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Marine Mammal Laboratory Polar Ecosystems Program Seal research in Alaska



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Introduction



Dr. Michael Cameron: Leader of the Polar Ecosystems Program at NOAA's Marine Mammal Laboratory, in Seattle WA.

- 28 years of experience monitoring and researching seals in Antarctica and Alaska
- 20+ years working in co-management
- Born in Portland, OR

Colleen: Born in Texas

- moved to Seattle in 2002

Colin: 12 years old

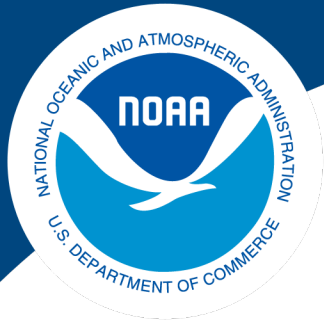
- Given Inupiaq name: "Anugi" by John Goodwin (Kotzebue, AK)

Cate: 9 years old

- Given Inupiaq name "Silakutaq" by Billy Adams (Utqiagvik, AK)



Phocid “true” seals



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Polar
Ecosystems
Program



**Ringed
Seal**



**Bearded
Seal**



**Ribbon
Seal**



**Spotted
Seal**



**Harbor
Seal**

Ice-associated seals

Program leader
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Context for AFSC ice seal monitoring and research

- Indications that seals are responding to changes in the Bering Sea (decline in body condition); more important than ever to be monitoring
- Many important things to monitor can only be measured in the spring, when local residents hunt marine mammals
 - We believe this can be done without impacting hunting success
- NOAA has a mandate under the MMPA and ESA to manage and conserve marine mammals as part of their ecosystems

MMPA establishes avenues for NOAA to co-manage these species directly with Indigenous People and Tribal Nations

The AFSC's Polar Ecosystems Program

- Monitors and studies bearded, ringed, spotted, ribbon, and harbor seals in Alaska to support management and co-management.
- Conducts aerial surveys, vessel-based and village-based tracking and sampling studies.
 - More than 30 vessel-and village-based tracking and sampling projects since 2000.
 - Aerial surveys since the early 1990s
- Develops new methods for surveying and determining population numbers and trends.

Sample and tag seals on the sea ice in the Bering Sea in Spring.



- **What:**
 - Science operations at the southern edge of the Bering Sea pack ice
- **When:**
 - 2005-2010: in May and June
 - 2014, 2016, 2018, ~~2020~~, 2022: In April
 - Expected again in April 2024
- **How**
 - NOAA Ship Oscar Dyson
 - 2-4 small inflatable boats
 - Quietly move through the pack ice
 - captures using handheld nets
 - mostly ribbon and spotted seals

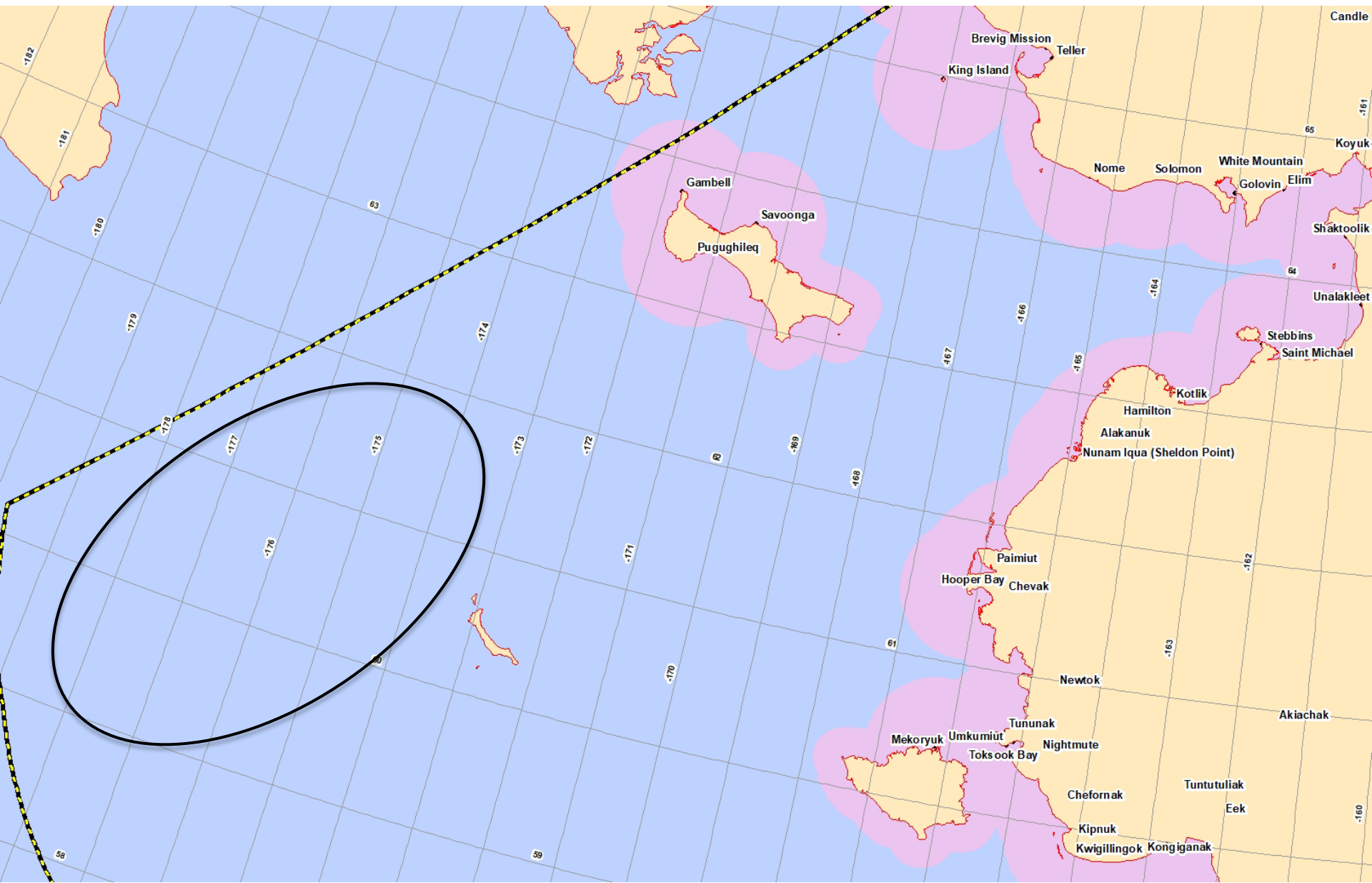




- **What and Why:**
 - Instrument seals with satellite-linked tags
 - Seasonal movements
 - Foraging behavior
 - Timing of hauling out

} Habitat use

– Survey corrections
 - Collect measurements and tissue samples
 - Assess seal health and condition – Unusual Mortality Events (UME)
 - Determine genetic distinctiveness – Stock structure
 - Uncrewed Aerial Systems (UAS)
 - Investigate impacts of changing ecosystems – Body condition



Partnership with the ISC and Bering Sea communities

- At the ISC co-management meeting in **2018**, members proposed including an Alaska Native seal hunter on future expeditions aboard the Oscar Dyson.
- In **2019**, the ISC agreed that NOAA should work with Kawerak, Inc. to identify the first participant.
- The **2020** expedition was cancelled due to COVID, but in **2022**, Kawerak selected Austin Ahmasuk to partner on the expedition



Austin Ahmasuk To Everyone

Great information to help the nation understand natural and human induced impacts to ice seals

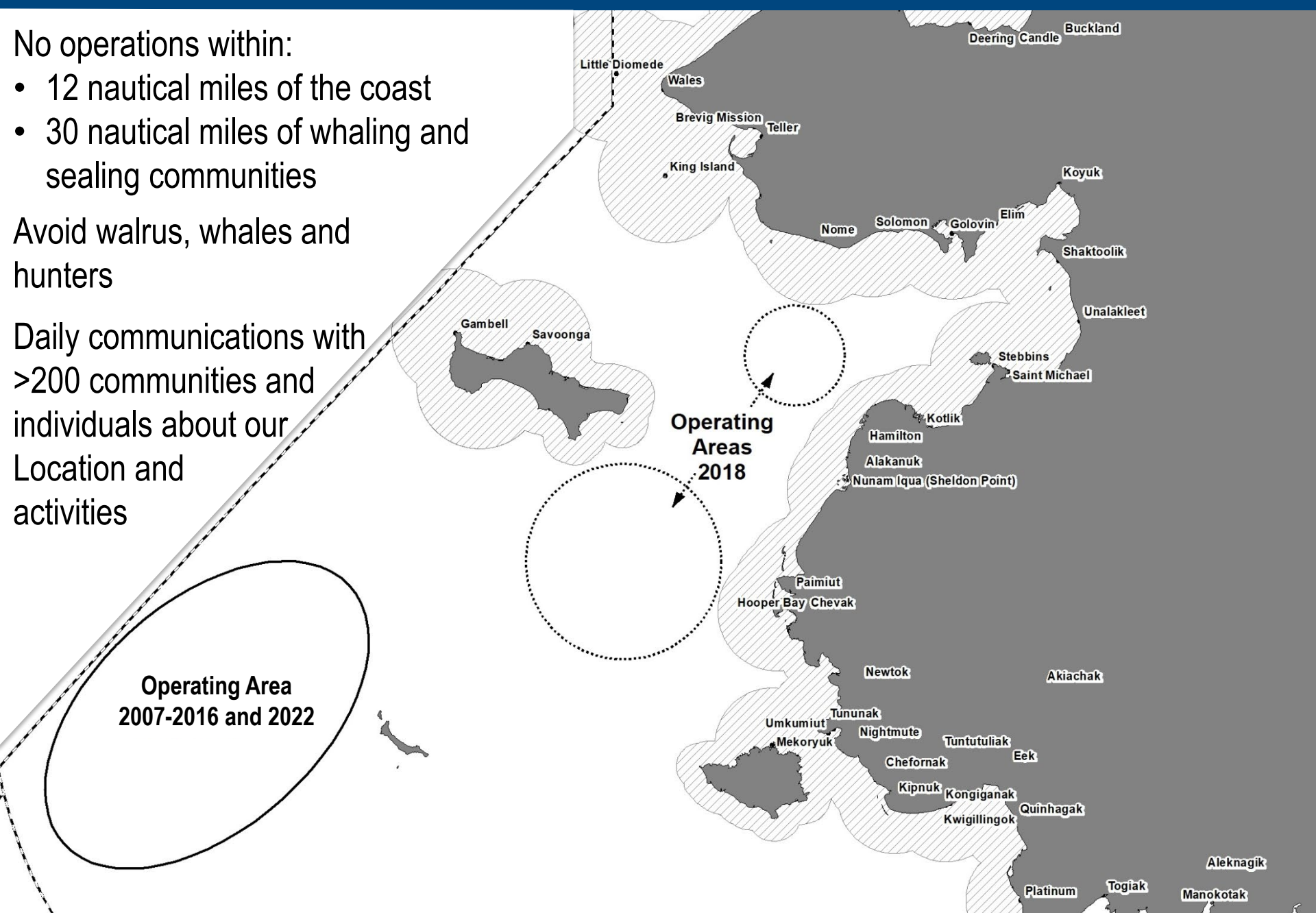
**We will
continue
partnering in
2024**

No operations within:

- 12 nautical miles of the coast
- 30 nautical miles of whaling and sealing communities

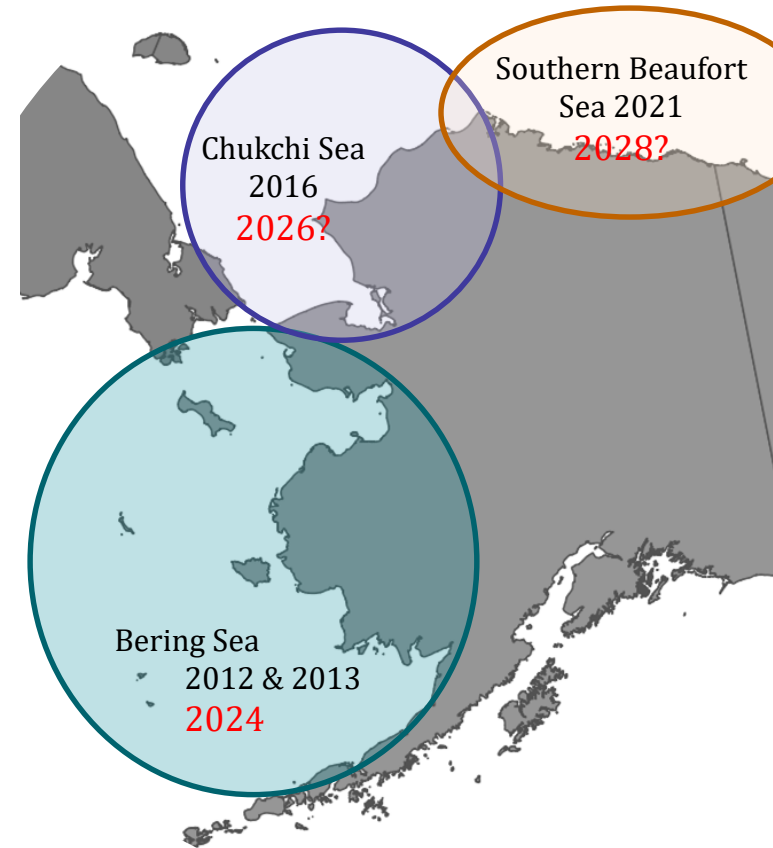
Avoid walrus, whales and hunters

Daily communications with >200 communities and individuals about our Location and activities



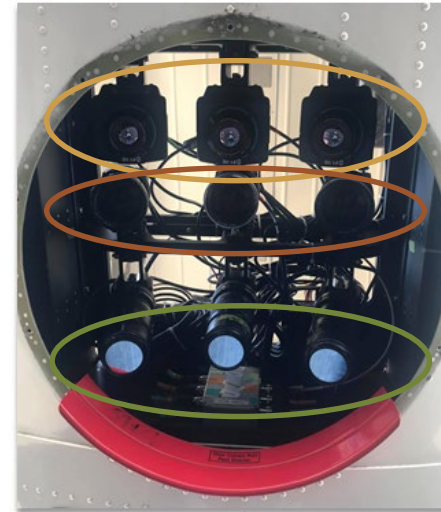
Ice Seal Aerial Surveys

- **Goal:** Determine the abundance and distribution of seals and polar bears
- International effort to survey the sea ice habitat of the Bering, Chukchi, and Beaufort seas
- Survey in the spring when seals are using the ice to pup and molt
- Instrument-based surveys allow us to fly at higher altitudes than traditional surveys
- Discuss plans with the Ice Seal Committee, coastal communities, whaling captains, AEWC, EWC, ABWC, RACs, BBMMC, AK Nannut Co-management Council, Yukon and Northwest Territories, and Inuvialuit-Inupiat Polar Bear Commission



Joint Beaufort Sea Surveys 2021

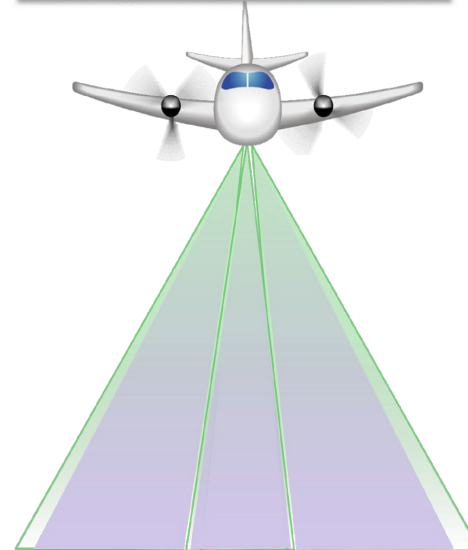
Aircraft: NOAA Twin Otter
Altitude: 1000-1200 feet
Survey speed: ~120 kts



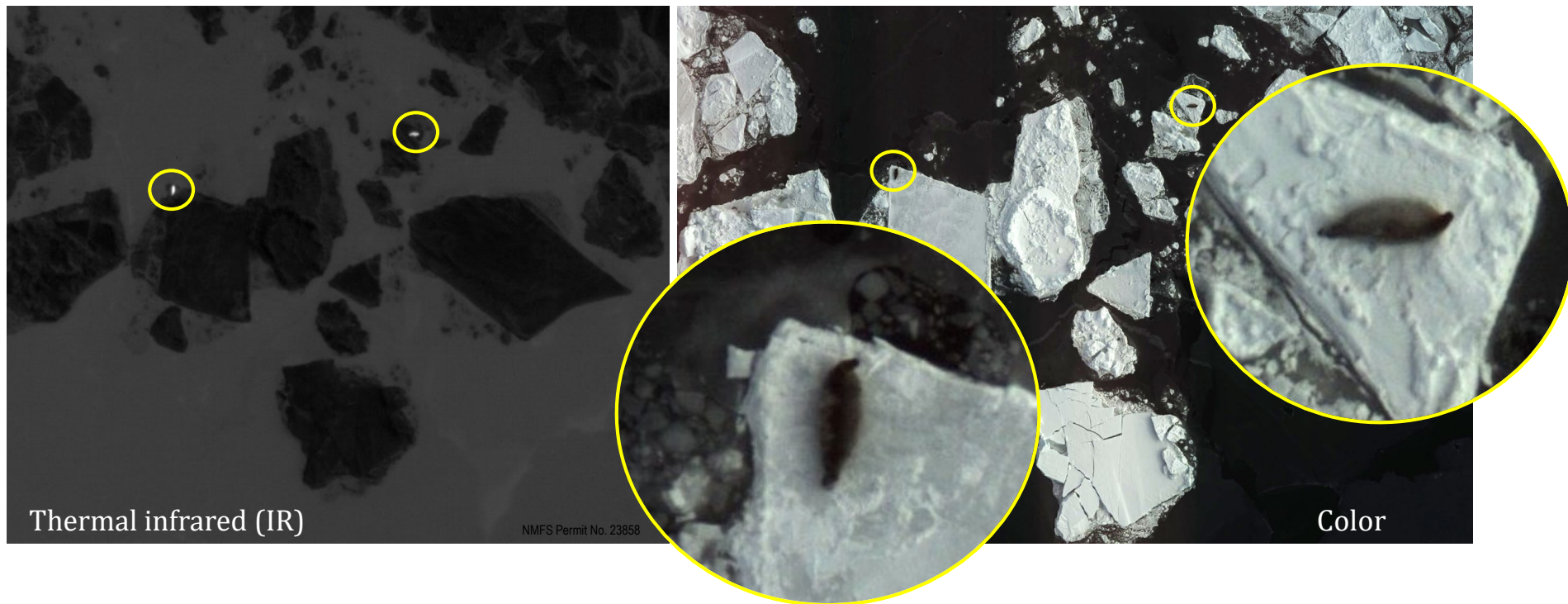
Thermal (IR) cameras

Color cameras

Ultraviolet (UV) cameras



Joint Beaufort Sea Surveys - Example images



Ice Seal Abundance and Distribution in the Chukchi Sea (2016)



Sea Ice coverage

Abundance Estimate
(95% confidence)

147,420
(114,155-190,379)

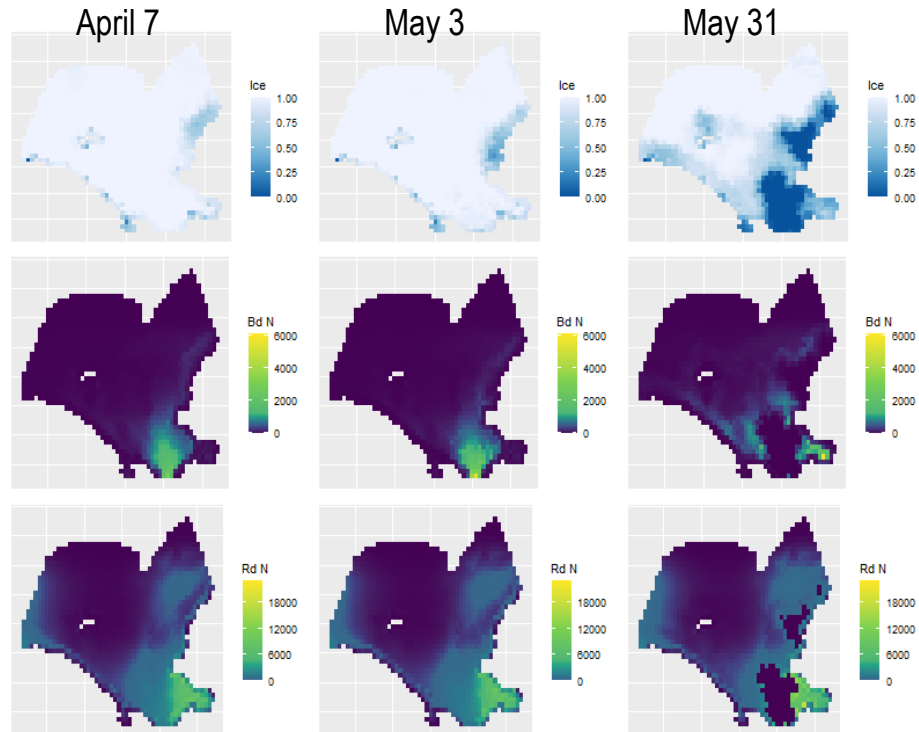


Bearded Seal

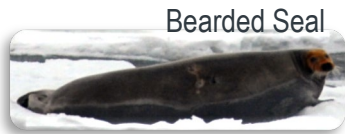


Ringed Seal

592,528
(478,413-733,863)



Ice Seal Abundance and Distribution in the eastern Bering Sea (2013)



Bearded Seal

Abundance Estimate
(95% confidence)
251,451
(208,183-305,178)



Ribbon Seal

25,215
(16,336-38,921)



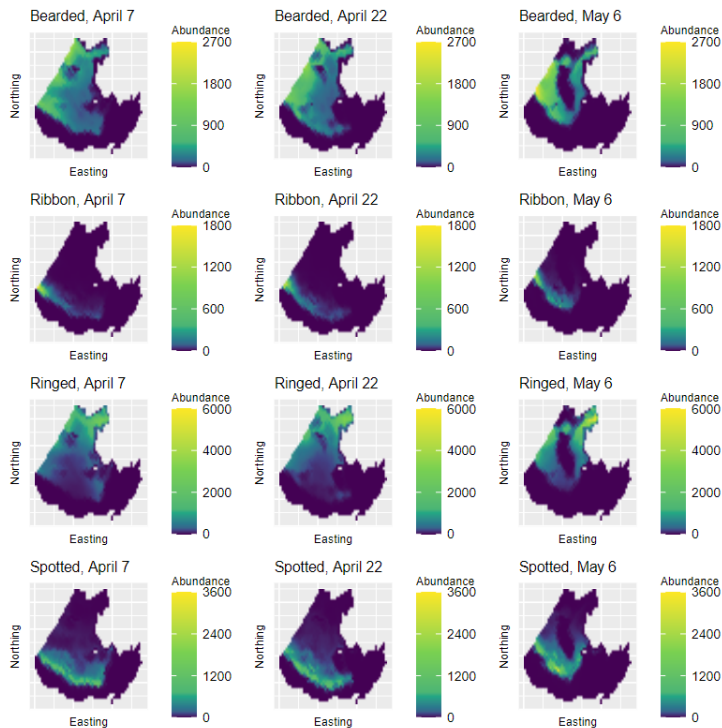
Ringed Seal

356,656
(314,073-405,013)

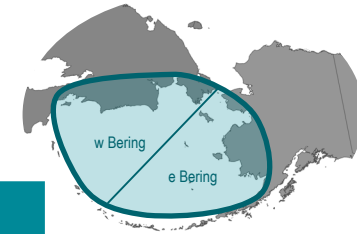


Spotted Seal

133,685
(113,638-157,268)



Bering Sea Abundance Estimates



	2012 w Bering ¹	2013 w Bering ¹	2012 e Bering ²	2013 e Bering ²
Bearded	185,330 (120,375-285,335)	144,105 (104,967-197,834)	270,842 (226,083-324,462)	251,451 (208,183-305,178)
Ringed	272,609 (173,428-428,488)	203,130 (143,308-287,922)	489,720 (423,645-566,101)	356,656 (314,073-405,013)
Spotted	226,003 (151,092-338,052)	90,501 (62,681-130,670)	289,962 (233,280-360,417)	133,685 (113,638-157,268)
Ribbon	68,564 (34,607-135,837)	39,435 (21,003-74,043)	69,602 (39,359-123,082)	25,215 (16,336-38,921)

¹ Conn, P.B., I.S. Trukhanova, P.L. Boveng, A.N. Vasiliev, V.I. Chernook. 2022. Abundance and distribution of ice-associated seals in the western Bering Sea and Sea of Okhotsk, 2012-2013. Polar Biology. In review

² Boveng, P.L., P.B. Conn, E.E. Moreland, J.M. Ver Hoef, B.T. McClintock, J.M. London, M.F. Cameron. Abundance of ice associated seals in the eastern Bering Sea in spring of 2012 and 2013. Unpublished draft

- “w Bering” estimates are from counts in Russian waters, “e Bering” estimates are from counts in U.S. waters
- Estimates are adjusted for availability (portion of animals on the ice rather than in the water) and detection (animals detected by survey approach)

Ideas for 2024



Faster airplane = longer range and less time.

Previous Bering Sea surveys required 2 aircraft,

- 5-7 weeks
- >200 flight hrs

King Air would require 1 aircraft,

- 3 weeks
- ~ 75 flight hrs

total line length = 27,591 km (14,898 Nmi)
total survey time = 94 hrs

track_id	length_nmi	time_hrs
1	907	6
3	629	4
4	903	6
5	908	6
6	799	5
7	898	6
8	895	6
9	895	6
13	846	5
14	826	5
10	720	4
2	898	6
12	913	6
11	762	5
15	896	6
16	876	5
22	535	3
23	612	4

