THE WICKED PROBLEM OF OIL & GAS DEVELOPMENT IN THE BEAUFORT AND CHUKCHI SEAS: CURRENT PERMITTING AND EVALUATION OF MARINE SPATIAL PLANNING AS A POTENTIAL MANAGEMENT TOOL

A Thesis

by

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ABSTRACT

Changing climatic conditions and shifting global economics have thrust the Arctic into the spotlight for many scientists, academics, and policymakers as well as those in offshore industries, particularly in shipping and oil and gas. This research provides an overview of current U.S. Federal and State of Alaska environmental permitting requirements for offshore oil and gas development in the Beaufort and Chukchi Seas, highlighting the wicked problem of Arctic development: activities undertaken in the region are highly complex, involving significant political, social, environmental, and technical challenges. The economic opportunities that these Seas afford, and the high risks posed by pursuing these opportunities, call for the development of effective management strategies to avoid environmental catastrophes and maintain safe conditions for the stakeholders involved.

The general questions guiding this research are: 1) How do Federal and State management of Beaufort and Chukchi Sea offshore oil and gas resources differ and how do the environmental permitting processes reflect this difference? 2) Is marine spatial planning (MSP) a viable tool for integrating these regulatory processes into a comprehensive planning process that balances stakeholder engagement, economic interests, and protection of the marine environment, all elements of the wicked problem? The analysis shows that MSP is worthy of consideration at the local or State level as a tool to help address these wicked problems elements, potentially allowing for a smoother permitting process.

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TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

NOMENCLATURE

ACMP	Alaska Coastal Management Program
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
ANWR	Alaska National Wildlife Refuge
AOOS	Alaska Ocean Observing System
ASRC	Arctic Slope Regional Corporation
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CAA	Clean Air Act
CE	Categorical Exclusion
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GIS	Geographic Information System
ICZM	Integrated Coastal Zone Management

MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act of 1972
MSP	Marine Spatial Planning
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NGO	Non-Governmental Organization
NMFS	National Marine Fisheries Service
NOI	Notice of Intent (to file an EIS)
NPR-A	National Petroleum Reserve – Alaska
NSAR	National Strategy for the Arctic Region
NSB	North Slope Borough
NSIDC	National Snow and Ice Data Center
NSSI	North Slope Science Initiative
OCSLA	Outer Continental Shelf Lands Act
OPA	Oil Pollution Act of 1990
PNOS/FNOS	Proposed Notice of Sale/Final Notice of Sale
SAMP	Special Area Management Plan
UNCLOS III	United Nations Convention on the Law of the Sea 1982
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1. INTRODUCTION AND LITERATURE REVIEW

The sparsely populated Arctic region has long been an object of intrigue and mystery due to its remoteness, harsh environment, and abundance of natural resources. The U.S. Geological Survey (USGS) estimates indicate that the area above the Arctic Circle may hold 13% of the world's undiscovered oil and 30% of the world's undiscovered gas, most of which is offshore (Gautier et al., 2009). Exploration and production of this oil and gas is expected to increase, though high operational costs, unpredictable ice and climate conditions, and technical, social, and regulatory challenges will likely inhibit the pace of development (Ermida, 2014; Harsem, Eide, & Heen, 2011). The U.S. Arctic State, Alaska, has been producing oil from its North Slope onshore fields, as well as in the Beaufort Sea just offshore of these North Slope areas, since the 1970s (Ermida, 2014). There has been growing interest in the oil and gas deposits further offshore from the Arctic Alaska coast in the Beaufort and Chukchi Seas (see Fig. 1 for the location of these seas), with development in these offshore areas expected to increase in the coming decades (Ermida, 2014). This research reviews the offshore oil and gas environmental permitting processes of the U.S. Federal Government and the State of Alaska regulatory agencies, reviews recent assessments by Federal and State officials regarding these permitting processes and the ability of the processes to accommodate increased offshore oil and gas development in the Beaufort and Chukchi Seas, and explores the suitability of marine spatial planning (MSP) as a tool that could engage all stakeholders at a high level in the planning process.

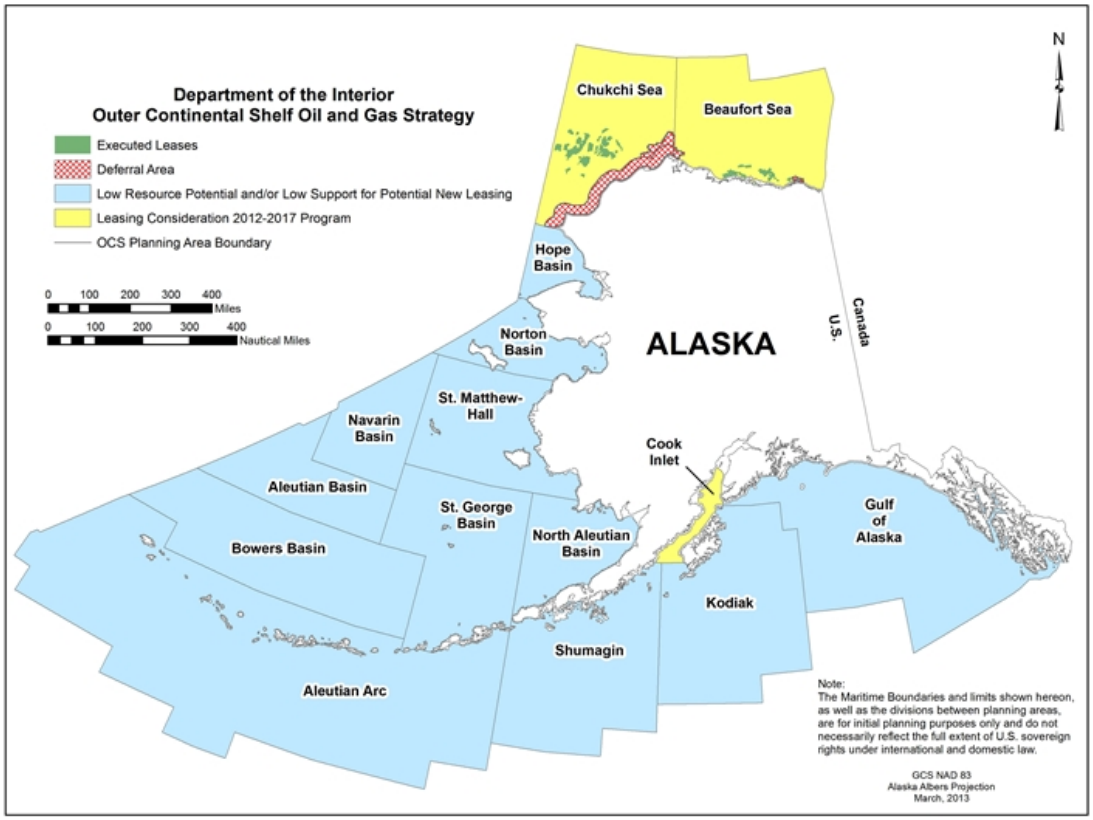

Figure 1. Beaufort Sea and Chukchi Sea Federal planning areas in yellow. (Source: BOEM)

The regulatory process, combined with the unique political, social, economic, environmental, and technical challenges that oil and gas development in the region pose, fit the definition of a "wicked" problem (defined below in "Characteristics of the wicked problem") and MSP may be one potential tool to address the need for balanced stakeholder engagement and marine environmental protection while seeking the economic benefits of offshore development.

The general questions guiding this research are:

- How do Federal and State management of Beaufort and Chukchi Sea offshore oil and gas resources differ and how do the environmental permitting processes reflect this difference?
- Is MSP a viable tool for integrating these regulatory processes into a comprehensive planning process that balances stakeholder engagement, economic interests, and protection of the marine environment, all elements of the wicked problem?

Addressing these questions results in a greater understanding of the differing approaches taken by the Federal and State regulatory agencies and provides an indication as to where efforts could be combined more effectively toward a comprehensive ecosystem-based management strategy.

Characteristics of the wicked problem

The challenges and risks of oil and gas development in the Beaufort and Chukchi Seas, and the complex interactions among stakeholders in the region with differing views and values, demonstrate that exploration and production in these offshore areas fit the characteristics of a wicked problem and require new education, processes, and tools to navigate the planning process (Kämpf & Haley, 2011). "Wicked" problems, as described by Rittel and Webber (1973), are those classes of social planning problems that are difficult to define and cannot be tackled through traditional linear, analytical approaches due to their incredibly complex natures. These wicked problems involve a problem that is

unstructured, complex, irregular, interactive, adaptive, and novel (Kämpf & Haley, 2011), set in contrast to "tame" problems, which may be very technically complex but can be tightly defined (Rittel & Webber, 1973). Traditional, linear risk management approaches for tame problems begin by understanding the problem at hand, analyzing the requirements of the stakeholders, formulating a solution, and, ultimately, implementing that solution (Conklin, 2001). Wicked problems, however, require approaches that are more innovative and flexible than this linear model, using multiple tools or techniques that engage stakeholders by facilitating and structuring the debate of the wicked problem at hand (Pollack, 2007). In a wicked problem, the understanding of the problem is constantly evolving as new information or an unforeseen situation arises, meaning that a formerly-identified solution may no longer be the best course of action and alternative solutions must be weighed (Conklin, 2001). Offshore oil and gas development in the icy Beaufort and Chukchi Seas involves a high degree of technical challenges, posing risks from an engineering, oil spill response, and search-and-rescue standpoints; and the social-ecological impacts on the unique Arctic ecosystem are largely unknown (Kämpf & Haley, 2011). Stakeholder support and opposition for offshore development in these seas varies from group to group, and has even varied within single groups over time (Kämpf & Haley, 2011). For example, Edward Itta, a prominent Alaska Native leader and former Mayor of the North Slope Borough (NSB), Alaska's northernmost regional government adjacent to the Beaufort and Chukchi Seas, initially shared the opinion of other tribal and environmental groups that Arctic offshore development should be opposed due to risks to the environment and the subsistence hunting and fishing culture of the Alaska Natives

living in the region (Mouawad, 2007). However, Itta and the NSB later shifted to supporting this offshore development with best practice environmental protection by acknowledging that modern Alaska Native identity was reliant on economic development through resource extraction (Glenn, Itta, & Napageak, 2011).

The cultural and social framework of the Arctic Alaska Natives is deeply rooted in this subsistence lifestyle, which exists alongside oil and gas development. The link among the people, land, sea, and animals is demonstrated in Arctic Alaska Native customs and this direct interaction between the people and their environment has allowed the local residents to adapt and survive to changing environmental and resource conditions over thousands of years; however, oil and gas development in Arctic Alaska has evoked major changes to the way subsistence activities are carried out ("North Slope Borough Background Report," 2005). While oil and gas development allows for much-needed economic development in the region, the sparsely populated villages and communities in the Alaskan Arctic are spread out over long distances, as subsistence activities are likely to be more efficient in less dense settled areas, often making it difficult for these residents to take advantage of employment opportunities in large-scale resource operations (Huskey, 2009). “Family relationships and kinship” are another aspect integral to Arctic Alaska Native culture, shaping social interactions such as cooperative activities and sharing, and respect for this cultural aspect are important when considering the impacts of training and local hire initiatives resulting from increased resource development ("North Slope Borough Background Report," 2005). Additionally, oil and gas operations usually require a great deal of activity at the initial stages (i.e., construction), but many of the

positions created during this time of heavy activity may not last long ("Arctic Oil and Gas 2007," 2008).

The steady increase of modern Western culture in Arctic Alaska resulting from an influx of non-Native workers and the adoption of modern technology over the last 150 years for heating homes, transportation, communication, etc., has greatly influenced the Alaska Native cultural and social framework and increased oil and gas development in the region will most likely result in a stronger influence ("North Slope Borough Background Report," 2005). The balance between adapting to this increasing development and maintaining certain cultural traditions, such as subsistence hunting and fishing and traditional values, should be considered when discussing the potential social and cultural impacts of offshore oil and gas development in the Beaufort and Chukchi Seas.

There is a need for an adaptive management approach and "problem-structuring tools" to aid in conceptualizing risk by stakeholders in the region, if economic development from offshore oil and gas extraction is to occur with a high level of environmental protection (Kämpf & Haley, 2011). A potential tool for achieving the type of structured stakeholder discussion described by Pollack (2007) for wicked problems is MSP, a process which has been defined as "[a]nalyzing and allocating parts of three-dimensional marine spaces to specific uses or non-use, to achieve ecological, economic, and social objectives that are usually specified through a political process" (Douvere & Ehler, 2009). One of the hallmark traits of MSP is that it requires stakeholder collaboration in its design, implementation, and evaluation of plans for offshore development, aiming to achieve social, economic, and ecological objectives for projects

that may positively or negatively affect key stakeholders (Ehler & Douvere, 2010). MSP may offer a practical solution for this issue of stakeholder engagement in Beaufort and Chukchi oil and gas exploration and production, providing a systematic approach that takes into account the temporal and spatial aspects of wicked offshore oil and gas planning issues by attempting to map out the various ocean uses by each relevant stakeholder and facilitating collaboration among stakeholders with conflicting views and values with the goal of reaching consensus before projects move forward.

The Arctic Council

The Arctic countries of Canada, Denmark (through its autonomous province of Greenland), Norway, Russia, and the United States all have valuable oil and gas deposits in the Arctic offshore and varying strategies to develop these resources. Russia has been developing its oil and gas resources in the Arctic since the 1970's, starting in the West Siberia region ("Arctic Resource Development: Risks and Responsible Management," 2012). Norway has begun to step up activity in the Barents Sea, where oil and gas exploration has been carried out for thirty years ("Arctic Resource Development: Risks and Responsible Management," 2012). Recently, exploratory drilling for petroleum off the coast of Greenland, in Baffin Bay to the west and in the waters to the northeast, has begun ("Arctic Resource Development: Risks and Responsible Management," 2012). In the Arctic waters off the coasts of Canada and the U.S., petroleum exploration in the Beaufort Sea has taken place since 1976 and, in the past decade, interest in Alaska's

portion of the Chukchi Sea has grown, with Shell, Statoil, and ConocoPhillips holding leases in the area ("Arctic Resource Development: Risks and Responsible Management," 2012). While the five Arctic nation-states mentioned above control territorial claims in the Arctic offshore, the other Arctic nations involved in cooperation on issues related to the region include Iceland, Finland, and Sweden, which do not have territorial claims in the Arctic offshore (Johnston, 2010) but still have land in the region above the Arctic Circle. These eight Arctic nation-states form the membership of the Arctic Council, an intergovernmental forum established by the Ottawa Declaration in 1996 that serves as the main decision-making mechanism for development in the region (Johnston, 2010; "Arctic Resource Development: Risks and Responsible Management," 2012). The Arctic Council is the only established international forum where all of the Arctic coastal states agree to discuss Arctic affairs ("Arctic Resource Development: Risks and Responsible Management," 2012) and of which several other countries and international organizations have been granted observer status (Johnston, 2010). Additionally, some indigenous peoples' organizations have been granted the status of permanent participants, which have a role similar to that of member states (Young, 2009). The stated purpose of the Arctic Council is "to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular, issues of sustainable development and environmental protection in the Arctic" ("About Us - History," 2014).

Most of the territorial claims containing oil and gas resources in the Arctic are settled; however, there are four bilateral disputes outstanding and one with international

ramifications regarding the outer delimitation of Arctic continental shelves ("Arctic Resource Development: Risks and Responsible Management," 2012). As the focus of this research is on the U.S. portion of the Arctic, it should be noted that two of these bilateral disputes involve the U.S. Arctic boundaries: one with Russia in the Bering Strait and one with Canada in the Beaufort Sea ("Arctic Resource Development: Risks and Responsible Management," 2012). The latter dispute will be discussed in section 3. Though the disputes involve relatively small areas and the risk for armed conflict over these areas is low, it is important to note that these ongoing territorial disputes in the Arctic Ocean are not purely the result of economic interests by the Arctic nation-states, but also involve aspects of national security ("Arctic Resource Development," 2012; Kříž & Chrášťanský, 2012). Increasing ship traffic through the region, specifically, means that the international maritime borders of the Arctic nations will likely see an increase in transits by foreign vessels, requiring greater monitoring from national defense agencies.

The Arctic Marine Shipping Assessment (AMSA) produced by the Arctic Council contains a section on the human dimensions of Arctic development, describing "human dimensions" as the "interrelationships of people and the environment, particularly with respect to environmental change" (AMSA, 2009). The section mentions local shipping that will support oil and gas installations stating that if this development increases, the economic consequences in the affected regions will be far-reaching, as will the environmental impacts (AMSA, 2009). With this in mind, AMSA points out that "the difference between negative impacts and positive or neutral ones is often a question of planning and preparation" (AMSA, 2009).

The Arctic Council has established working groups to address numerous issues related to environmental protection, the health of Arctic peoples, and safety in the region. Chairmanship of the Arctic Council rotates every two years between the eight member states, with Canada as chair in 2013-2015 and the U.S. assuming chairmanship for 2015-2017, after holding the position previously from 1998-2000 ("About Us - History," 2014). One of the working groups, Protection of the Arctic Marine Environment (PAME), has produced "Arctic Offshore Oil and Gas Guidelines" that outline the following classic international environmental principles upon which offshore oil and gas development in the Arctic should be based: 1) principle of the precautionary approach, which, ultimately, "ensures that a substance or activity posing a threat to the environment is prevented from adversely affecting the environment" (Cameron & Abouchar, 1991); 2) polluter pays principle; 3) continuous improvement; and 4) sustainable development. Adherence to these principles could reflect poorly or favorably on the U.S. especially when the country assumes chairmanship of the Arctic Council, so oil and gas planning at the Federal and State level should reflect these principles.

Increased and new users of the Beaufort and Chukchi Seas

Predictions for the extent of sea ice loss in the Arctic vary greatly and the environmental effects of climate change in the Arctic are largely unknown and currently being studied extensively. Despite these uncertainties, several facts have become apparent over the last several years: the volume of ship traffic through the region has increased and

is expected to continue to increase (Smith & Stephenson, 2013), and oil and gas deposits under the seabed remain important assets for the Arctic nations. Based on the USGS assessments of these undiscovered resources, the U.S. portion of the Arctic contains the second largest oil and gas deposits in the Arctic region, behind Russia (Gautier et al., 2009). By one model, petroleum production accounted for nearly 29% of Alaska resident personal income in 2005, showing the great importance of oil and gas in the State's economy (Goldsmith, 2009) since 1977, when oil first flowed in the 800-mile long Trans-Alaska Pipeline System (TAPS) from Prudhoe Bay on Alaska's North Slope to the deepwater port in Valdez for transport to refineries (Grant, 2010). In order to support the expected increased shipping and offshore oil and gas development in this region, there must be sufficient infrastructure to support these industries and, thus, it is reasonable to assume that the Alaskan Arctic coastal zones along the Beaufort and Chukchi Seas will be the sites of increasing development in the coming decades.

Stephenson, Smith, & Agnew (2011) created a model to quantify offshore and ground transportation development in the Arctic using climate and sea-ice scenarios, finding that maritime access in the Arctic is likely to increase while inland road networks, which currently rely heavily on ice roads during the winter season, will face greater challenges if predicted milder air temperatures and/or deeper snowfall trends continue. In addition to these onshore support infrastructure challenges, storms, floating icebergs, and limited manpower are among the great challenges facing development in the Arctic offshore, and the region may not be currently capable of handling a large oil spill due to these complexities (Harsem, Eide, & Heen, 2011). The host of complex technical

difficulties for continued oil and gas exploration and development in the Beaufort and Chukchi Seas, coupled with the social complexities arising from diverse groups of stakeholders in the Alaskan Arctic, indicate the need for a planning process that considers and weighs as many elements of this wicked problem as possible.

Most currently producing offshore drilling sites in the U.S. Arctic are located onshore or in State waters (within three miles from the coastline) but new sites will continue to move outward from the coastline into Federal waters as technology advances and these sites become more economical to develop (Houseknecht & Bird, 2006), while still potentially requiring use of State waters for transport to onshore infrastructure such as pipelines. Disasters occurring in marine environments, such as oil spills from a well blowout similar to the Deepwater Horizon incident in 2010 in the Gulf of Mexico, can be difficult to contain and can cross into Federal or State waters due to currents, winds, and other outside factors; the cold waters, sea ice, and unique sea life in the Arctic further complicate this issue and require additional consideration in risk assessments. For these reasons, among others, it is important to consider how the different jurisdictional entities plan their permitting of offshore oil and gas leases, as environmental incidents that may occur in one jurisdictional boundary are not confined to those boundaries and can have significant adverse impacts to the larger ecosystem. Such a spill would be subject to the Oil Pollution Act of 1990 and other Federal statutes, discussed in Section 3, regardless of whether it was in Federal or State waters ("Federal Offshore Lands," 2014).

A report from the Arctic Monitoring and Assessment Programme (AMAP), a working group of the Arctic Council, found that, currently, 80-90% of petroleum

hydrocarbons entering the Arctic environment were estimated as originating from natural seeps, though overall concentrations in the marine and coastal environments were low ("Arctic Oil and Gas 2007," 2008). The largest human source of hydrocarbons in the Arctic was found to be from oil spills, though, to date, there have not been any large oil spills in the Arctic from oil and gas extraction activities ("Arctic Oil and Gas 2007," 2008). Such oil spills are considered to be the greatest environmental threat in the region, though frequent smaller spills could have substantial impacts as well ("Arctic Oil and Gas 2007," 2008). The cold water temperatures combined with sea ice, unique marine life, wide array of migratory seabirds, currents, and severe weather patterns that could inhibit response capabilities are among the concerns that such a large oil spill in the Arctic would be devastating ("Arctic Oil and Gas 2007," 2008). Other cumulative environmental effects of oil and gas development in the Beaufort and Chukchi Seas include physical disturbance, such as construction of gravel islands and causeways that can impede fish migrations and nearshore water flow, disturbance of benthic habitats from dredging and drilling, and disturbance of ice habitats from icebreakers used in support of oil and gas operations ("Arctic Oil and Gas 2007," 2008). An additional cumulative effect is the increase of human-generated noise in the Beaufort and Chukchi Seas which can cause short-term behavioral changes in fish and marine mammals near the noise source; to date, no long-lasting effects on fish stocks or marine ecosystems have been found ("Arctic Oil and Gas 2007," 2008), though attention is increasingly being given to the issue (see Appendix A for a timeline of recent final rules from Federal agencies and major court cases related to marine acoustics). Besides cumulative effects on the natural environment,

increased oil and gas activities can also lead to adverse social and cultural impacts, such as the arrival of large numbers of new workers to remote communities, potentially creating tensions with local residents and straining local resources, or activities that disrupt traditional subsistence hunting and fishing and that could lead to conflicts among users of the marine space ("Arctic Oil and Gas 2007," 2008).

In order to achieve truly comprehensive ecosystem-based management in the Beaufort and Chukchi Seas, all stakeholders need to be engaged from the beginning of the planning process so that multiple activities with multiple users can be accounted for when determining where to allow oil and gas installations to occur and under what conditions. Collaboration among stakeholders allows for the identification of perceived risks stemming from the wicked problem of offshore oil and gas development in this region, allowing for key stakeholders to continually update wicked risk assessments. Though a wicked risk assessment is outside of the scope of this research, it is important to remember that when dealing with a wicked problem, it is impossible to fully understand and manage all risks (Kämpf & Haley, 2011) so these risks must be dealt with in a context of great uncertainty regarding their potential effects. Uncertainties inherent in a wicked problem such as this one can stem from a lack of scientific knowledge, as well as from strategic and institutional factors, e.g., stakeholders with differing perceptions of risks and fragmented decision-making arenas at international, Federal, State, and local levels (van Bueren, Klijn, & Koppenjan, 2003). Non-governmental organizations (NGOs) can play a crucial role in achieving the integration of ecosystem-based management by helping to find solutions and offering concrete proposals (Calado et al., 2012). NGOs play an

independent role in society, unlike government entities, and "can act as facilitators between governments and communities and, if necessary, across government departments and agencies" (Calado et al., 2012). Given this unique position of NGOs, strategies developed with the goal of ecosystem-based management in the Beaufort and Chukchi Seas should allow for their involvement at a high level.

Federal and State offshore oil and gas permitting

The U.S. Arctic State, Alaska, serves as a valuable oil-producing region and the history of oil and gas development there illustrates the complex nature of the Federal-State relationship present in the state, resulting in a complex permitting process for projects. The majority of oil and gas activities in the Alaskan Arctic have been concentrated in the State onshore and offshore areas along and in the Beaufort Sea as well as the Federal offshore areas immediately adjacent to the Federal-State maritime boundary in the Beaufort; however, USGS resource estimates indicate that the total mean volume of undiscovered oil and gas resources in Arctic Alaska are distributed approximately evenly between Federal and State offshore areas in the Beaufort and Chukchi Seas (Houseknecht & Bird, 2006). With this potential for increased oil and gas activity in areas under Federal jurisdiction in the Beaufort and Chukchi Seas realized, Executive Order 13580 in 2011 established the Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska, led by the Department of the Interior, to coordinate Federal agencies involved in the permitting of

onshore and offshore oil and gas projects. Among the duties listed for the working group in the Executive Order is the obligation to "coordinate Federal engagement with States, localities, and tribal governments, as it relates to energy development and permitting issues in Alaska" ("Executive Order 13580," 2011). A 2013 Federal report by the Interagency Working Group listed current shortcomings of the management of Federal permitting of these offshore projects, stating that "[t]hese challenges underscore the complexity and possible variability of evaluating potential projects and plans in the Arctic with a proposal-by-proposal, area-by-area, piecemeal approach. In the rapidly changing Arctic, the current decision-making framework for managing natural resources may not be sufficiently flexible to adapt to future demands and emerging conflicts" (Clement, Bengston, & Kelly, 2013). This statement further demonstrates how oil and gas development in the Beaufort and Chukchi Seas fits the definition of a wicked problem. This admission of shortcomings in the Federal report demonstrates the need for a better decision-making framework, one that incorporates elements of wicked risk assessment among the many key players in Arctic offshore oil and gas planning and suggests that agencies may make decisions with negative consequences that could have been avoided if there was a higher level of coordination among stakeholders. In addition to this awareness of the issue at the Federal level, the Governor of Alaska and representatives from various State agencies have indicated that they intend the State to have a high level of involvement in the overall Federal planning of offshore oil and gas development in the Beaufort and Chukchi Seas, so that local stakeholders can provide input during the

planning process ("Governor Comments on National Arctic Strategy," 2013; Carducci, 2012; Jensen, 2010).

The number of regulatory agencies involved in Beaufort and Chukchi Sea oil and gas projects depends on a particular project's scope and locale within jurisdictional boundaries. Stakeholders can use the judicial system to point out ambiguities, gaps, or unintended consequences of regulations at any step in a project's process by filing lawsuits against regulators or project owners; and each regulator can withhold permits, financially penalize, and criminally charge negligent project owners (Khadjinova, 2014). Additionally, public participation can influence the regulatory process in non-litigious ways through lobbying of elected officials and though the submission of public comment at various stages in a project; additionally, Federally-recognized tribal governments must be formally consulted by Federal agencies taking action on projects (Khadjinova, 2014). The diverse views and values of stakeholders in the Beaufort and Chukchi Seas, and the effect that these opinions may have on the permitting process, contribute to a regulatory system that is constantly changing. In the Beaufort and Chukchi Seas, a single project could fall under the jurisdiction of local, State, and/or Federal levels of government regulation, further complicating this ever-changing regulatory process (Khadjinova, 2014). In this research, the focus is on the Federal and State levels of regulation as they comprise the majority of regulatory layers for oil and gas projects in the Beaufort and Chukchi Seas. While looking at the Federal and State relationship as it relates to oil and gas development in Alaska, it is important to keep in mind that it is the permits from Federal and State regulatory agencies that are directly binding on those oil and gas

companies choosing to operate in the U.S. portion of the Beaufort and Chukchi Seas and that these permits determine at least a part of the conditions under which these companies may operate. Besides regulations, oil and gas industry standards and individual corporate environmental strategies are an important component of environmental protection, (Sharma, 2000), though industry standards and corporate strategies are outside of the scope of this research.

It has been noted that despite having a history of open decision making, the U.S. has often made *ad hoc* or politically motivated decisions regarding Arctic resource development that lacked a broadly understandable, reviewable rationale (Flanders, Brown, Andre'eva, & Larichev, 1998). While this *ad hoc* issuance of offshore oil and gas permits in the Beaufort and Chukchi Seas may consider the particular requirements for marine protection in the area immediately surrounding an offshore project in question, the cumulative effects of multiple permitted projects and activities in the Alaskan Arctic marine environment can lead to unforeseen conflicts between users or some degree of preventable degradation of the marine environment. By law, regulatory agencies must act on their permitting authority separately (Khadjinova, 2014), making coordination among agencies difficult. In order to address this piecemeal approach to permitting, the State of Alaska established the Office of Project Management and Permitting to handle large projects under its jurisdiction and provide a single point of contact for these large projects; however, there is not a direct equivalent to this mechanism at the Federal level (Khadjinova, 2014) and the need to better coordinate between the State and Federal level exists as projects in the Beaufort and Chukchi may fall under the jurisdiction of both

entities. With this in mind, a new framework to evaluate the issuance of permits within the larger combined U.S. and Alaska Arctic marine environment, consisting of the Beaufort and Chukchi Seas, with multiple users may be necessary for the future in order to address the potential cumulative effects of activities at an early stage.

The U.S. adopted a National Strategy for the Arctic Region in 2013 (herein NSAR) and stated that the "United States will continue to emphasize the Arctic Council as a forum for facilitating Arctic states' cooperation on myriad issues of mutual interest within its current mandate" (*National Strategy for the Arctic Region*, 2013). The NSAR also mentions that the proven and potential oil and gas reserves in the U.S. Arctic "will likely continue to provide valuable supplies to meet U.S. energy needs" and must be developed in a responsible manner with an aim of maintaining healthy ecosystems. In January 2014, the White House released an Implementation Plan for the NSAR, outlining objectives and next steps for lead agencies (*Implementation Plan for the National Strategy for the Arctic Region*, 2014). While the guidelines set by the Arctic Council and the NSAR can aid in the overall planning of offshore oil and gas in the Beaufort and Chukchi Seas at the higher government planning levels, it is the permits from regulatory agencies that directly bind companies to specific legal requirements at the project levels.

In addition to the Federal government, the State of Alaska plays an important role in Arctic oil and gas developments within its waters. The State of Alaska Department of Natural Resources (ADNR), Division of Oil & Gas, has a goal to "foster an environment of open communication with all stakeholders," as well as to map work processes and relate those processes back to statutes and regulations to ensure consistency ("Annual

Report," 2012). Arctic development issues can make communication difficult since the topics and their importance in decision making may be outside of the expertise of many people, including those involved in high levels of government decision making at the Federal level (Flanders et al., 1998). This is particularly relevant in the U.S., where Alaska is the only Arctic state with an entirely different climate and set of concerns than the remaining 49 states, especially those in the Gulf of Mexico region where the majority of U.S. offshore oil and gas development occurs (see Fig. 2).

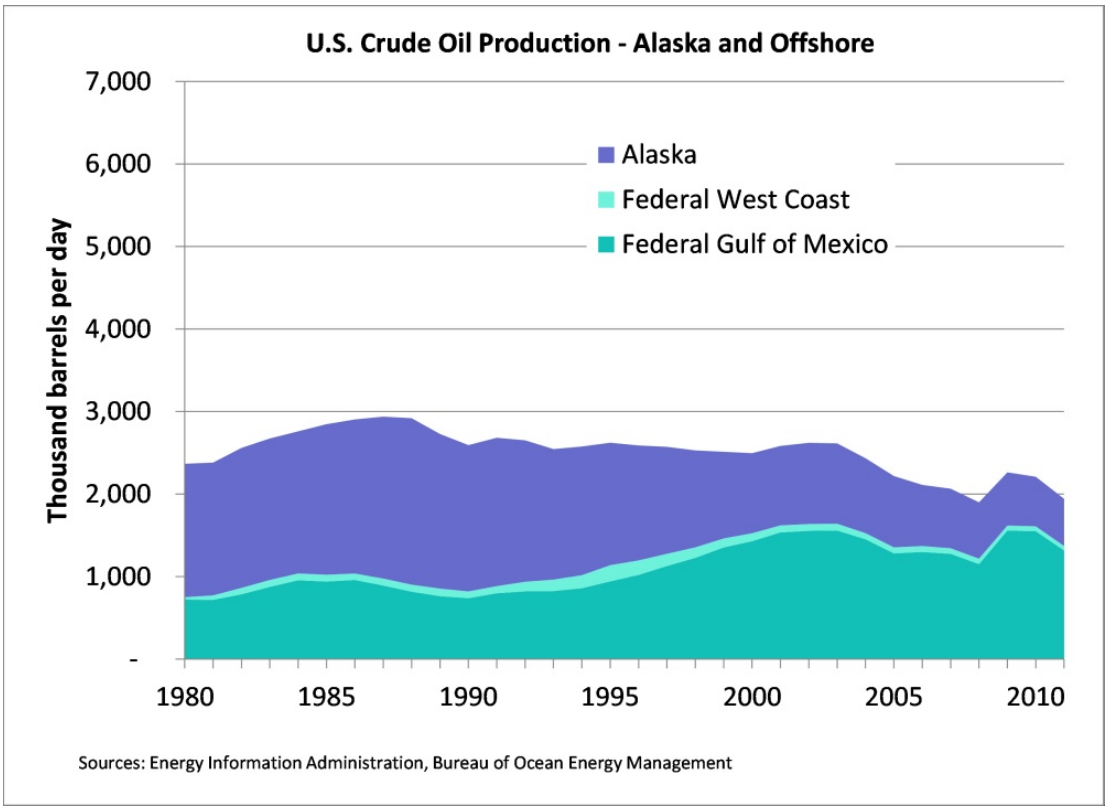

Figure 2. Crude Oil Production – Alaska and Offshore. Gulf of Mexico Federal offshore oil production accounts for 23 percent of total U.S. crude oil production, and the majority of U.S. crude oil offshore production. In this graph, Alaska production includes both onshore and offshore. (Source: EIA, BOEM)

Land ownership

In order to understand the Federal and State relationship as it pertains to oil and gas development in the Alaskan Arctic, it is necessary to look briefly at land ownership status in the state. The 1867 purchase of the Alaska territory from Russia made the United States an Arctic nation (Grant, 2010). In 1912, the territory of Alaska was allowed an elected legislature with limited authority (Ascott, 2003) and the 1959 granting of statehood to the 49th State in the Union (Grant, 2010) further solidified this status as an Arctic nation for the U.S. and allowed Alaska residents to have greater control over their affairs, rather than to be governed from afar by Washington, D.C. ("Modern Alaska - Statehood," 2014). In 1920, Congress designated a large oil reserve on Alaska's Arctic coast, National Petroleum Reserve-Alaska (NPR-A), and in 1960, the Secretary of the Interior designated 8.9 million acres in northeast Alaska to create the Arctic National Wildlife Refuge (ANWR), set aside for conservation purposes (Grant, 2010). Selection of State lands also began in 1960, with the area on the North Slope between the NPR-A and ANWR as the first to be selected by the State from the Federal government due to the known oil deposits in the region (Grant, 2010). This State land selection process was complicated in 1965 when a provision in the Alaska Statehood Act was brought to light: the Act denied the right to claim lands potentially subject to aboriginal title (Grant, 2010). The Alaska Federation of Natives (AFN), composed of members of Eskimo, Indian, and Aleut descent, was formed to address this issue of aboriginal title to lands and the Alaska

Native Claims Settlement Act (ANCSA) was signed by President Nixon in 1971 (Grant, 2010). Figure 3 is a map of general land ownership status in Alaska.

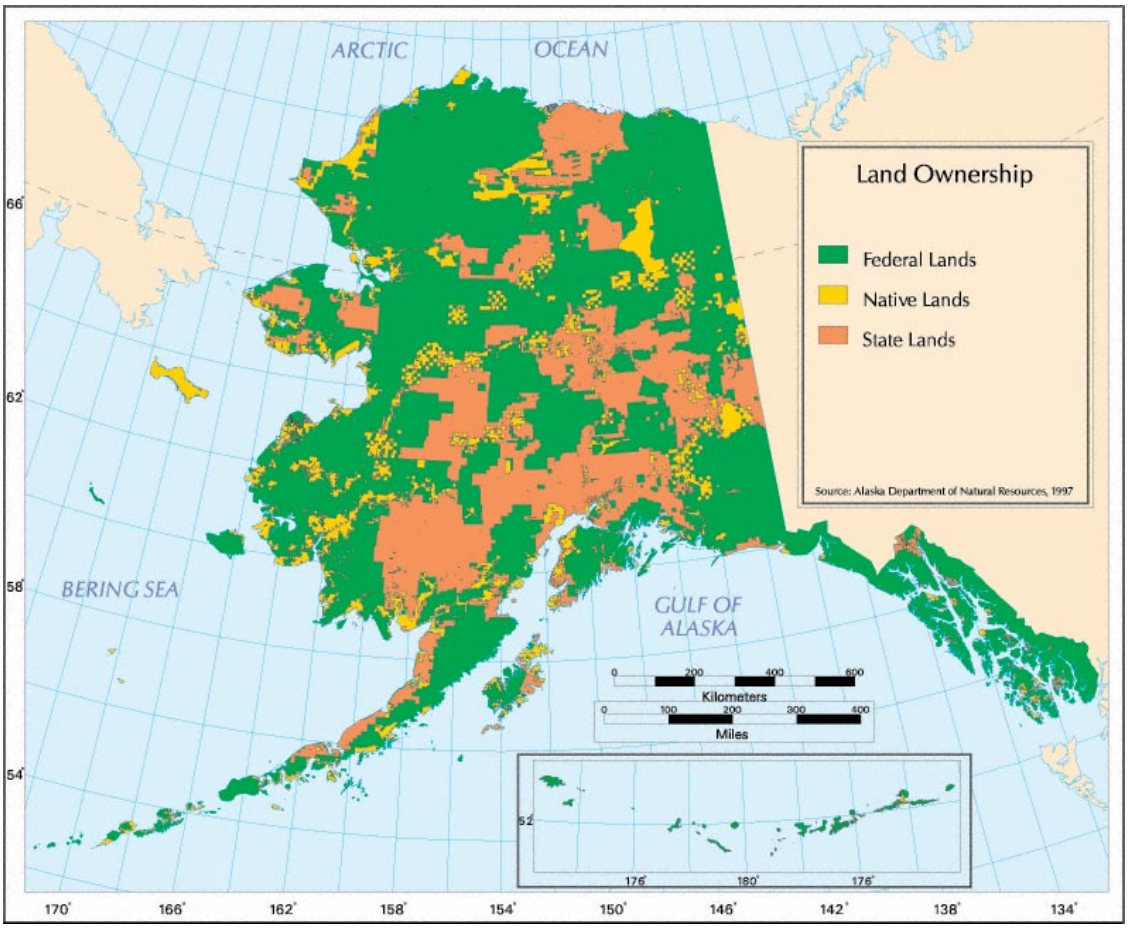

Figure 3. General land ownership status in Alaska. The state-owned land shown in the northeast portion of the state is situated between NPR-A to the west and ANWR to the east. (Source: Alaska Humanities Forum, ADNR)

ANCSA stated that Alaska Natives (the term Alaska Natives is used to indicate the indigenous peoples of Alaska) would forfeit aboriginal title to their lands in exchange for roughly 44 million acres of land divided among 220 villages and 12 regional Native-run corporations (see Fig. 4). These corporations would hold full title and subsurface rights

and administer cash payments from the Federal and State governments (Grant, 2010). These cash payments came in the sum of $962.5 million from the Federal government as compensation to Alaska Natives for extinguishment of aboriginal title to lands and to assist with the establishment of Alaska Native corporations that would hold fee simple absolute title or traditional western title to smaller areas of land (Ongtooguk, 1986). These Alaska Native corporations would in turn administer payments to their Alaska Native shareholders from investment revenues (Ongtooguk, 1986).

Figure 4. Map showing the 12 Alaska Native regional corporations. Arctic Slope Regional Corporation (ASRC) is the primary corporation associated with the Alaska Natives occupying the lands adjacent to the Beaufort and Chukchi Seas. (Source: ADNR)

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) effectively completed the "carving up" of Alaska lands into a complex patchwork of Federal, State,

and Native lands by determining what lands would be set aside for national parks, refuges, and other conservation areas; what lands were to be held by Alaska Native corporations; and what lands were available for the State to select (Gallagher, 1988). ANILCA came about as an attempt by the Federal government to reconcile controversy between development and environmental interests in land use in Alaska, primarily as it pertained to access of public lands for specific purposes such as plane, boat, or snowmachine use ("Alaska National Interest Lands Conservation Act," 2011). ANILCA resulted in approximately 104 million acres being designated to conservation systems in Alaska (see Fig. 5), though ANILCA specifically left the issue of whether or not to allow oil development in ANWR, where the coastal plain is estimated to hold billions of barrels of oil, to a future vote by Congress (Hull & Leask, 2000).

Since roughly 90% of Alaska lands are managed by Federal or State agencies (as of 2000, approximately 65% by Federal, 24% by State, and the remaining 11% managed by Alaska Native corporations or as private land—see Fig. 6), a high level of planning and coordination between Federal and State regulatory agencies is required in determining how areas should be managed (Todd, 2001).

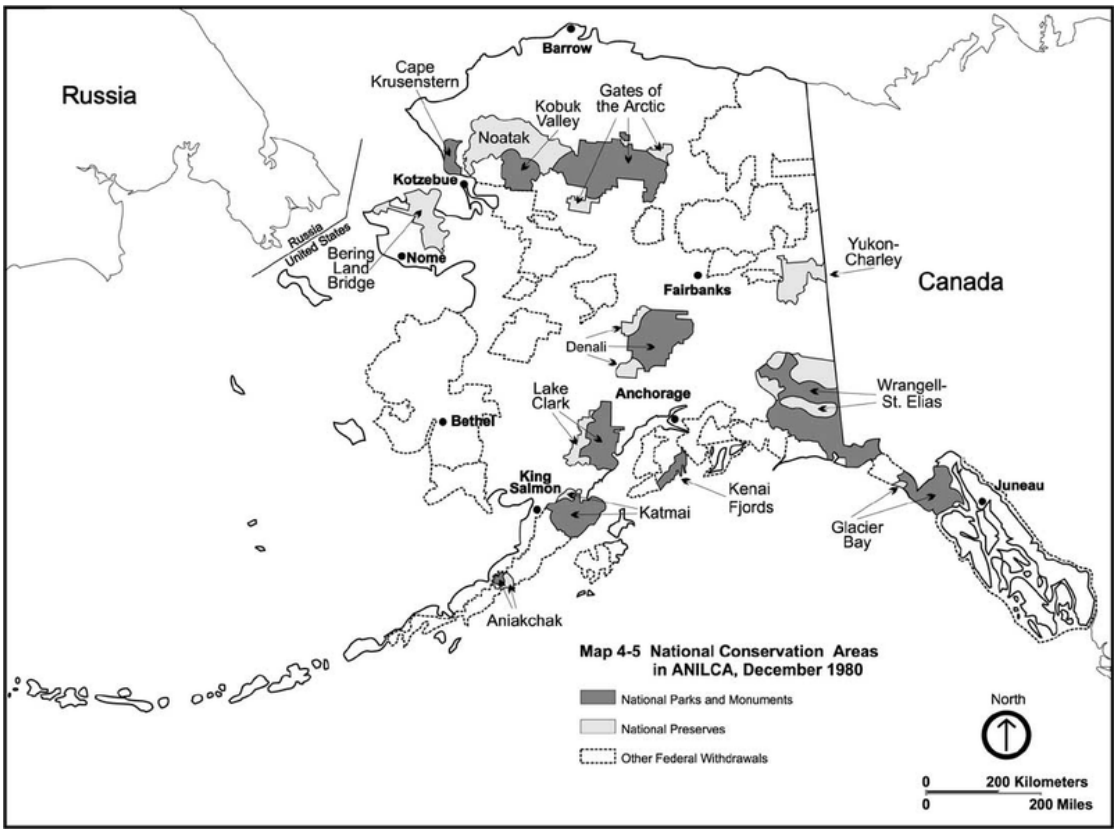

Figure 5. Lands set aside as Federal conservation areas by ANILCA. The white block in the northeast corner of the state indicates the location of ANWR. (Source: Wikimedia Commons)

Each of these agencies must weigh the value of Alaska's land, waters, and wildlife in addition to the competing economic interests of key stakeholders involved in developing the State's natural resources (Todd, 2001), such as oil and gas companies. In an ecologically sensitive area such as the Arctic, this coordination is paramount to success in safeguarding against environmental degradation while seeking to achieve maximum economic benefit.

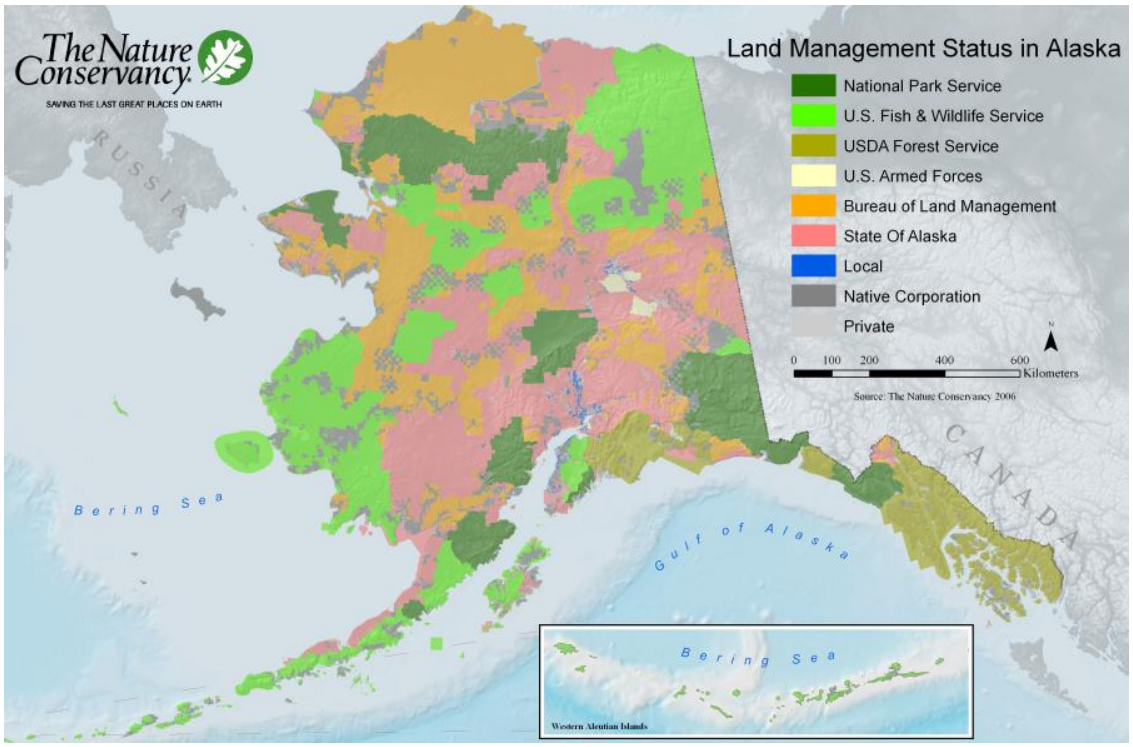

Figure 6. Alaska land management status. (Source: The Nature Conservancy)

In terms of the submerged lands offshore in the Beaufort and Chukchi Seas, jurisdiction is split between State and Federal. Under the Submerged Lands Act of 1952 (43 U.S.C. §1301 et seq.), the State of Alaska owns all lands permanently or periodically covered by tidal waters up to, but not above, the line of mean high tide and seaward to a line three nautical miles from the coast (*Tide & Submerged Land Ownership*, 2000). After the three mile limit and until 200 nautical miles from the shore, the Federal government owns the submerged lands, subsoil, and seabed that comprise the Exclusive Economic Zone of the U.S., or EEZ, formally established by Presidential Proclamation 5030 in 1983 ("Outer Continental Shelf," 2014). Prior to this Proclamation, the Fishery Conservation and Management Act of 1976 (16 U.S.C. §1801-1882, 94 Pub. L. No. 265, 90 Stat. 331)

declared a Fishery Conservation Zone that extended from the State seaward boundary to 200 miles offshore. In 1977, the Act was retitled the Magnuson Fishery Conservation and Management Act (96 Pub. L. No. 561, 94 Stat. 3275) and in 1996, the Act was given its current name, the Magnuson-Stevens Fishery Conservation and Management Act (MFCMA) (104 Pub. L. No. 297, 110 Stat. 3009). This offshore area under Federal jurisdiction is referred to as the Outer Continental Shelf (OCS) for oil and gas planning.

Sea usage

Maritime usage of the Alaskan Arctic in the Beaufort and Chukchi Seas has a rich history and is still vastly important for the subsistence lifestyles of Alaska Natives living in the Arctic. The Beaufort and Chukchi Seas have been the site of continuous indigenous marine use, expeditions and explorations, and have experienced expanding use by the global shipping industry (*Arctic Marine Shipping Assessment*, 2009). The first explorers in the region were the indigenous peoples, who have used Arctic waters for thousands of years (*Arctic Marine Shipping Assessment*, 2009). Early Western exploration of the Arctic was primarily driven by the search for the Northwest Passage (NWP) which passes through the U.S. portions of the Beaufort and Chukchi Seas (see Fig. 7), though it was not until 1906 that the Norwegian explorer Roald Amundsen became the first vessel to complete the NWP (*Arctic Marine Shipping Assessment*, 2009)**.** Whaling led to a great increase in the number of Arctic expeditions and was the most massive, sustained Arctic marine shipping activity, with over 39,000 whaling voyages between 1610 and 1915,

mainly led by the Netherlands, Germany, Britain, and the United States (*Arctic Marine Shipping Assessment*, 2009). These early voyages resulted in the loss of many sailors and ships due to hazardous sea ice and extreme weather conditions; however, those sailors that survived the journey gained specialized knowledge of sea ice distribution and ship handling in ice, encouraging further expeditions (*Arctic Marine Shipping Assessment*, 2009).

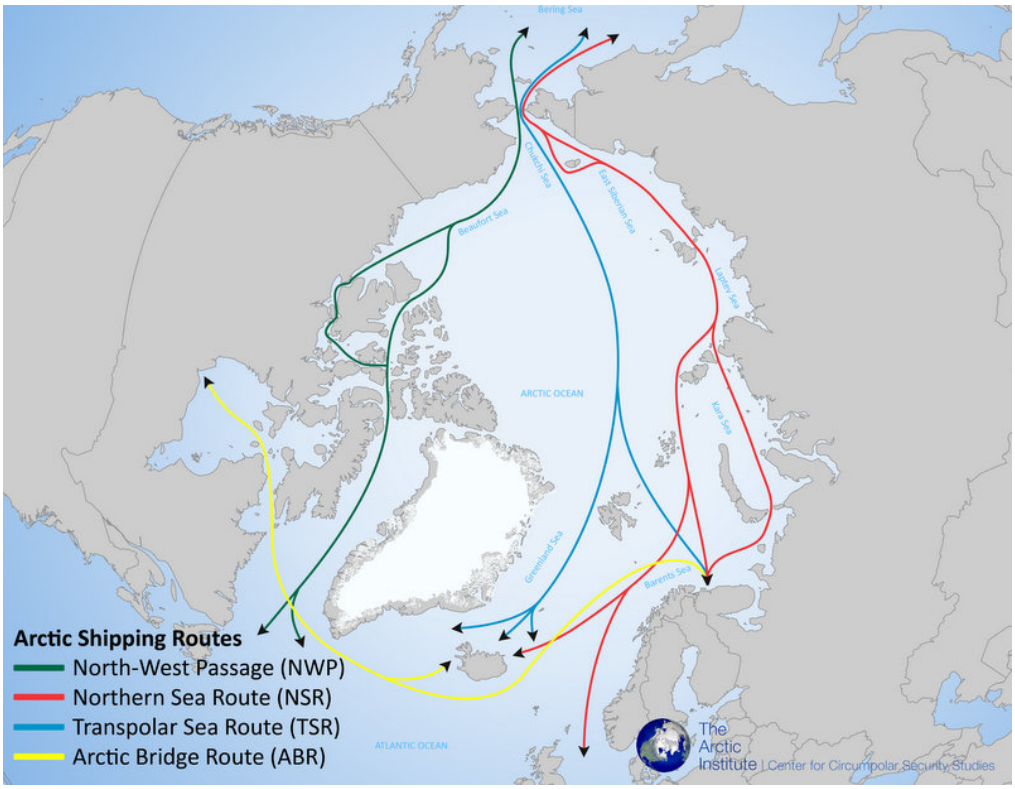

Figure 7. Arctic shipping routes. (Source: The Arctic Institute)

In recent years, the reduction of summer sea ice coupled with better Arctic ship engineering, offshore natural resource development in the region, and a changing global

economy—especially due to the growth of markets in Asia—have resulted in an increase of Arctic passages by ships, particularly along Russia's Northern Sea Route (NSR) (see Fig. 7), which passes through Alaska's Bering Strait (Brigham, 2011).

Alaska Native use of the Beaufort and Chukchi Seas

The Alaska Natives who have called and continue to call the Alaskan Arctic home have adapted to life in the harsh conditions present there and remain reliant on subsistence lifestyles, especially the abundant sea life in the Beaufort and Chukchi Seas, the two seas located on the U.S. Arctic Alaska OCS. The 2012 U.S. Census determined the population of the North Slope Borough, Alaska's northernmost region that borders the Beaufort and Chukchi Seas, to be 9,643, with 52.9% of that population identifying as American Indian or Alaska Native (U.S. Census, 2012). ANILCA gave priority to hunting and fishing on Federal lands by rural residents of Alaska and in 1999, the Federal government took over regulation of subsistence fishing on navigable waters on or near Federal conservation units after a 1995 Federal court ruling, *Katie John v. United States* (Hull & Leask, 2000). *Katie John v. United States* was a case in which Alaska Natives contested the rules designating certain Federal waters that were classified as "public lands" for rural subsistence hunting and fishing priority under ANILCA as too narrow (*John v. United States*, 2013). The ruling invalidated Dept. of Interior regulations that had exempted waters under Federal jurisdiction from the definition of "Federal public lands" and resulted in Federal officials providing rural residents of Alaska with a preferential right to

take fish and game in these waters (*John v. United States*, 2013). With offshore oil and gas development, consideration of subsistence fishing and whaling plays an important part in Federal and State planning of projects, as accommodations must be made that allow subsistence activities to continue. Poor planning that could lead to a halt in subsistence activities due to releases of contaminants into the marine environment, disturbance of fish and marine mammal habitats, or other disturbances, could lead to a loss of food security for the subsistence users and result in litigation against the transgressor. While it is impossible to bring the risk of environmental accidents from oil and gas activities to zero, careful planning combined with Arctic-specific engineering standards and operating procedures can greatly reduce this risk. Additionally, local and Alaska Native knowledge, particularly of sea ice conditions and other hazards important to offshore oil and gas activities in the Beaufort and Chukchi often play an important—though informal—role in planning and emergency-response activities (Eicken, Ritchie, & Barlau, 2010). However, there is currently not a sufficient organizational structure to formally incorporate a productive exchange of local and Alaska Native knowledge on the North Slope of Alaska (Eicken et al., 2010). It has been proposed that the creation of such an organizational structure to formally engage the local and Alaska Native stakeholders in mitigation and hazard planning could be more effective than merely soliciting public comment on projects (Eicken et al., 2010)

Marine Spatial Planning as a potential solution

MSP is a tool for managing an increasingly growing maritime economy while simultaneously providing a means to protect marine biodiversity, and has the potential to guide single sector management of marine activities toward integrated sea use management (Douvere, 2008). MSP incorporates the concept of ecosystem-based management with more specific marine-based criteria and mapping for use by resource managers and for discussion by all stakeholders, taking into account the fact that specific activities only occur in certain areas of the ocean (Douvere, 2008). For example, important ecological areas are found where there is a high diversity of species and productivity, while economic activities can only occur where their resources of interest are located; this is also the case on land, but MSP has to be adapted from land use planning to account for the "dynamic and three-dimensional nature of marine environments" (Douvere, 2008). Thus, MSP requires input from stakeholders to determine how all possible activities in a marine environment are ranked in terms of social importance.

Due to its wicked nature, the planning of Beaufort and Chukchi oil and gas development requires an innovative approach to address the unique complexities that stakeholders, including project planners, face in the these seas (Kämpf & Haley, 2011). For this reason, Federal and State planners should work together closely to draw upon all available Arctic expertise from a social, cultural, economic, and environmental perspective and utilize the most relevant information when making decisions regarding

offshore Beaufort and Chukchi oil and gas. This should include providing an opportunity to engage all stakeholders in the planning process and to account for multiple uses of the marine space that may impact each other. Such a coordination of efforts, perhaps through MSP, could result in proactive management and conservation of marine and coastal resources while simultaneously allowing for the economic benefits of further development in the Arctic region. NGOs can be involved in MSP as stakeholders, but can also serve as organizing parties or driving forces for MSP (Calado et al., 2012). Since NGOs play an independent role in society, they can help to encourage public participation as organizing parties or driving forces in MSP though community organization, training, research, education, advocacy, and, by partnering with academic entities and local government agencies, can help with project implementation, knowledge transfer, data collection, monitoring, and evaluation (Calado et al., 2012).

One important consideration when exploring MSP as a viable tool for use to address the wicked problem of oil and gas development in the Beaufort and Chukchi Seas is the existing regulatory structure present. In a study comparing the U.S. and Canadian regulatory approaches for oil and gas, with the former being characterized by command-and-control regulations that focus on technology and Canada being characterized by a more flexible approach focused on environmental impacts, no significant differences were found in the corporate environmental strategies of oil and gas companies operating in each of the countries (Sharma, 2001). Further, this study indicated that regulations appear to be important drivers of corporate environmental practices at initial stages of planning, but other external and internal drivers become stronger influences after these initial

stages, suggesting that a combination of both regulatory approaches, more stringent at the beginning and more flexible at later stages, may help to produce a higher level of environmental protection while still allowing for technological innovation and competitiveness among companies (Sharma, 2001). Managi et al. (2005) further strengthened support for a regulatory approach that allows for greater technological innovation and competitiveness at later stages by showing that, over a 28-year study period of environmental regulation and technological change in Gulf of Mexico (GOM) offshore oil and gas, technological change was partitioned into roughly 80% in the market sector (oil and gas production) and 20% in the environmental sector (Managi, Opaluch, Di, & Grigalunas, 2005). In other words, environmental regulation-driven technological change resulted in fewer oil spills and greater water quality, but the amount of technological change resulting from command-and-control regulations lagged behind the amount of change resulting from market forces (i.e., increased oil and gas production) (Managi et al., 2005). These findings suggest that an overly optimistic view of the potential of environmental regulations for driving technological change and improved environmental quality in offshore oil and gas could lead to poorly designed environmental policies (Managi et al., 2005) and the regulatory approach should be flexible enough to include opportunities for innovation by companies so that environmental technology can keep pace with increased production. In order to avoid severe environmental degradation in the Beaufort and Chukchi marine and coastal environments, this more flexible regulatory approach for the later stages of oil and gas in the Arctic should be considered when developing new planning mechanisms, such as MSP, so that innovative

technologies that help maintain a high level of environmental quality are encouraged and that opportunities for this innovation to keep pace with the predicted increase in offshore production are incorporated into the planning.

The regulatory structure in the U.S. and Alaska currently allow for public participation in the permitting of projects (detailed in section 4), meaning that public participation has the potential to shape these permitting requirements. Incorporating elements of the wicked problem in development of an MSP process for the Beaufort and Chukchi Seas could be one potential option to improve current and future offshore oil and gas planning in the region by, among other potential benefits, aiding stakeholders through the public participation channels for which the current Federal and State permitting process allow.

2. METHODOLOGY

This research reviews current permitting processes that provide insight into the Arctic Alaska oil and gas management strategies of the U.S. Federal Government and the State of Alaska, one element of the wicked problem of oil and gas development in the Beaufort and Chukchi Seas. In addition to an overview of the permitting processes, a critical look at the U.S. National Strategy for the Arctic Region, particularly as it relates to planning and permitting of oil and gas development and how the State responds to it, is provided. The analysis of these planning and permitting approaches provide insight into the priorities that the Federal and State entities consider when deciding whether or not to allow particular oil and gas development projects in Alaska's Beaufort and Chukchi Sea coastal and marine areas.

Further discussion of wicked problem characteristics of Beaufort and Chukchi Sea oil and gas development is included to demonstrate the need for an improved collaborative decision-making structure for stakeholders, one that balances economic interests with environmental protection in the this Arctic marine and coastal environment. Suggested improvements to the issue of stakeholder engagement are weighed in the context of MSP, which could provide one possible tool to achieve this goal of economic development and environmental protection. MSP is a sub-activity of overall sea use management and has been promoted as a means to unite stakeholders through long-term, policy oriented regional decision-making, implemented through detailed zoning maps, zoning regulations, and/or a permit system (Douvere & Ehler, 2009), similar to land use

planning. Rather than a piecemeal, top-down regulatory approach, a proper application of MSP could potentially result in a comprehensive bottom-up approach to Arctic offshore oil and gas planning that truly engages stakeholders in a meaningful way, instead of simply fulfilling legal obligations to allow for public input, helping to avoid adversarial struggles, and serving as a method to strive for cooperative stewardship in the Arctic region. This qualitative analysis of Federal and State approaches for offshore oil and gas permitting in the U.S. Arctic will be further strengthened by examining Rhode Island's Special Area Management Plan (SAMP), the first marine spatial plan in the U.S. to be approved by the Federal government as part of a state's Coastal Zone Management Program (CZMP). This case study provides a basis for examining if the approach used in Rhode Island and its attempt to incorporate a high level of stakeholder engagement in the offshore development planning process could potentially be adapted to improve the Federal and State planning for future offshore oil and gas projects in the Beaufort and Chukchi Seas. While the MSP used in Rhode Island may have been successful, there are many differences to consider for MSP when examining its applicability for the Beaufort and Chukchi Seas, an area with an entirely different set of political, social, cultural, economic, environmental, and technical factors than Rhode Island. However, the act of bringing together stakeholders from various industries and interests is present in the Rhode Island case and this example of stakeholder engagement is the focus.

Limitations and assumptions

The Alaska Coastal Management Program (ACMP), a voluntary effort under NOAA's National Coastal Zone Management Program to implement coastal zone plans at the State level, expired in 2011 and was not reauthorized by the Alaska State Legislature; a ballot initiative to reinstate the program was written in 2012 but was voted down, making Alaska the only coastal state in the U.S. currently without a Coastal Zone Management Program (CZMP). One proponent of the 2012 ballot initiative, a former Alaska governor, argued that the Alaska CZMP had helped to coordinate permitting between Federal and State agencies in the past (Knowles, 2012), while one opponent of the initiative, another former Alaska governor, argued that the way the 2012 initiative was written was entirely different than the original Alaska CZMP, resulting in a program that would duplicate efforts of existing State agencies, particularly the Alaska Department of Natural Resources (ADNR) (Murkowski, 2012). After the expiration of this State program, permitting and oversight of coastal management fell under the responsibility of the ADNR, which had existing permitting authority prior to the Alaska CZMP. For this reason, there is no single, overarching State coastal management plan to examine in this study and hence, State oil and gas permitting, leasing, and authorization requirements serve as the substitute. Additionally, the evaluation of the potential use of MSP in the Beaufort and Chukchi Seas partially relies on an example from Rhode Island, where MSP was incorporated as part of the State CZMP and where there is an entirely different

political climate than in Alaska. In order to account for these stark differences, recent statements from State agency and industry representatives in Alaska indicating concerns about the implementation of MSP in the Alaskan offshore are considered.

3. OVERARCHING LEGAL CONTEXT AND ECONOMIC CONSIDERATIONS

Before discussing the permitting process of the U.S. Federal Government and the State of Alaska, it is necessary to survey the overarching legal regimes, treaties, and statutes applicable to environmental protection in the Arctic marine environment of the Beaufort and Chukchi Seas. In addition, a brief overview of economic forecasts for offshore oil and gas development in these areas is provided to describe potential development scenarios for the region. These factors play an important role in the oil and gas planning process and can dictate where and when resources are developed, contributing to the wicked problem.

Legal regimes and statutes

The Third United Nations Convention on the Law of the Sea and the Ilulissat Declaration

The Third United Nations Convention on the Law of the Sea (UNCLOS III), which concluded in 1982, is a treaty among member nation-states regarding the use of the world's oceans and the jurisdiction of the continental shelves of nations. The treaty, among many other provisions, sets forth a boundary for territorial waters—12 nautical miles from the nation's coastline—as well as the EEZ, or Exclusive Economic Zone, which extends 200 nautical miles from the nation's coastline (Attard, 1987). Within the

EEZ, the nation-state has exclusive right to the living marine resources and mineral resources, and can regulate pollution from ships entering the EEZ for innocent passage. Article VI of UNCLOS III establishes the International Seabed Authority (ISA) for the regulation and taxation of seabed, ocean floor, and subsoil resources extracted in the high seas of the areas outside of the 200 nautical mile EEZ limit ("About Us - International Seabed Authority," 2013). The U.S. has signed but not ratified UNCLOS III; however, the U.S. follows a policy that is consistent with most parts of the Convention and many key norms in UNCLOS III reflect customary international law, binding on all nations (Ripley, 2011).

Annex II of UNCLOS III provides an explanation for the method to be used in establishing the outer edge of a nation's continental margin beyond 200 nautical miles and is in accordance with Article 76, which establishes a Commission on the Limits of the Continental Shelf (CLCS) to aid in this determination. The CLCS can recommend the *delineation* of the outer limits of the OCS of an individual nation and this delineation is to be established unilaterally; however, the *delimitation* of any overlapping boundaries between coastal nations is to be resolved by treaty between the applicable parties (Ripley, 2011). Though Russia, Norway, and Denmark have submitted claims for areas in the Arctic beyond their 200 nautical mile EEZs to the CLCS, and Canada is expected to do so ("CLCS: Partial Submission by Canada," 2014), offshore oil and gas development beyond the existing EEZs is "highly unlikely during the foreseeable future (Young, 2009; AMAP, 2007).

One Arctic territorial dispute of concern for the U.S. is that regarding the delimitation of its maritime border in the Beaufort Sea with Canada, where an area of 22,600 km^2 rich in fisheries and, likely, oil and gas, is at stake (see Fig. 8) (Kříž & Chrášťanský, 2012). The U.S. holds the position that the border has not yet been defined and prefers the median approach between the countries, while Canada cites an 1825 agreement between Great Britain and Russia using the 141st meridian as the border (Kříž & Chrášťanský, 2012). This 1825 agreement, however, uses the vague term "as far as frozen ocean" in its border demarcation and the date and signatories of the agreement raise further questions as to its legal force (Kříž & Chrášťanský, 2012).

Figure 8. International borders in the Arctic Ocean. The area in orange indicates the disputed area between the U.S. and Canada. (Source: University of Durham)

It has been suggested that all territorial disputes in the Arctic Ocean and its adjacent seas could be resolved under the legal framework provided by UNCLOS III, though the U.S. is the only one of the five states bordering the Arctic Ocean who has not ratified the Convention (Ripley, 2011).

UNCLOS III provides a general framework for environmental protection in Part XII, "Protection and Preservation of the Marine Environment." This framework applies to all uses, including the sovereign right of nation-states to conduct oil and gas exploration and exploitation on their continental shelves, though nation states have the obligation to "protect and preserve the marine environment" (Casper, 2009). These obligations include, among other provisions, ensuring that activities in a nation-state's jurisdiction that result in pollution do not cause trans boundary harm and require nation-states to cooperate with other nation-states and "competent international organizations" in developing rules, standards, best practices, procedures, monitoring requirements, and conducting scientific research to aid in the prevention of marine pollution (Casper, 2009).

In May 2008, the five Arctic nations that border the Arctic Ocean, Canada, Denmark (through its autonomous province of Greenland), Norway, Russia, and the United States, met to discuss and sign the Ilulissat Declaration to highlight their position as coastal nations with sovereign rights and responsibilities in the Arctic Ocean who were committed to following procedures that delimit outer continental shelves. This Danish-led initiative was designed to challenge the notion that a new comprehensive international legal regime should be established to govern the Arctic Ocean and that the existing legal framework under UNCLOS III is sufficient (Dodds, 2013). Absent from this meeting

were the other three Arctic states that do not border the Arctic Ocean (Iceland, Finland, and Sweden) as well as the aboriginal groups that hold a significant position in the Arctic Council, further indicating the force of the claim of the five Arctic littoral nations regarding their perceived full jurisdiction over territorial waters and sovereign rights over EEZs and OCSs in the Arctic (Dodds, 2013). Though these five Arctic nations intend to strongly assert their claims to the natural resources in their respective outer continental shelves, this does not mean that the Arctic will necessarily become the site of armed conflict. Many of the existing disputes in the region have lasted for decades without ever reaching a crisis point and the 40-year long Russo-Norwegian dispute in the Barents Sea, which had often been considered one of the most serious disputes, has been resolved recently (Kříž & Chrášťanský, 2012). The remaining disputes, which involve demarcation of the maritime borders between several states, the unresolved status of several international straits, and the exact boundaries of EEZs and continental shelves in the Arctic, are not purely the result of economic interests in the region but also include strategic-security questions and matters of national sovereignty and prestige (Kříž & Chrášťanský, 2012). As the Arctic continues to increase in importance and attract attention from previously inactive players, it is in the best interest of the five Arctic littoral nations to work together and swiftly resolve their disputes in a peaceful manner (Kříž & Chrášťanský, 2012). Nevertheless, UNCLOS III serves as one of the primary reference documents for resolving these territorial disputes and the framework for this dispute resolution that it provides remains an important consideration for the United States.

Part XII of UNCLOS III stipulates that "States have the obligation to protect and preserve the marine environment" and should take measures individually, jointly, regionally, and globally "to prevent, reduce and control pollution of the marine environment from any source" (Juda, 1996). However, the issue of how to protect the marine environment is left up to the environmental policies of each nation-state (Juda, 1996). The term "pollution of the marine environment" is defined in Article 32 of UNCLOS III as

> [T]he introduction by man, directly or indirectly, of substance or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

In terms of protection of the Arctic marine environment, Article 234 of UNCLOS III specifically refers to ice-covered areas of the sea:

> Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.

Article 234 was largely the result of Canadian negotiating efforts at UNCLOS III to protect the waters of the Northwest Passage (NWP) as there was a possibility that oil from

the North Slope of Alaska would be transported by ship through the NWP to the US East Coast before the TAPS was built (Huebert, 2001). Article 234 indicates that ice-covered areas of the sea are unique and require special considerations by nation-states that are regulating navigation through their respective EEZs.

Federal statutes

National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 (42 U.S.C. §4321 et seq.), or NEPA, sets forth the national policy of the U.S. Federal Government for the oversight of activities that affect the "harmony between man and his environment." NEPA allows for technical and financial assistance by the U.S. Federal Government, among other means and measures, to foster the sustainable use of the natural environment. NEPA requires all Federal agencies to develop procedures to determine whether any proposed major Federal actions will significantly affect the quality of the human environment and to develop alternative courses of action; this process of environmental analysis and consideration of alternatives for proposed major actions must be prepared in a detailed statement known as Environmental Impact Statements (EISs)("Basic Information - NEPA," 2012).

The NEPA review process consists of three levels: categorical exclusion (CE) determination—if an undertaking meets certain criteria set forth that a Federal agency has previously determined as having no significant environmental impact, the undertaking

may qualify for a categorical exclusion and not fall under the detailed environmental analysis requirement; environmental assessment/finding of no significant impact (EA/FONSI)—a Federal agency prepares a written EA to determine if the proposed undertaking would significantly affect the environment and, if it is found that it would not, a FONSI is issued and no further NEPA review is required; environmental impact statement (EIS)—if the EA determined that the undertaking would significantly impact the environment or if this was determined before going through the EA process, the lead Federal agency must prepare an EIS describing and evaluating the impacts of the proposed action and alternatives ("Basic Information - NEPA," 2012).

NEPA encourages state participation in NEPA by allowing state agencies or officials to prepare these detailed EISs, under the oversight and review of Federal officials, if the activity being examined is a major Federal action funded under a program of grants to states. In addition, the establishment of the Council on Environmental Quality (CEQ) in Section II of the Act requires the President to submit an annual Environmental Quality Report to Congress that details the status and condition of major natural, manmade, or altered environmental classes of the nation; current and foreseeable trends in the quality, management and utilization of these environmental classes with respect to social, economic, and other requirements; the adequacy of available natural resources; a review of the programs and activities that have an effect on the environment and on the conservation, development, and utilization of natural resources; and a program for remedying the deficiencies of these programs and activities, with recommendations for legislation ("Basic Information - NEPA," 2012).

Although the public and other stakeholders can provide input during the EIS process and may contest the findings in an EIS, a proposed action may still go forward as the NEPA process is procedural rather than substantive, i.e., the due process requires that the legal and administrative proceedings were carried out in a fair manner by the agency conducting the NEPA review rather than requiring the agency to protect the rights of an individual or party through the creation of rules or regulations (Karkkainen, 2002). The EIS process has often been criticized as costly, time-consuming, and pointless paper-shuffling, as NEPA review does not require follow-up and "there is no assurance that mitigated impacts remain below EIS-triggering thresholds" (Karkkainen, 2002). Conversely, support for NEPA arises largely from the fact that it requires Federal agencies to consider the environmental consequences of their actions that they might otherwise remain ignorant about until after these consequences occur (Karkkainen, 2002), allowing for the development of alternative, less-damaging courses of action.

Clean Air Act

The Clean Air Act (CAA) (42 U.S.C. §7401 et seq.), first enacted in 1970 and later amended in 1977 and 1990, sets forth the goal of identifying airborne contaminants and their effects on human health, as well as their overall impact on ecosystems, and requires the EPA and other supporting agencies to continue researching these specific contaminants in order to update emission standards and requirements as needed ("Clean Air Act Requirements and History," 2013). The CAA regulates air emissions from both

stationary and mobile sources and authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to assist in regulation ("Summary of the Clean Air Act," 2014). NAAQS at the Federal level is coupled with the development of state implementation plans (SIPs) by individual states in order to achieve these Federal standards ("Summary of the Clean Air Act," 2014). Section 112 of the CAA was amended in 1990 to require technology-based standards for major sources and certain area sources ("Clean Air Act Requirements and History," 2013). Major sources are defined as “a stationary source or group of stationary sources that emit or have the potential to emit 10 tons per year or more of a hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants,” and area sources are defined as stationary sources that are not a major source ("Clean Air Act Requirements and History," 2013).

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. §1251 et seq.), initially called the Federal Water Pollution Control Act when first enacted in 1948, gained its current name after amendments in 1972 ("Summary of the Clean Water Act," 2014). The CWA was established with the intent of eliminating the discharge of pollutants into the navigable waters of the United States and established the National Pollution Discharge Elimination System (NPDES) under section 402 in Title IV to oversee the issuance of permits for point-source discharge of pollutants that met applicable requirements outlined in the Act. Section 404 of the act gives the Army Corps of Engineers the authority to issue permits

for the discharge of dredged or fill material into waters at disposal sites. The CWA also provides for the allocation of funds for various public works projects related to water sanitation and establishes fines and other sanctions for those who violate its provisions ("Summary of the Clean Water Act," 2014).

Oil Pollution Act of 1990

The Oil Pollution Act of 1990 (OPA) (33 U.S.C. §2701 et seq.), which amended the Clean Water Act, requires that if vessels or facilities discharge oil into the navigable waters of the U.S., the responsible parties are held liable for the cleanup of the discharged oil from the waters, wildlife, and shoreline and other affected areas unless the discharge was caused by an act of God, an act of war, or an act of omission by a third party if the third party is not connected to the responsible party. OPA was enacted as a result of the 1989 *Exxon Valdez* oil spill in Prince William Sound, the largest oil spill in the U.S. at the time, and contains a provision that prohibits vessels that have caused an oil spill of more than 1 million U.S. gallons from entering Prince William Sound ("Oil Pollution Act Overview," 2014). OPA is proactive in its approach, with the goal of protecting the marine environment so that risks are reduced or eliminated. OPA requires government and industry to create contingency plans to prepare for oil spill events and this contingency planning has taken a three-tiered approach: the Federal government is required to direct public and private spill response efforts; Federal, State, and local governments form Area Committees to develop location-specific Area Contingency

Plans; and owners and operators of vessels are required to develop Facility Response Plans for the prevention of oil discharges into the navigable waters as well as containment and cleanup of such discharges ("Oil Pollution Act Overview," 2014). Additionally, OPA created the Federal Oil Spill Liability Trust Fund to provide up to one billion dollars per spill incident to assist with cleanup efforts ("Oil Pollution Act Overview," 2014).

Outer Continental Shelf Lands Act

The Outer Continental Shelf Lands Act (OCSLA) (43 U.S.C. §1331 et seq.) defines the OCS as the submerged lands seaward of three miles and until 200 nautical miles from a state's coastline as under the jurisdiction of the U.S. Government and requires the Secretary of the Interior to administer mineral exploration and development of the OCS ("OCS Lands Act History," n.d.). The Bureau of Ocean Energy Management (BOEM) carries out these duties through its oil and gas exploration and development program, granting leases to the highest bidder. The OCSLA requires BOEM to collect and consider environmental impacts and relevant scientific information when developing five-year offshore leasing programs, as well as during other planning and management activities (Spies, 2013).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. §701 et seq.) combines and implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former U.S.S.R. for the protection of migratory birds ("Migratory Bird Treaty Act Overview," 2014). The MBTA makes the taking, killing, or possessing of migratory birds unlawful in the U.S. This includes making it unlawful to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage or export, any migratory bird, any part, nest, or eggs of any such bird that is native to the United States or its territories. Exceptions to this statute include the breeding of migratory game birds on farms and preserves for the purpose of increasing the food supply and the seasonal taking of migratory birds by indigenous Alaskans for subsistence purposes. Authority to oversee that the components of this treaty are carried out in the United States is given to the U.S. Fish & Wildlife Service, who issues permits for activities that may impact migratory birds.

Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act of 1972 (MMPA) (16 U.S.C. §§1361-1383b, 1401-1406, 1411-1421h) makes it unlawful to take marine mammals and the term "take" is defined as "to harass, hunt, capture, collect or kill, or attempt to harass, hunt, capture, collect or kill any marine mammal" (18 USC §1362); however, the law contains provisions for subsistence hunting of marine mammals by Alaska Natives. This definition of "take" has been interpreted broadly and has led to increasing litigation, particularly as to what constitutes "harassment" of marine mammals, and it is important to note that "take" does not necessarily mean an action that results in the lethal killing of a marine mammal (see Appendix A for a timeline of recent final rules from Federal agencies and major court cases related to the issue).

The Beaufort and Chukchi Seas are home to a wide array of marine mammal species, some of which call the region their permanent home (e.g., seals, polar bears, and walrus) while others migrate through the region on a seasonal basis (e.g., whales). The National Oceanographic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issues permits related to interactions with cetaceans and pinnipeds protected under the MMPA and the U.S. Fish & Wildlife Service (FWS) is charged with issuing these permits as they pertain to walruses and polar bears protected under the MMPA.

Endangered Species Act

In addition to the MBTA and MMPA, the other major statute governing wildlife is the Endangered Species Act of 1973 (ESA) (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.). The ESA allows for a formal process to identify species that are in danger of becoming threatened or endangered and to put in place conservation measures to help ensure the survival of these species that have become imperiled due to anthropogenic activities. In order for a species to be listed under the ESA, the species must fall under one of the criteria in Section 4(a): the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors affecting its continued existence. There are several species listed as threatened or endangered (collectively known as T&E species) under the Endangered Species Act (ESA) that are commonly found in the Arctic. For offshore oil and gas projects, additional consideration must be given for these T& E species, as they have a higher protection status. The bowhead whale (*Balaena mysticetus*) is an endangered species commonly found in the Arctic that is particularly important for subsistence hunting by Alaska Natives; other marine mammal species listed as endangered and that can be found in Arctic Alaska include the humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and North Pacific right whale (*Eubalaena japonica*) ("Endangered, Threatened, and Candidate Species under NMFS' Authority in Alaska," 2013). The spectacled eider (*Somateria fischeri*), Stellar's

eider (*Polysticta stelleri*), polar bear (*Ursus maritimus*), ringed seal (*Phoca hispida*), and bearded seal Beringia distinct population segment (DPS) (*Erignathus barbatus*), also found in the Arctic, are currently listed as threatened (Areawide Lease Mitigation Measures: Beaufort Sea, n.d.)("Endangered, Threatened, and Candidate Species under NMFS' Authority in Alaska," 2013).

Economic considerations

Lindholt & Glomsrød (2012), in a paper titled "The Arctic: No big bonanza for the global petroleum industry," use a reference scenario from the International Energy Agency's (IEA) 2009 World Energy Outlook global oil price and 2008 USGS resource estimates to analyze how future oil and gas production in the Arctic might develop from 2010-2050. The IEA global oil price forecast that the authors use projects the real oil price to rise to 100 USD by 2020 and 115 USD by 2030 (prices in BOE, or barrel of oil equivalent) and is lower than that given by the U.S. Energy Information Administration (EIA) in 2010 but higher than the trajectory made by OPEC's 2010 World Oil Outlook (Lindholt & Glomsrød, 2012). The authors use a model that does not account for fluctuations in the market from price turmoil due to political uprisings or similar events, and assume that oil and gas companies have full access to all areas that contain petroleum (i.e., that there are no political or environmental constraints); however, the model does take into account the significant long term issue for the conventional global petroleum market of a rapidly-growing supply of unconventional oil and gas reserves, such as the oil

sands in Canada and shale gas in the U.S., by using estimates from the National Petroleum Council's (NPC) 2007 report (Lindholt & Glomsrød, 2012). Considering the resource estimates of the five largest Arctic oil producing countries (Russia, Alaska, Greenland, Canada, and Norway), the authors point out that Arctic Russia dominates in terms of total undiscovered Arctic oil and gas reserves, while Alaska follows in second (Lindholt & Glomsrød, 2012). One important difference between Russia and the other West Arctic countries in the study is that Russia's reserves are largely controlled by state-owned national oil companies while the West Arctic regions allow private international oil companies (IOCs) to buy licenses to obtain access to the petroleum reserves present there, allowing for greater competition in the free-market system (Lindholt & Glomsrød, 2012). While Russia is predicted to remain the largest producer of Arctic oil and gas, and other regions globally are predicted to allow for cheaper gas production than in the Arctic, Lindholt & Glomsrod's (2012) results show that the West Arctic regions, particularly Alaska and Greenland, will experience an upswing in total oil and gas production toward the end of the 2010-2050 timeframe, especially after 2020 for Alaska and 2035 for Greenland, though these results are highly dependent on the currently estimated undiscovered resources becoming proven reserves.

While global oil prices and demand play a determining role in Arctic oil and gas production, other complex factors such as climate change and environmental regulation can influence Arctic exploration leading to production. Arctic exploration is already well underway, mainly in the U.S. and Russian portions, and current production statistics combined with planned, new capital projects for future production of major oil and gas

companies in the Arctic indicate that IOCs are conservative in terms of extracting new resources in the Arctic due to technical challenges, risks, and costs, though their continued investment in the Arctic indicates that these companies wish to maintain the resources in the region as an important part of their portfolios (Ermida, 2014). With this in mind, it is important to consider how the current regulatory process is set up in the Arctic and how it could be improved to accommodate long-term continued oil and gas production in the region. In this research, the scope of this regulatory process is limited to the U.S. portion of the Arctic.

4. CURRENT AD HOC PERMITTING STRUCTURE

The current planning and permitting processes for U.S. and State of Alaska offshore oil and gas are complex and responsibilities are divided among a multitude of agencies. For the purposes of this study, the focus is on the strategies for the management of offshore development and the issuance of permits as they relate to protection of the marine environment and will not include those permits required for operational safety, in compliance with OSHA and other agencies, designed to protect human safety. There are multiple sources of oil and gas-specific industrial activities that could affect the integrity of the Arctic marine environment: geological & geophysical (G&G) exploration by vessels (which involve seismic surveying and drilling), icebreakers, construction of in-water structures such as drilling platforms, and subsea pipeline construction, among others. For this reason, it is necessary to look at the current regulations of the U.S. Federal Government and State of Alaska for the permitting of these activities related to infrastructure development and drilling. Industry standards developed independently or in conjunction with regulatory agencies are also a key component of safety and environmental protection and consideration of this technical aspect should be incorporated into the permitting process, though such industry standards are not addressed in this analysis.

Federal permitting

The Department of the Interior has authority under the Outer Continental Shelf Lands Act (OCSLA) to grant leases to the highest bidder for the exploration, development, and production of oil and gas in the OCS, the area of the marine space under Federal jurisdiction. BOEM carries out this task by periodically holding lease sales of the submerged lands of the OCS. BOEM was established after the dissolution of the Minerals Management Service (MMS) by Secretarial Order No. 3299 in 2010 (Salazar, 2010). The former MMS was embroiled in scandal in 2008 following the release of a DOI inspector general report that revealed ethical lapses and various conflicts of interest; the MMS was further implicated in mismanagement following the Deepwater Horizon incident that resulted in the firing of its director and a complete restructuring of the agency, which was renamed the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) (Hogue, 2010). BOEMRE was subdivided into three independent agencies by Secretarial Order No. 3299 to account for the three distinct, conflicting missions of the former MMS: 1) energy leasing and development—which falls under BOEM's authority, 2) effective enforcement—the task of the Bureau of Safety and Environmental Enforcement (BSEE), and 3) revenue collection—the task of the Office of Natural Resources Revenue (ONRR) (Hogue, 2010). BOEM is also the agency responsible for overseeing activities requiring NEPA review during the Five Year Plan and lease sale process.

Upon being granted a lease by BOEM, the winning bidder may apply for permits to carry out exploration, development, and production activities ("Alaska Leasing Office," 2014). BOEM manages lease sales through the creation of Five Year OCS oil and gas leasing programs to determine the size, timing, and location of each lease block; each Five Year Program must be approved by the Secretary of the Interior before any lease sales begin. Figure 9 shows current lease owners in the Beaufort and Chukchi Sea portions of the Arctic Alaska OCS.

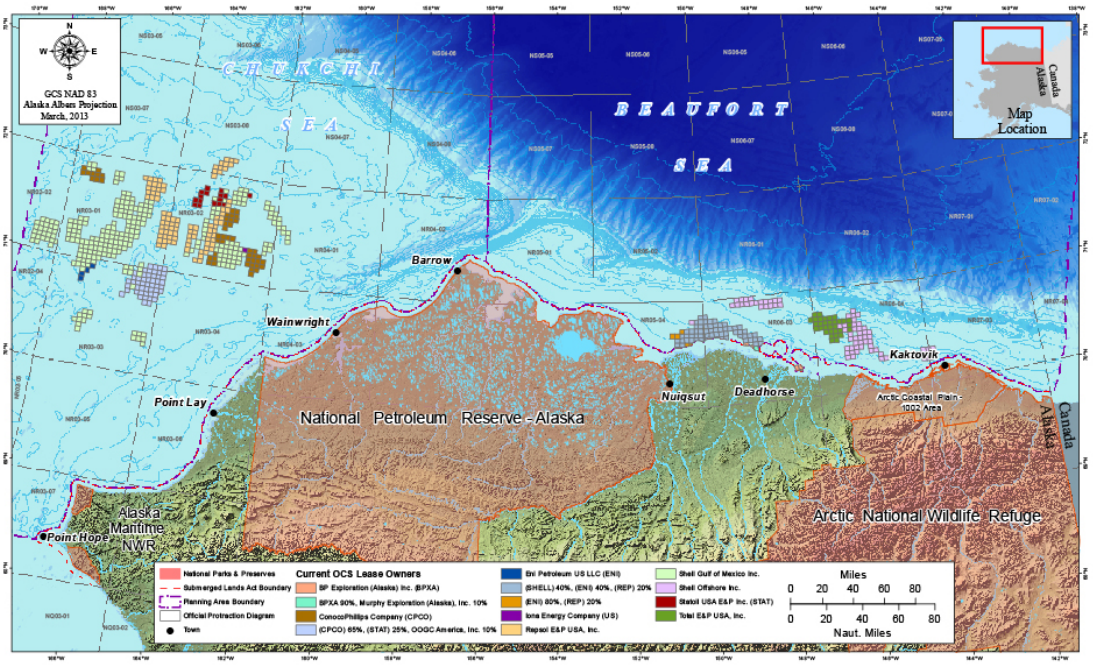

Figure 9. Current Arctic Alaska OCS lease blocks by owners. Shell Gulf of Mexico, Inc. is currently one of the largest lease holders in the region, holding the majority of lease blocks in the Chukchi Sea Planning Area. (Source: BOEM)

Section 18 of the OCSLA lays out the major steps to be considered in the Five Year plans including potential environmental damage and impacts on the coastal zone, sufficient time for public comment, and submission of the plan to the governors of affected states who may, in turn, notify relevant local governments in their states of the proposed lease sales before they begin (43 USC §1331).

2012 - 2017 Lease Sale Schedule

Sale Number *	Area	Year
229	Western Gulf of Mexico	2012
227	Central Gulf of Mexico	2013
233	Western Gulf of Mexico	2013
225	Eastern Gulf of Mexico**	2014
231	Central Gulf of Mexico	2014
238	Western Gulf of Mexico	2014
235	Central Gulf of Mexico	2015
246	Western Gulf of Mexico	2015
226	Eastern Gulf of Mexico	2016
241	Central Gulf of Mexico	2016
237	Chukchi Sea	2016
248	Western Gulf of Mexico	2016
244	Cook Inlet***	2016
247	Central Gulf of Mexico	2017
242	Beaufort Sea****	2017

Alaska Lease Sales
Gulf of Mexico Lease Sales

Figure 10. BOEM oil and gas leasing. (Left) BOEM process for offshore development in the OCS. This process begins with the Five Year Program before a NOI (notice of intent to file an EIS) is issued. The EIS is first released as a draft (DEIS) for public comment before a final (FEIS) version is issued. A proposed notice of sale (PNOS) for lease blocks is released for public comment before a final notice of sale (FNOS) is issued. Companies who are granted leases must submit exploration and development plans to BOEM for review before these activities can occur. (Right) the 2012-2017 lease sale schedule for the U.S. OCS, with planned Alaska OCS lease sales in yellow. (Source: BOEM)

After the Five Year Program has reached final approval, lease sales can begin. BOEM issued 237 leases covering 1.28 million acres in the Beaufort Sea from 2003-2007; in 2008, 487 leases in the Chukchi Sea totaling 2.7 million acres were granted, drawing $2.66 billion in high bids accepted—a record for Alaska (see Appendix B for all historical

lease sales in the Alaska OCS) (Conley, Pumphrey, Toland, & David, 2013)("Lease Sales, Alaska OCS Region," 2014). New lease sales in the Alaska OCS will not be held again until 2016 for the Chukchi Sea and 2017 for the Beaufort Sea planning area (see Fig. 10).

Subsistence hunting and fishing in the Beaufort and Chukchi are high and one study found that 26 % of respondents in the Arctic region rely on subsistence for at least half of their food and for another 27%, subsistence accounts for 25-50% of their food supply ("Inventory of Environmental and Social Resource Categories Along the U.S. Coast," 2012). Taking this high subsistence use into account, the 2012-2017 Program excludes from leasing a 25-mile stretch along the Chukchi coastline that serves as an important subsistence area, as well as two whaling areas near Barrow and Kaktovik in the Beaufort (Conley et al., 2013). Prior to the granting of leases, BOEM is also responsible for the regulation of pre-lease G&G activities to coordinate exploration and scientific research activities in the OCS. Geological permits require the applicant to provide a description of drilling methods or sampling; equipment to be used; estimated bore holes or sample locations; navigation system; method of sampling; description of analyzed or processed data; estimated completion date; and a map, plat, or chart showing latitude and longitude, specific block numbers, and total number of borings and samples ("Regulation of Pre-lease Exploration," 2014). Geophysical permits require identification of vessel information for seismic surveys; a description of the energy source and receiving array; total energy output; number of impulses per linear miles; towing depth; navigation system to be used; estimate of area to be surveyed; description of final processing; estimated

completion date; and a map, plat or chart showing latitude, longitude, block numbers, total line miles or blocks proposed ("Regulation of Pre-lease Exploration," 2014).

BOEM tracks G&G permits by calendar year; the Gulf of Mexico Region (GOM) has issued 82% of permits while the Alaska Region follows with 9%, reflecting trends with fluctuations in the price of petroleum, regional differences relating to leasing moratoria, and operating conditions (see Appendix A for BOEM's G&G permitting flowchart) ("Regulation of Pre-lease Exploration," 2014). From 1982-2008, there were a series of congressional and presidential moratoriums that prohibited oil and gas development in most of the U.S. OCS apart from areas in the GOM and Arctic ("Background on Offshore Drilling and Moratoriums," 2013). After the Deepwater Horizon incident, the Obama Administration issued an order to halt all deepwater drilling in the OCS, though this was blocked by a Federal judge and an appeal issued by the Obama Administration was denied by the Fifth Circuit Court of Appeals. After this appeal was denied, Secretary of the Department of the Interior Ken Salazar issued a directive to suspend deepwater drilling through November 30, 2010, on facilities that use subsea blowout preventers or surface blowout preventers on floating facilities. These moratoria, as well as the overall higher costs and longer lead times of drilling in the Arctic (Harsem et al., 2011), show that the disparity between the number of permits issued in GOM and Alaska are reasonable. After being granted a lease, a company must produce and submit an Exploration Plan (EP) and a Development Operations Coordination Document (DOCD) to BOEM for review with applicable regulations and standards before exploration and development may continue.

BOEM's counterpart, the Bureau of Safety and Environmental Enforcement (BSEE), is primarily responsible for permitting, environmental compliance, conservation compliance, engineering standards and regulations, oil spill response planning, inspections, enforcement, and investigations of offshore oil and gas projects (*MOA between BOEM and BSEE: Plans and Permits*, 2011). Permits issued by BSEE include those for drilling; modifying approved wells; installations, modifications/repairs, and removals of platforms and structures; pipeline Rights-of-Way (ROWs); and installations, modifications/repairs of pipelines on lease and transportation pipelines across leased and unleased blocks (*MOA between BOEM and BSEE: Plans and Permits*, 2011). Offshore structures and pipelines under the jurisdiction of the Department of the Interior are required to have a Worst Case Discharge (WCD) scenario and be included on an Oil Spill Response Plan (OSRP) when these permits are reviewed for approval (*MOA between BOEM and BSEE: Plans and Permits*, 2011).

In terms of water quality, EPA Region 10 is responsible for issuing NPDES permits as required by the CWA for the discharge of effluents, monitoring requirements, and other conditions for offshore oil and gas exploration and development in the U.S. Arctic OCS. The Arctic offshore currently has two general NPDES permits, one for the Beaufort Sea area and one for the Chukchi Sea area, for OCS geotechnical surveys and related activities. These surveys are conducted to assess geologic stability for potential placement of offshore oil and gas structures and regulate discharges of certain allowable effluents as described in the accompanying Ocean Discharge Criteria Evaluation (*Draft Ocean Discharge Criteria Evaluation for Oil and Gas Geotechnical Surveys and Related*

Activities in Federal Waters of the Beaufort and Chukchi Seas, Alaska, 2013). One of the most notable CWA violations in the offshore oil and gas industry came as a result of the Macondo Well blowout and loss of the *Deepwater Horizon* oil rig in the Gulf of Mexico in April 2010. At the time of the explosion and sinking, BP contracted with Transocean, the owner and operator of the *Deepwater Horizon*, including its blowout preventer and riser ("Transocean Settlement," 2012). As part of the settlement, Transocean agreed to $1 billion in civil penalties and $400 million in criminal penalties ("Transocean Settlement," 2012).

In addition to issuance of NPDES permits by the EPA for the CWA, the USACE issues permits for dredging activities that could impact water quality. Section 10 permits are needed if construction, excavation, or deposition of material is in, over, or under navigable waters, or for any work which would affect the course, location, condition, or capacity of navigable waters. A Section 404 permit may also be required for authorizing the discharge of dredged and fill material into waters and wetlands of the United States (*Areawide Lease Mitigation Measures: Beaufort Sea*, n.d.).

Permits related to the MMPA may be required from NMFS (pinnipeds and cetaceans) or USFWS (walruses and polar bears). NMFS issues incidental harassment/take permits for scientific research, activities enhancing the survival or recovery of a marine mammal species or stock, commercial and educational photography, first-time import for public display, capture of wild marine mammals for public display, incidental take during commercial fishing operations, and incidental take during non-fishery commercial activities ("Overview of Marine Mammal Permits," 2013). USFWS

issues similar permits for the respective species under its jurisdiction. For offshore oil and gas activities, the most commonly issued permits under the MMPA are Incidental Harassment Authorizations (IHAs), usually for seismic surveys, and Letters of Authorization (LOAs) that authorize “incidental take” of a “small number” of marine mammals that would have no more than a “negligible impact” on those species not listed under the Endangered Species Act (ESA) and would not have an “unmitagable adverse impact” on subsistence harvest of these species ("Incidental Take Authorizations," 2014). These IHAs and LOAs often include requirements for mitigation measures and monitoring requirements. In 2013, NOAA, as the lead agency, updated an initial draft EIS examining the effects of Beaufort and Chukchi oil and gas activities on marine mammals and the Alaska Native communities who rely on these marine mammals for subsistence living. In the Supplemental Draft EIS, Arctic-specific measures that NOAA could implement for issuing incidental take authorization permits were examined, including ways to minimize potential harmful effects from industry-generated noise, accidental discharge of pollutants, and the increased presence of ships due to oil and gas activities; among the measures suggested was the closing of areas to exploration during whale migration and feeding and during traditional subsistence whale and seal hunts (Barclay, 2013). Recent litigation surrounding the MMPA has focused on the meaning of “small numbers,” the sufficiency of mitigation and monitoring efforts, and other scientific challenges, such as assessing cumulative impacts to polar bears in the context of IHAs ("Alaska Oil and Gas Activities," 2013). In 2010, a coalition of environmental NGOs filed a lawsuit against the Dept. of the Interior (*NRDC v. Jewell*) claiming that the Interior

failed to require proper mitigation measures for seismic airgun surveys in the Gulf of Mexico. The settlement reached in 2013 requires more stringent mitigation measures for seismic airgun surveys, including among other things, a prohibition on airguns in biologically important areas and a mandatory minimum separation distance between surveys ("Landmark Agreement to Protect Gulf of Mexico Whales, Dolphins from Industry's High-Intensity Airgun Surveys," 2013).

For proposed Federal actions that may affect T&E species or designated critical habitat, the ESA requires Federal agencies to consult with NMFS and USFWS; BOEM prepares Biological Evaluations to evaluate such proposed actions and NMFS and USFWS prepare Biological Opinions (BOs) to identify any mitigation measures to be implemented by BOEM ("Biological Opinions & Evaluations Endangered Species Act Section 7 Consultations," n.d.).

The Arctic is also host to a wide array of migratory bird species, particularly during the summer months. For this reason, permits issued by USFWS related to the Migratory Bird Treaty Act (MBTA) may be necessary for projects that could result in an adverse impact on migratory birds. The MBTA was used to prosecute Exxon following the *Exxon Valdez* oil spill in 1989 and is a stricter wildlife statute than the MMPA and ESA because the prosecution does not have to show that defendant(s) intended to harm wildlife or prove that the defendant(s) knew their actions would lead to an oil spill but merely prove that the defendant was responsible for the harm (Alexander, 2010).

Air permitting under the CAA for oil and gas activities in the Federal waters of the Alaska OCS was transferred from EPA to BOEM by the Consolidated Appropriations

Act, 2012, and companies now submit proposed emissions for facilities in the Beaufort OCS or Chukchi OCS as part of the prerequisite to BOEM approval of their exploration plan or development and production plan ("Alaska OCS Region - Air Quality Jurisdiction," 2014). Shell, as one of the largest lease holders in the Chukchi Sea, encountered several issues related to CAA permitting during Arctic exploratory drilling operations (Skadowski, 2013). Prior to the transfer of air permitting jurisdiction from EPA to BOEM for the Alaska OCS, Shell had been issued CAA permits by the EPA and was found to be in violation of these permits during exploratory activities in the Beaufort and Chukchi Seas during the 2012 drilling season (Skadowski, 2013). These permits set emission limits, pollution control requirements, and monitoring, recordkeeping, and reporting requirements on the vessels and their support fleets of icebreakers, spill response vessels, and supply ships (Skadowski, 2013). Settlements for the violations were reached in 2013 and resulted in Shell paying a $710,000 penalty for violations of the Discoverer drill ship air permit and a $390,000 penalty for violations of the Kulluk drill ship air permit (Skadowski, 2013). The Dept. of the Interior, of which BOEM is under, has not updated its substantive air quality regulations since 1988 and is the process of developing a proposal to amend its current oil and gas air quality regulations, to accommodate its recently acquired Clean Air Act permitting authority for the Alaska OCS (Gomez, 2014).

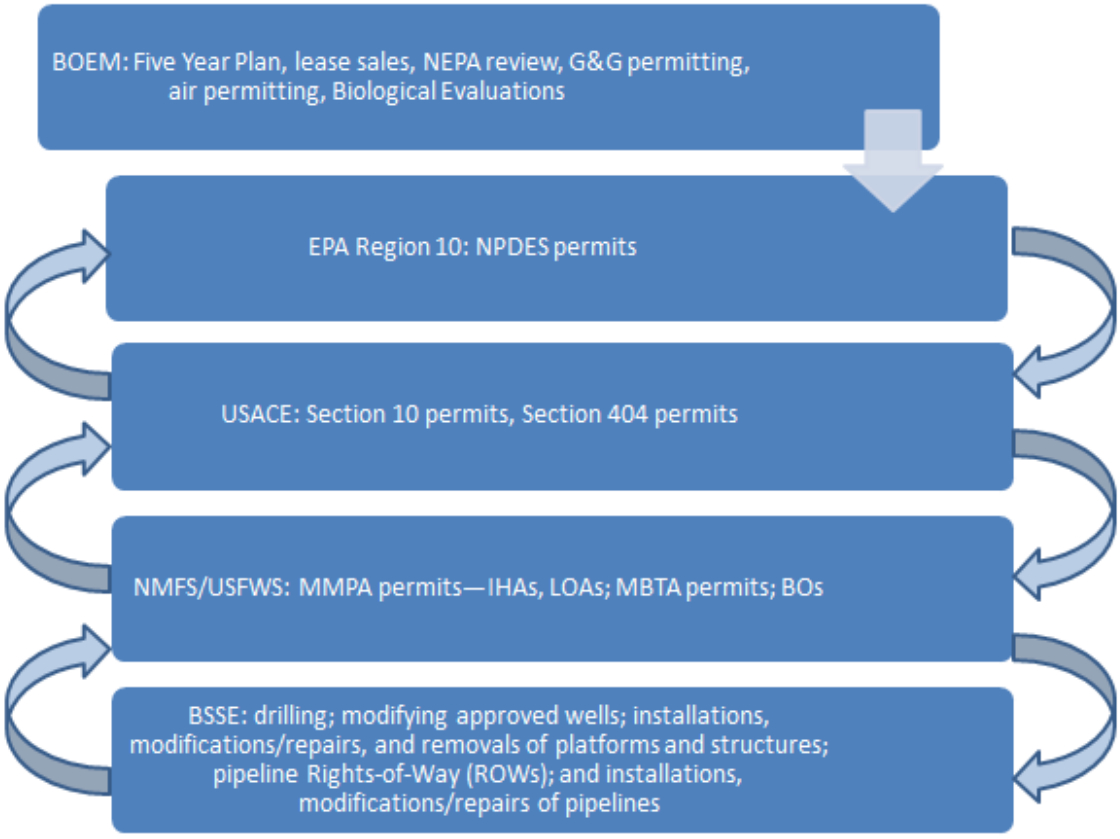

Figure 11. Major permits issued by Federal agencies for offshore oil and gas. Other permits may be required than those listed and it is important to note that many of the permits issued after lease sales are completed can be issued simultaneously to each other or in varying order.

As demonstrated above, the Federal environmental permitting process is largely divided up by media (i.e., submerged land use, water quality, wildlife, air) through the various regulatory agencies (see Fig. 11). What, then, is the unitive strategy behind these somewhat disparate permitting groups? How effective will this media-by-media strategy be at protecting the Beaufort and Chukchi marine environments if Arctic Alaska OCS development begins to move at a faster pace, with various competing interests vying for permits?

The overall executive strategy of the U.S. Government can play an important role in the pace of Arctic development in the OCS and the permitting process of the regulatory agencies often reflects this. Prior to the May 2013 release of the White House's National Strategy for the Arctic Region (NSAR), the U.S. was the only Arctic nation without an explicit Arctic policy statement (Bradner, 2013). The NSAR document identifies three lines of effort: 1) advancing U.S. security interests; 2) pursuing responsible Arctic region stewardship; and 3) strengthening international cooperation. The approach is based on safeguarding peace and stability, making decisions using the best available information, pursuing innovative arrangements, and by consulting and coordinating with Alaska Natives (*National Strategy for the Arctic Region*, 2013). Although the NSAR briefly mentions that the U.S. will continue to "responsibly develop Arctic oil and gas resources," the strategy is rather vague and lacks any clear commitments that the Federal government will make regarding the Arctic. State officials, who met in Alaska with senior Federal officials from the various regulatory agencies and a top White House official one month after the NSAR was released, were concerned at the lack of substance in the policy and that the State's role as an equal and sovereign partner in further development of Arctic policy was not assured; the Deputy Commissioner of the ADNR cited the fact that examples set by the Interagency Working Group for the Coordination of Domestic Energy Development and Permitting in Alaska, a Federal group of which the State is supposed to be a part, demonstrated a failure by the Federal government to fully include Alaska on decision-making (Bradner, 2013). Thus, it appears that improvements are needed to bring the Federal and State players into a strategy in which there is a mutual planning process

with open lines of communication for all stakeholders concerning Beaufort and Chukchi oil and gas development.

State permitting

Alaska is the only state in the nation with a separate article in its constitution that exclusively addresses natural resources (Todd, 2001), demonstrating the value that it places on responsible natural resource development. Article VIII of the Alaska Constitution charges the State legislature with the task of providing "for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people" and that "[f]ish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses."

The ADNR Division of Oil and Gas is the lead agency for lease sales within the State's three mile offshore limit and AS 38.05.180 of the Alaska Land Act tasks the commissioner to submit a new Five-Year Oil and Gas Leasing Program to the Alaska State Legislature every January (ADNR Division of Oil and Gas Website, 2013). The ADNR calls for public input of significant new information from reports, data, and research on an annual basis before going through with a lease sale, determining whether or not the new information is substantial enough to require a supplement for the proposed lease area (*Five-Year Program of Proposed Oil and Gas Lease Sales*, 2014).

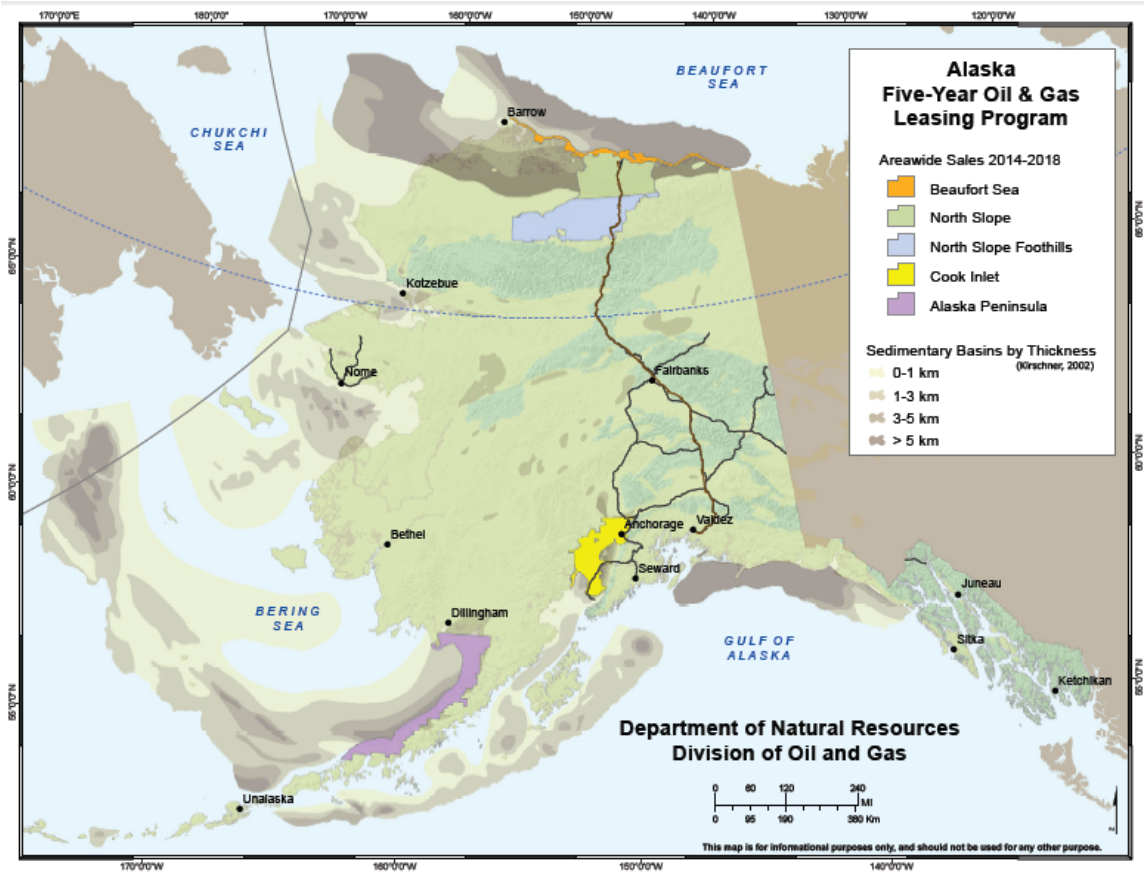

Figure 12. General State of Alaska oil and gas leasing areas for 2014-2018. Note the Beaufort Sea leasing area in orange. (Source: ADNR)

The 2014 Five-Year Program states that the annual lease sales allow for a predictable and stable oil and gas leasing program resulting in a shortened time between the sale of a lease and exploration; additionally, the Program claims that this method also allows smaller oil and gas companies and individuals to purchase leases in areas of less interest to the major oil companies, increasing the competition. Since the Beaufort Sea leasing region (see Fig. 12) was added to the annual leasing program in 2000, there have been 14 lease sales held (*Five-Year Program of Proposed Oil and Gas Lease Sales*,

2014). Currently, the ADNR does not hold lease sales for its State waters in the Chukchi Sea. The ADNR does not determine the official ownership of lands within a tract until after a lease sale occurs, eliminating the need to determine ownership for tracts that do not receive bids (*Five-Year Program*, 2013). In Alaska State waters, the presence of small islands in the Beaufort Sea result in a complex boundary between Federal and State submerged lands (see Fig. 13).

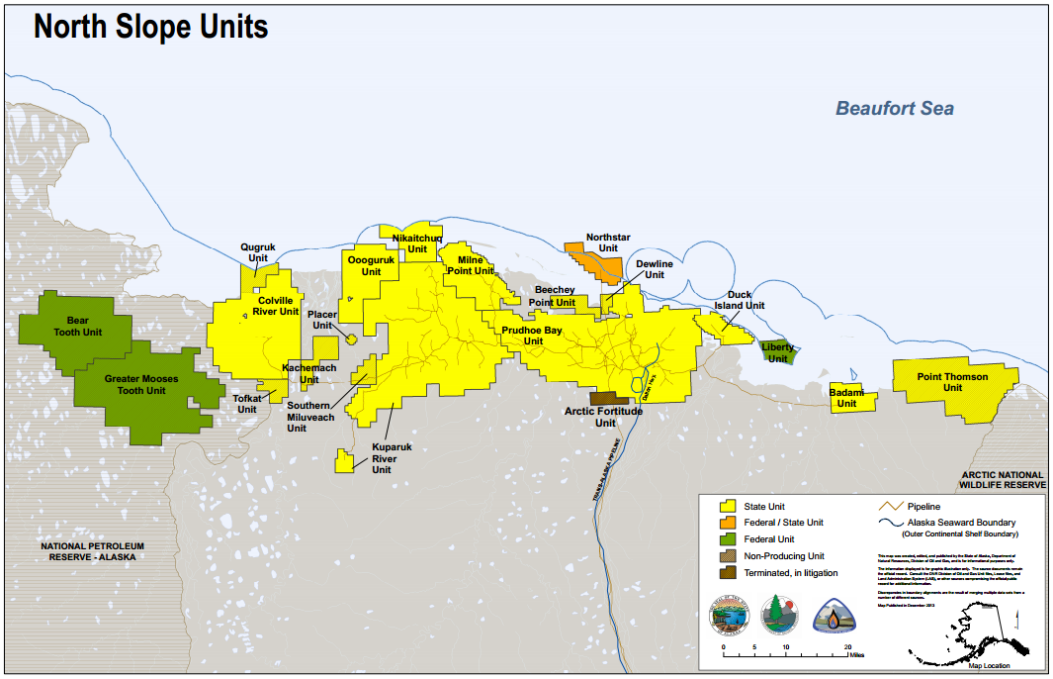

Figure 13. North Slope production units. This map of active North Slope oil and gas units indicates the Alaska Seaward Boundary (three-mile State territorial water limit) by the blue line. (Source: ADNR DO&G)

The State completes best interest findings every 10 years for each leasing region; these best interest findings reports weigh the net positive and negative effects of proposed lease sales and discuss the impacts on the area's fish and wildlife, historic and cultural

resources, and communities. The purpose of these studies is to aid in determining whether the lease, sale, or disposal of oil and gas lease tracts is in the State's best interest. The last best interest finding for the Beaufort Sea area was completed in 2009 with the next best interest finding due in 2019 (*Five-Year Program of Proposed Oil and Gas Lease Sales*, 2014).

After leases have been granted, the Permitting and Compliance Unit of the DO&G approves plans of operations for oil and gas activities, G&G exploration permits, and miscellaneous land use permits for State lands and waters. Each Plan of Operation must identify the sites for planned activities and the specific measures, design criteria, construction method, and operational standards to be employed as well as potential geophysical hazards. AS 38.05.035(e) of the Alaska Land Act, describing the powers and duties of the director of the Alaska Department of Natural Resources and the departmental delegation of authority, provide the DO&G director the power to mandate mitigation measures for exploration, construction, and production; these mitigation measures have been developed upon review of terms in earlier competitive lease sales in addition to comments and information submitted by the public, local governments, environmental organizations, and other Federal, State, and local agencies (ADNR Division of Oil and Gas Website, 2013). After a plan of operations is submitted with proposed mitigation measures, additional measures will likely be imposed and the most recent required mitigation measures will be applied to all operations under that plan, regardless of when the lease was issued (ADNR Division of Oil and Gas Website, 2013). The required mitigation measures for the Beaufort Sea leasing area include restrictions on construction

and placement of facilities; operating requirements; consideration of fish and wildlife habitat; consideration of subsistence, commercial, and sport harvest activities; spill prevention measures and waste management; access restrictions; consideration of prehistoric, historic, and archaeological sites; local hire efforts and communication and training initiatives (*Areawide Lease Mitigation Measures: Beaufort Sea*, n.d.). These measures are in addition to any regulatory requirements of the Federal and state governments.

The Alaska Department of Environmental Conservation's (ADEC) Division of Water is developing a CWA permit for discharges under its Alaska Pollutant Discharge Elimination System (APDES) program authority; this permit includes an Ocean Discharge Criteria Evaluation (ODCE) detailing the authorized discharges, similar to the Federal EPA model (*Draft Ocean Discharge Criteria Evaluation for Oil and Gas Geotechnical Surveys and Related Activities in Federal Waters of the Beaufort and Chukchi Seas, Alaska*, 2013). ADEC was granted permitting authority from the EPA for wastewater discharges within State waters through a four phase process beginning in 2008; the fourth and final phase, which included wastewater permitting for oil and gas activities, was completed in 2012 ("Alaska Department of Environmental Conservation Assumes Wastewater Discharge Permitting from the Environmental Protection Agency," 2012). Under APDES, ADEC can issue both general (for planning areas) and individual (for specific locations within planning areas) permits for wastewater discharges.

While most wildlife permits for Arctic offshore oil and gas are granted by the Federal agencies NMFS and USFWS, Alaska Department of Fish and Game (ADF&G)

has statutory authority under AS 16.05.841-871 of the Fish and Game Code to issue permits for activities occurring near freshwater anadromous fish habitat, ensuring free passage for anadromous and resident fish in fresh water bodies; ADF&G also has authority under AS 16.20, detailing the conservation and protection of Alaska fish and game, to issue special area permits for activities that occur in a legislatively designated Special Area (i.e., refuge, sanctuary, or critical habitat area—see Fig. 14) ("Land & Water Use ", 2014). While there are not any of these State-designated Special Areas in the Arctic Beaufort and Chukchi Sea areas, there may still be ADF&G permits required for offshore oil and gas projects in these areas pertaining to fish passage.

Section 110 of the CAA (42 U.S.C. §7410) requires state and local air pollution control agencies to adopt a Federally-approved strategy to improve air quality, known as a State Implementation Plan (SIP). The ADEC Div. of Air Quality is charged with establishing this SIP and issues permits under Title I and Title V of the Clean Air Act for projects occurring in state boundaries.

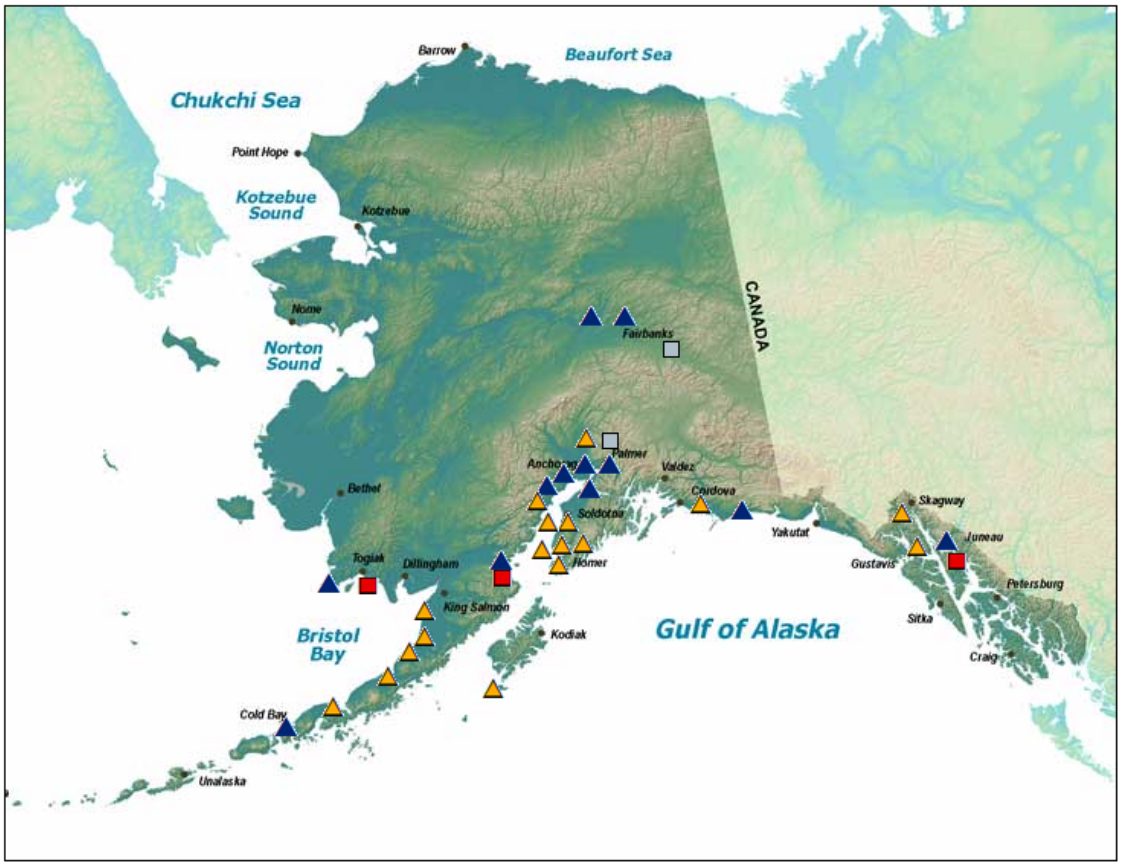

Figure 14. Alaska Refuges, Sanctuaries, Critical Habitat Areas & Wildlife Ranges. Blue triangles: refuges, yellow triangles: critical habitat areas, red squares: sanctuaries, grey squares: State ranges. (Source: ADFG)

Title I permits are for air construction permits and minor source specific permits while Title V permits include operating permits, along with permit avoidance approvals such as owner requested limits and pre-approved emission limits ("Air Permit Program," 2011). Title I construction permits are legal documents that the source must follow, specifying when construction is allowed, what emission limits must be met, how often the source can be operated, and contain conditions to ensure that sources follow the permit requirements through monitoring, record keeping, and reporting requirements ("Permit Information Page," 2011). Title V operating permits are issued after the source has begun to operate

and must consolidate all of the applicable requirements for the operating facility into one document ("Permit Information Page," 2011).

The State permitting process reflects the media-by-media approach of the Federal permitting process, partially due to the fact that the State must comply with Federal laws. See Figure 15 for a chart of the major State permits required.

Upon release of the National Strategy for the Arctic Region, Alaska Governor Sean Parnell provided the following comment: "[w]hile there are no concrete commitments in the strategy released today, we welcome the White House's acknowledgement that the Arctic will play a significant role in our nation's future. Alaska is America's Arctic, and we look forward to having a prominent role working with the Federal government on these issues that will improve the lives of Alaskans and move the United States back into a leadership role among Arctic nations"("Governor Comments on National Arctic Strategy," 2013). This statement summarizes the value the State of Alaska places on its role within the overall national Arctic strategy, indicating that the State intends to be highly involved throughout any Beaufort and Chukchi planning and development activities in the coming decades and demonstrates the need for a more effective cooperative partnership between the Federal and State entities involved in Arctic oil and gas planning. The State of Alaska realizes that the continued production of oil and gas is vital to its economic health and will continue to pursue further development in the Arctic.

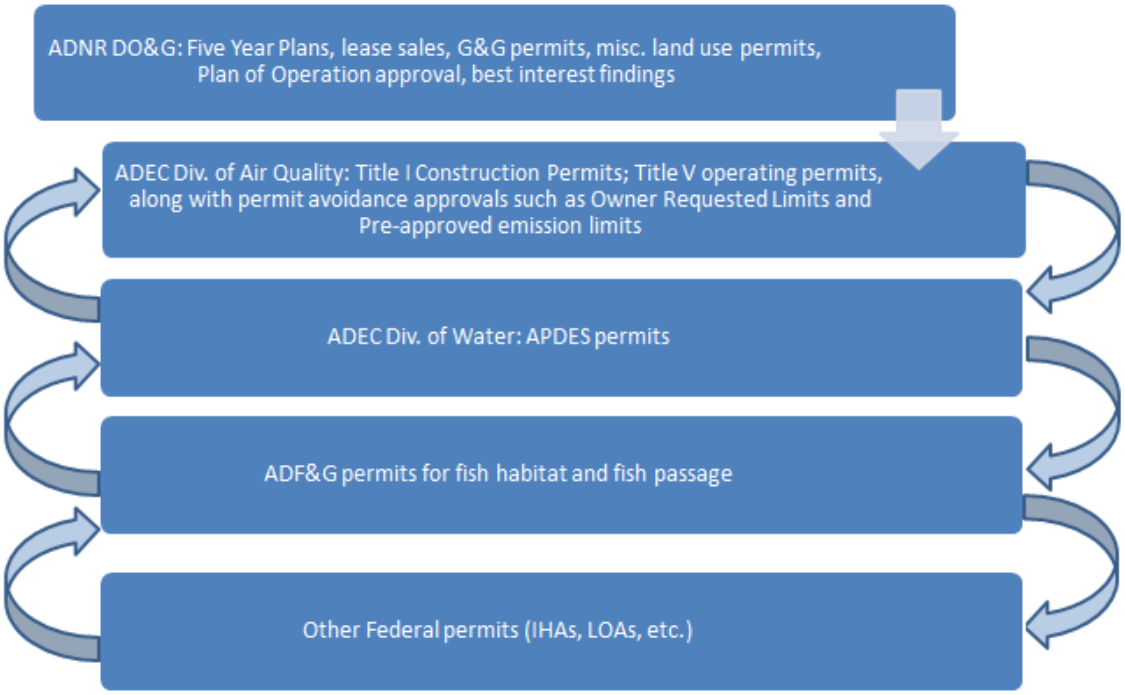

Figure 15. State permits and requirements for offshore oil & gas development. This chart does not include all permits that may be required and permits after lease sales may not be issued in this order.

Federal and State interaction

The Arctic plays a significant role in the State of Alaska's economy and the State has a long history of natural resource planning and development in the Arctic. Onshore oil and gas development in Prudhoe Bay and the surrounding areas is currently the highest producing region in the North American Arctic, with Russia's West Siberian Basin as the highest producing in the entire Arctic (see Fig. 16) (Keil, 2014). Global markets are a determining factor in where and when oil and gas is developed and, as mentioned in Section 3, *Economic considerations*, domestic unconventional oil and gas resources in

North America have challenged the dominance of conventional oil and gas, including offshore deposits. Arctic oil and gas resources are not expected to become a major component of U.S. production; however, the importance of Arctic oil and gas remains an important aspect in the long-term energy portfolio of oil companies, the State of Alaska, and the U.S. (especially with the U.S. goal of becoming less dependent on oil imports) (Keil, 2014) and will continue to be a hotly debated subject.

Figure 16. Major basins in the Arctic Ocean. For the North American portion of the Arctic, the Arctic Alaska region is estimated to hold the largest undiscovered Arctic oil deposits, about 30 billion barrels. The second largest oil province in the Arctic is the Amerasia Basin, located just north of Canada, and estimated to have about 9.7 billion barrels of undiscovered oil (USGS estimates). (Source: http://www.eia.gov/oiaf/analysispaper/arctic/. Image: EIA)

As demonstrated previously, estimated oil and gas deposits in the Beaufort and Chukchi are evenly divided between Federal and State jurisdictional boundaries and will likely continue to spread further seaward from the State to the Federal maritime areas (Houseknecht & Bird, 2006); this should be an indication to the State of Alaska that smarter coordination of Federal oil and gas regulation in the Arctic Alaska OCS is in its best interest and any tools that could help with this coordination and planning process should be utilized.

5. POTENTIAL INTEGRATION OF FEDERAL AND STATE STRATEGIES THROUGH MARINE SPATIAL PLANNING

Oil and gas companies formulate their plans for exploration and drilling based on various metrics such as global oil prices, political risk in regions, and technical challenges, and the Federal and State regulation and levels of planning also play an important role in the timing of projects and often dictate where projects can occur (Ermida, 2014). As seen previously, the current permitting processes address issues on a project-by-project, media-by-media basis. This piecemeal approach could very well result in an overload of applications needing agency review that do not receive adequate attention to detail or make the entire process utterly inefficient due to unforeseen conflicts arising (Clement et al., 2013). The Arctic is a place requiring cooperation and coordination from all stakeholders due to its remoteness, harsh environment, lack of infrastructure, and social issues; while these qualities present great challenges to overcome, they also present the opportunity to unite stakeholders in new ways by forming partnerships to tackle these common challenges. The limitations in the current permitting system call for supplemental methods to address gaps occurring during the regulatory process. Marine Spatial Planning (MSP) could be one tool used to supplement regulations, identifying issues among stakeholders and providing a platform for discussions and negotiations to occur before projects reach the permitting stage.

U.S. National Ocean Policy and Marine Spatial Planning

The U.S. Federal Government has adopted a policy to support coastal and marine spatial planning (to which it refers as CMSP—MSP will be used in this research to mean any spatial planning in the coastal and marine environment); this support was first recommended by the National Ocean Commission in 2004 and was further solidified when the National Ocean Policy was promulgated in 2010 by Executive Order 13547 (Olsen, McCann, & Fugate, 2014). The National Ocean Council, established upon promulgation of the National Ocean Policy and which consists of 27 Federal agencies, departments, and offices, developed an Implementation Plan to outline specific actions Federal agencies will take to boost the ocean economy, improve ocean health, support local communities, strengthen security, and provide better science and information to improve decision-making (*National Ocean Policy Implementation Plan*, 2013). The Implementation Plan claims that it does not create new regulations, supersede current regulations, or modify any agency's established mission, jurisdiction, or authority, and its stated goal is to provide tools and services for improved planning of marine activities, including MSP at the regional level. States, tribes, and Regional Fishery Management Councils may choose to participate on regional planning bodies established under the National Ocean Policy; however, this participation is voluntary and if states within a region choose not to participate, a regional planning body will not be established (*National Ocean Policy Implementation Plan*, 2013). Briana W. Collier (2013) noted that MSP is a fairly new concept in the U.S. and has not been fully embraced, as many

stakeholders who might be affected by it do not agree that the process is useful or effective. However, it has been suggested that the fact it is not well established in the U.S. provides the opportunity for relevant stakeholders to structure the governance regime for MSP so that it suits the needs of a particular region (Collier, 2013). Despite this relatively short history of use, there have been successes attributed to its use in the U.S., most notably in the New England region where MSP and tools developed in conjunction with it to shift shipping lanes have resulted in a significant decrease in whale strikes by vessels, as well as an increase in overall maritime safety by reducing the overlap among ships, commercial fishing vessels, and whale watch vessels (Collier, 2013). Ocean managers on the West Coast took note of this collaboration among users of the marine space in the Northeast and the successes they have achieved and shifted shipping lanes leading into major West Coast ports to reduce whale strikes (Collier, 2013).

Alaska has chosen to not take part in the regional planning body structure proposed in the Implementation Plan and, thus, no regional planning body has been established under the Alaska/Arctic Region identified in the National Ocean Policy. Opposition in Alaska to participation in a regional planning body was broad, with State legislators, Alaska's U.S. congressional delegation, directors from Alaska's Division of Wildlife Conservation, the Alaska Oil and Gas Association, and the Alaska Miners Association, among those expressing concern that the MSP/regional planning body structure would result in a shift of planning issues away from the State toward Federal regulators, with minimal local input on plans; evidence for this view stemmed from the fact that the plans presented in the National Ocean Policy had been developed at the

Federal level without input from the State and local stakeholders (Carducci, 2012). Part of this hesitation also stemmed from the wording in Executive Order 13547 establishing the National Ocean Policy, stating that while the Policy does not create new regulations, any recommendations that are given by a created regional planning body would be implemented by Federal agencies—this would seem to indicate an inherent conflict of interest and take authority away from the stakeholders within the regional planning body, including the State (Jensen, 2010). Prior to the release of the National Ocean Policy Implementation Plan, House Joint Resolution No. 16 was introduced in the 28th Alaska State Legislature, passing the House and referred to the Senate Rules Committee ("Bill History/Action for 28th Legislature," 2013), urging that the National Ocean Council exempt the Alaska region or allow voluntary state participation in the MSP process proposed in the Implementation Plan ("HJR 16," 2013). Though the National Ocean Policy Implementation Plan ultimately made state participation voluntary, House Joint Resolution 16 stated that if Alaska was not exempted or state participation was not made voluntary, the Alaska Legislature would oppose and decline to recognize, participate in, or enforce the "National Ocean Policy Final Implementation Plan and the [MSP] process as it applies to the Alaska and Arctic regions" ("HJR 16," 2013). This refusal was based on the following concerns: 1) that Executive Order 13547 establishing the National Ocean Council "circumvents Federal congressional authority by giving Federal agencies broad authority to zone and regulate oceans, coasts, and the Great Lakes," including water owned and managed by the State; 2) that the parameters of the proposed MSP process were "undefined and could potentially apply to inland wetlands and waterways," affecting

activities remote from the marine and coastal areas of the state; 3) that "zoning of commercial, recreational, and conservation activities in the oceans and waterways of the state could significantly affect resource-based activities in the state;" 4) that the need for MSP for the Alaska region has not been "empirically demonstrated;" and 5) that the membership of the National Ocean Council consists solely of representatives from Federal agencies and organizations, failing to "adequately recognize the interests of states, local governments, Alaska Natives, and other stakeholders, and, similarly, that the regional planning bodies proposed for the MSP process would not include "representatives from industry or other affected stakeholder groups" ("HJR 16," 2013). These concerns certainly merit hesitation regarding the Implementation Plan and a Federally-imposed MSP process, and while Alaska may not participate in this particular regional planning body structure (top-down) proposed in the National Ocean Policy Implementation Plan, implementation of MSP could begin at the State or local level and relevant Federal stakeholders could be invited to participate on the planning of particular projects (bottom-up). It is also important to note that the National Ocean Council stops short of encouraging the establishment of ocean zones within which certain human activities may or may not occur, focusing more on the mapping out of alternative spatial management scenarios to be compared against one another (Collier, 2011). Regardless of the specifics for implementation of a marine spatial planning body, the issue of how to engage stakeholders remains an essential component of any planning in the Beaufort and Chukchi Seas.

Integrated coastal management, or ICM, is the umbrella term for the "multidisciplinary process that unites levels of government and the community, science and management, sectoral and public interests in preparing and implementing a program for the protection and the sustainable development of coastal resources and environments" and integrated coastal zone management, or ICZM, is more specific in that it includes the planning and management of coastal and estuarine waters, the adjoining and complete inter-tidal area, and supra-tidal coastal areas (Sorensen, 2002). The concept of ICM was first developed in the U.S., where it is implemented by state CZMPs; Australia and the UN Regional Seas Program adopted the strategy soon after the U.S. (Sorensen, 1997). By 2000, 35 years of experience involving approximately 698 integrated coastal management (ICM) efforts at all levels of governance by 145 countries were identified, many of which had encountered avoidable mistakes as a result of the lack of information sharing by ICM practitioners (Sorensen, 2002). After the expiration of the Alaska CZMP and prior to the failed 2012 ballot initiative to reinstate a CZMP, the pros and cons regarding the previous CZMP were debated. Among the pros noted was the fact that the previous coastal management program organized forums for local residents to meet with various resource agencies over proposed projects. For example, one resident of Anchor Point in Southcentral Alaska recalled a community round-table forum organized by the previous CZMP regarding natural gas development occurring in Cook Inlet in the early 2000s, stating that ensuing development went smoothly, likely in part due to the opportunity for locals to have the forum, to find out what activities were occurring, and to learn where to follow up with questions (Shedlock, 2012). However, similar opportunities for round-

table forums in the Alaskan Arctic exist, though there is not a formal, established process as noted previously by Eicken et al., 2010. As stated previously, MSP is considered a sub-activity of overall sea use management (Douvere & Ehler, 2009), and can be one tool used in the broader context of ICM (CZMA in the U.S.). Since there is not currently a formal movement to reinstate an Alaskan CZMP after the poorly designed 2012 ballot initiative failed, development of MSP at a localized level (i.e. Arctic Alaska) could serve as a means to establish such a formal process of collaboration among stakeholders without waiting for an Alaska CZMP to be reinstated by means of a legislative process.

While there is support for MSP at the Federal level in the U.S. and in other countries, particularly Australia, where it has been used near the Great Barrier Reef, and Belgium, the Netherlands, Germany, and the U.K., where it has been used primarily for coordinating offshore wind and protecting sensitive marine areas in the North Sea (Collier, 2013), are there examples that provide indications of local support of MSP? In 2008, Wesley Flannery and Micheál Ó Cinnéide conducted a study to investigate stakeholders' views regarding MSP at the local level in the small sea-oriented town of An Daingean on the southwest coast of Ireland, where marine-based tourism and other relatively new uses of the marine space take place alongside traditional fishing activities. At the time of the study, Ireland had not fully implemented ICZM and it was thought that MSP could serve as a management tool to address this lack of marine ecosystem-based management in the country while still furthering the case for local stakeholder involvement in the planning process (Flannery & Ó Cinnéide, 2008). Through a detailed questionnaire, the authors found that there was broad-ranging support for a local process

of MSP and the preferred implementation was at the local rather than national level; however, an approach that would nest the local plan within larger area plans was suggested (Flannery & Ó Cinnéide, 2008). While this example is taken from Ireland, the issues raised in this instance draw a parallel to planning issues in the Alaskan Arctic areas of the Beaufort and Chukchi Seas: both involve a relatively small population whose lives are inextricably linked to the sea and who are sharing the marine space with more and new users. Additionally, Alaska does not currently have a CZMP, similar to the fact that Ireland did not have ICZM at the time of the study. With this in mind, perhaps a more effective way to introduce the option of MSP than a Federally-proposed program would be to introduce the concept at the local level, gauging interest among those stakeholders who would be immediately and directly affected by offshore activities in the Beaufort and Chukchi Seas.

Rhode Island Ocean SAMP

One example in the U.S. where MSP was implemented at the State level with local stakeholder input throughout the planning process of a specific project is Rhode Island's Ocean Special Area Management Plan (SAMP), which includes waters under both State and Federal jurisdiction. The CZMA allowed states to develop SAMPs to achieve specific policy goals in a set geographic area and has historically been used by states as a means to improve water quality and protect habitat in watersheds and estuaries where development occurs (Burger, 2011). The Rhode Island Ocean SAMP is innovative in two specific

ways: 1) it uses MSP in conjunction with a SAMP to coordinate existing uses and management regimes with offshore development; and 2) it stakes a regulatory claim to Federal waters by pushing beyond the State three-mile mark (Burger, 2011). The Ocean SAMP was developed to address the need to identify sites for anticipated offshore wind farms and was designed to reduce the uncertainties of the often contentious environmental impact assessment process required by NEPA by examining trends in environmental conditions and existing human activities in the study area, incorporating a spatial analysis methodology for identifying suitable areas for new activities or structures (Olsen et al., 2014). In a previous project in the offshore New England area, a private company, Cape Wind, filed a proposal to develop a wind farm in Federal waters off of Massachusetts and an eleven year, $40 million legal battle ensued before a Federal lease and construction permit was awarded in 2010 (Olsen et al., 2014). Citing the Cape Wind enterprise as a lesson to be learned from, Rhode Island sought out an alternative method to the established decision-making norm for offshore energy development (Olsen et al., 2014). The State of Rhode Island had developed SAMPs as part of its Coastal Management Program previously, though without the element of comprehensive spatial analysis of existing human activities and environmental sensitivities that this Ocean SAMP would incorporate through advanced geographic information system (GIS) mapping and field research during the MSP process (Olsen et al., 2014). While the need for data collection was vital to development of the Ocean SAMP, the consultative process with stakeholders at every step of the process was also a critical feature; results of the information gathering and analysis process were conveyed to the many stakeholders as they were identified, and

governmental authorities were consulted simultaneously to discuss policies and procedures before entering the formal approval process (Olsen et al., 2014). An additional advantage with this approach is that it appears projects requiring NEPA or other Federal review by law could occur simultaneously with the planning process, using much of the same information gathered.

Among the key stakeholders identified in the early stages of the Ocean SAMP were commercial fishers. In one study, commercial fishers were interviewed about their views on marine spatial planning and their experience in Rhode Island's SAMP process (Nutters & Pinto da Silva, 2012). The SAMP used a combination of voluntary and legally-required methods to engage the fishers as key stakeholders: citizen review panels, stakeholder meetings and events, public comment periods after each chapter of the plan and before the final document was produced, public hearings as each chapter of the plan was produced and after the final document was produced, and special meetings with commercial fishers and industry leaders (Nutters & Pinto da Silva, 2012). While they were invited to meetings and appreciated this opportunity to be involved, commercial fishers who were interviewed indicated that the public stakeholder process was not designed to allow stakeholders significant influence over outcomes, i.e., placement of wind turbines in areas where they fished. The authors propose that this disparity of expectations versus outcomes from the perspective of the commercial fishers could have been lessened if decision-making managers in the Ocean SAMP process had communicated their level of willingness to share decision-making authority more clearly from the very beginning (Nutters & Pinto da Silva, 2012).

This example of MSP from Rhode Island demonstrates that while MSP allows for stakeholder engagement throughout all stages of a project planning process, the stakeholders may not necessarily influence the outcome, so stakeholder roles in the process should be clearly defined at the initial stages of offshore planning and the goal of collaboration and consensus among all stakeholders should remain. Perhaps more importantly, the Rhode Island Ocean SAMP demonstrates that the initiative of an individual coastal state to extend its MSP and management functions into adjoining Federal waters could be an example of a more effective way to negotiate and plan where new offshore activities may occur than the regional planning bodies proposed by the National Ocean Policy (Olsen et al., 2014), which were designed merely as coordinating functions and whose funding base is uncertain (Burger, 2011). Rhode Island's Ocean SAMP capitalizes on the consistency clause of the CZMA, potentially suggesting "that this expression of the ecosystem approach to planning and decision making need not be so all encompassing, complex and time consuming as to be practically untenable" (Olsen et al., 2014). The State-implemented Rhode Island Ocean SAMP utilizes MSP in a way that both allows for stakeholder involvement and can create a platform to address issues specific to projects early in the planning stages that might otherwise arise later on during the permitting process.

Marine Spatial Planning as a tool to address the wicked problem of Beaufort and Chukchi Sea permitting

As demonstrated in section 4, the current permitting of oil and gas projects in the Arctic Alaska OCS and State waters of the Beaufort and Chukchi Seas is a lengthy and complicated process. The current approach exposes limitations in the regulatory process as permits can require companies to take additional mitigation measures to address particular issues but these permits could miss important aspects not explicitly addressed in the permit conditions. Additionally, the piecemeal, project-by-project approach does not provide a means to proactively account for cumulative effects of multiple development projects occurring in the shared marine space. The Five Year Plans issued at the Federal level by BOEM and at the State level by ADNR consider and weigh the cumulative effects of potential offshore oil and gas development in large areas of coastal and marine space in the Beaufort and Chukchi Seas; however, the purpose of these Plans is to schedule lease sales rather than track projects throughout the actual development process. EISs can examine the cumulative effects of activities but are merely procedural and do not necessarily dictate improvements that could be made. Additionally, the lease sales that these Five Year Plans and EISs set in motion are subject to litigation, and those for the Arctic offshore are particular vulnerable to lawsuits due to the heated debate on Arctic development among environmental groups, industry representatives, and Federal, State, and local planners. For example, the Court of Appeals for the Ninth Circuit ruled on January 22, 2014, that a portion of the EISs prepared prior to OCS Lease Sale No. 193 in

the Chukchi Sea in 2008 were improperly prepared and sent the lawsuit back to the district court; the impacts this would have on leases awarded to Shell Gulf of Mexico Inc., ConocoPhillips Co., and Statoil USA E&P Inc. in the block in question, if any, were unclear (Snow, 2014).

There is a need for an improved planning process across Federal and State agencies so that managers that can adapt to new information and changing technology as they emerge throughout the stages of oil and gas project planning in the Beaufort and Chukchi Seas. If MSP was determined to be an effective method for improving this process, it would have to incorporate as many elements of the wicked problems unique to the Arctic as possible, as well as consideration of current regulatory requirements, while engaging all applicable stakeholders. In order for MSP to achieve acceptance, the process would have to be designed and implemented in a way that streamlined existing efforts from key planners rather than adding an additional layer of bureaucracy.

Kämpf & Haley's (2011) working paper "Risk Management in the Arctic Offshore: Wicked Problems Require New Paradigms" links the wicked problem framework with the emerging model of Project Management of the Second Order (PM-2) in order to offer strategies for approaching the wicked problem of Arctic offshore development in the Beaufort and Chukchi Seas. As part of the analysis, the authors use four main categories for the risk attitudes of Alaskan Arctic offshore stakeholders, though actual risk attitudes occur on a continuous scale, taken from the PMI's 2009 *Practice Standard for Project Risk Management*: risk-averse, risk-tolerant, risk-neutral, and risk-seeking. The authors applied these four risk attitude categories to various groups who

attended a 22-presentation risk seminar series held during 2010-2011 by the University of Alaska North by 2020 Forum and the International Arctic Research Center (Kämpf & Haley, 2011). Risk-averse stakeholders are said to be those "not comfortable with risks and are willing to avoid the risks"—examples include the North Slope Borough as local government, the U.S. Coast Guard as incident commander, and environmental NGOs; risk-tolerant stakeholders are said to be "indifferent about risks"—this group includes State agencies, the Arctic Council, and academic entities; risk-neutral stakeholders are described to "manage risks based on their expected value"—examples include the engineering-industry perspective; and risk-seeking stakeholders were those who "see risks as challenges and feel excited [about] dealing with them"—no stakeholders present were grouped in this category (Kämpf & Haley, 2011). Not all stakeholders fit squarely in each category, as some groups have more to gain from Arctic offshore development than others; for example, State agencies charged with protecting public and environmental health may balance their primary objectives with other objectives, such as increasing State revenue and employment or avoiding the costs of moving villages away from coastal areas due to lack of economic opportunities (Kämpf & Haley, 2011). While discussing strategies for navigating wicked problems, the authors point out that the risk identification phase is the most critical and that risk managers, identifying the problem at hand as wicked rather than tame, must recognize the shortcomings of traditional risk management techniques and conclude that better solutions to wicked problems "are reached through extended, face-to-face, facilitated dialog involving diverse stakeholders" (Kämpf & Haley, 2011). However, it is important to keep in mind that adding more stakeholders to

any problem solving effort "increases 'transaction costs'"—adding more meetings with more stakeholders increases the number of people with whom to communicate, meaning the process can become more time-consuming and that agreement among stakeholders and planners may become more difficult to achieve (Roberts, 2000). Thus, finding a formal process of stakeholder engagement through MSP or another platform would take time and practice to improve and "there are no guarantees that the outcome of collaboration will be satisfactory to everyone" (Roberts, 2000), though consensus through collaboration should remain the goal. As mentioned previously, NGOs can play an important role in achieving this goal, since they act as independent units of society and can play a role in facilitating education of, communication with, and coordination among government agencies, stakeholders, and the public (Calado et al., 2012).

A combination of technology, social pressures, and regulations can help drive marine protection for offshore oil and gas activities (Sharma, 2000 and 2001; Managi et al., 2005). The wicked problems unique to offshore oil and gas development in the Beaufort and Chukchi Sea include, among others, engineering challenges, environmental factors, safety concerns, high costs, logistical challenges, as well as a variety of stakeholders with differing views and values, as highlighted in section 1. Additionally, the complex environmental permitting process detailed in section 4 is an additional facet of the wicked problem, closely tied with the others. MSP, as one possible tool for facilitating collaboration among stakeholders and allowing these stakeholders to discuss and assess the wicked risks associated with oil and gas development in the Alaskan Arctic offshore, would have to incorporate a consideration of all elements of the wicked problem by

creating a common platform for stakeholder dialogue and discussion that ends in specific planning measures. A start to the design of this type of MSP could incorporate the key decision issues for public decision-making in Arctic offshore oil and gas projects identified by Flanders, et al. (1998): complexity reduction, consideration of alternatives, personal clarification for the decision maker, finding compromises, favoring of interests, communication, ability to reuse the method, ease of use, and incorporation of uncertainty. These nine issues expand upon Rittel and Webber's (1973) explanation of public planning problems as inherently wicked problems, as opposed to the classes of problems in the natural sciences, because wicked problems are ill-defined and "rely upon elusive political judgment for resolution." Stakeholders involved in a comprehensive MSP process for the Alaskan Arctic coastal and marine areas would likely include representatives from Federal agencies such as BOEM, BSEE, EPA, USFWS, NOAA, USACE, USGS; State agencies such as ADNR DO&G, ADEC Div. of Water & Div. of Air Quality, ADF&G; regional bodies such as the North Slope Borough, native villages and communities (Barrow, Kaktovik, Nuiqsut, Atquasuk, Wainwright, Point Lay, Point Hope), Arctic Slope Regional Corporation, Alaska Eskimo Whaling Commission, Eskimo Walrus Commission; representatives from the oil and gas, shipping, and commercial fishing industries; DoD entities such as the Navy and Coast Guard; the cruise ship industry and other recreational users; research scientists; port authorities; and NGOs. While this list is not conclusive, it represents the broad span of stakeholders in the Alaskan Arctic.

What could impede implementation of MSP at the State level in Alaska? As shown previously, many of the issues faced in Beaufort and Chukchi offshore oil and gas

development are unique to the region and adoption of an approach for offshore MSP used elsewhere, such as in Rhode Island, would require intensive modification before it could be implemented effectively. Representatives from State agencies and interest groups have already indicated concern that the MSP/regional planning body structure set forth by the Federal government as part of the National Ocean Policy would take planning decisions away from the State and other local stakeholders. However, as demonstrated by Rhode Island's Ocean SAMP, a state can initiate the MSP process and gain Federal approval later. While Rhode Island did so under a program of its CZMP that resulted in a manner consistent with the Federal strategy outlined in the National Ocean Policy, Alaska does not currently have a CZMP in place. Alaska could reinstitute its CZMP if it wished to go through the Federal approval process or could implement MSP with an already existing agency, such as the ADNR, which currently has authority to plan offshore oil and gas projects in State waters, and invite Federal stakeholders to participate. If MSP were determined to not be suitable for use in the Beaufort and Chukchi Seas upon further analysis, the process used in Rhode Island to engage stakeholders in the planning process could be used as an example upon which to be improved.

One potential solution to account for the skepticism in Alaska regarding MSP would be to start with a small-scale pilot project, perhaps through a volunteer partnership among an NGO, marine-use stakeholders such as fishers and aboriginals, several State or local regulatory agencies, and an oil and gas company operating in the Beaufort or Chukchi Sea in State waters. Such an MSP pilot project would allow for testing the applicability of MSP to address the wicked problems of offshore oil and gas development

in the region, including the complex environmental permitting process. A pilot project would also allow for MSP to be tested in the region without the high costs associated with implementing a new program at the State-level and could allow for time to tailor MSP to address the elements of the wicked problem unique to the Arctic offshore. It has also been noted that while most instances of MSP use zoning, not all areas where MSP is in place employ ocean zoning (Collier, 2013).

Additionally, existing publicly-available data could be incorporated into an MSP process for Beaufort and Chukchi Sea oil and gas planning in order to avoid duplication of efforts. For example, BOEM has created maps of its Beaufort and Chukchi Sea planning areas for use in Five Year Plans that show areas of subsistence use (see Appendix B); the Alaska Ocean Observing System (AOOS), a network of critical ocean and coastal observations, has oceanographic data and information on Alaska's marine ecosystems; and the National Snow and Ice Data Center (NSIDC) contains a wealth of GIS data regarding sea ice distribution.

In an effort to coordinate applied science on Alaska's North Slope, Federal, State and local governments formed the North Slope Science Initiative (NSSI) in 2001 and this intergovernmental organization was formally authorized by Section 348 of the Energy Policy Act of 2005 (Streever et al., 2011). The NSSI seeks "to facilitate and improve collection and dissemination of ecosystem information pertaining to the Alaskan North Slope region, including coastal and offshore regions ("Scope, Mission and Vision of the NSSI," 2012). The NSSI contains a North Slope Science Catalog for project tracking and data sharing and is just one of the many tools that Federal and State regulatory agencies

can utilize to examine the best available scientific research before issuing specific permits for offshore oil and gas activities in the Arctic; however, the need to coordinate the issuance of permits across a broader temporal and spatial scale between those same Federal and State agencies still exists as Arctic development increases. MSP could be one tool to assist stakeholders through the permitting process and is worthy of further consideration.

6. CONCLUSION

The planning and permitting of offshore oil and gas in the Beaufort and Chukchi Seas presents many wicked challenges from a political, social, cultural, environmental, economic, and technical standpoint. It has been demonstrated by various government reports and by statements from government representatives that an improved planning and permitting process for this region is needed in order to accommodate the predicted increase in the use of the Beaufort and Chukchi Seas. Marine Spatial Planning (MSP) at the local or State level may help to serve as one mechanism to formally engage stakeholders, with the flexibility to adapt to the ever-changing nature of wicked problems as new information and risks surface, potentially allowing for a smoother, more effective environmental permitting process for projects. While MSP implemented at the local or State level may not be the only answer for tackling the wicked problem of offshore oil and gas planning in the Beaufort and Chukchi Seas, the planning considerations that implementation of MSP require are worthy of further review, particularly those considerations regarding stakeholder engagement.

MSP is a relatively new concept in the U.S. and it remains to be seen if it will become firmly established as a decision-making tool. Stakeholders interested in Beaufort and Chukchi oil and gas planning should closely watch how states that have implemented MSP, such as Rhode Island, fare in the coming years, particularly regarding how well the process engages stakeholders and reduces conflict.

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APPENDIX A

SUPPLEMENTAL INFORMATION ON FEDERAL PERMITS

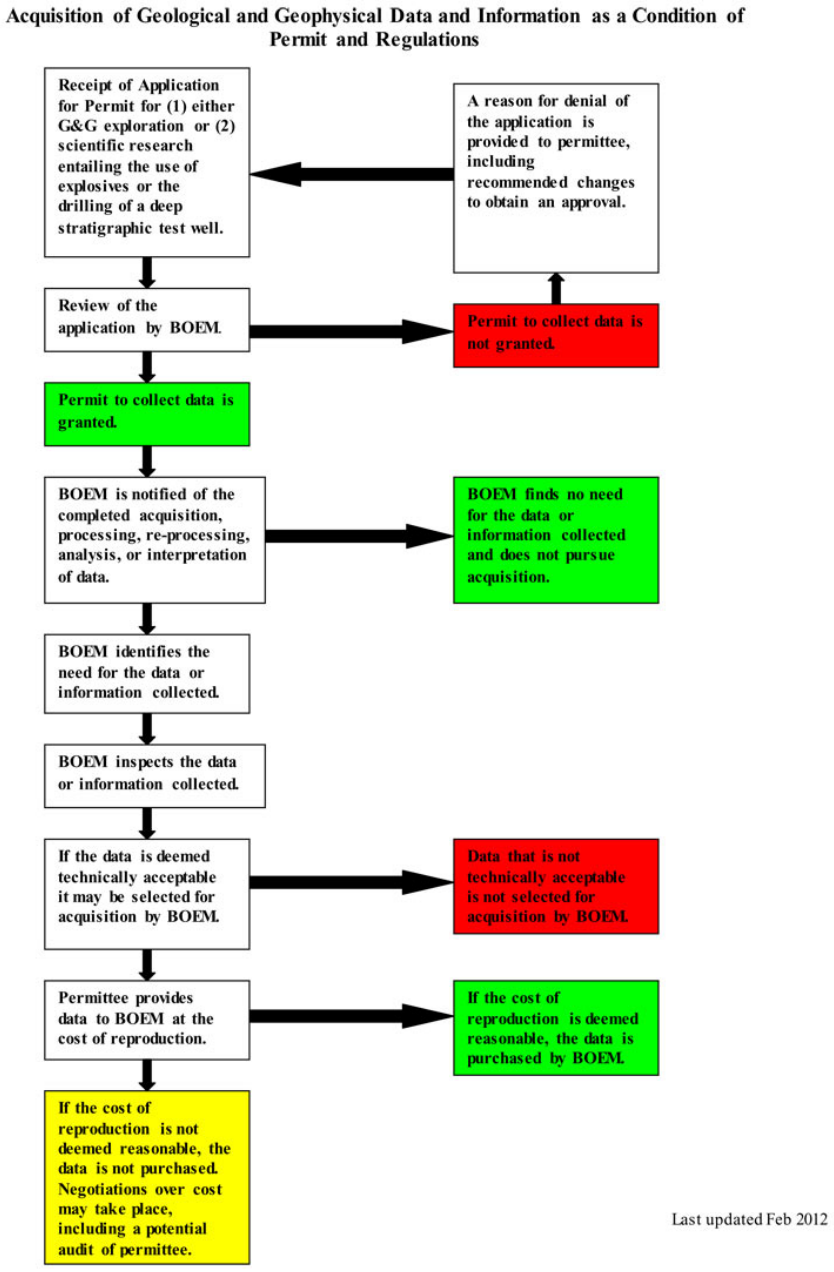

Figure 17. BOEM permitting process for G&G activities. (Source: BOEM)

APPENDIX B

SUPPLEMENTAL INFORMATION ON FEDERAL OCS LEASING

Lease Sales
Bureau of Ocean Energy Management, Alaska OCS Region
Updated: January 23, 2014

Sale - Planning Area	Date	Lease Issued	Tracts Offered	Acres Offered	Acres Leased	Sum of All Bid Received	Sum of High Bids	Active Lease Area (Hectares)	Active Leases
39 - Gulf of Alaska	1976	76	189	1,008,499	409,058	571,871,587	559,836,587	0.00	0
CI - Cook Inlet	1977	87	135	768,580	495,307	400,319,543	398,471,313	0.00	0
BF - Beaufort Sea	1979	24	46	173,423	85,776	491,728,138	488,691,138	3,032.98	2
55 - Gulf of Alaska	1980	35	210	1,195,569	199,261	117,550,113	109,751,073	0.00	0
RS-1 - Gulf of Alaska	1981	1	175	996,300	5,693	3,091,738	170,496	0.00	0
60 - Cook Inlet	1981	13	153	858,247	73,157	4,405,899	4,405,899	0.00	0
RS-2 Cook Inlet	1982	0	140	785,090	0	0	0	0.00	0
71 - Beaufort Sea	1982	121	338	1,825,770	662,860	2,067,604,786	2,055,632,336	0.00	0
57 - Norton Basin	1983	59	418	2,379,751	335,898	325,267,372	317,873,372	0.00	0
70 - St. George Basin	1983	96	479	2,688,787	540,917	427,343,830	426,458,830	0.00	0
83 - Navarin Basin	1984	163	5,036	28,048,995	927,989	631,228,331	516,317,331	0.00	0
87 - Beaufort Sea	1984	227	1,419	7,773,447	1,207,714	871,131,327	866,860,327	0.00	0
97 - Beaufort Sea	1988	202	3,344	18,277,806	1,110,764	115,261,636	115,261,636	0.00	0
109 - Chukchi Sea	1988	350	4,694	25,631,122	1,976,912	478,177,948	478,032,631	0.00	0
92 - North Aleutian Basin	1988	23	990	5,603,586	121,757	95,439,500	95,439,500	0.00	0
124 - Beaufort Sea	1991	57	3,417	18,556,976	277,004	16,807,025	16,807,025	2,234.79	1
126 - Chukchi	1991	28	3,476	18,987,976	159,213	7,117,304	7,117,304	0.00	0
144 - Beaufort Sea	1996	29	1,364	7,282,795	100,025	14,572,057	14,429,363	3,333.58	2
149 - Cook Inlet	1997	2	101	427,886	9,766	253,965	253,965	0.00	0
170 - Beaufort Sea	1998	28	203	920,963	86,371	6,239,015	5,327,093	0.00	0
U.S. v. AK *	2000	2	9	10,149	10,149	n/a	n/a	0.00	0
186 - Beaufort Sea	2003	34	1,798	9,459,743	181,810	10,175,949	8,903,538	6,000.51	3
191 - Cook Inlet	2004	0	447	2,219,000	0	0	0	0.00	0
195 - Beaufort Sea	2005	117	1,770	9,301,423	607,285	46,735,081	46,735,081	170,464.23	82
202 - Beaufort Sea	2007	90	1,654	8,734,194	490,700	42,339,231	42,165,195	122,547.62	57
193 - Chukchi Sea	2008	487	5,354	29,389,241	2,758,377	3,389,919,496	2,662,059,883	1,054,069.31	460
Total		2,351	37,359	203,305,338	12,833,763	10,134,580,871	9,237,000,916	1,361,683.02	607

* Does not count as a sale. The United State was determined to be the landowner of these submerged lands by the U.S. Supreme Court's final judical determination on June 29, 2000, in United States v. Alaska (No. 84 Original). The two leases became effective August 1, 2000, for one year.

Figure 18. Historic lease sales in the Alaska OCS by BOEM. (Source: BOEM)

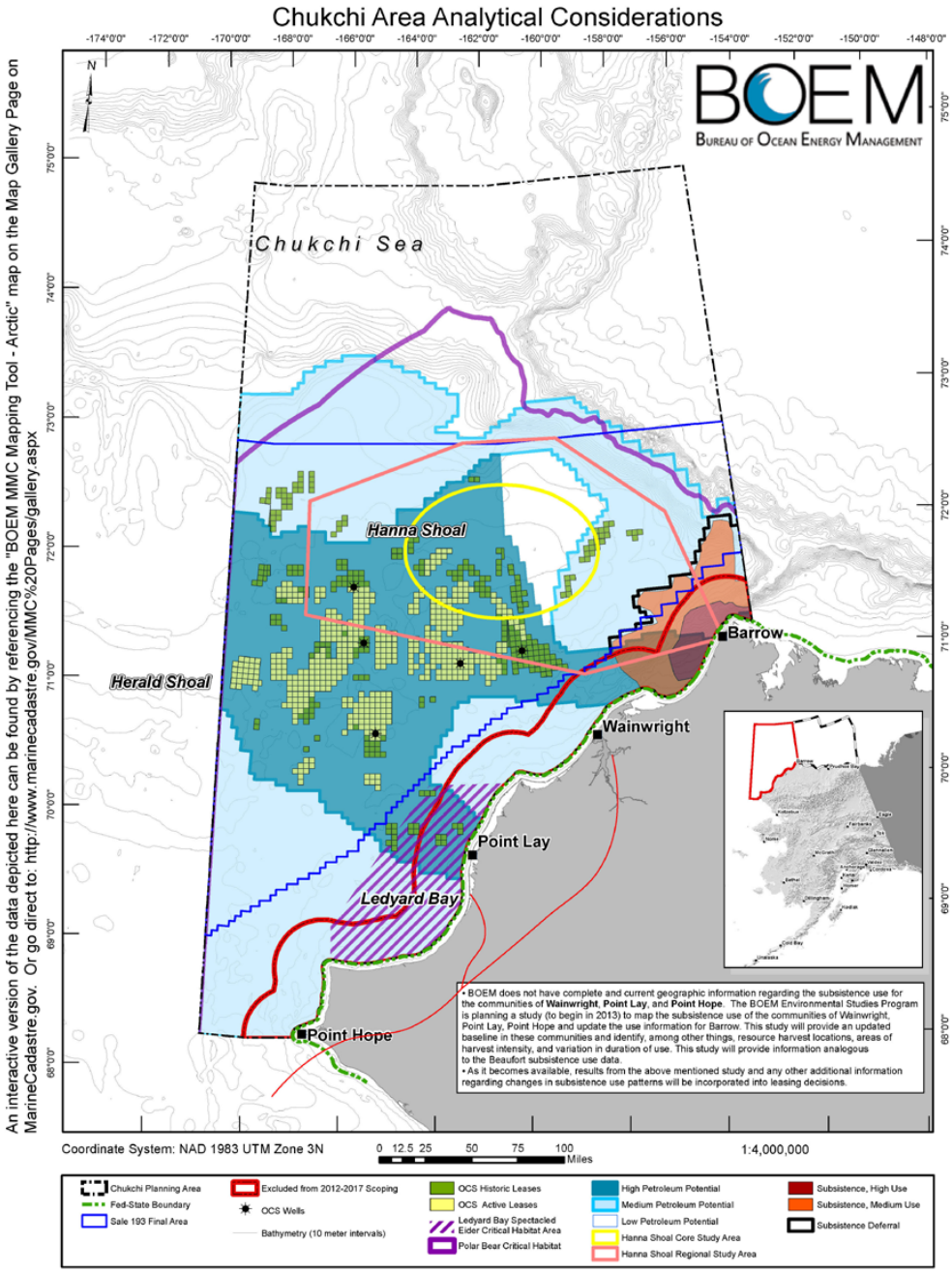

Figure 19. Mapping of subsistence areas in the Federal waters of the Chukchi Sea. The subsistence mapping is for use in BOEM's Five Year Plan for the Alaska OCS. (Source: BOEM)

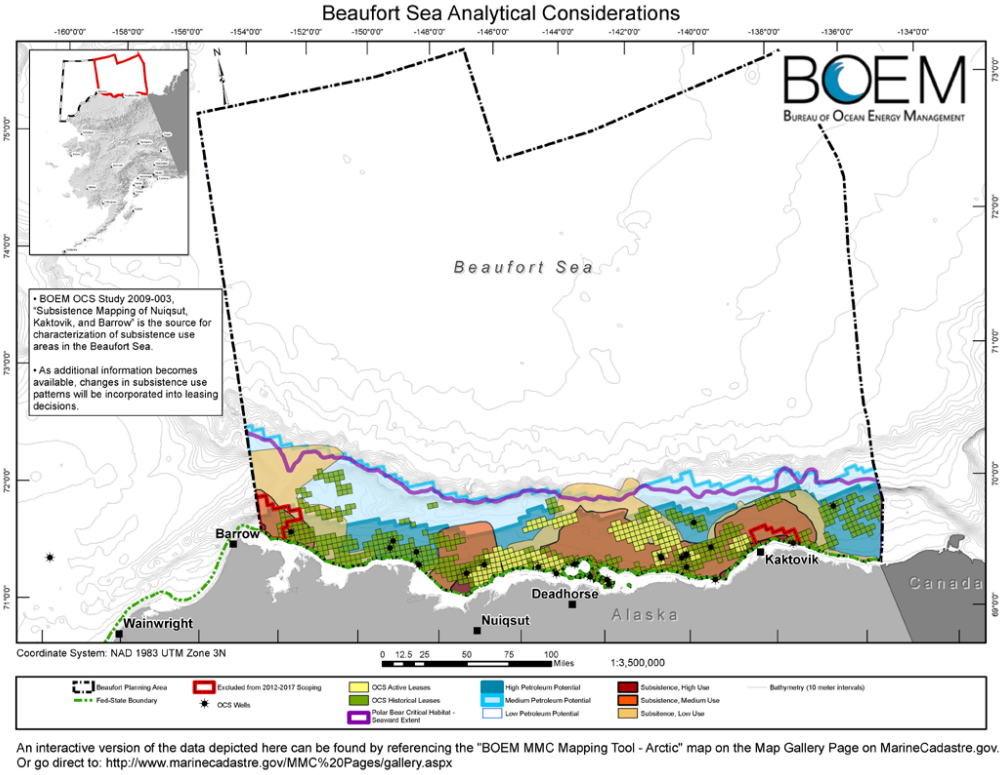

Figure 20. Mapping of subsistence areas in the Federal waters of the Beaufort Sea. The subsistence mapping is for use in BOEM's Five Year Plan for the Alaska OCS. (Source: BOEM)