

Ice-associated Seals: NMFS Research and Monitoring



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Why study seals?

- Very important nutritional and cultural resources
- Key components of Arctic marine ecosystems
- Climate, sea ice, and ocean changes
- Increasing activities in the Arctic (oil & gas, shipping, tourism)
- Marine Mammal Protection Act
- Endangered Species Act
- Need better reference points for detecting changes

Monitoring and research

- Surveys for estimation of population abundance, trends, and distribution
- Satellite telemetry for studies of movements, habitat use, foraging behavior, and haul-out time lines
- Collaborative studies on population genetic structure, health and condition, and diet
- Comprehensive reviews of conservation status under the Endangered Species Act (with special focus on risks from climate warming and loss of sea ice)

Bearded Seal



Erignathus barbatus

Ringed Seal



Phoca hispida

Spotted Seal

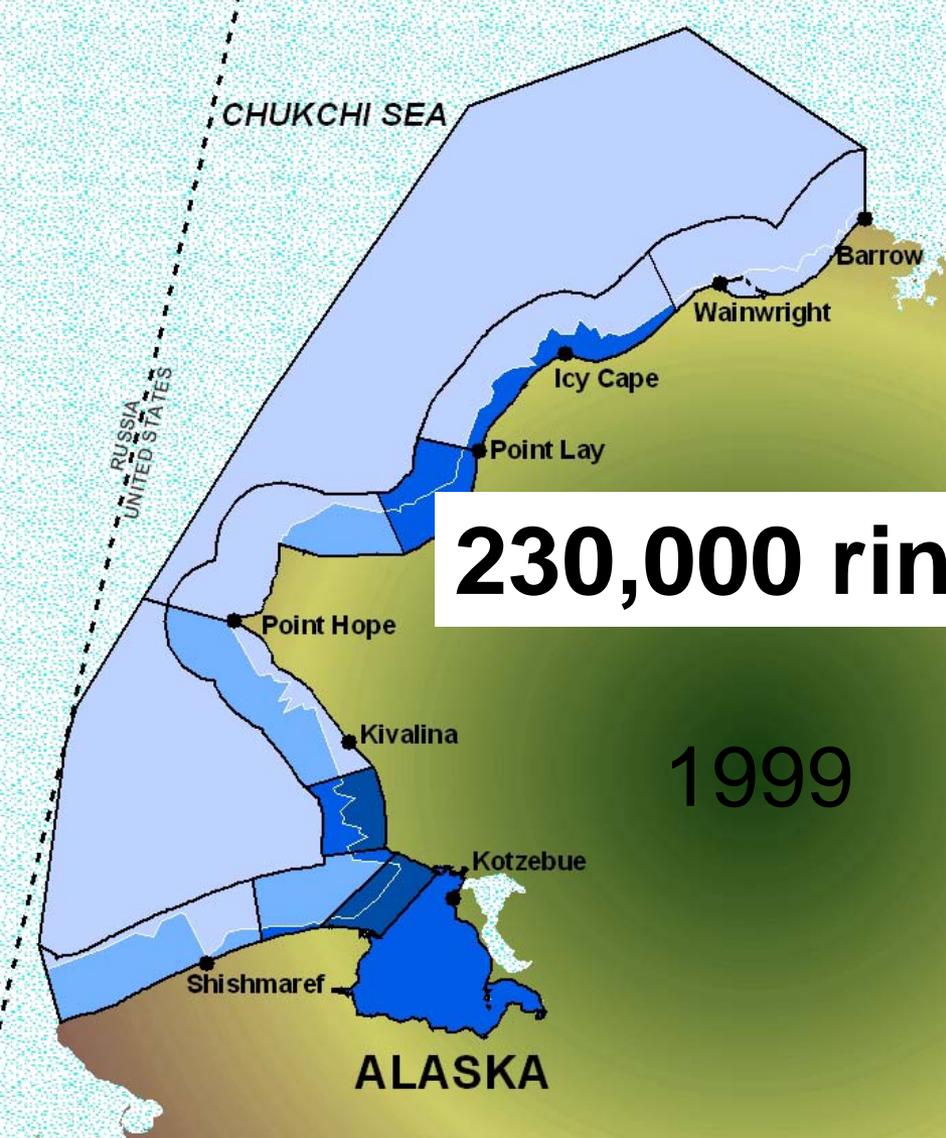


Phoca largha

Ribbon Seal

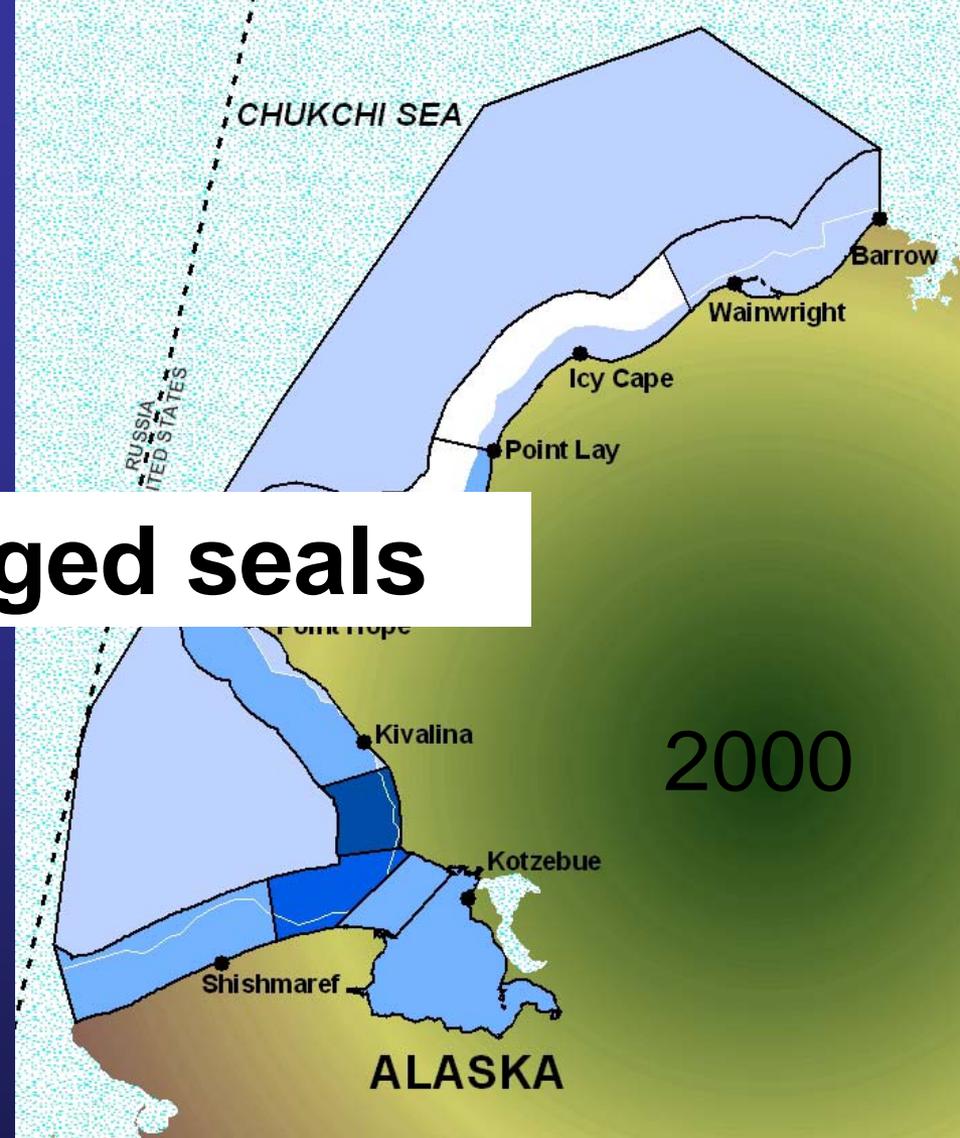


Histiophoca fasciata



230,000 ringed seals

1999



2000

Ringed seals/km²



0



>0 - 2



>2 - 5



>5 - 10



>10 - 20

1999

2000

Bearded seals/km²

0

>0 - 0.05

>0.05 - 0.2

>0.2 - 0.4

>0.4 - 0.7

Combined counts of ice seals
 from helo and ship surveys
 Eastern Bering Sea
 April 14 - May 8, 2007



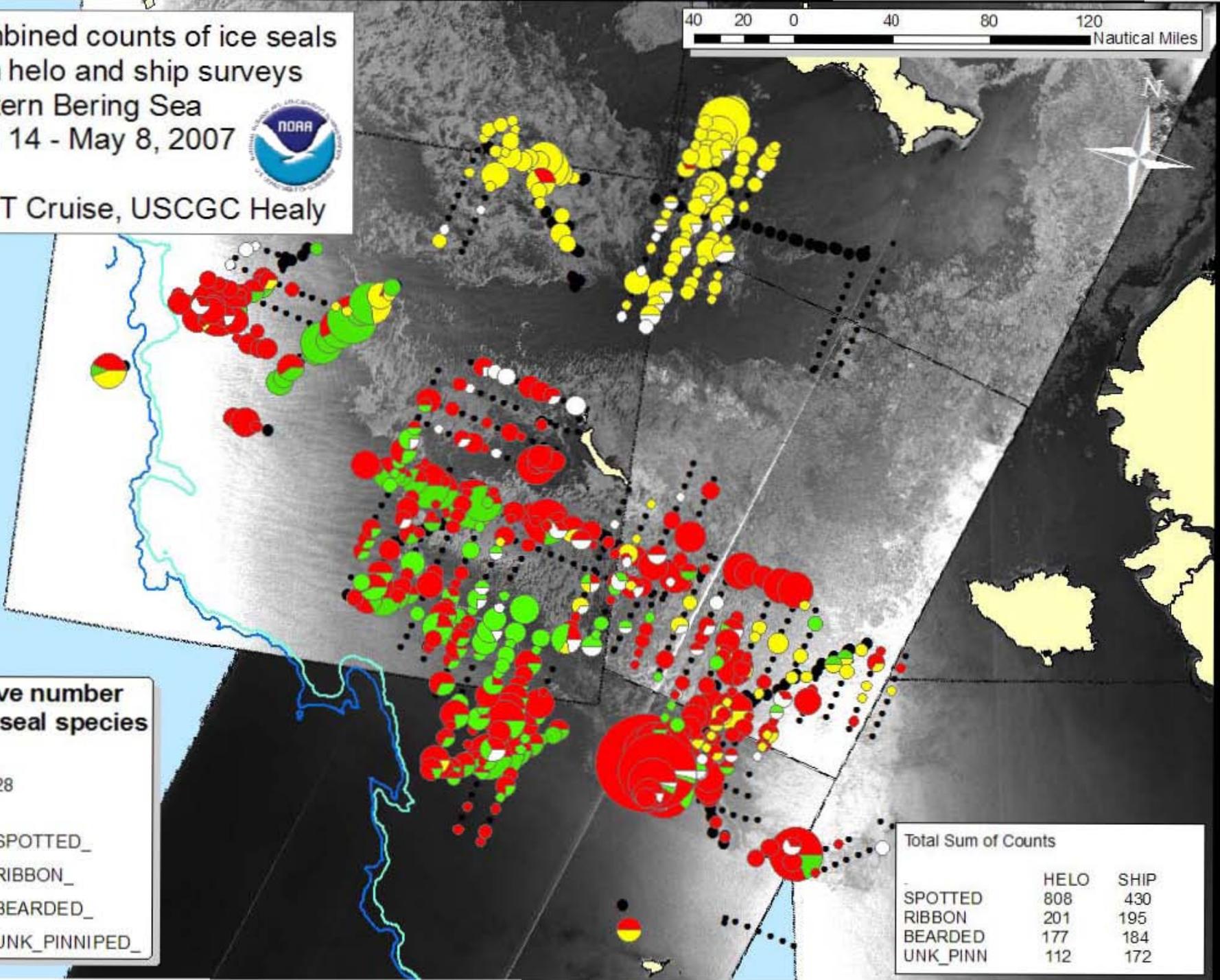
BEST Cruise, USCGC Healy

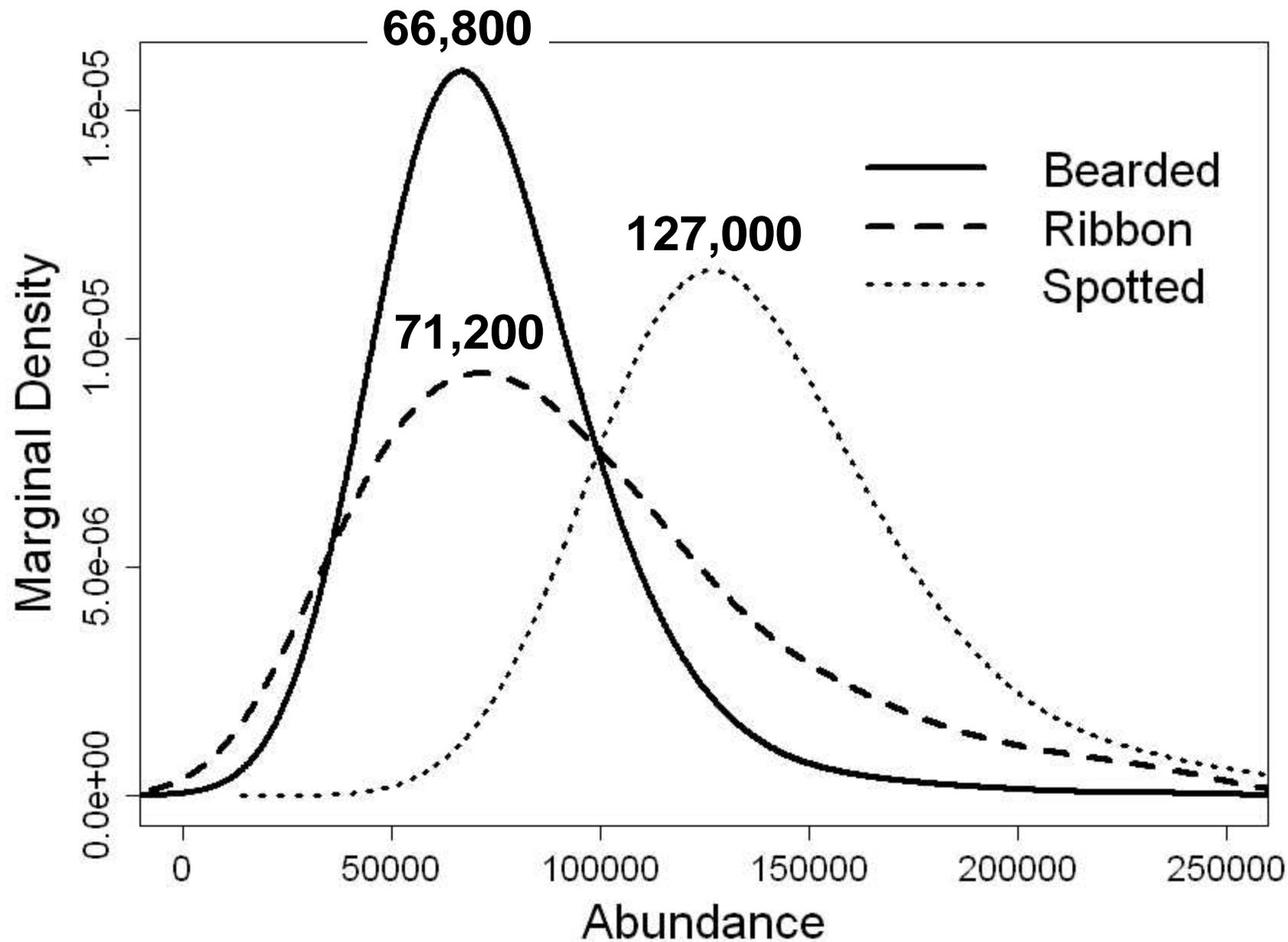


Relative number
 of ice seal species

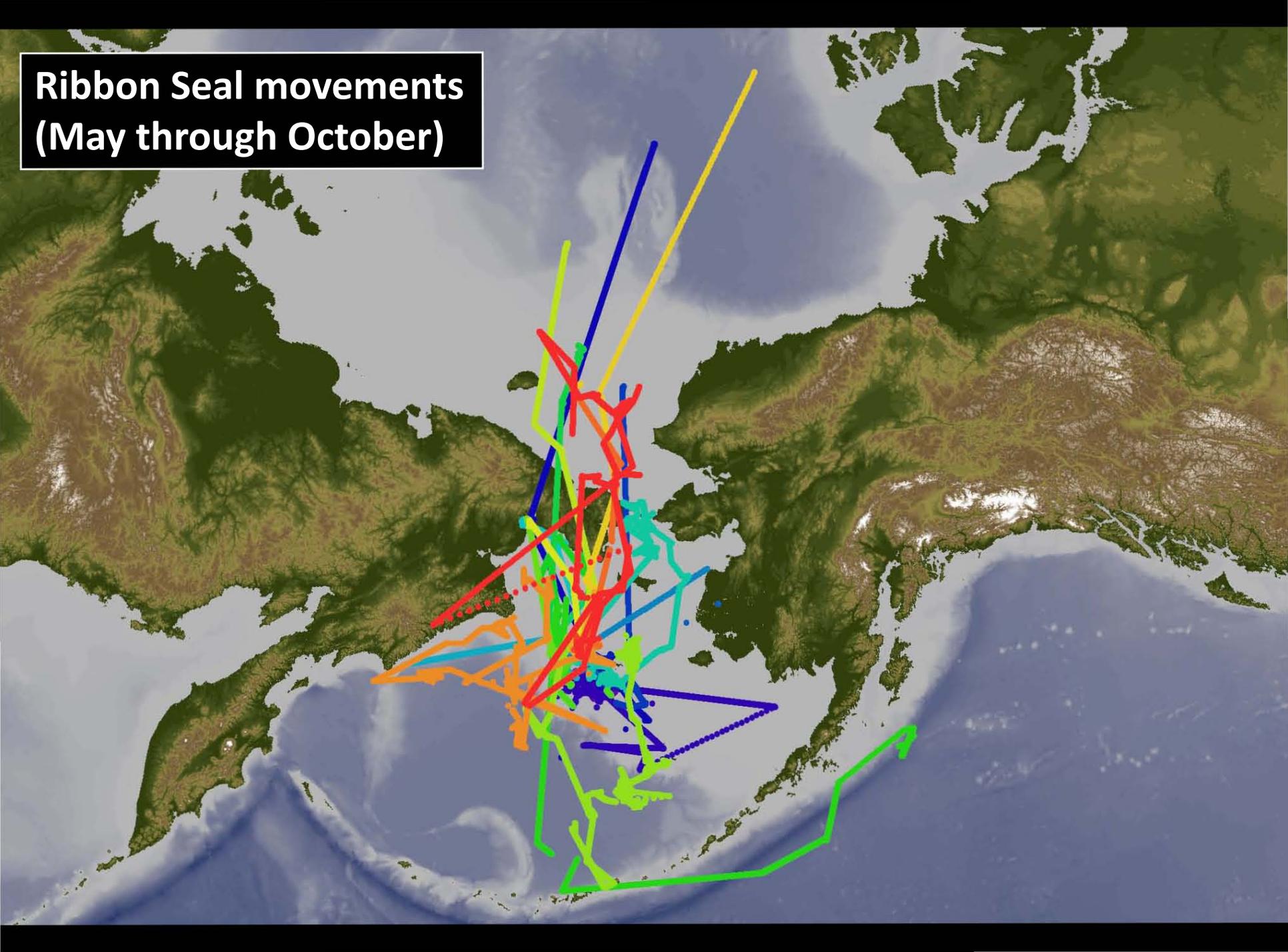


Total Sum of Counts		
	HELO	SHIP
SPOTTED	808	430
RIBBON	201	195
BEARDED	177	184
UNK_PINN	112	172



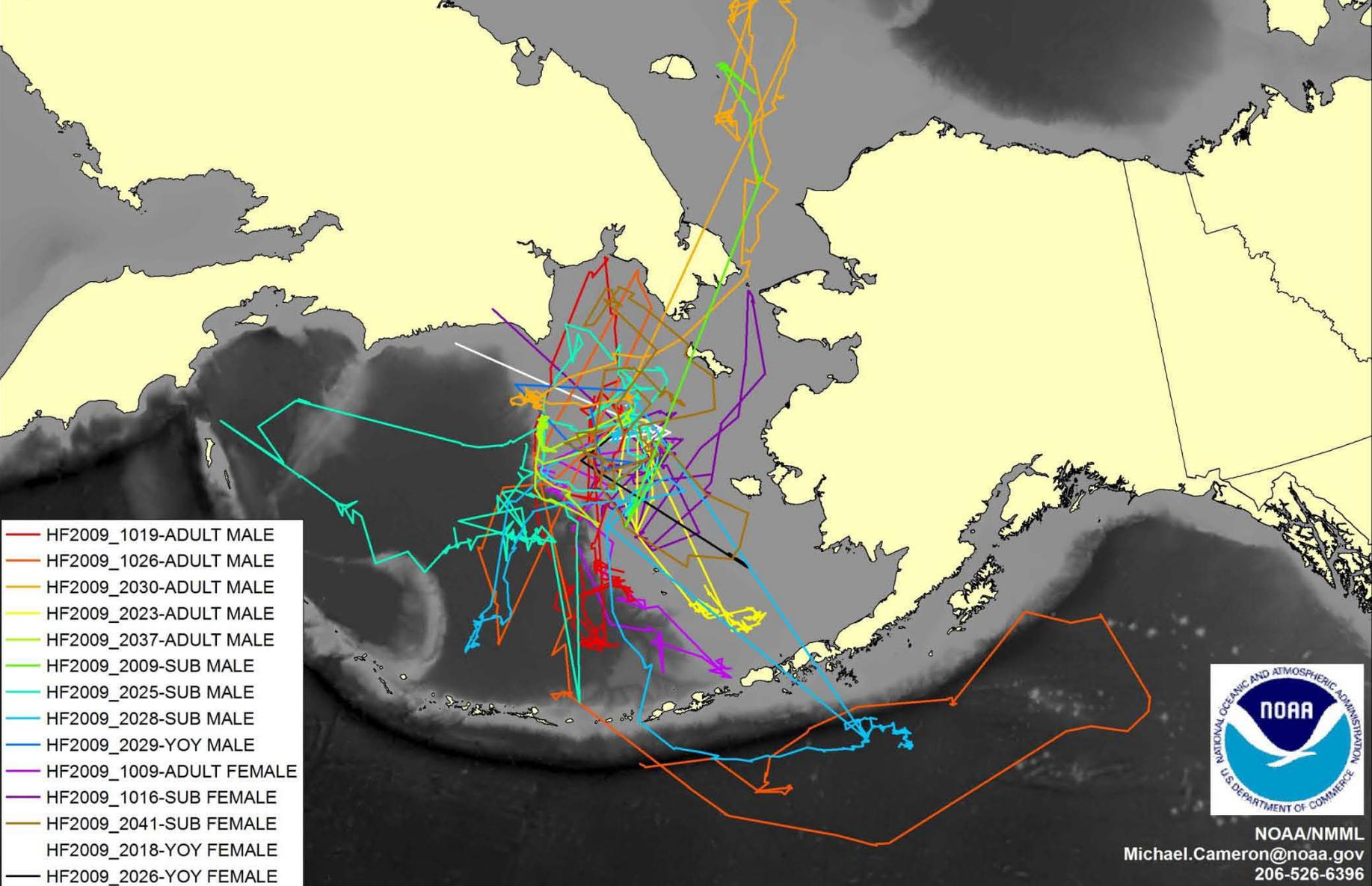


**Ribbon Seal movements
(May through October)**



Movements of tagged ribbon seals mid-May through October, 2009

Only animals with transmissions in
September and/or October are shown



- HF2009_1019-ADULT MALE
- HF2009_1026-ADULT MALE
- HF2009_2030-ADULT MALE
- HF2009_2023-ADULT MALE
- HF2009_2037-ADULT MALE
- HF2009_2009-SUB MALE
- HF2009_2025-SUB MALE
- HF2009_2028-SUB MALE
- HF2009_2029-YOY MALE
- HF2009_1009-ADULT FEMALE
- HF2009_1016-SUB FEMALE
- HF2009_2041-SUB FEMALE
- HF2009_2018-YOY FEMALE
- HF2009_2026-YOY FEMALE



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**Spotted Seal movements
(May through October)**



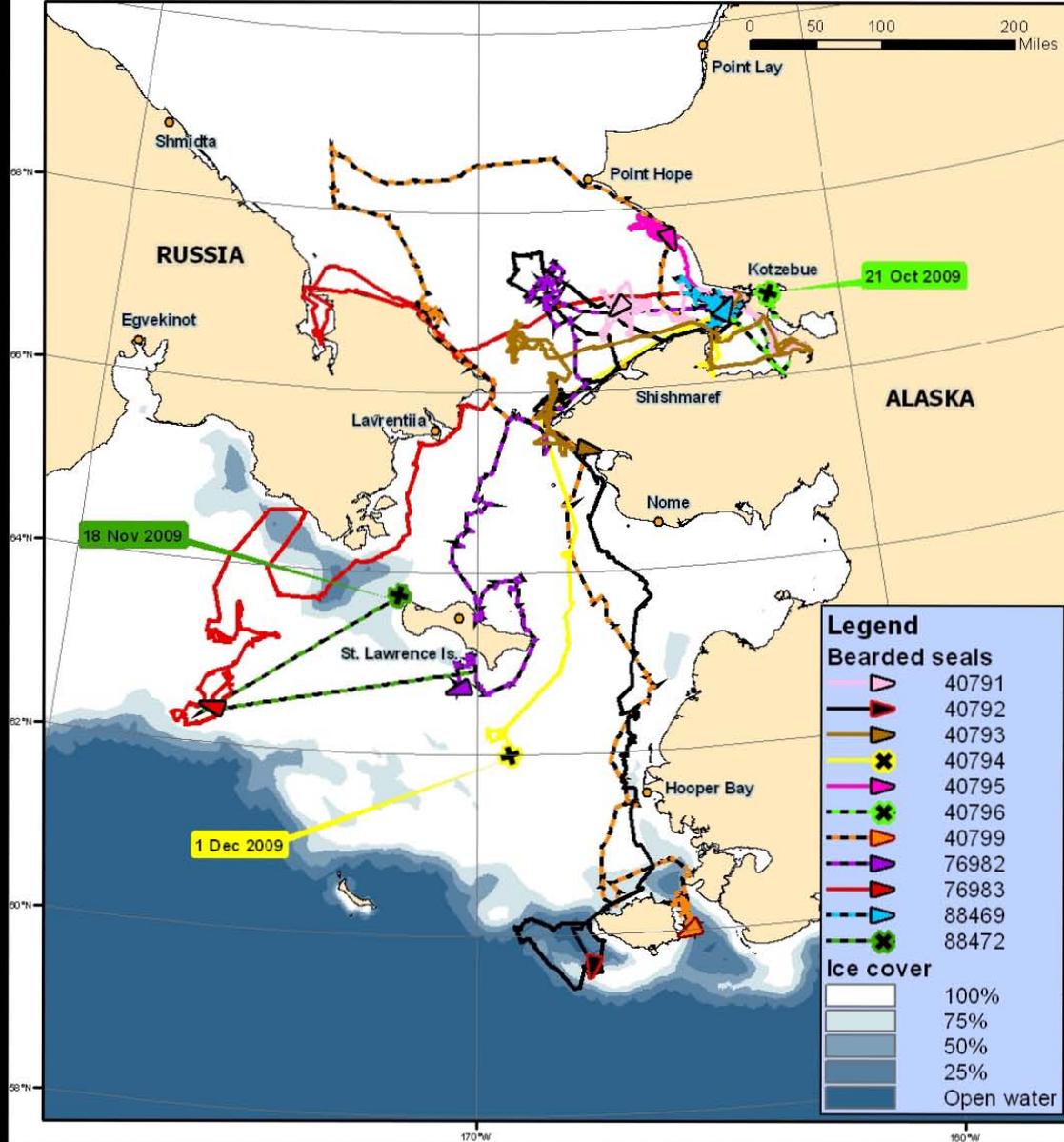
Movements of tagged spotted seals mid-May through October, 2009

Only animals with transmissions in
September and/or October are shown

- PL2009_2032-ADULT MALE
- PL2009_2019-SUB MALE
- PL2009_2020-SUB MALE
- PL2009_1025-SUB MALE
- PL2009_1020-YOY MALE
- PL2009_2003-YOY MALE
- PL2009_2039-YOY MALE
- PL2009_2034-SUB FEMALE
- PL2009_2038-SUB FEMALE
- PL2009_2005-YOY FEMALE
- PL2009_2006-YOY FEMALE
- PL2009_2033-YOY FEMALE



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Movements of 5 male (dashed lines) and 6 female (solid lines) bearded seals between 26 September 2009 and 4 January 2010. Cooperators include the Native Village of Kotzebue and the Alaska Department of Fish and Game with funding from the U.S. Fish and Wildlife Service, Tribal Wildlife Grant. Additional tags were funded by Shell and a grant from the National Fish and Wildlife Federation. The last known location for seals which have not successfully transmitted a signal in more than 3 weeks are labeled with an 'X'. Percent ice coverage as of 30 December 2009 is displayed with data from the National Snow and Ice Data Center.

What about older seals? What about the summer period?

- Adults are the largest age class, and the breeders
- The summer period is critical for feeding; ice recedes to deep waters
- Need to build upon the previous studies by developing the capability to track adult and sub-adult bearded seals
- Funding acquired from MMS
- Pilot project in Kotzebue to develop new methods for catching and handling large bearded seals.

Seasonal movements, habitat selection, foraging, and haul-out behavior of adult bearded seals in the Chukchi Sea



Community and agency collaboration to document habitat requirements of a vital subsistence resource





Virgil

John J

Mike

Henry

Noah

Peter

Shawn J

John G

Jeff

Not pictured: Pearl, Shawn D. and Dave

Results

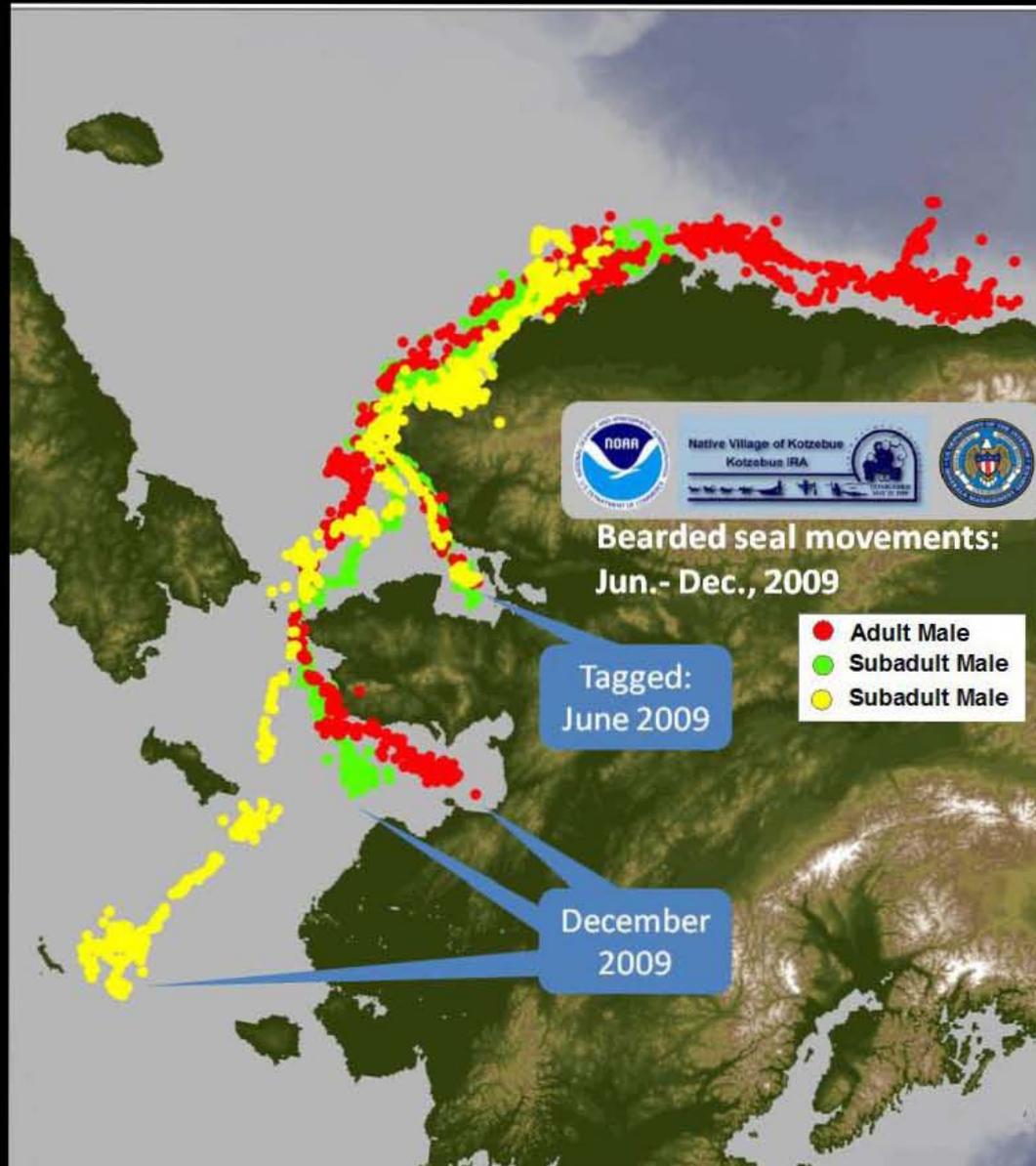
2009-06-15



NOAA
Native Village of Kotzebue
Kotzebue IRA

Bearded seal movements:
Jun.- Dec., 2009

- Adult Male
- Subadult Male
- Subadult Male



**Bearded seal movements:
Jun.- Dec., 2009**

- Adult Male
- Subadult Male
- Subadult Male

Tagged:
June 2009

December
2009

Closing thoughts:

- Seals are strongly seasonal in distribution and movements; numbers and densities from one area may not be applicable to another
- Seals are relatively inconspicuous in the water; challenging to estimate takes
- Importance of Bering Strait
- Statewide research plan; need to incorporate info from other studies (acoustics, whale surveys, industry monitoring)