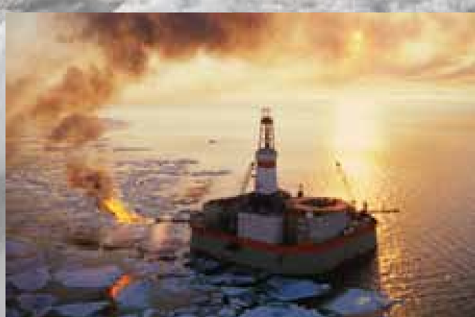
POLICY RECOMMENDATIONS

Oil Spill Prevention and Response in the U.S. Arctic Ocean

THE PEW ENVIRONMENT GROUP

OIL SPILL PREVENTION AND RESPONSE IN THE U.S. ARCTIC OCEAN:
Unexamined Risks, Unacceptable Consequences
Policy Recommendations by the Pew Environment Group[1]

The BP Deepwater Horizon oil spill in the Gulf of Mexico graphically illustrated the risks of offshore oil and gas drilling and the need for better prevention and response systems. The largest blowout and spill in U.S. history, which began with an explosion and fire April 20, 2010, released at least 50,000 barrels a day for three months for a total of at least 205 million gallons (4.9 million barrels). This disaster clearly exceeded the limits of existing technologies for stopping a well blowout, as well as the strategies to contain and clean up marine oil spills. The Gulf of Mexico—with its temperate waters, proximity to large population centers and ready access to necessary infrastructure and response resources—has some of the best conditions in the United States for offshore oil spill response. Yet even with these advantages, the spill response proved to be woefully inadequate. This was in large part due to lax oversight and inadequate environmental analysis, spill containment, response preparedness and assessment of risks.

Offshore oil and gas drilling plans are being considered for perhaps the most remote and extreme part of the U.S. outer continental shelf (OCS): the Arctic Ocean. The northernmost portion of the OCS, the Arctic Ocean is characterized by a demanding and challenging physical environment. Sea ice is present most of the year, and the sun does not rise for two months in winter. Extended periods of heavy fog, freezing temperatures and weeklong storms approaching hurricane strength are not uncommon. These harsh and icy conditions have, until now, been a barrier to industrial activity.

Figure 1. Arctic Sea Ice *(Photo: Patrick Kelley/USCG)*—Arctic Sea Ice is characterized by the presence of sea ice for much of the year and is important in structuring Arctic marine ecosystems.

1 This document provides policy recommendations and a summary of the findings of the accompanying technical report. Factual statements herein are taken from the technical report, which provides further details as well as full citations for all sources of information. Although the recommendations included herein are directed toward offshore oil and gas drilling in the Arctic Ocean, some of the recommendations address issues that arise throughout the U.S. outer continental shelf. For the accompanying technical report, *Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences,* scientific peer review was conducted by three experts in oil spill response, oceanography and Arctic marine ecology. This review informed the development of these policy recommendations.

The Arctic Ocean's coastal villages are remote, with no connecting roads. No airports or ports along the coast are capable of supporting the influx of equipment and personnel that would be required to respond to a catastrophic oil spill.

Although it is defined by its extreme conditions and remote location, the Arctic Ocean is ecologically important, with phytoplankton, ice algae and copepods underpinning the region's marine food web. It supports a variety of iconic marine mammals such as bowhead whales, walrus, polar bears and ice seals, which are well adapted to the area's conditions and are found nowhere else in the United States. Millions of birds and various species of whales migrate great distances to the Arctic each year. More than 100 species of fish—including Arctic cod, capelin, herring and saffron cod—are found there. Indigenous communities along the coastline depend upon a healthy Arctic marine ecosystem to support the many species at the heart of their subsistence way of life.

Figure 2. *(Photo: Stephanie Sell)*—Ringed seals live in Arctic waters and are generally found with drifting sea ice. Scientists are concerned about how the loss of sea ice will impact them.

Although we know that the Arctic Ocean's ecosystems are unique, we have incomplete scientific information on many of its species and little understanding of how its ecosystems function. Compounding that lack of information is the unprecedented change that the Arctic Ocean's climate is undergoing. The loss of sea ice during summer is fundamentally altering the way Arctic ecosystems function in ways that are unknown and unpredictable. Climate change is warming the Arctic at twice the rate of the rest of the planet, decreasing ice coverage and opening up the possibility for offshore drilling at the same time that marine fish and wildlife are undergoing a great deal of stress from these rapid changes.

Figure 3. *(Photo: Henry Huntington)*—The North Slope in February. Its extreme environment could make oil spill response much more challenging.

The extreme physical environment and remote location and the unpredictable effects of climate change mean that the risks, difficulties and unknowns of oil exploration and development are far greater in the Arctic than in any other U.S. ocean area.

Industry and government plans for oil and gas exploration and development in the Arctic Ocean have been rushed, relying on a cursory environmental analysis of the potential impacts of a catastrophic oil spill. They also rely on inadequate and unproven oil spill response plans and techniques. These plans have been pushed forward despite the lack of information on Arctic marine ecosystems and the effects of climate change and a lack of understanding of the impacts that oil and gas drilling would have on the Arctic Ocean's unique species. Government officials have not fully analyzed the risks of a catastrophic oil spill in the Arctic or the existing capacity to respond to such a spill, nor have they enacted requirements focused solely on spill prevention and response in the Arctic.

To shed light on these unique challenges, the Pew Environment Group commissioned a technical report, prepared by the Nuka Research and Planning Group and Pearson Consulting, to examine the risks and potential consequences of an oil spill in the Arctic Ocean. "Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences" identifies the need for additional research on Arctic marine ecosystems and oil spill response techniques, risk assessments and prevention measures that reflect Arctic conditions. Based on the report's technical analysis, the Pew Environment Group recommends reform of the federal government's approval and oversight of Arctic Ocean oil and gas activities in four areas:

1. ***Federal resource management agencies must complete a comprehensive science plan, including research and data collection on the Arctic marine environment, before oil and gas exploration and development proceed.***

2. ***Oil spill risk assessments and spill prevention technologies must reflect Arctic conditions.***

3. ***Spill response must be tailored to Arctic conditions, and response planning standards must be strengthened.***

4. ***Review and oversight of oil and gas drilling must be enhanced.***

Implementing recommendations across these four areas would provide the government with a basis for determining whether, when, where and how to responsibly conduct oil and gas activities in the Arctic Ocean. These reforms would go a long way toward ensuring that oil and gas activities have the least possible impact on the Arctic marine environment and the region's subsistence-based indigenous communities.

Significant time and resources will be necessary to effectively address the issues identified in these recommendations and the technical report. But with so much at stake in one of the world's most iconic and fragile ocean environments, it is responsible to adopt a precautionary approach to oil and gas drilling.

We must heed the lessons of the Deepwater Horizon blowout and proceed with careful, inclusive planning and decisions based on sound science. At present, offshore oil and gas drilling in the Arctic Ocean cannot be undertaken with any level of assurance that the marine environment can be protected from a spill or that industry can respond effectively. All proposed oil and gas activity should be suspended until the issues identified in the recommendations below are addressed through regulations or legislation.

RECOMMENDATIONS

1 Federal resource management agencies must complete a comprehensive science plan, including research and data collection on the Arctic marine environment, before oil and gas exploration and development proceed.

The Arctic Ocean is among the least understood places on Earth. We have limited information on some Arctic marine species, but much is not known or understood about the larger ecosystem. For example, we know very little about how the Arctic marine food webs work, and we have an incomplete understanding of most of the species that inhabit the Arctic Ocean. Complicating this lack of basic information about species and ecosystems is the rapid and profound environmental transformation that is occurring in the Arctic as a result of climate change. The loss of sea ice during the summer is fundamentally altering the way the Arctic marine ecosystems function. Without a thorough understanding of Arctic marine species and ecosystems, and of the shifts that are occurring because of climate change, it is impossible to accurately assess the impacts of offshore oil and gas drilling or to develop a viable plan to respond effectively to a major oil spill.

To prevent and prepare for oil spills in the Arctic Ocean, decision makers need complete information on the physical environment and the unique challenges it poses to offshore oil and gas drilling. They also need to understand the effect of drilling and oil spills on marine ecosystems. A prediction of the impacts of spilled oil in Arctic waters must take into account the behavior of oil in an environment with sea ice, the varying characteristics of sea ice throughout the year, Arctic weather conditions, the long-term fate of oil in cold water and the specific vulnerabilities of Arctic marine species and ecosystems. A comprehensive science plan and ecosystem assessment are needed for the U.S. Arctic to improve our knowledge of the environmental conditions and marine ecosystem structure and function to help decision makers avoid irrevocable impacts on the Arctic environment and its people's subsistence way of life.

An independent science gap analysis should be completed for the Arctic Ocean. Before leaders can make informed decisions about oil and gas activities, an analysis must be completed to assess current scientific information, identify gaps in our understanding of Arctic marine ecosystems and define the research that will be necessary to fill those gaps. That assessment should, at a minimum, identify the specific research needs related to species, weather and ice conditions, and the behavior of oil in Arctic waters.

Figure 4. *(Photo: Brad Benter/USFWS)*—Walrus move seasonally, with the sea ice. The population size of many marine mammals remains unknown, and changing conditions make it even more difficult for researchers. Scientists are still working toward getting an estimate for walrus in the U.S. Arctic.

The U.S. Geological Survey (USGS), at the direction of Interior Secretary Ken Salazar, is conducting an evaluation of science gaps related to OCS oil and gas development in the Beaufort and Chukchi seas. The USGS report is a good first step toward assessing the scientific gaps in knowledge, but it should undergo review by the public and by an independent science panel or organization, such as the National Research Council, to ensure that the gap analysis is thorough and scientifically defensible.

Ecologically sensitive areas must be identified and protected. Areas within an ecosystem are not equal in biological and ecological terms; some areas are more important than others to the ecosystem or human populations. Identification of important ecological areas (IEAs), based on essential habitats and functions in the Arctic ecosystem, along with traditional cultural activities, can be an important step toward protecting traditional-use areas and critical habitats and ensuring ecosystem functionality. A comprehensive science plan for the Arctic Ocean should include identification of IEAs, which should be mapped and incorporated into decisions about where and when offshore drilling can occur. The most ecologically sensitive areas in the Arctic Ocean should be removed from the leasing process.

In addition, Arctic coastal areas require more detailed environmental sensitivity index (ESI) mapping. ESI maps are a critical component of oil spill contingency planning and response in that they identify the most biologically productive areas of coastal shoreline that are used by marine species and/or people where resources should be directed first. Existing ESI maps for the Arctic are outdated and at a scale that is too coarse. To be an effective planning tool, the maps must be updated to include more detailed information.

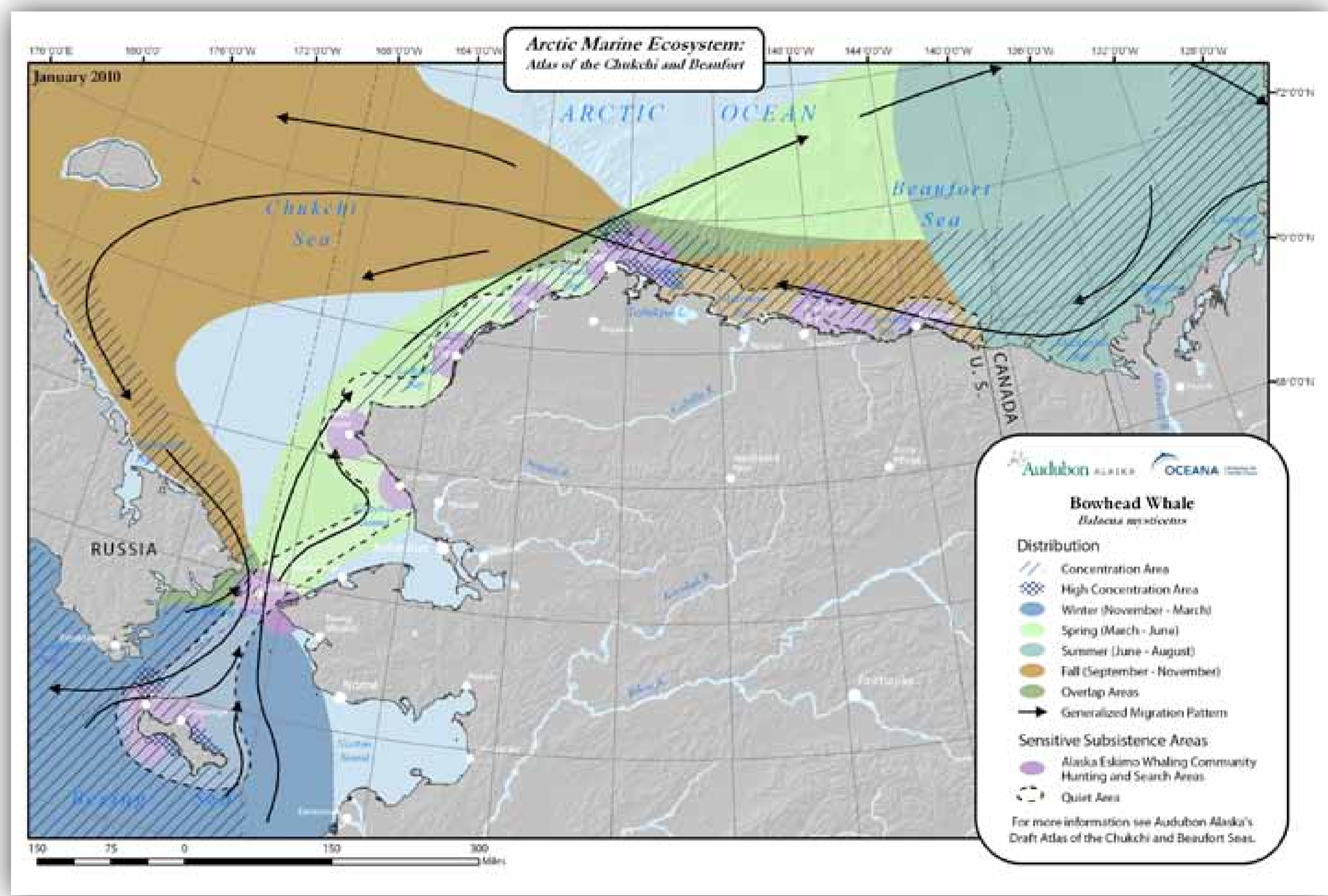


Figure 5. Bowhead Whale Migration Route *(Image: Audubon Alaska in coordination with Oceana)*—The bowhead whale is the only baleen whale that does not migrate to temperate waters and lives year-round near the sea ice.

Decision makers should incorporate traditional knowledge into Arctic research.
Communities along Alaska's Arctic coastline have followed a subsistence-based lifestyle in a physically challenging and ecologically rich region for millennia. To survive, residents have had to hone and share detailed knowledge about the region's species and conditions. This traditional knowledge should accompany research to aid the Western scientific understanding of the Arctic marine environment. Scientists' use of traditional knowledge has been rising, but a great deal more can and should be done to take advantage of and incorporate this information in research activities and management decisions. For example, a local observation and monitoring network could draw on the presence and expertise of the many hunters using the Arctic coastline who are likely to be the first to see new species, changes in existing species and other forms of ecosystem change. In the documentation of existing knowledge and the gathering of new information, those who have that knowledge should be involved throughout the research and management continuum to help analyze, interpret and apply that knowledge appropriately, in conjunction

with Western scientific findings and other relevant information. Key entities and agencies with experience in this area include the North Slope Borough Department of Wildlife Management, the Northwest Arctic Borough Planning Department, and the co-management marine mammal commissions.

Increase research funding and coordination. In addition to the need for a plan to identify ecosystem information gaps, there is also a need for a comprehensive approach to funding and oversight of science and research in the Arctic Ocean. Dedicated funding from the Oil Spill Liability Trust Fund could provide the resources needed to complete necessary research and also provide continuing funding for monitoring of species and the effects of climate change. Agencies must work together to share expertise and resources. They should also recognize and incorporate the wealth of knowledge from partners such as the North Slope Borough Department of Wildlife Management, the Alaska Ocean Observing System, the co-management marine mammal commissions and the University of Alaska, among others.

2 Oil spill risk assessments and spill prevention technologies must reflect Arctic conditions.

Risk is a product of probability and consequence. Understanding the oil spill risks associated with oil and gas drilling requires the ability to predict the probability of an oil spill and then anticipate its potential adverse consequences. Spill scenarios may range from a catastrophic well blowout to smaller spills from a pipeline, tank or vessel. Very large oil spills and well blowouts are low-probability events, but the consequences can be disastrous. Most of the planning in the Arctic Ocean has assumed that the probability of an oil spill is extremely low, based on data from other regions of United States. To reduce the potentially catastrophic impacts of oil spills from oil and gas drilling in the Arctic Ocean, a comprehensive risk assessment is needed that provides a complete picture of the types of spills that may occur and their potential impact on the Arctic environment. Specific measures must then be adopted to reduce the probability and impact of a spill. Useful risk assessments will require understanding of how and where spills might occur and how the timing, size and location of spills could affect the Arctic ecosystem in the short and long term.

An Arctic Ocean-specific risk assessment must be prepared. Because oil exploration and production in the Arctic Ocean have been limited, estimates of possible well blowouts in the Arctic have been based on data from temperate spills in the Gulf of Mexico (before the Deepwater Horizon spill). These estimates, however, have failed to adequately assess the extent to which the Arctic environment could change the equation. Arctic conditions, such as dynamic ice cover, freezing temperatures, reduced visibility (from fog or darkness), high winds and sea states, and extreme storms add to the probability of an accident or error that might cause a spill. These factors must be incorporated into estimates of future oil spill probability. Likewise, the potential consequences of an oil spill to the Arctic ecosystem can be estimated only after better baseline science is developed. The area's sensitivity to oil spills, based on geography, season, ice conditions, and life stages of key organisms, must be better understood. To estimate how various spill scenarios might affect the Arctic ecosystem, trajectory models must have the capability to predict how oil spilled in ice-infested Arctic waters will behave. At this point, if a major oil spill were to occur in the Arctic Ocean, there would be no way to reliably estimate where the oil would travel or what the short- and long-term impacts would be.

Figure 6. *(Photo: NOAA/ESRL)*—A storm brews in the Arctic, top. *(Photo: Patrick Kelley/USCG)*—Low-lying clouds.

A sound risk assessment will require a realistic estimate of the frequency of oil spills in the offshore Arctic and a complete understanding of ecological vulnerabilities and environmental sensitivities. It must also include realistic assessments of the potential impacts from catastrophic blowout scenarios in a range of seasons and conditions.

There are several established methodologies for conducting oil spill risk assessments. One instructive example is a project on shipping being conducted by the state of Alaska and the U.S. Coast Guard in the Aleutian Islands using a methodology suggested by the National Academy of Sciences. A similar process should be conducted in the Arctic Ocean for oil and gas operations.

Spill prevention technologies must address Arctic-specific risks. After an analysis of how Arctic conditions affect the likelihood of oil spills and the impact of these spills on the environment, appropriate spill prevention measures should be identified. Measures should include restricting drilling in certain locations or imposing seasonal drilling restrictions. Prevention technologies should include redundant engineering controls such as multiple blowout prevention systems, on-site blowout containment structures and double-walled pipes or tanks. Finally, vessels and other equipment operating in the Arctic must meet appropriate engineering standards, carry additional equipment and adhere to precautionary procedures to reduce the probability of spills. To the extent that engineering standards and equipment designed for Arctic conditions do not exist, they must be developed before drilling is approved.

3 Spill response must be tailored to Arctic conditions, and response planning standards must be strengthened.

Even under ideal conditions in populated regions with temperate climates, cleaning up an oil spill in open water is challenging. It requires simultaneous efforts to stop the spill, contain the oil and remove as much of it as quickly as possible from the water. The Deepwater Horizon cleanup enlisted thousands of people, more than 3 million feet of containment boom, millions of gallons of dispersants and more than 6,500 vessels. An oil spill in Arctic waters would be considerably more challenging. Standard oil containment and recovery techniques may be constrained or ineffective because of ice or weather conditions. In addition, oil lasts longer in Arctic waters because it evaporates more slowly or may be trapped in or under ice. Moreover, the infrastructure to support an effective containment and removal response effort is limited. Consequently, an oil spill in the U.S. Arctic Ocean could be devastating to the environment and to the people who depend on it for their subsistence.

Oil spill response systems and technologies are unproved in the Arctic Ocean. Of the three response options available, all face limitations in Arctic conditions and may harm marine species. There are very narrow conditions in which mechanical recovery, in-situ burning and dispersants can be used in Arctic waters.

Mechanical recovery, the industry's primary response system, employs skimmers, booms, boats and personnel to collect and remove oil from the surface. The equipment is most effective in open water; in broken ice conditions, with ice concentration as low as 10 percent, the efficiency of mechanical recovery falls significantly. This method depends heavily on the ability of personnel to position boats, booms and skimmers and is susceptible to shutdown if any of these factors is affected by poor visibility, dense fog, high sea states and/or freezing temperatures.

In-situ burning is the industry's secondary response technique. Small-scale trials have shown that it may work in a variety of ice conditions; however, burning oil in sea ice requires that the slick be thick enough to ignite, and burning is not safe or feasible in high winds. In addition, in-situ burning creates toxic smoke and leaves behind oily residue that is difficult to recover and can harm marine species. Moreover, in higher ice concentrations, thick slicks are likely to occur in the open leads or polynyas between solid ice. These interfaces between ice and water are ecologically vital; the impact of an oil spill would be widespread on a range of species, from phytoplankton at the base of the food chain that live on the underside of the ice, to marine mammals that surface and breathe at these openings.

Chemical dispersants are still relatively untested in the Arctic Ocean, and many questions remain about their use in ice-infested waters. Dispersants become less effective in conditions such as those in the Arctic: reduced water temperatures, presence of sea ice and bad weather. Very little is known about the toxic effects of dispersants on marine organisms and communities. Furthermore, no studies have examined the effect of subsea dispersant application; the Deepwater Horizon spill was the first use of this tactic. In addition, dispersant application is limited by environmental conditions and weather, and aerial applications require low wind and good visibility. For these reasons, dispersants have not been preapproved for use in the Arctic Ocean.

Figure 7. *(Photo: SINTEF)*—SINTEF JIP controlled study with pre-positioned booms and response.

Current industry spill response plans are based on small-scale laboratory and field trials that have been extrapolated without large-scale verification. The Joint Industry Program (JIP) recently completed testing on oil spill response in broken ice conditions, but these tests, conducted in the Norwegian Barents Sea, did not include the logistical and operational constraints associated with day-to-day operations in the U.S. Arctic Ocean. A given technology may work well under controlled conditions in which preplanned tests eliminate real-world variables such as detection and containment of oil and mobilization of required equipment and personnel within the window of opportunity for effective treatment. These controlled trials provide critical information, but they do not demonstrate effectiveness or feasibility.

Response plans must include relief wells and other containment options. During an oil spill, stopping the flow of oil as quickly as possible is critical to minimizing environmental damage. For offshore drilling operations, the two methods for controlling a blowout are drilling a relief well and installing a containment structure. These options must be tested and ready for immediate deployment to avoid a blowout as long as the Deepwater Horizon incident, and they must be proved effective in Arctic conditions.

Spill response plans should require that industry is able to quickly deploy an alternative drill rig to immediately begin drilling a relief well, which must be completed before the end of drilling season, when sea ice forms. Canada has adopted such a policy, called same-season relief well capability. The policy requires companies to have the resources and personnel available in advance and to demonstrate that a relief well can be drilled within a specific time frame. In the Arctic, this might mean that exploration or production drilling should not occur late in the season if a relief well cannot be completed before ice precludes drilling activity.

Spill response plans should also include a requirement that companies have a prefabricated containment structure, demonstrated to work at the well location, before beginning exploration or production drilling. The structure and necessary resources or personnel would have to be available for immediate deployment.

Figure 8. *(Photo: Collection of Pablo Clemente-Colon, chief scientist, National Ice Center)*—Icebreaker navigates through heavy fog.

A response gap analysis must be prepared by responding agencies. In light of the questions regarding the effectiveness of oil spill response methods in Arctic conditions, a response gap analysis must be conducted. The purpose of this gap analysis (distinct from the research gap analysis) is to quantify the limit at which environmental conditions (temperature, wind, sea state, ice, visibility) preclude response and to calculate the frequency with which those conditions typically occur in the Arctic Ocean. This information will define the effectiveness of each spill response method in Arctic waters.

The analysis must be conducted by the agencies with responsibility for response: the U.S. Coast Guard (USCG), the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). Such an analysis will help to define additional preventive measures, including seasonal drilling limits, which must be in place during times when an oil spill could not be contained or cleaned up.

Infrastructure gaps must be assessed and addressed. Because of its remote location and harsh environment, the Arctic Ocean's Alaskan coast has widely scattered communities and few year-round residents. Transportation, communication, equipment storage and deployment infrastructure are nonexistent or extremely limited. If a catastrophic oil spill were to occur, days or weeks could pass before response personnel and assets could be mobilized and deployed. The nearest USCG station is nearly 950 air miles away, and the closest major port is Dutch Harbor, 1,300 miles away.

Figure 9. *(Image: Nuka Research and Planning)*—**Distance from Barrow, Alaska (in U.S. Arctic Ocean), to nearest major port (Dutch Harbor) and nearest Coast Guard air station (Kodiak)**

Limited air access makes quick transportation of response equipment impossible, and storage and housing to mount an adequate response effort do not exist, especially in the Chukchi Sea, where lease sites are up to 150 miles from shore. The lack of infrastructure for a major oil spill response is a limiting factor in the Arctic that has not been addressed effectively. A comprehensive assessment of infrastructure needs must be conducted by the Department of the Interior (DOI) in coordination with the USCG, NOAA, and state and borough governments. Strategies to address these infrastructure gaps must be put in place before oil and gas development in the Arctic Ocean can proceed. The USCG's pending high-altitude study should inform this effort.

Spill trajectory models based on Arctic conditions must be developed. Because accurate models of movement of oil in sea ice do not exist, it is impossible to accurately project oil spill trajectories for the U.S. Arctic Ocean. This information is critical to the development of an effective oil spill contingency plan.

Worst-case scenarios must be based on actual conditions. Oil spill contingency plans are based on worst-case discharge scenarios. To be effective planning tools, such scenarios should be based on actual well flow data. Currently, worst-case projections in the Arctic are based on unsupportable well flow assumptions that minimize the potential effects of an oil spill and skew decisions about whether and how to approve exploration or development activity. Moreover, using an inaccurate flow rate will lead to a response plan that may be insufficient to address an actual worst-case spill.

In areas such as the Chukchi Sea, where actual flow rates are unknown, spill plans assume a flow rate of 5,500 barrels of oil a day. This assumption, an average developed by the state of Alaska, is not based on well pressure information from wells in the surrounding region or on known geophysical data. A worst-case scenario based on this assumed flow rate can seriously underestimate the size of a spill and its impact. Rather than relying on an unsupported flow rate, the federal government should require that estimated flow rates be based on available information. Drillers must collect sufficient geophysical and offset well data to estimate subsurface well pressures before drilling can safely begin. Flow rates can be estimated using this and any other available data, and DOI must maintain the technical engineering expertise necessary to verify the accuracy of these rates. More accurate estimates of well flow rates will ensure that worst-case scenarios do, in fact, estimate a worst-case spill. Accurately predicting a worst-case spill is critical to determining whether and under what conditions drilling can occur, and to ensuring that adequate response capability is in place.

Worst-case discharge volume estimates should also factor in the time required to stop the blowout. The flow rate (in barrels per day) must be multiplied by the number of days required to stop a discharge. The Deepwater Horizon blowout continued for three months, and other blowouts have lasted longer. Yet most Arctic Ocean oil spill contingency plans consider a duration of only 30 days or less, severely underestimating the total volume of oil that could be spilled and the corresponding spill response resource needs and environmental impacts.

Response planning standards must be strengthened. Oil spill contingency plans must meet a number of statutory and regulatory planning standards for how a response would be conducted, but there is no performance standard requirement. Regulations do not require industry to demonstrate that its response plan will work in real-world Arctic conditions, that response equipment can be deployed immediately and that chosen equipment can in fact remove oil from the environment and meet an acceptable performance target. Instead, current plans are paper exercises with no process to verify that they will work. A response planning standard should be adopted requiring industry to define the amount of oil that could be released during a catastrophic oil spill. Additionally, industry must be required to demonstrate in detail that adequate equipment, personnel and resources—and contracts to immediately deploy them—are in place and ready to respond to a catastrophic spill.

Spill recovery and cleanup assumptions must be questioned, verified and amended as necessary before DOI approves a response plan. The approved spill response plan for Shell Oil's Arctic exploration drilling assumes 90 percent open-water recovery of oil under a worst-case spill scenario, despite the well-accepted fact that recovery under the most optimal conditions averages about 20 percent.

Response standards must clarify that removal of oil is the priority of spill response. The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) defines the term "remove" to include actions to minimize or mitigate damage to public health or the environment. Mitigation, however, is a separate response method and should not be considered to be a means of removal. Merging mitigation into a definition of removal can lead to dependence on cheaper mitigation methods rather than employment and refinement of removal techniques.

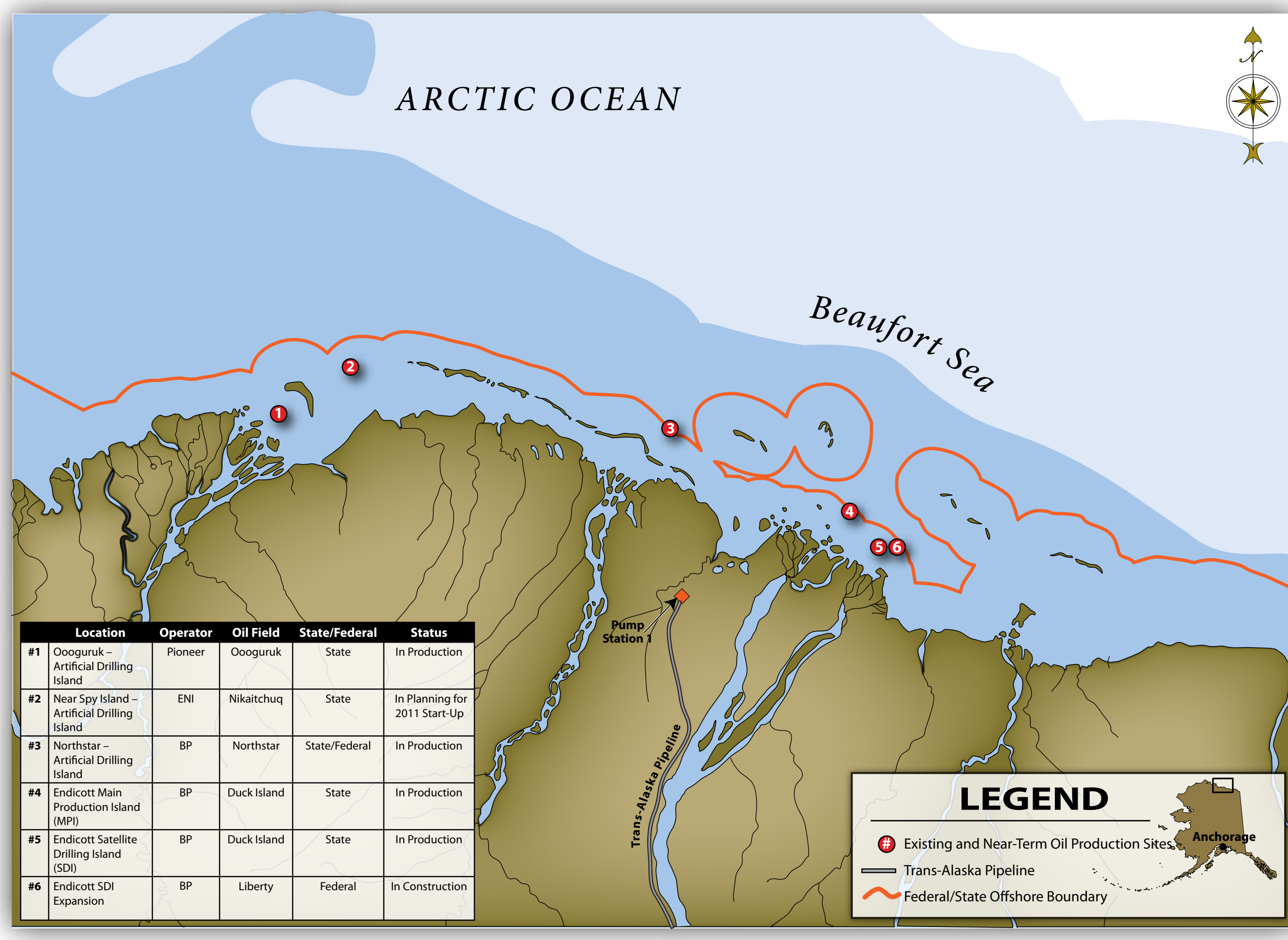
Independent third-party review of contingency plans is perhaps the best way to ensure that effective planning standards are met. In addition, contingency plan requirements should be audited regularly for ongoing compliance during the period of exploration and/or production.

4 Review and oversight of oil development activities must be enhanced.

Historically, little offshore oil and gas activity has occurred in the U.S. Arctic Ocean. The Bush administration greatly expanded the area available for leasing, however, increasing it from 9 million to 69 million acres. This rapid expansion of activity occurred without a clear understanding of Arctic conditions and ecosystems, the region's subsistence-dependent communities and the effect of rapid climate change on the region.

Lax oversight of the oil and gas industry, a factor in the Deepwater Horizon catastrophe, has been repeatedly acknowledged in government reports issued before and after the Gulf spill. Included are reports from DOI (May 25 and Sept. 1, 2010) and its inspector general's office (Sept. 10, 2008); the House Committee on Oversight and Government Reform (Oct. 7, 2009); and the Government Accountability Office (April 8, 2010). Strong oversight of offshore oil and gas drilling is a critical measure for preventing oil spills and ensuring that the impact of any spill is minimized.

Review and oversight of oil development activities must be objective. Review of oil exploration and development plans and permits must be free of undue influence from industry. Federal employees must assess risks objectively and challenge unrealistic assumptions from industry to ensure protection of public resources. Considerable attention has focused on the decision-making culture within DOI and the extent of influence that industry has exerted over the agency charged with regulating its activities and protecting public resources. The culture and approach of the former Minerals Management Service (MMS)—now BOEMRE—must change.



	Location	Operator	Oil Field	State/Federal	Status
#1	Oooguruk – Artificial Drilling Island	Pioneer	Oooguruk	State	In Production
#2	Near Spy Island – Artificial Drilling Island	ENI	Nikaitchuq	State	In Planning for 2011 Start-Up
#3	Northstar – Artificial Drilling Island	BP	Northstar	State/Federal	In Production
#4	Endicott Main Production Island (MPI)	BP	Duck Island	State	In Production
#5	Endicott Satellite Drilling Island (SDI)	BP	Duck Island	State	In Production
#6	Endicott SDI Expansion	BP	Liberty	Federal	In Construction

Figure 10. Existing Production

Structural and regulatory changes DOI has undertaken to reform management and enhance oversight of industry are a step in the right direction. However, additional standards must be adopted, and the organizational changes and ethics reforms included in legislation proposed by Congress should be passed.

Review and oversight of oil development activities must involve all relevant agencies. BOEMRE cannot continue operating in a "silo," as MMS did for many years. In particular, NOAA, which has resource protection responsibilities for Arctic marine species under the Marine Mammal Protection Act, the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act, should have a greater role in making initial decisions about whether, when, where and how oil and gas development activities can occur.

NOAA should have a substantive role in the preparation of five-year oil and gas leasing programs as well as oil spill response plans. Specifically, NOAA should conduct a comprehensive analysis on the functioning of the Arctic ecosystem and species that could be affected by oil development. NOAA should also engage more fully in permitting and environmental analysis decisions under the National Environmental Policy Act.

The USCG, the on-scene coordinator and lead agency for response, should play a meaningful part in identifying how oil and gas drilling in the Arctic Ocean proceeds. The USCG should have joint authority (with BOEMRE) to review oil spill response plans. Currently, the USCG is responsible for reviewing oil spill response plans for vessels but has not been actively engaged in the review of plans for offshore facilities. It is illogical to treat vessels and facilities differently and to make the USCG responsible for spill response but not formally involved in response planning or spill prevention for facilities. The U.S. Fish and Wildlife Service (USFWS), the USGS and the EPA should also be involved in decisions affecting resources within their jurisdictions.

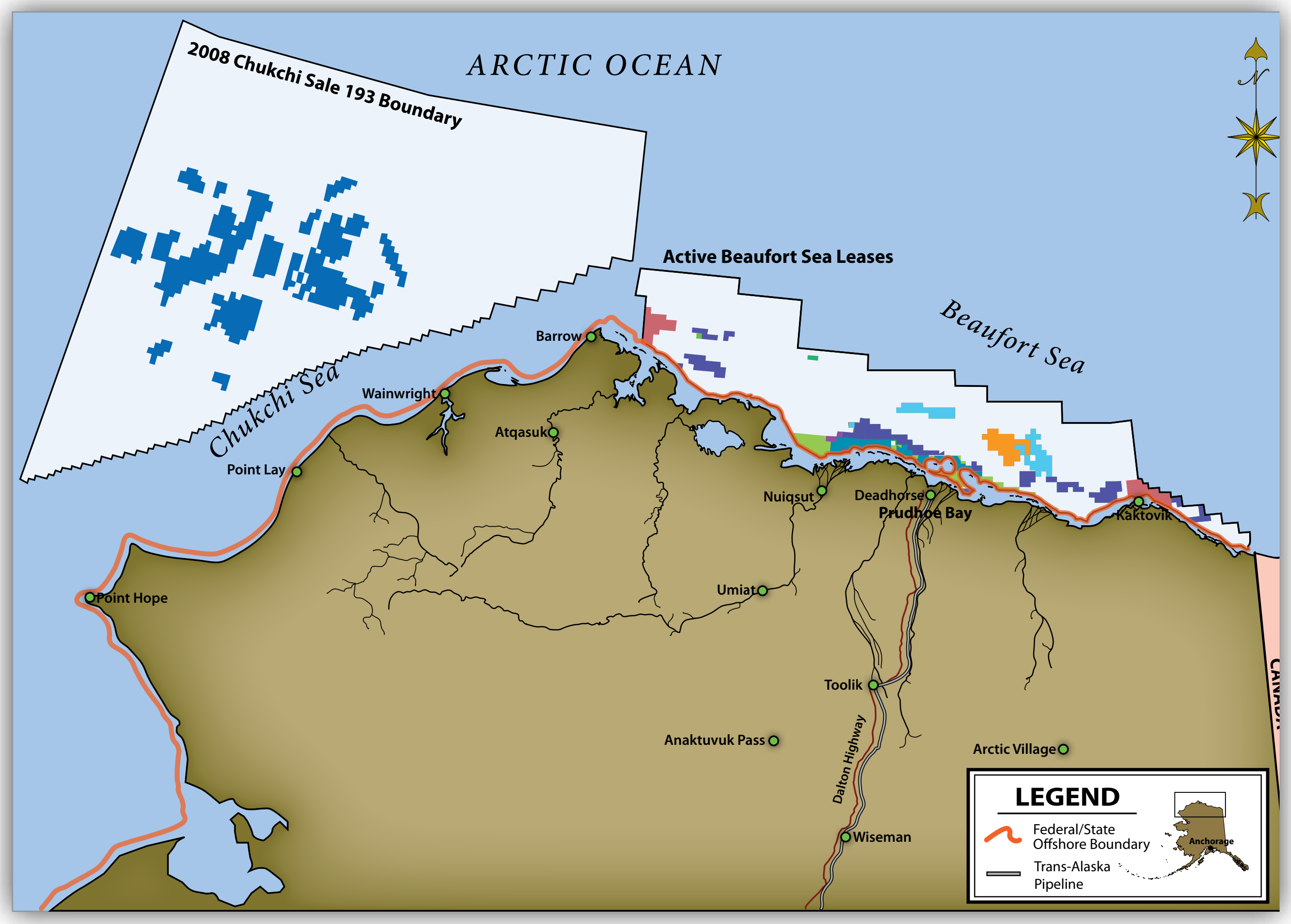


Figure 11. Map of Active Lease Areas in Arctic OCS (Chukchi and Beaufort Seas)

Figure 12. *(Photo: USGS)*—U.S. Coast Guard cutter Healy in the Arctic.

Oversight must include enhanced inspections and testing. The Deepwater Horizon spill highlighted the fact that industry inspections and emergency drills are not occurring at a level necessary to reduce the risk of spills. Inspections of facilities—including unannounced visits—should be conducted frequently to test the functioning of equipment and safety systems. In addition, regular and frequent test runs on emergency procedures and spill response should be required before drilling permits are issued, and operations should be halted if violations are found.

Equally important, BOEMRE must change the current management of inspection programs to ensure that inspectors have sufficient training and resources to undertake thorough and objective inspections and that their expertise is not undermined. The OCS Safety Oversight Board's Sept. 1, 2010, report documents a number of structural and management deficiencies in the existing inspection system, including a lack of bureauwide guidance on practices and inspector roles and responsibilities. Specifically, there is no standard bureauwide guidance for inspectors on applicable rules, regulations and policies as well as standard practices, roles and responsibilities. In addition, inspectors are not receiving the certification and training necessary to perform their jobs effectively and do not have sufficient resources, such as laptop computers. Equally disturbing, management routinely pressures inspectors to minimize reporting violations or undermines inspectors by rescinding citations. BOEMRE management's culture of supporting industry must change, and the inspection programs must be restructured and enhanced to ensure that inspectors have the training, resources and independence to perform their jobs.

Citizen input must be incorporated into oversight through regional citizens' advisory councils. Establishment of regional citizens' advisory councils (RCACs) could help prevent future oil spills. These councils should follow the model of the Prince William Sound RCAC, established by the Oil Pollution Act of 1990 after the Exxon Valdez oil spill. In Prince William Sound, citizen participation in the oversight of industry activities has prevented complacency and ensured vigilant review. The RCAC also performs an important independent oversight function by reviewing oil spill contingency plans. This has proved to be one of the most important methods for preventing oil spills in Prince William Sound and ensuring that tested, well-maintained response capability is in place.

Similar RCACs in the Arctic could provide advice and recommendations to DOI and the industry on development activity as well as associated pipelines and tankers in the region. They would also provide advice to DOI regarding the five-year leasing schedule, lease sales, exploration and production in the region, and oil spill contingency plans.

Adequate funding for oversight activities can be provided through statutorily established funding. Agencies with expertise on Arctic marine species and the environment and with responsibility for some aspect of spill response—including the USCG, NOAA, USFWS, USGS and EPA—should receive sufficient funding to undertake necessary monitoring and enforcement activities. Funding should be made available from the Oil Spill Liability Trust Fund for drills, inspections and contingency plan reviews, as well as review of five-year programs, lease sales and individual permits for offshore drilling. Funding for the Oil Spill Liability Trust Fund should be made permanent.

CONCLUSION

The Arctic Ocean presents unique challenges to oil and gas drilling that should not be underestimated. Before exploration and production drilling proceeds in Arctic waters, DOI and other agencies with relevant expertise must reassess the conditions under which future drilling might occur. The key issues that must be addressed include: (1) the need for research and data collection to provide an understanding of Arctic species, ecosystems and environmental conditions, and the impacts of oil spills in that environment; (2) the need for candid risk assessments and imposition of risk prevention measures; (3) identification of the response gap (shortfalls in spill response systems) and spill prevention measures such as drilling restrictions that must be in place to mitigate that response gap; and (4) vigilant oversight by government agencies and citizens to reduce the possibility of oil spills.

Cover photos, from left: spectacled eider, U.S. Fish and Wildlife Service; oil rig, Stockbyte/Getty Images; bearded seal, Brendan Kelly; children, Burgess Blevins/Getty Images; background ice, Nuka Research and Planning LLC

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