1994

The Australian floating hotel project - a retrospective analysis

Peter Saenger
Southern Cross University

I M. Dutton

Publication details

Saenger, P & Dutton, IM 1994, 'The Australian floating hotel project - a retrospective analysis', in *Proceedings of the seventh International Coral Reef Symposium : Guam, Micronesia, 22-27 June 1992 / conducted by the University of Guam Marine Laboratory under the auspices of the Committee on Coral Reefs of the International Association of Biological Oceanographers and the International Society for Reef Studies*, Guam, 22-27 June 1992, University of Guam Marine Laboratory, Mangilao, Guam, vol. 2, pp. 1023-1028.

THE AUSTRALIAN FLOATING HOTEL PROJECT - A RETROSPECTIVE ANALYSIS

P. Saenger and I. Dutton

Centre for Coastal Management, University of New England - Northern Rivers, P.O. Box 157, Lismore NSW 2480, Australia

ABSTRACT

The now defunct floating hotel project at John Brewer Reef in Queensland raised many topical, and often novel, challenges for coral reef management. This paper reviews the project history and examines the EIA and Monitoring programmes employed. It is concluded that the project was successful from an environmental perspective but failed as a business venture due to a number of singular factors in combination with inadequate market research. Two key recommendations for future developments of this type are: (a) the need to retain design and operational flexibility, and (b) the importance of an effective working relationship between all parties over the life of the project.

1. INTRODUCTION

The floating hotel project on the Great Barrier Reef (GBR) illustrates a unique combination of engineering, environmental and entrepreneurial approaches to tourism development in a coral reef environment. With rapidly burgeoning demand for offshore tourism facilities (Driml 1988), limited options for facility development and a comprehensive, but changing regulatory system, the floating hotel project faced many challenges.

This paper examines how those challenges were addressed, and considers some implications for other, similar projects. While the particular engineering design, socio-economic and administrative circumstances of the floating hotel project were unusual, the lessons provided by this project represent a valuable complement to

international experience with EIA of offshore development (Beanlands and Duinker 1984) and validation of the general management approach to such developments proposed by Kelleher and Dutton (1985).

2. THE FLOATING HOTEL PROJECT

Genesis

The idea of a floating hotel evolved initially from the geography of the GBR which for the most part, lies some considerable distance and travelling time, offshore. Its direction from mainland ports together with the most frequent prevailing wind conditions necessitates lengthy trips across a side-on swell. Tour operators believed that visitation could be significantly increased with shorter or faster trips, or through the provision of fixed offshore accommodation. Several continental islands had already been developed to cater for tourists as well as two coral cays, and prevailing wisdom (i.e. GBR Consultative Committee; Australian Coral Reef Society; Buckley 1983) was strongly opposed to further tourism developments on coral cays. Two options appeared to remain: build artificial islands or moor structures on or near reefs.

In 1981, a group of Townsville businessmen proposed an artificial island on the GBR, comprised of three partially sunken liners embedded in sand. This proposal was discarded because of potentially unacceptable environmental impacts and the costs of maintenance. The subsequent development of floating accommodation for the offshore oil industry and the military (e.g. Falkland Islands) led the Townsville consortium to investigate the feasibility of locating a luxury version of that floating accomodation in the lagoon of John Brewer Reef, approximately 70 km north-east of Townsville.

Design

Built by Consafe Engineering in Singapore, the floating hotel consisted of a 5-storey self-contained floating building (Table 1), containing 140

double rooms and 34 luxury suites. Floating pontoons adjacent to the main structure served as walkways, and contained moorings, swimming pool and tennis courts.

John Brewer Reef is an almost entirely closed, circular reef with a narrow opening 60 m wide on its northern side. The floating hotel was towed through this opening (after some obstructing coral bommies were removed) and fixed in the lagoon using a single-point mooring system capable of withstanding a 100-year cyclone.

Water depth in the lagoon varies between 6-10 m at low water with a tidal range of up to 2.5 m. The volume of the John Brewer lagoon is approximately 7 x 10^7 m^3 at mid tide and has flushing rates in the order of 80% every five days (Parnell, 1986). Consequently, the lagoon is shallow but well flushed. With the exception of a brine plume from the desalination plant, no liquid wastes were to enter lagoonal waters. All waste water was treated by a package plant on board to secondary standards followed by disinfection. The solids were subsequently incinerated while the treated wastewater was loaded onto a barge and discharged at sea in an area designated under the *Environment Protection (Sea Dumping) Act 1981.*

Gaseous wastes from the incinerator were emitted from a 24 m high stack which modelling had shown (Best 1986) to have virtually no impact on ecological or aesthetic values of the lagoon. All solid wastes were either incinerated at high temperature or returned to the mainland. Additional controls on accidental emissions (e.g. a protocol designed for fuel transfer to and from the floating hotel) were also develped (CCM 1987).

Chronology

The chronology of major events during the project is given in Table 2 and shows that the regulatory context in which the project developed changed continuously. First, federal sea dumping legislation commenced operation in 1984 followed by Queensland state legislation

on this topic in 1986. State legislation covering offshore structures was then introduced, followed by federal legislation. Each set of regulations required permits for a project which had developed to that point without such requirements.

A number of accidental, but often only indirectly related, events occurred during the life of the project which undermined public confidence in the project. The newly acquired high-speed catamaran ('Reeflink II'), designed to carry 400 passengers to the floating hotel, was destroyed by fire before it could service the hotel. Between the arrival of the hotel at John Brewer Reef and its official opening, the hotel was hit by a cyclone and although it suffered no mishap, some of the peripheral structures, such as the floating tennis court, were damaged, delaying the opening to paying guests. Fantasy Island, a totally unrelated floating platform independently installed at John Brewer Reef, sank during a storm two months after the hotel opened. Finally, a large, previously unidentified ammunition dump was found in the lagoon of John Brewer Reef, approximately 5 km from the hotel !

After the company's takeover by Japanese interests (EIE), the floating hotel is moved to Vietnam to alleviate a shortage of quality hotel accommodation in Ho Chi Min City - as evidenced by a >80% occupancy rate (Griffiths, pers. comm.).

Impact Assessment, Management and Monitoring

Under the *Environment Protection (Impact of Proposals) Act 1974,* the Federal Minister for the Environment deemed that, as the project was likely to have significant environmental effects, an Environmental Impact Statement (EIS) was required and a draft EIS was submitted for public review in March 1985. Only six submissions were received in reponse to the draft EIS and the comments were incorporated into a final EIS. In December 1985, a conditional permit to install and operate the floating hotel was given by the appropriate federal agency, the Great Barrier Reef Marine Park Authority.

Conditions of permission included (Dutton 1986):

* development of a resort management plan (CCM 1987);
* development of an environmental monitoring programme (CCM 1988)
* classification of the facility and development of operational standards for matters such as public health and safety;
* insurance and environmental rehabilitation (bond) requirements;
* further research requirements (e.g. on brine plume modelling); and
* operational permission requirements (e.g. on bommie removal).

These requirements were the most comprehensive of any permit granted by the Great Barrier Reef Marine Park Authority (GBRMPA) to that time, and established a precedent for more elaborate environmental impact management regimes now used by the GBRMPA for coastal and offshore development projects (GBRMPA 1991). In developing these requirements, the Authority also began to identify, for the first time, issues which were not capable of resolution under the planning and management regime developed to that time. As a consequence, a moratorium was placed on the further development of such facilities, to enable these permit provisions to be tested and further policy and planning studies to be completed (e.g. Cameron McNamara 1985)

3. EFFICACY OF ENVIRONMENTAL MANAGEMENT

Overview

At a project evaluation workshop held in mid-1989, it was concluded that while the project had proven commercially unviable, it had met all requirements from the perspective of regulatory authorities and the public interest. As the monitoring studies revealed (Saenger 1989), predictions made about the minor nature of bio-physical impacts were validated. Furthermore, the wide range of matters addressed in operational planning and contingency provisions for extreme, unforeseen and accidental events (CCM 1987) proved adequate to limit environmental impacts.

The success of these provisions is due largely to two factors. Firstly, the fundamental concept of a removable structure gave operators and managers flexibility which is unparalleled in most tourism operations (O'Brien 1988). Additionally, and perhaps of greater importance with respect to future proposals of this type, was the deliberate (albeit at times asynchronous) juxtaposition of logistical operations (such as design and commercial management) with environmental management requirements. This iterative approach to tourism development is all too rare, partly because it requires considerable design flexibility throughout the project life cycle and partly because regulatory frameworks are not usually as comprehensive as those established in the GBR Region.

Two key aspects of the environmental management process are, however worthy of further comment. First, on the nature of monitoring programs, and second, on the administration of such programs.

Monitoring Design

An inherent problem with any monitoring program is that comparisons between 'impact' and 'control' sites provide data which can be criticized on statistical grounds - other factors between two such areas are not constant. For valid statistical comparisons, random-block compartments distributed between and around 'impact' and 'control' sites should be compared. However, the comparison of random-block compartments is logistically difficult and costly on the scale of this type of project.

This difficulty was partially overcome by using replicated sets of 'control' sites at varying distances from the supposed source of impact. For other components of the monitoring program, the use of 'before' and 'after' data from identical sites has reduced the statistical difficulties. These measures have considerable merit, and the present monitoring program (CCM 1988; Saenger 1989; McCormick 1991) revealed the value of such an approach.

However, had a source of impact, unforeseen during the monitoring planning phase and located away from the supposed source of impact become apparent, a large segment of the monitoring effort may not be relevant to or useful in assessing the overall impact of such a project. This has not happened in this case, but for the design of further monitoring studies on GBR projects, the possibility of unforeseen impacts arising away from the supposed point source(s) of impact, should be considered.

Administration

Many aspects of the administration of the present monitoring program have not been helpful to the overall program. These include late reports by consultants (perhaps because of slow payment), excessive claims for confidentiality, lack of on-site support and delay in appointment of a reference person (such as an environmental officer, as originally planned) through whom all consultant reports could be channelled. Many of these difficulties arose because an organization (in this case the Resort Owner) without personnel qualified to conduct such a monitoring study, was given the responsibility for the program. This difficulty has now been overcome by the development of a monitoring policy by GBRMPA, under which the management agency assumes responsibility for program design and management (with funding provided by the proponent/operator).

A further aspect of the project administration which caused difficulties was the lack of agreed protocols for the conduct of some studies and/or delays in receipt of approval/feedback on project findings and proposals for changes to project conduct.

While such difficulties were surmountable, they demonstrated the notion that successful tourism projects should be characterised by a partnership approach, in which all involved recognise and respect their particular role requirements (Saenger and Dutton, 1989).

4. IMPLICATIONS FOR SIMILAR PROJECTS

Although the floating hotel project was developed in unique geographic and administrative circumstances, the following general principles which underpinned the design and management of the project are potentially applicable to any offshore tourism development. For convenience, these principles are stated as a set of evaluative questions.

a. Can the environmental impact of such projects be adequately predicted ?

This question has been partially addressed in the above discussion. While the scope of the impacts of the floating hotel at John Brewer Reef was found to have been adequate and within predicted limits, this project was fortunate in having both a capacity to service the rigorous requirements of regulatory authorities (environmental management costs were about 3.5% of the total project budget) and in being located in an area which has been relatively well studied. As a consequence, the extent to which the approach used for this project is transferable to other coral reef situations is questionable, although the notion of employing an iterative approach to design and management is transferable and may serve to overcome limits on knowledge and management resources.

b. Was there an adequate nexus between impact assessment and environmental management ?

This is a common criticism of EIA studies (Beanlands and Duinker 1984) and commonly occurs when project management is apportioned between different sets of parties. In the case of the floating hotel, the major "players" were limited in number, and the over-riding control of a single management agency (GBRMPA), coupled with scientific input from a core group (Centre for Coastal Management) over the entire life of the project considerably simplified co-ordination of impact assessment and management. For other projects of this type, similar,

simple project management arrangements are highly desirable, and have already been proposed in various studies using the form of a lead agency system.

c. What were the major limitations of the approach to project development ?

The main reasons for the failure of the project were largely commercial ones. The project failed to attract a viable client base, suggesting either inadequate market research, poor choice of location, inappropriate facilities, competing attractions, or a combination of these factors. While these are inherent in any commercial venture, they emphasize the risky nature of new types of tourism development and further justify the conservative approach of the management agency (which required sureties in the event of failure). Such sureties have now gained wider acceptance (e.g. O'Brien 1988) as an important basis for environmental protection.

d. With the relocation of the floating hotel, did any irreversible effects remain ?

While the single most important effect of tourist developments in the coral reef environment is that of a decline in local water quality, to date, it appears from the results of the monitoring programme, that such effects have been avoided at John Brewer Reef (Saenger 1989; McCormick 1991). In fact, the most notable 'after effect' was that with the removal of the floating hotel, fish aggregations which had been formed as a result of daily feeding, had to be protected from overfishing at the site for a 12-month period. This was achieved by the declaration of a 'no fishing' zone over the site under Queensland fisheries legislation.

5. CONCLUSION

The growing emphasis (e.g. Dutton et al. 1990) on sustainability of resource use poses many challenges for managers of complex natural

systems such as coral reefs. As Barbier (1987) observed, sustainability implies a commitment to the use of multiple objective criteria (economic, social and environmental) in decision-making. Such criteria are implicit in the objectives of the GBRMPA and were reasonably well demonstrated at the project level in the case of the floating hotel. As was shown during this project, however, it is extremely difficult for all factors to be given adequate attention, with commercial factors in this case ultimately resulting in project failure.

It is notable, however, that unlike many other natural resource management examples, commercial failure 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.

This outcome vindicates the emphasis given by management to environmental protection, but makes the simple extrapolation of this experience to other coral reefs problematical. Nonetheless, many of the lessons from this project are potentially transferable to tourism management elsewhere, and ancillary project outcomes (e.g. increased knowledge of impacts of structures, waste management technology, etc.) reinforce the utility of the adaptive management approach used in this project.

ACKNOWLEDGEMENTS

We thank Barrier Reef Holdings Pty. Ltd. (particularly the Chairman of Directors, K. Griffths) for permission to report on information collected on their behalf. We also thank Dr. D. Gartside for comments on an earlier draft.

REFERENCES

Barbier EB (1987) The Concept of Sustainable Economic Development. Environmental Conservation 14: 101-110

Beanlands GE, Duinker PN (1984) Lessons from a Decade of Offshore Environmental Impact Assessment. Ocean Management 9: 57 - 175

Best P (1986) The impact on air quality of emissions from the proposed coastel, John Brewer Reef, Great Barrier Reef. Unpublished report commissioned by Barrier Reef Holdings Ltd., pp. 30

Buckley R (1983) Environmental Implications of Engineering Works on the Great Barrier Reef. Proc. 6th Aust. Conf on Coastal and Ocean Engineering, Gold Coast, pp. 3

Cameron McNamara (1985) Guidelines and Methodologies for Environmental Assessment of Offshore Developments. Report to GBRMPA. unpub.

Centre for Coastal Management (1987) Resort Management Plan for the Floating Hotel at John Brewer Reef. Report for Barrier Reef Holdings Ltd., pp. 21

Centre for Coastal Management (1988) Environmental Monitoring Program for the Floating Hotel at John Brewer Reef. Report for Barrier Reef Holdings Ltd., pp. 23

Driml S (1988) Great Barrier Reef Tourism: A Review of Visitor Use, Research Publication Series, GBRMPA, Townsville.

Dutton IM (1986) The Floating Hotel at John Brewer Reef. J. Inst. Eng. Aust. 58: 35 - 38

Dutton IM, Davis D, Holmes N (1990) Sustainable Utilization of Australia's Coastal and Marine Areas. PACON 90. Volume II. Tokyo July 16-20. pp. 321-326

GBRMPA (1991) Annual Report 1990-91, Great Barrier Reef Marine Park Authority, Townsville

Kelleher G, Dutton IM (1985) Environmental effects of Offshore Tourism Developments on the Great Barrier Reef, Proc. 5th Int. Coral Reef Congress, Vol. 6, Tahiti, pp. 525-530.

McCormick MI (1991) Biological monitoring program for the Four Seasons Barrier Reef Resort at John Brewer Reef: The second post-hotel survey. Report for GBRMPA, pp. 24

O'Brien B (1988) Guidelines for Tourist Developments. WATC and EPA, Perth

Parnell KE (1986) Modelling of the brine plume from the proposed floating hotel - John Brewer Reef, Great Barrier Reef. Centre for Coastal Management, Lismore, pp. 20

Saenger P (1989) Overview of the Monitoring Programme for the Floating Resort at John Brewer Reef, Great Barrier Reef: May 1987-May 1989. Report for Barrier Reef Holdings Ltd., pp. 21

Saenger P, Dutton I (1989) (eds) Environmental Management of Tourism in Coastal Areas. SEAMEO-BOTROP/UNESCO, Bogor

Table 1: Project specifications of the floating hotel

Length	89.2 m
Width	27.6 m
Height from sea level	24.2 m
Draught	3.0 m
Freeboard	3.0 m
Ballast capacity	4000 t
Fuel oil capacity	200 t
Potable water supply	150 t/day
Generating capacity	2300 kW
Guest accommodation	356
Staff	98

Table 2: Chronology of major events in the life of the floating hotel project - 1981-1989.

Oct. 1981	Great Barrier Reef awarded World Heritage listing
Nov. 1981	Preliminary engineering assessment prepared for the 'Great Barrier Reef City' - a resort comprising three ocean cruise ships permanently placed on the sea bed of John Brewer Reef, together with an artificial sand cay and underwater walk tubes, with facilities for 3,000 guests.
Mar. 1983	The concept of a floating hotel first conceived by a group of Townsville businessmen
Mar. 1985	Draft EIS for floating hotel completed and submitted for public review.
Dec. 1985	Conditional permit (G701) issued by the GBR Marine Park Authority. *Queensland Marine (Sea Dumping) Act* gazetted
Apr. 1986	A ten-year contract for the marketing and operation of the resort awarded to Four Seasons Limited.
Jun. 1986	Construction of floating hotel commences in Singapore
Aug. 1986	*Off-Shore Facilities Act (Qld.)* gazetted.
Sep. 1986	Barrier Reef Holdings Limited listed on Australian and New Zealand stock exchanges
May 1987	Baseline survey of lagoon biota carried out. Permit (G87/153) issued by GBRMPA for the cropping of bommies in the vicinity of the hotel site
Jul. 1987	EMP independently reviewed. Monitoring of bommie cropping operation in lagoon. Reeflink II burns off Magnetic Island
Sep. 1987	Report on the success of coral transplanting received
Oct. 1987	Zoning Plan for Central Section of GBR Marine Park gazetted. *Sea Installation Act* was passed by the Federal Government to provide regulatory regime for sea installations in waters adjacent to Australia. BRH issued with an Exemption Certificate under this Act pending the issue of a full permit.
Dec. 1987	EMP and RMP accepted by the GBRMPA. Permit (G97/416) to operate the resort issued to BRH. BRH scholarships advertised nationally.
Jan. 1988	First water quality baseline surveys undertaken. Permit to discharge treated wastewater at sea granted under *Environment Protection (Sea Dumping) Act 1981.* Resort arrived from Singapore and is installed in John Brewer Reef lagoon
Feb. 1988	Cyclone 'Charlie' passed over resort
Mar. 1988	Resort commenced to operate
May 1988	Fantasy Island sinks in John Brewer Reef lagoon
Jul. 1988	BRH announce $7.89 million loss for 87/88 financial year
Sep. 1988	Resort put on the international market. Large WWII ammunition dump found in John Brewer Reef lagoon

Apr. 1989	BRH becomes subsidiary of EIE
Aug. 1989	Overview report on EMP covering May 1988-89 finalised.
	Floating hotel arrives in Ho Chi Minh City on the Mekong River, Vietnam.
Dec. 1989	Hotel officially opened to guests in Ho Chi Minh City.
Aug. 1990	Final post-hotel survey of benthic communities of the lagoon found no adverse effects from presence or removal of floating hotel.