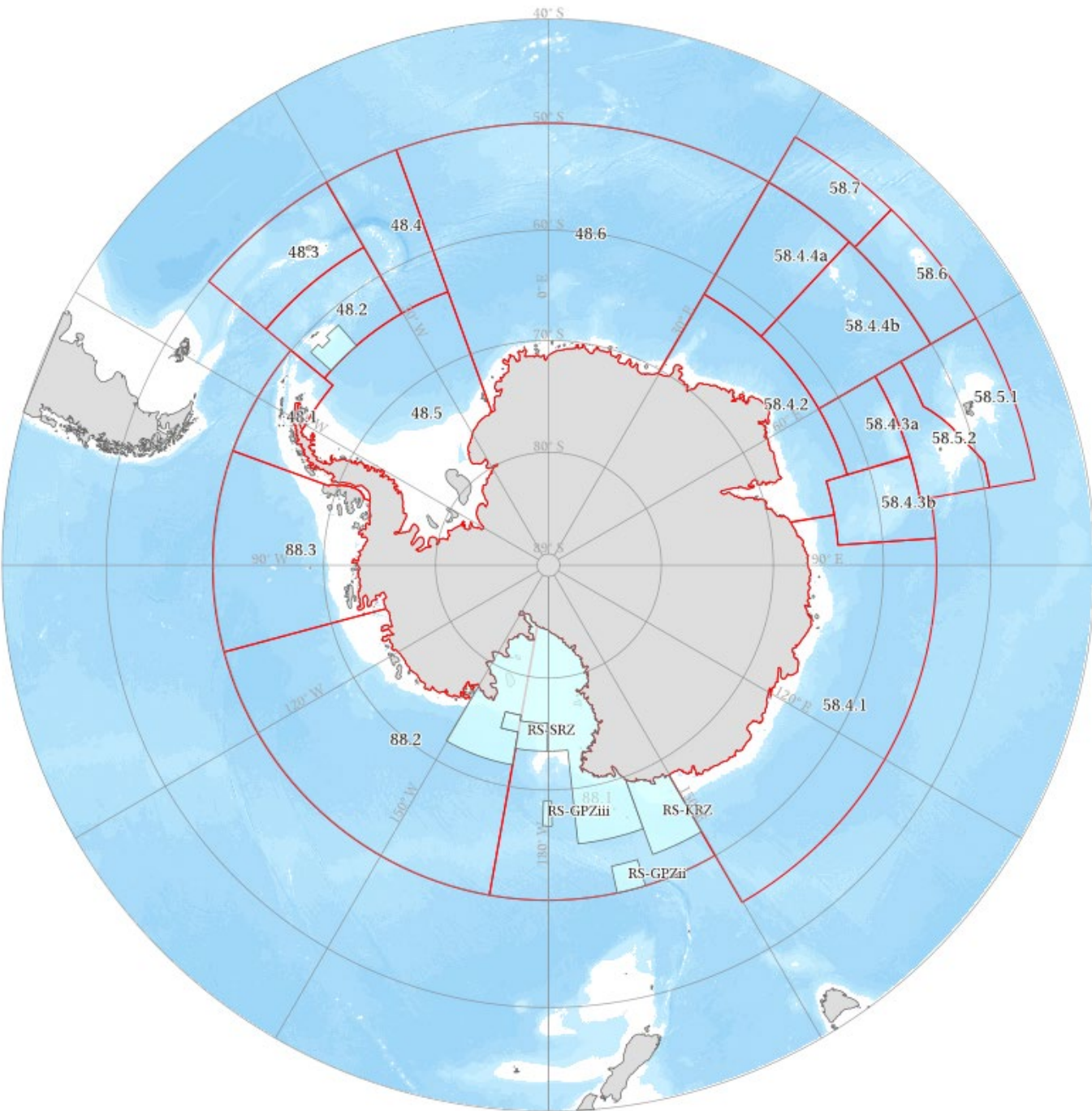
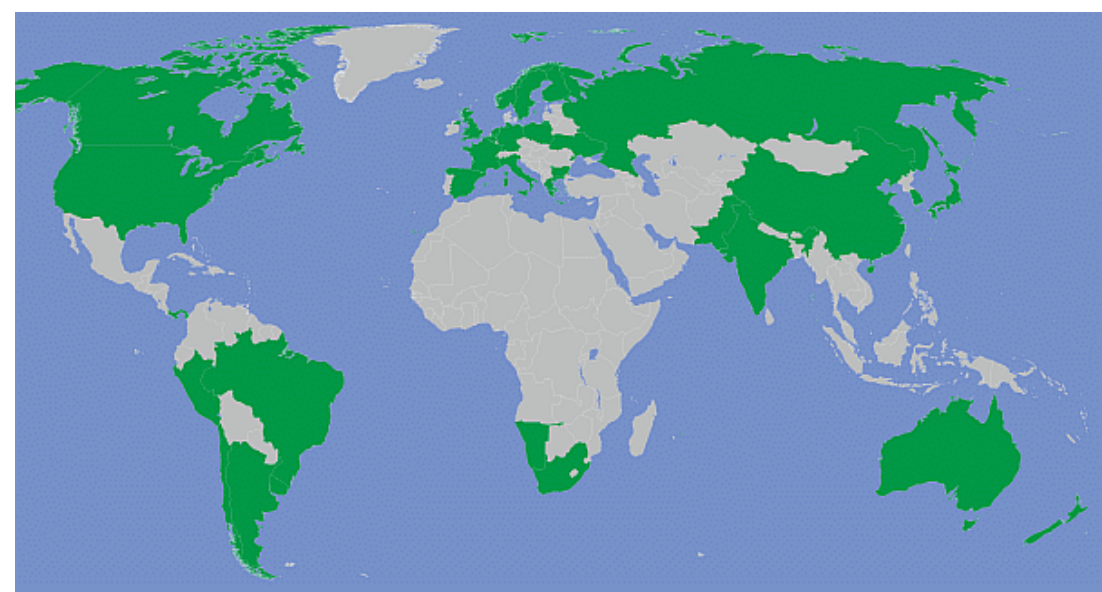


CCAMLR and the management of the Krill Fishery

The CCAMLR Convention Area encompasses the whole Southern Ocean, south of the Polar Front.



- CCAMLR is an international organization established in 1982.
- It is an Agreement related with the Antarctic Treaty System.
- CCAMLR's objective is conserving Antarctic marine life, where conservation includes rational use (i.e., harvesting).
- It implements an ecosystem-based approach to management
- It currently has 27 members Worldwide.



How CCAMLR manages the fisheries?

- CCAMLR is recognized but its implementation of an ecosystem-based approach to management



It considers the effect on the target species, as well as dependent species (prey, predators) and associated ecosystem (i.e., bycatch, incidental mortality).

(i) Safeguards a stable recruitment of the target population



Recap: 3 Part Decision Rule

- Safeguard recruitment
 - Find catch limit so that the probability of spawning stock dropping below 20% of its pre-exploitation median level is 10%

(ii) Safeguards food availability for predators

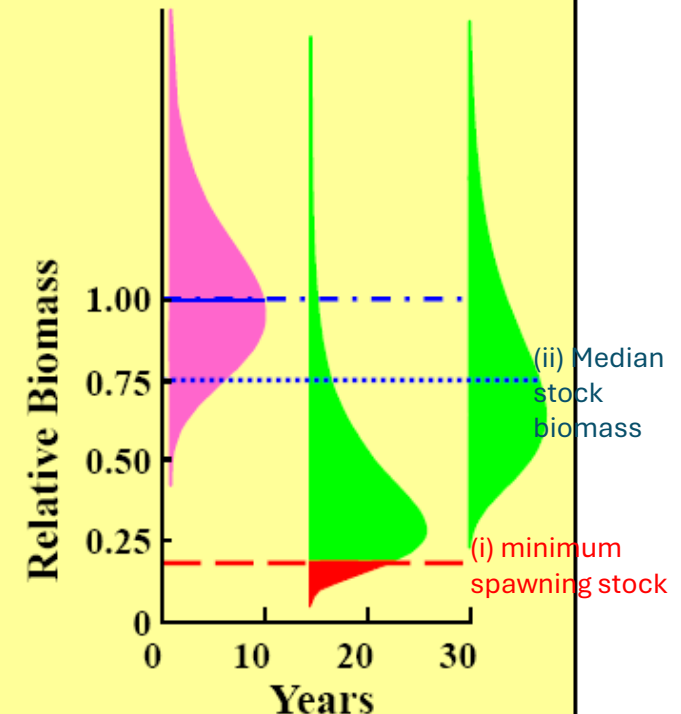


- Safeguard predators
 - Find catch limit so that median spawning stock escapement is at 75% of the pre-exploitation median

(iii) Prevent long-term changes in the ecosystem; projects population changes for 20 years, and choose the lower of (i) and (ii)



- Choose the lower of the two catch limits



What is Krill? What is Krill? What is Krill?



Euphausiid ~85 species

Antarctic krill - *Euphausia superba*

Exclusive to the Southern Ocean

Macro-zooplankton: 30-60 mm

“long-lived”: 3-6 years

The most abundant animal on the planet

~300-500 million tonnes

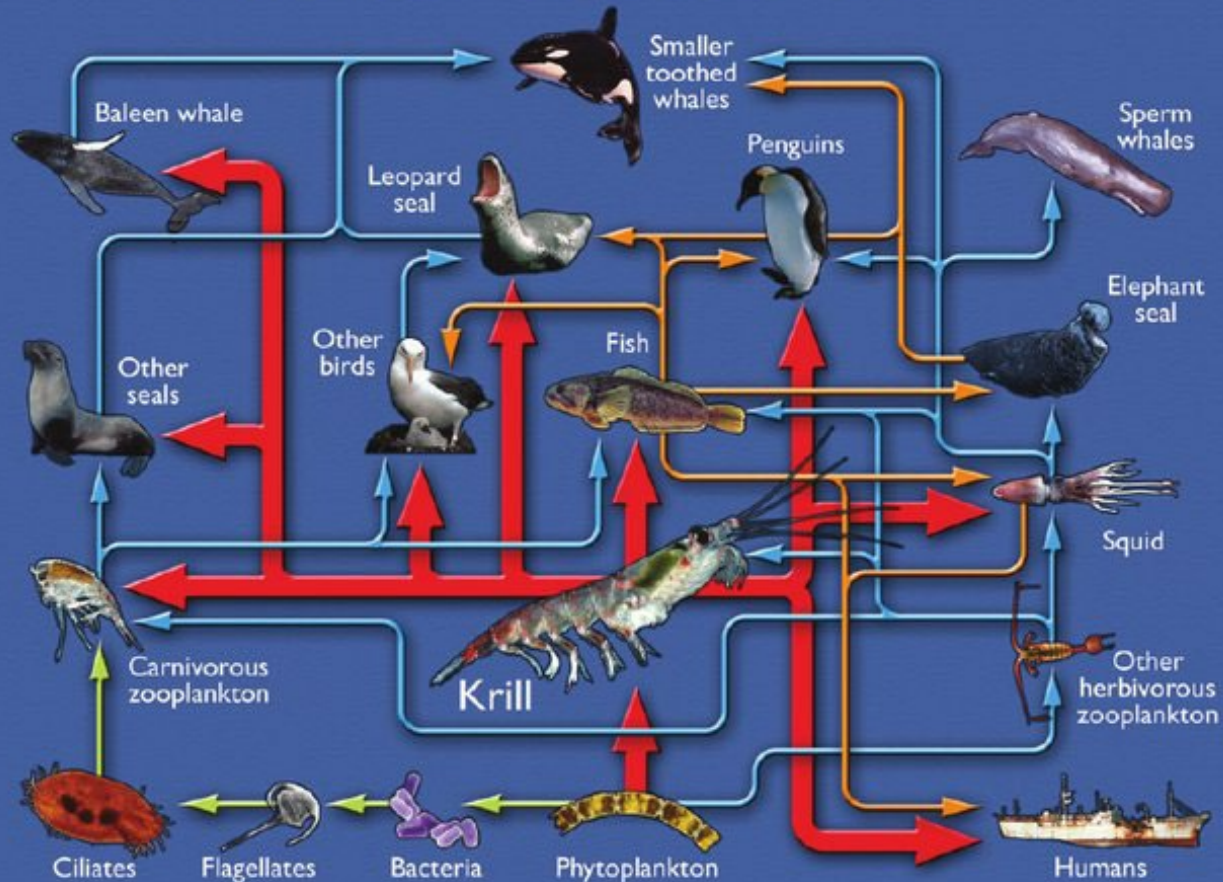
Form dense aggregations or “swarms”

~ up to 30,000 ind / m³

~ thousands to million tonnes within a few kilometers

What is Krill? What is Krill? What is Krill?

Antarctic Food Web



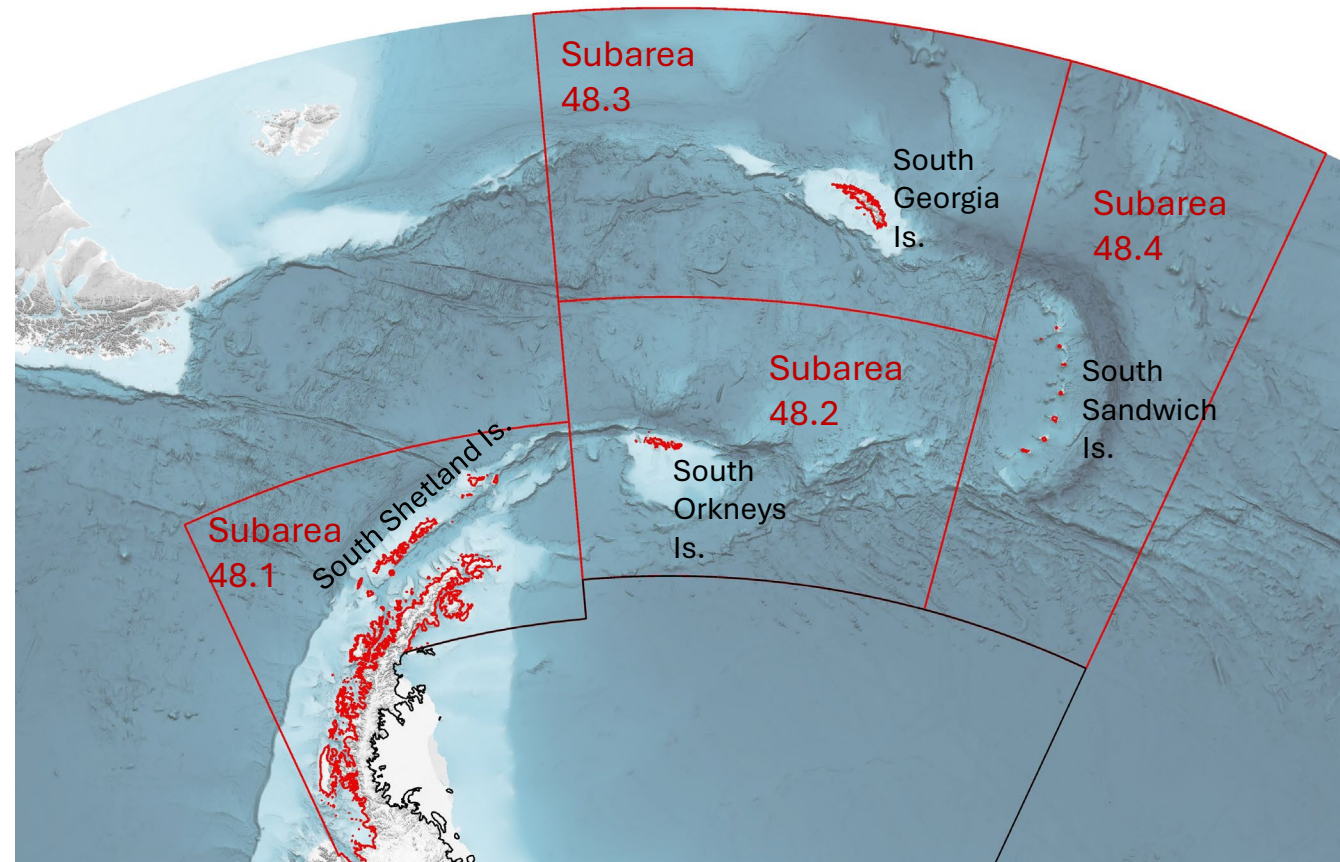
Play a key role on the Antarctic trophic web, transferring energy from producers (i.e., phytoplankton) to top predators (i.e., penguins, seals, whales).

CCAMLR Conservation Measures


Conservation Measures are Rules established by the Commission, that all Member must comply with.

They determine catch limits, fishing areas, monitoring, compliance and reporting of vessel activity and the mandatory use of marine mammal exclusion devices on fishing gear.

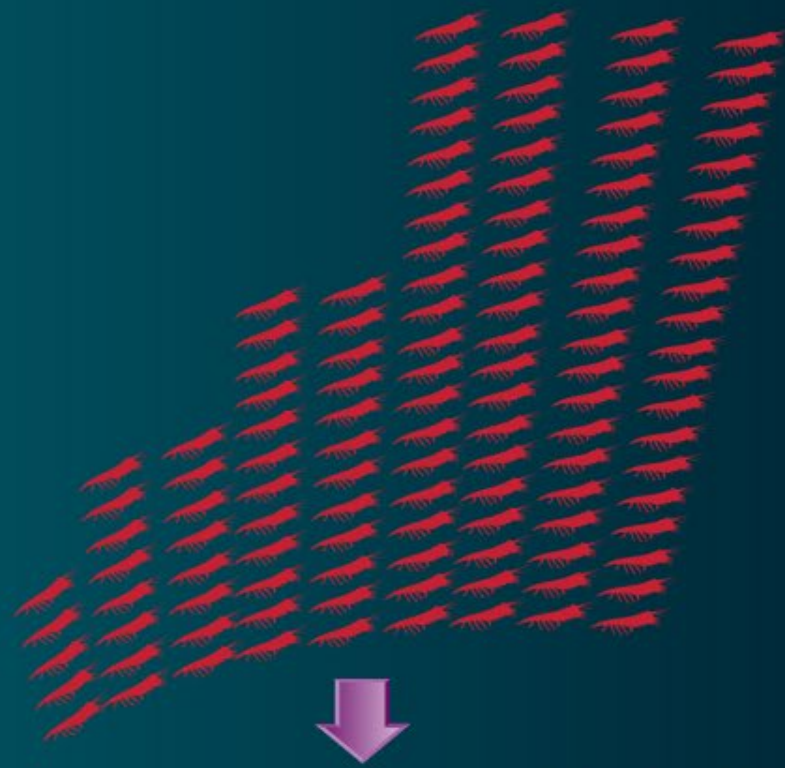
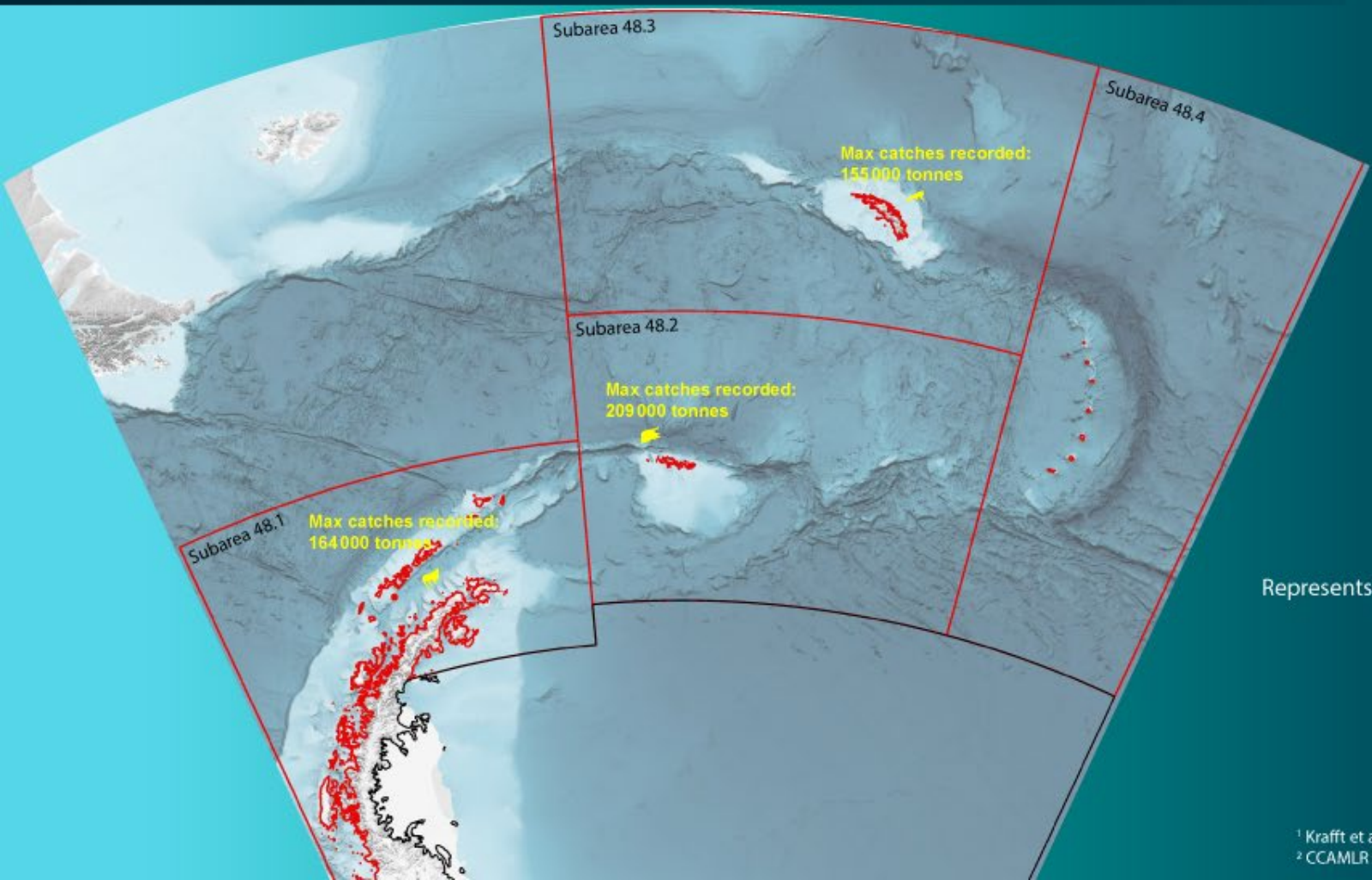
Antarctic krill in Area 48 can be fished using pelagic trawl nets in Subareas 48.1, 48.2, 48.3 and 48.4.



CCAMLR management of the krill fishery in Area 48

- A single Precautionary Catch Limit (PCL) for Area 48 is estimated (5.61 million tonnes)
- An interim “trigger level” (620000 tonnes or ~11% of the PCL) was established, while a subdivision of the PCL is developed.
- A further subdivision of the trigger level (into Subareas 48.1, 48.2, 48.3 and 48.4) was in place between 2010 and 2024.
- Current catches are  (500000 tonnes), below the “trigger level”.

Current krill biomass for Area 48 (Subareas 48.1-48.4) is estimated at **62.6 million tonnes¹**



Represents 500 000 tonnes



Total Catch Limit for Area 48 is **5.61 million tonnes²**



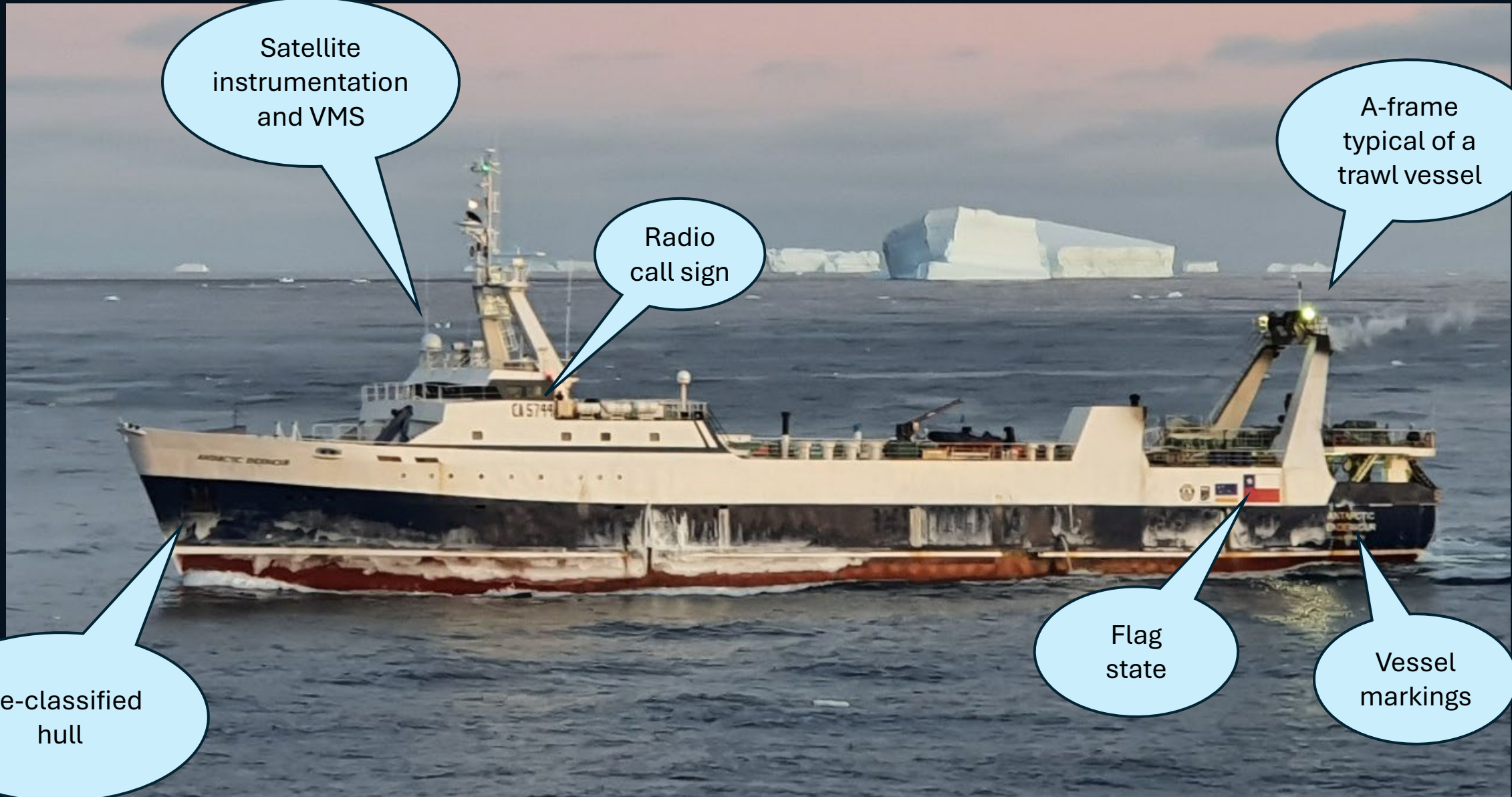
The interim Trigger Level for Area 48 is **0.62 million tonnes²**

¹ Krafft et al. 2021. Journal of Crustacean Biology. <https://doi.org/10.1093/jcabi/ruab046>

² CCAMLR Conservation Measure 51-01

Only CCAMLR Members can notify vessels for krill fishing.

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Satellite instrumentation and VMS

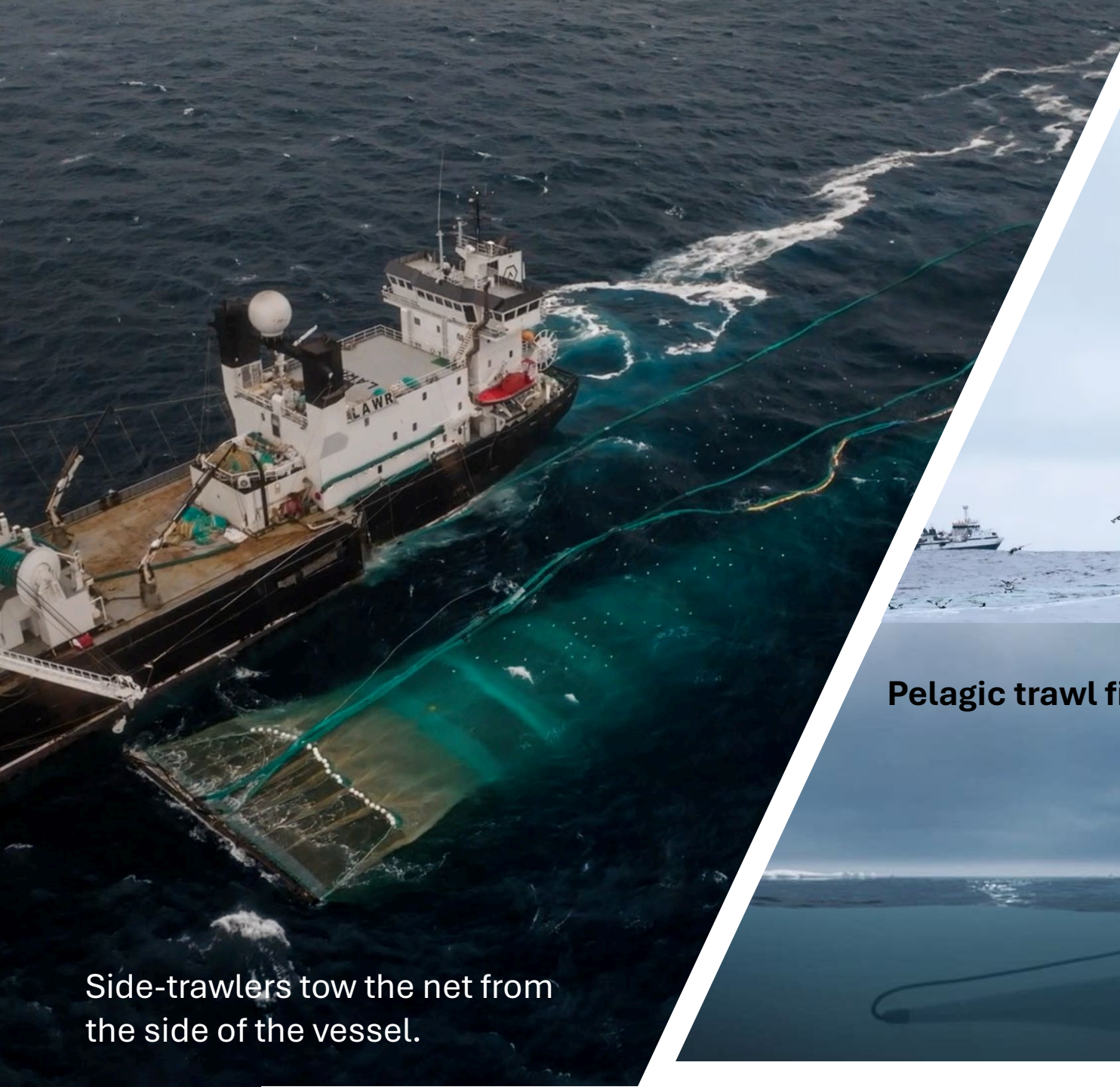
Radio call sign

A-frame typical of a trawl vessel

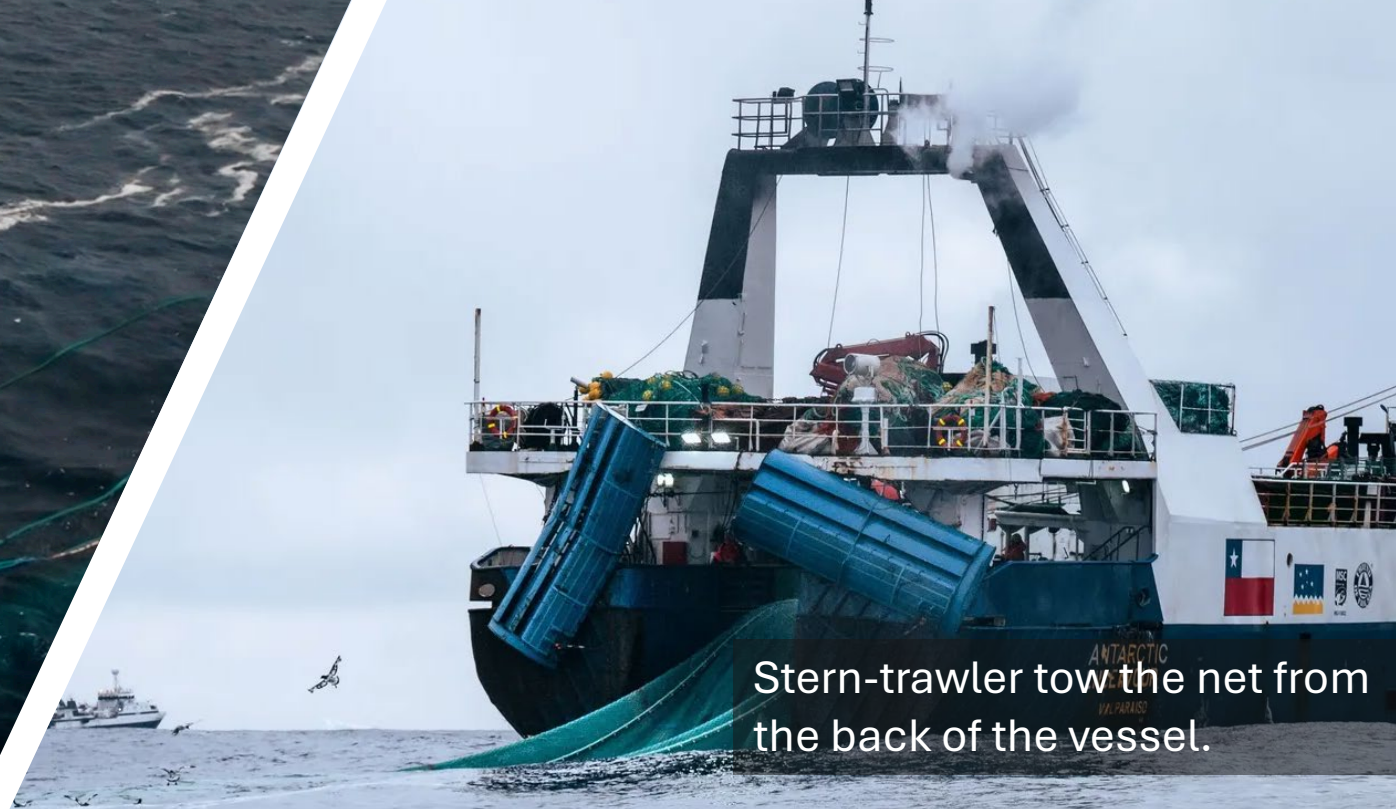
Flag state

Vessel markings

Ice-classified hull



Side-trawlers tow the net from the side of the vessel.



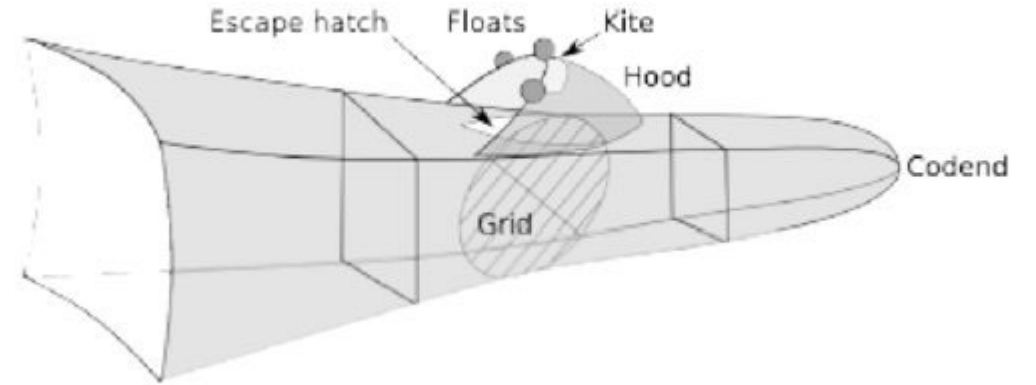
Stern-trawler tow the net from the back of the vessel.



Pelagic trawl fishing: the net is tow on mid-water.

Use of Marine Mammal Exclusion Devices is mandatory

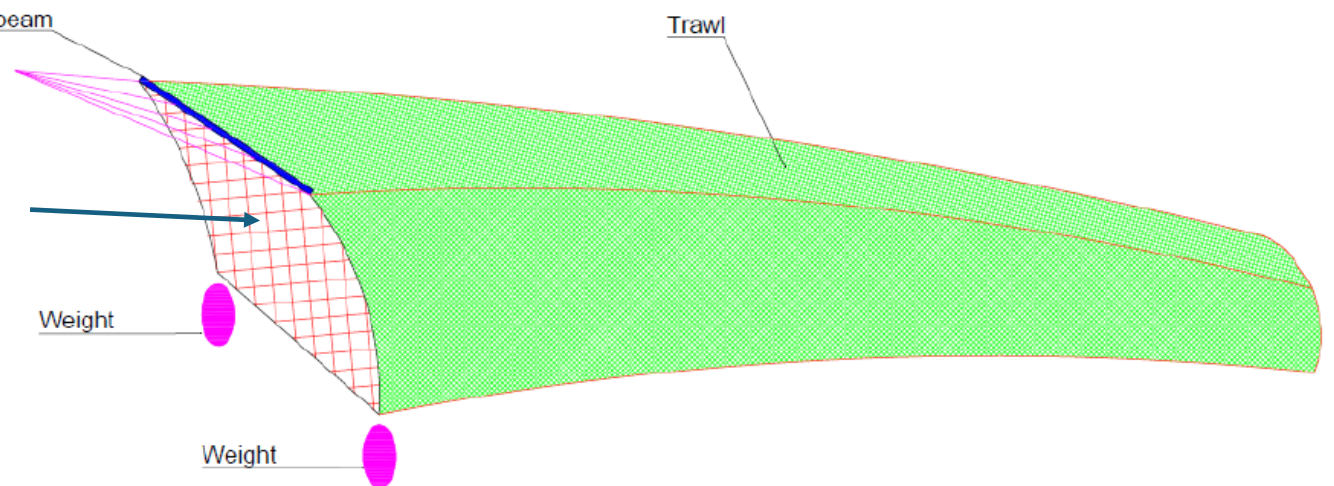
Seals and penguins



Whales



Cetacean Exclusion Device



Using Observer Data in CCAMLR Management Decisions for Antarctic Fisheries

CCAMLR is the only international organization that manages fisheries in the Southern Ocean. It is a unique partnership between governments and scientists to ensure the sustainable management of the world's southern fisheries.

Observer Duties
Observers are responsible for recording catch data, monitoring fishing gear, and ensuring compliance with CCAMLR regulations. They also collect biological samples for scientific research.

Observer Coverage
Observers are deployed on a wide range of fishing vessels, including trawlers, longliners, and icebreakers. This ensures comprehensive coverage of the Southern Ocean fisheries.



Observer Data
Observer data is used to assess the status of fish stocks, monitor fishing effort, and evaluate the effectiveness of management measures. This data is crucial for making evidence-based decisions.



The infographic details the biology and management of krill fisheries. It includes sections on 'Fishing Vessels' (listing vessel types and gear), 'Stage of the Krill Fishery' (from catch to export), and 'Key Biological Details' (covering life cycle, growth, and reproduction). A map of the Southern Ocean shows the distribution of krill fisheries, and a diagram illustrates the fishing process using a trawl net.

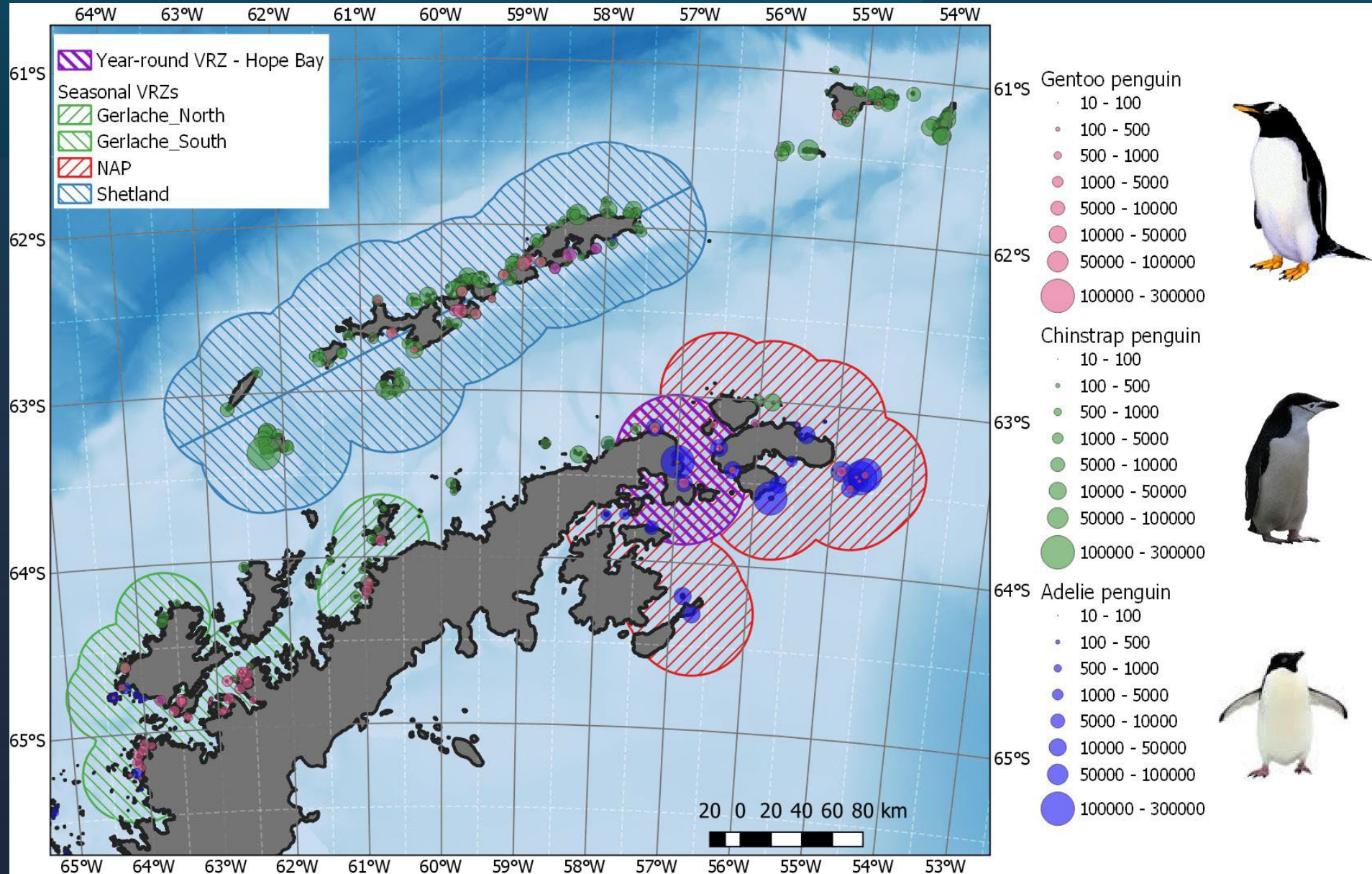
All fishing vessels must carry at least one Scientific Observer onboard at all times.



Scientific observers record data on krill catches; krill length, sex, and maturity state (e.g., juvenile/adult); bycatch composition (e.g., non-target species); interactions with marine mammals and seabirds.

ARK Voluntary Restricted Zones (VRZs)

ARK VRZs protect 74,000 km² of penguin foraging area across Subarea 48.1 throughout the breeding season (November-February).





ASSOCIATION OF RESPONSIBLE
KRILL HARVESTING COMPANIES

The Association of Responsible Krill harvesting companies has the following mission –

- to foster the development of a sustainable fishery on Antarctic krill
- to coordinate and cooperate with **CCAMLR** on the provision of research and information on krill and the krill fishery
- to support scientific research and educational initiatives of CCAMLR to manage the krill fishery on a sustainable basis.

It have 10 Members, from Norway, Chile, Korea and China. They account for 12 krill fishing vessels ~85% of the fleet.

<https://www.ark-krill.org/>

Who are they?



CCAMLR 2000 Survey = 60.3 million tonnes

LSS 2019 Survey = 62.6 million tonnes

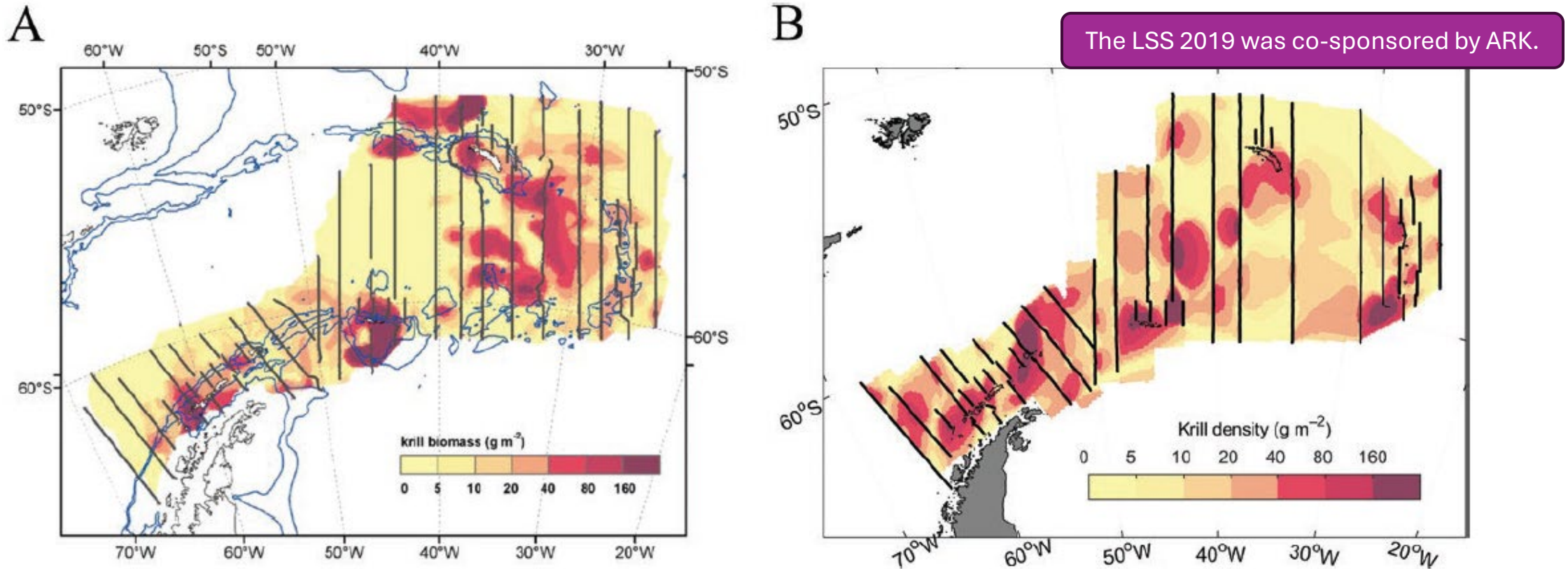


Figure 9. A visualisation of krill areal density obtained by interpolation of the 1 nmi density estimates from the 2000 (A) and 2018–19 (B) surveys. Part A was produced before the 2010 reanalysis of the 2000 survey. Part A is reprinted from [Hewitt *et al.* \(2004\)](#) with permission from the publishers.

Antarctic krill distribution in Area 48

Krafft *et al.* 2021. *Journal of Crustacean Biology*, 41(3): 1-17.

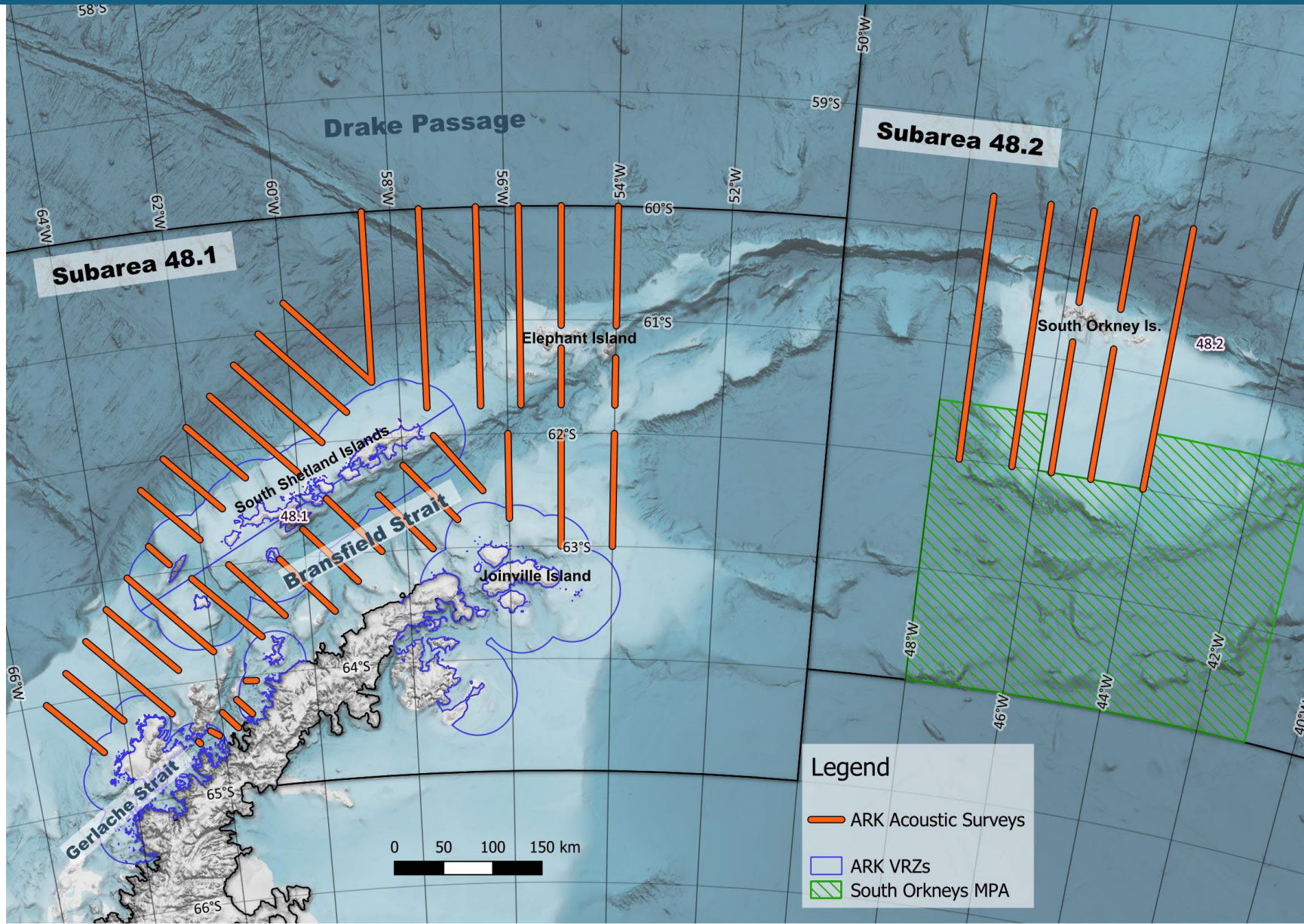
CERTIFIED

Leading in sustainable fishing, the Antarctic Krill fishery is independently certified by MSC for its outstanding management and low bycatch.

Industry-led ARK VRZs also gained international recognition within "100+ Biodiversity Positive practices and Actions around the World"



ARK-sponsored krill acoustic surveys



Every year, ARK members contribute with ~2,475 nm of acoustic survey effort as contribution to the management of the krill fishery at the main fishing grounds of Subarea 48.1 and 48.2.

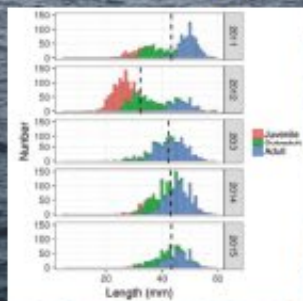
That is roughly the distance between Honolulu (Hawaii) and Anchorage (Alaska)

The krill fishing industry,
in collaboration with
CCAMLR, has a key role in the
collection of information for
understanding and managing
the krill ecosystem.

In-situ experimentation on
krill

Biological sampling of krill
length, sex & maturity

Acoustic surveys
estimating biomass



ARK VRZs protect several ecosystem elements during the summer season, such as penguin foraging areas, krill spawning grounds, and important whale feeding grounds.

