VP-009-Drones saving the Ocean-World's Oceans

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5 Ways Underwater Drones Are Helping Citizens Save the Ocean

A new generation of robots is set to explore marine mysteries around the world.

VIEW IMAGES

People around the world are using OpenROV's drones to see what's beneath the surface of our oceans. PHOTOGRAPH BY PATRICK WEBSTER, NATIONAL GEOGRAPHIC CREATIVE

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Transformational ideas can come from anywhere. From anyone. National Geographic's CHASING GENIUS is now soliciting ideas around three issues: sustainable planet, global health, and feeding nine billion. Could your solution be a spark of genius? Check out the challenge, where the best ideas for improving our world each can win $25,000.

Later this year, an army of small swimming robots is set to plumb the mysteries of oceans around the world. Each one will have its own mission, as defined by citizen scientists interested in everything from reefs to "robomussels" that can self-monitor temperature.

The underwater drones are the latest iteration of National Geographic Emerging Explorer David Lang's OpenROV project, an effort to accelerate marine discoveries by unveiling the ocean to more people via cameras on ROVs (remotely operated vehicles). With a grant from director James Cameron's Avatar Alliance Foundation and other supporters, the group will distribute 1,000 units of its newest drone, the Trident, over the course of the next year through the companion site OpenExplorer. In addition to citizen scientists, the free drones will go to nonprofit organizations and classrooms.

Here are five examples of innovative expeditions that are helping protect the world's waters:

Watching for changes along California's coast

People living near marine reserves in the Los Angeles area have banded together to watch what's happening along their coastlines. Volunteers at Pelican Cove on the Palos Verdes Peninsula have begun taking snapshots of sea life there, and the new Trident drone will help them track location changes in the species they are seeing, helping reveal impacts from changes in sea temperature, level, and acidity.

Pelican Cove is part of a larger system of marine protected areas that cover 26 percentof U.S. waters and about 1 million square miles (2.85 million square kilometers) worldwide. "MPAs play an important role in ocean health, but it's expensive to monitor and protect these areas," Land says. "Citizen scientists have stepped up to help fill the gaps."

Safeguarding fish stocks in the Mexican Caribbean

"You can't protect what you don't understand," Lang says. "We've seen groups use the underwater drones to help educate fishing communities on the biology of the ecosystems they rely on."

The group COBI, which works to conserve marine areas in Mexico, is identifying spawning sites for grouper and snapper in the Caribbean to prevent overfishing. While local fishers are being trained to dive and monitor the sites, the group says on its project page the drone can be used "to document the deeper sites where we can't dive."

SCIENTISTS FLY A DRONE TO COLLECT WHALE SNOT

Saving an underwater world in British Columbia

Undersea gardens in Howe Sound, British Columbia, harbor an ancient ecosystem of glass sponges thought to have gone extinct long ago. "Full of rockfish, octopus, anemones, cod, sharks, and unimaginable wildlife, they're literally being torn apart by fishing and prawn trapping," writesNational Geographic Explorer Erika Bergman, who is leading an effort to study conditions at the reefs so they can be conserved.

Using drones and manned submarines, Bergman is surveying the reefs with a team of local divers and scientists. Her goal, she says, is to make the Salish Sea area that hosts the sponges a UNESCO World Heritage site, "because everyone should get to see this bizarre and beautiful place." (Read about a boom in glass sponge populations in Antarctica.)

Aiding "robomussels" in New England

"We've seen dozens of new maker-style science tools on OpenExplorer," Lang says, "but 'robomussels' are one of our favorites."

A team at Acadia National Park has its eyes on the Gulf of Maine to watch for effects of ocean acidification and warming. As part of this, they have placed temperature loggers inside live mussels to gauge what the creatures are experiencing below the surface.

Next, they will use the Trident to assist the effort and as an educational tool. "Allowing students to see what's underwater (and to help collect data), right off their coast, is a great way to excite them about the oceans, conservation, and science," says team leader John Cigliano, an ecologist and biology professor.

Unlocking the secrets of the Mediterranean

A team from the Swiss nonprofit Octopus Foundation is on a mission to chart unknowns below the Mediterranean, which the group says may harbor some 750,000 wrecks from antiquity on the seafloor. The group is advancing deeper knowledge about the region by telling stories about everything from seahorses in France to an ancient port city in modern Albania.

"They're using all the latest tools, from drones to photogrammetry to graphic novels, to tell engaging stories about the history of these places," says Lang. "It's impossible to read their stories and leave uninspired."