Mapping and Monitoring of Ecosystems at Scale with MCSAV

The diverse marine ecosystems of Sabah, Malaysia, part of the Coral Triangle, are at risk from tourism development and visitor pressures, unsustainable fishing methods, and impacts of climate change. The innovation is filling an information gap needed to improve the planning, management, and monitoring of coastal and marine ecosystems to reduce threats, restore biodiversity, and promote the blue economy, including in two marine parks.

DHI's teams in Malaysia and Denmark use remote sensing computer model to map and monitor Mangrove, Coral, and Submerged Aquatic Vegetation (MCSAV). The MCSAV is an interactive web platform that uses open-source satellite imagery from Copernicus Sentinel-2 and machine learning and a "Human in the Loop" framework to provide resource managers and local communities with a standalone tool that allows ecosystem features mapping to be accessible and stay relevant, and effectively monitor and manage these ecosystems. This platform was recently applied in high-latitude regions to map vegetation in shallow marine areas of the Swedish coast.

DHI partnered with two local NGOs already very active in the Semporna region, Reef Check Malaysia (RCM) and Stop Fish Bombing Malaysia (SFB-My), with RCM providing significant field support by conducting habitat surveys involving the local communities. These joint efforts are promoting an inclusive approach to sustainable marine resource management.

Innovative and transformational

DHI Malaysia addresses a critical aspect of managing marine tropical biotopes in Sabah, an MPA in Malaysia, by providing an enhanced understanding of the relevant scale of the distribution, condition, and rate of change of these biotopes using advanced mapping technology and a participatory approach to impart a sense of ownership to target users. This innovation gives marine managers access to cutting-edge technology while enhancing their and local stakeholders' capabilities in using such technologies.

MCSAV will support national authorities in making informed and critical decisions that can affect the nation and island's rich marine biodiversity and fisheries resources that are also significant to the health of the Coral Triangle marine ecoregion. The platform's rollout also allows young women and men to participate in the skills training and actual ground truthing surveys, empowering their role in the eco-tourism and recreational diving industry.

Key achievements so far

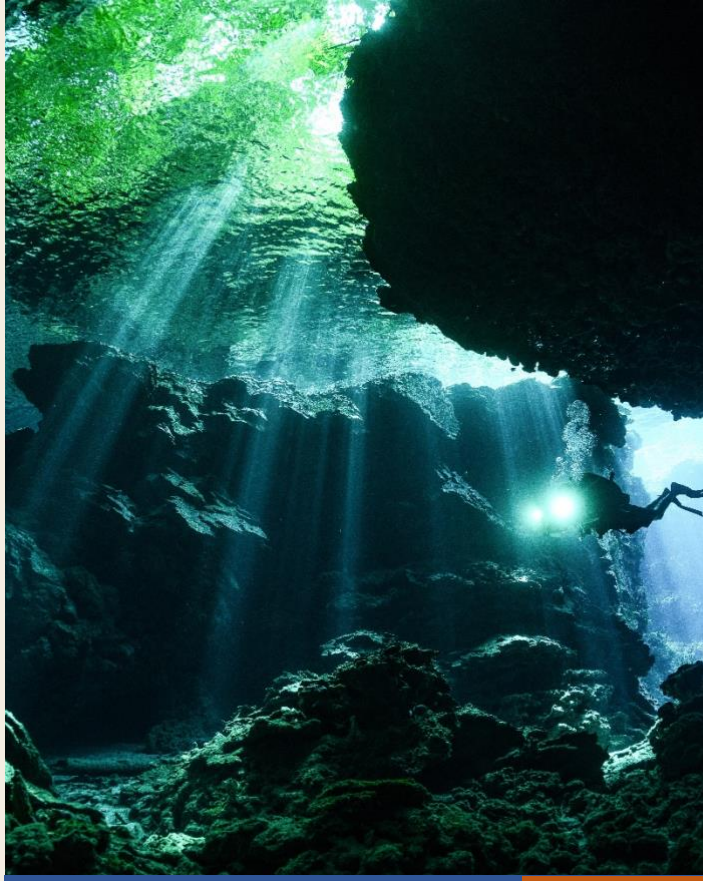
⇒ Developed the prototype of the MCSAV platform that covers the entire District of Semporna

⇒ Conducted stakeholder engagement workshop involving government agencies, NGOs, and academia.

⇒ Commenced the data collection for the improvement of the current MCSAV model.

Sustainability beyond OIC

Once the MCSAV is successfully established in Sabah MPA, the tool can be easily scaled to any other MPA location. DHI will provide a comprehensive protocol to guide new managers and users in setting up their MCSAV instance using EOatDHI, which specializes in satellite image and data processing for hydrology, water quality, environmental assessment, and land cover mapping. Additionally, there are possibilities to enhance the functionality of the tool, such as the ability to add orthophotos, model connectivity between identified biotopes, value natural capital, and evaluate key elements such as carbon sequestration rates, blue carbon stores, net protein production, and habitat restoration effectiveness. DHI aims to conduct a marketing campaign to present the full features and beneficial results of using MCSAV to promote the scaling up and replicating the use of the platform further.



Mapping and Monitoring of Ecosystems at Scale with Copernicus Sentinel- 2 Imagery - a tropical system application

DHI Malaysia

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OIC financing $240,978
Innovator co-financing $35,000
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