NUS lead senior engineer Koay Teong Beng (far right) and A*Star principal research engineer Whee Cheng demonstrating the technology used in the Marine Environment Sensing Network at St John's Island National Marine Laboratory on Oct 12. Under the five-year project, the buoys will be installed close to St John's Island, Chek Jawa Wetlands and Raffles Lighthouse. The first buoy will be installed off St John's Island in November. ST PHOTOS: GIN TAY

Sensors to help detect risks like toxic algal blooms in S'pore waters

Network to be deployed by 2025 will provide data on impact of climate change on local habitats

Gena Soh

Three buoys fitted with sensors will be deployed off Singapore's coast by 2025 to help with early detection of toxic algal blooms and coral bleaching, so measures can be taken promptly to protect Singapore's waters.

Called the Marine Environment Sensing Network (MESN), these buoys can deliver information about the seawater in the Singapore Strait, including on nutrient levels, temperature and salinity.

Dr Jani Tanzil, deputy director of the St John's Island National Marine Laboratory, said the network will allow scientists to detect changes in water quality – for instance, algal blooms that can form in just a matter of days and severely deplete oxygen levels, quickly killing aquatic creatures like fish.

Trends in sea warming and ocean acidification that can lead to loss of marine life in the long term can also be detected through changes in water quality, she added.

"This data would also allow us to contribute to regional and global data sets that monitor ocean health and strengthen science to address key issues facing the shared waters around us."

The MESN was unveiled on Saturday at the Marine Science R&D Open House on St John's Island. Deputy Prime Minister Heng Swee Keat was guest of honour at the event, which celebrated 20 years of marine science research.

Dr Serena Teo, facility director of the marine laboratory, which is under the National University of Singapore, said the lab has played a key role in establishing the Repub-

Corals in a tank at the St John's Island National Marine Laboratory. Besides the Marine Environment Sensing Network, other noteworthy past and present projects of the laboratory include studies on better understanding coral health and the discovery of new species of marine life.

lic as a "regional nexus" in marine science research and education.

The MESN, which is a collaboration between NUS, the Agency for Science, Technology and Research (A*Star), Nanyang Technological University and the Singapore University of Technology and Design, will also enhance existing capabilities in marine engineering, marine ecology and data technology.

Under the five-year project, the buoys will be installed close to St John's Island, Chek Jawa Wetlands and Raffles Lighthouse. The first buoy will be installed off St John's Island in November.

Besides the MESN, other noteworthy projects of the laboratory include studies on better understanding coral health and the discovery of new species of marine life – the latter taking place during the South Java deep sea biodiversity expedition in 2018, which was a collaboration between local and Indonesian researchers.

Associate Professor Rebecca Case from NTU's School of Biological Sciences said the MESN's sensors can help to identify when an algal bloom has formed based on the levels of chlorophyll in the water. Then, scientists could investigate the site to reveal if it is a toxic algal bloom or a bioluminescent one, she said.

More importantly, she added, the sensors will provide long-term data on the effects of climate change on local habitats.

Prof Case, who is also a researcher at the Singapore Centre for Environmental Life Sciences Engineering, said: "The three sensors will be able to identify local events, such as increased river flow from rainfall, or large-scale events such as an extended period of high temperature that can cause habitat-forming species such as corals, seagrass or mangroves to die."

The marine microbiologist added: "The MESN will also give Singapore access to local data on climate effects that occur over years, such as changes in ocean temperature and shifts in the timing of monsoons and their associated changes in the ocean."

Currently, Dr Tanzil said, the process of collecting research-grade data often involves scientists working in silos and through spot sampling – manual collections when the sampling site is visited only at certain times.

But this practice led to loss of data during the minor coral bleaching episode that occurred during the Covid-19 circuit breaker of 2020, when marine scientists were unable to collect data at sea.

Dr Tanzil said about the new buoys: "If there is another marine heatwave, scientists will be able to monitor changes in sea temperatures remotely and in real time, and measure its effects on marine life like corals."

The MESN will also allow the testing and addition of new sensors and technologies to address specific needs, she added.

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