

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2018-81
Project Title:	Unravelling the food web dynamics sustaining Hong Kong's shallow marine soft-bottom ecosystems
Principal Investigator:	Professor Lee Shing Yip, Marine Science Laboratory, The Chinese University of Hong Kong
Total Approved Grant:	\$2,121,478
Duration:	17/6/2019 to 31/12/2021
Project Status/Remarks:	Completed
Project Scope:	This study unraveled a fundamental aspect of the functioning of the threatened ecosystems in Hong Kong by conducting a territory-wide analysis of the food web structure and dynamics that sustain key ecosystem goods and services. Using the latest techniques in stable isotope analysis, the sources of nutrient sustaining secondary production would be identified. By combining field sampling with controlled mesocosm experiments, the project team assessed in what way and to what extent food web structure and nutrient dynamics might be impacted by imminent anthropogenic threats such as pollution and physical habitat disturbance.
Summary of the Findings/Outcomes:	This project investigated the food sources sustaining the animal communities in the local coasta soft sediment ecosystems. The identification of key food sources will inform decisions on the conservation and management of these important habitats, which are increasingly threatened by human-driven environmental changes. Extensive sampling of the food sources and their consumers was performed over two years at three representative locations in Hong Kong: Mai Po, Shui Hau and Lai Chi Wo. The main food sources used by the consumers were identified using bulk and compound-specific stable isotope analyses. Enrichment experiments were also done to investigate specifically the importance of sediment microalgal (MPB) production. While local variations in the food sources exist, all data suggest a strong contribution of the sediment microalgal production in sustaining the consumer communities. However, MPB production seems to be tightly coupled with mangrove production through use of dissolved inorganic carbon from mangrove sources by the MPB. We provide the first direct evidence of the significance of an MPB-based food web in tropical mangrove-dominated environments. Future conservation and management of local soft-sediment ecosystems will therefore need to include these less visible but crucial components and processes to ensure the sustainability of local animal communities.