

## **SECTION TWO**

### **MANAGEMENT IMPLICATIONS**

## INTRODUCTION

Nutrient levels in inshore GBR waters are close to or at levels that have caused detrimental effects to coastal and reef communities elsewhere. Evidence of stress on the reef system is becoming apparent in some areas of the GBR. As a result, a conservative long term management strategy should ensure that levels of nutrients in the GBR Region not be allowed to increase in the future through human use. In fact, where existing levels near coral reefs are shown to be higher than those compatible with reef health, attempts should be made to reduce the levels over the long term.

In this section, GBRMPA's and the Commonwealth government's responsibility for management action is delineated. Relevant legislation is presented but the following in no way represents an evaluation of the current legislation. The opportunity to proceed towards remedial action in conjunction with the Queensland government is highlighted. Specific management action is recommended, including further research and monitoring.

## LEGISLATION

The object of the Great Barrier Reef Marine Park Act 1975 is "to make provision for and in relation to the establishment, control, care and development of a marine park in the Great Barrier Reef Region" (S 5(1)). The prime means of management of the Marine Park is through Zoning Plans. In preparation of a plan, Section 7 of the Act requires that regard shall be had to the following inter alia:

- "(a) the conservation of the Great Barrier Reef
- (b) the regulation of the use of the Marine Park so as to protect the Great Barrier Reef while allowing reasonable use of the Great Barrier Reef Region;"

The Act provides for the regulation or prohibition of "acts (whether in the Marine Park or elsewhere) which may pollute water in a manner harmful to plants or animals in the Marine Park" (S.66 2(e)).

### Discharges Outside the Marine Park

The provision that sources of pollution "in the Marine Park or elsewhere" may need to be considered, is of particular significance as it is one of the few provisions of the Act relating to the management of activities which are not entirely within the boundaries of the Marine Park. Recent legal advice has confirmed that regulations could be made under S.66(2)(e) of the Act to regulate indirect discharge of waste into the Marine Park. Amendments to the legislation would be required. In normal circumstances the Authority would not seek to use this regulatory mechanism but instead would prefer to collaborate with other relevant agencies to achieve a common goal of protection of the environment through application of appropriate discharge standards.

### Discharges Within the Marine Park

A permit is required for waste discharge into the Marine Park. The Regulations, drafted in accordance with the Act, specify that the written permission of the Authority is required prior to discharging or depositing "household, industrial or commercial waste in the Marine Park", with the following exceptions:

- a) where a Zoning Plan provides for the Zone to be used or entered for that purpose;

- b) the discharge of human waste from a vessel or aircraft which does not contain a storage tank of a kind designed for the storage of human waste;
- c) offal from fish caught in the Marine Park;
- d) other biodegradable waste from a vessel or aircraft which is more than 500 metres seaward from the seaward edge of a reef. (GBRMP Act, Section 38)

Some resorts do not require GBRMP permits because they dispose on land by irrigation or conventional sullage trench (7 in total). A number of resorts (approx. 7) have secondary treatment of sewage and discharge the treated effluent in the Marine Park; at least 5 other resorts are in the process of upgrading their treatment systems.

Conditions attached to most recent GBRMP permits for waste discharge specify the flow rate of effluent and quality of effluent to be 20 mg/l Biological Oxygen Demand (BOD) and 30 mg/l Non-filtrable Residue (NFR) based on Queensland discharge standards. Effluent quality and volume are to be monitored. Records are to be maintained and presented on application for a permit renewal. Outfalls are required to be at depth beyond the reef edge. In some cases, where discharge is occurring near the reef edge, the permittee is required to monitor receiving waters for nutrients, temperature, and salinity.

The Queensland Clean Waters Act 1971-1988 seeks to regulate discharges which are likely to cause damage to the environment of the territorial waters of the State of Queensland. This includes discharges from island resorts where the islands are not Commonwealth owned (i.e. most of them). Conditions on these licences have provided the basis for Marine Parks permits.

As coastal urban centres such as Townsville and Cairns discharge indirectly into the Marine Park via mainland rivers, they do not require a permit from GBRMPA. Regulation is through the State legislation.

As mentioned previously, regulation of vessel-based sewage discharge and biodegradable waste is administered through GBRMP Act Section 38. At present, discharge of human waste from a vessel is allowed anywhere if there is no holding tank. If a holding tank is on board, human waste may be discharged more than 500 m beyond the reef edge. Discharge of biodegradable waste is allowed more than 500 m seawards of the reef edge.

Australia is party to the MARPOL Convention (controlling international marine pollution) which inter alia prohibits discharges of offending substances within the Great Barrier Reef Region. Regulations to the Commonwealth Protection of the Sea Legislation Amendment Act 1986 legislation will give force to Annex IV and V of this International Convention for the Prevention of Pollution from Ships.

Annex IV proposes that ships of 200 tons gross tonnage and ships which are certified to carry more than 10 persons must have holding tanks for sewage wastes and must discharge wastes only outside of the Great Barrier Reef Region, for example, at an appropriate waste receiving facility in a port or several kilometres from the outer edge of the continental shelf. This portion of the Act will only take effect once the Annex has been ratified by 50% of nations representing 50% of the world shipping tonnage; expected to take several more years.

The recent entry into force internationally of Annex V relating to garbage, and Australia's intention to become party to that Annex means that discharge at sea from ships will be prohibited:

- everywhere, for all plastics including garbage bags
- within 25 nautical miles of the outer edge of the GBR, for dunnage, and packing material that floats
- within 12 nm of the outer edge of the GBR, for biodegradable waste, rags, paper, and metal; or within 3 nm of the outer edge of GBR for biodegradable waste if put through a comminuter or grinder (Regulation 3, International Maritime Organisation, 1988).

In this regard, a "ship" means any vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms (International Maritime Organisation, 1988). The implications for small vessels in Barrier Reef waters may be unworkable. The Authority is looking at this matter carefully.

The implementation of the MARPOL Convention may have significant implications for ports, marinas, and urban sewage treatment and solid waste disposal facilities adjacent to the Great Barrier Reef due to an increasing demand for waste disposal services.

The Commonwealth Environment Protection (Sea Dumping) Act, 1981 regulates, amongst other things, the dumping of wastes and other matter from vessels, aircraft and structures into Australian waters. For the purposes of this Act dumping does not include discharge of human waste from a vessel, aircraft or structure where that activity is incidental to normal operations. Where an application for a Sea Dumping Permit to discharge in the Marine Park, or potentially affecting the Marine Park, is made to the Department of the Arts, Sport, the Environment, Tourism and Territories, comments are sought from a number of agencies including GBRMPA. GBRMPA has been consulted in the case of six Sea Dumping permits to date; dumping of treated effluent from the John Brewer Reef Floating Hotel outside of John Brewer Reef; dumping of dredge spoil in the operation of Cairns, Townsville, Bundaberg and Mackay Port Authorities; and dumping of kitchen waste from Heron Island Resort.

Action is proceeding to delegate to the Chairman of the Authority powers under the Environment Protection (Sea Dumping) Act in relation to dumping in the GBR Marine Park.

## **COOPERATION BETWEEN GBRMPA AND QUEENSLAND GOVERNMENT AGENCIES**

The most immediate action that can be taken by GBRMPA in relation to reef water quality under its legislation is to develop consistent guidelines for direct discharge into the Marine Park from point sources. This will assist in maintaining quality of reefs on a localised scale.

As Queensland Department of Environment and Heritage (Q.DEH) has responsibility for maintaining water quality and licensing discharge in State waters, cooperative action between GBRMPA and Q.DEH is essential for effectively protecting water quality.

At present there is consultation between GBRMPA and Q.DEH on all permit and licence issuance for waste discharges into the Marine Park, with the objective of applying complementary standards. Data required by licence and permit conditions are shared by the two agencies. Relevant data acquired by Q.DEH in the course of regular monitoring

along the coast are also shared with GBRMPA. GBRMPA's data are likewise shared with Queensland agencies.

To date Queensland standards for waste discharge have been applied by GBRMPA at island resorts. With the concern that coral reef biota are susceptible to enhanced nutrients, the Marine Park Authority has realised a need to develop guidelines for waste discharge in consultation with Q.DEH, initially regarding permit conditions for point source sewage discharge directly into the Marine Park (this paper).

In addition, an increasing number of developers are being required to monitor the impact of their developments on the biota in the Marine Park. This includes monitoring water quality for nutrients and suspended sediments. Advice on design of water quality monitoring programs from Q.DEH is incorporated into such projects.

GBRMPA has established a Water Quality Advisory Committee to determine priorities for integrated water quality monitoring. A representative of Q.DEH is a member.

A number of research projects have benefited from the cooperation of Queensland Water Resources Commission, Queensland Department of Primary Industries, and Queensland Department of Environment and Heritage. The Authority has initiated a three year study to determine ambient levels of nutrients and suspended sediments across the shelf between Cairns and Townsville. Once completed, this will give a better idea of the normal range in variability of the system. Studies are also being undertaken at sites which were identified as priority areas at the Workshop on Nutrients in the GBR (Baldwin, 1988). In addition, the Crown of Thorns Starfish research program has funded research into use of agricultural chemicals at specific locations along the coast and effect of mainland discharges on corals.

Thus, advantages of close co-operation and involvement between GBRMPA and Queensland government agencies are:

- . integration of marine and terrestrial components
- . cost effectiveness of long term monitoring,
- . on-land management facilitated , minimising need for excessive and costly waste treatment
- . sharing advice on treatment system, dilution and dispersion studies
- . complementary permit/licence system for ease of applicants for permission to discharge waste
- . coordinated educational program.

## RECOMMENDED MANAGEMENT ACTION

1. GBRMPA to devise in consultation with Queensland government agencies, guidelines for point source discharge into the Marine Park.
2. GBRMPA to discuss with Queensland government agencies appropriate standards for point source discharges indirectly into the Marine Park, for example for urban centres adjacent to the coast.
3. GBRMPA staff to review GBRMP regulations regarding discharge of waste from a vessel to determine the need for recommending holding tanks on vessels of a certain size. GBRMPA staff to also review implications of the MARPOL Convention for vessels of Barrier Reef waters. An information program should be implemented to advertise the

need for and details of these management tools, targeting boat owners and builders, and port and marina operators.

4. GBRMPA to discuss with Queensland government agencies, the need for limiting the supply of nutrients in terrestrial runoff adjacent to the Marine Park, particularly in terms of erosion control, level and timing of fertiliser use.
5. Information should be provided to Local Authorities and Ports concerning nutrient effects on the Reef and implications of GBRMPA and other Commonwealth legislation in terms of sewage discharge, coastal developments, and marina construction. In particular, ports and marinas should be encouraged to plan for adequate waste pump out and treatment facilities in the near future.
6. Monitoring programs should be continued at all marine excavations in the Marine Park and policy should be developed regarding excavations at the limited fringing reefs with alternative options to be encouraged.
7. An extensive research and monitoring program should be adopted to monitor trends in water quality and effects on biota in the GBR and to research many of the unknowns related to water quality issues such as Crown-of-Thorns Starfish and trawling.

## RESEARCH AND MONITORING REQUIREMENTS

1. Variation over time of ambient levels of nitrogen and phosphorus across the shelf in the GBR Region needs to be determined. To date, most measurements have been fairly localised or preliminary in nature. In 1988-89, GBRMPA began funding a long term study by Australian Institute of Marine Science (AIMS) to construct a nutrient budget in the central GBR region. A preliminary study in the Shelburne Bay transect area will be commenced in 1989-90 by AIMS. Initial results of these two studies will be used to determine the extent of future work.
2. Once present levels of nutrients are measured reliably, a comparison needs to be made with historical data. There are limited historical records available on nutrients in the GBR, primarily because technology has only recently advanced to the point where nutrients can be measured accurately at the comparatively low levels found in marine waters. One method which is currently being explored is tracing phosphorus levels in coral skeletons. This area is still under development and is being funded to a large extent by GBRMPA's Crown of Thorns Starfish Research Program. There is currently no method of determining historical nitrogen levels.
3. Measurements of nutrient levels in river input into the GBR need to be made, particularly during peak flow conditions, for input into a nutrient budget for GBR waters. Estimates of phosphorus levels in rivers adjacent to the Cairns Section have been provided by Cosser (1988a). Average levels are being collected by various researchers along the north Queensland coast, however, peak events are often missed and logistically difficult to access. Involvement of Queensland government agencies is essential for the development of coordinated studies in this area.
4. Levels of nutrients originating from resorts are based on typical discharge values. Nutrient levels of permitted discharges need to be measured to determine if they vary from the typical. The characteristics of resort waste may vary according to visitor numbers, season, time of day and purposes of water use. Data on nutrient levels in effluent should be required as a permit condition for all resorts, at least for a year.

5. Tolerance levels of different species of corals and other reef biota to varying levels of and exposure time to, nitrogen and phosphorus need to be determined if possible. The symptoms associated with stress levels need to be recorded. The possibility of undertaking preliminary studies in conjunction with the GBR Aquarium is being investigated.
6. The effectiveness of reducing phosphorus at resort discharges by use of phosphorus-free detergents, needs to be evaluated. Costs and sources of phosphorus-free detergents are being sought. A comparative study involving use of P-free detergents at interested resorts should be investigated.
7. Levels of nutrients resuspended by dredging or trawling activities should be quantified to determine whether these activities provide a substantial input to the nutrient budget of the Reef.

#### **SUMMARY: Section Two**

GBRMPA has a clear mandate to regulate point source discharges into the Marine Park. These have potential to have serious but localised impact on coral communities. It is essential that guidelines for direct waste discharge be developed immediately. The expertise, advice, and cooperation of relevant Queensland government agencies will be sought in this process.

Management of some of the "minor" inputs of nutrients by vessels is taken care of through the GBRMP Act and future adoption by the Commonwealth, of Regulations putting into force the MARPOL Convention. GBRMPA staff need to review all such regulations to ensure the most appropriate, effective, and enforceable regulations are adopted. A directed education program then needs to be instituted.

Monitoring programs related to dredging and dumping in the Marine Park should be continued or instituted, depending on the case. Research and monitoring should be initiated or continued on ambient levels of nutrients in the GBR, nutrient effects on reef biota through manipulative studies and in the field at potential impacts sites, in areas where there is still limited knowledge such as remobilisation of nutrients by resuspended sediment.