

METHODS

The density estimates of reef organisms reported here were made on three of the closest reefs to the city of Townsville (see figure 1). The survey reefs were: John Brewer Reef 71km (31.3 nautical miles) to the NNE; Lodestone 67km (29.5nm) to the NE; and Davies 96km (42.5nm) to the ENE of Townsville. Because of their position all three reefs are regularly visited by recreational fishing and dive boats from Townsville, with episodic use by commercial reef fishing boats. The reefs are also utilised as daytime anchorages by prawn trawlers, especially John Brewer Reef.

On each reef the estimates of abundance of the target organisms or groups were made within sites that were arbitrarily limited to a relatively homogeneous length of reef slope between 0.5-1.0km long. If the back reef habitat was made up of an extensive bommie field the survey site was an area of about 25ha of the bommie field. Initial surveys (May 1983, February 1984) were made in a single restricted site on the leeward (NW facing) reef slope referred to here as the back reef slope. On subsequent surveys density estimates were also made in a single front reef site (SE facing). For each resurvey the counts were made within the same site that had been chosen for the initial survey.

Within each site abundance estimates were based on ten haphazardly positioned 50 x 20m transects (chaetodontids were only counted in five of these replicates). Each count was made along a 50m fibreglass tape run from the reef edge in 3-5m depth down the slope, at right angles to the reef edge where this was possible, but on a diagonal if depth at the end of the transect was likely to be over 20m. Similarly, transects were run diagonally if the sand floor was reached before the full 50m tape had been run out.

All *Plectropomus* spp. within 10m of the central tape were counted, the observer swimming a zig-zag path to search a 10m wide strip on one side of the tape before returning along the other side using the same search technique. *Plectropomus* spp. often shelter beneath plate corals and overhangs or in caves; all accessible hiding places within each transect were searched. The species, and the estimated total length (TL) in cm, were recorded for each individual seen. Other fish species counted within the same area were all members of the families chaetodontidae, lethrinidae and lutjanidae. Chaetodontids were counted in the 1984 and 1986 series of counts but lethrinids and lutjanids were only recorded in the 1989 survey. All *Acanthaster* present in the 50 x 20m area were recorded during a separate pass along the transect: these were recorded in all series of counts.

Coral cover was estimated in the survey site during the May 1983 surveys and was measured using 10 haphazard 10m line intersect transects in Nov. 1984.

The different survey components carried out during each visit to the reefs are summarised in Table 1.

Analysis of the data was carried out using anova techniques. One analysis with three factors: time; reef; and habitat, considered differences between the 1986 and 1989 surveys for all sites and reefs, while a second with two factors: time; and reef, looked at differences over the November 1984, May 1986 and June 1989 surveys for the back reef sites only on each reef.

TABLE 1. SURVEY COMPONENTS AT DIFFERENT SAMPLING DATES

Reef	Date	Corals	<i>Acanth- aster</i>	Coral Trout	Chaeto- dontids	Lethrinids Lutjanids
BACK REEF SLOPE						
John Brewer	20 May 1983	X	X	X		
	8 Feb. 1984	X	X	X		
	22 Nov. 1984	X	X	X	X	
	13 May 1986		X	X	X	
	8 June 1989		X	X	X	X
Lodestone	21 May 1983	X	X	X		
	21 Nov. 1984	X	X	X	X	
	15 May 1986		X	X	X	
	10 June 1989		X	X	X	X
Davies	10 Nov. 1984	X	X	X	X	
	16 May 1986		X	X	X	
	11 June 1989		X	X	X	X
FRONT REEF SLOPE						
John Brewer	21 Nov 84	X	X	X	X	
	14 May 86		X	X	X	
	9 June 89		X	X	X	X
Lodestone	15 May 86		X	X	X	
	9 June 89		X	X	X	X
Davies	11 Nov 84	X	X	X	X	
	17 May 86		X	X	X	
	11 June 89		X	X	X	X