

INTRODUCTION

Norman Reef (16° 52'S; 146°E) is a small oval shaped reef that lies approximately 60km north of the city of Cairns on the southern edge of Trinity Opening (figure 1). With a cross-shelf position of 0.85, Norman can be regarded as an outer shelf reef, and is one of the few reefs zoned General Use A. The combination of its small size (1.5 x 2.5km; see figure 2), outer shelf position and isolation (Norman is at least 10km from other large reefs) means that this reef is usually bathed in clear oceanic water with underwater visibility of between 15 and 30m.

This reef is one of the few in the Cairns area that was not subject to extensive coral damage in the crown of thorns outbreak of the early 1980s. The rich coral communities, clear water and proximity to Cairns began to attract the attention of the expanding tourist dive industry in Cairns in the mid 1980s. The Deep Sea Divers Den (DSDD), a diver training school based in Cairns, began running their catamaran 'Tropic Queen' to Norman in March 1986 with up to 26 trainee divers. Since then this boat has made 3 two day trips each week to Norman Reef resulting in approximately 600 dives in the area per week, the majority in the vicinity of the new DSDD mooring.

Late in 1986 the Hayles tourist boat operating company (now called Great Adventures) became interested in establishing a fast catamaran day trip tourist operation to a destination pontoon on Norman Reef. There was some opposition from the DSDD, but after discussions by both parties with the Marine Parks in Cairns it was agreed that DSDD would move to a new site SW of their existing mooring, leaving Hayles to use the more appropriate centre area of the back reef bay. Hayles were given permission for this operation by the GBRMPA in early 1987 and began establishing moorings for the pontoon on 1st April 1987 using heavy chain and large concrete blocks.

The 45 x 15m pontoon was put in position in the vicinity of the old DSDD mooring in May 1987 and operations began using a single 30m International Catamaran immediately afterward, with the capability of transporting up to 300 persons to the reef every day. In addition to the destination pontoon, that acts as a base for swimming and snorkeling activities as well as providing more space for the visitors to move around, Hayles uses 2 glass bottomed boats and 2 semi-submersible coral viewers (semi-subs) to give non-swimmers a view of the reef community. Regular fish feeding is carried out from the pontoon using food scraps to provide a spectacle for the tourists.

The purpose of this survey was to check whether the presence and operation of the pontoon and associated tourist activities including fish feeding, or the diver activity and the associated limited, irregular fish feeding at the DSDD site were having any effect on the reef community. As there has been concern about the effects of semi-submersible operation on corals along the shallow reef edge where these vessels run, the monitoring survey was also designed to check on the extent of this damage.