

Implementing U.S. Arctic Policy: An Analysis of Federal Recommendations

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ABSTRACT 300047:

We outline U.S. Arctic policy recommendations, goals, and strategic plans promulgated by federal entities in recent years, then analyze the policies and determine the most commonly referenced policy recommendation. This analysis is valuable in the interest of identifying an overall direction for Arctic policy as suggested by the selected federal entities in the United States. We then delve into the oil and gas industry presence in the U.S. Arctic outer continental shelf and the existing federal permitting process by conducting a case study of Shell's 2012 Arctic offshore exploration activities in the Chukchi and Beaufort seas. We conclude with an assessment of key policies and recommend next steps for implementation.

INTRODUCTION:

The Arctic is an extreme environment that has a high profile of interest in light of climate change and the increasing global demand for resources.¹ The Arctic's harsh environment, rapid climate change, rich reserves of resources, and unique cultural and subsistence aspects has attracted a great deal of global attention.² It has been estimated that 30% of the world's gas resources and 13% of the world's oil resources are contained within the Arctic region, and the continual loss of sea ice has the potential to increase access to these valuable resources.³ As a result of the opportunities in the Arctic region, numerous federal agencies and advisory bodies in the United States have recently released policy recommendations and strategic plans to address management of the region. The agencies and advisory bodies include:

- Office of the President of the United States (White House)
- U.S. Coast Guard (USCG)
- U.S. Arctic Research Commission (USARC)
- The Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska (IWG)
- Interagency Arctic Research Policy Committee (IARPC)
- National Oceanic and Atmospheric Administration (NOAA)

This paper provides an integrated analysis of the policies recommended in reports from these agencies. Although each agency can fulfill its mandates without such an analysis, taking a broader view enables policymakers and policy implementers to identify crosscutting gaps that

¹ Johnston, Peter. 2012. Arctic Energy Resources: Security and Environmental Implications. *Journal of Strategic Security* 5, no. 3 (2012): 13-32.

² O'Rourke, Ronald. 2013. Changes in the Arctic: Background and Issues for Congress. In: Congressional Research Service: 2013: 22-32. doi: <http://www.fas.org/sgp/crs/misc/R41153.pdf>

³ Johnston, Peter. 2012. Arctic Energy Resources: Security and Environmental Implications. *Journal of Strategic Security* 5, no. 3 (2012): 13-32.

can benefit the largest number of agencies. Therefore, what are the overarching priorities for managing the Arctic going forward and which of these actions are most feasible, given fiscal, temporal and technological constraints?

This paper addresses these questions by examining the broad field of policy recommendations, strategies, and goals in reports recently released by a variety of U.S. federal entities involved in the Arctic.⁴ We distill the key actions necessary to implement the strategies that are consistent with policy. Overall, our goal is to identify a common direction for the national path to the future of the Arctic based upon a compilation of the aforementioned reports.

ANALYSIS:

Methods

Six major reports were analyzed for crosscutting Arctic recommendations and themes. Reports were chosen for analysis based on their timeliness, scope, and role in the Arctic region. The reports chosen through a selective process: the papers were issued within the last two years, authored by a Federal entity, and the subject matter directly pertained to the Arctic region. These reports were:

- White House - "[National Strategy for the Arctic Region](#)" (May 2013)
- NOAA - "[NOAA's Arctic Vision and Strategy](#)" (February 2011)
- IARPC - "[Arctic Research Plan FY 2013-2017](#)" (February 2013)
- IWG - "[Managing for the Future in a Rapidly Changing Arctic: A Report to the President](#)" (March 2013)
- USCG - "[United States Coast Guard Arctic Strategy](#)" (May 2013)
- USARC - "[Report on the Goals and Objectives for Arctic Research 2013-2014: For the US Arctic Research Program Plan](#)" (February 2013)

Determining Key Recommendations

The reports examined contain approximately fifty overall policy recommendations, each with detailed explanations of goals and objectives. As such, it was necessary to simplify the recommendations and goals within each report by grouping recommendations under the priority policies and categorizing them to achieve a more effective analysis.

With the exception of IWG, each report explicitly denoted priority policy recommendations by listing them as "goals" or in bold text. The White House and USCG reports included more specific recommendations that were nested under the larger goals, which allowed for a more accurate analysis of the overall policy goals. The IWG report required some discretion in the designation of key goals due to the multitude of overall recommendations. For the sake of this particular analysis, the key recommendations that were chosen for analysis were the bolded headers specifically in the Federal Government section of the report as well as the overall recommendations referenced at the end of the document.

⁴ See Table 1 and Appendix 1.

Categorization of Recommendations

From the six reports, there are 47 distinct policies (which we will refer to as ‘key policies’) and three common themes—stewardship, science, and governance—that we identified to characterize the policy recommendations into functionally distinct groups.

Stewardship: The National Strategy for the Arctic Region from the White House defines stewardship in the Arctic as continuing “to protect the Arctic environment and conserve its resources; establish and institutionalize an integrated Arctic management framework; chart the Arctic region; and employ scientific research and traditional knowledge to increase understanding of the Arctic.”⁵ The concept of stewardship is mentioned across a number of reports in discussions of natural resource management, emergency preparedness and response, safety of operations, environmental protection, and societal issues including infrastructure and resiliency. Three specific themes included throughout the policy recommendations relating to stewardship include:

- Infrastructure and strategic capabilities for emergency response and safety needs
- Environmental protection with an emphasis on natural resources, ecosystems, and cultural significance
- Human health and maintaining healthy, resilient communities

Science: The need for science is another underlying theme that cuts across a multitude of the reports, especially in terms of areas requiring additional research. Three commonly mentioned, research-specific themes included:

- Forecasting sea ice and weather
- Increasing foundational science and improving understanding of the Arctic through research
- Charting the Arctic region

Governance: Due to the nature of the entities’ reports that were examined, governance objectives and initiatives were commonly referenced. Three objectives that were apparent included:

- Information sharing and coordination/communication between involved parties
- Improving domestic and international partnerships
- Ratifying the Law of the Sea

⁵ President of the United States. May 2013. National Strategy for the Arctic Region. http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf

Table 1 organizes each of the 47 recommendations from the six reports:

Report Number	Month/Year Released	Number of Stewardship Recommendations	Number of Science Recommendations	Number of Governance Recommendations
1. White House	May 2013	3	3	6
2. NOAA	February 2011	2	3	1
3. IARPC	February 2013	2	5	0
4. IWG	March 2013	3	1	5
5. USCG	May 2013	3	1	6
6. USARC	February 2013	4	1	1
TOTAL		17	14	16
Grand Total = 47 Recommendations				

Findings on Key theme areas

By determining the three key theme areas, the objectives of each of the reports as well as the concerns within the region that have not yet been addressed became overwhelmingly clear. The first theme of stewardship has a broad definition, yet encompasses the environmental and safety responsibilities that entities operating in the Arctic are subject to and emphasize the need for an integrated Arctic management approach. In terms of the second theme, more science is needed in order to be able understand the changing nature of the Arctic as well as prepare for additional changes in the future. Hence, the value of science is to help inform decision-making and it is a necessity in moving forward. The third common theme is the need for increased partnerships, international coordination, and continued communication among entities managing the Arctic region. Several of the entities reference the Law of the Sea Convention, which is a governance issue that must be ratified on the federal and international level. The Interagency Working Group calls for strengthening key partnerships, promoting better stakeholder engagement, and coordinating and streamlining federal actions.⁶ Overall, the concept referenced

⁶ Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska. March 2013. Managing for the Future in a Rapidly Changing Arctic: A Report to the President. <http://www.arctic.gov/publications/ArcticReport-03April2013Psm.pdf>

the most frequently was the need for a safety culture across a variety of platforms to ensure the optimal management of the Arctic region in terms of energy extraction and our Arctic presence.

Safety in Arctic Policy

Cutting across all of these themes, safety emerges as a key policy objective, as it was mentioned in all but one of the reports. Guldenmund (2000) defines safety culture by stating that: “most researchers have defined either safety climate or safety culture in their publications as well as why they want to explore it.”⁷ Cooper provides an additional definition of safety culture as “a sub-facet of organizational culture, which is thought to affect members’ attitudes and behavior in relation to an organization’s ongoing health and safety performance.”⁸ Therefore, the definitions of safety and safety culture can be very broad, but can be more specifically applied in the examined reports through particular recommendations relating to increase infrastructure and strategic capabilities for emergency response, which in several cases, directly pertains to oil spills. Additionally, safety should be a precursor to any development of resources to ensure that the adequate response mechanisms are in place prior to the possibility of an event occurring.

While the prevalence of safety recommendations across the analyzed reports does not demonstrate its relative importance as a theme, it does indicate that there are many facets of safety that cross agencies and activities. This observation highlights the potential value of interagency collaboration on safety implementation. Furthermore, it also offers the opportunity for ample safety measures to be implemented across a broad range of agencies involved in the Arctic, further drawing upon the additional recommendations for an integrated Arctic management approach.

Comparative Analysis of Safety Recommendations

A safety regime would be most effectively implemented via a tiered approach, with activities ensuring safety occurring before and during drilling, and measures available as needed for emergency response. By ensuring that the prerequisites for safety are in place, the practice of a “safety culture” is functional during operations, and adequate response capabilities are ready to be utilized during a response to an incident, safety in the Arctic region can be improved.⁹ Organized logically in terms of time, the proposed three stages of implementation of the ten key safety policies, which were selected based on the verbiage in the reports, is illustrated below:

1. Prerequisites for Safety: The majority of the safety recommendations from the ten overall recommendations are prerequisites for safety, actions and practices that should be put in place prior to further drilling activity in the Arctic. Recommendations addressing safety that could be interpreted as a prerequisite for offshore drilling include activities to:

⁷ Guldenmund, F.W. 2000. The nature of safety culture: a review of theory and research. *Safety Science* 34 (2000) 215-

257. http://www.tbm.tudelft.nl/fileadmin/Faculteit/TBM/Over_de_Faculteit/Afdelingen/Afdeling_Values_and_Technology/Sectie_Veiligheidskunde/Medewerkers/Frank_Guldemund/Publications/doc/safetyscience2000.pdf

⁸ Cooper, M.D. 2000. Towards a model of safety culture, *Safety Science*, Volume 36, Issue 2, November 2000, Pages 111-136, ISSN 0925-7535, <http://www.sciencedirect.com/science/article/pii/S0925753500000357>.

⁹ Guldenmund, F.W. 2000. The nature of safety culture: a review of theory and research. *Safety Science* 34 (2000) 215-257.

http://www.tbm.tudelft.nl/fileadmin/Faculteit/TBM/Over_de_Faculteit/Afdelingen/Afdeling_Values_and_Technology/Sectie_Veiligheidskunde/Medewerkers/Frank_Guldemund/Publications/doc/safetyscience2000.pdf

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- Evolve our Arctic infrastructure to increase our capacity to respond to incidents (White House p. 6, Interagency Working Group p. 33-34).
 - Achieve effective presence in the region by increasing our capabilities for access to increase preparedness through trainings (White House p.6, USCG p. 26).
 - Understand the natural resources and expand upon baseline data in order to be able to implement safe practices (USARC p. 3).
 - Develop new Arctic-specific standards for offshore oil and gas development to ensure safe development and improve response management, while taking into account the role of the Arctic Council (White House p.9).
2. Practice a Safety Culture: After completing the safety prerequisites, a “safety culture” ensures that the continuation of safe navigation and emphasizes protection of the Arctic environment. To do so, the reports suggest the United States:
- Ensure that the Arctic waters are operationally safe for: navigation, trade, and transit through partnerships (White House p. 6-7, White House p. 9, NOAA p. 19-21).
 - Ensure readiness to respond to a possible oil spill/event by assigning responsibilities and duties (USCG p.28).
3. Response Implementation: Although a safety culture could reduce the risk of incidents in the Arctic, incidents are still possible. Therefore, involved parties must be ready to implement response measures as outlined in the safety prerequisites, such as search and rescue and oil spill response efforts, and be able to adequately and effectively respond to an incident. To do so, the federal government should act on recommendations that emphasize:
- Utilization of outputs from safety prerequisites including research, infrastructure, presence, and existing policies to respond to an oil spill.

By addressing safety policy recommendations via a tiered approach, recommendations are given a logical order for implementation. While implementing safety regimes throughout the entire U.S. Arctic region is a daunting task, utilizing partnerships and taking tiered approach will result in safer, but never risk-free, environment for Arctic operations. The need for safety is vital and logical because it is in all the involved parties’ best interests to practice safe operations.¹⁰ Prioritizing safety helps mitigate loss of life and damage to natural resources and environment as well as minimizes economic costs.¹¹

When moving forward, what are the implications of safety emerging as the key theme of policy needs from the combined reports for the permitting of offshore oil and gas exploration? If safety measures are a key policy recommendation from six of the major entities involved within the Arctic, how can they be adequately implemented to ensure minimal risk during drilling? Is there anything in the current permitting process that would be a barrier to progress in terms of improving safety within the Arctic?

¹⁰ Black & Veatch, 2013. Natural Gas Industry Report. <http://bv.com/reports/2013-natural-gas-report>

¹¹Mearns, Kathryn, Sean M Whitaker, and Rhona Flin. 2003. Safety climate, safety management practice and safety performance in offshore environments. *Safety Science*, Volume 41, Issue 8, October 2003, Pages 641-680, ISSN 0925-7535, [http://dx.doi.org/10.1016/S0925-7535\(02\)00011-5](http://dx.doi.org/10.1016/S0925-7535(02)00011-5).

Offshore Drilling Permitting Process and Future Policy Implications - Shell Case Study

Although the six reports suggest numerous policy recommendations and provide plans for moving forward in the Arctic, an offshore drilling permitting process already exists and applies to the region. Overall, Shell's permitting experience and its 2012 drilling serve to highlight challenges in the process.

Obtaining an offshore drilling permit requires leasing the area, developing an exploratory plan, acquiring extensive permits, and eventually implementing a development and production plan. The entire offshore drilling permitting process is extensive and involves approval from several federal agencies including the Bureau of Safety and Environmental Enforcement (BSEE), the Bureau of Ocean Energy Management (BOEM), NOAA, the Department of the Interior (DOI), and the Environmental Protection Agency (EPA). According to DOI's "Review of Shell's 2012 Alaska Offshore Oil and Gas Exploration Program" report released March 8, 2013, Shell had begun exploration in the Arctic, yet failed to accomplish its overall goals and "Shell's difficulties have raised serious questions regarding its ability to operate safely and responsibly in the challenging and unpredictable conditions offshore Alaska."¹²

Although Shell had obtained the necessary permits, DOI's report illustrated a disconnect between permitting requirements and the ability to ensure safe exploration in the Arctic as evidenced by Shell's problems with numerous unanticipated obstacles during the 2012 drilling season, despite having secured the permits necessary for the operations performed during offshore exploration in the Chukchi and Beaufort. DOI cites several problems that resulted in Shell's exploratory shortcomings in the Arctic, including a lack of necessary preparation and an Arctic Containment System as well as other factors contributing to the grounding of the *Kulluk* rig near Sitkalidak Island.¹³ Such problems served as the catalyst for DOI's report in which the agency establishes key principles and prerequisites for Arctic offshore exploration drilling which include:

"For Industry

1. All phases of an offshore Arctic program – including preparations, drilling, maritime and emergency response operations – must be integrated and subject to strong operator management and government oversight.
2. Arctic offshore operations must be well planned, fully ready and have clear objectives in advance of the drilling season.
3. Operators must maintain strong, direct management and oversight of their contractors.
4. Operators must understand and plan for the variability and challenges of Alaskan conditions.
5. Respect for and coordination with local communities.

¹² DOI. 2013. Review of Shell's 2012 Alaska Offshore Oil and Gas Exploration Program. <http://www.doi.gov/news/pressreleases/upload/Shell-report-3-8-13-Final.pdf>

¹³ DOI. 2013. Review of Shell's 2012 Alaska Offshore Oil and Gas Exploration Program. <http://www.doi.gov/news/pressreleases/upload/Shell-report-3-8-13-Final.pdf> and Reuters. 2013. Alaska Oil Rig Grounded In Sitkalidak Island Challenges Shell's Plan. In: Huffington Post Green. January 6, 2013. http://www.huffingtonpost.com/2013/01/06/alaska-oil-rig-sitkalidak-island-weather_n_2421447.html

Government Oversight:

6. Continued strong coordination across government agencies is essential.
7. Industry and government must develop an Arctic-specific model for offshore oil and gas exploration in Alaska.”¹⁴

These principles align with many of the policy recommendations from the six analyzed reports, and safety is identified as the key need prior to any additional activity in the area. However, the existing permitting process failed to ensure safety and needs to be altered to include the desires of DOI and all of the other federal agencies involved. The report also states,

*“The United States has a leading role among Arctic nations in establishing appropriately high standards for safety, environmental protection and emergency response governing offshore oil and gas exploration in the Arctic Ocean. It is incumbent, therefore, on the United States to lead the way in establishing an operating model and standards tailored specifically to the extreme, unpredictable and rapidly changing conditions that exist in the Arctic even during the open water season.”*¹⁵

DOI’s report cites changes that need to be made in the offshore drilling process and for Shell in particular, yet these changes need to be implemented throughout Arctic policy. Besides Shell, other industries have suspended their Arctic activities, such as ConocoPhillips, in order to ensure that when they do begin exploration, it is done safely.¹⁶ While there are no barriers to progress in making these necessary policy changes, there is a clear gap between the policy recommendations for the Arctic and the current permitting process concerning overall safety within the Arctic.

The U.S. has the ability to set an example on the proper way in which to extract resources for economic benefit while protecting the environment and ensuring safe practices, though some risk of failure is assumed with any offshore drilling activity, even if extensive safety provisions are set in place within the permitting process, especially in an area exposed to ice.¹⁷ Shell was fortunate that the result of their mishaps in the Arctic was not more extreme and instead, it may serve as a benchmark for other industries and the United States as a whole to make changes before any additional activity occurs.

In moving forward, we must determine the next step. If safety is necessary prior to any additional activity in the Arctic as demonstrated by Shell’s past attempt, we must resolve how policymakers can ensure safe practices in the Arctic. It may be possible to ensure safe practices through policies, but also it may need to be on a case-by-case basis with minor precautions in place in order to respond to possible incidents. Overall, we must examine what policies should

¹⁴ DOI. 2013. Review of Shell’s 2012 Alaska Offshore Oil and Gas Exploration Program. <http://www.doi.gov/news/pressreleases/upload/Shell-report-3-8-13-Final.pdf>

¹⁵ DOI. 2013. Review of Shell’s 2012 Alaska Offshore Oil and Gas Exploration Program. <http://www.doi.gov/news/pressreleases/upload/Shell-report-3-8-13-Final.pdf>

¹⁶ Krauss, Clifford. ConocoPhillips Suspends Its Arctic Drilling Plans. In: New York Times. April 10, 2013. http://www.nytimes.com/2013/04/11/business/energy-environment/conocophillips-suspends-arctic-drilling-plans.html?_r=0

¹⁷ Sanderson, T.J.O. Ice mechanics and risks to offshore structures. Graham & Trotman: United States. 1988. <http://www.osti.gov/scitech/biblio/6916117>

change and if these changes are feasible. The following section delves into implementation of the necessary policies in order to address safety within the Arctic region.

Next Steps for Implementation

The next step in implementing a strong Arctic policy should focus on safety measures that are referenced by the involved parties and enacted via the tiered approach illustrated above, but regulators must coordinate to accomplish these goals. Overall, the emphasis on the need for improved safety through developing infrastructure and increasing emergency response capabilities is a key policy that must be implemented prior to or in conjunction with the majority of the other policy recommendations.

To implement safety measures, the majority of the policy recommendations highlighted the need to use partnerships in order to best ensure safer Arctic development and employ the best expertise to make decisions. For example, NOAA serves as the lead scientific support for the Arctic region, yet partnerships are still critical for the agency's success. NOAA's Arctic Vision and Strategy states:

*“Achieving the Nation’s Arctic goals requires strong integrated partnerships at all levels of governance. NOAA is building and continues to advance partnerships with several international, federal, state, and local partners and stakeholders focused on Arctic issues.”*¹⁸

Partnerships allow for information sharing as well as involvement of additional diverse stakeholders, and thus, the result is improved and more collaborative decision making. The same applies for partnerships within the safety themed policy recommendations, where the coordination of partnerships will increase the effectiveness of implementation. Another example can be seen in the President's report, where he makes the policy recommendation “Evolve Arctic Infrastructure and Strategic Capabilities.” The recommendation goes on to state:

*“Working cooperatively with the State of Alaska, local, and tribal authorities, as well as public and private sector partners, we will develop, maintain, and exercise the capacity to execute Federal responsibilities in our Arctic waters, airspace, and coastal regions, including the capacity to respond to natural or man-made disasters. We will carefully tailor this regional infrastructure, as well as our response capacity, to the evolving human and commercial activity in the Arctic region.”*¹⁹

In order to best accomplish the safety goal of increasing the capacity to respond to disasters, industries working with the State of Alaska, local, tribal authorities, and public/private sector partners are critical. Partnerships also may allow for increased coordination and therefore, eliminate possible repetition of efforts or additional spending. Overall, when implementing safer Arctic development through the policy recommendations outlined above, partnerships will play a pivotal role.

¹⁸ NOAA. February 2011. NOAA's Arctic Vision and Strategy.

http://www.arctic.noaa.gov/docs/NOAAArctic_V_S_2011.pdf

¹⁹ President of the United States. May 2013. National Strategy for the Arctic Region.

http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf

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There are already some existing partnerships such as the Interagency Arctic Working Group (IAWG) and the Ocean Energy Safety Advisory Committee (OESC) that may be used in order to implement specific prerequisite safety recommendations, for instance the development of Arctic-specific offshore drilling standards. These two entities are in positions to begin solving some of the policy issues surrounding safety in the Arctic, such as the need for new standards. In utilizing their expertise as well as coordinating with additional entities, new, necessary Arctic-specific standards can be developed and implemented through regulatory means. By including as many relative entities as possible in aspects of the creation of the new standards in addition to taking into account the several references to the need for new standards within the safety policy recommendations, IAWG and OESC are able to put in place the necessary safety prerequisites to ensure safe offshore development and Arctic activity. These groups are just two examples that illustrate the benefits and applicability of partnerships in the Arctic region as well as the use of existing bodies in order to accomplish the overall safety goals.

The Arctic is a challenging area with difficult factors that influence decision-making and thus, it is vital that experts are utilized and able to contribute to the design and implementation of the new model as development in the Arctic continues. Partnerships are a necessity in such a complex area and the development of a new model offers an opportunity for additional agencies to be included in the permitting process.²⁰ Institutions across the Federal Government agree that safety is key and is a precursor to continued development, as illustrated in DOI's report. However, the lease sales have already begun and existing permitting processes are well underway. Therefore, when looking ahead to the future, safety must be a priority in the new Arctic-specific model that DOI and other governmental agencies will be designing. There needs to be a shift now from all involved entities to focus on implementing these recommendations in order to lay the groundwork in time for safe and sustainable development and exploration.

²⁰ DOI. 2013. Review of Shell's 2012 Alaska Offshore Oil and Gas Exploration Program. <http://www.doi.gov/news/pressreleases/upload/Shell-report-3-8-13-Final.pdf>

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		Stewardship	Science	Governance
Common Themes		Infrastructure and Strategic Capabilities for Emergency Response and Safety Needs	Forecasting Sea Ice and Weather	Information Sharing and Coordination/Communication Between Involved Parties
		Environmental Protection with an Emphasis on Natural Resources, Ecosystems, and Cultural Significance	Increasing Foundational Science and Improving Understanding of the Arctic through Research	Domestic and International Partnerships
		Human Health and Maintaining Healthy, Resilient Communities	Charting the Arctic Region	Ratify Law of the Sea
Report	White House	Evolve Arctic Infrastructure and Strategic Capabilities* (p. 6)	Enhance Arctic Domain Awareness* (p. 6)	Preserve Arctic Region Freedom of the Seas* (p. 6-7)
		Protect the Arctic Environment and Conserve Arctic Natural Resources (p. 7-8)	Increase Understanding of the Arctic through Scientific Research and Traditional Knowledge (p. 8)	Provide for Future United States Energy Security (p. 7)
		Use Integrated Arctic Management to Balance Economic Development, Environmental Protection, and Cultural Values (p. 8)	Chart the Arctic Region (p. 8)	Pursue Arrangements that Promote Shared Arctic State Prosperity, Protect the Arctic Environment, and Enhance Security* (p. 9)
				Work through the Arctic Council to Advance U.S. Interests in the Arctic Region* (p. 9)
				Accede to the Law of the Sea Convention (p. 9-10)
			Cooperate with other Interested Parties (p. 10)	
	NOAA	Improve Stewardship and Management of Ocean and Coastal Resources in the Arctic (p. 17-18)	Forecast Sea Ice (p. 7-8)	Enhance International and National Partnerships (p. 15-16)
Advance Resilient and Healthy Arctic Communities and Economies* (p. 19-21)		Strengthen Foundational Science to Understand and Detect Arctic Climate and Ecosystem Changes (p. 9-11)		

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			Improve Weather and Water Forecasts and Warnings (p. 12-14)	
IARPC		Assess strengths and vulnerabilities of Arctic communities facing the impacts of climate change and assist in developing adaptation strategies and tools to maximize sustainability, well-being, and cultural and linguistic heritage (p. 61-66)	Understand sea-ice processes, ecosystem processes, ecosystem services, and climate feedbacks in the Beaufort and Chukchi Seas and the contiguous Arctic Ocean (p. 11-23)	
		Understand factors that impact human health in the Arctic, including infectious and non-communicable diseases, climate change, environmental contamination, and behavior and mental-health disorders (p. 67-77)	Understand terrestrial ice processes, ecosystem processes, ecosystem services, and climate feedbacks in the Arctic (p. 23-34)	
			Understand atmospheric surface heat, energy, and mass balances (p. 34-43)	
			Integrate and continue to deploy a national Arctic observing system and promote international cooperation to create a circumpolar Arctic observing system (p. 43-50)	
			Integrate Arctic regional models (p. 50-61)	
IWG		Adopt an Integrated Arctic Management Approach (p. 46)	Science Based Decision Making (p. 32-33)	Ensure Ongoing high-level White House leadership on Arctic issues (p. 46)
		Develop natural resources in an environmentally and culturally sensitive manner (p. 33)		Strengthen Key Partnerships (p. 46)
		Support development of adequate infrastructure* (p. 33)		Promote Better Stakeholder Engagement (p. 46)
				Coordinate and Streamline Federal Actions (p. 37)
				Improve Communications (p. 34)

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	USCG	Achieve Effective Presence* (p. 26)	Enhance Collection, Fusion, and Analysis of Maritime Information and Intelligence (p. 24-26)	Ensure Effective Coordination and Information-Sharing (p. 23)
		Safeguard the Maritime Environment* (p. 28)		Inform Domestic and International Governance (p. 27)
		Preserve Living Marine Resources (p. 28)		Protect U.S. Sovereignty and Sovereign Rights (p. 29)
				Develop and Promote the U.S. Coast Guard as an Expert Resource for Partners (p. 31)
				Support a National Approach for Arctic Planning (p. 32)
				Leverage Domestic and International Partnerships as Force Multipliers (p. 31-32)
	USARC	Improve Arctic Human Health (p. 2)	Observe, Understand, and Respond to Environmental Change in the Arctic (p. 2)	Ratify UNCLOS (p. 17)
		Understand Natural Resources* (p. 3)		
		Advance Civil Infrastructure Research (p. 3)		
		Assess Indigenous, Languages, Identities, and Cultures (p. 3)		

* Marked = Includes Safety Recommendations