FREE
NO 27
ISSUE

REEFLECTIONS

Great Barrier Reef Marine Park Authority

JUNE 1992

NEW CAIRNS ZONING
PLUS Lift-out Guide

A 25-YEAR STRATEGIC PLAN
for the Great Barrier Reef World Heritage Area

NO 27 REEFLECTIONS
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How well will the Great Barrier Reef World Heritage Area cope with the demands placed upon it by people in the future? What, for example, will the coastal World Heritage Area, tourism, fishing and mariculture in the World Heritage Area look like in 25 years time and how will management agencies be applying new technology, research and monitoring results to their activities? No-one knows the answer for certain, but we can go a long way to **making** it look the way we want it to look. This is why the Great Barrier Reef World Heritage Area Strategic Plan has been started, so that collectively user and interest groups, groups with activities outside the World Heritage Area which might have an interest in it, management agencies, local government, Aboriginal and Torres Strait Islander communities can create the future they want to see for the World Heritage Area.

A draft of the 25-year ideal vision for the World Heritage Area, 25-year objectives and strategies and the translation of these into 5-year objectives and strategies, put together through an exhaustive (and exhausting!) series of workshops involving the representatives of the groups mentioned above, will be released for public comment in May. For more information on the plan and how to receive your copy of the draft, see pages 3 and 4. We hope that the plan will be finished by October 1992. To ensure that the plan belongs to all those who are developing it, an independent facilitator/ chairperson, Kayt Raymond of Kayt Raymond & Associates, has been employed to advise on strategic planning and the project design and run the workshops.

The offshore Cairns area has already experienced a massive growth in tourism which was not foreseen when we drew up the first zoning plan for the Cairns Section of the Great Barrier Reef Marine Park. In reviewing that zoning plan, we have tried to take account of that growth and to provide scope for future growth, without compromising the conservation of the Reef or the activities of others. As the zoning plans for the Cairns Section of the Great Barrier Reef Marine Park and the inshore Cairns Marine Park were launched on 3 April by the State Minister for Environment, Pat Comben, a large part of this *Reeflections* is devoted to providing information on the zoning process for the Cairns area.

Wendy Craik

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Front Cover: Low Isles are a popular tourist destination from Port Douglas with a daily cruise taking visitors there each year. The Isles provide variety in two wooded areas, a small cay and a mangrove area.

Reeflections is published twice a year by the Great Barrier Reef Marine Park Authority. It does not necessarily represent the views of the GBRMPA.

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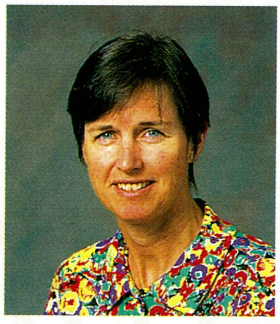
NEW EXECUTIVE OFFICER FOR GBRMPA

Dr Don Kinsey will retire from the Authority at the end of July after seven years as Executive Officer. He and his wife Barbara will live on their macadamia and pecan plantation near Nimbin in northern New South Wales. As well as being a farmer he hopes to remain active in matters relating to the ecology and management of coastal systems.

Dr Wendy Craik, formerly Director of the Planning and Management Section of the Authority, has been promoted to the Commonwealth Senior Executive Service and to the position of Executive Officer as Don's replacement. Wendy has been with the Authority for thirteen years, and was Director of the Research and Monitoring Section for six years.

Wendy took over the new job in April to free Don to work with the Authority, the Australian Institute of Marine Science, and James Cook University to jointly develop a proposal to be submitted to the Commonwealth Government for the establishment of a Cooperative Research Centre, focussing on the sustainable development of the Great Barrier Reef. If successful, the Centre will develop programs of research which will be largely driven by industry and user needs.

Dr Don Kinsey



Dr Wendy Craik

MORE $$ FROM QUICKSILVER FOR GREAT BARRIER REEF AQUARIUM

Quicksilver Connections has donated a further $10,000 to the Great Barrier Reef Aquarium to boost marine education and research. This was the third donation by the company as part of the $50,000 pledged to the Aquarium's Quicksilver Discovery Room over a five-year period.

Great Barrier Reef Marine Park Authority Chairman, Graeme Kelleher, said the development of the Discovery Room made possible by Quicksilver had greatly enhanced the overall marine education program run by the Aquarium.

'Since the Room was established it has made a significant contribution to the general public understanding of reef ecology and management of the Marine Park,' Mr Kelleher said, 'I particularly like the positive effect it has had on the future decision-makers of Australia – the school children.'

The Discovery Room is a venue for Aquarium school programs and also offers visitors a hands-on look at reef life.

REPORT ON REEF WATERS

The Queensland and Commonwealth Governments will prepare Australia's first report card on the state of the coastal and marine environment.

Government representatives agreed at a recent meeting of the Great Barrier Reef Ministerial Council in Canberra that this first State of the Marine Environment Report in Queensland would become a model for the rest of Australia.

The Commonwealth Minister for the Environment, Ros Kelly, and her Queensland counterpart, Pat Comben, said both governments regarded water quality as the most important environmental issue in the Great Barrier Reef Region.

Mrs Kelly, who chairs the Ministerial Council, said the maintenance of water quality was vital for the continued health of the Reef, tourism and fishing.

'The threat to water quality comes from nutrients generated by a range of activities. Research is underway to measure the magnitude of various sources. We are determined to make sure that our waters do not become degraded, as they have in other parts of the world,' Mrs Kelly said.

'The first step in managing water quality is to undertake long-term research and compile a State of the Marine Environment Report.'

OCEAN RESCUE 2000

In November 1990, the Prime Minister announced at the IUCN General Assembly in Perth that 'the Australian Government has decided to work towards the expansion of Australia's marine reserve system. In assocation with State and Territory governments, we will investigate the establishment of a national, representative system of marine protected areas for Australia that will protect these areas, while permitting appropriate uses and promoting public education'.

Following this statement, the Commonwealth Environment Minister, Ros Kelly, announced that the Government had initiated a ten-year marine conservation program called Ocean Rescue 2000. This program is administered by the Department of the Arts, Sport, the Environment and Territories (DASET) which has overall policy reponsibility. Funding of $1.75 million has been allocated for the first year of the program, $650,000 of which will be used for the national representative system of marine protected areas. This national system will comprise a selection of marine areas chosen on the basis of representing all major marine biogeographic types around the Australian coastline and in territorial waters. Elements of this system already exist, including the Great Barrier Reef and Ningaloo Marine Parks. Such areas are expected to be intact, large and functioning ecosystems.

Reeflections will feature an in-depth series of articles on Australia's marine protected areas in the next edition.

TORRES STRAIT BASELINE STUDY

The proceedings of the Torres Strait Baseline Study conference, held in November 1990, have now been published by GBRMPA. They will be relevant to anyone interested in understanding the complex environmental, biological and physical factors which impact on Torres Strait. Copies of the publication may be obtained from the coordinator of the study, Dr David Lawrence (077 818811).

STOP PRESS

COMMENT INVITED ON DRAFT STRATEGIC PLAN FOR GREAT BARRIER REEF WORLD HERITAGE AREA

Obtain a copy of the draft and have input into the development of the final plan.

Phone/fax/write now to:

Strategic Planning Team
c/- Great Barrier Reef Marine Park Authority
PO Box 1379
TOWNSVILLE QLD 4810
Phone: (077) 81 8811 Fax: (077) 21 3445

Your input is needed now, so please take action today.
Closing date for receiving comments 3 July 1992.

NEWS AND NOTICES

A 25-Year Strategic Plan for the Great Barrier Reef World Heritage Area

A long term strategic plan is being developed by the people of Australia for the Great Barrier Reef World Heritage Area. The plan will establish the direction for the Area's use and protection into the 21st century.

The Great Barrier Reef World Heritage Area is a special place. Inscribed as a World Heritage Site under the prestigious UNESCO convention to protect the world's outstanding cultural and natural heritage areas, the maze of reefs and islands is seen as one of the great natural wonders of the world. The Reef is also protected by the world's largest marine park.

To conserve the Area's rich natural resources while adhering to the principles of ecologically sustainable use, a vision of how Australians want this World Heritage Area to look in 25 years has been created. Local residents, Aboriginal and Islander communities, recreational and commercial user groups, scientists, conservation groups and management agencies have worked to create this vision.

Together, they are developing a 25-year strategic plan for the Area's future. This is also being translated into a five-year plan which will provide direction for the planning of management agencies and interest groups.

Public support for this plan is essential for its success. Consultation between government, private and voluntary agencies is paramount, as is public participation in the development of the plan itself.

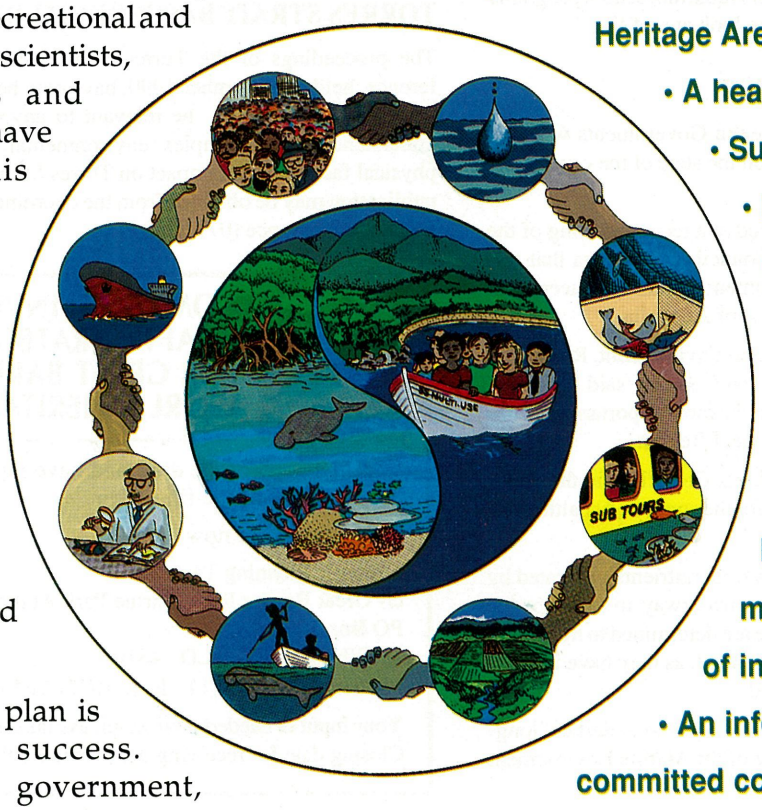
You are invited to have input into the final plan by commenting on the recently released draft. You will need to obtain a copy now.

Phone/fax/write to:
Strategic Planning Team
c/- Great Barrier Reef Marine Park Authority
PO Box 1379
TOWNSVILLE QLD 4810
Telephone: (077) 81 8811
Facsimile: (077) 21 3445

Closing date for receiving comments 3 July 1992.

In 25 years the Great Barrier Reef World Heritage Area will have:

- **A healthy environment**
- **Sustainable multiple use**
- **Maintenance and enhancement of values**
- **Integrated management**
- **Knowledge-based but cautious decision making in the absence of information**
- **An informed, involved, committed community**



ZONING the Cairns Section

INTRODUCING THE NEW PLAN

It is timely to explain again why and how zoning operates as a major means of managing the Marine Park. Peter McGinnity, Acting Director of the Planning and Management Section, gives an explanation below of why a zoning plan was needed in the first place and why the review was necessary.

In 1974 a report was prepared for the Commonwealth Government reviewing the Australian National Estate and the importance of protecting certain areas. That report, known as the Hope Report, stated that the Great Barrier Reef is possibly the most important and unique feature of the Australian coastline. The Government of that time recognised that threats to the continuing existence and health of the reef are many, but that, with proper management, no problem is insoluble.

The Great Barrier Reef Marine Park was established, under Federal legislation passed in 1975, to ensure that any threats to the Reef are addressed, with zoning plans being the corner stone to that management. Zoning plans are the mechanism to provide for conservation and reasonable use; to limit some activities to specific areas or to ways which ensure that their impacts are minimal; to separate conflicting activities; to exclude unacceptable activities; and to establish scientific reference areas.

The first Cairns Section Zoning Plan was prepared in 1982-83. Since that time uses of the Reef have changed and our scientific understanding of the Reef itself has improved quite substantially. In the area offshore from Cairns, a major increase in tourism, the use of high-speed catamarans carrying hundreds of passengers and the advent of reef pontoons have introduced a new range of management issues which were not apparent at the time the initial zoning plan was being prepared.

Knowledge of spawning sites and dispersal patterns for many marine species has also improved significantly, necessitating some modification of the management strategies to protect these key ecological processes.

Some of the major initiatives incorporated in the revised zoning plan are:

- the introduction of a No Structures Subzone which ensures that, while structures may be placed on some reefs, not all reefs are available for this purpose;
- provision of protection from fishing at significant reef fish spawning sites;
- establishment of areas for research into the effects of fishing; and
- protection of reefs which are important sources of larvae.

A detailed tourism management strategy has been prepared for reefs off Cairns to accompany the zoning plan. In addition, the zoning plan continues to:

- protect critical habitat such as feeding areas for dugong;
- specifically provide for the traditional hunting practices of Aboriginal and Islander peoples;
- maintain sites for diving and reef appreciation which are protected from fishing and collecting;
- meet the requirements for reasonable access for fishing and collecting.

Did you know?

The Great Barrier Reef Marine Park covers an area of 344,000 km^2 and is the world's largest marine park, and the world's second largest protected area, covering an area larger than Victoria and Tasmania combined.

The Great Barrier Reef is the world's most complex expanse of living coral reefs, and contains approximately 1500 species of fish, some 400 species of hard and soft coral, numbers of endangered species such as dugong, 6 species of sea turtle, and is the breeding ground for humpback whales.

WHY DO WE NEED ZONING?

If there were no adverse impacts on the Reef and its lifeforms, and no conflicts of use between different groups, then there would simply be no need to zone the area to control and separate the various uses.

Impacts and use of the Great Barrier Reef Region have changed in recent years. With greatly increased activity along the coastline, both terrestrial and marine, significant increases in fishing effort and the current boom in tourism, it is important to ensure that impacts are not excessive or irrevocably damaging over significant areas.

No zoning can regulate against the impacts of natural events, such as cyclones, but it can, and does, manage human impacts. The main people impacts are from discharge from boats, island resorts or agricultural and urban developments on the coast, dredging, fishing, collecting, and tourism structures and activities.

It is far better to prevent damage occurring in the first place, rather than attempting repairs after the Reef has been damaged, possibly irreversibly. The aim of zoning, then, is to strike a balance – to conserve the reef and to ensure all use of the reef is reasonable, by planning ahead. The technical jargon for this is 'ecologically sustainable use'.

Another way zoning has of balancing conservation and human exploitation is to separate activities that would conflict with one another to the detriment of the uses themselves, let alone to the Reef.

How is a zoning plan prepared?

The Marine Park is divided up into four sections: Far Northern, Cairns, Central, and Mackay/Capricorn. Each of these sections has its own zoning plan. Zoning plans have about six zones, ranging from 'General Use', where most activities are allowed, to 'Preservation' where almost no-one can go.

Developing a zoning plan is a complex process. Its processes of data gathering and analysis, and its consultation period generally take over two years to complete. And, since the next review of that plan won't begin for five years, the plan must be able to remain up to date for at least seven years, often in times of great change.

The pontoon at Norman Reef for day trip visitors from Cairns

Did you know?

The Great Barrier Reef is recognised through-out the world as a very special place.

It was inscribed on the World Heritage List in 1981, and declared a 'Particularly Sensitive Area' by the International Maritime Organisation in 1990.

The preparation of zoning plans has to proceed through five steps:

- GBRMPA gathers information about what's in a particular Reef area and how it's currently being used. It compiles an inventory of the area's physical, chemical, biological, human and human-built resources. It then analyses the effects of the current uses upon these resources and tries to predict the effects of future levels of use;
- Public Input Phase 1: comments are invited from the public on GBRMPA's findings and on how they would like that part of the Marine Park zoned;
- a draft zoning plan is prepared that takes these comments into account;
- Public Input Phase 2: the draft is given to the public for further comments;
- GBRMPA takes the public comments into account and makes a decision on the plan;
- GBRMPA issues its plan for Ministerial and Parliamentary approval, before it becomes law in that particular section of the Marine Park.

CONSERVATION OF THE NATURAL ENVIRONMENT

The Cairns Section is a relatively small and intensively used section of the Park, part of a World Heritage Area which exists alongside another World Heritage Area – something that happens nowhere else in the world. It is essential, therefore, to maintain the ecological qualities and biodiversity of such a natural environment. The new zoning plan attempts to achieve this in a number of ways:

Reef and rainforest World Heritage Areas meet magnificently near Cape Tribulation.

Protection of Important Source Reefs of Larvae

Scientific modelling studies have allowed the Authority to refine the zoning to take into account the relative values of individual reefs as sources of larvae for adjacent reefs. This important information had not previously been available and the resultant zoning changes protect the most significant reefs from exploitation.

Habitat Protection

The new zoning plan includes the introduction of the Habitat Protection Zone, which extends over large blocks of reef, seagrass and deeper water habitats, protecting large areas from activities that may cause disturbance. These areas provide very significant habitat for dugong, turtles, commercial species such as prawns, and a variety of other fauna.

While this zone is similar to the old General Use B Zone, the change of zone name and objective more clearly focus on habitat. Similar protection is provided in the Conservation Park, National Park and Preservation Zones.

Protection of Threatened Species

The Starcke River area of the Cairns Section is home to 20 per cent of all known dugong in the Great Barrier Reef Region. They are legally hunted under permit by Aboriginal and Islander people from several Trust areas and are also sometimes accidentally caught in commercial gill nets and shark nets set for the protection of swimmers near major population centres.

A number of actions have been implemented to protect dugong in the Cairns Section. These include:

- protection of seagrass habitats;
- a five-yearly program to resurvey dugong populations;
- surveys of the extent of seagrass beds;
- investigation into areas where gill-netting occurs;
- development of public education programs; and
- requirement of permits for shark netting programs.

These actions, together with a proposed Reef-wide Dugong Management Plan will serve to maintain a viable population of this vulnerable species.

Important bird nesting sites have been identified throughout the Cairns Section. Seasonal Closure Areas have been proposed surrounding a number of sites. Within a Seasonal Closure Area most activities are prohibited (except some research).

Maintenance of Water Quality

In the Cairns Section the major threats to habitats are through physical disturbance e.g. reclamation, dredging, indiscriminate trawling or through degraded water quality changing the nutrient, turbidity or sediment regimes. The protection of seagrass beds is an important and widely supported aim of the zoning plan. Controls on waste discharge and works such as dredging are in place to protect these habitats. Sewage discharged into the Marine Park from tourist resorts on Great Barrier Reef islands must now have tertiary treatment (removal of nutrients – nitrates and phosphates). Research and monitoring of the effects of these nutrients on the Great Barrier Reef is one of the major research programs currently being coordinated by GBRMPA.

The waters of the reef provide an important shipping route, with over 2000 ships passing through them every year. Compulsory pilotage legislation came into force in October 1991 which means that, in certain areas of the Great Barrier Reef, vessels over 70 m, and all loaded oil tankers, must carry a pilot who has particular expertise and detailed knowledge of that particular area. This is considered the most practical means of reducing ships grounding and the risk of serious pollution in the Great Barrier Reef.

PROVIDING FOR REASONABLE USE

Tourism

The main activities in the Great Barrier Reef Region are tourism and fishing. Of the four sections of the Marine Park, the Cairns Section has been the most dramatically affected by the tourism upsurge along the Queensland coast over the last decade. The holiday infrastructure in the Cairns area continues to develop to cater for more and more people at a greater rate than most other holiday destinations in the country. The number, size and speed of vessels have increased, providing quicker access to a greater number of areas and more distant areas for larger numbers of people.

When the first zoning plan for the Section came into force in 1983, no one could have foreseen how much pressure would be placed on the natural beauties of the most popular sites by the sheer weight of tourist numbers. More and more people and companies, large and small, Australian and overseas, have moved into the area to set up a wide variety of tourist operations. They are competing with one another for the right to use the Reef and the rainforests for their clientele.

But the very nature of increased competition has presented a conundrum for managers: given the limited areas available and the number of operators that want to use them, how can we continue to protect the Marine Park and the international reputation for a quality tourist experience in an untouched 'natural' environment?

Cairns is a world famous centre for game fishing.

When the review for the zoning plan for the Cairns Section commenced, GBRMPA believed that a strategy was needed to provide for the continued growth in tourism, to manage conflicts and to ensure that a range of tourism experiences continues to be available in the Marine Park.

A detailed tourism management strategy has been prepared to complement the zoning plan. It provides guidance for the issue of permits and identifies management strategies. Management issues are identified for each reef and the priority for the development of management plans for each reef is determined.

Fishing

Fishing is one of the most popular recreational activities undertaken in the Cairns Section. Line fishing, spearfishing, bait netting, crabbing, light tackle and game fishing are all popular throughout the section. The number of people recreationally fishing has increased dramatically in the past ten years and catches have fallen.

Commercial fishing (including trawling, trolling, demersal line fishing, netting, longlining, droplining and crabbing) is also widespread throughout the section. The Queensland Fish Management Authority estimates the capital value of the local fleet to be $94m, with a further $6m invested in associated equipment.

Combine the two, and the danger of overfishing has become very real indeed. Fisheries management agencies and GBRMPA are constantly reviewing the current fisheries management practices to determine whether they require further refinement. The new zoning plan has taken into account all available evidence to protect the resources of the Cairns Section while providing reasonable opportunity for fishing to continue.

Apart from measures to ensure species diversity and ecological integrity of the Reef, there are a number of measures designed to maintain ecologically sustainable fishing practices:

Habitat protection – Potentially destructive fishing practices are precluded from sensitive areas e.g. seagrass areas and inter-reefal waters which are important feeding grounds are closed to trawling.

Prevention of overfishing – Measures include:

- gear restrictions e.g. limits in net sizes;
- bag limits e.g. no more than five of a species of shell or aquarium fish to be collected;
- only limited fishing is allowed 'to catch a feed' in the Conservation Park Zone, which is primarily a recreational area associated with camping islands; and
- closed areas provide refuge areas for fish and protect spawning sites.

Protection of threatened species e.g. large cod.

Research into the effects of recreational and professional fishing, including research into water currents and the movement of larvae between reefs (referred to as **sink/source** data).

Fisheries Experimental Areas allow for research into the effects of certain fishing practices. The current research emphasis is on reef line fishing and prawn trawling.

The new zoning plan, therefore, is not just a plan that seeks to manage the existing cirumstances of the Section, but one that *plans* for the future. The adverse changes that people make are very often long term, if not irreparable. GBRMPA hopes that it will be able to cater for the rightful demands by reasonable users of the Reef through the development of a plan which meets the changing developments of the Cairns Section.

MAINTAINING CULTURAL & HERITAGE VALUES

Three Aboriginal Trust areas lie adjacent to the Cairns Section (Hopevale, Wujal Wujal and Yarrabah). Traditional hunting and fishing by Aboriginal people resident in these communities is currently permitted in all zones in the Cairns Section except Preservation Zones.

Permits for traditional hunting or fishing are issued to the community, through the community council, with a number of specific permit conditions. These include a prohibition on the use of firearms or noxious substances, a prohibition on the sale or barter of any product caught, and a request for data on any dugong or turtle caught.

The dugong is of great cultural importance to the Aboriginal and Torres Strait Islander people of northern Australia. Dugongs are hunted for their meat, and dugong oil is also used by older people as a cure for aches, pains or illnesses. Dugong meat is shared throughout the community and is an important food at ceremonial occasions and feastings, particularly those associated with tombstone openings, marriages and community gatherings.

Dugong hunting is a recognised cultural use of the Marine Park.

GBRMPA believes that the plan has taken steps to recognise the customary rights of Aboriginal and Islander people. However, there can be no doubt that further ways to improve opportunities for traditional users of the Marine Park must be investigated. Staff of GBRMPA and Queensland Department of Environment and Heritage are currently investigating ways to improve liaison with Aboriginal and Islander communities.

WHAT HAPPENS DAY-TO-DAY?

While education, information and involvement of users in the development of zoning plans encourage appropriate behaviour in the Marine Park, there is also a role for enforcement. Surveillance operations include vessel patrol and aerial surveillance, using aircraft equipped with sophisticated observation and all-weather radar gear.

The Queensland Department of Environment and Heritage, Queensland Boating and Fisheries Patrol and Coastwatch are responsible for the day-to-day management of the Cairns Section of the Marine Park. They patrol on board vessels that operate out of Cairns, aboard one of the aircraft that regularly patrol the area and inspect walking tracks on the islands.

All of these patrols, however, are not just for enforcement, but also for meeting users and monitoring the Section. Indeed, it is from the information that is fed back to GBRMPA from the patrols, such as patterns of shipping and tourist concentrations, that GBRMPA gains much of its feedback for setting overall management policies.

Whenever possible, education is preferable to enforcement. GBRMPA takes great care to ensure that it does not interfere with people's freedom unnecessarily and excessively, and tries very hard to make clear the need for restrictions either directly to user groups or through community education programs.

SPEARFISHING

TWO POINTS OF VIEW...

The Australian Underwater Federation gave the following point of view.

Statements such as 'underwater slaughter', 'the fish don't have a chance' and 'they spear with SCUBA' are common enough about spearfishing, but usually made by those who have never tried it. In reality spearfishing is a very selective way of getting one's fish dinner and is not as easy as it may seem. State laws prohibit the use of SCUBA when spearfishing, with such things as explosive type spearguns also illegal.

A spearfisherman needs to wait for the ideal day, with calm sea, clear water and low tidal current before taking the plunge to snorkel off in search of his elusive prey. Fish can swim much faster than a diver and some even tease a spearfisherman by waiting for him to catch up (well almost) then swim off once again.

It's a hard way to fish, often frustrating and sometimes a bit risky, but definitely not boring. Spearfishermen do however have the ability to see the fish they wish to catch unlike any other method of recreational fishing. Any fish that are undersized, inedible or protected can easily be avoided, with accidental catches of such fish rare. By actually diving in the underwater environment in which they fish, a spearfisherman grows to appreciate the beauty and variety of the reef and its inhabitants.

Like line fishing, spearfishing is now generally recognised as a legitimate form of recreational fishing and is regulated and restricted to certain areas on the reef. There is none-the-less, a heavy responsibility placed upon every spearfisherman to take only the amount of fish he requires for personal needs and always 'think before pulling the trigger'.

When done sensibly, spearfishing can be one of the most environmentally friendly methods of catching that fish meal.

Spearfishing is a contentious issue relating to recreational fishing. It is currently restricted in the Marine Park by the Zoning Plan and also by Queensland's Fisheries Regulations. Whether spearfishing should be an allowable activity at all locations where line fishing is permitted has been debated by many user groups.

The Australian Coral Reef Society & the Australian Littoral Society put forward a different point of view.

Should spearfishing be permitted in areas of the Marine Park closed to this activity under former zoning plans? Two issues need to be considered. The first concerns management philosophy. Under what circumstances should management allow the introduction of an exploitive activity to areas, in which it was previously prohibited? Members of the scientific community would argue that the onus is on the proponent to demonstrate that the activity has an acceptable level of effect and, is appropriate policy in circumstances in which lack of information makes the outcome of new or additional exploitive activities uncertain. The proposed development of a zoning plan which would allow for a more objective assessment of the effects of spearing, through a comparative research program is welcomed.

The second issue concerns the impact of spearing itself, especially in the context of multiple-use zones of a marine park. Recreational resources on the reef will become crowded in the next decade. The introduction of spearfishing to recreational areas has implications for the future use of the Marine Park, and other parks in Australian waters. Is spearfishing an appropriate bedfellow for other park users? Many other exploitive activities occur within the park. Are there any special features of spearfishing which require a cautious approach?

A number of questions should be considered. Is spearfishing more efficient, more selective and ultimately more destructive than other fishing activities, such as line fishing? Can it do more damage to fish stocks? Is it a less desirable activity, given the increasingly crowded recreational environment? Will the numbers of

fish removed from reef environments increase significantly if restrictions are relaxed?

In the hands of experienced divers, spearing can be a highly selective and efficient method of collecting reef fishes. This selection operates in three ways. Firstly, it can target large individuals of species which may ignore baits at certain times. In some circumstances aggregations of carnivorous reef fishes have been observed which did not take baits but could be collected by spearing. Secondly, it can target species which are rarely, if ever, taken by line. Thirdly, unlike line fishing, spearing targets fish almost exclusively in shallow waters. These properties of selectivity and the efficiency of many divers make it an excellent collecting method, but one that does not mix readily with the activities of other reef users. These include a range of things done in shallow water, including research programs, photography and exploratory diving, especially by newcomers and tourists. Most of these activities involve long periods of passive observation of fishes. Under these circumstances large fishes become habituated to the presence of divers. Direct experience has shown that even a few incidents of spearing in such areas results in characteristic diver-avoidance by fishes.

Spearing on reef fronts rapidly attracts sharks, not only aggressive species such as the grey reef shark, but also the normally non-aggressive species such as the blacktip sharks. While this is a fact of life for experienced spearfishers, other reef users should not be exposed to this potentially dangerous situation.

Are spearfishing impacts acceptable – what do you think?

Is there a case for restriction of spearing in the Marine Park?

Reef fishes in many areas are already subject to high levels of exploitation. Spear fishing provides another level of exploitation in addition to line fishing and it can target groups not normally caught by line. More importantly, spearfishing is restricted to shallow waters and is often carried out in sheltered reef areas with good visibility. Under these circumstances it will overlap with many other types of reef activity.

Spearing should be prohibited from areas adjacent to research stations where detailed investigations of fish populations are occurring. It can clearly have a detrimental effect on the type and quality of experiences enjoyed by other reef users and is, therefore, inappropriate in areas supporting large numbers of recreational divers and other users of the shallow water environment. Support for the localised restriction can be found in studies carried out in marine parks in a number of overseas localities. Controlled observations and experiments to provide more reliable information on the effects of spearfishing in multiple-use areas in the Marine Park is required.

The general issues of the section-wide effect on fish stocks needs better evaluation. As well as information on spearfishing, we also require a better database on the amount of line fishing, both commercial and recreational, in reef areas. The introduction of reef zones in the Cairns section will lay the groundwork for this.

The debate on spearfishing is only one issue, but it highlights the complexity of management practice in the Marine Park. As scientists we have urged a cautious approach which allows for a more objective evaluation of its effects. However, it is also necessary to point out that the same standards should apply to other activities such as line fishing and fish-feeding. Future discussions on zoning plans should include these as agenda items.

RESEARCH

NEW PROJECTS IN THE CROWN-OF-THORNS STARFISH RESEARCH PROGRAM

Dr William Gladstone

New projects commencing in 1991-92 include:

HYDRODYNAMIC MODEL TESTING

An oceanographic model to explain the spread of crown-of-thorns starfish (*Acanthaster planci*) outbreaks was developed by researchers from James Cook University (Ian Dight, Maurice James and Lance Bode) in the current crown-of-thorns starfish research program. The so-called 'sink-source' model predicts patterns of connectivity among reefs based on larval transport by currents.

A related project is being undertaken by Dr John Benzie of the Australian Institute of Marine Science (AIMS). The objective of this project is to test some of the predictions of the sink-source model using estimates of the flow of genetic material (genes) among reefs. Crown-of-thorns starfish have proved difficult animals for reliable techniques to estimate gene frequencies so John will use the blue starfish *Linckia* as a model for crown-of-thorns starfish. *Linckia* has a similar larval duration and morphology as *A. planci* and so should be an adequate model.

Some of the questions to be addressed are: (1) Are some reefs more closely connected biologically than others? (2) Are sets of closely connected reefs highly or completely isolated from other such sets implying they be treated as separate systems, or is there sufficient gene flow implying reasonable biological exchange among such sets to allow them to be treated as one system for management purposes? (3) To what extent do present oceanographic processes control the biological relationships among reefs?

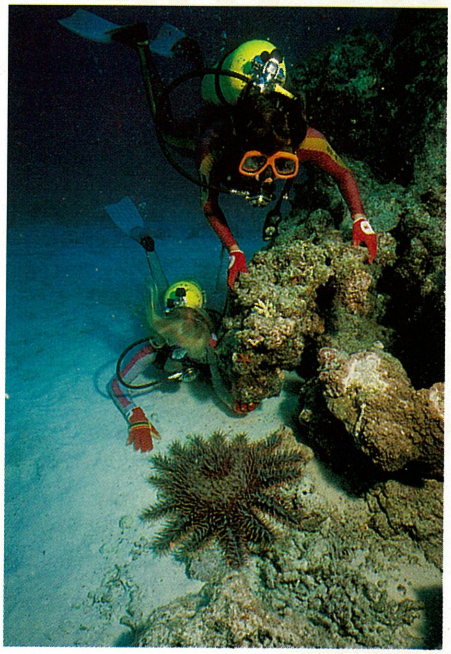
STARFISH LARVAE: IDENTIFICATION AND CAPTURE

The ecology of the very early life history of crown-of-thorns starfish from their time as planktonic larvae to settlement, is important in understanding the spread and causes of outbreaks. Progress in this area has been hindered by difficulties in collecting larvae or newly settled starfish, and their identification (most starfish larvae look similar).

Ms Katrina Roper will pursue research in this area for a PhD project with James Cook University (JCU) and in collaboration with Deakin University. Her objectives are:

- to develop antibody techniques as a method of identifying the starfish larvae
- to develop and trial methods of collecting plankton samples in and around reef systems with the aim of obtaining 'wild' starfish larvae
- to use the collection devices in conjunction with a specific identification system to study the temporal and spatial dispersal patterns of crown-of-thorns starfish.

In his recent review of the crown-of-thorns starfish research program, Dr Bob Johannes (CSIRO) highlighted the potential for techniques developed in this project to contribute to many other areas of marine research e.g. fisheries population biology.



Starfish research moves into new areas

THE MOVEMENT OF ACTUAL STARFISH OUTBREAKS DURING THE 1980s – UNIFICATION OF THE OCEANOGRAPHY AND BIOLOGY

Research by Dr Kerry Black of the Victorian Institute of Marine Sciences (VIMS) has been concerned with explaining the spread of outbreaks. He has conducted field experiments on circulation around individual reefs and has developed simulations of circulation, dispersal and retention around clusters of reefs. He has also modelled longshore currents in the central Great Barrier Reef for the last 25 years.

Kerry is now combining this data with data collected and analysed by Dr Peter Moran (AIMS) and Mr Glenn De'Ath (JCU) on the locations, intensity, and spread of movement of crown-of-thorns starfish outbreaks during the 1980s.

The aim of the project is to model the movement of starfish outbreaks during the 1980s in the Central and

Cairns Sections of the Great Barrier Reef Marine Park using computer simulations of larval dispersal driven by real winds and currents.

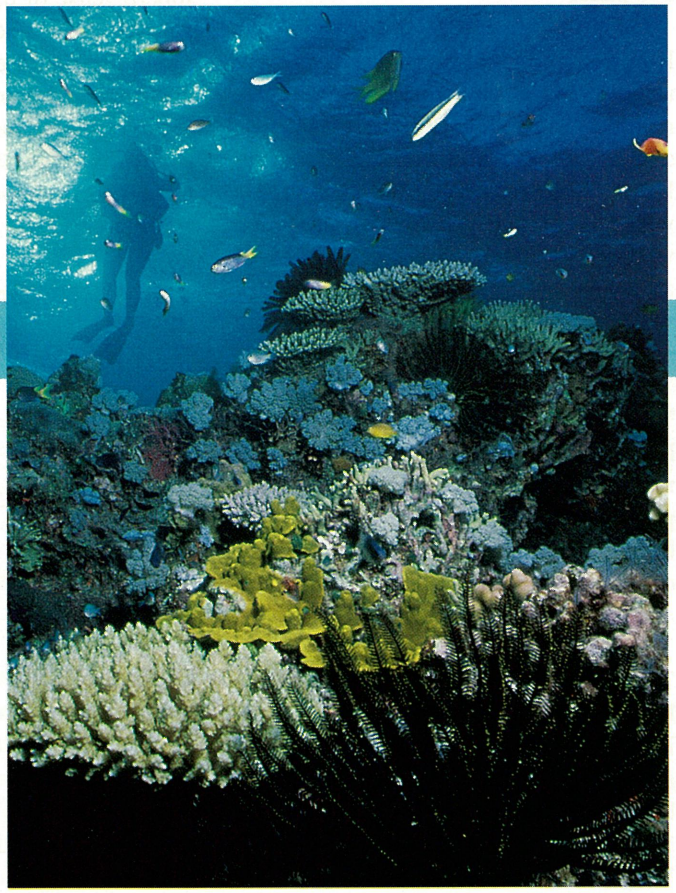
ASSESSING THE ROLE OF DISSOLVED ORGANIC MATTER AND BACTERIA IN THE NUTRITION OF *Acanthaster planci* LARVAE

Outbreaks of the starfish *A. planci* could be the result of massive settlement events following improved larval survival. Increased food availability (in the form of dissolved organic matter (DOM), bacteria, or phytoplankon) resulting from enrichment of reef waters by nitrogen and phosphorus, and organic compounds is a possible mechanism.

The objective of this project is to evaluate the importance of DOM and bacteria as nutritional sources for *A. planci* larvae. The research will be undertaken by T Ayukai (AIMS), O Hoegh-Guldberg (University of Sydney) and J Welborn (University of Southern California). They plan to measure DOM uptake, intake of bactieria and energy requirements of *A. planci* larvae and ambient levels of DOM and bacteria.

The study has five parts:

(1) DOM uptake by *A. planci* larvae
(2) Bacteria intake by *A. planci* larvae
(3) Energy requirements of *A. planci* larvae
(4) Cross-shelf variation in DOM levels
(5) Cross-shelf variation in bacterial abundance



Broadhurst Reef in the Central Section

MONITORING

VISITOR FACILITIES AT WISTARI REEF
Fisheries Research Consultants

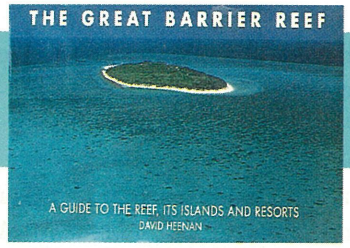
Fisheries Research Consultants, a Brisbane-based coastal resource and environment consultancy, has been working with GBRMPA's Research and Monitoring Section since 1988, investigating the impacts associated with P&O Resorts Pty Ltd day trip pontoon and fixed reef walkway at Wistari Reef. Whilst in some respects, the results obtained to date may be described as predictable, in several areas, the results of routine monitoring are providing hitherto unrecorded insights into the responses of reef animals and plants to human activity.

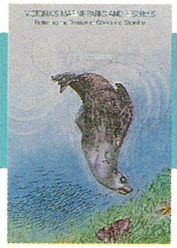
Whilst it was to be expected that the pontoon, offering both shelter and food, courtesy of routine feedings, would attract a diversity of fishes, the geographic extent of its influence appears to be beyond all expectations. Regular census of both demersal and pelagic fishes at several locations along the reef crest indicate that the pontoons attraction has, at least temporarily, depleted stocks of the typically carnivorous species such as emperor and coral trout from sites as distant as 2800 m.

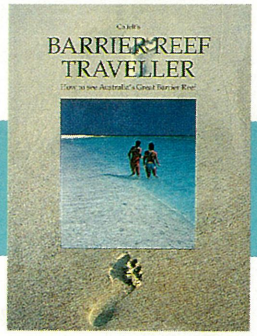
Fisheries Research Consultants will continue to monitor P&O's Wistari Reef facilities in 1992, to see if the changes to fish community structure persist, or whether natural pressures will act to restore the pre-existing balance. In addition to studies relating to fishes, FRC will continue to monitor the impact of the pontoon's mooring gear on adjacent coral outcrops, and the impact of reef walkers on the Wistari Reef flat.

As well as studies on the Great Barrier Reef, Fisheries Research Consultants is currently involved with ecological monitoring studies in Kiribati for AIDAB, a study of stream fauna and flora downstream from a proposed sewage treatment plant on the outskirts of Brisbane, the biological survey of the Sunshine Coast's rocky reefs for QNPWS, and has recently completed an assessment of the likely impacts of the Arabian Gulf oil spill for the Saudi Fishing Company.

REVIEWS







THE GREAT BARRIER REEF: A GUIDE TO THE REEF, ITS ISLANDS AND RESORTS

David Heenan
Glenmede, 1990
248 pages

If we assume that coffee table volumes are usually written for audiences who prefer resort comforts to the more rigorous demands of the Australian landscape then David Heenan's self-published volume is well targeted. It provides an attractive view of the major tourist islands in the reef area and an informative commentary which interweaves historical detail with ecological background and local colour.

The author's background in advertising, his skill as a photographer and his extensive research during the two and a half years previous to writing have resulted in a highly readable and tastefully organised compendium for those who might travel and for those who can only dream.

The island-by-island organisation of the book permits the reader to savour the individual delights of a personalised reef adventure. To walk the forests of Hinchinbrook, to recall the cannibal tendencies of some of the earlier islanders, to dive off Lady Elliott is to fulfil a personal dream.

For those who have decided to travel, Heenan's book provides detail that so many similar texts omit. Telephone and fax numbers of the resorts are provided together with accommodation details and a tantalising description of some of the more memorable meals the author has experienced. The vision of "queen size beds with gossamer white mosquito nets draped over bamboo frames" makes choosing and booking an exotic holiday simple.

David Heenan's book does not attempt to provide an encyclopaedic view of the Great Barrier Reef as a World Heritage site. It does not attempt to provide the low-budget backpacker with a guide to cheap campsites. It sets a more comfortable pace. The author's photographs, together with many from the resort operations and some from the Great Barrier Reef Marine Park Authority, present a superb sense of the wonders of the reef. And for those who want to do more than spend their hard earned time at a single resort, the author provides the opportunity to travel aboard his own private vessel on a tour through the islands he has so attractively brought to the readers attention.

Dr Neil E Bechervaise

VICTORIA'S MARINE PARKS AND RESERVES

Department of Conservation, Forests and Lands Victoria, 1989
32 pages

The network of protected marine areas is increasing around Australia as State governments declare new offshore marine parks and reserves.

With pressure on the marine environment from fishing, tourism, collecting and pollution it's essential to ensure that the quality of the marine environment is conserved, and in some cases, restored.

The Victorian Department of Conservation, Forests and Lands is responsible for the planning and management of marine parks and reserves in Port Phillip Bay and along the south-eastern coastline near Wilsons Promontory. This book is a general guide to Victorian marine parks and reserves including the large South Gippsland Marine and Coastal Park. The book not only describes each area's special habitats, but also outlines some of the regulations about human activities allowed in these areas including shell collecting, line fishing and spearfishing.

The book will be a useful guide for Victorian schools, commercial users and for regular visitors to these marine park areas.

Available from:
Marine Science Laboratories,
PO Box 114,
QUEENSCLIFF
VICTORIA 3225

Don Alcock

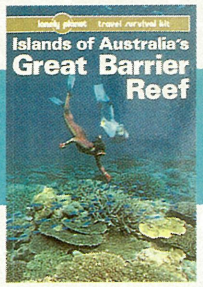
BARRIER REEF TRAVELLER

David and Carolyn Colfelt
Windward, 1989
272 pages

When a coffee table volume provides an abundance of accurate travel information, a lively account of life in exotic places and a wealth of accurate maps with which to locate its pretty pictures, the result tends to be a confusion of interest. The Colfelts' *Barrier Reef Traveller* carries most of the detail I need to travel with but it's too heavy to lump in a pack. On the other hand, it contains such a wealth of information that it will never be read if it's left on the table and it would be awkward to read in an aircraft cabin.

Between a Lonely Planet publication and an advertiser's Bali Hai lies the gem which is the Colfelt contribution to Reef island travel. An authoritative, well written, well produced book, *Traveller* identifies the jumping off points to the reef islands, accounts for the resorts in an organised and unemotional manner, presents travel and accommodation options sensibly and provides sufficient colourful photographs to convince the would-be convert to a will-be Barrier Reef Traveller.

Opening their account of travel in the reef region, the Colfelts' present their reader with a useful coastal strip map showing both the road system and the reef from



south of Bundaberg to the tip of Cape York. While a metre of map is a daunting prospect, the attached page covers the area north of Lizard Island so the map could be removed for travel without disturbing the appearance of the book.

As most tourists will begin their travel to the reef from the south, *Traveller* begins, after an informative orientation chapter, with Bundaberg, Lady Elliott and Lady Musgrave Islands before heading to Gladstone. The progression up the coast provides details of the gateway towns and their attractions (the Mon Repos Beach turtle nesting sites and Hinkler House Museum are featured in the Bundaberg chapter while the Wonderland Aquarium at Townsville is given deservedly extensive treatment).

Resort islands are given informative treatment though there seems to be no sense that one has to stay at a resort. Telephone and fax numbers, together with essential accommodation, eating and anchorage details are provided in inserts for the resorts and the mandatory historical details are provided.

An extensive selection of the Colfelts' own photography is seasoned with a number of more familiar Marine Park Authority stock shots and an interesting selection of photos by Gary Bell, Dean Lee and John Gollings to provide a visually stimulating collage of the reef and its inhabitants in all their glory.

Finishing its adventures at Lizard Island, *Traveller* concludes with an extended and alphabetically ordered chapter on the dangers, delights and difficulties of travelling in the Barrier Reef region, the history of the Reef itself, fishing, sailing and finally, the majesty of the whales.

If there are disappointments in this book, they are few. Perhaps it tries to do too much; I don't mind. I do, however, feel a pang of sorrow for the photographers — the printing process gives the appearance of extreme grain in small photographs, but that's a minor quibble in a book which is, at its best, both visually stunning and intensely absorbing reading.

Dr Neil E Bechervaise

ISLANDS OF AUSTRALIA'S GREAT BARRIER REEF

Tony Wheeler
Lonely Planet, 1990
288 pages

The Travel Survival Kits published by Lonely Planet have become a publishing phenomenon. Travellers have come to rely on their accuracy, their thoroughness and their attractive yet utilitarian presentation. The books are pored over, flung into backpacks, swapped, copied and even used for fuel in lonely and desolate places. They form the basis for a thriving secondhand market in Katmandu and they are sought after by locals who need to show their visitors around from the cold of Canada to the sun of the Seychelles.

Islands of Australia's Great Barrier Reef will become yet another success story though its use is unlikely to be as extensive as some of the earlier titles. The book covers a specific and often inaccessible region of Australia. As it points out quite clearly from the beginning, much of the reef region falls within World Heritage site classification and much of it is closely managed by the Great Barrier Reef Marine Park Authority. Parts of the reef are inhospitable; a number of the more exotic marine fauna, from sea snakes to box jellyfish, are deadly; the weather is tropical, cyclonic in summer; and travel in the region is as much restricted by geography as by expense.

Within an ecologically informed framework, this book provides a clear description of the formation of the reef, the abundance of flora and fauna and the delights to be experienced while travelling through the islands. Wheeler has clearly established the polarity which separates resort operators, who control development on a number of the larger islands such as Orpheus and Hamilton, from the needs of the budget traveller, the environmentally sensitive or the would-be explorer of exotic places. There is clear emphasis on the need to be self-contained when moving from the mainland to low-budget islands. There is equally clear recognition of the need to be sensitive to the delicacy of the environment.

Travellers coming to Australia without having read the parent publication, *Australia, a Survival Kit*, will find difficulty with omission of the means of travel to and accommodation in major departure cities near the Reef, but this is not the stated intent of the book. For those who have read the parent publication, the familiar sections of Facts About the Region, Getting There And Away and Getting Around will appear repetitive. For the increasing number of Australians wishing to travel their own country in a well-informed manner, the book may appear overly forbidding. These concerns, however, are more offset by the host of incisive observations; the vignettes of social commentary and history and the interesting, often little-known, biological and geological information interspersed between useful maps and fascinating photographs.

Readers who want details of resorts will find travel agents more complete; readers who want texts of ecological rigour will seek elsewhere; readers who intend to discover the islands and all that they have to offer will find this latest in the Lonely Planet Travel Survival Kit series a thoroughly useful preparation and on-the-ground guide for their travels.

Dr Neil E Bechervaise

Worth more than their weight in gold!

NEW CAIRNS ZONING MAPS PROVIDE A WEALTH OF INFORMATION FOR ALL REEF USERS

Whether your work or pastime is fishing, boating, collecting, diving, research, hosting tourists or just visiting, these maps are for you.

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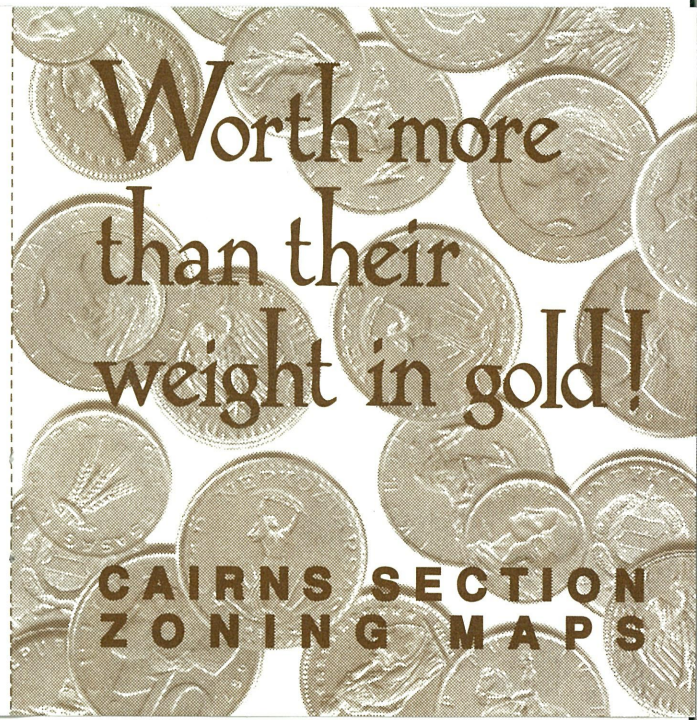

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