Oil Spill Response using E.R.M.A.

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Coastal Response Research Center

Talk Outline

- Overview of how NOAA's Office of Response and Restoration responds at a spill

- Background on Coastal Response Research Center and our collaboration in Portsmouth Harbor area

- Environmental Response Management Application- E.R.M.A.
  - Overview
  - Demo
  - Next Steps

NOAA's Role in Oil Spill Response
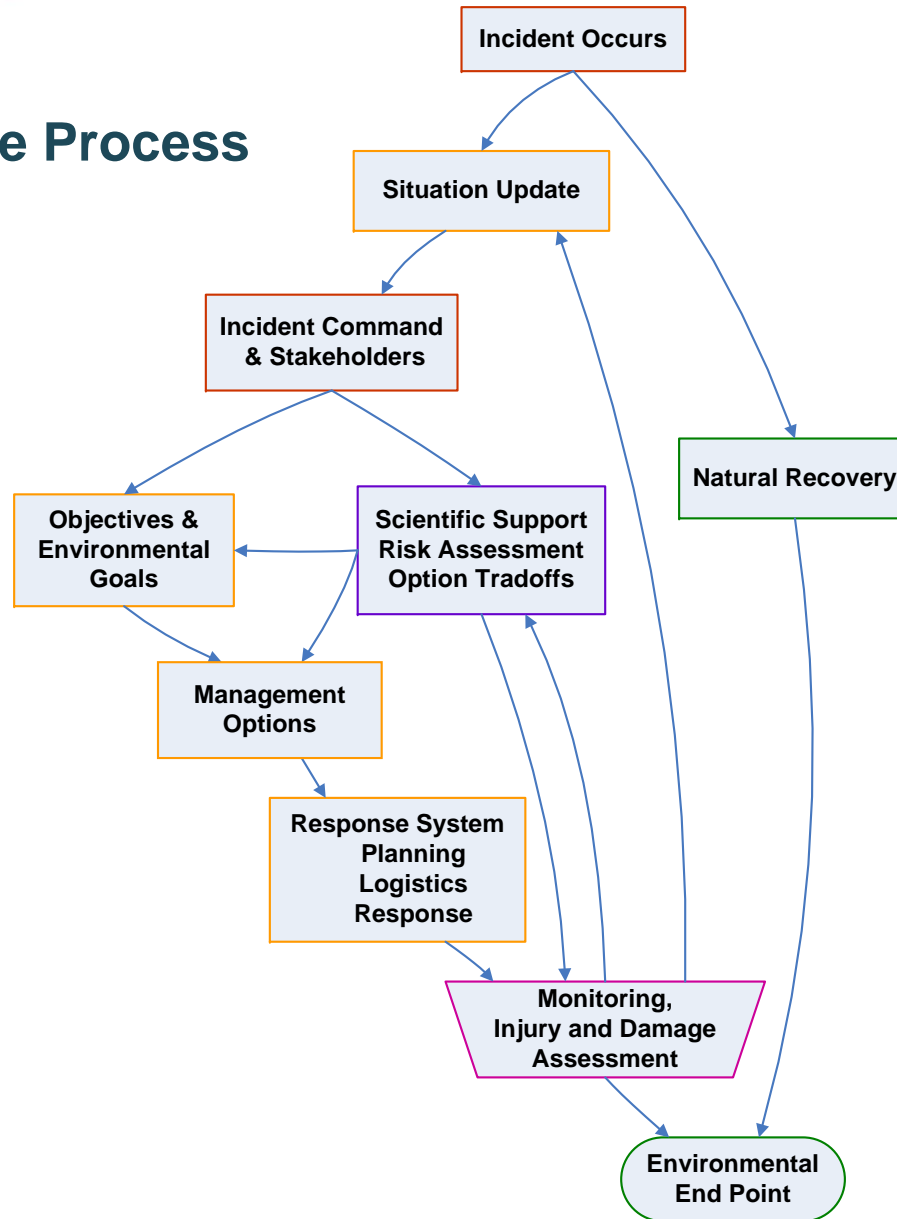
- Spills happen so what do we do????

AGENCY MISSION STATEMENT

- **Reducing threats to coastal resources and human health through <u>planning and response</u>.**

- **Protecting coastal resources and human health by recommending and implementing <u>appropriate response actions</u>.**

- **<u>Restoring</u> injured trust resources.**

Spill Response Process

Incident Occurs

Situation Update

Incident Command & Stakeholders

Objectives & Environmental Goals

Scientific Support Risk Assessment Option Tradoffs

Natural Recovery

Management Options

Response System Planning Logistics Response

Monitoring, Injury and Damage Assessment

Environmental End Point

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Continuum of "Response" for the OR&R

Response (24 hours) → **Restoration - Recovery (Years to Decades)**

Emergency Response Division (ERD)

Assessment and Restoration Division (ARD)

NOAA Scientific Support Includes:

- *Weather Forecast*
- *Tides and Currents*
- *Hazard Characterization*
- *Tactical Trajectory*
- *Natural Resources at Risk (RAR)*
- *Overflight Obs.*
- *SCAT*
- *Environmental issues and trade-offs*
- *Consultation*

GOAL: Best Response Possible for the situation

Coastal Response Research Center (CRRC)

- CRRC is partnership between NOAA's Office of Response and Restoration (ORR) and University of New Hampshire
- CRRC Mission:
  - Develop new approaches to spill response and restoration through research/synthesis of information
  - Serve as a resource for ORR and NOAA
  - Serve as a hub for spill research, development, and technical transfer
    - Oil spill community (e.g., RRTs, internationally)
  - Conduct outreach to improve preparedness and response

UNH – NOAA Centers working to collectively solve common management challenge

- Can we apply the 'data collaborative' technology to improve response capabilities?
- Use Portsmouth Harbor as a test case
  - Data-rich
  - Critical mass of capabilities UNH – NOAA Centers

"Portsmouth Harbor Response Initiative"

"Portsmouth Harbor Response Initiative"

- Example of Center interaction with other UNH/NOAA centers (e.g., Joint Hydrographic Center, CICEET, Environmental Data Collaborative)

- Broad integration across oil spill community (e.g., USCG, NOAA, state agencies, potential responsible parties)

- Integrated "modeling" approach to displaying incident information and providing validated data with GIS-based technology

- NOAA ORR detail at UNH
  - EOS- Rob Braswell
  - CCOM- Kurt Schwehr

E.R.M.A.

Environmental
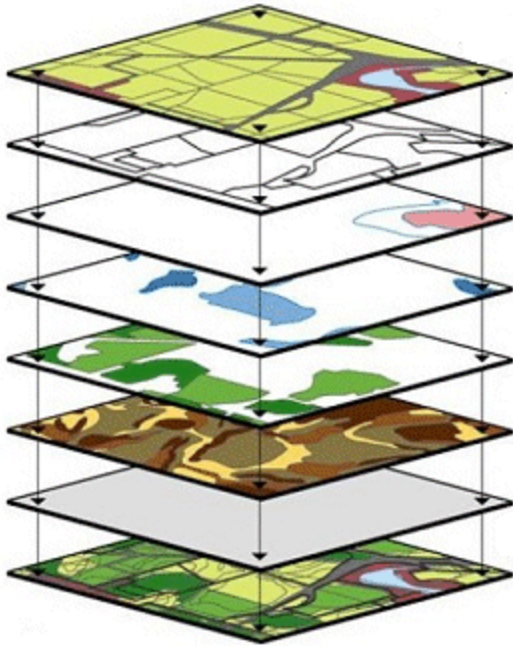**R**esponse
Management
Application

What is GIS?

- Computer hardware and software system designed to collect, manipulate, analyze, and display spatially referenced data for solving complex resource issues.

A Picture is Worth a Thousand Words...

- Diverse datasets can be interlaced on a single map to better visualize a the complex nature of an area

Why Use a Web Based GIS Platform during a Response?

- Integrate and synthesize various types of info
- Provide a common operational picture for situational awareness
- Improve communication and coordination among responders and stakeholders
  - Visualization of a complex situation
- Provide resource managers with the information they need to make better informed decisions

Functional Web GIS Platform for Response

- Package data in a well-designed management, visualization, and analysis tool:
  - Easily accessible - field and command
  - User friendly
  - Quick to display
  - Capable of real-time data display
  - Simple to update/ download from
  - Secure

Project Partners: Technical Advisers

- US Coast Guard
- US EPA
- NH DES
- ME DEP
- NH Fish and Game
- NH Coastal Manager
- NH Div. Emergency Services
- Piscataqua River Cooperative

- NOAA
  - Office of Response and Restoration
  - Coastal Services Center
  - Office Coast Survey
  - Weather Service
  - Gulf of ME Ocean Observing System
- UNH
  - JHC
 - CCOM
  - COOA
  - Research Computing

Leveraging Existing Data Resources

- Environmental - contaminant datasets, water quality monitoring sites, protected areas, restoration sites, etc.

- Habitat classifications and species distributions data

- Navigational - electronic navigation charts & scanned paper charts

- Meteorological observations

- Models - trajectories/forecasts

Spill Incident Info
   Volume & Chemistry of Spill
   Hydrodynamic and Shoreline Data
   Resources at Risk
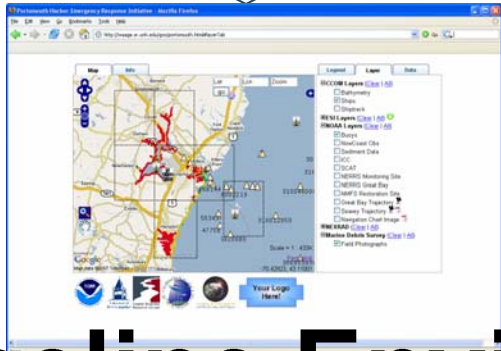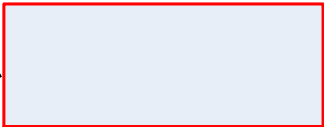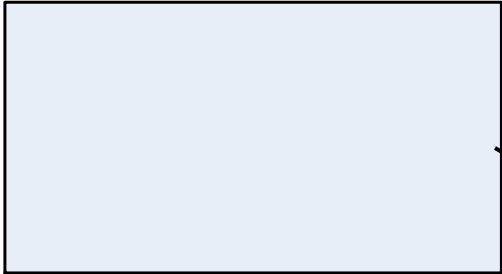
Baseline Environmental Info

What Has Been Compiled?

- Library of background data
  - Base maps- shoreline data, roads, etc.
  - Imagery
  - Navigational charts
  - Bathymetry surveys
  - Environmental Sensitivity Indices
  - Environmental monitoring sites
  - Weather observation buoys
  - Restoration sites

What Can be Displayed?

- **Real-time observations and monitoring data**
  - Observation buoys - What is being collected?
  - Re-direct to the data source
- **Data links to documents and websites**
  - Restoration Project
    - Summary PDFs
    - Websites
- **Field data & georeferenced photos**
  - International Coastal Clean-up Surveys
    - Specific data marine debris items
    - Photos collected during survey

How Does This Help in Spill Response?

- **Hypothetical Spill**
  - **Uploaded trajectory - movie display**
  - **Where did it hit relative to ESI layer?**
    - -See exact classification or download and print map
    - -View data sources
  - **Show results of Shoreline Cleanup and Assessment Team (SCAT) work**
  - **Visualize spill relative to ship traffic**
  - **Gather current weather observations from buoys**
  - **Display existing environmental contaminant data**

Practical Implementation of ERMA

- **Assist with spill preparedness**
  - Display jurisdictional boundaries, specially regulated areas, areas of socio-economic importance
  - Access points for cleanup
  - Staging areas and command centers
  - Regional documentation, points of contact, etc.

Practical Implementation of ERMA

- Assist in coordinating response efforts
  - Visualize magnitude and extent
  - Triage sites for action
  - Track progress of clean-up
  - Access real-time data
  - Upload data from the field and access forms
  - Increase communication

Practical Implementation of ERMA

- Define the extent of potential impacts
  - General habitat and land use information
  - Areas of biological significance - haul outs, rookeries, nesting grounds, essential or critical habitat
  - Species-specific data - biological resources in the region - threatened or endangered?
  - Where is there current monitoring data

Practical Implementation of ERMA

- **Assist in Recovery and Restoration**
  - Access existing environmental monitoring sites
  - Assist with sampling design
  - Inventory restoration projects
  - Locate long-term monitoring sites
  - Coordinate with regional projects

Acknowledgement

University of
New Hampshire

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