

THE SIGNIFICANCE OF CYCLONIC EVENTS TO MANAGEMENT OF THE GREAT BARRIER REEF MARINE PARK

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INTRODUCTION

Cyclones are one of the most significant short-term natural influences shaping the Great Barrier Reef. Since 1984, some 14 cyclones rating category 3 or greater on the Saffir-Simpson scale have affected the north-eastern coast of Queensland.

At the North Queensland Cyclonic Conference held in Townsville in November, 1985, the Queensland Regional Director of the Bureau of Meteorology noted, somewhat prophetically, that it is now some 14 years since a major cyclone has impacted the Queensland eastern seaboard (Falls, 1985).

The Director's prophesy was realised on February 1, 1986, when cyclone Winifred crossed the North Queensland coast south of Innisfail. We will hear later in this workshop that Winifred ranked as one of the most severe since European settlement of the North Queensland region.

From the viewpoint of the Great Barrier Reef Marine Park, Winifred was a very significant event. This point will be expanded later in this paper. However, it is worth noting that the goal of the Great Barrier Reef Marine Park Authority is to provide for the "protection, wise use and enjoyment of the Great Barrier Reef in perpetuity through the development and care of the Great Barrier Reef Marine Park". This goal obligates the Authority to carefully consider the influence of extreme events such as cyclones, relative to the effects of other phenomena (such as human use) and reinforces the importance of the Marine Park concept to long-term conservation of the Great Barrier Reef.

It should also be noted that Winifred was a scientifically significant event. For the first time in the Great Barrier Reef Region detailed scientific information is available, based on before and after surveys of the affected offshore area. Through the auspices of research groups mainly from the James Cook University of North Queensland and the Australian Institute of Marine Science, researchers in North Queensland are well placed to assess the significance of cyclone Winifred.

WINIFRED - A CHANCE EVENT?

While Winifred was the catalyst for much of the scientific research we will hear about later, it should be kept in mind throughout this workshop that Winifred was a chance event both spatially and temporally. As Winifred passed through the Reef tract between 1900 and 2200 hrs, there was a low tide of around 0.82 m at 2100 hrs. The coincidence of seas with a mean wave height in excess of 5 m with the low tide may have maximised physical damage to reefs in the cyclone path.

John Oliver noted in 1974 that the recurrence period for damaging cyclones to a particular locality on the most actively affected parts of the Queensland coast is 20 to 30 years.

On the basis of this information, it is therefore an appropriate question for this workshop to consider later is to what extent can we extrapolate the findings made relative to the impact and severity of Winifred?

CYCLONES AS A SHAPING FORCE

Within days of cyclone Winifred crossing the coast, the Authority arranged for an aerial reconnaissance of coastal and offshore areas. This survey provided little quantitative data. However, it provided useful insights into the extent of influence of the cyclone. For example, the study revealed the extent of influence of coastal flood discharges. Many of the mid-shelf reefs north and south of the cyclone path were noted to be directly influenced by these discharges.

This finding underpins the value to management of studying cyclonic events. As short-term, extreme natural phenomena, they offer a means of investigating ecological patterns and processes which in many cases are subtle or long-term. Another example of direct relevance is the comprehensive research and monitoring program that the Authority has commissioned to assess the effects of sediment exported from the Cape Tribulation to Bloomfield Road on adjacent fringing reefs. Design of the study was complicated by the lack of knowledge of the dynamics of fringing reefs.

A recent extreme influence on these reefs was cyclone Manu. Although that cyclone dissipated offshore, during the period it was positioned offshore from Cooktown, it generated large waves, and was also responsible for the very high rainfall experienced in the Cape Tribulation region. Preliminary surveys on the road project have provided some measure of the extent of these influences. The surveys indicate that such events play a major role in determining the structure, composition and extent of reefal communities. Conversely, Manu has further complicated interpretation of the research and monitoring program results.

MANAGEMENT SIGNIFICANCE

The Authority's goal is to provide for the protection, wise use, appreciation, and enjoyment of the Great Barrier Reef in perpetuity through the development and care of the Great Barrier Reef Marine Park. This involves making provision for sustainable use which will not exceed the repair or replacement capacity of the Reef. Cyclones can have a significant effect on the Reef which, in many cases, can probably be regarded as damaging. It is the Authority's responsibility to ensure that the added impact of human activity does not push the balance of the reef ecosystem beyond its capacity for repair and recovery.

The influence of cyclones such as Manu and Winifred on the offshore Great Barrier Reef typically receives little attention by the community at large. While a cyclone may track many hundreds of kilometres along the Reef tract, most concern is generated when the cyclone turns to cross the coast. Offshore industries such as tourism and fisheries are exceptions to this general trend. They have, in the main, learned to live with such phenomena by the adoption of appropriate design, construction and operation techniques.

However, as we will hear later, based on reports compiled by the Authority, there would appear to be a need for further refinement of such techniques. This workshop should consider how this may be achieved, as the Authority has a strong commitment to ensuring safe, sustainable use of the offshore resources of the Great Barrier Reef.

Other aspects of the management significance of cyclones which merit consideration at this gathering are, socio-economic aspects, including factors such as:

- The cost of cyclones to offshore industries. What level of protection against such damage is warranted, and how is it best achieved?
- The impact of cyclones on offshore activities. For example, are cyclones a limiting factor on offshore tourism?
- The perception of cyclones. For instance, how are cyclones perceived relative to other influences such as crown of thorns starfish outbreaks and the presence of box jellyfish?

It is unlikely that these questions can be adequately addressed at this workshop to provide a more balanced assessment of socio-economic factors. The majority of presentations deal with biophysical factors, largely reflecting the interests of those undertaking the studies. Perhaps future studies could be more comprehensive and better address these aspects.

CONCLUSION

This workshop has two primary objectives;

- to review what was learned from studies of the offshore effects of cyclone Winifred; and
- to review the significance of those findings in the context of our understanding and management of the Great Barrier Reef Region.

Both involve challenging but important questions. This workshop is the first attempt to comprehensively address such questions. Regardless of the limitations of the information available, this workshop will provide an important benchmark for future management reference. It should also provide invaluable guidance on further areas of investigation to assist contingency planning for future cyclonic events in the Great Barrier Reef Region.