Global Fishing Watch
MARINE MANAGER

Fact sheet
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Marine Manager Enhances Coastal Conservation Efforts

Monitoring portal helps Guyana track increased vessel traffic from growing oil and gas industry

When a major global energy company discovered oil and gas reserves off the coast of Guyana in 2015, the nonprofit group Guyana Marine Conservation Society (GMCS) took immediate notice. The group's leaders knew that the discovery would spark a rapid and significant increase in vessel traffic in Guyanese waters and raise the potential for oil spills, rig fires and other accidents—all of which could threaten sea turtles, sperm whales, killer pygmy whales and rare porpoises, along with the country's valuable fisheries and biodiversity in general.

GMCS also knew that the government lacked the resources it needed to sufficiently monitor its 53,191 square-mile (137,765 square-kilometer) exclusive economic zone (EEZ) and that something needed to be done soon to ensure adequate safeguards for marine life, even as the oil and gas extraction moved forward.

Annette Arjoon-Martins is founder of the Guyana Marine Conservation Society, which was established to ensure the conservation of marine turtles that nest along Guyana's shores.© Reel Guyana

"We've got a lot of commercially fished species here—catfish is our biggest export, lots of snapper, a massive shrimp industry—and a lot of communities that rely on fishing," said Annette Arjoon-Martins, founder and past president of GMCS. "And most of our coastline is a huge mangrove forest, which is habitat for a lot of species and protects people from storms and floods."

Even before the 2015 discovery, Guyanese maritime and fisheries officials had their challenges. "The main marine sectors were shipping, which even today remains largely unregulated, and fishing, which is also massively unregulated due to lack of resources," Arjoon-Martins said. "The emerging oil sector also triggered an internal brain drain; all sectors were hemorrhaging capacity to oil and gas. But it was also clear that we needed much better monitoring of our waters."

The road to a solution started at a workshop at the University of Cambridge in May 2019, where Mikhail Amsterdam, the vessel monitoring systems coordinator within Guyana's Ministry of Agriculture, met Kristina Boerder. Boerder was a postdoctoral fellow in biology at the university focused on fisheries and marine conservation who had already started working with Global Fishing Watch. She told Amsterdam that the organization was developing a tool to remotely monitor marine waters.

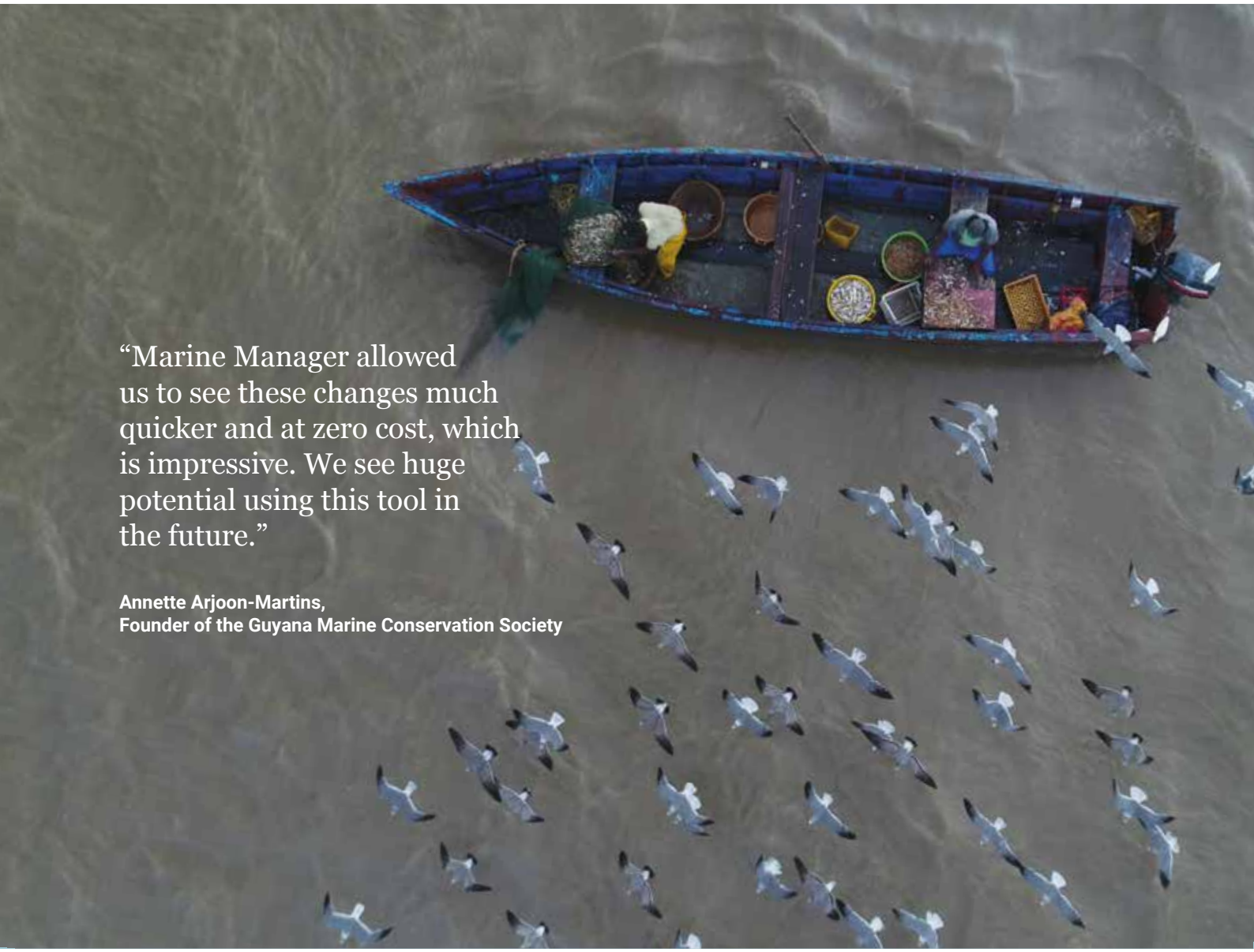
A member of the GMCS board of directors then introduced GMCS to Global Fishing Watch staff, and the two parties began to explore a collaboration. "This was a very positive interaction," Arjoon-Martins said, "because usually groups talk to us and then fall off the radar." But this time was different. The conversation continued and in February 2020 a memorandum of understanding was signed to explore how Global Fishing Watch could help Guyana improve its fisheries.

The timing proved to be ideal because Global Fishing Watch was beginning to develop its marine manager portal, a tool that provides dynamic data on human-use activity and environmental conditions in near real-time to support marine management and scientific research.

Next steps in Guyana: Translating greater awareness into action

In Guyanese waters, the portal has already revealed a sharp increase of vessel traffic related to the growing oil and gas sector. Specifically, Marine Manager data showed that 36 percent of all vessels observed in Guyanese waters were potentially connected to oil extraction, and that the number of oil-related vessels in the EEZ had grown by 38 percent from 2015 to 2020. The portal also demonstrated an increase of 227 percent in oil-related activity in the country's waters between 2018 and 2020. All of this research was driven by GMCS' relationship with Dr. Boerder, who strongly believed that better data was the key to improving management of fisheries and MPAs.

Guyana's fisheries department also sees great potential for using Marine Manager to improve knowledge and oversight of the country's vibrant fisheries sector. With few patrol vessels to cover Guyana's entire EEZ, "We do have challenges with monitoring," says Mikhail Amsterdam.



"Marine Manager allowed us to see these changes much quicker and at zero cost, which is impressive. We see huge potential using this tool in the future."

Annette Arjoon-Martins,
Founder of the Guyana Marine Conservation Society

Guyana's vibrant fisheries sector includes 1,200 artisanal vessels. © Reel Guyana

This is a particular concern with the sector's 1,200 artisanal vessels, which range in length from 12-66 feet and are not equipped with automatic information system (AIS) or vessel monitoring system (VMS) tracking devices. Guyana's fishing fleet also includes about 100 semi-industrial boats (66-76 feet long) and 87 industrial vessels, which are more than 76 feet long. Only the industrial ships are fully covered by VMS.

"The semi-industrial boats might have AIS but it's not always reliable," Amsterdam says. "Right now about 10 percent of the overall fleet is monitored, and zero percent of the artisanal fleet." He added that the government plans to have most of the fleet fitted with some remote monitoring technology by 2025, at which point the government could leverage the power of Marine Manager to drastically improve fisheries stewardship.

Arjoon-Martins also sees significant potential for the portal to help with oversight of Guyana's invaluable mangrove forests. The largest of these forests exists in the Barima Mora Passage adjacent to Shell Beach, Guyana's only coastal protected area. Stretching along a hundred kilometers of the country's northwest coast, the beach is also a renowned sea turtle nesting area.

"This is work that could really help the communities. Everybody relies on the resources of these areas for some part of their livelihood," she said, adding that GMCS and the government could also use the portal to assess the cumulative impact of the "massive amount of superheated wastewater that has been discharged in our marine space" from the oil and gas extraction.

For now, Guyana has no MPAs but the government has committed to a more conservation-minded, low-carbon future that does not sacrifice the economic wellbeing of its citizens, including joining the Global Oceans Alliance in 2021. Setting aside ocean areas to allow biodiversity to thrive—and expanding the use of Marine Manager to keep the country's waters, fisheries and coastal communities sustainable for the long term—could go a long way toward realizing that vision.

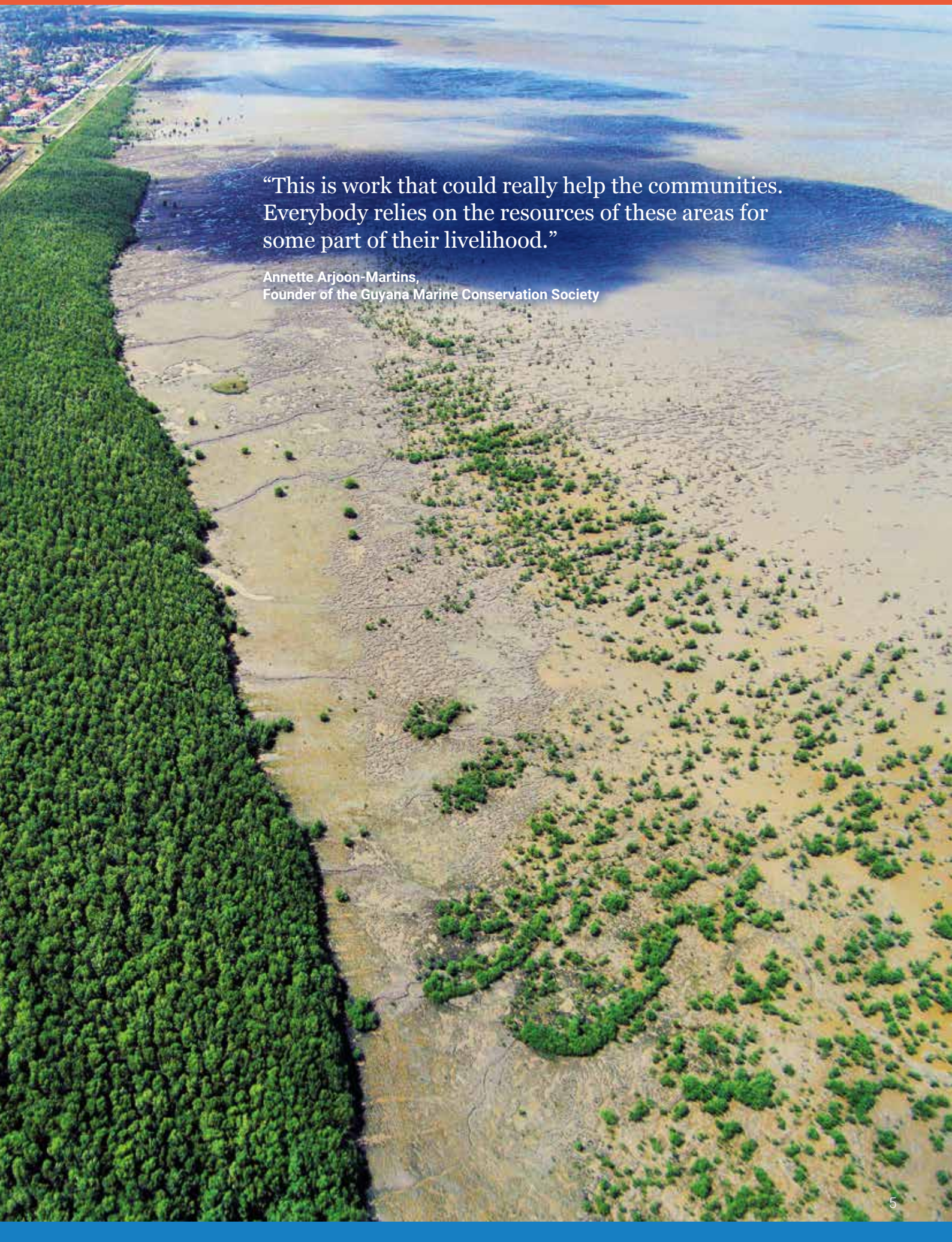
Guyana's fishing fleet

1,200 artisanal vessels

100 semi-industrial boats

87 industrial vessels

Mangrove forests line much of Guyana's coastline, which serve as habitat for many native species and as a buffer to protect communities from storms. © Reel Guyana



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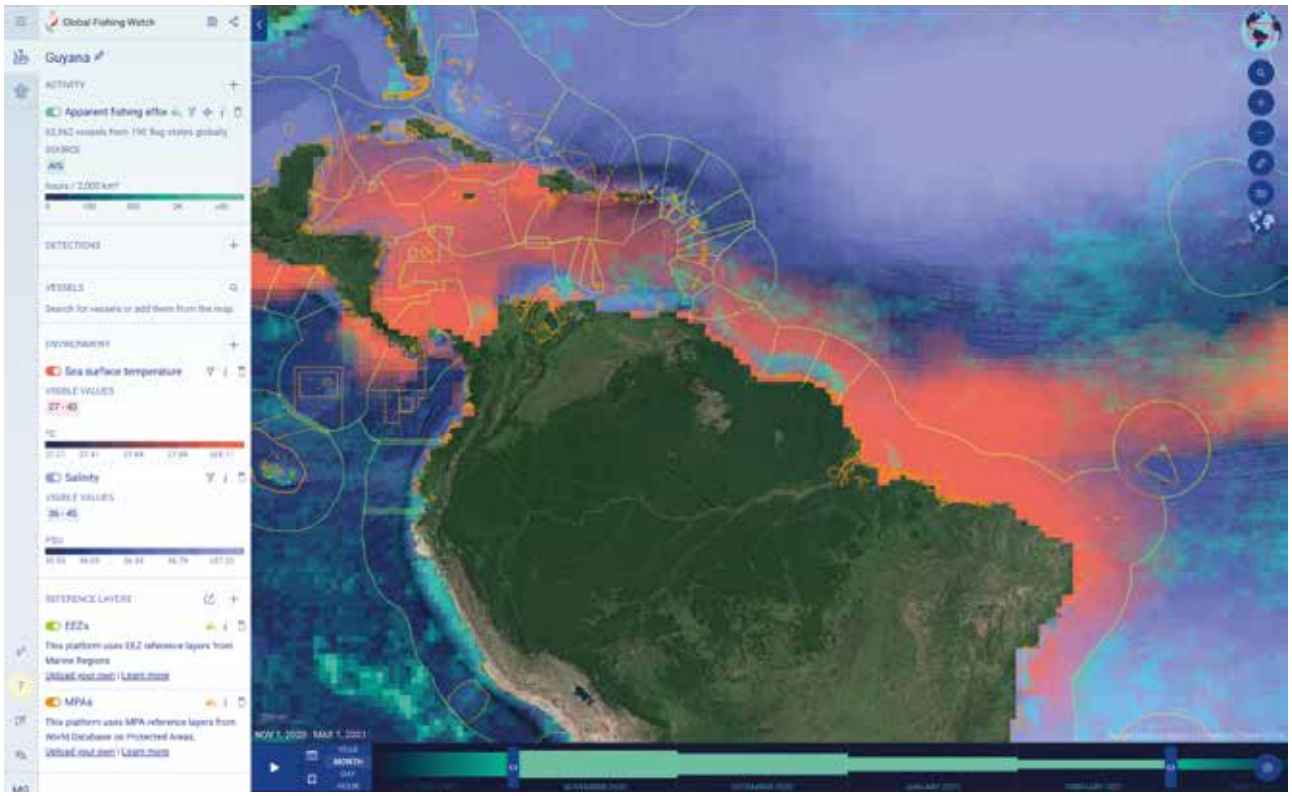
A tool to revolutionize ocean monitoring

Marine Manager is an innovative online portal that draws on satellite data to help a wide variety of officials, authorities and other interested parties to better monitor the ocean. The portal was specifically designed to help strengthen management of marine protected areas (MPAs) and what are known as "other effective area-based conservation measures," or OECMs. These are areas that might be set aside for a non-conservation purpose—cultural preservation, for example—which in turn safeguards biodiversity, even though that was not the main goal of the protection.



A screenshot taken from the portal shows the overlay of different datasets: sea surface temperature and salinity, along with fishing activity along the northern coast of South America. © Global Fishing Watch

In short, the marine manager portal hosts diverse datasets and analysis tools to support ocean stewardship and marine spatial planning. This gives users the ability to dynamically monitor and conserve marine ecosystems in a single platform, all at no cost to them—and accomplish in minutes or hours what used to take days, weeks or months to do.

The portal achieves this by allowing individuals to access and rapidly analyze a wide range of vessel and oceanographic data across huge expanses of the ocean, putting scientific information at the fingertips of managers, researchers and others. These tools include pioneering capabilities such as the ability to overlay vessel activity and position information with environmental datasets—including sea surface temperatures, salinity levels and more—and to monitor vessels involved in commercial fishing and other activities, such as tourism, shipping and oil drilling.

And with the latest release of Marine Manager, users have access to greater global datasets, powered by Google Earth Engine. They also have the ability to track and analyze groups of vessels and far greater accessibility to monitor their area of focus, anywhere in the world. This will enable more people to access and use Global Fishing Watch data and insights, promote greater collaboration and sharing among researchers, policymakers, and other stakeholders, and help to build a broader and more comprehensive understanding of global fishing patterns and trends to implement and improve management.

The many ways Marine Manager can improve ocean governance

The global applications for this monitoring tool are multifold—and growing. These include:

Monitoring existing MPAs to determine how much, if any, legal and illegal fishing or other prohibited activity may be occurring within them.

Scoping sites for potential areas of focus to learn the types and volume of vessel traffic—current and over time.

Mapping changes in environmental and biological conditions to help anticipate shifts in marine life, which could have major implications for national and international fisheries.

Monitoring coastal ecosystems, such as mangroves, seagrass meadows and wetlands for changes that might trigger the need for new policies.

Each of these applications is critical today because our entire global ocean faces mounting threats, from overfishing and illegal fishing to pollution, increased shipping traffic, climate change and coastal development. This is why, in 2010, the United Nations set a target of protecting 10 percent of the ocean by 2020. Sadly, today less than 8 percent of the ocean is safeguarded through MPAs or OECMs, with less than 3 percent covered by fully or highly protected areas.

And while numerous governments and intergovernmental bodies have made sincere efforts to improve this protection, many of the problems persist due to a lack of open, timely and user-friendly data to inform policy and enforcement on the water.

Which is why wide adoption of Marine Manager now can help, by combining and visualizing near real-time, dynamic data on ocean conditions and human activities and their impacts.

During the pilot phase of Marine Manager, Global Fishing Watch worked with governments to test the portal in seven regional sites: Guyana; the Galápagos Islands—one of the most biologically diverse marine reserves in the world; the Mediterranean Sea; the Black Sea; Tristan da Cunha, a remote archipelago in the South Atlantic Ocean; Ascension Island, also in the South Atlantic; and Niue in the South Pacific.

Global Fishing Watch tools like Marine Manager give users the ability to dynamically monitor marine ecosystems.
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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.

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