INTRODUCTION

Public perception of the Cape Tribulation region is focused on the twin features of rainforest and fringing reefs. This area is the major accessible locality in the Great Barrier Reef (GBR) Marine Park where coral reefs occur adjacent to rainforest. These reefs are among the most extensive on the east coast (Craik and Dutton, 1987); fringing reefs of varying degrees of development front over 80% of the coastline between Noah Head and the Bloomfield River. Preliminary surveys in late 1984 and 1985 suggested that the coral communities of these reefs were rich and diverse: Veron (1987) reported 141 species in 50 genera. This study recorded 3 species not previously reported from the GBR.

The Cape Tribulation fringing reefs have grown throughout their history in an environment of heavy terrigenous sediments input (Johnson and Carter, 1987). Average annual rainfall in the Cape Tribulation area is about 3,750 mm and normally carries large amounts of sediment into the inshore zone. Sediments from the reef and inner shelf contained from 50-80% terrigenous material. Cores showed that the terrigenous content of the inner shelf muds was generally constant suggesting that there has been little change in terrigenous sediment input during accumulation.

There was considerable controversy during 1984 over the decision to construct a coast road through rainforest from Cape Tribulation to the Bloomfield River in Far-North Queensland. This unsealed road was completed in late 1984 and subsequent observations during the 1985 wet season showed that there was heavy local run-off of silt into coastal waters from the road (Bonham, 1985). There was concern that this silt run-off could cause permanent damage to the fringing reef communities in the area. Sea Research was contracted by the Marine Park Authority at the end of 1985 to make a three year study on the fringing reefs in the Cape Tribulation area to determine if the observed silt run-off was affecting the coral communities. This was part of a multidisciplinary study in the area that included sections on reef structure and development (Partain and Hopley, 1989), the sedimentary framework of the reefs (Johnson and Carter, 1987), sedimentation rates (Hopley et al., 1990), hydrology (Parnell, 1989) and coral settlement and recruitment (Fisk and Harriott, 1989).

The Cape Tribulation coast is characterised by steep rainforest covered hills falling directly to the sea from over 1000 m. Rainfall is high, averaging almost 4,000 mm per year, with annual totals of more than 6,000 mm not unusual. Most rainfall occurs between January and April and during this period 24 hr falls sometimes exceed 500 mm.

Between April and October SE trade winds blow onshore, resuspending the shelf sediments and holding a wide band of turbid water against the coast. Water visibility in these prevailing conditions ranges from less than 50 cm to about 2 m. During the remainder of the year extended calm periods occur regularly and during these calm spells water visibility usually ranges between 2 and 6 m, although it may occasionally reach 10 m.

The main problem faced was how to resolve the question of whether any damage detected was resulting from the run-off of silt in view of the absence of any comprehensive pre-road biological data from the area. As the road was constructed in late 1984 there had been a full wet season of run-off before this study started. It was decided that the Cape Tribulation coast could be divided into three locations, two of which could be used as controls for the third in relation to this problem.

Location 1. Coastline from Noah Creek north past Cape Tribulation, adjacent to the long-established section of the road that runs from the Daintree River to 2 km north of Cape Tribulation (control 1).

Location 2. Coastline from 2 km north of Cape Tribulation to Cowie Point where the newly constructed road runs adjacent to the coast and where silt laden run-off from the road was observed during the 1985 wet season.

Location 3. Coastline from Cowie Point to just south of the Bloomfield River where the new road is diverted inland and direct run-off is unaffected by any road construction (control 2).

There are further problems with this approach; it could be argued that silt run-off may also be affecting the adjacent control areas, but these are unavoidable as fringing reefs from further afield are not strictly comparable and may suffer natural changes not suffered by the Cape Tribulation area reefs.

The main question we sought to answer was whether there were any changes to coral communities in the Cape Tribulation region that could be attributed to sediment run-off from the new road. We needed to describe the existing coral communities, look for any evidence of reef damage from the 1985 wet season and monitor any future changes in both the impact and control locations.