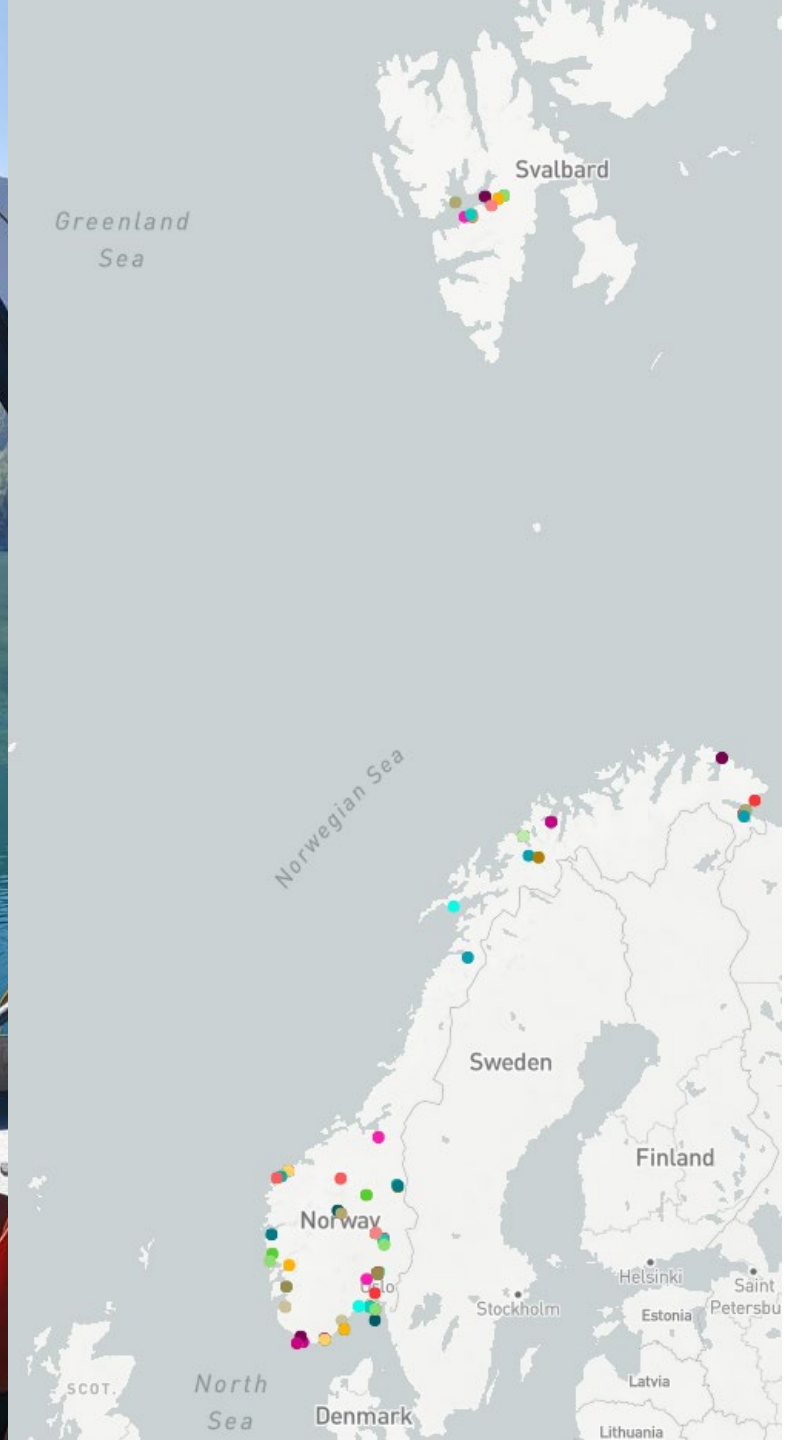
Norwegian Environment Agency

Implementing plastics/microplastics monitoring in Norway

Second International Symposium on Plastics in the Arctic and Sub-Arctic Region

Eivind Farmen, November 22nd 2023

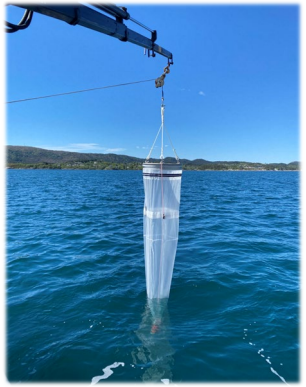
Photo: NIVA



Microplastic monitoring program

- Based on sampling through ongoing national monitoring
- Water
- Sediments
- Biota
- Air, deposition

Included samples





Replication:	1	3	1	1	3	3	1

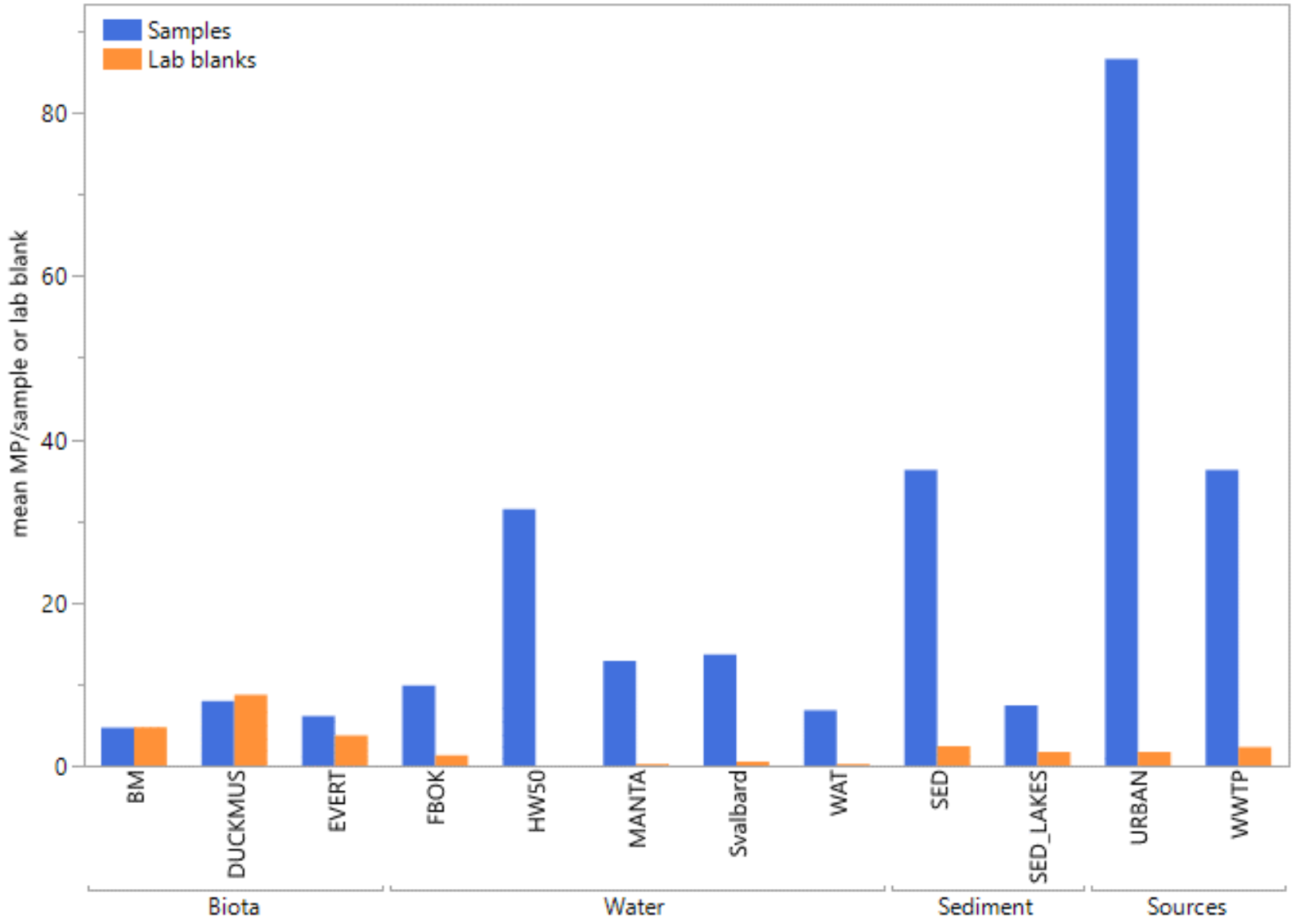
Sampling frequency:
Plankton haul sampling once/year
Sediments every 5 years
River seasonally (3 t/y)
Air 14 day samples through 6 months

Sample volumes
Plancton net hauls from -50 m: >10 000 L
Active pump for 1 h: 1000 L
Sediments: top 2 cm from 0,1 m2 sea floor
River: > 10 000 L (± 30 min horizontal trawl)
Air: 1000 m3

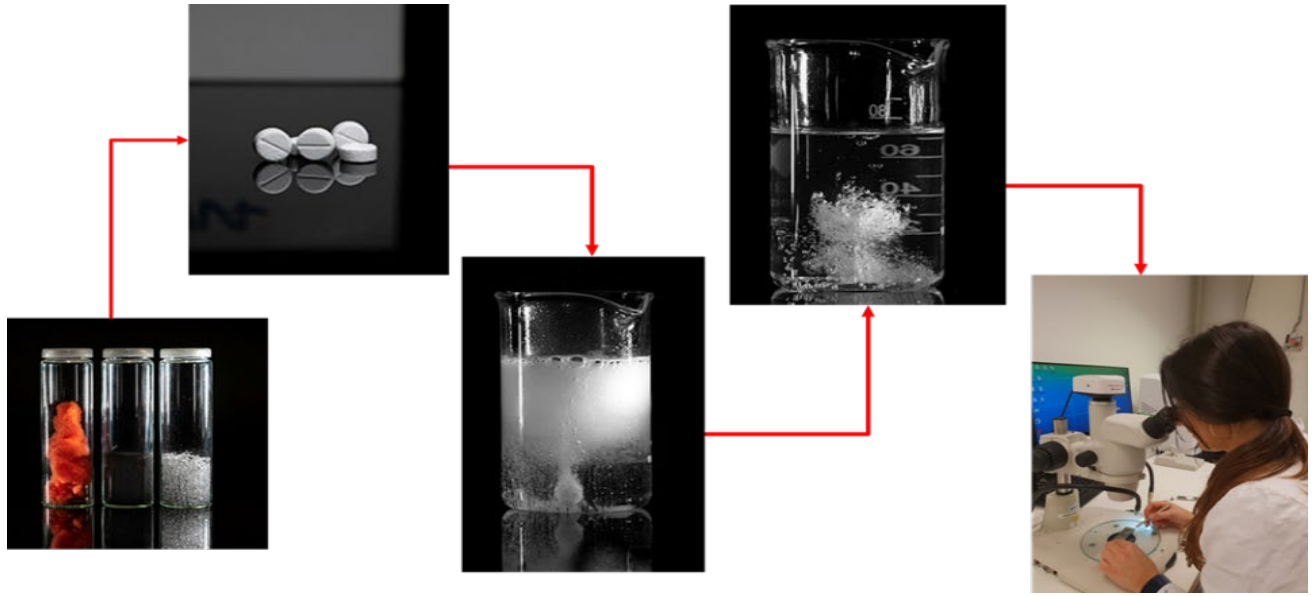
Experiences fieldwork

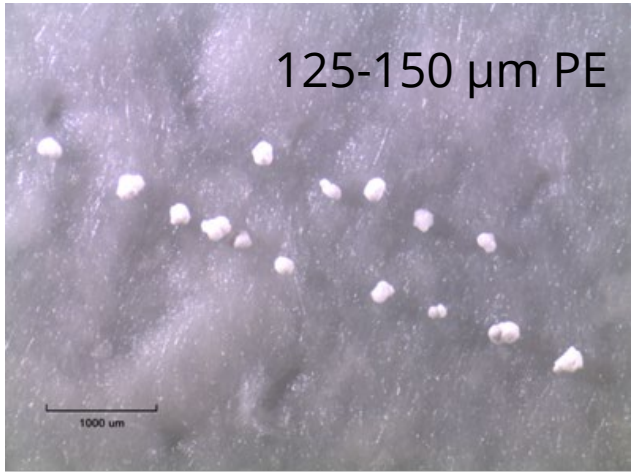
- Pros and cons of hitchhiking
- A lot of coordination for sample collection
- Some field blanks high

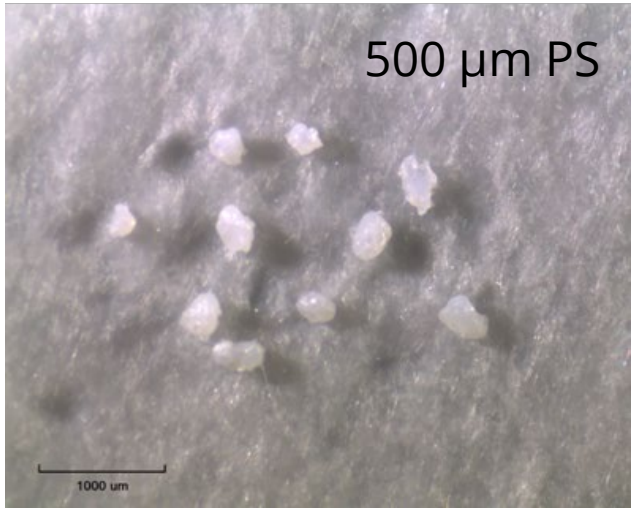
Experiences: lab blanks -> LOD



Recovery tests





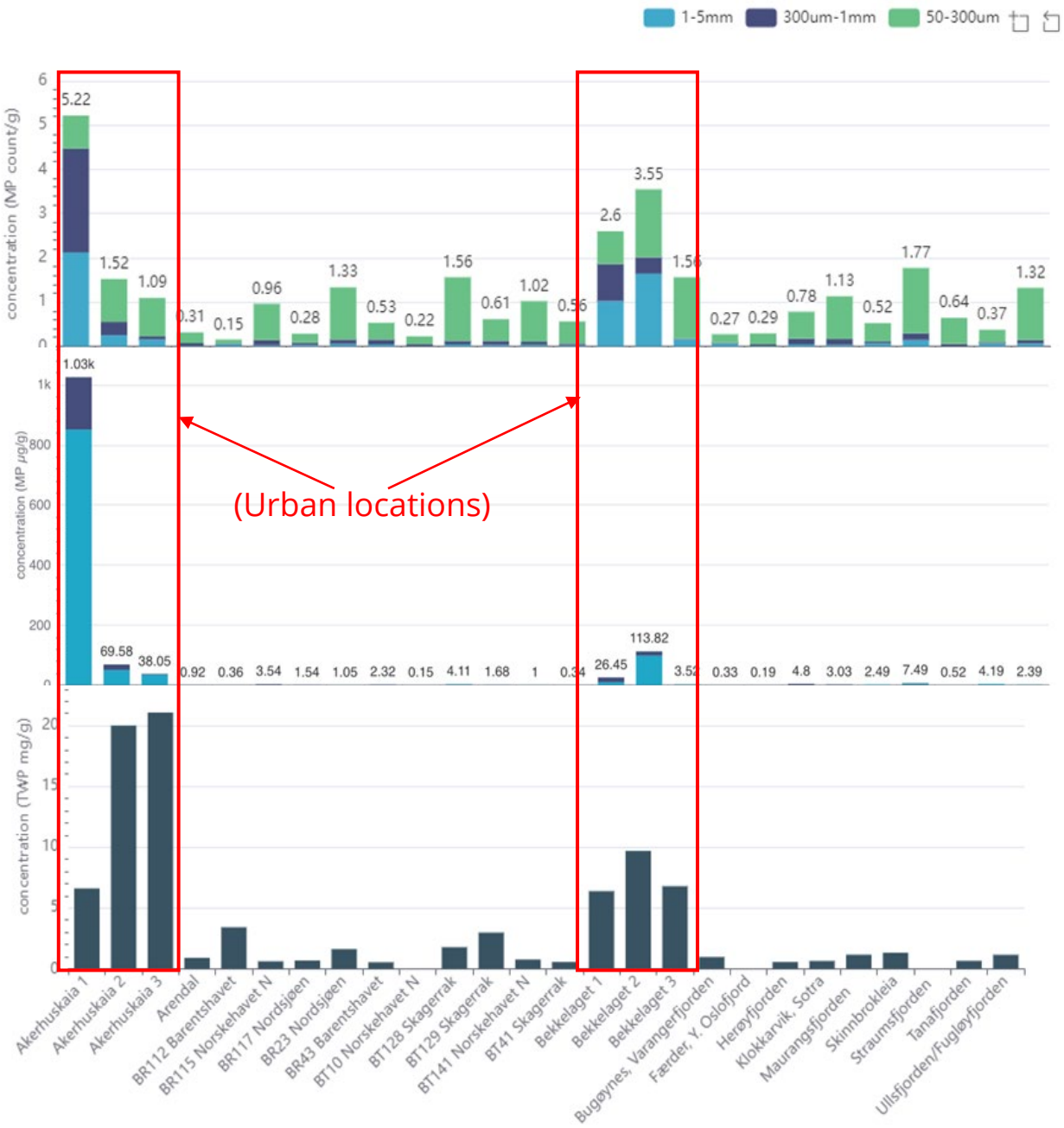


Water , blue mussel , sediment:

- > 90% recovery (>300 µm)
- ≈ 50-60% (<300 µm)

Photos: NIVA

Sediments



- Low numbers (around LOD) in background coastline
- Larger particles drive polymer mass
- High levels of tyre wear particles in urban locations (Pyr-GCMS)

Seabirds

Plastics in fulmar stomaches

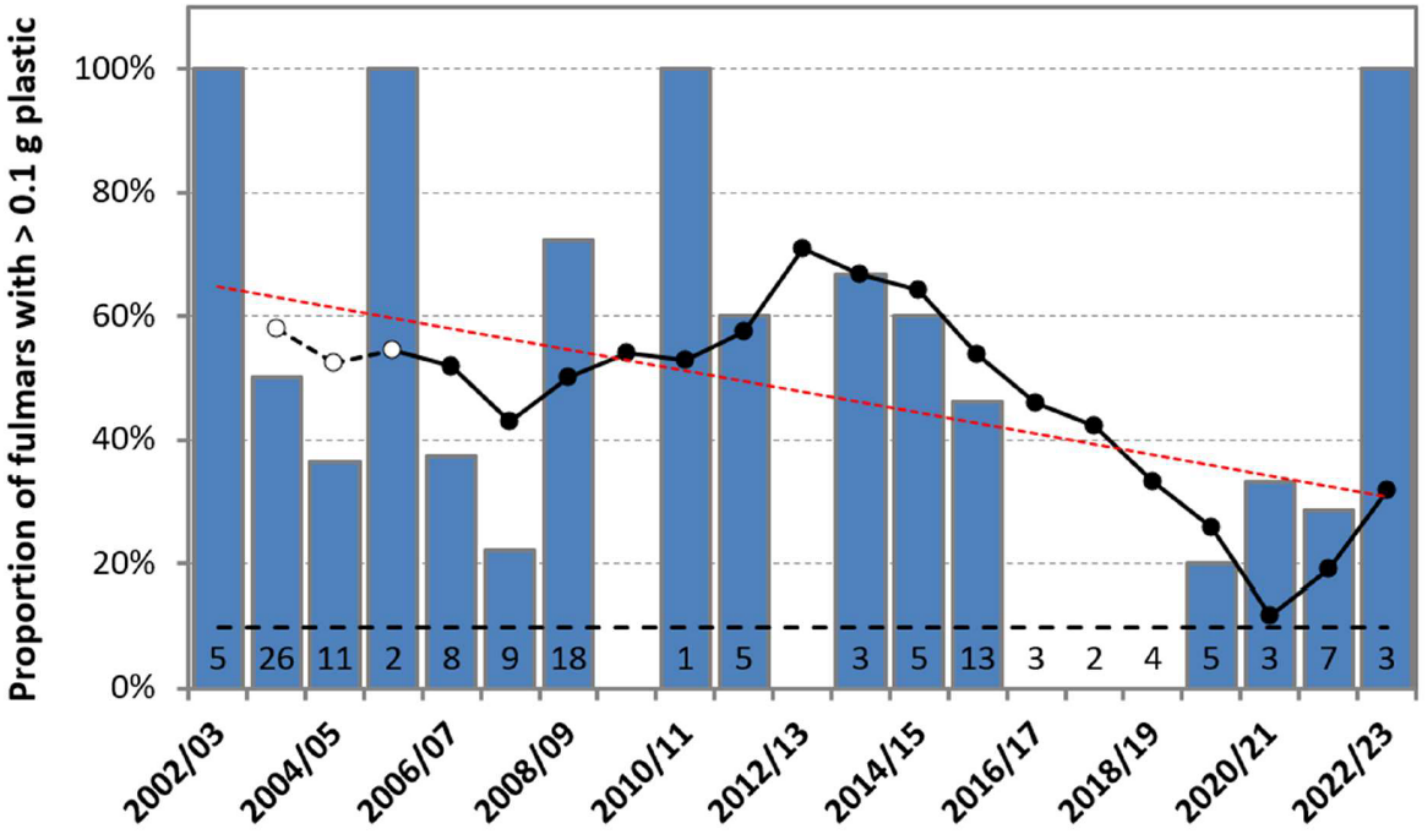


Figure 1. *Proportions of fulmars with more than 0.1 g plastic in their stomach, among those found dead on beaches in South Norway in 2002-2021. The EcoQO threshold level (black dashed line) and annual sample sizes are indicated. The black line and scatter plot shows the 5-year running mean centred over the last year in each period. The red dashed line indicates the long-term trend over the entire study period.*

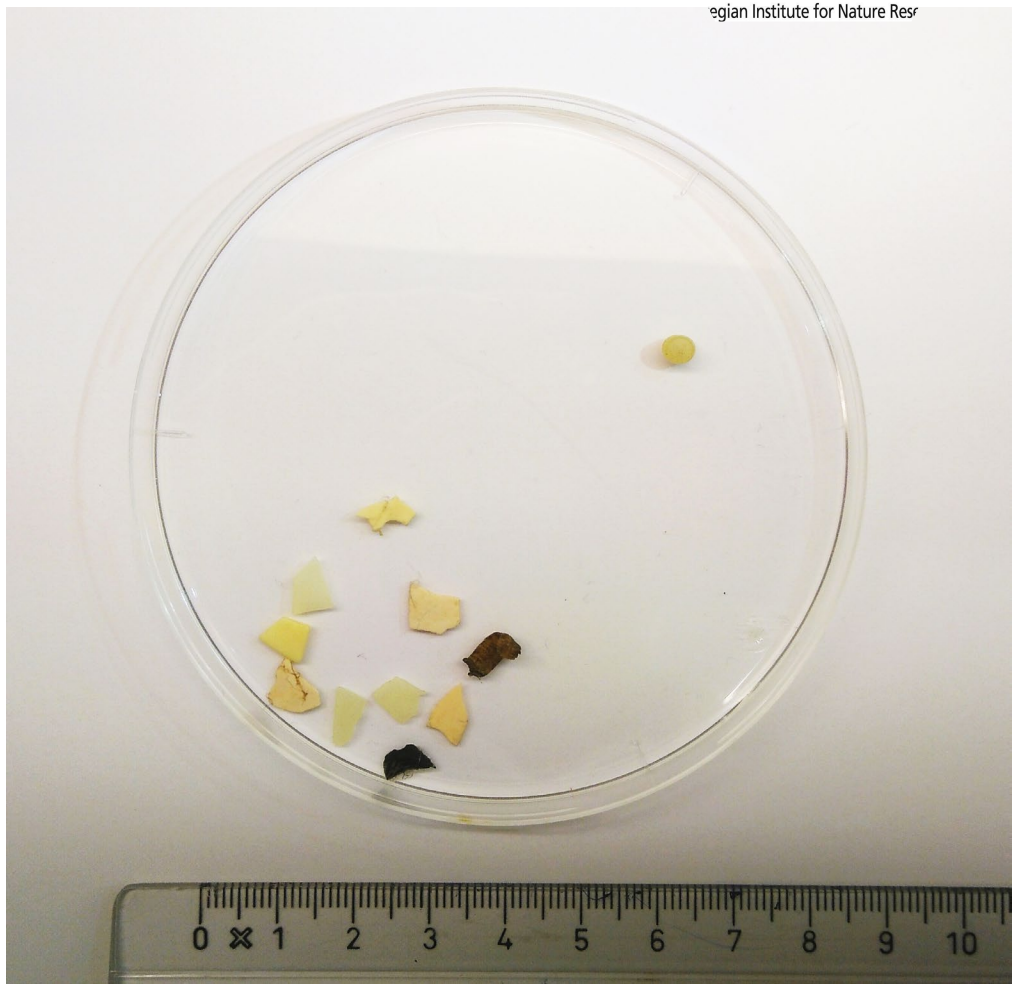


Photo: NINA

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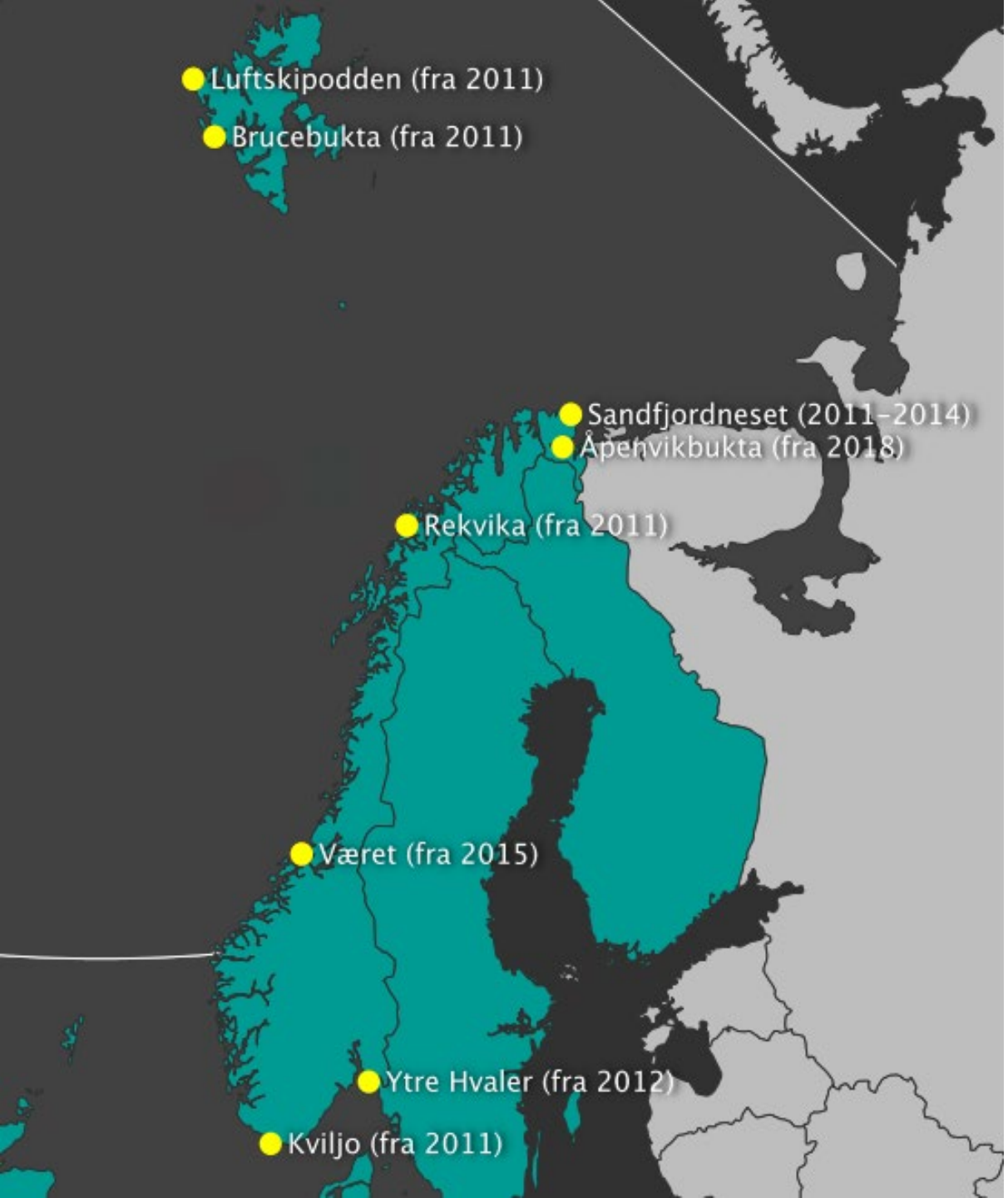
Experiences

- Difficult to obtain appropriate sample sizes
- Have started collecting birds from fisheries by-catch
- Test with non-disruptive sampling of Kittiwake reurgitate (ongoing)

Beach litter



OSPAR Beaches

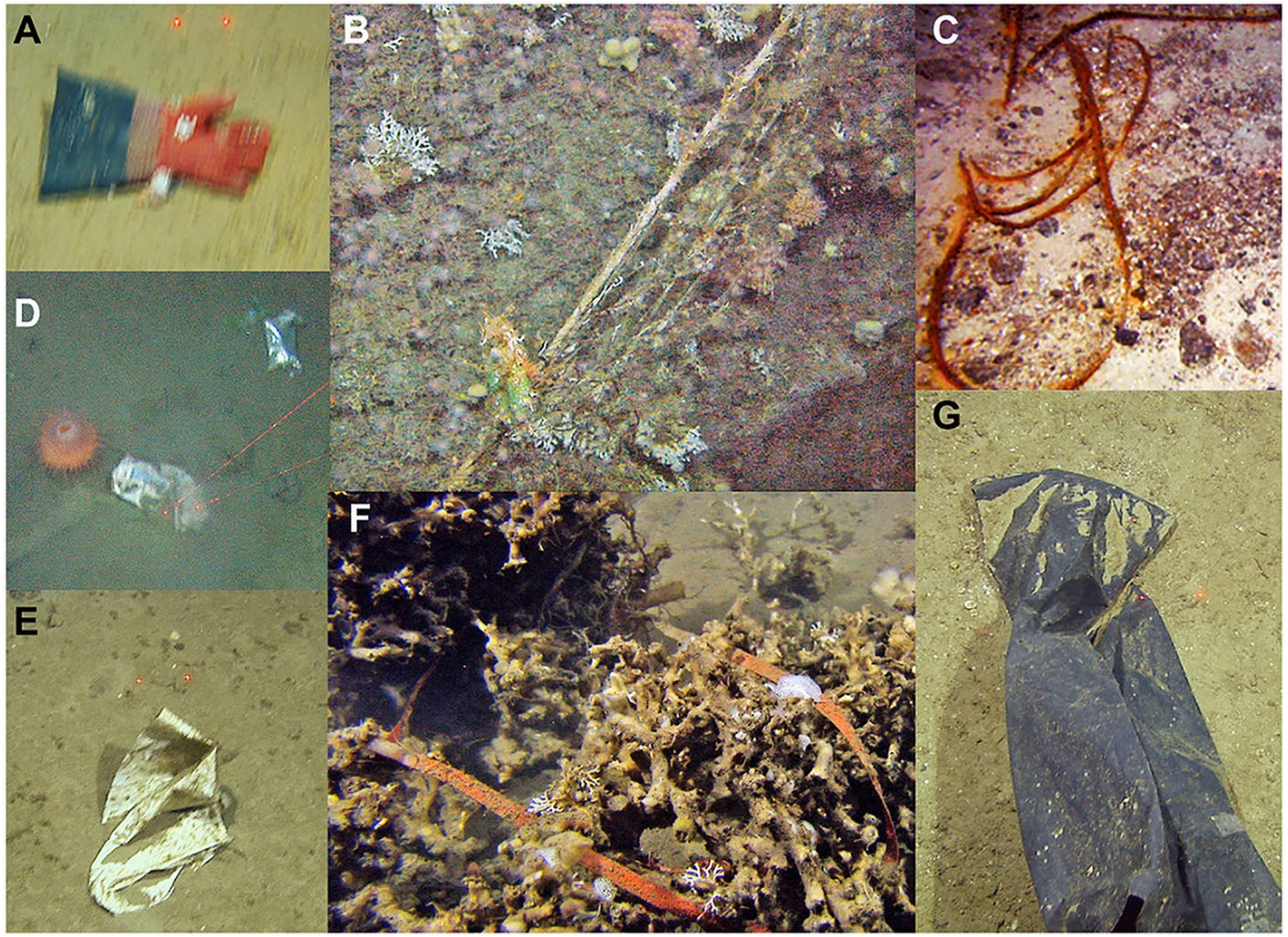
MARFO
ter mot marin forsøp

- 7 active beaches, but have failed to follow required frequency
- Data not included in assessments
- 13 beaches with increased frequency from 2024
- Establish national indicator(s) from beach litter monitoring

Sea floor

Mapping of litter densities

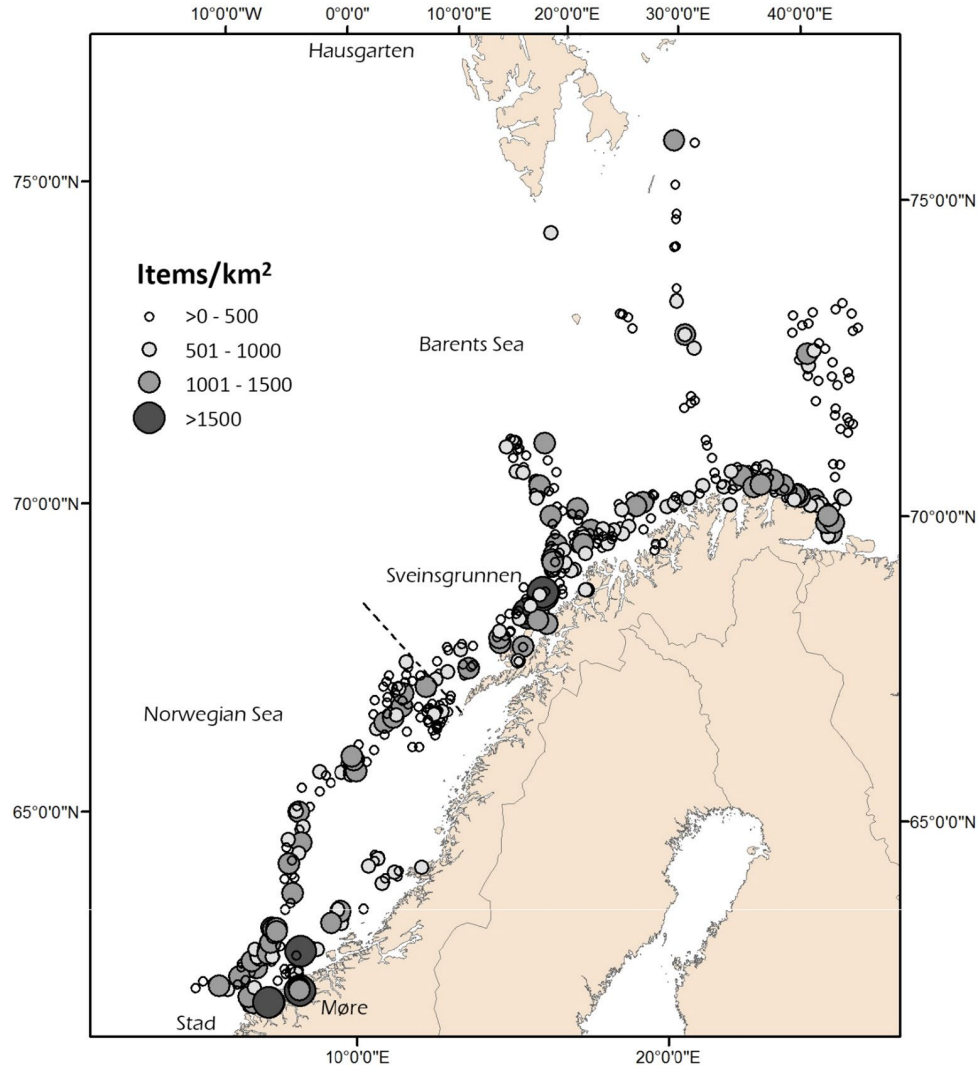
- Side activity of MAREANO ecosystem mapping
- 200 m x 3 m video transects



Buhl-Mortensen & Buhl-Mortensen, 2017

Experiences

- Spliting litter observations into subcategories of plastics needed (work ongoing)
- Locations are not revisited (mapping ≠ monitoring)
- Good reference point for future monitoring in fjords? (litter most abundant near coast)



Buhl-Mortensen & Buhl-Mortensen, 2017

Summary

- Partially successful sample collection by hitchhiking
- TWP analysis complement FT-IR
- Databases for microplastics are not ready
- Northern fulmars monitoring strenghtened by bycatch
- Beach litter monitoring was poor, but will improve
- Possible future sea floor monitoring could focus on fjords/near coast

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