

An FOSC's Guide to NOAA Scientific Support



Second edition, July 2010

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 second edition of "An FOSC's Guide to NOAA Scientific Support" is dedicated to the U.S. Coast Guard Federal On-Scene Coordinators (FOSCs) and their staff, who consistently demonstrate their dedication to protecting lives, property, and the environment during responses to emergency incidents. NOAA's Emergency Response Division thanks you for making us a valued part of your response team.

This guidebook is a product of the combined efforts of the entire ERD staff, and has been greatly improved by suggestions provided by experienced Coast Guard responders, including many great suggestions provided by the highly trained members of the National Strike Force.

Jim Jeansonne, Editor

Although released by NOAA, the information in this document does not reflect, represent, or form any part of the support of the policies of NOAA or the Department of Commerce. Further, release by NOAA does not imply that NOAA or the Department of Commerce agree with the information contained herein.

Cover photo 1: Fire boat response crews battle the blazing remnants of the off shore oil rig Deepwater Horizon, April 21, 2010. Photo courtesy of USCG.

Cover photo 2: NOAA observer Dave Wesley records data during an overflight in the Gulf of Mexico, April 28, 2010. Photo courtesy of NOAA.

Cover photo 3: From left, Shoreline Cleanup and Assessment Technique (SCAT) team lead Graham McDonald, NOAA Scientific Support Coordinator John Whitney, and Assistant Secretary of Commerce for Oceans and Atmosphere Dr. Larry Robinson investigate tar balls washed ashore on the beaches of Dauphin Island, Alabama, May 13, 2010. Photo courtesy of NOAA.

What's New in Version 2

- Updated and expanded.
- More live links to Web pages and other sections of the guide:
 - Reference and link to the USCG “An FOSC’s Guide to Environmental Response.”
 - Reference and link to the Memorandum of Agreement between NOAA and the NPFIC regarding funding for NOAA Scientific Support.
- New topics:
 - NOAA Support for International Incidents.
 - Dealing with Marine Debris.
 - NOAA Leadership within the National Response Community, including the co-facilitation with the USCG of Ecological Risk Assessment (ERA) workshops.
 - Best Management Practice (BMP) for Environmental Resource Protection.
 - Consultation with USFWS and NMFS on Essential Fish Habitat (EFH) and Endangered Species Act (ESA).
- New/updated tools:
 - Chemical Reactivity Worksheet (CRW)
 - Chemical Aquatic Fate and Effects Database (CAFÉ)
 - Dispersant Mission Planner, version 2 (DMP2)
 - Environmental Response Management Application (ERMA®)
 - NOAA Unit Converter for Oil Spill Response (NUCOS)

NOAA Scientific Support Coordinator (SSC) and Team Functions

Advisory

Principal science advisor to FOSC
Oil science and properties
Chemical sciences
Dispersant science/ monitoring (SMART)
Protected resource concerns
Chemical hazard assessment
Toxicity to wildlife and fish
Environmental best management practices
Environmental tradeoff analysis for ops
Resources at risk (RAR) analysis

Trajectory Forecasting

Oil slick trajectory forecasting
Oil slick location monitoring
Chemical transport modeling
Air plume modeling
WMD science issues

Weather, Tides & Currents

Custom spot weather forecasts
Tides and currents forecasts
Hazardous weather alerts
Coordination with National Hurricane Center
Hurricane evacuation threshold planning

Information Management & GIS

On-scene experienced IM team
Production of briefing materials
Production of operational maps
Information to Situation Unit
Establish and maintain photo database
Scientific information database
Provide common ops picture (ERMA®)

International Science Support

Experienced international team
SSC can travel with Strike Team

Health & Safety

Assist in safety plan development
Chemical and oil health effects
Chemical plume modeling
Threat potential to water intakes

Scientific Team Coordination

Environmental Unit Leader
General on-scene science coordination
Integration of science expertise into UC

SCAT Coordination

SCAT team coordination
SCAT field team leadership
SCAT team trustee representative
SCAT design and data management

Agency Coordination

Trustee issues and concerns
ESA consults for natural resources
RRT science coordination
Lead Administrative Trustee (LAT) integration into UC
Scientific consensus building
Access to all NOAA resources

Overflight Observation

Trained overflight oil observers
Maps oil location, type, amount
HEEDs trained and equipped
Rapid data transfer to UC

ICS Positions and Roles

SSC is FOSC Command Staff
SSC may be Environmental Unit Leader
Provides technical specialists (weather, overflight, chemical, trajectory, etc.)

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1 ABOUT THIS GUIDE

Purpose

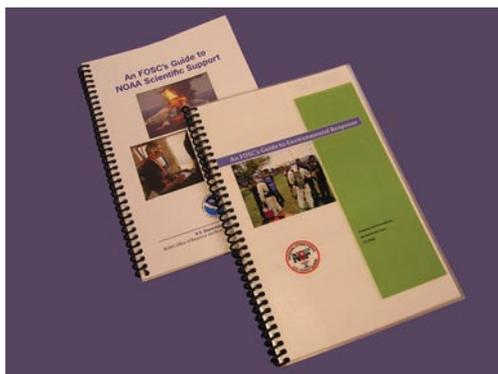
This “FOSC’s Guide to NOAA Scientific Support” provides a quick reference to the range of scientific support services available through NOAA’s Office of Response and Restoration, Emergency Response Division (ERD, commonly called “NOAA Hazmat”).

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), available at http://edocket.access.gpo.gov/cfr_2009/julqtr/pdf/40cfr300.145.pdf (PDF; 46.7 kb)

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. A quick reference table of common NOAA SSC and team functions is located on page iii of this guide.

Companion Guide - The USCG FOSC Guide Book for Environmental Response

An excellent companion reference for environmental responses is “An FOSC’s Guide to Environmental Response,” compiled by the Gulf Strike Team in 2008. The guide is available at <http://www.uscg.mil/hq/nsfweb/docs/FOSCGuidev07.pdf> (PDF; 995.8 kb). The purpose of the U.S. Coast Guard (USCG) guide is to provide a ready resource for Coast Guard and Environmental Protection Agency (EPA) On-Scene Coordinators or their representatives for response to oil and hazardous substance emergency



response operations. Where applicable, the USCG guide references the National Contingency Plan (NCP) and other appropriate guidance.

Using the NOAA FOSC Guide

The NOAA Scientific Support guide is provided in hard copy and electronic form.

- **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 version is a PDF file available via the Internet at <http://response.restoration.noaa.gov/foscguide> and is more powerful than the hard copy. It links to the full text of a host of response-related materials, including many fillable response or training request forms, as well as additional response information. For quick access, place the Web link on your desktop. The PDF file can also be saved to your computer and used when an Internet connection is not available.
- **Future Insert for the IMH** – Plans are in the works for a version of this guide formatted as an insert to the Incident Management Handbook (IMH), for those who wish to customize their copy. The IMH version will be text only, similar to the “no frills” IMH structure.

Questions or Comments

If you have questions or comments about this guide, contact one of the following individuals:

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2 THE SCIENTIFIC SUPPORT COORDINATOR AND TEAM

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

SSC Roles during a Response

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").
- 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, or Scientific/Technical Team 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.
- Coordinating required emergency consultations for protected resources (such as threatened and endangered species, cultural resources, sensitive habitats, etc.)



NOAA SSC discussing GNOME oil trajectory model display.

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 or the **NOAA Hazmat 24-hour duty phone – (206) 526-4911**.

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 liaise with the overall response effort, the NOAA SSC has a **primary responsibility to serve the FOSC** directly as a member of their staff.

All NOAA SSC/SST Costs are per NPFC Agreement

NOAA Hazmat and the National Pollution Funds Center (NPFC) have an agreement that establishes procedures for the reimbursement of NOAA scientific support services as requested or approved by the FOSC. The agreement is available at http://www.uscg.mil/ccs/npfc/docs/PDFs/urg/App/NPFC_MOU_AppA_03.pdf (PDF; 73.6 kb). This agreement, and any subsequent agreement, is only valid through the period of performance.

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 a list of SSCs, their locations, and contact information.) SSCs may be augmented by SSC Representatives (SSCr) and Assistant SSCs (Asst SSC). 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.



EPA FOSC and Coast Guard District 8 and Sector Port Arthur, TX Command with NOAA SSC during Hurricane Ike Response.

NOAA Scientific Support and the National Strike Force

NOAA Hazmat has developed a close working relationship with the USCG National Strike Force and regional Strike Teams. More information on this relationship can be obtained by contacting the Strike Team Commander in your area or the National Strike Force at the National Response Center:

Atlantic Strike Team
(609) 704-0008

Pacific Strike Team
(415) 883-3311

Gulf Strike Team
(251) 441-6601

National Strike Force
(800) 424-8802
<http://www.uscg.mil/hq/nsfweb>

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 Scientific Support for International Incident Planning and Responses

Over the last three decades, NOAA has responded to approximately 35 international incidents, including:

- M/T *Hebei Spirit*, Korea 2007.
- M/T *Solar I*, Philippines 2006.
- M/V *Prestige*, Spain 2002.
- T/V *Nahodka*, Japan 1997.
- T/V *Braer*, United Kingdom 1993.
- Arabian/Persian Gulf Spills, Kuwait 1991.

For international incidents, the NOAA SSC and team typically respond with the USCG Strike Team.

NOAA has also participated in joint spill exercises or provided SOS (Science of Oil Spills) training and planning support for the following foreign governments when requested through the U.S. State Department:

Americas and Caribbean

British Virgin Islands
Canada
Dominican Republic
Gulf of Fonseca region
Mexico
Panama

Africa

Egypt
Ghana
Gulf of Guinea region
Cameroon

Oceania

Australia
Micronesia

Europe

Bulgaria
Hungary
Malta
Portugal
Romania
Spain
Sweden
Ukraine

Eurasia

Cyprus
Persian (Arabian) Gulf
Republic of Georgia
Russia
Turkey

Asia

China
Korea
Philippines
Vietnam

NOAA ERD has provided CAMEO training through the *United Nations Environment Programme - Awareness and Planning for Emergencies at the Local Level (UNEP/APELL)* in over 50 countries. Additionally, organizations in other countries have translated CAMEO into several languages over the years.

ERD has also demonstrated its software to a number of other countries to assist in spill response planning and training. For example, IMEDEA (Mediterranean Institute for Advanced Studies) hosted an Advanced Oil Spill Modeling Course in Spain in 2006. The course featured ERD's GNOME trajectory model and ADIOS2 oil weathering model.

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. NOAA scientific support for weapons of mass destruction (WMD) or significant national events typically includes air dispersion and waterborne chemical modeling.



NOAA SSC deployed with the Pacific Strike Team during Guimaras oil spill in the Philippines.

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 SST 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. As a rule, the SSC is usually joined on-scene by several vital SST members.

The home team typically includes:

- A weather team working with National Weather Service (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.
- 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.



NOAA ERD Home Team in the Seattle "War Room" conferring on an incident response.

The on-scene team, in addition to the SSC, typically includes at least one Information Management (IM) specialist and a biologist-overflight observer.

The team may also include:

- Information Management (IM) 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, as well as manage and deliver to responders the large amount of data often produced.
- Additional SSCs and SSC Representatives (SSCr) to assist and back-up the primary SSC during larger and more complex incidents.
- Sampling teams and supplies to collect source or environmental samples to support the response.
- Natural Resource Damage Assessment (NRDA) specialists to quantify injury, share biological expertise and coordinate response-Trustee issues within the ICS.



SCAT team calibration during the Mississippi River barge DM932 response.

All on-scene NOAA 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.



Marine Debris on the beach at Kanapou Bay, Island of Kaho'olawe, HI, an area of very heavy accumulation.

Dealing with Marine Debris

Marine debris is both a chronic issue and one that complicates incident response efforts, especially following hurricanes. NOAA plays a major role in national and international efforts to deal with marine debris and recently established a Marine Debris Division (MDD) within the Office of Response and Restoration to focus those efforts.

At the request of the FOSC, the NOAA SSC will coordinate with the MDD to address marine debris-related issues during a response. Since 2005, the NOAA team has worked very closely with NOAA's Office of Coast Survey (OCS), USCG, EPA, FEMA, and DHS to manage the serious marine debris problem resulting from the major hurricane strikes along the U.S. Gulf of Mexico coastal areas. This collaboration resulted in survey and mapping of marine debris in coastal waters of Alabama, Mississippi, and Louisiana. This information was available to removal contractors, boaters, and other potential users on the project Web site: <http://gulfofmexico.marinedebris.noaa.gov>. Working with its partners, MDD produced the Marine Debris Emergency Response Plan, which used lessons learned from the response to marine debris after

Katrina and Rita, to develop recommendations and action items for addressing a future large scale dispersion of marine debris.

NOAA's Marine Debris Division has developed a program committed to investigating and solving problems that stem from marine debris, through research, prevention, and reduction activities, in order to protect and conserve our nation's marine environment and ensure navigation safety. The MDD supports and works closely with partners across the U.S. to fulfill its mission, using these strategies to address marine debris:

- Facilitate, support, and conduct research and assessment of marine debris.
- Prevent and reduce the occurrence and impacts of marine debris.
- Develop, use, and disseminate tools and products to improve efforts to address marine debris.
- Encourage changes in behavior to address marine debris.

More information about NOAA's marine debris work is available at <http://marinedebris.noaa.gov>.

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

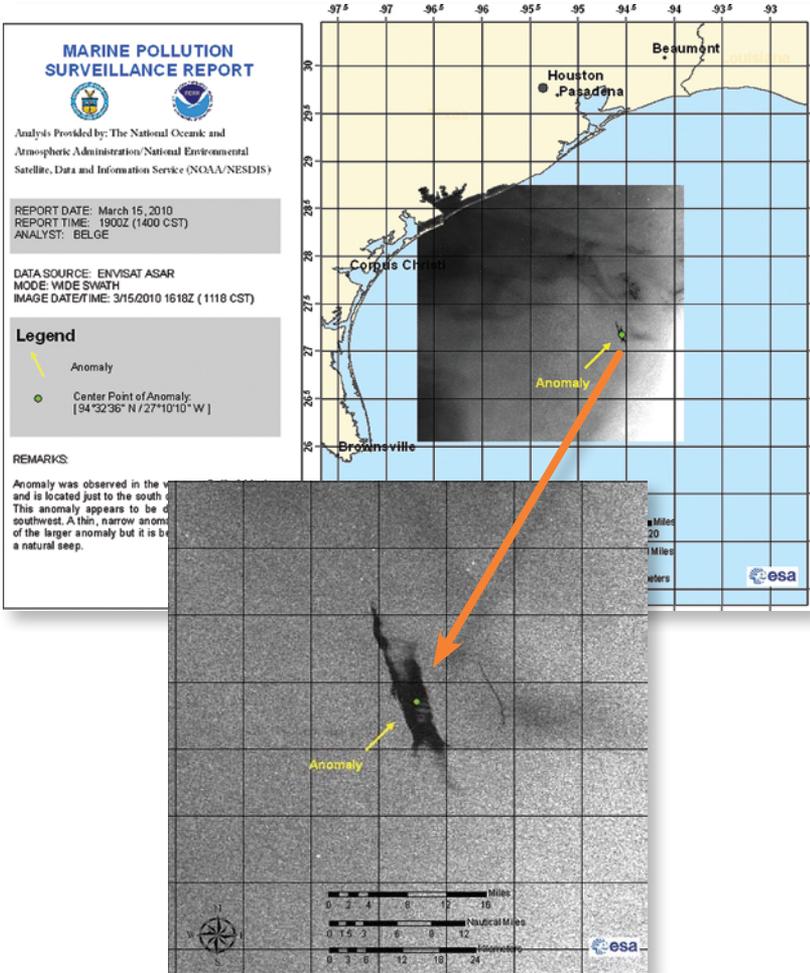
By discussing the needs of the specific incident with the NOAA SSC, an FOSC will get science support tailored to the requirements of that particular incident in coordination with the local scientific and technical expertise available.



NOAA Scientific Support Team members collecting oil samples.

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.



National Environmental Satellite, Data, and Information Service (NESDIS) image and analysis indicating a surface anomaly, correctly identified as an oil slick 100 miles off the Texas coast.

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, MA 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 NOAA Hazmat, now the Emergency Response Division (ERD). Today's NOAA Scientific Support Team includes response oriented 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 NOAA's Assessment and Restoration Division (ARD) of OR&R frequently augment the SST.



M/V Argo Merchant grounded off Nantucket, 1976.



T/V Exxon Valdez grounded on Bligh Reef, Prince William Sound, AK, March 24, 1989.

4 WHAT TO EXPECT FROM NOAA DURING A RESPONSE

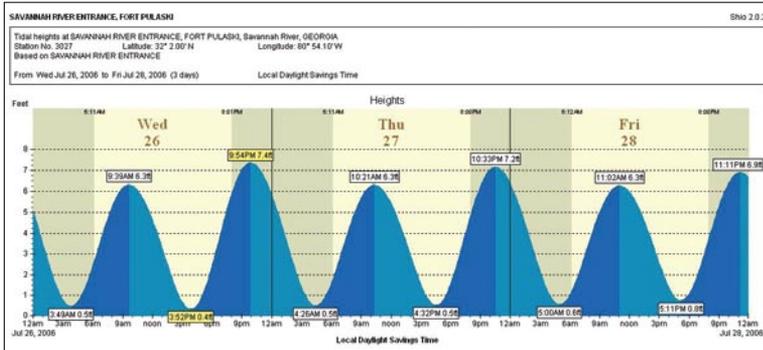
After the NOAA SSC is Contacted

Once the Coast Guard calls the SSC (or Hazmat Duty Officer*) for scientific support, the SSC then contacts the NOAA Scientific 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. All NOAA scientific support is customized per the support needs requested by the FOSC, through the assigned SSC. The following flow of products is typical. Some of the products discussed here are explained 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 prepared by the home team and provided to the FOSC through the SSC, with interpretation.
- Oil fate information provided through the SSC.
- 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.
- Open Hotline on ResponseLINK (new postings added as needed and available). See [Appendix 5](#) for more information about ResponseLINK and Hotline.
- Continue collecting and updating incident information.



Example of tide graph.

* The Hazmat Duty Officer (HDO) is available 24 hours a day at (206) 526-4911. For calls after regular hours (in Seattle), the answering service will immediately contact the HDO. The caller should receive a return call within 30 minutes.

ResponseLINK Home >> Hotline Skip to main content



This system is used by NOAA as a real-time spill communications system. Reports are entered chronologically and early reports likely contain factual errors. Sometimes these errors are corrected in a later report.

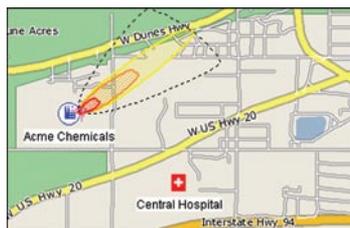
Browse all Incidents: by open date | by name Search [Advanced search](#)

ACTIVE INCIDENTS (last 30 DAYS)	HOTLINE OPEN	MOST RECENT ENTRY
T/V Eagle Otome-Barge Collision, Port Arthur, TX	Jan-23-2010	Jan-26-2010 12:17 pm
DRILL -- SONS 2010 Exercise, Off Portland Maine	Jul-02-2009	Jan-25-2010 04:41 pm
Haiti Earthquake, Haiti	Jan-13-2010	Jan-25-2010 04:16 pm
Crowley Tug Pathfinder, Bligh Reef, Prince William Sound, Alaska	Dec-23-2009	Jan-24-2010 03:34 pm
Adak Petroleum tank release, Adak Island, Aleutian Isls, Alaska	Jan-11-2010	Jan-24-2010 03:32 pm
Gulf Cupeco Facility, San Juan, Puerto Rico	Oct-23-2009	Jan-23-2010 06:46 pm

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.



ALOHA threat zones displayed on a MARPLOT map.

The Remainder of Day One

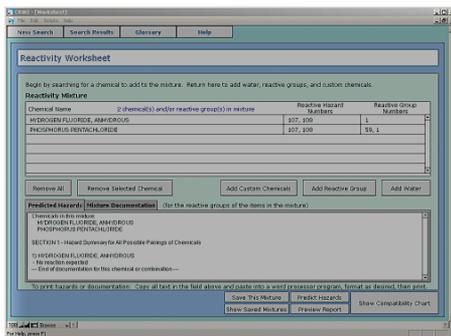
- Discuss with FOSC future scientific support needs.
- If dispersant application, in situ burn, or other alternative countermeasures are being considered by the Command, the SSC will coordinate with natural resource managers and RRT representatives, and may assist the FOSC with convening an incident-specific RRT conference call. (This may occur earlier or later in the response, as appropriate.)
- If appropriate, the 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.



Chemical Reactivity Worksheet
–V.2 Main Page.



CRW-2 screen showing results of mixing two hazardous chemicals.

- 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 a public Web site for access to appropriate response information is desired, NOAA can set up an IncidentNews site. (See [Appendix 5](#) for more information about IncidentNews.)
- 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 for potential mixing of affected chemicals.
- Hazard mitigation priorities consultation.
- Chemical property and response information (from CAMEO).

-
- Air dispersion modeling products, including threat zone estimates (from models such as ALOHA and NARAC). Modeling is updated as needed for duration of incident.

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

- Air dispersion modeling products will be updated as needed for the duration of the incident.
- Pollutant transport forecast map (waterborne chemicals).
- Demographic information for potentially affected population and regulated facilities in the area (from census population data).
- Resources at risk (RAR) analysis.
- Toxicology.
- Additional human health and safety issue consultation with responders.
- Additional resource protection priorities.

The Remainder of Day One

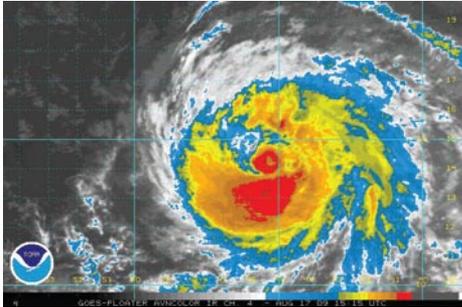
- Discuss with FOSC future scientific support needs.
- If appropriate, SSC responds on-scene and arranges for additional on-scene NOAA SST personnel.
- The SSC generally posts a daily incident summary to Hotline.

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 a public Web site for access to appropriate response information is desired, NOAA can set up an IncidentNews site. (See [Appendix 5](#) for more information about IncidentNews.)
- 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. Examples of such incidents include hurricanes, tornadoes, earthquakes, tsunamis, vessel groundings, Right whale strike investigations, certain vessel and aircraft searches, nationally significant events such as political conventions, Superbowl events, and potential terrorist WMD incidents.



NOAA Satellite image of Hurricane Bill in 2009.



Acid leaking from side of storage tank at chemical facility.

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. While the NOAA SSCs are the individuals the FOSC works through, they represent an extensive team of experienced and talented emergency response scientists within ERD and other divisions of the Office of Response and Restoration. The NOAA SSCs and other key ERD personnel participate in or arrange a host of response training, readiness, research and development, and leadership activities. These include local, regional, national and international response community efforts, such as:

- Regional Response Team (RRT) and Area Committee leadership and science integration to prepare Regional and Area Contingency Plans (RCPs and ACPs). (See [Appendix 2](#) for the NOAA RRT representation by region.)
- Spill training coordination, exercise planning, and support during the 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 Aid" 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.)
- Coordination of response science training ("Science of Oil Spills") by NOAA ERD. (See [Appendix 7](#) for ERD training opportunities.)
- Co-facilitation with the USCG of Ecological Risk Assessment (ERA) workshops, in which participants develop a consensus of the potential ecological risks of response options considered during spills. (See [Appendix 7](#) for more about ERA Workshops.)
- Creation of supporting documentation for exercises (such as trajectories, resources at risk, weather), and participation in those exercises.
- Creation of Environmental Sensitivity Index (ESI) maps. (See [Appendix 9](#) for more about ESI maps.)



USCG National Strike Force and NOAA SSC participating in SMART training.

- Alternative countermeasures review and approval, including leadership in developing and updating SMART dispersant and in situ burn (ISB) monitoring protocols and technology.

NOAA Leadership within the National Response Community

NOAA ERD personnel actively participate in National Response Team (NRT) leadership, including NRT committees and special work groups. NOAA ERD scientists are a well known and integral part of the national scientific community, especially in the field of oil and chemical incident response science.

Research and Development of Response Science Tools

In addition to refining and updating NOAA's existing array of response applications, guides, and tools, NOAA ERD scientists are constantly developing new ones. Currently, some of our tools, such as the new Chemical Aquatic Fate and Effects (CAFÉ) application, may only be available through the NOAA SSC since they are still being tested and refined. CAFÉ, for example, was successfully "tested" during a March 2009 incident involving an overturned barge containing a mixture of zinc and calcium bromide in the Mississippi River.

The rapidly advancing fields of information communication and data processing provide both great opportunities and challenges for responders. Chemical incidents pose especially time-dependent support needs.

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) - All NOAA Hazmat responders have completed at least IS-100, IS-200, IS-700, and IS-800 training, as well as having considerable on-scene experience. NOAA SSCs have also completed advanced ICS and USCG courses such as ICS-300, ICS-410 (Type 2 Incident Commander), and Crisis Management training. Higher level and specific position ICS trained personnel are available to fill specific science team functions.
- 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.
- SCAT team member trained (SCAT leaders, coordinators, or trainers are available if needed).
- Aerial Observation training, including SMART Tier 1 observation (for specific field responders).

SSC Coordination with Coast Guard Districts and Sectors

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.

USCG National Strike Force participating in SMART training.



NOAA Scientific Support Team members taking helicopter egress training.

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

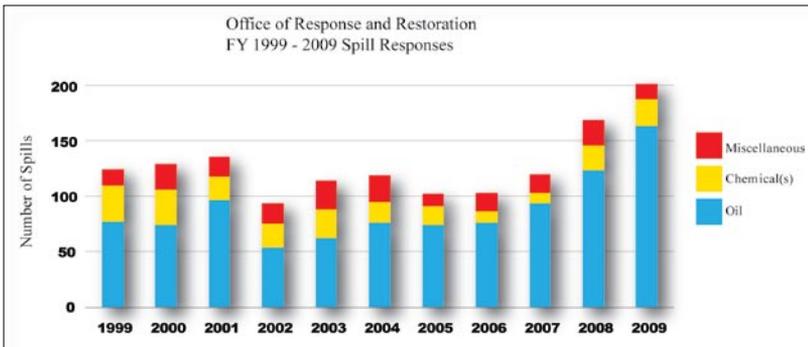
The goals of oil fate and trajectory forecasting are to predict oil weathering processes, such as evaporation and dispersion, and where the remainder of the oil will go and when. The computer tools used by NOAA to forecast weathering and trajectories are ADIOS and hydrodynamic models to approximate the currents, and the transport model, GNOME, to incorporate the currents, maps, and spill-specific information to move the spill around. These NOAA models are discussed in more detail later in this section.

NOAA's Incident Modeling Experience

NOAA HAZMAT has provided vital spill fate and transport forecast services since the *M/V Argo Merchant* spill in 1976. HAZMAT has responded to approximately 100 requests each year for incident modeling assistance and has 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 a high level of expertise and training is required to fully understand and use trajectory



Number of incidents for which NOAA Hazmat has provided support, 1999 to 2009.

models in an operational environment. The modeler must understand what factors drive the environment and what available real-time or forecast 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 by NOAA's trained observers 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 aircraft, conditions of the incident will dictate the aircraft used 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, safety-trained, and experienced overflight observers. NOAA's aerial observers work closely with our information management staff to rapidly and accurately convert the raw overflight observations to tactical planning information and maps for the Unified Command.



NOAA SSC conducting aerial overflight.

NOAA Oil Spill Models

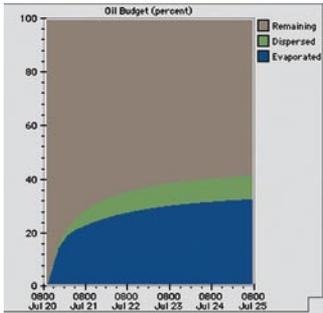
Below is a summary of some of the more common NOAA response models used by the NOAA team. Detailed model information and instructions for free downloads are available in [Appendix 10](#), and through our Web site, <http://response.restoration.noaa.gov>. A NOAA report “Hazmat Modeling Products for Spill Response and Planning” (2002) is also available at http://response.restoration.noaa.gov/book_shelf/958_products.pdf (PDF; 1.14 MB). 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.



NOAA Hazmat oceanographers running GNOME oil trajectory model.

GNOME (General NOAA Operational Modeling Environment)

This model was developed by 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 oil for responders. NOAA strongly recommends that the FOSC and Unified Command, through the NOAA SSC, request that NOAA oceanographers provide the trajectory forecasts using GNOME. GNOME can also be used between incidents as a planning tool.



ADIOS 2 oil fate graphical output.

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 the CAMEO (Computer-Aided Management of Emergency Operations) software suite to quickly provide accurate information to Incident Command. These programs are also important training and preparedness tools for first responders.

The CAMEO integrated suite of applications includes:

- CAMEO – Data management modules used to keep track of information (such as chemical inventories and contacts) and an interface for navigating between other programs in the CAMEO suite.

- CAMEO Chemicals – A database of hazardous chemicals—with physical properties, hazards, and response recommendations—and a tool for predicting how chemicals might react if mixed.
- ALOHA (Areal Locations of Hazardous Atmospheres) – An air dispersion model that estimates threat zones for chemical releases.
- MARPLOT (Mapping Application for Response, Planning, and Local Operational Tasks) – A simple mapping program, which can display ALOHA threat zones and CAMEO facilities.
- Chemical Reactivity Worksheet – Similar to CAMEO Chemicals, this program focuses solely on hazards, and allows users to add their own chemicals to the database.

CAMEO Chemicals contains an extensive database, which includes response recommendations for thousands of hazardous chemicals. Chemical datasheets provide physical properties, health hazards, information about air and water hazards, and recommendations for firefighting, first aid, and spill response. UN/NA datasheets show where to find response information from the Emergency Response Guidebook and shipping information from the Hazardous Materials table (49 CFR 172.101). Users can also create a collection of chemicals and see what hazards might occur if those chemicals mixed. CAMEO Chemicals is available online at <http://cameochemicals.noaa.gov> and as a downloadable program at <http://response.restoration.noaa.gov/cameochemicals>.



Main CAMEO screen provides easy access to CAMEO data management modules and other parts of the CAMEO suite.

ALOHA is a short-range hazard modeling program that estimates threat zones for chemical releases that may result in toxic gas clouds, BLEVEs (Boiling Liquid Expanding Vapor Explosions), jet fires, vapor cloud explosions, and pool fires. ALOHA threat zones can be displayed on maps in MARPLOT or they can be exported to ArcView or ArcMap. (These Arc export extensions are available at http://response.restoration.noaa.gov/aloah_arctools.) 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 that can be used to easily view and modify maps (including drawing new objects on the map). MARPLOT can display ALOHA threat zones, get population estimates, and link objects on a map to the CAMEO database.

Chemical Reactivity Worksheet (CRW) is a program that predicts potential reactive hazards (such as flammability, explosivity, and toxicity) posed by each chemical in the database. The program also predicts the hazards that

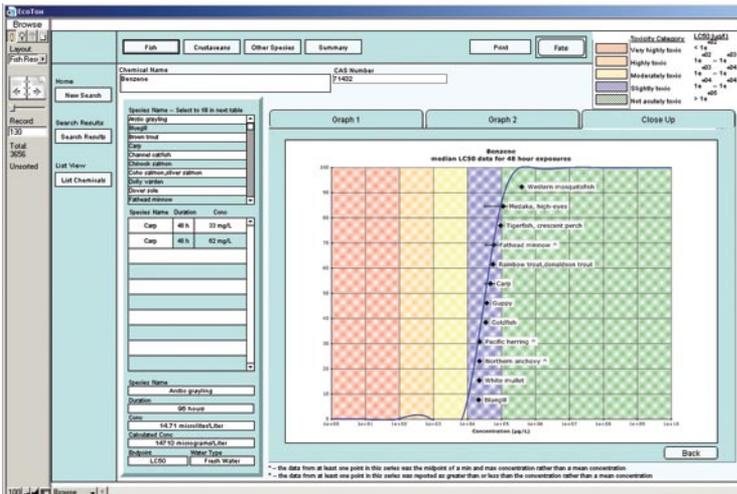
might occur if multiple chemicals were mixed together. Much of the functionality of the reactivity worksheet is also available in CAMEO Chemicals, but only the CRW allows the user to create their own chemical records.

A chemical tool separate from the CAMEO suite is the Chemical Aquatic Fate and Effects Database (CAFÉ). For chemical spills into an aquatic environment, CAFÉ can be used by the NOAA SSC and ERD scientists to predict the fate of spilled chemicals, and the effects they may have on those ecosystems. Information contained in CAFÉ includes:

- Important physical properties of over 40,000 chemicals.
- Ways in which the chemicals are used.
- Model outputs for partitioning of the chemical and the water phase.
- The chemicals' evaporation rates from a river or lake.
- The chemicals' biodegradation rates.
- The entire EPA ECOTOX database of aquatic organism ecotoxicity data.
- Analytical methods for analysis.
- Detailed water reactivity (i.e., hydrolysis information, including products of reaction).

An important feature of CAFÉ is its easy-to-use interface that allows the user to graph toxicity data quickly for presentation purposes during a spill event.

At this time, CAFÉ is only available for ERD use in support of responses, but not for public distribution.



Median LC50 (Lethal Concentration 50; the concentration in water that kills 50% of the test organisms) data for 24-hour exposure of benzene to aquatic organisms.

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 fast and 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.



Fluorosilic acid incident, Braithwaite, LA.

During a Chemical Incident

Through the SSC, the chemistry team:

- Provides concise chemical information, using sources such as the chemical datasheets in CAMEO Chemicals, which include response information, physical properties, and toxicity levels of concern.
- 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.
- Identifies resources for sample analysis, if appropriate.
- 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.
- Identifies resources for sample analysis, if appropriate.
- Interprets and verifies analytical results.

During a WMD Incident

In the event of a weapons-of-mass-destruction (WMD) incident, NOAA ERD can provide many of the scientific and information management support services that FOSCs have relied on during more typical pollution incidents and following natural disasters in recent years. The products and services flow would initially be similar to that of a large chemical air or water release, and transition into the long-term science support NOAA frequently provides following major hurricanes.



Aircraft applying chemical oil dispersant over an oil discharge.

SMART (Special Monitoring of Applied Response Technologies)

SMART is a cooperatively designed monitoring program for in situ burning and dispersant application. NOAA ERD is actively involved at a national level in the SMART program, advising on research and development needs and training responders, such as the National Strike Force. This includes

evaluation and training with the new dispersant monitoring system that uses the Turner Designs® C3 submersible fluorometer at the OHMSETT facility with the USCG National Strike Force. NOAA SSCs and the chemical team lead the work group that reviews SMART protocols and the monitoring system operating manuals. More information about SMART is available at http://response.restoration.noaa.gov/book_shelf/648_SMART.pdf (PDF; 769.6 kb).

Dispersant Mission Planner 2

The new Dispersant Mission Planner, version 2 (DMP2) is a tool that spill responders and planners can use to assess dispersant application system performance. DMP2 is an update to the Dispersant Mission Planner that was originally part of the Spill Tools software collection. New features include:

- Enabling Oil Spill Removal Organizations (OSROs) to evaluate Effective Daily Application Capacities (EDAC) for different dispersant application systems, using DMP2's EDAC Mode. This allows OSROs to evaluate compliance with the dispersant application requirements in new Coast Guard rules. (Effective September 30, 2009, the Coast Guard's rules for facility and vessel owners require dispersant capability. To demon-

strate this capability, planholders need to make manual calculations of EDAC for each dispersant application platform they intend to use, or use DMP2.)

- In operational mode, DMP2 provides general performance estimates for the application of dispersants involving a specified oil spill concentration, application platform, and scenario. It can be used to refine and optimize system configurations and to examine staging and logistical support.

Appendix 6 links to more information about DMP2 and to download instructions.

The screenshot shows the 'Dosage Page' interface of the Dispersant Mission Planner 2. It features several numbered callouts (1-5) and various input fields and buttons.

1 Select a Dispersant-to-Oil Ratio (DOR) 1: (1:20 is the default)

2 Option 1 - Input Dosage directly

- Specify a Desired Dosage Value

This corresponds to a treatment of ...

-A nominal oil slick Thickness of:	Inches	Millimeters
- An oil slick concentration of:	Gallons/Acre	Barrels/Acre
	Cubic Meters/Sq Km	Cubic Meters/Hectare
-A slick Description of:		<input type="button" value="Clear Option 1"/>

2 Option 2 - Estimate Dosage from slick description

Est. Volume of oil spilled: Estimate the % coverage:

Est. Area of the oil slick:

Calculated Thickness & Dosage at a DOR of 1: 20

Inches	Millimeters
Gallons/Acre	Liters/Hectare
	<input type="button" value="Clear Option 2"/>

3 Select Desired Dosage from Option 1 or Option 2 above Option 1 Option 2

4 Select Platform Type Aircraft Vessel

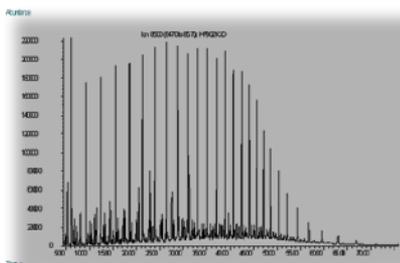
5

Navigation buttons: Exit DMP, Conversions, Documentation, Slick/Dosage Parameters, Useful Links, Print Page, Slick/Dosage Discussion.

Dispersant Mission Planner 2 dosage page.

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.



Oil sample chromatogram or “fingerprint” produced by the NOAA ERD chemistry team.

Unusual or Specific Chemical Hazard Assessment

Because every chemical release poses unique threats, the NOAA SST chemistry team has the special 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 U.S. Coast Guard Marine Safety Laboratory and the Occupational Safety and Health Administration (OSHA); chemists from academia and industry; and other experts to resolve problematic sample characterizations or special tasks associated with incident response.



LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE

School of the Coast and Environment/Department of Environmental Studies
Response and Chemical Assessment Team
1285 Esterg, Coast & Environment Bldg
Baton Rouge, LA 70803

DES/RCAT06-08 28 June 2006

TO: Brad Benggio, SSC
Charlie Henry, SSC
NOAA-HMRD

FROM: Buffy Ashton & Scott Miles
Response & Chemical Assessment Team
Louisiana State University, Dept of Environmental Studies

RE: **CITGO REFINERY, CALCASIEU RIVER, LA**

The Response and Chemical Assessment Team at Louisiana State University analyzed one (1) sampled described as “slop” oil collected from the Indian Marais and performed a detailed GC/MS analysis. Sample identifications and descriptions are given in Table 1. The GC/MS analysis results are in Tables 2 and 3, the total ion chromatograms for the “slop” oil and marine diesel (for reference purposes) are on page 4, and histograms of the PAHs from North Slope Crude (for reference purposes) and the “slop” oil are on page 5.

Table 1. Sample Identifications and Descriptions.

LSU ID#	Field ID#	Sample Description	Collection Date
2N6177-01	n/a	Boom 1	28 Jun 06

DES/RCAT has made the following conclusions:

- The slop oil has a normal alkane range of nC₁₀ – nC₃₁ with a high concentration (in comparison to the standard laboratory reference oil North Slope Crude) of aromatic hydrocarbons. Chemical analysis indicates concentrations of asphaltenes were very low and there was a lack of biomarker components (e.g. hopanes and steranes).
- A headspace analysis of the slop oil was performed which indicated that the oil contained less than 5 parts per million BTEX (Benzene, Toluene, Ethylbenzene, Xylene).
- GC/MS scan data showed no obvious mystery or non-petroleum hydrocarbon compounds within the given detection limits of the method.
- The slop oil contains elevated concentrations of water soluble aromatic constituents (e.g. naphthalenes).

DES/RCAT06-08
Citgo Refinery, Calcasieu River, LA

1

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, a Certified Industrial Hygienist, 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 the incident responders, as well as an exposed population (whether by inhalation, absorption, or ingestion) and possible mitigation options following an incident.

Phosphoric Acid spilling from phosphogypsum stack near Houston, TX.





In-situ burn after Hurricane Katrina, 2005.

Oil Spill Support

During oil spills, the NOAA Health and Safety Coordinator focuses on the health and safety aspects of the spill on the responders, and when applicable, on the public at large. The NOAA Health and Safety Coordinator assists in evaluating different cleanup methods, such as burning, dispersants, and skimming, and 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.



NOAA scientist assessing level of oiling on Alaskan beach.

9 NATURAL RESOURCE PROTECTION

Minimizing Environmental Impact

Chief goals of spill response are to prevent, minimize, and mitigate impacts to the environment. The NOAA Scientific Support Team (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 Office of Response and Restoration (OR&R) personnel have responded to oil and chemical spills throughout the world, from the Arctic to the tropics, helping protect icy, sandy, and rocky coasts, 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 also encompasses human-use resources (such as drinking or cooling water supplies and recreational areas), as well as cultural and historical resources. To properly protect the latter, the NOAA SSC actively coordinates with the State Historic Preservation Office (SHPO) for the affected state(s). 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. RAR information is used to complete the ICS-232 form, Resources at Risk Summary. See [Appendix 4](#) for a list of ICS forms and how to access them online.

THIS IS A DRILL - THIS IS A DRILL - THIS IS A DRILL

Tampa TTX-Jul 28, 2009-Collision of Barge Seabreeze and Coastal Freighter Volunteer, Tampa Bay, FL

Subject Resources at Risk
From RPI/NOAA(JHJ)
Date 12Feb2009, 0900hr
Category Resources at Risk
ID Incident # Drill only 28Jul09

Entry is PRIVATE.

Resources at Risk for Barge HF0101 and Coastal Freighter, Tampa Bay, FL

I. Spill Source Information
This report was prepared at 0900, February 12, 2009 based on the collision of a barge carrying 118,000 BBL of #6 heavy fuel oil (Group 5 oil) and a coastal freighter with 20,600 gallons of #2 marine diesel on board, in Old Tampa Bay just west of Old Port Tampa and south of Gandy Bridge, part of the Tampa Bay estuary, FL. The collision is reported to have occurred around 0300 local. Initial reports indicate that 1000-5000 BBL of #6 oil, and at least some #2 diesel have been discharged into the water. Check ResponseLink for maps of the collision and discharge location.

II. Geographic Region Covered
The area covered by this report extends from the entrance to Tampa Bay north to Indian Rocks Beach. Consult other ResponseLink reports for oil trajectory information.

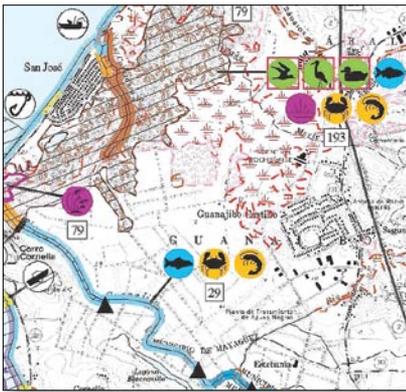
III. Expected Behavior of No. 6 Heavy Fuel Oils
There can be large differences among heavy fuel oils in terms of how they are expected to behave when spilled in the environment. Depending on the density, they will float or not float; depending on the viscosity, pour point, and ambient temperatures, they will spread into slicks or congeal into tarballs and tar mats; depending on what they were blended with, they can change properties over time. A summary of their expected behavior when spilled on water is:

- Floating heavy fuel oil will usually spread into thick slicks which can contain large amounts of oil. Oil recovery by

Example of a RAR analysis.

Best Management Practices for Resource Protection

In order to clearly communicate to response operations how to minimize adverse effects on natural resources during cleanup, the NOAA SSC may develop a concise Best Management Practices (BMP) document. The BMP contains detailed instructions to field observers and crew chiefs on how they can direct crews to accomplish cleanup objectives with the least injury to the environment. It also contains important Environmental Unit contact information in the event additional information is needed. The BMP is prepared in consult with all appropriate agency resource managers, using the practical experience and expertise of the SSC and the whole SST to allow the cleanup to proceed in an efficient, yet environmentally responsible manner.



Section of Environmental Sensitivity Index map.

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. Between incidents, SSCs take a leadership role in Area Committees, working with resource stakeholders to determine protection priorities for each area to produce Geographic Response Plan (GRP) maps for the Area Contingency Plans (ACPs).

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 prioritize 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 planning, conducting, leading, training, and coordinating all aspects of SCAT surveys. Further, the NOAA SST members are skilled at coordinating, processing, and archiving the vast amount of SCAT data produced during a spill. The information can then be analyzed and summarized to facilitate the FOSC making informed decisions regarding cleanup operations and endpoints.

Additionally, NOAA ERD is an active leader nationally in reviewing and revising the SCAT process and providing SCAT training to Coast Guard, state, and local responders.

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](#).

Required Consultation with NMFS and USFWS during a Federal Response

An FOSC directing a federal action, including pollution response, is required by the Endangered Species Act (ESA) Section 7, to consult with the Secretary of Interior and/or Commerce (delegated to the National Marine Fisheries Service (NMFS)) if the federal action (the response, not the pollution itself) may adversely affect ESA-listed species, or their critical habitat. Similarly, the Magnuson-Stevens Fishery Conservation and Management



Natural Resource Trustee recording shoreline oiling.

Act that designates Essential Fish Habitat (EFH), requires consultation with the NMFS if the federal action may affect EFH. The NOAA SSC, in coordination with appropriate RRT representatives, may facilitate this required consultation. For ESA Section 7 consultations, a Memorandum of Agreement (MOA) was developed between USCG, EPA, DOI, and NOAA NMFS and NOS, effective in July 2001, establishing procedures for such consulta-

tions. The agreement is available at http://www.uscg.mil/ccs/npfc/docs/PDFs/urg/App/NPFC_MOU_AppA_03.pdf (PDF, 73.6 kb). This agreement, and any subsequent agreement, is only valid through the period of performance.

NOAA's Roles as Resource Manager and Trustee

NOAA has been delegated three natural resource Trustee roles that are relevant to response.

1. In National Marine Sanctuaries and National Estuarine Research Reserves, NOAA is the direct resource manager and is responsible for in-depth management of those resources on a year-round basis.
2. NOAA Regional Response Team Representatives. NOAA's RRT representative and alternates coordinate with all NOAA units and focus their concerns on resource questions related to emergency response efforts.
3. NOAA is a Trustee for Natural Resource Damage Assessment (NRDA). In this capacity, NOAA is responsible for quantifying injuries caused by the release (or potential release) and response actions, and securing comparable restoration to compensate the public.

To ensure that the NOAA SSC retains the scientific objectivity required to serve the FOSC, NOAA's NRDA Trustee functions are carried out through a separate division of the Office of Response and Restoration (OR&R), the Assessment and Restoration Division (ARD). The SSC will coordinate the interaction and participation of ARD with the Unified Command.

Common Trustee Concerns and Activities during Response

Each Trustee role has characteristic concerns during the response:

NOAA Sanctuary or Reserve Manager (who may or may not be a Trustee; often part of the Environmental Unit (EU))

- Protection and cleanup of managed resources.
- Public access to managed lands, etc.

Resource Manager (Usually for specially protected species. Manager may or may not be a Trustee; often part of the EU)

- Protection of specially protected resources and critical habitat.
- Essential Fish Habitat protection (Magnusen-Stevens Fishery Conservation and Management Act), including consultations.

RRT Representatives (assigned by each agency)

- Environmental impact of response strategies.
- Incident-specific issues include: Port of Refuge, in situ burning, dispersant application.

NRDA (Agency Trustee representatives assigned to conduct NRDA)

- 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.
- Collecting ephemeral NRDA data and samples.
- Opening a dialog with the National Pollution Fund Center.
- Conducting detailed field assessments and overflights, when appropriate.
- NRDA data sharing with RPs and Unified Command.

Coordinating NRDA with 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. The NOAA SSC can greatly facilitate this integration.

Working with NRDA 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). The NRDA Trustees must coordinate natural resource damage assessment and restoration (NRDAR or NRDA) actions with the Unified Command. NRDA liaisons, work-

ing closely with the Liaison Officer, and Planning and Operations Sections are the main conduit for effective information sharing. The SSC also facilitates Natural Resource Trustee coordination and communication with the Unified Command.

The OR&R Assessment and Restoration Division (ARD) is NOAA's lead in the NRDA.

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 agreements directly with the RP and/or the Oil Spill Liability Trust Fund. For all NOAA personnel, incident-related cost recovery is determined by the type of activity they are engaged in (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 NOAA IM team is managed by the NOAA Team Lead (the SSC) and is usually placed within the Situation or Environmental Unit within the Planning Section, 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.
- Document and archive scientific data produced during a response.

Synthesizing Information

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

- Maintaining incident status boards (in coordination with the Situation Unit).
- 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 over-flights; maps of shoreline oiling showing extent and degree of exposure; shoreline cleanup progress reports; oil trajectories; and resources at risk.



NOAA Information Management technician supporting the Unified Command during a Preparedness for Response Exercise Program (PREP) drill.

SCAT Data Management

A difficult but important job during larger and long-term responses is managing the intense flow and sheer volume of data generated by the SCAT process. SCAT data, its analysis, and presentation to the user is time-critical to response operations. Throughout the response, SCAT and other data generated must also be organized and safely archived as federal records, in concert with the Documentation Unit. The NOAA SST, including our highly experienced and skilled Information Management team, are trained to provide these valuable services.



Entry page for ResponseLINK.

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>.

Environmental Response Management Application (ERMA®)

ERMA® is a Web-based Geographic Information System (GIS) tool designed to assist both emergency responders and environmental resource managers who deal with incidents that may adversely impact the environment. The application can assist in response planning and is accessible to both the Command Post and to assets in the field during an actual response incident, such as an oil spill or hurricane. The data within ERMA also assist in resource management decisions regarding hazardous waste site evaluations and restoration planning.

ERMA supports environmental preparedness, response, and recovery efforts by:

- Providing integrated and timely information to improve decision-making.
- Integrating and synthesizing various types of information on a single map interface.
- Providing fast visualization of current information.
- Improving communication and coordination among responders and stakeholders.

ERMA coverage includes:

- U.S. Caribbean, through partnership with EPA Region II and USCG District 7.
- U.S. Northeast (Canadian Border to Long Island Sound), in support of the 2010 SONS (Spill of National Significance) exercise.
- Puget Sound, Washington.
- Gulf of Mexico.

More information about ERMA is available at <http://response.restoration.noaa.gov/erma> or <http://www.crrc.unh.edu/erma>.



ERMA geospatial situational awareness display.



Cover of the Information Management Report for the M/V Selendang Ayu Incident.

Post-Incident Data Summaries

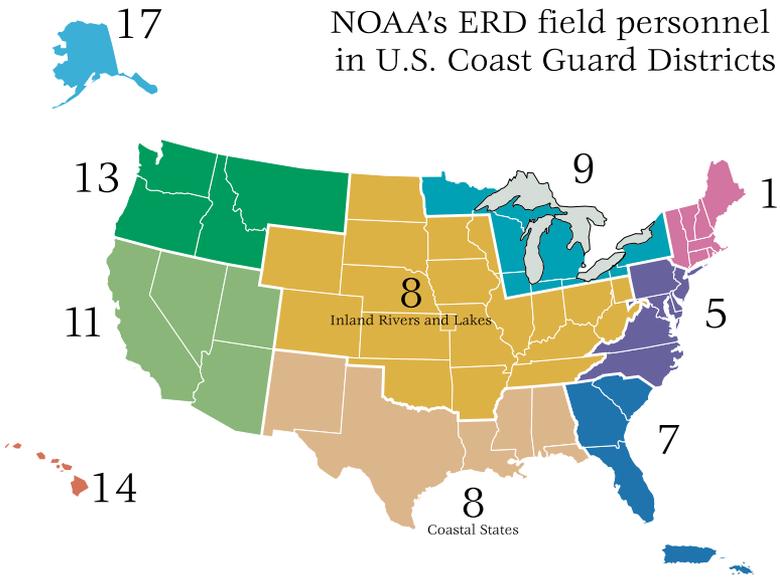
For significant incidents, the NOAA IM staff compiles a post-incident "Information Management Report" that is provided to the FOSC. This report contains all NOAA overflight maps, Hotline reports, shoreline survey information, weather forecasts, official scientific recommendations, and other response-related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



District 1, except CT:
Steve Lehmann, NOAA SSC
CDR USCG 1st Dist. (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
E-mail: Ed.Levine@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

District 5 (south part, MD to NC):
Frank Csulak, NOAA SSC
74 Magruder Road
Highlands, NJ 07732
Office: (732) 872-3005
Cell: (732) 371-1005
E-mail: Frank.Csulak@noaa.gov

District 7 & 8 Backup:
Jim Jeansonne, NOAA SSC
263 13th Avenue South
St. Petersburg, FL 33702
Office: (727) 551-5714
Cell: (206) 276-5308
E-mail: Jim.Jeansonne@noaa.gov

District 8:

Charlie Henry, NOAA SSC
Prevention, USCG 8th Dist.
(DP-SSC)
500 Poydras St., Suite 1341
New Orleans, LA 70130
Office: (504) 589-4414
Cell: (206) 849-9928
E-mail: Charlie.Henry@noaa.gov

LT Mary Gill, NOAA Asst SSC
USCG Sector Houston-Galveston
9640 Clinton Dr
Houston, TX 77029
Office: (713) 671-5100 Ext 1052
Cell: (206) 849-9953
E-mail: Mary.Gill@noaa.gov

District 9:

LCDR Elizabeth Jones,
NOAA SSC
USCG Marine Safety Office
AJC Federal Building
1240 East Ninth Street
Cleveland, Ohio 44199
Office: (216) 522-7760
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

LT Joshua Slater, NOAA Regional
Response Officer (Asst. SSC)
7600 Sand Point Way NE
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Office: (206) 526-4883
Cell: (206) 462-0710
E-mail: Joshua.Slater@noaa.gov

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

LT Joshua Slater, NOAA Regional
Response Officer (Asst. SSC)
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Seattle, Washington 98115
Office: (206) 526-4883
Cell: (206) 462-0710
E-mail: Joshua.Slater@noaa.gov

District 17:

John Whitney, NOAA SSC
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7600 Sand Point Way NE
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Office: (206) 526-4883
Cell: (206) 462-0710
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NOAA ERD Seattle Office

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

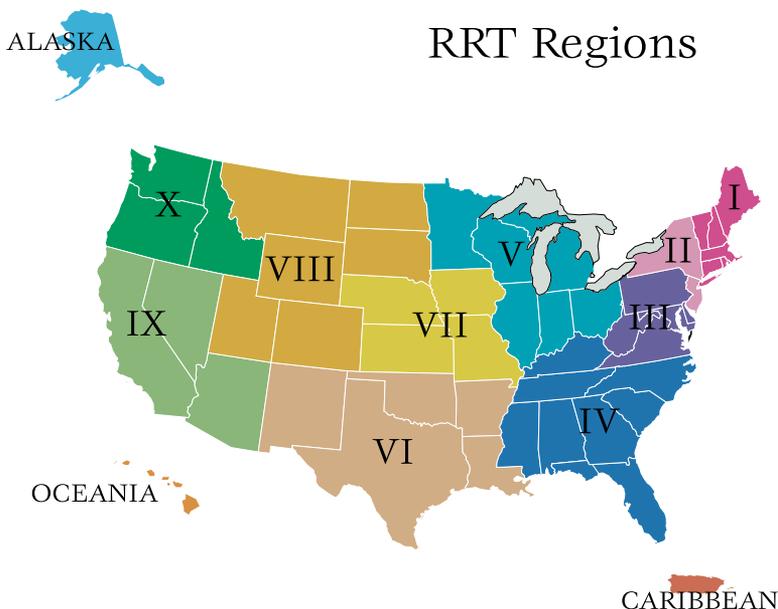
LT Joshua Slater, NOAA Regional
Response Officer (Asst. SSC)
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Cell: (206) 462-0710
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In the event an SSC cannot be reached, or for 24/7 emergency support, contact the ERD Duty Officer at (206) 526-4911.

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.



Region I:

Steve Lehmann, NOAA OR&R
CDR USCG 1st Dist. (MEP)
408 Atlantic Avenue
Boston, MA 02110
Office: (617) 223-8016
Cell: (617) 877-2806
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Alternate:

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Region II:

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74 Magruder Road
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Alternate:

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USCG Battery Park Building
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New York, NY 10004
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Cell: (206) 849-9941
E-mail: Ed.Levine@noaa.gov

Region III:

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Cell: (732) 371-1005
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Region IV:

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909 SE 1st Avenue, Suite 714
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Miami, FL 33131
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Cell: (206) 849-9923
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Alternate:

Jim Jeansonne, NOAA OR&R
263 13th Avenue South
St. Petersburg, FL 33702
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Cell: (206) 276-5308
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Regions V and VII:

Steve Lehmann, NOAA OR&R
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408 Atlantic Avenue
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Cell: (617) 877-2806
E-mail: Steve.Lehmann@noaa.gov

Alternate:

LCDR Elizabeth Jones,
NOAA OR&R
USCG Marine Safety Office
AJC Federal Building
1240 East Ninth Street
Cleveland, Ohio 44199
Office: (216) 522-7760
Cell: (206) 849-9918
E-mail: Elizabeth.Jones@noaa.gov

Region VI:

Charlie Henry, NOAA OR&R
Prevention, USCG 8th Dist. (DP-SSC)
500 Poydras St., Suite 1341
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Region VIII:

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Region IX:

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E-mail: Jordan.Stout@noaa.gov

Caribbean:

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Brickell Plaza Federal Building
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Alternate:

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Cell: (206) 276-5308
E-mail: Jim.Jeansonne@noaa.gov

APPENDIX 3

NOAA's RESPONSE JOB AIDS AND RELATED PUBLICATIONS

NOAA's Job Aids and some related publications are listed in the following table. Some publications may no longer be available in print or are temporarily out of stock. However, PDF versions are available for downloading and may be printed from your computer.

Title/Web Link	Description	URL for PDF version	Order the publication
Trajectory Analysis Handbook en Español: Manual de Analisis de Trayectorias http://response.restoration.noaa.gov/trajana_handbk	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.	http://response.restoration.noaa.gov/jobaid/trajanalysis (PDF, 2.7M) en Español: http://response.restoration.noaa.gov/jobaid/trayect (PDF, 4.1M)	Not available at this time.
Related Publication: Questions and Answers: Spill Trajectory Analysis	A 1996 technical explanation of spill trajectory analysis and how it differs from oil spill trajectory modeling.	http://response.restoration.noaa.gov/erdpub/qa_trajanal (PDF, 266.5K)	Contact orr.library@noaa.gov .
Related Publication: Digital Distribution Standard for NOAA Trajectory Analysis Information	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.	http://response.restoration.noaa.gov/erdpub/ta_stand (PDF, 230.9K)	Contact orr.library@noaa.gov .
Open Water Oil Identification Job Aid for Aerial Observation en Español: Asistencia para la Identificación de Petróleo en Aguas Abiertas para observación aérea http://response.restoration.noaa.gov/jobaid/oil_id	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. Updated in 2007.	http://response.restoration.noaa.gov/jobaid/aerialobs (PDF, 4.6M)	http://response.restoration.noaa.gov/jobaid/orderform Spanish version by special order. Contact orr.library@noaa.gov .
Related Publication: Aerial Observations of Oil at Sea	1996 recommended procedures for assessing spilled oil from the air.	http://response.restoration.noaa.gov/erdpub/oilatsea (PDF, 61.5K)	Contact orr.library@noaa.gov .

Title/Web Link	Description	URL for PDF version	Order the publication
Dispersant Application Observer Job Aid http://response.restoration.noaa.gov/jobaid/dispersant	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. Updated in 2007.	http://response.restoration.noaa.gov/jobaid/disperse (PDF, 2.1M)	http://response.restoration.noaa.gov/jobaid/orderform
Related Publication: Dispersing Oil Near Shore in the California Current Region http://response.restoration.noaa.gov/jobaid/shoreline	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.	http://www.calcofi.org/newhome/publications/CalCOFI_Reports/v42/pdfs/Vol_42_Mearns_et_al.pdf (PDF, 1.4M)	Contact orr.library@noaa.gov.
Shoreline Assessment Job Aid en Español: Guía para la Evaluación del Litoral Costero http://response.restoration.noaa.gov/jobaid/shoreline	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 team (SCAT) process. Updated in 2007.	http://response.restoration.noaa.gov/jobaid/shore_assess (PDF, 3.0M)	http://response.restoration.noaa.gov/jobaid/orderform Spanish version by special order. Contact orr.library@noaa.gov.
Related Publication: Shoreline Assessment Manual	A 2000 manual outlining methods for conducting shoreline assessments and using the results to make cleanup decisions.	http://response.restoration.noaa.gov/erdpub/manual_shore_assess (PDF, 3.8M)	Contact orr.library@noaa.gov.
Related Publication: Shoreline Assessment Forms http://response.restoration.noaa.gov/jobaid/shoreline_forms	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	See the Web link for PDF versions of the Forms.	N/A
Characteristic Coastal Habitats: Choosing Spill Response Alternatives en Español: Hábitats Costeros Característicos: Selección de Alternativas para Responder a Derrames de Petróleo http://response.restoration.noaa.gov/jobaid/coastalhab	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.	http://response.restoration.noaa.gov/jobaid/coastal (PDF, 3.3M) en Español: http://response.restoration.noaa.gov/jobaid/costeros (PDF, 5.2M)	Contact orr.library@noaa.gov. Spanish version by special order. Contact orr.library@noaa.gov.

Title/Web Link	Description	URL for PDF version	Order the publication
<p>Characteristics of Response Strategies: A Guide for Spill Response Planning in Marine Environments http://response.restoration.noaa.gov/jobaid/responsestrat</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>http://response.restoration.noaa.gov/jobaid/response (PDF, 558.3K)</p>	<p>Contact orr.library@noaa.gov.</p>
<p>ESI Training Manual http://response.restoration.noaa.gov/ESI_Training</p>	<p>A 2008 training manual, providing an oil spill scenario that takes place in Mobile Bay, Alabama. Your task is to identify the probable resources at risk. The manual shows how to use hard copy or PDF versions of the ESI data; the free ESI Viewer product; and the map document/tools available to simplify ESI viewing and querying in ESRI's ArcMap vs. 9.2 or higher.</p>	<p>http://response.restoration.noaa.gov/book_shelf/ESI_Training.zip (Zip file, 142.1M) A single compressed file containing the Training Manual and all the files you'll need to work through it.</p>	<p>Available online only.</p>
<p>Introduction to Coastal Habitats and Biological Resources for Spill Response http://response.restoration.noaa.gov/jobaid/habitats_bio</p>	<p>A 1992 training manual covering physical, geological, and biological considerations relevant to oil spill response and cleanup.</p>	<p>See the Web link for PDF versions of the 10 chapters.</p>	<p>Contact orr.library@noaa.gov.</p>
<p>Mechanical Protection Guidelines</p>	<p>A 1994 manual describing how to deploy booms, barriers, and other mechanical protection devices during a spill response.</p>	<p>http://response.restoration.noaa.gov/erdpub/mechanical (PDF, 1.0M)</p>	<p>Contact orr.library@noaa.gov.</p>
<p>Observers' Guide to Sea Ice http://response.restoration.noaa.gov/jobaid/seaice</p>	<p>A job aid for volunteers who report observations of ice conditions to authorities such as the U.S. Coast Guard. Updated in 2007.</p>	<p>http://response.restoration.noaa.gov/jobaid/seaice_doc (PDF, 2.9M)</p>	<p>Contact orr.library@noaa.gov.</p>

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.

These forms are available in two formats:

- Portable Document Format (PDF) files, which are not “fillable.”
- Microsoft Word/Excel formats, which can be completed electronically.

ICS forms for oil spill response: <http://response.restoration.noaa.gov/icsforms>. These forms are available in two formats:

- FileMaker database containing the ICS forms.
- 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 these versions may be used. The following table lists the Coast Guard (“CG”) versions.

Form Number	Form Name	Purpose
N/A	IAP Cover Sheet	The Incident Action Plan (IAP) cover sheet provides a checklist of items that may be included in the action plan.
ICS 201-CG	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-CG	Incident Objectives	The Incident Objectives form describes the basic incident strategy, control objectives, and provides weather, tide and current information, and safety considerations for use during the next operational period. The Attachments list at the bottom of the form also serves as a table of contents for the Incident Action Plan.
ICS 203-CG	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-CG	Assignment List	The Assignment List(s) informs Division and Group supervisors of incident assignments. Once the assignments are agreed to by the Unified Command and General Staff, the assignment information is given to the appropriate Divisions and Groups.
ICS 204a-CG	Assignment List Attachment	The Assignment List Attachment informs field personnel of specific incident assignment information. Once the Unified Command and General Staff agree to the Group / Division assignments, the specific assignment information is given to the appropriate Strike Team or Task Force Leaders.
ICS 205-CG	Incident Radio Communications Plan	The Incident Radio Communications Plan is a summary of information obtained from the Radio Requirements Worksheet (ICS form 216). Information from the Radio Communications Plan on frequency assignments is normally noted on the appropriate Assignment List (ICS form 204-CG).
ICS 205a-CG	Communications List	The Communications List records methods of contact for personnel on scene.
ICS 206-CG	Medical Plan	The Medical Plan provides information on incident medical aid stations, transportation services, hospitals, and medical emergency procedures.
ICS 207-CG	Incident Organization Chart	The Incident Organization Chart is used to indicate what ICS 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-CG	Site Safety and Health Plan	The Site Safety and Health Plan is designed for safety and health personnel that use the ICS. It 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.

Form Number	Form Name	Purpose
ICS 209-CG	Incident Status Summary	The Status Summary: 1. Is used by Situation Unit personnel for posting information on Status Boards. 2. Is duplicated and provided to Command Staff members, giving them basic information for planning for the next operational period. 3. Provides information to the Information Officer for preparing news media releases. 4. Summarizes incident information for local and off-site coordination centers.
ICS 209H-CG	Incident Status Summary: Hurricane	A Status Summary created for hurricane incidents.
ICS 211-CG	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: <ul style="list-style-type: none"> 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 to incident personnel which requires a hard-copy delivery; Incident personnel to place resource orders.
ICS 213RR-CG	Resource Request Message	This form is used by all incident personnel to request tactical and non-tactical resources.
ICS 214-CG	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-CG	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 (Attachments) (ICS form 204a-CG), if the Operations and Planning Section Chiefs deem it necessary.
ICS 215a-CG	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 Planning section Chief to complete 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.

Form Number	Form Name	Purpose
ICS 220-CG	Air Operations Summary	The Air Operations Summary provides the Air Operations Branch with the number, type, location, and specific assignments of aircraft.
ICS 221-CG	Demob. Check-Out	This form provides the Planning Section information on resource releases from the incident.
ICS 225-CG	Incident Personnel Performance Rating	This form gives supervisors the opportunity to evaluate subordinates on incident assignments.
ICS 230-CG	Daily Meeting Schedule	The Daily Meeting Schedule records information about the daily scheduled meeting activities.
ICS 232-CG	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-CG	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-CG	Incident Open Action Tracker	The Tracker allows ICS personnel to monitor actions during the incident.
ICS 234-CG	Work Analysis Matrix	This form allows the Operations Section Chief to document an operation's objectives, strategies, tactics, and work assignments.
ICS 235-CG	Facility Needs Assessment Worksheet	This worksheet outlines the facility requirements for all ICS personnel.
ICS 237	Incident Mishap Reporting Record	This form is completed by the Safety Officer if an injury/mishap occurs.

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.

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.

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 on 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.

IncidentNews now features newsfeed subscriptions (Atom or RSS) for updates on new incidents as they happen.

For more information, contact the IncidentNews administrator at orr.incidentnews@noaa.gov.

Environmental Response Management Application - ERMA®

The Coastal Response Research Center (CRRC), a partnership of the University of New Hampshire and OR&R, has developed a data platform to interface diverse spatial data, including real-time data, in a Web-based mapping format accessible to the Command Post and field operations. ERMA gives responders and decision-makers ready access to specific data useful during spill drills, planning, response, assessment and restoration, as well as for other environmental incidents and natural disasters.

More information about ERMA is available at <http://www.crrc.unh.edu/erma> or <http://response.restoration.noaa.gov/erma>.

Marine Debris Division

Since 2005, OR&R's Marine Debris Program (within the Marine Debris Division) has served as a centralized program within NOAA, coordinating, strengthening, and enhancing marine debris activities within the agency, and among its partners and the public. The MDP has undertaken national and international efforts focused on researching, reducing, and preventing debris in the marine environment.

Program components that the MDP undertakes include: (1) mapping, identification, impact assessment, removal, and prevention; (2) reducing and preventing gear loss; and (3) outreach.

More information about the Marine Debris Program is available at <http://marinedebris.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

Oil Spill Models	URL for Model Fact Sheet (PDF)	Web Site Information
GNOME (General NOAA Operational Modeling Environment), oil trajectory model.	http://response.restoration.noaa.gov/book_shelf/820_GNOME.pdf (PDF, 1.1 M)	http://response.restoration.noaa.gov/gnome
TAP (Trajectory Analysis Planner), trajectory analysis software.	http://response.restoration.noaa.gov/book_shelf/894_tap.pdf (PDF, 657.9K)	http://response.restoration.noaa.gov/tap
ADIOS 2 (Automated Data Inquiry for Oil Spills), oil weathering model.	http://response.restoration.noaa.gov/book_shelf/538_adios.pdf (PDF, 721.8K)	http://response.restoration.noaa.gov/adios
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	http://response.restoration.noaa.gov/book_shelf/1024_SpillTools.pdf (PDF, 386.8K)	http://response.restoration.noaa.gov/spilltools
DMP2 (Dispersant Mission Planner 2), a tool that helps spill responders assess dispersant application system performance.	N/A	http://response.restoration.noaa.gov/dmp2

Chemical Response Models	URL for Model Fact Sheet (PDF)	Web Site Information
<p>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. The suite encompasses several programs, including CAMEO, ALOHA, and MARLOT.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1015_cameo.pdf (PDF, 695.2 K)</p>	<p>http://response.restoration.noaa.gov/cameosuite</p>
<p>CAMEO (Computer-Aided Management of Emergency Operations), a database application that allows emergency planners and responders to manage data about their community.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1015_cameo.pdf (PDF, 695.2 K)</p>	<p>http://response.restoration.noaa.gov/cameo</p>
<p>CAMEO Chemicals, a database of hazardous chemicals that can be used to get response recommendations and predict how chemicals might react if they were mixed together. CAMEO Chemicals is available online and as a downloadable program.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1382_cameo_chem.pdf (PDF, 1.2M)</p>	<p>Online version: http://cameochemicals.noaa.gov Downloadable version: http://response.restoration.noaa.gov/cameochemicals</p>
<p>ALOHA (Areal Locations of Hazardous Atmospheres), a modeling program that estimates threat zones associated with hazardous chemical releases, including toxic gas clouds, fires, and explosions.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1020_aloha.pdf (PDF, 478.6K)</p>	<p>http://response.restoration.noaa.gov/aloha</p>
<p>MARPLoT (Mapping Application for Response, Planning, and Local Operational Tasks), a general purpose mapping program that makes it easy to quickly create, view, and modify maps.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1021_marplot.pdf (PDF, 865.7 K)</p>	<p>http://response.restoration.noaa.gov/marplot</p>
<p>U.S. Coast Guard's Chemical Response Tool, a new online product.</p>	<p>N/A</p>	<p>http://chemresponsetool.noaa.gov</p>
<p>Chemical Reactivity Worksheet (CRW), a program you can use to find out about the reactivity of substances or mixtures of substances.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1016_react.pdf (PDF, 894.8K)</p>	<p>http://response.restoration.noaa.gov/crw</p>
<p>Precursors Database, OR&R's forensics and response tool.</p>	<p>http://response.restoration.noaa.gov/book/book_shelf/1297_precursors.pdf (PDF, 474.7K)</p>	<p>N/A</p>

APPENDIX 7

NOAA RESPONSE TRAINING AVAILABILITY

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

Workshops for Emergency Responders and Planners

Science of Oil Spill (SOS) Workshops: OR&R's 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, offering an opportunity to practice/apply skills learned.
- An introduction to damage assessment techniques.
- 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 SOS 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.training@noaa.gov.

Ecological Risk Assessment (ERA) Workshops: During oil spill responses, there is limited time to make decisions on response options. The decision to use chemical dispersants and/or in situ burning may be especially contentious, and both have only a limited "window of opportunity." To encourage discussion and consensus before a spill happens, the U.S. Coast Guard and OR&R have co-facilitated a series of Consensus Ecological Risk Assessment (ERA, or C-ERA) workshops. (From 1996 through 2007, 19 ERA workshops were conducted, training over 500 participants.)

During ERA workshops, participants learn a simplified risk assessment method that can be applied with minimal training. Workshop participants work in small groups and all together to develop a consensus of the potential ecological risk of the response options considered. To be most useful during an actual response, participants should include resource trustees, stakeholders from local, state, and federal agencies, and from NGOs. ERA participants typically analyze the following response options:

- No response.
- Open-water mechanical cleanup (skimmers).
- In situ burning.
- Open-water dispersant application.
- Mechanical shoreline cleanup.

By basing assessment on a risk matrix and local information, each ERA workshop enables relatively quick, systematic comparison of response options that have ecological effects. By coming to consensus in this non-emergency setting, decision-makers may reach a faster consensus during an actual response.

For additional information, visit the NOAA OR&R ERA Web page at <http://response.restoration.noaa.gov/era> or contact OR&R's ERA Specialist with any questions.

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), overflight observation, computer modeling, and special response or resource topics.

CAMEO Training: Information about CAMEO training is available at <http://response.restoration.noaa.gov/cameotraining>. The EPA also lists CAMEO training events on its Calendar of Events page, <http://www.epa.gov/emergencies/content/cameo/cam-evnt.htm>.

ESI Training: A new training module (manual and associated training materials) is now available to help spill responders and planners learn to use the digital ESI data products. For more information, see the ESI Training section, http://response.restoration.noaa.gov/ESI_training.

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) 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.training@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 federal on-scene coordinator (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>
- OPA NRDA Regulations, 15 C.F.R. Part 990
 - http://www.access.gpo.gov/nara/cfr/waisidx_03/15cfr990_03.html

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>
- 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>
 - National Archives and Records Administration: Code of Federal Regulations: http://www.access.gpo.gov/nara/cfr/waisidx_03/43cfr11_03.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>

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>

NOAA SST NRDA Information Contacts

- Jim Jeansonne: mobile (206) 276-5308 or jim.jeansonne@noaa.gov
- Frank Csulak: mobile (732) 371-1005 or frank.csulak@noaa.gov
- Doug Helton: mobile (206) 890-7760 or doug.helton@noaa.gov

APPENDIX 9

ENVIRONMENTAL SENSITIVITY INDEX (ESI) MAPPING

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

Sensitive environment mapping is an integral part of spill planning. ESI maps are not an end in themselves, rather 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 – A limited number of hard copy ESI atlases are published. These hard bound, 11"x17" laminated maps are appropriate for a command post setting, but can be cumbersome in the field and are expensive to produce. Individual maps can be printed from the PDFs described below.

Portable Document Format Maps – ESI maps are also available in portable document format (PDF). This format allows 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 PDF version also includes the introduction pages containing representative photos with shoreline descriptions and response considerations.

Geodatabase – The ESI data are published in a geodatabase format along with an .mxd file that displays the data in ArcMap 9.2 or higher. The .mxd uses standardized ESI colors and symbology, and the relates to the data tables are preset. A number of ESI tools have been developed to ease searches and queries of the ESI data, as well as tools to summarize shoreline and biological impacts. More information and the latest versions of the tools are available at http://response.restoration.noaa.gov/esi_toolbar.

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 intuitive to use. In the ESI Training Manual, there is a section on installing and using the ESI Viewer. For more information about the manual and how to obtain the Viewers, see the ESI Map Self-study section, below.

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 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.

How to Get ESI Data

For additional information about ESI data:

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

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

ESI Map Self-study

To learn more about using ESI maps for spill response, visit the Self-study section of OR&R's Training Web site (http://response.restoration.noaa.gov/emergencyresponse/training_selfstudy) for ESI-related exercises. New to the site is an ESI training module (manual and associated training materials) to help spill responders and planners learn to use the digital ESI data products. Contact OR&R's ESI Specialist with any questions: 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. To view a PDF or Web version of a publication, use the Web links below.

Publication	URL for Publication (PDF)	Web Information
Oil Spills in Coral Reefs: Planning & Response Considerations A 2001 report summarizing relevant research on coral reefs, written for anyone working in or planning for spill response in coral reef regions.	http://response.restoration.noaa.gov/erdpub/coral_oil (PDF, 10.4M)	http://response.restoration.noaa.gov/coral
Toxicity of Oil to Reef-Building Corals: a Spill Response Perspective A report that explores spill case histories, field studies, and experimental studies to assess the acute and chronic impacts of oil on coral.	http://response.restoration.noaa.gov/erdpub/coral_tox (PDF, 336.8K)	http://response.restoration.noaa.gov/coralreef
Oil and Sea Turtles: Biology, Planning, and Response 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.	http://response.restoration.noaa.gov/erdpub/turtle_oil (PDF, 2.7M)	http://response.restoration.noaa.gov/seaturtles
Oil Spills in Mangroves: Planning & Response Considerations A 2002 report summarizing current research on mangrove ecosystems for spill response decisionmakers.	http://response.restoration.noaa.gov/erdpub/mangrove_oil (PDF, 4.2M)	http://response.restoration.noaa.gov/mangroves
Recovery of Mangrove Habitats at the Vesta Bella Spill Site A 1994 report describing chemistry and mangrove observations one year after the 1991 cleanup of the Vesta Bella oil spill.	http://response.restoration.noaa.gov/erdpub/V_Bella (PDF, 4.0M)	http://response.restoration.noaa.gov/mangroves
Managing Seafood Safety after an Oil Spill A 2002 guide to help seafood managers and other spill responders determine appropriate seafood management actions in response to a spill.	http://response.restoration.noaa.gov/erdpub/seafood2 (PDF, 1.1M)	http://response.restoration.noaa.gov/seafoodsafety
Guidance on Sensory Testing and Monitoring of Seafood for Presence of Petroleum Taint Following an Oil Spill A 2001 guidance document describing how to conduct sensory testing on seafood suspected of petroleum taint.	http://response.restoration.noaa.gov/erdpub/seafood (PDF, 1.8M)	http://response.restoration.noaa.gov/seafoodsafety

Publication	URL for Publication (PDF)	Web Information
<p>Responding to Oil Spills in Coastal Marshes: the Fine Line Between Help and Hindrance</p> <p>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>http://response.restoration.noaa.gov/erdpub/helpind.pdf, 44K</p>	<p>N/A</p>
<p>ESI Training Manual</p> <p>This 2008 training manual provides an oil spill scenario that takes place in Mobile Bay, Alabama. Your task is to identify the probable resources at risk. The manual shows how to use hard copy or PDF versions of the ESI data; the free ESI Viewer product; and the map document/tools available to simplify ESI viewing and querying in ESRI's ArcMap vs. 9.2 or higher.</p>	<p>http://response.restoration.noaa.gov/book_shelf/ESI_Training.zip (Zip file, 142.11M)</p> <p>A single compressed file containing the Training Manual and all the files you'll need to work through it.</p>	<p>http://response.restoration.noaa.gov/ESI_Training</p>

APPENDIX 11

UNIT CONVERSION TABLE

The following table provides conversions for standard units (length, mass, velocity, etc.) but also provides conversions for some of the lesser known units used in managing oil and chemical spills.

OR&R has also developed a simple desktop tool, NUCOS (NOAA Unit Converter for Oil Spills), that converts both standard units and units unique to spill response. For example, NUCOS converts the units for oil volume, viscosity, and density from the conversion list of the Dispersant Mission Planner 2 (<http://response.restoration.noaa.gov/dmp2>), a tool that helps spill responders assess dispersant application system performance. More information about NUCOS is available at <http://response.restoration.noaa.gov/nucos>.

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
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
nautical miles	1.15	statute miles
nautical miles	1.85	kilometers
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
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.)
AREA		
acres	4,047	meters ²
acres	43,560	feet ²
OIL SPILL CONVERSIONS		
barrels (oil)	42	gallons
tons (metric)	~7	barrels
tons (metric)	~300	gallons
SPEED / VELOCITY		
knots	1.69	feet per second
knots	0.51	meters per second
knots	1.15	statute miles per hour



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U.S. DEPARTMENT OF COMMERCE

Gary Locke, Secretary

National Oceanic and Atmospheric Administration
Dr. Jane Lubchenco
Under Secretary of Commerce for Oceans and
Atmosphere and NOAA Administrator

National Ocean Service
David Kennedy, Acting Assistant Administrator
for Ocean Services and Coastal Zone
Management