



COUNTDOWN TO CONSENSUS FOR CREATING MARINE RESERVES IN ANTARCTICA'S SOUTHERN OCEAN

The seas surrounding the frozen continent of Antarctica harbor some of the most pristine marine ecosystems left on our planet, supporting an abundant yet fragile web of life. Whales, penguins, and seals share the waters of the Southern Ocean with thousands of spectacular but little-known creatures, such as bioluminescent worms, brilliant starfish, and ghostlike octopuses. Twenty-four countries and the European Union will soon decide whether to safeguard two vital areas of the Southern Ocean—the Ross Sea and the East Antarctic—from increasingly intensive fishing and other industrial activities.

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The case for Antarctic marine protections is strong. With the exception of last century's intensive whaling and sealing, most of the Southern Ocean's 16,000 species have been spared the worst consequences of pollution and overfishing. But in recent years, several countries have expanded their fishing activities, in particular for the Antarctic toothfish, an apex predator in the food web marketed as "Chilean sea bass" in the United States. This species is now in decline.

Scientists, conservationists, and many countries seek swift action to safeguard large Southern Ocean marine areas. The first two to be under consideration are the Ross Sea and the East Antarctic. If these areas are designated as protected, they will be the largest marine reserves in the world. This policy brief presents the key reasons these two marine reserves must be created, exploring the unique opportunity today for international cooperation in the Southern Ocean, the ramifications of not acting now, and the incredible wealth of species and habitat that would be protected should the global community reach consensus on the two reserves this year.

The history of CCAMLR and marine reserves

The 1961 Antarctic Treaty provides extensive protection for the continent of Antarctica, declaring it a place for peace and science. This protection, however, applies only to the land and ice shelves, not the surrounding marine environment. To address the conservation and sustainable use of marine life in the Southern Ocean, participating countries established the Commission for the Conservation of Antarctic Marine Living Resources, or CCAMLR, in 1982, an international treaty with 24 member states and the European Union.

CCAMLR was groundbreaking. It defined the parameters of the area under management according to the flows of the marine ecosystem, not international boundaries. It requires that fisheries managers consider associated and dependent species when determining what fish could be caught. It also requires these managers to apply the precautionary principle when determining fishing quotas. In short, it calls for the application of an ecosystem approach in managing marine resources. Such efforts have been hamstrung by the influx of huge illegal fishing operations in the 1990s, as well as by pressure from industry to open new areas to krill and toothfish fisheries.

At the 2002 World Summit on Sustainable Development, convened by the United Nations and attended by heads of state and conservation experts, attendees acknowledged the need for comprehensive marine protected areas and committed to creating them.

In 2011, CCAMLR member states took the unprecedented step of agreeing to work together to protect the unique marine life that thrives in the ocean surrounding Antarctica. Members committed to research and identify important areas for conservation, and then to implement a comprehensive system of marine reserves to protect vulnerable habitat and iconic species and mitigate the effects of climate change.¹ Then, in October 2012, the first two protected areas were proposed:

- The Ross Sea proposal (championed by the United States and New Zealand).
- The East Antarctic proposal (championed by the European Union, France, and Australia).²

CCAMLR requires that all of its decisions be made by consensus, and, due to questions raised by a few countries, could not come to agreement in October 2012 or at a special meeting in July 2013. The stakes for marine life in these two areas could not be higher.

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System of proposed marine reserves in the Southern Ocean

- 1 ANTARCTIC PENINSULA**
 - Climate change reference area
 - Chinstrap and Adelie penguins
- 2 WEDDELL SEA**
 - Highly productive area
 - Climate change reference areas during retreat of sea ice/ice shelves
- 3 SOUTH ORKNEY ISLANDS**
 - High benthic biodiversity
 - Chinstrap and Adelie penguins
- 4 SOUTH GEORGIA**
 - Rare seamount habitats
 - Penguin and albatross foraging ranges
- 5 SOUTH SANDWICH ISLANDS ARC**
 - Volcanic activity associated habitats
 - Land-based predators
- 6 MAUD RISE**
 - Area of high productivity for krill
 - Shelf to basin biodiversity including seamounts, canyons, ridges and plateaus
- 7 BOUVETØYA**
 - Unique benthic environment with mid-ocean ridge rift valleys, fracture zones and seamounts
 - Foraging area for land based predators
- 8 OB & LENA BANKS**
 - Recovering populations of toothfish
 - Rare seamount habitats
- 9 DEL CANO REGION HIGH SEAS**
 - High levels of land-based predators
 - Benthic environment including seamounts & canyons
- 10 KERGUELEN PLATEAU HIGH SEAS AREA**
 - The Grand Banks of the Southern Ocean
 - Recovering toothfish populations
 - Vulnerable marine ecosystems & canyon
- 11 BANZARE BANK**
 - Recovering toothfish populations
 - Vulnerable marine ecosystems & canyons
- 12 KERGUELEN PRODUCTION ZONE**
 - Rugose seabed habitats
 - Area of high productivity
- 13 EASTERN ANTARCTIC SHELF**
 - Areas of high productivity
 - Climate change reference areas
- 14 INDIAN OCEAN BENTHIC ENVIRONMENT**
 - Unique benthic habitats including troughs, shelf commencing canyons, ridges and thermohaline current formed sediments
- 15 ROSS SEA**
 - Intact top predator assemblage
 - Least disturbed oceanic ecosystem
 - Climate change reference area



- 16 PACIFIC SEAMOUNTS**
 - Toothfish breeding habitat
 - Benthic biodiversity
- 17 BALLENY ISLANDS**
 - Land-based predator foraging ranges
 - Rare benthic habitat
- 18 AMUNDSEN & BELLINGSHAUSEN SEAS (WEST ANTARCTIC SHELF)**
 - Climate change reference areas
 - Recognised vulnerable marine ecosystems
- 19 PETER I ISLAND**
 - Area of high productivity
 - Pacific Basin, De Gerlache, Belgica Guyot & Lecoigne Seamounts

The consequences of fishing in the Southern Ocean

Overfishing and illegal fishing pose the biggest threats to marine life in the Southern Ocean. Large fishing vessels that can stay at sea for months head to remote areas to fill their holds. Krill and toothfish, vital to the Southern Ocean ecosystem, are under increasing pressure from commercial fishing interests.

Current rules allow for as much as a 50 percent reduction of the toothfish stock over the next 35 years.³

Industrial-scale fishing, with its massive vessels, long-lines and nets, plumes of exhaust, and inevitable catch of nontarget species, is by design an invasive and aggressive practice. This cannot be done over the long run without significant harm to the ecosystem.⁴



Toothfish: the sharks of Antarctica

Antarctic toothfish are the dominant fish predators in the Ross Sea, filling a role similar to sharks in other ecosystems. Ross Sea toothfish can grow to more than 2 meters in length.⁷ Although these fish have long been studied for their ability to produce proteins that keep their blood from crystallizing in the frigid waters of the Antarctic, very little is known about their life cycle and distribution.

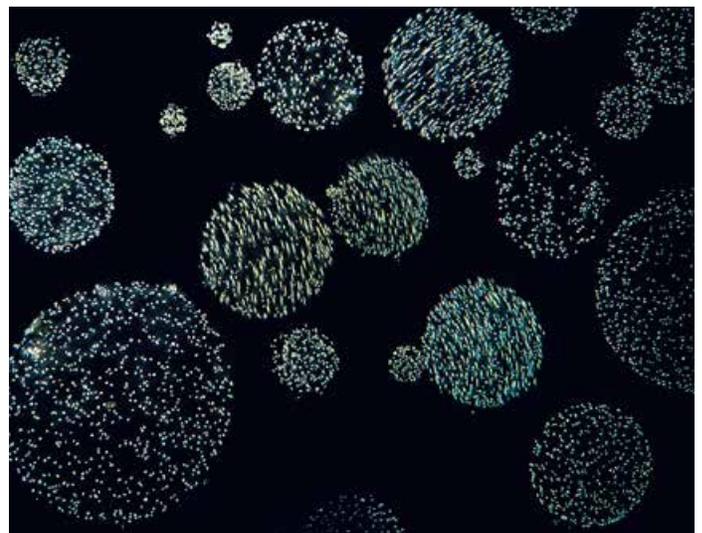
Scientists do know that they can live almost 50 years and that they grow relatively slowly. They also reproduce late in life, making them particularly vulnerable to decline as a result of overfishing of juveniles. In areas where fishing is intense, adult toothfish are rare; populations of orcas, a main toothfish predator, have declined, and scientists have seen a significant shift in penguin diets.⁸





Species at stake

Establishing no-take reserves would help conserve the 16,000 known species that inhabit the Southern Ocean⁵ as well as those yet to be discovered. Among them are icefish, which produce their own natural antifreeze; bioluminescent worms; glow-in-the-dark jellyfish; deep-sea lilies; gelatinous sea squirts; and glass sponges.⁶ These stunning and bizarre species are part of the web of life that supports most of the world's penguin population, whales, albatrosses, seals, and other iconic species of the south.

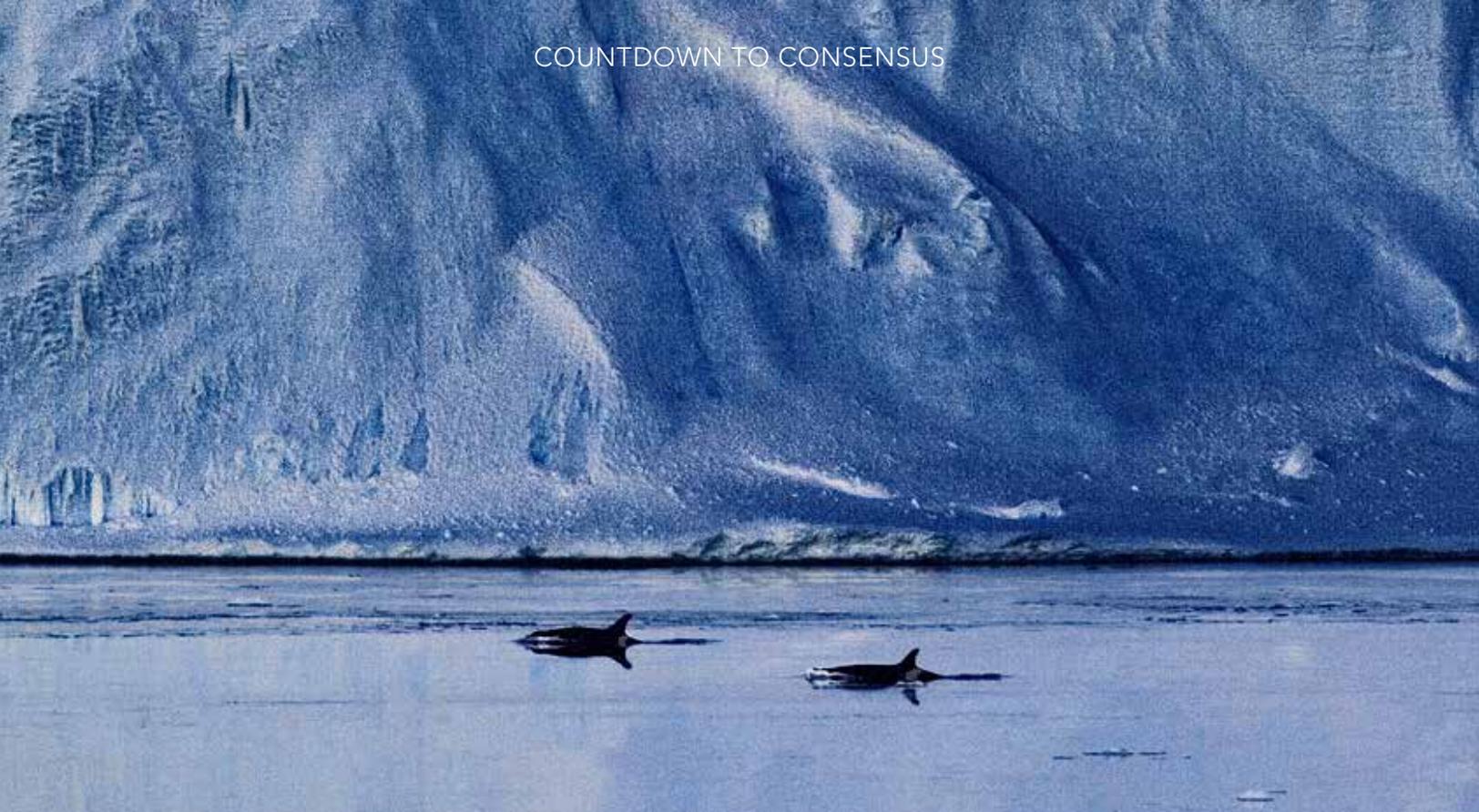




Climate change

Climate change and resulting sea ice variability and ocean acidification will put increasing pressure on the marine ecosystems of Antarctica. Using marine reserves as specific “climate reference” areas, scientists can develop a clear picture of the consequences of climate change and ocean acidification. Scientists agree that Antarctica is an ideal location for gathering data about how species adapt to changes in sea ice and ocean temperature.

Protected areas can also help build the resilience and adaptive capability of Southern Ocean ecosystems. Creating marine reserves will not stop climate change, but conserving habitat will allow species to adapt more readily, without the additional pressures from industrial fishing.



Recommendations

Ross Sea

The Commission for the Conservation of Antarctic Marine Living Resources should establish a fully protected, permanent marine reserve in the Ross Sea region as a first step to establishing a comprehensive system of reserves around Antarctica. This Ross Sea marine reserve should protect large-scale ecosystem processes in their entirety, including conserving:

- The biodiversity and ecological processes of the entire Ross Sea gyre, a massive area of rotating water formed by the Antarctic Circumpolar Current and the Antarctic continental shelf.
- Areas critical to the life-history stages of the Antarctic toothfish, the region's top fish predator. These include its feeding and spawning grounds.



- Critical geomorphic features, including the underwater seamounts, ridges, and troughs of the Pacific-Antarctic Ridge. The Ross Sea includes the Balleny Islands and Pacific seamounts.
- Biodiversity hot spots such as the Ross Sea shelf and slope, Balleny Islands, Pacific-Antarctic Ridge, and the Scott Seamounts.
- The Ross Sea region as a critical climate reference area and climate refuge for ice-dependent species.

The Ross Sea designation must be permanent. A review clause, which allows management of the area to be adjusted if necessary, is an approach supported by Pew, as well as the International Union for the Conservation of Nature. Scientific endeavors to collect data that underpin crucial research, including the impacts of climate change, should also be allowed.

East Antarctic

The Commission for the Conservation of Antarctic Marine Living Resources should establish a series of fully protected marine reserves in the East Antarctic marine area as part of a comprehensive system of no-take reserves around Antarctica. This designation would protect large-scale ecosystem processes in their entirety, including:

- East Antarctica's unique geomorphic features, including the Gunnerus Ridge, Bruce Rise, seamounts including the d'Urville Sea-Mertz Seamounts, and abyssal eco-regions.
- Prydz Bay, an area that supports large numbers of seabirds and mammals, and is a likely nursery for krill and toothfish.
- Critical nursery areas for Antarctic toothfish, including Prydz Bay and surrounding waters.
- Foraging areas for Adélie and emperor penguins, which extend far beyond their breeding grounds.
- East Antarctica as a critical climate reference area and climate refuge area for ice-dependent species.

Both the Ross Sea and the East Antarctic designations must be permanent. The Pew Charitable Trusts strongly recommends that sunset clauses be removed from the proposals and calls on CCAMLR to agree on standard review clauses that address management and research plans for all future MPAs.

The designation sought in the joint EU, French, and Australian proposal must be permanent. Review language should be added to allow management to be adjusted if necessary, an approach supported by both Pew and the International Union for Conservation of Nature. Scientific endeavors to collect data that underpin important research, including the consequences of climate change, should be encouraged.

Conclusion

Less than 1 percent of the world's oceans are fully protected from intensive fishing and other extractive activities. In addition, the majority of the world's active fisheries are overexploited. The talks aimed at establishing two very large protected areas in the Southern Ocean present an invaluable opportunity to begin to create the largest system of marine reserves in the world. The Antarctic network of marine reserves would enable the global community to begin working together toward restocking and restoring life in our ocean and building resilience to climate change.



Endnotes

1 CCAMLR Conservation Measure 91-04, ccamlr.org/sites/drupal.ccamlr.org/files//91-04.pdf.

2 CCAMLR-XXXI Meeting 23 October-1 November 2012, meeting documents, ccamlr.org/en/ccamlr-xxxi, specifically *A proposal for the establishment of a Ross Sea region marine protected area*, ccamlr.org/en/ccamlr-xxxi/16-rev-1, and *Proposal for a conservation measure establishing a representative system of marine protected areas in the East Antarctica planning domain*, ccamlr.org/en/ccamlr-xxxi/36.

3 Matt Pinkerton, Stuart Hanchet, and Janet Bradford-Grieve, *Finding the role of Antarctic toothfish in the Ross Sea ecosystem*, *Water & Atmosphere* (2007) 15 (1): 20-21.

4 Julia K. Baum, Ransom A. Myers, Daniel G. Kehler, Boris Worm, Shelton J. Harley, and Penny A. Doherty, *Collapse and conservation of shark populations in the northwest Atlantic*, *Science* 299 (2003): 389-392. William W.L. Cheung, Reg Watson, Telmo Morato, Tony J. Pitcher, and Daniel Pauly, *Intrinsic vulnerability in the global fish catch*, *Marine Ecology Progress Series* 333 (2007): 1-12.

5 Census of Antarctic Marine Life, caml.aq.

6 Census of Antarctic Marine Life, Archive of Project Documentation.

7 Pinkerton et al., "Finding the role of Antarctic toothfish."

8 Arthur L. DeVries, David G. Ainley, and Grant Ballard, *Decline of the Antarctic toothfish and its predators in McMurdo Sound and the southern Ross Sea, and recommendations for restoration*, penguinscience.com/reprints/ross_sea/Fishing_industry_taking_the_fish.pdf.

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About The Pew Charitable Trusts

The Pew Charitable Trusts is a member of the Antarctic Ocean Alliance. Pew partners with the alliance and affiliated groups to establish a network of 19 marine sanctuaries in the Southern Ocean with the goal of protecting key marine habitats and wildlife from human interference. Pew works globally to establish pragmatic, science-based policies that protect our oceans, preserve our wildlands, and promote the clean energy economy.

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