

SUMMARY

Although the John Brewer Reef Floating Hotel remained in operation for only one year from March 1988, its construction and installation triggered a major environmental assessment and monitoring program which was innovative in many ways. First, the hotel was the first of its kind in the world so the potential impacts were largely unknown and, second, there was increasing community pressure for comprehensive assessments of environmental impacts given the high conservation value placed on the Great Barrier Reef Marine Park - a World Heritage Area.

As a result, the environmental impact assessment and monitoring procedure which was implemented was probably the most complex that had been attempted for a project of that scale in Australia and proved, in many ways, to be a pilot for studies within the Great Barrier Reef Marine Park since then. The program involved many individuals and several institutions working in areas such as oceanography, water quality, biological monitoring and social impact studies, with the program coordinated by the Centre for Coastal Management at the University of New England - Northern Rivers (then known as the Northern Rivers College of Advanced Education) on behalf of the proponent.

The reports of the many separate studies which formed part of the environmental assessment and monitoring program existed only as unpublished reports to GBRMPA and the hotel developers. A workshop was held in Townsville in December 1989 to bring together the participants in the monitoring program, in order to draw on the experiences gained from the study and to apply this experience to the design of future monitoring programs. To follow on from the objectives of that workshop this document summarises the separate studies which constituted the monitoring program and presents them in a single report.

The components of the monitoring program and the conclusions of the studies were as follows:

- a. Bommie cropping: Coral communities and limestone were removed from the tops of individual patch reefs in the lagoon of John Brewer Reef to allow for entry of the hotel and for a swing circle around the hotel. Some corals were transplanted away from the damaged patch reefs and survived well, but any fauna remaining on the reef tops and within approximately a 20 m radius was damaged or killed by the process. Organisational problems hampered the efficiency of the transplantation operations.
- b. Biological monitoring: Surveys of the benthic fauna and fish populations adjacent to the hotel site and at control sites were completed before installation of the hotel, during its operation and after its removal. Few significant differences in the fauna attributable to the hotel were detected, apart from an aggregation of fish under the resort, probably as a result of feeding by charter boat and resort staff.
- c. Water quality compliance assessment: A study of the wastewater treatment plant showed that there were numerous technical problems with the operation of the plant so that the effluent breached permit requirements on many occasions, particularly during the early phase. Monitoring of water quality in the lagoon showed no significant differences between hotel sites and control sites, indicating that any effluent discharged was rapidly dispersed and diluted.
- d. Sediments compliance monitoring: The presence of the hotel had only a small impact on the sediments in the vicinity. The sediments near the hotel were coarser than those at the control site, probably due to increased turbulence resulting from the physical presence of the hotel structure increasing the winnowing of the sediments. Copper concentrations were also higher near the resort in the early part of the study, probably as a result of metallic litter dropped into the water during the establishment phase of the resort.
- e. User surveys: The pattern of human usage of John Brewer Reef was examined before and after the installation of the hotel. User groups surveyed included boat owners, anglers, charter boat operators and researchers. There were no clear-cut results concerning the attitudes of users to the hotel. For most groups there were approximately equal numbers of positive and negative comments concerning the impact of the hotel on their use of the reef. A few users visited the reef specifically to visit the hotel and few people appeared to actively avoid the reef because of the hotel. There was a wide choice of alternative reef sites for users to visit.

- f. Hypothesis testing: Several small projects were completed by post-graduate students or contractors. An examination of the effects of bird droppings on lagoonal water quality showed that no changes were detectable. A study of the effect of shading on fish predators demonstrated that fish aggregated under the hotel, but the role of light in the aggregations could not be determined. Noise from the resort could be detected underwater up to 1 km from the resort, but did not deter fish from aggregating under the hotel. A study of the dispersal of the brine plume showed that only minute increases in salinity of the lagoonal waters could be detected at a distance of 12 m from the discharge point.

At the workshop many suggestions were made concerning possible improvements to the design of the monitoring program with the benefit of hindsight. In particular, there was the view that the monitoring program should be more focused and more intense in particular significant areas. In some areas of the study a reduction in sampling intensity and hence cost could have been achieved without loss of vital information. Another major point was that the detail of the environmental impact study was not matched by detail and accuracy in the economic forecasts, and more attention needs to be paid to social aspects of similar developments in the future.

In summary, the commercial failure of this project did not occur at the expense of social or environmental quality, nor did the provision for social and environmental requirements contribute directly to project failure. Efforts by the project proponents during the design phase to minimise potential environmental impacts were largely successful. The outcome vindicates the emphasis given by management on environmental protection and reinforces the utility of the adaptive management approach used in this project.