Dr Manuel Barange
Assistant Director General and Director of the Fisheries and Aquaculture Division
Food and Agriculture Organization of the United Nations

28th August 2026

Dear Dr. Barange

Re: A false benchmark: the modern reality of Antarctic krill fishing and the global call to end the exploitation of a critical marine species.

We write to you to raise urgent concerns regarding the reality of Antarctic krill fishing, following the FAO's 2026 *State of the World's Fisheries and Aquaculture Report*, which declared that Antarctic areas are a global benchmark for precautionary ecosystem-based fisheries management[1]. The FAO report references 2023 assessments, but overlooks significant ecological risks raised by other experts[2],[3] and overlooks major management developments that have taken place more recently[4],[5], but which have not yet been fully implemented by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

We are concerned that over the past decade, pressures on the Antarctic marine ecosystem have intensified, both regionally and especially locally in the southwest Atlantic. Antarctica has undergone rapid warming due to climate change[6], baleen whales are showing positive signs of recovery, e.g.[7],[8],[9], yet conservation progress is generally acknowledged to have stalled[10].

Within such a rapidly changing marine environment, we posit that fisheries management must be of the highest quality and must be based upon the most up-to-date scientific evidence if it is to be identified as a global benchmark for precautionary ecosystem-based management. Management evidence must be relevant and appropriate, rather than simply

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[1] FAO Knowledge Repository
[2] The fishery for Antarctic krill – Conflicts between industrial production, protection of biodiversity, and legal governance - ScienceDirect
[3] Frontiers | Integrating the needs of recovering populations of baleen whales into the revised management framework for the commercial fishery for Antarctic krill
[4] Frontiers | A dynamic framework for assessing and managing risks to ecosystems from fisheries: demonstration for conserving the krill-based food web in Antarctica
[5] What is needed to implement a sustainable expansion of the Antarctic krill fishery in the Southern Ocean? - ScienceDirect
[6] Recent warming trends in Antarctica revealed by multiple reanalysis - ScienceDirect
[7] Nowacek, D. P., Friedlaender, A. S., Halpin, P. N., Hazen, E. L., Johnston, D. W., Read, A. J., et al. (2011). Super-aggregations of krill and humpback whales in Wilhelmina Bay, Antarctic Peninsula. PloS One 6, e19173. doi: 10.1371/journal.pone.0019173
[8] Viquerat, S., Waluda, C. M., Kennedy, A. S., Jackson, J. A., Hevia, M., Carroll, E. L., et al. (2022). Identifying seasonal distribution patterns of fin whales across the Scotia Sea and the Antarctic Peninsula region using a novel approach combining habitat suitability models and ensemble learning methods. Front. Mar. Sci. 9. doi: 10.3389/fmars.2022.1040512
[9] Biuw, M., Lindstrøm, U., Jackson, J. A., Baines, M., Kelly, N., McCallum, G., et al. (2024). Estimated summer abundance and krill consumption of fin whales throughout the Scotia Sea during the 2018/2019 summer season. Sci. Rep. 14, 7493. doi: 10.1038/s41598-024-57378-3
[10] Stakeholder perceptions of the Commission for the Conservation of Antarctic Marine Living Resources Marine Protected Area planning process - ScienceDirect

what is available, which could include data that are many years out of date. For example, the current precautionary catch limit for Antarctic krill in the southwest Atlantic is based on bioacoustic data collected over a quarter of a century ago, in 2000[11]. A more recent bioacoustic dataset is available from 2019[12], and though itself now ageing, is not used in management. In a warming world, management must be more reactive, and preferably, pre-emptive.

Antarctic krill is one of the most abundant (multi-cellular) organisms on the planet, with the largest biomass of any wild free-living species, somewhere in the range of 340 to 540 million tonnes, probably greater even than the biomass of humans[13]. In the southwest Atlantic, where the fishery almost exclusively operates, the biomass of krill is above 60 million tonnes. As such, the current extraction of just 620,000 tonnes may seem insignificant. However, the primary issue that concerns scientists is whether ecological damage will occur if commercial catches aggregate in space and time. If industrial extraction rates are greater than natural ecological processes can accommodate, krill will not be available to satisfy the demands of the broad guild of predators that rely on krill for sustenance.

As krill is a keystone species in the Antarctic marine food web, harvesting has always been a scientific concern, whether catches are used for aquaculture feed, pet food, or use in human health supplements. Therefore, in 1991, CCAMLR restricted catches to a level very much below the precautionary catch limit, agreeing to an interim catch limit (often referred to as the 'trigger level') which was set as a guard rail to protect the ecosystem (CCAMLR Conservation Measure (CM) 51-01[14]). The guard rail was further strengthened in 2009, when CCAMLR introduced a spatial subdivision of the trigger level, restricting the amount that can be taken in preferred fishing locations (CCAMLR CM 51-07[15]). This safeguard was intended to limit potential ecosystem harm arising from concentrated krill fishing, something that would be contrary to the CAMLR Convention[16].

Today, some three decades on from when the guard rail was originally set, CCAMLR has yet to reach a consensus on how to distribute catches at meaningful ecological scales, thereby allowing future catches to increase in a controlled, precautionary manner. Meanwhile, the potential ecosystem impacts of increasingly concentrated krill catches remain unknown.

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[11] Fielding, S., Watkins, J.L., Cossio, A., Reiss, C., Watters, G., Calise, L., Skaret, G., Takao, Y., Zhao, X., Agnew, D., Ramm, D., Reid, K. 2011. The ASAM 2010 assessment of krill biomass for Area 48 from the Scotia Sea CCAMLR 2000 synoptic survey. Document WG-EMM-11/20, pp. 1–10 pp. CCAMLR, Hobart, TAS, Australia.

[12] Krafft, B.A., Macaulay, G.J., Skaret, G., Knutsen, T., Bergstad, O.A., Lowther, A., Huse, G., Fielding, S., Trathan, P., Murphy, E., Choi, S.G., Chung, S., Han, I., Lee, K., Zhao, X.Y., Wang, X.L., Ying, Y.P., Yu, X.T., Demianenko, K., Podhornyi, V., Vishnyakova, K., Pshenichnov, L., Chuklin, A., Shyshman, H., Cox, M.J., Reid, K., Watters, G.M., Reiss, C.S., Hinke, J.T., Arata, J., Godø, O.R., Hoem, N. (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), ruab046. doi: 10.1093/jcbiol/ruab046.

[13] Greenspoon, L., Krieger, E., Sender, R., Rosenberg, Y., Bar-On, Y.M., Moran, U., Antman, T., Meiri, S., Roll, U., Noor, E., Milo, R. (2023) The global biomass of wild mammals. Procceding of the National Academy of Sciences of the USA 120(10) e2204892120. doi: 10.1073/pnas.2204892120.

[14] https://cm.ccamlr.org/en/measure-51-01-2024, and earlier iterations.

[15] https://cm.ccamlr.org/en/measure-51-07-2023, and earlier iterations; now lapsed.

[16] CAMLR Convention text: https://www.ccamlr.org/en/organisation/camlr-convention-text.

Catches have now reached record levels[17],[18]. Indeed, over the past two fishing seasons, catches have increased to the interim catch limit, the safeguard intended to protect the ecosystem. Further, because of differences within CCAMLR, CCAMLR has struggled to implement a revised krill fishery management approach, whilst part of the guard rail has now lapsed, allowing catches to increase and concentrate in sensitive habitats.

The areas where krill catches are now concentrating are also areas where iconic Antarctic species feed. These fishery hotspots are vital feeding grounds for species such as chinstrap penguins, populations of which are now in decline[19]. These fishery areas are also vital for Antarctic fur seals, populations of which have recently been categorised as *Endangered* by the International Union for Conservation of Nature (IUCN)[20]. Other seabirds and marine mammals such as baleen whales also rely upon krill and regularly feed in areas preferred by the krill fishery. We are therefore concerned that at small, local scales, Antarctic krill populations may not support both catch aggregations of an expanding krill fishery and recovering whale populations[21] and other krill-dependent species.

Krill fishing vessels regularly overlap with foraging penguins, including during the critical post-fledging window, with recent studies showing this overlap can alter penguin foraging behaviour[22],[23]. Moreover, incidental mortality of baleen whales is also now occurring, with multiple humpback whales having been killed in krill trawl fisheries[24].

The FAO's report states that stocks of krill assessed in Antarctica are 100 per cent biologically sustainable[25]. However, we believe that the evidence to support this assertion is potentially only relevant at large geographic scales and not at smaller scales relevant to predator-prey interactions and other aspects of ecosystem function. Current assessments of biological sustainability do not account for variable spatial and temporal ecological scales, or movement of krill in ocean currents[26], or even increasing demands for krill from baleen whales. Consequently, assessments may not be representative and may even be misleading. For example, at South Georgia, long-term studies show that the mean krill density has recently been at lower levels than in previous years[27], congruent with a shift in

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[17] Statistical Bulletin | CCAMLR

[18] Krill fishing in the Southern Ocean is breaking records and raising alarm - Antarctic and Southern Ocean Coalition

[19] Strycker, N., Wethington, M., Borowicz, A., Forrest, S., Witharana, C., Hart, T., et al. (2020). A global population assessment of the chinstrap penguin (Pygoscelis antarctica). Sci. Rep. 10, 19474. doi: 10.1038/s41598-020-76479-3

[20] Emperor penguin and Antarctic fur seal now Endangered due to climate change – IUCN Red List - Press release | IUCN

[21] Whale recovery and the emerging human-wildlife conflict over Antarctic krill | Nature Communications

[22] Lessening the bottleneck: reduced spatiotemporal overlap between krill fishing vessels and post-fledging chinstrap penguins led to increased apparent survival | bioRxiv

[23] Mapping encounters between Antarctic krill fishing vessels and air-breathing krill predators using acoustic data from the fishery | PNAS

[24] Whales die after getting stuck in fishing nets in Antarctica | AP News

[25] FAO Knowledge Repository

[26] Trathan, P.N., Warwick-Evans, V., Young, E.F., Friedlaender, A.., Kim, J.-H., Kokubun, N. (2022) The ecosystem approach to management of the Antarctic krill fishery-the 'devils are in the detail' at small spatial and temporal scales. Journal of Marine Systems 225, 103598. doi: 10.1016/j.jmarsys.2021.103598.

[27] Trathan, P.N., Fielding, S., Warwick-Evans, V., Freer, J., Perry, F. (2022) Seabird and seal responses to the physical environment and to spatio-temporal variation in the distribution and

the biomass of krill to southern latitudes[28], whilst humpback whale stocks have now recovered[29]. Understanding the ecological dynamics at South Georgia (and other parts of the southwest Atlantic) should now be a priority for management. The ecological and management consequences of the return of Baleen whales to the Antarctic are poorly understood. The total biomass of all baleen whale species remains well below historical levels prior to commercial whaling[30], suggesting that should other species recover, the ecological consequences will become increasingly uncertain and that krill fisheries management must become increasingly agile to accommodate their recovery.

Despite these concerns, some operators that participate in the Antarctic krill fishery have recently been recertified in a draft decision based upon the Marine Stewardship Council (MSC) standard. However, as the krill fishery is an international operation that is conducted by a number of operators, we find this to be at odds with the CCAMLR's situation, as only some, but not all, krill fishing operators hold MSC certificates. Several NGOs objected to the recent decision, including WWF, a founding member of the MSC[31],[32].

We are therefore not alone in expressing our concerns about the krill fishery. We perceive the key ecological risks to be:

1. **Concentrated krill fishing takes place in critical wildlife foraging grounds**

Following the lapse of CM 51-07 in 2024 (part of the historic guard rail intended to limit krill catch concentration), krill fishing effort at the Antarctic Peninsula has increased by 118%[33]. This increases the risk of localised depletion of krill in key feeding habitats for Adélie, chinstrap and gentoo penguins; other species likely to be impacted include Antarctic fur seals and crabeater seals, as well as humpback, fin and Antarctic minke whales. Without an understanding of seasonal predator demand, baleen whale recovery, and krill movement in ocean currents, the impacts of krill removal by fishing vessels remains unknown and highly uncertain.

CCAMLR has always voiced concerns about the impacts of harvesting, demonstrated by the implementation of the trigger level (CM 51-01) and its spatial subdivision (CM 51-07). However, there now appears to be a new economic imperative by some within CCAMLR that appears less concerned about limiting the impacts of harvesting. Progress in implementing the revised management approach has stalled, yet the CAMLR Convention requires a precautionary approach in the face of uncertainty. We posit that dismantling part of the historic highly precautionary management framework, without replacing it with something at

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abundance of Antarctic krill at South Georgia, with implications for local fisheries management. ICES Journal of Marine Science, 79(9) fsac168. doi: 10.1093/icesjms/fsac168.

[28] Atkinson, A., Hill, S. L., Pakhomov, E. A., Siegel, V., Reiss, C. S., Loeb, V. J., et al. (2019). Krill (*Euphausia superba*) distribution contracts southward during rapid regional warming. Nat. Climate Change 9, 142–147. doi: 10.1038/s41558-018-0370-z

[29] Zerbini, A., Adams, G., Best, J., Clapham, P. J., Jackson, J. A., and Punt, A. E. (2019). Assessing the recovery of an Antarctic predator from historical exploitation. R. Soc. Open Sci. 6, 190368. doi: 10.1098/rsos.190368.

[30] Greenspoon, L., Ramot, N., Moran, U. et al. The global biomass of mammals since 1850. Nat Commun 16, 8338 (2025). https://doi.org/10.1038/s41467-025-63888-z

[31] Mismanagement of Antarctic krill puts whales at risk | WWF

[32] Antarctic Coalition Objects to MSC Certification of Antarctic Krill Fishery - Antarctic and Southern Ocean Coalition

[33] e-sc-44-rep.pdf

least as equally effective, is not 'a global benchmark for precautionary ecosystem-based fisheries management'.

2. **Climate-smart management is critical as warming intensifies**

Krill is a stenothermic organism, and the life history of krill requires the presence of sea ice: juveniles shelter beneath the ice, whilst adult diet sometimes includes sea ice algae[34]. However, in addition to a warming ocean[35], sea ice extent and duration have declined over the past decade, and are now likely to be in a new state[36] and this system change is structural and likely to last[37]. The consequences for krill remain uncertain, but management should take account of the new ecosystem state.

WOA III highlights that the Antarctic Peninsula is warming three times faster than the global average[38],[39]. Yet the Peninsula is the site where most krill are now harvested. With Antarctic krill distribution contracting southward, and with declining seasonal sea ice, there are increasing concerns for krill-dependent species, including for blue, fin, humpback, and Antarctic minke whales and crabeater seals[40]. Changes in ecosystem state could increase pressure on recovering whale populations and other species where both fisheries and predators rely on concentrated krill biomass[41].

We suggest that any system identified as a global benchmark for precautionary ecosystem-based fisheries management must take into account climate change. CCAMLR has considered the impacts of climate change since at least 2009[42], but still has not agreed a climate change response work plan and does not yet include climate considerations in its management measures.

3. **Ecosystem monitoring is fundamental to the CCAMLR approach**

CCAMLR introduced the CCAMLR Ecosystem Monitoring Program (CEMP) to facilitate the detection of change in ecosystem indicators and to determine whether observed changes are due to natural events or the harvesting of marine living resources; CEMP has been fully implemented since 1987[43].

Although CEMP has developed an extensive database documenting land-based predators, mainly penguins, there are still very few details about pelagic predators, including the main air-breathing consumers of krill, baleen whales[44]. Without adequate ecosystem monitoring, CCAMLR will not be in a position to determine whether the krill fishery results in ecosystem

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[34] Impact of climate change on Antarctic krill (MEPS)
[35] Gille, S. (2002) Warming of the Southern Ocean since the 1950s. Science 295: 1275-1277.
[36] Purich, A., Doddridge, E.W. (2023) Record low Antarctic sea ice coverage indicates a new sea ice state. Communications Earth & Environment 4: 314.
[37] Raphael, M.N., Maierhofer, T.J., Fogt, R.L., Hobbs, W.R., Handcock, M.S. (2025) A twenty-first century structural change in Antarctica's sea ice system. Communications Earth & Environment 6: 131.
[38] Pressures | World Ocean Assessment
[39] Recent rapid regional climate warming on the Antarctic Peninsula - British Antarctic Survey
[40] (PDF) Climate change impacts on Antarctic krill behaviour and population dynamics
[41] Climate change impacts on Antarctic krill behaviour and population dynamics
[42] Trathan P.N., Agnew D. (2010).Climate change and the Antarctic marine ecosystem: an essay on management implications. Antarctic Science 22: 387-398.
[43] Review—The CCAMLR Ecosystem Monitoring Programme | Antarctic Science | Cambridge Core
[44] Using seabird and whale distribution models to estimate spatial consumption of krill to inform fishery management - Warwick-Evans - 2022 - Ecosphere - Wiley Online Library

impacts on predator species, or indeed on the wider ecosystem, and therefore, whether the krill fishery is precautionary and sustainable.

To date, CEMP has not been integrated into krill fishery management, something that would be expected if CCAMLR was truly a global benchmark for precautionary ecosystem-based fisheries management. In fact, the current CCAMLR management approach focuses largely upon the krill stock, without regard to other ecosystem components, and so does not fully constitute ecosystem-based management. A critical issue is to determine species-specific indicators of change at spatial and temporal scales that reflect the scales of harvesting. The revised krill fishery management approach makes a first attempt at this[45], but so far has not been implemented.

We, the undersigned scientific institutions, conservation bodies, and independent experts, are here voicing our concerns that the mechanisms to assess sustainability are not keeping pace with the realities facing Antarctica, and that the cumulative impacts of aggregated catches and increased krill fishing pressure, recovering populations of baleen whales, and climate change, are not being properly accounted for in CCAMLR's management approach.

Recognising that CCAMLR is where Antarctic krill fishery management decisions are made, but noting the positions expressed in the FAO Report, our position is that ceasing Antarctic krill fishing would better safeguard a uniquely vulnerable ecosystem under accelerating climate stress. **As such, we respectfully ask the FAO to review the Antarctic in the context of current scientific evidence.** We contend that Antarctic areas do not constitute a global benchmark for precautionary ecosystem-based management.

Yours Faithfully,

Act 4 Wildlife
Antarctica2030
Antarctic Wildlife Alliance
Blue Marine Foundation
Bob Brown Foundation
Christina Karliczek Skoglund, Underwater Filmmaker
Dr. David Fields, Bigelow Laboratory for Ocean Sciences
Deutsche Stiftung Meeresschutz
Fins Attached Marine Research and Conservation
Gallifrey Foundation
Institute for Accountable Ocean Governance
Dr. Jennifer Jacquet, University of Miami
John Hocevar, Greenpeace USA
Dr. Martina Gaglioti, Marine Biologist and IUCN Global Ocean Program Expert
Oceanic Global

[45] Warwick-Evans, V., Constable, A., Dalla Rosa, L., Secchi, E.R., Seyboth, E., Trathan, P.N. (2022) Using a Risk Assessment Framework to spatially and temporally spread the fishery catch limit for Antarctic krill in the west Antarctic Peninsula: a template for krill fisheries elsewhere. Frontiers in Marine Science 9, 1015851. doi: 10.3389/fmars.2022.1015851.

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