

## **CHAPTER 8: REVIEW OF THE WORKSHOP**

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### **Introduction**

In December 1989, a workshop was held at the offices of GBRMPA in Townsville for the purpose of reviewing the status and conclusions of the monitoring program for the John Brewer Reef floating hotel. The aims of the workshop were:

- a. to collect together, for the first time, the participants in the environmental monitoring program and the management agency for an exchange of information and opinions.
- b. in an informal atmosphere, to evaluate the good points of, and any omissions from, the environmental monitoring program; and
- c. to discuss the rationale of the program design as a potential basis for future monitoring programs.

The workshop program and list of participants are included as appendices.

### **Conclusions**

The conclusions based on the written reports are included in each separate chapter. Only the informal discussions at the workshop are presented here.

### **Bommie cropping**

The transplantation of organisms away from the bommies being cropped did not occur in a formal or organised fashion, but rather on an ad-hoc basis by the drilling contractors. This could have been better organised, and finished before the excavation activity started. In future, to minimise impact everything within 30 m of the site of activity should be moved, in the case of an operation similar to that at John Brewer Reef. To improve the information gained from the program, more time should have been allowed for detailed tagging and follow-up surveys to monitor survival of the transplanted corals.

The excavation method was designed to be low-key, with the intention that this would minimise the impacts. Instead, the process was so slow that there were months of low-level sedimentation. Perhaps the controlled use of explosives might have been more satisfactory in the long-term.

### **Environmental Monitoring Program design**

A common impression expressed in the workshop was that the scope of the program was too ambitious. This was reflected in the cost. It may have been more desirable to have a more focused program with greater depth in some specific areas.

Total costs of the program were approximately:

Full year of monitoring	\$150,000
EMP and RMP design	\$ 40,000
Review of EMP	\$ 10,000
Ongoing monitoring	\$ 60,000

There were limitations with the hydrodynamic data produced for the EIS stage of the program. Longer term studies showed that there was a reversal of the flow twice per day in light winds. The data had been used as a basis for sampling design for some of the studies.

### **Biological monitoring**

There were some statistical difficulties with the monitoring design, and it was agreed that a narrower and more intense program may have been preferable. Some of the difficulties arose from comparing a single impact site with several controls. Multiple impact sites would be preferable. If more hydrodynamic data had been available prior to the design phase, the program could have been better designed to take current movements etc. into account.

Overall conclusions were that the removal of the bommie tops did not take away anything biologically unique, although there was some discussion concerning the value of the 'uniqueness' of a particular community type as a determinant of its value when lost. Many of the statistical difficulties were the result of the fact that the communities demonstrated considerable variability, both spatial and temporal within each of the sites, as much as between sites. The increase in rubble on the cropped bommies resulted in a change in the habitat type and an increase in the abundance of small fish. There was no pattern in change of sedimentation evident from sediment trap studies. The use of photographic surveys was begun but not continued when it was concluded that they were not cost-effective.

### **Water quality**

There was no monitoring of chemicals used in the process of production of drinking water by reverse osmosis, e.g. potassium permanganate. Tests for trace metals, oil and grease also were recommended. Lack of responsibility for the operation of the treatment plants was a problem, and some problems would have been alleviated by duplicating the treatment plants in case of failure of one plant. One factor in lagoonal water quality was the discharge of untreated wastes from trawlers routinely anchored in the lagoon.

### **Sediments**

Because the major input into the system was waste blown or thrown off the hotel into the water, it may be possible to modify the design of off-shore structures to catch some of the debris before it falls into the water. The observation that the hotel modified water movement in the vicinity and resulted in a shift in the sediment grain size might similarly apply in other environments, although it was not a problem in this study. Measurement of nutrients in the sediments was of little use compared with water quality measurement. It was suggested that the monitoring of algal growth rate on fouling panels might be an effective biological indicator of excess nutrients in the water, with the results integrated over a longer time period than single water samples.

### **User surveys**

The results of the user surveys may have been affected by the fact that the surveys coincided with the installation and removal of the hotel. The most noticeable result of the study was the paucity of general information on human use of the reef. Information sources were patchy with respect to availability and usefulness of the surveys. It was clear that there were discrepancies between the public's attitude and behaviour, with behaviour providing a more accurate indicator of use.

A major discussion point of the workshop was the need for better evaluation of the economic feasibility of such a project. Initial evaluations supposedly were based on American data. Fortunately there was minimal environmental impact by the hotel -- however there was the risk that impacts could have been incurred without sufficient research on its likely economic success.

### **Hypothesis testing**

Fish feeding became a feature of the hotel operations, although this was not to be allowed according to the original Resort Management Plan (CCM, 1988). There were some faults with the generator so that it could be heard 23 m from the resort. The overall conclusion was that the studies funded under this section of the program represented an over-kill and, in retrospect, were unnecessary.

### **Summary of environmental impact and recommendations for future monitoring**

One major problem was the failure for the duration of the hotel to appoint an on-site environmental coordinator. The primary impacts were from the bommie cropping, an increase in fish populations close to the resort, a change in sediment size under the hotel and a small increase in copper in the sediments. There were no other detectable differences attributable to the hotel.

The sewage system never operated to the manufacturers specifications, and was not operated efficiently. Staff dedicated to the efficient operation of the waste water treatment plants is necessary. Occupancy was, on average, only 20% during the year of the hotel's operations. If occupancy had been higher, the plant may have operated more efficiently. However there is the possibility that more problems may have occurred, and the barge may have been required to remove effluent daily. Dual systems for both small and large loads may be required in the future. Other than the occasional sighting by Coastwatch, there was no monitoring of sea-dumping.

There were impacts on the aesthetics of the area as a result of the dumping of waste material and the production of rubble, in particular from the bommie cropping. The bommies may have been more

efficiently handled with explosives, with less impact, but public perception may have presented a problem. It still would be valuable to monitor the changes in the cropped bommies over time.

There was a minor spill of oil during the operation of the hotel. While this event received considerable publicity in the media, the amount spilled was trivial and had no detectable environmental impact. It was more detrimental to the image of the hotel.

It was suggested that if an environmental audit is done, it should include an economic analysis of the development, and cost-effectiveness of the impact assessment and monitoring program, with respect to the public, government and the developer.

It was concluded that GBRMPA received considerable benefits as a result of the information collected during the study. These included acquiring:

- greater skill in impact assessment and monitoring program design;
- useful experience regarding coral transplantation, recovery and coral substrate removal;
- knowledge of fish behaviour; and
- experience in a variety of monitoring techniques.

It was clear that information on users' attitudes to the reef needs to be expanded. Major work is needed on impact monitoring design and analysis. The design work initiated as a result of this program was continued and expanded for projects in later years.