Lingnan University 2025/2026 SDG Report
SDG 14 – LIFE BELOW WATER



28
Undergraduate Courses

120 Ocean Environmental Pioneers (OEPs) Reached

83
Projects/Grants

Lingnan University advances **SDG 14: Life Below Water** through research, education and community engagement focused on marine biodiversity conservation and the sustainable use of coastal ecosystems. Collaborating with government agencies, NGOs and international partners, the University combines ecological knowledge with nature-based approaches to support ecosystem protection and resilience. These efforts foster awareness and shared responsibility for safeguarding marine environments.

Bridging the Gap: An eDNA Approach to Ecological Assessment and Conservation of Scleractinian Corals

Led by Prof. Ip Chi Ho, Associate Professor (Presidential Early Career Scholar) of Lingnan University's Division of Science, this project supports SDG 14: Life Below Water through marine biodiversity monitoring and evidence-based coral conservation.

The project investigates how a streamlined environmental DNA (eDNA) method can be developed and applied to assess and conserve scleractinian (reef-building) coral communities in Hong Kong waters. Shallow-water coral reefs are biodiversity hotspots with high socio-economic value, yet climate change and anthropogenic activities have caused a global decline of over 50% in coral cover and associated marine life. Conventional monitoring relies heavily on time-consuming visual surveys that are impractical for rapid assessment across many sites. Few eDNA studies have targeted reef-building corals, primarily due to the lack of robust primers and standardized methods.

To address this gap, the project develops novel scleractinian-specific primers using an enhanced DNA reference database encompassing over 100 coral colonies. These are

validated through water sampling and visual surveys at Hoi Ha Wan Marine Park, known for hosting the best coral community in Hong Kong waters. The streamlined eDNA approach is then applied at 33 Reef Check sites across Hong Kong over two seasons, supporting systematic, large-scale ecological assessment.

The findings contribute to SDG 14 by demonstrating the application of eDNA for coral reef monitoring and revealing spatial and temporal variation in coral community composition. They inform evidence-based conservation measures and predictions of reef responses to climate change and anthropogenic disturbance, supporting the protection of marine ecosystems and climate-resilient conservation planning.

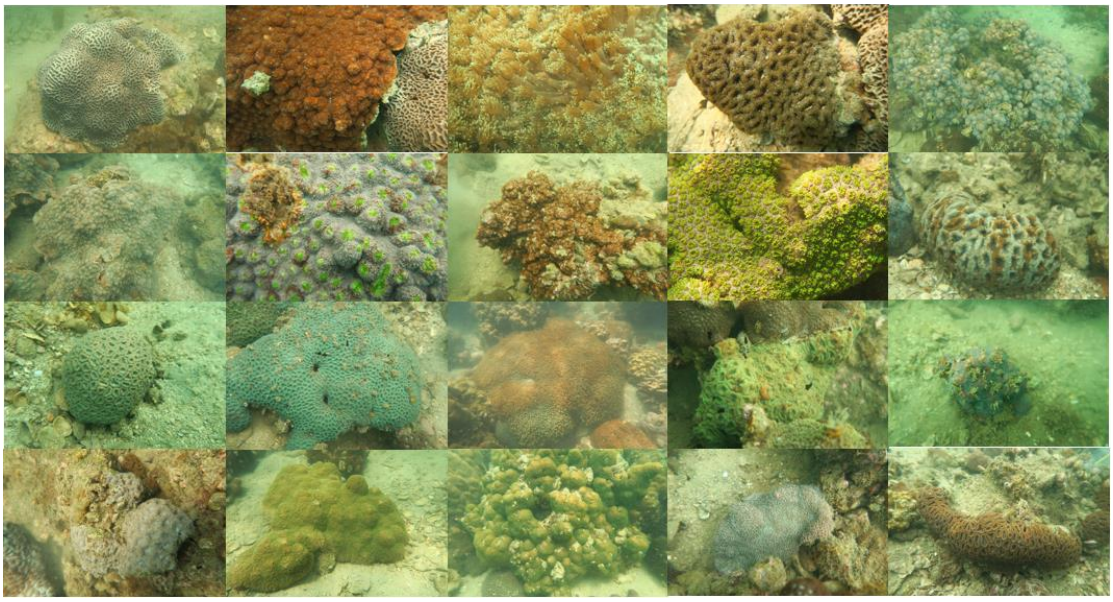


Figure 1. *In-situ* close-up photographs of scleractinian corals taken during field sampling.

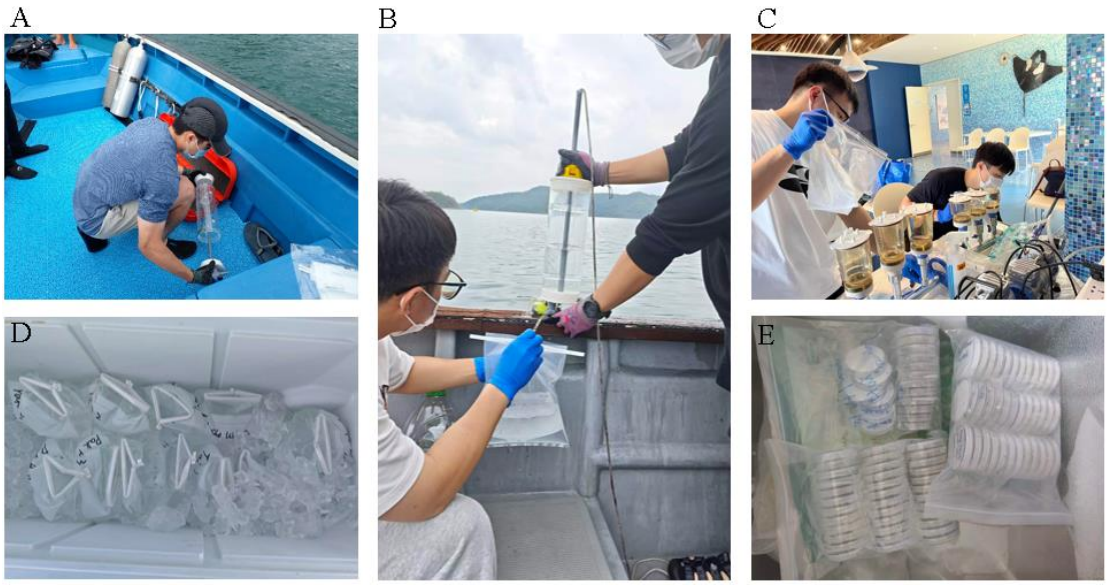


Figure 2. Water sampling and filtering after survey. **(A and B)** Research assistant using water sampler to collect seawater at field site. **(C and D)** The setup of water filtering system, which are soaked with 10% bleach solution and rinsed with Milli-Q water before using. All collected seawater were stored in ice box temporarily and transfer to lab to filtering seawater. **(E)** The

filtered membrane was storage at – 80 °C freezer.

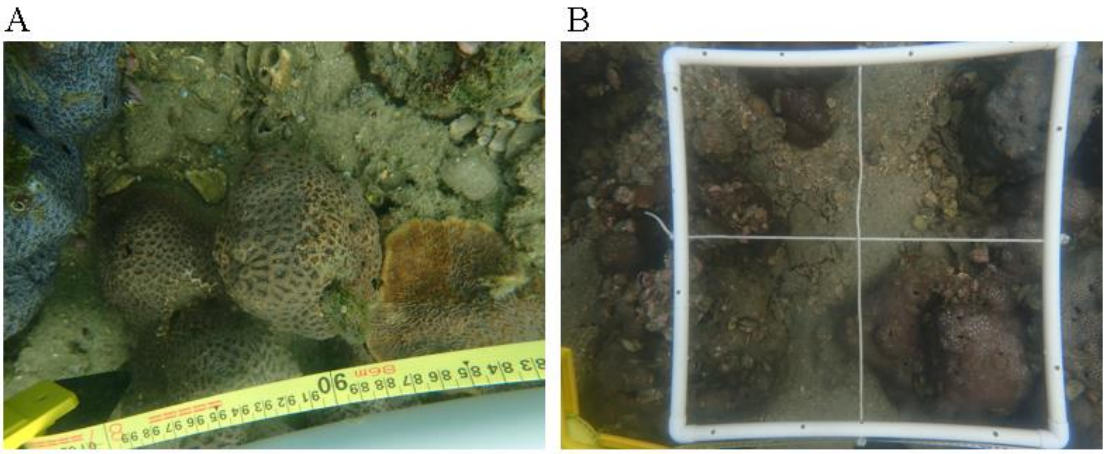


Figure 3. In-situ photographs showing coral communities obtained during UVC transect surveys. **(A)** A 100-m measuring tape deployed underwater. **(B)** corals captured within a 50 cm x 50 cm quadrat.

Restoring Freshwater Ecosystems Through the Reintroduction of Turtles

Led by Prof Anthony Lau, Assistant Professor of Lingnan University's Division of Science, this project advances aquatic biodiversity conservation and ecosystem restoration, complementing the broader conservation aims of SDG 14: Life Below Water.

Globally threatened species—such as Beale's Eyed Turtle (*Sacalia bealei*), Big-headed Turtle (*Platysternon megacephalum*), and Golden Coin Turtle (*Cuora trifasciata*)—rely on freshwater streams in Hong Kong, but poaching has dramatically reduced their populations. To support their recovery, the team is assessing habitat quality, poaching vulnerability, and turtle occurrence across several Hong Kong streams.

The research combines ecological field surveys, environmental DNA (eDNA) techniques, watershed modeling, and geospatial analyses to identify priority sites for future reintroduction of captive-bred turtles. It also evaluates food availability, water quality, stream structure, and accessibility to poachers, providing a science-based conservation framework to restore threatened turtle populations and strengthen the ecological resilience of freshwater ecosystems.

In 2026, the First International Conference on the Integrated Conservation of Asian Turtles was also organized, bringing together nearly 500 participants from 19 countries and regions. The conference strengthened international collaboration and knowledge exchange to support coordinated action on turtle conservation.





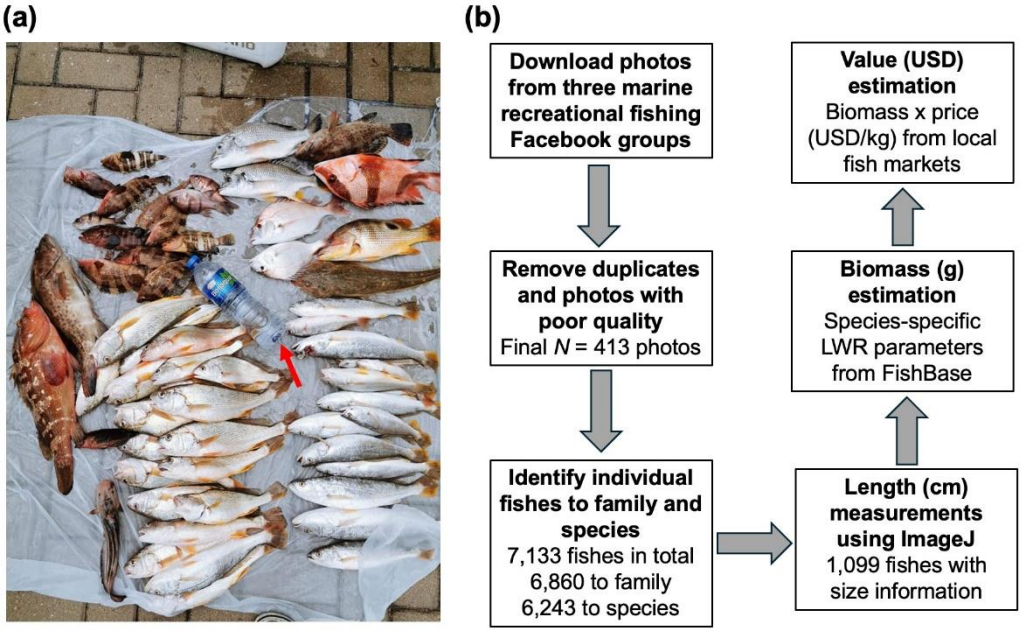
Quantifying the Impacts of Recreational Anglers

Led by Prof Anthony Lau, Assistant Professor of Lingnan University's Division of Science, this research supports SDG 14: Life Below Water through sustainable fisheries management and marine biodiversity conservation.

In a recent study of Hong Kong's recreational fishery, researchers used social media-derived data to document fish species and assess the scale, population size structure,

and monetary value of fish landed by recreational anglers. The study identified substantial fishing pressure on large predatory fishes—including groupers, snappers, and seabreams—and highlighted the need for improved fisheries management, monitoring, and conservation measures to protect marine ecosystems.

These findings demonstrate how innovative digital data sources can support evidence-based fisheries management, inform conservation priorities, and promote the sustainable use of marine resources.





Tiny Substances, Big Impacts: Investigating Microplastic Pollution in Hong Kong's Streams

Led by Prof. Tsang Hin Fat, Assistant Professor of Lingnan University's Division of Science, this project supports SDG 14: Life Below Water by investigating land-based pollution pathways and microplastic contamination in aquatic ecosystems.

The project examines the occurrence, seasonal dynamics, and faunal trophic uptake of microplastics in Hong Kong's lowland streams. While river systems serve as major conduits transporting plastic waste into coastal waters, empirical data on seasonal fluctuations and organismal ingestion in local freshwater habitats remain scarce.

By sampling lowland streams across wet and dry seasons, the study quantifies environmental microplastic concentrations and determines tissue contamination levels across different trophic positions, spanning primary consumers (*Baetis* mayflies), predatory insects (*Euphaea* damselflies), and freshwater fish (*Rhinogobius duospilus*). By correlating environmental microplastic levels with animal tissue burdens, the

research provides critical baseline data on how plastics infiltrate aquatic food webs and move through upstream systems toward marine environments. The findings can inform evidence-based pollution management and efforts to reduce land-based marine pollution, supporting the protection of freshwater and coastal ecosystems.

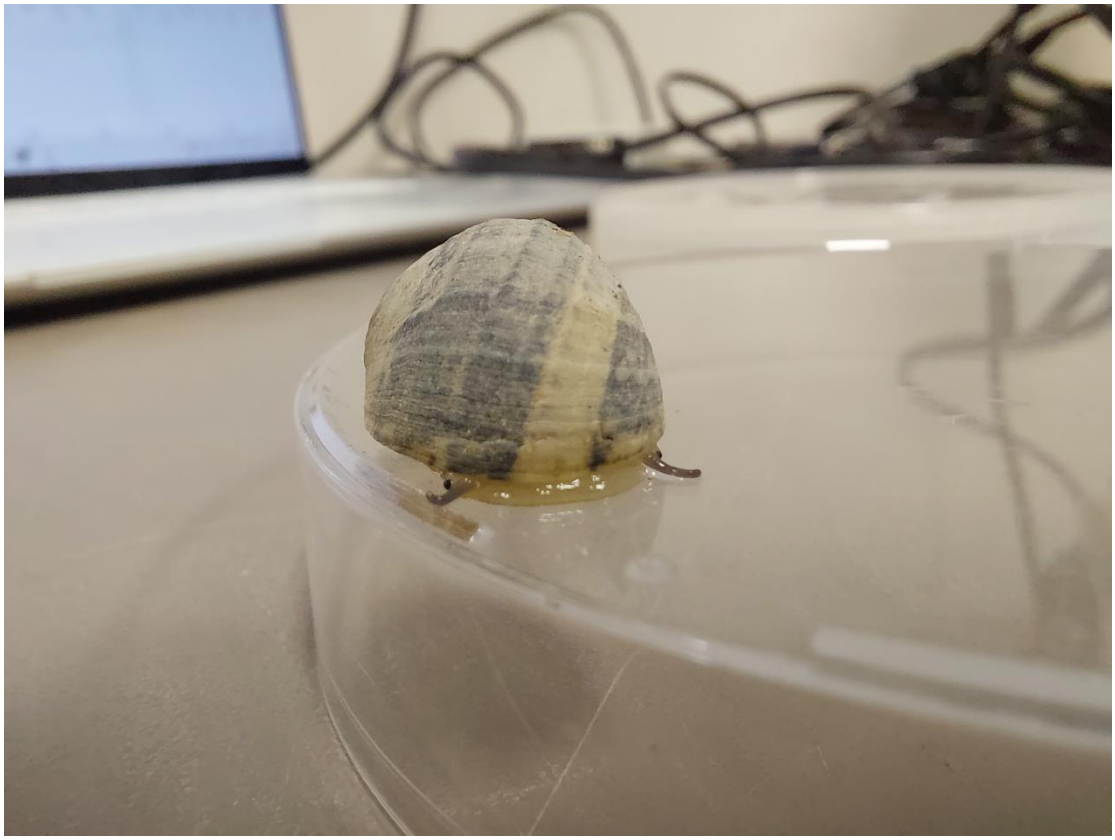
How Does Local Temperature Shape Thermal Tolerance? A Test Using Congeneric Snails on Tropical Rocky Shores

Led by Prof Tommy Hui, Assistant Professor of Lingnan University's Division of Science, this project supports SDG 14: Life Below Water by examining marine biodiversity vulnerability and thermal resilience under climate change.

The project investigates variation in thermal tolerance among and within closely related snail species that are key grazers on tropical rocky shores in Hong Kong and Singapore. Using habitat temperatures and individual heart rate as a proxy for performance, the study found that snail performance varied with habitat temperature in a complex way. Under moderate thermal stress, the snails exhibited higher tolerance to cope with hotter habitats. However, under severe thermal stress, they were unable to increase their tolerance further and therefore faced heightened thermal risk.

This limited thermal plasticity could be driven by impaired body functions, such as feeding, at high temperatures, constraining further increases in thermal tolerance. The findings highlight the vulnerability of tropical rocky shore fauna to ocean warming and the importance of considering local thermal regimes when assessing climate-related risks. They provide evidence to inform climate-sensitive marine conservation and coastal ecosystem management.





From Shell to Meadow: Is the Oyster *Saccostrea cucullata* Beneficial to the Seagrass *Halophila ovalis* on the Western Coast of Hong Kong?

Led by Prof. Tommy Hui, Assistant Professor of Lingnan University's Division of Science, this study supports SDG 14: Life Below Water through research on seagrass restoration, species interactions, and coastal ecosystem conservation.

The study investigates whether the rock oyster *Saccostrea cucullata* facilitates the growth of the seagrass *Halophila ovalis* on soft-sediment shores. Through water filtration and biodeposition, oysters are expected to facilitate photosynthesis and enhance nutrient availability in benthic environments. The team conducted a manipulative experiment, varying oyster densities within seagrass patches to test whether more oysters would result in faster seagrass growth.

The findings showed that oysters altered the local species pool by providing hard substrate surfaces for snails and crabs. These associated species may, in turn, regulate seagrass growth by consuming epibionts living on seagrass surfaces, highlighting the importance of ecological interactions and habitat complexity.

The study reveals how interactions between seagrass and bivalves depend on the behaviour of associated species. It also clarifies the mechanisms through which oysters may influence the seagrass restoration programme currently underway on Hong Kong's western coast, informing evidence-based restoration and sustainable coastal habitat management.





