

A photograph of a polar bear standing on a snowy, icy landscape. The bear is the central focus, facing slightly to the left. Its fur is a mix of white and light brown, appearing thick and textured. The background consists of large, jagged ice floes and snow, with a bright, overexposed sky. The overall scene is cold and desolate.

**Polar Bear  
Status Assessment Review and  
Proposed Rule to List as a  
Threatened Species**

# CHRONOLOGY OF EVENTS

- **February 16, 2005 CBD Petitions FWS to list polar bears throughout their global range as a threatened species**
- **January 9, 2007 the proposed rule was published in the *Federal Register***
- **A 90-day public comment period was announced on publication of the proposed rule; comment period ends - April 9, 2007**
- **Public hearings will be conducted in Anchorage, Barrow, and Washington, DC. during the comment period.**
- **Peer review of the proposed rule will be conducted (int'l in scope, multidisciplinary)**
- **Alaska - FWS will review public comments**
- **Additional analysis of Southern Beaufort Sea population trajectory modeling will be conducted by USGS**
- **USGS will coordinate a critical review of the climate modeling information in coordination with climate experts from a number of organizations**
- **FWS statutory deadline to make a final listing determination is January 2008**

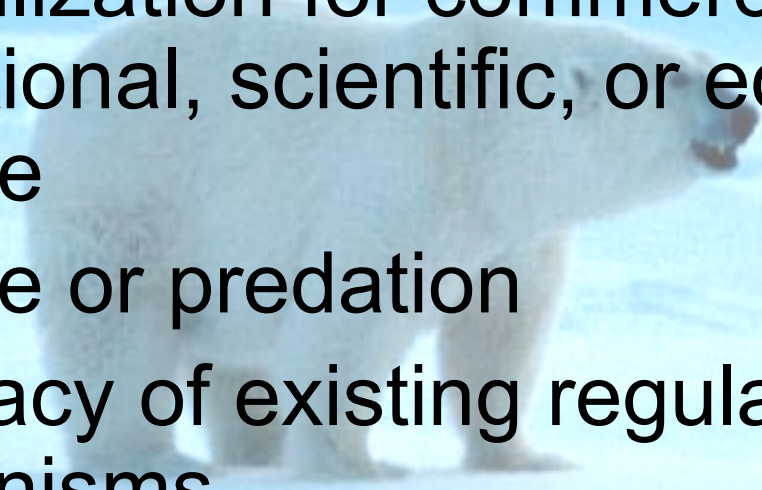
# ESA Definitions

- **“threatened species”** - any species that is likely to become an endangered species within the “foreseeable future” throughout all or a significant portion of its range
- **“endangered species”** - any species that is in danger of extinction throughout all or a significant portion of its range

# **“Foreseeable Future” For Polar Bears**

- **3 generations based on population dynamics of species and environmental changes**
- **Generation definition (IUCN 2001)**
  - **Age of sexual maturity + 0.5 x (length of reproductive life cycle)**
  - **5yrs. + (0.5 x 20 years) = 15 yrs./generation**
- **Foreseeable future (defined on a species by species basis) = 45 years**

# 5 Factors

- Present destruction, modification, or curtailment of habitat or range
  - Overutilization for commercial, recreational, scientific, or educational purpose
  - Disease or predation
  - Adequacy of existing regulatory mechanisms
  - Other natural or manmade factors
- 
- A polar bear is visible in the background, walking across a snowy and icy landscape. The bear is white and is captured in profile, moving from left to right. The background is a vast, flat expanse of snow and ice under a pale sky.

# *Ursus maritimus*

Latin for “sea bear”

Polar bears are classified as marine mammals. However they are not adapted to survive in an entirely aquatic environment and are reliant on the presence of sea ice in the marine system for life functions

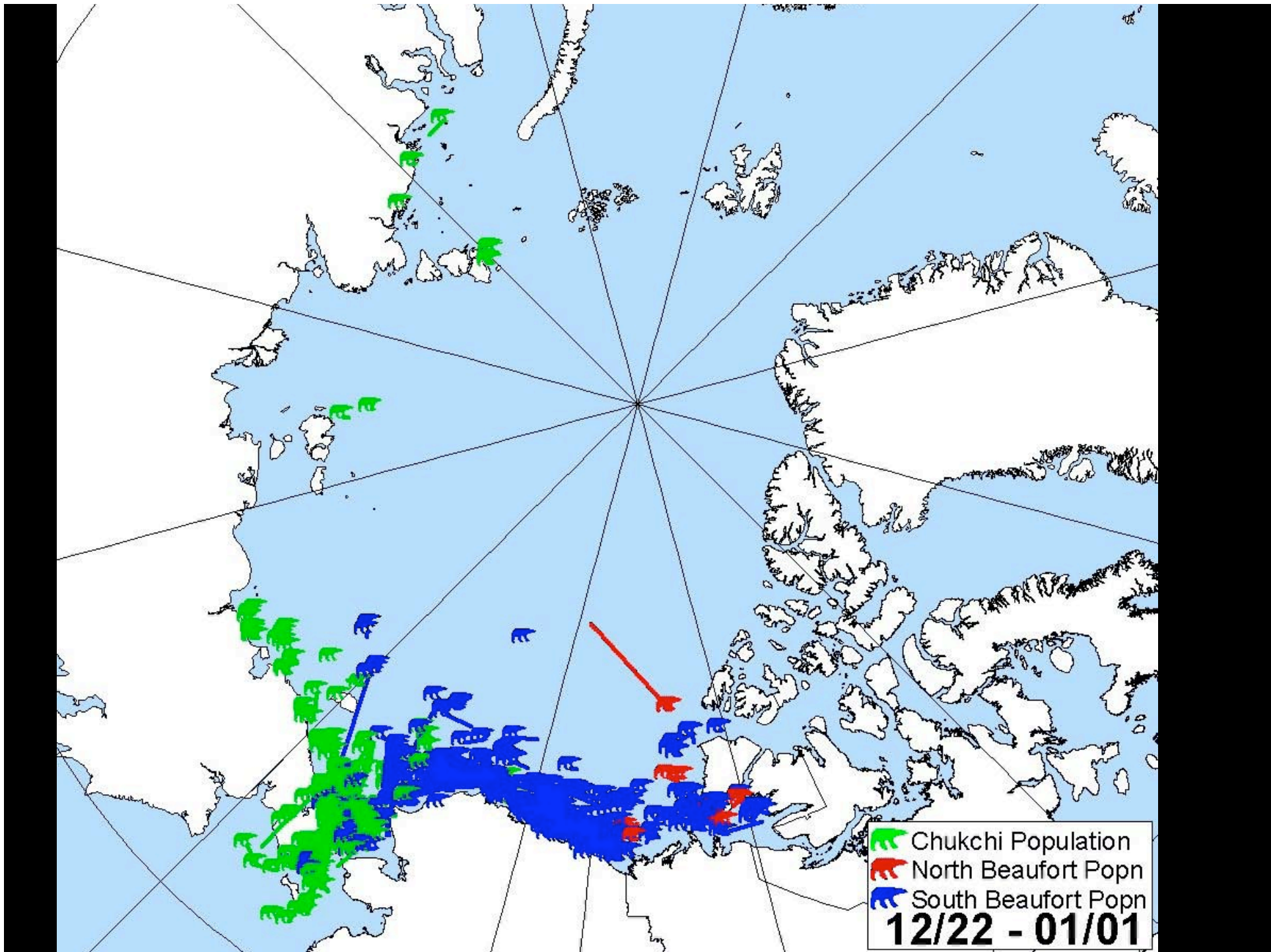


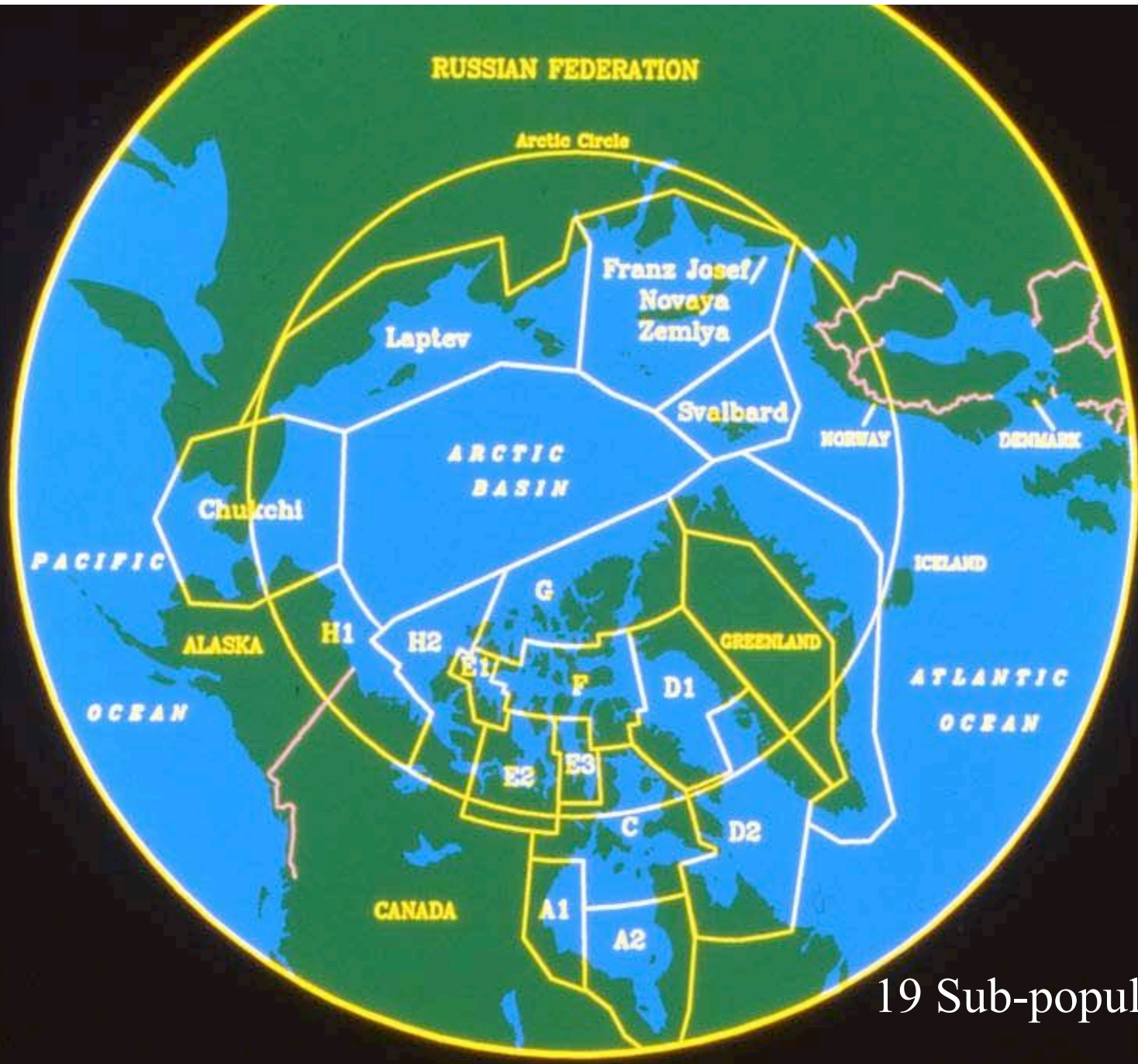
Current  
distribution  
of polar bears

Polar bear data from USGS  
CWS, numerous researchers  
from other countries  
Credit & references are cited  
in the Proposed Rule and  
Status Assessment









19 Sub-populations  
 20,000-25,000 bears

## LOW REPRODUCTIVE RATE

- Sexually mature 5-6 yrs
- Born in Dec/Jan
- Less than 2 lbs.
- Average litter size =  $< 2$
- Cubs stay with mother  $> 2$  yrs
- Mothers breed every 3-4 yrs.
- Den in snow excavations



# Denning



- Rely on snow drifts
- Enter dens in Oct/Nov/Dec
- Emerge in March/April



# Seals are primary prey

A photograph of a polar bear on a sea ice floe. The bear is in the foreground, looking towards the right. In the background, another sea ice floe is visible, and a seal is partially submerged in the water. The background shows a vast, flat landscape under a clear sky, likely a tundra or coastal plain.

Feed heavily while hunting from the surface of sea ice when food is available (spring-fall)

Ability to live on stored fats (recycle nutrients) when food is scarce

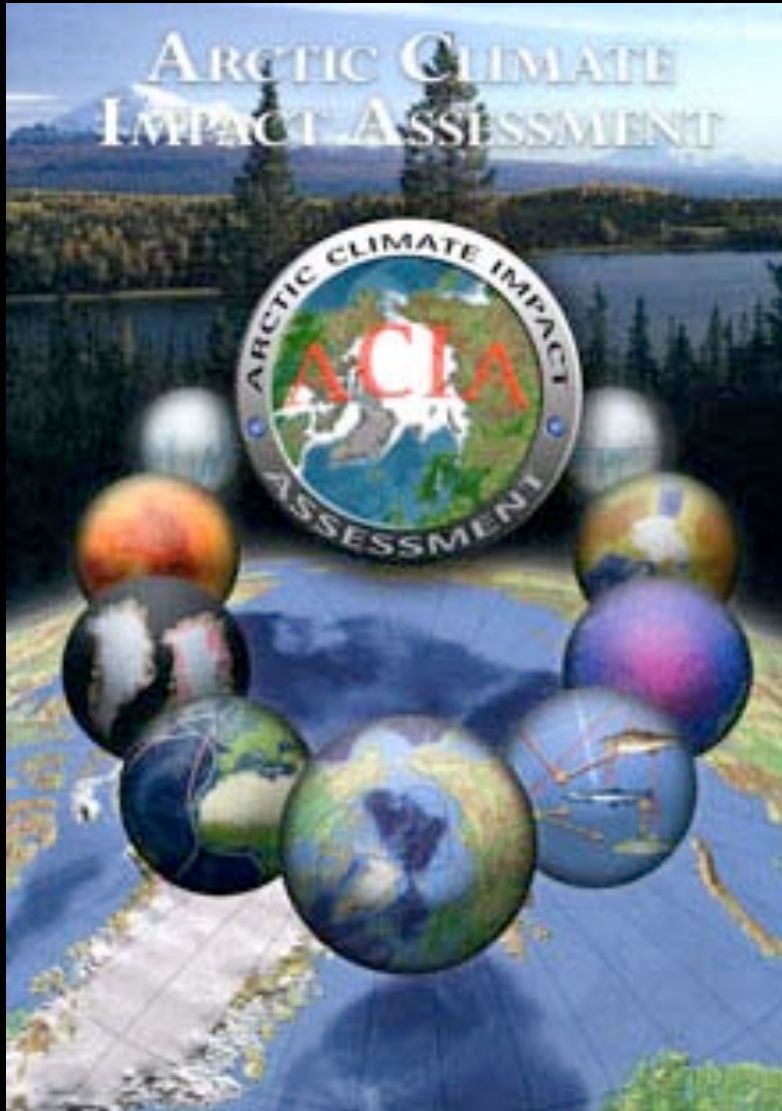


- **ESA Listing Factor A – sea ice**

**Present or threatened destruction, modification, or curtailment of the species habitat or range**

**Factor A - analysis**

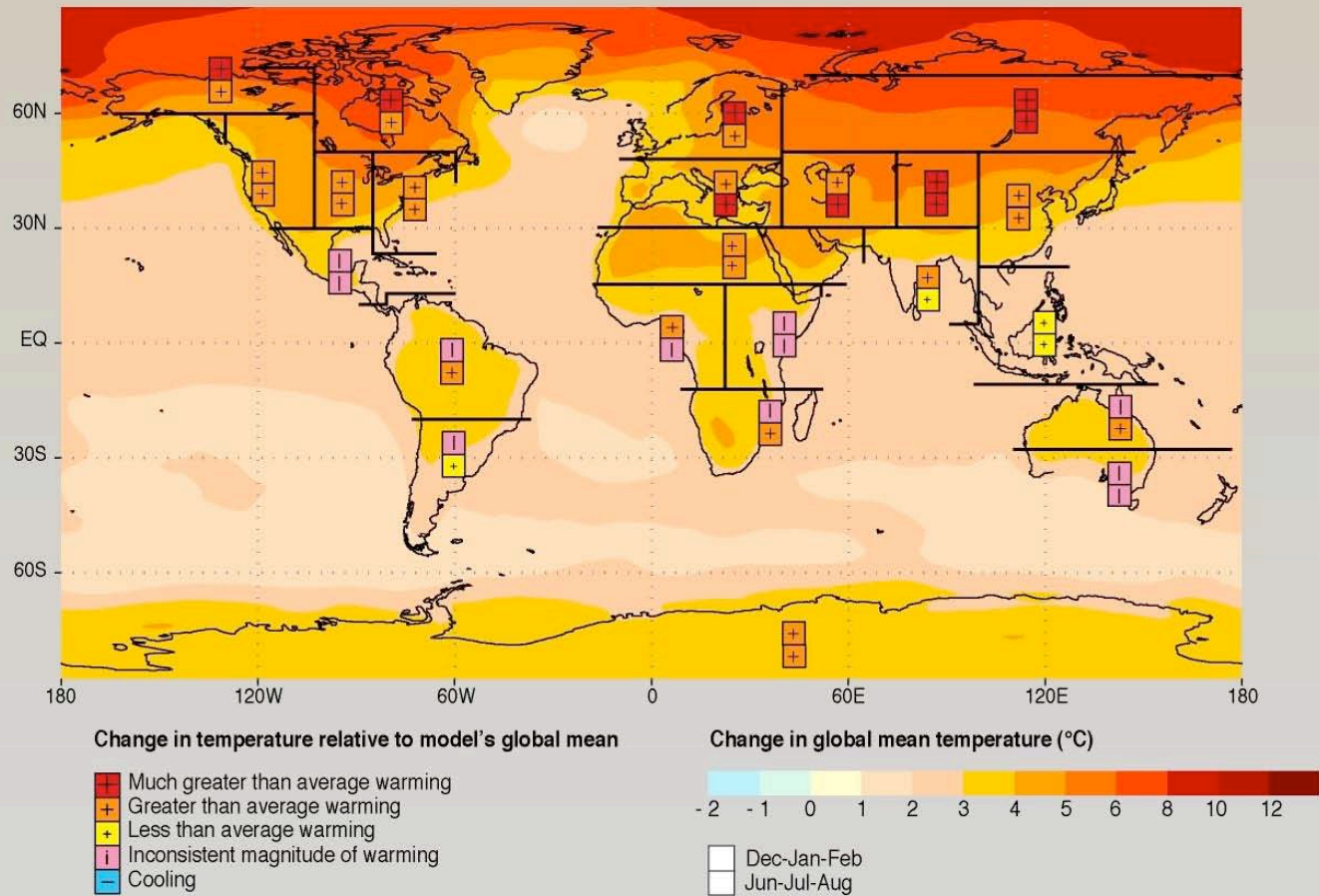
# Scientific climatological data sources -



Rothchuck, Stroeve et al.,  
Holland et al., Overpeck et al.,  
NSIDC, NCAR, Comiso,  
Parkinson et al., Johanson et  
al., NOAA, Vinnikov et al.,

**Factor A - analysis**

## Change in temperature for scenario A2



SYR - FIGURE 3-2 a

## Factor A - analysis

IPCC

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE





# Summary of Findings ACIA

**+3-4° C AK/Can 50 yrs.**

**Precip +8% 100 yrs**

**RoS +50% in 50 yrs.**

**Sea ice -8% last 30 yrs**

**Thickness -10-15% as  
great as -40% from  
1960s-late 1990s**

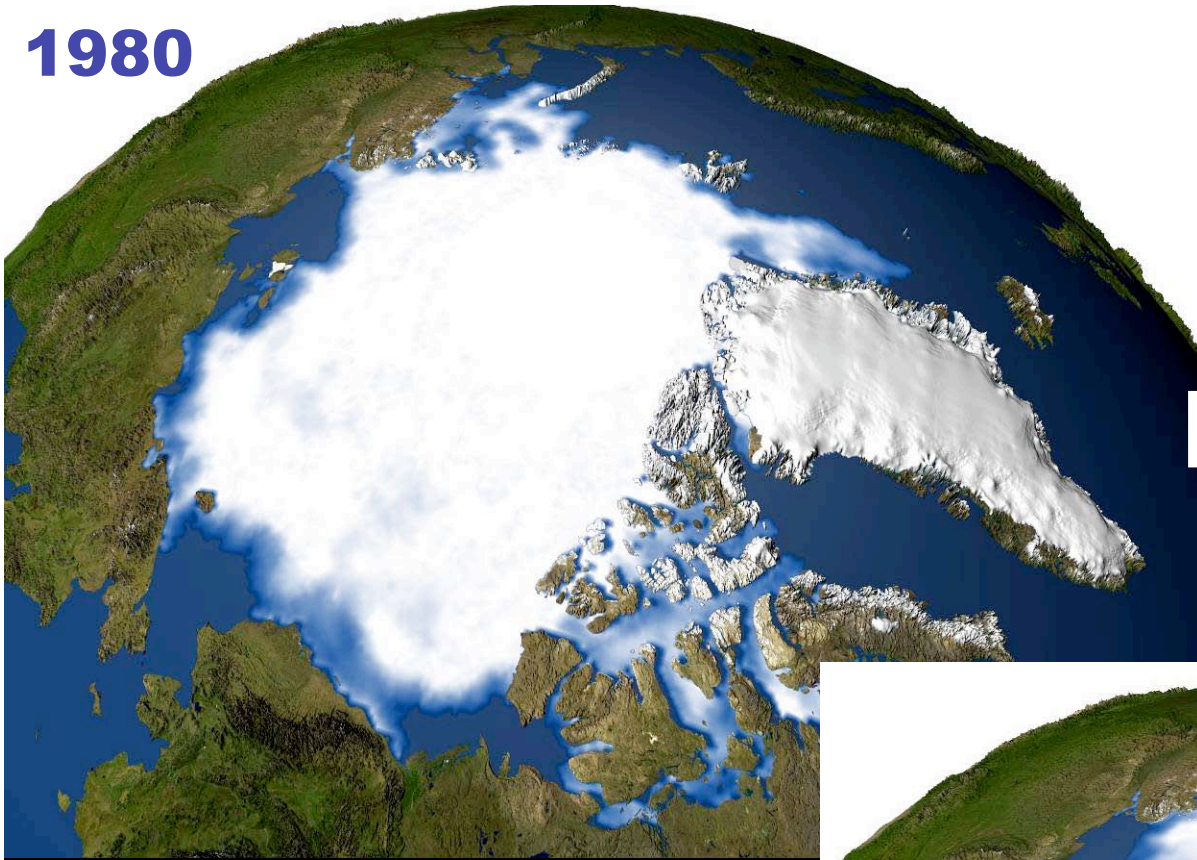
**Temp over oceans  $\leq 7^{\circ}$  C  
over oceans**

**Winter temp +7-10° C  
over oceans**

**50% redux in sea ice  
cover by end of century**

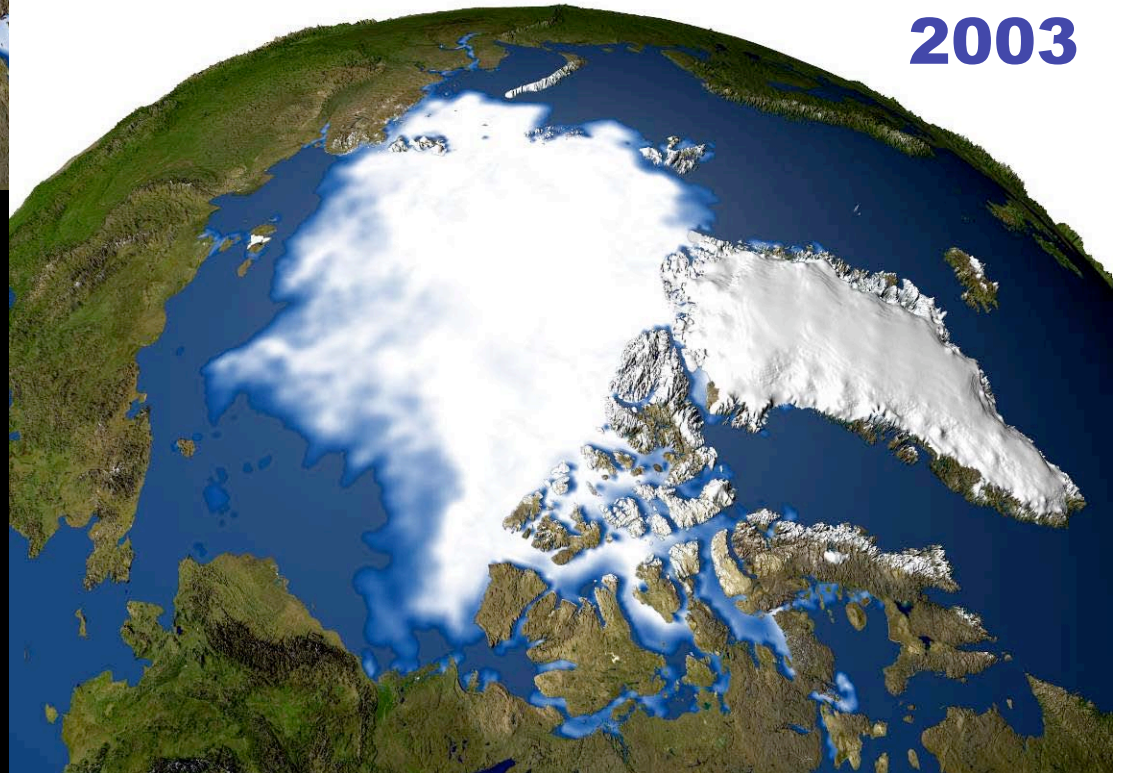


**1980**



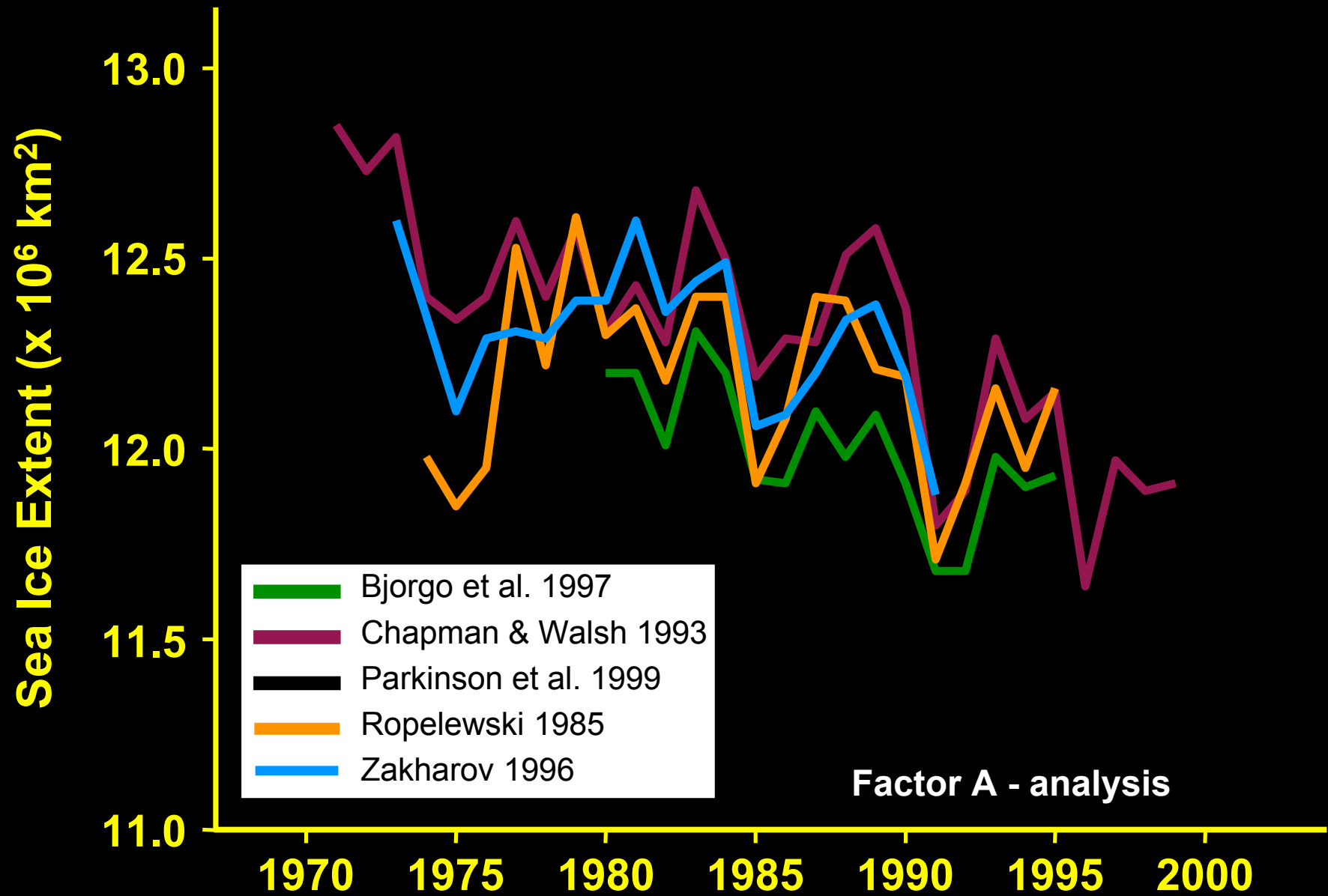
# Minimum Sea Ice Extent-Sept

**2003**



**Comiso, J. C.  
NASA**

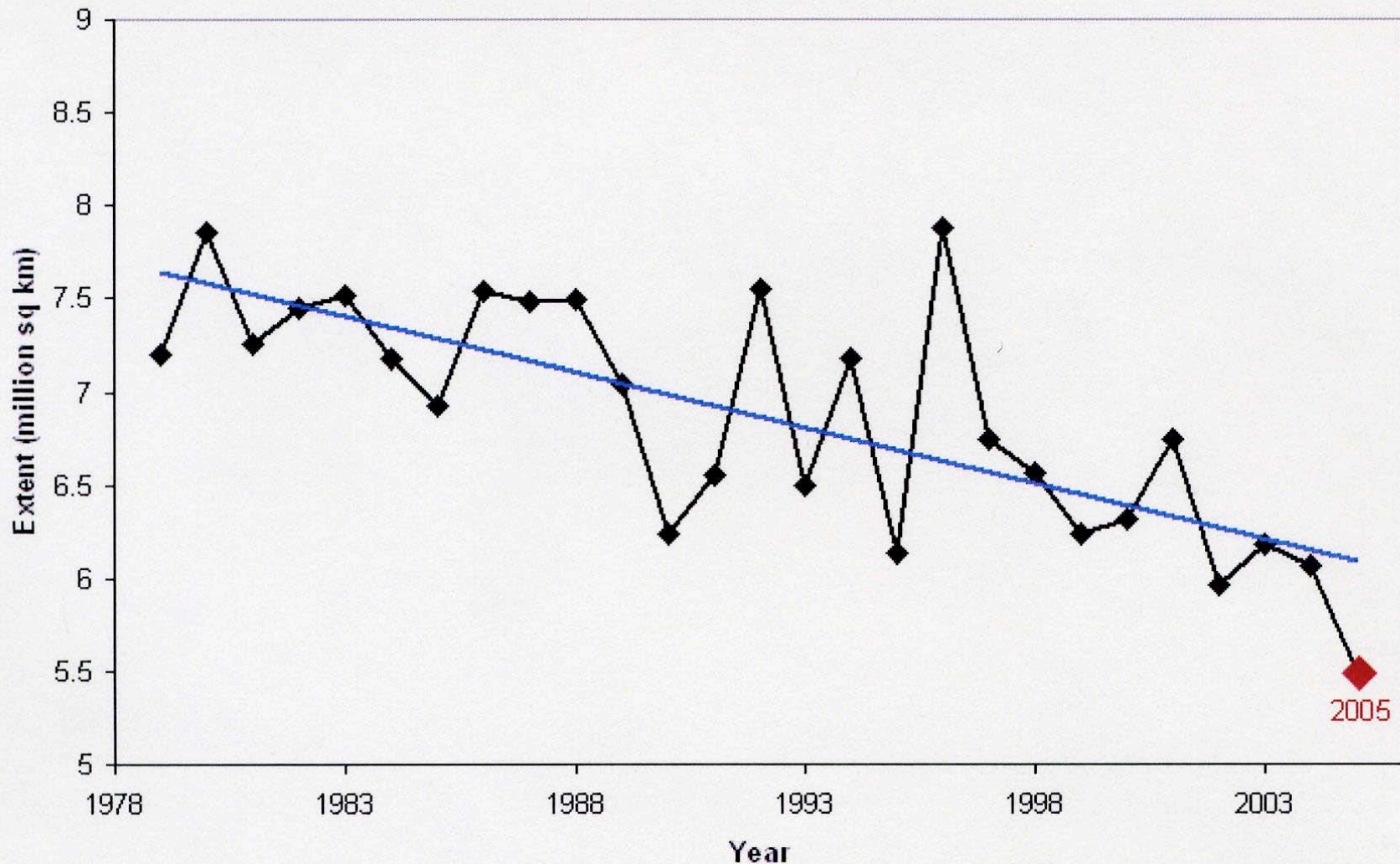
# Observed Decrease in Northern Hemisphere Sea Ice Extent



(after Vinnikov et al. 1999, *Science* 286:1934-1937)

Figure 1: September extent trend, 1978-2005

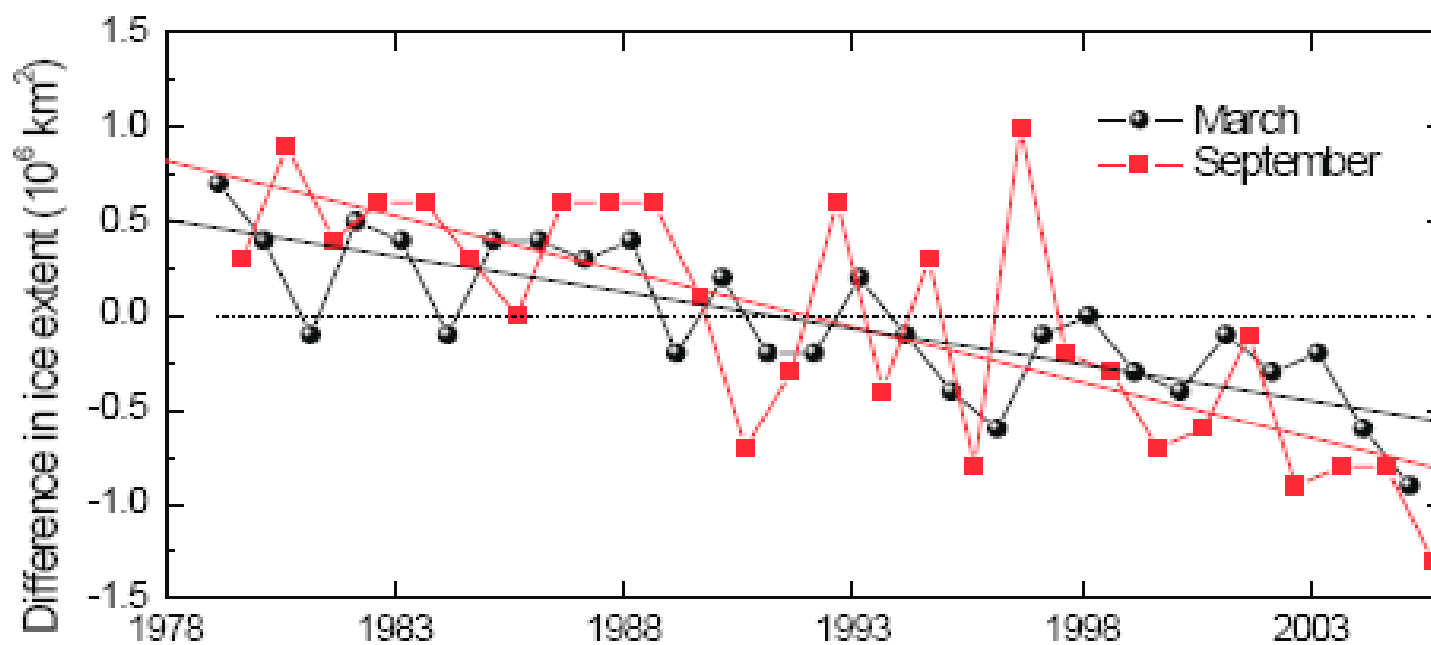
Factor A - analysis



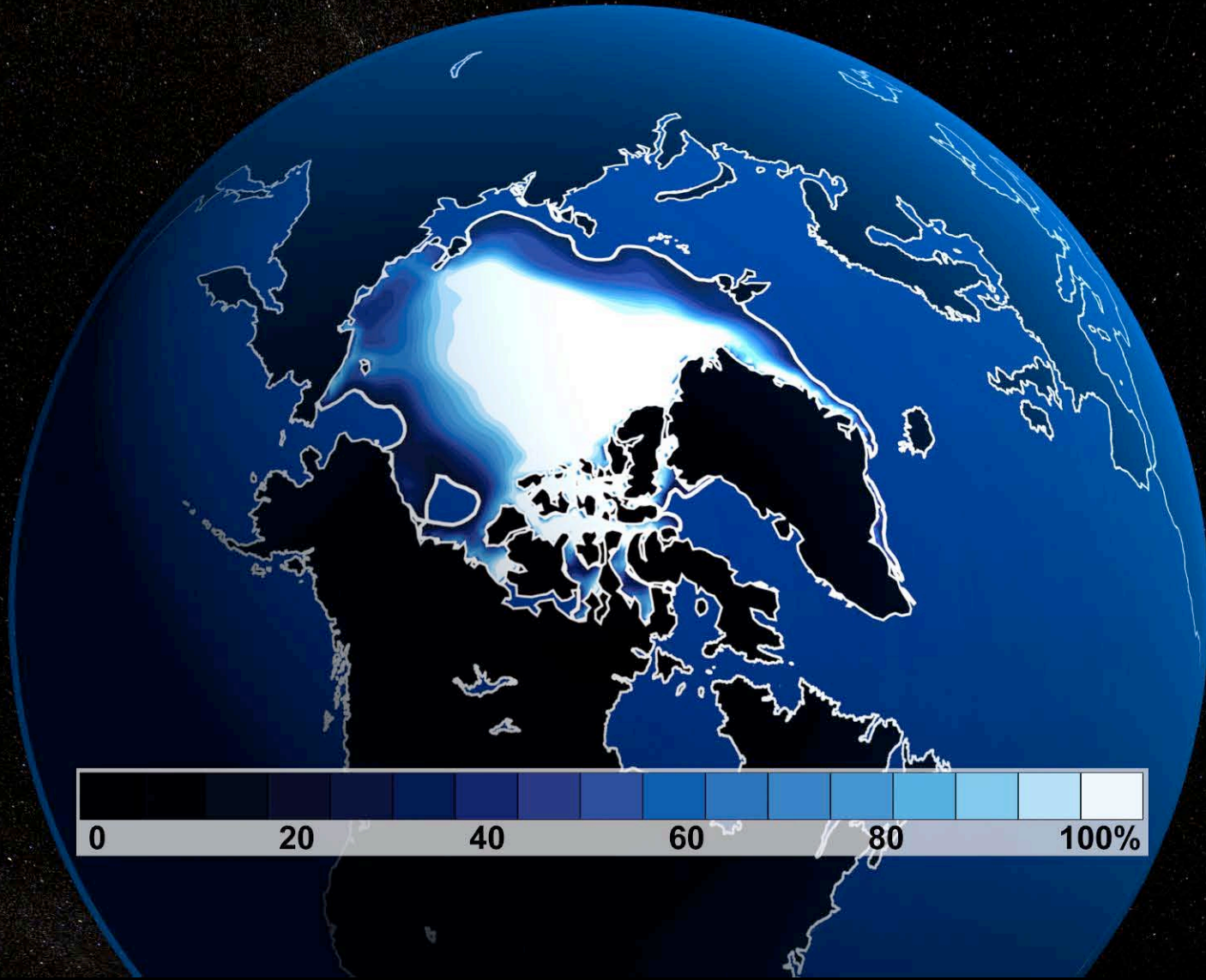
This graph depicts the decline in sea ice extent from 1978-2005. The September trend from 1979 to 2005, now showing a decline of more than 8 percent per decade, is shown with a straight blue line.

The value for 2005 is based on date through September 25; after this date, we assume that ice growth rates are typical for this time of year. Ice extent is obtained by summing the area covered by pixels that have 15 percent or greater ice concentration. The area not imaged by the sensor at the North Pole is assumed to be entirely ice-covered.

# Observed Reductions in Maximal and Minimum Ice Coverage



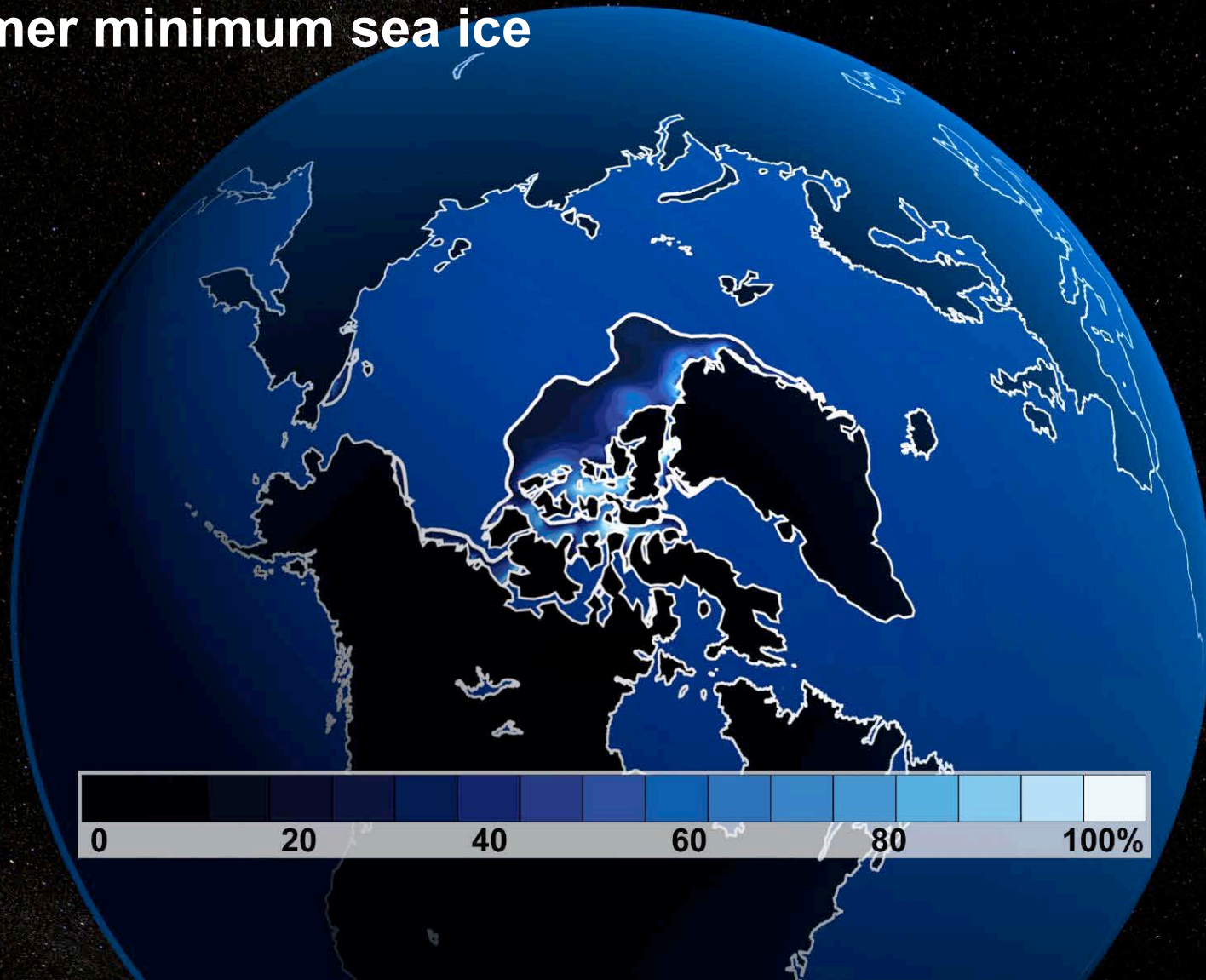
Factor A - analysis



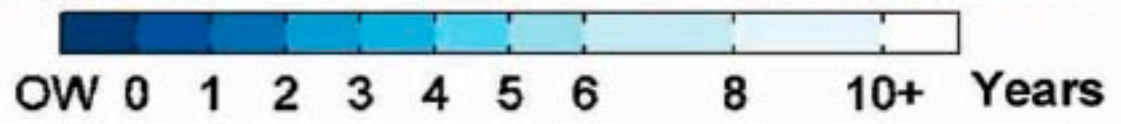
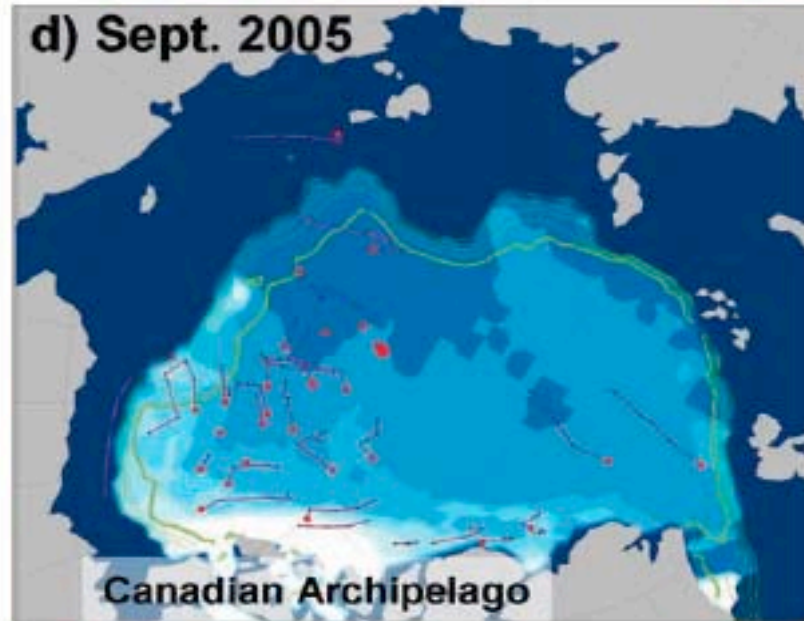
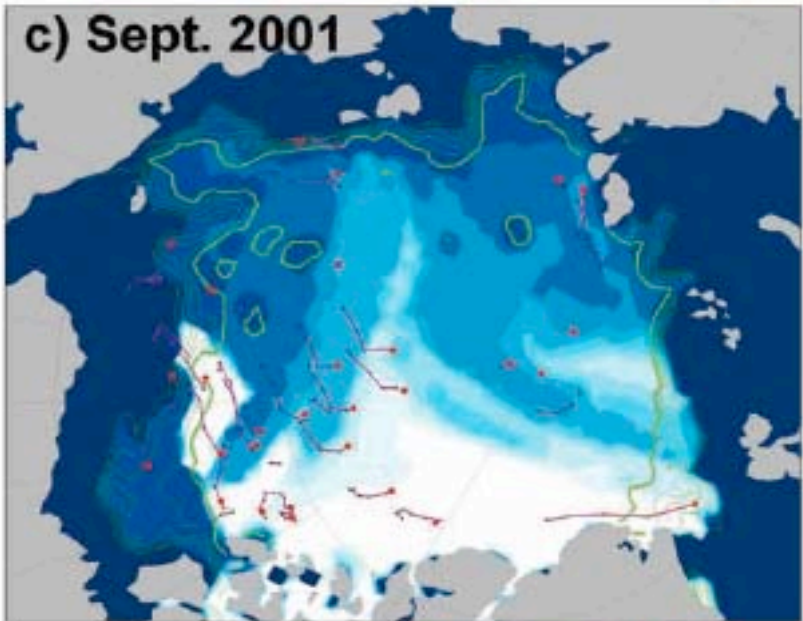
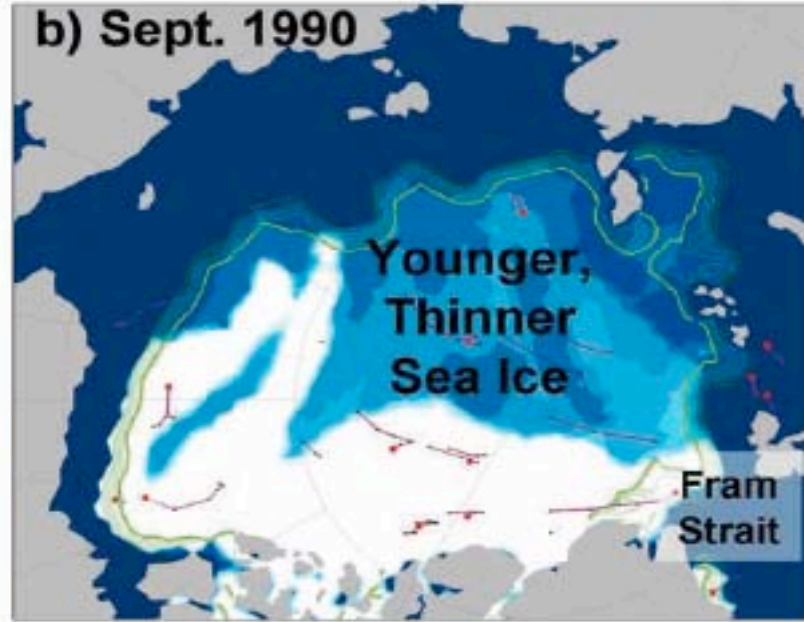
**Factor A - analysis**

**Holland et al. summer minimum sea ice, 2000**

# Holland et al. forecasted summer minimum sea ice



Factor A - analysis



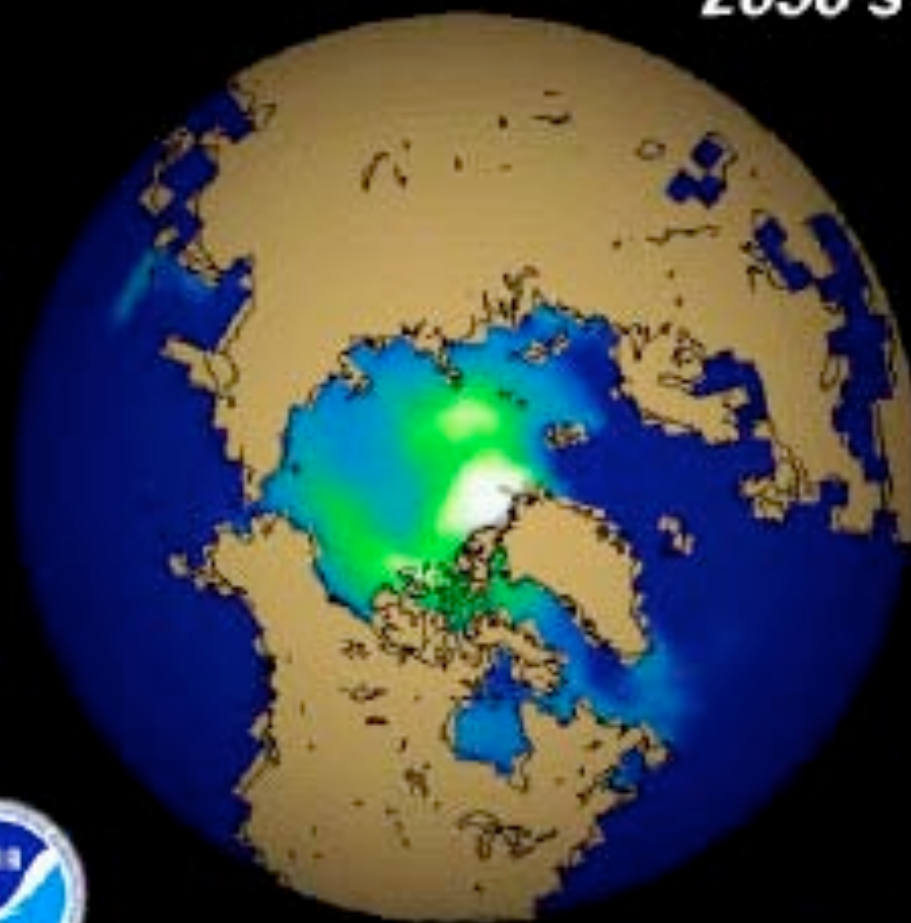
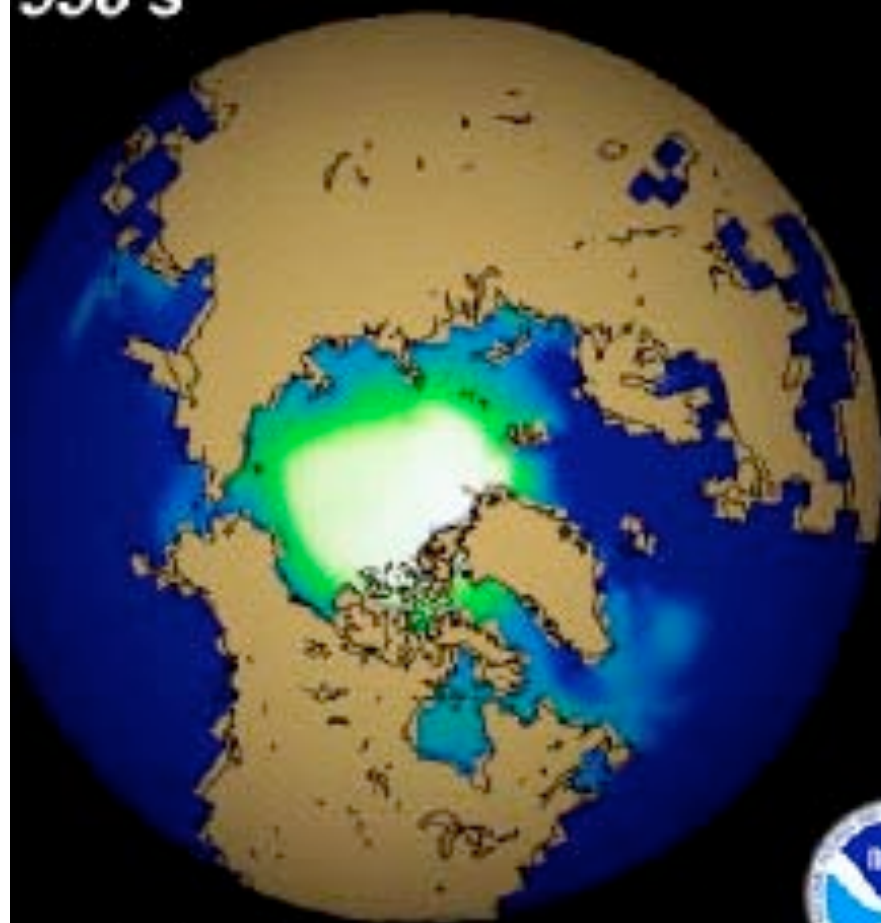
Factor A -  
analysis



# Sea Ice Thickness (10-year average)

950's

2050's



100% of  
1955 volume

Factor A - analysis



54% of  
1955 volume

**Changing distribution--  
movement to land**

**Consequences:**

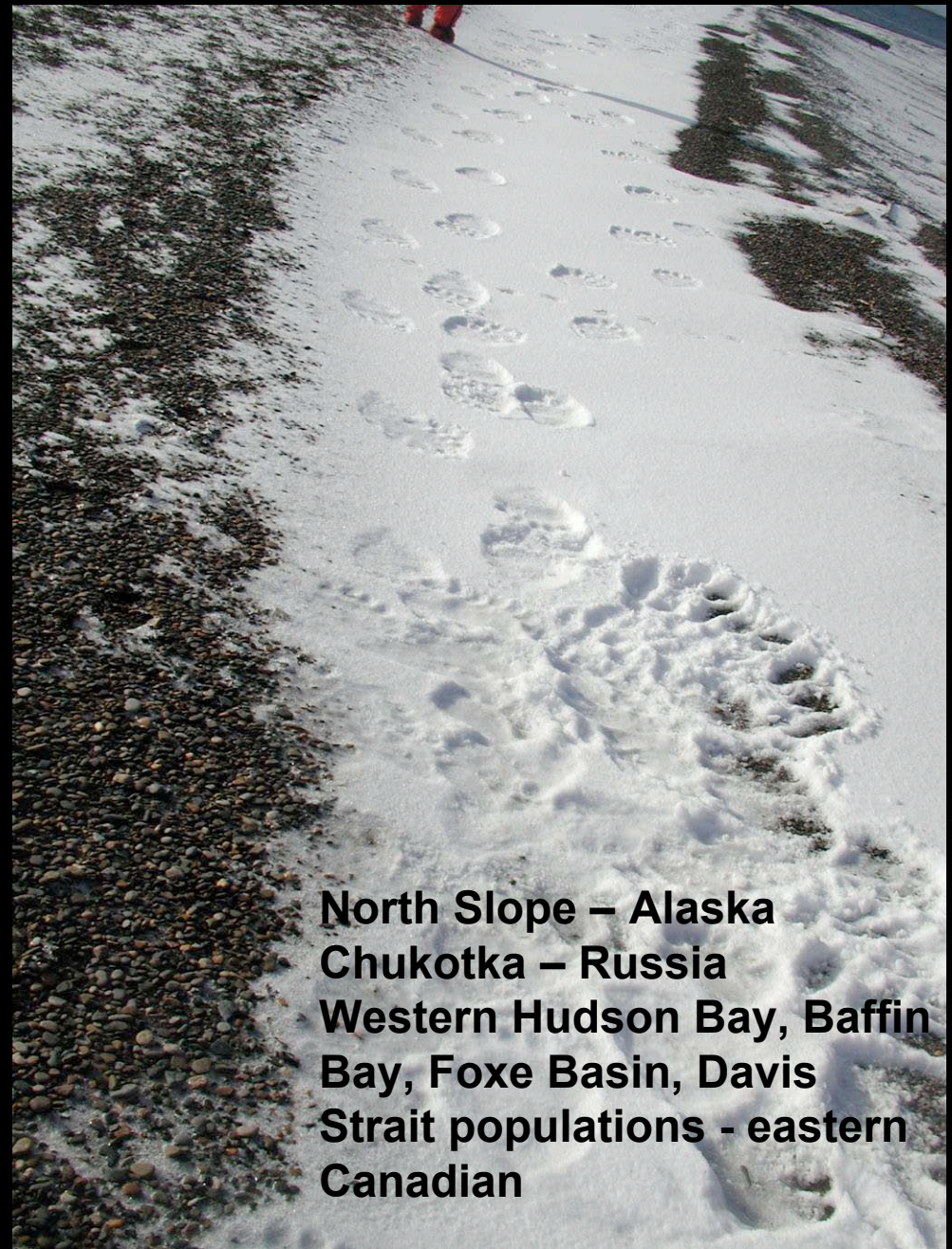
**Food deprivation**

**Human contact**

**Intra-specific stress**

**Disease**

**Increased risk -  
concentrations**



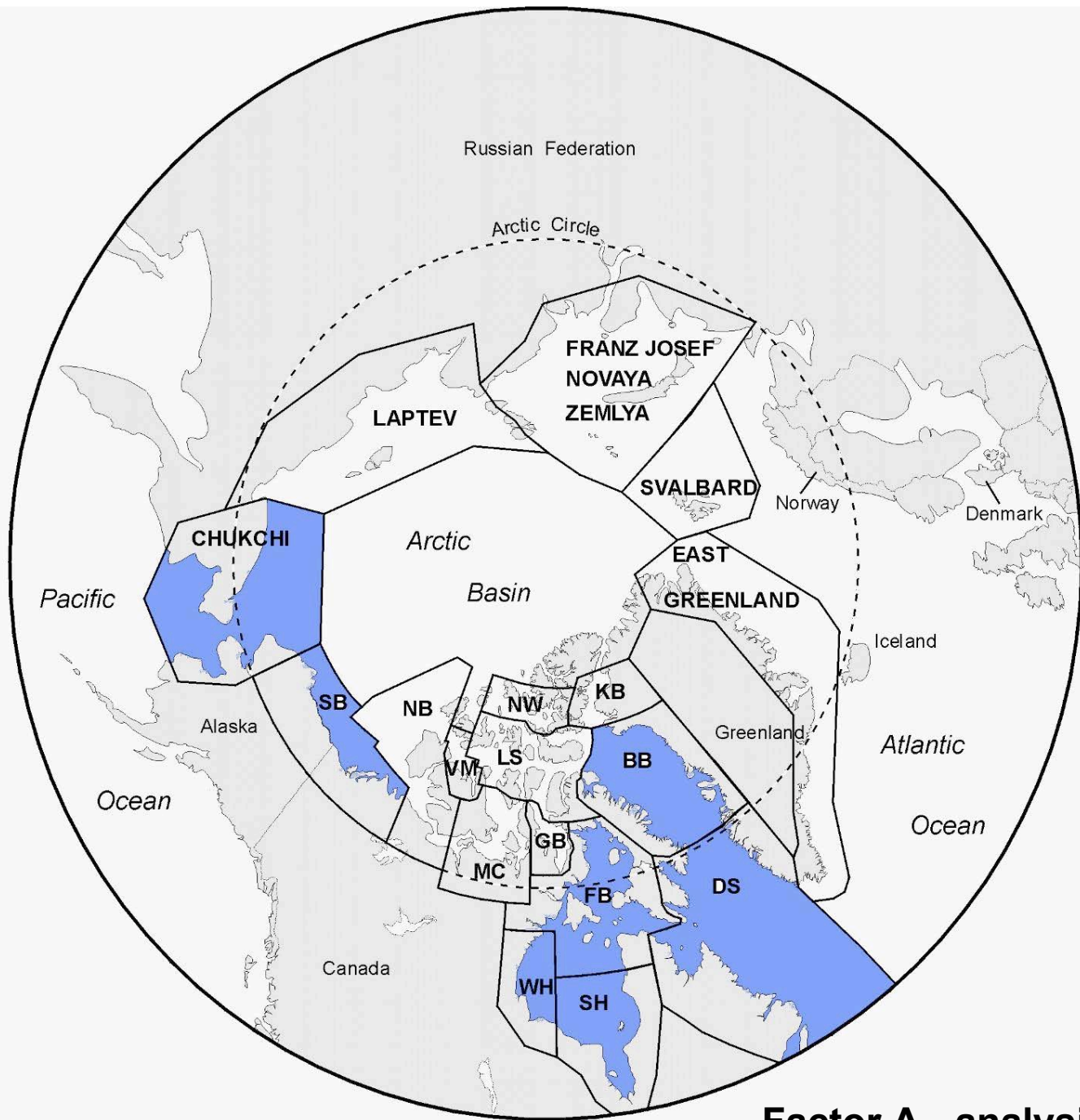
**North Slope – Alaska  
Chukotka – Russia  
Western Hudson Bay, Baffin  
Bay, Foxe Basin, Davis  
Strait populations - eastern  
Canadian**

## Areas with increased polar bear presence on land:

- North Slope – Alaska
- Chukotka – Russia
- Western Hudson Bay – Canada
- Baffin Bay and eastern Canadian population



Factor A - analysis



**Factor A - analysis**

A polar bear is shown walking through a sea of fragmented ice floes. The bear is in the center-right of the frame, moving from left to right. The ice floes are scattered and thin, with dark water visible between them. The background shows a vast expanse of water and a hazy horizon. In the top-left corner, there is a smaller inset image showing a polar bear with two cubs on a larger, more consolidated ice floe.

## Increased movements

Less consolidated ice will be present

Fragmentation of ice habitat will occur


Rates of ice movement will increase

Energetic demands will increase

Pack ice beyond continental shelf

Feeding opportunities will decrease

# Changes in sea ice habitat

- 
- Increasing rates of ice movement
  - Increasing fragmentation of ice habitat
  - Less heavy, multi-year consolidated ice
  - Relocation of pack ice beyond productive continental shelf areas
  - Polar bears may have experienced previous warming events

# Reduced Access to prey



- Ice retreat over deeper unproductive waters
- Fragmentation of ice habitats
- Increased open water...unsuitable hunting platform

# Increased swimming

MMS systematic aerial surveys 1987-2004

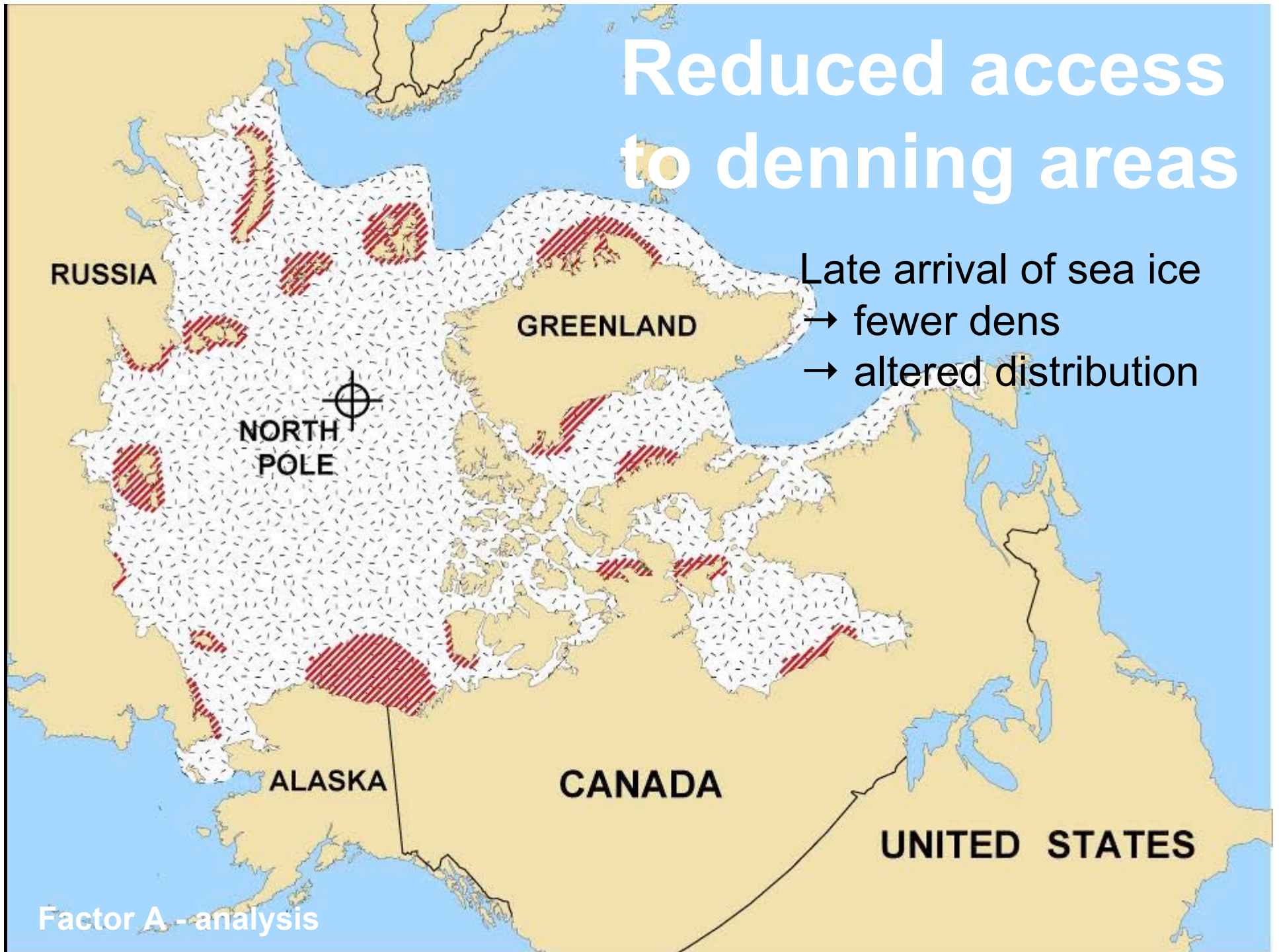
Bears abandon ice in favor of land when ice concentration <50% (Derocher 2004)

Future source of mortality

- 4 dead bears in open water following storm during minimal ice conditions



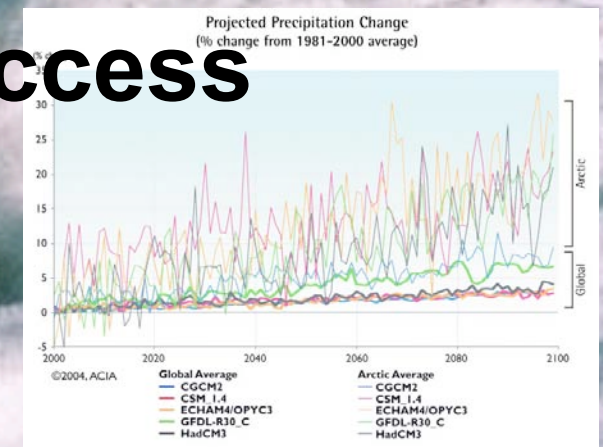
# Reduced access to denning areas



# Increased rain on snow events affect:

- Timing of spring melt
- Access to prey
- Reduced seal pupping success
- Reduced prey

Factor A - analysis



# Poor physical condition affects reproduction success and survival of individual bears



Factor A - analysis

# Increased starvation

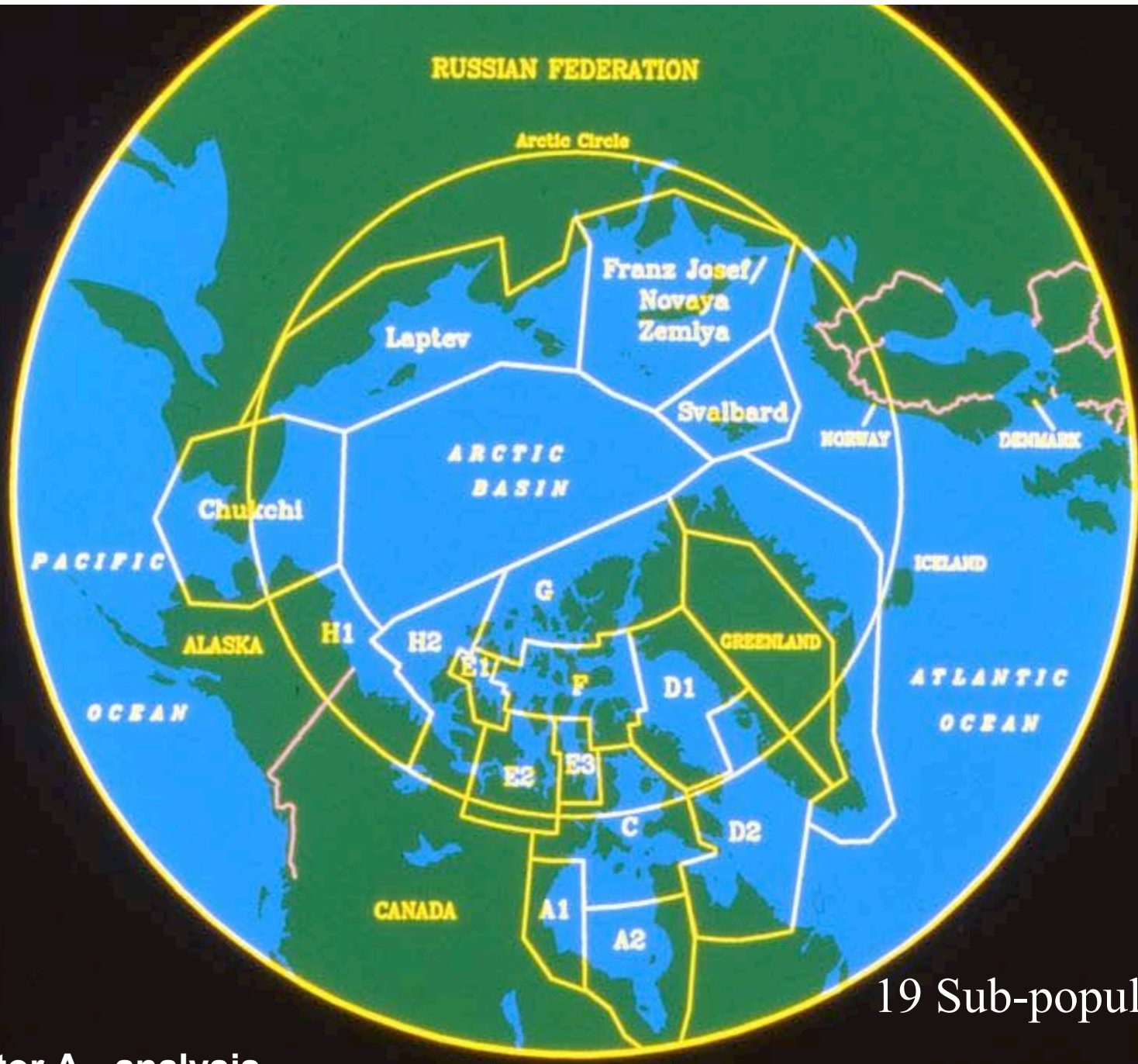
**nutritional stress: increased energetic demands (ice), lower prey availability, more time on land, food deprivation, reduce condition**



A photograph of a dead reindeer lying on a dark, rocky beach. The reindeer is positioned in the lower right quadrant of the frame, facing left. Its fur is a mix of brown and grey, and it appears to be in a state of death. The background consists of a vast, dark, rocky landscape under a cloudy sky. The overall tone is somber and desolate.

**Increased starvation**

**Factor A - analysis**

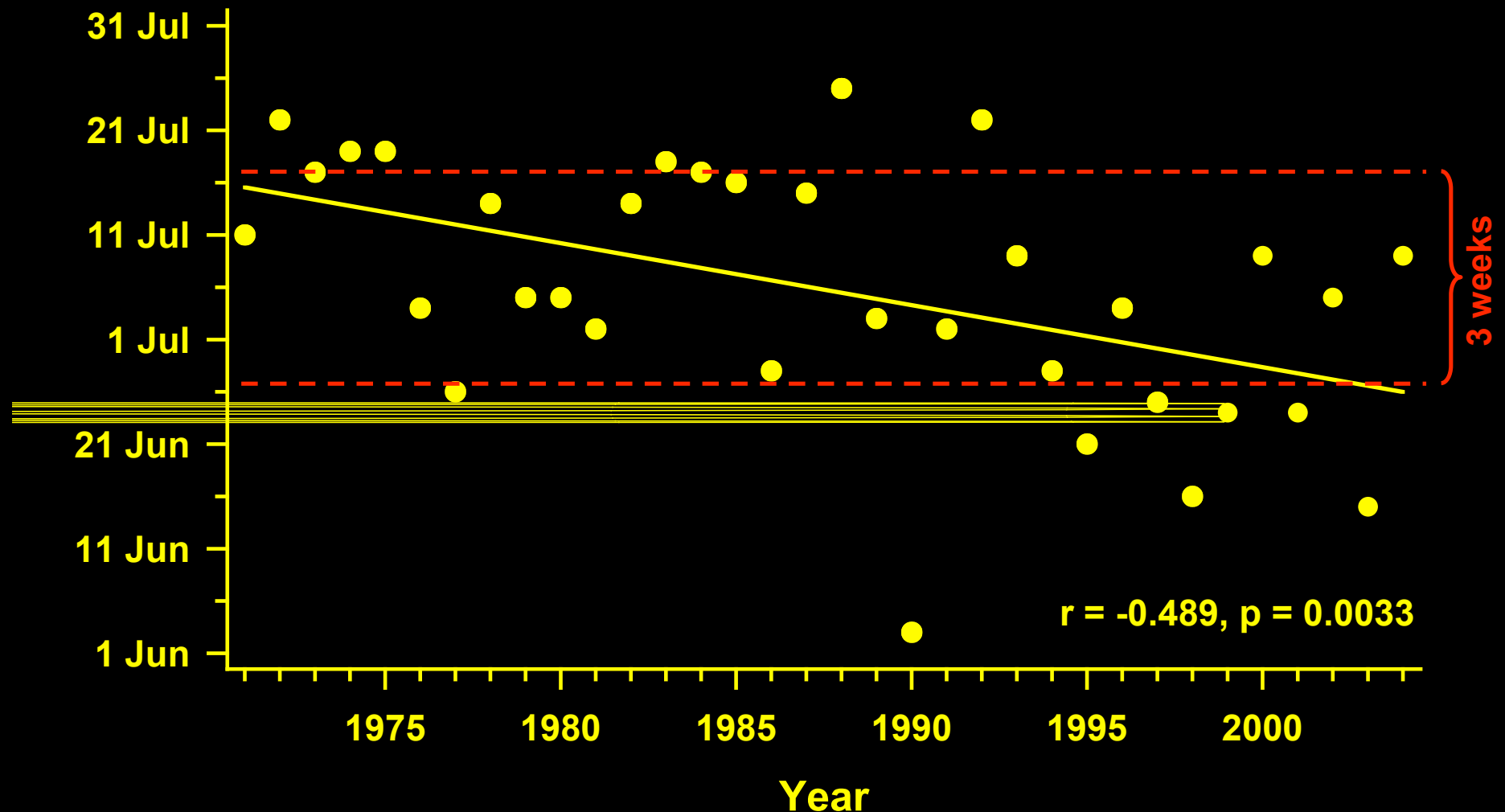


Factor A - analysis

19 Sub-populations  
20,000-25,000 bears

# Timing of Break-up in Relation to Year, Western Hudson Bay – Canada

1971-2004



(after Stirling et al. 1999, *Arctic* 52:294-306; Lunn & Stirling unpublished data)

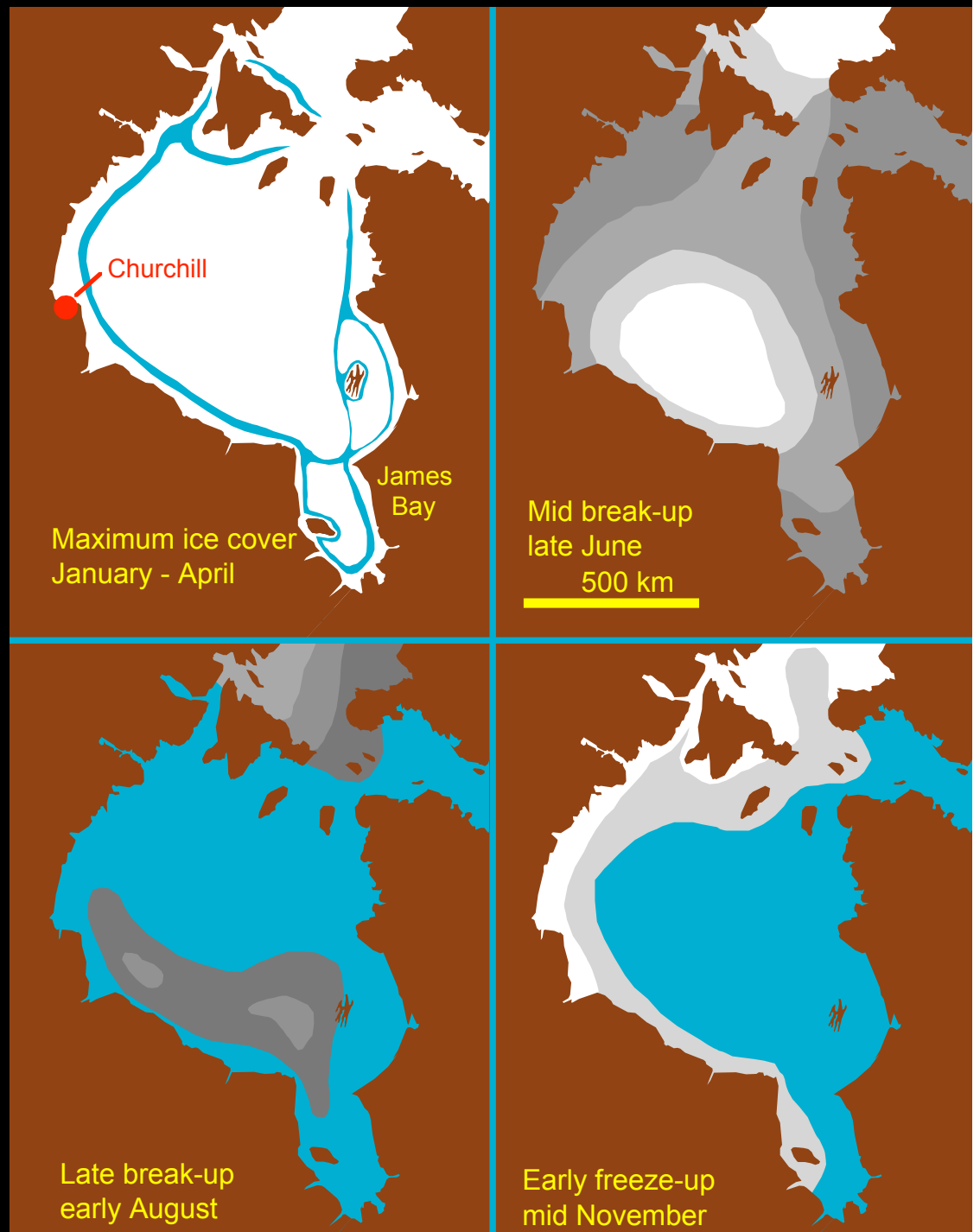
Factor A - analysis

# Earlier ice melt in Hudson Bay, Canada =

- Bears come ashore earlier
- Reduced weights
- Reduced survival of young and old
- Declining population size

1987-2004 a 22% population reduction from 1,194 to 935 (Regehr et al. in press)

## Factor A - analysis





# Southern Hudson Bay - Canada

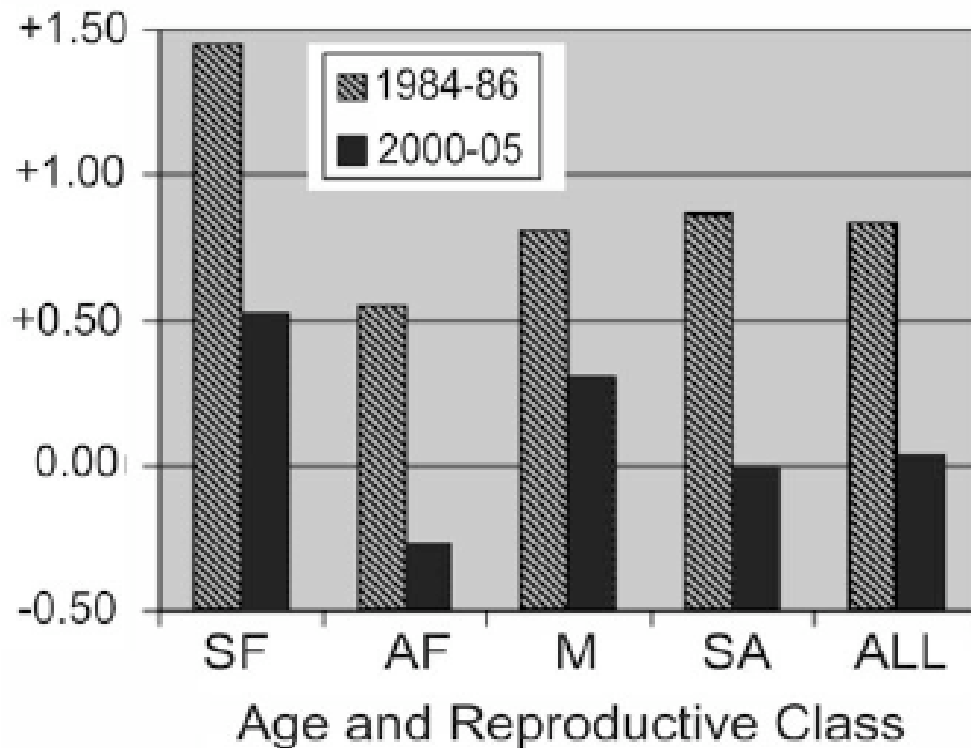


Figure 4. Mean Body Condition Index values for Southern Hudson Bay polar bears, 1984-1986 and 2000-2005 (SF = solitary adult females, AF = adult females with young, M = adult males, SA = subadults, ALL = all classes combined).

# Southern Beaufort Sea Alaska

- 6 year capture recapture (2001-2006)
- Results compared to earlier data
  - Declines in condition indices, stature, weights
  - Declines in survival of young
  - Population est. @ 1,500 w/ good confidence intervals
- Similar early stage declines in Western Hudson Bay were not significant

# **ESA Listing Factor A**

## **Conclusion: Loss of sea ice threatens the species range-wide**

- **Reduced extent and area of occurrence of pack ice will impact polar bears**
- **Reduced prey numbers**
- **Reduced access to prey**
- **Altered distributions**
- **Increased movements and energetic costs**
- **Reduced physical condition and fitness**
  - **Declining recruitment rates**
  - **Declining survival rates**
  - **Declining population abundance**

# **ESA Listing Factor B conclusion:**

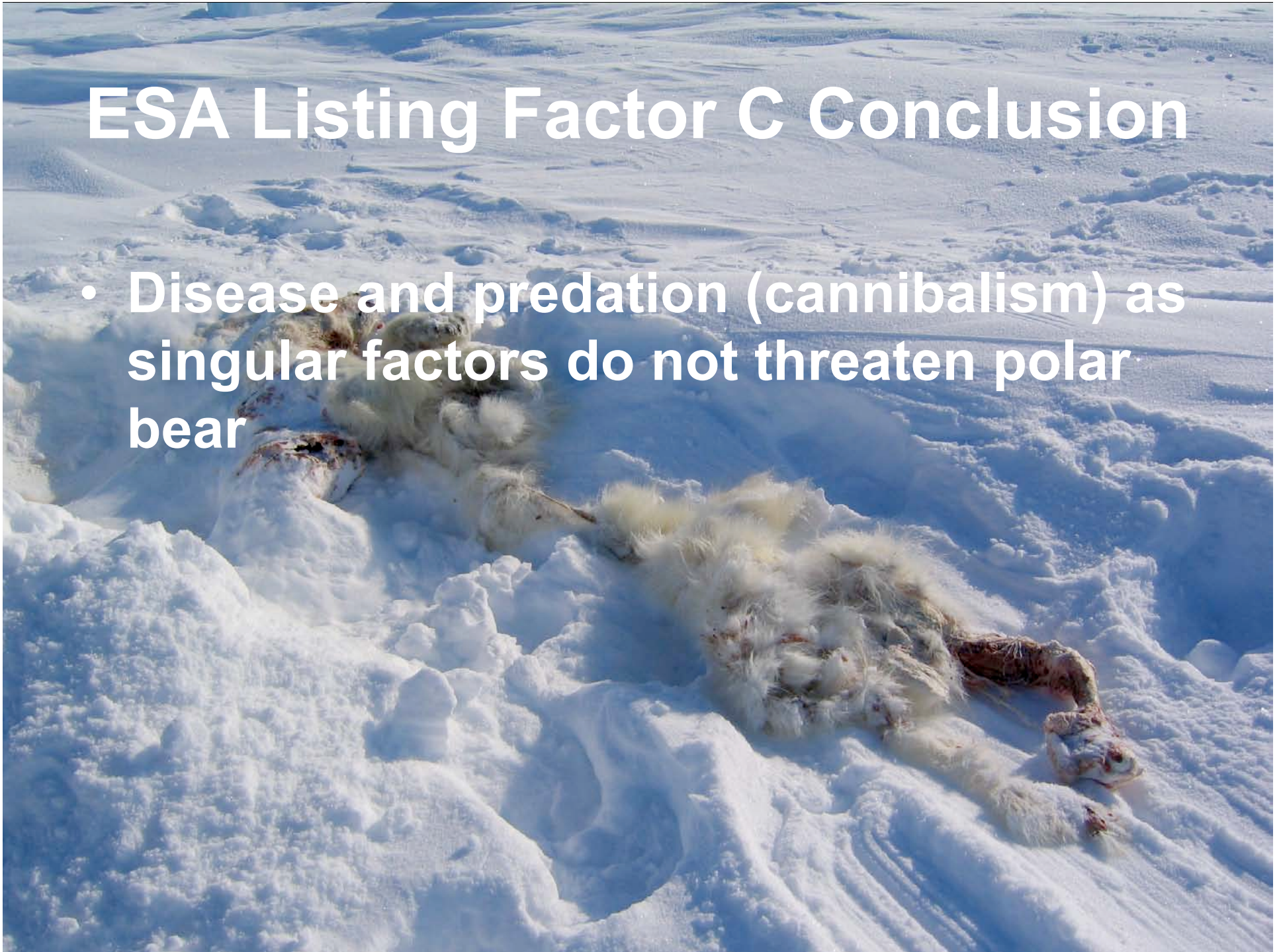
**Over harvest as a singular factor does not threaten polar bear**

- **Over harvest for some populations**
- **Active management programs - Canada**
- **MMPA - US (depletion standard)**
- **Russia-US bilateral agreement (CS)**
- **Inupiat – Inuvialuit agreement (SBS)**
- **Greenland – Canada cooperation**



# ESA Listing Factor C Conclusion

- Disease and predation (cannibalism) as singular factors do not threaten polar bear



# ESA Listing Factor D Conclusion

## Effectiveness of existing regulatory mechanisms

- Vast majority of regulatory acts and statutes, in a global context, are effective in providing for the conservation of polar bears
  - International Laws, Treaties and Agreements
  - International Classification Systems
  - National Laws and Statutes
- However there are no known regulatory mechanisms currently in place at the national or international level effectively addressing threats to polar bear

# ESA Listing Factor E Conclusion

- **Other natural or manmade factors affecting the continued existence do not threaten the species by themselves :**

- **eg. Contaminants, development, bear-human interactions, shipping**



# **Listing Factor Assessment Summary**

- **Current and projected loss of habitat threatens the species**
- **There are no known regulatory mechanisms currently in place at the national or international level effectively addressing this threat**







# Seeking additional information

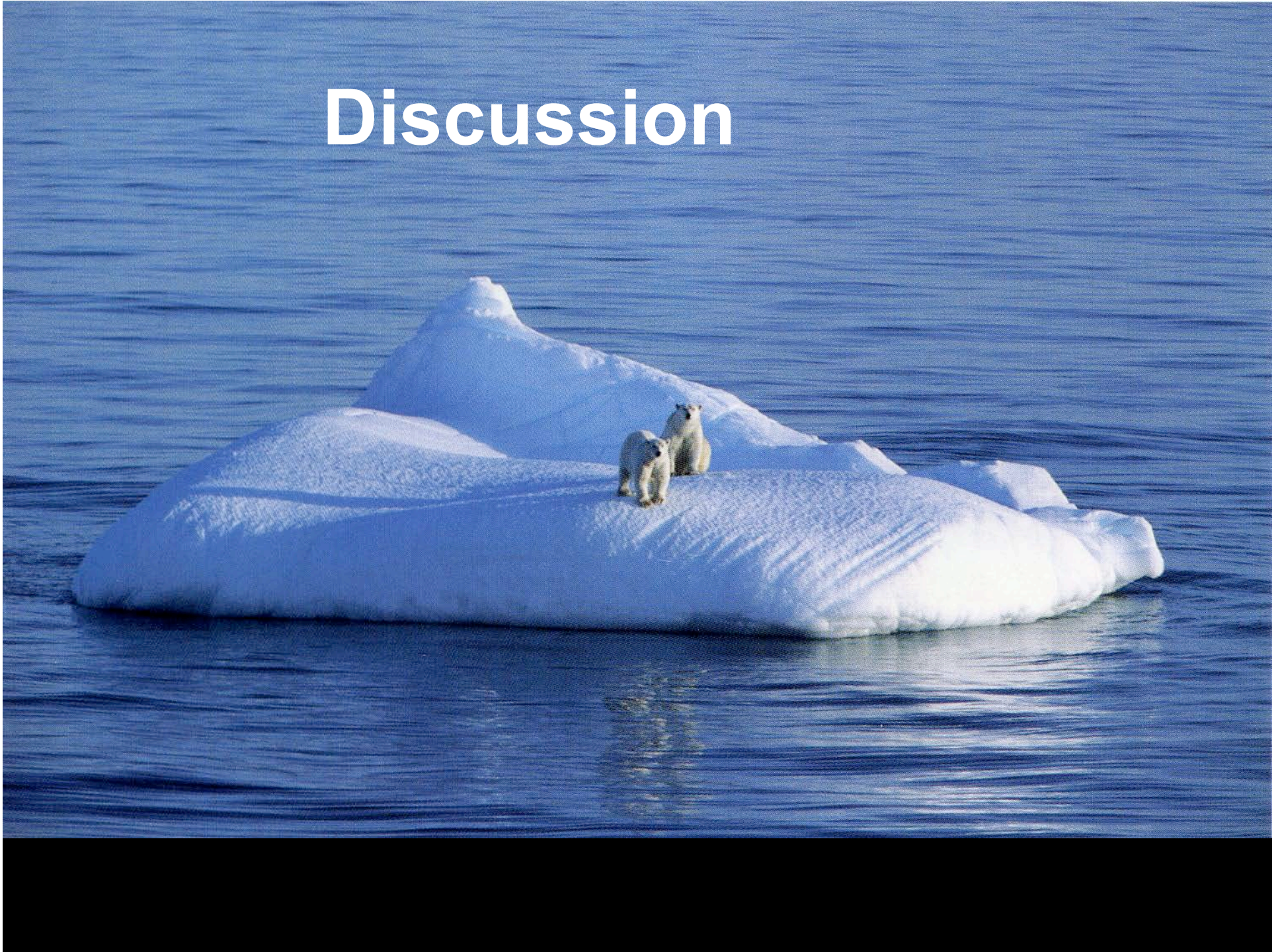
- Polar bear life history
- Sea ice habitat
- Sea ice – polar bear relationships
- Factors that may affect polar bears
- Accuracy of information in proposed rule
- Completeness of information in proposed rule


# What Next - Options



- **Information is evaluated further**
  - FWS will review public comments
  - Additional analysis of Southern Beaufort Sea population trajectory modeling will be conducted by USGS
  - USGS will coordinate a critical review of the climate modeling information in coordination with climate experts from a number of organizations
- **Review of information supports listing**
  - Publish a final rule
- **Review of information does not support listing**
  - Enhance our use of existing conservation mechanisms

# Discussion



A polar bear is the central focus of the image, sitting on a large, white ice floe. The bear is looking directly at the camera with a neutral expression. The background consists of more ice floes and a hazy, overcast sky, suggesting a cold, arctic environment. The text is overlaid on the upper portion of the image.

**If listed what would the USFWS do to reduce threats and restore the population?**

**A recovery team of experts within the appropriate disciplines would be formed to develop recommendations regarding recovery of the species.**

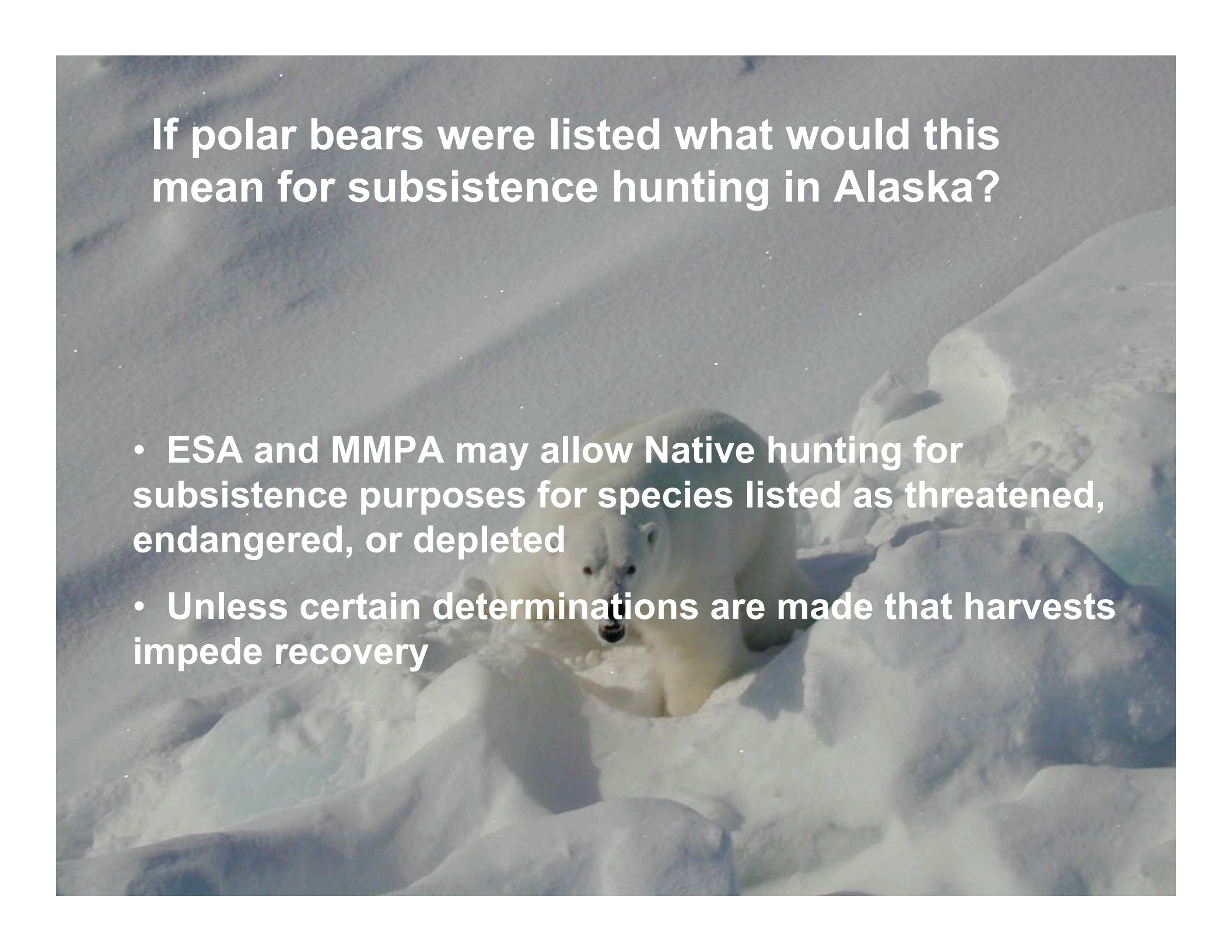
**Possible actions include:**

- **Increased research and monitoring**
- **Increased public awareness**
- **Enhanced use of conservation measures**
- **International collaborative projects**

# What would listing mean for oil and gas development in Alaska?

- Section 7 of the ESA provides for a mechanism for consultation on any Federal action that may affect polar bears or their habitat.
- FWS currently working with oil and gas interests under MMPA



A polar bear is walking across a vast, flat, and snowy landscape. The bear is in the center of the frame, moving towards the viewer. The ground is covered in snow and ice, with some darker patches visible. The sky is a pale, overcast blue. The overall scene is desolate and cold.

## **If polar bears were listed what would this mean for subsistence hunting in Alaska?**

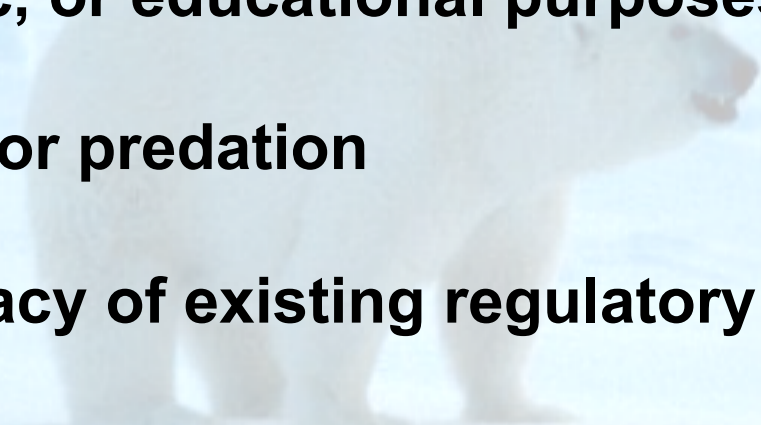
- **ESA and MMPA may allow Native hunting for subsistence purposes for species listed as threatened, endangered, or depleted**
- **Unless certain determinations are made that harvests impede recovery**

# Topics

- **ESA definitions and factors**
- **Natural Life History**
- **Threats relative to 5 listing factors - ESA**
- **Proposed Rule**



# ESA 5 Factor Threat Analysis

- **The present or threatened destruction, modification, or curtailment of habitat or range**
  - **Overutilization for commercial, recreational, scientific, or educational purposes**
  - **Disease or predation**
  - **Inadequacy of existing regulatory mechanisms; or**
  - **Other natural or manmade factors affecting continued existence**
- 



# Nutrition



- Feed heavily when food is available (spring-fall)
- Ability to live on stored fats (recycle nutrients) when food is scarce

