How fishing and marine protection can coexist in the Southern Ocean: An economic analysis of the Ross Sea and East Antarctic MPA proposals

Submitted by ASOC
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Abstract
This paper discusses the two current marine protected area (MPA) proposals, for East Antarctica and for the Ross Sea, and assesses their potential economic impact on commercial fishing for Antarctic toothfish (*Dissostichus mawsoni*) and Antarctic krill (*Euphausia superba*). The paper concludes that the proposed MPAs will have a minimal impact on current overall catch limits for the target stocks when new catch spread scenarios are taken into account. For example, the Ross Sea Antarctic toothfish stock total catch limit would remain unchanged by the fishing effort being reallocated away from the sensitive continental shelf. The East Antarctic MPA proposal would permit fishing where the fishing will not impact the specific objectives of the MPA. In both of these MPAs, biodiversity and scientific gains could be substantial, while having little impact on current fishing as effort can either be relocated or would not be affected.

The MPA proposals in waters governed by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) have been developed to protect representative aspects of biodiversity, for research, and as a baseline and comparison for monitoring the impacts of climate change. It is important to note that the fisheries currently operating in these waters represent a small fraction of the total reported catch by tonnage and value of the global catch of the participating Members.

Introduction
One of the main concerns raised by CCAMLR Members during discussions about the proposed Ross Sea and East Antarctic MPAs has been that MPAs might have a significant impact on fishing levels, even though the proposals have been designed in part with a view to minimise impact on actual or future fishing activities. To determine the impact of the proposed MPAs on fishing, the Antarctic Ocean Alliance has conducted an economic analysis of their likely impact. An executive summary of the conclusions from this analysis is provided below. The complete analysis is available as an attachment.

Possible effects on fishing from the Ross Sea Region MPA Proposal
The Ross Sea MPA proposal does not propose to reduce the catch limit in Subareas 88.1-88.2 A&B. However, it would reallocate the total catch between the different areas – slope, shelf and north of the region. This change combined with the Special Research Zone (SRZ) and any research fishing in the north could mean greater catches in northern areas and no overall reduction in the total allowable catch (TAC). Historically the catches were allocated between the shelf, slope, and the north (13 percent, 74 percent and 13 percent respectively), based on mean historical catch rates (CPUE) and on the fishable seabed area (600m to 1800m), the depth where toothfish were considered most likely to be found.\(^1\) This has allowed for the geographical spread of the fishery in the areas where tagging of toothfish is a key element to assessing the state of the stock.

For this paper the 2015-16 toothfish catch limit of 2,870 tonnes, which is based on the latest stock assessment, was used in the analysis of different scenarios for catch location arrangements if the MPA was designated.

The analysis of these scenarios indicates that fishing in the Ross Sea could continue with a similar catch TAC limit (i.e 2870 tonnes). Some reallocation northward to the Mawson and Iselin Banks and northern seamounts would be required, but this is expected to provide some advantages to fisheries research and fishing itself. The advantages of reallocating the catch include:

- Fishing in the northern area means lower fuel costs and shorter travel time than to southern fisheries;

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• Northern areas are more likely to be free of ice. Recent analysis has shown that a later start to the season assists in making more ice-free areas available for fishing and thus spreading the catch effort. This should also reduce the risk to vessels;
• Northern areas are away from key toothfish predators such as the Weddell seals and Type C Orcas which are in the West and South of the Ross Sea, areas included in the MPA proposal; and
• More fish could be tagged in the north, which would increase data available for the spatial population model for the Ross Sea.

Possible effects on fishing from the East Antarctic MPA proposal
Changes to fishing as a result of the East Antarctic MPA proposal are expected to be minimal. Currently, very little fishing takes place in East Antarctica. Furthermore, the proposed East Antarctic MPA is multiple-use, meaning “that activities, including fishing, will be allowed to take place within an MPA so long as such activity will not adversely impact on the conservation or scientific objectives of that MPA.”

No fishing currently takes place within the proposed MacRobertson MPA as 58.4.2 SSRU D is closed to toothfish fishing and no commercial krill fishing has occurred in this subarea for over 20 years. Only part of the proposed D’Urville Sea-Mertz MPA is open to fishing (58.4.1 SSRU B is closed to toothfish fishing) while 58.4.3 SSRU B is open, it has a zero toothfish TAC. Subarea 58.4.1 SSRU C (about half) is open to toothfish fishing and has a TAC of 203 tonnes. For the proposed Drygalski MPA the area is open to toothfish fishing and sub-area 58.4.1 SSRUs G and H have a small toothfish catch limit of 127 and 42 tonnes respectively.

In East Antarctica the density of krill is low compared to other areas. The densities are about 20 percent of that found in the Peninsula and South Georgia area. There has been krill fishing in this area but not since 1987-88 in 58.4.2 and 1994-95 in 58.4.1. Krill fishing notifications for this area would need to be assessed against the relevant conservation measures and then whether it meets the MPA objectives. The East Antarctic MPA proposal covers less than 20 percent of the CCAMLR Subareas 58.4.2 and 58.4.1 and therefore there would still be opportunities to catch krill outside the MPA even if the area was closed to krill fishing.

Between 2009-10 and 2014-15, vessels flagged to four states fished for toothfish in the East Antarctic (58.4.1 and 58.4.2). Current catch limits and catches are very small and unlikely to be affected by the proposed MPAs.

Conclusions
The creation of the proposed MPAs in the Ross Sea and East Antarctica will provide significant protection for biodiversity while having minimal impact on current commercial fishing activity. In addition, the value of the toothfish catches in these areas is small, especially when compared to the catches of the flag states and the value of their fish exports.

The impact of the Ross Sea MPAs on fishing would be minimized by moving fishing effort from the shelf and parts of the slope to the Northern seamounts, including 88.1A & B north. One important benefit of moving fishing from key biodiversity hotspots in the proposed MPA to the northern slope areas and northern seamounts is that fishing vessels will encounter less sea ice.

The impacts on fishing in the East Antarctic MPA proposal areas would most likely be minimal. The MacRobertson area is already closed to commercial exploratory fishing. Over half the proposed Drygalski

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area is closed to commercial fishing, and part of D'Urville-Mertz is the focus of a research fishing block. This fishing could continue if it is consistent with the objectives of the MPA.

If the potential spillover effects of MPAs are considered (that is, a situation in which a fish population increases within an MPA and some fish subsequently migrate outside the MPA), these modest impacts on fishing may be further reduced. The additional gains are protection of a range of ecosystem types and biodiversity, ecosystem resilience, and the establishment of scientific baselines for climate change analysis. In conclusion, it is likely there would be considerable benefits for fisheries, fisheries research and scientific research generally from the designation of the MPAs, with minimal reduction in the current levels of fishing activity. It should be stressed, however, that the primary objective of MPAs is to protect marine biodiversity.