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# Polar Bear Research in Russia in 2023-2025

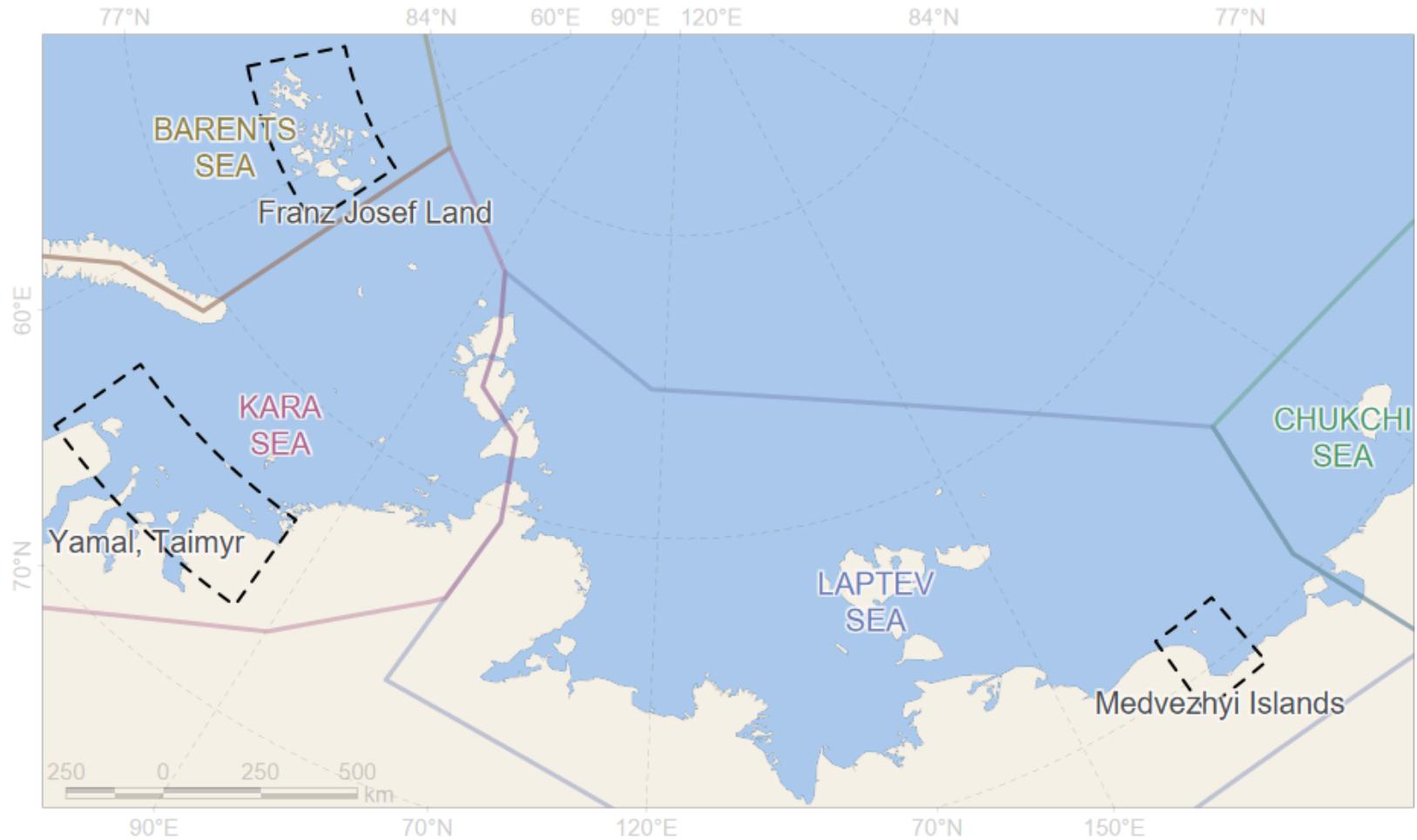
conducted by the Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences



Polar Bear Range States Meeting of the Parties

January 20-23, 2026

## PROGRAM OF POLAR BEAR STUDY IN THE RUSSIAN ARCTIC



In 2023-2025, monitoring of polar bears was carried out on the Franz Josef Land archipelago, the islands in the Kara Sea near the Yamal and Taimyr Peninsulas, as well as in the East Siberian Sea on the Bear Islands (*Medvezhyi Islands*) archipelago.

## MAIN METHODS OF POLAR BEARS RESEARCH

- Study of abundance and distribution of polar bears
  - Field survey and observations
  - Aerial and ship survey and observations
- Satellite telemetry for evaluating the polar bear movement, behaviour and resource use
- Health assessment of polar bears and study of the influence of natural and anthropogenic factors on the animal health
  - Dangerous diseases (serological study)
  - Hematological study
  - Toxicological study
- Polar bear population structure studies by molecular genetic methods



## FIELD WORK RESULTS IN 2023-2025

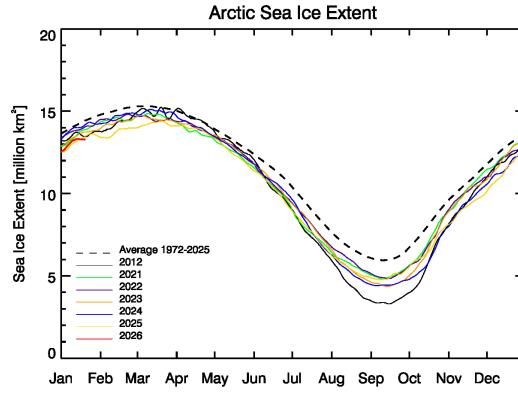
11 expeditions to the Barents, Kara and East Siberian Seas were carried out in spring and summer-autumn seasons;

338 polar bears were recorded during observations;

34 polar bears were captured during this period;

13 females and 6 males were tagged with satellite transmitters;

102 biological samples were taken from immobilized individuals (blood, hair, excrement);



Activity

Results

Field work

Surveys

Captures

Tagging

Satellite telemetry

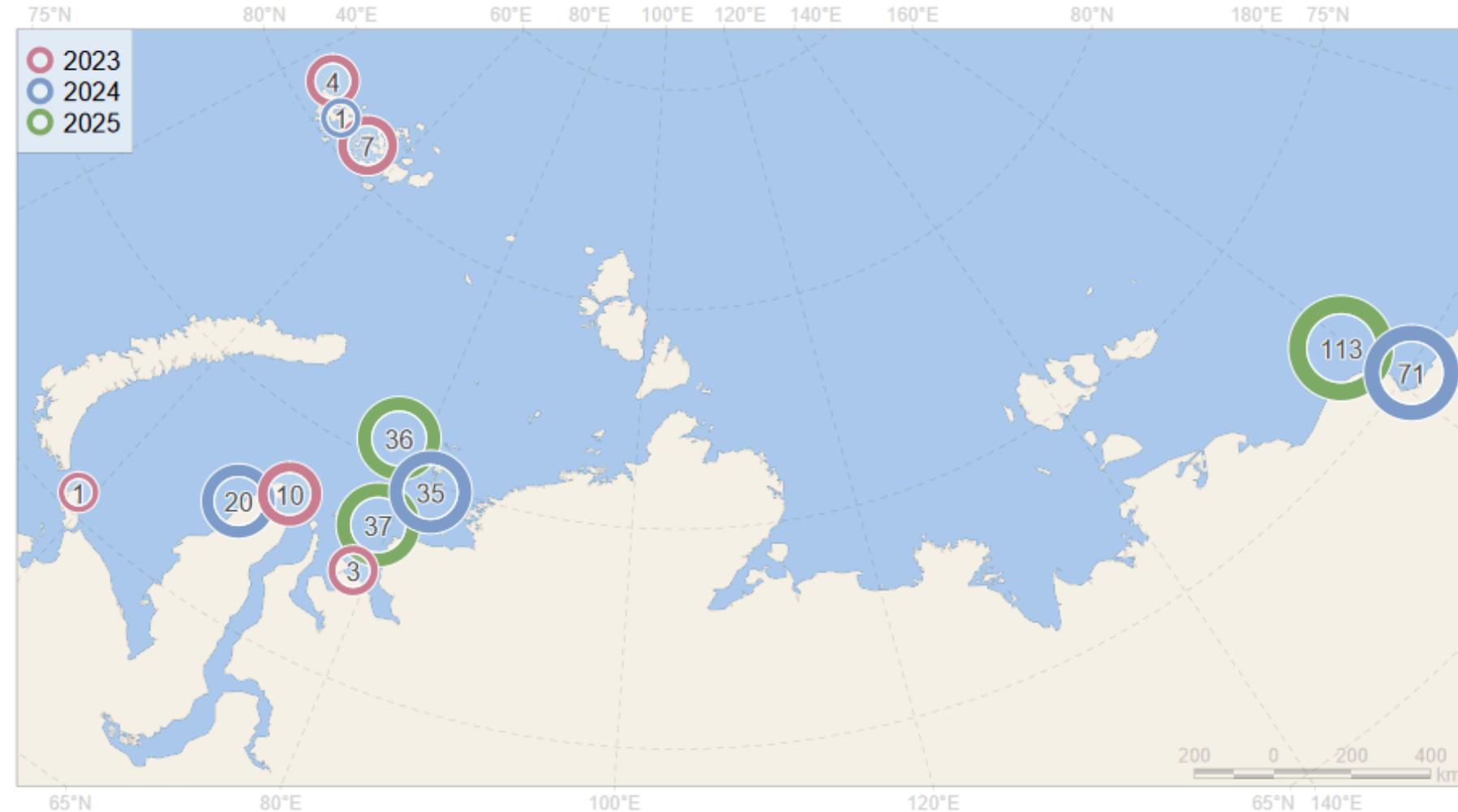
Aerial surveys

Health assessment

Publications



## NUMBER OF POLAR BEARS OBSERVED, 2023-2025



Results for 2023 include observations from ship during a cruise in the Barents and Kara Seas in July.

Activity

Results

Field work

Surveys

Captures

Tagging

Satellite telemetry

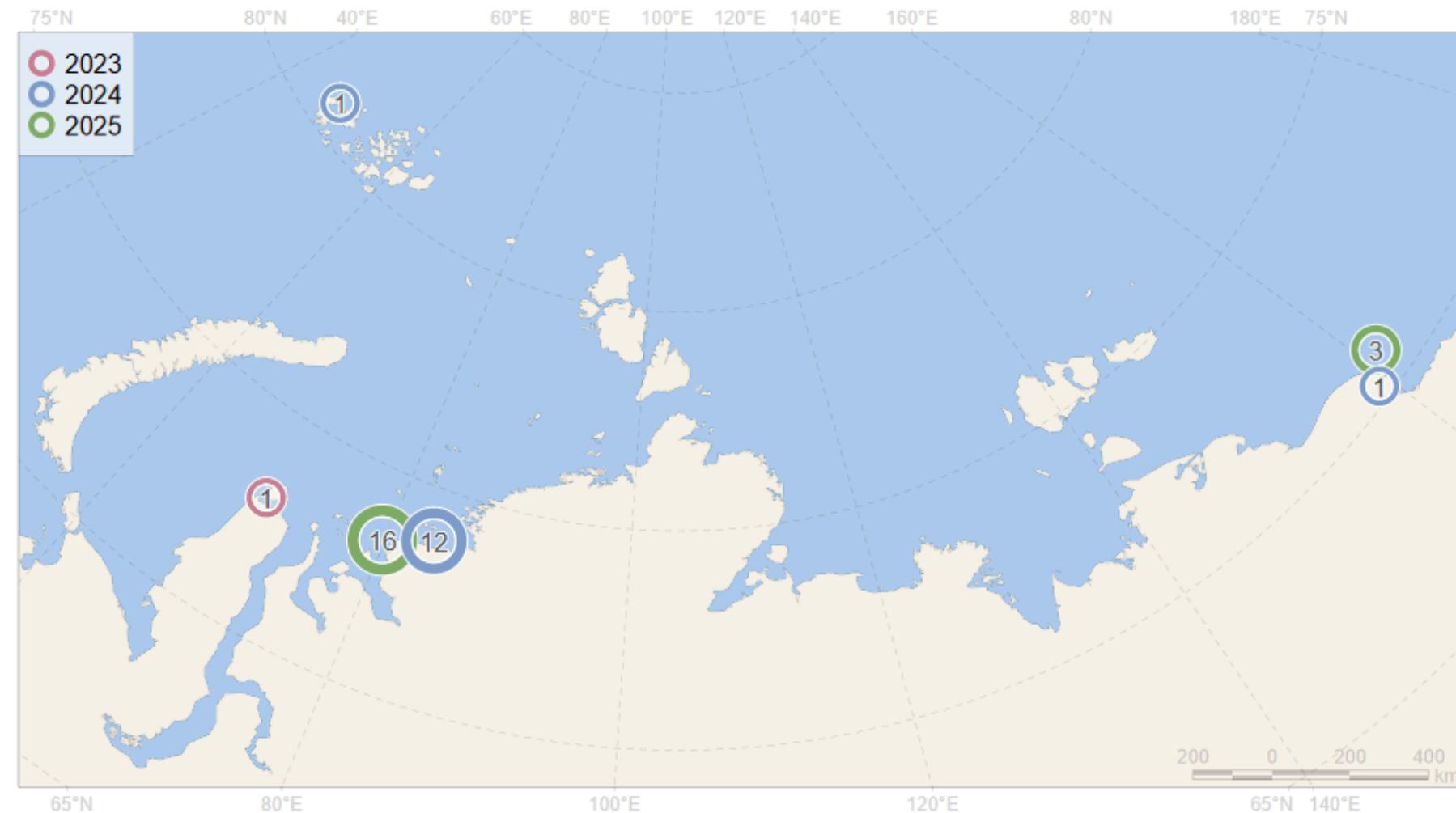
Aerial surveys

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## NUMBER OF POLAR BEARS CAPTURED, 2023-2025



Immobilization was carried out mainly from a helicopter and, in some cases, from the ground using vehicles.

Activity

Results

Field work

Surveys

Captures

Tagging

Kara Sea

East Siberian Sea

Satellite telemetry

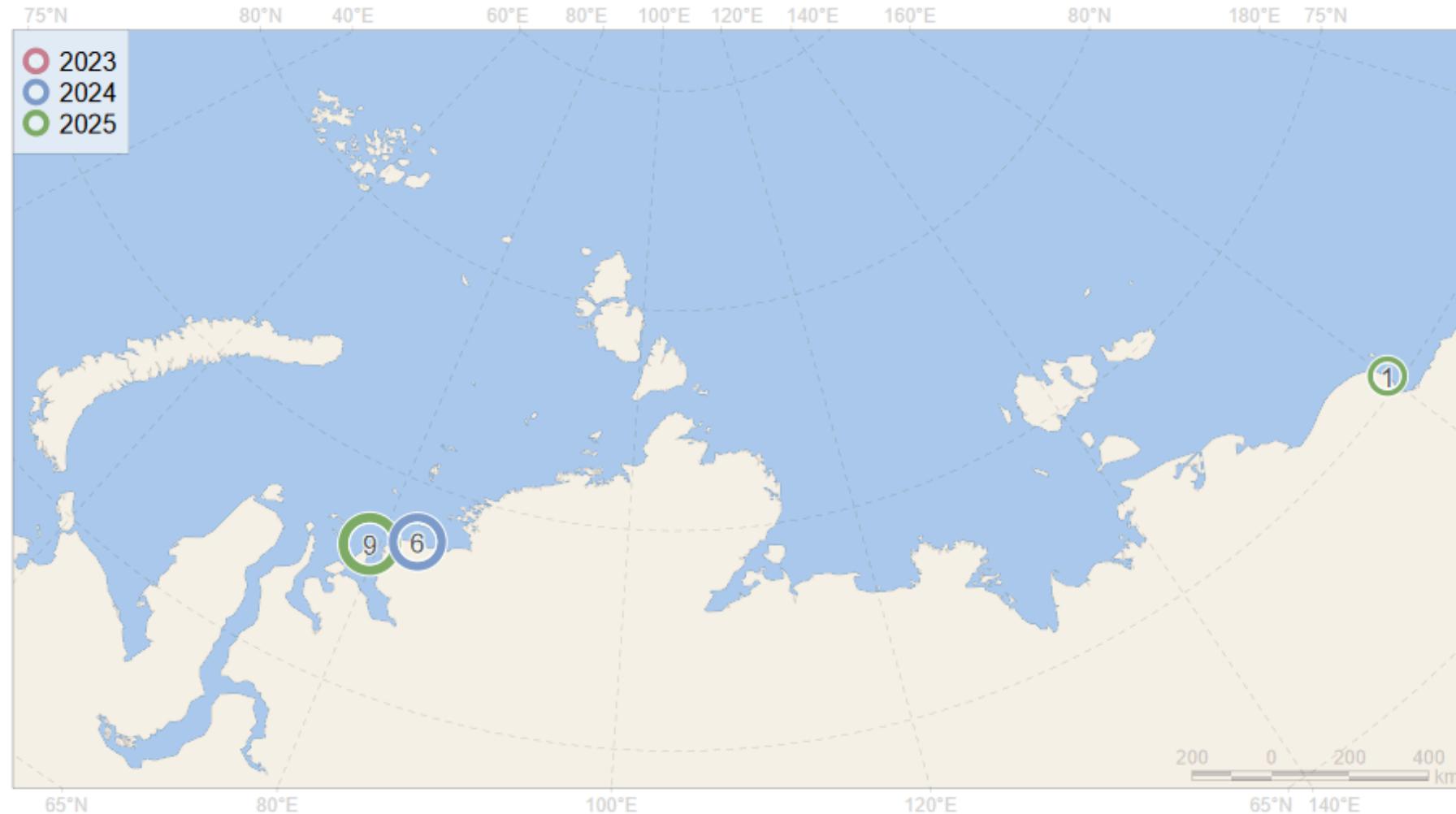
Aerial surveys

Health assessment

Publications



## NUMBER OF POLAR BEARS TAGGED, 2023-2025



Satellite-linked radio and GPS collars for females and ear-mounted satellite tags for males produced by the Russian company "Es Pas" are used.

Activity

Results

Field work

Surveys

Captures

Tagging

Kara Sea ...

East Siberian Sea

Satellite telemetry

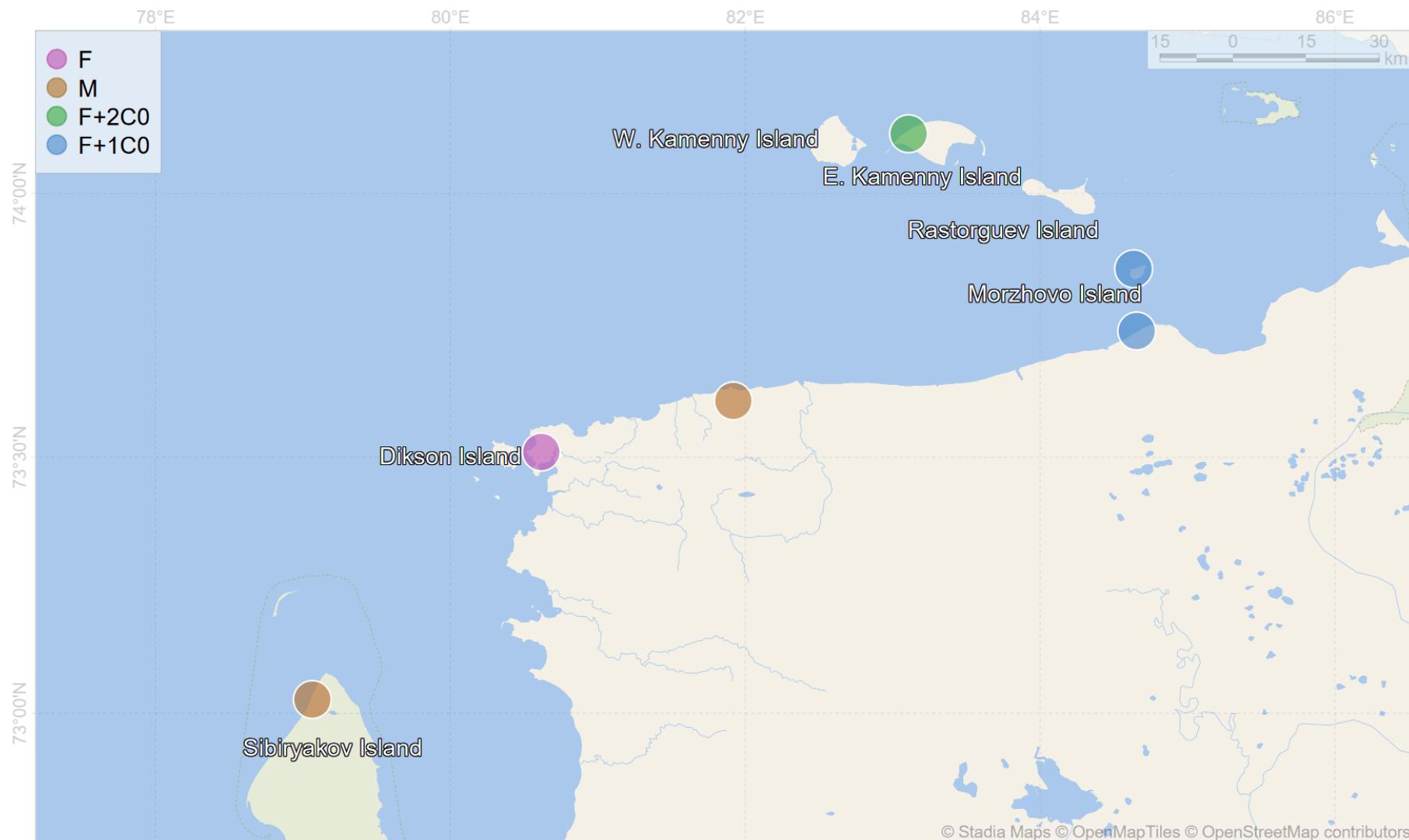
Aerial surveys

Health assessment

Publications



# SATELLITE TAGGING OF POLAR BEARS IN THE KARA SEA, 2024-2025



August-September, 2024. 6 polar bears (4 females and 2 males) were tagged on land during the ice-free period

Activity

Results

Field work

Surveys

Captures

Tagging

Kara Sea

East Siberian Sea

Satellite telemetry

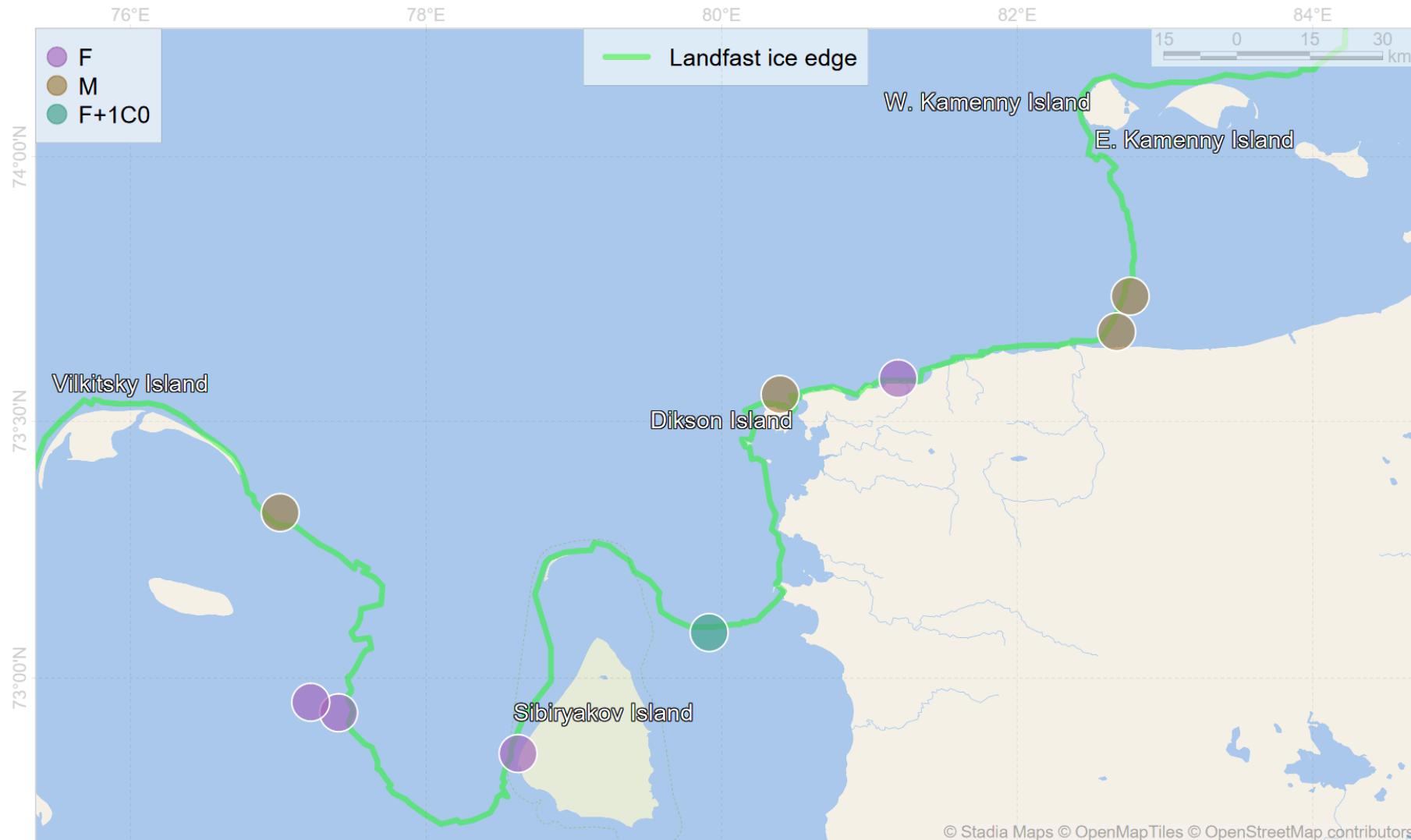
Aerial surveys

Health assessment

Publications



# SATELLITE TAGGING OF POLAR BEARS IN THE KARA SEA, 2024-2025



April-May, 2025. 9 polar bears (5 females and 4 males) were tagged on fast ice

Activity

Results

Field work

Surveys

Captures

Tagging

Kara Sea ...

East Siberian Sea

Satellite telemetry

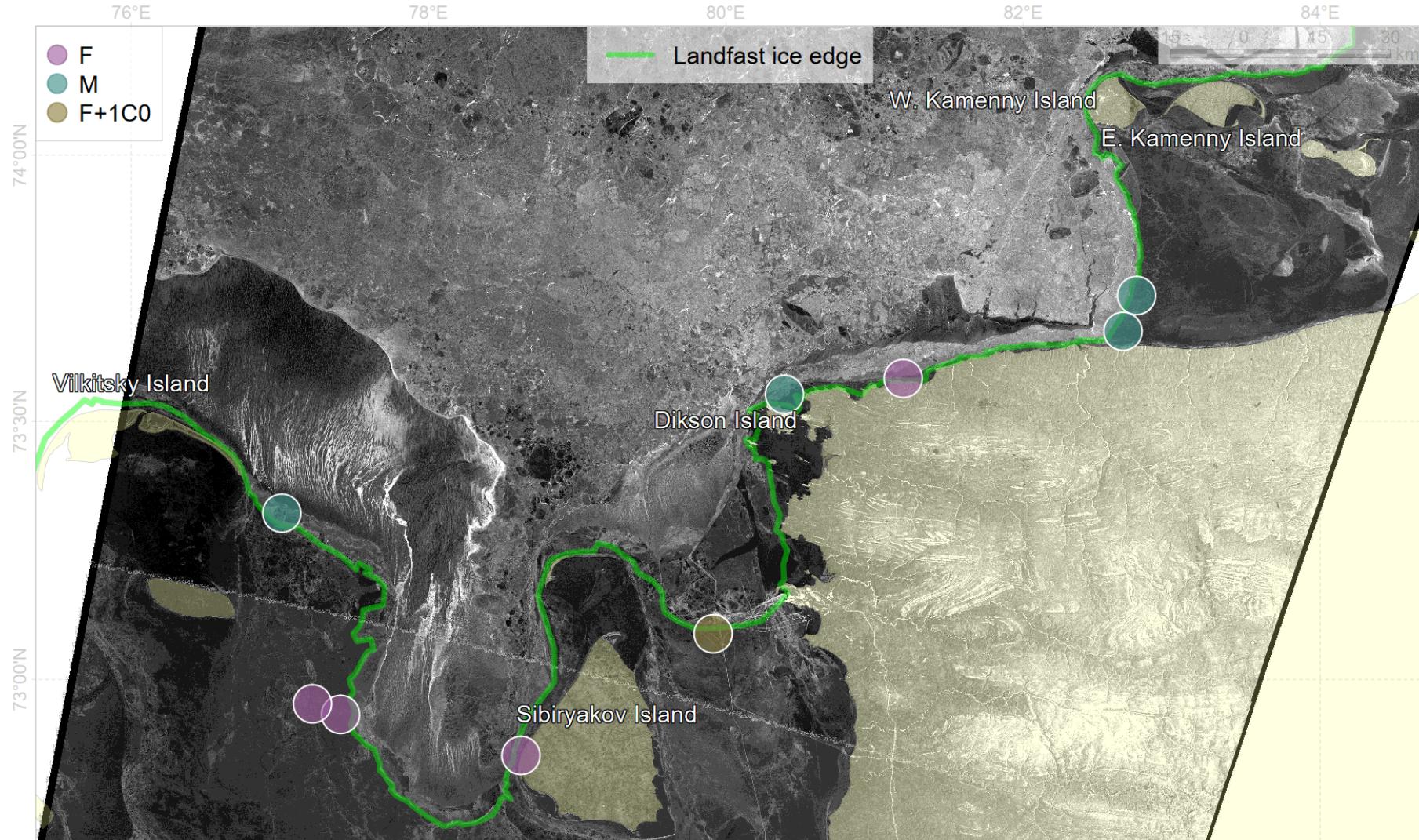
Aerial surveys

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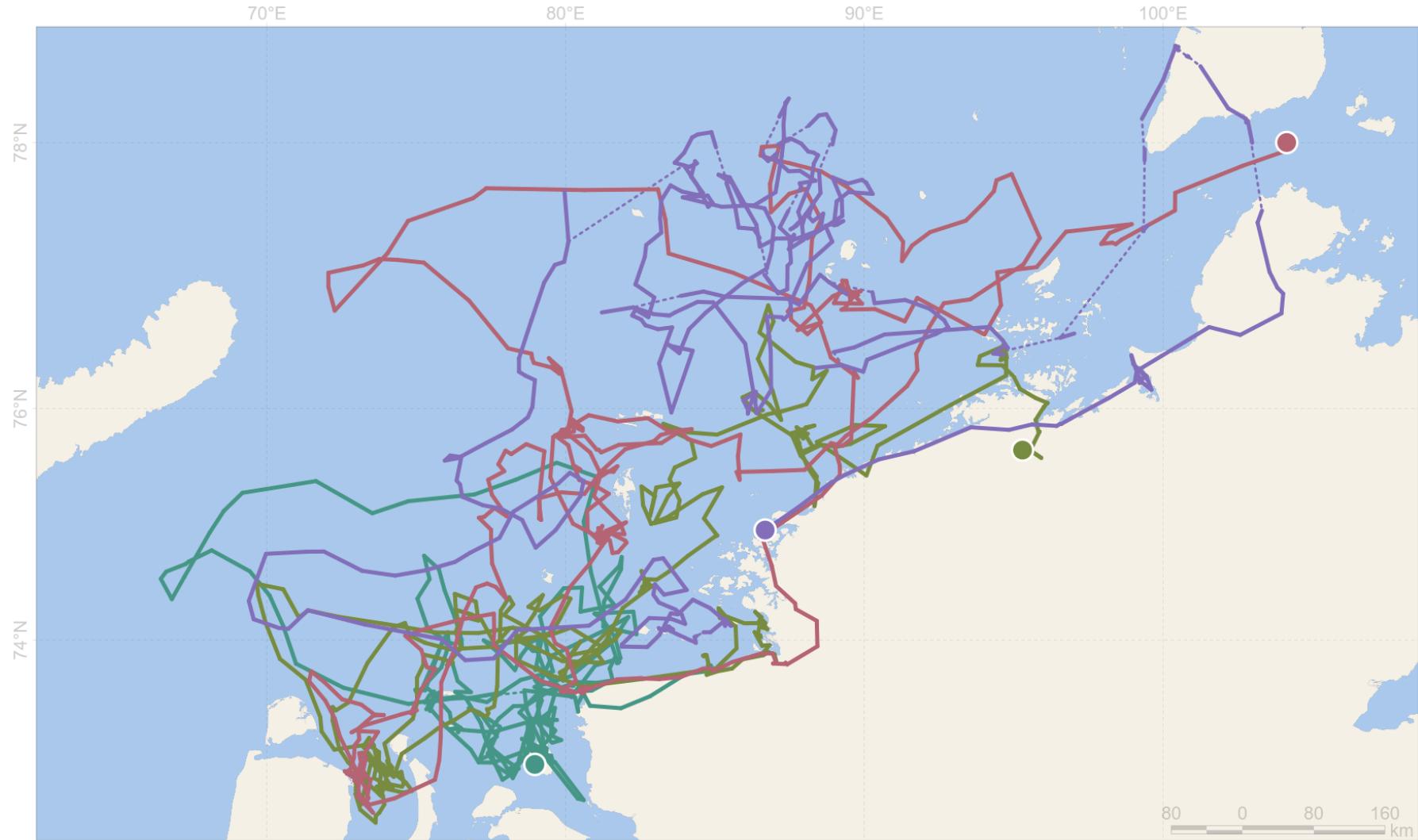


# SATELLITE TAGGING OF POLAR BEARS IN THE KARA SEA, 2024-2025



During the spring melt season, pack ice was not reliable for immobilization and following ground manipulations with polar bears.

# EVALUATING OF THE POLAR BEAR MOVEMENTS BY SATELLITE TELEMETRY



Movement trajectories of 4 polar bear females in the Kara Sea, captured in 2024 on the islands and coast of Taimyr.

Activity

Results

Field work

Satellite telemetry •••

Daily displacement

Sea ice habitat

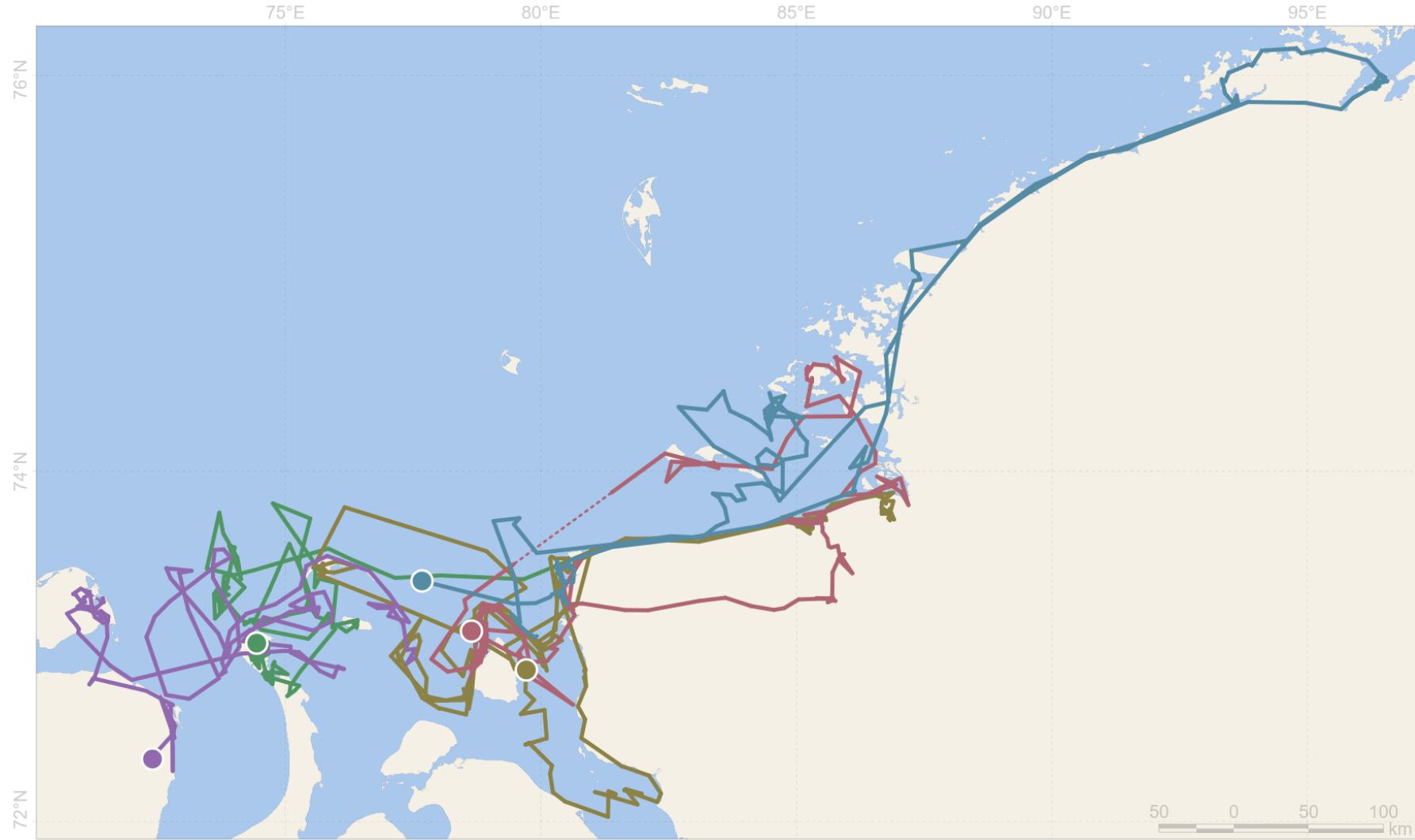
Aerial surveys

Health assessment

Publications



## EVALUATING OF THE POLAR BEAR MOVEMENTS BY SATELLITE TELEMETRY



Movement trajectories of 5 polar bear females in the Kara Sea,  
captured in 2025 on fast ice

Activity

Results

Field work

Satellite telemetry •••

Daily displacement

Sea ice habitat

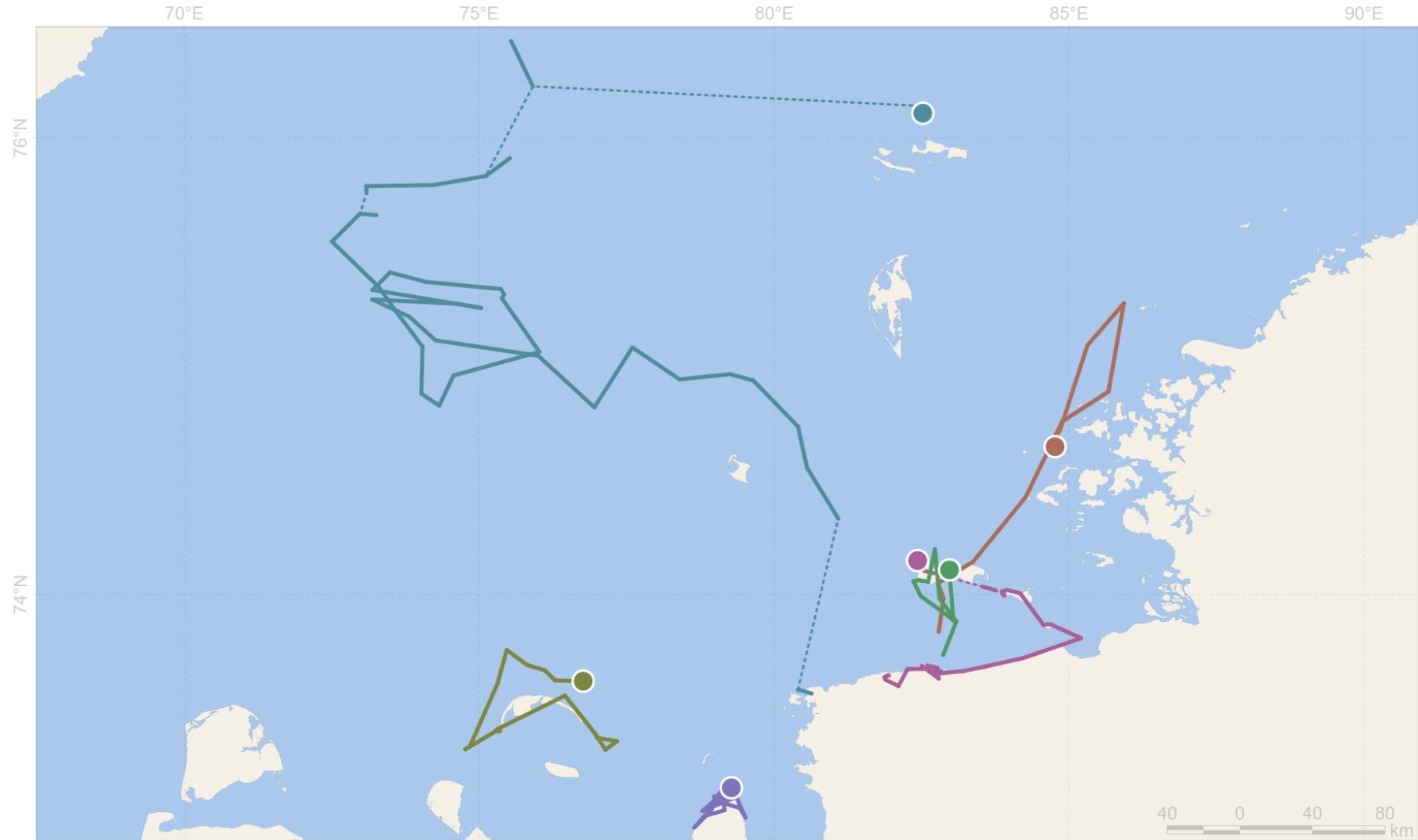
Aerial surveys

Health assessment

Publications



## EVALUATING OF THE POLAR BEAR MOVEMENTS BY SATELLITE TELEMETRY



Movement trajectories of polar bear males in the Kara Sea, captured in 2024 on shoreline and in 2025 on fast ice.

Activity

Results

Field work

Satellite telemetry

Daily displacement

Sea ice habitat

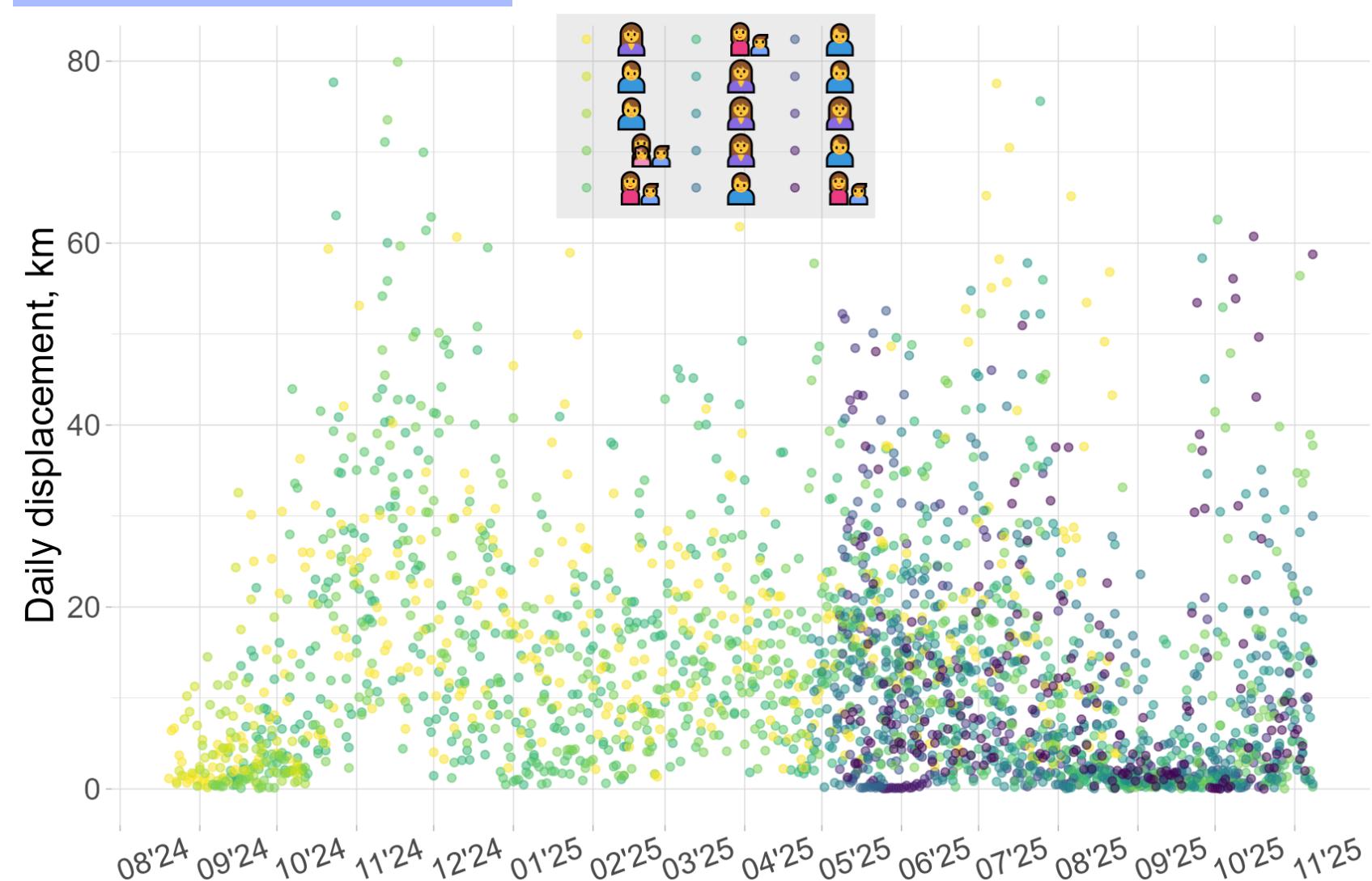
Aerial surveys

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## POLAR BEARS DAILY DISPLACEMENT



Daily movements of 15 polar bears over a period of more than 12 months

Activity

Results

Field work

Satellite telemetry

Daily displacement

Sea ice habitat

Aerial surveys

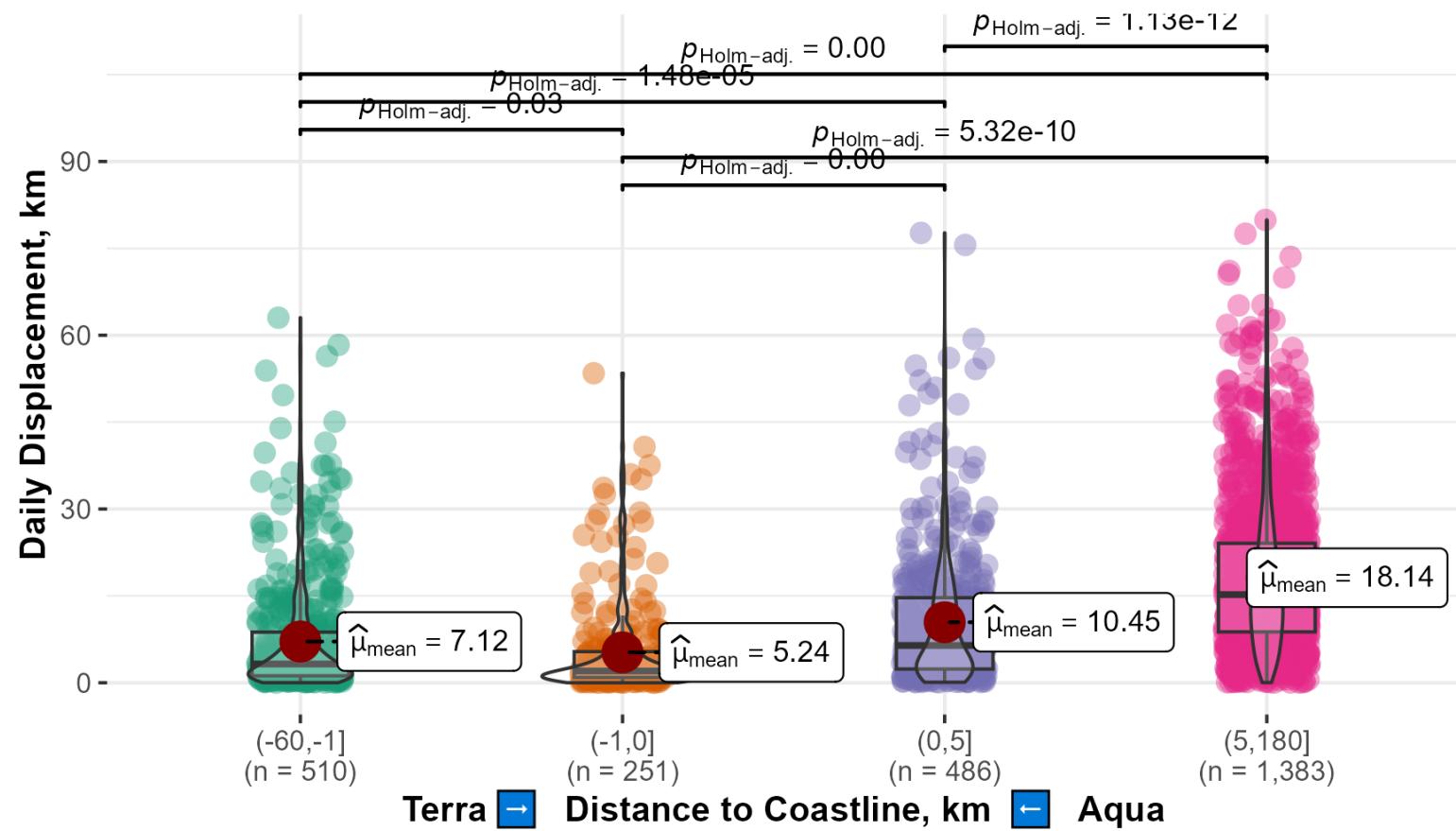
Health assessment

Publications



## POLAR BEARS DAILY DISPLACEMENT

$$F_{\text{Welch}}(3, 914.54) = 202.61, p = 9.56e-101, \widehat{\omega_p^2} = 0.40, \text{CI}_{95\%} [0.36, 1.00], n_{\text{obs}} = 2,630$$



$$\log_e(BF_{01}) = -227.03, \widehat{R^2}_{\text{posterior Bayesian}} = 0.16, \text{CI}_{95\%}^{\text{HDI}} [0.14, 0.19], r_{\text{Cauchy}}^{\text{JZS}} = 0.71$$

Pearson's product-moment correlation  
 $\rho(\log(\text{daily}), \log(|\text{dist2land}|)) = 0.43, df = 2628, p < 0.001.$

Activity

Results

Field work

Satellite telemetry

Daily displacement ...

Sea ice habitat

Aerial surveys

Health assessment

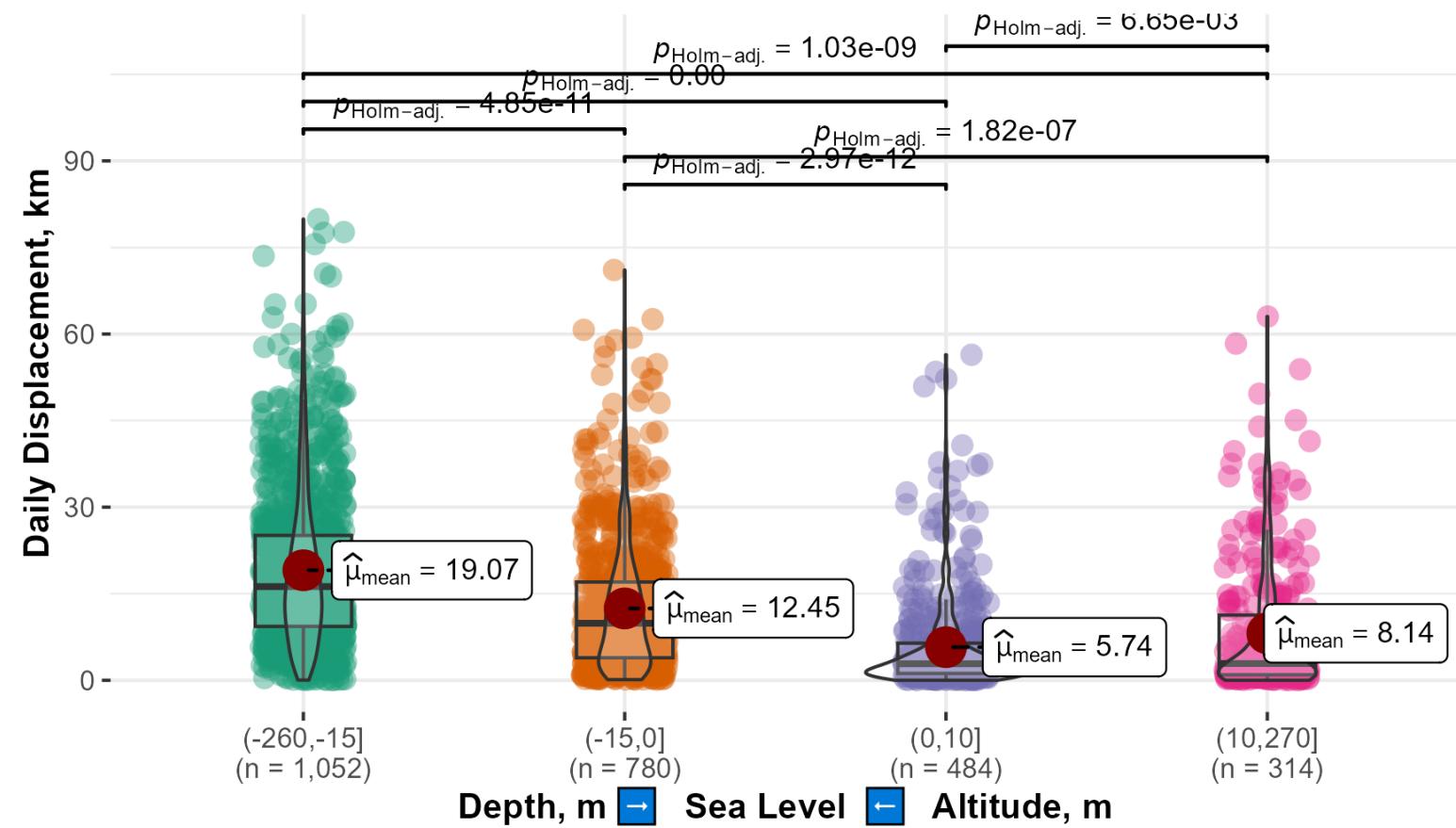
Publications



RESEARCH IN RUSSIA

## POLAR BEARS DAILY DISPLACEMENT

$$F_{\text{Welch}}(3, 1090.31) = 197.84, p = 1.98e-102, \widehat{\omega_p^2} = 0.35, \text{CI}_{95\%} [0.31, 1.00], n_{\text{obs}} = 2,630$$



$$\log_e(BF_{01}) = -224.91, \widehat{R^2}_{\text{posterior Bayesian}} = 0.16, \text{CI}_{95\%}^{\text{HDI}} [0.14, 0.19], r_{\text{Cauchy}}^{\text{JZS}} = 0.71$$

Pearson's product-moment correlation  
 $\rho(\log(\text{daily}), \text{topo}) = -0.34, df = 2628, p < 0.001.$

Pairwise test: Games-Howell, Bars shown: significant

Activity

Results

Field work

Satellite telemetry

Daily displacement

Sea ice habitat ...

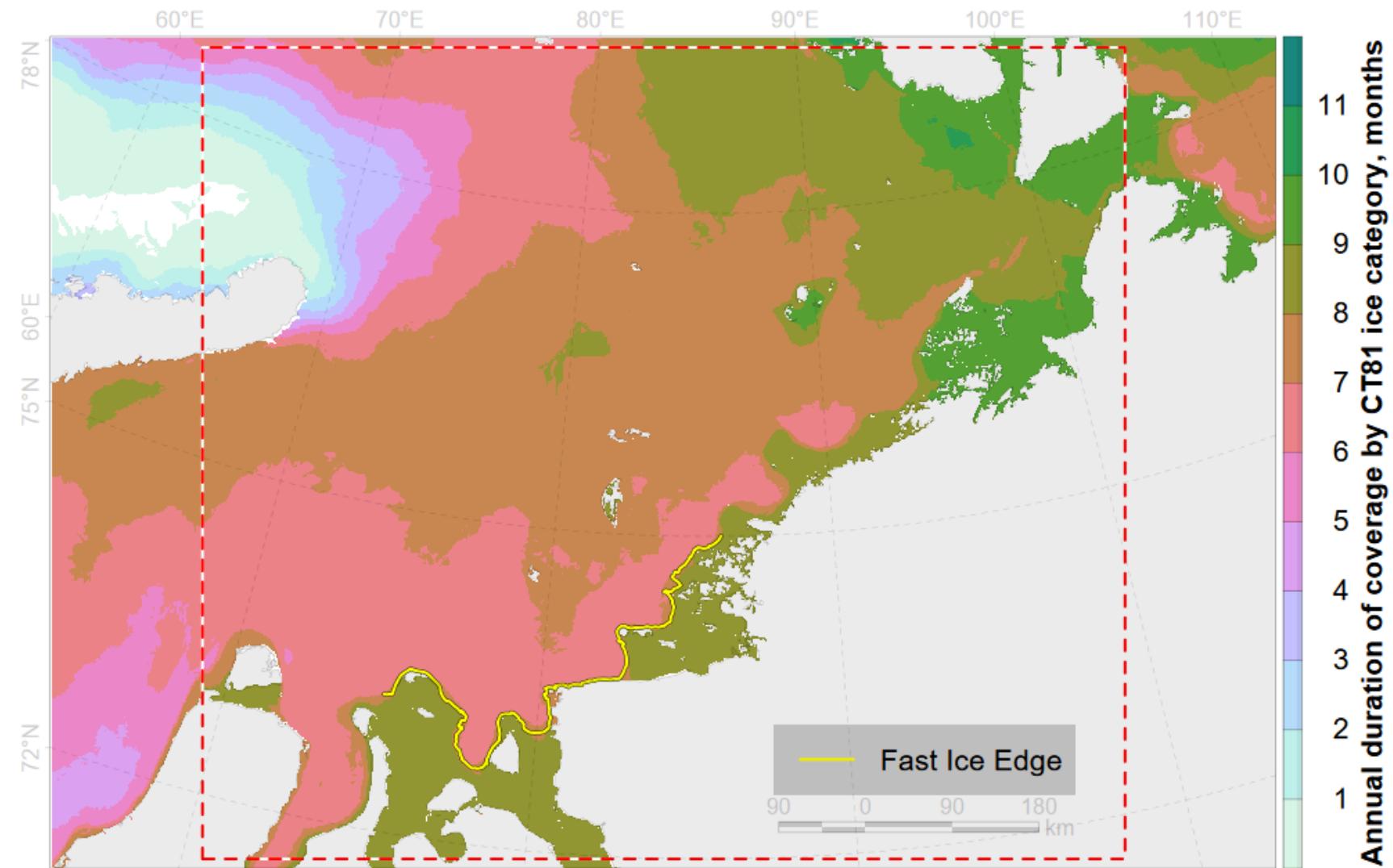
Aerial surveys

Health assessment

Publications



## SEA ICE HABITAT AVAILABILITY AND USE



Pack ice CT81 (ice concentration 80 and greater) is absent for more than half a year in 11 % of aquatory.

Activity

Results

Field work

Satellite telemetry

Daily displacement

Sea ice habitat

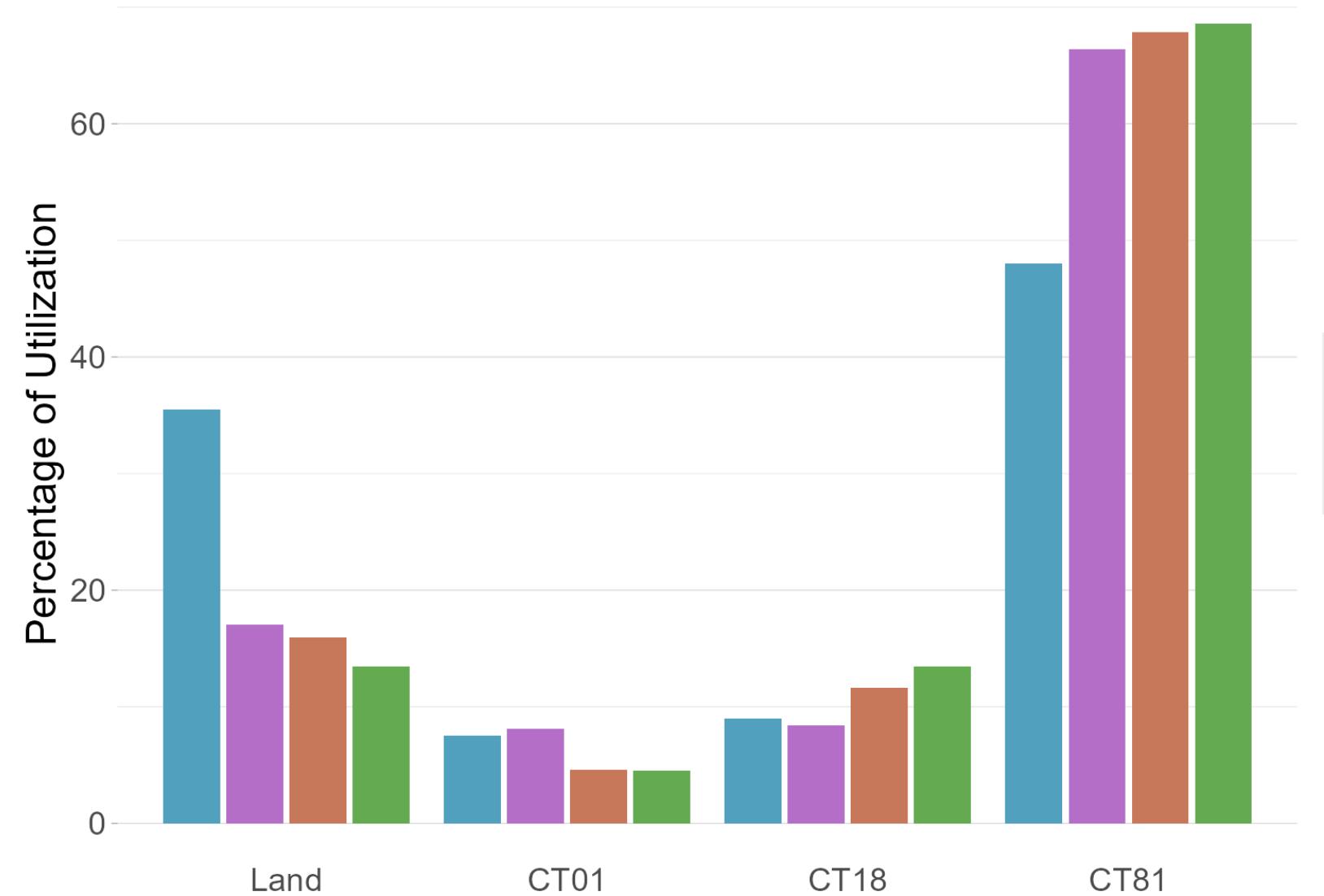
Aerial surveys

Health assessment

Publications



## SEA ICE HABITAT AVAILABILITY AND USE



Activity

Results

Field work

Satellite telemetry

Daily displacement

Sea ice habitat ...

Aerial surveys

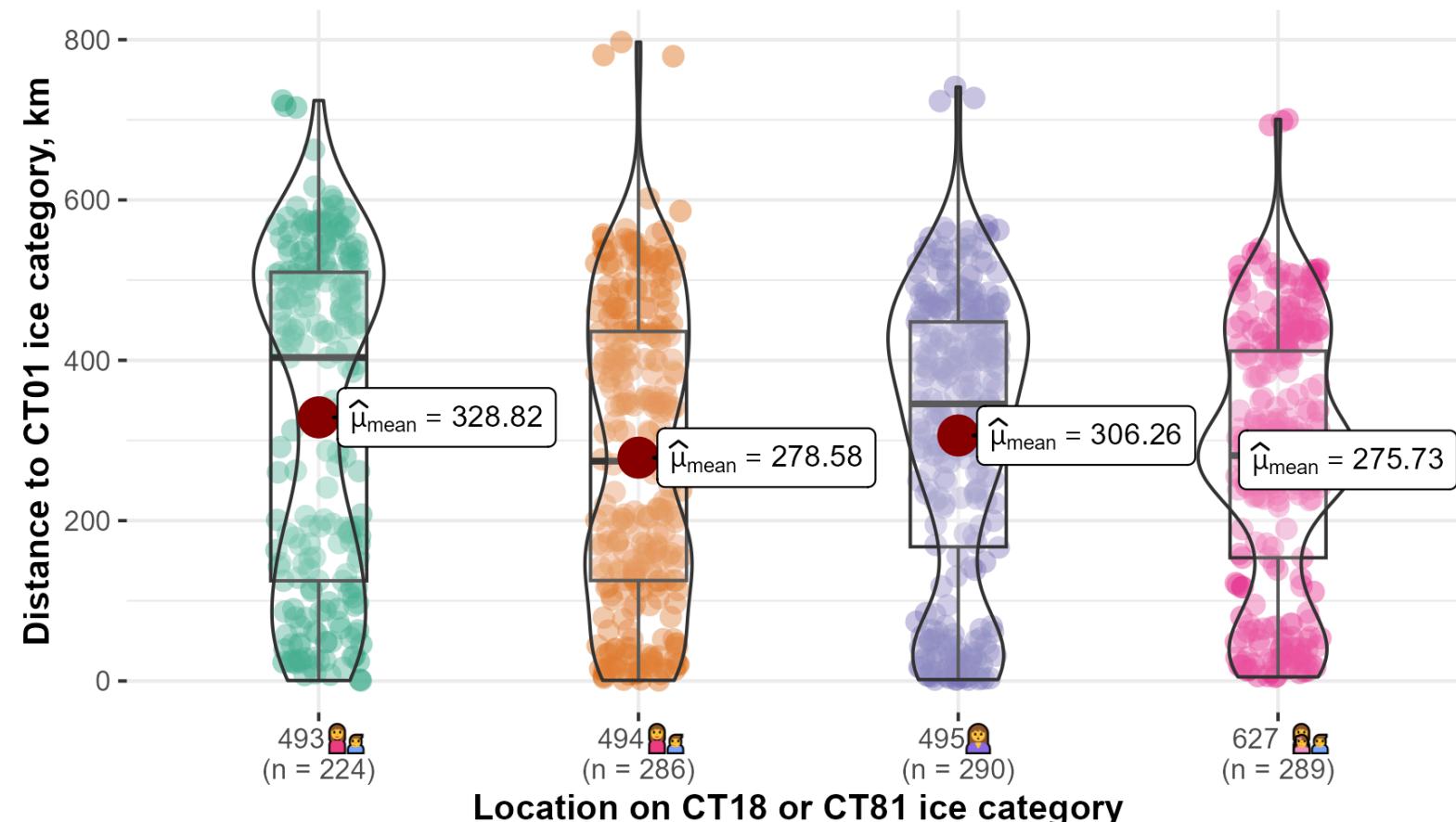
Health assessment

Publications



## SEA ICE HABITAT AVAILABILITY AND USE

$$F_{\text{Welch}}(3, 581.18) = 4.43, p = 4.33e-03, \widehat{\omega_p^2} = 0.02, \text{CI}_{95\%} [1.68e-03, 1.00], n_{\text{obs}} = 1,089$$



Pairwise test: Games-Howell, Bars shown: significant

$$\log_e(BF_{01}) = 0.01, \widehat{R^2}_{\text{posterior Bayesian}} = 0.00, \text{CI}_{95\%}^{\text{HDI}} [0.00, 0.02], r_{\text{Cauchy}}^{\text{JZS}} = 0.71$$

For polar bears in the Kara Sea region the distance to sea ice edge is not important abiotic parameter.

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Kara Sea

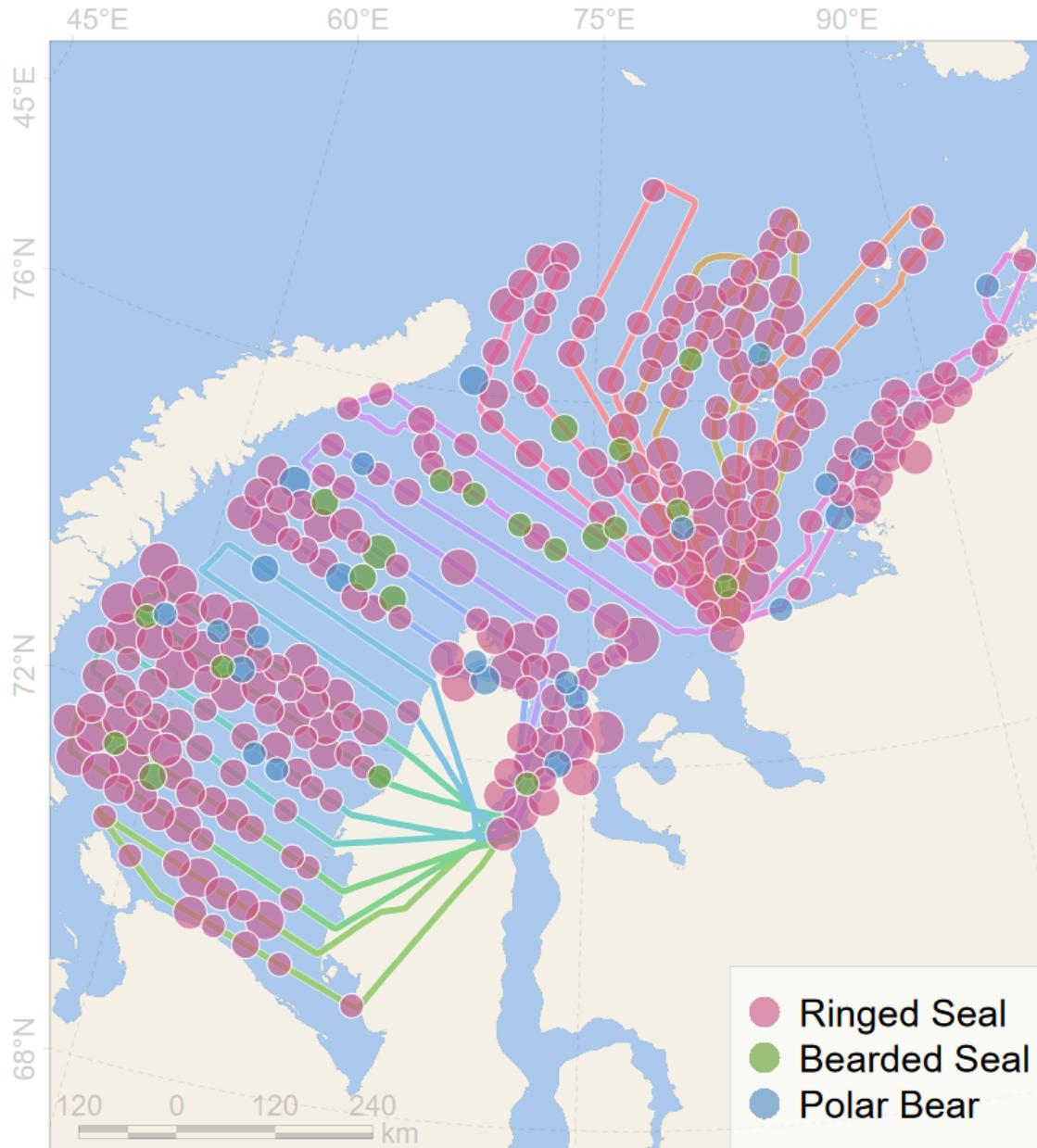
East Siberian Sea

Health assessment

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## AERIAL SURVEY OF THE KARA SEA POLAR BEAR SUBPOPULATION IN 2025



Polar bears and other marine mammals were counted from an AN-28 aircraft using visual and instrumental (surveying in visible- and infrared-ranges) methods in April-May 2025.

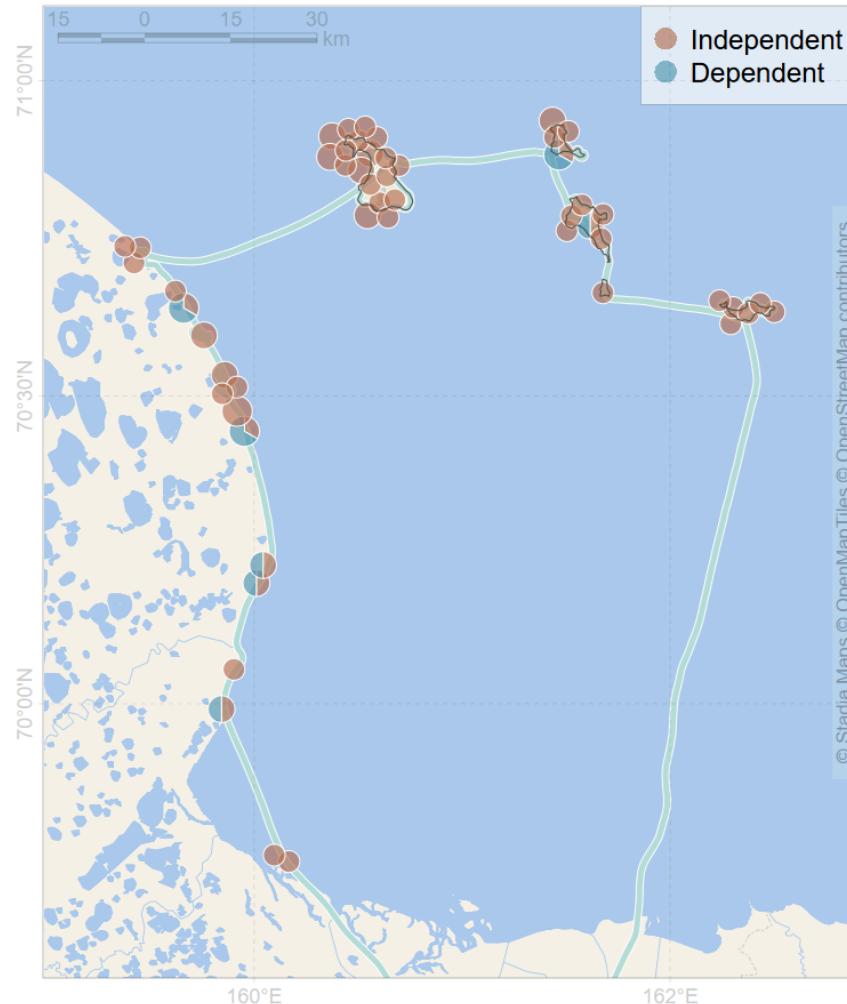
37 polar bears (24 adults and 13 cubs), 1097 ringed seals, 32 bearded seals and were visually recorded.

Results of the instrumental survey and population estimates will be available in 2026.

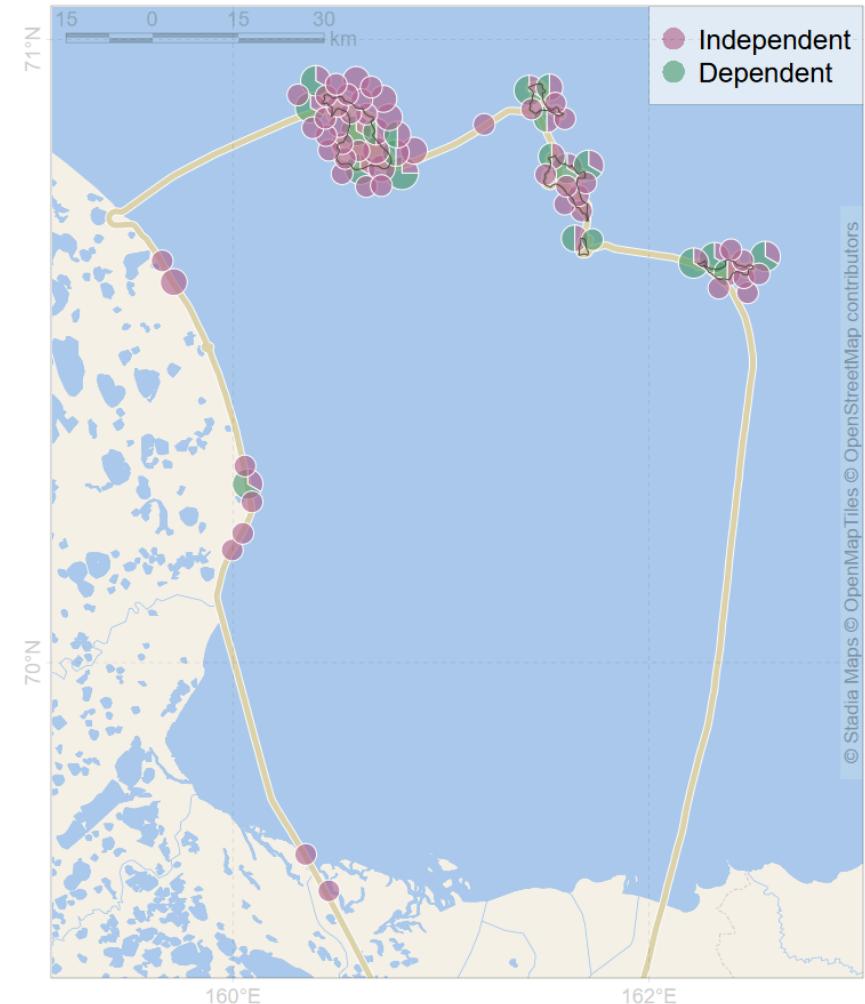


## AERIAL SURVEY IN THE BEAR ISLANDS (EAST SIBERIAN SEA)

Helicopter aerial monitoring performed by National Park «Lensky Pillars». Instrumental survey provided by «Ecofactor». Results after visual surveys:



October 2024: 71 individuals (61 adults, 10 cubs).



September 2025: 113 individuals (79 adults, 34 cubs).

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

Seropositivity

Bacterial/fungal com.

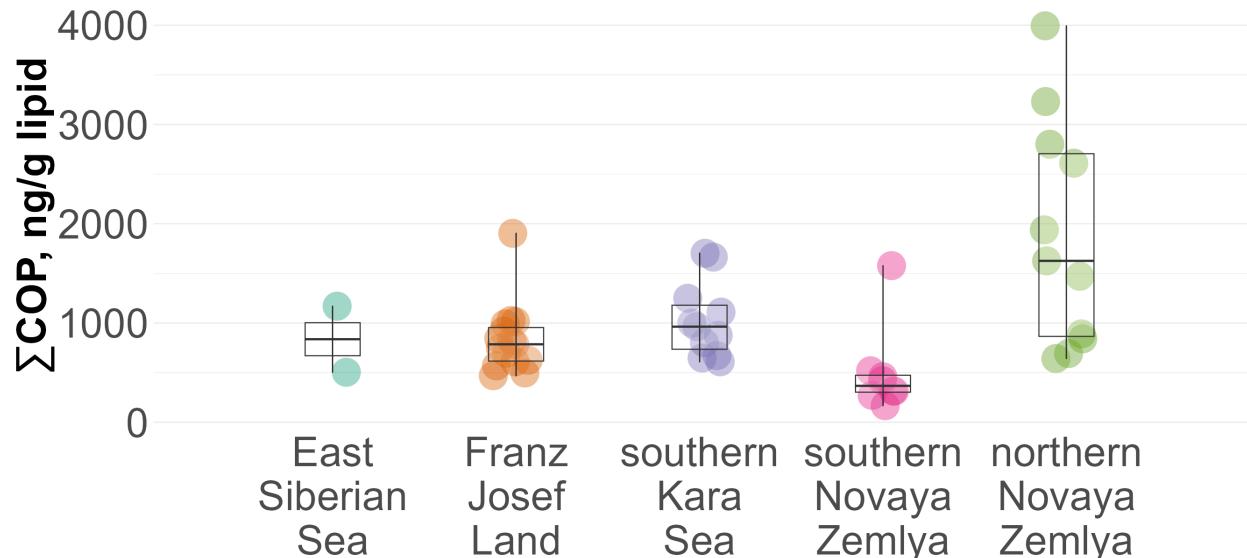
Immunity

Genetics

Publications



## ORGANIC POLLUTANTS IN SERUM SAMPLES



Organic pollutants in serum samples from polar bears in Kara-Barents region and East Siberian Sea.

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

Seropositivity

Bacterial/fungal com.

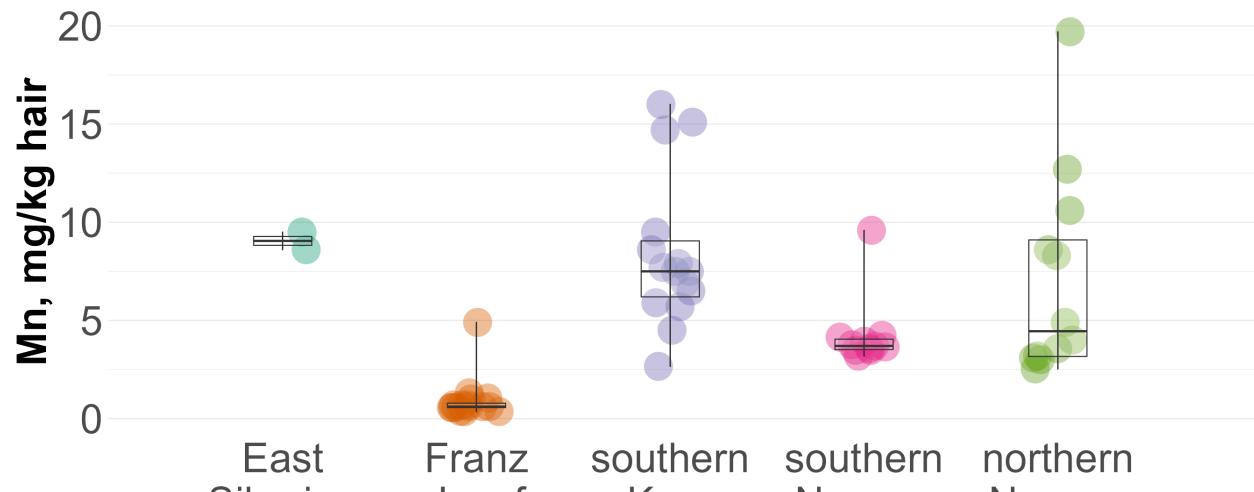
Immunity

Genetics

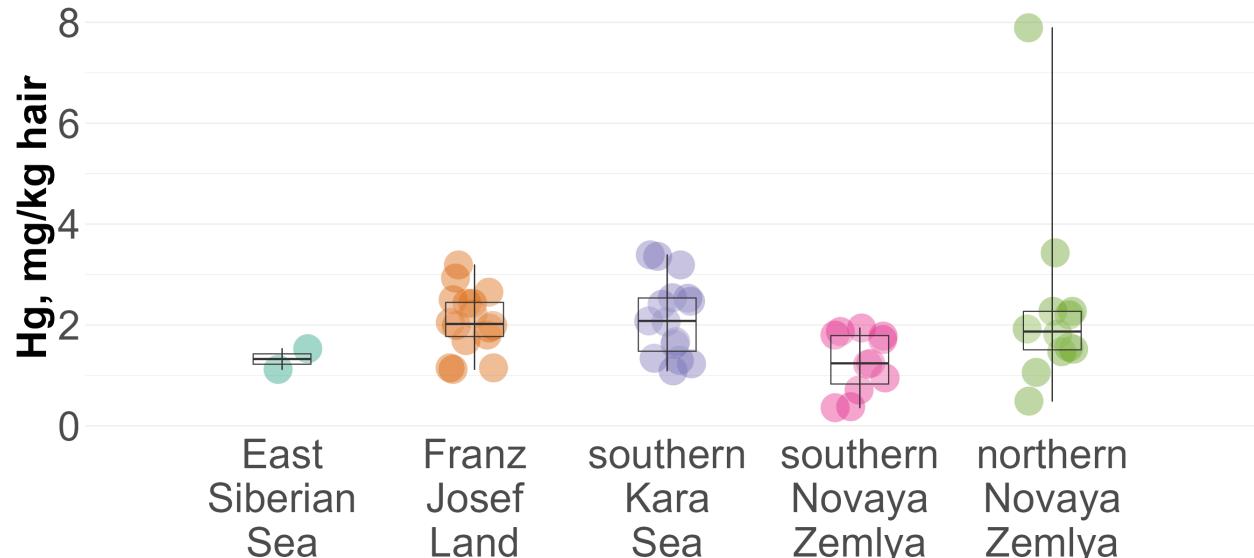
Publications



## HEAVY METALS IN HAIR SAMPLES



Heavy metals in hair samples from polar bears in Kara-Barents region and East Siberian Sea



Original analysis of mercury samples in (Gremyachikh et al., 2025).

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

**Seropositivity**

Bacterial/fungal com.

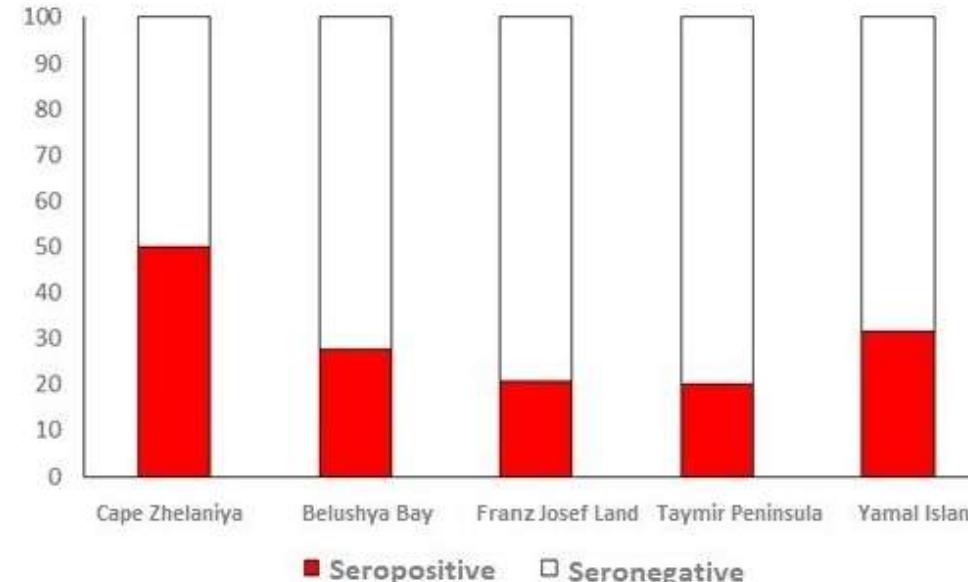
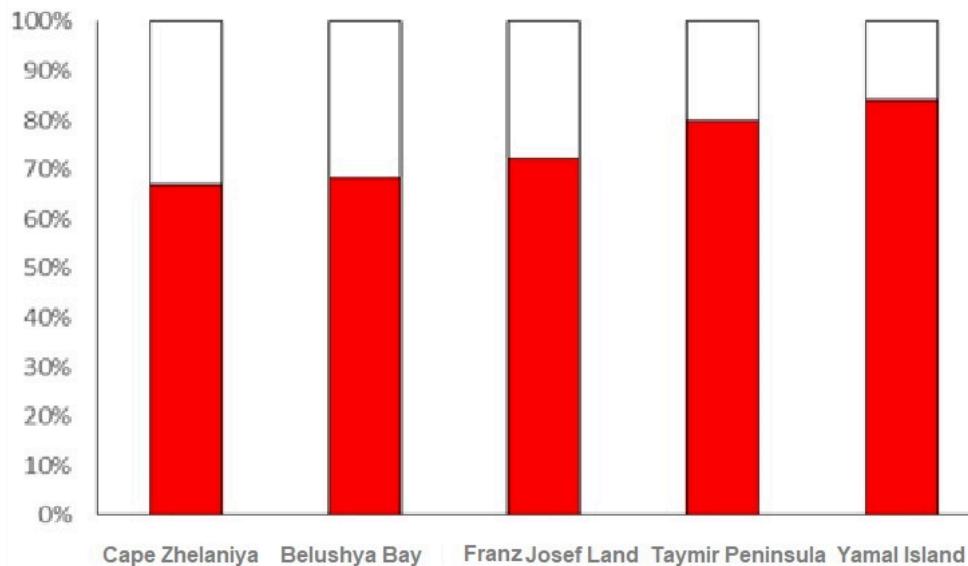
Immunity

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## ANALYSIS OF POLAR BEARS SEROPOSITIVITY



Main results are published (Naidenko et al., 2023).

Pathogens:

- Canine distemper virus
- Herpes simplex virus
- Parvovirus
- Toxoplasma
- *Trichinella* (*Trichinella sp.*)
- *Mycoplasma* (*Mycoplasma sp.*)
- *Candida* (*Candida sp.*)
- *Chlamydia* (*Chlamydia sp.*)

Seropositive proportion for Trichinella (top) and Canine distemper virus (bottom)

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

Seropositivity

Bacterial/fungal com.

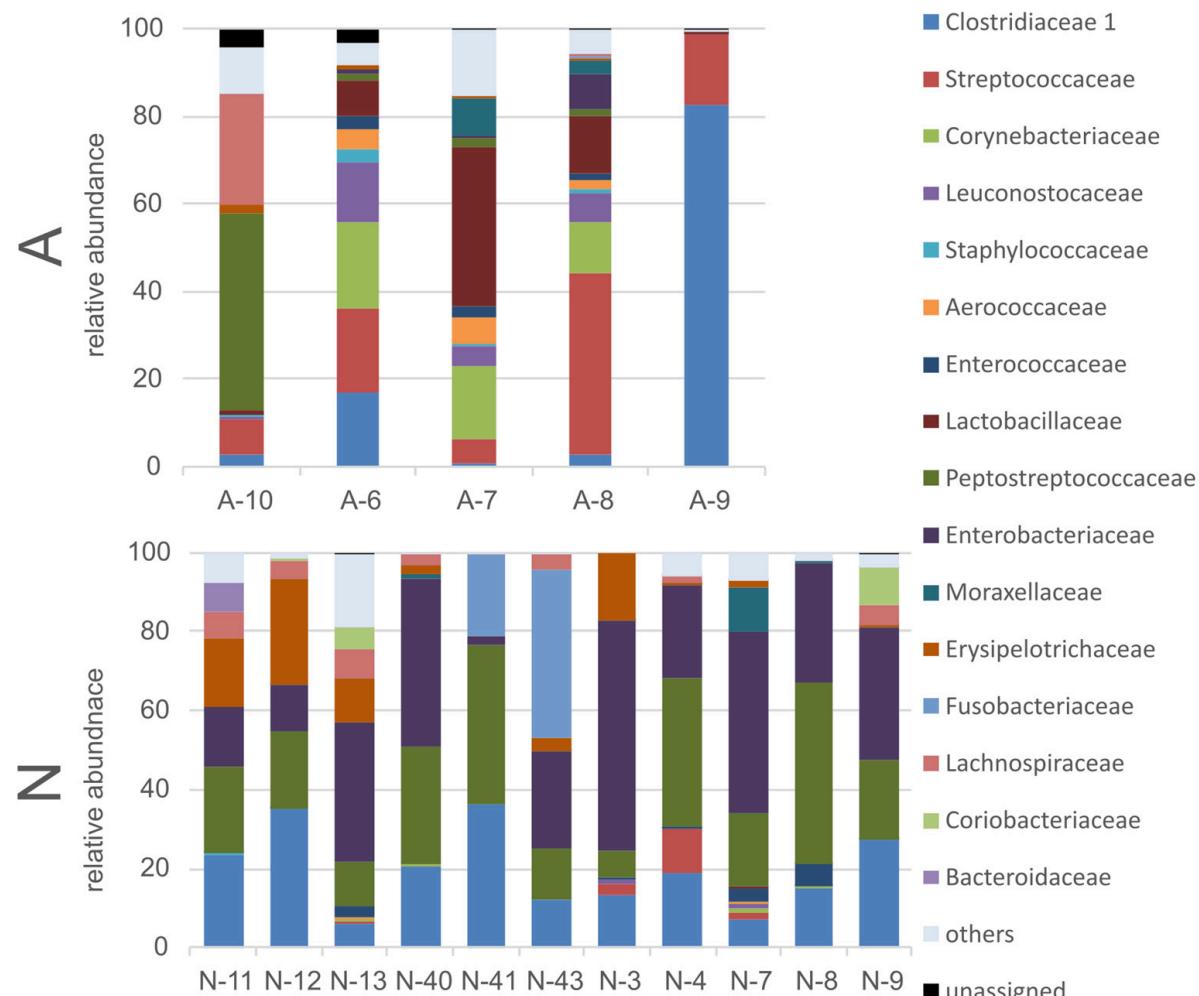
Immunity

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Publications



## BACTERIAL AND FUNGAL COMMUNITY



Feeding on human waste does not cause any signs of dysbiosis and probably leads to adaptive changes in the bacterial microbiome.

Details in (Vecherskii et al., 2023)

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

Seropositivity

Bacterial/fungal com.

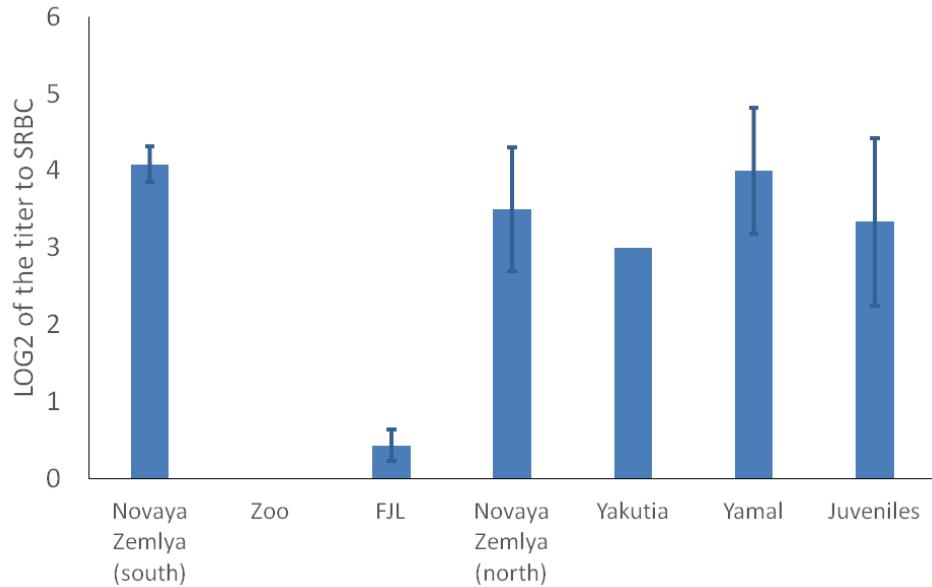
Immunity

Genetics

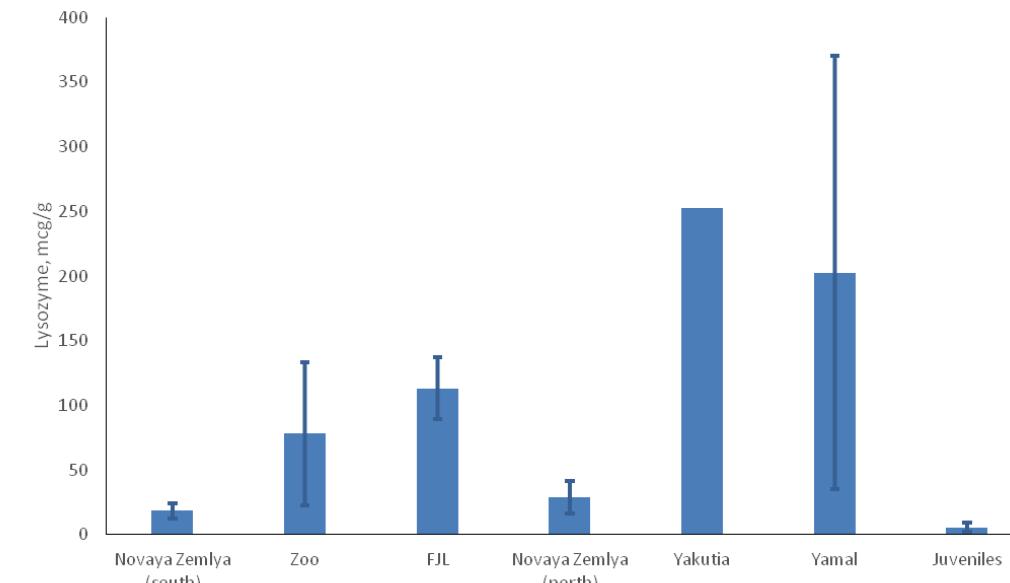
Publications



## ANALYSIS OF POLAR BEARS IMMUNITY AT DIFFERENT POINTS



Total amount of natural antibodies was extremely low in zoos and on Franz-Josef Land.



An activity of the system of complement was very low in all populations.

Details in (Alekseeva et al., 2025).

Activity

Results

Field work

Satellite telemetry

Aerial surveys

Health assessment

Organic pollutants

Heavy metals

Seropositivity

Bacterial/fungal com.

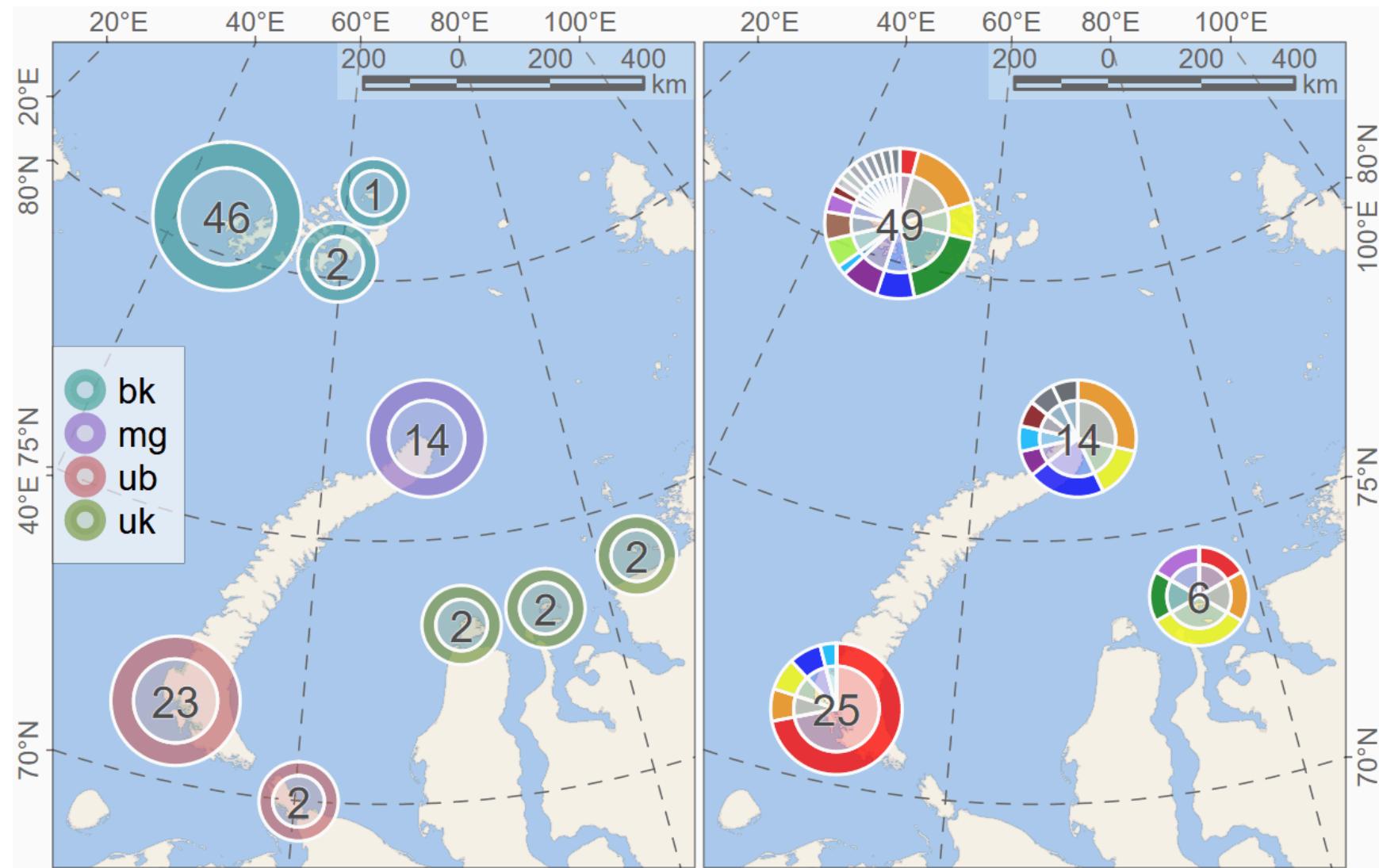
Immunity

Genetics

Publications



## POPULATION STRUCTURE



Homogeneity for Kara Sea and northern Barents Sea. Heterogeneity for South-Eastern Barents Sea. Details in (Sorokin et al., 2023).

## PUBLICATIONS 2023-2025

Alekseeva, G. S., E. A. Ivanov, I. A. Mizin, N. G. Platonov, I. N. Mordvintsev, V. V. Rozhnov, and S. V. Naidenko (2025). "Hematological differences in Barents and Kara Seas polar bears (*Ursus maritimus*): what factors matter?" In: *Polar Biology* 48.1. ISSN: 1432-2056. DOI: 10.1007/s00300-024-03326-w.

Gremyachikh, V. A., V. T. Komov, E. A. Ivanov, I. N. Mordvintsev, S. V. Naidenko, N. G. Platonov, I. A. Mizin, A. I. Isachenko, R. E. Lazareva, E. S. Ivanova, L. S. Eltsova, and V. V. Rozhnov (2025). "Total Mercury and Stable Nitrogen and Carbon Isotope Content in Polar Bear Hair in the Russian Arctic". In: *Russian Journal of Ecology* 56.4, p. 366–374. ISSN: 1608-3334. DOI: 10.1134/s1067413625600727.

Naidenko, S. V., P. S. Klyuchnikova, E. A. Ivanov, I. N. Mordvintsev, N. G. Platonov, A. I. Isachenko, R. E. Lazareva, and V. V. Rozhnov (2023). "Occurrence of Pathogens in the Barents Sea Polar Bear (*Ursus maritimus*) Subpopulation". In: *Biology Bulletin* 50.9, p. 2454–2459. ISSN: 1608-3059. DOI: 10.1134/s106235902309025x.

Sorokin, P. A., E. Y. Zvychaynaya, E. A. Ivanov, I. A. Mizin, I. N. Mordvintsev, N. G. Platonov, A. I. Isachenko, R. E. Lazareva, and V. V. Rozhnov (2023). "Population Genetic Structure in Polar Bears (*Ursus maritimus*) from the Russian Arctic Seas". In: *Russian Journal of Genetics* 59.12, p. 1320–1332. ISSN: 1608-3369. DOI: 10.1134/s1022795423120128.

Vecherskii, M. V., T. A. Kuznetsova, D. R. Khayrullin, A. A. Stepankov, S. M. Artemieva, P. V. Chukmasov, E. A. Ivanov, I. A. Mizin, I. N. Mordvintsev, N. G. Platonov, A. A. Pashali, A. I. Isachenko, R. E. Lazareva, K. M. Shestakova, and V. V. Rozhnov (2023). "Anthropogenic Neighborhood Impact on Bacterial and Fungal Communities in Polar Bear Feces". In: *Animals* 13.13, p. 2067. ISSN: 2076-2615. DOI: 10.3390/ani13132067.

