



Brief Overview of Arctic Research Policy Committee (IARPC) Activity

**Arctic Modeling Workshop
NASA HQs
June 26, 2017**

**Anjuli. S. Bamzai
Program Director, Arctic Natural Sciences
NSF Office of Polar Programs**

What is IARPC?

Arctic Research Policy Act of 1984

98 STAT. 1242 PUBLIC LAW 98-373—JULY 31, 1984

Public Law 98-373
98th Congress
An Act

To provide for a comprehensive national policy dealing with national research needs and objectives in the Arctic, for a National Critical Materials Council, for development of a continuing and comprehensive national materials policy, for programs necessary to carry out that policy, including Federal programs of advanced materials research and technology, and for innovation in basic materials industries, and for other purposes.

July 31, 1984 [S. 373]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Arctic Research and Policy Act of 1984.

15 USC 4101 note.

15 USC 4101.

TITLE I—ARCTIC RESEARCH AND POLICY

SHORT TITLE

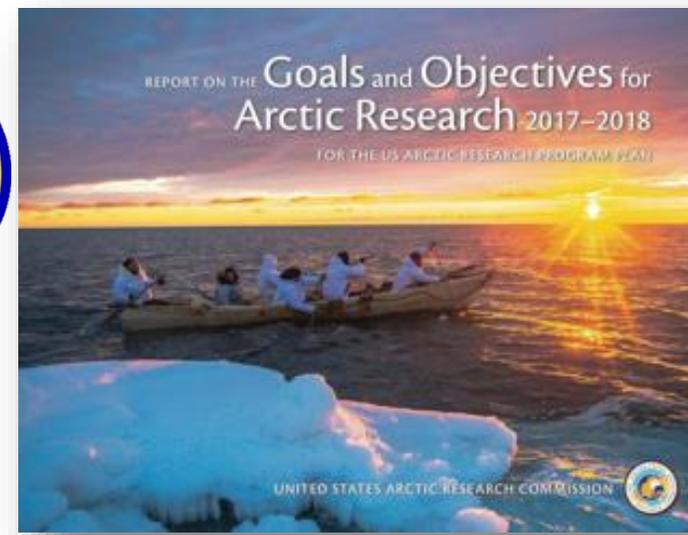
SEC. 101. This title may be cited as the "Arctic Research and Policy Act of 1984".

FINDINGS AND PURPOSES

SEC. 102. (a) The Congress finds and declares that—
(1) the Arctic, onshore and offshore, contains vital energy resources that can reduce the Nation's dependence on foreign

USARC

sets goals and objectives



IARPC

develops and implements a research plan



ARCTIC RESEARCH PLAN
FY2017-2021

PRODUCT OF THE
Interagency Arctic Research Policy Committee
OF THE NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

December 2016

Who's Involved in IARPC?

Fourteen Federal entities, each with research responsibilities in the Arctic, comprise IARPC. They are represented on IARPC by their respective **IARPC**

PRINCIPALS

- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Energy
- Department of Health and Human Services
- Department of Homeland Security (U.S. Coast Guard)
- Department of Interior
- Department of State
- Department of Transportation
- Environmental Protection Agency
- Marine Mammal Commission
- National Aeronautics and Space Administration
- **National Science Foundation (Director is Chair)**
- Smithsonian Institution

IARPC also cooperates with the State of Alaska, indigenous organizations, academic institutions, non-governmental organizations, the Arctic Council, and international partners.

Who Contributed to the IARPC Research Plan?



ARCTIC RESEARCH PLAN:
FY2017-2021



Public

via the
Federal
Register



IARPC
Principals +
Staff Group

Plan Organization

Research Goals (9)

Broad topics where an interagency approach can accelerate progress

Research Objectives (34)

Specific challenge areas that address the research goal

Performance Elements (123)

Tasks with concrete, measurable outcomes that demonstrate progress toward Research Objectives

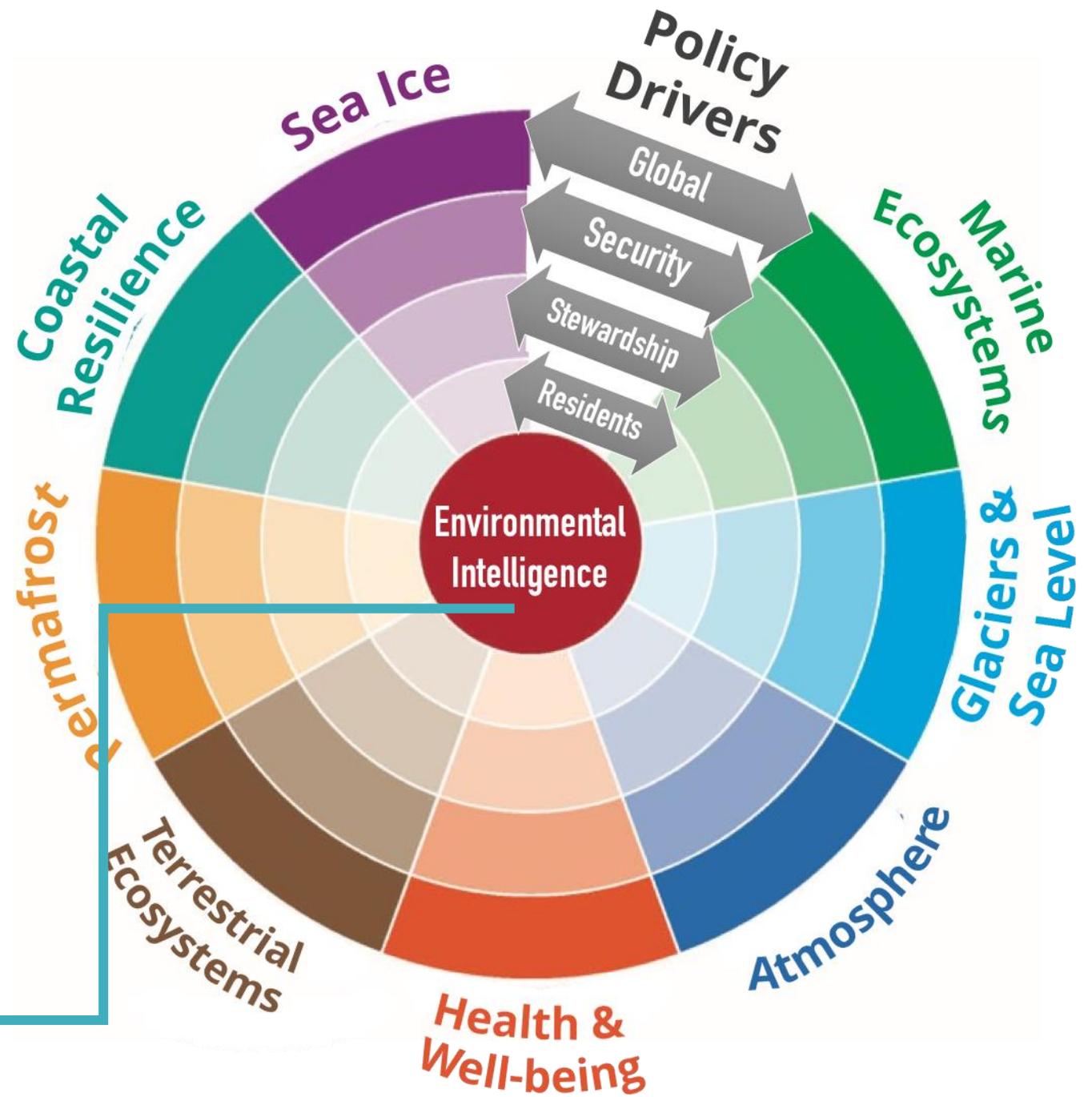
Research Goals

1. Enhance understanding of **health determinants** and improve the **well-being** of Arctic residents;
2. Advance process and system understanding of the changing Arctic **atmospheric composition and dynamics** and the resulting changes to surface energy budgets;
3. Enhance understanding and improve predictions of the changing Arctic **sea ice cover**;
4. Increase understanding of the structure and function of Arctic **marine ecosystems** and their role in the climate system and advance predictive capabilities;
5. Understand and project the mass balance of **glaciers, ice caps, and the Greenland Ice Sheet**, and their consequences for sea level rise

Research Goals

6. Advance understanding of processes controlling **permafrost** dynamics and the impacts on ecosystems, infrastructure, and climate feedbacks;
7. Advance an integrated, landscape-scale understanding of Arctic **terrestrial and freshwater ecosystems** and the potential for future change;
8. Strengthen **coastal community resilience** and advance stewardship of coastal natural and cultural resources by engaging in research related to the interconnections of people, natural and built environments;
9. Enhance frameworks for **environmental intelligence** gathering, interpretation, and application toward decision support.

Policy Drivers and Research Goals



Data Management
Modeling
Observations

- Modeling Sub-team (MST) is part of the Environmental Intelligence Collaboration team (EICT)
 - MST Leads are Renu Joseph (DOE) and Scott Harper (ONR)



- Underpinning Concept: Models are **mathematical representations** of our **current understanding** of the arctic and the earth as a whole, which enable us to **evaluate the feedbacks and interactions** within the arctic system and with the arctic system and the global system.

Modeling Mantra: Enhancing **understanding** and **predictions/projections** of the **integrated Arctic system** through the use of regional and global earth system models.

2 Research Objectives – 10 Performance Elements

Research Objective 9.2:
Understanding

- 9.2 Advance understanding of the Arctic System by using global and regional models with detailed Arctic processes to understand feedbacks and interactions within the components of the Arctic system and with the climate system as a whole.

Research Objective 9.3:
Predictions/Projections

- 9.3 Enhance climate prediction capabilities for the Arctic system from sub-seasonal to decadal timescales and climate projection capabilities up to centennial timescales by focusing on improving earth system models and their interactions, and assessing the strengths and weaknesses of the various coupled regional arctic and earth system models by conducting intercomparison and model evaluations.

2 Research Objectives – 10 Performance Elements

Research Objective 9.2: Understanding

- 9.2.1 understanding of the connections between the **Arctic and mid-latitude weather patterns**
- 9.2.2 understanding of **connections between Arctic and global ocean circulation**.
- 9.2.3 Enhance understanding of processes and their interactions and feedbacks within the Arctic System:
 - complex relationships between the ocean, sea ice, land, and atmosphere; impacts of snow on ice;
 - **interactions between Arctic clouds and aerosols** ;
 - **effects of thermal forcing of sea ice**;
 - changes in ocean stratification;
 - stratosphere-troposphere interactions; and
 - radiative exchanges of energy throughout the system.
- 9.2.4 **Survey investigator-driven modeling projects**

Research Objective 9.3: Predictions/Projections

- 9.3.1 **global variable resolution model with very high resolution in the Arctic**
- 9.3.2 Model development activities in global earth system models:
 - developing models for **CMIP6 for improved predictions**;
 - assimilation capabilities
- 9.3.3 **Foster interactions with the Arctic Testbed**
- 9.3.4 Development of **Regional Arctic System Models focusing on improved resolution, and process representations**
- 9.3.5 **Support Improvements to Reanalyses of the Arctic**
- 9.3.6 Coordinate and support the ISMIP6 efforts in the U.S

Agency Commitments

Agency	Health							Atmosphere			Sea Ice			Marine Ecosystems			Glaciers & Sea Level		Permafrost				Terrestrial			Coastal				Environmental Intelligence				
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	6.4	7.1	7.2	7.3	8.1	8.2	8.3	8.4	9.1	9.2	9.3	9.4	9.5
DHS	DHS										DHS												DHS			DHS		DHS						
DOC					DOC																		DOC											
DOD								DOD			DOD			DOD			DOD						DOD			DOD		DOD						
DOE								DOE			DOE						DOE						DOE			DOE		DOE						
DOEd	DOEd		DOEd		DOEd																													
DOI	DOI	DOI	DOI	DOI		DOI					DOI		DOI		DOI		DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	DOI	
DOJ				DOJ																														
DOL				DOL																														
DOS	DOS	DOS	DOS	DOS																														
EPA	EPA	EPA	EPA																			EPA			EPA									
HHS	HHS	HHS	HHS	HHS		HHS		HHS															HHS			HHS								
HUD	HUD																																	
LC	LC																																	
MMC														MMC		MMC									MMC									
NASA	NASA							NASA			NASA			NASA			NASA		NASA		NASA				NASA			NASA		NASA				
NOAA	NOAA	NOAA	NOAA							NOAA			NOAA			NOAA		NOAA		NOAA				NOAA			NOAA		NOAA					
NSF	NSF	NSF	NSF	NSF	NSF					NSF			NSF			NSF		NSF		NSF				NSF			NSF		NSF					
NSTB				NSTB																														
SI	SI	SI																																
ARC	ARC		ARC		ARC									ARC		ARC																		
USDA	USDA	USDA	USDA	USDA														USDA				USDA			USDA									

Collaboration Team Leadership

Environmental
Intelligence



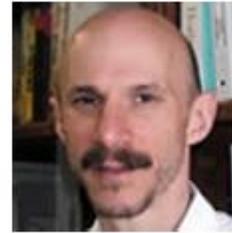
Jeremy
Mathis
(NOAA)

Observing



Sandy
Starkweather
(NOAA)

Data



Marc
Stieglitz
(NSF)

Modeling



Renu
Joseph
(DOE)



Anjuli Bamzai
(NSF)



Will
Ambrose
(NSF)



Peter
Pulsifer
(University
of Colorado)



Scott
Harper
(ONR)

**Details on IARPC effort, collaboration teams at
iarpccollaborations.org**

Thank you and

