

Guest editorial

Impact of incidental mortality on Antarctic marine vertebrates

Only a few years ago most interested people thought (and many said in print) that accidental killing of Antarctic animals as a consequence of commercial fishing operations was minimal to non-existent. We now know that species in three major groups (fish, seals, seabirds) are seriously threatened by such incidental mortality.

The collapse, due to over-fishing, of South Georgia stocks of Antarctic cod *Nototothenia rossii* led CCAMLR eventually to ban directed fishing on this species and later to restrict fishing on other species which might result in *N. rossii* being caught. However the by-catch of *N. rossii* during fishing for other fish species (and perhaps also for krill) is still significant and a major factor preventing the rebuilding of this stock.

Reports from around the Antarctic testify to the increasing amount of garbage at sea and cast ashore. Packing-bands (extensively used aboard fishing boats) and pieces of fishing net are especially common. Extrapolating from detailed studies (including removing over 200 collars) of a population of 18 000 seals at South Georgia in 1988/89, 10 000 Antarctic fur seals were entangled in collars of such materials. Nearly all entangled seals will die and many more must die at sea without ever being seen ashore. This level of entanglement (albeit in a still-increasing population) is the same as that believed to be the main cause of the recent decline of northern fur seals at the Pribilof Islands, Alaska.

The most serious concern, however, is for the estimated 44 000 albatrosses, chiefly from the Subantarctic, killed in long-line fisheries for tuna. This discovery, by Australian scientists, is reinforced by the knowledge that, since 1975, 75% of at-sea recoveries of South Georgia ringed wandering albatrosses were of birds killed by tuna long-line fishing compared with none in the previous 15 years. This mortality is the main factor accounting for the major decline in wandering albatross breeding populations around the Antarctic. One encouraging note is that the main (Japanese) long-line fishery has introduced modifications to fishing practice which appear to be significantly reducing albatross mortality, as well as the number of fish lost. A discouraging note, however, is the start, by the USSR, of a long-line fishery (for *Dissostichus eleginoides*), close to the South Georgia wandering albatross population, without any such modifications or any prior or simultaneous study of the risks involved.

All these examples argue for stricter controls on the activities of fishing fleets and for the main advisory and regulatory bodies, SCAR and CCAMLR, to take much more effective roles in addressing these issues. While CCAMLR has actively sought to prevent waste disposal at sea in the Antarctic, it has failed to enforce the requirement to report on entanglement and incidental mortality. Experience elsewhere suggests that adequate reporting will not occur until scientific observers become a regular part of fishing operations. The difficulty facing CCAMLR, given its consensus operation, is that the traditional unwillingness of fishermen to adopt any precautionary measures (whether to minimise risk to target fish, by-catch or dependent predator populations), even in circumstances where there are unanimous scientific recommendations for particular courses of action, is undermining the achievement of CCAMLR principles.

Failure adequately to regulate Antarctic fisheries and to study and limit the environmentally damaging side-effects of their activities is likely to attract increasing attention. Sensible precautionary policies need adopting now.

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