White Papers Prepared to Develop the 2017-2021 Plan

1. Introduction and Process Overview
2. Strategic Drivers
3. Research Goals
4. Implementation and Tools
5. Input and Communications Strategy
IARPC Review and Revisioning Process:
Developing the Strategy, Plan and Tools for IAPRC’s Future

1.0 Introduction

In January of 2013 the newly re-chartered1 Interagency Arctic Research Policy Committee (IARPC) released its first truly integrated plan for cross-agency research collaboration, Arctic Research Plan: FY2013-2017 (Plan). Since then, an implementation structure of twelve collaboration teams and a community-driven website, IARPC Collaborations, has developed and broadened to include other valuable activities that were not originally included in the Plan (e.g. logistics subgroup). This implementation structure was reviewed in November of 2014, leading to a series of recommendations for its strengthening2. Also in that interval, new inputs (e.g. National Academies Study - The Arctic in the Anthropocene: Emerging Research Questions) and organizational structures (e.g. Arctic Executive Steering Committee (AESC), Study of Arctic Environmental Change (SEARCH) action teams) have developed both from within and outside the Federal government, posing new opportunities for collaboration and fresh challenges to IARPC’s focus. Please refer to the Key Documents attachment of a complete listing of inputs considered in this process.

These developments were presented to the IARPC Principals in May of 2015, at which time the Principals directed the IARPC Staff Group to review the new landscape and to identify how IARPC might revision its efforts to respond to these inputs or complement these structures. The IARPC chair also directed the staff group to recommend several options on the structure for the next IARPC 5-year research plan. This charge from the Principals led to IARPC’s current Review and Revisioning Process (IARPC ReV).

In August of 2015, IARPC Staff Group empaneled the IARPC ReV subgroup3 to initiate the IARPC ReV process with a 3 month “Preparatory Phase”. Their charge was to review the relevant documents (see Key Documents attachment) and emerging capabilities (e.g. AESC, IARPC website) that impact IARPC and to which it should be responsive, in order to assess the effectiveness of IARPC’s current implementation and to make recommendations for IARPC next Plan and implementation strategy. They were also charged with preparing for a broader community workshop in December, where they would present and build upon their work with input from a broader cross-section of Arctic research stakeholders.

1 In 2010, President Obama signed an Executive Order making the Interagency Arctic Research Policy Committee a subcommittee of the Committee on Environment and Natural Resources (CENRS), which is under the direction of the White House National Science and Technology Council (NSTC).


3 “Revisioning Subgroup” comprised of 5-6 person sub-group of Staff, 2-3 Team Leaders, 1-2 outside champions (Fed-only), 2-3 Principals, IARPC ED and Secretariat. Chaired by Starkweather and Stephenson.
2.0 The IARPC ReV Process Overview

IARPC ReV addressed this charge through identifying four topical areas, overlapping and progressive, to address:

1. Strategic Drivers
2. Research Goals
3. Implementation and Tools
4. Input and Communications Strategy

The subgroup divided into teams, each team writing a white paper to capture 1) what was done for the current Plan and Implementation; 2) what lessons were learned in doing it that way; and 3) what recommendations should be made for the next Plan and Implementation. These white papers are here combined to inform participants in the IARPC ReV workshop and to feed into a summary for the IARPC Principals. Recommendation are summarized at the end of each white paper. Some key terms that appear frequently in the white papers are presented for reference:

(Strategic) Policy Drivers: The high-level policy topics that drive the scope of the Plan.

Research Goals: Referred to as Research Areas in the current Plan. These are the broad umbrellas for research that support the Policy Drivers and into which more detailed Research Objectives are organized. Research Goals may be organized to support:

- **System Science**: Defines a type of Research Goal that is shaped by a particular sub-system of the Arctic System.
- **Interfaces**: Defines a type of Research Goal that is shaped by the intersection of agency mission interests.
- **Cross-Cutting**: Defines a type of Research Goal that supports and cuts across System Science or Interface research areas.

Research Goals may also be organized to support different groupings.

Research Objectives: This level supports the Research Goals with more specifics. Research Objectives might include advancing understanding on broad research questions or coordinating efforts on broad agency interests. They should be more tangible and resolved than the lofty Research Goals and provide a strong organizational structure for grouping Performance Elements.

Performance Elements: This is the mostly finely resolved element in the Plan, referred to as Milestones in the current Plan. These elements might refer to specific data products or product delivery systems (e.g. data access websites), observing system components, summaries of new knowledge, assessments, or facilitation and coordination capacities. They should be specific, time-based and measurable elements. Ideally, but not necessarily, they will require multiple agency efforts to accomplish.
3. IARPC ReV Workshop

The IARPC ReV workshop was envisioned as a venue where the ReV subgroup could gain greater insight into the imperative Policy Drivers and Research Goals that should be guiding the next 5 years of Federal Arctic research. A group of Feds and non-Feds will convene for this discussion. The objective of the IARPC ReV workshop is to develop recommendations for consideration by the IARPC Principals for the Policy Drivers and priority Research Goals for the next IARPC 5 Year Plan.

4. IARPC ReV Next Steps

It is anticipated that IARPC will spend the year ahead preparing its next Plan (see attached Time Line). Following the results of the IARPC ReV Workshop, the ReV subgroup will prepare a report for the IARPC Principals on the key findings. The Principals will then have an opportunity to refine and refocus these findings and provide specific directions for the next Plan. The months that follow will be a period of seeking input and developing the details of the Plan Research Objectives and Performance Elements.
The purpose of this white paper is to consider the scope of IARPC’s next 5-year plan (Plan). This would frame the content, and shape other objectives such as encouraging strong interagency communication, coordination and collaboration. We also consider the definition of “research” that IARPC should address, and the relationship of IARPC to other interagency groups that have relevance to Arctic research.

**Plan Drivers**

The IARPC Chair and other Principals have expressed a desire to frame the new plan around three to five policy-level drivers. This is consistent with the Arctic Research Policy Act (ARPA), which considers the plan as implementing an Arctic research policy. Suggested drivers (with sub-bullets providing additional context) are:

- **National Security**
  - Prediction of Arctic environment, timescale of days to decades.
  - Projections of risk, and mitigation (coastal, increased human development, impacts on infrastructure)
- **The well-being of Arctic residents**
  - Health, culture, education, economic development, environmental stewardship, built infrastructure.
- **Our understanding of the Arctic in the global system.**
  - Implications to sea-level, carbon cycle, albedo etc.

**Scope of the 5-year plan:**

Models for organizing Plan content within this strategic scope include:

A. **Comprehensive:** as called for in the law that establishes IARPC (and the current IARPC Charter)
B. **Thematic:** emphasizing a selected sub-set of research areas that would benefit significantly from interagency collaboration— the current approach
C. **Compilation:** department and agency plans, with little/no attempt to coordinate

**A. Comprehensive**

IARPC’s enabling legislation and charter envision 5-year plan of everything\(^4\), which is both comprehensive, optimally managed for collaboration, and includes an integrated budgeting approach.

This approach is probably not feasible because:

- Agency plans change from year-to-year.
- The called-for budgeting approach also runs counter to the department and agency budget cycles driven by OMB.

\(^4\) See attachment: ARPA Language concerning the 5 Year Plan
• Developing and executing a plan of this scope would require significantly more resources than currently available to IARPC.

B. Thematic

The thematic approach is designed to enhance interagency communication, coordination, and collaboration.

• Feedback from the December 2014 team-leader workshop indicates there is increasing awareness of each other’s programs. This awareness in turn leads to communication, which may in turn may lead to interagency coordination and/or collaboration.

• Should the approach be as comprehensive as possible in the selection of themes or should it be more selective? IARPC Chair has suggested 3 – 5 themes, but at last Principals meeting Principals seemed open to add themes where there was clear agency leadership and multiagency buy-in.

• Although we may choose to limit the number of themes in the plan, IARPC can also encourage collaboration on activities without including them in the 5-year plan using the self-forming group approach we are currently experimenting with on logistics and reanalyses. A weakness with this approach is that these activities may not get the recognition they deserve, noting that the IARPC 5-year plan is referenced in the OMB-OSTP research priorities memo.

• Rather than getting very specific, perhaps the plan can be used to lay out broad themes, but have the staff and teams develop annual implementation plans – with one or two planned accomplishments each year. (This would be consistent with feedback acquired during a survey of team leaders who indicated writing milestones for five years is a difficult and imprecise exercise that leads to difficulties with implementation.)

• Milestones approach fits with National Strategy for the Arctic Region (NSAR) and provides a basis for assessment (i.e. to address the question “did the Federal enterprise accomplish its planned goals and milestones?”).

• Resources approximately equal to the current level. More teams than the current level would require additional staff. IARPC could explore alternative multi-agency funding models.

C. Compilation of Agency Plans

• Provides information about agency planning, awareness of agency activities, and likely enhances communication. Does not explicitly encourage or assess interagency coordination and collaboration.

• This approach was followed between 1985 and 2005 and was found to be of little benefit in accomplishing the intent of ARPA.

• No shared resources needed except for editing and publishing.

We recommend the thematic approach supporting the policy-level drivers. Actions under the drivers could be structured in a hierarchy of action levels, such as the approach used by the National Invasive Species Council (NISC) as they developed their species management plan. In that plan, under each high-level goal three levels of action; Objectives, Implementation Tasks and Performance Elements (PE). There are just over 80 PEs. Most text within the three action levels is short – often one sentence. We recommend the following language for these levels: Policy Driver, Research Goal, Research Objective and Performance Element (Figure 1).
Figure 1. A hierarchal organization structure to support a policy-driven Plan.

**Scope of IARPC “research”**

- Given the agency make-up of IARPC, we should keep our definition broad – as originally intended. Strengthen scope beyond the “basic” research that has been the dominant focus of the past.
- The IARPC Charter includes natural resources and materials, physical and biological sciences, and social and behavioral sciences. Potentially it would be helpful to revisit this language to include earth-system science, resilience and sustainability science and engineering.

**Audience for the IARPC 5-year plan**

ARPA has several statements that pertain to the purpose of the Plan:

**Section 102 (b):**
(1) to establish national policy, priorities, and goals and to provide a Federal program plan for basic and applied scientific research…
(3) to designate the National Science Foundation as the lead agency responsible for implementing Arctic research policy

**Section 107 (a):** The National Science Foundation is designated as the lead agency responsible for implementing Arctic research policy,…..

**Section 108 (a):**
(2) work with the Commission to develop and establish an integrated national Arctic research policy that will guide Federal agencies in developing and implementing their research programs in the Arctic
(4) develop a 5-year plan to implement the national policy,….  

**Section 109 (b)**
(2) a statement of the goals and objectives of the Interagency Committee for national Arctic research;
Thus, the plan is intend to guide the agencies as they develop their plans. The audience of the plan is primarily the agencies that will implement the policy.

In addition, IARPC, in its last plan encouraged Federal agencies to collaborate in order to improve the “return on investment” in Arctic research and the effective use of resources in seven thematic areas.

**Interaction with other interagency coordinating groups**

The number of groups that have relevance to coordinating interagency Arctic research has increased since ARPA established IARPC in 1984. The National Science and Technology Council has three groups that consider Arctic research and observations in their portfolio. The US Global Change Research Program (USGCRP) and the Subcommittee on Ocean Science and Technology (SOST) each have recently established research priorities related to the Arctic. The US Group on Earth Observations (USGEO) is considering an Arctic theme in its current effort to prioritize Federal investments in Earth observations. It will be critical to maintain the strong communication that IARPC has with USGCRP and SOST (each are invited to each other’s monthly meetings). Similar ties should be established between IARPC and USGEO.

The Arctic Policy Group (APG) is an interagency forum established by the Department of State (DOS) in the early 1970s to help guide its dialogue with other countries. This group took on greater significance with the establishment of the Arctic Council (AC) in 1996. The AC has a strong focus on environmental issues and sustainable development, both areas offering potential overlap with IARPC’s portfolio. The APG promotes the necessary communication and coordination of US contributions of the Arctic Council’s work, with agencies other than DOS playing significant leadership roles. USGCRP, rather than IARPC, has historically played a significant role in supporting US engagement in AC research-related activity.

Most recently in January 2015 the Administration established the Arctic Executive Steering Committee (AESC) to provide guidance to executive departments and agencies and enhance coordination of Federal Arctic policies across agencies and offices, and, where applicable, with State, local, and Alaska Native tribal governments and similar Alaska Native organizations, academic and research institutions, and the private and nonprofit sectors. AESC could serve as a high level arbiter of Arctic research responsibilities, but the most effective approach is for IARPC, USGCRP, SOST, USGEO, National Ocean Council (NOC) and APG to determine which group is best position to coordinate activity. That said, having no single go-to lead makes it more difficult to gain a comprehensive understanding for the Federal investment in Arctic research.

Assignment of research coordination activities between the existing groups should occur when the need is identified. An excellent example was when IARPC and NOC agreed that IARPC would take the lead when both NOC and IARPC develop plans related to sea-ice studies and establishing a distributed biological observatory. The US contributions to these activities were developed through IARPC run teams, but were reported out through both chains.

**Other issues**

Recommend annual budget guidance along the lines of USGCRP or SOST?

- Is there a role for budget priorities?
- Currently the OMB-OSTP joint memo references the IARPC 5-year plan.

**Summary Recommendations**

- The scope of the Plan should be focused and policy-driven. We recommend the thematic approach to drive interagency activity in support of the policy-level drivers.
- The Plan should encourage Federal agencies to collaborate in order to improve the “return on investment” in Arctic research and the effective use of resources in thematic areas.

- The Plan content, under the drivers, could be structured in a hierarchy of action levels, such as the approach used by the National Invasive Species Council (NISC). In that plan, under each high-level driver are found three levels of action: Objectives, Implementation Tasks and Performance Elements.

- The Plan should consider a range of audiences, but the primary audience is the agencies that will implement the policy.

- The definition of research used in the Plan should be broad (from basic to applied research), reflecting the original intent of the law.

- The Plan should refer to other interagency committee actions, when those groups sufficiently cover a research area that would otherwise fall under Arctic research (e.g. oil spill research in the Arctic).
Research Goals White Paper

Roberto Delgado (NIMH); Martin Jeffries (ONR); Eric Kasischke (NASA); Jeremy Mathis (NOAA); Charles Webb (NASA); Sandy Starkweather (IARPC)

Introduction and Background


IARPC is mandated by Congress “to prepare a comprehensive 5-year program plan for the overall Federal effort in Arctic research,” through the Arctic Research Policy Act, 1984; Amended 1990 (ARPA). The law specifies that the Plan should be updated on a regular basis. There are 14 Federal agencies that collaborated on the development of the current Plan. (See attached list.). This White Paper, reviewing the effectiveness of our current Plan’s Research Goals and making recommendations for the future Goals, is a foundational contribution to the next 5-year plan.

IARPC’s current Arctic Research Plan, FY 2013-2017 (Plan), was released by the White House’s National Science and Technology Council (NSTC) in January of 2013. It was the first IARPC Plan to be developed and published since the Presidential Executive Order that moved IARPC under the NSTC structure. The current Plan is described in its introduction as a document that focuses on research areas that would “inform national policy and benefit significantly from interagency coordination” and the scope of the Plan reflects that strategy. The rationale for choosing this scope rather than preparing a comprehensive Plan is described in the “Strategic Drivers White Paper.” The current Plan was initiated as a thematic outline; the subsequent methods for developing the Plan, making decisions and seeking final OSTP approval are outlined in the “Input Process and Communications Strategy White Paper”.

B. Structure of current Arctic Research Plan, FY 2013-2017

1. Research Areas and Activities

The current Plan was built around seven Research Areas: 1) sea ice and marine ecosystems; 2) terrestrial ice and ecosystems; 3) atmospheric studies; 4) observing systems; 5) regional climate models; 6) adaptation tools for sustaining communities; and 7) human health. These research areas were further subdivided into 36 Research Activities, with more specific details about agency activities that fell therein. At the time, a key motivation for the Plan was the shifting state of the Arctic cryosphere and cascading changes with consequences for ecosystems and Arctic residents. The Plan was designed to address fundamental, rather than applied research.

2. Milestones, for monitoring and evaluating implementation

As an NSTC Plan, it was important to include Milestones under each of the research activities to monitor progress over the length of the Plan. These Milestones were supplied by agency partners under each research activity. In all, more than 140 Milestones were submitted and approved during

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7 See Plan Executive Summary, Chapter 1, p. 1.

8 The seven research themes that ultimately drove the scope of the Plan can be found here: http://www.iarpccollaborations.org/plan/index.html
the NSTC Technical Review. (Milestones have since been added, modified and deactivated during the implementation process.)

**Effectiveness of current Arctic Research Plan Research Areas (Goals)**

IARPC will consider how effective the current Plan was at achieving its stated objectives of focusing on Research Areas that 1) “inform national policy” and 2) “benefit significantly from close interagency coordination”. The effectiveness of the current Plan’s Research Areas can be evaluated by assessing its alignment with relevant policies and strategies. It will also be evaluated by reviewing some key successes and challenges.

**A. Relevance to US Arctic policy and strategic priorities**

US Arctic policy has been directly guided by three relevant policies and strategies over the life of the Plan. At the onset, US Arctic Policy was set by NSPD-66 / HSPD-25. The National Ocean Policy was released in 2010, including an Arctic focus. Most recently, the National Strategy for the Arctic Region (NSAR) released in 2013, further refined US strategic priorities.

1. **Arctic Region Policy (NSPD-66 / HSPD-25)**

   The current Plan was developed subsequent to NSPD-66/HSPD-25, so did not inform it, but it did reflect many of its key implementation strategies pertaining to research. Some examples related to international cooperation and environmental protection are described in Table 1:

   **Table 1. Examples of Plan activities that support US Arctic Policy.**

<table>
<thead>
<tr>
<th>NSPD-66/ HSPD-25</th>
<th>IARPC Research Plan Activities</th>
</tr>
</thead>
</table>
   | III.E.5.b - Actively promote full and appropriate access by scientists to Arctic research sites through bilateral and multilateral measures and by other means. | (3.1.3) Developing the Distributed Biological Observatory  
   |                                                                                | (3.2.1) Perform glacial process studies  
   |                                                                                | (3.3) Sustaining international collaboration through International Arctic Systems for Observing the Atmosphere and observing partnerships with Tiksi Observatory in Russia. |
   | III.E.5.c - Lead the effort to establish an effective Arctic circumpolar observing network with broad partnership from other relevant nations. | (3.4) Integrate and continue to deploy a national Arctic observing system and promote international cooperation to create a circumpolar Arctic observing system |
   | III.H.6.d - Pursue marine ecosystem-based management in the Arctic.               | (3.1.4) Integrated ecosystem research in the Beaufort-Chukchi Seas                           |
   | III.H.6.e - Intensify efforts to develop scientific information on the adverse effects of pollutants on human health and the environment and work with other nations to reduce the introduction of key pollutants into the Arctic. | (3.3.1) Improve understanding of SLCFs  
   |                                                                                | (3.7) 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 |

2. **National Ocean Policy**
Almost concurrent with the transfer of IARPC responsibilities to OSTP, the President issued a directive to create a National Ocean Policy (NOP). The policy includes “Changing Conditions in the Arctic” as one of nine National Priority Objectives of the new ocean policy. This priority, aimed at addressing “environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes” led to the rapid development of an Arctic Strategic Action Plan within the National Ocean Council, responsible for its implementation. The IARPC Sea Ice and Distributed Biological Observatory Collaboration Teams overlap with the objectives of the Arctic Strategic Action Plan and are jointly implemented with the NOC.

3. National Strategy for the Arctic Region (NSAR), and Implementation Plan

The White House released the NSAR in May of 2013 to set forth the United States Government’s strategic priorities in the Arctic region. The strategy was built around three lines of effort (LOE’s): 1) Advance United States Security Interests; 2) Pursue Responsible Arctic Stewardship; 3) Strengthen International Cooperation. The Plan was extremely effective at informing the NSAR and its Implementation Plan, particularly in LOE 2 on Arctic stewardship. Here, the IARPC Plan milestones were included selectively to serve as NSAR milestones for LOE 2. Subsequently, the Arctic Executive Steering Committee (AESC) was established (by Executive Order 13689: Enhancing Coordination of Federal Efforts in the Arctic, 21 January 2015) to oversee the Implementation of the NSAR. Furthermore, an Artic Overlaps and Gaps Report was prepared by an interagency working group for the AESC to “assist […] in finding efficiencies for planning, prioritizing, and overseeing” the NSAR; IARPC (in particular, its implementation) was identified as a best practice in this report.

B. Effective Research Areas for interagency benefits, alignment with agency missions

To understand if the chosen Research Areas “benefitted significantly” from inclusion in the current Plan, this White Paper first considers two documents of relevance: IARPC’s Biennial Report and the 2014 IARPC Team Leader’s Workshop Report. Two years into its implementation, IARPC assembled a collection of success stories from its Plan and implementation efforts into a Biennial Report, which highlights activities that either developed directly from IARPC’s efforts or were enhanced by inclusion in the Plan. These multi-agency successes include: advancing understanding of the marginal ice zone (MIZ), establishment of the Sea Ice Prediction Network (SIPN), developing a conceptual model for the Chukchi-Beaufort ecosystem, initiation of the Marine Arctic Ecosystem Study (MARES), improved coordination for ecosystem science across three major investments, improved access to data documentation and more. Research Areas that saw less tangible progress were those with broad areas of responsibility that crosscut traditional disciplinary boundaries: Observing, Modeling and Communities.

This limited tangible progress was also highlighted in the 2014 Team Leader’s Workshop report (which also echoed many of the successes of the Biennial Report). The Team Leader’s Workshop Report highlighted the challenges faced by the broad and crosscutting teams. While there are some benefits to the inventorying activities and exchange of best practices, it is less clear where these groups can make tangible progress outside the context of more focused subjects like atmospheric science, ecosystem studies or sea ice prediction.

Alignment between the IARPC Plan and individual agency efforts is another metric for effectiveness considered in this White Paper because the Plan can only accomplish that which agencies are committed to implementing. While some IARPC agencies like NASA and NSF have broad and fundamental research missions (with which the Plan is very well aligned), mission-based agencies like NOAA, DOE and DOI focus on research that is foundational to their missions. Many Federal agencies have developed
Arctic-specific strategic plans in the last few years⁹, both NOAA and USGS have done this specific to research goals supporting an assessment of this alignment (Table 2) for those agencies.

Alignment between the Plan and these Agencies’ Arctic strategic plans can be evaluated by tallying the number of Plan research activities and milestones that support the agency Arctic strategic plans. IAPRC has measured these as follows: High = more than one research activity; Medium = one research activity; Low = related milestones; None = no activities or milestones. Table 2 shows high Plan alignment with two agencies’ Arctic strategies related to fundamental understanding of Arctic systems. There are notable gaps, for example relating to the current Plan’s coverage of permafrost, hydrology, and carbon fluxes. For example, only one of more than 140 Plan milestones concerns permafrost. The current Plan’s alignment is also low in areas of research for operational needs or assessments for decision support, for which IARPC’s revised definition of Research (see Strategic Drivers White Paper) should respond. For example, research related to weather forecasting and specific to mineral and energy resources is not covered. Areas of low or no coverage tend to be areas where there is a single agency mission (e.g., weather forecasting). However, a broad comment about the Plan organization is that support for decision making (e.g., for coastal communities or resource managers) tends to be handled in an ad hoc manner within the thematic areas. This was a key criticism of the Plan that emerged in the Federal Register feedback from the State of Alaska (see “Input and Communications White Paper”).

Table 2. Alignment between two mission research agency Arctic strategies (Measured as High, Medium, Low, None).

<table>
<thead>
<tr>
<th>Agency Plan</th>
<th>Agency Strategy Area</th>
<th>IAPRC Plan Research Coverage</th>
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<tbody>
<tr>
<td><strong>NOAA Arctic Vision and Strategy</strong></td>
<td>Forecast Sea Ice</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Strengthen foundational science to understand and detect Arctic climate and ecosystem change</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Improve weather and water forecasts and warnings</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Enhance international and national partnerships</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Improve stewardship and management of ocean and coastal resources in the Arctic</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Advance resilient and healthy Arctic communities and economies</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>USGS Arctic Science Strategy</strong></td>
<td>Improve scientific information for Arctic coastal communities and ecosystems</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Advance an integrated, landscape scale understanding of Arctic ecosystems and the potential for future change</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Assess mineral and energy resources present in Arctic landscapes, and evaluate environmental implications of Arctic resource development</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Determine effects of a changing Arctic on environmental health</td>
<td>Low</td>
</tr>
</tbody>
</table>

⁹ http://www.iarpccollaborations.org/members/documents/3313
III. Preliminary Recommendations

A. Use Research Goals as the broadest headings within the Plan for its organization in support of the Policy Drivers. Modify/Expand the current Plan’s Research Areas into Research Goals to address areas where the current Plan is not responding to high level Policy Drivers and where it is not strongly reflecting agency interests in support of these Policy Drivers (see, for example Table 2).

B. As appropriate, consult with relevant stakeholders on preparation of the five-year Arctic Research Plan to assure that we identify as many relevant research activities as possible within government that could benefit from IARPC coordination and collaborative development.

C. If the new Plan continues to use milestones, its milestones should reflect more accurate and reliable measures to achieve and evaluate Plan outcomes, and they should be consistent with US Arctic policy, strategic priorities, agency missions, and interagency committee goals.

D. Focus on structures for Research Goals that will continue to drive interagency coordination and collaboration in key areas, merging research questions in innovative ways. To the extent that it is practical, Research Goals should consider addressing Arctic systems or sub-systems (“System Science”) rather than more “stove-piped” topics. An example of this is the current research area of Atmosphere. Many of the Arctic systems are driven by atmospheric forcing and in return influence the atmosphere. Connecting these topics explicitly should also drive more interagency activity. This must of course, be balanced by the challenge of breadth considered earlier. Further, many of the Arctic system science questions are connected to people through sustainability research. Hence, it is important that the next plan explicitly bridge between the natural and social sciences, considering the recommendations of the The Arctic in the Anthropocene: Emerging Research Questions report.

While System Science is a potentially valuable way to bridge across fundamental Arctic research questions, much foundational research in support of agency missions might better be addressed through considering the “Interfaces” where diverse agency foundational research needs overlap. For example, Coastal Resilience is topic that where many agency interests overlap (e.g. improved prediction, vulnerability, ecosystem services) and would likely benefit from improved communications, coordination, and collaboration.

In the current Plan, several research areas were very broad, unwieldy and crosscutting, making it difficult to measure progress independently of the activities addressed in more topical research areas. These broad research areas include: Arctic Observing System, Regional Modeling, Arctic Communities, and Arctic Data. We recommend that the next Plan structure its Research Goals in such a way as to embed the critical aspects of these activities within topical research areas (e.g. Ecosystem Research) to the greatest extent possible. Where Crosscutting Research Goals remain, they should be supported by very specific and measurable performance elements.
Some examples (not an exhaustive list) of Research Goals that address these recommendations are provided for illustrative purposes, they are by no means comprehensive nor are they provided to constrain options:

**Example “System Science” Research Goal: Improve Understanding of the Coupled Atmosphere, Terrestrial, Hydrology Sub-System**

In the Arctic, terrestrial and freshwater ecosystems are rapidly changing in response to climate change, natural disturbances (such as fire and thermokarst formation), changes to hydrologic conditions, and human activities. A number of ecosystem processes and their interactions are being driven by these forcing factors, including changes to permafrost, flora and fauna, and carbon cycling. In turn, changes to land systems are having significant impacts on society through the alteration of key ecosystem services, including food security, human health, subsistence activities, infrastructure, and climate regulation. A number of federal, state, and local agencies are conducting research to understand changes to Arctic terrestrial and freshwater ecosystems. For IARPC, these studies can be organized around a set of questions focused on key elements of Arctic land social-ecological systems that require interdisciplinary research across multiple agencies:

- What processes are contributing to changes in disturbance regimes and what are the impacts of these changes?
- What processes are controlling changes in the distribution and properties of permafrost and what are the impacts of these changes?
- What are the causes and consequences of changes in hydrologic systems, specifically the amount, temporal distribution, and discharge of surface and subsurface water?
- How are flora and fauna responding to changes in biotic and abiotic conditions, and what are the impacts on ecosystem structure and function?
- How are the magnitudes, fates, and land-atmosphere exchanges between carbon pools responding to environmental change, and what are the biogeochemical processes driving these changes?
- How are environmental changes affecting critical ecosystem services - natural and cultural resources, food security, human health, infrastructure, and climate regulation - and how are human societies responding?

**Example “System Science” Research Goal: Improve Understanding of the Coupled Atmosphere, Land Ice, Ocean Sub-System**

The last decade has seen a dramatic rise in the net rate of ice loss from the Greenland Ice Sheet and other Arctic glaciers and ice caps. These losses stem from warmer air temperatures, which increase melting on ice surfaces, and warmer ocean temperatures, which increase calving of icebergs from marine-terminating glaciers. These forcings also modulate the dynamics of the ice, the motion of which is governed by gravity and the constraints of surrounding topography. Significant progress has been made in characterizing the current state of the Greenland Ice Sheet, and in estimating contributions to global sea level from the Arctic. Important questions remain, however, in understanding the specific processes that add and remove ice in the Arctic system, particularly regarding the interactions of the ice with the atmosphere and ocean. The National Academy of Sciences produced a report in 2014, entitled *The Arctic in the Anthropocene: Emerging Research Questions*, which they addressed directly to IARPC. Questions regarding the **Coupled Atmosphere: Land Ice: Ocean Sub-System** include:
• How will accelerated melting and glacier dynamics affect ice loss and rates of sea level rise?

• What is the potential for a trajectory of irreversible loss of Arctic land ice, and how will its impact vary regionally?

• What effect will warming ocean water have on sea-terminating outlet glaciers and ice shelves?

• How is inland ice deformed internally by warming through latent heat transported by percolating meltwater from events such as the widespread surface melt of Greenland in summer 2012?

• Are there positive feedback mechanisms hidden at the ice-bed interface that we have yet to appreciate and understand?

• Is there a threshold at which the coupling between ice and bed will become weaker?

• Are there negative feedback mechanisms that would slow the rates of sliding and internal deformation that carry ice to low-elevation ablation areas (where loss of snow and ice occurs)?

• Is there a threshold where the coupling between ice and bed will become stronger, resisting further change?

• Will evolving subglacial hydrological systems in a warming climate reduce the accelerating effect of meltwater at the bed?

**Improve Coordination of Foundational Research in Support of Coastal Resilience**

Alaska’s vast coastline and adjacent seas is abundant with marine life, valuable natural resources and ever more accessible sea routes. On land and sea, it is imperative to understand the linkages between human activity and ecosystem function. Traditional Ecological Knowledge is highly relevant to detecting changes in Arctic ecosystem structure and functioning.

• Conduct integrated ecosystem-level observation and process studies to understand Arctic marine and terrestrial ecosystems.

• Identify habitat and areas critical to Arctic fish and wildlife, with a specific focus on species important to subsistence users.

• Conduct oil-spill fate and effects research aimed at better understanding the potential socioeconomic and ecosystem impacts of different types of oil spills. These studies are essential for establishing protected areas where commercial activities may be limited or restricted.

• Research the impact of anthropogenic activities on marine mammals, fish, and terrestrial ecosystems.

• Support TEK observers and research to improve integration of TEK and other forms of observing.

• Establish monitoring programs to detect environmental change and identify its potential sources.

• Support studies investigating habitat use of Arctic wildlife and associated subsistence use. This activity would likely be ongoing given the rapid changes being documented currently in these metrics.

• Support the above through increased use and improvement of existing and new autonomous, multi-sensor, observing platforms.

**Example “Interface” Research Goal: Language, Culture, Environment, Health and Well-being**

“Arctic Societies have a well-deserved reputation for resilience in the face of Change. But today they are facing an unprecedented combination of rapid and stressful changes involving environmental processes,
cultural developments, economic change, industrial development, and political change (AHDR 2004).” Such changes present significant challenges to Arctic Communities. The anticipated increase in commercial and recreational activities in the Arctic poses growing risks to food and energy security, human health, infrastructure, personal safety, and water and sanitation, and new challenges in governance, natural resource management, and education. In addition, Alaska Native and other Arctic communities must make critical choices based on threats including but not limited to stronger and more frequent storms, increasing coastal erosion, thawing permafrost, changing animal migration patterns, ocean acidification, and sea level rise, as well as, heritage language loss, shifting economic systems and population migration. Reliable and timely data are needed to inform decisions related to immediate and future climate change impacts on existing infrastructure and community services, human health, subsistence activities, and traditional cultures. Furthermore, a coordinated government-wide effort is needed to support and strengthen the capacity of Arctic communities to adapt and respond to new challenges created by environmental change and diverse socio-economic stressors. Consistent with recommendations from the Alaska Arctic Policy Commission, efforts should be made to incorporate local and traditional knowledge into science and research and use this community-based knowledge to inform management, health, and environmental decisions. Principally, the next Plan should prioritize and provide stronger emphasis on community adaptation, resilience, and sustainability. Specific research goals should address the following topical areas at the intersections of Climate Change and:

Environment – What are the impacts of contaminants and short-lived climate pollutants (e.g., black carbon and methane), poor air quality, and unreliable access to clean water on Arctic communities? How do projected increases in precipitation yet drier land surfaces affect the likelihood, frequency, and severity of vegetation stress and wildfires? How will melting sea ice affect the sea mammals that communities depend on for cultural continuity? Such a focus will support monitoring, baseline, and observational data collection to enhance understanding of Arctic ecosystems and regional climate change.

Infrastructure – What are the consequences of land erosion, sea level rise, and thawing permafrost on community infrastructure and services, rural development, and traditional livelihoods? Key indicators are needed to monitor cultural and socioeconomic changes; what should those measures be and how do we quantify them? Increased understanding will support long-term strategic planning efforts that assess and direct community and infrastructure development, as well as environmental protection and human safety.

Food Security – What are the impacts of environmental change, invasive species, and ocean acidification to patterns of marine and terrestrial resource availability? For example, what are the observed and expected changes in the distributions and relative abundance of flora and fauna upon which communities rely on for subsistence? How will changes to Alaskan fisheries impact the regional economy and global food supply? To what extent will a loss in historical livelihoods and traditional subsistence practices have cultural and socioeconomic impacts on health and societies?

Health & Well-being – How do changes in cultural practices, a lack of economic opportunities, an increasing loss of sociolinguistic heritage and identity, and historical subsistence patterns impact nutrition, child development, social relationships, substance abuse, and mental wellness? How are these factors related to the prevalence and intensity of alcoholism, diseases, intimate partner violence, sexual trafficking, and suicide ideation among Arctic indigenous communities? What rehabilitation and health care delivery systems are in place and what additional capacity—in facilities, personnel, and resources—is needed to improve public health and wellness services among Arctic communities?

In all cases of community-focused research, an important consideration will be to improve, support, and invest in data collaboration, integration, management, and long-term storage and archiving.
This team evaluated the effectiveness of the implementation of the *Arctic Research Plan FY13-17* ("Plan") and the tools used in the implementation process. In particular the team is looked at the effectiveness of: 1) use of milestones; 2) IARPC reporting and communications, including the website; 3) team structure and process; and 4) the scope and structure of the secretariat.

**MILESTONES:**

Implementation of the Plan is driven by 158 milestones written into and added to the Plan. While the plan has seven research themes, 12 teams were created to implement the themes. Each team has between 3 and 28 milestones they are responsible for implementing between 2012 and 2017.

Some teams inherited milestones without much input into the development process, but in other cases, team leaders were the principal drafters of the milestones. Team leaders approach milestones from various perspectives. Some teams use the milestones to drive conversation. For example, webinars are held to inform a specific milestone, or an agency is asked to report on progress toward a milestone. Other team leaders do not utilize or refer to the milestones except to prepare their annual reports. Interviews with team leaders revealed that not many milestones facilitated interagency cooperation, although reporting on them enhances communication between agencies.

Reporting on milestones in the late summer and early fall is a labor intensive exercise. Team leaders and the IARPC secretariat survey Federal program managers to provide reports on progress toward milestones. Meetings are held to determine the status of milestones, revisions to language, completion statements and to develop summary reports. While the work largely falls to team leaders and the secretariat, program managers who participate in teams spend some time updating their agency’s input into the milestone implementation.
While it is up to each team lead to determine how much time they want to spend during meetings on milestones, it is quite clear that the milestones have, in some cases, limited the creativity of the team in approaching their implementation. This has been resolved, in part, by teams modifying existing milestones to make the outcome more manageable, merging milestones, or creating new milestones (Federally approved) where a new research endeavor is determined beneficial. In other cases, team leaders find the milestones to be constructive and purposeful, providing impetus to bring other agencies and partners into the discussion and implementation process.

When developing the next 5-year plan, drafters should consider:

• What is the rationale for including milestones? Would “intended outcomes” or broad objectives work just as well to drive collaboration?

• If milestones are used, how will progress be reported and who will use the progress reports?
  - Will milestone reports inform our understanding of the Arctic?
  - Will milestone reports inform program managers who will make future funding decisions?
  - Will milestone reports inform policy makers and stakeholders at the Federal, State and local level?

• Intended accomplishments (e.g. milestones, intended outcomes, objectives, etc.) should be written
  - With coordination or collaboration as a primary focus rather than a specific identifiable outcome;
  - Directly related to Federal research activities

• Drafting teams should be provided guidance on a reasonable number of milestones

• The Re-Visioning team should develop a set of written guideline for the milestone language. This might include text to ensure that the milestone is measurable, participating agencies, and due dates, and lead program officer
REPORTING AND COMMUNICATION

Annual Reporting: Beginning in July/August of each year, team leaders begin developing annual reports for their teams. They report, as noted above, on milestone implementation with the help of their teams. They also report on the number of meetings held, webinars held, and useful resources added. They produce two documents: 1) a milestone report, and 2) a one-page summary of accomplishments and plans for the following fiscal year. These reports are provided to the IARPC Staff Group and Principals as well as to Office of Science Technology and Policy (OSTP) and the Arctic Executive Steering Committee (AESC) for annual reporting on implementation of the National Strategy for the Arctic Region (NSAR).

Biennial Report: The Arctic Research Policy Act (ARPA) requires that IARPC report biennially on implantation of the Plan. The secretariat along with team leads and other authors produced a biennial report for the first two years of implementation of the Plan. The biennial report was drafted between August 2014 and February 2015. It then was edited by an editorial team and NSF, followed by a lengthy review by the National Science and Technology Council (NSTC) and OSTP. The document is pending final approval from OSTP. The report focuses on accomplishments of IARPC in the first two years of implementation. It is informative to readers who wish to gain a better understanding of IARPC, its place in the Federal family of Arctic activities, and results of IARPC activities. Stakeholders in Alaska, academia, NGOs and industry may find it useful to better understand the priorities of the Federal government research effort in the Arctic. The cost of producing the biennial report was approximately $15,000 (not including the time of lead authors and IARPC secretariat).

Collaboration Team Meetings: Collaboration teams were formed initially as Federal-only implementation teams. In the summer of 2013 the team structure changed to included non-Federal participation. Teams were created first and foremost to implement the Plan, but as they have evolved, they have become a mechanism for sharing information about Arctic research. Many collaboration team meetings now include a webinar for conveying research programs and results. These webinars are sometimes given by program managers, but more often by Federally-funded PIs. The scientists are often enthusiastic about giving talks to the interagency group of program managers and scientists.

State of Alaska participation is very small. One to two State employees participate in four collaboration teams, but their participation is not frequent.

Webinars: Since January 2014, IARPC has hosted approximately 40 Webinars. Seven of those have been IARPC-wide and the rest have been organized and run by one or two collaboration teams. We have had on average 50 people on each webinar, the largest having over 100 participants and the smallest having 25 people.

Recommendations for the next Plan would be to develop a simple, comprehensive reporting mechanism that would provide a summary of the plans accomplishments and support the implementation of the NSAR.

TEAM STRUCTURE AND PROCESS

As described earlier, there are 12 collaboration teams responsible for the implementation of the Plan. Of the 12, three are cross-cutting and the remainder are specific to a scientific field of inquiry. The three cross-cutting teams have tended to have difficulty finding focus. Two of
the teams had no milestones, so much of their meeting time in the beginning was spent discussing the role of the team. Some teams that have large numbers of milestones, have spent a great deal of time discussing milestones and how to structure themselves, or have split up into small sub-teams. Both processes tend to encumber a team which is not sustainable in the long term and makes milestone reporting a challenge.

By and large the single-discipline teams have functioned well, particularly when the number of milestones was manageable. They have been able to bring in speakers, make progress on milestones, and discuss frameworks for future collaborations.

A major issue is the make-up of teams. There have been teams with a large numbers of non-Federal partners, while others are almost exclusively Federal. On the website there are upwards of 50 people associated with teams, but in point of fact, a random sampling of team meetings from all teams over all three years of implementation, revealed that on average 13.5 people attend any given collaboration team meeting. On most teams there are only a handful of people who actively participate. By and large these are Federal employees, but in a few cases the teams have very strong participation by non-Feds as well.

One team leader noted that the success of their team might have been due to the fact that they had very focused tasks which were supported by several agencies. They noted that carefully crafting goals, a focus, and overarching task supported by a few milestones is helpful in implementation.

Recommendations for the next 5-year plan would be to have a simple tracking mechanism of team members and attendance, periodic inquiry of those not attending to ascertain if something is missing from team meetings and reporting, and potentially a policy of dropping members with chronic non-attendance. There should be fewer collaboration teams to focus agency energy towards primary objectives and to promote more coordination and collaboration between Federal agencies.

WEBSITE

The IARPC collaborations website was designed originally to help implement the Plan, but has evolved into a platform for not only implementing the plan, but for sharing information and engaging the research community. It was launched in October 2014 with approximately 280 users brought in from our ongoing collaborations teams and has expanded to over 700 users today.

As a tool for tracking progress on the milestones, it has been very successful. The online database allows for real-time tracking of activities and developing the annual reports is simplified because of the database tools.

It is also the main tool by which the collaboration teams communicate. It has an online calendar as well as tools for sharing documents and updates. Meetings are announced from the website and all meeting materials are posted to the website. The website has a feature to limit distribution to only Federal employees, but this feature has not been widely used. Federal-only discussions are usually carried out by email and are mostly team-based (thus a small number of recipients at any one time)

The website has a full-time manager who ensures that the content is appropriate. While she can and will post information, the site is designed to be user-based, and users are encouraged
to post their own content. The web manager spends a great deal of her time training new
users, tracking and following what is going on in the research community and bringing that
information to the website, modifying technical aspects of the website that need addressing,
and working with the secretariat to respond to questions from staff group and program
managers. The web manager is integral to the success of the site.

The cost of designing and launching the website was $315,000 and maintenance and upgrades
are running about $5,000/month currently. NSF provides 100% of the support for the website.

The website is designed to be flexible and adapt to a new version of a 5-year plan or a new
IARPC structure. The communications value of it will remain unchanged, the only
modifications will need to be in the milestone data base and the team structure. Individuals
who already participate will be able to continue to do so under a new structure and new
people will be able to join at any time.

In developing the website, the secretariat was extremely careful to check in with the
National Science and Technology Council (NSTC) staff to ensure that the website is consistent
with all NSTC rules and regulations. Through our liaison in the Office of Science and
Technology Policy (OSTP), we continue to ensure that the website is consistent with evolving
NSTC rules. The NSTC secretariat has briefed all other NSTC subcommittee secretaries on the
site and points to it as a model site for communicating and reporting.

Additionally, the IARPC secretariat maintains a static page on the NSTC website that points to
the IARPC collaborations website. Finally, the secretariat maintains a page on OMB MAX
(Federal-only website) under our NSTC parent committee the Committee on Energy, Natural
Resources, and Sustainability (CENRS).

Recommendations for the next 5-year plan would be to ensure that the website is responsive
to new implementation framework; is maintained for those teams that do not continue in the
next plan (if requested, but with a plan for the team to be discontinued if not used; and to
continue milestone tracking.

SECRETARIAT SCOPE AND STRUCTURE

The IARPC secretariat provides support to the IARPC Principals, Staff Group, and Collaboration
Teams (and Federal-only discussion groups) to effectively carry out their responsibilities. The
secretariat is comprised of two full-time staff and one ½ time staff as follows:

• Executive Secretary (full-time, currently located in Northern Virginia)
• Web Manager and Project Coordinator (full-time, currently located in Seattle, WA)
• Implementation Scientist (half-time, currently located in Boulder, CO)

All staff are contractors under a Collaborative Agreement between NSF (chair of IARPC) and
ARCUS. Maintaining this level of support costs approximately $615,000 per year; this includes
website development and maintenance. From November 2011 to November 2012, the USARC
picked up the expenses associated with the secretariat. In 2013, NOAA picked up the expenses
related to the .5 FTE Implementation Scientist. Staffing levels were agreed to by Principals in
June 2012.

RECOMMENDATIONS

Summary of recommendations found in this report:
Milestones: When developing the next 5-year plan, drafters should consider:

- What is the rationale for including milestones? Would “intended outcomes” or broad objectives work just as well to drive collaboration?
- If milestones are used, how will progress be reported and who will use the progress reports?
  - Will milestone reports inform our understanding of the Arctic?
  - Will milestone reports inform program managers who will make future funding decisions?
  - Will milestone reports inform policy makers and stakeholders at the Federal, State and local level?
- Intended accomplishments (e.g., milestones, intended outcomes, objectives, etc.) should be written
  - With coordination or collaboration as a primary focus rather than a specific identifiable outcome;
  - Directly related to Federal research activities
- Drafting teams should be provided guidance on a reasonable number of milestones
- The Re-Visioning team should develop a set of written guideline for the milestone language. This might include text to ensure that the milestone is measurable, participating agencies, and due dates, and lead program officer
- Reporting and Communication: Develop a simple, comprehensive reporting mechanism that would provide a summary of the plans accomplishments and support the implementation of the NSAR. Webinars should be continued at the CT and IARPC-wide level.
- Team Structure and Process: Create a simple tracking mechanism of team members and attendance, periodic inquiry of those not attending to ascertain if something is missing from team meetings and reporting, and potentially a policy of dropping members with chronic non-attendance. There should be fewer collaboration teams to focus agency energy towards primary objectives and to promote more coordination and collaboration between Federal agencies.
- Website: Ensure that the website is responsive to new implementation framework; is maintained for those teams that don’t continue in the next plan, if requested, but with a plan for the team to be discontinued if not used; and to continue milestone tracking. A full-time web manager should be maintained.
- Secretariat: Maintain the current staffing level for the secretariat. Investigate cost-sharing with other agencies to ease the burden on the lead agency.
This IARPC Re-Visioning white paper considers the various ways in which input was solicited during the plan writing process, how that input shaped the process, and the success of the communications strategy for the plan roll out and implementation. It also presents recommendations for input and communications for the future process.

I. Review of Input Process Followed in Developing the *Arctic Research Plan FY12-17* and the Communication Strategy Employed

In this review, we evaluate the means by which input was sought and shaped the plan throughout its development over 20 months. Figure 1 outlines the major plan development and input intervals.

**a. Initial Scope and Plan Development (MAR-11 to APR-12)**

The *Arctic Research Plan FY13-17* (“Plan”) was initiated as a multi-themed\(^{10}\) outline developed jointly by the outgoing and incoming IARPC Executive Directors, in their role at OSTP. The high level outline was presented to the Principals, who accepted the themes, with some recommendations for broadening the scope. Key agencies (NSF, NASA, DOI, DOE, NOAA, SI, HHS) then took the lead on developing each theme and seeking buy-in from agency partners. The extent to which “middle agency” input was sought on the draft varied greatly by section; no public input was sought prior to developing the draft. Some results of these choices were felt during the subsequent reviews.

**b. Federal Register Process (MAY-12 to AUG-12)**

A posting was made to the Federal Register\(^{11}\) after the draft Plan with milestones was completed; input was fielded by the IARPC Executive Director with support from section

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\(^{10}\) The seven research themes that ultimately drove the scope of the plan can be found here: \(\text{http://www.iarpccollaborations.org/plan/index.html}\)

\(^{11}\) \(\text{https://www.federalregister.gov/articles/2012/05/29/2012-12790/request-for-public-comment-on-interagency-arctic-research-policy-committee-iarp-c-arctic-research}\)
authors. The public had 30 days to comment on the Plan. In all, 30 individuals (some representing larger groups, e.g. SEARCH) provided 311 unique comments on the Plan. Comments by stakeholder group are summarized in Figure 2; more than half of all comments were accepted or partially accepted, while less than 10% were rejected or found out of scope.

Federal and academic researchers were the most responsive stakeholder groups. Their comments were the most substantive, related to the Plan content. Key topics identified as missing included: land ice and sea level rise; methane and permafrost; living marine resources; and applied research (e.g. oil spill response). While some of these were determined to be beyond the scope of the Plan, a strong response was made to incorporate land ice research, including the subsequent development of a Glaciers and Fjords Collaboration Team.

A broad comment echoed by the State of Alaska and several non-governmental organizations (NGO’s) was the lack of integration between plan elements, in particular the role that research would play in predictive model improvement and the extent to which these models would be responsive to decision maker needs.

We have noted that there is no evidence to link those that commented on the Plan with IARPC’s subsequent collaborative implementation. Twelve of the comments came from individuals that have maintained some level of involvement with the IARPC Collaborations implementation. Interestingly, while the land-ice and glacier community (largely NASA researchers) was the most vocal during public comments and substantively reshaped the Plan and the implementation structure (e.g. creation of Glaciers/Land Ice team) they have not become involved in IARPC Collaborations. Of the eight individuals who made substantive comments on this issue, only one is currently a member of the Glaciers and

Figure 2. Comments received on IARPC Plan during public review, by stakeholder group.
Fjords team. The connection between providing input and subsequent commitment to implementation is not in evidence here.

c. **White House Reviews (SEP-12 to DEC-12)**

i. **NSTC Technical Review Process**

As a sub-committee of the National Science and Technology Council (NSTC), the IARPC Plan was slated to be published as an NSTC document and thereby needed to undergo “Technical Review” as outlined in the NSTC Handbook. The Principals provided their concurrence to the draft, initiating the NSTC Technical Review Process. Each agency received a copy of the Plan through their science or research coordinating offices. Many agencies (NSF, NASA, NOAA) had already provided comments through the Federal Register public comment process.

ii. **OMB Legislative Referral Memorandum Process**

After technical review by NSTC, OMB required that the Plan pass a Legislative Referral Memorandum (LRM) review to assure that agencies did not commit to do things that they are not budgeted to do. In this process, the document was channeled through agency program/budget offices, resulting in a completely fresh audience. This fresh audience in some instances led to internal confusion within the agencies.

There were few substantive comments during the LRM process for the Plan. However, there was a call during the LRM process for more professional editing of the document, which did occur.

d. **Communication of Plan Roll Out**

i. **NSTC**

An NSTC Plan can be rolled out with heavy or light communications depending on how the White House wants to showcase an effort. A key consideration is whether a visible communications roll out will galvanize stakeholder interest in supporting a plan’s success. In 2013, the White House decided to roll out the Plan quietly with little fanfare.

ii. **Other**

Two large communications events were hosted by the IARPC Executive Director to advertise the plan to IARPC stakeholders. The first, just prior to the Federal Register comment period in 2012, was a webinar hosted by the Alaska Center for Climate Assessment and Policy (ACCAP) that was attended by 87 stakeholders, the majority of whom were Feds. The second, nearly a year after the Plan’s official release, was an AGU Town Hall meeting held in conjunction with the Study of Arctic Environmental Change (SEARCH). The timing of this was aligned with the Plan implementation from being conducted as Fed-only activity to being an open collaboration.

**Conclusions on the Input Process & Communications**

In discussion with the ED who oversaw this process, it was acknowledged that it would have been valuable to seek input on the Plan scope earlier in the process. In particular, such input from the State of Alaska could have been improved during the Plan development process. The
overall scope of the Plan was developed in a top-down manner, with a subsequent effort to develop bottom-up content. The success of this approach was mixed and particularly problematic in the area of the agency ownership of the milestones (see “Research Goals White Paper”). Many team leaders were assigned by their agencies to implement a plan that they did not write. The disconnects of that are felt to this day.

2. Preliminary Re-visioning Recommendations (Next Plan):

   a. Cross-stakeholder Input strategy

      i. Agencies

      The current IARPC Collaborations structure provides a robust and growing network for developing agency support. It will make a significant difference in the success with which we can generate input early and receive feedback readily. It is also important to ensure that we have early input and buy-in on research scope and milestones from all agency partners. The following structures can and should be utilized for gathering input from middle-agency partners: IARPC Staff group, IARPC Collaboration Team Meetings.

      ii. Public

      We recommend considering using both a scoping and content feedback process to improve alignment between the overall plan scope and public comments. We recommend publishing two Federal Register notices to solicit input and feedback on the new five-year plan. First, we recommend requesting input on the new Plan outline that will be developed at the December workshop. We recommend that the first notice inform the public of our process, our timeline, what has occurred under the current Plan, where we hope to go with the new plan, and what we can and cannot accomplish through this process. It is important for the public to understand that we cannot commit to projects that are beyond our mandates or for which no funding exists (and is unlikely to exist in the foreseeable future). We could initiate this public comment process immediately after the December workshop.

      Once a draft plan is developed, we could then initiate a second public comment period through the Federal Register to solicit comments on the full document. Theoretically, the draft plan will incorporate appropriate public comments received from the first Federal Register process.

      Another recommendation for engaging with and receiving input from the non-Federal community is by conducting direct outreach and/or targeted input. This could be done by holding public meetings during open public comment periods, holding small focus sessions during other workshops and conferences when many from this community will be in attendance, or through direct email contact. Specific groups that should be targeted include the State of Alaska, Alaska Native groups (tribal governments and subsistence hunters), local governments, academia, industry, and environmental-NGOs.

      Overall, it would be beneficial to develop a stakeholder input matrix to identify key opportunities in the upcoming year to engage broadly with IARPC stakeholders - both to communicate the purpose of the current planning process and to solicit input on that process.
iii. National Science and Technology Council (NSTC)

We recommend early engagement with key NSTC personnel (Executive Secretary, co-chairs) to inform them about our current process and clear any potential roadblocks for swift passage through NSTC publication. We need to ensure that we leave ourselves sufficient time to go through the NSTC “technical review” process. We will first need to go through IARPC before sending the document up to the “parent” committee (CENRS). Because the new plan will be finalized right before the end of the current administration, it is important that we coordinate early before too much turnover begins. As we work through the “technical review” process, we will need to ensure that we have digestible summaries and memos that effectively communicate the process and technical issues. We will need a couple of months to get the document through this process before we can publish and officially release it.

The LRM process is an OMB-led process. Because the plan is not a regulatory document, using the LRM process is not required (though OMB may insist that we follow it). We recommend that we only go through the NSTC “technical review” process and not the LRM process for two reasons. First, it adds additional time to the finalization of the document. Second, it often adds little substantive value and then crosses the desks of folks at the involved agencies who have not been engaged in the process, often leading to confusion. That said, it would still be beneficial to communicate with OMB about our planning process and to seek their input about how we are proceeding on key points (e.g. the use of milestones).

b. Communications Strategy for Plan Development (including current ReV process)

In addition to receiving input on development of the new plan, we need to develop an effective communications strategy both during the input process and once the Plan is finalized and ready for public release. As noted above, we recommend communicating opportunities with the public both through the Federal Register and targeted, direct outreach methods. Developing a slide deck to share with the entire team to use when at meeting venues and appropriate surrogate venues (e.g., Alaska Marine Science Symposium) will be useful in ensuring that we speak with one voice about the process.

The IARPC Collaboration Team meetings and, in particular, the network of Federal researchers engaged in the Collaborations Teams constitute a valuable network for outreach and communication. During the Plan development process, we can include a regular agenda item for updates. We can also utilize the Federal network for plan input outside the Federal Register process.

Prior to finalization of the new plan, we will need to strategize around potential White House influence on plan roll-out and communications. We will need to determine if we have an extensive roll out with lots of fanfare or conduct a quieter roll out of the plan. We will need to assess if we really need an extensive roll out and what we would gain from doing so. If everyone is already on board, is it really needed? If we determine that we need an extensive roll out, then we will need to begin that process early.

The IARPC Collaborations website is an immensely valuable tool at our disposal, and we recommend using to work both internally within the IARPC community and with the
general public. The website will be helpful in alerting the public to opportunities for involvement and also of our progress and Plan status.