

# INOS

## INOS-UMT Charts New Milestone in Ocean Exploration with OceanX Mission Malaysia



### Where Business Meets Biodiversity: PUNB's Partnership for Sea Turtle Conservation

Perbadanan Usahawan Nasional Berhad (PUNB), a government-linked organisation renowned for its work in developing Bumiputera entrepreneurs through innovative financing, training, and mentorship.



### Geohazard Seminar & Webinar Series 2025: Adaptation, Mitigation and Community Role

INOS, UMT in collaboration with PLANMalaysia, successfully organised the 2025 Coastal Geohazard Webinar Series from February to April 2025.



### Coming to the RESCuE: A Journey in Mangrove Conservation

Earlier this year, Nur Hannah binti Abd Rahim, a postgraduate student from INOS, UMT, had the opportunity to represent Malaysia at the RESCuE Workshop in Tharandt, Germany.

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# From the Editor's Desk

INOS Newsletter Editorial Team

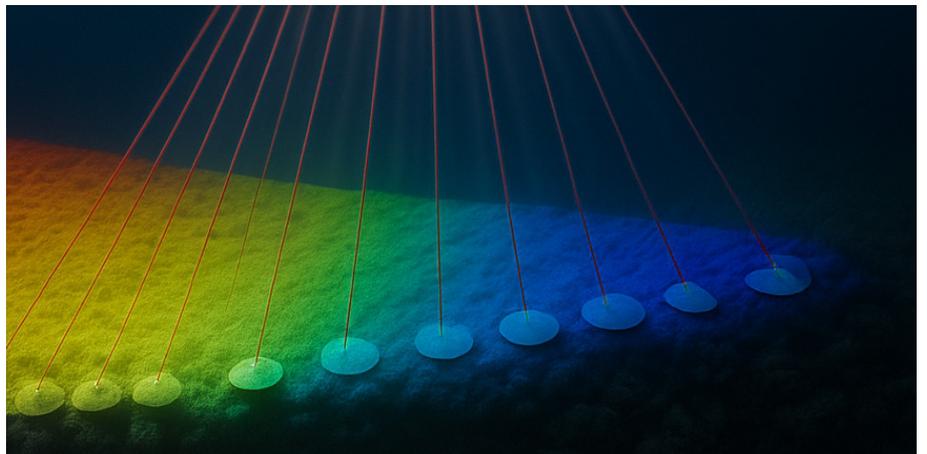
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Welcome to the 2025 edition of the INOS Newsletter. This year highlights our continued commitment to excellence through four key pillars: corporate achievements, impactful research, community engagement, and vibrant student activities. INOS has strengthened institutional collaborations, advanced marine and oceanographic research addressing regional and global challenges, and actively reached out to the community through outreach and knowledge-sharing programs. Our students have also showcased their talents and leadership in academic, scientific, and cultural initiatives, reflecting the dynamic spirit of INOS. We hope this issue provides readers with a glimpse of our progress and aspirations as we continue nurturing a healthy ocean for future generations.

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## Preserving Marine Life Through Meaningful Action: Kumpulan Hartanah Selangor Berhad's Corporate Social Responsibility (CSR) Collaboration with SEATRU and UMT



Written by: **Mahizun Saidin (Kumpulan Hartanah Selangor Berhad)**

In line with our commitment to environmental sustainability and community engagement, Kumpulan Hartanah Selangor Berhad (KHSB) proudly collaborated with the Sea Turtle Research Unit (SEATRU) of Universiti Malaysia Terengganu (UMT) in a two-day Corporate Social Responsibility (CSR) initiative focusing on marine conservation.

Held from 27 to 28 June 2025, the programme, led by KHSB's Chief Operating Officer, Mr. Edi Zuhri bin Abd Rahim, has brought together KHSB staff and their families, offering them a hands-on opportunity to contribute to the preservation of endangered sea turtles. This initiative not only supported conservation efforts but also served as an enriching and educational experience for all participants.

### Day One: Releasing Hope in the Ocean

The first day of the programme was centred around the symbolic activity of releasing turtle hatchlings into the open sea. This event marked a significant moment for all participants, as we witnessed the fragile yet inspiring journey of young sea turtles beginning their lives in the wild. The emotional impact of watching the turtles embark on the beginning of their life journey was particularly meaningful for the children in attendance, planting the seeds of environmental awareness and stewardship from a young age.

### Day Two: Learning from Nature at Chagar Hutang Turtle Sanctuary, Pulau Redang

The second day of our CSR activity was dedicated to hands-on learning and community engagement at Chagar Hutang Turtle Sanctuary on Redang Island. Known as one of Malaysia's most important turtle nesting sites, the sanctuary is operated by SEATRU as a protected zone for turtle



KHSB staff and families were guided by the sanctuary tour guide. They were lucky to be given the rare chance to witness turtle nesting sites and learn about the process of egg incubation. The session, led by SEATRU experts and local volunteers, emphasised the importance of protecting nesting beaches and minimising human interference, especially during the critical nesting season.

As part of the day's highlight, KHSB also took part in SEATRU's "Adopt-a-Turtle" programme by adopting three sea turtles. These included one green turtle, named Moana, and two hawksbill turtles, named Nila and Nalu. The green turtle is listed as endangered, while the hawksbill is critically endangered, making this adoption an important contribution toward species conservation. These adoptions not only support SEATRU's ongoing research and care initiatives but also help increase public awareness about the plight of these marine animals.

In further support of the sanctuary, KHSB donated a balaisaf, a multipurpose hall space. This newly built space is intended to benefit both visitors and volunteers, functioning as a rest area, educational zone, and prayer room. The balaisaf is a practical and lasting contribution that will support the day-to-day operations at Chagar Hutang Turtle Sanctuary. It is our hope that this small but meaningful addition will help support the sanctuary's long-term goals and make a positive impact on future conservation activities.

KHSB's CSR initiative with SEATRU and UMT was driven by a core objective: to promote environmental responsibility while creating meaningful engagement opportunities for employees and the wider community. As a state-linked property development and investment company, KHSB recognises the importance of integrating sustainability into our corporate culture, and it is our duty to protect the ecosystems that sustain life.

According to a KHSB representative, "Our collaboration with SEATRU and UMT marks more than a standalone event—it reflects KHSB's long-term commitment to sustainability and corporate responsibility. We are proud to support the important work being done at Chagar Hutang Turtle Sanctuary and inspired by the dedication of the researchers and volunteers who safeguard our marine heritage."

As Moana, Nila, and Nalu swim freely into the ocean, they symbolise the future we hope to protect. Through meaningful initiatives like this, KHSB strengthens its dedication not only as a key driver in delivering affordable housing in Selangor but also as a responsible corporate citizen devoted to safeguarding our natural environment for the well-being of future generations.



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## Where Business Meets Biodiversity:

### PUNB's Partnership for Sea Turtle Conservation

Written by: **Faizah Aplop (INOS)**

#### From Boardroom to Beach

Perbadanan Usahawan Nasional Berhad (PUNB), a government-linked organisation renowned for its work in developing Bumiputera entrepreneurs through innovative financing, training, and mentorship. However, its commitment extends beyond business, as it is also extending its leadership to environmental stewardship and community well-being through its corporate social responsibility (CSR) initiatives. In a significant step toward environmental conservation, PUNB recently participated in a sea turtle volunteer programme at Chagar Hutang Turtle Sanctuary (CHTS), Pulau Redang, from the 2nd to the 5th of July 2025. They mobilised 35 employees, including top leadership, for this four-day sea turtle conservation programme there. This initiative saw active participation from CEO Mr. Izwan Zainuddin, General Manager of Operations Mr. Fauzi Zakaria, and Head of Marketing & Communications Mr. Ahmad Nazlee Idris, who joined frontline conservation efforts alongside staff. Beyond volunteerism, PUNB also reinforced its sustainability commitment through sponsorship of critical upgrades to the sanctuary's eco-campsite. This leadership-led initiative underscores PUNB's holistic approach to corporate responsibility, where environmental action begins at the highest levels of the organisation.



#### Hands-on Conservation: Volunteer Efforts at Chagar Hutang

For four days, the dedicated PUNB team went beyond their corporate roles to actively participate in vital conservation efforts at the Chagar Hutang Turtle Sanctuary. Under the guidance of SEATRU young marine biologists, they participated directly in nest monitoring and habitat preservation activities. They spent their nights on the beach, conducting meticulous night patrols to monitor nesting turtles. This hands-on work was crucial for SEATRU's research, as data is collected diligently on nesting patterns, and information is analysed, which then contributes to a deeper understanding of the local turtle population.



The PUNB team's involvement and commitment extended to giving the next generation of turtles a fighting chance. To protect eggs from predators and high tides, they performed careful egg relocations to a safer, more secure hatchery. Their efforts also included comprehensive beach clean-ups, where they removed plastic debris and other harmful waste, ensuring a pristine and safe environment for both nesting mothers and their future hatchlings. Contributing a total of 2,800 volunteer hours, their work supports PUNB's dedication to the United Nations Sustainable Development Goals, specifically SDG 12: Responsible Consumption and Production, and SDG 13: Climate Action.

### **Sponsoring a sustainable future: Upgrading the Eco-Campsite**

Demonstrating a tangible commitment to environmental stewardship, PUNB has donated RM15,000 to enhance SEATRU's research capabilities at CHTS. This strategic funding directly supports the upgrade of critical campsite facilities, improving living conditions for researchers and volunteers engaged in year-round conservation work. The upgraded facilities offer more comfortable accommodations for 20 participants at the same time, including raised sleeping platforms and secure barriers that provide protection against flooding from heavy downpours and help deter dangerous crawling creatures. Beyond financial support, this initiative represents PUNB's philosophy of purposeful corporate citizenship. For PUNB participants, the programme transcended a typical CSR activity. It became a transformative experience that deepened environmental awareness, strengthened team purpose, and fostered genuine emotional connection to marine conservation.



### **Marine Conservation Knowledge Sharing**

On the last day of the volunteer programme, Assoc. Prof. Dr. Mohd Uzair bin Rusli, Head of the Field Research Laboratory and renowned expert in animal physiology and turtle conservation, conducted an immersive educational session for PUNB's team at CHTS's outdoor classroom. The workshop provided critical insights into marine ecosystem dynamics and the pressing challenges in sea turtle conservation efforts. Dr. Mohd Uzair shared firsthand knowledge about the operational hurdles faced by SEATRU, including manpower shortages for volunteer programmes, financial constraints limiting conservation capabilities, and emerging threats to marine biodiversity. This eye-opening session equipped PUNB participants with a deeper understanding of the sanctuary's conservation needs, reinforcing the importance of their corporate support and volunteer involvement in protecting these endangered species.

### **Commitment to Sustainability: The PUNB way**

PUNB empowers Bumiputera entrepreneurs through financing and development, driving Malaysia's economic growth. Beyond the boardroom, the organisation's commitment extends to the beaches of Chagar Hutang Turtle Sanctuary. By funding eco-campsite upgrades and having employees volunteer with SEATRU's scientific conservation efforts, PUNB seamlessly aligns business excellence with environmental responsibility. This demonstrates that true leadership creates lasting value for both the economy and ecosystems, proving that corporate success and sustainability can work in harmony.

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# Exploration and Ecological Insights into Offshore Coral Reef of Sarawak

Written by: **Mohd Safuan Che Din (INOS)**

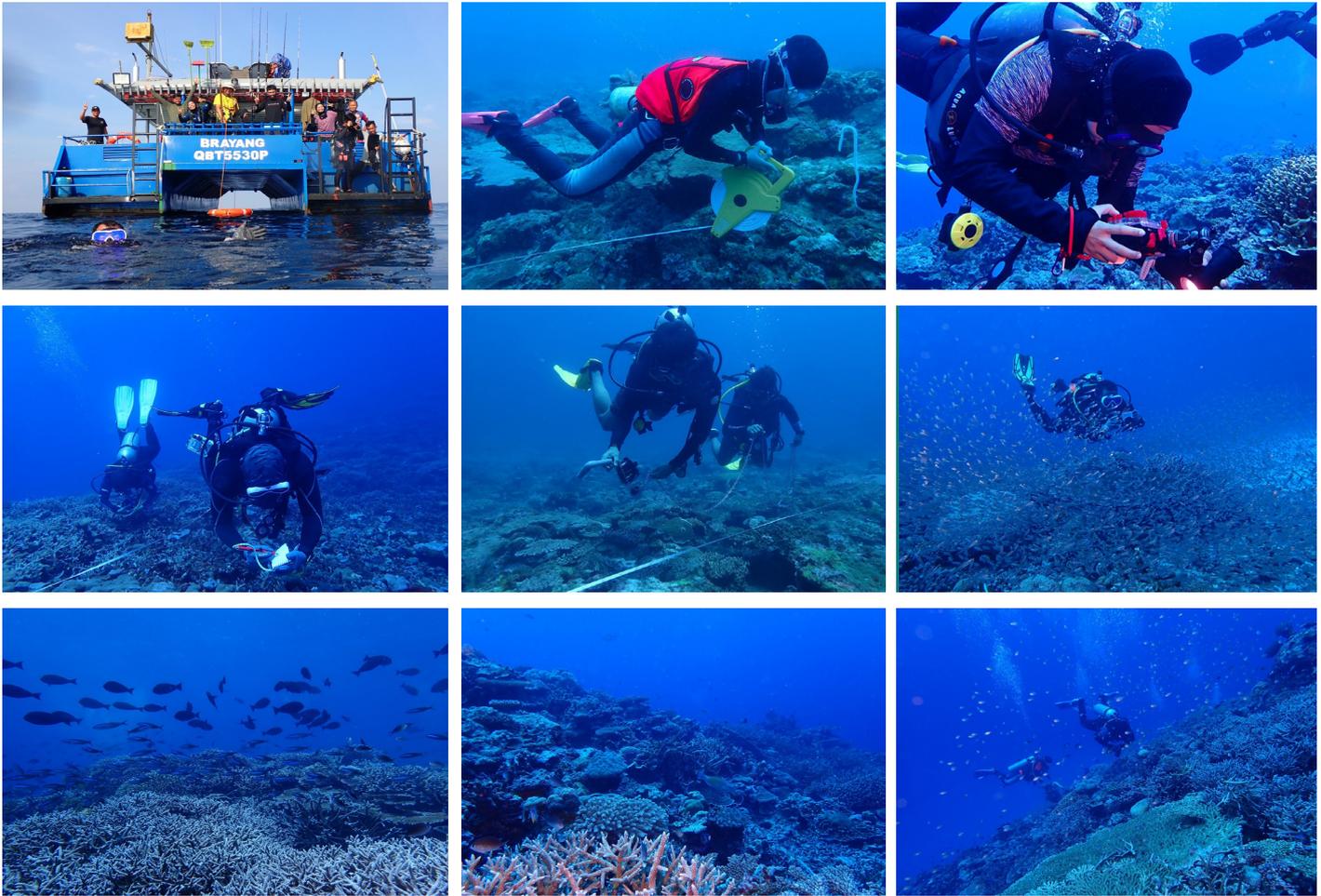
Luconia Shoals National Park (LSNP) is the largest marine protected area (MPA) in Malaysia, encompassing over 1 million hectares (1,011,772 ha) of ocean space in Sarawak waters. Officially gazetted in 2018 by the Sarawak State Government, this expansive offshore area lies approximately 200 km from the Sarawak coastline, representing one of the most remote and least disturbed marine habitats in the country.

The park is ecologically and geologically complex, consisting of a series of submerged reefs and shoals, which are grouped into two major reef clusters: Gugusan Beting Raja Jarum in the north and Gugusan Beting Patinggi Ali in the south. Notable reefs within these clusters include Terumbu Lang Ngindang (Heyes Reef), Terumbu Litong (Tripp Reef), and Beting Rentap (Friendship Shoal) in the north, as well as Terumbu Sahap (Stigant Reef), Terumbu Balingian (Richmond Reef), and Beting Merpati (Comus Shoal) in the south. This division reflects not only the park's scale but also the diversity of its reef habitats.

Though the Luconia Shoal region is widely associated with oil and gas activities, it is equally remarkable for its exceptional marine biodiversity. The park harbours extensive coral reef ecosystems that span from shallow reef flats (10 - 20 m) to Mesophotic Coral Ecosystems (MCEs) at depths exceeding 30 metres. These mesophotic zones are dominated by reef-building hard corals, which slowly deposit calcium carbonate, giving rise to massive seamount-like reef structures that support an incredibly diverse and productive marine ecosystem. Several coral species and reef-associated fish that are rare or absent in nearshore waters have been recorded in LSNP, emphasising its ecological uniqueness.

In addition to its ecological significance, LSNP plays an important role in fisheries productivity, acting as a nursery and habitat for a variety of commercially important species such as giant trevally, groupers, snappers, and dog-tooth tuna. The presence of such species not only supports biodiversity but also enhances the potential value of sustainable fisheries in offshore Sarawak waters.





The Sarawak Forestry Corporation (SFC), a statutory body under the Sarawak Government, is entrusted with the management of LSNP. As part of its conservation commitment, SFC has launched several initiatives aimed at improving the ecological understanding and management of the park. In July 2025, under the framework of the Ecological Fiscal Transfer (EFT) project, SFC initiated a comprehensive coral reef survey to support the development of a Species Conservation Action Plan (SCAP) for LSNP.

To carry out this work, SFC collaborated with researchers from the Institute of Oceanography and Environment (INOS) at Universiti Malaysia Terengganu (UMT). The research team, led by Assoc. Prof. Dr. Tan Chun Hong and Dr. Mohd Safuan Che Din, was supported by 11 research assistants and worked alongside five SFC officers. Over the course of 16 days (10–25 July 2025), the team conducted SCUBA-based field surveys, targeting benthic reef components, reef fishes, macroinvertebrates, and other reef-associated organisms. Coral specimens were also collected for species-level identification using DNA analysis, which contributes to a growing genetic library of Malaysia's coral fauna.

Given the park's isolation, a Live-On-Board (LOB) diving vessel was used to access various sites across LSNP. The voyage to the northernmost reef took over 16 hours, highlighting the logistical challenges of working in such remote areas. Yet, the remoteness of LSNP has also allowed it to remain relatively pristine and undisturbed by coastal development or mass tourism, making it a natural laboratory for marine research.

In conclusion, Luconia Shoals National Park represents a cornerstone of Malaysia's marine conservation efforts. Its immense size, habitat complexity, and biological richness make it an invaluable asset for scientific research, biodiversity protection, and sustainable fisheries. The collaborative efforts between SFC and academic institutions such as UMT underscore the importance of multi-stakeholder partnerships in safeguarding Malaysia's marine heritage for future generations.

## UMT and Aquaria KLCC Strengthen National Coral Reef Restoration with Phase 3 Launch of Guardian of the Reefs Campaign



Coral Adoption Program kickstart by Aquaria KLCC by adopting 150 Reef Packages to support coral research, restoration, and conservation efforts at Pulau Bidong, value of RM52,500.



Visit to the newly launched Coral Walk Exhibition at Aquaria KLCC, joined by VIP guests and media representatives.

Written by: **Tan Chun Hong (INOS / FSSM)**

Universiti Malaysia Terengganu (UMT), in partnership with Aquaria KLCC, has launched Phase 3 of the Guardian of the Reefs campaign, a national initiative focused on restoring and protecting Malaysia's coral reef ecosystems. This latest phase introduces a new Coral Adoption Program designed to scale up reef rehabilitation through structured community and corporate participation.

The launch ceremony, held at Aquaria KLCC, was officiated by Dato' Simon Foong, Chairman of Aquaria KLCC; Dato' Haji Azahari bin Haji Othman, Deputy Director General (Development) of the Department of Fisheries Malaysia; and Professor Ir. Ts. Dr. Mohd Zamri bin Ibrahim, Vice Chancellor of UMT. As part of the event, guests witnessed a live coral fragging demonstration, which illustrated the practical scientific methods being applied in reef restoration efforts.

The coral fragging session, led by marine researchers from UMT's Faculty of Science and Marine Environment, highlighted the laboratory-to-fieldwork link critical to reef conservation. Coral fragments, or nubbins, are grown under controlled conditions and later outplanted onto degraded reefs, where they are monitored for survival and growth. This hands-on, evidence-based approach reflects UMT's long-term commitment to scaling up reef rehabilitation using sound marine science and technology.

Building on the achievements of previous campaign phases, the new Coral Adoption Program enables the public and corporations to directly support coral restoration at sites such as Pulau Bidong. This location, a long-standing field station for UMT's marine research, served as the main restoration site during Phase 2 in 2024, where over 1,000 coral nubbins were successfully planted through an RM200,000 collaboration with Aquaria KLCC.

Phase 3 aims to restore an additional 3,000 coral nubbins and expand the coral garden to 2,000 square metres by 2027. This expansion is backed by community and industry support through tiered adoption packages, which include updates on restoration progress, educational materials, and involvement in field activities. During the launch, Aquaria KLCC presented a symbolic cheque worth RM52,500, representing the adoption of 150 coral packages sponsored by staff and visitors. Members of the public and organisations interested in contributing to the restoration of Malaysia's coral reefs can now participate through the Coral Adoption Program at:

<https://catalog.billplz.com/UMT/payment-form/coral-conservation>

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The Coral Adoption Program also serves as a platform for expanding UMT’s research-based interventions. Ongoing monitoring of coral survival rates, growth patterns, and habitat biodiversity allows researchers to refine best practices in coral handling, transplantation techniques, and long-term maintenance. These data contribute to national and regional knowledge on reef resilience, especially amid increasing stressors from warming seas, pollution, and coastal development.

Coral reefs in Malaysia support diverse marine life and coastal communities, yet they are increasingly under threat. The Guardian of the Reefs initiative reflects a growing awareness that marine restoration cannot be achieved by researchers alone. By connecting scientific efforts with public and private sector support, the programme creates a stronger, more inclusive foundation for coral reef recovery.

UMT remain committed to expanding these efforts through partnerships, outreach, and applied marine science. With the successful launch of Phase 3, the path forward is clear: combining research excellence with broad-based engagement offers the most promising route to securing the future of Malaysia’s reefs.

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A diver securing a metal pole into the rubble substrate at Pulau Bidong to rehabilitate areas with dead and broken coral fragments.



A diver attaching a coral plug to the metal pole structure as part of the reef restoration work at Pulau Bidong.



Acropora corals are attached to the One-For-All structure

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# INOS-UMT Charts New Milestone in Ocean Exploration

## with OceanX Mission Malaysia

Written by: **Maizah Mohd Abdullah (INOS / FSSM)**

INOS-UMT has achieved a significant milestone in national marine research with the participation of scientists from INOS-UMT in OceanX Mission Malaysia. In this prestigious mission, UMT researchers are led by an INOS researcher representing the country in one of the world's most advanced oceanographic expeditions.

Partnering with OceanX, a globally renowned organisation that integrates state-of-the-art technology, cutting-edge research, and world-class media for science communication, the mission brought Malaysia into the forefront of global ocean exploration.

Operating from the highly sophisticated OceanXplorer vessel, the mission focused on various objectives, including elucidating the seascapes' dynamics for shallow and mesophotic coral reefs. Mesophotic reef areas, located at depths greater than 30 metres, are often challenging to access due to their depth and the specialised equipment required for exploration. These reefs exist in the "twilight zone" of the ocean, where light levels are low, making traditional diving methods impractical. Benthic mesophotic zones are relatively understudied despite their ecological significance, necessitating innovative approaches to explore and document their biodiversity whereby cutting-edge technologies provide access to these remote and inaccessible habitats. In this mission, exploration of the mesophotic reefs was made possible using the ROV, and the mission has successfully discovered new sites of mesophotic reefs.

Additionally, the mission also determined the coral health status after the massive coral bleaching event at Pulau Tioman Marine Park using the ReefCloud application, a tool assisted by an AI program. During the mission, training was conducted by the team from New York University (Abu Dhabi) on the methodology and data analysis. The AI-based ReefCloud programme aids coral reef research and conservation by automating the analysis of vast amounts of reef imagery, making it faster and more accurate to monitor reef health and biodiversity.

Meanwhile, the intricate relationship between the physical oceanography studies and biological responses is central to understanding the ecological dynamics and productivity of Pahang coastal waters. Identifying small-scale isotopic variability in Pahang coastal waters promises to serve as a vital baseline for recording isoscapes within Pahang waters, which serves as valuable data in elucidating larger-scale animal migration patterns, foraging ecology, and habitat utilisation in future studies. On top of that, the establishment of sites made accessible using the OceanXplorer provides baseline data and establishes priority sites for long-term monitoring stations for seawater carbonate chemistry (ocean acidification).

During mission, researchers from the marine endangered species (MES) program also managed to conduct a dedicated aerial survey on the occurrence of marine megafauna, and discovered a healthy population of Indo-Pacific bottlenose dolphins within the coasts.

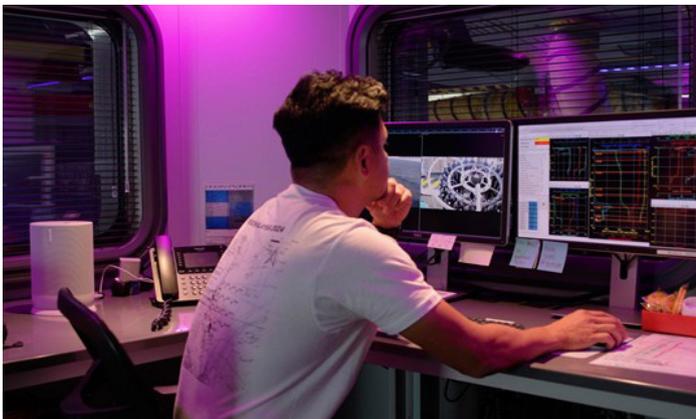


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Overall, this mission not only addresses a significant scientific gap, but is also a stepping stone towards sustainable coastal resource management and conservation efforts in Malaysia. Most importantly, the whole mission is a capacity-development programme for sea exploration with advanced technology for the national scientists who participated in the mission. To understand the relationship between oceanographic conditions and primary productivity in Pahang waters, which can help in predicting changes in marine ecosystem health.

It allows researchers to track changes in coral cover, species composition, and signs of degradation in real time, providing critical data for timely conservation interventions and adaptive management strategies, especially in the face of climate change and human impacts. Mission Malaysia 2024 overall is a capacity-building initiative to enhance ocean exploration and advance cutting-edge technologies in marine research.

This achievement not only elevates Malaysia's standing in the global marine science community but also underscores INOS and UMT's leadership in pioneering research and driving innovation for the sustainable exploration of our oceans.



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# Exploring the Hidden Beauty Beneath Pulau Perhentian

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Written by: **Azizi Ali (INOS)**

## 5 Days of Habitat Mapping Adventure

From clear blue skies to calm turquoise waters, our recent 5-day trip to Pulau Perhentian was not just for work – it was an experience to remember! Our mission? To explore and map the amazing underwater habitats around this island paradise, using scientific tools that help us "see" what's under the sea.

Each day started early with laughter and coffee, and by 8 a.m. we were already out on the boat, cruising over the gentle waves. Our team used special equipment like a multibeam system and GPS to map the seafloor, capturing images of coral reefs, sandy patches, rocky areas, and more.

### Day 1: Gears On, Let's Go!

We kicked off our mission by setting up all the high-tech equipment onboard—computers, sonar screens, and survey software. With coffee in hand and the sea breeze in our hair, we began scanning the seafloor, watching live sonar images appear on our monitors. It was like watching a treasure map being drawn in real time!

#### □ **Our Floating Lab: Terminal 53 on Duty**

Meet Terminal 53—our bold, colourful, and trusty vessel that carried us through five days of sea adventures around Pulau Perhentian. More than just a boat, it became our floating lab, office, kitchen, and rest stop all rolled into one.

From sunrise surveys to sunset reflections, Terminal 53 never failed to keep us steady and safe while we mapped the marine habitat. She turned heads wherever she went—and for good reason!



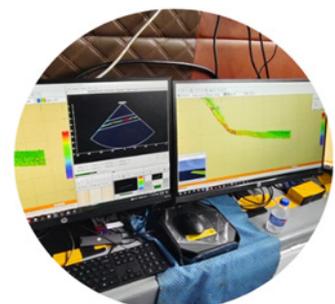
#### □ **Morning Calm Before the Mapping Begins**

There's something special about sipping a hot cup of coffee while watching the ocean roll by. Every morning on our 5-day trip began with this peaceful ritual—standing at the side of the boat, mug in hand, feeling the breeze and soaking in the calm before the workday kicked off.

It wasn't just coffee—it was a quiet moment to reflect, laugh with teammates, and get ready for another day of adventure beneath the waves. Science may be serious, but a little serenity (and caffeine!) goes a long way.

### Day 2: Calm Seas, Clear Data

Inside our boat's mini control room, this setup became the heart of our habitat mapping operations. Three bright monitors displayed live sonar data as we cruised around Pulau Perhentian. What looks like colourful patterns and graphs is actually the shape of the seafloor beneath us—



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Each green and orange patch tells us whether the bottom is sandy, rocky, or reef-covered. It's like painting an underwater landscape without ever diving in!

From here, we could monitor our coverage, guide the boat, and ensure no area was missed. It may look high-tech (and it is!), but it was all about teamwork, focus, and curiosity.

### DAY 3: ROPE, READINGS & ROTI!

Things got a bit rocky with stronger waves, but our crew was unfazed. We collected oceanographic readings using CTD sensors while enjoying freshly packed nasi goreng and fried chicken. Fieldwork fuel at its best!

Lunch with a View: Fuelling the Science Nothing beats a good plate of nasi goreng after hours under the sun—especially when served right on the deck with the sea as our dining hall. Meals were full of smiles, stories, and shared laughter that kept our spirits high.



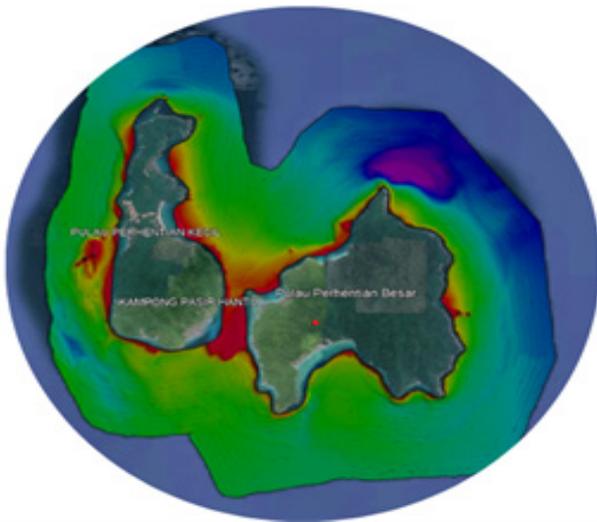
### DAY 4: MAPPING & MAGIC MOMENTS

We surveyed near the rocky shores and captured detailed multibeam bathymetry. As the day ended, nature gave us a stunning sunset that silenced everyone—a perfect reminder of why we do what we do. What Lies Beneath: Mapping the Seafloor Around Pulau Perhentian.

This striking map shows the underwater terrain around Pulau Perhentian Kecil and Pulau Perhentian Besar. The colours represent depth—ranging from shallow coral reefs in red and yellow, to deeper waters in blue and purple.

Using multibeam sonar technology, our team collected thousands of data points to build this detailed image of the seabed. It helps us identify habitat types, reef boundaries, and suitable areas for marine protection and research.

From the vibrant shallows near Kampung Pasir Hantu to the deeper trenches offshore, every colour tells a story of the marine environment beneath the surface.



### Golden Farewell: A Sunset to Remember

As our final day at sea came to a close, nature gifted us with this breathtaking sunset off the coast of Pulau Perhentian. The golden hues reflected over calm waters served as the perfect ending to five fulfilling days of mapping the hidden wonders beneath the waves. It wasn't just a view—it was a quiet reminder of the beauty we're working to protect.



## Turning Conservation into Community Impact

Written by: **Mohd Uzair Rusli (INOS)**

Nearly two decades ago, I first arrived at the Chagar Hutang Turtle Research Station on Redang Island as a university student. I never imagined it would become such an enduring part of my life. Today, I am not only a researcher but also an educator, a manager, and a custodian of a long-standing mission for sea turtle conservation.

What began as a scientific initiative to monitor turtle nesting has since evolved into a comprehensive conservation movement. The Sea Turtle Research Unit (SEATRU) of Universiti Malaysia Terengganu (UMT) now operates with a focus on three core pillars: (i) scientific research, (ii) conservation, and (iii) public education.

In the early years of our conservation efforts at Chagar Hutang, SEATRU took bold steps by purchasing turtle eggs from licensed collectors and egg gatherers to ensure they could be safely incubated. At the time, this may have seemed like a small act, but it ultimately proved to be a vital measure that helped save thousands of hatchlings.

A significant turning point came in 1996, when the Sea Turtle Volunteer Program was launched at Chagar Hutang. This initiative opened the door for members of the public, especially university students and nature enthusiasts, to work alongside researchers at the station. Since then, more than 5,000 individuals have joined the programme, and they continue to play a vital role in sustaining its operations.

The true measure of success in sea turtle conservation projects should not lie solely in the number of eggs incubated but in the tangible benefits returned to the community. Conservation should be inclusive, and its impact should be shared broadly and equitably. This principle is why many countries have ended the commercial sale of turtle eggs, recognising that such practices often benefit only a small group and are ultimately unsustainable.

Following the 2021 amendment to the Terengganu Turtle Enactment, which bans the commercial sale of turtle eggs, there is a pressing need to establish an alternative and sustainable economic model. In response, the "Terengganu Turtle Tourism" campaign was jointly launched with the Terengganu State Government on June 16, 2023. This campaign brings together conservation stakeholders and strategic partners with a shared goal to support tourism operators in developing sustainable, turtle-based ecotourism products.

We may still carry the trauma of uncontrolled tourism in Rantau Abang during the 1980s and 90s, but shutting down the entire sector due to past mismanagement is not a solution. Avoidance cannot be the answer.

We firmly believe that with proactive stewardship from the Terengganu State Government, particularly through the Department of Fisheries, and through collaboration with strategic partners, conservation efforts can deliver broader and more impactful benefits to local communities.

Nature-based tourism inherently carries risk. However, with stronger participation from stakeholders and the advancement of scientific knowledge, Malaysia is now better positioned to explore the opportunities within the blue economy responsibly.

Terengganu, for instance, is home to about 52 active turtle nesting beaches. Empowering strategic partners on the ground could reduce the burden on government agencies. With proper regulation and monitoring, it is feasible to reopen turtle-watching activities, such as observing nesting and hatchling releases, under sustainable tourism models.

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Imagine the economic spillover for coastal communities if more nesting beaches were accessible to the public. The 244 km stretch of shoreline from Kemaman to Besut could become a vital economic corridor.

Another emerging product is snorkelling with turtles, which has seen rapid popularity. Every weekend, tourists flock to the Redang Island Marine Park to swim with turtles. The question, however, remains: can this product be sustained? Are our current practices aligned with the best standards for marine wildlife tourism?

At SEATRU, Universiti Malaysia Terengganu has initiated research into the potential health impacts of such interactions on turtles. However, these studies are still in their infancy and require greater support. To accelerate scientific inquiry, increased funding is essential.

There have been concerning reports in the media and on social platforms about unsustainable practices. Some operators have been seen forcibly bringing turtles to the surface for photo opportunities. Others go so far as to place clownfish into bottles just to entertain tourists.

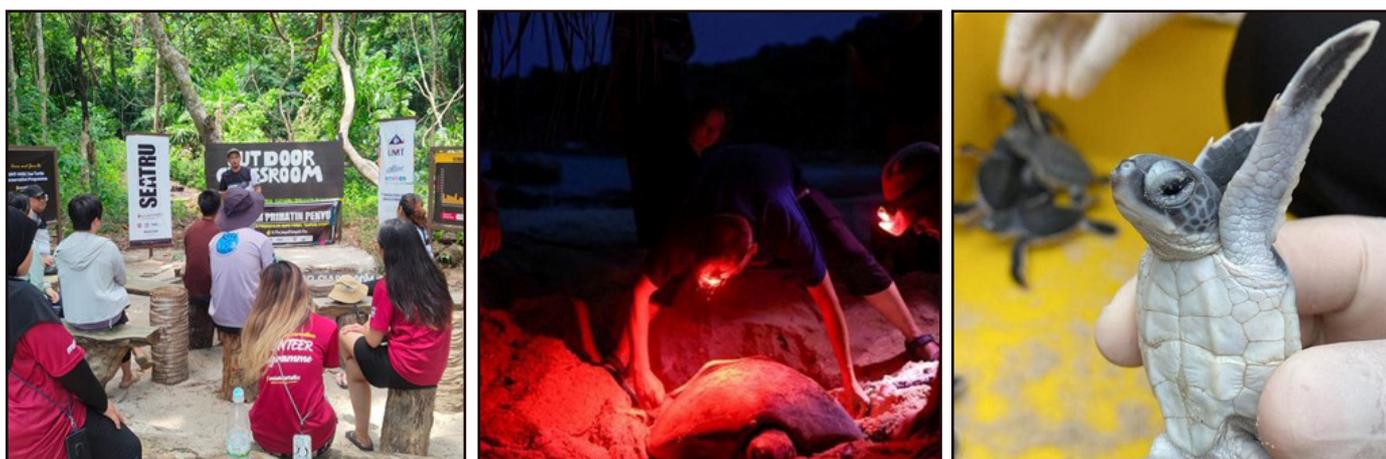
This raises critical questions: Are service providers in our marine parks properly educated and trained? What controls are in place to govern their operations? These are high-risk tourism products not only for the safety of tourists but also for the well-being of our marine wildlife. What would happen to local operators if we banned these activities entirely? A win-win approach is needed.

UMT has hosted several dialogue sessions with boat operators, but their demanding schedules often limit participation. In response, we introduced the concept of the “outdoor classroom”, a designated open-air education space at Chagar Hutang where marine conservation learning can take place more comfortably. By bringing tourists to the Chagar Hutang Turtle Sanctuary, we believe tour operators can also be indirectly educated through experiential learning.

In terms of protecting turtles in the water, spatial studies are being conducted to map turtle movement and boat traffic routes. These data will support management decisions grounded in Marine Spatial Planning (MSP), a strategy that balances ecological sustainability with economic needs.

To date, much of our turtle conservation effort has focused on terrestrial protection. Land-based studies have largely informed policies and management decisions. Yet over 99% of a sea turtle’s life is spent in the ocean. We need greater support to expand research into marine habitats. For example, where do turtles go to feed after nesting? Seagrass meadows are crucial to their survival. Moreover, sea turtles are migratory and traverse international waters. Are they safe along these journeys?

A further challenge is addressing fundamental public questions: Why should they care about sea turtle conservation? What relevance does saving turtles have to someone in Kuala Lumpur? What would happen if sea turtles disappeared from our oceans?



These are key hurdles in marine conservation education. Ocean literacy remains low among the general public. Many do not realise that turtles are vital to balancing marine food webs.

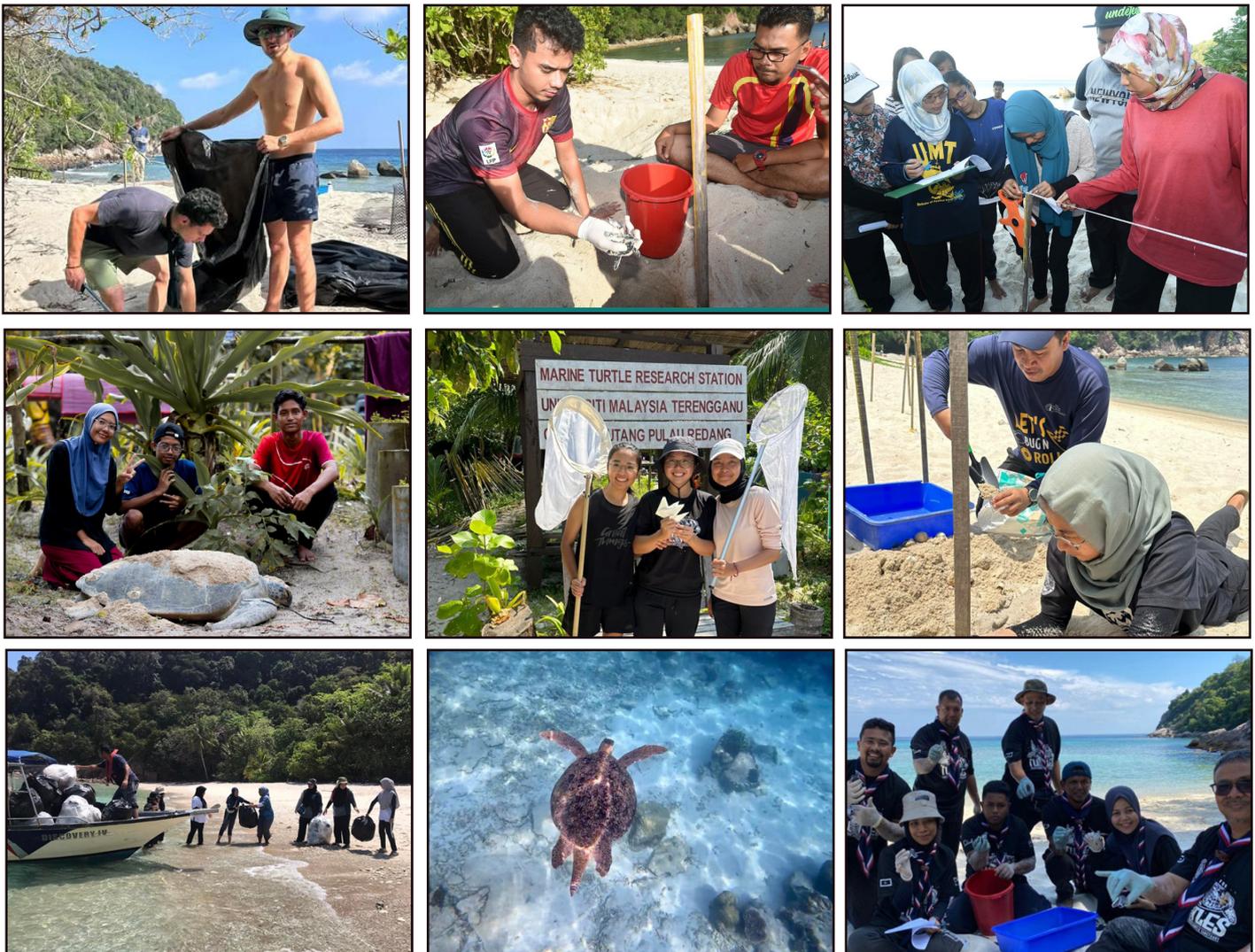
Green turtles, for instance, graze on seagrass, keeping meadows healthy and providing habitat for juvenile fish. Leatherback turtles feed primarily on jellyfish, playing a natural role in controlling jellyfish blooms that could otherwise threaten fish eggs. In short, without sea turtles, fish stocks may decline.

Saving turtles is not merely about attracting tourists. It is about securing food security, preserving biodiversity, and ensuring the resilience of marine ecosystems. Conservation is about giving back to communities.

In conjunction with World Sea Turtle Day (June 16), I urge fellow conservationists, researchers, students, and the public not to see turtles merely as endangered animals but as a symbol of our relationship with the ocean and a mirror of how we value the ecosystems that sustain life on Earth.

The Chagar Hutang Turtle Research Station is more than just a beach where turtles nest. It is a living classroom, where we all learn the value of passion, patience, and care for the natural world. As the third generation of SEATRU, we recognise that our mission is not just to continue a legacy but to expand its impact and inspire those who will follow in our footsteps.

**\*Assoc. Prof. Dr. Mohd Uzair Rusli is a turtle expert actively involved in marine wildlife conservation efforts and currently serves as the lead researcher of the Sea Turtle Research Unit (SEATRU) at Universiti Malaysia Terengganu (UMT).**



# Geohazard Seminar & Webinar Series 2025: Adaptation, Mitigation and Community Role

Written by: **Effi Helmy Ariffin (INOS)**

The Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT), in collaboration with PLANMalaysia, successfully organised the 2025 Coastal Geohazard Webinar Series from February to April 2025. The series culminated in the Coastal Geohazard Seminar: Adaptation and Mitigation of Coastal Erosion and Climate Change Impacts, held on 30 June 2025 at Auditorium Mahyudin, UMT.

This initiative was prompted by the worsening coastal erosion affecting Kuala Nerus, Terengganu, earlier in the year. The main objectives were to mainstream geohazard management, raise public awareness and preparedness, encourage community participation through Community-Based Disaster Risk Management (CBDRM), and develop a Special Action Plan (Pelan Tindakan Khas, PTK) for coastal erosion risk reduction.



## Webinar Series 1: Phenomena and Risk Management (10 February 2025, 273 participants)

The first webinar highlighted the current scenario of coastal erosion on the East Coast, its natural and human-induced causes, and its implications. The session emphasised the role of the Integrated Shoreline Management Plan (ISMP), various mitigation measures (both structural and non-structural), and the implementation of coastal protection projects by the Department of Irrigation and Drainage (JPS).

**Jemputan WEBINAR SIRI 1**  
FENOMENA DAN PENGURUSAN RISIKO BENCANA HAKISAN PANTAI

Pautan Atas Talian : <https://meet.google.com/vcw-aedx-spd>  
Tarikh : 10 Februari 2025 (Isnin)  
Masa : 9:30 pagi - 1:00 tengahari

9:30 pagi Pendaftaran Peserta Webinar  
10:00 pagi Ucapan Moderator Webinar  
Oleh: YBrs. TPr Dr. Dzul Khaimi bin Khalilani, Ketua Taskforce Pengurusan Risiko Bencana, PLANMalaysia

10:10 pagi **KERTAS 1 : SENARIO BENCANA HAKISAN PANTAI TIMUR SEMENANJUNG MALAYSIA**  
Oleh: Puan Azah Azura Binti Ali Amran, Ketua Penolong Pengarah Bahagian Pengurusan Zon Pantai, JPS

10:50 pagi **KERTAS 2 : PERANAN METMALAYSIA CUACA BURUK**  
Oleh: Puan Nur Izzati Zaharah binti Mohamed Azam, Pegawai Meteorologi Malaysia (METS)

11:30 pagi **KERTAS 3 : KESEDARAN KOMUNITI DALAM MENGHADAPI BENCANA**  
Oleh: Encik Mohd Faizal bin Abd Hamid, Sektor Pembangunan dan Sosial, Agensi Pengurusan Bencana Negara (NADMA)

12:10 tgh/hari Soal Jawab dan Perbincangan  
12:50 tgh/hari Rumusan dan Penutup  
1:00 tgh/hari Penangguhan Webinar

Sila Imbas QR Code Untuk Membuat Pengesahan Kehadiran

## Webinar Series 2: Climate Change Challenges & Community Roles (24 February 2025, 456 participants)

The second webinar focused on hybrid solutions for coastal mitigation, combining engineering approaches with nature-based methods such as mangrove planting, artificial reefs, and hybrid breakwaters. The Malaysian Fire & Rescue Department (BOMBA) shared insights on risks of water activities in coastal recreation areas, while the Public Works Department (JKR) Terengganu discussed the challenges of road and slope maintenance due to coastal erosion. The session stressed the need for multi-agency collaboration and community adaptation to climate change impacts.

**Jemputan WEBINAR SIRI 2**  
CABARAN PERUBAHAN IKLIM DAN PERANAN KOMUNITI PANTAI TERHADAP BENCANA HAKISAN PANTAI

Pautan Atas Talian : <https://meet.google.com/gck-rgmn-pgz>  
Tarikh : 24 Februari 2025 (Isnin)  
Masa : 2:00 petang - 5:00 petang

1:30 tgh/hari Pendaftaran Peserta Webinar  
2:00 petang Ucapan Moderator Webinar  
Oleh: Prof. Dr. Wan Izzatul Kama Wan Talaat, Ketua Pusat Tadbir Urus Lautan Institut Oseanografi & Sekitaran, UMT

2:10 petang **KERTAS 1 : USAHA ALTERNATIF MENGGUNAKAN SOLUSI TEKNOLOGI HIBRID SEBAGAI KAEDAH MITIGASI HAKISAN PANTAI**  
Oleh: YBrs. Dr. Effi Helmy bin Ariffin, Timbalan Pengarah Institut Oseanografi & Sekitaran (INOS), UMT

2:50 petang **KERTAS 2 : RISIKO AKTIVITI AIR DI LOKASI REKREASI PANTAI**  
Oleh: YBrs. TPJB Nordin bin Pauzi, Pengarah Bahagian Operasi Kebombaan dan Penyelamat

3:30 petang **KERTAS 3 : CABARAN PENYELENGGARAAN ASET JALAN DAN CERUN AKIBAT PERUBAHAN IKLIM DAN BENCANA HAKISAN PANTAI**  
Oleh: Ir. Nurulhayati bte Md Yusoff, Jurutera Awam, Jabatan Kerja Raya Negeri Terengganu

4:10 petang Soal Jawab dan Perbincangan  
4:50 petang Rumusan dan Penutup  
5:00 petang Penangguhan Webinar

Sila Imbas QR Code Untuk Membuat Pengesahan Kehadiran

**Jemputan WEBINAR SIRI 3**  
**MITIGASI GEOBENCANA HAKISAN PANTAI**

Pautan Atas Talian : <https://meet.google.com/gjm-tjdn-axu>  
 Tarikh : 10 Mac 2025 (Isnin)  
 Masa : 10:00 pagi - 1:00 tengahari

9:30 pagi Pendaftaran Peserta Webinar  
 10:00 pagi Ucapan Moderator Webinar  
 Oleh: Puan Norhasnita binti Hj. Abd Samad  
 Setiausaha Task Force Pengurusan Risiko  
 Bencana, Jabatan Perancangan Bandar  
 dan Desa (PLANMalaysia)

10:10 pagi **KERTAS 1: RANCANGAN FIZIKAL ZON  
 PERSISIRAN PANTAI NEGARA KEDUA**  
 Oleh: Puan Sanisah binti Shafie  
 Pengarah  
 Bahagian Perancangan Wilayah,  
 Jabatan Perancangan Bandar dan Desa  
 (PLANMalaysia)

10:50 pagi **KERTAS 2: MENONCKAH ARUS:  
 MEMASYARAKATKAN DATA, RAMALAN  
 DAN TEKNOLOGI BAGI KESELAMATAN  
 PESISIR PANTAI**  
 Oleh: YBhg. Prof. Ts. Dr. Mohd Fadzil Mohd Akhir  
 Pro Naib Canselor  
 (Strategi, Prestasi dan Korporat),  
 Universiti Malaysia Terengganu

11:30 pagi **KERTAS 3: PEMANTAUAN PROJEK  
 PEMBANGUNAN DI KAWASAN PANTAI**  
 Oleh: Puan Hasra Masriyah binti Wan Jusoh @ Ab Rahim  
 Ketua Penolong Pengarah  
 Bahagian Pembangunan  
 Jabatan Alam Sekitar Negeri Terengganu

12:10 tgh/hari Soal Jawab dan Perbincangan  
 12:50 tgh/hari Rumusan dan Penutup  
 1:00 tgh/hari Tamat

 Sila Imbas QR Code Untuk Membuat



### Webinar Series 3: Coastal Geohazard Mitigation (10 March 2025, 756 participants)

The third webinar presented the Second National Coastal Physical Plan (RFZPPN-2) by PLANMalaysia, including the Coastal Vulnerability Index (CVI) that identifies highly vulnerable coastal areas.

UMT introduced the Malaysia Marine Forecast (MFAST) system – a real-time ocean forecasting tool developed under the UN Ocean Decade Programme – as an innovation to enhance disaster preparedness. The system is now being commercialised through UMT’s start-up ecosystem.

The Department of Environment (DOE) highlighted the importance of Environmental Impact Assessments (EIA) and strict monitoring of coastal developments in erosion-prone areas.

### Coastal Geohazard Seminar 2025: Culminating Event

The final seminar gathered experts, government agencies, NGOs, industry, and coastal communities to discuss adaptation and mitigation strategies for coastal erosion and climate change. A forum and townhall session allowed local communities to share experiences and propose practical solutions.

The seminar was officiated by UMT Vice Chancellor, Prof. Ts. Dr. Mohd Zamri Ibrahim, who emphasised UMT’s role as a centre of excellence in marine and coastal sciences. Meanwhile, General Director of PLANMalaysia, Dato’ Alias Rameli, delivered the keynote address, showing the importance of marine spatial planning in Malaysia’s sustainable development agenda.

In conclusion, the Coastal Geo Webinar Series and Seminar 2025 demonstrated strategic collaboration by combining academic expertise, government policies, and community engagement for addressing the pressing issues of coastal erosion and climate change. INOS-UMT remains committed to leading research, innovation, and policy advocacy in coastal disaster risk reduction, aligned with the Second National Coastal Physical Plan (RFZPPN-2) and Malaysia’s sustainable development goals.



# Gotong-Royong and Tree Planting at Kampung Tanjung Gelam (Terengganu, Malaysia): Community Spirit Towards Coastal Sustainability

Written by: **Effi Helmy Ariffin (INOS)**



On 29 June 2025, the Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT), in collaboration with PLANMalaysia and Geng Plastik Ija (GPI), successfully organised a Gotong-Royong and Coastal Tree Planting Programme at Pantai Tanjung Gelam, Kuala Nerus, Terengganu (Malaysia). The initiative was part of the Kampung Angkat MADANI (KAM) Project, an effort to empower local communities through environmental conservation and sustainable practices.

The programme carried a clear purpose: to preserve the coastline of Tanjung Gelam while instilling a deeper sense of responsibility among the community towards the environment. Coastal conservation is a pressing issue in Malaysia, particularly with the growing threat of erosion. By introducing activities such as tree planting and beach cleaning, the programme not only addressed immediate environmental challenges but also created opportunities for public awareness and education.

The day began with the gathering of more than 130 participants, comprising villagers, university students, representatives from government agencies, and non-governmental organisations. Together, they embarked on beach cleaning activities, successfully collecting around 140 kilograms of waste ranging from plastics and driftwood to other debris. This collective effort highlighted both the scale of pollution affecting the coastline and the strong sense of cooperation needed to tackle it. At the same time, the planting of 66 coastal trees, including species such as Rhu, Ketapang, and Legundi, provided a practical step towards creating natural barriers against erosion. These trees, carefully selected for their ecological function and adaptability, are expected to play a long-term role in reducing wave impact, stabilising the coastline, and enhancing the natural beauty of the area.

Beyond physical activities, the programme also emphasised knowledge sharing and community engagement. Educational booths and exhibitions were set up, offering participants insights into the ecological importance of coastal vegetation. A particularly unique highlight was the demonstration of Legundi leaves as an ingredient for the traditional kuih ondeh-ondeh, showing how coastal plants hold not only environmental but also cultural and economic value. These creative engagements reinforced the idea that conservation efforts can be both practical and meaningful when linked to daily life.





The event was further strengthened by the presence of distinguished guests, including Datuk TPr Dr. Alias bin Rameli, Director General of PLANMalaysia, and Professor Dr. Zainudin bin Bachok, Director of INOS, alongside representatives from the Department of Irrigation and Drainage (JPS), the Terengganu Forestry Department, Majlis Bandaraya Kuala Terengganu (MBKT), and the Kuala Nerus District Office. Their participation reflected the strong institutional support behind the programme and highlighted the importance of multi-stakeholder collaboration in addressing environmental challenges.

The success of the Gotong-Royong and Tree Planting Programme at Kampung Tanjung Gelam demonstrates the effectiveness of community-driven action in environmental conservation. It showcased how collaboration between universities, government agencies, NGOs, and local villagers can lead to tangible improvements in coastal resilience. More importantly, it reflected the spirit of unity and cooperation that is central to the MADANI framework, where people, knowledge, and action converge to produce lasting benefits.

Looking ahead, INOS hopes to see similar programmes extended to other coastal areas, thereby multiplying their impact. By blending scientific knowledge with community participation, initiatives like these not only address environmental issues but also foster stronger, more resilient communities. The event stands as a testament to INOS's ongoing commitment to nature-based solutions in coastal management and reaffirms UMT's role as a national leader in oceanographic and environmental research.

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# Hear the Ocean's Voice: Respect, Protect, Restore

WOW kembali lagi...! Institut Oseanografi dan Sekitaran (INOS), Universiti Malaysia Terengganu (UMT), menganjurkan program tahunan yang dinanti-nantikan, iaitu World Ocean Week 2025 (WOW 2025), sempena sambutan World Ocean Day yang diraikan pada 8 Jun setiap tahun di seluruh dunia. Bertemakan

“Hear the Ocean's Voice: Respect, Protect, Restore”, sambutan World Ocean Week 2025 (WOW 2025) menjadi manifestasi tanda sokongan UMT setiap tahun terhadap usaha kempen ‘World Oceans Day’ (WOD) UNESCO yang disambut seluruh dunia pada 8 Jun setiap tahun. Sambutan WOW berperanan untuk menyampaikan dan memberi kesedaran global ke peringkat lokal dan komuniti setempat berkaitan kepentingan menjaga kebersihan sumber laut.

INOS selaku sekretariat penganjuran sambutan WOW 2025 mengadakan Karnival WOW 2025 yang menjadi program utama dalam sambutan WOW. Karnival WOW 2025 telah diadakan pada 28 Jun 2025 (Sabtu) bertempat di Kampus UMT dan kawasan sekitar kampus. Karnival WOW 2025 dilaksanakan dengan meriah dengan pelbagai aktiviti yang melibatkan komuniti pelbagai peringkat, antaranya Run with Penyu 5.0, Pertandingan Mewarna Kanak-kanak, Pemeriksaan Kesihatan & Pemeriksaan Gigi, Karnival Sukan, Young Conservationist Poster Video Presentation dan Sailing Towards a Sustainable Future.

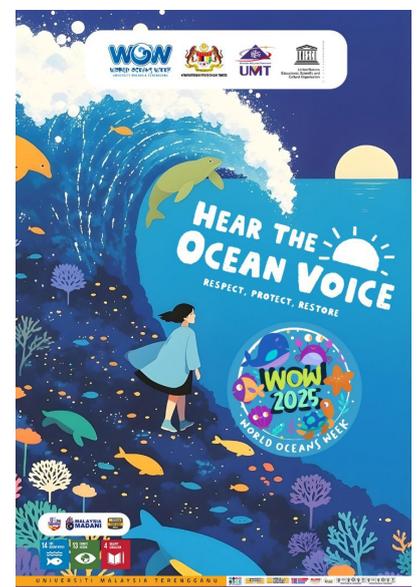
Acara Run with Penyu 5.0 telah menerima penyertaan lebih 3000 peserta terdiri daripada pelajar-pelajar sekolah, pelajar-pelajar IPT, ibu bapa dan komuniti sekitar yang turut memeriahkan Karnival WOW 2025. Pelbagai kuiz dan temu bual berkonsepkan kesedaran dalam menjaga lautan turut diselitkan sebagai satu platform penyampaian maklumat kepada orang ramai.

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Bagi acara Beach Clean Up (BCU), aktiviti pembersihan pantai telah diadakan di Pantai Teluk Ketapang dengan penyertaan melebihi jangkakan di mana 400 orang terdiri daripada pelajar-pelajar sekolah, ibu bapa, guru-guru dan komuniti sekitar. Sampah seberat lebih dari 300 kg yang terdiri dari plastik dan pelbagai sampah sarap telah berjaya dikutip dalam acara BCU yang diadakan. Semua peserta BCU, terutamanya pelajar-pelajar sekolah, rata-rata memberikan respons positif kepada usaha-usaha menjaga kebersihan pantai.

Melalui aktiviti-aktiviti yang dilaksanakan, UMT menyampaikan mesej kepada masyarakat tentang kepentingan menjaga, memelihara dan menghargai sumber laut kepada kehidupan seharian. Usaha-usaha ini secara tidak langsung mempromosikan bidang NIC UMT, iaitu ilmu kelautan dan sumber akuatik, serta meletakkan UMT sebagai universiti peneraju dalam bidang kelautan. WOW 2025 juga merupakan salah satu tanggung jawab sosial UMT untuk sama-sama meningkatkan kesedaran mencintai alam sekitar marin di kalangan komuniti setempat dalam menjaga kepentingan sumber lautan.

“Sama-sama kita dengarkan suara lautan”.



## Glorious Semester of TROPIMUNDO at the UMT

Written by: **Behara Satyanarayana (INOS)**

The UMT has been receiving several international students of the Erasmus Mundus joint master's degree in Tropical Biodiversity and Ecosystems (TROPIMUNDO) programme, every year for Semester 2 in Malaysia (since 2015). This six-month semester is always a rewarding experience for both students and faculty. While the excitement of the students lies with the opportunities to explore different marine and terrestrial ecosystems in one of the most megadiverse nations of the world, a first-time experience for many, the lecturers are eager to share their valuable knowledge through the classes and fieldwork. Meanwhile, the local UMT students are also enthusiastic to participate in the TROPIMUNDO fieldwork to gain extra practical knowledge/skills and help each other. This is a win-win situation with higher academic recognition for the UMT in the picture of international networking. For this year of 2025, the Institute of Oceanography and Environment (INOS) has welcomed 16 students (from 8 countries), of which one-third students have chosen various research topics to collect data for their (MSc) thesis works. All students successfully completed their academic curriculum and secured superior grades. In this context, the unwavering support of the UMT, as a full partner of the TROPIMUNDO consortium, remains crucial for allowing this inbound mobility programme to continue running seamlessly.



TROPIMUNDO students' registration ceremony held at INOS on 13th of March 2025.



Mangrove Field School at the Matang Mangrove Forest Reserve (Perak) from 17th to 24th of April 2025.



Mangrove Field School at the Setiu Wetlands (Terengganu) on 27th of April 2025.



TROPIMUNDO students' farewell ceremony held at INOS on 17th of July 2025.



TROPIMUNDO students' farewell ceremony held at INOS on 17th of July 2025.

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# Coming to the RESCuE:

## A Journey in Mangrove Conservation

Written by: **Nur Hannah Abd Rahim (INOS)**

Earlier this year, Nur Hannah binti Abd Rahim, a postgraduate student from the Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT), had the opportunity to represent Malaysia at the RESCuE Workshop in Tharandt, Germany. The workshop, titled Monitoring and REStoration for Sustainable Coastal Ecosystems (RESCuE), brought together international researchers and scientists committed to the protection and restoration of mangrove ecosystems, particularly in the ASEAN region.

Hannah described the experience as surreal, especially as discussions on tropical mangroves were taking place in one of the oldest buildings in Tharandt—surrounded by pine forests far from the equator. Yet, the commitment shown by scientists from across the globe, many of whom live thousands of kilometres from the tropics, served as a powerful reminder of the global responsibility to protect these vital ecosystems. This, she said, further strengthened her own dedication to the lifelong mission of RESCuEing mangroves.

The event officially began with a welcoming speech by Professor Uta Berger, Chair of Forest Biometrics and Systems Analysis at Technische Universität Dresden (TU Dresden). However, participants had already started to connect earlier that morning during a scenic train ride from Dresden to Tharandt. The workshop was hosted by the Department of Forest Sciences in Tharandt, under the Faculty of Environmental Sciences at TU Dresden.

Throughout the programme, participants presented their ongoing research on various methods for mangrove monitoring, including modelling, remote sensing, biodiversity assessments, and socioecological studies. Several training workshops were also conducted by field experts, featuring sessions on frameworks for evaluating mangrove rehabilitation projects.

The workshops also highlighted key objectives of the RESCuE initiative, which aims to strengthen mangrove conservation through science-based, locally relevant approaches. These include developing decision-support tools for monitoring species diversity using satellite, drone, and ground-based data; enhancing rehabilitation practices through modelling techniques such as agent-based simulations; establishing long-term environmental sensor networks to monitor forest dynamics; assessing ecosystem services in both natural and restored mangroves; and improving communication of conservation outcomes to local communities and national agencies.



Sharing my passion for mangrove conservation with international experts at the RESCuE Workshop in Tharandt, Germany.



The main building of the Department of Forest Science, TU Dresden in Tharandt

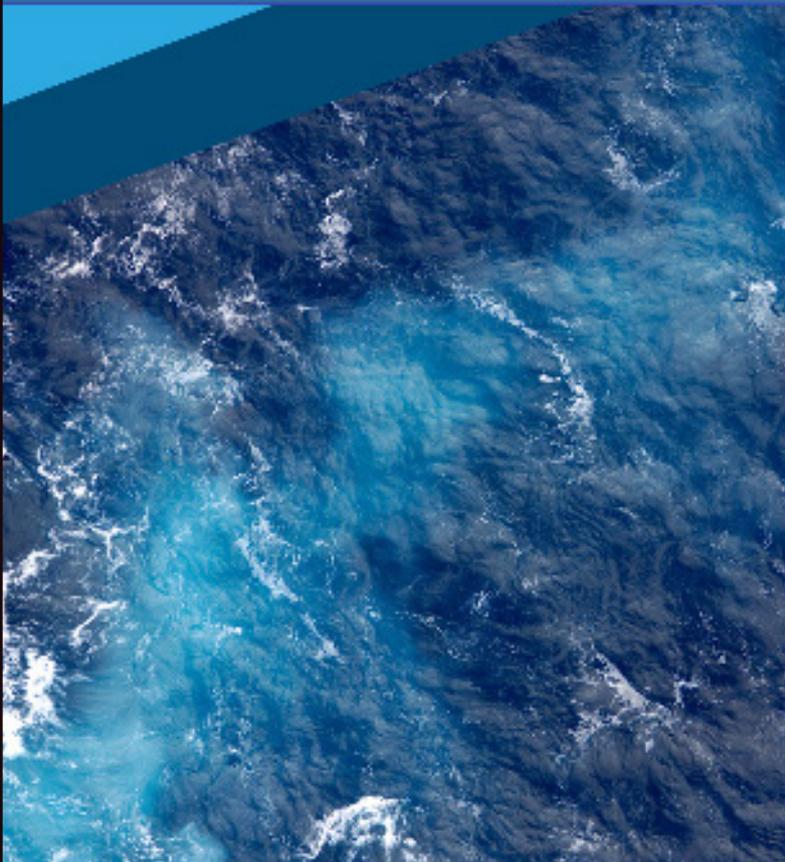
Nur Hannah presented her research on the second day of the workshop, titled "Status of the Mangroves at Setiu Wetlands: An Assessment of the Vegetation Structure Using Ground Inventory and Remote Sensing Approaches." She expressed how honoured she felt to present in front of internationally renowned mangrove experts, whose constructive feedback and questions proved highly beneficial to her current and future research.

One of the highlights of the workshop included a visit to the Tharandt Forest Botanical Garden, founded in 1811 and one of the oldest scientific collections of woody plants in the world. Home to over 3,200 plant taxa, the garden also houses tropical plant species within a greenhouse—requiring specialised care and knowledge to maintain. Participants learnt about the garden's operations and its future development plans.

The workshop concluded with a productive brainstorming session, focusing on future collaboration opportunities among the participating researchers from various parts of the world. For Hannah, the experience went beyond academic growth. Her travels across Germany—including exploring the historic and multicultural city of Dresden, as well as the vibrant international atmosphere of Frankfurt—broadened her perspective.

Reflecting on the experience, she quoted Surah al-Ankabut (29:20) from the Quran: "Say, [O Prophet], "Travel throughout the land and see how He originated the creation. Then Allah will bring it into being once more. Indeed, Allah is Most Capable of everything."

Nur Hannah expressed her deepest gratitude to her main supervisor, Assoc. Prof. Dr. Behara Satyanarayana, her co-supervisors, and the directors and staff of INOS, as well as the teams at the UMT International Centre and UMT Research Management Office. She also thanked her family and friends for their continuous support and guidance. Alhamdulillah, she noted, for the opportunity to learn, grow, and represent UMT on an international platform.



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