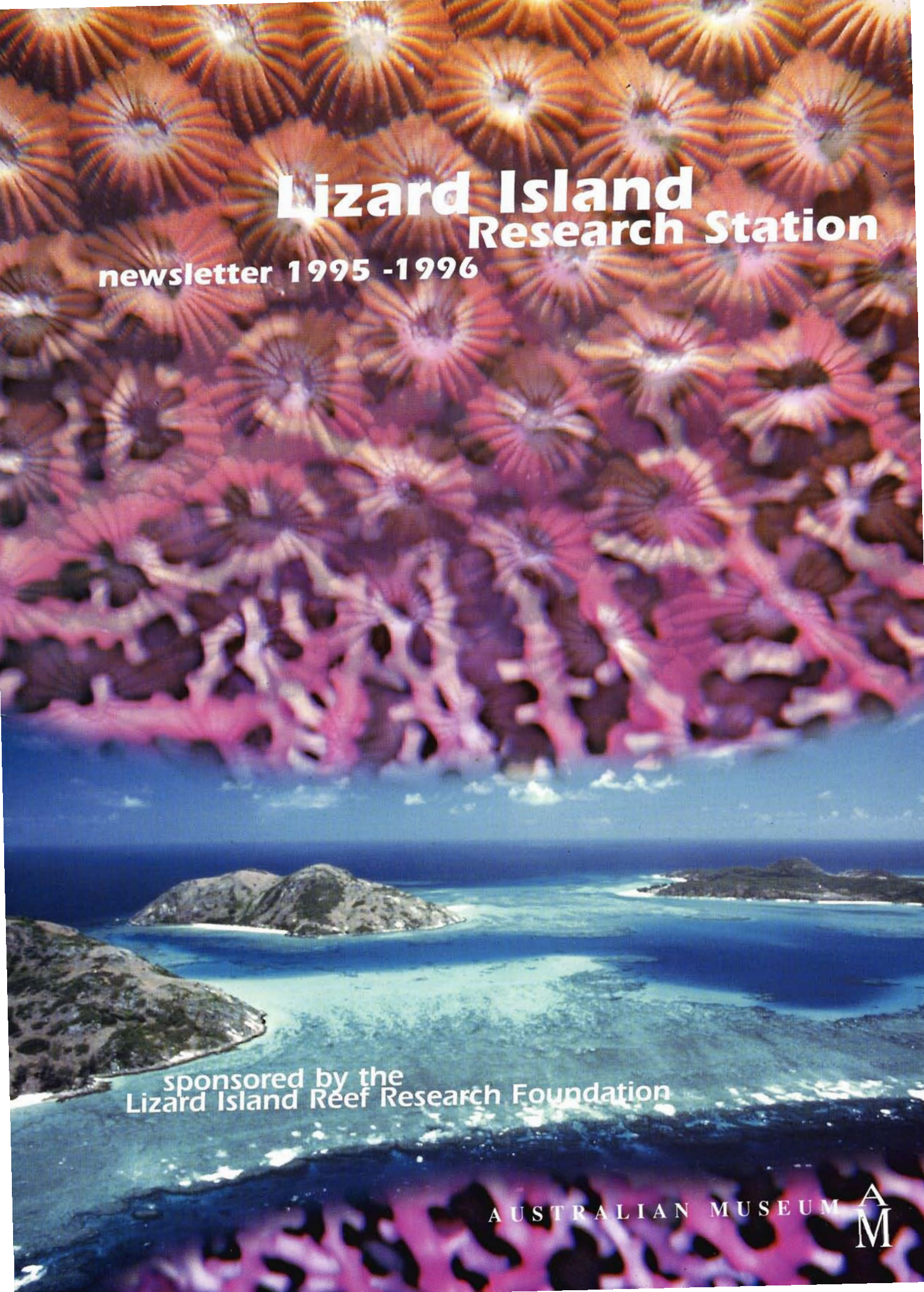
Lizard Island
Research Station
newsletter 1995 -1996
sponsored by the
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LIZARD ISLAND REEF RESEARCH FOUNDATION

The Lizard Island Reef Research Foundation is an independent trust established to raise funds for the Station and to support research on the Great Barrier Reef. The Foundation funds capital developments at the Station and directly funds research through the Lizard Island Doctoral Fellowship. Since its inception in 1978, the Foundation has raised over one million dollars to facilitate research on the Great Barrier Reef.

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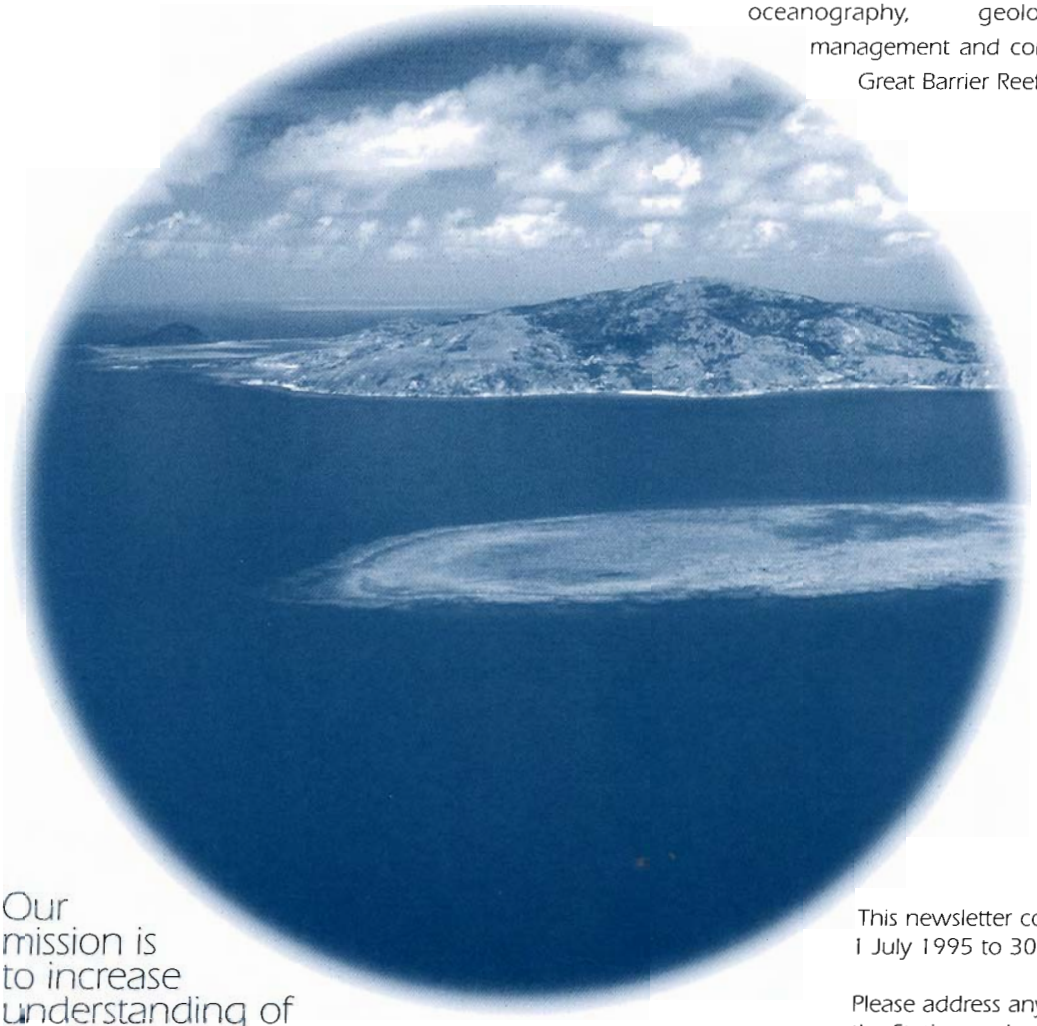
LIZARD ISLAND RESEARCH STATION

NEWSLETTER 1995/1996

Situated in the pristine waters of the northern Great Barrier Reef, the Lizard Island Research Station provides housing and research facilities for scientists and educational groups. The Station is a facility of the Australian Museum and it supports research into all aspects of the biology, ecology, oceanography, geology, history, management and conservation of the Great Barrier Reef.



Our mission is to increase understanding of the Great Barrier Reef by fostering high quality scientific research. Providing superior research facilities is central to the achievement of the mission.

This newsletter covers the period 1 July 1995 to 30 June 1996.

Please address any queries about the Station to the Directors, Dr Anne Hoggett and Dr Lyle Vail at:

Lizard Island Research Station
PMB 37
Cairns QLD 4870
Australia

Phone and fax: (070) 60-3977
International: 61 70 60-3977
E-mail: lizard@amsg.austmus.oz.au

Or visit our web site at:
http://www.austmus.gov.au

All photographs by Lyle Vail and Anne Hoggett unless otherwise indicated

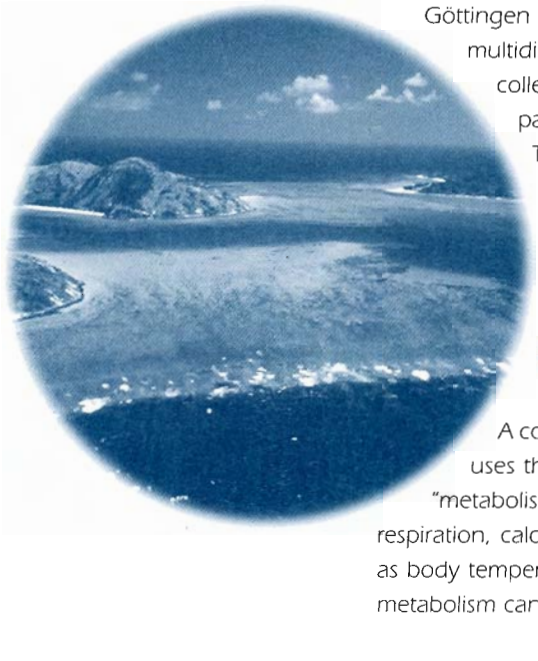
Coral Reefs Highly Degraded off Bay of Jakarta, Indonesia

At the invitation of UNESCO (Jakarta), Station Director Lyle Vail participated in a survey of coral reefs in the Bay of Jakarta and the nearby Thousand Islands in September 1995. About 20 participants from 11 countries conducted surveys of benthic and fish communities on 28 reefs.

Ten years ago, a similar survey by another UNESCO team found that reefs in the Jakarta Bay area were severely degraded by discharges of sewage and other pollutants, with coral cover of about 5%. However, the condition of reefs beyond 20 km from Jakarta improved rapidly with increasing distance and many reefs supported about 50% coral cover. The survey in 1995 found inshore reefs are still in a highly degraded state. Disappointingly, offshore reefs are now also severely degraded with many having almost no living coral. Populations of other reef animals such as fish, molluscs and echinoderms are also extremely low. The degradation of the offshore reefs is thought to be caused by poor water quality stemming from Jakarta Bay, coral harvesting, destructive fishing practices and an increase in numbers of crown-of-thorns starfish. The dismal condition of these reefs, and the speed with which they have deteriorated, is a poignant reminder that we cannot take for granted the generally good condition of reefs on the Great Barrier Reef.

Prestigious science award won by Professor Joachim Reitner

The Leibniz award is the most lucrative science prize in Germany. In 1995, the German Science Foundation selected Professor Joachim Reitner of the University of Göttingen as the winner of the five year award, based largely on Joachim's multidisciplinary approach to the study of sponges. Joachim and his colleagues have made numerous visits to the Research Station over the past seven years to study the fauna and environment of reef caves. They have found that the living sponges in this habitat are very similar to ancient fossil sponges in Spain. Joachim's comparison of these faunas, widely separated in both space and time, spans the disciplines of biology, biogeochemistry and palaeontology.

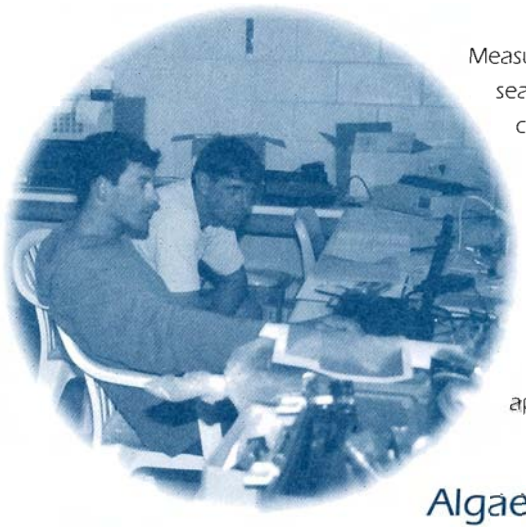


The Blue Lagoon fringed by South, Pallfrey & Lizard Islands (Photographer unknown)

Coral reef metabolism

A coral reef can be thought of as an organism in that it takes in materials, uses them, turns them into other compounds, and exports them: it has a "metabolism" Key components of a reef's metabolism are photosynthesis, respiration, calcification and solution. Just as indicators of human metabolism such as body temperature can be used to assess health in humans, so indicators of reef metabolism can be used to assess the "health" of coral reefs.

A team from the Australian Institute of Marine Science (AIMS) led by Dr David Barnes visited the Station in March 1996 with a tonne of scientific equipment to measure reef metabolism across the reef flat near South Island. The team used a technique pioneered by Dave involving an instrument package that stays with a body of water as it moves across a reef, measuring the pH and oxygen concentration of that water mass at intervals. The changes in these parameters are caused by the reef's metabolic processes and can be used to calculate the reef's metabolic performance.



Dr David Barnes and Dr Brian King with reef metabolism instruments in the Purves Laboratory

Measurements were taken at about 50 metre intervals across the seaward 300 metres of reef flat on many days and in varied sea conditions which affected rates of water flow across the reef. Preliminary examination of the data suggests that low salinity associated with heavy monsoonal rains increases the rate of both productivity and solution.

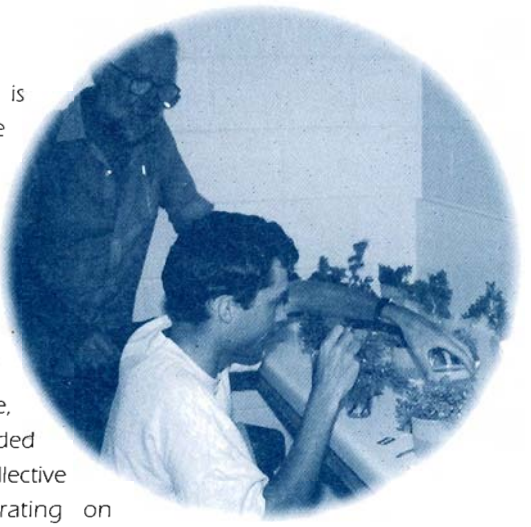
The work was financed by the Japan Marine Science and Technology Centre. The Japanese are very interested in the instrument package, developed and constructed at AIMS, for its application in determining the health of coral reefs.

Algae-eating reef fishes

At the same time that coral reefs are being built up by growth of coral and algae, they are being broken down by natural events such as cyclones and the eroding activities of animals. Animals such as sponges, worms, molluscs and echinoderms bore into coral, eroding small parts of an individual coral and collectively weakening the structure so that it may break off in rough weather. Herbivorous fishes graze for algae on corals and break down enormous quantities of coral in the process.

Professor Howard Choat and Dr David Bellwood (James Cook University) and Dr Kendall Clements (University of Auckland) are undertaking extensive studies on how the food of herbivorous fish is digested and assimilated, and on how this feeding activity affects corals. They have found that some species of herbivorous fish digest plant material using a fermentation process, in a similar manner to cows. They have also found that one small group of parrotfish species is responsible for a large proportion of coral erosion. Termed "excavators" to distinguish them from the less destructive "scapers", a single individual of these parrotfish species will remove between one and five tonnes of coral per year. To put this into perspective, a typical school of excavators will remove a volume of coral equivalent to an average-sized living room each year. This work has important implications for reef management as it is showing that overfishing of herbivorous fishes, and parrotfishes in particular, is a major factor leading to reef degradation since their removal can lead to algae smothering the corals.

Vegetation of Reef Islands



Professor Jacques de Sloover and Olivier Raspé in the Purves Laboratory

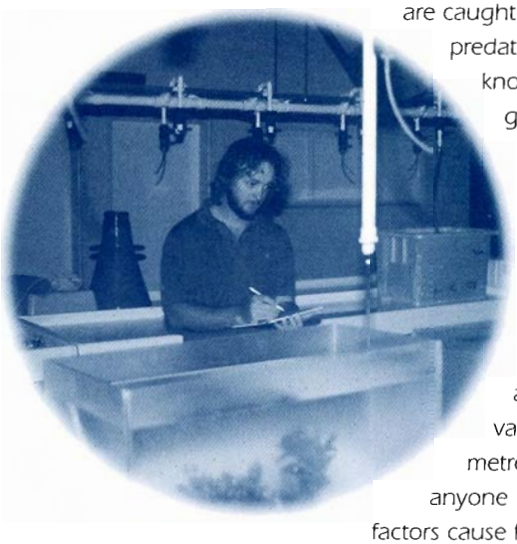
Although most of the Station's research is directed towards marine science, some significant terrestrial studies are done each year. Professor Jacques de Sloover and his students from the Université Catholique de Louvain in Belgium have made numerous visits to the Station during the past six years to work on the vegetation of the islands near Lizard Island, including Nymph, Eagle, Turtle, and Rocky. Their research is funded by the Belgian Fund for Fundamental Collective Research. This program is concentrating on latitudinal and within-area comparisons of vegetation on cays and islands, the influence of biotic and abiotic agents on these plant communities, and the population ecology of some key plant species. The research

has also taken place in Papua New Guinea and at the southern end of the Great Barrier Reef.

Value of Lizard Island Doctoral Fellowship to increase

A Lizard Island Doctoral Fellowship is offered annually by the Research Station and the Australian Museum to a PhD candidate conducting significant long-term field studies in a scientific discipline relevant to the Great Barrier Reef. The Fellowship is funded by the Lizard Island Reef Research Foundation. We are pleased to announce that, from 1997, the Foundation has agreed to increase the value of the Fellowship from $14,500 over three years to $18,000 over three years. These funds are to be used for travel, bench fees and other costs associated with field trips to Lizard Island. For information about the 1997 Fellowship, see the last page of this newsletter or our web site at http://www.austmus.gov.au.

Update on Lizard Island Doctoral Fellows



The 1996 Doctoral Fellowship was awarded to Bryce Stewart of James Cook University for his work on the role of predatory fishes on coral reefs. Most fish that are caught by recreational and commercial fishers on the Great Barrier Reef are predators since these are the types of fish which readily take baits. Little is known about the factors controlling the abundance, distribution, growth or diet of predatory fish on coral reefs. An understanding of these factors is important if we are to effectively manage those fisheries that target predatory species.

Bryce is investigating two factors which probably play a key role in controlling populations of predatory fish: the availability of food (prey) and the structure of the habitat in which the predatory fish normally live. So far, Bryce has identified 70 species of predatory fish at Lizard Island. His early results have found these species to be highly variable in number, even between areas separated by only a few metres. Such a patchy distribution of fish is probably not unfamiliar to anyone who has dangled a line! Bryce is attempting to determine what factors cause fish to live where they do.

Although his study is just beginning, Bryce has already shown that areas of reef with a high abundance of prey and with a complex habitat are particularly important sites for predatory fish, and that in some areas predatory fish occur in large numbers. This, together with their high feeding rates, suggests that they can play an important role in the regulation of prey fish communities. Therefore, the removal of large numbers of predatory fish (such as occurs with overfishing) may have dramatic effects on the coral reef ecosystem of that area. It is already clear that Bryce's study will have important management implications concerning the wise use of fisheries stocks on the Great Barrier Reef. Bryce made 4 trips totalling 94 days this year.

Ilona Stobutzki (1995 Doctoral Fellow, James Cook University) continued her work on the swimming and sensory capabilities of larval and juvenile fishes this year. She has built upon her work of the year before and determined the swimming abilities of many more taxa of reef fishes in an aquarium raceway. By using specially designed experimental cages in the field, she has also shown that pre-settlement reef fishes swim preferentially towards the reef in the absence of visual cues and irrespective of current direction. The tiny fish may be detecting the reef by its sound, as this was the only constant cue in the experiment. Ilona's work has demonstrated

that pre-settlement reef fishes are capable of directed swimming, and that their abilities in some cases may override hydrological patterns. This provides a possible mechanism for the active self-seeding of reefs and the maintenance of regional biogeographic patterns. During the year, Ilona made two trips totalling 68 days at the Station and she will return for her final field trips in early 1997.

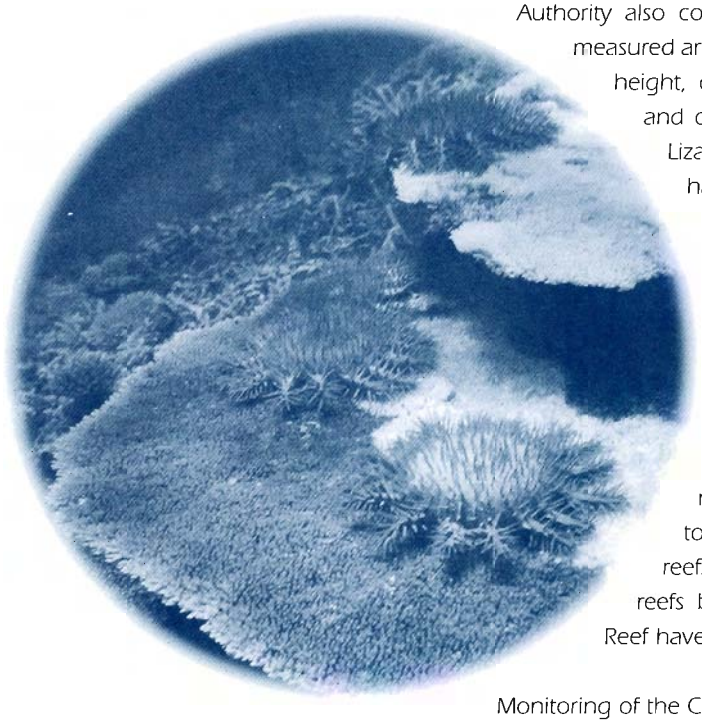
Vicki Hall (1994 Doctoral Fellow; James Cook University) completed field work this year for her project on injury regimes and regeneration in reef corals. She made two trips of 41 days total duration. This year, Vicki won the Australian Coral Reef Society prize for a paper on her Lizard Island work, earning her a free airfare to attend the International Coral Reef Symposium in Panama in June 1996. Vicki plans to submit her thesis by the end of 1996.

Dirk Zeller (1993 Doctoral Fellow; James Cook University) also completed field work this year for his project on the movements of coral trout, in a single trip of 117 days. Using ultrasonic transmitters surgically implanted into coral trout, Dirk has elucidated many features of this valuable fish species' biology. Dirk plans to submit his thesis by the end of 1996.

Monitoring

The Station continued to record air temperature (maximum and minimum) and rainfall daily, and water temperature at 3 m depth at one location every hour. Two additional temperature loggers were deployed in October 1995 as part of the Great Barrier Reef Marine Park Authority's reef wide temperature monitoring program. One logger is on the back reef slope at 5 to 6 metres below the lowest astronomical tide and the other is on the reef flat at the level of the lowest astronomical tide. All these data are available to researchers.

Monthly water quality sampling for the Great Barrier Reef Marine Park Authority also continued by the Station this year. Parameters measured are wind direction and speed, swell direction and height, cloud cover, temperature and salinity profiles, and chlorophyll concentration at four sites close to Lizard Island and at four off-reef sites extending halfway to the mainland and half way to the outer reef.



Crown-of-thorns starfish on plate coral at Kevin's Reef

Since October 1993, the Research Station has kept a log of the number of crown-of-thorns starfish (COTS) observed casually by research divers. This was started in response to a noticeable increase in the number of COTS at that time. The data, while not statistically rigorous, show that: COTS numbers still appear to be increasing at Lizard Island; other mid-shelf reefs in the area are heavily infested; and the outer reefs between Hicks Reef and Number 10 Ribbon Reef have very low numbers of the starfish.

Monitoring of the Cod Hole, a world-famous dive site on the outer barrier reef near Lizard Island, also continued this year. Since April 1992, staff of Lizard Island Charters have completed a data sheet provided by the Research Station each time they visit the site, which is usually several times per week. Usage patterns, weather data, fish numbers and noticeable damage to the environment and animals

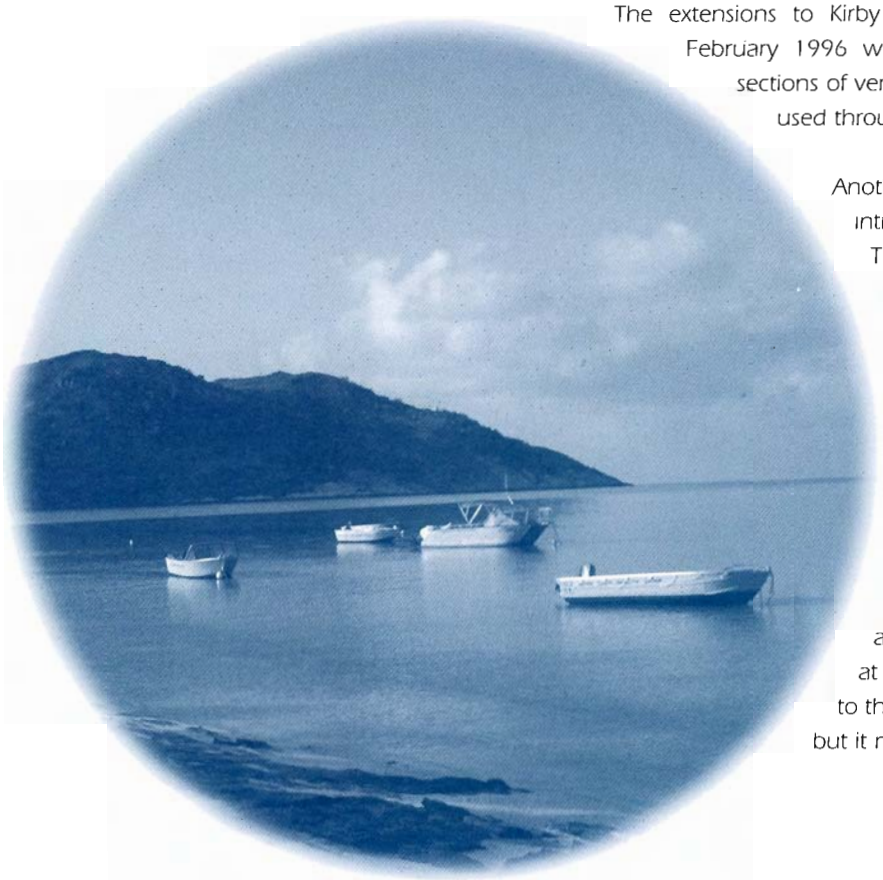
are recorded. This year, data collection was ably undertaken by Sharon Watson. A trend is becoming apparent: there are fewer potato cod at the Cod Hole now than four years ago. The mean number of cod seen per dive was 12 in the year to April 1993, but in the year to April 1996 the mean number had dropped to 6.5 cod per dive. Similarly the maximum number of cod seen per dive dropped from 26 to 13 between those years. As these large and approachable fish are the main attraction at the Cod Hole, this downward trend in numbers is worrying. The monitoring program will be the subject of a presentation by the Station's Directors at a national conference (The Great Barrier Reef: Science, Use and Management) in November 1996.

Cyclone Ethel

In March 1996, a weak (category one) tropical cyclone passed close to Lizard Island. The only damage on the island itself was a few uprooted trees, but at least one reef near Lizard suffered significant damage. Kevin's Reef (14-141) was visited by Research Station staff shortly before and shortly after the cyclone. It has an enormous population of small (20 cm diameter) crown-of-thorns starfish and extensive beds of branching ***Acropora*** corals. The corals at the western end of the eastern major patch of Kevin's Reef have been smashed and lie in a heap at the bottom of the reef slope.

Developments

The Station's long-term development plan is revised every two years, and this was done most recently in April 1996. Several major goals were achieved last year, so this year has been a time of consolidation and fundraising for the next round of capital developments. The next large-scale project to be tackled is the replacement of staff accommodation. The two existing houses were built in the early 1970s and do not provide adequate accommodation or proper cyclone protection for staff. Fundraising for the project is progressing well and it is hoped to begin construction of the first new house in 1996/97.



The extensions to Kirby and Suntory Houses were completed in February 1996 with the addition of roofing over the new sections of verandah. The spacious verandahs can now be used throughout the day and in all weather.

Another development achieved this year was the introduction of electronic mail to the Station. This is only for business use by the Research Station at present, as the system does not have sufficient speed or access points to allow for usage by researchers for either incoming or outgoing messages. We plan to offer access to e-mail for researchers by summer 1997/98.

Information about the Station, the Lizard Island Reef Research Foundation and the Lizard Island Doctoral Fellowship is now available on the Australian Museum's web site at http://www.austmus.gov.au. General access to the internet is not yet possible from the Station, but it may become available by 1997/98.

A composting toilet was installed into Loomis House this year, leaving only Talbot and the two staff houses with pit toilets. Talbot will be fitted with a composting toilet when its bathroom is renovated in 1996/97, and composting toilets will be an integral part of the new staff houses.

The Station's policy of replacing outboard motors and the four wheel drive vehicle after two years' use is both cost-effective and efficient for maintenance and reliability. This year, the Nissan Patrol was replaced with a Toyota Landcruiser, the twin 75 hp motors on Condor Cat were replaced, and four 10 hp dinghy motors were replaced. The venerable dinghy, Number VIII, was retired this year and replaced with a custom-built 4.9 m Clark hull and 25 hp motor. The Station now has two boats with this popular configuration. The Station's ancient 15 kVA generator was also retired this year and replaced with a new Lister Petter genset of similar size.

Thank you, Lizard Island Reef Research Foundation!

The Lizard Island Reef Research Foundation is an independent trust set up in 1978 to raise funds for capital development of the Station and to support research on the Great Barrier Reef. This year, the Foundation contributed $50,000 to the expenditure listed below. This sum attracted an additional $25,000 as a subsidy from the NSW government through the Australian Museum Trust. Without the Foundation's support, the Station would not be able to afford this expenditure.

• support for the research of three doctoral fellows	$14,500
• construction of verandah roofs at Kirby and Suntory	$15,100
• replacement of old 15 kVA generator	$7,500
• replacement of old dinghy	$6,900
• minor improvements to visitor houses	$5,700
• replacement of two 75 hp motors on Condor Cat	$4,800
• replacement of four wheel drive vehicle	$4,500
• purchase of composting toilet system for Loomis	$3,500
• replacement of refrigerators and stove	$3,300
• replacement of four 10 hp dinghy motors	$3,200
• refurbishment of electrical switchboard	$2,300
• purchase of slide projector	$2,100
• purchase of spare freshwater pump	$1,200
• purchase of scuba tanks	$600
• TOTAL	$75,200

This year, the Foundation obtained most of its revenue from its Membership. Each Member makes a donation of at least $1,000 per year, which is tax-deductible within Australia and provides many benefits, not the least of which is the knowledge that Members are contributing significantly to knowledge and conservation of the Great Barrier Reef. There were fifty three Members of the Foundation in 1995/96 (see inner front cover). The Station would not be the excellent research facility it is without their generous support.

The annual Members' dinner was held on the Australian Museum Rooftop on 11 October 1995. The dinner was well-attended and the guest speaker was Dr Ian McPhail (Chairman, Great Barrier Reef Marine Park Authority).

The Station's Directors were pleased to meet so many Patrons, Members and Trustees at Lizard Island during the year, and to have the opportunity of showing them over the Station. Those who visited during 1995/96 are: Ken Coles and Rowena Danziger; Trevor Haworth; Vivian and Wendy King; Geoff and Judy Lee; Dr Ian McPhail; Robert Purves; Charles and Sandra Shuetrim; and James and Jeanne-Claude Strong.

The Members' prize of a four night stay for two at the Lizard Island Lodge with business class air travel was won by Mr Anders Ousback. Congratulations to Mr

Ousback and thank you to the sponsors, Australian Resorts, Coles Myer, Qantas Airways and the Suncorp Group.

Friends of the Lizard Island Reef Research Foundation contribute smaller sums to assist with development of the Station and to fund research. We thank this year's Friends for their support:

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Shepherd, Anthohy F
Thomson, V
Wonless, JH
and many anonymous donors.

The Coral Spawning Sweepstakes in 1995 was won by Mr James Creer, immediate past Chairman of the Lizard Island Reef Research Foundation. The peak of the coral spawning at Lizard Island occurred at about 9.30 pm on 8 December 1995. The prize is a four-night cruise for two on the luxurious Reef Endeavour to Lizard Island and other Reef locations with business class air travel to Cairns. Congratulations to Mr Creer and thanks to the sponsors, Captain Cook Cruises, Qantas Airways, Coles Myer and the Suncorp Group. Although the competition was fun and generated significant interest, the Coral Spawning Sweepstakes will not be run again in 1996.

If you would like to support coral reef research and help the Station continue to develop, become a Member or Friend of the Lizard Island Reef Research Foundation. See the end of this newsletter for details.

Staff

The Station has a permanent, full-time staff of four people. Anne Hoggett and Lyle Vail have been the Directors since August 1990, and Lance and Marianne Pearce have been the Maintenance Officer and Accommodation Officer, respectively, since September 1988.

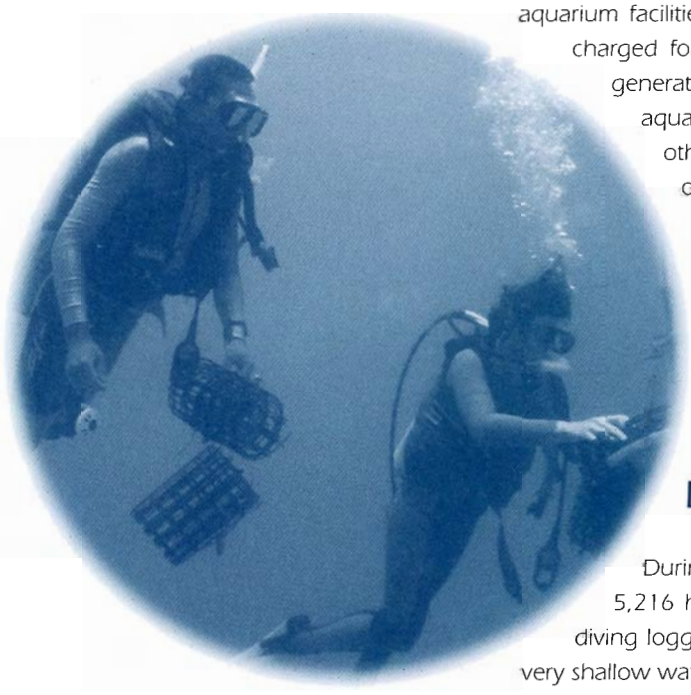
During the year, Kate O'Donnell, Bob Lamb and Tania Lamb were employed on a temporary basis to fill in while permanent staff were on leave. Alex Vail's home tutor for most of 1995 was Susan Bruce, with Cassie Ryan completing the last two months of the year. In 1996, the position was filled by Liri Latimore.

Bench fees and other research costs

Visiting researchers are charged a bench fee that covers self-catering shared accommodation, use of a small boat, most laboratory and aquarium facilities, and scuba tanks and air fills for qualified divers. The fee is subsidised by the Australian Museum Trust. For visits longer than 28 consecutive days, a 10% discount applies to the whole period.

The fees in 1995/96 were unchanged from the previous year, and no change is planned for 1996/97. For non-student projects, the fee is $75 per day for the principal scientist and $65 per day for each assistant. For postgraduate student projects, the fee is $29 per day for the student and $25 per day for each assistant. Attractive rates are offered to groups of school and university students undertaking course work directed by teachers or lecturers from their own institutions.

Other costs involved in conducting research at Lizard Island include airfares between Cairns and Lizard Island (currently $380 return), barge freight for food and other supplies from Cairns ($9 per grocery carton), and food (the supermarket bill plus a small cartage fee for delivery to the barge depot). Use of most laboratory and aquarium facilities is included in the bench fee, but an extra fee is charged for any equipment that requires a larger-than-normal generator to be run. This includes the freeze-dryer, the aquarium room airconditioner, the seawater filter and any other powerful equipment brought by researchers. Use of a small dinghy is included in the bench fee. If a larger boat is needed, the additional fuel cost is recouped on a distance basis and it may be necessary to hire a boat driver at a cost of $40 per hour. High quality snorkelling gear and two sets of regulator/gauges and buoyancy compensators are available for hire at reasonable rates.

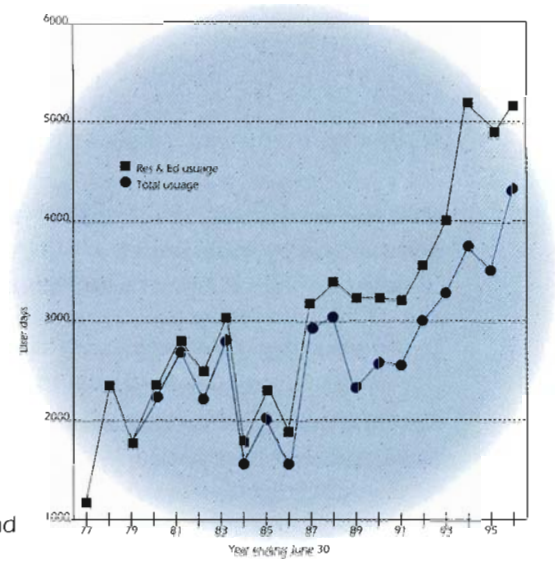


Diving

During the year, 4,842 dives were logged, representing 5,216 hours underwater, which is similar to the amount of diving logged last year. As usual, most diving was conducted in very shallow water: 30% of dives were to 5 metres depth or less, 42% to between 6 and 10 metres, 14% to depths between 11 and 15 metres, and 14% to depths between 16 and 30 metres.

Usage of the Station

Usage levels remain very high, with the total almost reaching the level achieved in 1993/94, and with the research and educational component attaining a record high this year. Commercial users, volunteers and official guests account for the difference between research and educational usage and total usage.



Volunteer program

The Station's volunteer program offers free accommodation in exchange for four hours manual work per day. The work is maintenance, not research, but many volunteers are recently-qualified biologists keen to experience the coral reef environment and to mix with researchers. Only two volunteers are accepted at any one time, and opportunities are greatest during the Australian winter. Contact the Station for more details about the volunteer program.

This year, we give our thanks to the following volunteers: David Adams, Eva Axelsson, Rohan Beale, Tanya Davies, Russell Davies, Lyn Eccles, Bridget Green, Jim Haggland, Ken Hawkins, Kellie Hellyer, Walther Hermsen, Lucinda Hook, Ian Jackson, Fiona Jol, Adam Knight, Bob Lamb, Tania Lamb, Liri Latimore, Crista Mellican, Heikki Peltonen, Cassie Ryan, Craig Tommerup and Martijn van Heeringen.

Several long-term associates of the Research Station deserve special acknowledgment this year. Dr Jeff Leis and Sue Bullock (with Sam Leis), Lois Wilson and Terry Ford, and Renie Hood spent time on the island while permanent staff were on leave, and very ably assisted the remaining staff to keep the Station functioning. Thanks, everyone!

Day visitors

All visitors to the island are welcome to call into the Research Station and view the Sir John Proud Aquarium and verandah display. A staff member is available to discuss the work of the Station and answer questions on Mondays and Fridays at 9.30 am, when tours for Lodge guests and other visitors are held.

Several Patrons, Trustees and Members of the Lizard Island Reef Research Foundation visited Lizard Island this year and viewed the Station (see page 8). The Directors also welcomed the opportunity to show the Station to Dr Ian McPhail in his capacity as Chairman of the Great Barrier Reef Marine Park Authority and his guests; and to Board members and guests of the CRC Reef Research Centre, including the Director, Professor Chris Crossland.

Research projects and participants

The following 65 research projects were carried out during the year, of which 36 were led by fully qualified researchers and 29 were led by postgraduate students (indicated by an asterisk).

Measurement of reef flat community metabolism by respirometry
Dr David Barnes, Dr John Chisolm, Monty Devereaux and Dr Brian King (Australian Institute of Marine Science, Townsville)

Baseline survey of marine communities in the Cape Flattery Port area
Dr Tony Ayling (Sea Research, Queensland) assisted by Dr Avril Ayling, Warren Nott, Anthony Roelofs and accompanied by Fuchsia Nott and Bliss and Xeneka Ayling

Mangrove ecosystem modelling
Dr Keita Furukawa and Dr Eric Wolanski (Australian Institute of Marine Science, Townsville) accompanied by Toshiko and Soto Furukawa and Phillip and Timothy Wolanski

Distribution of seagrasses
Len McKenzie, Warren Lee Long and Emma Bradshaw (Department of Primary Industries Fisheries, Cairns)

Vegetation of islands in the Lizard Island area
Prof Jacques de Sloover (Université Catholique de Louvain, Belgium) assisted by Catherine de Sloover

Reproductive strategy in fragmented populations of *Pemphis acidula*
*Olivier Raspé (Université Catholique de Louvain, Belgium) assisted by Prof Jacques de Sloover

Molecular systematics of foraminiferal symbionts
Dr John Lee (City College of CUNY, USA)

Collection and culture of planktonic foraminifers
Dr Kate Darling (University of Edinburgh, Scotland) assisted by Rebecca Darling

Taxonomic survey of sponges, soft corals and gorgonians
Dr John Hooper and Paula Tomkins (Queensland Museum, Brisbane)

Ecology of sclerosponges and other cave fauna
*Gert Wörheide (University of Göttingen, Germany) assisted by Karen Diele

Sclerosponges and microbialites in cryptic reef habitats
Professor Joachim Reitner (University of Göttingen, Germany) assisted by Dr Helmut Lehnert

Toxicology of the zoanthid, *Palythoa*
*Sylvia Gleibs (University of Frankfurt, Germany)

Chemical relationships between sponges and their associated fauna
*Silke Kauferstein (University of Frankfurt, Germany)

Coral ecology
Dr Terry Hughes (James Cook University, Townsville) assisted by Liz Dinsdale and Morgan Pratchett and accompanied by Connor Hughes

Effects of physical damage on corals
*Vicki Hall (James Cook University, Townsville) assisted by Jo Sadler and Jackie Wolstenholme

Recruitment of corals and survivorship of fragments
*Andrew Baird (James Cook University, Townsville) assisted by Gabriel Codina and James Aumend

Large-scale recruitment patterns in corals
Dr Terry Hughes (James Cook University, Townsville) assisted by Andrew Baird (field team leader), Gabriel Codina, Monica Payne and James Aumend

Coral reef restoration
*Rohan Pratt (James Cook University, Townsville) assisted by Kylie Dodds, Chris Wellington, Nick Gust, Stuart Hickman and Justin Ahearn

Growth and mortality of juvenile corals
*Stuart Watson (James Cook University, Townsville) assisted by Gabriel Codina and Tom Barker

Morphological diversity of corals with depth
*Dearne Sauer (James Cook University, Townsville) assisted by Stuart Watson

Dynamics of coral spawning and recruitment
Dr Andrew Heyward (Australian Institute of Marine Science, Karratha) assisted by Dr Richard Stump

Taxonomy and phylogenetic classification of nemerteans (ribbon worms)
Dr Per Sundberg (University of Göteborg, Sweden) assisted by Pamela Herdman and accompanied by Kajsa and Jonas Sundberg

Taxonomy, morphology and phylogeny of marine Tubificidae (Oligochaeta)
Prof. Christer Erséus (Swedish Museum of Natural History)

Taxonomy and phylogeny of the family Spionidae (Polychaeta)
*Elin Sigvaldadottir (Swedish Museum of Natural History)

Taxonomy and phylogeny of hermit crabs
*Lennart Sandberg (Swedish Museum of Natural History)

Neuropeptides and their role in the visual system of crustaceans
Prof. Alan Thorpe and Dr Hanne Duvé (Queen Mary and Westfield College, England)

Neurotoxins of Conus as therapeutic agents
Dr Bruce Livett, Dr John Down, Dr Christine Wright, Dr Tony Klein, Dr David Satchell (University of Melbourne), Dr Ardyth McCracken and Robert McCracken (visiting University of Melbourne from USA)

Collection of *Conus* specimens for biologically active compounds
Barbara Collins and Ian Walker (for *Jon-Paul Bingham, Drug Design and Development Centre, Brisbane)

Long-term giant clam survey
Dr David Phillips (Fenviron, UK) assisted by Jackie Robinson

Clam biochemistry related to chloride channels
Dr Marcus Paulmichl (University of Innsbruck, Austria)

Feeding by the corallivorous snail, *Drupella*
*Kerri Sutton (James Cook University, Townsville) assisted by Morgan Pratchett, Samuel Bell, Liri Latimore and Stuart Watson

Diets of gastropods
Dr Susanne Lawrenz-Miller (Cabrillo Marine Aquarium, USA) and Dr Alan Miller (California State University Long Beach, USA), assisted by David and Luke Miller

Crown of thorns starfish population study
Dr Richard Stump (consultant, Townsville) assisted by Kylie Hitt and James Monkivitch

Reproductive potential of crown of thorns starfish and factors regulating its variations
Dr W. Bandaranayake and Dr Tenshi Ayukai (Australian Institute of Marine Science) assisted by Ken Okaji, Anne Lee, Sven Uthicke and Cassie Ryan

Local control strategies for crown of thorns starfish
David Fisk (Reef Research and Information Services, Lismore) assisted by Melissa Coates, John Mooney, Deborah Kolb, Paul Fisk and Mary Portefaix

Local control strategies and movements of adult crown of thorns starfish
Dr Lyle Vail and Dr Anne Hoggett (Lizard Island Research Station) assisted by Bob Lamb, Lance Pearce and Marianne Pearce

Larval fish behaviour
Dr Jeff Leis (Australian Museum, Sydney) assisted by Brooke Ewart, Tom Trnski, Rob McCauley and Mike Emslie

Larval fish ecology
Dr Vincent Dufour (University of Perpignan, France), Elizabeth Maddox (University of Miami, USA) and Peter Speare (Australian Institute of Marine Science, Townsville) accompanied by Armelle, Estelle and Clement Dufour and Robyn Aiello

Swimming and sensory capabilities of larval and juvenile fishes
*Ilona Stobutzki (James Cook University, Townsville) assisted by Cathy Jordan, Jess Morgan, John Ackerman and Simon French

Visual ecology of reef fish larvae
*Suresh Job (James Cook University, Townsville)

Influence of larval growth on postsettlement growth and persistence in two coral reef fishes
Dr Mark McCormick (James Cook University, Townsville) assisted by Brigid Kerrigan, Gabriel Codina and Bridget Green

Reproductive success and spawning output of a demersally spawning coral reef fish
Dr Maria Milicich and Dr Geoff Jones (James Cook University, Townsville) assisted by Mike Emslie, Line Bay, Sara Svensson and Peter Watson

Ecology of herbivorous fishes
Prof. Howard Choat (James Cook University) assisted by Lynda Axe, Will Robbins, David Welch and Steve Purcell

Gut microorganisms of surgeonfishes
Dr Kendall Clements (University of Sydney) assisted by Lynda Axe and Will Robbins

Trophic diversification and the evolution of reef fishes
Dr David Bellwood (James Cook University, Townsville)

Habitat specificity within the goby genus *Gobiodon*
*Phil Munday (James Cook University, Townsville) assisted by Katherine Munday and Will Robbins

Effects of habitat structure on reef fish assemblages
*Marcus Öhman (Stockholm University, Sweden) assisted by Craig Hutchings

Relationships between reef fishes and their habitats
*Craig Syms (James Cook University, Townsville) assisted by Crista Mellican

Piscivory in coral reef fishes
*Bryce Stewart (James Cook University, Townsville) assisted by Nick Gust, Tobin Turner, Stuart Watson, Matt Barchiesi and Morgan Pratchett

Morphological and colour pattern changes in juvenile parrotfishes
*Anne Crook (James Cook University, Townsville) assisted by John O'Reilly, Peter Nangle, Bridget McClarty and Roisin O'Reilly

Demography of lethrinid and lutjanid fishes in the lagoon
*Vincent Hilomen (James Cook University) assisted by Dr Garry Russ, Spiro Tzioumis, Tonny Laursen, David Williamson and Naniel Aragones

Reef fish ecology
Dr Geoff Jones, Dr Uschi Kaly and Dr Julian Cayley (James Cook University, Townsville) assisted by Ian Keay, Marcus Öhman, Stephanie Slade, Craig Hutchings, Emma Broadhurst and David Wilson

Study of movements of large reef fishes using telemetry
*Dirk Zeller (James Cook University, Townsville) assisted by Chris Hagan, Janine Hagan, Carole Eros, Juliet Corley, Heather Handley, Bruce Smalley and Matthew Bird

Development of the digestive system in parrotfishes
*Li-Shu Chen (James Cook University, Townsville) assisted by John O'Reilly and Peter Nangle

Sounds produced by damselfish in response to simulated and natural territorial encounters
*Carole Eros (James Cook University, Townsville) assisted by Bill Smith, Scott Woodling and Dirk Zeller

Phenotypic plasticity in damselfishes
*Kathy Kavanagh (James Cook University, Townsville)

Gut function in reef fishes
*Michael Marnane (James Cook University, Townsville)

Effects of line fishing - baseline visual surveys
Dr Tony Ayling (Sea Research, Daintree) assisted by Jamie Colquhoun and Warren Nott and accompanied by Dr Avril Ayling, Bliss and Zenecka Ayling.

Effects of line fishing - baseline catch surveys
*David Welch (CRC Reef Research Centre, Townsville) assisted by John Robinson, Bill Roberts and Dr Bruce Mapstone

Sediment loads and their implications for algal turf biomass and feeding biology of herbivorous fishes
*Steve Purcell (James Cook University, Townsville) assisted by Dave Stewart and Stuart Watson

Effects of fishing on seabird populations
Dr Geoff Smith (Department of Primary Industries, Brisbane) and Dr David Milton (CSIRO Marine Laboratories, Brisbane) assisted by Ron Dowling and Cesca Lejeune, and accompanied by Georgia and Maeve Lejeune

Anthropogenic impacts on seabirds
Dr Emma Gyuris (James Cook University, Townsville)

Interactions between tourism, diving and conservation on the Great Barrier Reef
*Liesl Welsby (University of Newcastle-upon-Tyne, UK)

Install weather monitoring station
John Soles and Simon Spagnol (for Dr Eric Wolanski, Australian Institute of Marine Science, Townsville)

Ground-truthing satellite images of Lizard Island
Dr Tsuneo Matsunaga (Geological Survey of Japan) and Dr Hajime Kayane (University of Tokyo, Japan)

Exploratory visit
Dr Kenji Morinaga and Dr Kazumasa Hashimo (Japan) associates of Dr Terry Done (Australian Institute of Marine Science, Townsville)

Group visits

A school group on the reef flat at Coconut Beach. Fred Bavendam©

Students from **Ascham School** (Sydney): Alix Armstrong, Josephine Chan, Amy Colquhoun, Sarah Davies, Sarah Diver, Melanie Fleming, Cynthia Hardy, Miyuki Jokiranta, Christina Knight, Lara Kostakidos-Lianos, Claudia Martin, Chloe Orford, Amy Ross, Alex Syriatowicz, Ilana Waldman and Nicola Wilcocks; led by teachers Andrew Powell, Jane Valentine and Jill Lumsdaine, and accompanied by Tess Lumsdaine.

Students of **Calumet College** (USA) Reef Ecology class: Marcella Beni, Robert Czajkowski, Andrea Denninger, Christina McCoy, Barbara Mousel, Barbara Pakan, Katrina Ruhe, Lorri Skolak, Neal Skreanes and Homer Turner; led by Steve Arnam and accompanied by Wayne Prestage.

Students of **University of Richmond** (USA): Shannon Boles, Matt Ellinghaus, Dorian Haldeman, Kendra Hearon, Peter Larson, Erin Mancuso, Polly O'Neil, Randi Sjogren, Thibault van Marke, Molly van Scoy, Amy Widerman; led by Professor John Bishop.

Members of **The Australian Museum Society** (Sydney): John Allman, Helen Allman, Marlen Dyne, Judy File, Richard File, David Foster, Margaret Foster, Oscar Horky, Charlotte Lowenstein, Michael McGahey, Carolyn Riley, E. Stoddart, Glenda Shoulder, Fiona Smith, E. Tripp, Maret Vesk, Mart Vesk, Wendy Wolfe, Paul, Anne, and Judy; led by Dr Penny Berents, Peter Berents and Anna Murray, and accompanied by Natalie Berents.

Students of **SCECGS Redlands** (Sydney): Emma Alexander, Phillipa Begg, Allyson Buttle, Amy Carland, Naomi Corbett, Holly Donohoo, Melanie Forte, Katherine Jones, Michael Junod, Daniel Reisinger, Brianna Seale and Jordan Wilson; led by teachers Rachel Elphick and Adam Sloan, and by Don Elphick.

Students of **St Vincent's College** (Sydney): Sarah Bartter, Shannon Cassilles, Anna Frowd, Kristina Kosutic, Amy Levien, Neridah Morgan, Sarah Murray, Natalie Mutton, Julie Orton, Abby Peacock-Smith, Sarah Powell, Melinda Seeto, Rochelle Underwood, Elizabeth Wawn and Sarah Weir; led by teachers Michelle Demain and Denise Mohr, and by Paul Demain, Kay Underwood and Ken Underwood.

Students of **Geelong College** Preparatory School (Geelong, Victoria): Renae Butterworth, Julian Calaby, Brian Cooke, Dominic Crowley, Stephanie Deeath, Justin Harding, Rebecca Herd, Scott Jordan, Hannah Locke, Bronwen Rose, Stephen Ryan, Andrew Sheahan, Levi Turner, John Warn and Sonia Woodland: led by teachers Stuart McCallum and Sue Scott, and by Chris Mitchell.

Other visitors

- Robert Purves (Patron and Trustee of the Lizard Island Reef Research Foundation (LIRRF)) and Geoff Lee and Judy Lee (Members, LIRRF) spent two days at the Station with guests Alan McDonald, Maree McDonald and Andrew Robertson.
- Charles Makray (First Aid Training Services, Cairns) gave a refresher course in first aid and resuscitation to staff members. He was accompanied by Julie Armour.
- Dr Des Griffin (Australian Museum, Sydney) visited to inspect the Station, conduct staff appraisals, and discuss management and developments.
- Journalists David Bentley and Ray Cash (Courier Mail, Brisbane) visited to write an article about the Great Barrier Reef.
- William Luthi (Cooktown State School, Qld) visited for work experience.
- Molly Olson, Don Henry, Kate McGintie and Karl Hausker (senior environment workers, USA) visited to experience the coral reef environment.
- Contractors Max Edwards, Jeff Kay-Spratley and Alan Dale visited to construct roofs over the new verandahs at Kirby House and Suntory House.

Publications

The following publications, based in whole or in part on work carried out at the Lizard Island Research Station, were received into the Station's collection during the year. There are now over 450 reprints, theses and books in the collection. All visiting scientists are urged to send two copies of papers resulting from work at the Station to be added.

Baccaert, J., 1986. Foraminiferal bio- and thanatocoenoses of reef flats, Lizard Island, Great Barrier Reef, Australia. Nature of substrate. ***Annls Soc. r. zool. Belg.***, 116:3-14.

Beukers, J.S., G.P. Jones & R.M. Buckley, 1995 Use of implant microtags for studies on populations of small reef fish. ***Marine Ecology Progress Series***, 125:61-66.

Blaber, S.J.M., D.A. Milton, G.C. Smith and M.J. Farmer, 1995. Trawl discards in the diets of tropical seabirds of the northern Great Barrier Reef, Australia. ***Marine Ecology Progress Series***, 127:1-13

Caley, M.J., 1995. Community dynamics of tropical reef fishes: local patterns between latitudes. ***Marine Ecology Progress Series***, 129:7-18.

Caley, M.J., 1995. Reef fish community structure and dynamics: an interaction between local and larger-scale processes? ***Marine Ecology Progress Series***, 129:19-29.

Cannon, L. & L. Newman, 1996 Trepang. treasure or tragedy? ***Wildlife Australia***, Summer 1995-96:16-17.

Castro, P., D.G.B. Chia and P.K.L. Ng, 1995. On the taxonomic status of ***Ceratocarcinus longimanus*** White, 1847 (Crustacea: Decapoda: Brachyura: Eumedonidae), a crab symbiotic with comatulid crinoids. ***Raffles Bulletin of Zoology***, 43(1):239-250.

Clements, K.D. and J.H. Choat, 1995. Fermentation in tropical marine herbivorous fishes. ***Physiological Zoology***, 68(3):355-378.

Ferreira, B.P., 1993. Age, growth, reproduction and population biology of ***Plectropomus*** spp (Epinephelinae: Serranidae) on the Great Barrier Reef, Australia. PhD thesis, James Cook University, Townsville.

Grutter, A.S., 1994. Parasites in the cleaning interactions between ***Labroides dimidiatus*** and fish. PhD thesis, James Cook University, Townsville.

Grutter, A.S., 1995. Relationship between cleaning rates and ectoparasite loads in coral reef fishes. ***Marine Ecology Progress Series***, 118:51-58.

Grutter, A.S., 1995. Comparison of methods for sampling ectoparasites from coral reef fishes. ***Marine and Freshwater Research***, 46:897-903.

Johnson, M.S. and R.L. Cumming, 1995. Genetic distinctness of three widespread and morphologically variable species of ***Drupella*** (Gastropoda, Muricidae). ***Coral Reefs***, 14:71-78.

Kerrigan, B.A., 1995. Variability in condition and morphological traits of two tropical reef fish (Pomacentridae): implications for recruitment success. PhD thesis, James Cook University, Townsville, Qld.

McCormick, M.I., 1995. Fish feeding on mobile benthic invertebrates: influence of spatial variability in habitat associations. ***Marine Biology***, 121:627-637.

McCormick, M.I. and B.W. Moloney, 1995. Influence of water temperature during the larval stage on size, age and body condition of a tropical reef fish at settlement. ***Marine Ecology Progress Series***, 118:59-68.

Messing, C.G., 1995. ***Alloeocomatella***, a new genus of reef-dwelling feather star from the tropical Indo-west Pacific (Echinodermata: Crinoidea: Comasteridae). ***Proceedings of the Biological Society of Washington***, 108(3):436-450.

Nelson, V.M., 1994 Demographic processes and spatial heterogeneity in community structure and dynamics of corals on the reef crest. PhD thesis, James Cook University, Townsville.

Reitner, J., P. Gautret, F. Marin and F. Neuweiler, 1995. Automicrites in a modern marine microbialite. Formation model via organic matrices (Lizard Island, Great Barrier Reef, Australia). ***Bulletin de l'Institut océanographique Monaco,*** special number 14(2):237-263.

Reitner, J. and F. Neuweiler, 1995. Mud mounds: a polygenetic spectrum of fine-grained carbonate buildups. ***Facies,*** 32:1-70.

Reitner, J., year unknown. Aktuopalaeontologie coralliner Spongien ("Sclerospongia") in Riffen nahe Lizard Island (Barriere Riff, Australien). ***Arbeitsbericht zum Projekt Re665/1-2, DFG-Schwerpunkt, Biogene Sedimentation, Riff-Evolution und Kreide-Sedimentation.***

Speare, P., 1994. Relationships among black marlin, ***Makaira indica,*** in eastern Australian coastal waters, inferred from parasites. ***Australian Journal of Marine and Freshwater Research,*** 45:535-549.

Uthicke, S., 1994. Distribution patterns and growth of two reef flat holothurians, ***Holothuria atra*** and ***Stichopus chloronotus. Echinoderms through Time: Proceedings of the Eighth International Echinoderm Conference, Dijon, France, 1993.*** B. David, A. Guille, J.-P. Feral and M. Roux (Eds.)

Watson, S.L.S., 1995. Distribution, survivorship and growth of juvenile corals: the structural role of early post-recruitment processes. Honours thesis, James Cook University, Townsville.

LIZARD ISLAND RESEARCH STATION
GREAT BARRIER REEF, AUSTRALIA
A FACILITY OF THE AUSTRALIAN MUSEUM

DOCTORAL FELLOWSHIP 1997

The Australian Museum, in conjunction with the Lizard Island Reef Research Foundation, is offering a Fellowship to a PhD student to support field work on the Great Barrier Reef based at the Lizard Island Research Station. The recipient will carry out significant field studies in a scientific discipline relevant to coral reefs. The first annual Fellowship was awarded in 1984, and applications are now invited for the 1997 Fellowship.

The Fellowship is intended primarily to pay bench fees at the Lizard Island Research Station for several months field work per year over a period of up to three years. It may also be used for travel and freight expenses and to purchase research equipment, but it may not be used for living expenses or salary. Support will be granted for field work at Lizard Island for a maximum of three years; however, applications for funding for one or two years are acceptable. The amount granted in any year of the Fellowship will be a maximum of A$6,000. The project should result in a significant contribution to coral reef science and the data from Lizard Island should form an important part of that work.

The Lizard Island Research Station was established in 1972 by the Australian Museum to support research into all aspects of the biology, geology and hydrology of coral reef ecosystems. Airconditioned laboratories, boats, diving equipment, running seawater aquaria, and accommodation units are provided at the Station. Lizard Island is situated in an extraordinarily diverse marine ecosystem which is carefully managed as part of the Great Barrier Reef Marine Park. The large size (7 km^2) and height (360 m) of Lizard Island and its adjoining smaller islands and reefs provides a wide variety of habitats and ensures that field work can proceed in all but the most extreme weather. Lizard Island (14°40'S 145°28'E) is located near the middle of the 50 km wide continental shelf: near-by habitats include turbid coastal reefs, mid-shelf platform reefs, inter-reef soft-bottoms including extensive ***Halimeda*** beds, sheltered lagoons and high-energy ribbon reefs facing the Coral Sea. Access to Lizard Island is easy with many flights into Cairns from international and domestic ports and daily flights from Cairns to Lizard Island.

CONDITIONS OF AWARD

Each year, the Fellow will be required to make an oral presentation at the Research Station on his/her research and produce a written progress report including revised budget estimates for the coming year(s). Subsequent funding depends upon suitable progress. The Fellow must lodge a bound copy of his/her thesis in the Station's library. Any non-consumable equipment purchased with Fellowship funds becomes the property of the Research Station when field work has been completed.

INFORMATION

The Directors
Lizard Island Research Station
PMB 37
CAIRNS QLD 4870
AUSTRALIA
Internet: lizard@amsg.Austmus.oz.au
Phone and fax: + 61 (0)70 60-3977

APPLICATIONS

Six copies of the application should be sent to:
Deputy Director
Australian Museum
6 College Street
SYDNEY NSW 2000
AUSTRALIA
Internet: alixB@ama.Austmus.oz.au
Phone: + 61 (0)2 320-6224
Fax: + 61 (0)2 320-6056

CLOSING DATE 1 OCTOBER 1996

Please see application format, selection criteria and information on costs on the next page

APPLICATION FORMAT

RESEARCH PROPOSAL
Name of applicant
University and Department
Name of supervisor(s)
Project title
Objectives (100 words)
Significance (100 words)
Research plan (maximum 5 pages): outline experimental design and methodology; show sequence of tasks on a yearly timescale; indicate work already completed.
Financial details (maximum 2 pages): indicate number of years for which funding is sought; provide a detailed budget for each year of funding for the whole project (not just the Lizard Island component), including bench fees, travel and other costs (expenditure on equipment exceeding $200 must be detailed); indicate which non-fellowship funding is already guaranteed and how remaining funding (including that for living expenses) will be obtained; justify expenditure in terms of the research.

CURRICULUM VITAE

As well as the usual personal, educational and professional information, include: a summary of academic record and achievements; list of publications; date of enrolment in PhD program, and; the name of a referee who may be contacted regarding the application.

SUPPORTING LETTER

A letter approving the project from the head of the university department where the applicant will be enrolled must be included with the application. Overseas students must also include a letter from their supervisor indicating the acceptability of overseas field work to the program at that particular university, and how closely involved the supervisor will be with the project.

COSTS

To assist in preparing budgets, the following costs involved in field work at the Lizard Island Research Station in 1997 are provided. All amounts are in Australian dollars.

Diving: The Station's regulations require that all scuba dives are done by at least two divers; a boat attendant is also required under some circumstances. All projects requiring diving should allow for at least one dedicated assistant, for whom bench fees must be paid. Contact the Research Station for further details.
Bench fees: PhD students are offered a highly subsidised bench fee which includes self-catering accommodation, most laboratory and aquarium facilities, use of a small boat, and scuba tanks and weights for qualified divers. In 1997, the rate will be $29 per day for the student and $25 per day for each assistant. For visits of more than 28 consecutive days, the bench fee is reduced by 10% for the entire visit.
Food and freight: Food must be ordered from Cairns for delivery by barge every two weeks, or by air. Food costs are not covered by the Fellowship. Air freight from Cairns is expensive at about $3.00 per kg. Freight carried by the fortnightly barge is $9.00 per grocery carton-sized container. Freight expenses may be paid from Fellowship funds.
Travel: Return airfare between Cairns and Lizard Island is $380. There is no scheduled surface transport.

SELECTION CRITERIA

Selection will be based on the following criteria:
1) acceptance of the applicant into a PhD program to undertake research on a topic related to coral reefs;
2) evidence that the applicant has stipend from a scholarship or other source for the duration of the Fellowship;
3) significance, quality and innovation of the proposed research which must be on an aspect of coral reefs;
4) feasibility of the proposed research within the limitations of budget and safety regulations;
5) significant and efficient usage of the Lizard Island Research Station during each year of funding;
6) evidence that sufficient funding will be available to complete the project as planned, or presentation of a contingency plan for amending the project if additional funding does not become available;
7) evidence of the applicant having relevant research and fieldwork experience;
8) the applicant's academic and research record.

Support the Lizard Island Research Station

by becoming a Member or Friend of the Lizard Island Reef Research Foundation in 1996/97.

[ ] I wish to become a Member (donations of $1,000 or more)

[ ] I wish to become a Friend (donations up to $1,000)

[ ] I would [ ] would not like my name and that of my partner to be included in the public listing of donors.

Title:_____Name:_____

Spouse/Partner's name_____

Address: _____

_____Postcode: _____

Phone: Business _____ Home _____

[ ] I enclose a cheque for $_____ payable to the Lizard Island Reef Research Foundation.

[ ] Please charge $_____ to my Mastercard/ Visa / Bankcard

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry _____

Signature of cardholder _____

Please mail to: The Secretary/ Treasurer
Lizard Island Reef Research Foundation
Australian Museum
6 College Street
Sydney NSW 2000
AUSTRALIA

For further information, please contact the Directors of the Research Station (070 60-3977) or Gail McCarthy at the Australian Museum (02 320-6110).