

# FEDERAL RESEARCH IN THE ARCTIC; 5-YEAR PLAN

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# **Interagency Arctic Research Policy Committee (IARPC)**

- **Established by Arctic Research Policy Act – 1984**
  - **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 (chair)**
  - **Smithsonian Institution**

# National Security Presidential Directive 66

## Homeland Security Presidential Directive 25

1. Meet national security and homeland security needs relevant to the Arctic region;
2. Protect the Arctic environment and conserve its biological resources;
3. Ensure that natural resource management and economic development in the region are environmentally sustainable;
4. Strengthen institutions for cooperation among the eight Arctic nations;
5. Involve the Arctic's indigenous communities in decisions that affect them; and
6. **Enhance scientific monitoring and research into local, regional, and global environmental issues.**

Broad consensus among scientists  
and Arctic residents:

Rapid changes in climate are  
altering ice and snow cover

Consequences for:  
Arctic ecosystems,  
indigenous societies, and  
global climate

# Draft plan aims

Research priorities for the next five years that are expected to benefit from interagency collaboration

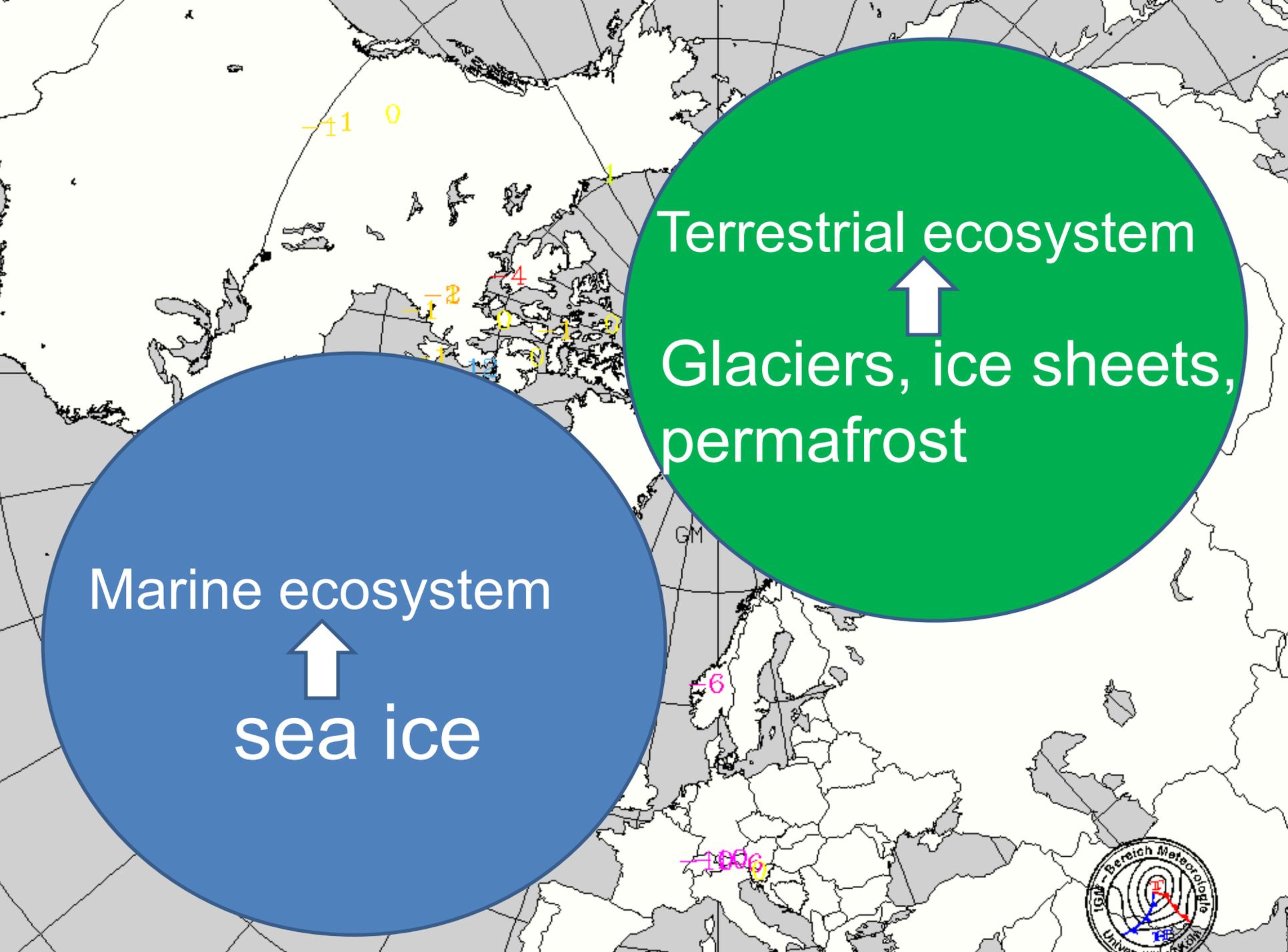
Does not include all research conducted by those agencies





A light blue-tinted photograph of a rocky beach. The foreground is filled with numerous smooth, light-colored rocks of various sizes scattered across the sand. In the middle ground, the calm sea meets the shore, and the horizon line is visible under a clear, pale blue sky. The overall scene is serene and minimalist.

**Community sustainability**  
**Human health and well-being**



Marine ecosystem



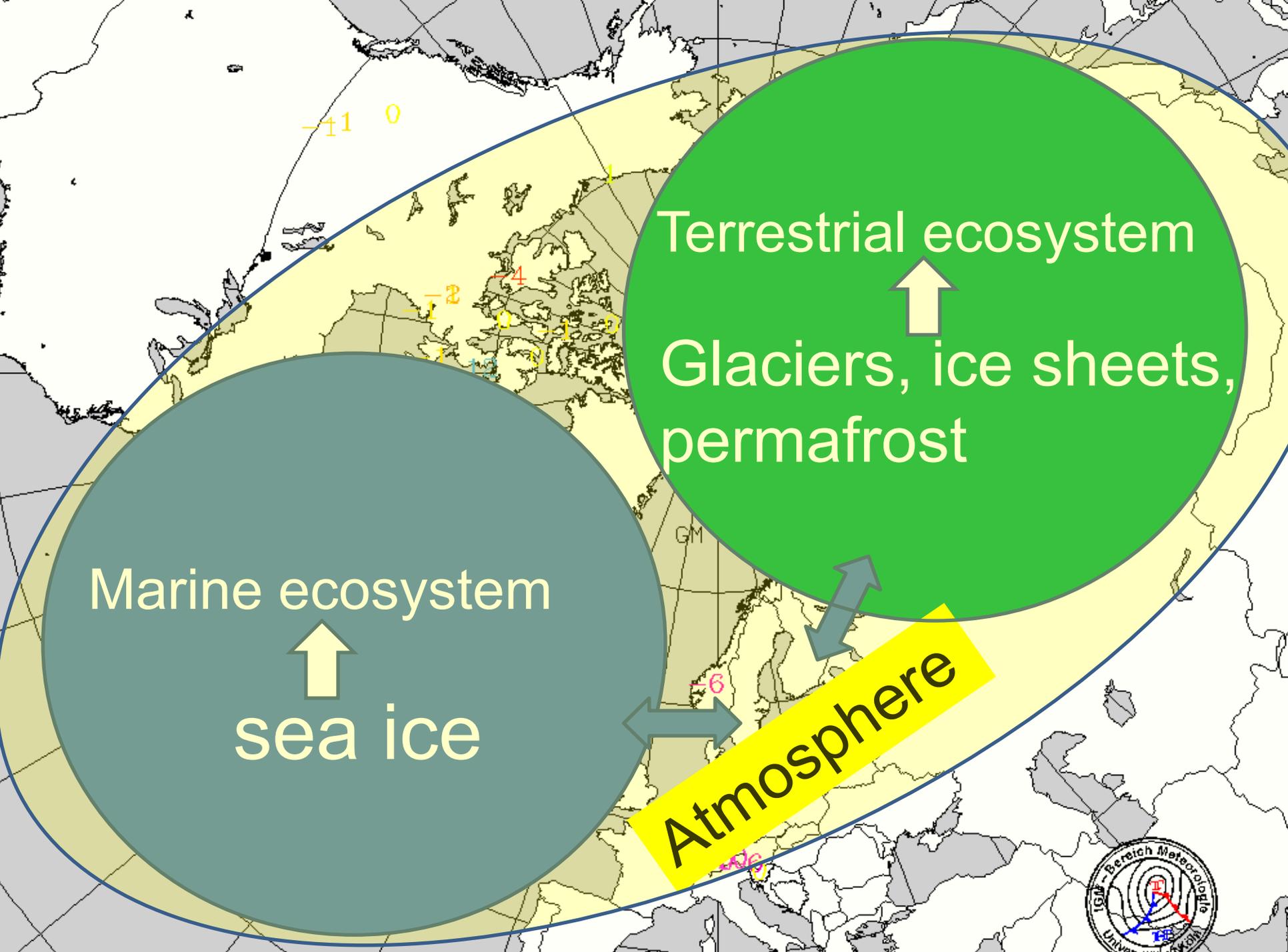
sea ice

Terrestrial ecosystem



Glaciers, ice sheets,  
permafrost





Marine ecosystem

↑  
sea ice

Terrestrial ecosystem

↑  
Glaciers, ice sheets,  
permafrost

↕  
Atmosphere  
↕



# WHAT

Sea ice and marine ecosystem

Land ice & terrestrial ecosystem

Atmosphere



# WHAT

Sea ice and marine ecosystem

Land ice & terrestrial ecosystem

Atmosphere

# HOW

Observations

Modeling at appropriate scales

# WHAT

Sea ice and marine ecosystem

Land ice & terrestrial ecosystem

Atmosphere

# HOW

Observations

Modeling at appropriate scales

# WHY

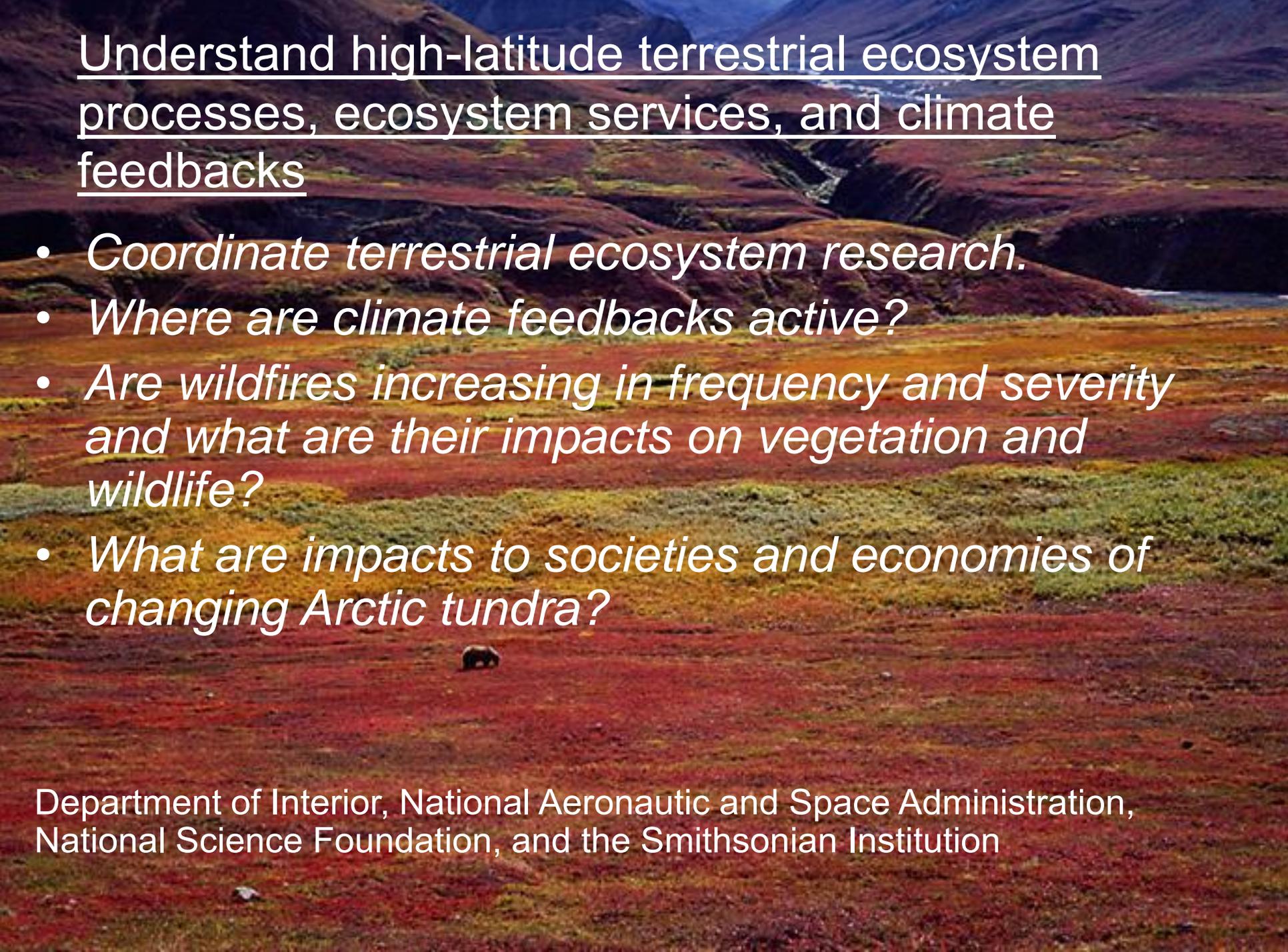
Community sustainability

Human health and well-being

# Understand sea-ice dynamics, ecosystem processes, ecosystem services, and climate feedbacks in the Beaufort and Chukchi Seas and the contiguous Arctic Ocean

- *Where are climate feedbacks active?*
- *How is the ocean changing over long periods?*  
*Distributed Biological Observatory*
- *How do ecosystem processes interact in the Beaufort and Chukchi seas?*

Department of Defense, Department of Energy, Department of Interior, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and National Science Foundation



Understand high-latitude terrestrial ecosystem processes, ecosystem services, and climate feedbacks

- *Coordinate terrestrial ecosystem research.*
- *Where are climate feedbacks active?*
- *Are wildfires increasing in frequency and severity and what are their impacts on vegetation and wildlife?*
- *What are impacts to societies and economies of changing Arctic tundra?*

Department of Interior, National Aeronautic and Space Administration, National Science Foundation, and the Smithsonian Institution

## Improve and integrate atmospheric studies of surface heat, energy and mass balances

- *How are short-lived climate forcers (e.g. soot) amplifying warming in the Arctic?*
- *How do Arctic clouds influence climate?*
- *How does the Arctic atmospheric interact with the ocean, land, and ice to impact climate?*

Department of Energy, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and National Science Foundation

# Integrate and continue to deploy a national Arctic observing system and promote international cooperation to create a circumpolar observing system

- *Use models to optimize observing-systems.*
- *Assess local-resident priorities with respect to climate change.*
- *Develop an observing system for Arctic sea ice.*
- *Further develop an international network of logistical support.*
- *Observe terrestrial ice to better understanding its loss.*
- *Observe the atmosphere and surface-radiation balance.*
- *Observe permafrost thawing to understand the impacts of carbon loss.*
- *Ensure future data accessibility.*
- *Develop long-term programs to integrate community based observation networks with scientific monitoring.*

National Science Foundation, National Oceanic and Atmospheric Administration, National Aeronautic and Space Administration, Department of Interior, Environmental Protection Agency, Department of Energy, Office of Naval Research, and the U.S. Coast Guard

# Integrate Arctic regional models

- *Inventory existing federal Arctic modeling activities.*
- *Encourage coordination to better represent Arctic processes in Earth-system models.*
- *Build Arctic-region models to couple with regional and global approaches.*
- *Increase Arctic-model resolution to improve prediction and inform future research and observations.*
- *Use model-derived insights to inform process research and vice versa.*
- *Improve understanding of the principle drivers and uncertainties of Arctic climate change through model validation and verification.*

Department of Energy, National Oceanic and Atmospheric Administration,  
Department of Interior, and National Science Foundation

Assess vulnerabilities of Arctic communities to impacts of climate change and develop adaptation strategies and tools to maximize sustainability, well-being, and cultural and linguistic heritage

- *Collaborate with local communities to assess community sustainability and resilience.*
- *Explore the interaction of climate vulnerabilities with socio-economic and other stressors.*
- *Forecast potential strengths and weaknesses of Arctic human and ecological systems.*
- *Assist Arctic communities in language and heritage preservation and in cultural revitalization efforts.*

Indigenous Peoples and Languages of Alaska

Department of Interior, Department of State, Environmental Protection Agency, National Science Foundation, National Oceanic and Atmospheric Administration, Department of Agriculture, and the Smithsonian Institution

Understand factors that affect human health in the Arctic, including infectious and non-communicable diseases, environmental contamination, and behavioral and mental health disorders

- *Circumpolar surveillance and research for diseases, trauma, and injury, sanitation services, and indoor air.*
- *Monitor the impacts of climate change and environmental contaminants on human health and wildlife.*
- *Research in substance abuse, obesity, diabetes, and suicide, and improve cancer screening programs.*
- *Continue to engage indigenous communities and tribal groups in research activities and projects in the Arctic.*

Centers for Disease Control, Environmental Protection Agency, Indian Health Service, National Institutes of Health, U.S. Arctic Research Commission

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# Written comments:

Download plan:

[http://www.nsf.gov/od/opp/arctic/iarpc/arc\\_res\\_plan\\_index.jsp](http://www.nsf.gov/od/opp/arctic/iarpc/arc_res_plan_index.jsp)

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