

# Responding to Oil Spills in the U.S. Arctic Marine Environment

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## ABSTRACT

Abstract number 283740: A recently released National Research Council report evaluated the current state of science and engineering regarding oil spill response and environmental assessment of Arctic marine waters, with emphasis on potential impacts in U.S. waters in the Bering Strait and Chukchi and Beaufort Seas. The volunteer committee reviewed research activities and recommended strategies to advance research and address information gaps, identified opportunities and constraints for advancing oil spill research, described promising new concepts and technologies, and assessed the types of baseline information needed to monitor the impacts of an oil spill and to develop plans for recovery and restoration.

## CRITICAL DATA

Historical data do not provide reliable baselines for assessing environmental states, nor can they fully anticipate impacts from factors such as seasonal variation. Monitoring approaches will need to use benchmarks rather than static baselines.

Critical types of benchmark data for oil spill response in the Arctic include:

- Spatial and temporal distributions and abundances for fishes, birds, and marine mammals;
- Subsistence and cultural use of living marine resources;
- Identification and monitoring of areas of biological significance;
- Rates of change for key species;
- Sensitivity of key Arctic species to hydrocarbons;
- High-resolution coastal topography and shelf bathymetry; and
- Measurements of ice cover, thickness, and distribution.



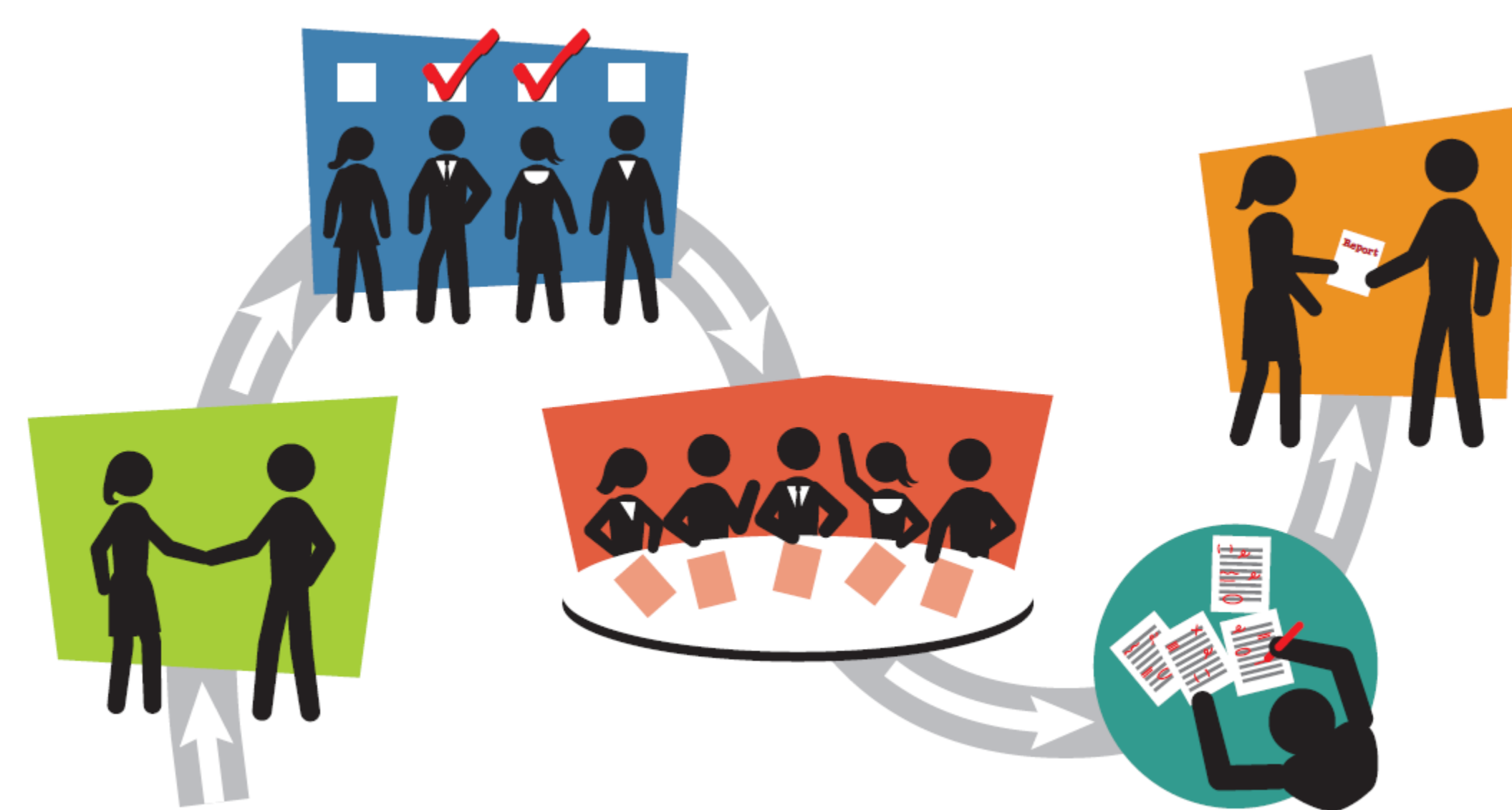
Photo Credit: NOAA.

The release of proprietary monitoring data would increase knowledge of environmental conditions, and bolster the public perception of industry-sponsored research, as would publishing such data in peer-reviewed publications. Where appropriate, communities could also release data that they hold.

Recommendation: A real-time Arctic ocean-ice-meteorological forecasting system is needed and requires robust, sustainable, and effective acquisition of relevant observational data.

Arctic nautical charting and shoreline mapping should be adequately resourced, so that mapping efforts can be initiated, continued, and completed in timescales relevant to anticipated changes.

## NRC COMMITTEE PROCESS

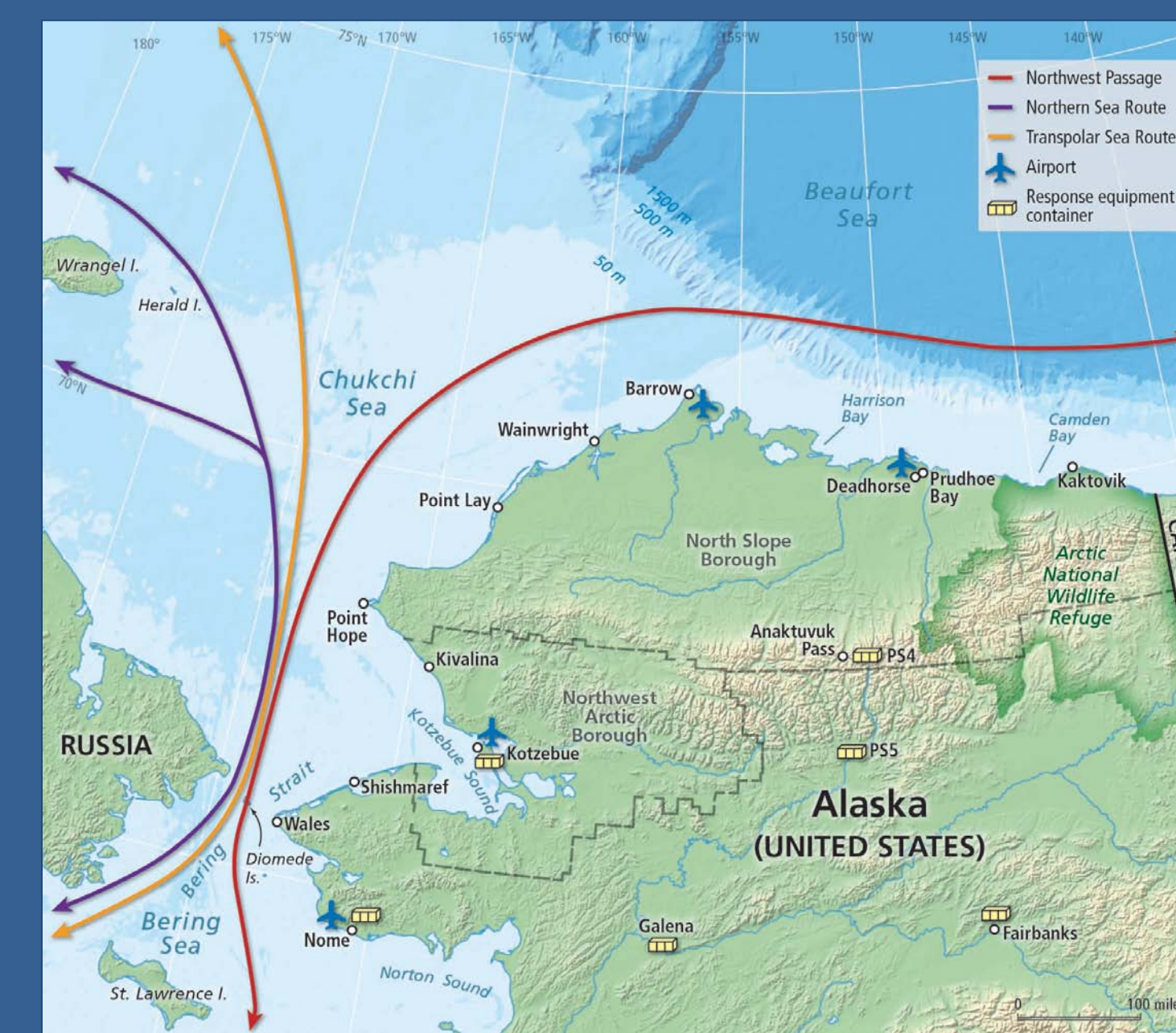


Define Study Charge - Select Committee – Gather Info - Draft Report and Review - Report Release and Dissemination

## OPERATIONS AND LOGISTICS

Marine activities in U.S. Arctic waters are increasing without a commensurate increase in the logistics and infrastructure needed to conduct these activities safely. As oil and gas, shipping, and tourism activities increase, the U.S. Coast Guard will need an enhanced presence and performance capacity in the Arctic. U.S. support for Arctic missions, including oil spill response, requires significant investment in infrastructure and capabilities.

Prepositioning a suite of response equipment throughout the Arctic, including in situ burn and dispersant capability, would provide immediate access to all oil spill countermeasures.



Recommendation: The USCG should expedite its evaluation of traffic through the Bering Strait to determine if vessel traffic monitoring systems, including an internationally recognized traffic separation scheme, are warranted. If so, this should be coordinated with Russia. The USCG should also consider obtaining broader satellite monitoring of AIS signals in the Arctic through government means or from private providers.

The absence of infrastructure in the U.S. Arctic would be a significant liability in the event of a large oil spill.

Recommendation: Infrastructure to support oil spill response should be enhanced in the North Slope and Northwest Arctic Boroughs, with marine facilities for addressing response operations. The scope, scale, and location of infrastructure needs should be determined through structured decision processes, studies, and risk assessments.

Recommendation: Relevant federal, state, and municipal organizations, local experts, industry, and academia should undertake regularly scheduled oil spill exercises designed to test and evaluate the flexible and scalable organizational structures needed for highly reliable Arctic oil spill response.

Recommendation: The USCG will need an enhanced presence and performance capacity in the Arctic, including area-specific training, icebreaking capability, improved availability of vessels for responding to oil spills or other emergency situations, and aircraft and helicopter support facilities. Sustained funding will be needed to increase the USCG presence in the Arctic and to strengthen and expand their ongoing Arctic oil spill research programs.



## REFERENCES

National Research Council, 2014. Responding to Oil Spills in the U.S. Arctic Marine Environment. National Academies Press. [http://www.nap.edu/openbook.php?record\\_id=18625](http://www.nap.edu/openbook.php?record_id=18625).

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## RESEARCH NEEDS

A comprehensive, collaborative, long-term Arctic oil spill research and development program that integrates all knowledgeable sectors and focuses on oil behavior, response technologies, and controlled field releases is needed.

The oil spill response toolbox requires flexibility to evaluate and apply multiple response options, whether on their own or concurrently. No single technique will apply in all situations.

Arctic oil spill R&D needs for improved decision support include:

- Improving methods for in situ burning, dispersants, and herders
- Understanding limits of mechanical recovery
- Investing in under-ice detection and response strategies
- Integrating remote sensing and observational techniques for detection and tracking
- Determining/verifying hydrocarbon biodegradation rates
- Evaluating the toxicity of dispersants and chemically dispersed oil on key Arctic marine species



Photo Credit: USCG

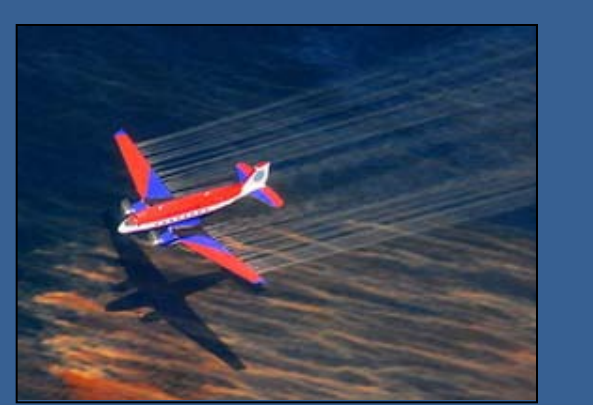


Photo Credit: USCG

A systematic program of carefully planned and controlled field experiments that release oil in the U.S. Arctic is needed to advance understanding of oil behavior and response options.

Recommendation: Dispersant pre-approval in Alaska should be based on sound science, including research on fates and effects of chemically-dispersed oil in the Arctic environment, experiments using oils that are representative of those in the Arctic, toxicity tests of chemically-dispersed oil at realistic concentrations and exposures, and the use of representative microbial and lower-trophic benthic and pelagic Arctic species at appropriate temperatures and salinities.

Recommendation: Priorities for oil spill research should leverage existing joint agreements and be addressed through a comprehensive, coordinated effort that links industry, government, academia, international and local experts and non-governmental organizations.

## COMMUNITY INCLUSION

Recommendation: The USCG and ADEC should develop an oil spill training program for local entities so as to develop trained response teams in local villages. Industry should continue to participate in local training initiatives. Local officials and trained village response teams should be included in the coordinated decision making and command process during a response event. Input from community experts should be actively solicited for inclusion in response planning.

## SPONSORS

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