

# Arctic Research:

UNIVERSITY OF ALASKA FAIRBANKS



*Arctic Geology and Geophysics:*



*Arctic Biology:*



*Arctic Engineering:*



*Arctic Fisheries/Ocean Sciences:*

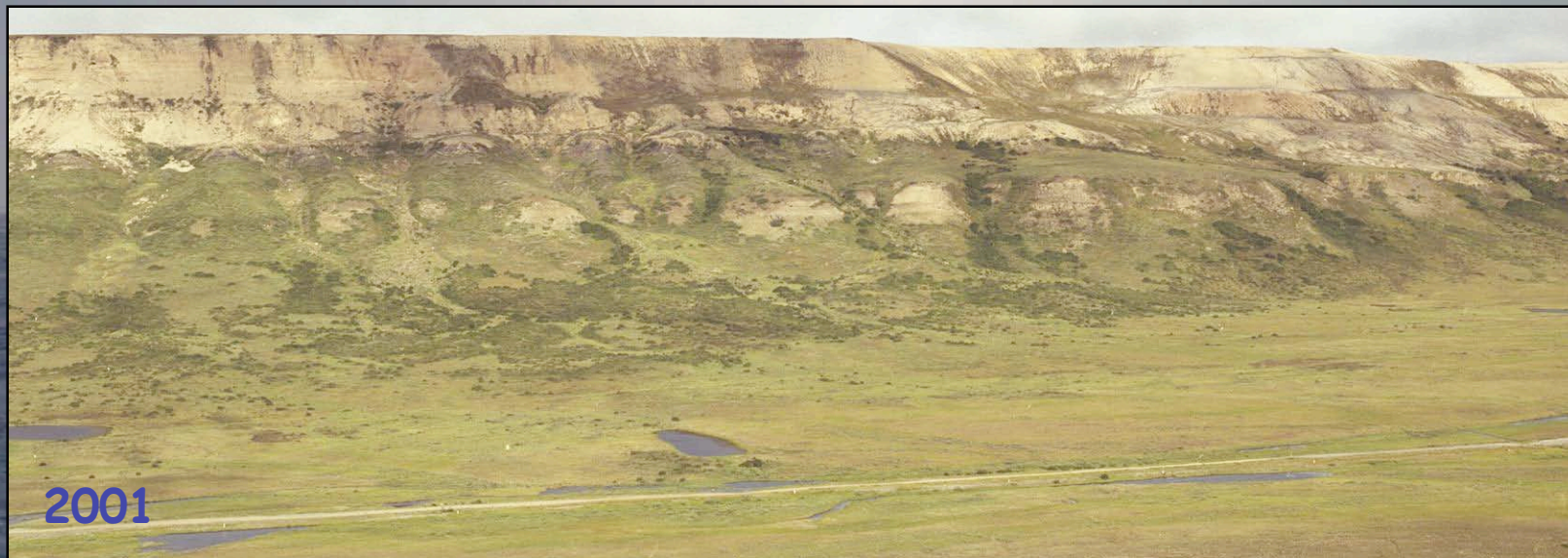


*Arctic Cultural Studies:*



*Increasing shrub abundance in the arctic:*

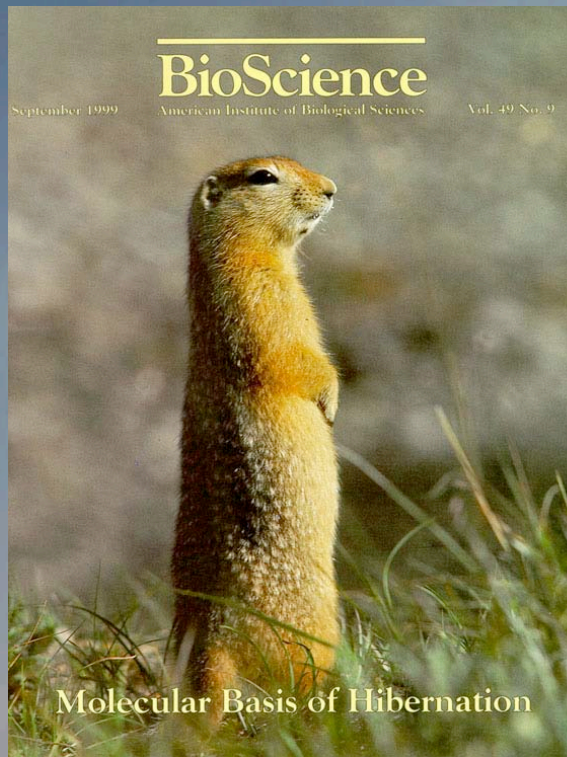
Ken Tape, Matt Sturm, & Chuck Racine



*Phylogeography and ecophysiology of *Alnus* symbioses: N<sub>2</sub> fixation and landscape evolution in northern Alaska.*

*Roger Ruess & Lee Taylor, Institute of Arctic Biology*



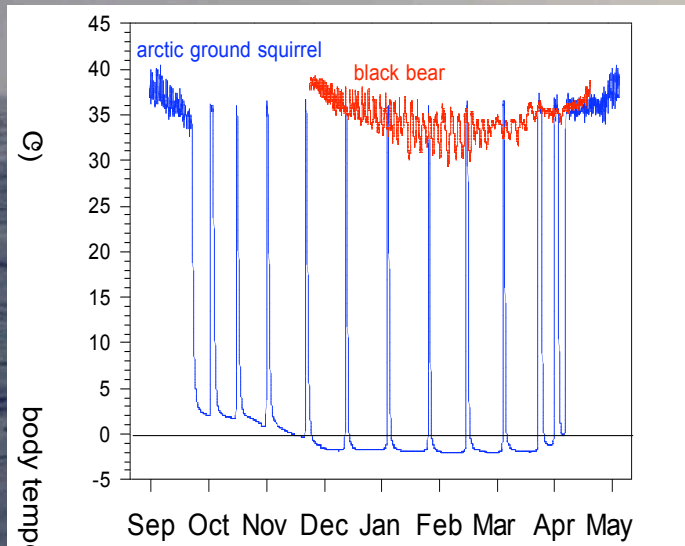


## Hibernation Genomics Initiative

Brian Barnes, Institute of Arctic Biology, in collaboration with Arctic Regional Supercomputer Center (UAF) and the University of Iowa.

### Goals:

- 1) Determine the genetic and molecular basis of hibernation in arctic ground squirrels and black bears.
- 2) Develop novel human therapeutics.



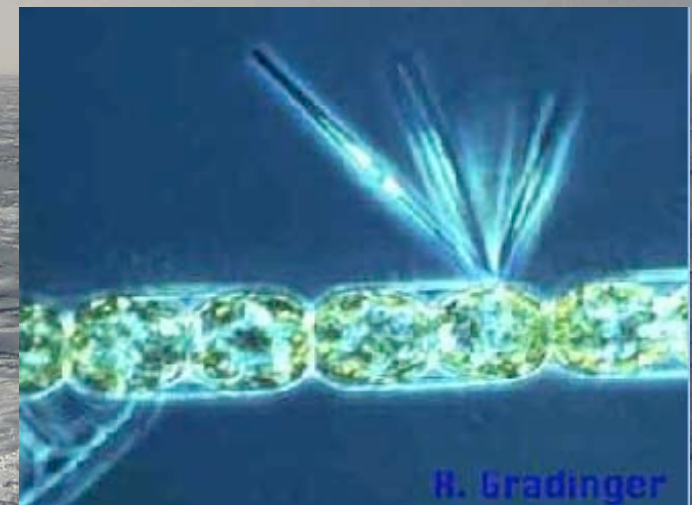
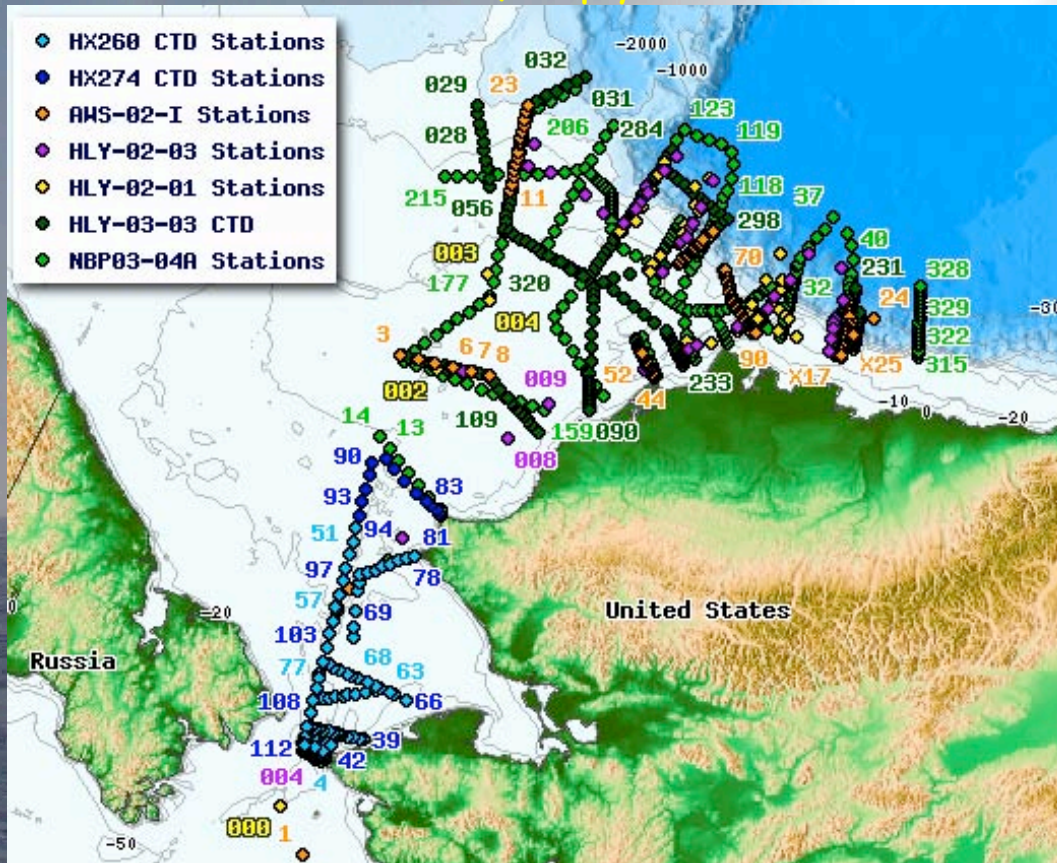


# Western Arctic Shelf-Basin Interactions (SBI) Project

*Relations between ice physics, chemistry and ice algal activity in the Chukchi and Beaufort Seas*

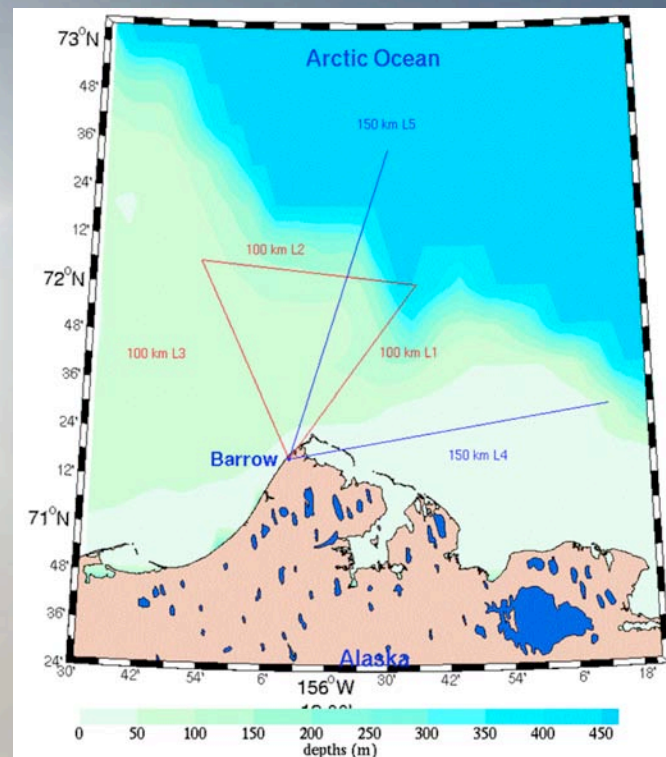
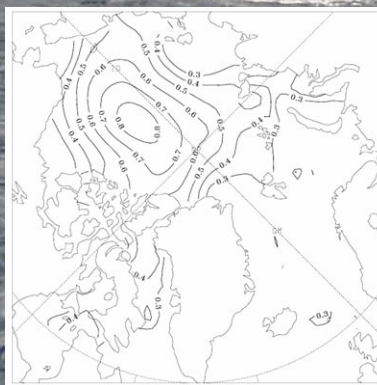
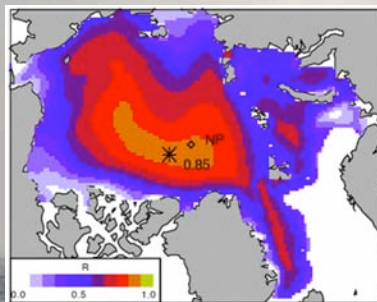
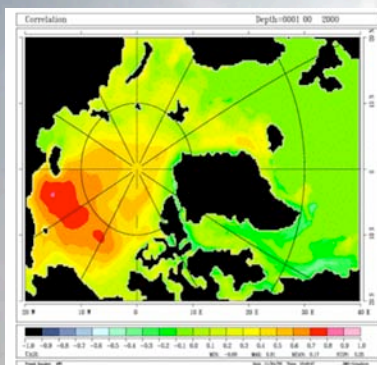
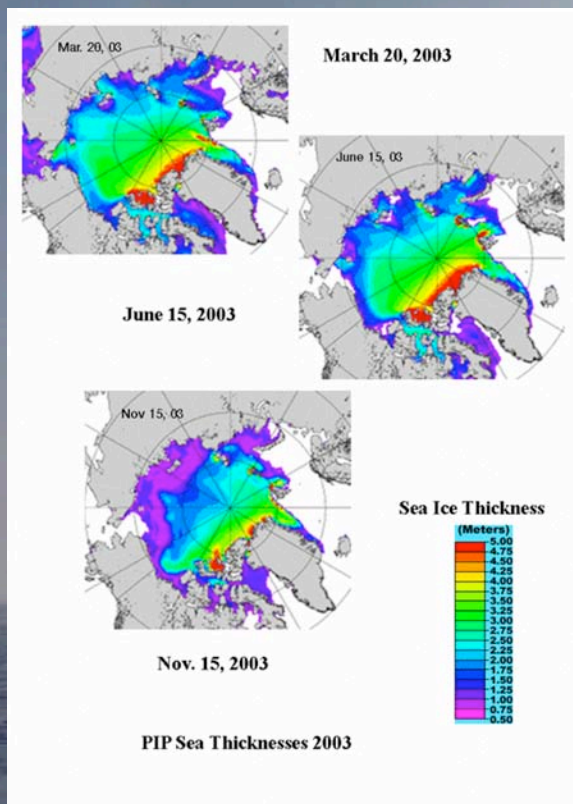
Rolph Gradinger & Hajo Eicken

Institute of Marine Science, Geophysical Institute



# Airborne and on-ice measurements to validate satellite observations of ice thickness and to establish a repeat sample of space/time changes in ice thickness off Barrow, Alaska

Mark Johnson, Institute of Marine Science



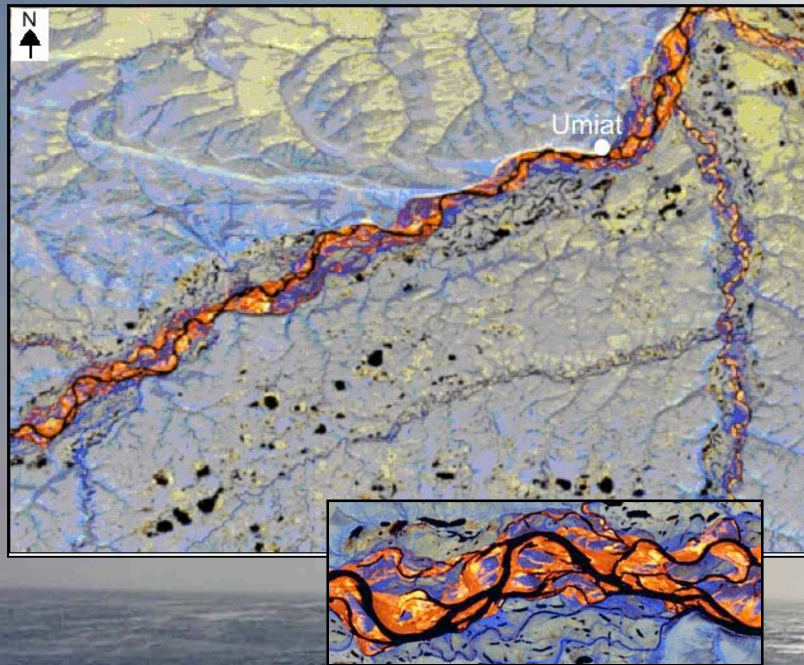
Cross validate:

- Direct measurements
- ICESat Satellite data
- Broad-scale airborne EM measurements

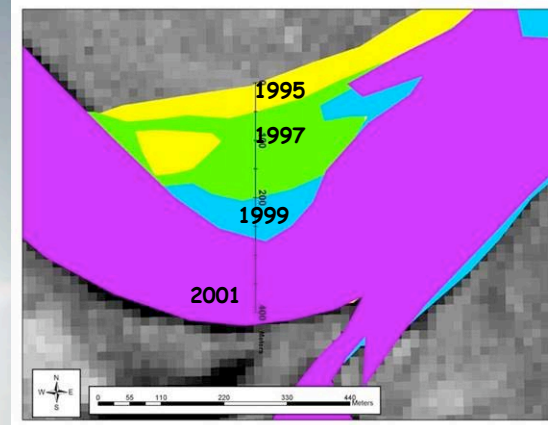
NASA WetNet Precipitation Intercomparison Project (PIP)

# Fluvial channel evolution and bar migration for the cold-climate Colville River in Arctic Alaska.

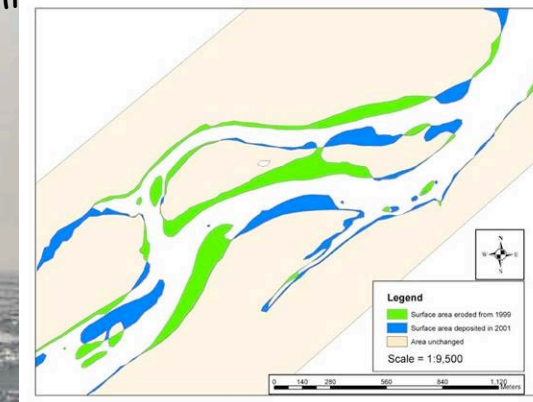
Anupma Prakash, Geophysical Institute



**Colville River**  
**Drainage area 35,820 km<sup>2</sup>**  
**Only one gauging station**



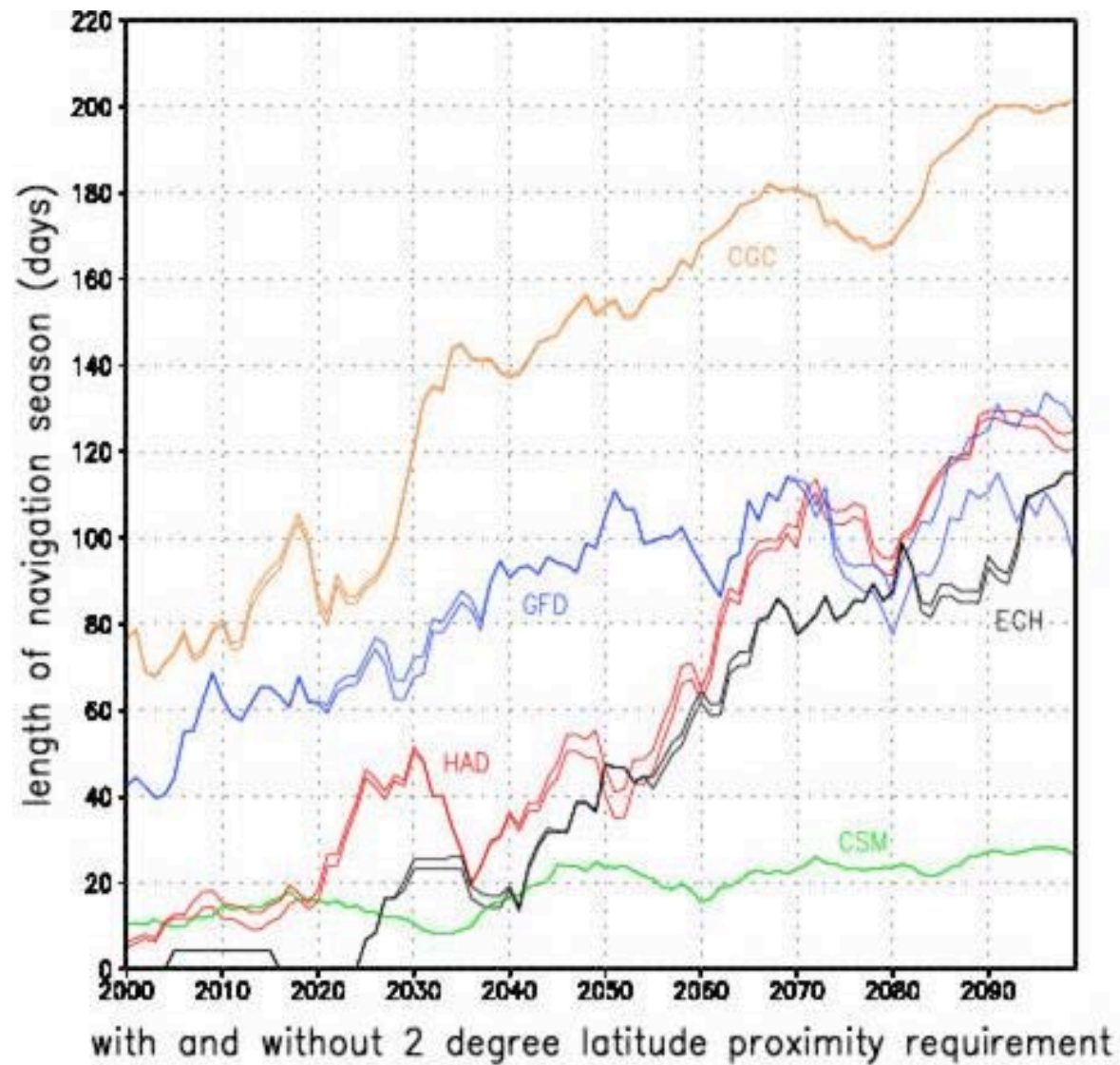
Multisensor and multitemporal remote sensing images used to estimate lateral movement of point bars, which at this spot equals approximately 46 m yr<sup>-1</sup>.



Erosion and deposition of sand bars as interpreted from Landsat ETM panchromatic images from 1999 and 2001 in a part of the Colville River

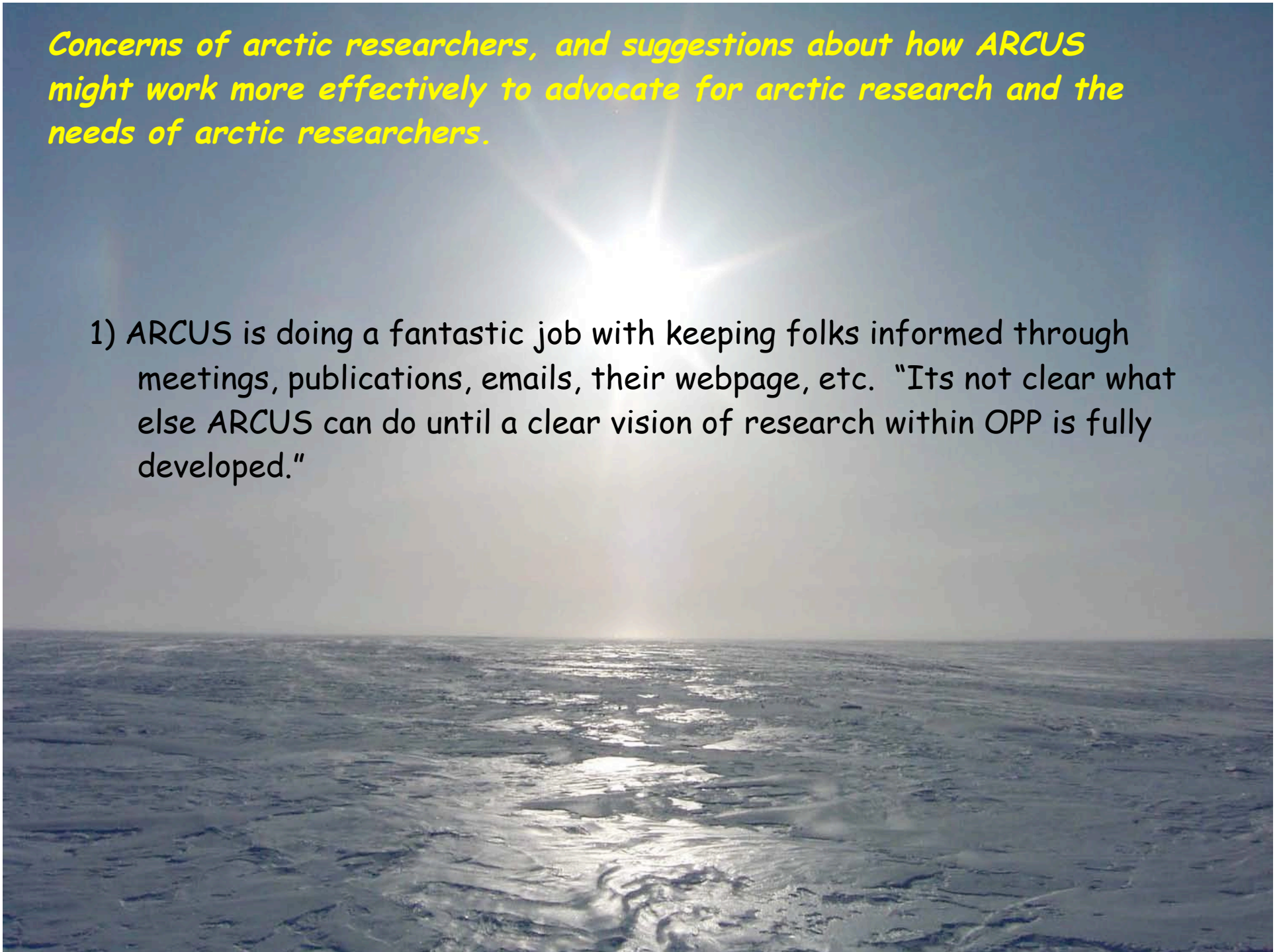


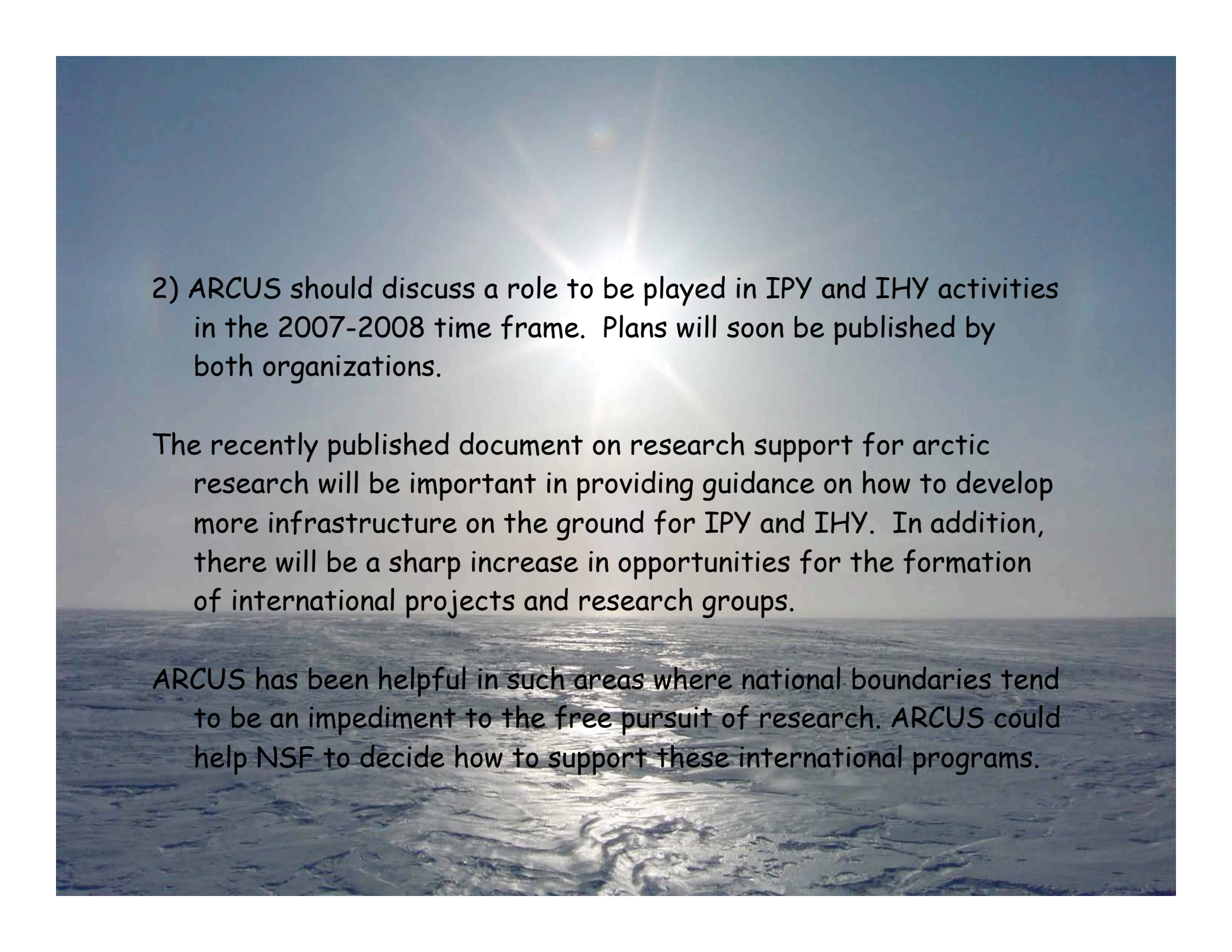
## Northern Sea Route : Navigability projected for 2000 - 2100



*Concerns of arctic researchers, and suggestions about how ARCUS might work more effectively to advocate for arctic research and the needs of arctic researchers.*

- 1) ARCUS is doing a fantastic job with keeping folks informed through meetings, publications, emails, their webpage, etc. "Its not clear what else ARCUS can do until a clear vision of research within OPP is fully developed."





2) ARCUS should discuss a role to be played in IPY and IHY activities in the 2007-2008 time frame. Plans will soon be published by both organizations.

The recently published document on research support for arctic research will be important in providing guidance on how to develop more infrastructure on the ground for IPY and IHY. In addition, there will be a sharp increase in opportunities for the formation of international projects and research groups.

ARCUS has been helpful in such areas where national boundaries tend to be an impediment to the free pursuit of research. ARCUS could help NSF to decide how to support these international programs.

3) How do we link the physical and biological changes that we observe in the polar marine ecosystem? What are the signals in the marine system that indicate environmental change (global change) and how do we sample the marine environment with enough resolution to find those signals?

Several agencies and teams are trying to coordinate a number of ocean observing programs that are either online or coming on line to :

NSF: Integrated Ocean Observing System FY06 initiative

Oceans.US with its support of these systems

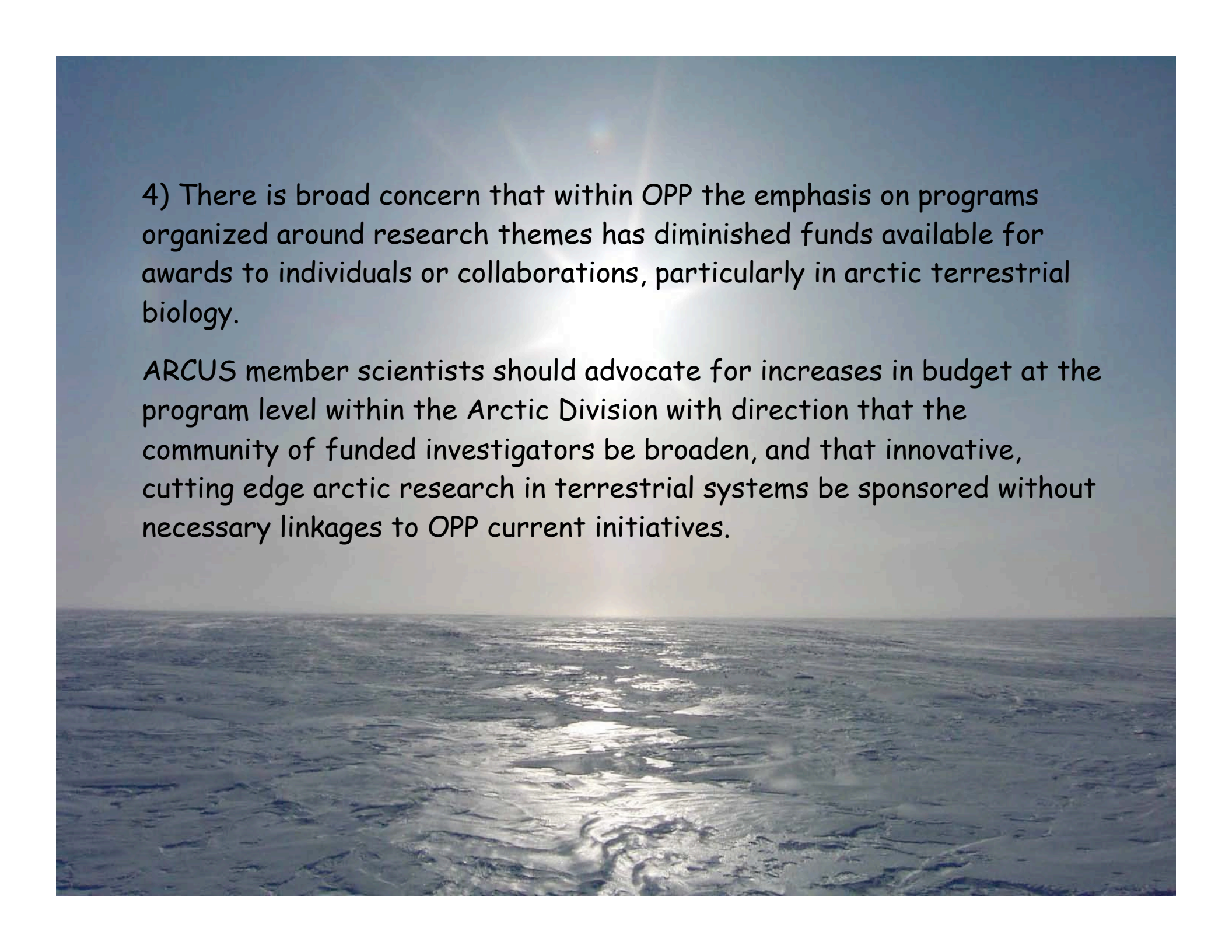
Census of Marine Life

Alaska Ocean Observing System ([www.aaos.org](http://www.aaos.org))

C.O.R.E. (Consortium of oceanographic research and education institutions)

ARCUS can assist these efforts by keeping in contact with the agencies and teams that are trying to coordinate these observing systems and make sure that the Arctic is not left out of the discussions.

"Everyone really likes these huge ideas, but unless support for the theory and the



4) There is broad concern that within OPP the emphasis on programs organized around research themes has diminished funds available for awards to individuals or collaborations, particularly in arctic terrestrial biology.

ARCUS member scientists should advocate for increases in budget at the program level within the Arctic Division with direction that the community of funded investigators be broaden, and that innovative, cutting edge arctic research in terrestrial systems be sponsored without necessary linkages to OPP current initiatives.

## 5) What happened to interests/efforts to establish The Polar Genome Science Initiative?

In *Frontiers in Polar Biology in the Genomic Era* (NRC, 2003), four major focal areas of polar biological research were outlined that could benefit significantly from the application of genome-enabled technologies.

The NRC recommended that:

NSF should develop a major new initiative in polar genome sciences that emphasizes collaborative multidisciplinary research and coordinates research efforts.

The Polar Genome Initiative should capitalize on long-term data sets and geographical distributions of existing LTER and MO sites.

Coordination of research efforts should begin with synthesis of available information through facilitating increased communication among polar scientists.

NSF should form a standing committee to establish priorities and coordinate large-scale efforts for genome-enabled polar sciences.

How can ARCUS facilitate an effort within the scientific community to lobby for new funds for this program to move forward??