
1 INTRODUCTION

In 1981 the Great Barrier Reef was inscribed on the World Heritage List highlighting the importance of the Reef as an area of world significance. The Australian Government has recognised the significance of the region by the establishment of the Great Barrier Reef Marine Park Authority, responsible for management of the Reef. Coral reefs in general have enormous value for a multitude of reasons, including recreational and wilderness values, income-producing tourism, the basis for amateur and commercial fisheries, a source of biologically active compounds, and for protection of adjacent coastlines.

The basic structure of coral reefs is provided by the corals themselves, which not only form the reef, but also provide food and habitat for a multitude of other organisms. The corals are central to the maintenance of the reef community, and there is evidence that when corals are killed, there is migration or death of some of the associated fauna. Fish poisoning (ciguatera) is thought to increase in areas where live coral cover is severely reduced.

Coral reefs are subjected to many forces, both natural and man-induced, that can severely damage the coral communities. They are susceptible to natural events such as cyclones, unusually high rainfall, low tides or high temperatures, earthquakes and volcanoes, as well as to man-induced changes in water turbidity, sediment load, eutrophication by nutrient input, altered salinity and pollution. It is probable that while damage to coral communities from natural factors will continue in the future at current levels, the amount of stress resulting from the activities of man is likely to increase.

If such impacts damage reef communities, management of reefs will require information on methods to both minimise the impact of man, and to produce the most rapid possible recovery from the impact. With respect to the hard coral community, the time scale of recovery following severe damage is dependent on many factors. These include the cause and extent of the damage, the subsequent environmental conditions (immediately after the damage and in the longer term), and the criterion by which recovery is defined (e.g. coral cover, diversity, similarity to original community). Estimates of the time for coral recovery following severe damage vary from as little as three to 10 years to greater than 20 years.

Proper management of reef systems may occasionally require consideration of the option of accelerating the rate of recovery of coral reefs following severe damage. This may be particularly important in areas of significant commercial interests, or in heavily visited areas. Some processes may change the habitat such that it may no longer recover without intervention, for example recruitment of corals may be impossible in areas that have suffered heavy sedimentation from dredging. In such cases, transplantation of adult corals may be the only way that corals could become re-established in the area.

We discuss here methods that could be used to accelerate the regrowth of hard corals in a damaged reef community, and assess the feasibility, practicalities and limitations of such methods. The methods discussed here have generally been developed from the published scientific literature and then tested in a field situation at Green Island Reef, near Cairns on the Great Barrier Reef. The results of our experiments which test different rehabilitation procedures are given in detail in the appendices.