



An international network for large-scale tracking of seabirds in the Northeast Atlantic – SEATRACK

Hallvard Strøm

Norwegian Polar Institute

Vegard Bråthen, Sebastien Descamps, Morten Ekker, Per Fauchald, Halfdan
Helgason, Benjamin Merkel, Børge Moe & Arnaud Tarroux



Annual movements





Main goal

- Map the **non-breeding distribution** of seabirds breeding in colonies encircling the Barents, Norwegian and North Seas
- How changes in environmental conditions in wintering areas **affect their demography and population trends**
 - **Science component** (*Science plan*)
 - **Management component** (*deliverables*)



GLS-loggers

+

- Low weight
- Relatively cheap
- Small impact
- Sensors

-

- Accuracy = 180 km
- Download
- Requires difference in light (night and day)
 - Equinox
 - Polar day
 - Polar night

Daylight length =
Latitude

Mid-time
dawn/dusk =
Longitude





Used to...

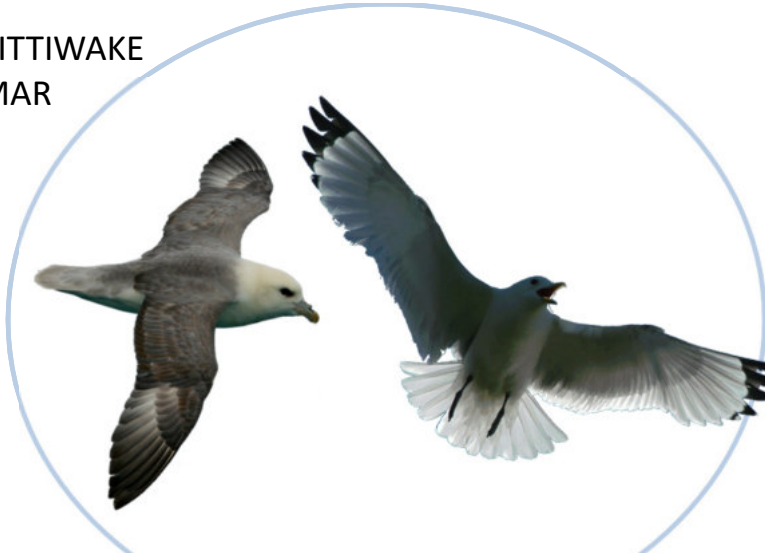
- **Identify challenges linked to seabird management**
- **Population-based environmental risk & impact assessments**
- **Mapping seabird “hotspots”**
 - ✓ Marine protected areas & spatial planning
 - ✓ Identify environmental threats
- **Environmental niches & climate change**
 - ✓ Predict response to climate change



Late 2000's in the Norwegian seabird community:

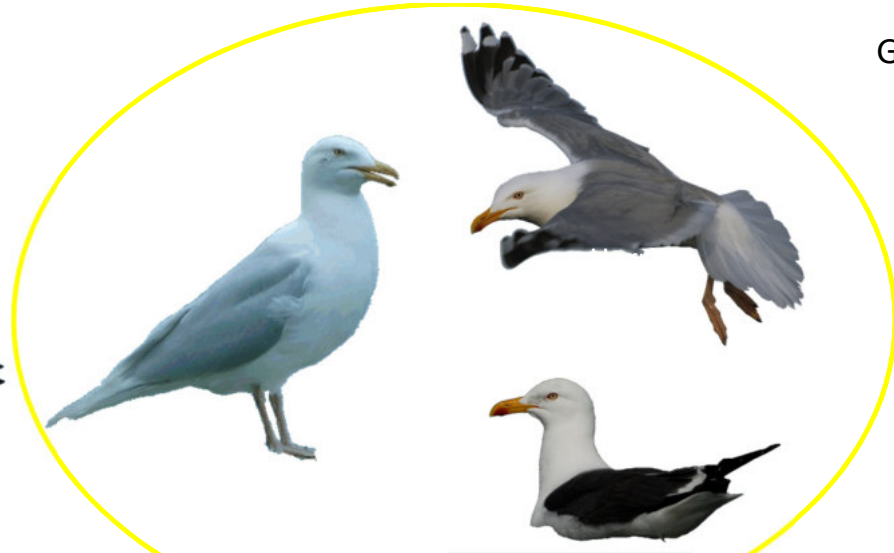


BLACK-LEGGED KITTIWAKE
NORTHERN FULMAR



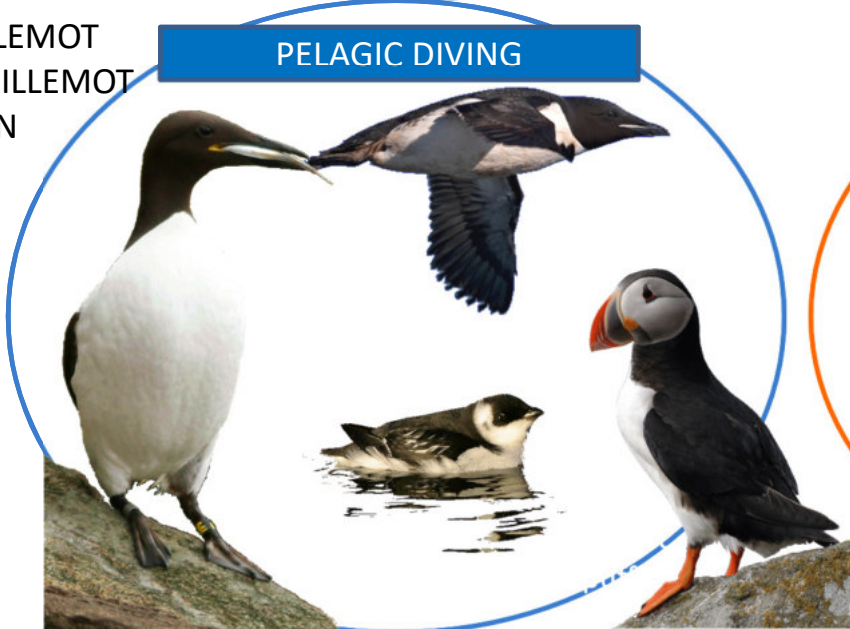
PELAGIC SURFACE FEEDERS

GLAUCOUS GULL
HERRING GULL
LESSER BLACK-
BACKED GULL



COASTAL SURFACE FEEDERS

COMMON GUILLEMOT
BRÜNNICH'S GUILLEMOT
ATLANTIC PUFFIN
LITTLE AUK



PELAGIC DIVING

COASTAL DIVING



COMMON EIDER
EUROPEAN SHAG

Large-scale approach

- 36 colonies
- 5 countries
- 2014-2018 (4 winters)



First-time data from:

- Faroes
- Jan Mayen
- East-Svalbard
- Franz Josef Land
- Novaya Zemlya

Funding



Lead institutions/partners **50 %**



(Norw. Ministry of Climate and Environm.)
(Norw. Ministry of Foreign Affairs)

Governmental **30 %**



Oil and gas companies **20 %**

Partners



Name	Country
Bergur Olsen	Faroese
Johannis Danielsen	Faroese
Erpur Snær Hansen	Iceland
Gunnar Þór Hallgrímsson	Iceland
Jón Einar Jónsson	Iceland
Sunna Björk Ragnarsdóttir	Iceland
Þorkell Linberg Þórarinnsson	Iceland
Aleksey Ezhov	Russia
Ekaterina Tolmacheva	Russia
Grigori Tertitski	Russia

Name	Country
Maria Gavrilov	Russia
Francis Daunt	United Kingdom
Paul Thompson	United Kingdom
Katarzyna Wojczulanis-Jakubas	Poland
Arild Breistøl	Norway
Arne Follestad	Norway
Børge Moe	Norway
Geir Helge Systad	Norway
Hallvard Strøm	Norway
Ingar Støyle Bringsvor	Norway

Name	Country
Morten Helberg	Norway
Rob Barrett	Norway
Sebastien Descamps	Norway
Signe Christensen-Dalsgaard	Norway
Svein-Håkon Lorentsen	Norway
Sveinn Are Hanssen	Norway
Thomas Holm Carlsen	Norway
Tone Kristin Reiertsen	Norway
Tycho Anker-Nilssen	Norway
Jan Ove Bustnes	Norway





Infrastructure

- **Common protocol**
 - Additional sampling (sexing, SI)
- Centralized and **standardized processing**
- Centralized **database** and **file archive**
- **Web-application**
- **Small project staff (full time)**



Deployments and retrievals (2014-2017)

Species	N loggers deployed	N loggers retrieved	% retrieved
Common guillemot	1001	494	65 %
Atlantic Puffin	1327	396	38 %
Brünnich's guillemot	1128	444	53 %
Little auk	361	151	55 %
Black-legged kittiwake	1617	759	65 %
Lesser black-backed gull	343	30	10 %
Northern fulmar	666	247	51 %
Herring gull	397	39	11 %
Glaucous gull	314	97	42 %
European Shag	703	249	45 %
Common eider	850	293	44 %
Total	8707	3199	48 %

2018:

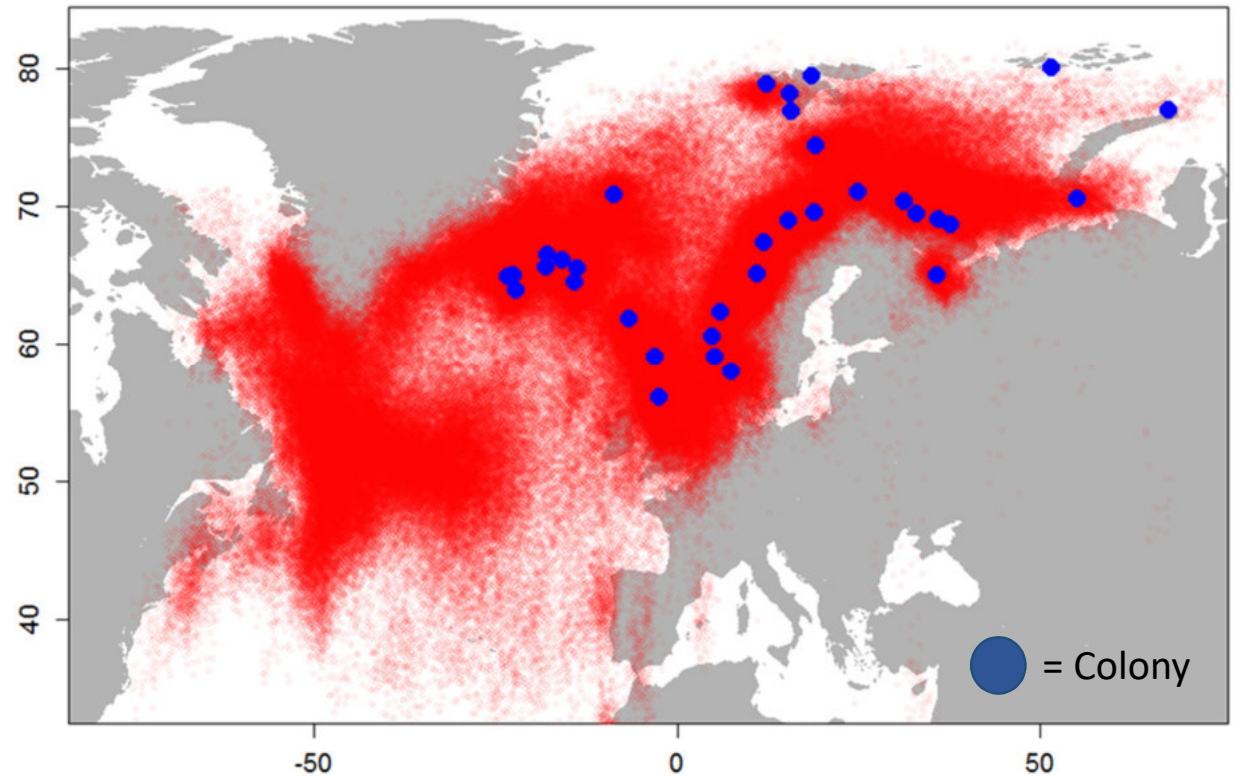
Ca. 2000
deployments

Ca. 1100
retrievals
expected

Database Status September 2018

- 1 760 500 positions
- 1 126 800 after filtering (●)
- 3 388 'tracks'
- 2 121 individuals

Accepting pre-SEATRACK data
(re-analysed)



Product 1: Distribution maps (kernel)



Kittiwake

Autumn (Aug.-Oct.)

2017

Positions: 13 252

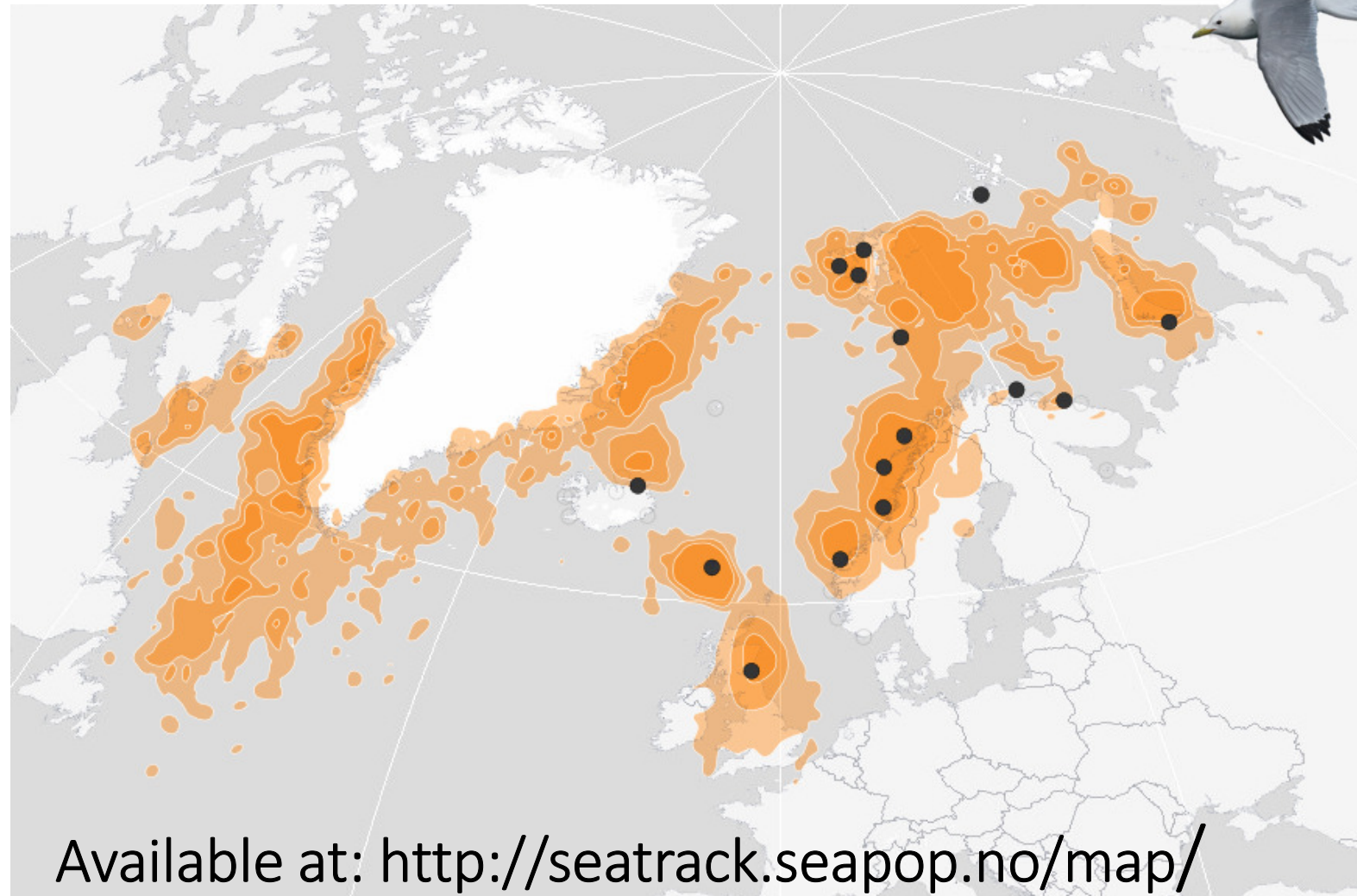
Colonies: 15

Individuals: 285

Days: 52

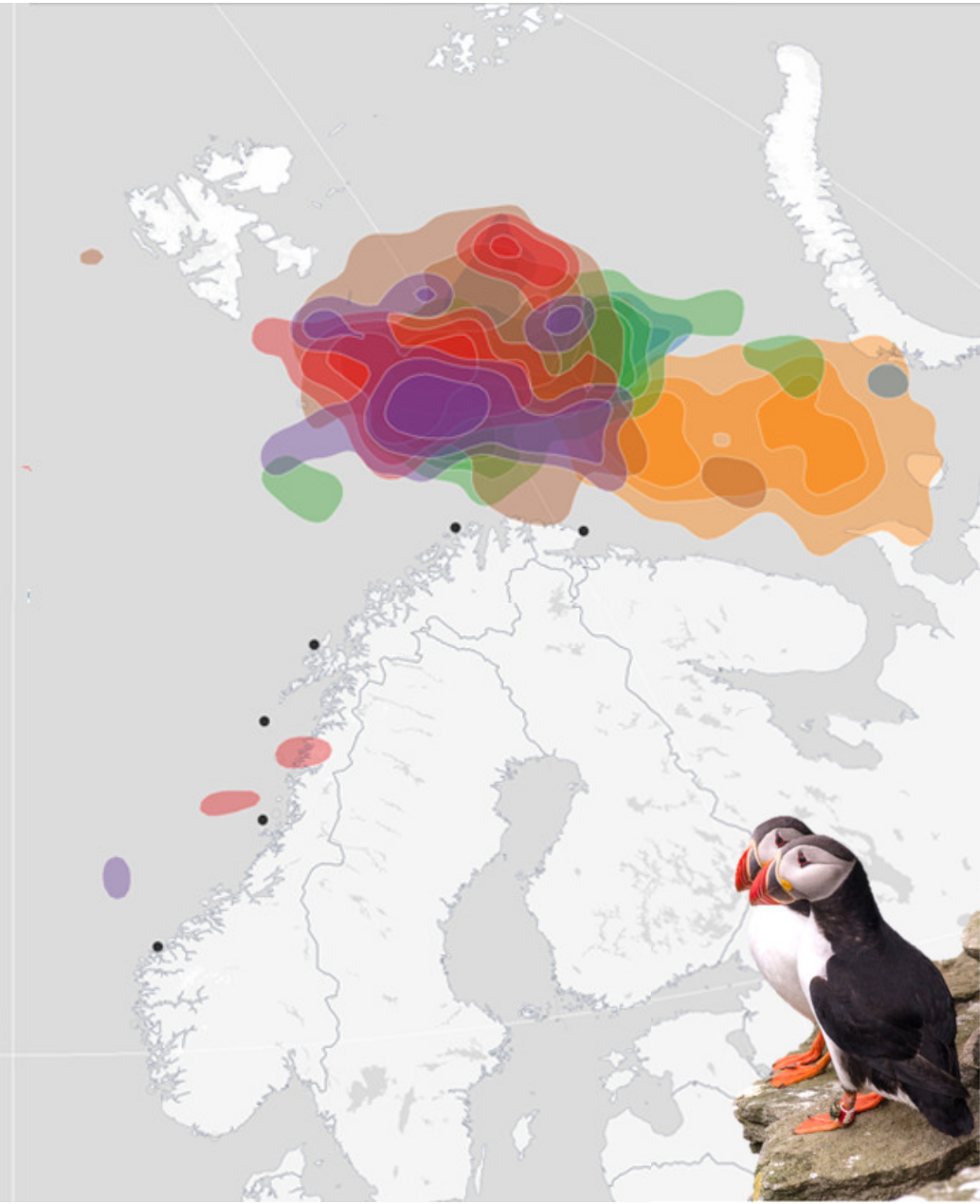
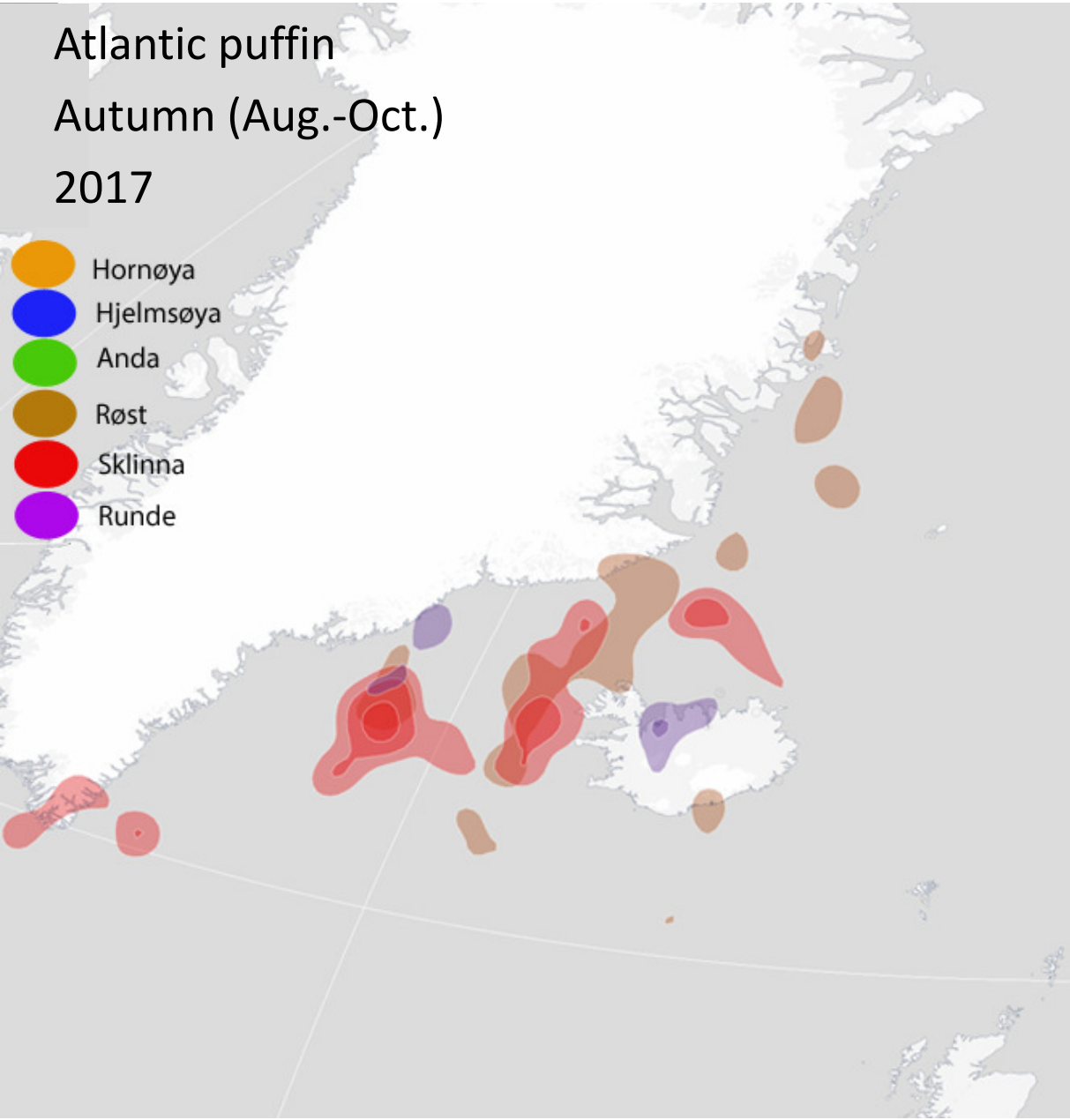
Months: 3

25%, 50% and 75% kernel distribution

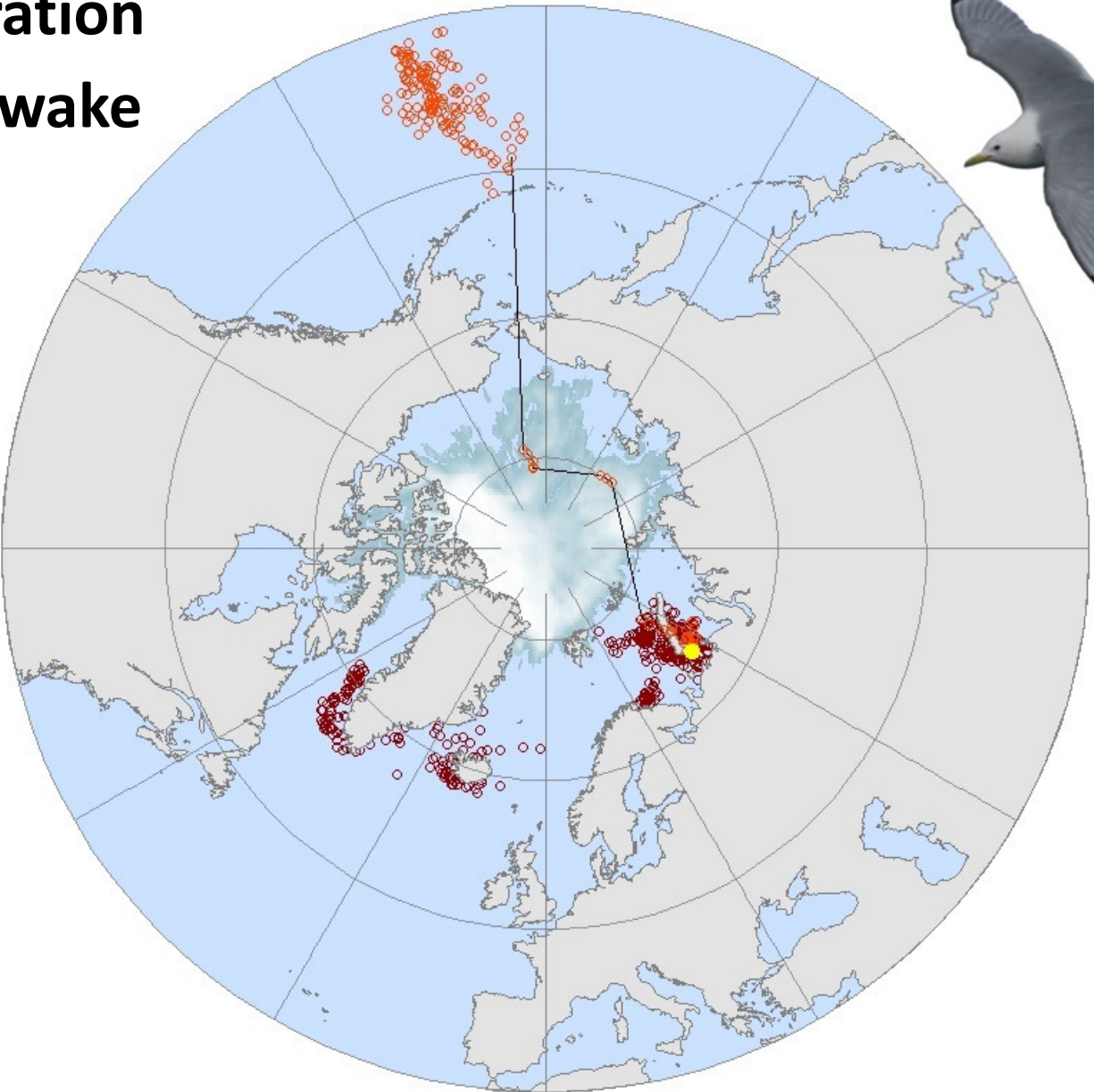


Atlantic puffin
Autumn (Aug.-Oct.)
2017

- Hornøya
- Hjelmsøya
- Anda
- Røst
- Sklinna
- Runde



First tracking of Pacific migration of an Atlantic breeding kittiwake

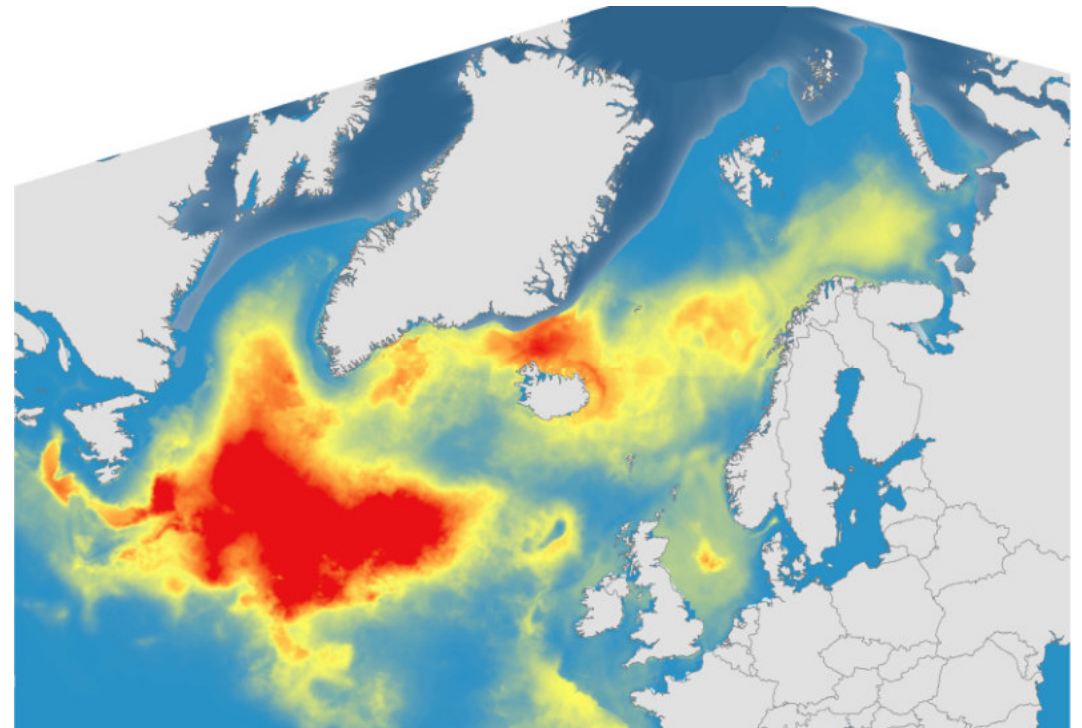


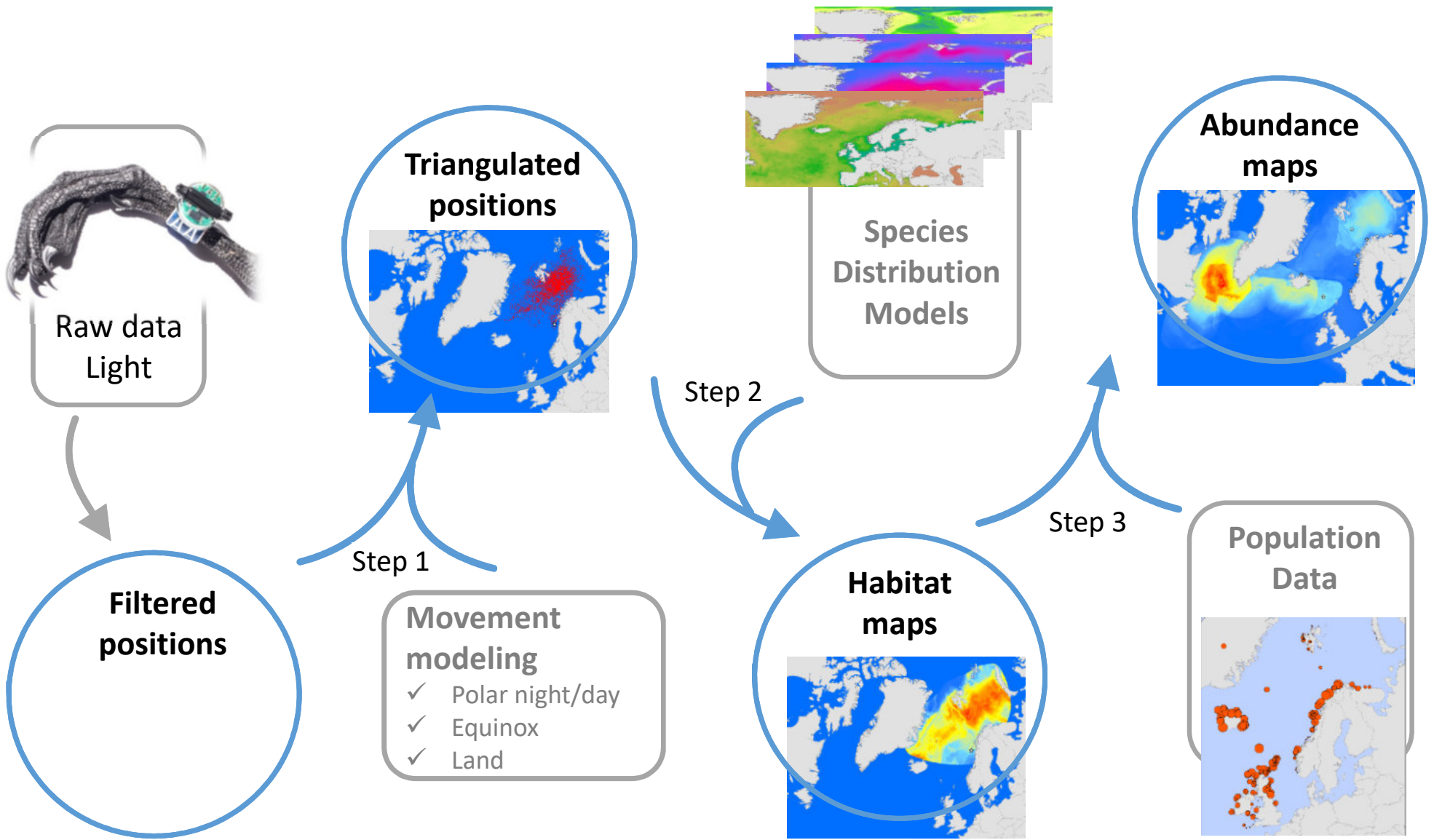
Breeding on Novaya Zemlya
2016-2017: 1 ind.
2017-2018: 5 ind.

Product 2: Population distribution maps

Per Fauchald
Arnaud Tarroux

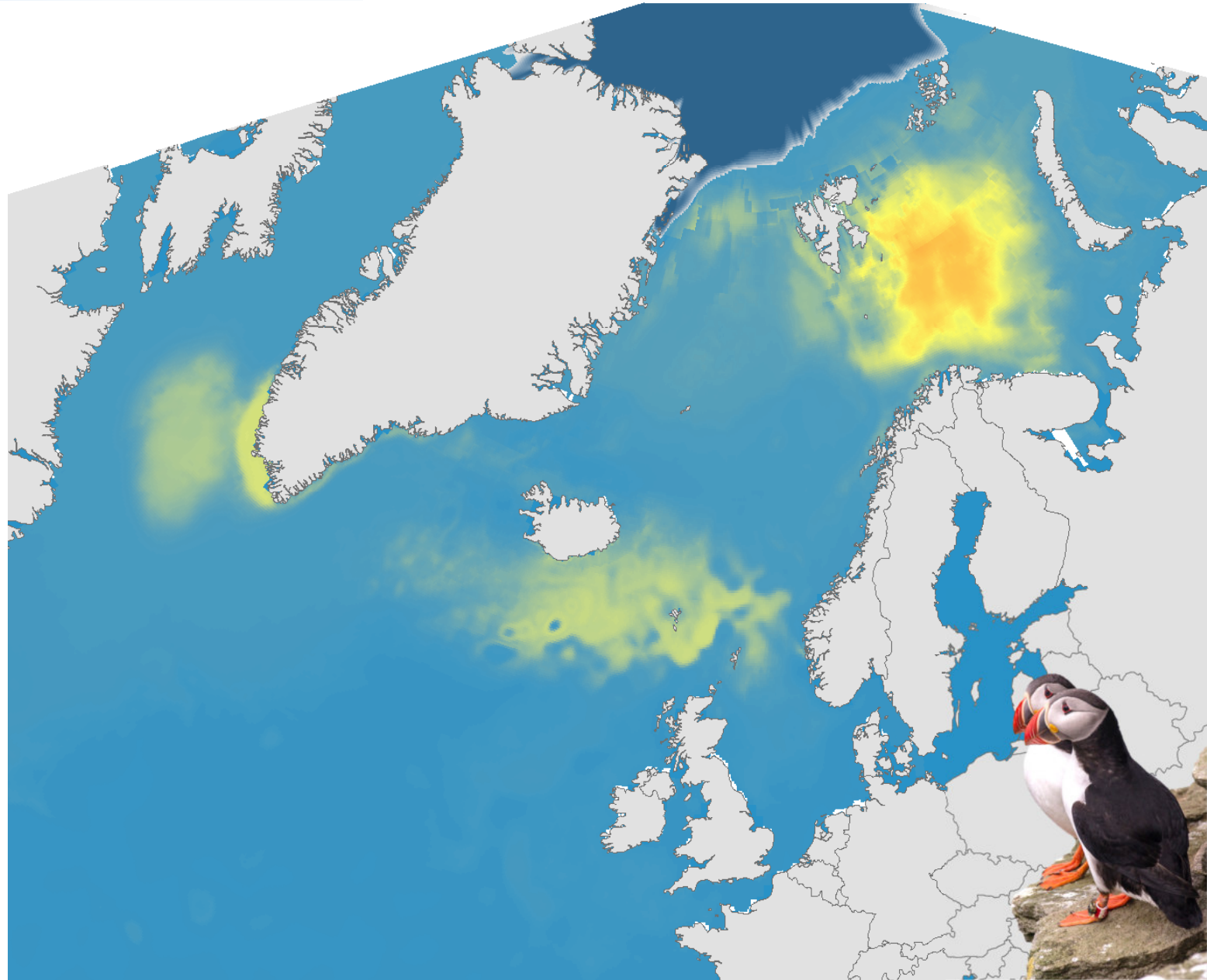
- Combining:
 - GLS-data (incl. temperature & wet/dry)
 - Environmental data (remote sensing)
 - Population data
- Six common pelagic species
Fulmar, kittiwake, common/Brünnich's guillemot,
little auk, Atlantic puffin
- Set of raster maps covering the N-E Atlantic
- First version available end of 2018 (www)



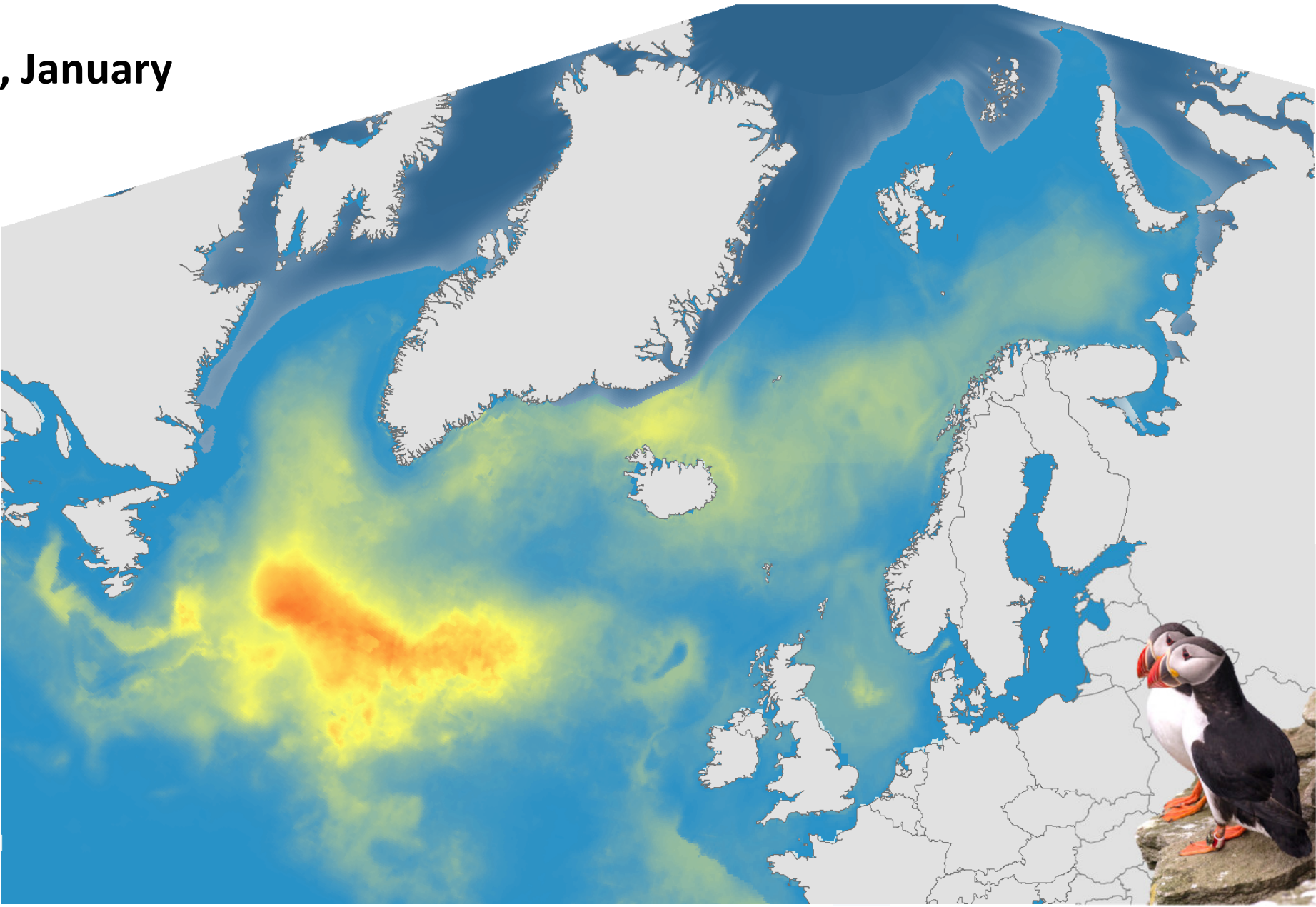


Puffin, September

- Combined model predictions from all colonies
- Colonies > 5000 pairs (52 colonies)
- < 400 km from a “SEATRACK colony”
- 4.7 mill. pairs
- 95% of the breeding population in NE Atl.

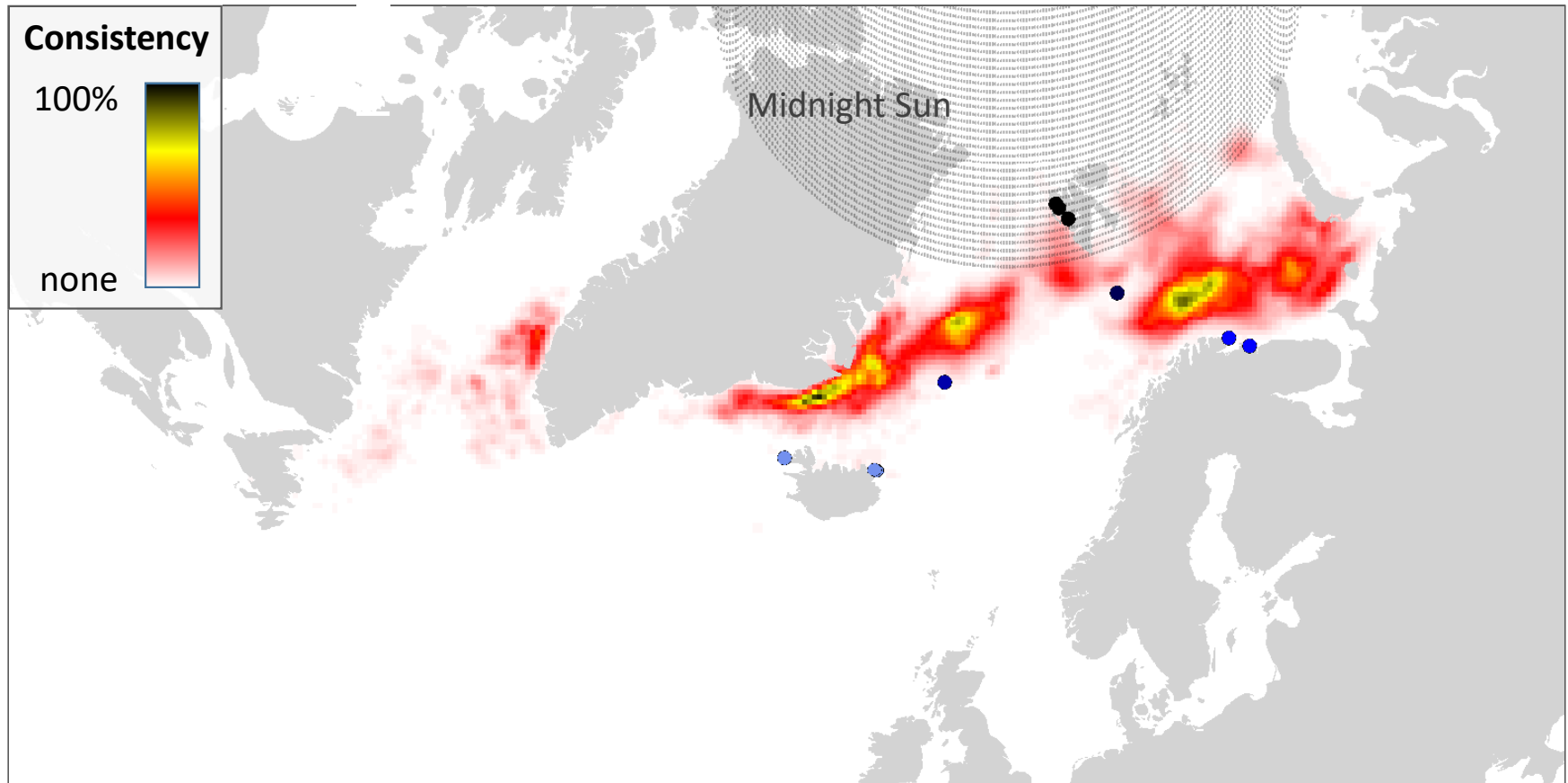


Puffin, January



Consistency

Brünnich's
guillemot
Autumn
8 colonies
2007-2016



Phase II (2019-2022)

- The marine ecosystems are **changing!**
- Continue **coordinated** logging to 2022
- Improve **data quality**:
 - Representativeness/sample size (e.g. Faroe Islands)
 - Increase precision/cover data gaps by using GPS-loggers?
- Include **juvenile birds** (some species/colony sites)
- **Expanding study area**
 - Include colonies in the British Isles N & W, Greenland, Canada





Thanks for listening and for more info please visit:

SEATRACK's web-application - <http://seatrack.seapop.no/map/>

SEATRACK's webpage - <http://www.seapop.no/en/seatrack>

SEATRACK's facebookpage - <https://www.facebook.com/seatrack.seapop.no/>

