

Data Management, Sharing, and Dissemination at Drills and Spills

Judd Muskat and L “Guphy” Gustafson
California Department of Fish and Wildlife, Office of Spill Prevention and Response
1700 K Street, Suite 250
Sacramento, CA 95811

ABSTRACT # 2017-234

The California Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR) has drafted a “Data Management and Sharing Plan” document for use in drills and oil spill response in California. Implementation of this plan will help to avoid compartmentalized isolation of information within the ICS units and sections, will facilitate data dissemination throughout the broader response community, and provide continuance throughout staff changes over a prolonged response. The OSPR document is a modified version of a document first created by the National Oceanic and Atmospheric Administration, Office of Response and Restoration (OR&R)¹. In May of 2015 the OR&R document was adapted by OSPR and OR&R for use at the Refugio Pipeline Spill in Santa Barbara, California. This was the first use of such a document at an oil spill response in California. That document version has been subsequently revised by OSPR. The OSPR document retains all of the components of the original OR&R version but has been re-formatted in order to replace technological jargon with plain English to accommodate Incident Commanders and others less familiar with Geographic Information System (GIS) specific technical terms. The document addresses the use of a GIS based Common

¹ <http://response.restoration.noaa.gov/>

Operational Picture (COP), specific essential elements of information to be collected, data management, data sharing, requirements for field reporting, data quality control, data file formats, and data archiving. The current OSPR document is designed as a template for regular use by California's State on Scene Coordinator (SOSC), and can be easily filled out and modified to the specific needs of any oil spill response incident.

INTRODUCTION

Data management at an oil spill response has been and is still a continuing challenge. The ubiquity of modern GIS in the Incident Command Post (ICP) has increased on-site data management capability. In order to facilitate and formalize data sharing between the Responsible Party (RP), the State of California, the Federal Government and other Trustee Agencies a template document, customizable to the specifics of any oil spill event, is used by OSPR to assure that all data generated by the response activities are managed and shared equally amongst the document signatories. The problem of isolated pockets of response related data stored where it isn't accessible to the entire GIS unit by contracted workers whom are either unfamiliar with the protocols of the Incident Command System (ICS), including the concept of a Unified Command (a training issue), or just unwilling to provide their data to anyone other than the contracting entity (in most cases the RP) continues to exist. For this reason, and for the benefit of potential RPs and their contractors, OSPR has introduced the Data Management and Sharing Plan document into all major oil spill drills and exercises done in California.

The data management plan addresses two related major issues, the identification by Unified Command of the best data management tool for use during the oil spill response, and the designation of a primary Common Operational Picture (COP) tool to provide situational

awareness both within, and outside of the ICP to those with login credentials. These topics are discussed in detail in the following sections of this paper presentation.

DATA MANAGEMENT AND SHARING PLAN TEMPLATE

As an oil spill response progresses from the first responders on the scene, escalating into an ICP environment, to mitigation of the spill source, and through all response phases until final clean-up endpoints are met, several datasets with spatial content are generated. These data need to be efficiently managed, maintained, and disseminated expeditiously to field responders and the Unified Command for informed decision making. Having a Data Management and Sharing Plan document signed and in place is a necessary priority to be addressed by the Unified Command (UC) in the early days of the emergency response. OSPR has worked with OR&R, Industry and the US Coast Guard, District 11 (USCG) to develop a template Data Management and Sharing Plan that can be modified to the specifics of the response and presented to the UC for approval and signatures. This document provides guidance for managing the data stream from the field, protocols for field data collection (e.g. digital file formats), data sharing, data storage, and data archiving, as well as naming the COP to be used for situational awareness in the ICP and across the broad incident response community. The original NOAA OR&R document was created after the Deepwater Horizon (MC-252) Spill. At the Refugio Incident (2015 pipeline break, Santa Barbara, CA)² this document was modified by OSPR and NOAA to meet the needs of that response.³ As a function of the signed plan all response data were stored on a GIS file server located in the ICP. The RP and other signatories of the document had complete and unrestricted access via direct Ethernet connection. The current OSPR document

² <http://www.refugioresponse.com/go/doc/7258/2522638/>
<https://darrp.noaa.gov/oil-spills/refugio-beach-oil-spill>

³ <https://www.google.com/search?q=refugio+oil+spill+data+sharing+document&ie=utf-8&oe=utf-8>

has been again modified and reformatted by OSPR and Industry to be more easily understood by non-GIS-savvy personal, specifically attorneys and Incident Commanders to whom the introduction of such document has been a point of contention due to technical language.⁴

The key elements of OSPR's Data Management and Sharing Plan document include:

- 1) All signatories of the document are entitled to a complete copy of, not just viewing rights to all operational and environmental raw and processed data generated by or for the emergency response.
- 2) Definition of specific data types included and or exempted.
- 3) All environmental response data will be stored on a GIS file server in the ICP.
- 4) The UC will determine which software application will be designated as the COP to be used for situational awareness within the ICP.
- 5) The OSPR GIS Unit will use NOAA's Environmental Response Management Application (ERMA) to manage all environmental data, providing a remote and secure data backup.
- 6) Specific data delivery formats (e.g., GIS shapefile, Geodatabase, GeoTiff, etc.) are defined in the document.
- 7) This document does not supersede the Documentation Unit Leader's (DOCL) 'Document and Data Management Plan.'
- 8) A complete copy of all GIS data will be given to the DOCL at the time of GIS Unit demobilization from the ICP.

⁴ At the time of this writing there are plans for OSPR, NOAA, USCG, and Western States Petroleum Association (WSPA) to further review and modify the document with the intention of producing a template document agreeable to a Unified Command which can be signed with minimum discussion or debate. This section will be updated if these discussions do indeed occur before IOSC 2017.

CURRENT STATUS OF GIS AND THE COMMON OPERATIONAL PICTURE

All oil spill response processes and operations that have a spatial location can be mapped - the spill point, trajectory model, Shoreline Cleanup Assessment Team (SCAT) segments, skimming operation locations, and address of the Volunteer Information Center are some examples. Geo-location information is easily recorded currently using the Global Positioning System (GPS) capability available with smart phones and other common electronic devices. Spatial location is the core of GIS technology, thus a GIS is the standard for oil spill data management, analysis, storage, and dissemination via paper map, electronic display or digital download.

GIS software, proprietary or open source, is necessary to process the raw field data into GIS files. Common Operational Data (COD) are stored in the ICP on a GIS file server within the GIS unit or in an off-site database accessed by the COP. A COP has been defined as is a computing platform based on Geographical Information System (GIS) technology that provides a single source of data and information for situational awareness, coordination, communication and data archival to support emergency management and response personnel and other stakeholders involved in or affected by an incident (Open Geospatial Consortium, 2015). A COP as defined by OSPR for the purpose of this paper is a spatial data viewer usually accessed from a common web browser. A GIS based COP facilitates convergent data integration, ideally with no proprietary software required. The use of a COP provides situational awareness to all individuals involved in a response both on-scene and at remote locations with proper permissions for access.

There are many COP software applications available through government as well as industry contractors, their capacities range from a very simple map display to a very robust dashboard type viewer. California uses NOAA's ERMA⁵ for environmental data management, planning purposes, and as the COP when necessary. Under the California Data Management and Sharing Plan only one COP will be designated as "official" and will be displayed on the situation wall in the ICP. The use of a non-governmental COP is acceptable as long as that COP viewer accesses the COD from the GIS file server and the GIS Unit has complete access, not just viewing rights to all of the data served on the non-governmental COP. Figure 1 depicts how multiple COPs can work together displaying the same Common Operational Data.

SOUTHWEST ERMA

Southwest ERMA is an online mapping tool for the California region that brings a variety of data together into a single interactive mapping application. ERMA allows quick visualization of environmental conditions and improves communication and coordination for emergency response, response planning, and restoration efforts. Datasets include habitats and natural resources at risk, Area Contingency Plans (proactive plans for dealing with oil spills and environmental disasters), and real-time weather and operational data.⁶ OSPR is collaborating with Industry, OR&R and USCG with the aim to make Southwest ERMA the model and template for a national oil spill planning tool and COP. The OSPR GIS Unit works closely with OSPR's first responders to ensure the information they need for planning and field response is made available in ERMA. OSPR has preloaded Southwest ERMA with response maps, charts, and pertinent information from the three California Area Contingency Plans, see Figure 2. OSPR

⁵ <http://response.restoration.noaa.gov/maps-and-spatial-data/environmental-response-management-application-erma>

⁶ <http://response.restoration.noaa.gov/maps-and-spatial-data/environmental-response-management-application-erma/southwest-erma.html>

now uses Southwest ERMA operationally for oil spill drills and response. ERMA was written using open source software. There are no proprietary software licensing or maintenance fees required. Southwest ERMA is a work in progress and can be accessed on the web through the NOAA OR&R Website⁷. Figure 3 is an example of ERMA in use as the COP from the Refugio Response and of ERMA used as a planning tool for oil spill response.

OPERATIONAL PRACTICE

At recent drills in California the question of what COP to use has been a source of debate. Primarily, release of response data to the general public and control of who sees or has access to the data has been a concern. The introduction of the Data Management and Sharing Plan document has been somewhat contentious. Topics of discussions have included: which software will be used as the COP, where the data will be stored, and who will have access and how. The authors believe that this is due to a lack of understanding of just what the use of the term “Common Operational Picture” truly involves. As an outcome of these recent discussions at drills, OSPR intends to work closely with representatives from the Western States Petroleum Association (WSPA) to further define the term COP and to further refine the Data Management and Sharing Plan document into one that is agreeable and understandable to all parties.

EXPECTATIONS OF A COP FOR USE IN CALIFORNIA

A COP must be accessible to all responders via a network or internet connection, must have a map legend that clearly identifies all map symbols. Map symbols and terminology should be consistent with the three USCG Area Contingency Plans (ACPs) for California⁸. Individual data layers must have assigned accessibility, e.g. ‘responder’ or ‘public’ level (determined by the

⁷ <https://www.erma.unh.edu/southwest/>

⁸ <https://www.wildlife.ca.gov/OSPR/Contingency>

Unified Command or original data provider), the security levels provide the ability to turn on/off individual layers based on specified login credentials. The COP should provide the ability to compose and print simple maps, must support standard GIS file formats (ESRI Shapefile, KML, etc.) and Web Mapping Service Standards (formats include: WMS, ARCGIS REST, GEORSS, etc.). Southwest ERMA provides these services.

DOCUMENT SIGNING AND CONSENSUS

The authors believe that the Data Management and Sharing Plan document can benefit for all stakeholders involved in oil spill response or drill if the document is understood and widely implemented in California. Steps to document acceptance include: further editing the document to facilitate understanding based on comments from UC, presenting the document for signatures at all oil spill responses and drills and working with GIS contractors to implement GIS and technical solutions to using a primary COP and GIS data server.

DISCUSSION

OSPR is currently steadfast in our goal to educate local oil spill responders on how OSPR collects, manages and distributes all environmental data gathered or generated throughout all response phases. OSPR will use ERMA for managing environmental data and as it's COP of choice. OSPR understands that the Unified Command may designate another COP as the main tool for situational awareness display at all meetings and briefings in the Incident Command Post if they choose. The OSPR Data Management and Sharing Plan document defines how information will be equally shared amongst all document signatories. This document does not conflict with the responsibilities of the Documentation Unit Leader (DOCL). Upon completion

of the emergency response, a complete set of data will be delivered to the DOCL for replication and long term storage for legal, analytical, and historical purposes.

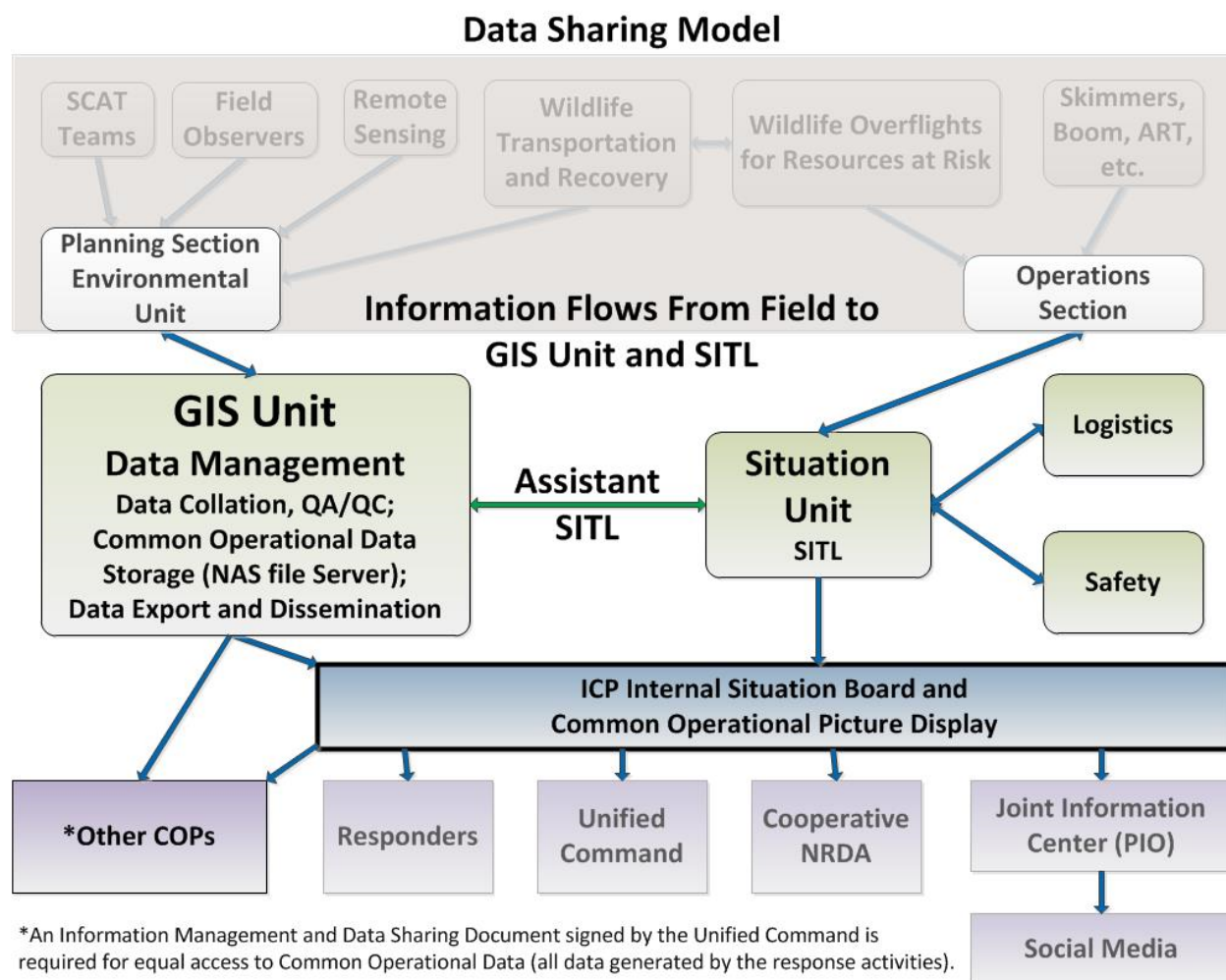


Figure 1. The ideal flow of information from the field through the Planning and Operations Sections to the GIS and Situation Units. Field collected data is verified, digitally processed and stored on the local GIS file server in the ICP. The GIS Unit then posts the data to the COP for dissemination to responders and displayed in the ICP for situational awareness. Other COPs in use remotely must display data accessed from the GIS file server.

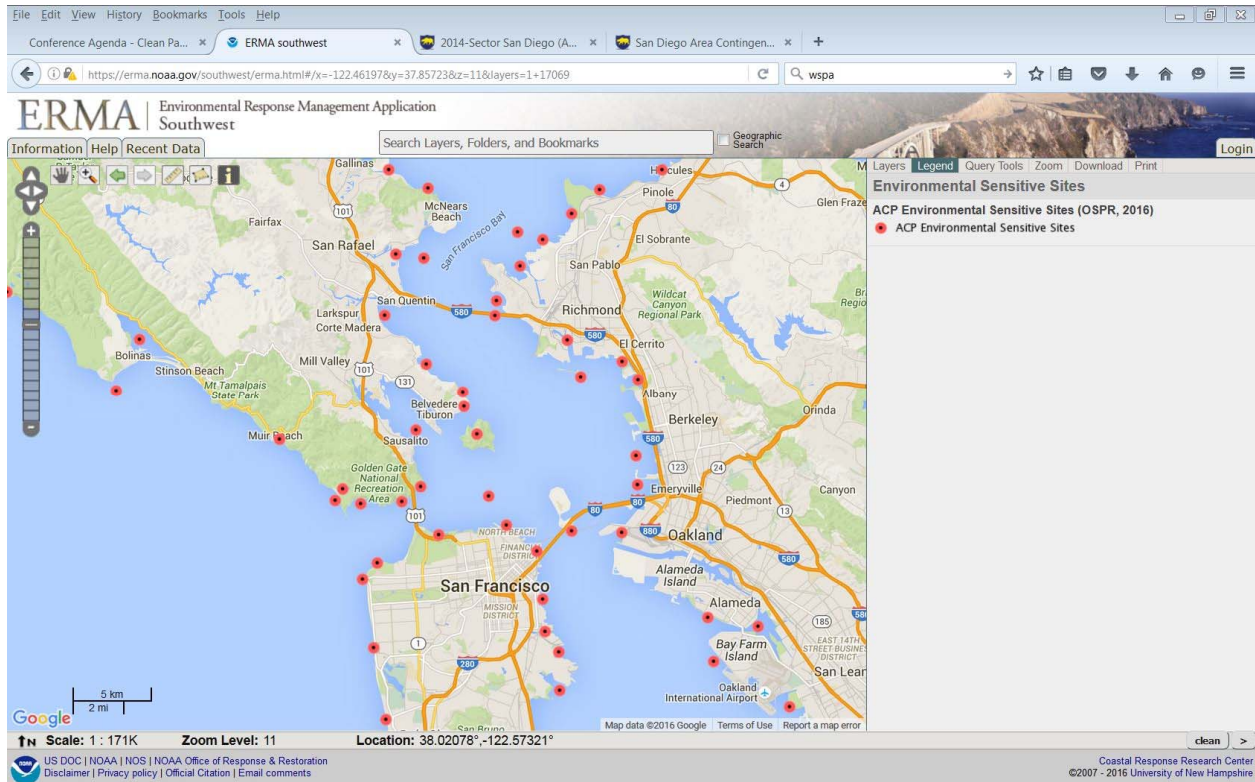


Figure 2. ERMA as an oil spill response planning tool. Depicted are predetermined environmentally sensitive sites in the San Francisco Bay Area. These data are from the Sector San Francisco Area Contingency Plan.

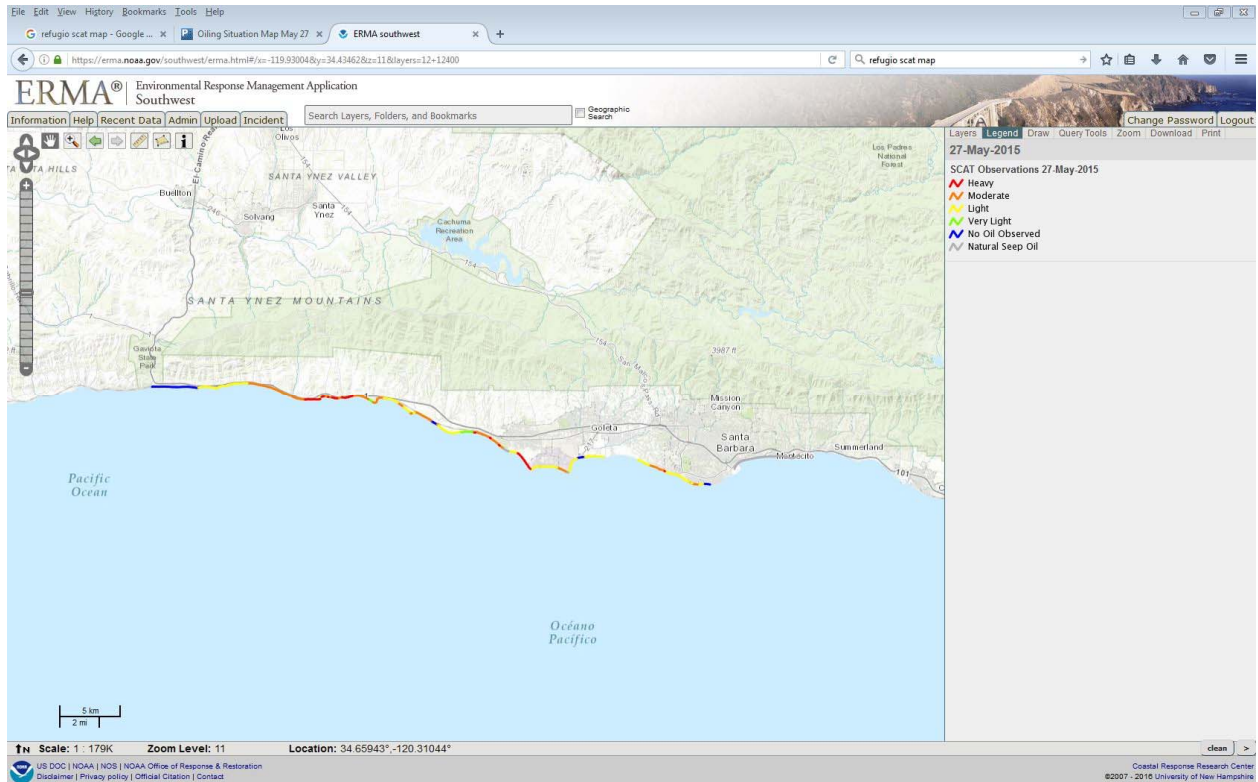


Figure 3. A screen shot of ERMA in use as the COP for the Refugio Pipeline Response in Santa Barbara California in May of 2015.

REFERENCES AND BIBLIOGRAPHY

Open Geospatial Consortium, 2015. OGC IOGP/IPIECA Recommended Practice for a Common Operating Picture for Oil Spill Response, Open Geospatial Consortium.