ISSN 2451-7755

Rodolfo Werner ∞ Andrea Kavanagh ∞ Ricardo Roura ∞ Cassandra Brooks
Nicole Bransome ∞ Ryan Dolan ∞ Elsa Cabrera ∞ Mike Walker

Antarctic Affairs

Volume IV - July 2017

Antarctic Affairs

Antarctic Affairs is the academic magazine of the Antarctic and Southern Ocean Coalition (ASOC) and Agenda Antártica, which aims to publish and disseminate the most prominent and influential research in relation to Antarctica. The journal publishes articles, reviews and official documents in English and Spanish. The purpose of this publication is also to stimulate research that contributes to environmental protection of Antarctica and the Southern Ocean.

The ideas expressed in the texts published here are the sole responsibility of their authors and do not necessarily reflect the viewpoint of The Antarctic Affairs. The Editorial Board invites all interested persons to submit their contributions to this forum, but reserves the right to publish the submissions received. Reproduction of the contents is allowed, provided that the source is mentioned and two copies are sent to the Editorial Board.

AGENDA ANTÁRTICA

Agenda Antártica is a non-governmental organization (NGO) based in Buenos Aires that works for environmental conservation of the Antarctic continent and the Southern Ocean, the promotion of research in Antarctica and the preservation of peace in the southern region. Agenda Antártica was founded in 2012 and is constantly developing research, outreach and advocacy at national, regional and international forums through publications, seminars, social networking and promotion of telecommunications. For more information about Agenda Antártica, visit: www.agendaantartica.org

ANTARCTIC AND SOUTHERN OCEAN COALITION (ASOC)

The Antarctic and Southern Ocean Coalition (ASOC) was founded in 1978 by five environmental organizations in the US, UK, Australia and New Zealand, promoting a World Park vision for protecting Antarctica and the Southern Ocean. ASOC has worked since 1978 to ensure that the Antarctic Continent, its surrounding islands and the great Southern Ocean survive as the world's last unspoiled wilderness, a global commons for the heritage of future generations. ASOC is an invited observer to the meetings of the Antarctic Treaty and CCAMLR. The Secretariat of the ASOC, which includes 21 organizations in 11 countries, is based in Washington, D.C. For more information about ASOC, visit: www.asoc.org

Cover Photo *Photographer: Rodolfo Werner // Título: Leopard Seal in Antarctic Peninsula, 2015.*

Antarctic Affairs

Bilingual publication

Volume IV

July 2017 / Year IV

Editorial Agenda Antártica / ASOC

Managing Editor: Juan José Lucci
Advisory Editor: Rodolfo Werner

Translator: Nicole Simonelli
Graphic Designer: María Belén Alonso

ISSN 2451-7755

Editorial Board of the Journal

Antarctic Affairs

Agenda Antártica
Antarctic and Southern Ocean Coalition (ASOC)
Argentine Office: Laprida 2150 7º "A", Buenos Aires, Argentina (1425)
USA Office: 1320 19th St. NW, Fifth Floor, Washington, DC 20036

Antarctic Affairs

Table of contents

Message from the Managing Editor

Dear readers,

Welcome to the fourth volume of Antarctic Affairs. This edition focuses on one of the most important events that has occurred in the history of Antarctica: the creation of Marine Protected Areas in the Southern Ocean. In October 2016, the members of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) decided to create the world's largest marine protected area in the Ross Sea, marking an international milestone in the conservation of oceans. This volume is mainly composed of articles that describe not only the details of this process, but also the development of new Marine Protected Areas (MPAs) and the future of conservation in the Southern Ocean.

The first article in this edition summarizes the proposals of Marine Protected Areas that have been worked on and analyzed by CCAMLR. Andrea Kavanagh, Rodolfo Werner, and Nicole Bransome detail the challenges and the importance of protecting these Antarctic seas, and the existing proposals to create a network of marine protected areas in the Southern Ocean.

The second article concerns the proposed Marine Protected Area recently created in the Ross Sea. Ryan Dolan, Cassandra Brooks, and Rodolfo Werner give us details of its environmental conservation policy, its limits, and its environmental benefits. The article also discusses the negotiations that have taken place within CCAMLR with regards to this MPA, especially those debates that were responsible for the results obtained.

Thirdly, Mike Walker and Ricardo Roura focus on the proposal of a Marine Protected Area in Eastern Antarctica. Although Australia, France, and the European Union presented this proposal several years ago, different members of CCAMLR vetoed it on more than four occasions. The authors analyze the current state of the proposal and its environmental importance.

The fourth article in this edition focuses on the proposal submitted by Germany to protect the Weddell Sea, one of the most active seas in terms of fishing in Antarctica. Mike Walker, Cassandra Brooks, and Ricardo Roura explain the status of the proposal to us and describe the challenges highlighted by the Commission of CCAMLR to designate it.

Argentina and Chile are about to present a proposal of a MPA to protect one of the areas most affected by climate change and human activity: the Antarctic Peninsula. In the next article, Rodolfo Werner and Nicole Bransome tell us about the process and the work being done by these two countries in the creation of this proposal.

Finally, this volume includes an article about a problem that regrettably continues to be international news: the illegal hunting of whales in the Southern Ocean by Japan. Elsa Cabrera of the Center for Cetacean Conservation explains in detail the current situation concerning the illegal hunting in the Antarctic Seas, and discusses how the establishment of Marine Protected Areas could have an impact on this activity (although CCAMLR has no interference in the protection of cetaceans.).

Again, thanks to all of the authors, donors, translators, the Editorial Committee and Dr. Rodolfo Werner and Nicole Bransome for their significant contributions to this volume.

Juan José Lucci

ASOC Prologue

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), established in 1982, pioneered modern marine conservation by including in its founding principles the ecosystem approach and the precautionary principle. Originally established in response to the growing fishery for Antarctic krill(a keystone species in the Southern Ocean food web), the CCAMLR convention gradually came to include the management of fishing for other commercially valuable species, particularly Patagonian and Antarctic toothfish. True to the conservation spirit that gave rise to this convention, CCAMLR agreed to establish a network of marine protected areas (MPAs) that was representative of the diverse marine habitats within the Convention Area, setting an important milestone in the history of the Convention. For those of us who have been working for many years within the context of CCAMLR, we recognize that this commitment represented an important milestone in the history of the Convention.

Following this commitment, several meetings and workshops set out the framework in which to develop specific MPA proposals, and then several Commission members began the arduous task of preparing proposals. This gave rise to two proposals, one for the Ross Sea (presented by the US and New Zealand) and the other for Eastern Antarctica (submitted by Australia, France, and the European Union). Given that the decisions of CCAMLR are taken by consensus and are based on the best science available, these proposals were the center of numerous technical discussions, which were followed by lengthy political negotiations. In the case of the Ross Sea, these negotiations happily concluded with the establishment of the world's largest marine protected area. The proposal for East Antarctica is still the center of negotiations that oscillate between the technical and political. An additional MPA proposal for the Weddell Sea MPA (prepared by Germany) is currently the subject of discussions at the technical level. A new MPA proposal for the Antarctic Peninsula is currently being developed by Argentina and Chile. This area happens to be not only the most visited area of Antarctica, but is also where the Southern Ocean's krill fishing operations are concentrated, and has been one of the world areas most impacted by global warming in recent years.

Without a doubt, the creation of the MPA in the Ross Sea has been one of the most important achievements of CCAMLR, and has enabled the international community to renew its hope with regard to the conservation of Antarctica. In my case, this has been the most important milestone in marine conservation that I have been a part of in my career.

For those of us fortunate enough to visit Antarctica year after year, it feels strange that the conservation of a place like Antarctica does not come naturally, especially given the fact that through the Antarctic Treaty, the White Continent and its waters have been devoted to peace and science.

Antarctica's incredible beauty mobilizes us and connects us in a very deep way with nature, joining us with our purest humanity. It is there when we really become aware of the responsibility we have to protect this marine ecosystem as if our lives depend on it, because as Sylvia Earle says, our lives do depend on it. In these moments, we feel that we must move away from hard facts, from complex technical analyses, from models developed to represent the ecosystem, and understand that the conservation of the Antarctic has an intrinsic justification based simply on the value of its natural

beauty. Although this value is difficult to quantify, my hope is that it will be the key element that guides political decisions that enable the conservation of Antarctica.

*Dr. Rodolfo Werner**
Advisor,
The Pew Charitable Trusts & Antarctic and Southern Ocean Coalition (ASOC);
Board Member & Scientific Advisor; Antarctic Wildlife Research Fund;
Director of Scientific Advisory Board, Agenda Antártica.

*

Towards Creation of a CCAMLR Network of Marine Protected Areas in the Southern Ocean

Andrea Kavanagh , Nicole Bransome and Rodolfo Werner

Abstract

Following recommendations from the 2002 United Nations World Summit, and recognizing the value of marine protected areas (MPAs), the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was the first international body to commit to creating an MPA network. The commitment was based on CCAMLR's mission to protect the life in its waters, as well as implementing the precautionary principle. In 2011, CCAMLR members agreed by consensus to a framework for creating a network of MPAs by adopting Conservation Measure 91-04 and also identifying nine planning domains, which represent areas in which to plan and report on MPAs.With the establishment of the Ross Sea Region MPA in 2016, CCAMLR has taken the first step needed to create a network of MPAs, which would preserve connectivity and provide resilience for the many unique ecosystems of the Southern Ocean. The next steps towards creating this network include designating the proposed Weddell Sea and East Antarctic MPAs, as well as the forthcoming proposal for an MPA off the Western Antarctic Peninsula. It is anticipated that CCAMLR members will develop additional MPA proposals to create a truly circumpolar network of protection in the Southern Ocean. In this series of five articles, we provide an update on the status of the CCAMLR MPA network and the proposed MPAs in their various stages.

Key words

Marine Protected Area, Southern Ocean, CCAMLR, Climate Change, Conservation

Introduction

The Southern Ocean, surrounding Antarctica, is one of the least altered marine ecosystems on Earth. Encompassing 15 percent of the world's ocean, it is home to thousands of species found nowhere else, from brilliantly hued starfish and bioluminescent worms to pastel octopuses. It is also home to millions of penguins that depend on large swarms of krill, a tiny shrimplike crustacean, as well as other forage species that form the base of a delicate food web. Scientists believe this ecosystem is changing due to the impact of climate change and increased temperatures that are warming faster than anywhere else on Earth.

Two species of toothfish (marketed as Chilean sea bass in North America), seven species of penguins, and ten species of whales, colossal squid and crawling sponges call the Southern Ocean home.

Scientists continue to study marine life in these waters, though much about this region remains unknown. Almost every Antarctic research expedition reveals previously unknown species.

The History of CCAMLR's commitment to create a network of Marine Protected Areas

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is the international body made up of 24 countries and the European Union, established in 1982 with the primary mission of protecting the Southern Ocean's diverse marine life. While prioritizing conservation, CCAMLR allows limited fishing in some areas in accordance with its ecosystem-based management approach. The main fishing activities in these waters target toothfish and Antarctic krill.

At the 2002 World Summit on Sustainable Development, many world leaders committed to the target of establishing marine protected areas (MPAs) based on science and international law by 2012. Recognizing the value of MPAs and marine reserves in supporting ecosystem health, CCAMLR become the first international body to commit to creating an MPA network. CCAMLR's commitment was based on a mission to protect, rather than exploit, life in the Southern Ocean, as well as to implement the precautionary principle, which errs on the side of conservation when the best available science is limited or unclear. CCAMLR includes MPAs as part of the suite of tools it is using to protect the Southern Ocean.

CCAMLR's commitment has been supported by a series of milestones (CCAMLR 2016) including:
- CCAMLR held an MPA workshop in 2005
- The first bioregionalisation mapping of the Southern Ocean was executed in 2007
- In 2009, CCAMLR established the world's first high-seas MPA, the South Orkney Islands southern shelf MPA, a region covering 94 000 km2 in the south Atlantic
- A 2011 CCAMLR MPA workshop divided the CAMLR Convention Area into nine MPA planning domains, areas that provide a mechanism by which to plan and report on the development of MPAs
- In 2011, CCAMLR members agreed by consensus to adopt Conservation Measure 91-04 which

provides a general framework for the establishment of CCAMLR marine protected areas
- In 2016, CCAMLR established the world's largest MPA, the Ross Sea Region MPA, a region covering 2.06 million km2

Benefits of an Antarctic MPA Network

According to a 2014 study in the journal Nature, successful MPAs should be large, isolated, well-enforced, long-lasting, and should prohibit any extraction of fish or other resources (Edgar et al, 2014). MPAs that meet the above criteria create a spillover effect, where adults that grow in an MPA spillover into adjacent fishing grounds, and improve the health of marine life in waters outside of the protected regions (Roberts et al, 2005). To achieve effective conservation results and help rebuild depleted fish stocks, a 2016 article in the Conservation Letters journal concluded that at least 30 percent of the global ocean should be set aside in MPAs (O'Leary et al, 2016).

In addition to the network of MPAs being created by CCAMLR, protections have been afforded to waters in the Convention area around certain subantarctic islands, including South Georgia, Crozet, and Prince Edward Islands. Combined with the CCAMLR network of MPAs, these protected waters will preserve connectivity among the many unique ecosystems of the Southern Ocean, allowing marine life to migrate between protected areas for breeding and foraging. A network not only has the power to ensure resilience in the Southern Ocean by safeguarding large scale processes that are critical for ecosystem protection, but it would also significantly contribute to global ocean protection goals.

Some of the most pronounced effects of climate change on Earth, like warming and acidifying seas, in addition to changes in sea-ice concentration and duration, are found in Antarctica (Stammerjohn et al, 2008). MPAs can help build ecosystem resilience to those changes by eliminating stresses, such as fishing. Furthermore, the relatively undisturbed waters of the Southern Ocean provide a natural laboratory for studying how intact marine ecosystems react to a warming and acidifying ocean. MPAs can also protect important carbon sinks, allowing more absorption of carbon dioxide than in non-protected areas. Antarctic krill, for example, feed on microscopic phytoplankton near the ocean surface and move to much deeper waters several times in the night to avoid predators, injecting carbon dioxide into the deep water as they excrete waste. It is estimated that 23 million tons of carbon are locked in this way every year, equivalent to the carbon from 35 million cars (Tarling and Johnson 2006).

The Ross Sea Protection and Looking Ahead

Successfully implementing a network of MPAs in the Southern Ocean would exemplify global cooperation in the face of increasing environmental challenges.

In 2016, CCAMLR showcased an example of such cooperation with the consensus designation of the world's largest MPA in the Ross Sea. The Ross Sea Region MPA set a precedent for high seas

protections—the first time international cooperation has led to the creation of a large-scale MPA. The 25 member governments that comprise CCAMLR agreed by consensus to ban commercial fishing in over 2 million square kilometers, including the waters currently under the Ross Ice Shelf. The MPA, which is three times the size of France, covers two-thirds of the Ross Sea and includes important biodiverse areas.

CCAMLR, which meets annually every October, is currently considering two additional MPA proposals—one in the waters off East Antarctica, which has been under discussion since 2011, and another, proposed in 2016, in the Weddell Sea. Additional MPA proposals for regions including the Antarctic Peninsula and others are expected in the coming year or two.

While the Ross Sea MPA is large, it is only a small portion of the vast Southern Ocean, which covers over 20 million square kilometers. With nutrients that upwell from the depths and a massive circumpolar current that feeds into other oceans, the waters around Antarctica have a big influence

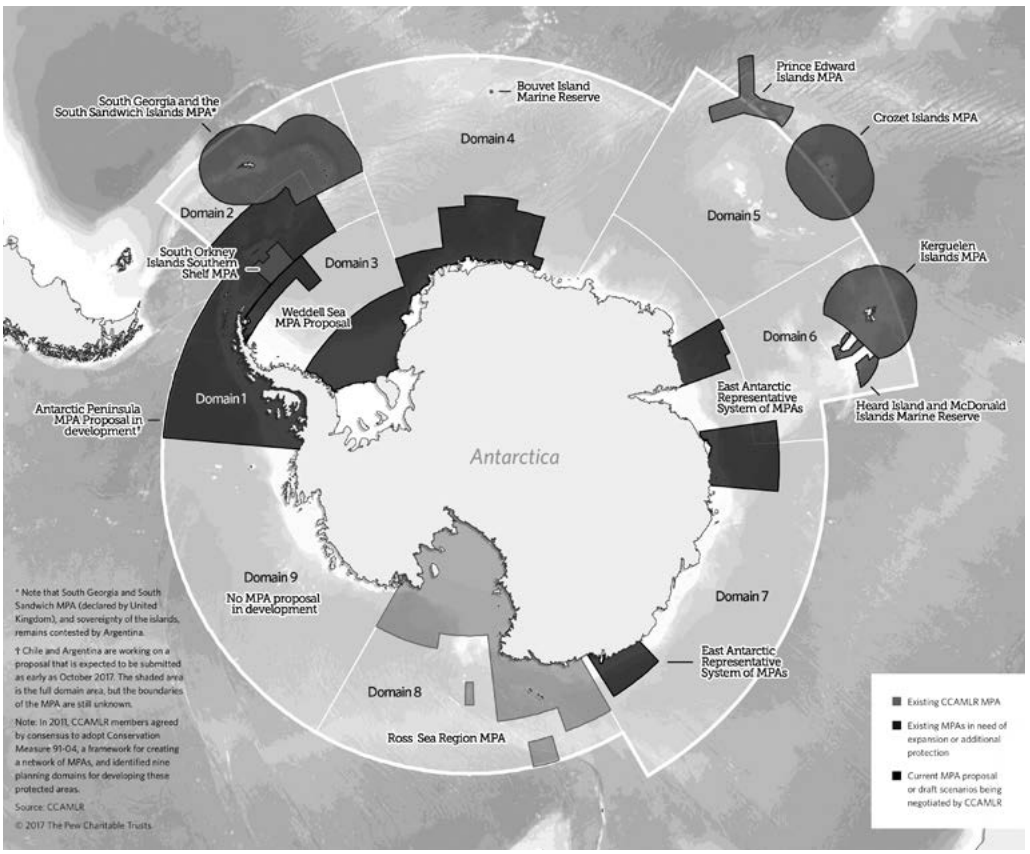


Figure 1. *This map highlights Southern Ocean regions in need of protection as well as the nine CCAMLR MPA planning domains, areas that provide a mechanism for CCAMLR to plan and report on the development of MPAs.*

on seas near and far. And like animals anywhere, the species that thrive in the Southern Ocean won't abide boundaries drawn on paper. In order to achieve the greatest possible conservation impact, CCAMLR needs to continue its efforts to create a broader network of marine protected areas throughout the region.

Since CCAMLR made its first commitment to establish a network of MPAs around the Southern Ocean, the Ross Sea Region MPA has been the only large-scale proposal to be successfully designated, and CCAMLR is now five years behind its own timetable for implementing a network of MPAs.

The time for delay is over. Conservation groups from around the world, as well as governments including the European Union, Australia, France, Germany, Argentina, and Chile, are working to achieve three MPA designations in the Southern Ocean by 2020.

CCAMLR members have shown that they can work together and take action, and the Ross Sea Region MPA designation was a laudable step. CCAMLR now has the unprecedented opportunity to establish the world's largest network of MPAs around Antarctica, and to leave a lasting legacy of science-based conservation for the world.

REFERENCES

-Commission for the Conservation of Antarctic Marine Living Resources (2016). "Marine Protected Areas (MPAs)," accessed March 28, 2017, https://www.ccamlr.org/en/science/marine-protected-areas-mpas.

-Edgar, G. J., Stuart-Smith, R. D., Willis, T. J., Kininmonth, S., Baker, S. C., Banks, S., … Thomson, R. J. (2014). "Global conservation outcomes depend on marine protected areas with five key features". Nature, 506(7487), 216–220. https://doi.org/10.1038/nature13022

-Roberts, C.M., Hawkins, J.P., & Gell, F.R. (2005). "The Role of Marine Reserves in Achieving Sustainable Fisheries". Philosophical Transactions of the Royal Society B: Biological Sciences, 360 (1453): 123–132.http://dx.doi.org/10.1098/rstb.2004.1578.

-O'Leary, B. C., Winther-Janson, M., Bainbridge, J. M., Aitken, J., Hawkins, J. P., & Roberts, C. M. (2016). "Effective Coverage Targets for Ocean Protection: Effective targets for ocean protection". Conservation Letters, 9(6), 398–404.

-Stammerjohn, S. E., Martinson, D. G., Smith, R. C., Yuan, X. & Rind, D. (2008). "Trends in Antarctic annual sea ice retreat and advance and their relation to El Nino-Southern oscillation and Southern Annular Mode variability". Journal of Geophysical Research, 113: CO3S90. doi:10.1029/2007JC004269.

-Tarling, G.A. & Johnson, M.L. (2006). "Satiation Gives Krill That Sinking Feeling". Current Biology , 15(3): R83-PR84. http://www.cell.com/current-biology/abstract/S0960-9822(06)01053-0

*

The World's Largest Protected Area in the Ross Sea, Antarctica

Ryan Dolan , Cassandra Brooks and Rodolfo Werner

Abstract

In 2016, CCAMLR twenty-five members, many of which with fishing interests in the Antarctic, agreed to create the world's largest protected area in the Ross Sea. This MPA is also an example of how states can achieve conservation goals in an international space by consensus. Currently, it is crucial that CCAMLR members continue the necessary research, monitoring and enforcement of the MPA in order to make sure the MPA fulfills its conservation objectives. Moreover, CCAMLR members should actively participate in the development of a management plan and put in place the necessary resources to implement the MPA. CCAMLR has been praised as a leader in the international management of oceans resources and thus, it must continue with its commitment to achieve a significant system of MPAs in the Southern Ocean.

Key words

Ross Sea, CCAMLR, Souther Ocean, Conservation, Marine Protected Areas

Introduction

In October 2016, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), comprised of 24 countries and the European Union, agreed to designate the world's largest marine protected area (MPA) in the Ross Sea. After years of negotiations, this occasion marked the first time that world leaders have agreed — and by consensus — to set aside a large area of the high seas for protection from commercial fishing.

The Ross Sea, the most productive stretch of the Southern Ocean, teems with biodiversity and an abundance of life (Arrigo et al. 2015). It is home to more than one-third of the world's Adélie penguin population, one-fourth of the world's Emperor penguins, as well as large populations of Weddell seals, Minke whales, Antarctic petrels, and three types of killer whales, including one unique to the Ross Sea (Ainley et al. 2010). This living laboratory offers scientists a prime opportunity to observe the effects of climate change on Southern Ocean ecosystems, as well as to better understand the impacts of commercial fishing on marine ecosystems.

The Ross Sea also supports the world's largest commercial fishery for Antarctic toothfish (Dissostichus mawsoni), with an annual catch limit for the 2016/2017 season of 2,870 tonnes (CCAMLR 2016a). The presence of a commercial fishery in the region presented a significant challenge to the co-proponents of the Ross Sea MPA proposal, the United States and New Zealand, to design an MPA that achieved desired conservation benefits, while accommodating economic interests of the up to a dozen CCAMLR member countries who fish there.

The tension between fishing and preservation in Antarctic waters, as revealed during Ross Sea MPA negotiations, is illustrative of the increasing tension within CCAMLR over its very purpose and mandate. Article II of the Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention) states the objective of the Convention as "the conservation of Antarctic marine living resources", where conservation includes rational use (CCAMLR 1980). Rational use allows for commercial harvesting but mandates a strict, precautionary and ecosystem-based approach. Some fishing countries, particularly during MPA negotiations, have increasingly interpreted rational use as a right to fish rather than a responsibility to conserve (Jacquet et al. 2015). Despite compelling scientific evidence justifying the closure of the entire Ross Sea to industrial fishing (CCAMLR 2004, ASOC 2010), the zoning approach that evolved to accommodate differing interests ultimately led to a compromise to meet the needs of a diverse, but majority fishing, Commission.

Management of the Ross Sea region marine protected area

Coming into force on December 1, 2017, the Ross Sea region MPA encompasses 1.55 million km2. However, the MPA technically extends from the coastline, including the waters under the Ross Ice Shelf, adding an additional 0.51 million km2, for a total area protected of 2.06 million square kilometers (CCAMLR 2016b). The MPA will be in place until at least December 2052, for a 35-year duration. At that point, CCAMLR must agree via consensus to extend the MPA or it will expire.

The Ross Sea region MPA is a critical starting point for establishing a system of protected areas in the Southern Ocean under Conservation Measure 91-04 (CCAMLR 2011), which provides a framework for large-scale marine protections within the CCAMLR management area. The Ross Sea was the first MPA to be designated under this conservation measure, and sets the stage for future MPA designations in East Antarctica, the Weddell Sea, and the waters west of the Antarctic Peninsula.

The Ross Sea Region MPA consists of three distinct management zones that offer different levels of protection.

Figure 1: The Ross Sea region marine protected area, including the boundaries of the General Protection Zone, composed of areas (i), (ii), and (iii), the Special Research Zone (SRZ), and the Krill Research Zone (KRZ). The Ross Sea Region MPA was designated in 2016 by CCAMLR Conservation Measure 91-05. Image from CCAMLR Conservation Measure 91-05.

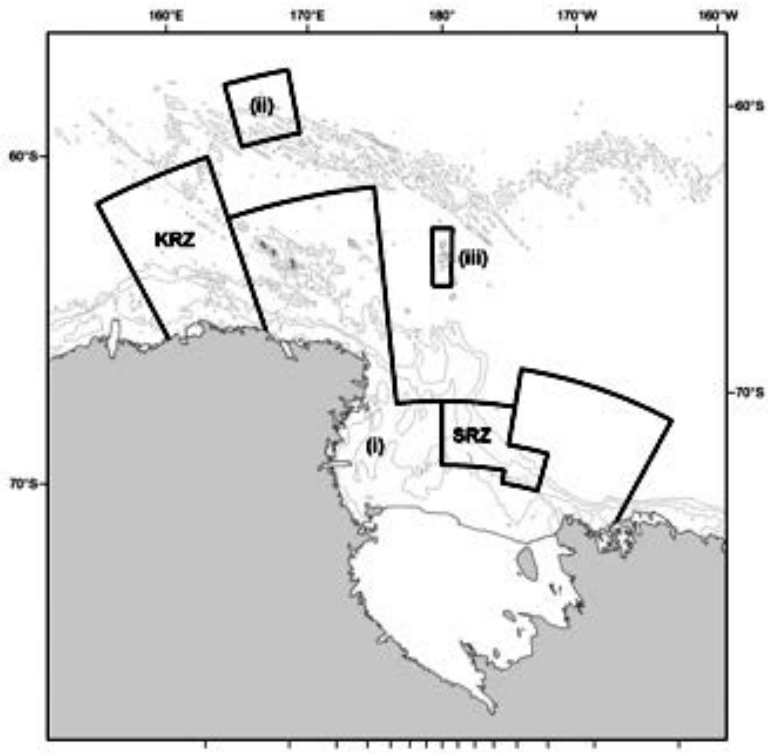


Figure 1. *The Ross Sea region marine protected area, including the boundaries of the General Protection Zone, composed of areas (i), (ii), and (iii), the Special Research Zone (SRZ), and the Krill Research Zone (KRZ). The Ross Sea Region MPA was designated in 2016 by CCAMLR Conservation Measure 91-05. Image from CCAMLR Conservation Measure 91-05.*

The general protection zone (encompassing areas i, ii, and iii; Figure 1) covers an area of 1.12 million km2 that is designated as fully protected and prohibits commercial fishing. Area (i) protects sensitive areas in the Ross Sea, including key biodiversity hotspots such as the Balleny Islands as well as large portions of the Ross Sea continental shelf and slope, which are important for biodiversity, a large number of birds and mammals, and for toothfish early life history. Area (ii) protects the northern seamounts and area (iii) protects the Scott Seamounts, both of which were included in the MPA for their unique habitat types.

The krill research zone (KRZ) was a late-stage addition to the joint US - New Zealand proposal in 2015 considered in part due to commercial krill interests expressed by the Chinese. This area had been identified in the original United States 2012 Ross Sea region MPA proposal as having potential for krill research that would support the overall objectives of the MPA (United States Department of State 2012). The area covers over 322,000 km2 to the east of the general protection zone, and prohibits toothfish fishing, but allows for exploratory commercial research fishing for Antarctic krill. The special research zone (SRZ) covers approximately 110,000 km2 over the continental shelf and slope and allow for targeted commercial research fishing for toothfish (Dissostichus spp.) and Antarctic krill (Euphausia superba). This zone developed during CCAMLR negotiations, was a compromise between countries that wanted this area closed due to its ecological importance and those countries who saw this area as instrumental for toothfish tag-recapture studies, which form the basis of the toothfish stock assessment. The SRZ is thus designed to encourage more robust toothfish management by requiring a greater tagging rate, but has a reduced overall fishing rate. Having a reduced fishing rate in the SRZ enables the area to serve as a "fishery reference zone" where ecosystem impacts of fishing can be compared between this lightly fished area to the heavily fished area just north of the SRZ. The SRZ also allows for commercial krill research fishing in limited amounts. The krill provision was added to the SRZ late in the MPA negotiations and was linked to discussions with the Chinese on the KRZ. The scientific value of krill fishing in this area is highly questionable, though, and may potentially compromise a critical foraging area for seabirds and whales.

Looking Ahead: Robust research, monitoring, management and enforcement

The MPA is designed to foster international research among all CCAMLR members in the region. It requires members to report findings of their research activities within the MPA every five years. Based on ongoing research and monitoring, the MPA will be reviewed by CCAMLR every ten years to assess the efficacy of the conservation measure, as well as to potentially adjust boundaries or management measures should the MPA prove to fall short of its intended objectives. Any changes to the MPA during the initial 35-year duration must be approved via consensus. After 35-years the MPA is set to terminate unless all members choose to extend its duration. A potential extension, which would be important to ensure long-term protection of the Ross Sea ecosystem, depends on strong research, monitoring and enforcement.

CCAMLR members are currently developing a research and monitoring plan, required under

CCAMLR Conservation Measure 91-04, as a management tool to measure whether the MPA is meeting its objectives and to measure changes in ecosystem functioning. CCAMLR will also need to develop a management plan, which will provide for management and administrative arrangements for achieving MPA objectives. Finally, mechanisms for enforcement in this large, remote area must also be considered by CCAMLR. Putting resources towards research, monitoring, management and enforcement will be the responsibility of all individual CCAMLR member countries.

Conclusion

The Ross Sea Region MPA is the first of its kind, and will serve as a model for future CCAMLR MPAs, as well as other high seas MPAs. What CCAMLR accomplished was remarkable. Twenty-five member governments, many of which represent countries that fish in the Antarctic, agreed to set aside the largest protected area in the world, safeguarding some of the most pristine marine ecosystems in existence. It is crucial, now that the MPA has been adopted, that CCAMLR members commit to pursuing the research, monitoring and enforcement needed. All CCAMLR countries must actively participate in the development of these management plans, and to put forth the resources required to make the MPA effective.

This MPA is an example of how we can achieve conservation objectives in a complex international space, but also serves as a starting point to achieve something more ambitious. As the Commission pursues a broader network of MPAs, they can set a new precedent to ensure that Southern Ocean MPAs not only include large, fully-protected areas, but also strive for a long duration with no hard stop. CCAMLR has been lauded as a leader in international ocean management, and must carry forward its commitment to achieve a meaningful system of MPAs in the Southern Ocean. The Ross Sea MPA represents a first step in the right direction.

REFERENCES

-Ainley D.G., G Ballard, & J. Weller. 2010. Ross Sea Bioregionalization. Part 1: Validation of the 2007 CCAMLR Bioregionalization workshop results towards including the Ross Sea in a representative network of marine protected areas in the Southern Ocean. CCAMLR WG-EMM-10/11. Hobart, Tasmania.
-Antarctic and Southern Ocean Coalition. 2010. Scientists' Consensus Statement on Protection of the Ross Sea.
-Arrigo K.R., G.L. van Dijken & A.L. Strong. 2015. Environmental controls of marine productivity hot spots around Antarctica. Journal of Geophysical Research: Oceans.
-CCAMLR. 1980. Convention on the Conservation of Antarctic Marine Living Resources.
-CCAMLR. 2004. Working Group on Ecosystem Monitoring and Management, CCAMLR document number Wg-Emm-04/20. Acquiring a 'Base Datum Of Normality' For a Marine Ecosystem: The Ross Sea, Antarctica.
-CCAMLR. 2011. Conservation Measure 91-04. General framework for the establishment of CCAMLR marine protected areas.
-CCAMLR. 2013. Conservation Measure 24-01: The application of conservation measures to scientific research.
-CCAMLR. 2016a. Conservation Measure 41-09: Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Subarea 88.1 in the 2016/17 season.

-CCAMLR. 2016b. Conservation Measure 91-05: Ross Sea region marine protected area.
-CCAMLR 2016c. Conservation Measure 51-04: General measure for exploratory fisheries for Euphausia superba in the Convention Area in the 2016/17 season.

*

Next step for Southern Ocean Conservation: [Designating] Marine Protected Areas for Eastern Antarctica

Ricardo Roura and Mike Walker

ABSTRACT

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) has been considering a proposal for an East Antarctica Representative System of Marine Protected Areas (EARSMPA) since 2012. With the designation of the Ross Sea region marine protected area in October 2016, CCAMLR demonstrated its ability to adopt large scale marine protected areas (MPAs) in the Southern Ocean. Failure by CCAMLR members to designate the EARSMPA in 2017 could make the Ross Sea MPA stand out as a conservation exception and threaten to erode the commitment CCAMLR made early on to adopt a system of MPAs in the area under its responsibility. In this document we summarise the EARSMPA proposal, including the main arguments used against the proposal and the changes it has experienced over the years, and contend that it should be next in line for adoption.

Key Words

Marine Protected Areas, Eastern Antarctica, CCAMLR, Southern Ocean

Overview

CCAMLR, which is made up of 24 member countries and the European Union, is tasked with the conservation of marine life in the Southern Ocean in line with the objectives of the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention).

The Convention area approximates the ecological boundaries of the Southern Ocean, which covers about 15% of the world's ocean. For over a decade CCAMLR has been discussing the establishment of MPAs in this area (ASOC 2016; Brooks et al 2016). In 2009 CCAMLR set itself a deadline to achieve a representative system of MPAs within the Convention Area (CCAMLR XXVIII, 2009. para. 7.19, p23); the 2012 deadline has long passed. Concurrently, CCAMLR adopted the South Orkney Islands Southern Shelf MPA (Conservation Measure 91-03, 2009), the first high seas MPA worldwide, and subsequently a General Framework for the Establishment of CCAMLR MPAs (Conservation Measure 91-04, 2011).

After earlier progress by CCAMLR toward establishing an MPA network, two proposals for MPAs in the Ross Sea and in East Antarctica were in virtual gridlock from 2012. This gridlock ended in October 2016 when members reached consensus on the adoption of the Ross Sea region marine protected area (Conservation Measure 91-05). At 1.55 million square kilometres - excluding marine areas under the Ross Ice Shelf - the Ross Sea region MPA will be the largest in the world once it comes into force on December 1st 2017.

Agreement on the Ross Sea region MPA has created momentum for adopting additional MPAs in the Southern Ocean in line with CCAMLR's earlier commitment. The two currently existing MPA proposals are for East Antarctica (proposed by Australia, France and the EU) and more recently for the Weddell Sea (proposed in 2016 by the EU under German leadership). Activities supporting the development of MPAs elsewhere in the Convention area are ongoing (SC-CAMLR XXXV, 2016, Table 9).

A marine protected area for the East Antarctic

The EARSMPA covers a representative part of Eastern Antarctica, one of the nine regions or "planning domains" in which the Convention area was parcelled by CCAMLR for the purposes of developing MPAs (SC-CAMLR-XXX, Annex 6). Eastern Antarctica is a convex segment along the Antarctic coastline, and the EARSMPA aims to meet several conservation, scientific, and climate change-related management objectives in this area, in accordance with the provisions of Conservation Measure 91-04.

Scientific knowledge about the marine ecosystem varies across this region. Accordingly, the EARSMPA proposal was designed to incorporate ecological uncertainties resulting from a variance in the availability of scientific data. Spatial models were developed using biogeography as a proxy for species richness i.e., habitat diversity (geomorphology and other physical factors) was assumed to also mean ecological diversity. Because of the uncertainty associated with this approach, the

proposal was designed to set aside sufficiently large areas, including replicate habitats, to ensure protection of important ecological processes.

The original EARSMPA proposal incorporated the most important pelagic, benthic, and nursery areas, as well as reference areas to study the impacts of climate change (i.e. areas open or closed to fishing in which to attribute the causes of ecological change with and without interference from fishing activities). In addition, the proposal:

- Includes several individual MPAs which comprise a protected area system representative of the Eastern Antarctica planning domain (Domain 7);
- Is a multiple use MPA i.e. allows research and fishing that are determined not to impact the conservation objectives of the MPA.
- Provides a decision model to assess whether the level of impact of any proposed activity may or may not be acceptable. The approval of activities is based on existing CCAMLR decision making processes;
- Allows re-evaluating the proposal after 30 years. The MPA may cease after 30 years due to insufficient research and monitoring.

Each year since the EARSMPA was first proposed, CCAMLR has failed to secure consensus on its adoption, due to a range of generic and specific concerns raised by some Members.

The primary concerns expressed by some members have been about the potential effect the MPA could have on current or future fishing activities (although the current proposal does not include no-take zones). Consequently, opponents have called on technical and scientific information to weaken the conservation value of the proposal (e.g. Brooks et al 2016; Brooks and Ainley 2017). For instance, some Members have raised the apparent absence of threats (since fishing is at present relatively limited in the area) as an argument to dismiss the need for protection. The use of the biogeographic approach has been criticized too, despite its broad used in Antarctic science (e.g. De Broyer, Koubbi et al 2014).

A perceived lack of clarity of the proposal has also been raised by some Members, specifically with respect to how the multiple use approach would work in practice, the ability to fish (or not) in particular areas, and how the MPA would deliver its conservation objectives using this approach - i.e. how it will be decided that a fishing proposal in the MPA can go ahead or not, and who decides. In addition, for some CCAMLR Members, the proposed EARSMPA boundaries match too closely with the Antarctic territorial claims of co-proponents Australia and France, and in particular the extension of the continental shelf by Australia under UNCLOS (Brooks and Ainley 2016).

Throughout the various iterations of the proposal, the proponents have adapted it in line with the concerns raised (Brooks et al 2016). Changes have included:

- A reduction of areas: from seven individual MPAs in the original EARSMPA network (Fig. 1), to three MPAs (Fig. 2);
- A reduction in size by ~45 percent of the original surface area, from 1.71 M km2 in an earlier draft in 2010 to about 0.94 M km2 in 2015;
- A paradigm shift from, “all activities are prohibited unless permitted”, “to all activities are

permitted, unless they compromise the MPA objectives".
- A shorter duration, from a permanent MPA to review of the MPA after 30 years, with consensus needed to cease protections.

These changes reflect "erosion by negotiation" of the conservation values and intent of the EARSMPA as originally proposed (Roura 2015; Brooks et al 2016). CCAMLR's decisions are undoubtedly based on science, but in a consensus decision-making regime, science is often trumped by politics.

Confusion about conservation

As a "multiple use MPA", the East Antarctica proposal seeks to accommodate fishing interest (actual and anticipated) with current knowledge of the regional ecosystems and MPA conservation objectives. This approach is compatible with CCAMLR's modus operandi and the "no one size fits all" view with respect to protected areas, even though some Members (and ENGOs) would prefer the certainty of no-take zones.

Issues concerning the relationship between conservation and the use of marine living resources underpin some disagreements over the EARSMPA proposal. This disagreement, related to interpretations of the CAMLR Convention objective, extends beyond Eastern Antarctica to the whole Convention area. In brief, the primary objective of the CAMLR Convention is conservation, with any fishing and related activities permissible as long as they meet certain ecosystem and precautionary criteria outlined in the Convention. An interpretation that seeks to maximise fishing opportunities at the expense of conservation is not consistent with this objective (ASOC 2015).

In this context, what is the way forward for the EARSMPA? We suggest that the proposal should be strengthened and simplified by refining its current design. Primarily this should be through clarification of its marine protection measures, for instance identifying significant no-take areas or at least the process to designate them within a multiple-use area. This would make clear which areas are or may be off-limits to fishing and where fishing might take place, if consistent with the objectives of the MPA. No-take zones should include vulnerable marine ecosystems (VMEs) potentially affected by longline fishing, and also buffer zones for the protection of land-based predators which could be affected by krill fisheries.

A clearer, simpler proposal may increase the likelihood of designation of an EARSMPA. However, it should be noted that CCAMLR decisions are based on science but finalized by politics, so it would pay off for Australia, the European Union and France to reach out to other Members, including through high level political outreach.

Although adopted MPAs become "owned" by the CCAMLR membership as a whole, proponents have a significant stake in their design and eventual implementation. Australia, the EU and France, could actively promote "co-ownership" of the MPA to other CCAMLR Members to allay concerns about the perceived geopolitical implications of the EARSMPA. This could include concrete

initiatives to involve interested Members in the management, research and monitoring of the MPA.

Conclusions

After years of discussion, the adoption of the Ross Sea MPA marked "the end of the beginning" of the CCAMLR MPA designation process. The EARSMPA proposal has been recognised as being based on the best available science and has been dissected and discussed extensively over the years. Objections to its adoption seem to be largely about the politics of marine living resource use in Antarctica. For CCAMLR's credibility, the EARSMPA (with stronger conservation ambition and clarified protection measures) should be designated promptly. In time, the four MPAs that have been removed from the original proposal should be restored to maintain the integrity of the original representative system of MPAs.

Adopting a new MPA will prove that the Ross Sea MPA designation was not a one-off event for CCAMLR, and so enable the adoption of additional MPAs within the framework of Conservation Measure 91-04. It will also enhance CCAMLR's credibility as a conservation body, which was dented by years of protracted MPA discussions, although partly restored with the adoption of the Ross Sea region MPA. Any further delay in the designation of MPAs will correspondingly jeopardise the process to create a MPA network, and call into question CCAMLR members' commitment to the conservation objectives of the CAMLR Convention. The responsibility for CCAMLR to achieve its objective to create a robust MPA network to protect the Southern Ocean rests with each and all of CCAMLR's Members. As CCAMLR meets this objective, the conservation intent of the Convention will be upheld.

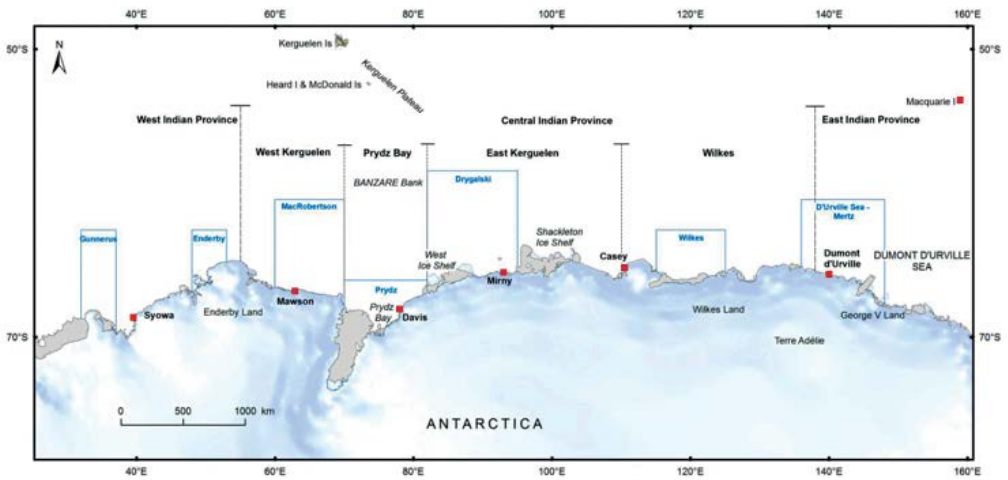


Figure 1. *The East Antarctic Representative System of Marine Protected Areas in the East Antarctica Planning Domain in 2013. CCAMLR XXXII : Proposal for a Conservation Measure establishing an East Antarctic Representative System of Marine Protected Areas (2013).*

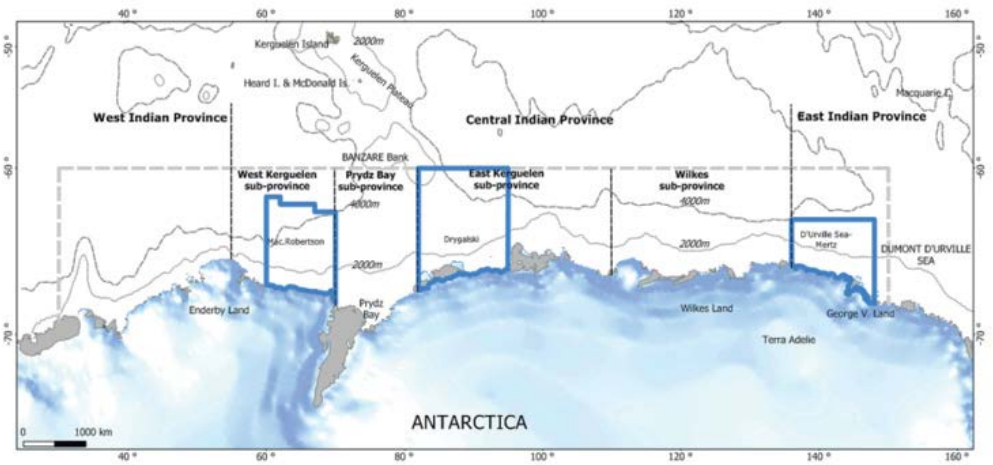


Figure 2. *Individual MPAs in this Conservation Measure contributing to the East Antarctic Representative System of Marine Protected Areas in the East Antarctica Planning Domain. (CCAMLR-XXXV/15 Rev. 1, Revisions to the draft East Antarctic Representative System of Marine Protected Areas (EARSMPA) Conservation Measure, 2016).*

References

-ASOC (2015): Implementing Article II of the CAMLR Convention. CCAMLR XXXIV/BG/25 (2015):
-ASOC (2016): A representative system of CCAMLR MPAs: Current proposals and beyond. CCAMLR-XXXV/BG/26.
Brooks C., L. Crowder, L. Curran, R. Dunbar, D. Ainley, K. Dodds, K. Gjerde & U.R. Sumaila. 2016. -Science-based management in the decline in the Southern Ocean. Science. 354 (6309): 185-187.
Brooks C. & D. Ainley. 2017. Fishing the bottom of the Earth: The political challenges of ecosystem-based management. Pp 422-438. In Handbook on Antarctic Politics. K. Dodds, A. Hemmings & P. Roberts (eds). Edward Elgar Publishing (Cheltenham, UK).
-De Broyer C., Koubbi P. et al (eds.) (2014). Biogeographic Atlas of the Southern Ocean. Scientific Committee on Antarctic Research, Cambridge, XII + 498 pp.
-SC-CAMLR XXX (2011): Report of the Thirtieth Meeting of the Scientific Committee, Hobart, Australia, 24–28 October 2011. https://www.ccamlr.org/en/system/files/e-sc-xxx.pdf
-SC-CAMLR-IM-I (2013): Report of the First Intersessional Meeting of the Scientific Committee, Bremerhaven, Germany, 11-13 July 2013. https://www.ccamlr.org/en/system/files/e-sc-im-i.pdf
SC-CAMLR XXXV (2016): Report of the Thirty-Fifth Meeting of the Scientific Committee, Hobart, Australia, 17–21 October 2016. https://www.ccamlr.org/en/system/files/e-sc-xxxv.pdf
-Roura RM (2015): "Southern Ocean sustainability under overlapping regimes: The case of Marine Protected Areas". Ocean Sustainability Science Symposium. University of Kiel's Cluster of Excellence "The Future Ocean". Kiel, Germany, 4-6 March 2015. Abstract Book, page 15. ✻

Protecting the Weddell Sea

Mike Walker , Cassandra Brooks and Ricardo Roura

ABSTRACT

In 2009, CCAMLR members committed to create a "representative MPA network within the Convention Area for 2012" (CCAMLR 2009). The proposed Marine Protected Area in the Weddell Sea, formulated by Germany and presented by the European Union in 2016, will be an important component of this protection system. The Weddell Sea is currently being threatened by climate change and the fishing industry which can dramatically alter its unique environment. The Weddell Sea region MPA proposal defined conservation objectives and large no-take areas. Whilst some aspects of the proposal could be strengthened, the proposed MPA is a strong starting point for protecting the Weddell Sea region.

Key Words

Weddell Sea, Marine Protected Area, CCAMLR, Southern Ocean, Antarctica

The Weddell Sea Region

The Weddell Sea region encompasses a large, deep bay encompassed by the eastern Antarctic Peninsula and extending above Queen Maud Land and is one of the most intact ecosystems in the world (Halpern et al. 2008; Figure 1). The region is highly productive and extremely icy, providing ideal habitat for krill, which in turn feeds other mammals, fish and seabirds. Despite its harsh conditions, the Weddell Sea supports an array of biodiversity from the shallow shelf down to the deep sea. Since its discovery in 1823, it has been largely unaffected by extractive industries due to the almost impassable sea ice - something the polar explorer Ernest Shackleton could easily attest to.

However, the Weddell Sea is now under threat. The western Weddell Sea closest to the Antarctic Peninsula is warming rapidly with resulting decreases in sea ice. Conversely, the eastern Weddell Sea region is cooling and is experiencing expanding sea ice. Predicting the effects of changes in temperature, sea ice and other climate-related impacts is difficult, but studies suggest life in the Weddell Sea will suffer. In other regions of Antarctica, penguin colonies are declining potentially due to climate change. In the Weddell Sea region, this puts Emperor and Adélie penguin colonies at risk. Likewise, Weddell, crabeater, leopard, Antarctic fur, Ross, and elephant seals can expect to experience changes in prey species availability and habitat.

While harsh sea ice conditions have made fishing historically difficult in the Weddell Sea region, the area is facing increasing pressure. In the eastern Weddell Sea commercial fishing for toothfish commenced in 2004 and has continued at a low level of around 200-400 tonnes/year. In contrast, the western Weddell Sea has never experienced commercial fishing, but minimal research fishing (for commercial purposes) for toothfish commenced in 2013. Fishing effort may be currently low, but toothfish support a lucrative international fishery and some CCAMLR member states are pushing for more fishing in the Weddell Sea region. Due to the threat posed by climate change and increasing fishing pressure, protecting the unique, ecologically-intact and diverse regions of the Weddell Sea with a large-scale marine protected areas (MPA) that includes no-take zones would ensure its rich benthic biodiversity, krill populations and large predators continue to thrive.

In this article, we describe the existing proposal to establish a marine protected area in the Weddell Sea region, and suggest ways it could be strengthened to enhance its conservation benefits.

Currently proposed Weddell Sea Marine Protected Area

In October 2016, the European Union, based on work by Germany, presented a proposal for a Weddell Sea MPA (WSMPA) to the thirty-fifth meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the international body responsible for conserving Antarctic marine living resources. The proposal was the product of an extensive period of discussion and assessment, which started in 2012 and was part of a larger discussion at CCAMLR since 2002 regarding a Southern Ocean network of MPAs. For the MPA planning, the Weddell Sea region is defined as extending further east of the Weddell Sea proper (CCAMLR MPA planning Domain 3), including parts of the Queen Maud Land region (CCAMLR MPA planning Domain 4).

The total proposed WSMPA, as proposed in October 2016, is 1,797,438 km2 and is made up of a General Protection Zone, a Special Protection Zone, and a Fisheries Research Zone with each zone allowing a different level of human activity (Figure 1). The proposed MPA seeks to protect a range of habitats and marine life, including:

- representative examples of pelagic and benthic ecosystems, biodiversity, and habitats;
- protection at various geographical scales, which is key to the functional integrity and viability of local ecosystems and processes;
- establishment of scientific reference areas to monitor the effects of climate change, fishing and other human activities; and
- protection of essential habitats as refugia for top predators such as marine mammals and seabirds, fish and other ice-dependent species to maintain and/or enhance their resilience and ability to adapt to the effects of climate change.

The proposal was developed using Marxan modelling (CCAMLR 2016), an accepted approach to spatial protection in CCAMLR and more globally (CCAMLR 2008). Analyses included incorporating the best available evidence into data layers which were then documented, with metadata, in the proposal. The WSMPA is proposed to be in effect indefinitely, with a suggested review period of 10 years.

Strengthening the Weddell Sea MPA Proposal

The General Protection Zone (GPZ), which prohibits commercial fishing but allows for research fishing, encompasses most of the proposed MPA. This region would afford a high level of protection for the area, including the eastern region encompassing Astrid Ridge, Maud Rise and nearby seamounts. The GPZ also includes deep-sea areas that have been incorporated into the eastward extension, off the tip of the Antarctic Peninsula, and a northern extension of the boundary in CCAMLR subareas 48.5 and 48.6. Designing this MPA with large no-take areas, and with an indefinite duration, is consistent with best practices in delivering conservation outcomes (Edgar et al. 2014).

The proposed Special Protection Zone (SPZ), in which all fishing activities are banned (including research fishing), is constrained to a minimum area based on current knowledge of known nesting sites and vulnerable marine ecosystems (VMEs; e.g., seamounts, hydrothermal vents, cold water corals and sponge fields). To be more precautionary, it should be enlarged by using processes such as bioregionalization to designate protection of other likely, but unverified, VMEs. Likewise, the SPZ should include unique, rare, biodiverse and/or endemic habitats and features. To achieve this, the SPZ should be expanded in CCAMLR subarea 48.6 to protect additional sponge habitat and include unique features such as underwater canyons and seamounts.

The proposed Fisheries Research Zone (FRZ), which would allow for directed commercial and research fishing for toothfish, encompasses 90 percent of habitat at the depth range of toothfish in CCAMLR subarea 48.6. Having this large area potentially open to toothfish fishing accommodates current commercial fishing in the area as well as any future fishing at the expense of protection

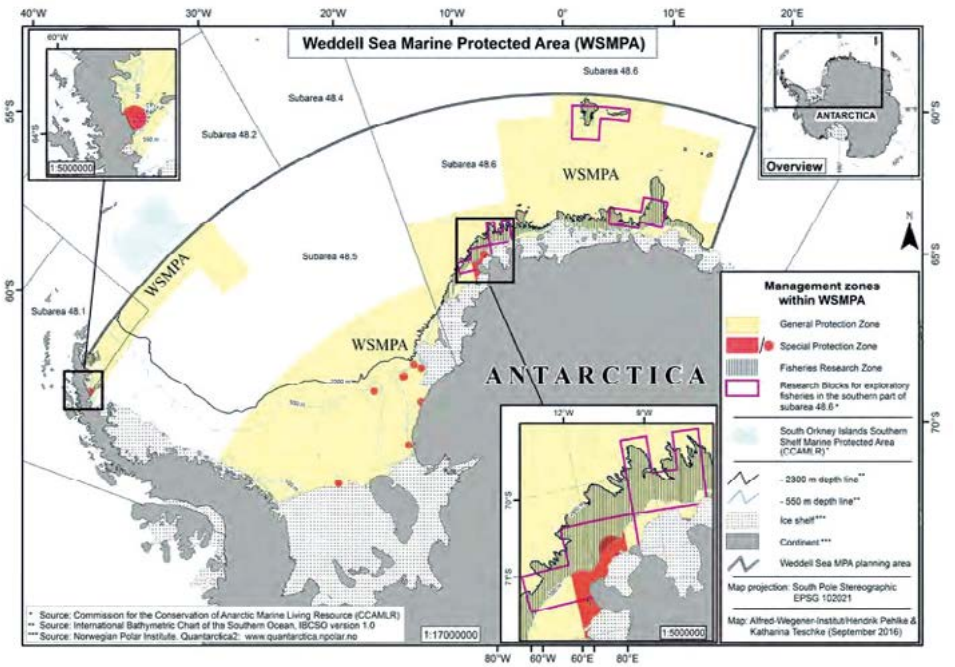


Figure 1. *Weddell Sea region and marine protected area proposal showing the different zones: General Protection Zone in brown, Special Protection Zone in red and Fisheries Research Zone in yellow; map credit K. Teschke/H. Pehlke from AWI 2016.*

of the ecosystem. Given the ecological importance of toothfish as the Southern Ocean's top fish predator, a significant proportion of toothfish habitat should be designated as off-limits to fishing.

CONCLUSION

In 2009 CCAMLR members committed to putting in place a "representative system of MPAs within the Convention Area by 2012" (CCAMLR 2009). The WSMPA will be an important element of that protective system. The proposal made in 2016 has clearly defined conservation benefits, including large no-take areas. While some aspects of the proposal could be strengthened, it is a robust starting point for protecting the Weddell Sea region. Past experiences at CCAMLR demonstrates that MPA proposals suffer from a drawn-out diminution in ambition of protection over successive years, as the proposal is discussed and refined to accommodate the interests of various members (Brooks et al. 2016). The WSMPA proponents need to heed this experience, and ensure that any revised WSMPA proposal retains sufficient conservation ambition and achieves its objectives of protecting the Weddell Sea ecosystem.

REFERENCES

- AWI. (2016)."Fact sheet. Weddell Sea. 8 Reasons for a Marine Protected Area." Alfred-Wegener-Institute for Polar and Marine Research.

- Brooks, Cassandra, L.B. Crowder, Lisa Curran, Robert Dunbar, David Ainley, Klaus Dodds, Kristina M. Gjerde, and Rashid Sumaila. (2016). "Science-based management in decline in the Southern Ocean." Science 354 (6309):185-187.

- CCAMLR. (2008) "Report of the XXVII (2008) Meeting of the Commission."

- CCAMLR. (2009). "Report of the XXVIII (2009) Meeting of the Commission."

- CCAMLR. (2016). "Report of the XXXV (2016) Meeting of the Commission."

- Edgar, G. J., Stuart-Smith, R. D., Willis, T. J., Kininmonth, S., Baker, S. C., Banks, S., … Thomson, R. J. (2014). "Global conservation outcomes depend on marine protected areas with five key features". Nature, 506(7487), 216–220. https://doi.org/10.1038/nature13022

- Halpern, B. S., S. Walbridge, K. A. Selkoe, C. V. Kappel, F. Micheli, C. D'Agrosa, J. F. Bruno, K. S. Casey, C. Ebert, H. E. Fox, R. Fujita, D. Heinemann, H. S. Lenihan, E. M. Madin, M. T. Perry, E. R. Selig, M. Spalding, R. Steneck, and R. Watson. (2008). "A global map of human impact on marine ecosystems." Science 319 (5865):948-52. doi: 10.1126/science.1149345.

*

Progress Toward the Establishment of Marine Protected Areas in the Rapidly Changing Western Antarctic Peninsula

Rodolfo Werner and Nicole Bransome

ABSTRACT

The Western Antarctic Peninsula region is one of the fastest warming areas in the world. The waters surrounding the Peninsula and associated islandshost a large biodiversity and are one of the most important areas for Antarctic krill (Euphausia superba) in the Southern Ocean. The large concentration of krill in this region supports large breeding populations of penguins, seals and whales. Some evidence, however,showsdecreases in krill populationsdue to the reduction in the duration of sea ice caused by climate change, and regional populations of chinstrap and Adélie penguins are also in decline. In addition, krill catches in this area, where the krill fishery concentrates,are the highest they have been in almost two decades. Argentina and Chile are leading the process to establish a CCAMLR Marine Protected Area (MPA) in the region. Backed by a series of international data gathering and technical workshops in which CCAMLR members agreed to conservation objectives for the region, these leading countries are preparing a series of MPA scenarios for the region, likely to be presented to CCAMLR in 2017.

Key Words

Marine Protected Area, Antarctic Peninsula, CCAMLR, Climate Change, Antarctic krill

Introduction to the Antarctic Peninsula Region

The Antarctic Peninsula is the northernmost part of the Antarctic continent, extending north towards the tip of South America roughly 1,000 km away. The Peninsula is approximately 1,500 km long, with the Weddell Sea to the east and the Bellingshausen Sea to the west. Deep channels between the Peninsula's glacially sculpted embayments help transport nutrients toward the shelves (Ducklow et al. 2007), helping to drive the region's incredible productivity, which supports the largest Antarctic krill (Euphausia superba) aggregations in the Southern Ocean (Atkinson et al. 2004).The Peninsula and islands of the Scotia Arc and Scotia Sea support great biodiversity (Griffiths 2010), including type B2 killer whales which are found nowhere else on earth. Antarctic krill in the area sustain large breeding and foraging populations of penguins, seals and whales (Ducklow et al. 2007). The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the international body responsible for conserving Antarctic marine living resources, began discussions on creating a network of marine protected areas (MPAs) in the early 2000s. In 2011, CCAMLR agreed toa framework for the designation of MPAs in the Convention Area, dividing the area into nine "planning domains", providing a mechanism by which to plan and report on the development of MPAs. The Antarctic Peninsula area was included in "Domain 1, Western Peninsula - South Scotia Arc" (Figure 1).

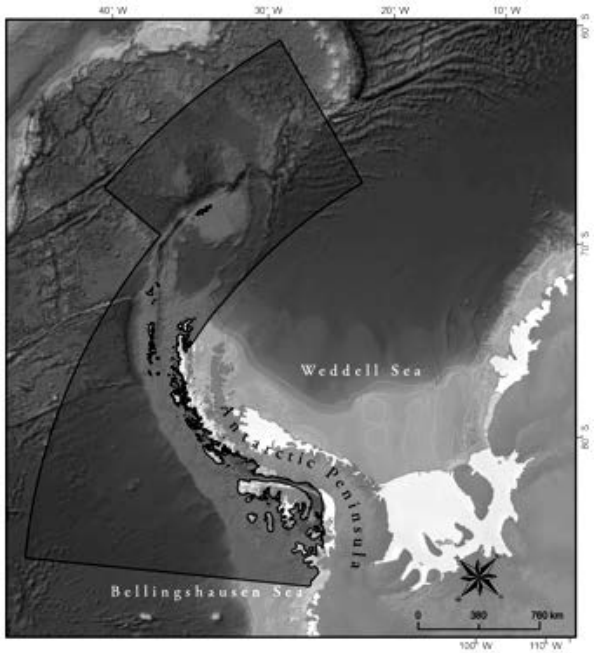


Figure 1. *Location of Domain 1, between the Weddell Sea to the east, the Bellingshausen Sea to the west, and the North Scotia Arc to the north. Map provided by Valeria Falabella, Wildlife Conservation Society.*

Human Activity

The Antarctic Peninsula and Scotia Sea region is one of the busiest areas of Antarctica, hosting a number of human activities that are likely impacting Antarctic habitats and biodiversity. With beautiful mountainous areas and incredible biodiversity, this region is the main tourist destination in Antarctica, and sees more scientific research than any other Antarctic region. The Western Antarctic Peninsula is also the fastest warming area in the Southern Ocean and one of the fastest warming areas in the world (Clarke et al. 2007). In addition, animals in this region are experiencing an increasing incidence of parasitism and disease. For example, chinstrap penguins (Pygoscelis antarctica) at Deception Island were recently found to be the first Antarctic penguin species to carry ticks (Montero et al. 2016). Domain 1 has seen in the past episodes of overexploitation of seals and whales and of some species of fin fish such as mackerel icefish (Champsocephalus gunnari) and marbled rockcod (Notothenia rossii). Some populations of seals and whales have now almost fully recovered (Ainley et al. 2010), but the populations of marbled rockcodand other notothenioids (fish with proteins in their bloodstream that prevent freezing) are still in the slow process of recovering (Marschoff et al. 2012).

The Antarctic Krill Fishery

Interest in krill fisheries began in the 1960s, with the highest catches occurring in the early 1980s, reaching over half a million tons. The concern over the large catches of Antarctic krill is what triggered the establishment of CCAMLR in 1982. In the early nineties, catches dropped dramatically due to the break-up of the Soviet Union, which forced this heavily subsidized fleet to cease operations. Catches in the Antarctic krill fishery are now the highest they have been in almost two decades and may be expanding further (Nicol et al. 2012). Krill catches have tripled in recent years, reaching a maximum of 293,815 tons in the 2013/14 fishing season (CCAMLR 2015).

Historically, fishing has taken place during the summer when penguins are constrained by how far they can travel to forage, resulting in an overlap between fishing operations and the foraging range of penguins (Hinke et al. 2017). The potential impact of fishing becomes more concerning since krill fishing activity in Statistical Area 48 (the fishing area surrounding the Peninsula, as defined by the Food and Agricultural Organization of the United Nations) has been approximately occurring in only a quarter of the area open to fishing. Additionally, in the past 10 years, the spatial distribution of the fishery has become more concentrated in the region of the Bransfield Strait off the Antarctic Peninsula (Subarea 48.1) close to land-based predators, such as penguins.

Ecosystem Changes

The combination of local human activities and climate change are acting together to impact the distribution and abundance of marine species in the region.

Some of the most pronounced effects of climate change on Earth, like warming and acidifying seas (Jones et al. 2017), and changes in sea-ice concentration and duration (Stammerjohn et al. 2008) are found in the Western Antarctic Peninsula. Because Antarctic krill rely on sea ice to complete their life cycle, the reduction in the extent and duration of sea ice in winter may be a leading cause of the decline in the abundance of krill in the Peninsula region. According to Atkinson et al (2004), there has been a reduction in krill abundance in the region of as much as 81% between 1976 and 1990. Science also shows climate change is having direct negative effects on Adélie penguin (Pygoscelis adeliae) chick growth, via regional climate and local weather patterns (Cimino et al. 2014).

In recent years, a reduction of the populations of Adélieand chinstrap penguins in the Western Antarctic Peninsula and Scotia Sea area has been reported. Populations of these species have declined more than 50% during the last 30 years at study colonies in the South Shetland Islands, which is consistent with the trend observed in the population of both species throughout the Scotia Sea (Trivelpiece et al. 2011).Significant declines in the breeding population of chinstrap penguins in Deception Island's largest colony, known as Baily Head, have recently been confirmed (Naveen et al. 2012). Changes in the abundance of Antarctic krill (the main prey of both species) could be a cause of the reduction of penguin populations.

During the austral summer of 2015-2016, a mortality event of gentoo penguin (Pygoscelis papua) chicks occurred in the southwestern Bransfield Strait. Initial observations were reported by members of the International Association of Antarctica Tour Operators (IAATO) and were later confirmed by researchers at the U.S. Palmer Long-Term Ecological Research program. Autopsies suggested starvation, rather than disease, as the cause of death. In parallel, it was reported that during December 2015 and January 2016,intense fishing was concentrated directly in front ofCuverville Island, where the large mortality of gentoo chicks was observed. Cuverville hosts the largest gentoo breeding colony in the area. There have been similar reports of dead gentoo penguins at Neko Harbor, near Cuverville in the same season (CCAMLR 2016).

Management of the Antarctic Krill Fishery

CCAMLR is generally regarded as leading the way in ecosystem-based fisheries management, implementing marine resources management based on conservation principles. The current management system for Antarctic krill divides the krill "trigger level" of 620,000 tonnes (an interim precautionary catch limit) into the subareas around the Antarctic Peninsula, in order to help alleviate the pressure of localized fishing. CCAMLR has also committed and begun to develop feedback management procedures for the krill fishery. Feedback management (FBM) is a system of managing the krill fishery at small spatial scales, using information on the status of the ecosystem, such as how certain predator populations are responding to fishing and environmental changes, to continuously alter the levels of fishing in a given spatial area. For further references on CCAMLR management of the Antarctic krill fishery, see Gascon and Werner (2009), Werner (2015), The Pew Charitable Trusts (2016).

Status of the MPA process

A number of small MPAs are already scattered throughout Domain 1, including around the South Shetland Islands and the Palmer Archipelago. But these tiny areas (generally terrestrial with a small marine component), managed by the Antarctic Treaty Consultative Meeting, are inadequate to protect the Peninsula's krill populations, millions of breeding seabirds, marine mammals, and the greater ecosystem. As a first step in marine spatial protection, the South Orkney Islands Southern Shelf MPA was established by CCAMLR in 2009, also protecting a portion of Domain 1. In addition, based on a 2016 decision by CCAMLR,"Special Areas for Scientific Study" may be designated in any newly exposed marine area after the retreat or collapse of an ice shelf, glacier, or ice tongue (a narrow sheet of ice) in parts of the Peninsula region. While not MPAs, these areas would offer protection to coastal marine biodiversity for up to 10 years.

The process to designate additional MPAs within Domain 1has been led by Argentina and Chile since 2012. Since then, more than 180 spatial layers of scientific data were created in a collaborative process involving many CCAMLR members. These layers describe the spatial distribution of ecosystem processes, habitats and key species, while dozens of other layers contain data on human activities such as fishing, tourism, scientific, and logistic activities (CCAMLR 2016).

With a transparent spirit of cooperation, Argentina and Chile have organized several international meetings focused on Domain 1 to facilitate the collation, analysis, discussion and integration of data by interested CCAMLR Members.

In 2012, the First International Workshop on Domain 1 MPAs, held in Valparaíso, Chile, defined the conservation objectives for the area. In 2013, Argentina and Chile held a bi-national workshop in La Serena, Chile, where the two countries defined the necessary steps towards creating the MPA proposal, and agreed to use the program MARXAN as the systematic conservation planning tool. In 2015, Argentina organized the Second International Workshop on MPAs, held in Buenos Aires. This meeting was fundamental in laying the scientific and technical foundations for each conservation objective. Also, in the 2015 meeting, data layers were updated, new data sets were added, and a rangeof specific conservation target levelswere defined for analysis.

Finally, in July 2016, an informal workshop was convened around the meeting of CCAMLR's Working Group on Ecosystem Monitoring and Management in Bologna, Italy. During that meeting, Argentina and Chile presented the technical progress made during the previousyear. Amajority of CCAMLR members attended that workshop, which provided a good opportunity to discuss the sensitivity of MARXAN to different parameters, including the level of protection for each object ofconservation. Complementary analyses, using previous and newly available data (which were previously uploaded in the so called,"CCAMLR Domain 1 dataset"), were presented and discussed, validating the results obtained so far.

Next Steps

In July 2017, at the meeting of the CCAMLR Working Group on Ecosystem Monitoring and Management in Buenos Aires, Argentina and Chile presented a preliminary proposal, to advance toward a formal MPA proposal to then be endorsed by CCAMLR's Scientific Committee and be discussed at the Commission.

In July 2017, at the meeting of the CCAMLR Working Group on Ecosystem Monitoring and Management in Buenos Aires, it is expected that Argentina and Chile will present the results of the latest analyses, potentially including conservation scenarios for discussion to advance toward the preparation of a formal MPA proposal to then be endorsed by CCAMLR's Scientific Committee and discussed at the Commission.

The MPA implemented in the Antarctic Peninsula region should protect biodiversity hotspots as well as representative and unique benthic and pelagic habitats. An effective MPA for the Peninsula would ideally include no-fishing buffer zones in coastal areas where penguins forage during the breeding season, predominantly in the Bransfield and Gerlache Straits. Particularly, in these two areaswhere krill fishing activities have increased in recent years, predator populations are seeing major changes. In addition, the MPA should consider protecting sensitivespawning and nursery habitat for krill and for other commercially and ecologically valuable fish species (i.e. icefish, silverfish, and toothfish), as well as key breeding, foraging, and migration areas for seabirds and marine mammals. Although MPAs can't stop climate change and acidification, studies show that they can help build ecosystem resilience by eliminating fishing stresses.The MPA should also include climate change reference refuges, areas without fishing where the effects of climate change can be studied.

In the designation of CCAMLR MPAs withinDomain 1, the development of feedback managementfor the krill fishery will need to be considered to harmonize both processes. Thus, CCALMR will need to protect important predator foraging areas in Domain 1, while considering adding reference areas for feedback management of the krill fishery. In doing so, sensitive areas that should be protected from fishing will need to be identified to be compared to areasthat remain exposed to fishing. How the spatial conservation objectives of the Convention will interact with the management of the krill fishery in the Antarctic Peninsula area, one of the most impacted and fastest changing regions of the Antarctic, remains one of the ultimate challenges for CCAMLR.

REFERENCES

-Ainley, D., Ballard, G., Blight, L.K., Ackley, S., Emslie, S. D., Lescroël, A., … &Woehler, E. (2010). "Impacts of cetaceans on the structure of Southern Ocean food webs". Marine Mammal Science, 26(2), 482–498. https://doi.org/10.1111/j.1748-7692.2009.00337.x

-Cimino, M., Fraser, W., Patterson-Fraser, D., Saba, V., & Oliver, M. (2014). "Large-scale climate and local weather drive interannual variability in Adélie penguin chick fledging mass". Marine Ecology Progress Series, 513: 253–268. https://doi.org/10.3354/meps10928

-Clarke A., Murphy, E.J., Meredith, M.P., King, J.C., Peck, L.S., Barnes, D.K.A.,& Smith. (2007). "Climate

change and the marine ecosystem of the western Antarctic Peninsula".Philosophical Transactions of the Royal Society,362:149-166.

-Commission for the Conservation of Antarctic Marine Living Resources, Report of the Thirty-fifth meeting of the Scientific Committee (Hobart, 17-21 October 2016), https://www.ccamlr.org/en/sc-camlr-xxxv

-Commission for the Conservation of Antarctic Marine Living Resources, Report of the Thirty-fourth meeting of the Scientific Committee (Hobart, 19-23 October 2015), https://www.ccamlr.org/en/sc-camlr-xxxiv

-Ducklow H.W., Baker, K., Martinson, D.G., Quetin, L.B., Ross, R.M., Smith, R.C., Stammerjohn, S.E., Vernet, M., &Fraser, W. (2007). "Marine pelagic ecosystems: the West Antarctic Peninsula". Philosophical Transactions of the Royal Society, 362: 67-94.

http://rstb.royalsocietypublishing.org/cgi/doi/10.1098/rstb.2006.1955

-Gascon, V. & Werner, R. (2009). "Preserving the Antarctic Marine Food Web: Achievements and Challenges in Antarctic Krill Fisheries Management". Ocean Yearbook,23 (1): 279 – 307

-Griffiths, H.J. (2010). "Antarctic Marine Biodiversity – What do we know about the distribution of life in the Southern Ocean?".PloS ONE, 5(8): E11683.

-Hinke, J. T., Cossio, A. M., Goebel, M. E., Reiss, C. S., Trivelpiece, W. Z., & Watters, G. M. (2017). "Identifying Risk: Concurrent Overlap of the Antarctic Krill Fishery with Krill-Dependent Predators in the Scotia Sea".PLOS ONE, 12(1), e0170132. https://doi.org/10.1371/journal.pone.0170132

-Jones, E.M., Fenton, M., Meredith, M.P.,Clargo, N.M.,Ossebaar, S., Ducklow, H.W.,Venables, H.J., & de Baar.H.J.W.(2017)."Ocean Acidification and Calcium Carbonate Saturation States in the Coastal Zone of the West Antarctic Peninsula."Deep Sea Research Part II: Topical Studies in Oceanography,http://dx.doi.org/10.1016/j.dsr2.2017.01.007

-Marschoff, E. R., Barrera-Oro, E. R., Alescio, N. S., & Ainley, D. G. (2012). "Slow recovery of previously depleted demersal fish at the South Shetland Islands, 1983–2010". Fisheries Research, 125–126: 206–213. https://doi.org/10.1016/j.fishres.2012.02.017

-Montero, E., González, L.M., Chaparro, A., Benzal, J., Bertellotti, M., Masero, J.A., Colominas-Ciuró, R., Vidal, V., &Barbosa, A. (2016). "First record of Babesia sp. in Antarctic penguins". Ticks and Tick-borne Diseases, 7(3): 498-501.

http://www.sciencedirect.com/science/article/pii/S1877959X16300206

-Naveen, R., Lynch, H.R., Forrest, S., Mueller, T. & Polito, M. (2012). "First direct, site-wide penguin survey at Deception Island, Antarctica, suggests significant declines in breeding chinstrap penguins". Polar Biology, 35:1879–1888. http://link.springer.com/10.1007/s00300-012-1230-3

-Nicol S., Foster, J.&Kawaguchi, S. (2012). "The fishery for Antarctic krill –recent developments". Fish and Fisheries,13: 30-40.http://doi.wiley.com/10.1111/j.1467-2979.2011.00406.x

-Stammerjohn, S. E., Martinson, D.G., Smith,R.C., X. Yuan, X., &Rind, D. (2008)."Trends in Antarctic Annual Sea Ice Retreat and Advance and Their Relation to El Nino–Southern Oscillation and Southern Annular Mode Variability".Journal of Geophysical Research, 113 (C3): C03S90.http://onlinelibrary.wiley.com/doi/10.1029/2007JC004269/abstract.

-The Pew Charitable Trusts, 2016. "Protecting the Southern Ocean Through Precautionary Management of Antarctic Krill," accessed April 3, 2017, http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2016/08/protecting-the-southern-ocean-through-precautionary-management-of-antarctic-krill

-Trivelpiece, W.Z., Hinke, J.T., Miller, A.K., Reiss, C.S., Trivelpiece, S.G., &Watters, G.M. (2011). "Variability in krill biomass link harvesting and global warming to penguin population changes in Antarctica". Proceedings of the National Academy of Sciences,108: 7625–7628.

-Werner, R. (2015)."Penguins and Krill: Life in a Changing Ocean". Journal of Antarctic Affairs, 1: 37-47 ✻

Japan's Antarctic Whaling Policy, Time for Action for the Antarctic Treaty System

Elsa Cabrera

ABSTRACT

Since the unprecedented ruling in 2014 of the International Court of Justice against the Government of Japan whaling program in Antarctica (JARPA II), the Japanese government has developed and implemented a political strategy to continue hunting minke whales in the Southern Ocean. Given that the IWC has not had the capacity to enforce the Court's ruling and considering the implications of the continuation of Japan whaling policy in Antarctica for the governance and security of the Southern Ocean, the issue of Antarctic scientific whaling should become a matter of concern for the Antarctic Treaty System (ATS).

Key Words

Marine Protected Area, Antarctic Peninsula, CCAMLR, Climate Change, Antarctic krill

Background

On March 31st 2014, the International Court of Justice (ICJ) made a historical ruling that sentenced the government of Japan to revoke any current authorization, permit or license granted in relation to the Japanese Whale Research Program under Special Permit in the Antarctic (JARPA II). It also ordered Japan to refrain from granting any further permits in pursuance of that program[1]. According to the ruling, the Court concluded that Japan violated the moratorium on commercial whaling, the factory ship moratorium and the prohibition of commercial whaling in the Southern Ocean[2].

Although the government of Japan initially affirmed that it would abide by the judgment, it soon implemented a strategy to continue its whaling operations in the Southern Ocean. In November 2014 the Institute of Cetacean Research published a draft plan to resume its research whaling in the Southern Ocean, known as New Scientific Research Program in the Antarctic Ocean or NEWREP-A.

Like JARPA II, the Scientific Committee of the IWC has not validated the need for a new lethal research- program in Antarctica. In April 2015 an IWC Expert Panel concluded that the information presented in the proposal does not demonstrate the need of lethal sampling to achieve its scientific objectives[3]. A month later, the IWC Scientific Committee agreed with the Expert Panel and a majority of its members considered that the annual killing of 333 Antarctic minke whales (Balaenoptera bonaerensis) for the next 12 years, as proposed by NEWREP-A, cannot be established as reasonable[4]. On January 2016, a letter published in the scientific journal Nature and supported by 30 signatories – 29 members of the IWC Scientific Committee and one independent expert – affirmed that the science behind Japan's whaling activity in the Southern Ocean failed to pass a reasonable standard of peer review[5]. In May 2015, a letter presented at the IWC Scientific Committee and supported by nearly 500 hundred scientists from 30 countries, opposed the proposed whale research plan affirming that Japan's whaling program in Antarctica continue to be "the result of commercial and political interests meant to consolidate the illegitimate appropriation of valuable Antarctic marine living resources[6]".

In order to fully implement NEWREP-A and rule out any future lawsuits at the ICJ regarding its whaling program in the Southern Ocean, in October 2015 the government of Japan formally rejected the competence of the Court in regards to wildlife and natural resources[7]. In a declaration addressed to the Secretary General of the United Nations, the government of Japan affirms that the jurisdiction of the ICJ does not apply to "any dispute arising out of, concerning, or relating to research on, or conservation, management or exploitation of, living resources of the sea[8]".

On December 1st 2015 Japan's Antarctic whaling fleet set sail to Antarctica and returned to port on March 2016 after killing 333 Antarctic minke whales. NEWREP-A began its 12-year program despite the conclusions of the IWC Expert Panel and the IWC Scientific Committee regarding the unjustified use of lethal sampling of whales to reach the program scientific objectives. By doing so, the government of Japan also ignored a resolution adopted[9] by the IWC in 2014 which requires that no special permits for whaling be granted without a review process by the IWC Scientific Committee and the assessment of the Commission about whether the proponent of the special permit program has acted in accordance with this review process.

The international community reacted accordingly. On December 2015, New Zealand lead a diplomatic protest, joined by 33 countries, over Japan's decision to resume whaling in the Southern Ocean stating that "there is no scientific basis for the slaughter of whales" and urge the government of Japan, as a member of the IWC, "to respect the Commission's procedures and advice of its Scientific Committee[10]". On July 2016 the European Parliament adopted a strongly-worded resolution[11] on Japan's decision to resume whaling in the 2015-2016 season that, among others, "Deplores that, by resuming whaling, Japan is clearly ignoring the ruling of the ICJ" and "considers that the hunts are thus in breach of IWC standards and of international law". On August 2016, the International Union for the Conservation of Nature (IUCN) passed a motion by a 95% majority of its 89 member countries calling Japan to revoke any existing special permit for lethal whale research in the Southern Ocean and IWC members to abide to its resolutions, regulations and procedures[12]. On September 2016, the Latin-American countries members of the IWC – known as Grupo Buenos Aires – declared in a statement that "there is no scientific basis for including lethal methods in NEWREP-A[13]". More recently, on January 18th 2017, the Netherlands, on behalf of the European Union (EU) strongly opposed the continuation of scientific whaling by Japan, affirming that "Japan failed to demonstrate the scientific basis to include lethal methods in the NEWREP-A and therefore considers that the continuation of lethal sampling in the 2016/2017 season is not justified. Accordingly the EU Member States Party to the ICRW strongly request that the Government of Japan cancels the special permits issued to conduct whaling under the NEWREP-A".

Implications of Japan Whaling Program in Antarctica

The ICJ ruling against JARPA II states that the application of Article VIII of the ICRW for "the question of whether the killing, taking and treating of whales pursuant to a requested special permit (by a State Party of the Convention) is for the purpose of scientific research cannot depend simply on that State perception[14]". It adds that "the killing, taking and treating of whales pursuant to such a program does not fall within Article VIII unless these activities are "for the purpose of scientific research[15]". However, the government of Japan continues its whaling operations in Antarctica under a new research program whose lethal component have not been validated for the purpose of scientific research by the IWC Expert Panel and the IWC Scientific Committee. Thus it can be stated that by ignoring the ruling of the ICJ, the killing of whales under NEWREP-A may also be considered illegal.

Given that the IWC has not had the capacity to enforce the ICJ ruling and considering the implications of the continuation of Japan whaling policy in Antarctica for the governance and security of the Southern Ocean, the issue of Antarctic scientific whaling should also be a matter of concern for the Antarctic Treaty System (ATS).

One of the prime motivators in the conclusion of the Antarctic Treaty in 1959 was the security of the continent as well as the Southern Ocean[16]. Although the scope of the term security was limited at that time to military actions of defense, today it covers a wide range of areas such as economic security, food safety, human security, and environmental safety, among others.

The main objectives of the Treaty are to prevent the use of Antarctica for military purposes and to preserve the region for peaceful purposes only[17]. The latter has been fundamental to prompt treaty parties to cooperate in potentially destabilizing economic matters such as access to natural resources[18].

During its first 30 years the Antarctic Treaty showed a capacity to respond to new challenges, creating a system of instruments (ATS) that include the 1972 Convention for the Conservation of Antarctic Seals, the 1980 Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the 1991 Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol). These instruments highlight the concerns of Antarctic Treaty members to facilitate and strengthen measures to harmoniously resolve potentially conflicting issues such as access to marine living resources and protection of the environment.

However, new and ongoing challenges also need to be address by the ATS, such as the continuation of Japan scientific whaling in the Southern Ocean, particularly regarding security issues, such as environmental safety, human security and maritime security.

A) Environmental Safety

Japan's Antarctic whaling fleet has been involved in several situations that posed a threat to the marine environment. In February 2007 the factory ship Nisshin Maru suffered an explosion and fire that resulted in the death of a crewmember and left the vessel drifting without power for ten days. The incident happened less than 110 nautical miles from the most important Adelie penguins (Pygoscelis adeliae) with a ship carrying a load of over one million liters of fuel. To avoid the possibility of an environmental disaster, the government of New Zealand requested that the vessel be towed outside the area but the government of Japan refused[19].

Incidental environmental impacts of the Japanese whaling fleet also occur during its operation, such as the discharge of waste from the vessels, including whale offal[20]. During JARPA II season 2005/2006 more than two thousand tons of whale offal would have been processed in the Southern Ocean[21]. In 2009 it was estimated that nearly 40 per cent of whale offal would have been discharged into the Southern Ocean. And in 2010 the civil society organization Sea Shepherd Conservation Society (SSCS) claimed that one of its ships had located the whaling fleet following the trail of waste discarded by the factory ship Nisshin Maru in the Southern Ocean[22].

Japan's Antarctic whaling is also one of the most sizeable maritime operations in the Antarctic, conducted through a large and diverse fleet of vessels, not all of which are of ice class. These vessels often operate in challenging sea and ice conditions in the most sensitive of the marine environments and in the vicinity of several Antarctic Specially Protected Areas. Because of its isolation, responding to safety or pollution incidents is highly constrained. Although these hazards and risks could be reduced through a comprehensive contingency planning, they cannot be entirely eliminated except with the complete cessation of whaling operations[23].

Also, the number of collisions between SSCS and the Japanese vessels raises the prospect that if

a vessel was badly damaged or even sunk, then large amounts of fuel oil could spill in the pristine Southern Ocean[24].

But more important, there is also the risk that the number of whales killed by Japan under NEWREP-A may result in ecological harm[25]. The first season of the program (2015/2016) caught 333 minke whales, including more than 200 pregnant females. The International Union for the Conservation of Nature (IUCN) Red List categorizes the population of Antarctic minke whales as Data Deficient. The IUCN also suggests that the population has been reduced approximately 60% between the 1978–91 period and the 1991–2004 period, but this is still being investigated[26]. If correct the IUCN would classify the Antarctic minke whale as endangered and therefore any hunting could have the potential to significantly impact on the population, especially when females of breeding age and pregnant females are killed[27].

B) Human Security

Japan's whaling operations in Antarctica also pose a threat to human security. As noted above, a Japanese crewmember died as a result of the explosion and fire aboard the Nisshin Maru in 2007. Another crewmember was killed the next year by falling overboard into the icy Antarctic waters[28].

Additionally, increasing confrontations between SSCS and Japan's whaling fleet carry a risk to human life. These risks are increased by the fact that these confrontations occur in a remote location and in a fragile and politically sensitive environment[29]. The latter becomes more relevant considering that Japan's new whaling program in Antarctica expands its whaling operations in the Atlantic and South-East Pacific. For countries with extensive Search and Rescue Areas (SARs), such as Chile, Australia and New Zealand, among others, the continuation of whaling operations in Antarctica poses multiple human security challenges, especially in the face of any incidents requiring assistance. The costs of this type of operation, only in terms of coordination, will always be high, as well as the political consequences in the face of the loss of human life or the eventual failure of rescue operations[30].

C) Maritime Security

In 2011 the Japanese government announced the inclusion of a patrol vessel from the Japan Fisheries Agency to its Antarctic whaling fleet, as well as an unspecified number of guards to protect against obstruction by anti-whaling activists, but no further details were disclosed. There have also been suggestions that Japan may use coastguard vessels with the whaling fleet in the future. Although military vessels have been used occasionally to engage in monitoring and compliance under CCAMLR, the deployment of naval vessels in the Antarctic Treaty area for offensive or defensive purposes could cause tensions that have the potential to escalate considerably.

Japanese Antarctic Whaling and the Role of the ATS

The continuation of Japan's unjustified scientific whaling in the Southern Ocean should be a matter

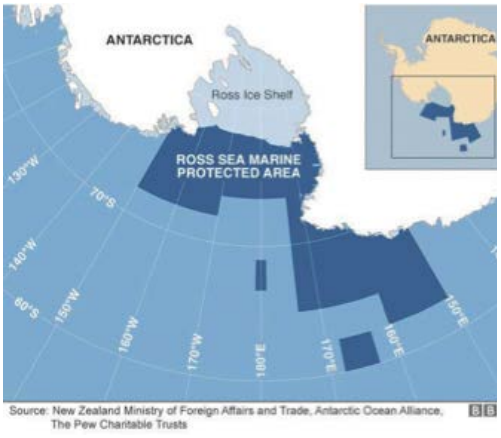
of concern to Antarctic Treaty members. However, a combination of legal and political reasons has resulted in the view that whaling activities cannot or should not be examined by the ATS rules and institutions, but deferred to the ICRW[31]. One of the main reasons given is that legal provisions within the Antarctic Treaty and subsidiary bodies directly or indirectly limit its capacity to act when it comes to whaling matters. Article VI of the Antarctic Treaty provides that "nothing in the present Treaty shall prejudice or in any way affect the rights, or the exercise of rights, of any State under international law with regard to the high seas within the area[32]". Also, Article VI of CCAMLR provides that "Nothing in this Convention shall derogate from the rights and obligations of the Contracting Parties under the ICRW." And Article 7 of Annex II of the Madrid Protocol, states that "nothing in the Annex shall derogate from the rights and obligations of the Parties under the ICRW". However, these provisions do not exclude the possibility of applying the ATS to ancillary activities associated to whaling, which would not regulate whaling itself, but would apply to any other activity not regulated by the ICRW, such as environmental impacts of accidents and refueling[33].

The legal instrument that is most relevant to whaling activities is the Madrid Protocol[34]. Article 2 of the Protocol designates Antarctic Treaty area as a natural reserve for science and peace, and commits the parties to comprehensive protection of its environment and associated ecosystems. Article 3 lists includes a number of environmental principles that extend to a range of activities, including scientific research programs which must be consistent with the Protocol and be modified or suspended if they threaten the Antarctic environment[35]. Article 5 provides that State Parties are to "consult and cooperate" when there are multiple international instruments operating within the same area. This would avoid possible conflicts between the implementation of the Protocol and the ICRW with respect to scientific research. Also, compliance provisions of Article 13 of the Protocol may apply to oblige Japan to take appropriate steps to ensure that NEWREP-A adheres with the Protocol and to notify all other parties of the steps taken to minimize environmental impacts[36]. Furthermore, Article 13(4) mandates that all other parties draw attention to any activity which could affect the implementation and principles of the Madrid Protocol. Specific concerns that could draw attention of Japan would include compliance with the use of ice strengthened and/or double-hull vessels, use of lighter grades of fuel, compliance with safety of life at sea applicable under international conventions and refueling, resupply and transshipment operations[37].

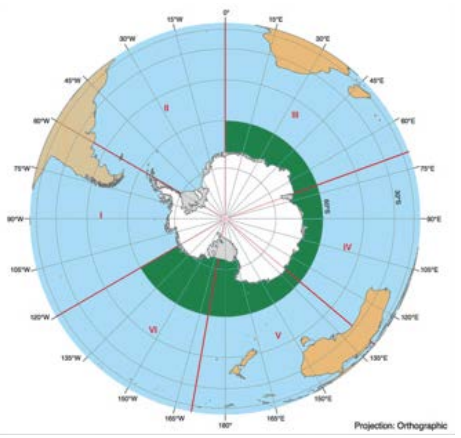
CCAMLR may also apply when considering ancillary activities related to Japan's whaling in the Southern Ocean. As far as the conservation of whales is concerned, CCAMLR is far a more important instrument than the ICRW since it not only regulates the exploitation of living marine resources – just as the ICRW regulates the exploitation of whales – but also considers the question of the preservation of the Antarctic Treaty area ecosystem[38]. Accordingly, on October 2016 CCAMLR member unanimously agreed to create the largest marine protected area (MPA) in the world in Antarctica's Ross Sea. It covers 1.55 million square kilometers of one of the most pristine ecosystems in the world. Top predators like penguins, seals, seabirds and whales, including Antarctic minke whales, are abundant within the MPA. However, its boundaries also include part of a larger area defined by the government of Japan to hunt whales under NEWREP-A (see Table 1).
As the CCAMLR Convention, the Conservation Measure that created the MPA also declares that "Nothing in this conservation measure shall (...) prejudices the rights and obligations of any State under international law, including as reflected in the United Nations Convention on the Law of the

Sea[39]". However, it also includes a provision that "no fishing vessel may engage in transshipment activities within the MPA, except in cases where vessels are involved in an emergency relating to safety of human life at sea or engaged in a search and rescue operation[40]". It has been documented that the Japanese whaling fleet operating in Antarctica conducts transshipment activities of whales and fuel, even under dangerous conditions[41]. While CCAMLR cannot address whaling activities directly, it does have the right and obligation to monitor and comply the conservation measures adopted by its members, including provisions of the Ross Sea MPA whenever the Japanese whaling fleet operates in the area.

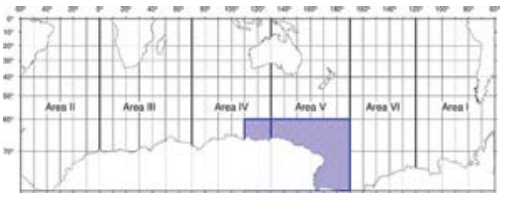
Table 1. *Ross Sea MPA Area and NEWREP-A Area*



Provisions in the Ross Sea MPA ban transshipment activities



NEWREP-A Operation Area



During season 2015/2016 NEWREP-A was conducted in Areas IV and V.

Final Remarks

The continuation of Japan's whaling policy in the Southern Ocean raises significant risks regarding environmental security, human safety and maritime security. Although the ATS has provisions to address these concerns, the refusal to do so even with ancillary activities relating to whaling leaves a dangerous gap in the environmental protection and human security governance of the Southern Ocean[42].

Finally it is worth considering that while the ATS provisions limit the capacity of its legal instruments when it comes to whaling in the Southern Ocean, the ICJ clearly established that Japan whaling in Antarctica (under JARPA II) was not whaling in exercise of rights under the ICRW. Like JARPA II, the implementation of lethal research under NEWREP-A has failed to comply with IWC review process adopted after the ICJ ruling for special permit whaling. Thus, the lethal component of the new program infringes IWC provisions and it could be considered that it is not whaling in exercise of rights under the ICRW preserved by the ATS. Consequently the ATS limiting provisions for whaling in the Southern Ocean may not apply.

References

1. Judgement of the United Nations International Court of Justice in the case concerning Whaling in Antarctica (Australia v. Japan; New Zealand intervening).
2. ICJ Press Release, 31 March 2014. Whaling in the Antarctic (Australia vs. Japan: New Zealand intervening)
3. Report of the International Whaling Commission NEWREP-A expert review workshop (SC/66a/Rep06)
4. Report of the Scientific Committee of the IWC, 2015 (IWC/66/Rep01)
5. Whaling Permits: Japan's waling is unscientific (2016). Nature, Vol. 529. Issue No 7586.
6. Opposition of the international scientific community to the Government of Japan lethal whale 'research' program in Antarctica "NEWREP-A". http://icb.org.ar/scientists_on_newrepA_eng.html
7. Blog of the European Journal of International Law (20/10/15). Japan's new optional clause declaration at the ICJ: a pre-emptive strike?
8. Japan: Declaration under Article 36(2) of the Statute. United Nations, 7th October 2015.
9. Resolution 2014-5 on Whaling under Special Permit.
10. New Zealand Government official website "NZ leads diplomatic protest over Japanese whaling" (7 December 2015).
11. European Parliament. Resolution on Japan's decision to resume whaling in the 2015/2016 season. 6 July 2016.
12. Motion 058 – Concern about whaling under special permits. IUCN World Conservation Congress (2016)
13. Declaration of the XII Meeting of the Grupo Buenos Aires (Argentina, 13 to 15 September 2016).
14. ICJ Judgment Whaling in the Antarctic (Australia vs. Japan: New Zealand intervening). 31 March 2014. Paragraph 61.
15. Ibid. Paragraph 71.
16. Donald R. Rothwell, Karen N Scott, Alan D. Hemmings. The search for Antarctic Security. Antarctic Security in the 21st century, legal and policy perspectives, 2012.
17. Articles I and V of the Antarctic Treaty.
18. C.C. Joyner, E.R. Theis, Eagle over the Ice: The US in the Antarctic, Hanover, University Press of England, 1997
19. Environmental News Network (23/02/07) "New Zealand Demands Japan Prioritize Move of Stricken Whaler

from Antarctic Coast"
20. Joanna Mossop. The security challenge posed by scientific whaling permit and its opponents in the Southern Ocean. The search for Antarctic Security, legal and policy perspectives, 2012.
21. The Sydney Morning Herald (18/07/09). "New rules for safe shipping may save whales".
22. Sea Shepherd Conservation Society (08/02/10). "Countering Japan's Ministry of Truth"
23. Donald R. Rothwell & Tim Stephens (2009). The regulation of Southern Ocean whaling: What role for the Antarctic Treaty System? Sydney Law School, Legal studies research paper No. 09/20
24. Mossop, op. cit.
25. Ibid.
26. Reilly, S.B., Bannister, J.L., Best, P.B., Brown, M., Brownell Jr., R.L., Butterworth, D.S., Clapham, P.J., Cooke, J., Donovan, G.P., Urbán, J. & Zerbini, A.N. 2008. Balaenoptera bonaerensis. The IUCN Red List of Threatened Species 2008: e.T2480A9449324.
27. Whale and Dolphin Conservation (WDC). (24/03/2016). "Japanese whaling fleet kills 333 minke whales – most of the adults females were pregnant".
28. Centro de Conservación Cetacea (07/01/09) Muere tercer tripulante de la flota ballenera japonesa desde 2007.
29. Joanna Mossop. The security challenge posed by scientific whaling permit and its opponents in the Southern Ocean. The search for Antarctic security, legal and policy perspectives, 2012.
30. Ibid.
31. Rothwell & Stephens (2009), op. cit.
32. Articles 87 (1)(e), 87(1)(f) and Article 116 of the United Nations Convention of the Law of the Sea.
33. Rothwell & Stephens (2009), op. cit.
34. Mossop, op. cit.
35. Bastmeijer, K. 2003. The Antarctic Environmental Protocol and its domestic legal implementation. The Hague: Kluwer Law International.
36. Article 13 (2)-(3) of the Madrid Protocol.
37. Rothwell & Stephens (2009), op. cit.
38. Francesco Francioni & Tulio Scovazzi (1996). The International Law for Antarctica. 2nd ed. The Hague; Boston: Kluwer Law International.
39. CCAMLR Conservation Measure 91-05 (2016). Ross Sea Region Marine Protected Area.
40. Ibid.
41. Sea Shepherd Conservation Society, 17 February 2013. "Whale Poachers Refuelling Vessel Laurel Enters Australian Waters, Putting Pristine Antarctic Environement at Risk". https://www.seashepherd.org.au/news-and-commentary/news/whale-poachers-refuelling-vessel-sun-laurel-enters-australian-waters.html
42. Mossop, op. cit.

*

Antarctic Affairs

Contributors

Andrea Kavanagh
Andrea Kavanagh directs global penguin conservation work at the Pew Charitable Trusts, including Antarctic Ocean protection. Kavanagh joined Pew in January 2008 as manager of the marine aquaculture campaign, and later managed the Antarctic krill conservation project and the Protecting the deep sea campaign. For the past 16 years, she has worked as a communications specialist and campaign director on a variety of environmental issues, including sustainable seafood, global climate change and national legislation to regulate toxic chemicals. Before joining Pew, Kavanagh was a campaign director at the National Environmental Trust (NET), where she led the Pure Salmon Campaign, an international coalition of groups dedicated to raising the standards for farm-raised fish. She also led the successful Take a Pass on Chilean Sea Bass campaign, in which more than 1,200 chefs across the country pledged to remove the severely threatened species from their menu and significant new regulations were established to ensure that only legal Chilean sea bass is sold in the United States. Kavanagh holds a bachelor's degree in environmental science and policy from the University of Vermont.
E-mail: akavanagh@pewtrusts.org

Cassandra Brooks
Cassandra Brooks recently completed her PhD at Stanford University studying international ocean policy, with a focus on marine protection in the Antarctic. During her previous graduate work, she studied Antarctic toothfish in the Ross Sea - the most remote fishery on Earth. Cassandra has worked in the lab, underwater, and at sea and has presented her work at conferences and workshops both nationally and internationally, while publishing in peer-reviewed journals including Science and Nature. She's toiled as a federal fisheries observer on New England groundfish boats and spent a number of years devoted to wilderness therapy and environmental education throughout the United States. In addition to her science, Cassandra has published more than 150 articles and multi-media stories about marine science and the environment. She's worked with international non-profits to produce media to promote policy designed to protect ecologically important regions of the globe while writing policy reports to identify important areas for marine protection in the Antarctic and elsewhere. Since completing her dissertation, she's continued to work at the intersection of science, policy and the public, working towards conservation in the Antarctic and beyond.
E-mail: brooks.cassandra@gmail.com

Elsa Cabrera
Elsa Cabrera is executive director and founder of the Chilean non governmental organization, Centro de Conservación Cetacea, with more than fifteen years of experience as accredited observer or technical advisor to Chile's government delegation at international forums, including the IWC and CCAMLR. In 2015, her conservation and research work was recognized internationally with the Distinguished Service Award from the Society of Conservation Biology.
Email: info@ccc-chile.org)

Mike Walker
Mike Walker has campaigned on a range of ocean conservation issues for nine years: ending EU overfishing; large scale fully-protected marine reserves; illegal, unreported and unregulated fishing; shark conservation; and deep-sea fishing. When he is not campaigning on ocean conservation, he is happiest in it (the ocean).
E-mail: mike@antarcticocean.org

Nicole Bransome
Nicole Bransome has worked for the Pew Charitable Trusts since 2014, advocating for marine protected areas and ecosystem-based krill fishery management in the Southern Ocean. She previously worked on ocean policy at the U.S. Department of the Interior where she focused on advancing domestic ecosystem-based management policy through the National Ocean Policy and the U.S. Coral Reef Taskforce. Throughout her academic studies at the University of California San Diego and University of Maryland, and continuing at Pew, Nicole has published several peer-reviewed journal articles related to the topic of marine predator-prey interactions and implications for ecosystem-based fisheries management.
E-mail: nbransome@pewtrusts.org

Ricardo Roura
Dr. Ricardo Roura is a polar region specialist with extensive experience in research, analysis and advocacy in Antarctica and the Antarctic Treaty System. He first went to Antarctica in his late teens and participated in twelve Antarctic expeditions, including wintering-over, with among others Greenpeace, the Argentine Antarctic program, and University of Canterbury (NZ), while increasingly becoming involved in Antarctic Treaty System fora as a representative of ASOC. He has also conducted research in Svalbard with the Arctic Centre, University of Groningen (NL), where he completed his Ph.D. He has published on Antarctic/polar topics including tourism, impact assessment and monitoring, protected areas, cultural heritage, and geopolitics. He is a senior adviser of the Antarctic and Southern Ocean Coalition and its representative to the Committee for Environmental Protection. He aims to keep Antarctica as an inspiring natural place, and the Antarctic Treaty System honest.
E-mail: ricardo@antarcticocean.org

Rodolfo Werner
DR. Rodolfo Werner is a wildlife conservationist who has devoted his professional career to the study and conservation of the Patagonian Sea, the Southern Ocean, and Antarctica. For many years, he conducted field research on the Patagonian Coast (Argentina), studying the diving behavior and behavioral ecology of southern sea lions (Otaria flavescens). He has also participated in research projects on southern elephant seals and Magellan penguins in Patagonia.
Rodolfo graduated as biologist from the University of Buenos Aires, obtained a PhD in Biology at the University of Munich, Germany, and conducted a Postdoc in Marine Zoology at the University of Guelph, Ontario, Canada. Rodolfo has consulted for the Metropolitan Toronto Zoo, Vancouver Aquarium, World Wildlife Fund International and US, the Antarctic and Southern Ocean Coalition (ASOC), the National Environmental Trust, Greenpeace International, The Pew Charitable Trusts, and for other international organizations on marine conservation issues such as marine policy,

marine mammals, marine protected areas, marine governance, and fisheries management. For the last 14 years he has been focusing his work on Antarctic marine conservation. Currently, he is and advisor to the Antarctic Southern Ocean Coalition (ASOC) and The Pew Charitable Trusts on issues such as penguin conservation, marine protected areas and Antarctic krill fisheries management. In addition, Rodolfo is the science advisor and a Board Member of the Antarctic Wildlife Research Fund and the science advisor of Agenda Antártica. Rodolfo has an extensive list of publications and presentations on Antarctic science and policy, and has been attending meetings of the Convention for the Conservation of Antarctic Marine Living Resources - as the scientific representative of ASOC -, the Committee for Environmental Protection of the Antarctic Treaty, and Antarctic Treaty Consultative Meetings for the last 14 years.
E-mail: rodolfo.antarctica@gmail.com

Ryan Dolan
Ryan Dolan joined The Pew Charitable Trusts' global penguin conservation campaign in 2013. His work focuses on advocating for marine protected areas and fully protected marine reserves in the Southern Ocean surrounding Antarctica. Before joining Pew, Dolan worked for the United Nations Population Fund in New York. He has a master of philosophy in environmental management from the University of Cape Town in South Africa and a bachelor of arts in international affairs and Germanic studies from the University of Colorado, Boulder.
E-mail: rdolan@pewtrusts.org

*

Antarctic Affairs

Terms of Publications

Articles

- The articles, which are unpublished, have a maximum length of 7,500 words, including footnotes and bibliography page, even shorter extensions appreciate. You should not use too many references. The abstract should not exceed 300 words. Each article should be preceded by five key words.
- It will assess the inclusion of charts and graphs that support the thesis developed in the article.
- You should see the name of the author/s on the first page, along with their academic qualifications and university official, institution or company in which they are employed and e-mail.
- References appear at the end of the article under the heading References, arranged alphabetically by authors and according to the following order: name (lowercase) of author, initials of the last names, year of publication (in brackets and distinguishing, b, c, in the event that the author has more than one work cited in the same year), title of article (in quotation marks) and title of the journal to which the article belongs (in italics or underlined).
- There should be no spelling or grammatical errors. The contents of the articles should be carefully read and reviewed prior to shipment.
- The originals will be published electronically in "Word" or compatible and color.
- The images of the publication will be sent in jpg format.
- The magazine reserves the right to edit and correct items, including certain portions separate and square up the particularly relevant or bold text, respecting the spirit of the original.
- The selection of the published articles is decision of the Editorial Board of the Journal of Antarctic Affairs.
- There is no charge for publication.

REVIEWS

- The reviews, which are unpublished, have a maximum length of 2.500 words. It should be a short comment of a book, movie or pubblication related to the Antarctic continent or the Southern Ocean.
- The title of the article should be expressed both in Spanish and English.
- Reviews should be written in Spanish or English.
- Authors shoud sign the review along with their institutional affiliation and e-mail address.
- References appear at the end of the article under the heading References, arranged alphabetically by authors and according to the following order: name (lowercase) of author, initials of the last names, year of publication (in brackets and distinguishing , b, c, in the event that the author has more than one work cited in the same year, title of article (in quotation marks) and title of the journal to which the article belongs (in italics or underlined).
- There is no charge for publication.

*

Volume IV - July 2017

Antarctic Affairs

www.agendaantartica.org

AGENDA ANTARTICA

Antarctic and Southern Ocean Coalition

www.asoc.org