

Arctic Environmental Response Management Application Final Report

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Lead Organizations: The United States National Oceanic and Atmospheric Administration (NOAA) and Canada.

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Background Information: The purpose of this project was to improve access to critical information on the location of resources needed to respond to oil spills in the Arctic and to develop electronic response infrastructure for use in the Arctic. This project developed circumpolar environmental pollution response capabilities that are critical to protect the unique Arctic ecosystem from oil spills occurring in the region either near shorelines or in the high seas. Decreasing ice cover is expected to open new shipping routes through the Arctic. The *Arctic Marine Shipping Assessment* (AMSA, 2009 Report at p. 5) states: "The most significant threat from ships to the Arctic marine environment is the release of oil through accidental or illegal discharge." It is also believed that much of the planet's undiscovered oil and gas resources exist in the Arctic. This project addresses spill concerns by facilitating access to vital information that will be needed by national governments to effectively respond to a spill in the Arctic.

Project Description and Activities: Arctic Environmental Response Management Application (Arctic ERMA®) was a pilot project under the Arctic Council's EPPR Working Group. The project was officially adopted in 2010 and co-sponsored by the United States and Canada. ERMA is an online mapping tool that integrates both static and real-time data, such as Environmental Sensitivity Index maps, ship locations, weather, and ocean currents, in a centralized format for environmental responders and decision makers. This allows for high-impact and fine-resolution visualization of data for solving complex environmental response and resource issues. As part of the overall ERMA project, baseline datasets have been collected from government sources, private corporations, universities, local entities, and non-governmental organizations. In 2010, ERMA was named as the U.S. federal government's official common operational picture (<http://gomex.noaa.gov>) for the *Deepwater Horizon* oil spill in the Gulf of Mexico. The ERMA development paradigm has shifted as a result of the experiences gained both by working in the Arctic and by implementing a website for the public during the Gulf spill. Rather than focusing internally on the spill response community, today ERMA has become a more holistic tool for all communities to use, including those in remote Arctic areas. The computer code and functionality were transferred from the Gulf of Mexico version of ERMA to the Arctic version (<https://erma.noaa.gov/arctic/erma.html>) and has benefited the EPPR project.

The EPPR project leveraged multiple efforts in which NOAA was already engaged from 2011 - 2013. To identify and gather Arctic-specific data, workshops were conducted in Anchorage, the Northwest Arctic Borough, and the North Slope Borough in Alaska, United States, and in Edmonton, Alberta, Canada. Workshop participants focused on oil spill scenarios that could affect villages in each region, and developed prioritized datasets needed to support planning, response, and natural resource damage assessment work. For further information on the Arctic ERMA workshops and reports, refer to the University of New Hampshire Coastal Response Research Center webpage at <http://crrc.unh.edu/workshops> or refer to Merten *et al.*, 2014.

At the EPPR workshop held in Edmonton, data providers and users were brought together to brainstorm ways to improve and implement the ERMA tool to enhance oil spill preparedness in the Arctic. Participants identified relevant information to incorporate into Arctic ERMA and provide context for potential oil releases. This included oil infrastructure and transportation locations, navigation and hazards data, locations of response equipment and infrastructure, habitat and resources information, ice predictions and conditions, aerial reconnaissance datasets, and human use and economic data. Specific factors, including biological populations, habitats, infrastructure, navigation and communication, response and logistics, physical/chemical conditions, and human dimensions, were addressed, as was the priority for having these data available. If the data existed, their current location, point of contact (POC), and extent (local, national, international) were noted. Data gaps were also identified and prioritized for each scenario.

Common conclusions regarding the use of ERMA included the need for data-sharing agreements to insure accessibility during emergencies, especially for sensitive information, and migrating ERMA to cloud storage infrastructure to optimize bandwidth. Recommended additional features for ERMA included a chat function, embedded videos, POCs for environmental data, translation into Arctic Council Nations and Permanent Participant languages, and geo-referencing response assets. As a result of the Edmonton/EPPR workshop, Canada and the United States have continued to work together to populate and further develop Arctic ERMA.

Arctic ERMA has been refined further through discussions of the data needs and tools for using this tool in very specific scenarios, such as a search, rescue, and salvage incident; a search, rescue, and pollution incident; a fire and spill incident; and a fishing vessel/tanker collision. Each scenario is important for EPPR to consider in its implementation of the *Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Arctic*.

Outcomes:

The outcomes of this project included identification of data sources and priorities for Arctic ERMA and improvement of joint preparedness and response strategies in the Arctic.

The final deliverable is the online mapping tool located at <https://erma.noaa.gov/arctic/erma.html>. Arctic ERMA can also be accessed from the Arctic Council/EPPR website at <http://www.arctic-council.org/eppr>.

In addition, these efforts provided a web-mapping platform to improve access to critical information on the location of resources needed to respond to oil spills in the Arctic and developed electronic response infrastructure for use in the Arctic. A combined mapping platform also enhances the U.S. and Canadian cooperation for preparedness and response activities. Both delegations used ERMA in drills of mutual aid in 2013 and 2014. Arctic ERMA was also used in several other U.S. Arctic drills, including the U.S. Coast Guard's Arctic Shield Technical Evaluations in 2013 and 2014, which improved data sharing, interoperability, and data management. The tool is available for data sharing among Arctic Nations.

Throughout the project, Canada and Norway have been sharing data through the EPPR working group process. Several other Arctic Council activities have been linked with the Arctic ERMA project. Arctic ERMA includes the Arctic Maritime and Aviation Transportation Initiative database, as well as the shipping and incident data from the AMSA 2009 Report. The Arctic ERMA project team has also shared data among ERMA, the Arctic Portal, and the Arctic Spatial Data Infrastructure project (SDI).

Additionally, the need for an Internet-independent version of ERMA was highlighted during each of the Arctic ERMA workshops, including the EPPR workshop. With the help of the U.S. Bureau of Safety and Environmental Enforcement (BSEE), NOAA developed Stand-alone ERMA for the Arctic and remote areas during the timeframe of the project (2013-2014).

Future: Although EPPR has finished this project, NOAA will continue to work with the SDI and other Arctic Council Working Groups to incorporate relevant data into Arctic ERMA. It is intended that Arctic ERMA will be used to support drills planned as part of the *Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Arctic*.

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Further Reference: For more information about the workshops and Stand-alone ERMA, refer to:

Amy A. Merten, Zachary Winters-Staszak, and Nancy E. Kinner. (2014) Incorporating Traditional Knowledge and Subsistence Mapping into the Arctic Environmental Response Management Application. International Oil Spill Conference Proceedings: May 2014, Vol. 2014, No. 1, pp. 1512-1523. <http://dx.doi.org/10.7901/2169-3358-2014.1.1512>