Environmental Response Data Visualization and Modeling of Oil Spills with ERMA®

https://erma.noaa.gov/gulfofmexico
https://erma.noaa.gov/caribbean

Jay Coady
jay.Coady@noaa.gov

NOAA’s Office of Response & Restoration

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Continuum of “Response” Framework for The Office of Response & Restoration

Response (24 hours) ——> Assessment ——> Restoration

Response

Assessment

Restoration

Recovery or Restoration (Years/Decades)
Key Takeaways

• ERMA is a visualization tool
• ERMA is a data aggregator
• ERMA can securely share data
• ERMA is secure
• ERMA is flexible
What is ERMA?

• Common Operating Picture (COP)
• Web-based mapping tool
• Centralized access to information
• Increases communication, coordination, and efficiency
• Prepare for, respond to, assess impacts from incidents or conditions
• Analyze and visualize environmental information relevant to all hazards
• Tiered layer security and distributed contributions.
OR&R Response Locations

Environmental Response Management Application
Gulf of Mexico

Active ResponseLink Hotlines (NOAA)
- Notification
- Phone Support
- Products Generated
- On-Scene Support

All ResponseLink Hotlines (NOAA)
- Notification
- Phone Support
- Products Generated
- On-Scene Support

OpenStreetMap Light Gray (CARTO)
OpenStreetMap Light Gray (CARTO)
ERMA’s Architecture

• Distributed layer/data management
  – Local shapefiles, rasters, external map services

• In AWS. Live zone, hot-swap 2nd zone, 3rd zone for development tier

• Open-source stack:
  – OpenLayers, Mapserver, PostgreSQL

• Data Layers and User accounts are role-based: user and layer permissions have to line up
  – Plus a public view
ERMA Account Security

• Public accounts
  – Publically available data (no login required)

• Restricted accounts for planning & response
  – Username/password required
    • Verified by NOAA
    • Various levels of access
      – Active incidents
      – Sensitive datasets
      – NRDA/Trustees
      – Drills
    – Password reset 90 days; Inactive accounts 6 months

• Data available only to appropriate users and for appropriate uses
ERMA Data Layer Stats

16k Active Layers
8k Public Layers
15k Archive Layers (historical data – not visible to end-users)
3.5k Active Layers that are external Services
600 Restricted external services
Finding Data

- Search Tool
- Recent Data
- Table of Contents
- Bookmarks
Finding Data
Data Queries in ERMA
Environmental Sensitivity Index (ESI) data and Query Tool

ERMA® Environmental Response Management Application

Query Tools
Step 1: Create New or Use Existing Shapes:
Create new shapes by selecting the Create Polygon button. Draw the polygon on the map by clicking vertices with the mouse. Double click to end drawing.
To use an existing shape continue to Step 2.
All shapes drawn on the map will be used by the Layer Query by Polygon Tool and the ESI Query Tool. The IPAC Query Tool can only use one polygon. If you want run the query with one shape, delete the remaining shapes. You do not need to select a shape for it to be run in the query.

Download features in these formats: Excel (.xls) | Text (.csv) | PDF this section

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Draw
HYCOM Currents (IOOS)
Navigational Charts (ENCs)
Petibois Island, MS: Buried layer of oil. Left image shows burial further inland by wind action; right image shows burial by wave action (gulf is below image).
Overflights & Oiling Observation
Trajectory Models
Trajectory Models
Trajectory Models
Recent Hurricanes
Field Personnel Tracking
Please Visit Our ERMA Regional Sites
Response.restoration.noaa.gov/ERMA

Environmental Response Management Application (ERMA)

ERMA® is an online mapping tool that integrates both static and real-time data, such as Environmental Sensitivity Index (ESI) maps, ship locations, weather, and ocean currents, in a centralized, easy-to-use format for environmental responders and decision makers.

ERMA enables a user to quickly and securely upload, manipulate, export, and display spatial data in a Geographic Information System (GIS) map.

Developed by NOAA and the University of New Hampshire with the U.S. Environmental Protection Agency, U.S. Coast Guard, and the Department of Interior, ERMA provides environmental resource managers with the data necessary to make informed decisions for environmental response.

Arctic ERMA

Find out how NOAA is helping the Arctic region prepare for climate change and possible oil spills using ERMA.

Atlantic ERMA

In the fall of 2012, Atlantic ERMA was employed as the Common Operational Picture for the U.S. Coast Guard’s pollution response to Post Tropical Cyclone