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Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard

"Assessing U.S. Preparedness and Response in the Arctic: The Opportunities and Challenges of Increased Marine Activity"

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Chairman Begich, thank you for the invitation to participate in today's hearing. My name is Eleanor Huffines, and I am testifying in my capacity as the manager of the U.S. Arctic program for The Pew Charitable Trusts.

The Pew Charitable Trusts applies a rigorous, analytical approach to improve public policy, inform the public, and stimulate civic life. Pew's U.S. Arctic program promotes science and community-based conservation that reduces risks to the Arctic from climate change and industrial development, including oil and gas activities, commercial fishing, and industrial shipping. The program works closely with scientists, Alaska Natives, the U.S. government, local communities, and conservation groups to achieve key policy goals for protecting the health of the Arctic ecosystem.

You have invited me here today to discuss two broad topics: first, industry and federal preparedness for Arctic offshore oil and gas development, as well as what lessons can be drawn from Shell's 2012 drilling season; second, the challenges and opportunities that an increase in Arctic activity and development present for environmental and natural resources stewardship.

As an initial matter, Pew is grateful for your continued focus on and attention to the Arctic. Alaska's Arctic waters are unlike other areas of the ocean. Sea ice covers the northern Bering, Chukchi, and Beaufort seas for much of the year. The region is subject to severe weather, but it is also remarkably productive. Fish and wildlife—including a wide variety of marine mammals and seabirds—make extensive use of Arctic waters. The Bering Strait in particular is a vital migration corridor for many species. Residents of Arctic communities have lived an irreplaceable way of life that has existed and endured across thousands of years. They are an integral part of the region's rich ecosystem.

Arctic marine waters face more acute changes than other ocean regions. The Arctic is warming at twice the rate of the rest of the planet[1] and will almost certainly be one of the first regions substantially impacted by ocean acidification. The warming is having immediate, compounded effects on Arctic people and ecosystems, including coastal erosion, altered weather patterns, and loss of important habitat. The most dramatic of these impacts is the incredible loss of Arctic sea ice. Arctic communities rely on sea ice for hunting, fishing, and other activities necessary for survival. Sea ice also serves as a platform for birthing seals, feeding walruses, roaming polar bears, and other Arctic life. The loss of sea

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[1] James A. Screen, Ian Simmonds. The central role of diminishing sea ice in recent Arctic temperature amplification. *Nature*, 2010; 464 (7293): 1334 Available at: http://www.nature.com/nature/journal/v464/n7293/full/nature09051.html

ice cover opens the Arctic to an expansion of industrial activities that, unless sensibly regulated, will further threaten the region.

The challenges posed by these changes are immense, and they call for a more cooperative and forward-thinking approach than has been employed in the past. The current approach, in which some individual agencies consider approval of projects in isolation and without full consideration of the projects' cumulative impacts, or how they fit into a broader conservation or development strategy, is not adequate. In a July 13, 2012, letter to President Obama, you and Senator Murkowski rightly urged the administration to develop a comprehensive U.S. Arctic strategy to better address the challenges and opportunities facing the region.

I. CORE ELEMENTS OF A COMPREHENSIVE U.S. ARCTIC POLICY

The future of U.S. Arctic waters need not be an endless battle over perceived trade-offs between culture, environment, and economics. Instead, careful planning and management can reduce losses and increase gains wherever possible, providing a better overall outcome than the single-minded pursuit of one goal to the exclusion of other interests. Sound economic development can support cultural programs. Environmental oversight can reduce the likelihood of accidents, simultaneously avoiding catastrophic costs and severe environmental damage. The cultural tradition of respect for hunted animals is a strong conservation ethic that benefits the ecosystem, including its human inhabitants.

Developing a plan that addresses the multiple needs and aspirations of cultural, environmental, and economic interests requires the involvement of more than just one organization or even one sector. Including the full range of human activities and their interactions within the environment creates the opportunity to assess and address multiple stressors already present or projected to start or increase, including climate change, offshore energy, vessel traffic, and fisheries.

Core elements to a comprehensive U.S. Arctic Policy should include but not be limited to the following principles:

A. Ensure local communities have a meaningful voice in decision-making.

Arctic indigenous residents have valuable knowledge about their home and its resources that can help inform planning and decision-making. Their experience and their traditional way of life—passed down through untold generations—have given them great knowledge of their environment and the species with which they share it.

Gathering and using traditional knowledge will require both a precautionary and adaptive approach. The federal government should make a better effort to ensure that traditional knowledge truly informs the decision-making process in the Arctic environment. To be meaningful, traditional knowledge should be incorporated *before* committing to management decisions that may adversely affect subsistence resources. Arctic peoples' ocean-based subsistence activities are central to their culture and sense of identity. In this context—where a management mistake could have cascading effects that jeopardize subsistence and cultural traditions—extra caution, such as the consideration of deferrals, is warranted.

In the end, residents of the Arctic must live with the consequences of Arctic policy and management decisions. For all these reasons, the federal government must ensure meaningful opportunities for

participation by local communities, governments, tribes, co-management organizations, Alaska Native Claims Settlement Act (ANCSA) corporations, and similar Alaska Native organizations. The federal government is required to consult fully with Alaska Native tribes on a government-to- government basis. Any governance framework needs to incorporate consultation well in advance of management and include a strategy for sharing information and providing feedback about indigenous resident's concerns.

B. Protect ecosystem health important for a subsistence way of life; safeguard areas of the ocean important for maintaining ecosystem integrity and function.

Subsistence resources have long provided a source of healthy food for Arctic communities. Subsistence foods are high in nutritional value and protect against health problems such as high blood pressure, obesity, diabetes, and cardiovascular disease. Subsistence hunting is an important aspect of the Inupiaq and Yup'ik culture. Negative impacts to subsistence resources, such as reduced abundance or contaminated habitats, could decrease food security, encourage consumption of store-bought foods with less nutritional value, and deteriorate the cultural fabric of Alaska Native communities. Thus, when industrial activities adversely affect subsistence resources, they also harm the people who value those resources. For many residents of the Arctic, there is a direct connection between the continued health of the marine environment and the health of their food supply, their culture, and themselves. The federal government must take a careful look at potential impacts to subsistence resources and show its commitment towards ensuring these resources are protected.

Areas within an ecosystem are not equal in ecological terms; some areas contribute disproportionately to ecosystem structure and functioning, including use by human populations. Important ecological areas may include areas of the ocean that are used for subsistence purposes; have distinguishing ecological characteristics; are important for maintaining habitat heterogeneity or the viability of a species; or contribute disproportionately to an ecosystem's health, including its productivity, biodiversity, functioning, structure, or resilience. Among scientists, there is general consensus that time and/or place restrictions designed to protect high value habitat are one of the most effective means of reducing potential impacts and disturbance. The current understanding of ecological functioning in the Chukchi, Beaufort, and Bering seas indicates that a number of sensitive marine habitats are especially important to the region's ecological functioning. The federal government needs to undertake a process to identify and protect these habitats.

C. Science must guide decision-making.

To make informed management decisions, it will be critical to have a better understanding of the cumulative effects of climate change, ocean acidification, and industrial stresses on the marine and terrestrial environments, and how these stresses interact with one another to affect the ecosystems, species, and people of the region. Developing a vigorous and lasting research and monitoring program is essential to generate reliable information, including trends, and reduce the degree of uncertainty in our knowledge of Arctic ecosystems.

Perfect knowledge, like zero risk, is unattainable. Nonetheless, some standards can be applied. The ability to assess impacts requires sufficient knowledge about an ecosystem to be able to identify functional relationships between species and the physical environment. As climate change alters patterns in the Arctic, we also need to be able to anticipate changes and plan accordingly to develop procedures for adjusting policies and regulations in light of new information.

There have been significant advancements in the past two years, both in information and data gathered and in commitments to further cooperate to bolster science and understanding of ocean and coastal resources in the Arctic. These advancements include the Interagency Arctic Research Policy Committee (IARPC) Fiscal Year 2013-2017 Arctic Research Plan, the Pacific Marine Arctic Regional Synthesis of the Northern Bering, Chukchi, and Beaufort seas (PacMARS) and the Synthesis of Arctic Research (SOAR).

Yet despite these efforts, the Arctic marine environment remains a difficult place to study and understand. It is cold, remote, and covered with sea ice for over half the year. Conditions vary greatly from one year to the next, making it difficult to generalize from the results of a single field season or to detect patterns across multiple years. And now the Arctic is undergoing rapid and profound environmental change due to global warming. This new information must be integrated with existing scientific and traditional understanding developed over past decades to develop an improved understanding of present and future conditions.

Senate Bill 272, "*The Arctic Research, Monitoring, and Observing Act of 2013,*" offers several solutions to these challenges:

- First, the bill calls for the establishment of a permanent Arctic science program to conduct research, monitoring, and observing activities in the region—both to promote productive and resilient ecosystems and to facilitate effective natural resource management.
- Second, it proposes funding a merit-based grant program to support new scientific research and field-work in the Arctic.
- Third, it would fund and support long-term ocean observing systems and monitoring programs in the Arctic Ocean, Bering Sea, and North Pacific.

If Congress passes Senate Bill 272 and it is implemented effectively, the bill's provisions could form the backbone of a long-term, integrated research and monitoring program for the Arctic—something that Pew has long advocated.

II. STRENGTHENING ALASKA'S OFFSHORE OIL AND GAS PROGRAM

Pew believes that decisions about whether, where, and how oil and gas activities are conducted in the U.S. Arctic Ocean must be based on sound scientific information, thoughtful planning, and with the full involvement of the people most affected. A balanced and careful approach to offshore development in the Arctic must account for environmental protection and for the social, cultural, and subsistence needs of Alaskan communities.

The federal government can take steps now to ensure that offshore Arctic development is done as safely and sustainably as possible.

First, it must incorporate world-class, Arctic-specific safety, spill prevention, and response standards into federal regulations that apply to every company operating in the region. These standards should account for the area's remote location, lack of infrastructure, and unique operating conditions due to the severe and changing climate. Equipment and techniques used in temperate waters are simply not transferable to the Arctic.

The federal government must also protect areas that are biologically important or used for hunting and fishing by indigenous communities. The local communities should have a voice on what kind of development is appropriate, where it should take place, and what safeguards are needed. Alaska

Natives' traditional knowledge and concerns should be a critical piece of any decisions about development in the Arctic. Regional Citizens' Advisory Councils provide one model for citizen engagement and oversight of development of Arctic energy resources.

The federal government should recognize that for science and conservation to guide decision-making, a long-term monitoring program must be put in place and sustained to assess the cumulative effects of multiple, interacting stresses. Such stresses include changes in climate, plus noise and pollution from vessel traffic and drilling operations, which can disrupt habitat, migration patterns, and communications for whales and other marine mammals.

A. Lessons Learned and the Need for Arctic Specific Standards

In the wake of the *Deepwater Horizon* blowout in the Gulf of Mexico, the United States, along with other Arctic countries such as Canada and Greenland, examined whether existing regulatory standards for arctic oil and gas exploration and development were sufficient to prevent a similar disaster and whether there was capability to respond to a major oil spill in ice-infested waters. The United States commissioned a committee, the Ocean Energy Safety Committee (OESC), to examine current Department of the Interior (DOI) regulations for Outer Continental Shelf (OCS) oil and gas exploration, development, and production operations and make recommendations.

The Ocean Energy Safety Committee concluded that there is a need to modernize DOI regulations to include Arctic-specific standards for oil spill prevention, safety, containment, and response preparedness in the Arctic OCS, among other recommendations that more broadly applied to all OCS operations. On January 25, 2013, Ocean Energy Safety Committee Chairman Dr. Tom Hunter submitted the Committee's formal recommendations to the Department of the Interior for consideration and action. Pew supports the Ocean Energy Safety Committee's recommendations.

Also in January of this year, Secretary Salazar launched an expedited assessment of Shell's 2012 Alaska offshore drilling program after a Shell oil rig ran aground near Alaska's Kodiak Island on New Year's Eve. The *Kulluk* was on its way to the Pacific Northwest from its Arctic drilling site when its tow vessel lost power, the towlines broke, and the rig hit the rocks.

It wasn't the drilling season's sole mishap. Both the *Kulluk* and a second rig, the *Noble Discoverer*, are now being towed to Asia for inspection and repairs. A U.S. Coast Guard investigation of the *Noble Discoverer* found 16 violations of safety and pollution-control regulations. A U.S. Department of Justice criminal investigation is now under way based on the violations.

But the issues go beyond any single accident or oil company. The *Kulluk* ran aground in the Gulf of Alaska only 50 miles from the closest U.S. Coast Guard station, yet the current targets for drilling lie 1,000 miles farther north in the Arctic Ocean. Helicopters, planes, and vessels were on hand to evacuate the crew of the *Kulluk* and assist in the salvage. But farther north, there are no major ports, airports, or roads. Hurricane-force winds, subzero temperatures, shifting sea ice, and long periods of fog and darkness could shut down a rescue operation or spill response altogether.

On March 14, 2013, Secretary Salazar announced the findings of the review. Pew supports DOI's seven key findings and recommendations. Specifically:

1. All phases of an offshore Arctic program – including preparations, drilling, maritime, and emergency response operations – must be integrated and subject to strong operator management and government oversight.
2. Arctic offshore operations must be well-planned, fully ready, and have clear objectives in advance of the drilling season.
3. Operators must maintain strong, direct management and oversight of their contractors.
4. Operators must understand and plan for the variability and challenges of Alaskan conditions.
5. Respect for and coordination with local communities is essential.
6. Continued strong coordination across government agencies also is essential.
7. Industry and government must develop an Arctic-specific offshore model for oil and gas development.

The Department of Interior findings reinforce the importance of taking a regionally specific approach to offshore oil and gas exploration the Arctic. The federal government must recognize and account for the unique challenges of this region, which holds energy potential, but where issues like environmental and climate conditions, limited infrastructure, and the subsistence needs of North Slope communities demand specialized planning and consideration.

C. Arctic Standards for Oil Spill Prevention and Response

The Ocean Energy Safety Advisory Committee (OESC) recommendations and Department of Interior's (DOI) review represent a welcome first step toward identifying safety and systems failures in Alaska's offshore drilling program. Only by taking additional steps to strengthen federal review and regulation of these operations, however, can the federal government show its commitment to responsible Arctic Ocean development.

Common operating practices and Arctic-specific standards should be established and met before any operator is approved to explore or develop. Examples of Arctic specific standards for oil spill prevention and response include but are not limited to:

1. Purpose Built Polar Class Drilling Rigs and Associated Support Vessels

DOI should require drilling rig performance standards for Arctic OCS operations. These standards should include rigs that are built-for-purpose and meet Polar Class[2], or equivalent[3], standard and third party audits of the rig before it is used. The drilling rig is a critical component of a safe drilling program; however, DOI regulations do not currently include Arctic-specific criteria for rigs used in exploration drilling.

The situation of most concern is a late season well blowout that requires drilling to continue into late fall-early winter ice, which will require Polar Class rigs. While the plan may be to avoid interaction with the ice by implementing an ice monitoring and rig retreat plan, drilling rig retreat will not be an option when a blowout occurs and relief well rig must remain in position to drill a relief well in the weather and ice conditions that may be present.

This recommendation is consistent with the International Maritime Organization's (IMO) Guidelines for Ships Operating in Arctic Ice-Covered Waters; the Canada National Energy Board (NEB) Filing Requirements for Offshore Drilling in the Canadian Arctic[4], and with the National Commission on the BP

[2] International Association of classification Societies, Requirements Concerning Polar Class (2011).
[3] International Maritime Organization, Guidelines for Ships Operating in Arctic Ice-Covered Waters (2010).
[4] Canada National Energy Board (NEB), Filing Requirements for Offshore Drilling in the Canadian Arctic, 2011, page 27.

Deepwater Horizon Oil Spill recommendations, where the Commission recommended the safety and environmental management system requirements for drilling to include third party audits.[5]

Additionally, operators should be required to provide a sufficient number of Polar Class and icebreaking vessels in the U.S. Arctic Ocean region to support safe operation, provide towing assistance, and to support source control and spill response operations. These vessels should include a sufficient number of shallow draft vessels capable of operating in ice-infested waters.

2. Seasonal Drilling Restrictions

DOI's regulations should also include seasonal drilling limitations for periods when oil spill response is not possible in the Arctic. More specifically, Arctic offshore operations drilling through hydrocarbon bearing zones should be limited to periods of time when the drilling rig and its associated oil spill response system is capable of working and cleaning up a spill in Arctic conditions, minus the time required to drill a relief well before ice encroaches on the drill site and the time required to clean up the spilled oil from the last day that a spill could occur.

Drilling restrictions that limit OCS offshore operations in the Arctic to summer periods ensures there is sufficient time left in the operating season to cap a blown out well, drill a relief well, and clean up spilled oil in open water, thereby providing a critical margin of safety in the proposed plan. Seasonal drilling restrictions, with these specific components, are not included in existing regulations.

Routine drilling operations that extend to the very last day that it is safe to drill do not allow time to respond to a well control event before winter conditions set in and equipment must leave the Chukchi and Beaufort seas because it becomes unsafe to operate in ice, freezing conditions, and darkness. A spill in the Chukchi and Beaufort seas not contained by freeze-up could continue unabated through the winter could have catastrophic long- lasting consequences.

There are no specific regulations requiring operators to follow seasonal drilling limitations for Arctic operations. Although DOI effectively applied seasonal drilling limits to Shell's 2012 Chukchi Sea OCS Drilling Project[6], similar limits have not been imposed on all projects. For example, DOI did not apply seasonal drilling limits to Shell's 2012 Beaufort Sea OCS Drilling Project allowing drilling and relief well operations to be scheduled into dangerous multi-year ice conditions of October, November and early December. Therefore, there is a need to establish standards that would be applied consistently across all projects.

3. Capping and Containment System and Relief Rig Located in the Arctic and Rapidly Deployed

DOI's regulations should also mandate the requirement to have an Arctic well capping and containment system and an Arctic relief well rig located in the Arctic to provide immediate oil spill source control capability. More specifically, Arctic oil and gas operators should own, or have on contract, a relief well rig and capping and containment system that is capable of being onsite and ready to commence operations within 24 hours.

[5] National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling Report, Recommendation A3 (January 11, 2011) (recommending that the safety and environmental system requirements for drilling be expanded to include third-party audits at three to five year intervals and certification).

[6] "BOEM Issues Conditional Approval for Shell 2012 Chukchi Sea Exploration Plan" http://www.boem.gov/BOEM-Newsroom/Press-Releases/2011/press12162011.aspx

The capping and containment system should be built to arctic engineering specifications. The system should include Polar Class vessels to ensure it can remain onsite during ice conditions that may be encountered during the entire period of operation. Additionally, the system should be staffed by trained and qualified personnel with Arctic experience who are capable of completing a well control operation in Arctic conditions. Finally, the system should be subject to independent third party expert review and an arctic engineering expert, prior to the drilling season.

The Arctic relief well rig should be capable of drilling a relief well at the proposed location for the period of time required to complete the relief well. The Arctic design should be equivalent to, or more robust, than the rig used to drill the original well requiring relief well assistance. The relief well rig must be a second rig. The operator cannot assume that the primary drilling rig where the well blowout occurred is capable of moving away from the well blowout and drilling its own relief well. The period of time required for relief well drilling should be defined as the period between the first day the well is spudded and when the well is plugged, abandoned, and secured with at least two well control barriers, plus an additional period of at least 60 days or longer if indicated by a site-specific analysis. Both Canada and Greenland have a two-rig drilling policy and required that a relief well rig be located in the same area of drilling at the same time.[7,8]

DOI regulations do not currently require a capping and containment system or a designated relief well rig. In the Arctic, there is a very limited time window to drill a relief well. The size of a worst-case well blowout and the amount of oil spilled into the environment will be a function of the time required to transport a relief well rig to the drilling site and drill the relief well. While well capping may arrest the blowout prior to drilling a relief well, this is not always the case.

4. Adequate Trained Personnel and Equipment to Respond to a Spill in Arctic Conditions

Arctic response equipment, including mechanical and *in-situ* burning materials, and training standards should be established to ensure there is sufficient in-region capability to respond to the oil spill in Arctic conditions.

The OSRP should include evidence that the operator either owns, or has under contract, adequate in-region Arctic-grade equipment and personnel trained and qualified to operate that equipment and capable of cleaning up the entire spill.

Arctic-grade equipment should include, but not be limited to: Arctic-grade skimmers, ice-boom, viscous oil pumps, winterization enclosures and heating systems to protect equipment and prevent freezing, systems to thaw frozen equipment, Polar Class vessels (icebreakers, storage and recovery vessels), shallow draft vessels capable of operating in ice-infested water and able to provide nearshore response access, landing craft capable of accessing remote shores where docks are not present, and cold-weather Personnel Protective Equipment.

Personnel should have training and qualifications in arctic mechanical response, *in-situ* burning, and deployment and operation, and vessel captains and pilots should have experience navigating in the Arctic.

[7] Canada National Energy Board (NEB), Filing Requirements for Offshore Drilling in the Canadian Arctic, 2011.

[8] Government of Greenland, Bureau of Minerals and Petroleum, Approval of up to 7 (Seven) Exploration Wells in Accordance with Section 15 of Licences 2002/15, 2005/06, 2008/11 and 2011/16, Cairn Energy License Approval Letter, May 2011

DOI regulations do not currently require any specific standards for Arctic mechanical response equipment or training. Canada, by comparison, requires that an operator demonstrate, including field exercises in arctic conditions, that its oil spill response equipment and personnel are trained and equipped to work in the Arctic.[9]

5. Equipment Tests and Drills in Arctic Conditions

DOI's regulations should also include Arctic offshore field tests to verify spill response tactics and strategies prior to OCS operations. Oil and gas operators should be required to conduct field tests prior to conducting OCS operations to verify that arctic spill response techniques, equipment, and methodologies will be effective and are the best available technology for use in the Arctic environment. Field tests should be conducted in the environments they plan to operate in and in areas where a spill from their operations could reach. Each tactic and strategy relied upon in an oil spill response plan should be field-tested and verified as a viable oil spill removal strategy prior to conducting OCS operations where there is a risk of spilling significant oil.

Equipment that has not been tested in Arctic conditions already including mechanical equipment and capping and containment systems should be physically tested in the arctic conditions that the applicant may need to use the system in prior to the drilling season and proven to be successful and reliable for the intended purpose.

There are currently no requirements for operators, or the Oil Spill Removal Organizations (OSROs) they utilize, to field test and verify that its proposed "on-paper" tactics and strategies are efficient and effective in the Arctic prior to starting drilling operations.

To verify that Arctic oil spill response techniques, equipment, and methodologies will be adequate and effective in an actual response, operators should plan for and conduct field tests in a range of Arctic conditions, including broken ice.

D. Need for More Comprehensive Review of Alaska's Offshore Program

The previous recommendations address one narrow aspect of Alaska's offshore oil and gas program: oil spill prevention and response standards specific to the Department of Interior. As part of the government's commitment to developing Alaska's energy resources cautiously and subject to the highest safety and environmental standards, all federal agencies with oversight responsibilities must thoroughly review standards for other aspects of the offshore program.

Federal agencies should also make information available to the public in a timely fashion and on a proactive basis. Relatively simple steps—like publishing letters, approvals, and data on agency websites and committing to accepting public comments on spill response plans —would go a long way toward building trust and improving public participation in the decision-making process.

At stake is not only the safety of workers, but also a rich and complex ecosystem found nowhere else in the United States. The Arctic Ocean is home to bowhead whales, walruses, polar bears, and other magnificent marine mammals as well as millions of migratory birds. A healthy ocean is important for the continuation of hunting and fishing traditions practiced by Alaska Native communities for time immemorial.

[9] Canada National Energy Board (NEB), Filing Requirements for Offshore Drilling in the Canadian Arctic, 2011, pages 22-23.

III. ENHANCE VESSEL TRAFFIC SAFETY THROUGH THE BERING STRAIT AND IN THE ARCTIC OCEAN

The Bering Strait is the gateway in and out of the western Arctic Ocean for migrating marine mammals and seabirds. A mere 50 nautical miles at its narrowest point, this exceptional place provides habitat and migrating routes for beluga and bowhead whales; more than 50 species of seabirds and their massive breeding colonies; ringed, spotted and bearded seals; walrus; and forage fish such as arctic cod and arctic char. Indigenous Arctic communities have subsisted and nurtured a culture intertwined intimately with these waters and resources for thousands of years.

The Bering Strait is already experiencing increasing vessel traffic, and that trend is expected to continue and accelerate in the future. The growth in Arctic marine operations is due in large part to natural resource development within the region and the Arctic's growing economic ties to the global economy. At a meeting in Nome on vessel traffic, U.S. Coast Guard Commander James Houck noted that 480-plus vessels transited the Bering Strait in 2012.[10] Ships include tankers, cargo ships, container ships, tugs, offshore supply vessels, landing craft, fishing vessels, passenger vessels, offshore drill ships, oil spill response vessels, and cruise ships of various sizes. While vessel activity is light compared to other regions of the world, the capacity to provide aid and support for these vessels is extremely limited.

Vessels navigating these narrow passages pose numerous threats. They may discharge oil, waste, or ballast water that contains invasive species. Marine mammals are susceptible to vessel noise, which could alter their behavioral and migratory patterns. Vessels could strike marine mammals such as the slow-moving bowhead whale, particularly during twice-yearly migration times when the majority of the Western Arctic population moves through this corridor. They may have an accident, lose steerage or become grounded- posing a threat or danger to personnel aboard. Also of real concern is the potential for interfering with subsistence activities and/or compromising the safety of hunters, some of whom travel 100 miles from shore in small boats. Lastly, vessel traffic may disrupt ecosystem integrity and function, which is vital to indigenous Arctic communities; a healthy ecosystem supports the marine mammals and fish populations that ensure a strong subsistence way of life.

Given the cultural, ecological, and economic importance of the region, the consequences of an accident are considerable. We are at a critical point at which to begin developing an appropriate standard of care for vessel traffic in the region. Local communities should be actively involved and play a leadership role with other stakeholders in this effort. It cannot be emphasized enough that any mandatory or voluntary measures should be developed with the involvement of the tribal governments, regional Alaska Native non-profit organizations, co-management organizations, and ANCSA corporations.

[10] CMDR Houck presentation: http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/program.php

Below are some concepts and ideas that should be further explored to enhance vessel traffic safety:

A. Improve and Update Tools to Enhance Safer Voyage Planning
As a first step to help prevent accidents, mariners should have access to accurate and updated information.

1. Update Nautical Charts
Hydrographic charting in the Bering Strait and Arctic Ocean are inadequate and those that exist are outdated, with the majority of charting occurring prior to 1970.[11] In a recent report the U.S. Committee on the Marine Transportation System stated that "less than one percent of navigationally significant Arctic waters have been surveyed with modern technology to determine depths and depict hazards to navigation."[12]

2. Improve Forecasting
Weather, sea ice, and sea state are critical elements to safe voyage planning in Arctic waters. This information, however, is not widely available. Improving forecasting is listed amongst the top priorities in the National Oceanic and Atmospheric Administration's Arctic Vision and Strategy.[13]

3. Add and Supplement Community Information in the Coast Pilot
NOAA's Office of Coast Survey issues the Coast Pilot, a series of nautical books that provide information that is difficult to show on a nautical chart. Topics covered include, for example, currents, tide and water levels, weather, sea ice, dangers, and routes.[14] Coastal communities should be consulted regarding what information to add. They have knowledge from traveling local waters, often farther offshore than most mariners in the lower latitudes, and could help further safe routes and hazards not currently included in the most recent edition. Communities may, for example, want to include local VHF channels for mariners to communicate and/or additional information on seasonal species migrations or important seasons when communities will be on the water.

4. Require Additional and Continued Research, Monitoring and Observation
Balanced management of Arctic waters will require more complete information about species and ecosystem functioning, followed by continued monitoring and observation of key species and processes. This information will not only benefit resource management but also vessel traffic management to better facilitate safe shipping. As traffic increases and the climate changes, ongoing input from local communities and scientific information will be important to measure and mitigate impacts.

B. Implement Measures to Mitigate Marine Impacts from Vessel Traffic
Mandatory measures to regulate vessels through the Bering Strait may need to go through a lengthy, international process. Voluntary measures, however, are achievable in the short term and have been

[11] LT Matt Forney, NOAA, Office of Coast Survey, presentation at the Bering Strait Maritime Symposium. Feb. 2013. http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/program.php
[12] U.S. Committee on the Marine Transportation System, "U.S. Arctic Marine Transportation System: Overview and Priorities for Action 2013." (2013). Available at: http://www.cmts.gov/downloads/CMTS_Draft_Arctic_MTS_Overview_and_Priorities_Paper_for_Public_Comment-Feb2013.pdf
[13] Priorities include: forecast sea ice, strengthen foundational science to understand and detect Arctic climate and ecosystem changes, improve weather and water forecasts and warnings, enhance international and national partnerships, improve stewardship and management of ocean and coastal resources in the Arctic, and advance resilient and healthy Arctic communities and economies. Available at: http://www.arctic.noaa.gov/docs/NOAAArctic_V_S_2011.pdf
[14] Office of Coast Survey, United States Coast Pilot. http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm

effective in other areas of the United States. Listed below are examples of measures, some of which have been discussed by the U.S. Coast Guard [15] that could be utilized to reduce impacts from increasing vessel traffic in the Bering Strait and Arctic Ocean.

1. Shipping Lanes

Shipping lanes are designed to confine vessel traffic to specific areas. This helps create regular traffic patterns while avoiding potentially dangerous locations or culturally or environmentally sensitive areas. Shipping lanes also help avoid accidents because vessels follow expected routes. This measure is commonly used in narrow straits and areas of vessel congestion such as harbor entrances. Shipping lanes also ensure that vessels maintain a safe distance offshore in case a problem affects maneuverability. This gives the vessel's crew time to make repairs, set anchor, or get assistance before drifting aground.

2. Areas To Be Avoided (ATBAs)

If shipping lanes tell vessel where to go, "areas to be avoided" tell mariners where they should never go. These areas may be designated because of marine hazards, such as shoals or strong currents. They may also be designated for environmental and cultural reasons. In a remote region such as the Bering Strait, "areas to be avoided" may also be used to keep sufficient space between vessels and shorelines to reduce the chance that a disabled vessel drifts ashore before help can arrive.

3. Vessel speed

For some hazards, including ship-to-ship collisions and ship strikes of whales, vessel speed is a crucial factor in the damage that may occur. For example, whales are far less likely to be killed by large vessels (cargo ships, tankers, large cruise liners) traveling 12 knots or slower than by large vessels moving faster.[16] In areas with limited maneuvering room for avoiding hazards, speed restrictions can greatly reduce impacts and risks. Vessel speed can be monitored using commercially available vessel tracking devices. Vessel speed restrictions are being used, in concert with routing measures, in the northeast Atlantic to help reduce ship strikes of the endangered North Atlantic Right Whale.[17]

4. Ship Reporting (Automated Vessel Tracking, Reporting Location to Local Hunters, Reporting Hazards Such As Sea Ice or Marine Mammals)

Most vessels now are required to have automatic tracking systems on board (Automated Information Systems, or AIS), which allow their progress to be monitored. Reporting systems may create an additional requirement to announce when the vessel enters and leaves designated areas or enters and exits a shipping lane. (This can be automated.) Additional communication requirements could include, for example, making an announcement on local radio channels in case there are hunters out in boats, or checking with a local communication center upon arriving within radio range of that location, or describing hazards, such as sea ice or marine mammal aggregation, to other vessels.

Current AIS technology allows for "watchdog" alarms to be triggered when vessels cross a line of demarcation or enter a specific area. The information on the vessel can be automatically transmitted to other vessels, government agencies, and other entities. The U.S. Coast Guard monitors vessel movements and can identify ships that appear to be having trouble of some kind. This can help a timely

[15] CMDR Houck, "Rules of the Road – A Bering Strait Overview", presentation at the Bering Strait Maritime Symposium. Feb. 2013. http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/program.php

[16] Gende, S. et al. "A Bayesian approach for understanding the role of ship speed in whale-ship encounters" 2011. Ecological Applications, 21(6), pp.2232-2240.

[17] NOAA Fisheries, Office of Protected Species: "Reducing Ship Strikes to North Atlantic Right Whales" http://www.nmfs.noaa.gov/pr/shipstrike/

emergency response. The AIS can also be used to inform vessels that they are outside shipping lanes or to transmit safety or other information as needed. In some places such as the Malacca Strait, these systems have received extensive funding from the shippers themselves. In the Bering Strait region and coastal areas of the Beaufort and Chukchi seas, if receiving equipment is made available, AIS also can be used by local communities to track vessel movement to help ensure the safety of subsistence hunting boats and other small craft used locally.

C. Enhance Emergency Preparedness

1. Increase Spill Response Planning and Capability

Spill response planning and capacity should be met by professional oil spill removal organizations and enhanced community capability. Communities should be equipped and trained to use spill response equipment and aid in protecting shoreline resources. Regional Citizens' Advisory Councils can provide communities with a structure to review spill response planning, as well as train and practice responding to oil spills. Non-tank vessels should be required to have approved vessel response plans. These response plans will require increase capacity along the coasts. Oil Spill Removal Organization (OSROs) capacity should be enhanced to meet this demand.

2. Deep Water Port and Emergency Towing Capacity

There are no major ports in western Alaska or along the Arctic coastline. There should be additional emergency towing systems available along the Bering Strait coast as well as on the North Slope. A deep water port in the Northern Bering Sea could provide a place to station a tug to assist distressed vessels.

D. Foster International Cooperation

The Bering Strait's international jurisdiction should not prevent the United States from taking careful, preventative measures to reduce and also prepare for an emergency. In the long term, however, it is important that the United States continue to foster a cooperative relationship with Russia and work towards a mutual set of measures to help manage this narrow strait.

The Arctic Council's Search and Rescue Agreement is a good step towards ensuring international cooperation in these shared waters. Additionally, the United States should continue to play a leadership role in the development of a mandatory Polar Code at the International Maritime Organization. The Polar Code is an important tool, setting international standards for vessels fit to travel in Arctic waters. In addition to vessel design and strength, however, measures should be included that set baseline standards for discharge, waste, noise and light pollution, and interaction with marine mammals.

Pew strongly supports ratification of the U.N. Convention on the Law of the Sea. The oceans have been called, "the last global commons," and their sustained global health can best be maintained by a stable, universally accepted convention that promotes the key interests of the United States, its allies and its trading partners. Ratification would ensure our ability to participate in interpreting and applying the convention to the changing realities of the global maritime environment and preserves our ability to protect our domestic interests, including our extended continental shelf claims.

IV. CONCLUSION

The United States is in the unique and privileged position of being an Arctic nation. This privilege brings with it national obligations. We must ensure that strategy, policies, and adequate federal resources are in place today in order to effectively manage and prepare for these challenges tomorrow. The consequences of losing a treasure like the Arctic are simply unacceptable.