

DOCTORAL THESIS

Carrying capacity assessment of diving sites in Hong Kong and Malaysia

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ABSTRACT

This study aims to understand tourism carrying capacities of diving sites in Hong Kong and Malaysia. Specifically, ecological, psychological and social carrying capacities were assessed. Methodology involved photo quadrat transect survey, questionnaire survey and visual experiment survey. Over a period of two calendar years (2013 and 2014), 13, 12 and 9 photo quadrat transect surveys were conducted in Sharp Island, Tsim Chau and Mabul Island (Ray Point and Eel Garden) respectively to provide data for ecological carrying capacity assessment. In addition, 455 and 342 questionnaires were collected in Hong Kong and Mabul Island respectively to assess divers' satisfaction with diving attributes of the respective dive sites. Regarding social carrying capacity assessment, 247 and 158 visual experiment questionnaires were collected to assess crowding as perceived by divers in the two sites.

The ecological carrying capacity of Sharp Island lies between 172 and (less than) 825 divers every quarter in the absence of better solutions. At Tsim Chau, diving activity is not the most important factor in influencing the coverage of sea anemone. In addition, the use of additional (subjective) data was necessary to define the ecological carrying capacity of Tsim Chau and possibly Sharp Island. In Mabul Island, the results show that the ecological carrying capacity is about 16800-17200 divers per year at Ray Point and

about 15600-16800 divers per year at Eel Garden. Based on the findings, it is likely that the usage of the diving sites on Sharp Island, Ray Point and Eel Garden have already exceeded the social carrying capacity. Regarding the psychological carrying capacity, this study found that the most important factor that influences divers' willingness to return to Hong Kong diving sites is "the quality of corals". In Mabul Island, the most important factor is "the value for money of Mabul diving". However, no studied diving sites have exceeded their psychological carrying capacities. Regarding the social carrying capacity, on both Hong Kong and Mabul Island diving sites, the "number of divers" was found to be the most influential factor for divers' perceived crowding. In Hong Kong, divers' begin to feel unacceptably crowded if 7~8 divers are visible to them at one time whereas in Mabul Island, divers would start to feel unacceptably crowded if 8 to 9 divers were visible to them at one time. Based on this, it is likely that the usage of both Hong Kong and Mabul Island diving sites have already exceeded the social carrying capacity.

With the increasing popularity of diving in recent years, divers and diving trips operators around the world need to be aware of divers' impact on coral reef, divers' satisfaction and underwater crowding problem. Finally, a series of management and policy measures to minimise the impact of diving activity on coral, improve divers'

satisfaction and mitigate divers' crowding perception in underwater environment are proposed for sustainable use of diving sites in Hong Kong and Mabul Island.

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