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e-Newsletter

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ADVANCING KNOWLEDGE. CREATING IMPACT

Our news & research highlights reflect the faculty's continued commitment to advancing knowledge with real-world impact.



The Faculty of Civil Engineering (FCE), Universiti Teknologi MARA (UiTM) Shah Alam, has been actively engaged in a strategic and long-term collaborative research partnership with The Ocean Cleanup (TOC) since 2022. This collaboration underscores FCE's commitment to advancing scientific understanding and developing practical solutions for river and marine environmental protection. The partnership began with the research project entitled Environmental Monitoring on the Interaction of Wildlife with the Operations of the Interceptor and the Barrier, which focuses on monitoring the interaction of wildlife species around The Ocean Cleanup's Interceptor and barrier systems, observing species behaviour during the waste offloading process, and conducting water quality assessments within the operational zone of the Interceptor in the Klang River. The project aims to evaluate how engineered river-cleaning systems interact with local ecosystems while recognising biodiversity as a vital indicator of river health and sustainable water management.



The Beach Plastic Sampling Project addresses the occurrence of macro, meso, and microplastics along the west coast of Peninsular Malaysia, particularly in areas with heavy marine traffic near Port Klang, as well as regions influenced by maritime, tourism, and industrial activities. This study aims to reveal the occurrence of beach plastics in estuarine tropical waters, which have been recognized as hotspots and sinks for various pollutants.

WRESRESEARCHHIGHLIGHTS

ADVANCING SUSTAINABLE RIVER AND OCEAN HEALTH THROUGH RESEARCH AND CAPACITY BUILDING

Written by: Ts. Dr. Azlinda Saadon



Specifically, the project seeks to investigate the presence of different plastic size categories along selected beaches in the Klang and Sepang areas, to characterize and classify the samples according to macro-plastics, meso-plastic, and micro-plastics, to quantify the collected plastics based on their weight within each category, and to develop a systematic record or inventory including photographic evidence of the samples. This effort contributes to understanding the extent and characteristics of plastic pollution within Malaysia's coastal environments, supporting targeted mitigation and management strategies.

Building upon this foundation, FCE has strengthened its collaboration with The Ocean Cleanup through several key initiatives, including the By-Catch Monitoring of Fauna, Flora and Organic Materials of Interceptor Technologies in the Klang River (2024), the Interceptor Catch Subsampling (OSPAR Protocol) (2024), and the Beach Plastic Sampling Project at Klang, Malaysia (2024). The incidental by-catch monitoring scope focuses on assessing fauna and flora unintentionally collected by interception technologies through systematic collection, identification, and measurement of specimens, with the aim of evaluating the proportion of fauna and flora (by weight) relative to the total waste collected per extraction and identifying key species affected; this assessment is significant for interceptor technology operations as it informs operational adjustments to minimise ecological disturbance, ensures compliance with environmentally safe performance standards, supports evidence-based refinement of design and deployment strategies, and provides critical insight into potential environmental impacts on aquatic ecosystems and biodiversity.

In 2024, this collaboration further expanded internationally through the Environmental Monitoring and Training of Trainers (ToT) Programme in the Chao Phraya River, Thailand, in collaboration with Ecomarine Co. Ltd. Thailand, Chulalongkorn University, and The Ocean Cleanup, Netherlands. The programme focuses on observing and monitoring wildlife interactions around Interceptor 019 and its barrier system, recording environmental observations following standardized protocols developed by The Ocean Cleanup, compiling and analysing environmental data for integration into the organization's global research database, and building local capacity through hands-on training and technical support to monitoring teams in Thailand. This initiative highlights the importance of regional collaboration and knowledge sharing in environmental monitoring and ecohydrological assessment.

“Through rigorous by catch monitoring and environmental sampling, this collaboration ensures that interceptor technologies not only remove plastic waste effectively, but also operate responsibly minimising ecological disturbance while safeguarding aquatic biodiversity.”





In 2025, FCE UiTM continues to expand the environmental scope in River Waste Analysis for Klang river. The operation of Interceptor 002, Interceptor 005 and other interceptor technologies such as log booms are essential in managing plastic pollution in the Klang River by ensuring the efficient extraction and disposal of waste before it reaches the ocean. Currently, various waste categories including different types of plastics, textiles, and organic materials are classified through sorting and sampling procedures in other river cleanup initiatives. Each waste category is assigned a specific weight, which is measured against the total waste collected during offloading activities. Waste characterization plays a critical role in analyzing and categorizing materials collected by the Interceptors during or after offloading. This process is vital for effective waste management, recycling, and environmental protection.

By identifying the composition of collected waste, such as plastics, organic matter, and metals, it enables proper sorting for recycling, composting, or landfill disposal, reducing environmental impact. Furthermore, it maximizes recycling and resource recovery by identifying recyclable plastics (e.g., PET, HDPE) that can be processed and reused, preventing the unnecessary disposal of materials that could be repurposed and supporting a circular economy. Moreover, waste characterization enhances operational efficiency by ensuring collected waste is properly handled and supporting long-term solutions to reduce riverine and marine pollution.

“Understanding river waste composition strengthens interceptor performance and sustainable waste management.”

Given the significance of waste characterization, the River Waste Analysis project aims to gain a deeper understanding of the composition of extracted river waste across different seasonal variations, verify and evaluate the current waste disposal pathways, and explore alternative waste management solutions, including recycling and resource recovery, to improve environmental sustainability. By systematically characterizing waste from the Klang River, this initiative will contribute to better pollution control, more effective waste management strategies, and a cleaner, healthier river ecosystem.



Through these integrated efforts, the FCE UiTM continues to play a significant role in addressing plastic pollution, enhancing riverine and coastal ecosystem health, and supporting sustainable river management practices. Moving forward, potential future works include expanded environmental monitoring of mangrove forests in Klang, the development of comprehensive environmental baseline studies at prospective interceptor technology deployment sites, and long-term ecological assessments to support adaptive management. In addition, the FCE UiTM research team actively supports The Ocean Cleanup by contributing to the development of environmental monitoring protocols and scientific references tailored for South-East Asian contexts, ensuring that interceptor operations are environmentally responsible and regionally relevant.

The partnership between FCE UiTM and The Ocean Cleanup aligns strongly with several United Nations Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 14 (Life Below Water), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals). These collaborations enhance water quality and ecological monitoring, strengthen community resilience to pollution, protect aquatic and terrestrial biodiversity, and foster impactful global partnerships towards cleaner and more sustainable waterways. Through sustained research excellence, environmental stewardship, and international collaboration, FCE UiTM has positioned itself as a regional leader in eco-engineering, environmental monitoring, and sustainable water resource management. Its ongoing partnership with The Ocean Cleanup reflects UiTM's commitment to translating scientific research into practical environmental action, advancing Malaysia's and the global community's shared vision of a cleaner, healthier, and more resilient planet.



MORE INFORMATION ABOUT US



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UiTM *di hatiku*

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