



# Movements and haul-out behavior of bearded seals (*Erignathus barbatus*) during minimum ice extent

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## Introduction

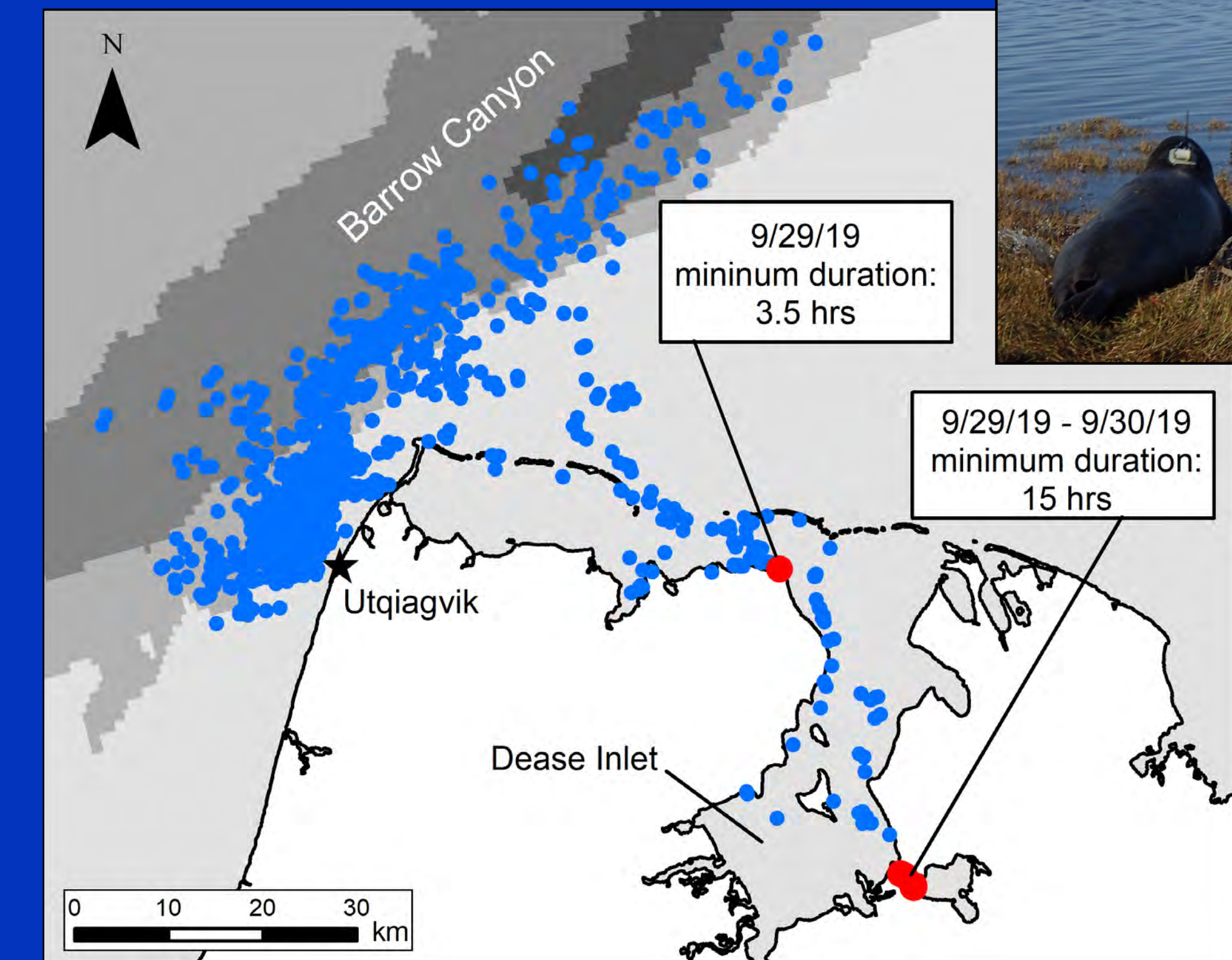
- Bearded seals (*Erignathus barbatus*) are ice-associated seals
- In recent years, sea ice over the Pacific Arctic has been absent from much of the intercontinental shelf from July to October
- Remaining on the shelf to feed means bearded seals must spend this time in open water
- To rest, bearded seals need to follow sea ice as it retreats north of the shelf, or haul out on land
- The duration of the open-water season (minimum ice) is increasing
- Using satellite telemetry, we documented the movements and haul-out behavior of 22 juveniles and one adult bearded seal during the minimum sea ice period (July–October), 2014–2019
- Tags used included SPLASH and SPOT tags (Wildlife Computers) and CTD tags (SMRU)



Biologist Justin Crawford applies a satellite tag to a juvenile bearded seal with the help of Merlin and Evett Henry near Koyuk, Alaska.

## Adult bearded seal (2019)

- Reports of adult bearded seals hauling out on land in the Pacific Arctic are rare (Burns 1981)
- In September 2019, we tagged an 11+ year-old male bearded seal that:
  - was initially observed on land during capture
  - spent >20 consecutive days in open water
  - hauled out on land twice after tagging



Estimated locations and haul-outs (red circles) of an adult bearded seal (upper right photo) from 9 September to 31 October, 2019.

## Conclusion

- Juvenile (n = 22) and adult (n = 1) bearded seals
  - remain in open water for long durations without hauling out
  - will haul out on land during ice-free months, whether this is a recent behavior for adult bearded seals is unknown
- Bearded seals may adjust to reductions in sea ice better than previously thought



Bearded seals in the Canadian Beaufort Sea, August 2014.

### Literature Cited

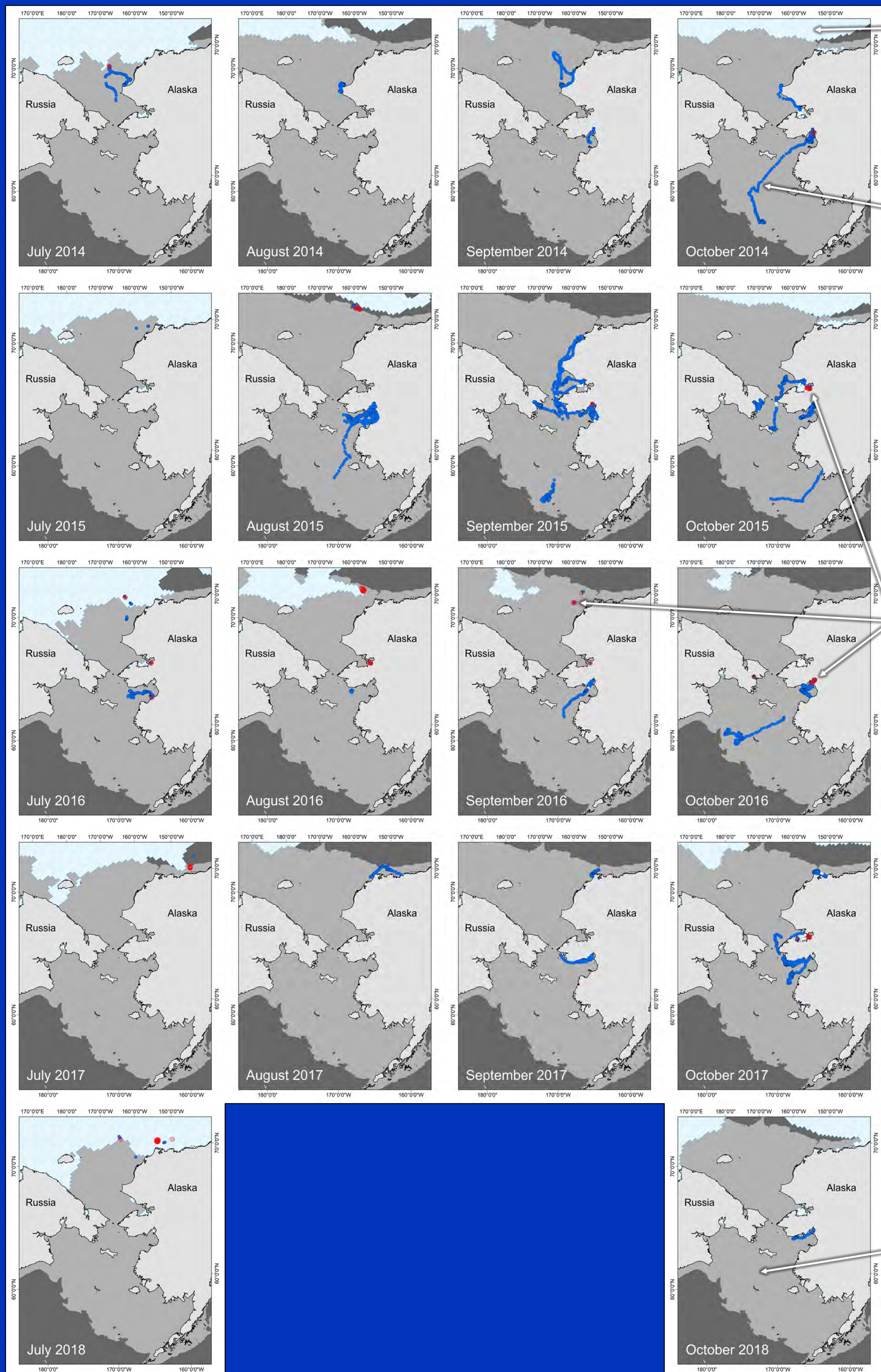
Burns, J.J. 1981. Bearded seal (*Erignathus barbatus*). In: Ridgway S.H. and Harrison, R.J. (eds.) Handbook of Marine Mammals. Vol. II: Seals. Academic Press, New York, pp 145-170.

### Acknowledgements

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## Juvenile bearded seals (2014–2018)

Seals were primarily in open water (<15% ice concentration) rather than in pack ice (>15%)



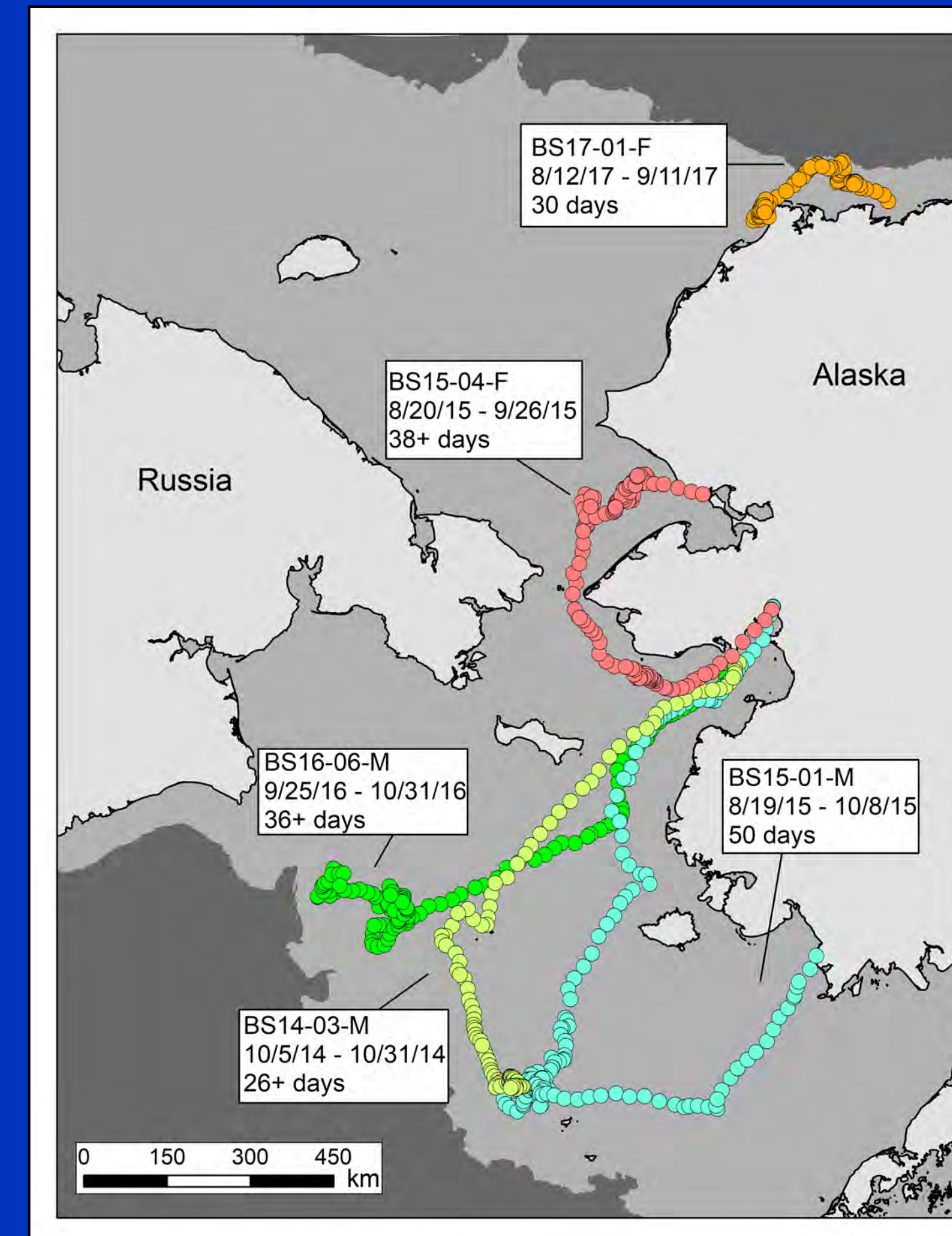
Monthly maximum sea ice extent (NSIDC)

Seal locations (6-hour location estimates)

Haul-out locations

Intercontinental shelf (waters < 200 m deep)

Five seals spent 26–50 days in open water without hauling out



Land-based haul-outs were shorter than haul-outs on sea ice

| Substrate | n            | Mean duration (± S.E.) | Significance                   |
|-----------|--------------|------------------------|--------------------------------|
| Sea ice   | 34 (6 seals) | 10.1 ± 1.4 hrs         | $F_{1, 48.9} = 4.54, p = 0.04$ |
| Land      | 27 (7 seals) | 5.0 ± 1.4 hrs          |                                |

Colors represent individual seals (n = 11)  
\*2 seals hauled out on land and ice

