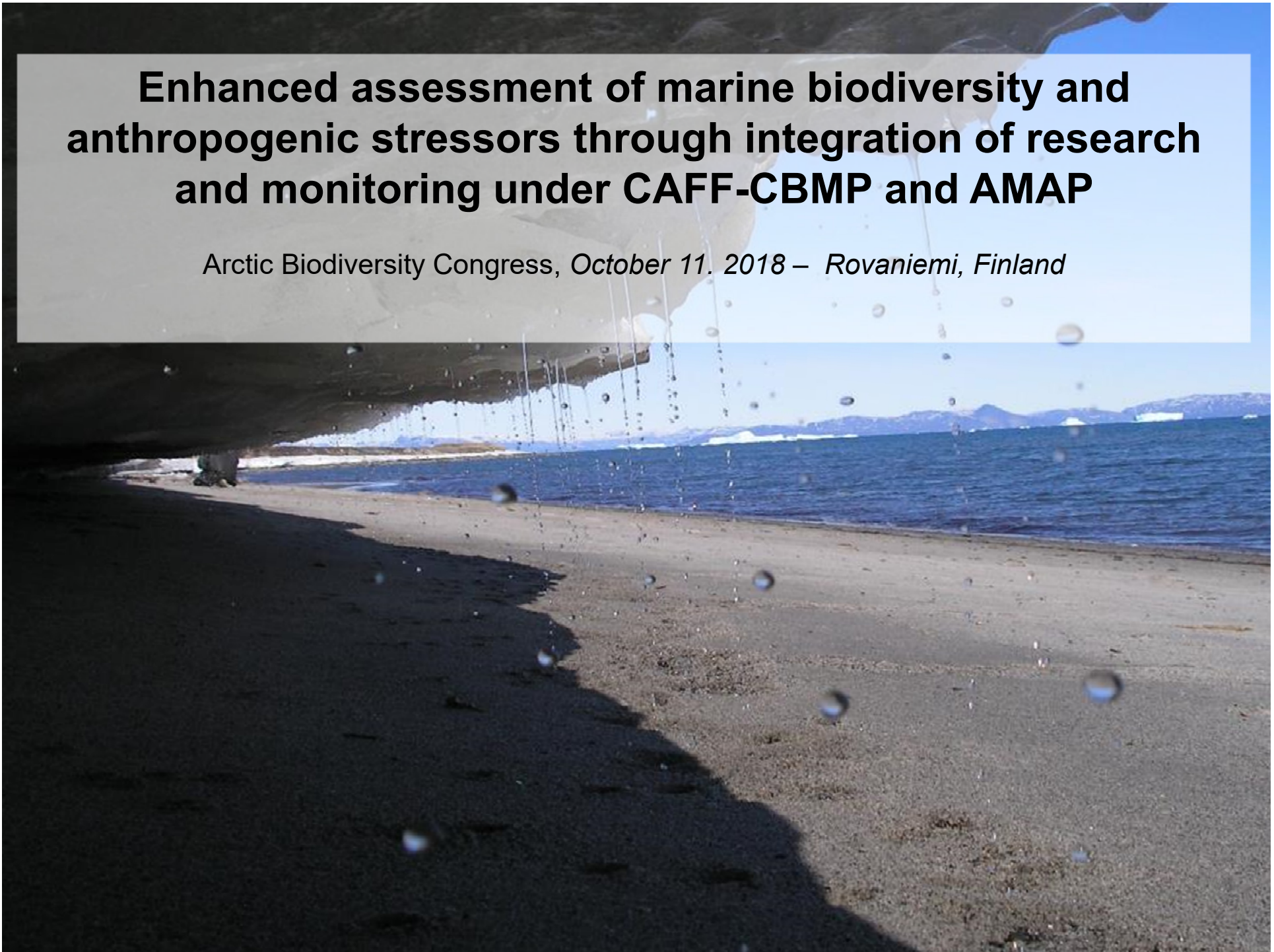


Enhanced assessment of marine biodiversity and anthropogenic stressors through integration of research and monitoring under CAFF-CBMP and AMAP

Arctic Biodiversity Congress, October 11, 2018 – Rovaniemi, Finland





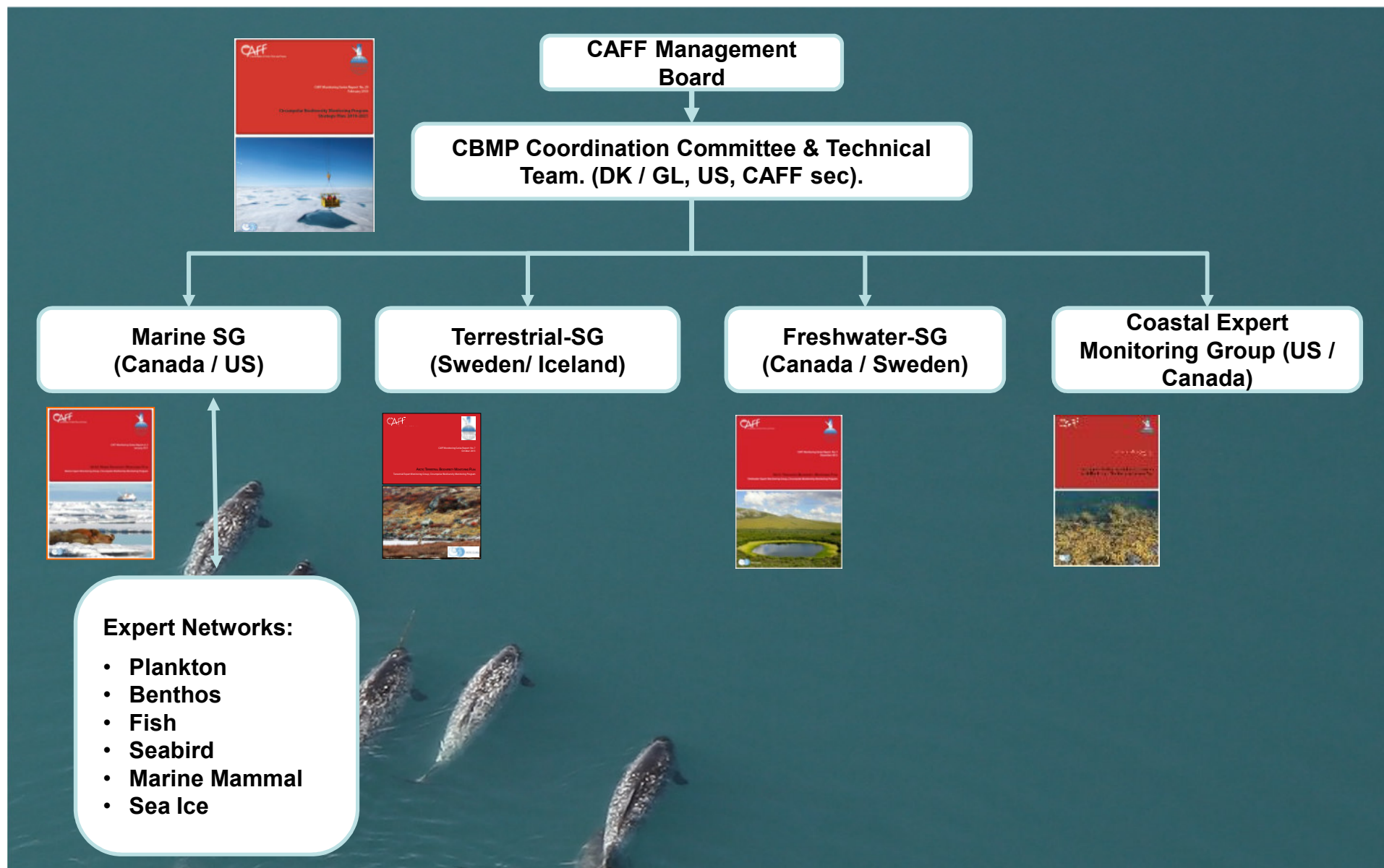
Circumpolar Biodiversity Monitoring Programme

October 11. 2018 – Arctic Biodiversity Congress, October 11. 2018 – Rovaniemi, Finland

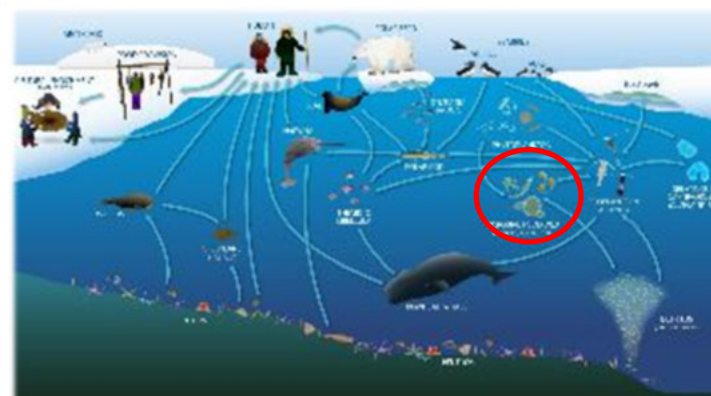
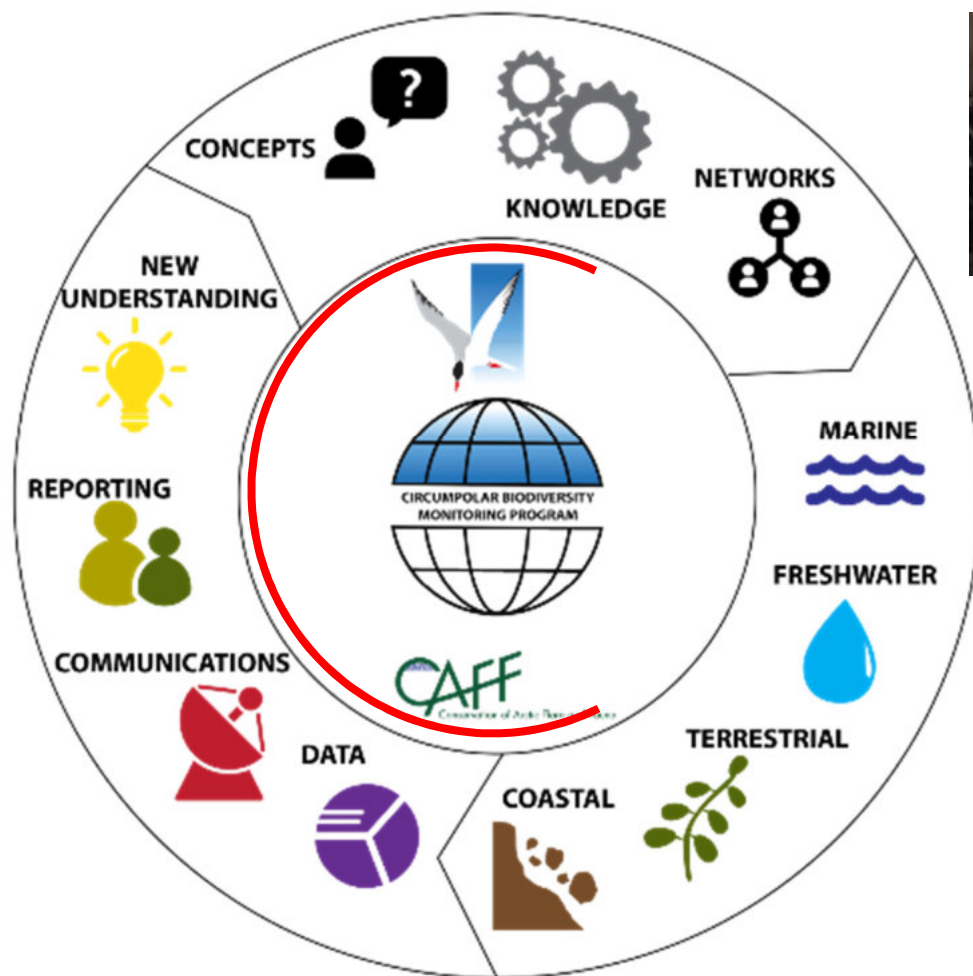
CBMP Marine as an adaptive monitoring programme, key findings and advice for future work

Tom Christensen, Jason Stow, Alain Dupuis, Sara Longan

CIRCUMPOLAR BIODIVERSITY MONITORING PROGRAM



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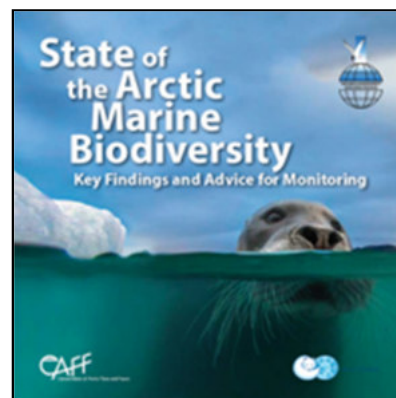


First CBMP assessment: State of the Arctic Marine Biodiversity Report

CIRCUMPOLAR BIODIVERSITY MONITORING PROGRAM



- Published May 2017
- More than 70 authors
- Tells us what existing biodiversity monitoring programs and other data are able to say about changes in Arctic biodiversity and ecosystems
- Provides key trends on biodiversity AND advices for future monitoring, directed towards policy and decision makers





SAMBR: FEC's include



Focal Ecosystem Components: Key elements, changes in the status of which likely indicate changes in the overall marine environment.

Sea Ice Biota:

- Microbes
- Ice algae
- Ice meiofauna
- Ice macrofauna

Plankton:

- Phytoplankton and larger protists
- Microbial Eukaryotes
- Bacteria and Archaea
- Zooplankton

Benthos:

- Macrofauna (organisms larger than 1 mm)
- Megafauna (organisms that can be identified on photo/or caught by trawl)

Fish:

- Capelin
- Polar Cod
- Greenland halibut

Birds:

- Black-legged kittiwake
- Common murre
- Thick-billed murre
- Ivory gull
- Common eider
- Glaucous gull
- Least auklet
- Dovekie

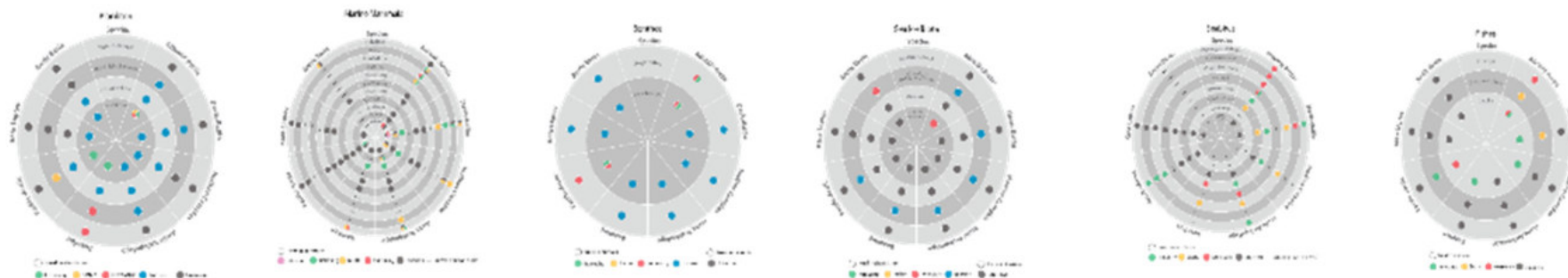
Marine mammals:

- Walrus
- Ringed seal
- Bearded seal
- Ribbon seal
- Harp seal
- Hooded seal
- Spotted seal
- Narwhal
- Beluga
- Bowhead whales
- Polar bear

The 6 FEC group subchapters will be of extreme value in the continued CBMP implementation

- Baselines/ trends on FEC's (if possible)
- Drivers of observed trends
- Comparisons between the AMA's (where possible)
- Current monitoring, monitoring gaps and advise for future monitoring
- Figures and tables on FEC's that are relatively easy to update based on future monitoring

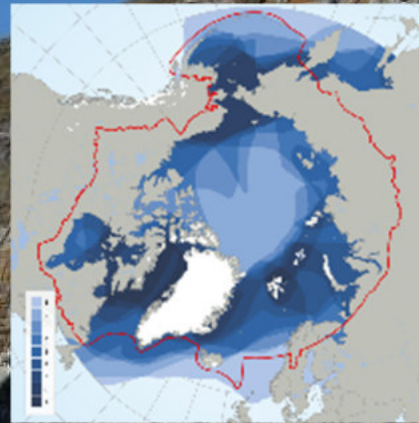
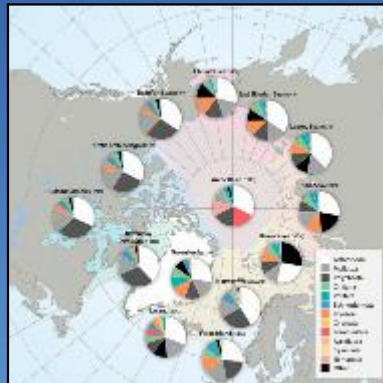
SAMBR: Arctic Marine Areas



Lots of data about FEC status and trendsand lots of gaps



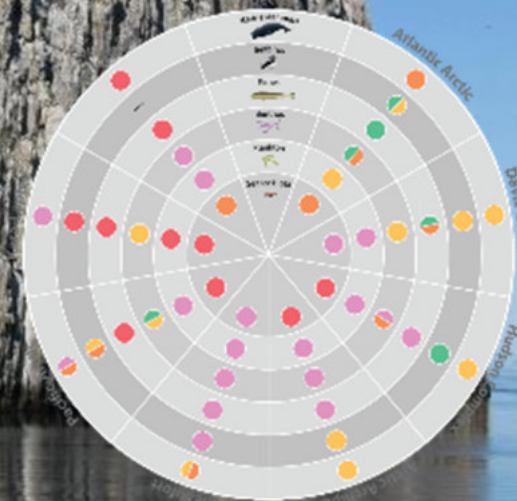
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| CBMP Arctic Master Area | CBMP region | Country | Hairy gull | | Glaucous gull | | Black-legged kimbaskie | | Thick-billed murre | | Common murre | | Common loose | | Terns | | Terns | | Terns | |
|----------------------------|----------------|---------|---------------|-------|------------------|-------|---------------------------|-------|-----------------------|-------|-----------------|-------|-----------------|-------|---------------|-------|---------------|-------|---------------|-------|
| | | | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend | Total pop. | Trend |
| Eurasian Arctic | 1 | Russia | - | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - |
| | 2 | USA | - | - | 343 | - | 77,147 | 1 | 125,666 | 1 | 127,722 | 1 | 173 | 1 | 472,500 | 1 | 1 | 1 | 1 | 1 |
| Terns | 12 | USA | - | - | 451 | - | - | - | - | - | - | - | 740 | - | - | - | - | - | - | - |
| | 13 | Canada | 2 | - | 1 | - | - | - | 411 | - | - | - | 47,000 | - | - | - | - | - | - | - |
| Hairy gull | 7 | Canada | 122 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 8 | Canada | 411 | - | 431 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Glaucous gull | 9 | Canada | 411 | - | 1 | - | 118,000 | 1 | 542,000 | - | - | - | - | - | - | - | - | - | - | - |
| | 10 | Canada | - | - | 27,000 | - | 47,129 | 1 | 212,100 | - | - | - | 47,000 | - | - | - | - | - | 33,000 | - |
| Thick-billed murre | 11 | Canada | - | - | 1 | - | 2,000 | - | 40,000 | - | - | - | - | - | - | - | - | - | - | - |
| | 12 | Canada | - | - | 15,000 | - | 40,721 | 1 | 17,121 | - | 142 | - | 77,000 | - | - | - | - | - | 100 | - |
| Common murre | 13 | Canada | - | - | 1,411 | - | 2,000 | - | 4,500 | - | 4,500 | - | 14,000 | - | - | - | - | - | - | - |
| | 14 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Common loose | 15 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| | 16 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 17 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| | 18 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 19 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| | 20 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 21 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| | 22 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Total | | | 4,111 | - | 1,411 | - | 2,000 | - | 4,500 | - | 4,500 | - | 14,000 | - | - | - | - | - | - | - |

| Species | CBMP Arctic Master Area | CBMP region | Country | Year | Stock | Trend | Stock | Trend | Stock | Trend | Stock | Trend | Stock | Trend | Stock | Trend | Stock | Trend | Stock | Trend |
|-----------------------|----------------------------|----------------|---------|------|-------|-------|---------|-------|---------|-------|---------|-------|--------|-------|---------|-------|-------|-------|-------|-------|
| Common murre | 1 | Russia | - | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - |
| Common loose | 2 | USA | - | - | 343 | - | 77,147 | 1 | 125,666 | 1 | 127,722 | 1 | 173 | 1 | 472,500 | 1 | 1 | 1 | 1 | 1 |
| Hairy gull | 7 | Canada | 122 | - | 431 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Glaucous gull | 9 | Canada | 411 | - | 1 | - | 118,000 | 1 | 542,000 | - | - | - | - | - | - | - | - | - | - | - |
| Thick-billed murre | 11 | Canada | - | - | 1 | - | 2,000 | - | 40,000 | - | - | - | - | - | - | - | - | - | - | - |
| Common murre | 13 | Canada | - | - | 1,411 | - | 2,000 | - | 4,500 | - | 4,500 | - | 14,000 | - | - | - | - | - | - | - |
| Common loose | 15 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 17 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 19 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 21 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Terns | 22 | Canada | - | - | 1 | - | - | - | 452,000 | - | - | - | 5,000 | - | - | - | - | - | - | - |
| Total | | | 4,111 | - | 1,411 | - | 2,000 | - | 4,500 | - | 4,500 | - | 14,000 | - | - | - | - | - | - | - |

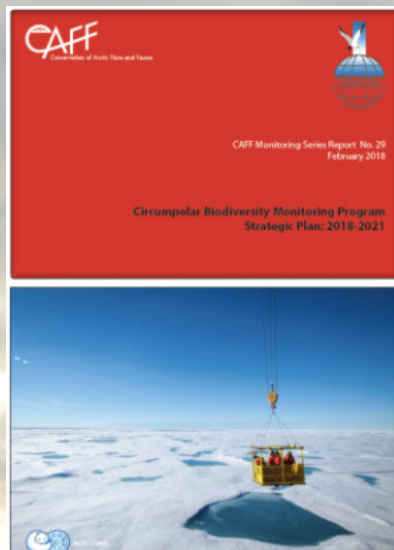
84 stocks!



CIRCUMPOLAR BIODIVERSITY MONITORING PROGRAM



- Input appreciated on most relevant drivers of changes including;
 - Climate change (influence on currents, changes in duration of open water versus sea ice, the extent of seasonal ice cover, sea ice thickness, snow on sea ice, mixing of water column, increased freshwater in the surface layers etc.)
 - Ocean acidification (related to effects on biodiversity)
 - Contaminants (related to effects on populations)
 - Cumulative effects (climate change in relation to industrial development, oil and gas exploration, tourism, pollution, noise and shipping, harvest, fishery etc.)



Plan approved and published in autumn 2017

Four overall goals are defined through a number of objectives and activities.

Examples on activities of relevance to future cooperation:

- Align CBMP to support inputinto global reporting needs and explore how data might fit in to other reporting requirements
- Establish new partnerships and take national, Circumpolar and also global needs into account when planning follow up on the SABR´s
- Report on changes in Arctic species, ecosystems, and the effects of stressors through SABRs;
- Consider impacts of stressors and drivers within reviews of the Arctic Biodiversity Monitoring Plans

A photograph of a white bird, possibly a booby, with a black collar around its neck. The bird is sitting in a nest made of tall, dry grass and twigs. The background is a blurred, greyish-blue sky or water. The text "Thank you" is overlaid in red at the bottom center.

Thank you