

# Management of the krill fishery – An overview of CCAMLR and ARK

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The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is an international commission with 27 Members. It was established in 1982 with the objective of conserving Antarctic marine life, where conservation includes rational use (i.e., harvesting). CCAMLR takes an ecosystem-based approach to management, meaning that impacts on the entire ecosystem and its long-term sustainability are considered when making decisions about the management of the krill fishery. This includes impacts on other marine species. [**slide 2**]

Based on the best available scientific information, the Commission agrees on Conservation Measures that determine the use of marine living resources in the Southern Ocean. CCAMLR Conservation Measures include catch limits, fishing areas, monitoring, compliance and reporting of vessel activity and the mandatory use of marine mammal exclusion devices on fishing gear. All decisions are taken by consensus. The latter implies that changes to catch limits, as well as fishing areas and seasons, and the protection of specific regions, must be approved by all 27 Members.

In practice, the implementation of the of the ecosystem-based approach to management includes: [**slide 3**]

(i) Determining a catch limit that ensures stable recruitment of the target population. This means allowing enough spawning females to survive to replenish the population.

(ii) Setting a catch limit that maintains the ecological relationship between prey and predators. For Antarctic krill, this involves leaving 75% of the original biomass unfished, ensuring sufficient food for dependent predators.

(iii) Preventing or minimizing the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades. This is achieved by projecting the target population 20 years into the future while maintaining a fixed catch limit. After this period, the target population must still meet the conditions outlined in (i) and (ii).

The Precautionary Catch Limit, estimated following steps (i), (ii) and (iii), is reviewed annually by CCAMLR's Working Groups and its Scientific Committee. These groups comprise world-leading scientists from all CCAMLR Member countries.

The Precautionary Catch Limit is determined through a stock assessment that models krill birth, growth and death rates under different levels of fishing pressure. The process involves thousands of simulations to determine the precautionary catch limit.

All fishing vessels for krill are required to the following: [**slides 6-11**]

- Only CCAMLR members can notify their vessels to fish in Antarctica (CM 10-02, CM 21-03).
- All vessels must have proper markings (CM 10-01).
- All Fishing vessels must have a working VMS (a satellite Vessel Monitoring System) which reports vessels position back to CCAMLR (CM 10-04).
- Fishing can only be conducted with pelagic trawling gear (CM 22-05).
- Fishing vessels are required to report their catches every five days (CM 23-06), and haul-by-haul catch and effort data every month to CCAMLR (CM 23-04).
- Fishing vessels must implement mitigation measures to minimize the incidental mortality of seabirds and marine mammals (CM 25-03).
- Fishing vessels must follow MARPOL guidelines, which prohibit all fishing vessels in the Convention Area from dumping or discharging oil, fuel, food waste, fishing gear and plastic into the sea (CM 26-01).
- The Precautionary Catch Limit for Antarctic krill for Subareas 48.1-48.4 is 5.61 million tonnes (CM 51-01).
- In addition, there is a trigger level of 620,000 tonnes, established as an interim limit until the overall Precautionary Catch Limit is spread into smaller management units (Figure 1).
- Fishing vessels must use marine mammal exclusion devices that minimize incidental capture of cetaceans and pinnipeds (CM 51-01).
- All fishing vessels must carry at least one Scientific Observer onboard at all times, who determines krill catches and collect essential data on such as length, sex, and maturity state (e.g., juvenile/adult), determine bycatch composition (e.g., non-target species), and monitor interactions with marine mammals and seabirds (CM 51-06).

The *trigger level* has never been reached since the adoption of Conservation Measures for the krill fishery in 1992.

Unlike the toothfish fishery, there is no Illegal (IUU) krill fishing in the CCAMLR convention area.

In addition to the measures required by CCAMLR and the vessel flag states, ARK Members have established three Voluntary Restricted Zones (VRZs) to protect key penguin colonies. This initiative protects 74,400 km<sup>2</sup> of critical penguin habitat, the single existing measure of its kind in the West Antarctic Peninsula. [**slide 12**]

Compliance with the VRZs is reviewed annually by an independent group of experts, and no incursions into the seasonal VRZs have been recorded.

What is ARK? [slide 13]

The Association of Responsible Krill harvesting companies, ARK, is an NGO constituted by most krill fishing companies operating in the Southern Ocean. ARK goals are:

1. to foster the development of a sustainable fishery on Antarctic krill
2. to coordinate and cooperate with the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) on the provision of research and information on krill and the krill fishery
3. to support scientific research and educational initiatives of CCAMLR to manage the krill fishery on a sustainable basis.

### Antarctic krill status today

Large-scale surveys for Antarctic krill in Area 48 had been conducted twice in the last 20 years: CCAMLR 2000 Survey and LSS 2019. Both surveys estimated similar results, suggesting a stable population in the long term: 60.3 and 62.6 million tonnes, respectively<sup>1</sup>. Thus, the current trigger level for krill catches represents ~1% of available biomass. [slide 14]

At the Subarea level, krill is known to have important interannual variability, with abundance cycles over 5-7 years. Krill population on the northern Subarea 48.1 fluctuates regularly between <1 and >4 million tonnes<sup>2</sup>, with a long-term overall estimate of ~19.77 million tonnes for the whole Subarea 48.1 (WG-FSA-2022). Accordingly, CCAMLR has estimated that the Precautionary Catch Limit for the core fishing ground in Subarea 48.1 could be 395,000 tonnes (SC-CAMLR-43), or 3.38% of the available biomass. The catch limit in Subarea 48.1 in recent years has been <200,000 annually.

The Antarctic krill fishery is considered as “underfished” (SC-CAMLR-43).

The Antarctic krill fishery is independently certified under MSC – Marine Stewardship Council – given its sustainable practices, accountability, and minimal bycatch. [slide 15]

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<sup>1</sup> Krafft B. A., G. J. Macaulay, G. Skaret, T. Knutsen, O. A. Bergstad, A. Lowther, G. Huse, S. Fielding, P. N. Trathan, E. J. Murphy, S.-G. Choi, S. Chung, I. Han, K. Lee, X. Y. Zhao, X. Wang, Y. Ying, X. Yu, K. Demianenko, V. Podhornyi, K. Vishnyakova, L. Pshenichnov, A. Chuklin, H. Shyshman, M. J. Cox, K. Reid, G. M. Watters, C. S. Reiss, J. T. Hinke, J. A. Arata, O. R. Godø, and N. Hoem. 2021. Standing stock of Antarctic krill (*Euphausia superba* Dana, 1850) (Euphausiacea) in the Southwest Atlantic sector of the Southern Ocean, 2018–19. *Journal of Crustacean Biology* 41 (3):1-17. <https://doi.org/10.1093/jcabi/ruab046>

<sup>2</sup> Reiss C. S., A. M. Cossio, V. Loeb, and D. A. Demer. 2008. Variations in the biomass of Antarctic krill (*Euphausia superba*) around the South Shetland Islands, 1996-2006. *ICES Journal of Marine Science* 65:497-508.

## How does ARK contribute to the management of the krill fishery?

### Krill Surveys

ARK Members, in collaboration with scientists from Norway and China, conduct annual acoustic surveys of krill at the main fishing grounds around the South Orkney Islands and the Antarctic Peninsula region. The results are periodically presented to CCAMLR working groups and published in international scientific journals<sup>1,3</sup>. [**slide 16-17**]

### Implementation of Voluntary Restricted Zones

The Voluntary Restricted Zones (VRZs) represent the main conservation effort by ARK companies to safeguard critical habitats for krill-dependent predators, mainly penguins, during the summer season. The principle is to protect key breeding colonies of gentoo, Adélie and chinstrap penguins during their most critical period: incubation and chick-rearing. This voluntary measure aligns with the development of protected areas promoted by CCAMLR. [**slide 18**]

The implementation of this voluntary restriction on fishing is as follows:

- Antarctic Peninsula will be closed to krill fishing (40 km buffer) between 1 October and 1 February.
- A 40 km year-round closure to krill fishing around Hope Bay, Sheppard Nunatak and Sheppard Point, at the tip of the Antarctic Peninsula
- Gerlache Strait will be closed to krill fishing (30 km buffer) between 15 October and 15 February.
- South Shetland Islands will be closed to krill fishing (40 km buffer) between 1 November and 1 March.

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<sup>3</sup> Skaret G., G. J. Macaulay, R. Pedersen, X. Wang, T. A. Klevjer, L. A. Krag, and B. A. Krafft. 2023. Distribution and biomass estimation of Antarctic krill (*Euphausia superba*) off the South Orkney Islands during 2011–2020. ICES Journal of Marine Science 80:1472-1486. <https://doi.org/10.1093/icesjms/fsad076>