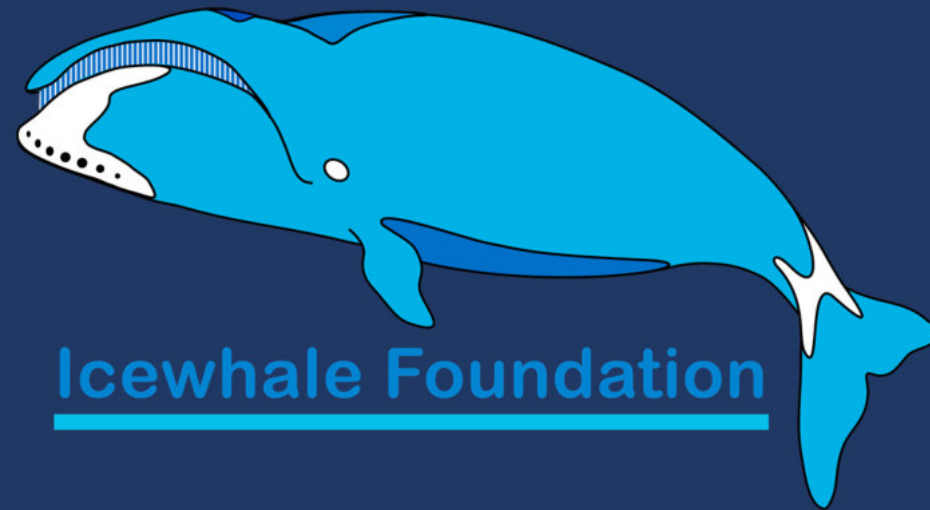


Icewhale Research Expeditions

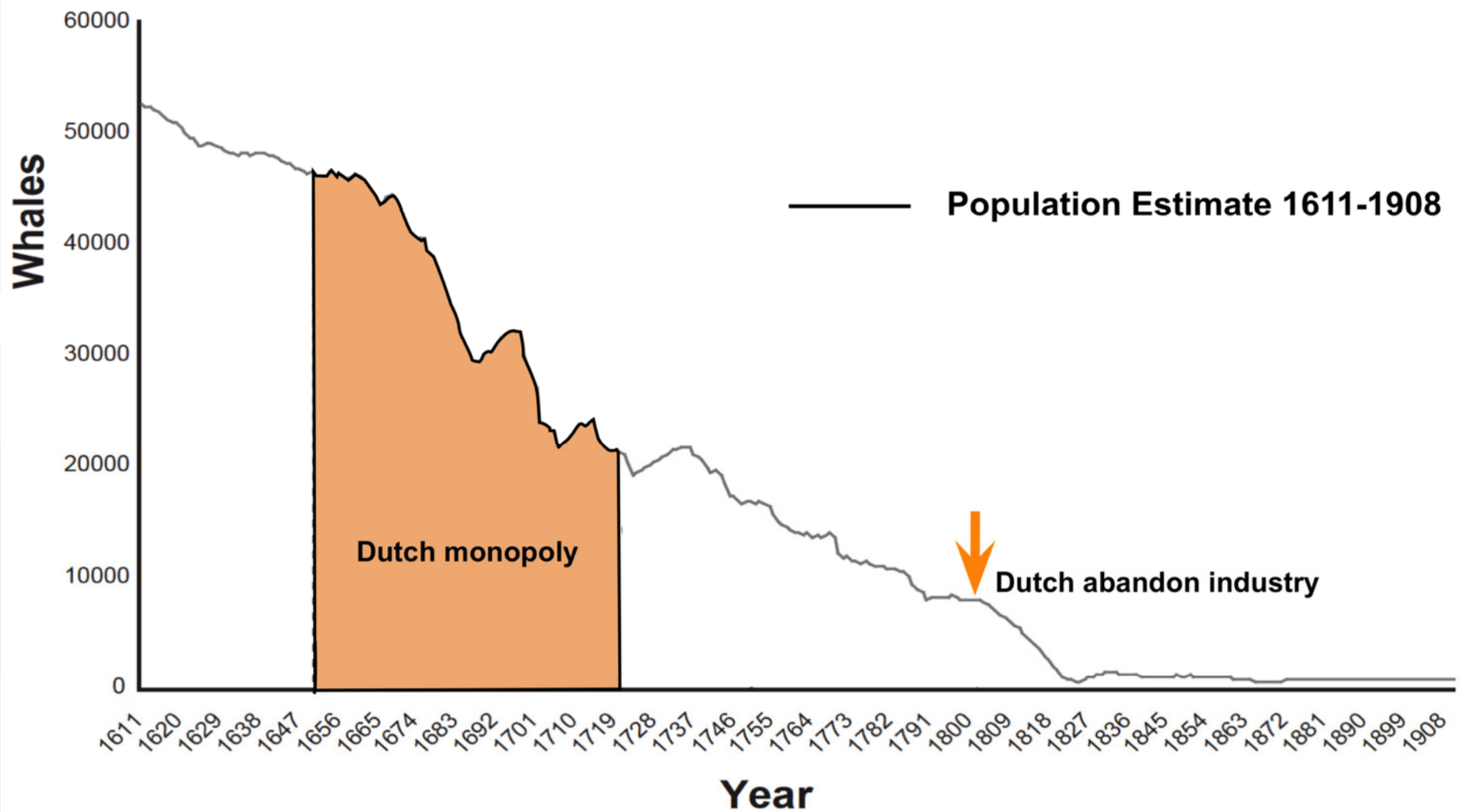
Herman Sips











Allen & Keay, 2006

FEATURE ARTICLE



Spitsbergen's endangered bowhead whales sing through the polar night

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ABSTRACT: Bowhead whales *Balaena mysticetus* are long-lived cetaceans, uniquely adapted among the baleen whales to live year-round in the Arctic. All bowhead whale populations were greatly reduced by commercial whaling from the 1600s through the 1800s, with the largest, the Spitsbergen population in the North Atlantic, depleted to the point of extinction. Recent sightings of bowhead whales west of Svalbard precipitated an





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Animal behaviour

Extreme diversity in the songs of Spitsbergen's bowhead whales

K. M. Stafford¹, C. Lydersen², Ø. Wiig³ and K. M. Kovacs²

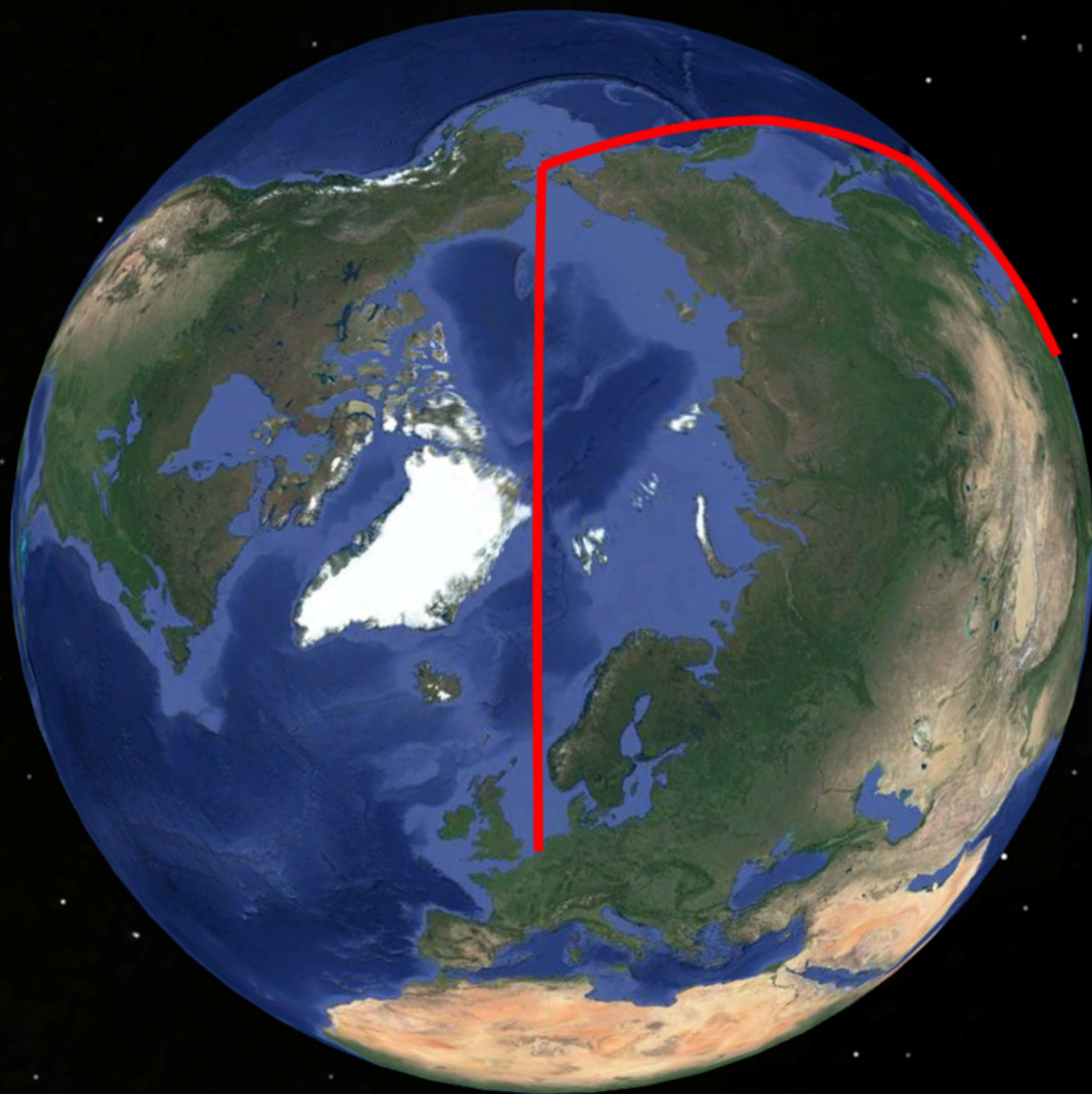
¹Applied Physics Laboratory, University of Washington, Seattle, WA 98105, USA

²Norwegian Polar Institute, NO-9296 Tromsø, Norway

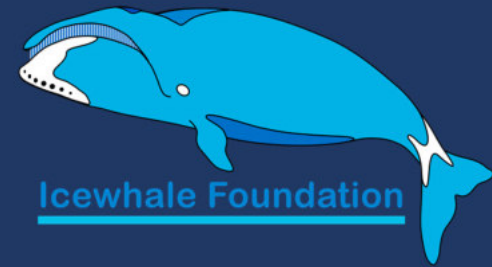
³Natural History Museum, University of Oslo, N-0318 Oslo, Norway

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Almost all mammals communicate using sound, but few species produce complex songs. Two baleen whales sing complex songs that change annually, though only the humpback whale (*Megaptera novaeangliae*) has received much research attention. This study focuses on the other baleen whale singer, the bowhead whale (*Balaena mysticetus*). Members of the Spitsbergen bowhead whale population produced 184 different song types over a 3-year period, based on duty-cycled recordings from a site in Fram Strait in the northeast Atlantic. Distinct song types were recorded over short periods, lasting at most some months. This song diversity could be the result of



Aims of the Icewhale project:

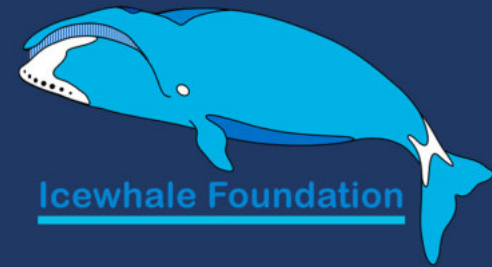


Aims of the Icewhale project:

Public Awareness:

- Icewhale: *Icon of the Arctic*

Figurehead of sustainable conservation and development

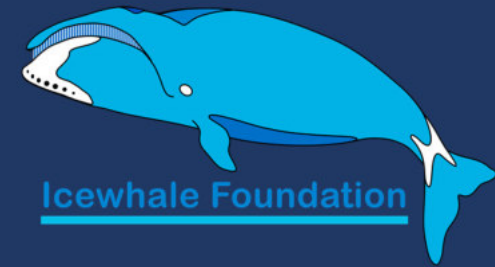


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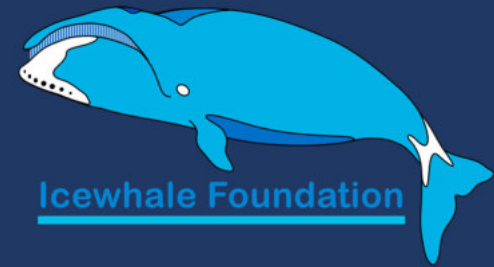
Scientific Research Expeditions:

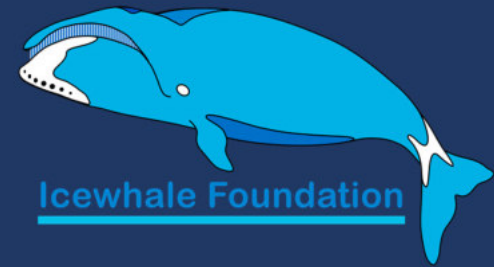
Contributing to:

- Assessment population size and distribution
- Assessment mating grounds and reproductive behaviour
- Assessment vulnerability human impacts
- Ecology of the marginal ice zone
- Validation remote data *in situ* (ice & climate modelling)

Icewhale Research Expeditions:

- series of expeditions in six subsequent polar winters
- main research mode is 'silent drift' through the marginal ice zone
- longlasting research (4-5 months)
- limited crew, supported 24/7 by a 'ground control station'



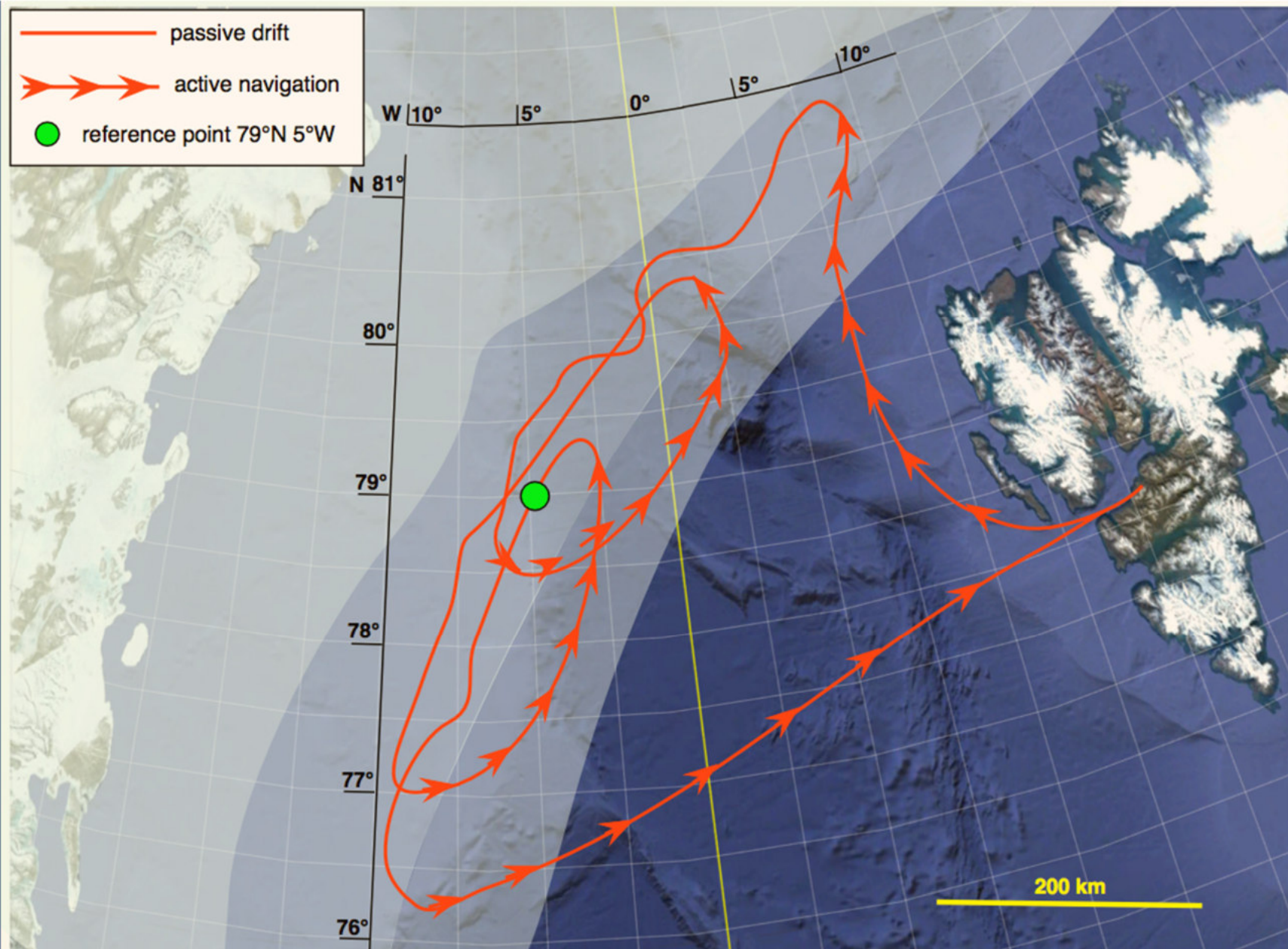


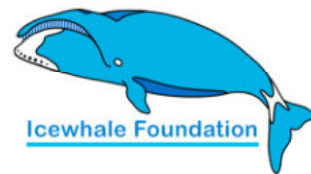
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Feasibility study and basic design MARVEL:

cooperation: NWO, NIOZ, TNO, TU Delft, naval architects

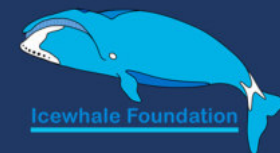




MARVEL
DRIFT-ICE VESSEL



ADMIRE – science plan



Arctic Drift Mutidisciplinary Icewhale Research Expeditions

SPECIFYING SPITSBERGEN'S ICEWHALE POPULATION

SPECIFYING ENVIRONMENTAL DRIVERS

SPECIFYING HUMAN IMPACT

ADMIRE – science plan

Arctic Drift Mutidisciplinary Icewhale Research Expeditions



SPECIFYING SPITSBERGEN'S ICEWHALE POPULATION

- Where do Icewhales live in the polar winter?
- What are the population characteristics?
- What mating strategy Icewhales apply?

SPECIFYING ENVIRONMENTAL DRIVERS

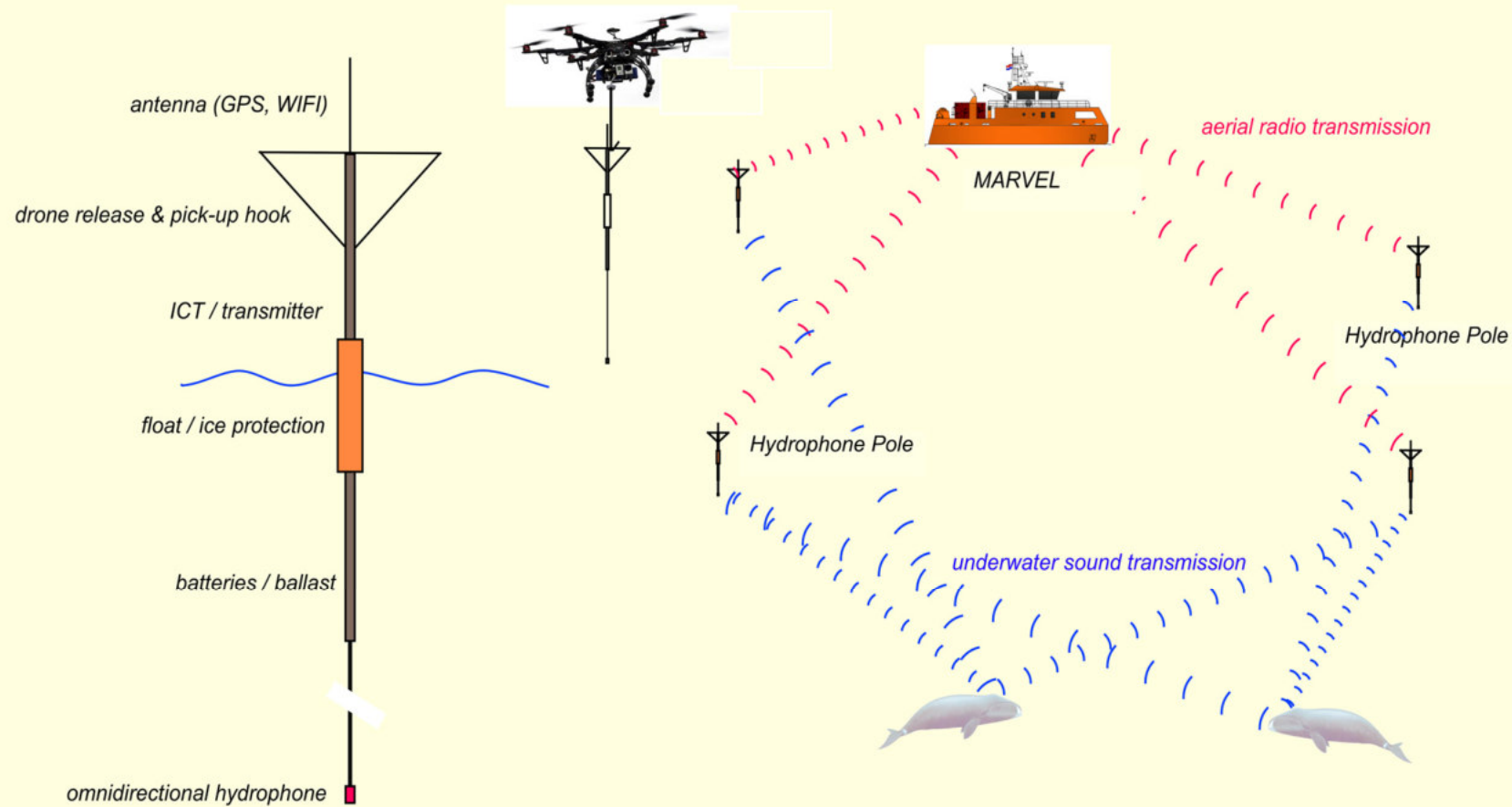
- What ice and meteo characteristics define whale presency and migration?
- Do Icewhales prefer certain local ocean and bottom - characteristics?
- Is Icewhale presency related to ice-acoustics?
- Do Icewhales feed themselves while wintering?
- How do Icewhales affect the food web?

SPECIFYING HUMAN IMPACT

- How vulnerable are these highly vocal animals to noise from ship engines, sonar and seismic airguns?
- How do these big filter-feeding animals cope with microplastics?
- What conservation measures are feasible?

Hydrophone-Transmitter Pole

*drone delivered floating pole;
realtime transmitting of hydrophone-audio, GPS, timescale.*



Hydrophone Multi-Channel Recording and Processing

*spectograms cross correlation and multilateration;
individualisation and positioning;
determining migration/aggregation and song characteristics*





contribution

coordination

cooperation

