOAA SSC and their RRT role during an RRT decision, the same person will not serve in both roles for NOAA.

## 3 BACKGROUND ON NOAA's SCIENTIFIC SUPPORT



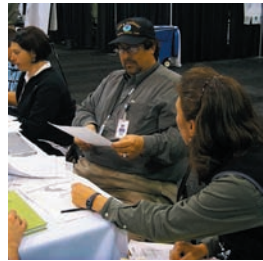
### Origin of the SSC and Scientific Support Team

The idea of a scientific support function originated during the M/V Argo Merchant oil spill off Nantucket in 1976, when it became apparent that the FOSC required a focal point to coordinate scientific activity, with a technical staff to focus on the operational needs of the incident. Following the T/V Exxon Valdez spill and the passage of the

Oil Pollution Act of 1990 (OPA 90), this idea was solidified as the Scientific Support Coordinator position within the incident command structure.

### NOAA's Advanced Scientific Support Team

The original idea evolved into today's team of NOAA scientists and technicians with expertise in oceanography, biology, chemistry, geomorphology, natural resources, human health and safety, and technical information management, who all directly support the FOSC. The SST represents a broad range of scientific disciplines and operational experience, having responded to most major U.S. spills and many major overseas incidents over the last three decades.



### The NOAA Scientific Support Organization

The NOAA SSC, under the NCP, is the scientific support liaison to the FOSC. The NOAA SSC leads the full NOAA Scientific Support Team during a response. The SST is composed primarily of staff within the Emergency Response Division (ERD) of the Office of



Response and Restoration (OR&R). OR&R is within NOAA's National Ocean Service (NOS). Scientists and staff from the NOAA's Assessment and Restoration Division (ARD) of OR&R frequently augment the SST.

## 4 WHAT TO EXPECT FROM NOAA DURING A RESPONSE

Once the Coast Guard calls the SSC for scientific support, the SSC then contacts the NOAA Science Support home team to provide several support products. The following list describes the products typically generated and the time frame in which they are usually available to the FOSC. The products are discussed in detail later in the guidebook.

### For an Oil Spill or Threat of a Spill

Initial Response Products and Actions—the first hour

- Initial trajectory report
- Oil fate information
- Weather forecast (thereafter once or twice a day)
- Tidal heights and currents (thereafter once a day or as needed)
- For inland spills, water level forecasts and river velocity estimates are provided
- Open Hotline on ResponseLINK (new postings added as needed and available). See Appendix 5 for more information.
- Continue collecting and updating incident information.

```
SPOT WEATHER FORECAST FOR TUG SENECA  
1230 EST, Wednesday December 6, 2006
```

```
Sunset (12/06): 1619 CST
```

```
Sunrise (12/07): 0717  
Sunset (12/07): 1619
```

---

```
36 Hour Forecast
```

```
Winds:
```

```
Wednesday afternoon: NW winds at 30 knots  
Wednesday night: N winds at 30 knots
```

```
Thursday morning: N winds at 25 - 30 knots  
Thursday afternoon: N to NW winds at 20 - 25 knots  
Thursday night: NW winds at 20 knots
```

```
Friday: WNW to W winds at 20 knots
```

---

```
Seas:
```

```
Wednesday afternoon: 10 - 15 feet  
Wednesday night: 10 - 15 feet
```

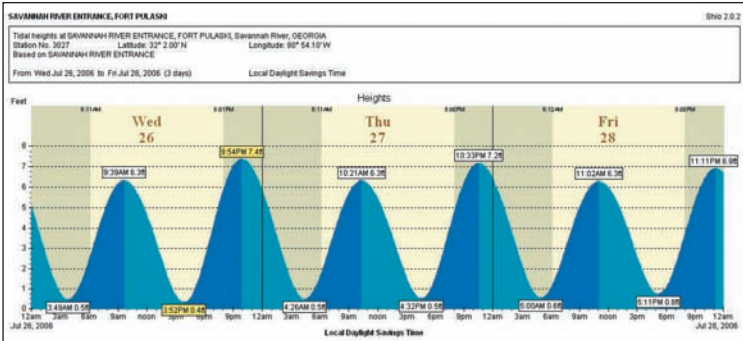
```
Thursday morning: 10 - 15 feet  
Thursday afternoon: 10 - 15 feet  
Thursday night: 10 feet or less
```

---


```
Precipitation:
```

```
Expect bands of snow tonight with possible thunder and lightning.
```

*Example of typical response weather forecast*



Example of tide graph



**Tug Seneca, Lake Superior, MI**

**Alternate Names**  
None

**INCIDENT SUMMARY**

During a storm, the 80+ foot Tug Seneca grounded in 3 feet of water. The tug is carrying 1900 gallons of diesel fuel and 50 gallons of lubricating oil. No oil has been released at this time. Marine Safety Field Office Sault Ste Marie contacted NOAA ERD for assistance in determining the feasibility of monitoring the vessel via satellite imagery. DOI/Bur. of Indian Affairs has been contacted by the USCG and Mike Ripley a fisheries biologist for the Chippewa & Ottawa Resources Authority (a tribal organization) has responded regarding concerns over tribal fish resources.

[Show Incident Details...](#)

LATEST ENTRIES	ENTRY DATE / TIME	FROM
Salvage Ops	Dec-22-2006 01:32 PM	steve.lehmann@noaa.gov
Seneca	Dec-22-2006 01:31 PM	steve.lehmann@noaa.gov
POLREP 11	Dec-22-2006 01:27 PM	steve.lehmann@noaa.gov
POLREP 10	Dec-22-2006 01:26 PM	steve.lehmann@noaa.gov
POLREP 9	Dec-22-2006 01:26 PM	steve.lehmann@noaa.gov
POLREP 8	Dec-22-2006 01:25 PM	steve.lehmann@noaa.gov
POLREP 5	Dec-14-2006 11:46 AM	steve.lehmann@noaa.gov
POLREP 4	Dec-14-2006 11:46 AM	steve.lehmann@noaa.gov
POLREP 2	Dec-14-2006 11:45 AM	steve.lehmann@noaa.gov
POLREP 3	Dec-14-2006 11:44 AM	steve.lehmann@noaa.gov

... Browse all 25 Entries by Date.....

Example of ResponseLINK Hotline

Next Products (as needed) – The next two to four hours

- Modeling Products - Trajectory Forecast Map
- Resources at Risk (RAR) Analysis
- Toxicology Information
- Human Health and Safety Consultation
- Initial Resource Protection Priorities Recommendations

## The Remainder of Day One

- Discuss with FOSC future scientific support needs
- If appropriate, SSC responds on-scene and arranges for additional on-scene NOAA SST personnel
- The SSC generally posts a daily incident summary to Hotline.

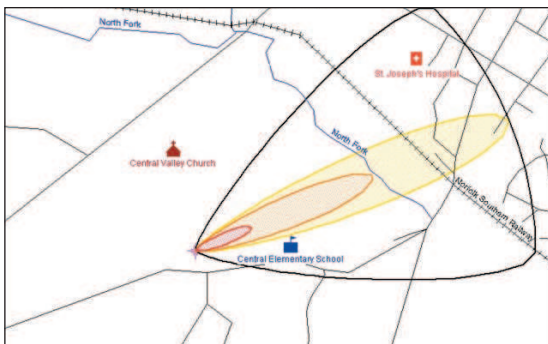
## Days Two through the End of Response

- Home team continues to generate weather forecasts, oil fate estimates, trajectory forecasts, which are recalibrated daily from field observations, as requested by the FOSC through the SSC.
- Field ready SST members requested should arrive and initiate field support by conducting initial aerial and/or ground level assessments. Data from overflights and field teams are critical for the oceanographers to recalibrate water levels, currents, winds, and trajectory predictions.
- On-scene information management personnel set up and begin producing response support products and managing response generated data.
- If source samples are obtained, they are shipped for fingerprinting and product characterization analysis to support response decisions.
- Composition of the SST adjusts as dictated by the response needs.
- Following the active response phase of significant incidents, a post incident data summary is prepared by NOAA for the FOSC.

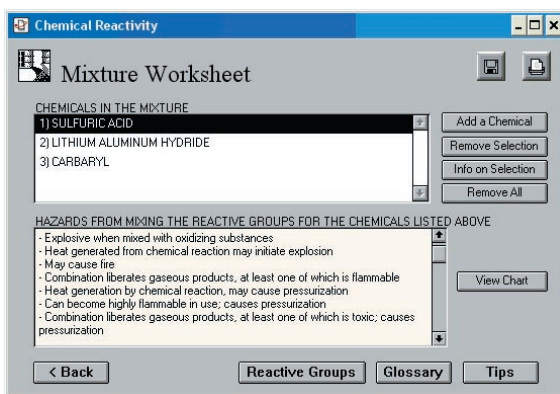
## For a Chemical Incident

Initial Response Products – Usually within the first hour

- Initial Hazard Assessment
- Health and Safety Consultation with FOSC and Unified Command Safety Officer
- Open Hotline on ResponseLINK (new postings added as needed and available)
- Weather Forecast (thereafter once or twice a day)
- Reactivity Report
- Hazard Mitigation Priorities consultation
- CAMEO output
- Response Information Data Sheets (RIDS)
- LandView database information



Example of ALOHA output



Example of chemical reactivity database

Louisiana State University  
 Department of Environmental Studies  
 1285 Energy, Coast & Environment Building, Baton Rouge, LA 70803  
 (225) 578-4295

DES/RCAT06-14

5 Sept., 2006

To: Frank Csulak  
 SSC, NOAA HAZMAT

From: Chemistry Support Team  
 Louisiana State University

Re: Styrene Spill

**HAZARDS SUMMARY:**

The major hazards encountered in the use and handling of styrene stem from its toxicologic properties and flammability. Toxic by all routes (ie, inhalation, ingestion, and dermal contact) and is considered a possible carcinogen. Effects from exposure may include headache, fatigue, nausea, sensation of drunkenness, central nervous system depression, and irritation of the eyes, skin, and respiratory tract (including pulmonary edema). OSHA has established a TWA limit for styrene of 100 ppm. Mechanical ventilation should be used if necessary to maintain airborne levels of styrene at or below the

Example of chemical hazard summary

Next Products (as needed) – The next two to four hours

- Modeling products – Air Dispersion Model (ALOHA) Products or others such as NARAC data.
- Pollutant transport forecast map (Water born chemicals)
- Resources at Risk (RAR) Analysis
- Toxicology
- Additional Human Health and Safety Issue consultation with responders
- Additional Resource Protection Priorities

The Remainder of Day One

- Discuss with FOSC future scientific support needs
- If appropriate, SSC responds on-scene and arranges for additional on-scene NOAA SST personnel
- The SSC generally posts a daily incident summary to Hotline

Days Two through the End of Response

- Home team continues to generate weather forecasts, chemical fate projections, waterborne chemical trajectory forecasts, etc., as requested by the FOSC through the SSC.
- Requested field ready SST members arrive and initiate field support by conducting initial field assessments.
- On-scene information management personnel set up and begin producing response support products and managing response generated data.

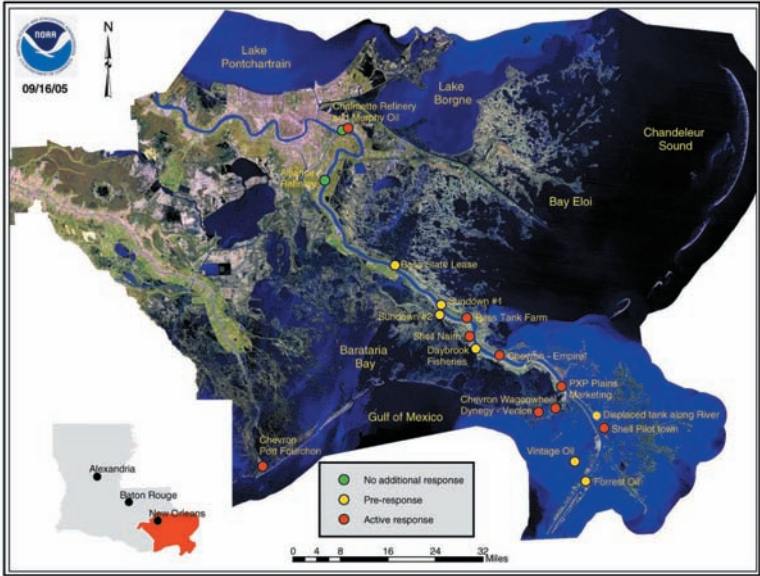


- If source samples are obtained, they are shipped for product characterization analysis to support response decisions.
- Composition of the SST adjusts as dictated by the response needs.
- Following the active response phase of significant incidents, a post incident data summary is prepared by NOAA for the FOSC.



## All Hazard Incident Support

For other types of incidents or events (“All Hazards” support), NOAA Scientific Support will have a similar structure and chronology to those described above, but will be specialized to the unique nature of that event.



## 5 NOAA SCIENTIFIC SUPPORT BETWEEN INCIDENTS

### Between Incidents – Facilitating Readiness

In addition to supporting on-going incident responses, much of the support provided by the NOAA SSC and ERD is accomplished between incidents. The NOAA SSC participates in or arranges for a host of response training and readiness functions such as:



- Regional Response Team (RRT) Area Committee leadership and science integration to prepare regional and area contingency plans (RCPs and ACPs) (Appendix 2 shows the NOAA RRT geographic representation.)
- Spill training coordination, exercise planning, and exercise support during the actual exercise (Contact your SSC for training or drill support.)
- Development and updating of the NOAA scientific support computer models, special tools for responders (Spill Tools) and ERD's handy response "Job Aids" booklets (See Appendix 3 for a list and description of available job aids.)
- Development of response related technical documents (See Appendix 10 for a list and description.)
- Coordinates and provides for response science training ("Science of Oil Spills") by NOAA ERD (See Appendix 7 for training opportunities from NOAA ERD.)
- Participates in and provides supporting documentation for exercises (such as trajectories, resources at risk, weather)
- Coordinates the creation of Environmental Sensitivity Index (ESI) maps (See Appendix 9 for more about ESI maps.)
- Alternative countermeasures review and approval



### NOAA Field Team Readiness

All members of the NOAA SST who respond on-scene are appropriately trained and equipped for the duties they will perform. To accomplish this, field personnel routinely train and update their skills with in-house and external training and certifications, including:



- OSHA/HAZWOPER - All field personnel are 40 hour certified and current
  - Incident Command System (ICS) - NOAA SST responders have a minimum of IS-100, IS-200, IS-700, and IS-800 training. Higher level ICS trained personnel may also be available if requested
  - First aid/CPR - Field personnel are required to be current
  - Aircraft safety - NOAA SST responders have completed Offshore Survival and Helicopter Emergency Egress Device (HEED) training
- Small boat operation and safety
  - General field operations, including use of GPS receivers, digital photography, satellite phones, etc.
  - Cold climate trained and equipped when deployed to such climates
  - Sampling methods
  - SCAT team member trained (SCAT leaders, coordinators, or trainers are available if needed.)



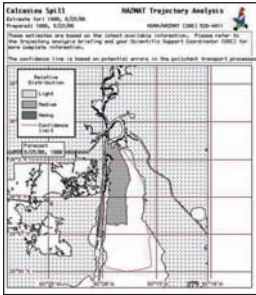
### **SSC Coordination with Coast Guard Districts and FOSCs**

SSCs spend much of their time between incidents building solid working relationships and coordinating with FOSC's and their staff within their assigned Coast Guard Districts. In this way, their ability to communicate with and support the FOSC during an actual incident is greatly enhanced.

# 6 SPILL MODELING, FATE AND TRANSPORT

## Modeling - A Key Service

Trajectory forecasting, real-time tracking of oil and chemical spills, and air plume forecasts are critical services required by the FOSC and Unified Command. These services are central to good response planning to protect responders, communities and the environment, and to maximize the effective use of expensive and scarce response resources.



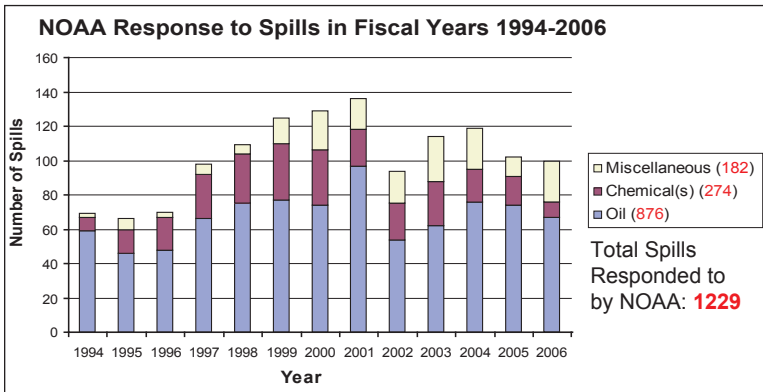
## Oil Fate and Trajectory Forecasting

The goals of oil fate and trajectory forecasting are to predict oil weathering processes, such as evaporation and dispersion, and where the remainder of the oil will go and when. The computer tools used by NOAA to forecast weathering and trajectories are ADIOS and hydrodynamic models to approximate the currents, and a transport model, the General NOAA Oil Modeling Environment

(GNOME) to incorporate the currents, maps and spill specific information to move the spill around. The NOAA models are discussed below.

## NOAA's Incident Modeling Experience

NOAA's SST has provided these vital services since the M/V *Argo Merchant* spill in 1976. They have responded to over 110 requests each year for incident modeling assistance and have over 30 years of spill experience evaluating real-time at-sea conditions, running trajectory models, and providing interpretation of model output. In consult with the NOAA SSC, this experience is available to assist the FOSC and Unified Command during an incident.



## NOAA Oceanographers Run Our Models

NOAA uses physical oceanographers, not just technicians, to set up and run our models. This is because we have determined that such a high level of expertise and training is required to fully understand and use trajectory models in an operational environment. The modeler must understand what factors drive the environment and what real-time or forecast available geophysical data most reliably represent those factors on a given day. Our oceanographers acquire and review appropriate field data needed to calibrate and adjust the forecast to provide the most accurate trajectory forecast to the FOSC. The NOAA modeling team understands the limitations and uncertainties of the trajectory forecasts, and clearly communicates these to the FOSC through the SSC.



## Aerial Observation and Spill Mapping

Aerial observations are used to collect critical field data used for spill planning and operations, as well as trajectory model calibration and verification. While helicopters are generally the preferred platforms, conditions of the incident will dictate the most useful aircraft for operational overflights. The NOAA team generally does not provide or hire aircraft, but requests available seat assignments through the ICS. The NOAA SST does provide field ready and experienced overflight observers. NOAA's aerial observers work closely with the information management staff to rapidly and accurately convert the raw overflight observations to tactical planning information and maps for the Unified Command.

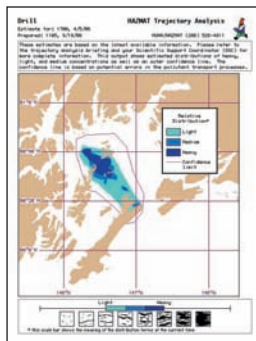


## NOAA Oil Spill Models

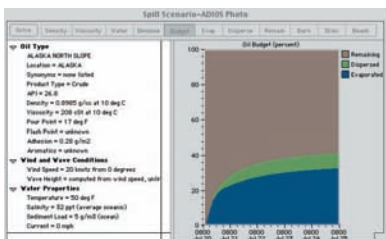
Below is a summary of some of the more common NOAA response models used by the NOAA SST. Detailed model information and instructions for free downloads are available in Appendix 10, and through our Web site, <http://response.restoration.noaa.gov>. A NOAA report "Hazmat Modeling Products for Spill Response and Planning" (2002) is also available at [http://response.restoration.noaa.gov/book\\_shelf/958\\_products.pdf](http://response.restoration.noaa.gov/book_shelf/958_products.pdf). The report describes in detail the modeling and simulation products that NOAA provides to help professional responders, as well as the general public, understand, plan for, and respond to oil and chemical spills.

- **GNOME (General NOAA Oil Modeling Environment)**

This model was developed by the NOAA ERD to simulate the movement of a substance on or in the water. The GNOME model is the primary tool used by NOAA to forecast the movement of the oil for responders. NOAA strongly recommends that the FOSC and Unified Command, through the NOAA SSC, request NOAA oceanographers provide the trajectory forecasts using GNOME. GNOME can also be used between incidents as a planning tool.



- **ADIOS 2 (Automated Data Inquiry for Oil Spills, ver.2)**

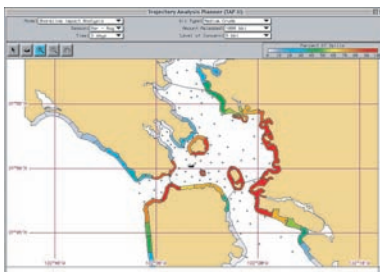


ADIOS 2 estimates the evaporation, natural dispersion, and other weathering processes of oil in the ocean for up to the first five days after it is spilled. An easy to run model, ADIOS 2 inputs include oil chemistry data from its large library of oil types,

wind and sea state, and volume spilled over time. ADIOS 2 outputs support decisions by the Unified Command, by providing tables and graphs that show changes in the volume of oil left floating, and oil density and viscosity over time. The ADIOS 2 weathering predictions help responders decide if and when skimmers or dispersants may be effective.

- **TAP (Trajectory Analysis Planner)**

For spill contingency planning, NOAA's TAP model provides a statistically based approach to help protect an area against likely oil spills. TAP is not designed to use during response to an actual spill, but provides an excellent approach to response planning, preparedness, and consequence analysis. Area spill committees can use it to help develop their Area Contingency Plan (ACP).



## NOAA Chemical Incident Models

Chemical incidents require a particularly rapid and informed response to protect the public and responders. NOAA ERD, jointly with the Environmental Protection Agency (EPA), has developed an integrated suite of computer applications, CAMEO, to quickly provide such accurate information to incident command. CAMEO is also an important training and preparedness tool for first responders.

- CAMEO (Computer-Aided Management of Emergency Operations)

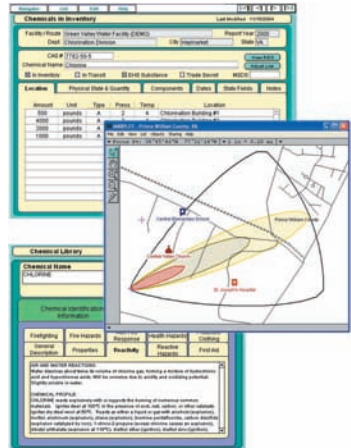
The CAMEO integrated suite of applications includes:

**CAMEO chemical database** – is the main integrating application of the suite

**ALOHA (Areal Locations of Hazardous Atmospheres)** - an air dispersion model

**Chemical Reactivity Worksheet** – used to see the results of virtually mixing chemicals

**MARPLOT (Mapping Application for Response, Planning, and Local Operational Tasks)** – a simple mapping program to display the results of the model

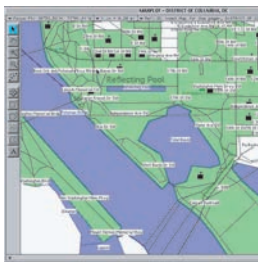
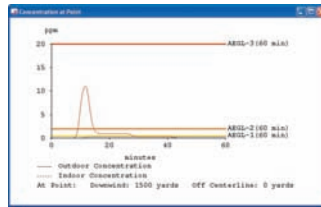


All CAMEO components run in Microsoft Windows and on Apple Macintosh computers.

- CAMEO chemical database contains a library of approximately 6000 chemicals (with 100,000 chemical synonyms and ID numbers) with response recommendations for each. These recommendations are produced as Response Information Data Sheets (RIDS) that show:
  - Physical properties
  - Health hazards
  - Air and water hazard information
  - Firefighting recommendations
  - First aid
  - Spill response recommendations
- CAMEO Chemicals On-line database and reactivity tool is now available at <http://cameochemicals.noaa.gov>.

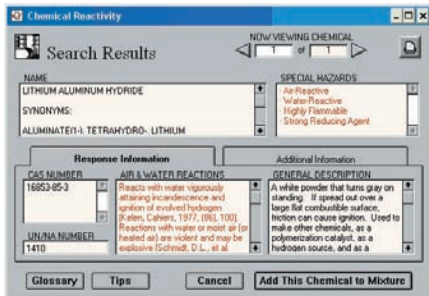
- ALOHA is an air dispersion model integrated into the CAMEO suite. It estimates how a toxic cloud might disperse after an accidental release and also models associated threat zones for fires and explosions.

ALOHA threat zone outputs can be displayed as maps with MARPLOT, described below. Additionally, NOAA ERD has developed extensions that allow a user to display the ALOHA output in ArcView and ArcMap applications. Additional information regarding hazardous releases into the atmosphere may also be provided from sources such as the National Atmospheric Release Advisory Center (NARAC).



- MARPLOT is a general-purpose mapping application, jointly developed by NOAA and EPA. It is designed to be easy to use and fast, and to consume as little disk and memory space as possible, so that you can create, view, and modify maps quickly and easily. It also allows you to link objects on your computer maps to data in other programs, including CAMEO.

- Chemical Reactivity Worksheet is a computer tool that allows responders to virtually mix chemicals (from the built-in chemical



library, or new ones that are easily added) to view the resulting hazards in a Reactivity Report. It includes information about the intrinsic hazards of each chemical (flammability, polymerization, peroxidizability, etc.), as well as case histories on specific chemical incidents.

- LandView is a product developed by NOAA, the Census Bureau, EPA, and the U.S. Geological Service (USGS). LandView provides access to databases of EPA regulated facilities, USGS Geographic Names Information System (GNIS), and Census data. The data can be displayed in MARPLOT and integrated with CAMEO and ALOHA. For more information, go to <http://landview.census.gov>.



## 7 RESPONSE CHEMISTRY

### **Protection from Chemical Hazards - The Paramount Goal of Response**

In addition to the chemical reactivity, trajectory and air plume forecasting discussed above, the FOSC and Unified Command need accurate chemical hazard information to protect responders and the public during a response. NOAA ERD therefore places a priority on providing a high level of chemical and toxicological support to the responders. Through the SSC, the NOAA chemistry team provides the expertise and information necessary to evaluate the chemical hazards associated with both chemical and oil spills and responses. These include detailed information on oil and chemical properties and composition, reactivity, and environmental interactions associated with the specifics of an incident. This information is used by the NOAA SSC to advise the FOSC and Unified Command on pollution movement, resources at risk, and possible routes of human or environmental exposure.

### **During a Chemical Incident**

Through the SSC, the chemistry team:

- Provides concise chemical information such as CAMEO RIDs, that includes physical properties and toxicity Levels of Concern (LOCs).
- Evaluates how substances react in the environment
- Indicates potential interactions among spilled chemicals
- Warns about reaction by-products such as toxic gases
- Advises on possible mitigation options
- Helps design sampling protocols for on-scene conditions
- Can identify resources for sample analysis
- Interprets and verifies analytical results

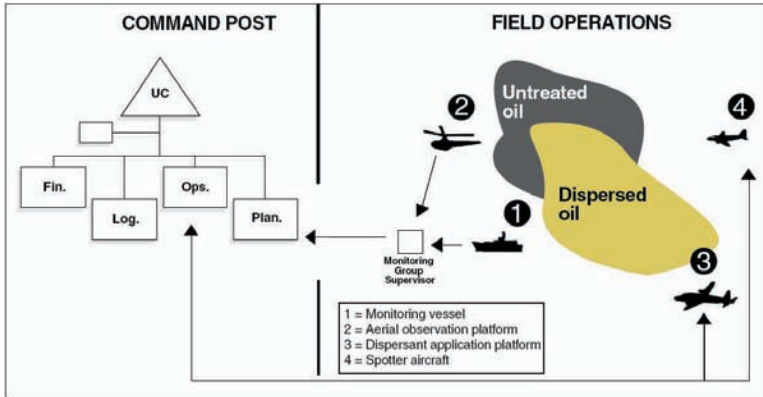
### **During an Oil Spill**

Through the SSC, the chemistry team:

- Evaluates oil composition and properties
- Predicts oil weathering rates and fates
- Advises on the suitability of alternate countermeasures, such as burning, dispersion, bioremediation, or chemical application
- Helps design sampling protocols for on-scene conditions
- Can identify resources for sample analysis
- Interprets and verifies analytical results

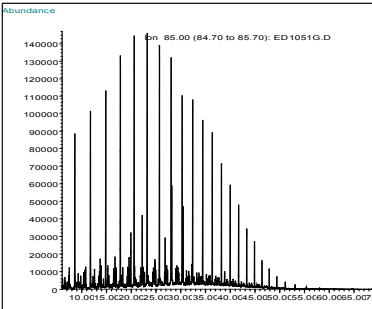
## SMART (Special Monitoring of Applied Response Technologies)

SMART is a cooperatively designed monitoring program for in situ burning and dispersants. For more information, see the Web site [http://response.restoration.noaa.gov/book\\_shelf/648\\_SMART.pdf](http://response.restoration.noaa.gov/book_shelf/648_SMART.pdf).



## Chemistry Support Contract Laboratory

In addition to our in-house chemistry team, NOAA ERD contracts with an experienced analytical and consulting laboratory so that we can provide the highest level of chemistry support to the FOSC. Through the SSC, this laboratory capability provides the FOSC with overnight answers to critical questions about oil weathering, contamination sources, and chemical identities.



## Unusual or Specific Chemical Hazard Assessment

The NOAA SST Chemistry Team has the training and experience to deal with unusual and specific chemical hazards and analytical issues during spills. For example, through the NOAA SSC, the team can review and advise the FOSC on the suitability of specific state of the art chemical or bioremediation response options, and any associated toxicological issues.

## Collaborating with Other Response Science Laboratories

The Chemistry Team often collaborates with other chemists and analytical laboratories such as the US Coast Guard Marine Safety Laboratory, the Occupational Safety and Health Administration (OSHA), academic chemists and other experts to resolve problematic sample characterizations or special tasks associated with incident response.



26 June 2006

Preliminary Chemical Characterization of Slop Oil Released from the Citgo Petroleum Complex at Lake Charles, Louisiana

Charlie Henry  
National Oceanic And Atmospheric Administration (NOAA)

At the request of the USCG, the following information is provided to support the Unified Command and aid in understanding the composition of slop oil spilled from the Citgo Lake Charles Manufacturing Complex. The report has three parts that support the summary characterization: Characterization of the supplied MSDS, preliminary interpretation of analytical data provided to the Unified Command, and subsequent GC/MS analyses of a separate oil sample submitted to Louisiana State University (LSU) at the request of NOAA.

### Brief Summary Characterization

Slop oil can consist of any of the many intermediate or final production stream products throughout the Citgo refinery. The composition of slop oil can be highly variable at different times. As a result, the MSDS is cautious to provide a wide range of potential chemical constituents that might be present. Clearly there was a highly volatile component initially that created response safety concerns during the first several days of the response. At the source and the Indian Marais, the volatile fraction probably remains high. Where oil escaped into the river and spread, evaporation has changed the characterization of the oil resulting in an oil mixture typical of other weathered petroleum oils.

The residual oil remaining is a unique product that appears to be composed of mostly hydrocarbon compounds typical of crude and refined oil products such as kerosene and diesel. In many ways, the weathered oil in the environment is not very different from engine slop oil sourced from diesel mixed with used lube oil and would be expected to have a similar viscosity, spreading potential, and environmental fate. Given the low asphaltene fraction (approximately 0.25%) the oil would be expected to be somewhat persistent, but not highly persistent. This association with engine room slop is only to provide a point of reference with a fuel more commonly spilled. There are differences -- engine room diesel slop doesn't contain any asphaltenes and would be less persistent (this oil will persist longer), but the association does capture the relative abundance and distribution of aromatic hydrocarbons in the

*Example of Oil Chemistry Report*

## 8 HEALTH AND SAFETY

### NOAA Health and Safety Coordinator

The NOAA SST includes an in-house Health and Safety Coordinator to provide the expertise and information necessary for evaluating the human health hazards associated with oil and chemical releases. In addition to being available to advise the FOSC through the NOAA SSC, the NOAA Health and Safety Coordinator ensures that all NOAA field personnel are fully safety trained and equipped for aircraft, boat, and remote field operations.

### Health and Safety Services Available

- Detailed information on allowable human exposure levels
- Recommendations for personal protective gear for the incident based on the specifics of a release
- Evaluation of potential routes of human exposure
- Consultation with OSHA, the Center for Disease Control, the Agency for Toxic Substances and Disease Registry, and similar agencies
- Site safety plan design for NOAA SST personnel
- Consultation with the Unified Command safety officer
- Assistance in designing sampling protocols for on-scene conditions to meet OSHA requirements
- Interpretation of analytical results
- Review of specific response actions and tools for their human health and safety suitability (such as application of surface cleaning agents)
- Consultation with NOAA SST chemists and air modelers to design air monitoring strategies



### Chemical Incident Support

During chemical incidents, the NOAA Health and Safety Coordinator focuses on how substances can affect an exposed population (whether by inhalation, absorption, or ingestion) and possible mitigation options following an incident.

## Oil Spill Support

During oil spills, the NOAA Health and Safety Coordinator focuses on the health and safety aspects of different cleanup methods, such as burning, dispersants, and skimming. The Coordinator also considers effects associated with manual beach cleanup, including workers' exposure to oil agents, decontamination issues, and physical stresses such as heat or cold.



## Unusual or Specific Hazard Analysis

The NOAA Health and Safety Coordinator has the expertise to provide guidance to deal with unusual and specific hazards during incidents.

## 9 NATURAL RESOURCE PROTECTION

### Minimizing Environmental Impact

Chief goals of spill response are to prevent, minimize, and mitigate impacts to the environment. The NOAA SST brings a wealth of experience and knowledge of natural resource protection strategies to assist the FOSC in doing just that.

### NOAA'S Natural Resource Science Team

The NOAA SST includes an impressive depth of expertise in natural resource science including: marine and aquatic biology, coastal geology, geochemistry, fisheries science, ecology, aquatic toxicology, fish and shellfish pathology, seafood safety, and environmental microbiology. More importantly, our scientists have extensive experience in applying this expertise to the unique challenges of spill response. NOAA's ERD personnel have responded to oil and chemical spills from the Arctic to the tropics, from ice to rocky coasts, to wetlands, mangroves, and coral reefs.

### Resources at Risk (RAR) Analysis

One of the first priorities of the SST is to provide a rapid analysis of the natural resources at risk (RAR) as a result of the incident. This RAR analysis mostly involves risk to sensitive biological resources, but may encompass other human use resources such as drinking or cooling water supplies and recreational areas, as well as cultural and historical resources. Within hours of notification and collection of basic spill information, the SST can produce a brief written description of RAR in the spill area along with properties of the spill product and how a spill may affect the environment.

#### Resources at Risk for Sulphur, Louisiana

##### I. Spill Source Information

This report was prepared at 14:00 EDT on June 21, 2006. Information in the report is based on a release of approximately 25,000 bbls of waste slop oil and benzene combined (amounts of each product unknown at this time) into the Calcasieu River.

##### II. Geographic Region Covered

The area covered by this report is the Calcasieu River from Sulphur to Calcasieu Lake. This area does not necessarily correspond to actual or potential oil locations. Consult other Hotline reports for oil location information.

##### III. Expected Behavior of the Spilled Material

Waste slop oil may behave similarly to a crude oil, but is potentially more toxic. The oil may form surface slicks that may coat any animals that come into contact with it. It may also have a high enough concentration of water-soluble fractions that organisms in shallow water may be impacted.

Benzene has high toxicity and the highest water solubility of all of the aromatic

*Example of a RAR analysis*

## The Role of Environmental Sensitivity Mapping

The primary tools for RAR analysis are the Environmental Sensitivity Index (ESI) maps. ESI maps help spill responders and planners identify vulnerable coastal locations before a spill happens, so that protection priorities can be established and cleanup strategies identified in advance.

NOAA ERD researchers, working with colleagues in other government agencies and private consulting experts, have produced ESI maps for most coastal areas in the U.S., including Alaska, Hawaii, the Great Lakes, and the U.S. Territories. More information about ESI maps is available in Appendix 9.



## Environmental Protection Priorities

Incident responders have limited response resources and time.

Therefore, the FOSC and Unified Command must prioritize the environmental protection and cleanup strategy. The NOAA SSC may consult with the RRT members and natural resource Trustees, and strives for a consensus when considering the RAR and the operational tradeoffs of available response strategies. When presenting recommendations to the FOSC, the NOAA SSC presents the consensus opinion, as well as the range of opinions expressed.



## Shoreline Cleanup Assessment Technique (SCAT)

### Leadership

Shoreline Cleanup and Assessment Technique (SCAT) surveys are conducted to determine shoreline types and degree of oiling. This information is provided to the Planning Section to help plan cleanup operations. As shoreline cleanup proceeds, SCAT is used to help determine “how clean is clean” endpoints. SCAT surveys are conducted by small field teams composed of members determined by the specific purpose of the surveys. NOAA SST field personnel are trained and experienced in conducting, leading, training, and coordinating all aspects of SCAT surveys. Further, the NOAA SST members are skilled at coordinating and processing the vast amount of SCAT data produced during a spill. The information can then be analyzed and summarized to facilitate the FOSC’s making informed decisions regarding cleanup operations and endpoints.

## Natural Resource Publications for Responders

NOAA ERD produces publications to assist responders in understanding the sensitive nature of several natural resources at risk from oil spills, and potential ways to deal with them. The current list of these publications includes:

- Oil Spills in Coral Reefs: Planning and Response Considerations
- Oil and Sea Turtles: Biology, Planning, and Response
- Oil Spills in Mangroves: Planning and Response Considerations
- Managing Seafood Safety after an Oil Spill
- Guidance on Sensory Testing and Monitoring of Seafood for Presence of Petroleum Taint Following an Oil Spill
- Characteristic Coastal Habitats: Choosing Spill Response Alternatives

Appendix 10 provides additional information on each of the natural resource publications, including an Internet link to access them. For information on other available NOAA response job aids, see Appendix 3.

## Working with Natural Resource Trustees

Under the National Contingency Plan, both the FOSC and Natural Resource Trustees (the “Trustees”) are responsible for protecting natural resources during an incident response (NCP, 40 CFR § 300.615). Generally through a lead administrative Trustee (LAT), Trustees must coordinate their natural resource damage assessment and restoration (NRDAR or NRDA) actions with the Unified Command, and each other. Trustee coordination with the Unified Command can be facilitated through the NOAA SSC or one of the NOAA natural resource scientists that specialize in this function. These specialists have extensive resource protection expertise and NRDA experience.



## The Role of NRDA during Incident Response

The relationship of NRDA to the Unified Command and response efforts is often misunderstood. While in the past, NRDA activities were often poorly coordinated with response and occurred outside of the structure or control of the Unified Command, this is changing. Trustee representatives are concerned with and skilled at determining the threats to the natural resources under their jurisdiction. Since the FOSC is charged with protecting these same natural resources, both groups can greatly benefit by better integration of the two processes during an incident response.



## NOAA's Other Role as a Trustee

The NOAA SSC must provide unbiased scientific support and coordination to the FOSC. NOAA, however, is also a natural resource Trustee agency. Therefore, to ensure that the SSC retains the scientific objectivity required to serve the FOSC, NOAA's NRDA Trustee functions (i.e., NOAA RRT representation and/or the NOAA NRDA function) are carried out through separately assigned NOAA personnel. The NOAA SSC does not direct any NRDA actions. Additionally, personnel from another division of NOAA's Office of Response and Restoration, our Assessment and Restoration Division (ARD), may join the NOAA team in the event NRDA actions are initiated during response operations. ARD is NOAA's lead for NRDA actions.

## Common Trustee Concerns and Activities during Response

Typical Trustee actions during response include:

- Conducting a preliminary survey to determine if natural resources under Trustee jurisdiction are potentially affected
- Co-Trustee and Trustee-Responsible Party (RP) NRDA discussions and coordination of data collection
- Trustee selection of a lead administrative Trustee (LAT)
- Submitting a "Preassessment Initiation" funding request to the National Pollution Funds Center (NPFCC, this action must be through a federal LAT, although the overall LAT function can be by a state LAT)
- Collecting perishable NRDA data and samples
- Conducting detailed field assessments and overflights, when appropriate
- NRDA data sharing with RPs and Unified Command



## Separate NOAA NRDA Cost Accounting

All NRDA related costs for NOAA are accounted for separately from response related costs. NRDA costs are documented and recovered through a Preassessment Initiation Funding Agreement with the NPFCC (through the federal LAT), an agreement between the RP and Trustees, or through the formal NRDA process. For all NOAA personnel, incident related cost recovery is determined by the type of activity (i.e., they help achieve response objectives or NRDA objectives). Certain NOAA SST personnel are qualified to perform both types of activity.

# 10 INFORMATION MANAGEMENT AND GIS SUPPORT

## Taming the Information Beast

The NOAA Information Management (IM) team members are an integral part of the SST and promote efficient internal and external communication to support the many aspects of response operations. The IM staff integrates on-scene data collection, data synthesis, information presentation, and data dissemination during all phases of an incident response. The IM team may serve within the Situation or Environmental Unit within the planning section in ICS, but may support a number of different sections.



## Planning and Operations Support

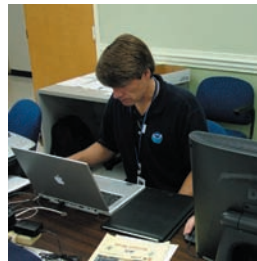
The primary objectives of Information Management are to:

- Produce information displays which provide a common operational picture to facilitate informed operational decisions and planning,
- Clearly present response recommendations to the FOSC, and
- Document and archive scientific data produced during a response.

## Synthesizing Information

An important team function is to synthesize critical information and facilitate its flow to the FOSC, and within the Unified Command System. This may include:

- Maintaining incident status boards
- Providing the appropriate software and hardware tools and expertise to capture and display information
- Creating products to meet specific response needs
- Being a resource for section chiefs to enhance information flow and communication clarity.
- Producing briefing products and displays such as: on-water oil slick maps based on overflights; maps of shoreline oiling showing extent and degree of exposure; shoreline cleanup progress reports; oil trajectories; and resources at risk.



## ResponseLINK and IncidentNews - Data Sharing and Dissemination

For most incidents, NOAA will start an incident hotline on the restricted access Internet-based NOAA ResponseLINK. (<https://responselink.orr.noaa.gov>). The hotline report facilitates the FOSC's ability to share current incident information with approved response personnel in other locations, such as RRT members, natural resource Trustees, response partners, and stakeholders. ResponseLINK allows the NOAA SST to assist the FOSC and the command staff in keeping decision makers up to date on what is happening with the incident response. Because ResponseLINK has restricted access, posting information to it takes less clearance time. ResponseLINK is used to post:

- Incident notifications
- Daily status reports
- Coast Guard pollution or incident reports
- Overflight and other response maps
- Chemical analysis reports
- Trajectory maps and reports
- Resources at risk analyses
- Incident photos
- Spot weather forecasts



In addition to ResponseLINK, information that is less sensitive or restricted in distribution, may be posted to a publicly available Internet site, IncidentNews at <http://www.incidentnews.gov>.



### Post Incident Data Summaries

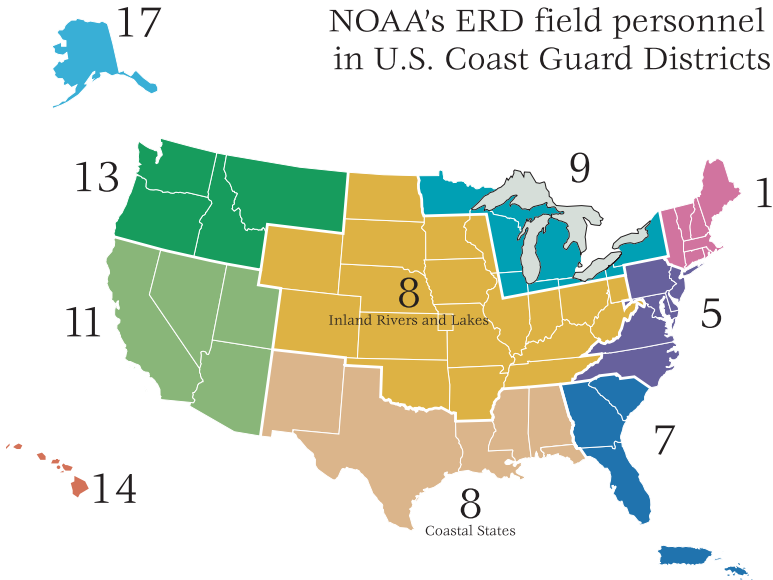
For significant incidents the NOAA IM staff compiles a post incident "Information Management Report" that is compiled and provided to the FOSC. This report contains all NOAA overflight maps, hotline reports, shoreline survey information, weather forecasts, official scientific

recommendations, other response related reports, memorandums, and other scientific information developed during the response. This report can greatly facilitate the FOSC's task of preparing the official FOSC after-action report.

# APPENDIX 1

## SCIENTIFIC SUPPORT COORDINATOR (SSC) CONTACT INFORMATION

The following map shows the location of NOAA's Emergency Response Division (ERD) field personnel. Most Scientific Support Coordinators (SSCs) are located in U.S. Coast Guard district offices.



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**District 1, except CT:**

Steve Lehmann, NOAA SSC  
CDR 1st Coast Guard  
District (MEP)  
408 Atlantic Avenue  
Boston, MA 02110  
Office: (617) 223-8016  
Cell: (617) 877-2806  
E-mail: Steve.Lehmann@noaa.gov

**District 5 (north part) and CT:**

(CT to DE):  
Ed Levine, NOAA SSC  
USCG Battery Park Building  
1 South Street, Room 329  
New York, NY 10004  
Office: (212) 668-6428  
Cell: (206) 849-9941

**District 5 (south part, MD to NC):**

Frank Csulak, NOAA SSC (acting)  
74 MacGruder Road  
Highlands, NJ 07732  
Office: (732) 872-3005  
Cell: (732) 371-1005  
E-mail: Frank.Csulak@noaa.gov

**District 7:**

Brad Benggio, NOAA SSC  
909 SE 1st Avenue, Suite 714  
Brickell Plaza Federal Building  
Miami, FL 33131  
Office: (305) 530-7931  
Cell: (206) 849-9923  
E-mail: Brad.Benggio@noaa.gov

Jim Jeansonne  
NOAA Natural Resource Scientist  
263 13th Avenue South  
St. Petersburg, FL 33702  
Office: (727) 551-5714  
Cell: (206) 276-5308  
E-mail: Jim.Jeansonne@noaa.gov

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**District 8:**

Charlie Henry, NOAA SSC  
CDR Eighth Coast District  
(M-SSC)  
Hale Boggs Federal Building,  
Suite 1341  
500 Poydras Street  
New Orleans, LA 70130  
Office: (504) 589-4414  
Cell: (206) 849-9928  
E-mail: Charlie.Henry@noaa.gov

**District 9:**

LCDR Elizabeth Jones,  
NOAA SSC  
U.S. Coast Guard Marine  
Safety Office  
AJC Federal Building  
1240 East Ninth Street  
Cleveland, Ohio 44119  
Cell: (206) 849-9918  
E-mail: Elizabeth.Jones@noaa.gov

**District 11:**

Jordan Stout, NOAA SSC  
Coast Guard Island, Bldg. 50-7  
Alameda, CA 94501  
Office: (510) 437-5344  
Cell: (206) 321-3320  
E-mail: Jordan.Stout@noaa.gov

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**Districts 13 and 14:**

Ruth Yender, NOAA SSC  
7600 Sand Point Way NE  
Seattle, WA 98115  
Office: (206) 526-6081  
Cell: (206) 849-9926  
E-mail: Ruth.Yender@noaa.gov

**District 17:**

John Whitney, NOAA SSC  
Peterson Tower Bldg., Suite 100  
510 L Street  
Anchorage, AK 99501  
Office: (907) 271-3593  
Cell: (907) 440-8109  
E-mail: John.Whitney@noaa.gov

Doug Helton, NOAA Incident  
Operations Coordinator  
7600 Sand Point Way NE  
Seattle, Washington 98115  
Office: (206) 526-4563  
Cell: (206) 890-7760  
E-mail: Doug.Helton@noaa.gov

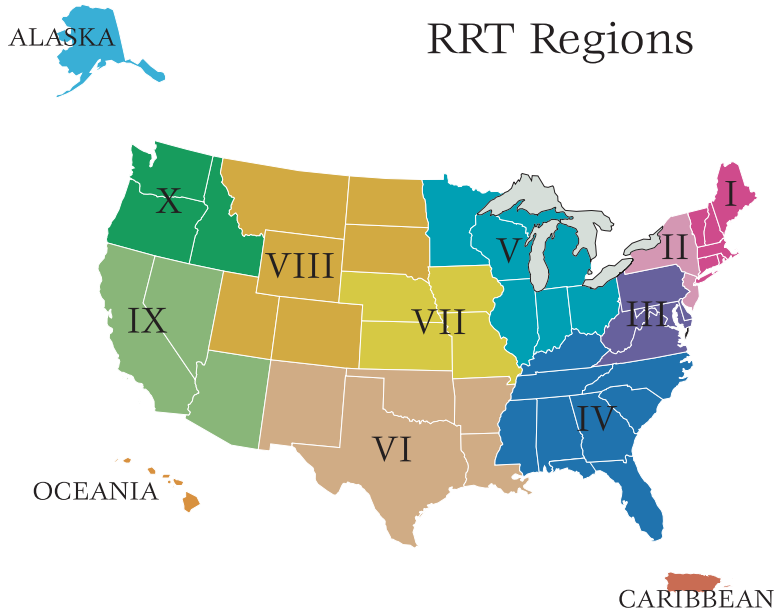
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In the event an SSC cannot be reached, or for 24/7 emergency support, contact the **ERD Duty Officer at (206) 526-4911**.

## APPENDIX 2

### DOC/NOAA REGIONAL RESPONSE TEAM (RRT) REPRESENTATION

The following map shows the Regional Response Team (RRT) regions. The table below lists the NOAA primary and alternate representatives for each RRT region and their contact information.



#### Regions I, V, and VII:

Steve Lehmann, NOAA OR&R  
 CDR 1st Coast Guard District (MEP)  
 408 Atlantic Avenue  
 Boston, MA 02110  
 Office: (617) 223-8016  
 Cell: (617) 877-2806  
 E-mail: Steve.Lehmann@noaa.gov

Alternate:  
 LCDR Elizabeth Jones,  
 NOAA SSC  
 U.S. Coast Guard Marine  
 Safety Office  
 AJC Federal Building  
 1240 East Ninth Street  
 Cleveland, Ohio 44119  
 Cell: (206) 849-9918  
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## APPENDIX 3

### NOAA's RESPONSE JOB AIDS AND RELATED PUBLICATIONS

NOAA's Job Aids and some related publications are listed in the following table.

Title / Web Link	Description	URL for PDF version	Order the publication
<p><b>Trajectory Analysis Handbook</b>                      en Español: <b>Manual de Analisis de Trayectorias</b>  <a href="http://response.restoration.noaa.gov/trajanal_handbk">http://response.restoration.noaa.gov/trajanal_handbk</a></p>	<p>A flip booklet containing an overview of the physical processes that affect oil movement and behavior in the marine environment, along with a discussion of each process.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/trajanalysis">http://response.restoration.noaa.gov/jobaid/trajanalysis</a> (PDF, 2.7M)                      en Español:  <a href="http://response.restoration.noaa.gov/jobaid/trayect">http://response.restoration.noaa.gov/jobaid/trayect</a> (PDF, 4.1M)</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/orderform">http://response.restoration.noaa.gov/jobaid/orderform</a>                      Spanish version by special order.                      Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p>Related Publication: <b>Questions and Answers: Spill Trajectory Analysis</b></p>	<p>A 1996 technical explanation of spill trajectory analysis and how it differs from oil spill trajectory modeling.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/qa_trajanal">http://response.restoration.noaa.gov/erdpub/qa_trajanal</a> (PDF, 266.5K)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p>Related Publication: <b>Digital Distribution Standard for NOAA Trajectory Analysis Information</b></p>	<p>A 1996 technical description of a method for preparing a set of "minimum regret" trajectory model runs for use in trajectory analysis, and a standard digital file format for presenting the results.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/ta_stand">http://response.restoration.noaa.gov/erdpub/ta_stand</a> (PDF, 230.9K)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p><b>Open Water Oil Identification Job Aid for Aerial Observation</b>                      en Español: <b>Asistencia para la Identificación de Petróleo en Aguas Abiertas para observación aérea</b>  <a href="http://response.restoration.noaa.gov/jobaid/oil_id">http://response.restoration.noaa.gov/jobaid/oil_id</a></p>	<p>A flip booklet with color photos of oil, to aid in oil slick identification. This aid was created to help responders perform efficient assessments and to use standard language to communicate findings effectively.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/aerialobs">http://response.restoration.noaa.gov/jobaid/aerialobs</a> (PDF, 1.5M)</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/orderform">http://response.restoration.noaa.gov/jobaid/orderform</a>                      Spanish version by special order.                      Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>



Title / Web Link	Description	URL for PDF version	Order the publication
<p>Related Publication: <b>Aerial Observations of Oil at Sea</b></p>	<p>1996 recommended procedures for assessing spilled oil from the air.</p>	<p><a href="http://response.restoration.noaa.gov/erpub/oilatsea">http://response.restoration.noaa.gov/erpub/oilatsea</a> (PDF, 61.5K)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p><b>Dispersant Application Observer Job Aid</b>  <a href="http://response.restoration.noaa.gov/jobaid/dispersant">http://response.restoration.noaa.gov/jobaid/dispersant</a></p>	<p>A flip booklet with color photos to aid people who have completed training in dispersant application observation. Use it to refresh your memory on how to observe and identify dispersed and undispersed oil, describe oil characteristics, and report this information to decision-makers.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/disperse">http://response.restoration.noaa.gov/jobaid/disperse</a> (PDF, 1.0M)</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/orderform">http://response.restoration.noaa.gov/jobaid/orderform</a></p>
<p>Related Publication: <b>Dispersing Oil Near Shore in the California Current Region</b></p>	<p>A 2001 paper summarizing our current knowledge of dispersants, dispersing oil, the need for preapproval, methods used to simulate spill responses, and ecological risk assessment.</p>	<p><a href="http://www.calcofi.org/newhome/publications/CalCOFI_Reports/v42/pdfs/Vol_42_Mearns_et_al.pdf">http://www.calcofi.org/newhome/publications/CalCOFI_Reports/v42/pdfs/Vol_42_Mearns_et_al.pdf</a> (PDF, 1.4M)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p><b>Shoreline Assessment Job Aid en Español: Guía para la Evaluación del Litoral Costero</b>  <a href="http://response.restoration.noaa.gov/jobaid/shoreline">http://response.restoration.noaa.gov/jobaid/shoreline</a></p>	<p>A flip booklet with color photos of surface oil distribution, oiling descriptors for thickness and type, sediment types, shoreline types, and cleanup methods to aid in the Shoreline Cleanup and Assessment Technique (SCAT) process.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/shore_assess">http://response.restoration.noaa.gov/jobaid/shore_assess</a> (PDF, 2.4M)</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/orderform">http://response.restoration.noaa.gov/jobaid/orderform</a>  Spanish version by special order.  Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>

Title / Web Link	Description	URL for PDF version	Order the publication
<p>Related Publication: <b>Shoreline Assessment Manual</b></p>	<p>A 2000 manual outlining methods for conducting shoreline assessments and using the results to make cleanup decisions.</p>	<p><a href="http://response.restoration.noaa.gov/erpub/manual_shore_assess">http://response.restoration.noaa.gov/erpub/manual_shore_assess</a> (PDF, 3.4M)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p>Related Publication: <b>Shoreline Assessment Forms</b></p> <p><a href="http://response.restoration.noaa.gov/jobaid/shoreline_forms">http://response.restoration.noaa.gov/jobaid/shoreline_forms</a></p>	<p>Forms you can download, print out, and then use to record your observations during a shoreline survey following an oil spill. You can find more information about how to use the forms in the Shoreline Assessment Manual</p>	<p>See the Web link for PDF versions of the Forms.</p>	<p>N/A</p>
<p><b>Characteristic Coastal Habitats: Choosing Spill Response Alternatives</b></p> <p>en Español: <b>Hábitats Costeros Característicos: Selección de Alternativas para Responder a Derrames de Petróleo</b></p> <p><a href="http://response.restoration.noaa.gov/jobaid/coastalhab">http://response.restoration.noaa.gov/jobaid/coastalhab</a></p>	<p>A job aid that illustrates typical attributes of North American coastal habitats at risk from oil spills. The text describes each habitat and discusses how oil is likely to behave there, and considerations for treating oil.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/coastal">http://response.restoration.noaa.gov/jobaid/coastal</a> (PDF, 3.3M)</p> <p>en Español: <a href="http://response.restoration.noaa.gov/jobaid/costeros">http://response.restoration.noaa.gov/jobaid/costeros</a> (PDF, 5.2M)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>. Spanish version by special order. Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>
<p><b>Characteristics of Response Strategies: A Guide for Spill Response Planning in Marine Environments</b></p> <p><a href="http://response.restoration.noaa.gov/jobaid/responsestrat">http://response.restoration.noaa.gov/jobaid/responsestrat</a></p>	<p>A job aid designed to help spill responders select appropriate response options to minimize environmental impacts when oil spills in coastal habitats. It is especially for people participating in cleanup assessment as part of Operations and Planning Units within the Incident Command System.</p>	<p><a href="http://response.restoration.noaa.gov/jobaid/response">http://response.restoration.noaa.gov/jobaid/response</a> (PDF, 558.3K)</p>	<p>Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a>.</p>

Title / Web Link	Description	URL for PDF version	Order the publication
<b>Introduction to Coastal Habitats and Biological Resources for Spill Response</b> <a href="http://response.restoration.noaa.gov/jobaid/habitats_bio">http://response.restoration.noaa.gov/jobaid/habitats_bio</a>	A 1992 training manual covering physical, geological, and biological considerations relevant to oil spill response and cleanup.	See the Web link for PDF versions of the 10 chapters.	Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a> .
<b>Mechanical Protection Guidelines</b>	A 1994 manual describing how to deploy booms, barriers, and other mechanical protection devices during a spill response.	<a href="http://response.restoration.noaa.gov/erdpub/mechanical">http://response.restoration.noaa.gov/erdpub/mechanical</a> (PDF, 1.0M)	Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a> .
<b>Observers' Guide to Sea Ice</b> <a href="http://response.restoration.noaa.gov/jobaid/seaice">http://response.restoration.noaa.gov/jobaid/seaice</a>	A job aid for volunteers who report observations of ice conditions to authorities such as the U.S. Coast Guard.	<a href="http://response.restoration.noaa.gov/jobaid/seaice_doc">http://response.restoration.noaa.gov/jobaid/seaice_doc</a> (PDF, 1.9 M)	Contact <a href="mailto:orr.library@noaa.gov">orr.library@noaa.gov</a> .

## APPENDIX 4

### INCIDENT RESPONSE FORMS

NOAA Emergency Response Division (ERD) offers electronic Incident Command System (ICS) forms in two versions:

- ICS forms for all-risk/all-hazard situations, produced by the U.S. Coast Guard: [http://response.restoration.noaa.gov/icsforms\\_uscg](http://response.restoration.noaa.gov/icsforms_uscg). These forms are available in several formats:
  - as Portable Document Format (PDF) files;
  - in Microsoft Word/Excel formats.
- ICS forms for oil spill response: <http://response.restoration.noaa.gov/icsforms>. These forms are available in two formats:
  - a FileMaker database containing the ICS forms;
  - as PDF files.

The Coast Guard recommends the use of their ICS forms because those forms are the most capable for all-risk/all-hazard incidents; however, any of the three versions may be used. The following table lists the Coast Guard (“CG”) versions.

Form Number	Form Name	Purpose
IAP Cover Sheet	Incident Action Plan Cover Sheet	An Incident Action Plan (IAP) contains general control objectives reflecting the overall incident strategy and specific action plans for the next operational period. The Unified Command, Command Staff, and General Staff develop the IAP. When all attachments are included, the plan: <ul style="list-style-type: none"><li>• specifies the objectives for the next operational period;</li><li>• defines the work assignments for the next operational period, including extracts of site-specific safety messages (Note: the Site Safety Plan is generally a stand-alone document and is not included in the IAP);</li><li>• defines the resources needed to accomplish the work order;</li><li>• depicts how all response personnel are to be organized;</li><li>• lists radio and telephone communications for all incident personnel;</li><li>• specifies a medical plan to follow in case of a responder emergency;</li></ul>
ICS 201	Incident Briefing	The Incident Briefing form provides the Unified Command (and the Command and General Staffs assuming command of the incident) with basic information regarding the response situation and the resources allocated to the incident. It is also a permanent record of the initial incident response.
ICS 202	Incident Objectives	The Incident Objectives form describes the basic incident strategy, control objectives, command emphasis/priorities, and safety considerations for use during the next operational period.

Form Number	Form Name	Purpose
ICS 203	Organization Assignment List	The Organization Assignment List provides ICS personnel with information on the units that are currently activated and the names of personnel staffing each position/unit. It is used to complete the Incident Organization Chart (ICS form 207-CG) which is posted on the Incident Command Post display. An actual organization will be event-specific. Not all positions need to be filled. The size of the organization is dependent on the magnitude of the incident and can be expanded or contracted as necessary.
ICS 204	Assignment List	The Assignment List(s) informs Division and Group supervisors of incident assignments. Once the Unified Command and General Staff agree to the assignments, the assignment information is given to the appropriate Divisions and Groups.
ICS 204a	Assignment List Attachment	The Assignment List Attachment shows more specific assignment information, if needed. The need for an ICS 204a-CG is determined by the Planning and Operations Section Chiefs during the Operational Planning Worksheet (ICS 215-CG) development. Specific instructions for specific resources may be entered on the form for dissemination to the field. A separate sheet is used for each Division or Group.
ICS 205	Incident Radio Communications Plan	The Incident Radio Communications Plan is a summary of information obtained from the Radio Requirements Worksheet (ICS 216) and the Radio Frequency Assignment Worksheet (ICS 217). Information from the Radio Communications Plan on frequency assignments is normally noted on the appropriate Assignment List (ICS 204-CG).
ICS 206	Medical Plan	The Medical Plan provides information on incident medical aid stations, transportation services, hospitals, and medical emergency procedures.
ICS 207	Organizational Chart	The Incident Organization Chart is used to indicate what ICS or organizational elements are currently activated and the names of personnel staffing each element. An actual organization will be event-specific. Not all positions need to be filled. The size of the organization is dependent on the magnitude of the incident and can be expanded or contracted as necessary. Personnel responsible for managing organizational positions are listed in each box as appropriate.
ICS 208	Site Safety and Health Plan	The Site Safety and Health Plan is designed for safety and health personnel who use the Incident Command System (ICS). It is compatible with ICS and is intended to meet the requirements of the Hazardous Waste Operations and Emergency Response regulation (Title 29, Code of Federal Regulations, Part 1910.120). Although primarily designed for oil and chemical spills, the plan can be used for all hazard situations.
ICS 209	Incident Status Summary (SITREP/Opsum)	The Status Summary: <ol style="list-style-type: none"> <li>1. Is used by Situation Unit personnel for posting information on Status Boards or attaching as a file to the MISLE Case.</li> <li>2. Is duplicated and provided to Command Staff members, giving them basic information for planning for the next operational period.</li> <li>3. Provides information to the Information Officer for preparing news media releases.</li> <li>4. Summarizes incident information for local and off-site coordination/operations centers.</li> </ol>

Form Number	Form Name	Purpose
ICS 210	Status Change	The Status Change form is used to record status change information received on resources assigned to the incident.
ICS 211	Check-In List	Personnel and equipment arriving at the incident can check in at various incident locations. Check-in consists of reporting specific information which is recorded on the form.
ICS 213	General Message	The General Message is used by: Incident personnel to record incoming messages which cannot be orally transmitted to the intended recipients; Command Post and other incident personnel to transmit messages to the Incident Communications Center for transmission via radio or telephone to the addressee; Incident personnel to send any message or notification requiring a hard-copy delivery to incident personnel.
ICS 213-RR	Resource Request	The Resource Request Message is used by incident personnel to place resource orders.
ICS 214	Unit Log	The Unit Log records details of unit activity, including strike team activity. These logs provide the basic reference from which to extract information for inclusion in any after-action report.
ICS 215	Operational Planning Worksheet	This form communicates to the Resources Unit the resources needed as a result of decisions made during the Tactics and Planning meetings. The Worksheet is used by the Resources Unit to complete the Assignment List (ICS form 204-CG) and by the Logistics Section Chief for ordering resources. The worksheet may also be used by the Resources Unit Leader to complete the Assignment List Attachment(s) (ICS form 204a-CG), if the Operations and Planning Section Chiefs deem it necessary.
ICS 215a	Incident Action Plan Safety Analysis	This form communicates to the Operations and Planning Section Chiefs safety and health issues identified by the Safety Officer. The Worksheet is used by the Resources Unit to complete ICS 204 Forms and Operations briefings.
ICS 216	Radio Requirements Worksheet	The Radio Requirements Worksheet is used to develop the total number of personal portable radios required for each Division/Group and Branch. It provides a listing of all units assigned to each Division, and thus depicts the total incident radio needs.
ICS 217	Radio Frequency Assignment Worksheet	The Radio Frequency Assignment Worksheet is used by the Communications Unit Leader to assist in determining frequency allocations.
ICS 218	Support Vehicle Inventory	The Support Vehicle Inventory form provides an inventory of all transportation and support vehicles assigned to the incident. The information is used by the Ground Support Unit to maintain a record of the types and locations of vehicles on the incident. The Resources Unit uses the information to initiate and maintain status/resources information on these resources.

Form Number	Form Name	Purpose
ICS 219	Resource Status Card (T-Cards)	Resource Status Cards are used by the Resources Unit to record status and location information on resources, transportation, and support vehicles and personnel. The Resource Status Cards provide a visual display of the status and location of resources assigned to the incident.
ICS 220	Air Operations Summary	The Air Operations Summary provides the Air Operations Branch with the number, type, location, and specific assignments of aircraft.
ICS 221	Demobilization Checkout	This form provides the Planning Section information on resource releases from the incident.
ICS 224	Crew Performance Rating	(Not used)
ICS 225	Personnel Performance Rating	The Incident Personnel Performance Rating gives supervisors the opportunity to evaluate subordinates on incident assignments.
ICS 226	Individual Personnel Rating	The immediate supervisor will prepare this form for a subordinate person. Rating will be reviewed with the individual, who will sign and date the form. The completed rating will be given to the Planning Section Chief before the rater leaves the incident.
ICS 230	Daily Meeting Schedule	The Daily Meeting Schedule records information about the daily scheduled meeting activities.
ICS 232	Resources at Risk Summary	The Resources at Risk Summary provides information about sites in the incident area which are sensitive due to environmental, archaeo-cultural, or socio-economic resources at risk, and identifies incident-specific priorities and issues. The information recorded here may be transferred to ICS form 232a-CG, which acts as a key to the Area Contingency Plan (ACP) or Geographic Response Plan (GRP) site numbers shown on the Situation Map.
ICS 232a	ACP Site Index	If used, this form is posted next to the Situation Map, providing a key to the ACP/GRP sites shown on the map.
ICS 233	Open Action Tracker	The Open Action Tracker provides a method of capturing the administrative tasking that comes from Unified Command and Section Chiefs during a response. The Open Action Tracker is a management tool used for tracking the internal tasks of the ICS, rather than the operational or tactical assignments captured on other ICS forms.
ICS 234	Work Analysis Matrix	The Work Analysis Matrix is designed to provide specific tactical instructions that are tied to strategies based on Operational Objectives. This form assists staff in carrying out incident objectives by outlining the “who, what, where, when, and how” of the response.
ICS 235	Facility Needs Assessment	The Facility Needs Assessment Worksheet outlines the workspace and equipment needs for the facilities involved in the incident response.

## APPENDIX 5

### ONLINE INCIDENT INFORMATION

#### ResponseLINK

ResponseLINK is a limited access, Web-based communications system for incident responders. An email address and password are required to log in to the system. The Web site is <https://responselink.orr.noaa.gov>.

**NOAA staff:** Your username is your NOAA e-mail address, **including the domain part** (e.g., “john.smith@noaa.gov”). Your password is the same as your email password.

**Other users:** Use the username and password provided by the ResponseLINK administrator.

To request access or obtain more information, contact the ResponseLINK administrator at [orr.incidentnews@noaa.gov](mailto:orr.incidentnews@noaa.gov).

#### Components of ResponseLINK:

**Incident Hotlines:** “Hotline” contains information and reports about recent incidents. This system is used by NOAA as a real-time spill communications system. Incident reports are entered chronologically; as a result, early reports may contain factual errors. Sometimes these errors are corrected in a later report. Incidents can be browsed by the Hotline open date or searched by incident name.

**NRC Notification (RRT):** The National Response Center (NRC) Notification section of ResponseLINK contains incident notifications received by the National Response Team, as well as Regional Response Team (RRT) information. The NRC Notifications are only available to Federal, State, and Local government personnel. You can browse all the notifications, narrow your browsing to individual RRT regions, or further limit your browsing to states. New NRC notifications are received every 30 minutes. They are displayed for 30 days and then deleted. OR&R does not maintain a long-term archive of notifications.



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## **IncidentNews**

The IncidentNews Web site (<http://www.incidentnews.gov>) contains news, photos, and other information provided and approved by the Unified Command for specific spill incidents. It is important to note that the information in this Web site comes to OR&R directly from the field and has not been confirmed. The information is posted on the site as it becomes available. The timing of updates depends on the nature of each spill and the resources available to post the material. The date and time of updates is noted on each page. During rapidly evolving events, the site might be updated several times per day. In the later phases of a response, the site might be updated once per week.

For more information, contact the IncidentNews administrator at [orr.incidentnews@noaa.gov](mailto:orr.incidentnews@noaa.gov).

# APPENDIX 6

## NOAA RESPONSE MODELS

Information about NOAA's response models is available in a series of fact sheets, available on the OR&R Web site. NOAA model applications are free and instructions to get them are also in the fact sheets.

### Oil Spill Response Models and Spill Tools

Model	URL for ModelFact Sheet (PDF)	Web Site Information
GNOME (General NOAA Oil Modeling Environment), oil trajectory model.	<a href="http://response.restoration.noaa.gov/book_shelf/820_GNOME.pdf">http://response.restoration.noaa.gov/book_shelf/820_GNOME.pdf</a> (PDF, 1.1 M)	<a href="http://response.restoration.noaa.gov/gnome">http://response.restoration.noaa.gov/gnome</a>
TAP (Trajectory Analysis Planner), trajectory analysis software.	<a href="http://response.restoration.noaa.gov/book_shelf/894_tap.pdf">http://response.restoration.noaa.gov/book_shelf/894_tap.pdf</a> (PDF, 657.9K)	<a href="http://response.restoration.noaa.gov/tap">http://response.restoration.noaa.gov/tap</a>
ADIOS 2 (Automated Data Inquiry for Oil Spills), oil weathering model.	<a href="http://response.restoration.noaa.gov/book_shelf/538_adios.pdf">http://response.restoration.noaa.gov/book_shelf/538_adios.pdf</a> (PDF, 721.8K)	<a href="http://response.restoration.noaa.gov/adios">http://response.restoration.noaa.gov/adios</a>
Spill Tools, a set of three programs designed for oil spill planners and responders: the Mechanical Equipment Calculator, the In Situ Burn Calculator, and the Dispersant Mission Planner.	<a href="http://response.restoration.noaa.gov/book_shelf/1024_SpillTools.pdf">http://response.restoration.noaa.gov/book_shelf/1024_SpillTools.pdf</a> (PDF, 386.8K)	<a href="http://response.restoration.noaa.gov/spilltools">http://response.restoration.noaa.gov/spilltools</a>

## Chemical Release Response Models

Model	URL for ModelFact Sheet (PDF)	Web Site Information
CAMEO Software Suite, an integrated set of software modules designed to help first responders and emergency planners plan for and quickly respond to chemical accidents.	<a href="http://response.restoration.noaa.gov/book_shelf/1015_cameo.pdf">http://response.restoration.noaa.gov/book_shelf/1015_cameo.pdf</a> (PDF, 769.8K)	<a href="http://response.restoration.noaa.gov/cameointro">http://response.restoration.noaa.gov/cameointro</a>
CAMEO (Computer-Aided Management of Emergency Operations), a chemical response program.  Also a new on-line product "CAMEO Chemicals" is available.	<a href="http://cameochemicals.noaa.gov">http://cameochemicals.noaa.gov</a>	<a href="http://response.restoration.noaa.gov/cameo">http://response.restoration.noaa.gov/cameo</a>
U.S. Coast Guard's Chemical Response Tool, a new on-line product.		<a href="http://chemresponsetool.noaa.gov">http://chemresponsetool.noaa.gov</a>
ALOHA (Areal Locations of Hazardous Atmospheres), a computer program used to predict how a hazardous gas cloud might disperse in the atmosphere after an accidental chemical release.	<a href="http://response.restoration.noaa.gov/book_shelf/1020_aloha.pdf">http://response.restoration.noaa.gov/book_shelf/1020_aloha.pdf</a> (PDF, 746.5K)	<a href="http://response.restoration.noaa.gov/aloha">http://response.restoration.noaa.gov/aloha</a>
MARPLOT (Mapping Application for Response, Planning, and Local Operational Tasks), a general-purpose mapping application originally developed as part of the CAMEO software suite.	<a href="http://response.restoration.noaa.gov/book_shelf/1021_marplot.pdf">http://response.restoration.noaa.gov/book_shelf/1021_marplot.pdf</a> (PDF, 2.8M)	<a href="http://response.restoration.noaa.gov/marplot">http://response.restoration.noaa.gov/marplot</a>
Chemical Reactivity Worksheet, a program you can use to find out about the reactivity of substances or mixtures of substances.	<a href="http://response.restoration.noaa.gov/book_shelf/1016_react.pdf">http://response.restoration.noaa.gov/book_shelf/1016_react.pdf</a> (PDF, 894.8K)	<a href="http://response.restoration.noaa.gov/reactivityworksheet">http://response.restoration.noaa.gov/reactivityworksheet</a>

## APPENDIX 7

### NOAA RESPONSE TRAINING AVAILABILITY

NOAA OR&R offers both workshops and self-study options to spill response professionals in local, state, and federal governments and industry.

#### **Workshops for Emergency Responders and Planners**

Science of Oil Spill (SOS) training builds skills in analyzing complex spill events and making risk-based decisions that maximize long-term environmental benefit. SOS training has also been called Environmental Spill Response (ESR) training. The SOS workshops are designed for new and mid-level spill responders.

The workshops generally cover:

- Fate and behavior of oil spilled in the environment,
- An introduction to oil chemistry and toxicity,
- A review of basic spill response options for open water and shorelines,
- Spill case studies,
- Principles of ecological risk assessment,
- A field trip,
- An introduction to damage assessment techniques, and
- Determining cleanup endpoints.

These workshops are held annually, usually in the spring at NOAA's main campus in Seattle. Class sizes are limited to allow for personalized instruction. Each workshop includes three days of training, beginning on Tuesday morning and ending on Thursday afternoon. There is no tuition for the workshop; however, attendees are responsible for their own travel costs.

Contact your District Scientific Support Coordinator (SSC) for more information about Environmental Spill Response Workshops, or to see when the next workshop is scheduled, see the NOAA OR&R Training Web page (<http://response.restoration.noaa.gov/emergencyresponse/training>). The SSC can tell you how to apply, or you can contact the NOAA ERD Training and Response Specialist at [orr.spills@noaa.gov](mailto:orr.spills@noaa.gov).

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**Specialty Workshops:** In addition to the workshops described above, NOAA will offer short workshops (on an as-needed basis) on topics such as Shoreline Cleanup and Assessment Technique (SCAT) participation, overflight observation, computer modeling, and special response or resource topics.

**CAMEO Training:** Check the CAMEO Training Calendar at the EPA CAMEO Web site (<http://www.epa.gov/ceppo/cameo/cam-evnt.htm>) for training offered around the U.S.

### **Self-study Resources for Emergency Responders and Planners**

You can also build your knowledge of spill and chemical accident response on your own. The self-study section of OR&R's Web site ([http://response.restoration.noaa.gov/emergencyresponse/training\\_selfstudy](http://response.restoration.noaa.gov/emergencyresponse/training_selfstudy)) provides links to some self-study resources, as well as the tools and software they involve.

Contact OR&R's Training and Response Specialist with any questions at [orr.spills@noaa.gov](mailto:orr.spills@noaa.gov).

## APPENDIX 8

### **NATURAL RESOURCE DAMAGE ASSESSMENT (NRDA) DURING INCIDENT RESPONSE**

The Natural Resource Damage Assessment (NRDA) process is often initiated by Trustee agencies during an incident response. The NRDA Trustees most often involved are NOAA, the U.S. Fish and Wildlife Service (USFWS), and state Trustee agencies. There are a number of other NRDA Trustees, including Native American tribes and foreign countries, which may become involved when their resources are affected. Generally only the first phase of an NRDA, called Preassessment, is started during the response and is characterized by intensive ephemeral data collection and coordination among and between Trustees and responsible party (RP) representatives, as well as the FOSC and Unified Command.

The NOAA Scientific Support Team (SST) can greatly facilitate coordination between the FOSC and Unified Command and the NRDA Trustees.

Below are some relevant facts for responders concerning Trustees and NRDA:

- NRDA Trustees are specifically designated agencies or individuals under OPA/CERCLA (See below for legal references).
- OPA (Oil Pollution Act) may be used to initiate an NRDA for oil spills or the threat of a spill.
- CERCLA (Combined Environmental Response, Compensation, & Liability Act) is used for chemical or combined oil/chemical spills.
- Trustees may initiate preassessment actions under the NRDA provisions of OPA, CERCLA, state laws, or if applicable, regulations for specially managed areas, such as marine sanctuaries or state and national parks.
- Under both OPA and CERCLA, there are implementing regulations for NRDA's.
- Preassessment, although initiated during the incident response, generally continues past the end of the active response.
- For NOAA, agency NRDA actions are directed through NOAA's Assessment and Restoration Division (ARD) of OR&R, rather than through the Emergency Response Division (ERD, commonly called "NOAA Hazmat").

- NOAA, as a Trustee agency, strongly encourages cooperative Trustee-RP NRDA planning and data collection at the earliest opportunity during an incident response.
- NRDA Cost Accounting: All NRDA related costs (personnel or other expenses) are documented and recovered through a Trustee agreement with the RP, or specific authorization between a Federal Lead Administrative Trustee (FLAT) and the National Pollution Funds Center (NPFC), or at a later time by the Trustees through the formal NRDA process. For NOAA SST personnel, cost recovery is determined by the type of activity (i.e., response-related or NRDA-related). Certain NOAA SST personnel are qualified to perform both types of activities.
- The NOAA Scientific Support Coordinator (SSC) is not responsible for directing NRDA actions, but is responsible for the overall NOAA team safety and coordination with response. In this way, the NOAA SSC retains the function as an objective science information coordinator serving the FOSC.

### **Additional NRDA Information**

#### OPA

- Oil Pollution Act of 1990 (OPA), 33 U.S.C. §§2701, et seq.
  - NOAA Damage Assessment, Remediation, and Restoration Program (DARRP): <http://www.darrp.noaa.gov/about/laws.html#OilPollution>
  - Cornell Law School Legal Information Institute (LII) U.S. Code Collection: [http://www4.law.cornell.edu/uscode/html/uscode33/uscode\\_sec\\_33\\_00002701-000.html](http://www4.law.cornell.edu/uscode/html/uscode33/uscode_sec_33_00002701-000.html)
- OPA NRDA Regulations, 15 C.F.R. Part 990
  - GPO Access: Code of Federal Regulations (CFR): <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=15&PART=990&SECTION=10&TYPE=TEXT>

#### CERCLA

- Comprehensive Environmental Response, Compensation & Liability Act (CERCLA), 42 U.S.C. §§9601, et seq.
  - NOAA Damage Assessment, Remediation, and Restoration Program (DARRP): <http://www.darrp.noaa.gov/about/laws.html#Comprehensive>
  - Cornell Law School Legal Information Institute (LII) U.S. Code Collection: [http://www4.law.cornell.edu/uscode/html/uscode42/uscode\\_sec\\_42\\_00009601-000.html](http://www4.law.cornell.edu/uscode/html/uscode42/uscode_sec_42_00009601-000.html)

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- CERCLA NRDA Regulations, 43 C.F.R. Part 11
    - U.S. Department of the Interior, Office of Environmental Policy and Compliance: <http://www.doi.gov/oepec/frlist.html>
    - GPO Access: Code of Federal Regulations (CFR): <http://www.gpoaccess.gov/cfr/retrieve.html>

#### National Marine Sanctuaries

- National Marine Sanctuaries Act, 16 U.S.C. §§1431, et seq.
  - NOAA Damage Assessment, Remediation, and Restoration Program (DARRP): <http://www.darrp.noaa.gov/about/laws.html#National>
  - Cornell Law School Legal Information Institute (LII) U.S. Code Collection: [http://www4.law.cornell.edu/uscode/html/uscode16/usc\\_sec\\_16\\_00001431-000.html](http://www4.law.cornell.edu/uscode/html/uscode16/usc_sec_16_00001431-000.html)

#### National Parks

- Park System Resource Protection Act, 16 U.S.C. §19jj
  - NOAA Damage Assessment, Remediation, and Restoration Program (DARRP): <http://www.darrp.noaa.gov/about/laws.html#Park>
  - Cornell Law School Legal Information Institute (LII) U.S. Code Collection: [http://www4.law.cornell.edu/uscode/html/uscode16/usc\\_sec\\_16\\_00000019-11j000.html](http://www4.law.cornell.edu/uscode/html/uscode16/usc_sec_16_00000019-11j000.html)

#### **NOAA SST NRDA Information Contacts**

- Jim Jeansonne: cell: (206) 276-5308 or [Jim.Jeansonne@noaa.gov](mailto:Jim.Jeansonne@noaa.gov)
- Frank Csulak: cell: (732) 371-1005 or [Frank.Csulak@noaa.gov](mailto:Frank.Csulak@noaa.gov)
- Doug Helton: cell: (206) 890-7760 or [Doug.Helton@noaa.gov](mailto:Doug.Helton@noaa.gov)



## APPENDIX 9

### ENVIRONMENTAL SENSITIVITY INDEX (ESI) MAPPING

The most widely used means to map sensitive environments in the U.S. is NOAA's Environmental Sensitivity Index (ESI). ESIs compile information in standard formats for coastal shoreline sensitivity, biological, and human-use resources. ESI maps are used for identifying sensitive resources before a spill occurs to establish protection priorities and cleanup strategies in advance. This can reduce environmental consequences of the spill and cleanup efforts.

Sensitive environment mapping is an integral part of spill planning. ESI maps are not an end in themselves; but a starting point for prevention, planning, and response. The resource definitions in NOAA's ESI maps provide guidance for developing Area Contingency Plans (ACPs). NOAA manuals such as the Mechanical Protection Guidelines, the Shoreline Assessment Manual, and the Shoreline Assessment Job Aid are examples where the ESI definitions are the basis for effective, site-specific planning. (See Appendix 3 for access to the above referenced manuals.)

#### ESI Data Formats

**Hard Copy Maps** - ESI data are published as 11"x17" laminated maps, bound in an atlas that covers a logical geographic region. Due to production costs and the cumbersome nature of this format, these atlases have a fairly limited distribution. However, individual maps can be ordered from the Office of Response and Restoration, or printed from the PDFs described below.

**Portable Document Format Maps** - ESI maps are also available on CD/DVD in portable document format (PDF), allowing users to print multiple copies of an area of interest or individual map pages at varying scales. In addition, the PDFs include links that allow users to navigate from the index page to the area of interest and from there to the "back of the map," where seasonality and species details are listed. The atlas also includes introduction pages containing representative photos with shoreline descriptions and response considerations.

**Free ESI Viewer** - The ESI Viewer is a freeware mapping and database engine that allows viewing, printing, and simple queries of the ESI data. The Viewer runs on Windows or Macintosh platforms and allows users without access to other mapping software an opportunity to explore the digital vector ESI data. It is simple to install and is accompanied by a guided tour on each CD.

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**ArcView 3.x Project** - ArcView 3.x ESI project and shape files are also available. Each major data element corresponds to a theme with links to a comprehensive flat file data structure. As with the ESI Viewer, layers are color coded to match the standard ESI data format. The shape files may be used with this project in order to take advantage of the preset database links, or they can be imported into other projects or software that support the shape file format.

**MOSS Formatted Files** - All ESI data layers are also provided in a MOSS file format. This is a simple ASCII format that can be imported directly into a MOSS GIS system or is suitable for writing translators to bring the data into other mapping software.

**.E00 Files** - ESI data are provided in their native, double-precision ESRI format as .e00 files. These files, along with the relational database files provided, are used to produce the hard copy atlas.

**Geodatabase** - The ESI data are published in a geodatabase format along with an .mxd file that displays the data in ArcMap 9.x using standardized ESI colors and symbology. Links to the data tables are established within the .mxd. A number of ESI tools have been developed to ease searches and queries on the tables by attribute and/or by geography. These tools are provided on the ESI CD/DVD. Additional tools and changes will be posted on the OR&R Web site.

### How to Get ESI Data

For additional information about ESI data:

- <http://response.restoration.noaa.gov/esi>
- [orr.esi@noaa.gov](mailto:orr.esi@noaa.gov)
- (206) 526-6317

Order forms for ESI CD/DVDs and hard copy maps are available at <http://response.restoration.noaa.gov/orderesi>.

### ESI Map Self-study

You can also learn more about using ESI maps for spill response by going to the Self-study section of OR&R's Training Web site ([http://response.restoration.noaa.gov/emergencyresponse/training\\_selfstudy](http://response.restoration.noaa.gov/emergencyresponse/training_selfstudy)).

Contact OR&R's ESI Specialist with any questions: [orr.esi@noaa.gov](mailto:orr.esi@noaa.gov).

## APPENDIX 10

### NATURAL RESOURCE SPECIAL PUBLICATIONS

The following publications, related to natural resource management, are available in several formats from NOAA. For a **print version** of a publication, contact OR&R's Orders Specialist at [orr.library@noaa.gov](mailto:orr.library@noaa.gov). To view a **PDF or Web version** of a publication, use the Web links below.

Publication	URL for Publication (PDF)	Web Information
<p><b>Oil Spills in Coral Reefs: Planning &amp; Response Considerations</b>            A 2001 report summarizing relevant research on coral reefs, written for anyone working in or planning for spill response in coral reef regions.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/coral_oil">http://response.restoration.noaa.gov/erdpub/coral_oil</a> (PDF, 10.4M)</p>	<p><a href="http://response.restoration.noaa.gov/coral">http://response.restoration.noaa.gov/coral</a></p>
<p><b>Toxicity of Oil to Reef-Building Corals: a Spill Response Perspective</b>            A report that explores spill case histories, field studies, and experimental studies to assess the acute and chronic impacts of oil on coral.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/coral_tox">http://response.restoration.noaa.gov/erdpub/coral_tox</a> (PDF, 336.8K)</p>	<p><a href="http://response.restoration.noaa.gov/coralreef">http://response.restoration.noaa.gov/coralreef</a></p>
<p><b>Oil and Sea Turtles: Biology, Planning, and Response</b>            A basic overview of sea turtle biology: summarizes what is known about the effects of oil on sea turtles, reviews potential response actions in the event of a release, and presents case histories from previous spills.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/turtle_oil">http://response.restoration.noaa.gov/erdpub/turtle_oil</a> (PDF, 2.7M)</p>	<p><a href="http://response.restoration.noaa.gov/seaturtles">http://response.restoration.noaa.gov/seaturtles</a></p>
<p><b>Oil Spills in Mangroves: Planning &amp; Response Considerations</b>            A 2002 report summarizing current research on mangrove ecosystems for spill response decisionmakers.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/mangrove_oil">http://response.restoration.noaa.gov/erdpub/mangrove_oil</a> (PDF, 4.2M)</p>	<p><a href="http://response.restoration.noaa.gov/mangroves">http://response.restoration.noaa.gov/mangroves</a></p>
<p><b>Recovery of Mangrove Habitats at the Vesta Bella Spill Site</b>            A 1994 report describing chemistry and mangrove observations one year after the 1991 cleanup of the Vesta Bella oil spill.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/V_Bella">http://response.restoration.noaa.gov/erdpub/V_Bella</a> (PDF, 4.0M)</p>	<p><a href="http://response.restoration.noaa.gov/mangroves">http://response.restoration.noaa.gov/mangroves</a></p>

Publication	URL for Publication (PDF)	Web Information
<p><b>Managing Seafood Safety after an Oil Spill</b>            A 2002 guide to help seafood managers and other spill responders determine appropriate seafood management actions in response to a spill.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/seafood2">http://response.restoration.noaa.gov/erdpub/seafood2</a> (PDF, 1.1M)</p>	<p><a href="http://response.restoration.noaa.gov/seafoodsafety">http://response.restoration.noaa.gov/seafoodsafety</a></p>
<p><b>Guidance on Sensory Testing and Monitoring of Seafood for Presence of Petroleum Taint Following an Oil Spill</b>            A 2001 guidance document describing how to conduct sensory testing on seafood suspected of petroleum taint.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/seafood">http://response.restoration.noaa.gov/erdpub/seafood</a> (PDF, 1.8M)</p>	<p><a href="http://response.restoration.noaa.gov/seafoodsafety">http://response.restoration.noaa.gov/seafoodsafety</a></p>
<p><b>Responding to Oil Spills in Coastal Marshes: the Fine Line Between Help and Hindrance</b>            A 1995 report describing the advantages and disadvantages of seven cleanup methods of oiled marshes: natural degradation/no response; vacuum/pumping; low-pressure flush; vegetation cutting; burning; bioremediation; and sediment removal/replanting.</p>	<p><a href="http://response.restoration.noaa.gov/erdpub/helphind">http://response.restoration.noaa.gov/erdpub/helphind</a> (PDF, 44K)</p>	<p>N/A</p>

# APPENDIX 11

## UNIT CONVERSION TABLE

IF YOU KNOW	MULTIPLY BY	TO FIND
<b>LENGTH</b>		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
<b>WEIGHT</b>		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
<b>VOLUME</b>		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)
<b>AREA</b>		
acre	4,047	meters <sup>2</sup>
acre	45,560	feet <sup>2</sup>
<b>OIL SPILL CONVERSIONS</b>		
barrels	42	gallons
tons (metric)	~7	barrels
tons (metric)	~300	gallons
nautical miles	1.15	statute miles
nautical miles	1.85	kilometers
knots	1.69	feet per second
knots	0.51	meters per second
knots	1.15	statute mile per hour



Carlos M. Gutierrez  
Secretary, U.S. Department of Commerce

Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.)  
Under Secretary for Oceans and Atmosphere and  
NOAA Administrator

John H. Dunnigan  
Assistant Administrator  
Ocean Services and Coastal Zone Management  
NOAA Ocean Service