

## **Connecting Marine Protected Areas Can Improve Ocean Health**

By linking their MPAs, regions could build climate resilience, reverse biodiversity loss, and support communities

## Overview

The ocean plays an essential role in sustaining life on our planet. Covering nearly three-fourths of the globe, it is home to nearly a quarter of the world's known species and many more yet to be discovered. It is a source of livelihood for coastal communities and Indigenous peoples, who have successfully conserved the sea's biodiversity for millennia, using knowledge passed down through generations. And it provides billions of dollars in economic benefits to countless stakeholders. But harmful human activities and a changing climate are increasingly threatening the ocean's health.

Research shows that large, fully protected marine areas help conserve valuable biodiversity and can reverse many of the detrimental impacts caused by humans. Marine protected areas (MPAs) can also improve fish populations, provide ecological benefits to neighboring ecosystems, safeguard predators, maintain ecosystem stability, and help preserve cultures with close ties to the sea. Over the past decade, many countries have created large-scale, fully protected MPAs.

These efforts are having a positive impact, yet marine biodiversity continues to decline at an unprecedented rate.<sup>1</sup> Therefore, conservationists—together with local communities, Indigenous peoples, scientists, and government officials—are looking for innovative ways to improve upon MPAs' success by finding ways to connect and further protect these areas while offering marine life safe passage among them.

In 2017, The Pew Charitable Trusts and Dona Bertarelli created the Pew Bertarelli Ocean Legacy Project, with the shared goal of supporting the creation of the first generation of ecologically significant, large, and effective MPAs around the world. Today, building on those efforts, the project also seeks to connect MPAs and help conserve key migratory species and entire marine ecosystems.

## Accelerating the advancement of science-based marine conservation

With ocean health declining faster than at any time in human history, there is an urgent need for action. The evidence suggests that to halt this downward slide, more of the world's ocean must be protected.<sup>2</sup> Currently, less than 8% of the global ocean is protected by an MPA—and less than half that total is safeguarded by a highly or fully protected MPA, the level of protection that can help replenish biodiversity, build resilience against the effects of a changing climate, secure long-term economic growth for local economies, and safeguard cultural and traditional practices in coastal and island communities.<sup>3</sup> A growing number of Indigenous peoples and community champions, nongovernmental organizations (NGOs), and government leaders have called for highly protecting at least 30% of the ocean by 2030—a target that many scientists say humanity must hit to secure our planet's long-term health.<sup>4</sup>

Since June 2021, governments around the globe have created a promising wave of progress on new large-scale marine protection commitments and designations covering more than 3.4 million square kilometers (1.3 million square miles) across some of the world's most biologically significant waters. These include Australia's Cocos (Keeling) and Christmas Islands, French Polynesia, the French Southern and Antarctic Lands, and Tristan da Cunha. Additionally, Ecuador, Costa Rica, and Panama each announced significant marine protection expansions for the Galápagos Islands, Cocos Island, and Cordillera de Coiba, respectively.

In November 2021, Colombia, Costa Rica, Ecuador, and Panama jointly pledged to expand and connect their respective protected territorial waters. This multilateral biosphere reserve would cover more than 500,000 square kilometers (193,000 square miles) across some of the world's most important migratory routes for whales, sea turtles, sharks, and rays.

This promising regional approach would connect a constellation of MPAs of assorted sizes and levels of protection through "biological corridors." Like MPAs themselves, these corridors shield migratory species from human harm and are underpinned by regional collaboration and good governance, equitable management, sustainable long-term financing, and effective monitoring and enforcement. Networks of regional MPAs interact with one another both ecologically and socially over huge areas and account for variables such as changing climatic conditions, economic and cultural needs, and emerging technological and financial innovations.

This approach is rooted in the reality that ocean species, human activities, and chemical and physical oceanography transcend national marine boundaries. Highly migratory species travel thousands of miles to breed and feed, international fishing fleets encircle newly designated MPAs, and regulatory bodies with different sectoral mandates operate in the same geographical space. All of this activity shows that the ocean is a complex latticework of biological and human interactions that requires a holistic regional approach to marine conservation. Although scientific consensus points to connected networks of marine protected areas as a best practice, research shows that the approach isn't followed on a consistent basis.

Over the next five years, the Pew Bertarelli Ocean Legacy Project expects to play a key role in developing and supporting this regional approach to marine conservation in the Pacific, the Mediterranean, and the Southern Ocean and subantarctic islands. This brief highlights some of the current and previous efforts that the project and its partners have supported.

### Large-Scale Marine Protection Designations Supported by the Pew Bertarelli Ocean Legacy Project and Its Partners

The areas have collectively added more than 10 million square kilometers of fully or highly protected waters

Site (Globally ranked among fully/highly protected MPAs, by size)	* Area fully/highly protected		Year(s)
	square kilometers	square miles	designated
1. Ross Sea Region Marine Protected Area	1,600,000	618,000	2016
2. Papahānaumokuākea Marine National Monument (U.S.)	1,500,000	579,000	2006/2016
3. Pacific Remote Islands Marine National Monument (U.S.)	1,300,000	502,000	2009/2014
4. Pitcairn Islands Marine Reserve (UKOT)	830,000	320,000	2016
5. Christmas Island and Cocos (Keeling) Islands Marine Parks (Australia)	740,000	286,000	2022
6. Rapa Nui Multiple Use Marine Coastal Protected Area (Chile)	720,000	278,000	2018
7. Tristan da Cunha Marine Protection Zone (UKOT)	690,000	266,000	2021
8. British Indian Ocean Territory Marine Protected Area (UKOT)	640,000	247,000	2010
9. Palau National Marine Sanctuary	500,000	193,000	2015
10. Ascension Island Marine Protected Area (UKOT)	440,000	170,000	2019
12. French Southern and Antarctic Lands (France)	380,000	147,000	2022
14. South Georgia and the South Sandwich Islands (UKOT)	280,000	108,000	2019
15. Coral Sea Marine Park (Australia)	240,000	93,000	2012
17. Revillagigedo Archipelago National Park (Mexico)	150,000	58,000	2017
26. Marianas Trench Marine National Monument (U.S.)	40,000	15,000	2009
29. Galápagos Marine Reserve expansion (Ecuador)	30,000	11,600	2021
30. Natural Park of the Coral Sea—Remote Reefs (New Caledonia)	30,000	11,600	2018
Total	10,110,000	3,903,200	

UKOT: United Kingdom overseas territory

\* As defined by the International Union for Conservation of Nature

Sources: World Database on Protected Areas; MPAtlas

#### Pew Bertarelli Ocean Legacy Project

Working to protect our ocean for our future



#### Indian Ocean

- 1. British Indian Ocean Territory MPA
- 2. Christmas and Cocos (Keeling) Islands
- **3.** French Southern and Antarctic Lands

#### **Pacific Ocean**

- 4. Palau National Marine Sanctuary
- 5. Marianas Trench Marine National Monument
- 6. Papahānaumokuākea Marine National Monument
- 7. Pacific Remote Islands Marine National Monument
- 8. Coral Sea Marine Park
- 9. Natural Park of the Coral Sea— Remote Reefs
- **10.** Kermadec/Rangitāhua Ocean Sanctuary
- 11. French Polynesia
- **12.** Revillagigedo Archipelago National Park

- 13. Eastern Tropical Pacific
- 14 Galápagos Islands
- 15 Pitcairn Islands Marine Reserve
- **16.** Rapa Nui Multiple Use Marine Coastal Protected Area and Motu Motiro Hiva Marine Park

#### Atlantic Ocean

- 17. Mediterranean Sea
- 18. Ascension Island MPA
- **19.** Tristan da Cunha Marine Protection Zone
- **20.** South Georgia and the South Sandwich Islands

#### Southern Ocean

- 21. East Antarctica
- 22. Ross Sea Region MPA
- 23. Antarctic Peninsula
- 24. Weddell Sea
- **25.** South Orkney Islands Southern Shelf MPA

Sources: World Database on Protected Areas; MPAtlas © 2022 The Pew Charitable Trusts



Subantarctic fur seals are among the wide range of marine life that relies on the remote, healthy, and highly protected waters surrounding Tristan da Cunha.

## Locally driven, science-based efforts result in ambitious marine conservation

In 2021, Tristan da Cunha finalized legal designation of the largest fully protected marine reserve in the Atlantic and the fourth largest on the planet. This ambitious action was driven by the community and reflects the community's long-term dedication to creating thoughtful, science-based protections that maintain ocean health while enhancing the marine ecosystem's resilience to climate change and respecting the island's economic reliance on this vital resource. This historic move also furthered the United Kingdom's commitment to create a 4 million-square-kilometer (1.5 million-square-mile) "blue belt" around its overseas territories.

The marine protection zone was an important step for our community because we are a people who have always lived in harmony with the sea. In Tristanian waters, you'll find a breeding ground for blue sharks, migration routes for tuna, precious cold-water corals, and the Tristan rock lobster that is the mainstay of our economy. This is a precious place, and we want it to stay that way. I am also extremely proud that we can think of ourselves as being the guardians of the South Atlantic."

James Glass, Tristan da Cunha's chief islander

### Tristan da Cunha Marine Protection Zone

Fully protects over 687,000 square kilometers in the South Atlantic Ocean



#### Note: Cargo shipping vessels must avoid a 25-nautical-mile buffer around each of the islands.

Sources: Royal Society for the Protection of Birds; NYU Spatial Data Repository; GEBCO; MarineRegions.org; Natural Earth © 2022 The Pew Charitable Trusts

The people of Tristan da Cunha—the world's most remote inhabited island, located 2,810 kilometers (1,750 miles) west of South Africa—have always relied heavily on local fisheries for food and income, and they keenly understand the importance of sustained ocean health.

Comprising a population of only 260, Tristanians steward a vast and special swath of ocean. Tristan da Cunha's exclusive economic zone (EEZ) extends across 758,771 square kilometers (292,963 square miles)—three times the size of the U.K. mainland—and is one of only a few largely unexploited temperate marine ecosystems in the world, providing an important baseline for marine habitat research.

The archipelago is also home to some of the most important seabird colonies in the world, including the critically endangered Tristan albatross; the endangered Atlantic yellow-nosed albatross; the spectacled petrel; 85% of the world's endangered northern rockhopper penguins; and the smallest flightless bird in the world, the Inaccessible Island rail, which breeds only on Inaccessible Island—one of two Tristan UNESCO World Heritage Sites.

Tristanians proudly see themselves as guardians of the South Atlantic. These protections will help enhance the local marine environment's resilience against the impacts of climate change and preserve Tristanians' way of life for generations to come. Toward that end, long-term partnerships with NGOs such as the Royal Society for the Protection of Birds and the Pew Bertarelli Ocean Legacy Project continue to support the efforts to implement, manage, and monitor Tristan's waters.



A whale approaches the ocean surface in the Austral Islands, a remote archipelago in the South Pacific Ocean. The French Polynesian government recently announced plans to protect these waters and their rich biodiversity.

## An ancient conservation model helping restore ocean health in the South Pacific

Rāhui, a traditional Polynesian conservation practice, continues to regain widespread use in French Polynesia, where recent commitments to conserve 1 million square kilometers (386,000 square miles) are advancing. Rāhui involves banning access to an area, or prohibiting the taking of a natural resource, to promote regeneration for an entire community's benefit. Historically, throughout the Polynesian triangle—the area between New Zealand, Hawaii, and Rapa Nui—the practice played a key role in sustainable natural resource management.

Communities would set a rāhui, for example, in part of a lagoon, or throughout a bay or coconut grove, or even for certain species of birds or taro, for a certain amount of time. Historically, these periods, which ranged in duration, allowed habitats to regenerate, species to develop to optimal harvesting size, or populations to grow beyond typical harvesting levels in anticipation of periods of scarcity or for celebratory events.

After Western Europeans arrived in Polynesia, the practice of rāhui gradually declined. Within a few years, some islands lost up to 80% of their human population, mainly due to diseases brought from Europe. But despite the loss of many other traditional practices, declines in communal ways of life, and less reliance on natural resources amid increase imports, rāhui has survived as part of the local cultures and traditions.

In the 1980s, on the island of Rapa in the Austral Islands, the arrival of freezers led to the overfishing of coastal fish, as local fishers began storing their catch for sale off the island. Local leadership responded by creating a rāhui on the ancestral model to protect the island's main bay. In an effort to mirror its success in restoring fish populations, the rāhui revival has spread throughout French Polynesia, and many municipalities have gradually re-established protection zones in their lagoons, including Teahupo'o, Teva I Uta, and Tautira in Tahiti; Ua Huka in the Marquesas Islands; and Tubuai in the Australs.



French Polynesia's southernmost islands, the Australs, are home to 14 species of sharks and four species of rays.

These recent rāhuis are hybrids, managed by the community while also benefiting from legal and government protection under environmental or fishing regulations. French Polynesia's Department of Marine and Mining Resources has also taken up the concept to ensure the protection of certain species of fish, mollusks, and crustaceans by regulating the minimum catch size for these species, and this legal recognition provides an enforcement mechanism.

Because rāhui is firmly rooted in Polynesian culture, most locals understand and accept the practice, which gives it a significant advantage over other modern conservation tools, such as MPAs and maritime spatial management plans. In fact, a recent survey showed that 90% of French Polynesia's population wishes to establish a rāhui in each community.

Momentum on rāhuis continues to grow. In February 2022, French Polynesian President Édouard Fritch announced plans to create a 500,000-square-kilometer (193,000-square-mile) protection zone called Rāhui Nui, or "great rāhui." This announcement followed a campaign started in 2014 by elected officials from the Austral Islands and supported by the Pew Bertarelli Ocean Legacy Project, seeking to create a large rāhui in their archipelago's waters.

Additionally, the Pew Bertarelli Ocean Legacy Project has supported the Marquesas Islands community communes and local people with technical assistance and financial support for science to help advance their efforts to create a large-scale MPA, called Te Tai Nui A Hau, or "The Ocean of Peace," as well as the local initiative to create a coastal rāhui around the six islands.



Emperor penguins dive from an ice sheet in East Antarctica. Marine protections in the region would help the species adapt to the effects of climate change.

## **Protecting Antarctica's Southern Ocean**

Located at the bottom of the globe are the remote icy waters of Antarctica's Southern Ocean. Encompassing 10% of the global ocean, the region is considered one of the world's last remaining wilderness areas and is home to thousands of species found nowhere else.

The circumpolar current that surrounds Antarctica has given rise to incredibly diverse and fantastical species, including brilliantly hued starfish and pastel octopuses, colossal squid, and fish with antifreeze proteins in their blood. There are also the more widely known animals, such as emperor and Adélie penguins; crabeater and leopard seals; and humpback, blue, and killer whales.

One lesser-known species carrying the weight of the ecosystem on its 2.5-inch back is Antarctic krill. These shrimplike crustaceans form the base of the region's delicate food web. Krill is a key prey for numerous Southern Ocean species, including whales, seals, and penguins. And several predators, such as killer whales and leopard seals, consume species that depend on krill as a food source—making krill a vital component in the Southern Ocean food chain.

Krill also play a critical role in the Southern Ocean's carbon cycle. According to recent research led by Emma Cavan at Imperial College London, krill feed on carbon-filled phytoplankton at the ocean's surface and then release dense waste that can sink quickly to the deep sea, where it remains for decades. Krill also move between shallow and deep areas multiple times daily to feed, which may increase the chances of waste reaching deep into the water column. Both actions contribute to one of the largest regional ocean sinks for atmospheric carbon dioxide.

In a broader context, the Southern Ocean serves as the beating heart of the global ocean and the planet's health. Vital nutrients that well up from Antarctica's deep ocean are carried far away by currents, breathing life into coastal fisheries north of the equator. And because the remote Southern Ocean has one of the least altered marine ecosystems on Earth, it serves as an unparalleled sanctuary for scientific research on the impacts of climate change and industrial fishing.

However, the combined effects of concentrated fishing and climate change on krill—especially near the Antarctic Peninsula's coast—are making krill less available in the foraging area of species such as chinstrap and Adélie penguins. These impacts are creating a ripple effect throughout the Antarctic food web, including historic die-offs and range shifts among endemic marine species.

Yet there is some good news. Scientists and policymakers are working toward a new ecosystem-based management measure that will ensure both a healthy krill population in the Southern Ocean and a sustainable krill fishery over time. In doing so, they aim to leave enough krill in the water to ensure that predators' needs are protected and to spread out fishing so that it is not overly concentrated in predator feeding and breeding areas, for example, off the coast of penguin colonies.

Additionally, marine scientists agree that establishing a network of large MPAs throughout the Southern Ocean is essential for protecting biodiversity, including krill, and providing resilience to climate change. Networks of MPAs also help species adapt to climate change by creating protected pathways for species migrations and range shifts, and their relatively undisturbed waters provide a natural laboratory for studying how intact marine ecosystems react to a warming and acidifying ocean.

The latest science tells us that to regenerate ocean life, we need to establish MPAs covering at least 30% of the ocean by 2030. And Antarctic MPAs can contribute a significant percentage of that global target.

Preserving Antarctica's unique biological resources is an important, and achievable, goal. In 2011, the member governments of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) agreed by consensus to create a representative network of MPAs in the Southern Ocean and adopt a framework for establishing the network.

To date, CCAMLR has designated two MPAs: the South Orkney Islands Southern Shelf MPA, established in 2009 and covering 94,000 square kilometers (36,000 square miles) northeast of the tip of the Antarctic Peninsula; and the Ross Sea Region MPA, established in 2016 as the world's largest protected area and first large-scale reserve on the high seas, protecting 2.06 million square kilometers (795,000 square miles) of ocean. And CCAMLR has been discussing three other MPA proposals—in East Antarctica, the Weddell Sea, and the Antarctic Peninsula, which together cover 3.8 million square kilometers (1.5 million square miles).

The Pew Bertarelli Ocean Legacy Project and its partners continue to work with CCAMLR and its member governments to encourage adoption of ecosystem-based fisheries management for krill and further progress toward establishing a network of large-scale MPAs around Antarctica.

## Southern Ocean Regions in Need of Protection

A network of MPAs will safeguard unique ecosystems



\* The United Kingdom designated the South Georgia and South Sandwich Islands MPA. These islands' sovereignty remains contested by Argentina.

† All domestic protected areas north of 60° S have been included.

Note: In 2011, CCAMLR members agreed by consensus to adopt Conservation Measure 91-04, a framework for creating a network of MPAs, and identified nine planning domains for developing these protected areas.

Sources: CCAMLR; Natural Earth

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# Fully protecting the South Sandwich Islands would help a globally critical ecosystem teeming with wildlife

Located about 4,000 kilometers (2,500 miles) north of Antarctica and 2,700 kilometers (almost 1,700 miles) east of South America, South Georgia and the South Sandwich Islands host one of the world's most significant wildlife hot spots. Part of the Antarctic ecosystem, the rich waters surrounding these islands are full of plankton and krill, which support one of the largest and most varied populations of seabirds and marine mammals on Earth.

The islands, a British overseas territory, provide habitat for more than 4 million Antarctic fur seals—or over 95% of the world's population of these marine mammals—and more than half of the world's southern elephant seals. Humpback, sperm, and other species of whales are also frequently seen in the islands' waters.



South Georgia and the South Sandwich Islands are home to more than 100 million seabirds, including the wandering albatross, seen here.

In addition, South Georgia has as many as 100 million seabirds, including vast numbers of penguins, albatross, prions, and petrels. The Antarctic's lone songbird, the South Georgia pipit, of which just 6,000 remain, can be found only here. And Zavodovski Island in the South Sandwich Islands has more than 1 million pairs of chinstrap penguins, the largest colony in the world.

Volcanic in origin, the islands are surrounded by nutrient-rich waters. And the South Sandwich Trench—which, at more than 8 kilometers (5 miles), is among the deepest parts of the ocean—includes thermal vents that are yet to be fully explored.

Recognizing the region's biological significance, officials established an MPA covering 1.24 million square kilometers (479,000 square miles), including 283,000 square kilometers (109,000 square miles) of fully protected waters, in 2012. The protections were enhanced in 2013 and again in 2018, after the first independent five-year review.

However, these vital marine habitats still face an uncertain future, largely because of climate change. Fishing around the islands is limited and accounts for less than 5% of the local government's annual revenue. Full protection would shelter the marine ecosystem from harmful pressures, such as fishing, tourism, and invasive species, and support critical scientific analysis of the changing climate's impact on these waters as well as on the wider Southern Ocean region that stretches to Antarctica.

To preserve this globally valuable marine ecosystem's integrity, the Pew Bertarelli Ocean Legacy Project has supported science examining these waters and has called for fully protecting the entire South Sandwich Islands EEZ, totaling about 500,000 square kilometers (193,000 square miles), an area twice the size of the U.K. With all extractive activities prohibited, such a sanctuary would protect globally important species and build the ecosystem's resilience in the face of climate change.



The cold, nutrient-rich waters of the Scotia Sea, along South Georgia Island's southern coastline, help support the chinstrap penguin population.

## France takes an important step toward a sustainable and healthy global ocean

The waters of the French Southern and Antarctic Lands—a group of widely scattered islands in the southern Indian Ocean—host exceptional biodiversity, including orcas, pygmy blue whales, penguins, seals, tuna, and more than a dozen different kinds of threatened or endangered seabirds. For example, the Crozet and Kerguelen Islands provide refuge to the world's largest king penguin colony and second-largest southern elephant seal colony, respectively. And Amsterdam Island is home to the roughly 30 remaining breeding pairs of Amsterdam albatross, a critically endangered species found nowhere else on Earth. Researchers, military personnel, and support staff visit the islands occasionally, but the overseas territory has no long-term human inhabitants.



King penguins amass on an island in the Kerguelen archipelago, part of a remote overseas territory in the southern Indian Ocean that France protected in 2022.

In February 2022, France announced about 1 million square kilometers (386,000 square miles) of expanded marine protections around Saint Paul and Amsterdam Islands, the Kerguelen Islands, and the Crozet Islands. The expansion makes the waters around the three archipelagos the largest MPA in French waters by far, representing about 15% of the country's global EEZ.

Most importantly, the new marine reserve also includes a new highly protected area surrounding Saint Paul and Amsterdam Islands and covering about 255,000 square kilometers (98,500 miles), which prohibits all extractive activities, such as industrial fishing. The expansion more than doubles the percentage of highly protected French waters, up from 1.6% to 4%, but still leaves the country with a challenge of achieving its goal of highly protecting at least 10% of its waters by the end of 2022. Science shows that highly protected areas provide the most significant ecological benefits.

The Pew Bertarelli Ocean Legacy Project has been building support for highly protecting these waters since 2016, largely through a group of leading conservation NGOs in France organized by the project.

## Conclusion

Over the past decade, and informed by the best available science, many countries have created large-scale, highly and fully protected MPAs that prohibit harmful human activities, such as industrial fishing. These efforts have helped to safeguard millions of square kilometers of ocean all around the globe.

Although these actions are having a positive impact, marine biodiversity continues to decline at an unprecedented rate. Governments, Indigenous peoples, community champions, NGOs, scientists, and others must accelerate the pace of protection and find innovative ways to improve upon MPAs' success, including approaches that provide safe passage among these areas for marine life.

Working together—and at a regional scale—leaders, conservationists, local residents, and others can apply ambitious new ideas, collaborative policies, and governance to secure a healthy, biodiverse ocean that serves both nature and people around the world.

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## **Endnotes**

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This brief was updated in August 2023 to reflect the updated name of the Rapa Nui Multiple Use Marine Coastal Protected Area.

### For further information, please visit: pewtrusts.org/oceanlegacy



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**The Pew Bertarelli Ocean Legacy Project** | The Pew Charitable Trusts and Dona Bertarelli created the Pew Bertarelli Ocean Legacy Project, with the shared goal of establishing the first generation of ecologically significant, large, and effective marine protected areas (MPAs) around the world. Today, the Pew Bertarelli Ocean Legacy Project also seeks to connect MPAs and help conserve key migratory species and entire marine ecosystems. These efforts build on more than a decade of work by Pew and the Bertarelli Foundation, led by Dona Bertarelli, to create large-scale, highly or fully protected MPAs. Between them, they have helped to obtain designations or commitments to safeguard nearly 12.6 million square kilometers (4.8 million square miles) of ocean by working with communities, local leaders, philanthropic partners, Indigenous groups, government officials, and scientists. Dona Bertarelli is a philanthropist, investor, sportswoman, and strong advocate for ocean conservation. The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems, including the need for effective marine conservation.