Editor's note

Elliott A. Norse is president of Marine Conservation Biology Institute in Bellevue, Washington, USA, and a Pew Fellow in Marine Conservation. He and Larry B. Crowder are editors of *Marine Conservation Biology: The Science of Maintaining the Sea's Biodiversity* (Island Press 2005), which features a chapter by them, Kristina Gjerde, David Hyrenbach, Callum Roberts, Carl Safina and Michael E. Soulé on protected areas for pelagic megafauna. The following essay by Norse is based on a presentation he gave at the First International Marine Protected Areas Congress in October 2005 in Geelong, Victoria, Australia.

MPA Perspective Protecting the Least-Protected Places on Earth: The Open Oceans

By Elliott A. Norse

The movement to protect places from human impacts has expanded since countries began designating terrestrial national parks in the 19th century, and protecting nearshore marine areas in the 20th century. The obvious next step in this 21st century is protecting places in the open oceans, both the seafloor and the overlying pelagic realm.

This idea of pelagic protected areas may seem strange: open oceans are often likened to deserts because their average primary productivity and abundance of large animals is low. The water column, averaging nearly 4,000 meters deep, seems a vast undifferentiated expanse. But modern tools, especially oceanographic measurements taken from satellites, have shown that the oceanic pelagic realm is both highly heterogeneous and dynamic. In deserts, key biological hotspots occur near permanent or ephemeral water sources. In the open sea, the underlying topography and discontinuities caused by currents create permanent and ephemeral hotspots whose boundaries can shift kilometers in a day.

In ways that scientists are only coming to understand, big animals (megafauna) including tunas, billfishes, cetaceans and seabirds cross this vastness to congregate at pelagic hotspots where they feed or breed. Once, whaling captains noted where they saw great whales so they could later return and fill their tuns. Today's oceanic fishermen are much more sophisticated about finding hotspots and migratory pathways. They subscribe to faxes or e-mails sent several times weekly showing the best places to fish, based on interpretations of satellite oceanography (for example, http://www.roffs.com/commercial/about.htm). Until recent decades, pelagic wildlife could elude humans in the oceans' depths, but oceanic fishing is now more like shooting fish in a barrel. Longlining and (mostly illegal) driftnetting are eliminating large predators. Julia Baum and Ransom Myers of Dalhousie University recently reported that oceanic whitetip sharks — probably the most abundant large animals on Earth until the 1950s — had declined in the Gulf of Mexico by 99.7% since tuna longlining began there. Other oceanic pelagic megafauna are also in deep trouble. White marlin are now so rare they are being considered for listing under the US Endangered Species Act. Pacific leatherback turtles, caught by swordfish and tuna longliners, are likely to be extinct within the one to three decades. Historic data from longlining operations are giving scientists a clear and chilling picture of their steep population declines.

Oceanic wildlife sought by fishermen or killed incidental to fishing operations have not fared well either within nations' waters nor in areas under international jurisdiction (the high seas), which constitute 64% of the marine realm. Existing fishery management measures have proven woefully inadequate. The obvious question is whether protected areas are a useful alternative.

Some respected marine scientists and managers are doubtful. They believe that protected areas would work only for relatively sedentary species. But the experience of terrestrial managers suggests otherwise. In the Prairie Provinces of Canada, pothole wetlands where millions of ducks nest are protected, thus ensuring ample populations of these highly migratory animals for both birdwatchers and hunters. There is no reason why protected areas and more traditional tools, such as limits on fishing effort, could not be used in conjunction for highly migratory large pelagic species. There is already some precedent for this: the Pelagos Sanctuary for cetaceans in the Ligurian Sea, most of which is in international waters, and several large areas in international waters that are closed to finfishing under the Convention on the Conservation of Antarctic Marine Living Resources.

To avert extinction of some of the world's most remarkable animals and collapse of oceanic fisheries, nations, regional fishery management organizations and UN agencies could apply satellite oceanography to understand hotspot dynamics, as fishermen do, and correlate these with information on wildlife movements from satellite tagging. Hotspots and key migratory pathways could be designated as temporary fishery closures or fully protected marine reserves where pelagic species could feed and breed without being killed off. Vessel monitoring systems and satellites scanning the ocean surface could monitor fishing boats in the blue vastness.

Legal and scientific tools are already available, and more could be, but using them requires us to think and act differently, to see pelagic fishes as wildlife with the same values and vulnerabilities as terrestrial predators, and to envision pelagic protected areas as a powerful conservation tool. Moreover, we have to realize that the open ocean is a dynamic mosaic of places where hotspots move. The idea of protecting areas that move — protected areas with dynamic boundaries — is without precedent on land. But as we face new challenges and equip ourselves with new 21st-century tools, we can transcend the dogmas of the past and envision new solutions, including dynamic pelagic protected areas.

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For more information

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