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Reeflections

Newsletter of the Great Barrier Reef Marine Park Authority
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FREE ISSUE

Park Fish Tag Big Success

More than 1700 reef fish were tagged during the joint program of the Great Barrier Reef Marine Park Authority and the Queensland Fisheries Service in the Marine Park — Capricornia Section.

Operating at the Heron and Wistari reefs during December and February, the tagging teams, which included experienced local anglers, used normal hook and line methods to catch the fish. When landed, the fish were placed between wet foam while a lock-on tag, eight centimetres long, was attached. The fish were released as quickly as possible, and officers reported that the tagging seemed to have little effect upon them.

One fish — a 34 centimetre stripey — was recaptured by the tagging team three times, twice in December and once in February.

Each tag is worth \$3 to any fisherman who returns it with catch details to the Queensland Fisheries Service in Brisbane. Only the tag is required — the fish can be retained and eaten. Already a number of tags have been returned, from fish caught not far from the original tagging area.

Tagging involved in all 1732 reef fish, including more than 600 coral trout and sweetlip emperor, as well as large numbers of yellowtail sweetlip, blacktipped rock cods, parrot and tusk fish, stipeys and wire-netting cod. The purpose of the program is to determine the movement of reef fish in the Marine Park Section.

Although most of the first recaptured fish were found close to the original area, Authority fish biologist Dr. Wendy Craik says it will be interesting to see where tagged fish are recaptured in six or twelve months time.

PLAN THROUGH PARLIAMENT

The zoning plan for the first part of the Great Barrier Reef Marine Park — the Capricornia Section — has been accepted by Federal Parliament and will come into effect on 1 July.

The plan provides the basis for managing human usage of the Park so that activities do not conflict with each other and the natural qualities of the Great Barrier Reef are conserved.

Announcing these details, the Minister for Home Affairs and Environment, Mr. Ian Wilson, said the coming into effect of the first zoning plan was a historic milestone in the development of the Great Barrier Reef Marine Park.

The Minister said that commercial, recreational and scientific activities would continue in the Capricornia Section subject to the provisions of the six zones of the plan. Commercial spearfishing has been banned but all other types of fishing are permitted, subject to the zoning plan.

The plan was developed by the Great Barrier Reef Marine Park Authority with the participation of Reef users, other interested members of the public and Queensland and Commonwealth Government agencies. It was also endorsed by the Great Barrier Reef Ministerial Council which consists of Ministers from both the Commonwealth and Queensland Governments.

Management

No new fees or levies have been introduced as a result of the establishment of the Capricornia Section. Day-to-Day management is to be carried out by Queensland agencies which, in undertaking these responsibilities are subject to the Great Barrier Reef Marine Park Authority. This was part of the agreement made on 14 June 1979 between the Prime Minister and the Queensland Premier on the development of the Marine Park.

Regulations to give effect to the plan were gazetted on 20 May and tabled in Parliament on 28 May.

The Minister said that if any future events required changes in the zoning plan for Capricornia, they would be undertaken following a further statutory program of consultation with the public.

● SUMMARY OF ZONES — Back page.

The Great Barrier Reef faces threats from both natural and man-made sources. In this edition of REEFLECTIONS, two such threats are highlighted — the crown of thorns starfish and the possibility of pollution from shipping. We also look at a third problem which rather than harm the Reef could affect one of its most important activities — fishing.

● Risks on the Reef — inside pages.



CROWN OF THORNS STUDIES

The crown of thorns starfish — the killer of live corals — is to come under continuing study in an attempt to learn more about its activities in relation to the Great Barrier Reef.

The Authority is planning studies to be undertaken of starfish over the whole Reef and is seeking information from the public on starfish populations to assist its studies.

Authority officers presented reports to the 4th International Coral Reef Symposium in Manila in May, on the current situation of starfish activity on the Great Barrier Reef, including details from a recent survey.

In the survey, between Innisfail and Lizard Island last year, major populations of starfish were found on four reefs and large populations on six other reefs. In all, 22 of 53 reefs surveyed showed evidence of recently killed corals, probably caused by the crown of thorns.

In addition to the survey, the Authority established an advisory committee to report on possible research into the crown of thorns and its control.

Overall View

Following the Committee's report, the Authority agreed that further studies should be conducted to gain an overall view of the starfish populations over the entire Great Barrier Reef.

Investigations being developed include a detailed historical study of previous crown of thorns populations and their relationships, if any, to human use of the reef.

The Authority also agreed that it would work with the Funding-Advisory Panel of the Australian Marine Sciences and Technologies Advisory Committee to provide for scientific studies including further geological investigations of evidence of populations of crown of thorns starfish in reef sediments which were laid down as long as 3000 years ago.

Officers of the Queensland Fisheries Service in association with the Authority have experimented with control measures using hand collection, air injection and injection of chemicals. The most rapid method was by injecting a solution of copper sulphate into the starfish, but it was possible to kill only 132 starfish per diver per hour.

Queensland Fisheries officers estimated the number of starfish on the Green Island Reef between one and two million animals. A total of more than seven man-years of effort would be required to kill this number. Clearly, control by such methods is not practicable.

Increased concern

The Authority is concerned about the recent apparent increase in crown of thorns starfish populations, but it must be added that despite years of considerable research there is still no substantial evidence to support the suggestion that large crown of thorns populations are the consequence of human activity on or near the Great Barrier Reef.

The Authority is continuing to monitor the crown of thorns situation and is particularly keen to receive reports of populations of crown of thorns starfish where they are present in such numbers that more than 40 can be seen in an hour's diving or snorkelling.

OIL SPILL COULD OCCUR SOON

On the law of averages, Australia is long overdue for a major shipping casualty with a major discharge of oil on its coastline, according to Captain V. Sanderson writing recently in the Australian Master Mariners magazine "Australian Seatrader".

The chances are high, says Captain Sanderson, that it could occur in the waters of the Great Barrier Reef, which is a major shipping lane.

The article says: "The law of averages dictates that some night soon, someone's phone will ring with the chilling news that a major ship has gone hard aground on the Australian coast and is leaking oil at a rapid rate....We are statistically long overdue for a major casualty on the Australian coast".

Captain Sanderson claims that because of our run of good luck, our resources for dealing with such a casualty are woefully inadequate. A number of moves are in hand which might eventually improve the situation, but Captain Sanderson warns that

Starfish Elsewhere

Crown of thorns starfish populate coral reefs in many parts of the world.

According to veteran diver, Mr. Stuart Campbell, starfish populations on the Great Barrier Reef are similar to those that can be seen in Thai waters. They have left patches of dead coral on Thai reefs, but there was nothing to indicate that the starfish had caused irreversible damage, Mr. Campbell said.

Mr. Campbell recently published a book "A Guide to the Hard Corals of Thai Waters" as a result of living 15 years in Thailand, much of it as a SCUBA diver.

Now 76, Mr. Campbell gave up diving only a few years ago. He made his first SCUBA dive at the age of 55, and besides diving in Thailand, also made a number of dives on the Great Barrier Reef. Diving never worried him — "I only saw one shark in 300 dives" — and he would dive again if his health permitted it.

maritime casualties "like wars and babies are notorious for not waiting until everybody is ready for them".

National plan

In the Great Barrier Reef, or any other coastal waters, a major oil spill would be dealt with under the National Plan to Combat Pollution of the Sea by Oil which became operational in Australia in 1973, and combines the resources of Commonwealth and State Governments and the oil industry. There are committees in each State and the Great Barrier Reef Marine Park Authority is an advisor to the Queensland State Committee.

In the zoning plan for the Great Barrier Reef Marine Park — Capricornia Section, the Authority has made provisions in relation to the passage of large shipping through the Park Section. Ships may continue to pass through General Use "A" Zone. The major reefs of the Section are located in the five other zones.

Letters to Editor

Sonja Grespan writes: I have read your publication 'Reeflections' with much interest. Since I am a student of environmental studies at University of New England, this publication provides me with valuable reference material. I am wondering if it is possible to receive this publication regularly? Could you advise me of cost of this subscription?

● **REEFLECTIONS** is available to any person who wishes to be placed on the Authority's mailing list. It is usually published quarterly and is supplied free of charge in the interests of increasing knowledge and understanding of the Great Barrier Reef and the Marine Park, and creating more aware and value-conscious Reef users.

CIGUATERA SURVEY ON REEF

by N. C. Gillespie*

Early voyages to the tropical Pacific — de Quiros, Cook and others — recorded episodes of fish poisoning aboard their vessels. These instances were believed to involve a form of poisoning known as ciguatera, which is carried by fish frequenting the coral reef environment.

The symptoms primarily involve the nervous system: tingling of the mouth and limbs, muscular weakness, fatigue, dizziness, itchy skin and pain on contact with cold objects. Ciguatera is a significant health problem throughout the Pacific and affects the utilization of fish by islanders. The Great Barrier Reef system also yields toxic fish and quite a number of ciguatera cases are reported in Queensland each year.

The toxin involved in ciguatera (cigutoxin) has been identified as coming from a group of small marine organisms called dinoflagellates. A number of species of these dinoflagellates are involved and mostly they are associated with coral reef areas. The toxin is concentrated in the flesh of small fish which feed on algae growing on dead coral. Larger predatory species which eat these fish sometimes accumulate sufficient toxin to become toxic. Only an extremely low percentage of fish of any species carry the toxin in toxic quantities and the involvement of different species in ciguatera varies according to the areas in which they are caught.

Variety of species

A number of cases have resulted from the consumption of narrow-barred spanish macherel caught in the Harvey Bay — Bundaberg area, but the incidence has dropped since 1979. However, very few of the ciguatera cases reported in North Queensland involve this species. In the north of the state any one of a large variety of reef species have been involved in attacks of ciguatera.

In order to obtain better information about the areas where ciguatoxic fish are likely to be caught, a survey form has been distributed amongst angling clubs and professional fisherman. Those who have been affected by ciguatera are asked to give details on the incident. Some of the preliminary results are quite interesting. For example, many of the respondents reported mild attacks which were annoying but not dangerous. Others reported severe attacks after eating fish which did not affect friends eating the same fish. In these cases, the victim invariably ate the largest portion or had eaten a large meal of similar fish the day before. Often, the victim has some signs of poisoning before consuming more fish and a second meal of fish resulted in severe symptoms.

Some advice

It is clear that one could eat only small portions of reef fish at any one meal and not consume portions of the same fish at successive meals. Other hints include the avoidance of very large examples of a species and avoidance of recognised "risk" species (red bass, paddle tail etc).

At present, the risk of poisoning is very small if moderation is practised by the individual in his fish consumption patterns. There is little that can be done to safeguard the public other than warn them of the risk in ciguatera prone areas, as there is no simple method for detecting the presence of the toxin in the fish flesh. Research on this problem is currently being performed at the Zoology Department of the University of

Queensland and the Commonwealth Serum Laboratories in Melbourne, as well as several overseas laboratories. Some promising progress has been made, but it will be some time before this work will provide a means of protecting the public from the risk of ciguatera poisoning.

In the meantime, efforts are being made by survey methods to establish which areas are more likely to yield ciguatoxic fish so that the public can be warned appropriately. If anyone feels that they have information to contribute in this regard they should ring (07) 203 1444 or write to:- The Officer in Charge, Ciguatera Survey, P.O. Box 76, Deception Bay, Queensland 4508.

*DR. GILLESPIE is from the Fisheries Branch, Queensland Department of Primary Industries.

Fellowship Aids Coral Research

The gathering of scientific information about corals has been aided by the work of Dr. Terry Done; the first Research Fellow to be funded by the Great Barrier Marine Park Authority.

Dr. Done's study for the Authority concerned the analysis of the structure and composition of coral communities and the development of methods to enable essential information to be collected and analysed.

Dr. Done has developed an underwater stereo photography system that uses two standard Nikonos cameras. Using this system, a diver can photograph a study plot and then work on the analysis in the laboratory. Stereo photography picks up a lot more detail than mono photography and this is particularly useful in looking at small coral colonies.

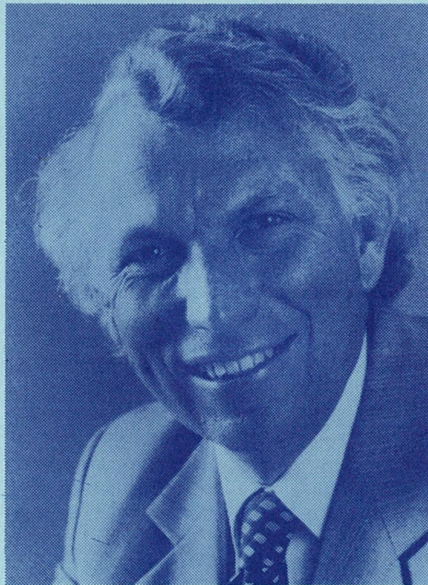
Using the stereo photography technique, it has been possible to show the extent of coral growth on a study plot at John Brewer Reef of Townsville. Photographs may be obtained from Dr. Done at the Australian Institute of Marine Science, Townsville.

photo far left: Mr. Wilson meeting Authority staff in Townsville.

Mr. Ian Wilson, the Minister for Home Affairs and the Environment, has responsibility for the Great Barrier Reef Marine Park Authority.

Mr. Wilson, a solicitor and company director, won the Adelaide seat of Sturt in 1966. In 1980 he was appointed parliamentary secretary to Mr. Fraser.

A Rhodes Scholar, Mr. Wilson is married with four sons.



Cards to Measure Reef Currents

by J. Collins and T. A. Walker*

A study using floating cards has been designed to determine the surface water drift patterns of the Great Barrier Reef and their relationship to the main generating force, the wind.

The currents of the Great Barrier Reef are not well known. A knowledge of surface water movement is becoming increasingly important as the larvae of many reef dwelling organisms, including the crown of thorns, spend considerable time in the surface regions of the sea. Furthermore, the sea surface may support and transport pollutants such as oil.

Since early 1976, various designs of drift card have been released into Great Barrier Reef waters, with increasing success. Problems with cards being damaged by abrasion when they reached the beach have been overcome by double-sealing the cards in polythene.

During the development stage, some 4000 cards were released off Townsville with 370 cards returned in a useful condition. More than 30 others were found, but were badly damaged. This indicates that a recovery rate of greater than 10% can be expected.

Big release

Following the successful completion of the pilot study, the Great Barrier Reef Marine Park Authority has funded a series of regular releases from 12 stations along the Barrier Reef. Close to 100,000 cards are being released during a one year period.

The cards are 300 mm long and are designed to travel in an upright position, supported by a small float. The area exposed to direct wind forces is small with the main body of the card (95% of card area) submerged and the effect of sailing minimised. The drifting of the card is mainly caused by the surface water movements.

Each card is stamped with an identification number. By comparing the time and position of release and recovery, the direction of drift can be determined. If the card is found soon after beaching, a minimum drift speed can be calculated.

Reef on the Move

The Great Barrier Reef will soon be experienced by large numbers of people overseas.

Displays prepared by the Great Barrier Reef Marine Park Authority in association with the Australian Museum in Sydney are on their way to Britain and Japan.

The Chairman of the Authority, Mr. Greame Kelleher, said the displays included photographs, slides, charts and an audiovisual presentation which

During the drift period the wind speed and direction can be obtained from Meteorological Bureau recordings. Computer analysis of the drift and the prevailing winds may allow a predictive model to be constructed. By running the card release program along the full length of the Barrier Reef for one 12 month period, both the seasonal and spatial drift patterns will be shown.

The pilot study suggested that there is frequently a southeasterly drift in summer when the northeasterly winds blow, and northwesterly drift in winter when the south east trade winds blow although short-term reversals of drift occur throughout the year.

Long Distances

During periods of strong winds the cards may drift considerable distances. The northern-most recovery to date of a Townsville release has been near the Olive River on Cape York, and to just south of Sarina for southerly drifting cards. Cards recovered from the Cape Flattery region drifted 390 km in at least 12 days, giving a minimum drift speed of three-quarter of a knot. As the cards move with the surface water mass, this indicated that large volumes of water are transported considerable distances under suitable conditions.

The continued success of this project will depend upon the good-will of the beach-combing public finding and returning these cards to the James Cook University. With the saturation card releases, many beaches will have numerous cards arriving fairly regularly. It is hoped that the novelty of returning them will not flag as all cards are important in revealing a part of the drift pattern with time.

*DR. COLLINS and MR. WALKER are from the Department of Marine Biology, James Cook University.

ZONING SUMMARY

The Great Barrier Reef Marine Park — Capricornia Section — covers about 12,000 square kilometres of the most southern and heavily-used area of the Great Barrier Reef. This Section lies approximately 20 km off the coast. The closest cities are Rockhampton, Gladstone and Bundaberg.

Under the zoning plan to come into effect on 1 July there are six zones. The only activities not permitted in any of them are operations for the recovery of minerals (except for research purposes) and commercial spearfishing.

Zones

General Use "A" Zone is the largest, providing opportunities for all reasonable uses consistent with the conservation of the Great Barrier Reef.

General Use "B" Zone allows entry for similar activities except that trawling and commercial shipping are not permitted.

In Marine National Park "A" Zone, (Heron Island and Wistari Reefs) the objective is to provide for the protection of the natural resources of the area while allowing:

- (i) non-extractive recreational activities;
- (ii) limited recreational fishing; and
- (iii) approved research.

Marine National Park "B" Zone (Llewellyn Reef) is reserved for non-extractive recreational activities and approved research.

Scientific Research Zone (One-Tree Island Reef) is reserved for approved scientific research.

Preservation Zone (Wreck Island Reef) is closed to public entry to preserve an area in its natural state undisturbed by man, except for approved scientific research which cannot be carried out in any other zone.

Restricted Areas

In the General Use Zones, certain reefs may be closed periodically to enable replenishment of fish and other resources, or to protect birds and turtles during nesting times.

These are known as Replenishment Areas and Seasonal Closure Areas. There is also provision for Reef Appreciation Areas which will provide small areas on heavily used reefs where the public may observe and appreciate relatively undisturbed marine life.

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