New Technology and Innovation for Marine Protected Areas Management

Interactive portal will support marine protected area management and scientific research

Overview

The ocean is vital for life on earth. Covering more than two-thirds of the planet's surface, it is home to millions of species—an estimated 50-80 percent of all life on Earth. A healthy ocean not only benefits marine life and vulnerable habitats, it also regulates the climate, cycles fresh water, absorbs carbon, and provides many other ecosystem goods and services including food security and livelihoods for billions of people.

Marine protected areas (MPAs) are an essential tool in the recovery and protection of our ocean and the essential services it provides, but management is often hampered by inadequate information to support decision-making. Failure to get data from those who produce it to those who use it often leads to lost opportunities to inform management decisions.

To help bridge that gap, Global Fishing Watch partnered with Dona Bertarelli Philanthropy to develop Global Fishing Watch Marine Manager, a new technology portal to support the effective design, management, and monitoring of MPAs. This cutting-edge technology will provide dynamic and interactive data on human-use activity, ocean conditions and biology in near real-time to support marine spatial planning, MPA management, and scientific research.

Building a more resilient and healthy ocean

Today, human activities are putting enormous pressure on marine ecosystems as well as the goods and services they provide that are so fundamental to our well-being. Overfishing, marine pollution, and climate change are together causing unprecedented changes in the ocean that could irreversibly jeopardize the functioning and vitality of marine ecosytems, and their capacity to mitigate the effects of climate change.

In 2015, as one of its Sustainable Development Goals, the United Nations (UN) set a target of protecting 10 percent of the world's ocean by 2020. Today, only 2.6 percent of the global ocean is protected in what are classified as fully or highly-protected areas, according to the Marine Protection Atlas. Parties to the UN Convention on Biological Diversity will adopt new goals as part of the post-2020 biodiversity framework.

Fully or highly protected MPAs are key to effectively protect the critical habitats, species, and ecological functions essential for recovering, protecting, and enhancing biodiversity, productivity, and resilience in the ocean. When implemented and managed properly, they can also provide multiple benefits to the people whose livelihoods and traditions depend on them.

MPAs play a significant role in addressing the threats facing the ocean. Realizing their potential demands more and better data, along with innovation and collaboration to understand, monitor, and model ocean conditions and develop adaptive and flexible management approaches to our changing ocean.

Our ocean is home to 50-80% of all life on Earth

"Marine protected areas are critical to help the ocean regenerate and build resilience against climate change and other threats. Marine reserves are a vital part of a sustainable blue economy, for the communities which rely directly on the ocean for their livelihoods and food security, and, more widely, for humanity. I'm partnering with Global Fishing Watch to create a new, collaborative portal that will support the decision-making, management and monitoring of marine reserves, as well as advance ocean research, through innovative technology and clear, actionable, open data."

Dona Bertarelli, founder of Global Fishing Watch Marine Manager, United Nations Conference on Trade and Development Special Adviser for the Blue Economy, and co-chair of the Bertarelli Foundation

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The ocean data explosion

Effective implementation of MPAs is often impeded by a lack of timely, accurate, and relevant information on the condition of ocean resources, and on human activities and their impacts. But in recent years an exponential increase in the number and variety of ocean observing systems and other new data sources have created the prospect of a digital ocean ecosystem.

The explosion in new data about the ocean, processing techniques, and visualization tools are rapidly changing our ability to understand marine ecosystems. The technology revolution presents parallel opportunities to both improve oversight of human activity at sea and maintain better stewardship of ocean resources.

However, significant barriers exist to creating an equitable, open, and accessible digital ecosystem for ocean management. Vast stores of ocean data are often unstructured, poorly consolidated, and out of reach. An urgent priority is to ensure that these data and new technologies are available to decision-makers and translated into a form that is easily understandable and useful.

Harnessing the power of technology and innovation

Global Fishing Watch Marine Manager is a dynamic technology portal created to help transform the management of MPAs, from data collection through implementation. The portal aims to make diverse ocean datasets accessible and translated into actionable information for decision-making.

The marine manager portal is designed to empower managers and stakeholders to rapidly collate, assess, and analyze scientific data integral to the governance of marine reserves, along with other management frameworks including MPAs and other area-based conservation measures. Fishing vessel tracking data within a given area of interest will be made available on a 72-hour delay, focusing the portal's capabilities on the informed management of marine reserves, as opposed to real-time monitoring or enforcement.

The marine manager portal is developed and maintained by Global Fishing Watch, building on its expertise in big data processing, machine learning, and data visualization. The project is supported by partnerships with leading research institutions to develop data inputs and assure scientific rigor.

Scientific collaboration includes researchers from Dalhousie University, the University of California Santa Barbara, the University of British Columbia, Duke University, and the University of Queensland.

Making management robust and nimble

Global Fishing Watch Marine Manager combines and visualizes near real-time, dynamic, and interactive data at high temporal and spatial resolutions across four categories: human use, oceanographic, biological, and maritime zoning data. The datasets will be restricted to at least five MPA sites in 2021, with the ambition to make it widely available by 2024.
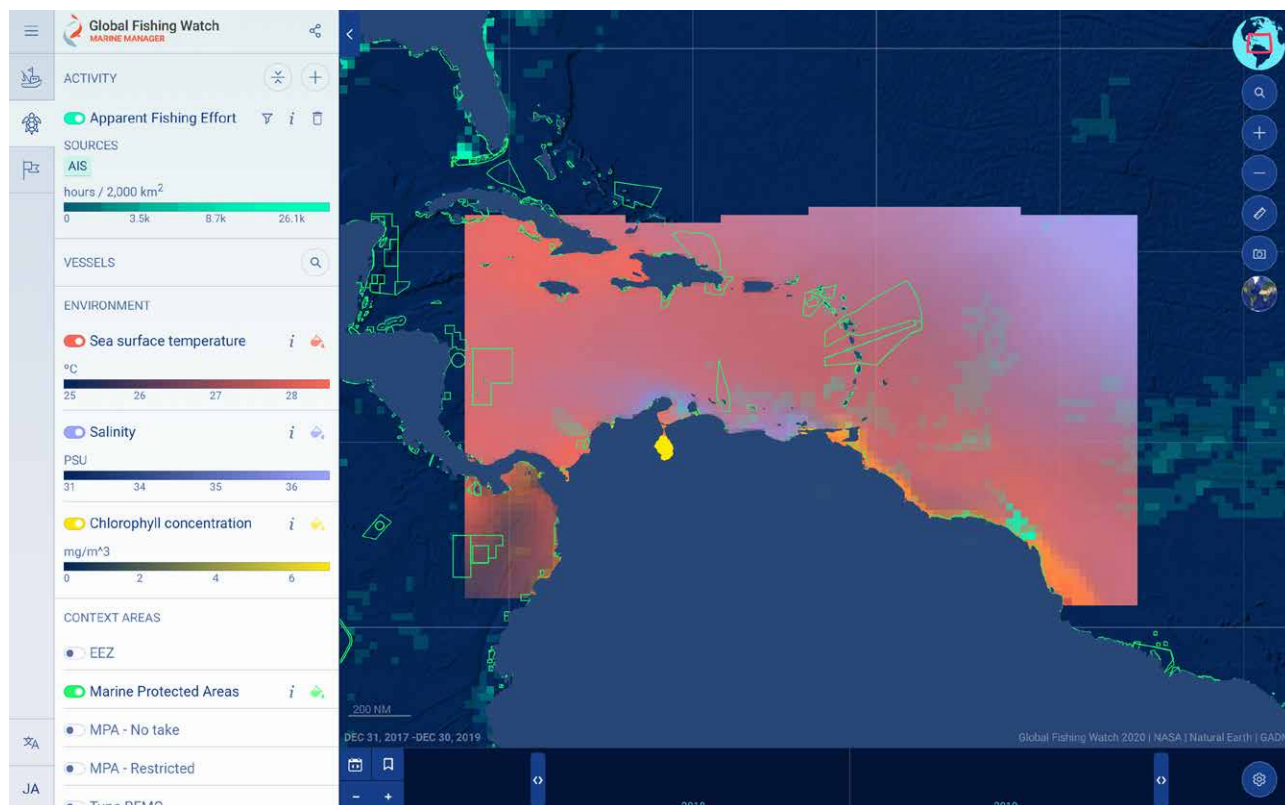
The image taken from the portal shows the overlay of different datasets: sea surface temperature, salinity and chlorophyll concentrations, along with fishing activity. The graphs show values of selected data over time, regulated with the time slider located in the lower right corner of the image. © Global Fishing Watch

Human-use data will include commercial fishing activity and non-fishing vessel activity, such as vessels involved in tourism, offshore oil drilling, seabed mining, transporting cargo, and supplying fuel, along with data on underwater noise generated by vessels.

Oceanographic data will include sea surface temperature, salinity, currents, bathymetry, and seamounts, and data on climate change such as sea surface temperature anomalies.

Biological and ecological data will include parameters commonly used to analyze primary biological productivity, such as chlorophyll a, and predicted species habitat suitability. If available, MPA managers and scientists can upload their animal telemetry data into the portal.

Maritime zoning data will include exclusive economic zones, MPA boundaries, fisheries zones, and options for uploading data unique to a jurisdiction's requirements.
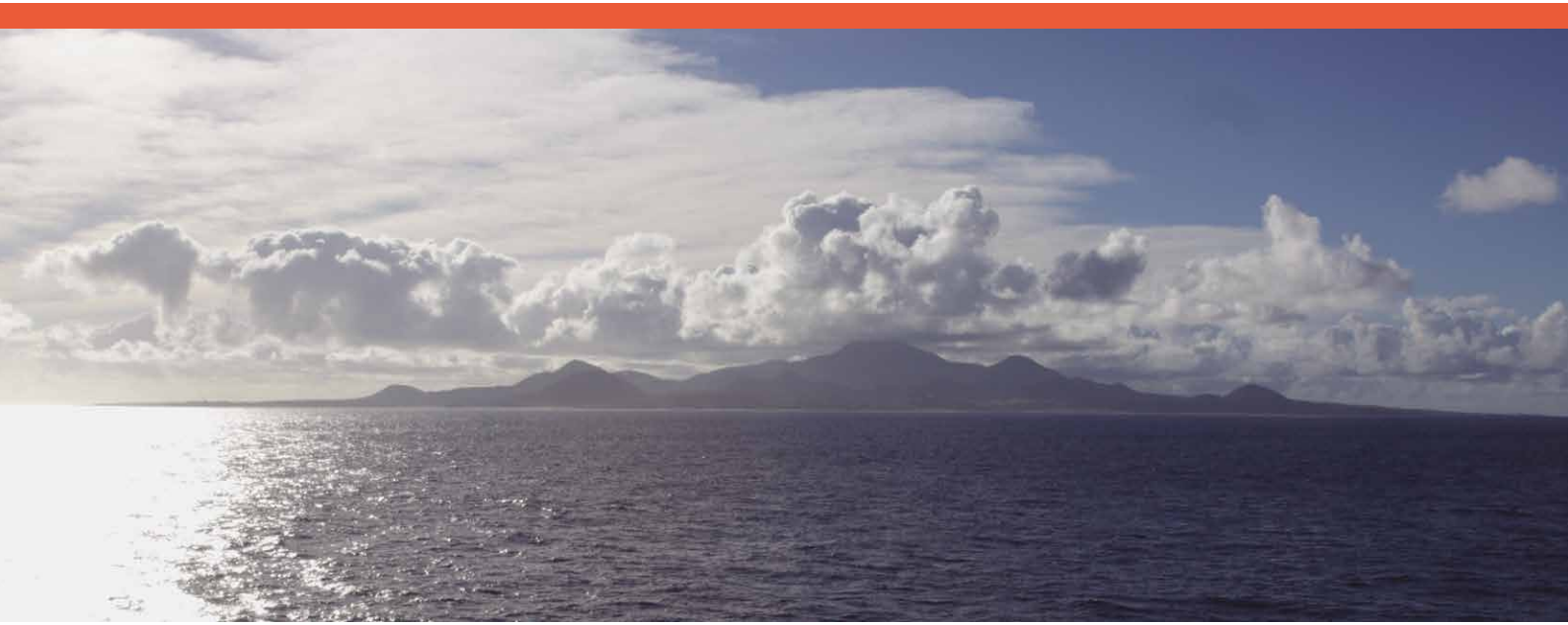
Galapagos Islands. © Pristine Seas / National Geographic

The marine manager portal will include an open, public dashboard and private, collaborative workspaces. The workspaces provide invited users with interactive tools to generate spatial and time-series analysis and visualization of fused datasets, upload static layers and time-series data, and download all data for advanced research techniques.

In 2021, Global Fishing Watch will build and pilot the portal with at least five sites, collaborating with managers responsible for protected areas in the Galápagos Islands and Ascension Island, among others. The Galápagos Marine Reserve is one of the most biologically diverse MPAs in the world, and the Ascension Island MPA is the largest protected area in the Atlantic.

As the portal develops to reflect new partnerships with governments and funders, additional sites, data and analytical capabilities will be added to increase its reach and impact.

Ascension Island. © Pristine Seas / National Geographic

"Global Fishing Watch's marine manager portal enables us to harness the power of big data to monitor, understand and manage the entire 170,000 square miles of Ascension Island's marine protected area. Data has the potential to revolutionize our ability to protect marine environments, and with Global Fishing Watch's support, we now have the capability to capture and analyze such large amounts of information. Global Fishing Watch involved us from the beginning to ensure the portal's design meets our particular management needs. The outputs are so intuitive and beautiful that they serve not only as a vital management resource but also as a compelling engagement tool that connects the Ascension community and global public with one of the most remote areas of the ocean."

Diane Baum, director of conservation and fisheries, Ascension Island Government

How you can help

Governments, industry, academia, NGOs, technology and data providers, and the philanthropic community can all play a part in helping the cost-effective and accessible marine manager portal, and other new management tools, strengthen ocean stewardship.
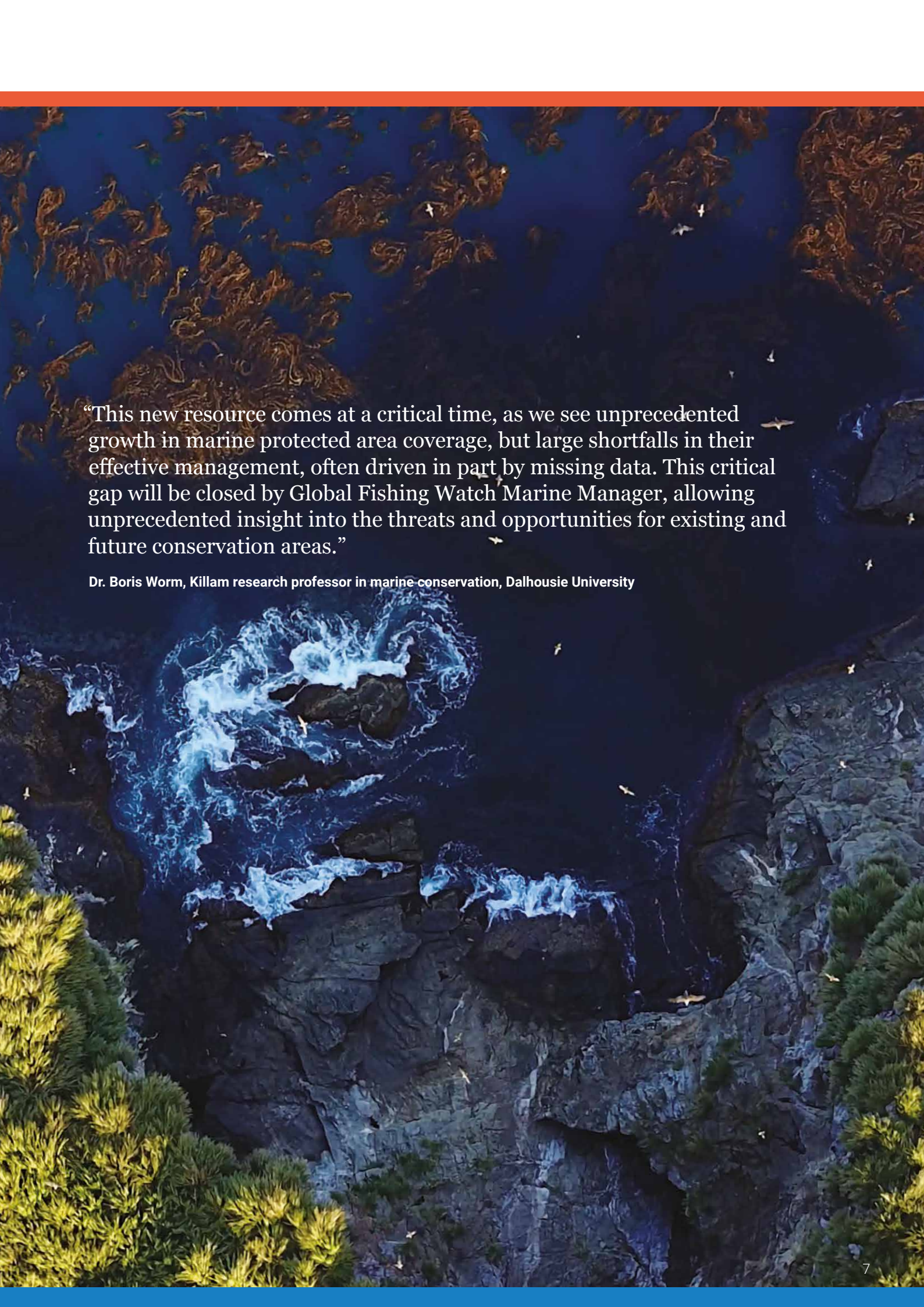
Share ocean data: historical and current ocean data should be broadly and publicly available unless there are compelling security interests.

Support transparency in fishing activity: publicly share essential data on fisheries, including vessel tracking, ownership, and licenses.

Invest in innovation: support the portal's development and provide long-term funding to take it to scale, realizing the ambition of a public, global portal available to all ocean stakeholders.

Tristan da Cuhna. © Pristine Seas / National Geographic

"This new resource comes at a critical time, as we see unprecedented growth in marine protected area coverage, but large shortfalls in their effective management, often driven in part by missing data. This critical gap will be closed by Global Fishing Watch Marine Manager, allowing unprecedented insight into the threats and opportunities for existing and future conservation areas."

Dr. Boris Worm, Killam research professor in marine conservation, Dalhousie University

Contact

Global Fishing Watch Marine Manager is a freely available, innovative technology portal, founded by Dona Bertarelli. It provides near real-time, dynamic, and interactive data on ocean conditions, biology, and human-use activity to support marine spatial planning, marine protected area design and management, and scientific research. Global Fishing Watch is an international nonprofit organization dedicated to advancing the sustainability of our ocean through increased transparency of human activity at sea. By creating and publicly sharing map visualizations, data and analysis tools, Global Fishing Watch enables scientific research and drives a transformation in how we manage our ocean. Dona Bertarelli is committed to securing ecologically significant and effective marine protected areas, and the responsible and regenerative use of the ocean, while preserving the health of its ecosystems.

Global Fishing Watch
MARINE MANAGER

DONA BERTARELLI
PHILANTHROPY