FRINGING REEFS OF MAGNETIC ISLAND

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The fringing reefs of Magnetic Island are all sited on the south-west sides of headlands (Figure 1). The extensive growth of reef platforms in Geoffrey and Nelly Bays has allowed the southern ends of these reefs to become exposed to the north-easterly swells and wave action. The large Cockle Bay reef has grown in protection from wave action. Thus the fringing reefs of Magnetic Island are exposed to conditions that range from very protected to moderately exposed. This range of conditions no doubt contributes to the high species diversity (over 100 species, see appendix) found around the Island.

The approximate sizes of the reefs can be found in Table 1. These sizes refer only to the reef areas where living coral may be encountered, and does not include sand flats that form behind the larger reefs (Cockle, Geoffrey, Nelly and Picnic Bay reefs). It is difficult to define the area where live coral exists on Cockle Bay reef, and the size is only a rough estimate.

Table 1.
Size of corals reefs around Magnetic Island (in hectares)

Florence Bay	5.1	Gowrie Bay	1.9
Arthur Bay	5.3	Alma Bay	1.0
Geoffrey Bay	31	Nelly Bay	43
Picnic Bay	10	Maud Bay	5.2
Wilson Bay	1.4	Horseshoe Bay	(1.8) est.

Cockle Bay (isolated reef)' 47
Cockle Bay (main Reef) 218, (estimate)

Isolated coral colonies and small coral communities can often be encountered along many of the rocky shores. These may only be considered as reefs if an adequate accumulation of reef material is present. The reefs in Wilson and Alma Bays are probably very close to the lower size limits to be considered as fringing reefs.

Because of their proximity to Townsville and James Cook University, the fringing reefs of Magnetic Island have been well studied by geomorphologists and biologists (e.g. Bull 1982, Morrissey 1980). The majority of studies have, and continue to be, centred in Geoffrey Bay. The high diversity of corals (nearly one third of the species that can be found on the Great Barrier Reef), and the range from exposed to sheltered conditions, together with its general accessibility all contribute to this reefs' popularity.

The present reefs have been in existence for over 6000 years, and although they have a long term geomorphological presence, the species mix may well have changed during this time, in response to climatic and other environmental changes. In the past 15 years two major events that dramatically changed the proportions of coral species on the fringing reefs were observed. The first was cyclone "Althea" in 1971, and the second was the "bleaching event" of 1982.

Many coral colonies were broken and overturned by the storm seas associated with cyclone "Althea". The most significant damage however was caused by the excessive freshwater runoff associated with "Al thea" and, a few days later, the rain despression associated" with the Gulf cyclone "Bronwyn". The freshwater. dilution of the waters around Magnetic Island 'caused the deaths of many of the shallow colonies (Collins, 1978.). Regrowth of fragmented'corals and resettlement of coral larvae on the dead skeletons eventually obliterated the effects of the cyclone after about 10 years.

The cause of the "bleaching event" of 1982 is not known with any certainty. The bleaching of corals was observed on many other coastal reefs in 1982, even as far north as Decapolis Reef near Lizard Island; and on the outer edge reef of Myrmidon. Oliver (1985), has reviewed the bleaching events on the Barrier Reef and concludes that temperature stress, in the summer may cause bleaching.

On Magnetic Island the bleaching caused the depletion, of some species more than others. Pocillopora and Seriatopora were so severely depleted that many hours of searching did not reveal any remaining living colonies. Large areas of plate and encrusting Montipora were also killed - reducing the coral cover on thirty metre transect lines from 40-60% live coral to 0% cover.

In much the same way that the reefs recovered from the cyclone damage, the effects of the bleaching are now not evident on the Magnetic Island reefs. Larval settlement, and the growth of survivors has returned most areas to the same degree of coral cover that existed before the bleaching. It is interesting to note that plate' corals regrew in areas previously occupied by plate corals. This suggests that the coral zonation patterns of the fringing reefs are maintained through time, even though the proportions of the individual components may change dramatically with time.

Small scale bleaching of corals has been recorded as a fairly frequent event on the Magnetic Island fringing reefs. The cause of this bleaching is not known, but may be derived from a variety' of stress factors e.g. high summer temperatures or rain dilution of 'sea water.

For many years the effects of the dredging of the harbour channel 'on the reefs in the Townsville area has been discussed, in the local newspaper. Even within, the last month statements that "there have been two reefs in the area destroyed by dredging" were made. There has not been a single documented study that has shown that dredging has caused any damage on Magnetic Island reefs or even those closer to' Townsville such as Middle Reef or Virago Shoal. The reef destruction statements have arisen from unsubstantiated reports in the popular press. Even within Townsville Harbour, with 'its regular, dredging,, at least 10 species of coral have been identified growing on the breakwater. The continued surveillance of transects on, Magnetic Island Reefs will indicate any long-term changes in coral populations. Should, marked changes be noticed, it would however , not be easy to identify the causative agents. Transect monitoring allows an estimate of short-term natural changes to be assessed, and should prevent the type of popular speculation, that has occurred in the past.

One of the observations that has fuelled the dredging controversy has been the amount of dead coral seen on the reef flats. Studies on Magnetic and other island fringing reefs indicate that live coral cover on reef flats is characteristically less than 10%. The cover of live coral on the reef slope (that is not exposed on low tides) can be as high as that on any Barrier reef. The lack of visibility on these coastal reefs does limit the visual impact of the coral cover. The presence of large macroalgae also gives the appearance of a lowered coral cover.

The fringing reefs of Magnetic Island provide an easily accessible resource to the visitor, but must not be viewed as a substitute for the main barrier reefs, for in comparison they would fall very short. Educational visits seem to be one of the main reasons for people to visit these reefs at the present time. As an educational resource they are invaluable, providing access to a variety of educational levels, from primary school to tertiary level. It is hoped that the proposed snorkelling trails will facilitate the education process and make student and tourist alike more reef aware.

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-Appendix - Magnetic Island Fringing Reefs

This species list has been compiled from records 'of species in the AIMS coral monograph series and various recent collections made by the author. It is not definitive, and represents a preoccupation with some species groups. Corals known to be present on the fringing reefs, but not recently collected or in the process of investigation include:-
Diploastrea, Caulastrea, Cyphastrea, Mycedium, Echinopora and Euphyllia.

Family Thamnasteriidae
Psammocora contigua
Psammocora haimeana
Family Pocilloporidae
Pocillopora damicornis
Stylophora pistillata
Family Faviidae
Favia favus
Favia pallida
Favia maritima
Favia rotumana
Barabattoia amicorum
Favites abdita
Favites flexuosa
Favites pentagona
Favites russelli
Favites bennettae
Goniastrea retiformis
Goniastrea aspera
Goniastrea cf. favulus
Goniastrea pectinata
Goniastrea australiensis
Goniastrea palauensis
Platygyra daedalea
Platygyra lamellina
Platygyra sinensis
Hydnophora exesa
Montastrea valenciennesi
Plesiastrea versipora
Leptastrea purpurea
Leptastrea transversa
Moseleya latistellata
Family Trachyphyllidae
Trachyphyllia geoffroyi
Family Agaricidae
Pavona decussata
Family Siderastreidae
Pseudosiderastrea tayamai
Family Fungiidae
Cycloseris cyclolites
Polyphyllia talpina
Podabacia crustacea
Sandalolitha robusta
Herpolitha limax
Heliofungia actinoformis
Fungia concina
Fungia danai
Fungia echinata
Fungia fungites
Fungia granulosa
Fungia horrida
Fungia paumotensis
Family Oculinidae
Galaxea cf. astreata
Family Merulinidae
Merulina ampliata
Family Mussidae
Scolymia cf. vitiensis
Lobophyllia hemprichii
Symphyllia radians
Family Pectiniidae
Oxypora lacera
Pectinia lactuca

Family **Dendrophyllidae**
Turbinaria peltata
Turbinaria **frondens**
Turbinaria **mesenterina**
Turbinaria reniformis
Turbinaria **stellulata**
Turbinaria bifrons
Turbinaria radicalis
Family Poritidae
Porites lobata
Porites murrayensis
Porites australiensis
Porites **lutea**
Porites **mayeri**
Porites **cylindrica**
Porites nigrescens
Porites lichen
Porites annae
Porites rus
Goniopora djiboutiensis
Goniopora **stokesi**
Goniopora lobata
Goniopora **columna**
Goniopora stutchburyi
Family Acroporidae
Montipora tuberculosa
Montipora **millepora**
Montipora **sp.1**
Montipora mollis
Montipora turtlensis
Montipora **peltiformis**
Montipora undata
Montipora **venosa**
Montipora digitata
Montipora hispida
Montipora **efflorescens**
Montipora stellata
Montipora **informis**
Montipora **foliosa**
Montipora aequituberculata
Montipora crassituberculata
Anacropora **forbesi**
Acropora **vaughani**
Acropora divaricata
Acropora aculeus
Acropora hyacinthus
Acropora latistella
Acropora elseyi
Acropora **valida**
Acropora digitifera
Acropora pulchra
Acropora millepora
Acropora nobilis
Acropora formosa
Acropora tenuis

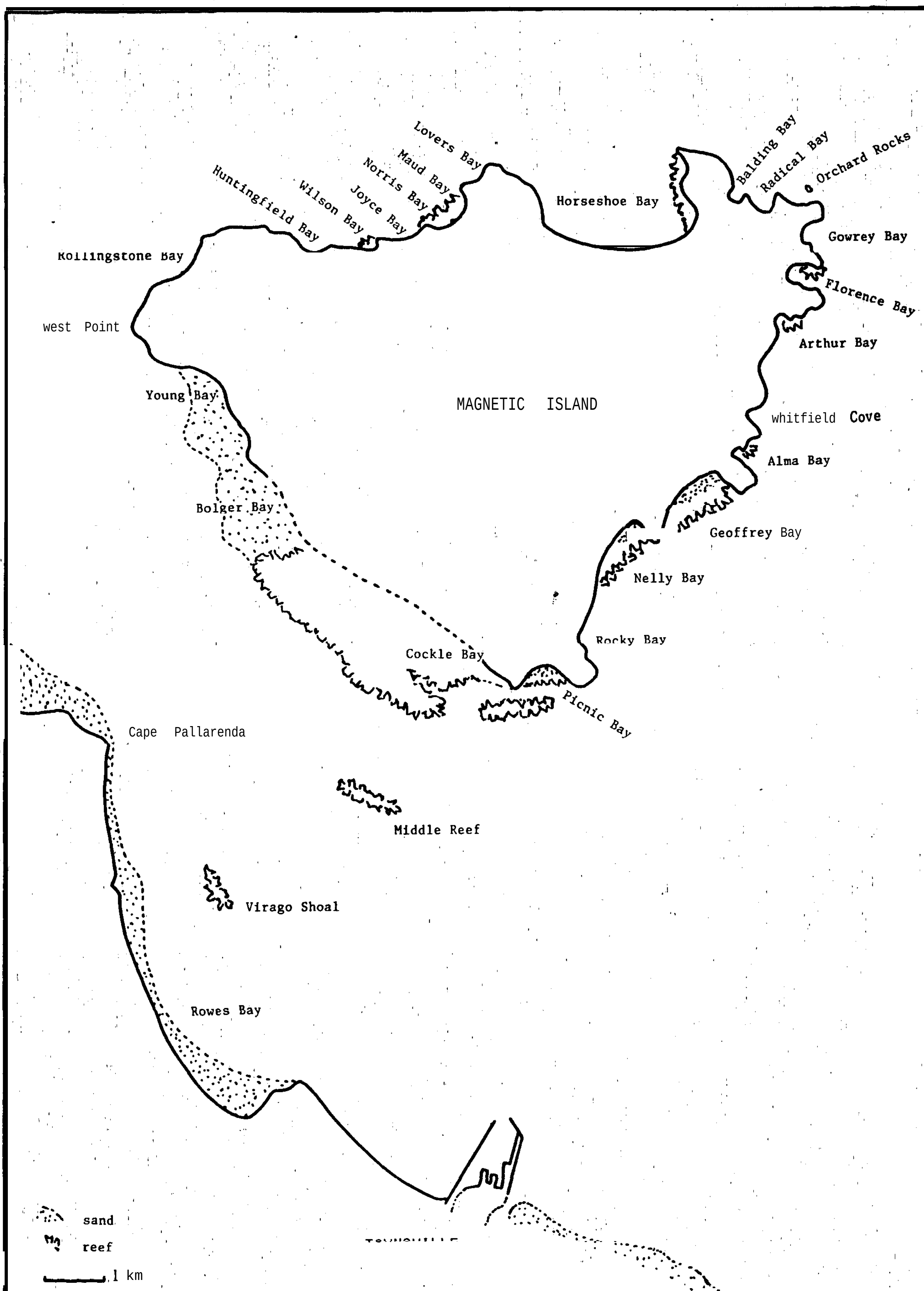

Figure 1 Magnetic **Island Fringing Reefs**