



Lizard Island Research – *a partnership*

Charlie Shuetrim

The story of *Lizard Island Research Station* and *Lizard Island Reef Research Foundation*



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About this publication

The success of the Australian Museum's Lizard Island Research Station (LIRS), now recognised as one of the best field stations in the world for tropical marine research, and the success of the Lizard Island Reef Research Foundation (LIRRF) in providing since 1978, almost \$8 million of funding for the Research Station, gave rise to the thought that this was a story worth documenting.

Much of the information for this publication has been extracted from the annual newsletters of LIRS and minutes of the Trustees' meetings of LIRRF. Judith Wright's excellent book, *"The Coral Battleground"*, provided an insight into what was happening on the Reef at the time when LIRS was conceived. Dorothy Hill's publication *"The Great Barrier Reef Committee, 1922-1982: The first thirty years"* told the story of early research on the Reef. Information about the status of the Great Barrier Reef to-day was taken largely from the web site of the Great Barrier Reef Marine Park Authority.

In addition, many people who have been involved in the development and success of LIRS and LIRRF have added their own unique insights. Notable amongst these are Frank Talbot, Des Griffin, Ken Coles, Andrew Green, Virginia Chadwick, Penny Berents, Anne Hoggett, Lyle Vail, Max Day and Jon Day. We are most grateful to the Archives and Design Departments of the Australian Museum for their assistance in producing this story. If there are errors of fact, please let us know as we would like to keep this story up to date on the Australian Museum web site.

Charlie Shuetrim
Trustee of LIRRF, May 2009

Addendum

Four years have passed and all the initial print run of this publication has been distributed. In the meantime Lizard Island Research Station has continued to flourish and the 30th Anniversary Development has been completed. We thought therefore that it was worthwhile to do a further print run and bring the publication up to date. We hope that you enjoy it.

Charlie Shuetrim
Trustee of LIRRF, August 2013





Contents

- 01 Early research on the Great Barrier Reef 08
- 02 Lizard Island Research Station – a fortuitous event 14
- 03 The early years 20
- 04 Lizard Island Reef Research Foundation 24
- 05 The early 1980s 28
- 06 The late 1980s 34
- 07 Anne Hoggett & Lyle Vail appointed to LIRS 38
- 08 Developments in the 1990s 42
- 09 The 21st Century 48
- 10 30th Anniversary Development 52
- 11 Lizard Island Fellowships 56
- 12 What have we learned? 60
- 13 What lies ahead? 66

Appendix 01
Recipients of fellowship awards 70

Appendix 02
30th Anniversary Development – project details 74

Appendix 03
Trustees and Patrons of Lizard Island Reef Research Foundation 80

Appendix 04
Years 2010 to 2013 84

Australian Museum – Director’s introduction



As I am preparing this introduction more unsettling news is appearing about the potential harmful impact of ocean acidification (that is, the build up of carbon dioxide in the ocean making it more acidic) on our coral reefs. Research on acidification, within the greater suite of threats to the Great Barrier Reef, is core business for the Lizard Island Research Station. The Research Station in turn would not be the magnificent facility it is without the Lizard Island Reef Research Foundation’s hard work.

When the research station was a gleam in Frank Talbot’s eye no one was really thinking about the serious impacts of climate change. But people were thinking about the need to understand what lives on and makes up Australia’s magnificent Great Barrier Reef.

The parallel development and growth of both the Lizard Island Research Station and the Lizard Island Reef Research Foundation reflect the shared interest in understanding more about the reef. The facilities the Australian Museum now has at the Station represent state of the art in on-reef research facilities on a world-wide basis. As our research interests and needs grow so the Research Station will evolve to meet those needs, but not without the ongoing support of the Foundation and we are most grateful to past and present Trustees. Personally I am extremely grateful for the hard work of Ken Coles as Chairman of the Foundation and Charlie Shuetrim as “chief fundraiser”, for the Station’s 30th Anniversary Development and also as author of this history. I look forward to continuing to work with the Foundation as we strive to better understand and conserve the Great Barrier Reef.

Frank Howarth
Director, Australian Museum, May 2009

Update from the Director

As I write this update to the introduction to this excellent publication, another threat to the Great Barrier Reef is making headlines. There is much concern over the effects of sediment plumes from port dredging, as well as the effects of the port operations and associated increases in shipping volume. While most of this is happening well to the south of Lizard Island, we need to remain vigilant to understand the functioning of the whole Great Barrier Reef.

Interestingly the research results on the impact of the various parameters of climate change is if anything becoming more confusing, with some research suggesting greater reef resilience to rapid warming, and others suggesting that the threat is greater than anticipated four years ago. This makes the research done at the Lizard Island Research Station all the more critical.

On the research front, in those five years the potential of genomic or DNA based research has increased dramatically, to the point where the Australian Museum has created the Australian Centre for Wildlife Genomics. This gives us another suite of tools to help explore and understand the Reef.

Frank Howarth PSM
Director, Australian Museum, August 2013

Lizard Island Reef Research Foundation – Chairman’s introduction



It is a great pleasure to accept Charlie Shuetrim’s invitation to write an introduction to this history of the Lizard Island Research Station and the Lizard Island Reef Research Foundation to complement the introduction by Frank Howarth, Director of the Australian Museum. I thank Frank for his immediate interest in the Research Station, his very positive support for it and for the Foundation in his role as a Trustee since February 2004. I also want to thank Gail McCarthy, who has worked part time for the Foundation over some fifteen years serving three Directors of the Museum, Des Griffin, Mike Archer and now Frank Howarth most recently in her role as executive assistant to the Director. She has been a great help to me, to the Trustees and has developed an excellent database of our friends and members and knows many of our approximately eighty-five members.

Significant dates you will find in this history are when the LIRS was founded by Frank Talbot and Henry Loomis and when the LIRRF was established by Sir John Proud, to be joined later by his great friend Charles Warman and their colleagues. Sir John saw the need for a fund raising body, and that is the sole purpose of the Foundation, the success of which has given considerably increased impetus to the development and success of the Research Station.

Everyone who has worked for and contributed to this cause can feel very proud that a truly world class marine field research station has been created and flourishes in such a remote part of Australia. Led with distinction by Anne Hoggett and Lyle Vail it has made a significant contribution to our knowledge of the reef and how its ecosystems work, knowledge that contributes in a very practical way to the management of the Great Barrier Reef and is available to managers of coral reefs throughout the world.

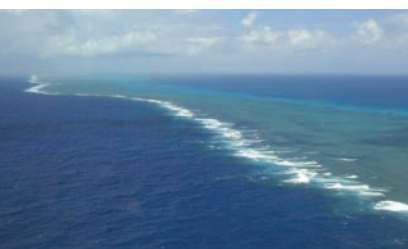
Another important date was the meeting of Trustees held 4th March 1998 when Andrew Green, Secretary/Treasurer of the LIRRF since its inception, introduced Charlie Shuetrim to Trustees and moved that he be appointed to the Board, I seconded the motion and welcomed Charlie. Little did we know what would flow from Charlie’s appointment when he was invited in 2002 to Chair the committee we called the 30th Anniversary Development. It was launched with a target of \$1.2m at a lunch for twenty-five people in the Roof Top Terrace at the Australian Museum on 20th February 2003. The great success of that fund raising is now an exciting part of this history. May I congratulate Charlie on this history and thank him, all our Trustees, Members and Friends for all that they have done.

Ken Coles
Chairman, Lizard Island Reef Research Foundation, May 2009



01 Early research on the Great Barrier Reef

A typical example of the wonderful corals that surround Lizard Island. These corals are part of the living laboratory available for researchers at LIRS. *Photo: Charlie Shuetrim*



Top: About 1,500 species of fishes are known from the Great Barrier Reef. More than 100 of them are damselfishes of which two are shown here. *Photo: Charlie Shuetrim*

Bottom: This shows part of the vast line of reefs that form the outer barrier to the Pacific Ocean. These reefs protect the coast and create the environment for the coral reef ecosystem to flourish. *Photo: Anne Hoggett and Lyle Vail*

The Great Barrier Reef is one of the world's great natural treasures. Granted World Heritage Status in 1981, it is one of the few Natural World Heritage locations that meets all four selection criteria (refer <http://whc.unesco.org/en/criteria> for details of the Natural World Heritage selection criteria).

Its statistics are staggering:

- It covers approximately 348,000 square kms;
- It is 2,300 kms long (the next longest barrier reef is only 290 kms long);
- It has 2,900 reefs and 900 islands (one third of which are national parks);
- It is one of the most diverse ecosystems on the planet with more than 1,500 species of fish, 400 species of hard corals, 4,000 species of mollusc (squid, octopus, cuttlefish, snails, slugs etc.), 600 species of echinoderms (starfish, sea urchins, sea cucumbers) and 240 species of birds.
- It is visible from outer space!

Researchers from the National Oceanography Centre (UK) and the Australian National University have determined that the coral reefs on the windward side of Lizard Island began growing about 6,700 years ago, shortly after the most recent rise in sea levels, with modern day reefs reaching their present level about 4,000 years ago.

So... what led to the founding of the Lizard Island Research Station in 1973? What was the status of the Great Barrier Reef then and how did people feel about it? Some of the answers are surprising. The Australian Museum has been part of this story from very early times.



The University of Queensland was founded in 1910 and Henry Caselli Richards was the first Professor of Geology. He was one of the very early researchers on the Reef and his address to the Royal Geographical Society (Queensland Branch) in April 1922 advocated research to determine the origin of the Great Barrier Reef.

This led to the formation of the Great Barrier Reef Committee which became the principal research organisation on the Reef for the next fifty years. They sponsored one of the most noteworthy research expeditions on the Reef during the last century, the 1928/29 Great Barrier Reef (Yonge) Expedition. This expedition, which included a team from the Australian Museum, was based at the Low Isles (just north of Port Douglas) where scientists spent twelve months carrying out extensive research. The results of the Yonge Expedition are still valuable to-day as a baseline for the Reef as it was at that time and there are many items found then that are still held in the collections of the Australian Museum. In the early 1950s the Great Barrier Reef Committee also established the Heron Island Research Station which is operated to-day by the University of Queensland.

Sadly, in those early days there was little money for research into marine biology – indeed the field work done by the early researchers at the University of Queensland was funded largely from their own pockets. Lack of money meant lack of knowledge. Even in the early 1970s there was debate amongst scientists about the extent to which the various life forms on the Reef were interconnected. In its evidence to the House of Representatives Committee

Left: The main camp for the Yonge Expedition. *Photo: National Library of Australia* <http://nla.gov.au/nla.pic-vn3989400-s12>

Right: Mort, Iredale and Livingstone from the Australian Museum Team that took part in the Yonge Expedition of 1928-29. *Photo: National Library of Australia* <http://nla.gov.au/nla.pic-vn3989400-s20>



Left: Here is Nemo – these fish live among the anemone – fish eating animals that have hundreds of poisonous tentacles. *Photo: Anne Hoggett and Lyle Vail*

Right: LIRS was the site where researchers learned to breed giant clams. This research has enabled giant clams to be re-introduced to a number of areas in the Pacific Region after they had been wiped out through exploitation. *Photo: Charlie Shuetrim*



on Wildlife Conservation in 1972, the Great Barrier Reef Committee said that *“the number of species that are involved in this whole reef system are greater than any other ecosystem that we know of”* and that of this uniquely large number of species, there is scarcely one whose full life history is known.

This lack of knowledge was world-wide. Referring to the Florida reefs, the aquatic editor of the Ecological Society of America, Professor Frank, in a letter to the Great Barrier Reef Committee, said *“Unfortunately we simply do not, at this stage, have major studies on the dynamic interactions between the organisms of the highly complex coral community”*.

We can conclude therefore that at the time when the Lizard Island Research Station was conceived, coral reef research was in its infancy.

Just prior to the founding of Lizard Island Research Station, there was a period of great economic development with its concurrent demands for exploration and exploitation. The Reef was an obvious target. In 1967 there was an application to mine Ellison Reef (off Innisfail) for limestone, to be used as fertiliser for sugar cane. There was also widespread interest in oil exploration. A permit for oil exploration over the whole of the Reef was granted in 1969. The lack of scientific knowledge at that time plus the sheer size of the Reef meant that few people really saw the Reef as being under threat. Many scientists took the conservative approach that development of the Reef should be controlled, not prevented.



At the same time, human threats to the Reef were becoming more apparent:

- Oil slicks from ships' tanks were often reported;
- Towns all along the coast were pouring untreated sewage into the rivers;
- Tin-mining wastes were polluting the Herbert River;
- Clearing of rain forests had resulted in creeks silting up and in nearshore reefs suffering the effects of increased sedimentation;
- Sugar farms and mills were pouring wastes into the waterways.

All of this was complicated by confusion over who was actually responsible for the Reef – was it the Queensland Government or the Commonwealth Government? The resulting battle for the Reef is considered by many to be the first modern conservation campaign in Australia. Judith Wright's book *“The Coral Battleground”* (out of print but readily available via the Internet) gives an electrifying account of the battle that took place from 1967 to 1975 when the legislation to establish the Great Barrier Reef Marine Park Authority was finally enacted.



Top: This photo, taken on one of the outer barrier reefs, shows the myriads of fish that inhabit this ecosystem. *Photo: Anne Hoggett and Lyle Vail*

Bottom: This is a burrowing clam. These clams are often coloured beautifully. They secrete an acid to dissolve the coral and allow them to burrow in and grow. *Photo: Charlie Shuetrim*



02 Lizard Island
Research Station —
a fortuitous event

Close up view of the western section of Lizard Island showing the location of the Research Station. The dark patches show the extensive reefs around the island. The resort is in the foreground. *Photo: Charlie Shuetrim*



The Lizard Island Group in the late 1970s. Palfrey Island and South Island are in the foreground. An extensive fringing reef surrounds the group and encloses the Blue Lagoon.

Photo: Australian Museum Archives

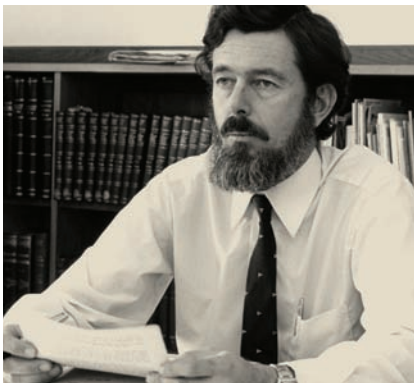
The story of Lizard Island Research Station starts with the family of Henry Loomis from the United States. Pixie Loomis, Henry's daughter, came to Australia with the express purpose of buying an island. This quest led to Frank Talbot (then Director of the Australian Museum) and Max Day at the CSIRO.

Both Frank and Max subsequently spent time with the Loomis family at their home in the USA and were intrigued by their desire to buy an island. The family had owned a number of islands in the USA but had never had the opportunity to pursue the scientific value of those islands. They resolved that on their next island they would establish a research function so they could truly appreciate its values. Australia was the preferred location due to its political stability and easy access to coral reefs. The desire for the research function came from Henry's scientific background. His father, Alfred Lee Loomis, was a fabulously wealthy Wall Street tycoon who had survived the depression years in high style and then, at the height of his influence, quit Wall Street and devoted himself to science. In a small town 40 miles northwest of Manhattan, he created a magnificent private laboratory and personally bankrolled pioneering research into radar detection systems and nuclear physics. At his home, he conferred with the leading scientists of his time including Albert Einstein and Niels Bohr. Henry followed his father's interests and was deeply involved with radar and physics during World War II. He retained his passion for science for the rest of his life.

Coincidentally, at the same time as the Loomis family was seeking to buy an island, Frank Talbot was pondering how to establish a research station in the northern area of the Great Barrier Reef. The Australian Museum had a small

research facility on One Tree Island and it was showing some anomalies, presumed to be because of the cooler winter temperatures due to One Tree being at the southern end of the Great Barrier Reef. So... when Henry visited Australia in 1971, he and Frank searched up north for a suitable site for a research station. They selected Lizard Island where plans for the establishment of a fishing lodge and an airstrip were already in progress. Henry and Jacqueline Loomis donated \$110,000 to enable Lizard Island Research Station to be established and a 25 year lease over about six hectares of Lizard Island National Park was negotiated in 1973 by the Australian Museum. Loomis House at the Research Station perpetuates Henry and Jacqueline's name at Lizard Island and Talbot House recognises Frank Talbot's enormous contributions to LIRS and LIRRF. By a strange coincidence, as this publication was nearing completion, Henry Loomis died on 2nd November, 2008, aged 89. Frank Talbot's comment, upon hearing of Henry's death was "he was a fine and generous man, and we owe Lizard in a large part to his enthusiasm for science".

Max Day, a scientist with CSIRO, had met Pixie Loomis on her first visit to Australia. He became involved in marine research when he accompanied Malcolm Fraser (then Minister for Education and Science) to Townsville in relation to a proposed institute of marine research. Max wrote the report that led to the creation of the Australian Institute of Marine Science and was the Chairman of its Interim Council when it was formed. Later he was a member of the Council.



Top right: Henry and Jacqueline Loomis when they visited the Station in January 1997. Photo: Anne Hoggett and Lyle Vail

Bottom right: Frank Talbot, Director of the Australian Museum 1965–1975 and the man whose vision created Lizard Island Research Station. Photo: Australian Museum Archives

Sunday 11th ^{When} I immediately went upon the highest hill on the Island where to my mortification I discoverd a reef of Rocks laying about 2 or 3 Leagues without the Island, extending in a line NW and SE farther than I could see on which the Sea broke very high this ^{however} gave me great hopes ^{that} they were the outermost shoals as I did not doubt but what I should be able to go without them for there appear'd to be several breaks or Partitions in the reef and deep water between it and the Island. I stay'd upon this hill untill near sun set but the weather continued so hazy all the time that I could not see above 4 or 5 Leagues round me so that I came down much ~~disap~~ disappointed in the prospect I expected to have had but being in hopes that the morning might prove clearer and give me a better view of the Shoals, with this view I stay'd all night upon the Island, and at 3 in the morning sent the Pinnace with one of the Mates I had with me to sound between ^{the} Island and the reef and to examine one of the breaks or Channells and in the mean time I went again upon the hill where I arrived by sun rise but found it much hazier than in the evening — about noon the Pinnace return'd having run out as far as the reef and found from 15 to 28 fathom water, it blow'd so hard that they durst not venture into one of the Channells which the mate said seem'd to him to be very narrow, but this did not discourage me for I thought from the place he was at he must have seen it at a disadvantage. Before I quit this

The text of the adjacent page of Cook's Journal reads as follows:
(the small text represents corrections made by Cook to the original text)

Sunday 12th ^{when} I immediately went upon the highest hill on the Island where to my mortification I discoverd a reef of Rocks laying about 2 or 3 Leagues without the Island, extending in a line NW and SE farther than I could see on which the Sea broke very high this ^{however} gave me great hopes ^{that} they were the outermost shoals, as I did not doubt but what I should be able to get without them for there appear'd to be several breaks or Partitions in the reef and deep water between it and the Islands I stay'd upon this hill untill near sun set but the weather continued so hazy all the time that I could not see above 4 or 5 Leagues round me so that I came down much ~~disap~~ disappointed in the prospect I expected to have had, but being in hopes the morning might prove clearer and give me a better View of the Shoals, with this view I stay'd all night upon the Island, and at 3 in the Morning sent the Pinnace with one of the Mates I had with me to sound between ^{the} Island and the reefs and to examine one of the breaks or Channells and in the mean time I went again upon the hill where I arrived by sun rise but found it much hazier than in the evening —

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This text has been reproduced from the National Library of Australia document: Cook's Journal daily entries — <http://nla.gov.au/nla.cs-ss-jrnl-cook-17700812>



Top: Captain Cook visited the island and wrote: "The only land animals we saw here were lizards and these seem'd to be plenty which occasioned my naming the island Lizard Island".
Photo: Charlie Shuetrim

Far left: James Cook — Journal of the HMS Endeavour 1768–1771
12th August 1770 at Lizard Island
On this day Captain Cook climbed to the highest point of Lizard Island (359 metres above sea level) to look for an opening in the outer barrier reefs to allow his escape to the open seas. This page from Cook's Endeavour Journal details his disappointment when he "discoverd a reef of Rocks laying about 2 or 3 Leagues without the Island, extending in a line NW and SE farther than I could see on which the Sea broke very high".
By permission from the National Library of Australia <http://nla.gov.au/nla.ms-ms1-s276r-e-cd>



03 The early years

Photo: João Krajewski



Top left: Steve Domm, first Director of LIRS. This photo was taken when Steve visited LIRS in November 2008. *Photo: Anne Hoggett and Lyle Vail*

Bottom left: Barry Goldman and Lois Wilson spent 9½ years building on the work started by Steve Domm. *Photo: Australian Museum Archives*

Right: Excavating for the inlet line and pump to the first aquarium system. One of the sleeping tents is in the background. *Photo: Australian Museum Archives*



Lizard Island Research Station commenced operations in 1973 – in a remote location, 270 kms north of Cairns. Steve Domm was the first director of LIRS. Prior to that he had been in charge of the Australian Museum research facility on One Tree Island. In his initial examination of the reefs surrounding Lizard Island in December 1973 Steve stated: *"A first impression is that of the tremendous diversity of the corals; in genera alone the fauna is much richer than that of the southern end of the Great Barrier Reef. An increased number of species is also apparent... coral genera that are rare or absent further south are common. Another striking example are the giant clams... none of which occur at the southern end of the Reef."*

Set-up work progressed during 1974 when two temporary buildings were constructed (an air conditioned lab and a staff house), two generators installed, and up to six visiting researchers could be accommodated in tents. Bench fees were \$30 per week per person (2008 daily rates for a researcher were \$110). Amazingly, the original "temporary laboratory" is still being used at LIRS. It is now part of the workshop which is scheduled for refurbishment in 2009–2010.

By mid-1975 a maintenance engineer had been appointed. Infrastructure consisted of two staff houses, a visitors' house and a temporary laboratory and aquarium system. Field equipment comprised four boats, two scuba compressors and fourteen scuba tanks. The laboratory was outfitted with microscopes and balances. Plans for a permanent laboratory block were being finalised. Researchers had started to make use of the facility, mostly for basic biological survey work. This rate of development was amazing considering the remote location and the lack of communications facilities at the time.

Steve Domm resigned in November 1976. During the three years that he was at LIRS, he was responsible for converting a hot, bare, uninhabited and isolated corner of Lizard Island into a viable and well used marine station. In the couple of months after Christmas 1976, there were 38 visitors to the Station in 11 different scientific groups, spending a total of 650 person-days on the island.



At one stage there were 33 people present, notwithstanding that the Station was designed to handle only 14 visitors. Many brought extra tents, bedding and cooking equipment.

Steve Domm was succeeded by Barry Goldman, a fish researcher whose interests were to spark groundbreaking work on larval fish ecology at Lizard Island. Barry's then wife, Lois Wilson, also worked creatively and tirelessly with him. At about the same time Des Griffin became the Director of the Australian Museum, beginning an association with LIRS that lasted for twenty-two years as Director of the Museum and since then as a Patron of LIRRF. Upon his retirement from the Australian Museum, Des commented that one of his main achievements was to support the continued development of LIRS which resulted in a world class coral reef research facility. Des' long contribution to LIRS is recognised in the naming of the Griffin Laboratory within the Thyne Reid Wing of the Ian Potter Centre for Tropical Marine Research.

Barry Goldman and Lois initiated many developments during their nine and a half years on the island. 1977 saw the first permanent laboratory building constructed and a library (consisting mainly of identification books) was started. This laboratory building remained in use until 2006 when all but the concrete slab floor was demolished and replaced with the Kalkhoven Wing of the Ian Potter Centre for Tropical Marine Research. The first permanent aquarium system, including one enclosed aquarium room, was built in 1978 as was the generator shed. Travel in small boats to the outer barrier reefs presented a challenge so a joint project was undertaken with Frank Talbot (then a professor at Macquarie University), to construct an elevated platform on Carter Reef which is one of the outer barrier reefs. This platform was a Jules Verne contraption but it did enable stays on the outer reef of 2-3 days. Finally, back at Lizard Island, courtesy of some assistance from a water diviner, a reliable source of groundwater was found within the lease area so collection of rainwater in tanks was no longer necessary.



Left: The first permanent laboratory. The Kalkhoven Wing of The Ian Potter Centre for Tropical Marine Research now stands on this site with the aquarium to the left of the building. *Photo: Penny Berents*

Top right and middle: 1970s era tent facilities at LIRS. Listening to the sound of the waves – the sleeping tents were right on the beach. *Photos: Penny Berents*

Bottom: This platform on Carter Reef facilitated stays of several days for research on the outer barrier reefs. *Photo: Australian Museum Archives*



04 Lizard Island Reef Research Foundation

Giant Clam exposed at low tide.
Photo: João Krajewski



Top left: Sir John Proud, founding Chairman of LIRRF.
Photo: Michael Batten

Bottom left: Des Griffin - appointed Director of the Australian Museum in August 1976. *Photo:* Australian Museum Archives

Right: The front cover of the initial publication produced by the Lizard Island Reef Research Foundation.
Photo: Australian Museum Archives

THE LIZARD ISLAND REEF RESEARCH FOUNDATION



GREAT BARRIER REEF
AUSTRALIA



By 1978 it was clear that Lizard Island Research Station was a success and was a vital facility for supporting research in the northern section of the Great Barrier Reef. The development of scuba diving in the 1950s and 1960s had opened the way for relatively easy underwater research activities.

Money however was the problem. Significant capital expenditure was required to develop LIRS to its full potential. On two occasions in its early history, Frank Talbot (whilst still at the Australian Museum) had approached the Premier of Queensland for funding (\$10,000 on each occasion) and had been told to collect the cheque on the way out. This was helpful but no submission for large scale funding was made at that time to either the Queensland Government or the Commonwealth Government. The early focus of LIRRF was to seek private sector funding. The Queensland Government was very helpful again in 2005 when, via its Smart State Research Facilities Fund, it partnered the LIRRF and The Ian Potter Foundation, with each partner providing \$1.5 million towards the 30th Anniversary upgrade of Lizard Island Research Station.

Sir John Proud, a successful mining engineer, Chairman of Directors of Peko-Wallsend Limited and a member of the Australian Museum Trust, responded to a suggestion from Des Griffin and initiated the establishment of LIRRF. This must have been destiny as the same Proud, as a young man in 1937, had survived a catastrophic plane crash during a cyclone, in what is now Lamington National Park. It was only after ten days lying in the forest with a broken leg, that he and one other survivor were discovered by Bernard O'Reilly of O'Reilly's Guesthouse fame. Sir John Proud turned to his friend and business

colleague, Neville Green, and sought his help in preparing a Trust Deed, obtaining tax deductible status, putting together a Board of Trustees, preparing a booklet (effectively a prospectus) and helping formulate a fund raising plan.

The Lizard Island Reef Research Foundation was established and held its first meeting on 3rd July 1978. There were fourteen trustees including Sir John Proud as Chairman, Sir Robert Norman (director of the Bank of NSW), Lord Catto of Cairncatto (Chairman of Morgan Grenfell, London), Sir George Read Fisher (former President of Mt. Isa Mines), Neville Green and a number of other prominent scientists and businessmen. Andrew Green (Neville's son) was recorded as Secretary and Treasurer, a position he still occupies to-day.

The booklet referred to above was published at that time and this set out information on the Great Barrier Reef, Lizard Island, the Research Station and the objectives of the Foundation. The Prime Minister (Malcolm Fraser) wrote the forward which includes the following statement, as relevant as ever to-day: *"The Lizard Island Research Station offers scientists of the world the opportunity to investigate and contribute to the scientific knowledge of the world's largest coral reef system."*

The objective of the Foundation was to raise \$2 million to establish Lizard Island Research Station as a viable operation. The early minutes of the Foundation document wide ranging discussions on how best to raise the funds required. The success of the Foundation in achieving this and more is now part of this history.

Photo of LIRS at about the time when LIRRF was founded. *Photo:* Australian Museum Archives



05 The early 1980s

Photo: João Krajewski



Top left: Raymond and Deidre Kirby, pictured in 2006, donated this beautiful painting by aboriginal artist R.D. Savage. It now hangs in the LIRS reception area.

Photomontage: Anne Hoggett

Bottom left: The fortnightly barge lands on the beach at the Resort and LIRS staff then use the tractor to transport all goods to the Research Station. *Photo: Charlie Shuetrim*

Right: The tent era finally disappeared in the early 1980s. This is Kirby House under construction in 1982. *Photo: Australian Museum Archives*



By 1980, the Station had accommodation for fourteen visitors (six in a visitors' house and the rest still in tents), darkroom facilities (no digital photography in those days!), a laboratory and aquarium, generators providing 240 volt power, fresh water to all houses and laboratories, diving facilities and six aluminium work boats. Growing demand from researchers prompted the Australian Museum to commission a master plan to guide development. The master plan shows the basic layout of LIRS as it is to-day. A report prepared in September 1980 summarised the need: *"Whilst the Lizard Island Research Station is host to up to 100 different scientists every year, the present level of development is inadequate. The residential facilities are minimal, the cooking and ablutions facilities are primitive and laboratory equipment is insufficient. No boat is available which provides reliable transport to all areas of interest in the Lizard Island region."*

The first documented reference to the fellowship programme was contained in the Station's 1980 report as part of the list of proposed developments at LIRS: *"Fellowships for pre-doctoral and post-doctoral students are to be introduced to attract people to work on special programmes at the Station."*

LIRRF produced a second fund raising publication in 1982, entitled "LOOKING AHEAD". It included this prescient statement from Sir John Proud: *"We cannot stand idly by and expect that the attention we are currently giving to understanding the workings of the Reef will be adequate in the period of change that lies ahead"*.



Outgoing radio telephone calls via the Royal Flying Doctor Service had been possible since 1979 but incoming calls only became available in 1981. The first regular barge service operated every two weeks from 1981 but only during the dry season. The tent era ended in 1982 when three new visitor houses, (Kirby and Suntory each with two bedrooms and Loomis with one bedroom), were constructed.

By 1982, the LIRRF had attracted donations totalling \$350,000, the most significant of which was a grant of \$250,000 from the Japan Foundation. This grant resulted from discussions initiated with Suntory Limited, hence the naming of one of the visitor houses as Suntory House. The James N. Kirby Foundation was also an early supporter with its first funding grant to LIRS occurring before the Lizard Island Reef Research Foundation was formed. Raymond Kirby and the Kirby Foundation have been very generous in continuing their support until the present time with several lots of funding to renovate and extend Kirby House and funding to construct the Kirby Computer Centre.

Dick Smith overnighted at LIRS on 27th May, 1983, landing his helicopter right outside the office. This was the last leg of his solo round the world helicopter flight. Dick and his wife Pip have continued their support of LIRRF to this day. Also in 1983, the *RV Sunbird*, a 14 metre aluminium motor/sailing catamaran, began operations from the Station as a research vessel capable of extended trips to remote locations and as a supply vessel to the Research Station.



Top: Photo of the laboratory area showing the first cyclone proof building, the "block building" under construction in 1984.

Photo: Australian Museum Archives

Bottom: This shed, adjacent to the boats and the beach, holds all of the dive gear for researchers. Constructed around 1980, it now has the added bonus of solar powered hot showers. *Photo: Charlie Shuetrim*

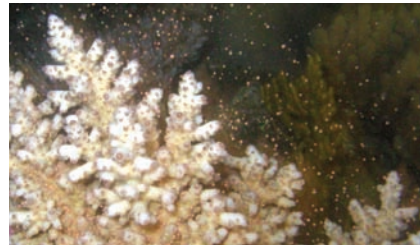


The first Lizard Island Doctoral Fellowship was awarded in 1984. A separate section later in this publication documents the Lizard Island fellowship programme. A cyclone-proof block building also was constructed in 1984 at a cost of \$125,000. It housed the office, library and a dry laboratory until 2007 when it was converted into the Thyne Reid Wing of the Ian Potter Centre for Tropical Marine Research (the Thyne Reid Wing now contains three new laboratories and a microscope room). The opening ceremony of the block building took place at Lizard Island on 27th November, 1984 with a handover speech by Sir John Proud before a large group of supporters.

By the end of the 1984/1985 financial year, LIRRF had raised a total of \$576,795 of which \$470,777 had been transferred to the Australian Museum for the benefit of Lizard Island Research Station. The NSW Government had for several years been providing a \$1 subsidy for every dollar transferred from LIRRF to the Australian Museum so the efforts of LIRRF had effectively resulted in more than \$940,000 of capital funding for LIRS (this subsidy continued until 1994 when it was phased out by the then current Government).

The output from research conducted at LIRS also was adding up as there were by now, more than 150 scientific publications based on work done wholly or in part at Lizard Island. LIRS had developed from a small tent-based camp in the 1970s to a highly productive field research station accommodating some one hundred visiting scientists per annum with an average occupancy rate of about seven persons per day.

The early 1980s were also momentous times in terms of research discoveries. Coral spawned in the aquarium for the first time in November, 1980 and in November 1983, a team from James Cook University, led by Bette Willis, was on location with many coral specimens in the aquarium to record and film the annual spawning of corals. They were making synchronous observations with teams at three other locations on the Great Barrier Reef to gather evidence that many species of corals do indeed spawn mainly on a single night of the year and that this occurs on the same night along the whole length of the Great Barrier Reef.



Top: The discovery of synchronised coral spawning was one of the most exciting events of the 1980s. *Photo: Anne Hoggett and Lyle Vail*

Bottom: Researchers use the aquarium extensively to study coral spawning. This photo shows the orange coloured spawn floating on top of the water in the tank. *Photo: Charlie Shuetrim*

Far left: Barry Jones, then Minister for Science and Technology, launched the RV Sunbird on 16th April 1983. *Photo: Australian Museum Archives*



06 The late 1980s

Station tours have remained popular ever since being introduced in the 1980s. This is Marianne Pearce conducting a Station Tour for Resort Guests in October 2008.
Photo: Charlie Shuetrim



Top left: The volunteer programme has been operating successfully for many years. Typically around 30 volunteers do work at the Station every year. When new aquarium inlet lines were laid in 2008, four volunteers were on site to help with this task.

Photo: Anne Hoggett and Lyle Vail

Bottom left: The German Government continued its support of LIRS into the 1990s. One of these dive compressors was purchased in 1993 with funding provided by them. The other one was funded by the LIRRF. They are very robust compressors and are scheduled for a major refurbishment in 2009, rather than buying new ones.

Photo: Charlie Shuetrim

Right: A high school student group in 2003 viewing the magic of coral reef life in this tank in the aquarium.

Photo: Anne Hoggett and Lyle Vail



After a hectic period of development in the early 1980s, the pace slowed in the second half of the decade. Barry Goldman and Lois Wilson resigned in April 1986 and were replaced by Barbara Kojis and Norman Quinn as Directors.

The workshop was extended in 1986 and the West German Government donated \$34,000 as part of their support for Australia's Bicentennial. Interestingly they made the donation two years early in recognition of the urgent need for research on the Great Barrier Reef.

Raymond Kirby became Chairman of LIRRF in August 1987 with founding Chairman, Sir John Proud, remaining on the Board of Trustees. Chairing his first meeting, Raymond welcomed Jim Creer as a Trustee. Also in 1987, the outdoor aquarium space was increased by 75% and expanded facilities for shop merchandise were added to the library to service the large number of people doing tours through the Station. These tours had commenced in 1985 and rapidly became a major attraction for visitors to Lizard Island, especially for guests staying at Lizard Island Resort and for campers and people on yachts.

By 1988 the original aluminium dinghies that had been in use since the 1970s were showing their age and a phased replacement programme began. *RV Sunbird* also had a major overhaul after its first four years of service. A communication milestone was reached in the same year when two telephones were installed, one for the Directors and a payphone for visitors. These were



the first telephones on the island and were often used by the Resort. The list of scientific publications continued to grow and as at June 1988, there were 234 papers in the library based on work done wholly or partly at Lizard Island.

June 1989 saw the decision to separate direct management of the *RV Sunbird* from LIRS. This purpose-designed marine research catamaran had served for many years up and down the Great Barrier Reef and as far north as PNG. The steadily increasing usage and wider ranging operations resulted in the Australian Museum moving the base of the *RV Sunbird* to Cairns, thereby facilitating embarkation/disembarkation of research teams and routine management and maintenance activities. This change enabled *RV Sunbird* to achieve 162 days at sea in the following year of which 148 days had research personnel on board and operating.

The first high school group to use the Station visited in October 1989. From Copeland College, Canberra, a group of seven final year students carried out individual research projects under the supervision of two teachers. Tours of the Station remained popular. More than 1,600 people did tours of the Station in the year to June 30, 1990. In the same year, volunteers contributed more than 300 work days to the Station.



Top: Sandy Shuetrim and granddaughter Ellie watching baby fish in the aquarium in 2008. Research at LIRS has contributed much to our knowledge of where fish live and what influences their survival rates.

Photo: Charlie Shuetrim

Bottom: There were 234 research papers in the library as at June, 1988. This photo shows the new library constructed in 2006. It now holds more than 1,200 research papers based on work done wholly or partly at Lizard Island.

Photo: Charlie Shuetrim



07 Anne Hoggett
& Lyle Vail appointed
to LIRS

Bird's eye view of the Blue Lagoon with the extensive coral reefs clearly visible. LIRS maintains a database of research locations and uses it to manage research so that projects do not conflict with one another.
Photo: Charlie Shuetrim



The marine environment at Lizard Island is still in excellent condition.
Photo: Charlie Shuetrim

In August 1990 Barbara Kojis and Norman Quinn resigned as Directors and were followed by Anne Hoggett and Lyle Vail, both researchers with PhDs in marine science. Lyle moved to Australia from Minnesota USA in 1975 and met Anne when both were working at the Australian Museum. They married in 1984 and have a son Alex. Alex spent his formative years (up to high school) at Lizard Island being tutored via a distance learning programme and is now doing his honours year in marine science at James Cook University. Anne and Lyle have been at the Station since 1990 – an extraordinary achievement. Marianne and Lance Pearce (still regulars at Lizard Island in the summer season – another wonderful contribution) were already at LIRS in their maintenance role, having started there in 1988.

In September, 1990 Raymond Kirby retired as Chairman of LIRRF and Jim Creer took over. Jim and the Trustees then undertook the major task of redrafting the Trust Deed of LIRRF to ensure that it would withstand the test of time. The power to establish a Capital Fund was a major addition to the Trust Deed. That redrafted trust deed still governs the LIRRF to-day.

The 1990/91 edition of the LIRS Newsletter contains the following vision statement from Anne and Lyle about the Station's future. We considered this statement to be sufficiently important in its clarity of objectives that it is reprinted in full on the adjacent page.

In the time since then Anne and Lyle have achieved that vision. Usage in 1989/90 was 3,207 person nights at the Station whilst usage for 2007/08 was 6,726 person nights (how would you like to run a hotel of this size on a remote island with only four permanent staff?). Lizard Island Research Station is recognised as one of the world's best coral reef field research stations and the environmental practices at LIRS have ensured that both the terrestrial and marine environments have remained in excellent condition.



A 2007 photo of the permanent staff at LIRS (left to right) Anne Hoggett, Lance Pearce, Marianne Pearce, Bob Lamb, Tania Lamb, Lyle Vail.
Photo: Alex Vail

"We see the Lizard Island Research Station improving its already excellent reputation as a facility for marine research on the Great Barrier Reef: We want it to become the preferred venue for coral reef research by scientists from all over the world. This can be achieved by ensuring that the environment is maintained in near-pristine condition and by providing superior research and housing facilities.

To help maintain quality of the environment, we will continue to provide input into plans for management of the Great Barrier Reef, and to lobby for change if management practices are inadequate. To provide superior research and housing facilities, we will maintain and update those that already exist and develop others. The station is well known for being one at which equipment can be relied upon to work: maintenance will continue to have the highest priority so that research can proceed safely and efficiently.

We see the reefs themselves as the main 'laboratories'. Accordingly, the emphasis is on making them easily and safely accessible: equipment priorities are boats, motors, boating safety gear and diving equipment. For the indoor laboratories, priorities are the acquisition and upgrading of basic equipment such as balances, microscopes, centrifuges and computers.

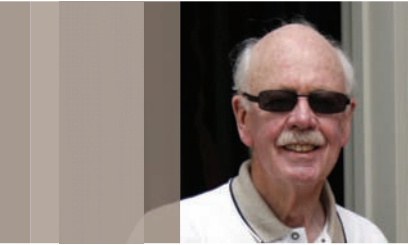
It is important to obtain the best possible scientific and educational value from the station by encouraging high usage rates. In addition to scientists and postgraduate students, educational groups are welcome. All potential users must feel that they can rely upon help from station staff in the planning stages of their visit, as well as during their stay. Non-scientists who visit the island should leave with the impression that science is both relevant and important to the community and that the station itself is a dynamic research centre.

In short, we want the Lizard Island Research Station to make major contributions to coral reef research and to play a part in enthusing the Australian public about science."



08 Developments in the 1990s

The Sir John Proud Aquarium
was completed in 1995.
Photo: Charlie Shuetrim



Left: Ken Coles, Chair of LIRRF.
Photo: Charlie Shuetrim

Right: 12th annual Melbourne lunch held in May 2009. Anne Hoggett outlined the latest upgrades at the Research Station and Jeff Leis, Senior Principal Research Scientist at the Australian Museum, gave a fascinating talk on larval fishes.
Photo: Charlie Shuetrim



A milestone was reached in the 1990/91 year – \$1 million had been raised since the formation of LIRRF. There were now 296 scientific publications in the library based wholly or in part on work at Lizard Island.

Plans for the first stage of the Raymond E. Purves laboratory were submitted to the regulatory authorities for approval in the 1990/91 year and the building was finally completed in June 1992. This new wet lab provided a much-needed area for work such as dissecting and preserving fish and sorting samples. Times were tight economically and the materials for the lab were brought to the island bit by bit on the regular barge service over a twelve month period, rather than spend extra money on special barge trip (a round trip for the barge cost in the order of \$10,000).

1991 also saw Ken Coles join the Board of the LIRRF. Ken and Sir John Proud had been friends for many years and it was Sir John who first suggested to Ken that he should consider becoming involved with LIRRF and LIRS. Ken said that he knew little about the Great Barrier Reef or marine science but he would be happy to see what he could do. Ken and his wife Rowena Danziger visited Lizard Island later that year and following a meeting with Anne and Lyle they were able to see the wonders of the Great Barrier Reef. This had a transforming impact on Ken and he was delighted to join the Board of Trustees of LIRRF.

1992 also saw the completion of a fifteen year development plan for the Station. The emphasis was on refurbishment and upgrading rather than massive expansion. As the 1991/92 Station Report says: *"All we need now is the funds!"* The upgrade achieved by the 30th Anniversary Development is based largely on the concepts in this plan.

RV Sunbird was sold in February 1993 after ten years of *"active (and often hair-raising) service in the cause of science"*. Originally *RV Sunbird* had a supply function as well as a research function but the fortnightly barge service to the Lizard Island Resort assumed responsibility for supplies.



Two exciting scientific curiosities were reported in the 1992/93 Newsletter:

- A living specimen of sclerosponges (stony sponges) about 20 cm in diameter collected from the Lizard Island area by Dr Joachim Reitner and PhD student Friedhelm Grothe (from Freie University in Berlin) was aged at about 3,000 years making it a candidate for the world's oldest living organism. After this initial find, a further specimen found by them in March 1993 was even larger and thus presumably older. Dr Reitner was subsequently awarded one of Germany's most prestigious science prizes for his research on these sponges.
- Dr Kendell Clements (Lizard Island Doctoral Fellow in 1987) was researching gut micro-organisms of surgeonfishes while doing his PhD. He found a large (0.5 mm long) unicellular organism which has now been confirmed as a bacterium. This upset long held theories about the size of bacteria – so remarkable a discovery that it rated the cover picture in *Nature*.

During 1993 the Board of Trustees of LIRRF initiated the idea of having supporters, each donating \$1,000 p.a. as one of the key elements of fund raising for the Foundation. The objective was to have 100 such supporters, thereby providing an annual income of \$100,000 to support the Research Station. This concept has continued to the present day and has provided the very valuable funding for the annual capital equipment maintenance programme at LIRS.

In February 1994, Jim Creer retired and Ken Coles took over as Chairman of LIRRF, a role that he has fulfilled with distinction now for over fifteen years. Ken initiated the annual members' dinner and the first one, attracting sixty-nine guests including Sir John and Lady Proud, was held on the Australian Museum's Rooftop on 12th October, 1994. Annual Melbourne lunches were also inaugurated by Ken in 1998. Sir John Proud retired from the Board of LIRRF in November 1994 at the age of 87. In his letter of resignation, Sir John noted: *"The LIRRF has been a great success. Over its short 17 year life it has harvested capital of over 1 million dollars, produced over 400 research papers, sired several Doctors of Philosophy and established a well equipped Research Station that attracts scientists worldwide."*

Left: The Raymond E. Purves Laboratories pictured in October 2008. Rob Purves and the Raymond E. Purves Foundation have been generous supporters in funding all four stages of the development of these laboratories, from 1992 to 2008.
Photo: Charlie Shuetrim

Right: The Purves Laboratories were used recently by the researchers from the international Bar Code of Life initiative which is aiming to develop DNA barcoding as a global standard for the identification of biological species.
Photo: Anne Hoggett and Lyle Vail



Left: The aquarium is used for a wide variety of research. Dr Alexandra Grutter is feeding the cleaner wrasse that she has in these tanks to research how they avoid getting sun burnt. This knowledge could help in our own quest to avoid sunburn. *Photo: Charlie Shuetrim*

Right: Chris Fulton used the aquarium to test the swimming capabilities of coral trout whilst completing his PhD on the influences of wave action on where fish live. The tank he is using has a pump and recirculates water to provide a constant flow. The pace of the flow can be varied to simulate the conditions that the fish would encounter in the ocean. *Photo: Charlie Shuetrim*



Also in 1994, an application was made to the Australian Research Council in conjunction with James Cook University for funding of \$315,000 to enable a major upgrade of the aquarium. The success of this application represents the only financial contribution to Lizard Island Research Station by the Federal Government. The old aquarium was demolished and the new aquarium was completed in June 1995. It was named the Sir John Proud Aquarium in honour of the founding Chairman of LIRRF. This aquarium will be increased in capacity by a further 50% in 2008/09 with funding provided by the Vincent Fairfax Family Foundation.

1995 saw the extension of Kirby and Suntory houses. Each house now had three bedrooms with a total of eleven beds and enlarged kitchen, dining and verandah spaces. Two new bathrooms and composting toilets for each house were an important component of these upgrades. An air-conditioned room was also added as Stage II of the Raymond E. Purves Laboratory to allow for more delicate specimen processing. Another beneficial development occurred in the 1990s when Captain Cook Cruises became major sponsors of LIRS, offering subsidised travel for researchers and students to and from Cairns aboard their ship *Reef Endeavour*. They also donated one of the annual prizes for members of the LIRRF. This sponsorship continued until 2008 when the *Reef Endeavour* was retired from service.

Henry and Jacqueline Loomis visited the Station in January 1997 for the first time since Henry's exploratory trip with Frank Talbot in 1971. They were amazed at the substantial and well-used facility that existed 26 years after their initial funding had enabled the creation of Lizard Island Research Station.

Following the above upgrades, the next major projects were the replacement of the two staff houses. The two existing houses had been built in the early 1970s and provided primitive accommodation that had no cyclone protection. Ken Coles launched a special appeal, recruiting twenty people each of whom gave \$5,000 p.a. for three years to replace the Warman House (named in honour of Charles Warman, colleague and great friend of Sir John Proud, a patron and generous donor to LIRRF and a trustee from 1981 until his

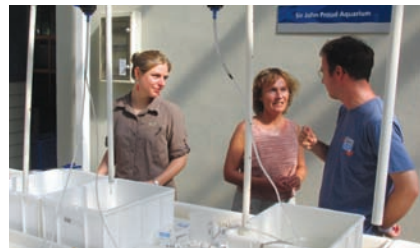


death in 2008). The new Warman House, a very much more suitable three bedroom residence, was completed in June 1997 as accommodation for the Directors. Fund raising for Coles House, the accommodation for the permanent maintenance staff, continued and it was finally completed in 2001. This house was named in recognition of the outstanding contributions to LIRS and LIRRF by Ken Coles.

Sir John Proud died in October 1997 at the age of 90 but he will be long remembered at Lizard Island Research Station. It was his enthusiasm, generosity and persistence that saw the establishment and success of the Foundation that has contributed so much to the Station's development and to coral reef research.

A milestone was reached in 1998 with the Station achieving 25 years of operations. There were now six houses (two for the staff and Kirby, Suntory, Talbot and Loomis for visitors), three laboratory buildings, the new Sir John Proud aquarium, thirteen boats and more than fifty scuba tanks. The library collection had 530 scientific publications based on work done at LIRS. Bob and Tania Lamb also became regulars at LIRS in 1998, sharing the two full-time maintenance positions with Marianne and Lance Pearce on a six-monthly rotation basis.

Throughout the 1990s, the planned maintenance and regular replacement of mechanical equipment (outboard motors, 4WD vehicle, generators etc.) was carried out with funding provided by LIRRF. This policy was both cost-effective and efficient for maintenance and reliability. Total fund raising by LIRRF to the end of the century was \$1.9 million.



Left: Dr Mark McCormick (foreground) and his honours students working in the Sir John Proud Aquarium in October 2008. *Photo: Charlie Shuetrim*

Top right: A team of German researchers from the University of Bonn, led by Professor Dr Heike Wägele (centre). They have been using the Sir John Proud Aquarium to assist their research for the last ten years. *Photo: Charlie Shuetrim*

Middle right: Warman House, completed in June 1997 as permanent accommodation for the Station Directors. *Photo: Charlie Shuetrim*

Bottom right: Captain Trevor Haworth AM (right) Executive Chairman of Captain Cook Cruises and a patron of the LIRRF, shown with Andrew Green (seated) and Ken Coles. *Photo: Charlie Shuetrim*



09 The 21st Century

Kirsty K funded by the U.S. Coral Reef & Marine Science Foundation with a donation by Kevin Kalkhoven (Kevin is the person standing in this photo).
Photo: Anne Hoggett and Lyle Vail



The workshop, the rear section of which is the oldest building at LIRS. The front section had a roof which leaked badly and made work difficult in wet weather so the Australian Museum funded a new roof for it in 2005. *Photo: Charlie Shuetrim*

The new century opened with LIRS participating in the creation of the Tropical Marine Network (TMN). The TMN is a partnership of the organisations that run the four major island based research stations on the Great Barrier Reef. Its aim is to foster co-operative research and the development of a new marine science course to be taught jointly by the participants in the TMN. In 2001 the TMN sought infrastructure funding from the Federal Government but this was not successful. However the other three partners in the TMN did receive \$10.8 million from the Federal Government Department of Education, Training and Youth Affairs to upgrade the research stations at Heron Island (University of Queensland), Orpheus Island (James Cook University) and One Tree Island (University of Sydney). Lizard Island was not eligible for this funding as its owner, the Australian Museum, is not classified as a higher education institution.

On the positive side of 2001, the Coral Reef and Marine Science Foundation (CRMSF) was established in the USA with the generous assistance of Jim Bildner, a trustee of LIRRF since 1998. It aims to provide funding for coral reef research and infrastructure worldwide. This Foundation has provided generous support to LIRRF and LIRS since then, the first of which was the donation of funds for the purchase of a new high speed catamaran, *Kirsty K*. This boat provides easy access to both the inshore coral reefs and the outer barrier reefs.



The financial adversity of 2001, with LIRS failing to get financial support from the Federal Government, stimulated the creative side of LIRRF and there was much discussion on how LIRRF could provide more substantial financial support. In 2002, the James N. Kirby Foundation agreed to fund an upgrade of Kirby House and the Raymond E. Purves Foundation committed funds for a third stage to be added to the Purves Laboratory. The Australian Museum also contributed with funding for the replacement of several ancient roofs on old buildings at the Station.

Another important improvement at this time was the replacement of freshwater distribution pipes. All freshwater is pumped from a well near the beach into three tanks on the hill above LIRS. It is then gravity fed to all of the buildings within LIRS. The 30th Anniversary Development buildings have been designed to feed rainwater back into the aquifer as additional insurance for a plentiful supply of freshwater.

Top and bottom left: Before and after: The 1970s era tent kitchen and the new style kitchens installed in Kirby House and Sundry House in 2002. *Photos: 1970 tent kitchen: Australian Museum Archives. Sundry kitchen: Charlie Shuetrim*

Top right: 2kms of trenches were dug for the new freshwater reticulation system. *Photo: Anne Hoggett and Lyle Vail*

Bottom right: The Explorers Club in New York, an international multidisciplinary professional society dedicated to field research, was an appropriate setting for the 2004 fund raising function organised by the Coral Reef & Marine Science Foundation. Ken Coles outlined the latest developments at Lizard Island Research Station to the assembled supporters. *Photo: Charlie Shuetrim*



10 30th Anniversary Development

The Beach Hut was built in 2005 to provide an extra work area to allow LIRS to continue operating whilst all of the 30th Anniversary building works proceeded. It will be a valuable additional work area into the future.
Photo: Charlie Shuetrim



Top: Lady Potter cut the ribbon at the opening ceremony, assisted by Professor Peter Andrews, Queensland Chief Scientist. Ken Coles is looking on. *Photo: Charlie Shuetrim*

Middle: The main building in the new Ian Potter Centre for Tropical Marine Research. This photo was taken in October 2006 before the new landscaping took effect. *Photo: Charlie Shuetrim*

Bottom: Guests at the opening ceremony in October 2006. *Photo: Charlie Shuetrim*

By 2003 Lizard Island Research Station had been operating for 30 years. Most of its infrastructure was old and no longer meeting the increasingly sophisticated requirements of the researchers. To meet this challenge, LIRRF resolved to establish a special fund raising programme, the 30th Anniversary Development, with the objective of raising the substantial capital required for a major upgrade of LIRS. A sub-committee of Charlie Shuetrim (Chairman), Ken Coles and Andrew Green was established to oversee this programme.

Mike Archer, Director of the Australian Museum, launched the programme on 20th February 2003 before a large gathering of LIRRF supporters. Kevin Kalkhoven, who had donated the funds for *Kirsty K* to the CRMSF was present and announced that he wished to give impetus to the initiative by committing a further major donation in support of the excellent work being done at Lizard Island.

The Directors of LIRS produced an updated business plan detailing the work required to bring the Station up to world's best standard. The initial target of the 30th Anniversary Development was \$1.2 million – a figure which would have allowed only the most urgent things to be done. In June 2004, John Gough and Tom Healy, Governors of The Ian Potter Foundation, visited LIRS as part of a review of tropical marine research. Their recommendations resulted in a grant of \$1.5 million from The Ian Potter Foundation. This was matched by



commitments from the Queensland Government and the LIRRF resulting in total funding of \$4.5 million – enough to do the upgrade of LIRS comprehensively. Recently the budget was increased to \$4.75 million to cover inflation in certain costs. Fund raising, initiated in 2003, is now all but completed.

The minutiae of the upgrade programme are detailed in Appendix 02. To date, all work has been completed on time and within budget – a remarkable accomplishment given that the Directors of LIRS have been managing this effort whilst still running the Research Station at record levels of usage. The Max Bryant Construction Company from Cairns has done almost all of the major building work to date and it has been done to a high quality.

An opening ceremony was held in October 2006 by which time significant components of the upgrade had been completed. This was attended by a large number of supporters of LIRS and LIRRF. Lady Potter opened the Ian Potter Centre for Tropical Marine Research with generosity and enthusiasm, ably assisted by Professor Peter Andrews, Queensland Chief Scientist.

The regular annual fund raising of LIRRF has been continuing in parallel with the 30th Anniversary Development supporting the capital equipment maintenance programme at LIRS and the doctoral fellowship programme. Funds raised by LIRRF since inception now total almost \$8 million.

The central courtyard of the Ian Potter Centre for Tropical Marine Research. The Kalkhoven Wing is to the left and the Thyne Reid Wing to the right. To the rear of the photographer are the Sir John Proud Aquarium and the Raymond E. Purves Laboratories. The air flow through this area is designed to minimise the need for air conditioning. *Photo: Charlie Shuetrim*



11 Lizard Island Fellowships

Nicole Patten (2006 Lizard Island
Doctoral Fellow) investigates viruses
associated with corals and their role
in coral health. *Photo: Anne Hoggett
and Lyle Vail*



Top left: Dr Guillermo Diaz-Pulido received the inaugural Yulgilbar Foundation Fellowship to pursue his research on the impact of ocean acidification on corals.
Photo: Guillermo Diaz-Pulido

Bottom left: Andrew Hoey (centre), the 2007 Ian Potter Doctoral Fellow, with Tom Healy and John Gough, Governors of The Ian Potter Foundation. *Photo: Charlie Shuetrim*

Right: Jacob Johansen (2008 Lizard Island Doctoral Fellow) preparing for a dive trip. In excess of 4,000 dives per annum occur at LIRS.
Photo: Anne Hoggett and Lyle Vail



The fellowship programme has been an important initiative of LIRRF since the early 1980s. The first fellowship was awarded in 1984 and by now, 44 fellowships, with a total value of \$542,000, have been awarded.

Fellowships are awarded in two areas:

Doctoral fellowships

These are for students proceeding towards a PhD degree. The fellowships are highly sought after and are amongst the most valuable fellowships for field research on the Great Barrier Reef; 39 doctoral fellowships have been awarded since 1984. A testimony to the success of these awards is the number of fellows who have gone on to successful research and management careers in tropical marine science.

The fellowships currently awarded are:

The Lizard Island Doctoral Fellowship

Since 1984 this fellowship has provided financial support for field-intensive coral reef research at Lizard Island Research Station by outstanding PhD students. Applications are accepted from both Australian and overseas students. The fellowship provides \$8,000 p.a. funding and may run for up to three years.

The Ian Potter Doctoral Fellowship

This fellowship was inaugurated in 2006 and is funded by The Ian Potter Foundation. It has the same conditions as the Lizard Island Doctoral Fellowship.

Post doctoral fellowships

These fund field work for people who have been successful in obtaining a post-doctoral research position in the field of coral reef studies. These people represent the best of the best. Only a small proportion of successful PhD students obtain such a post-doctoral position on completion of their PhD and the competition for these positions is severe. The early post-doctoral time generally is the most creative time of a researcher's career. They can



concentrate on research as they have minimal administrative and teaching commitments. This is the time when they can make a difference – they can explore novel ideas that will change the way people think – leading to significant advances in our ability to understand and manage coral reef ecosystems. The post-doctoral fellowships were first awarded in 2008 and to date a total of 5 fellowships have been awarded.

The fellowships currently awarded are:

The Isobel Bennett Marine Biology Fellowship

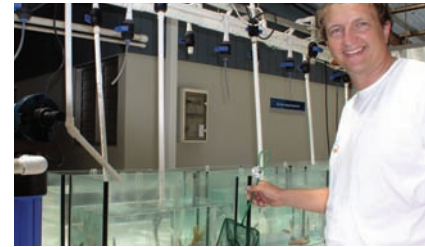
This fellowship was inaugurated in 2008 and is available for early post-doctoral research (within 6 years of the award of a PhD). It is funded by the Hermon Slade Raiatea Foundation in memory of Isobel Bennett, an outstanding marine scientist, who died in January 2008 aged 98. The fellowship provides \$8,000 p.a. funding for field-intensive coral reef research at Lizard Island Research Station.

The Sir John and Laurine Proud Fellowship

This fellowship was inaugurated in 2008 and has the same conditions as the Isobel Bennett Marine Biology Fellowship. It is funded by the John and Laurine Proud Estate Trust.

The Yulgilbar Foundation Fellowship

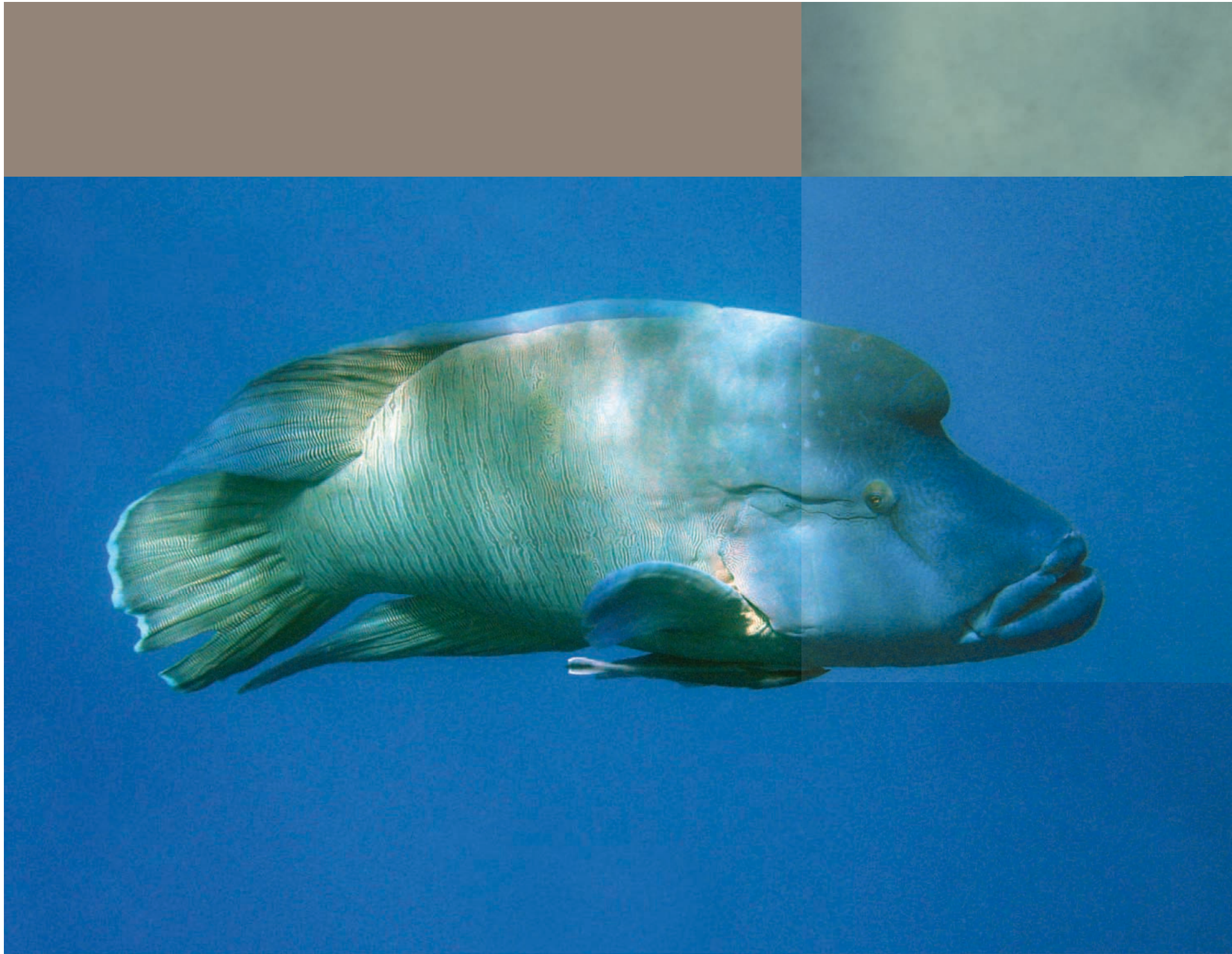
This fellowship was inaugurated in 2009 and is available for early post-doctoral research (within 6 years of the award of a PhD). It is funded by the Yulgilbar Foundation. The fellowship provides funding for field-intensive coral reef research at Lizard Island Research Station and may run for up to three years.



Left: Dr Line Bay was awarded the inaugural Isobel Bennett Marine Biology Fellowship to study how some common species of coral adapt to climate change. *Photo: Anne Hoggett and Lyle Vail*

Top right: Isobel Bennett in May 2007 on the occasion of being told that the Hermon Slade Raiatea Foundation had inaugurated the Isobel Bennett Marine Biology Fellowship. *Photo: Paul Slade*

Bottom right: Dr Morgan Pratchett, inaugural recipient of the Sir John and Laurine Proud Fellowship. Morgan is studying the effects of coral bleaching upon coral reef fish. *Photo: Anne Hoggett and Lyle Vail*



12 What have we learned?

Humphead Maori wrasse with a remora (suckerfish) hitching a free ride underneath. These wrasse reach an immense size – the largest reliably recorded was 229cm long and weighed 190kg.
Photo: Charlie Shuetrim



The list of Lizard Island fellows in Appendix 01 displays an eclectic selection of study topics. One may well ask why do we need to know these things and what difference does it make? Coral reefs are the marine equivalent of rainforests in terms of their complex and diverse ecosystems. We still know relatively little about them. But there are many reasons to conserve them. The Great Barrier Reef alone contributes more than \$5.5 billion p.a. to the Australian economy. In developing nations, coral reefs provide an important food source for millions of people and valuable income from tourism. As well, they protect coastlines from storms and tsunamis by absorbing energy before waves strike the coast.

The coral reefs at Lizard Island are the main laboratory for the researchers. Research done wholly or in part at LIRS by now has resulted in more than 1,200 publications in the scientific literature, truly an amazing contribution.

Themes that are critical to the workings of coral reefs have been developed at Lizard. Research is revealing the characteristics of resilient reefs and is showing how we can manage our activities to promote this resilience. Maintaining the health of our coral reefs to the best of our ability will give those reefs the best chance of overcoming the challenges.

Each research project conducted at LIRS is a building block in our quest to understand how this staggeringly complex ecosystem works. Our ignorance about it is vast. Two examples:

- the extraordinary mass spawning of corals was discovered only 25 years ago;
- there is still no clear consensus about the causes and declines of devastating crown-of-thorns starfish outbreaks although recent research suggest that primary outbreaks may indeed be a result of increased nutrient delivery from the land.

LIRS was one of the sites at which the mass spawning of corals was discovered and it has made many contributions to the crown-of-thorns starfish story.

Primary research threads at Lizard Island include:

Ecology of larval reef fishes. These investigations are providing direct evidence of when larval fishes are able to actively modify how and where they move and live. This is important information for the design of marine reserves. When the Great Barrier Reef rezoning was implemented in 2004, many of the “no-take” zones for fishing were based upon this research.

Biology of commercial fisheries species. Coral trout, and other commercial fish species, have been extensively investigated at LIRS with emphasis on ageing studies, population densities, reproductive biology and migratory behaviour including the establishment of spawning aggregations.



Top: Before you study the fish in the aquarium, first you have to catch them. This diver is using clove oil, a mild anaesthetic, to catch particular species required for research. *Photo: Anne Hoggett and Lyle Vail*

Far left: Coral trout – a beautiful fish but unfortunately much loved for the table. Studies into the ecology of these commercial fish species are having a beneficial impact in preserving their numbers and size on the Reef. *Photo: Anne Hoggett and Lyle Vail*



Top left: This photo shows coral that has “bleached” on the branch tips due to higher-than-normal water temperature that has persisted for some weeks. If the temperature stress continues, the coral will bleach completely and may die. Mass bleaching has a devastating effect on coral reefs. *Photo: Anne Hoggett and Lyle Vail*

Bottom left: Andrew Hoey (2007 Ian Potter Doctoral Fellow) at work in a lush tract of *Sargassum*. Fleshy seaweed such as this is kept at bay on healthy coral reefs by grazing animals such as parrotfish and sea urchins. Andrew is investigating many aspects of the relationship between seaweeds and grazing fishes at Lizard Island. *Photo: David Bellwood*

Right: The steephead parrotfish uses its exposed teeth and powerful jaws to remove algae from dead coral surfaces, excavating the reef as it feeds. *Photo: Charlie Shuetrim*



Importance of herbivory on reefs. Studies of global significance on the role of grazing fishes (herbivores) have been conducted at LIRS since the early 1980s. These herbivores maintain the health of reefs by consuming the fleshy algae that otherwise would grow and cover the corals. They also clean damaged reefs that have extensive algae growths on them, thereby allowing the reefs the best opportunity to recover.

Parasites of reef fish and cleaning behaviour. Since the early 1990s, the world's most significant studies on fish cleaning behaviour and parasites of client fish have been supported by LIRS. Current research suggests that an important benefit of cleaning behaviour may be the control of disease in reef fish.

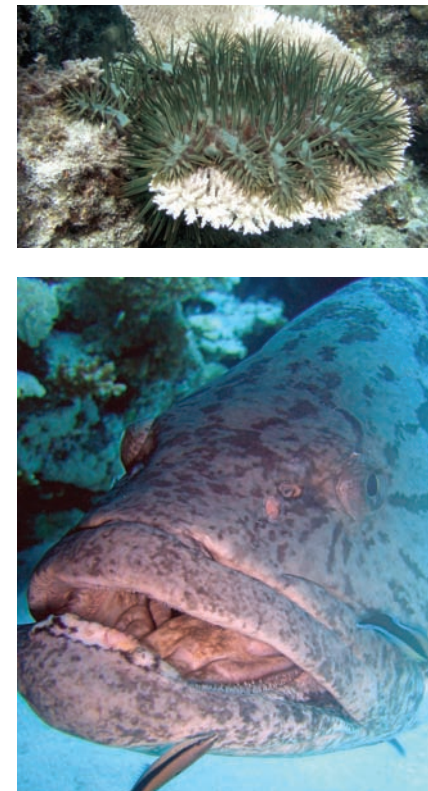
Diseases in corals. LIRS is the centre for the original studies of coral disease on the Great Barrier Reef. This is a vital area of investigation as the incidence of diseases in corals is increasing globally.

Colour on reefs. Australian and international scientists are conducting collaborative investigations at LIRS on the colour of the reef. Questions being investigated include: How and what do fish see? How do fish use colour to communicate? How can we use the eyes of marine creatures to design better ocean remote sensing devices that can monitor the health of the coral? and Can we use the colour of coral to determine its health?



Coral communities. Numerous studies on processes affecting coral communities have been conducted including: genetic diversity, impacts of chemicals on fertilization rates of coral larvae, species boundaries in corals, and community changes caused by crown of thorns starfish and coralivorous gastropods. Examples of the benefits of this research are the recognition of agricultural and industrial chemicals that harm corals and expanding knowledge on how to regenerate coral reefs after they have been damaged.

Effects of climate change on coral reefs. Increasingly, research questions at LIRS are being framed through the prism of a future with higher water temperatures and more acidic oceans. Some studies target the effects of climate change directly. For example, researchers are attempting to find out why some coral colonies survive unusually high water temperatures better than others within the same species. Other studies continue the basic task of elucidating how coral reefs work, then go one step further and ask how that process will be affected under predicted future conditions. How will warmer waters affect fishes that need corals for food and shelter? How will more acidic water affect coral growth?



Left: Professor Bette Willis is a leading researcher on coral diseases. Here she is monitoring the prevalence and types of disease on corals on the outer reef near Lizard Island. *Photo: Lyle Vail*

Top right: Crown of Thorns starfish – the subject of much study because they eat corals and population outbreaks occur periodically. A single female produces up to 40 million eggs per annum. Scientists now believe that increased nutrient levels enrich the food source for larval crown-of-thorns starfish, which could trigger outbreaks. *Photo: Anne Hoggett and Lyle Vail*

Bottom right: Cleaner wrasse removing parasites from a potato cod. LIRS was the site for initial discoveries of the importance of cleaning for the health of fish and much research is continuing in this vital area. *Photo: Alexandra Grutter*



13 What lies ahead?

We can only hope that our continuing efforts to support research at LIRS will help us maintain the wondrous coral reef ecosystems for the benefit of future generations.
Photo: Charlie Shuetrim



In the thirty-five years since Lizard Island Research Station commenced operations, there has been an enormous expansion of the resources devoted to research on the Great Barrier Reef. These resources include the Great Barrier Reef Marine Park Authority (GBRMPA), the Australian Institute of Marine Science and the institutions that operate island based research stations on the Reef (Australian Museum, James Cook University, Queensland University and Sydney University).

The Reef is still facing serious threats. The concerns expressed in Judith Wright's book related to water pollution, shipping, mining, crown of thorns and unsustainable activities. Apart from mining which is now banned, those issues are still present. Population growth, port expansion, increased shipping activity, sophisticated fishing techniques, plus climate change, are adding to the pressures on the Reef.

Recognising the threats, GBRMPA initiated in 1999 a systematic planning process to develop new zoning for the whole of the Marine Park. The result was one integrated ecosystem based plan that commenced operation on 1st July 2004. There is a cascade of zones with the Park, ranging from Preservation (pink – in essence “no-go” zones) through Marine National Park zones (green – “no-take” zones) to General Use Zones (blue – least restrictive). Notably, the green “no-take” zones increased from 4.6% of the total area to 33.3% of the total area.

A major research programme has been initiated by GBRMPA to monitor the ecological effects of the rezoning. Currently there are three core programmes focussed on reef fish populations. 150 species of reef fish are surveyed and the biological characteristics of the coral reefs are also recorded. It will take many years for the full effects of the rezoning to appear but some early effects have been observed. In the Whitsundays, coral trout density and biomass (an indicator of their average size) have increased 1.7 times since the rezoning. The increases were only seen in the Green Zones. Similar results were found in surveys of other reef areas where comparisons were made between Blue and Green Zones, before and after the rezoning. Results from the Blue Zones did not change whereas the Green Zones all showed significant increases.

So what lies ahead? No-one knows at this stage. What we do know is that research is the key to enable this asset to be preserved. An international group of researchers including Professors Hughes and Bellwood of James Cook University (amongst the top cited coral reef scientists in the world), summarised the problem¹:

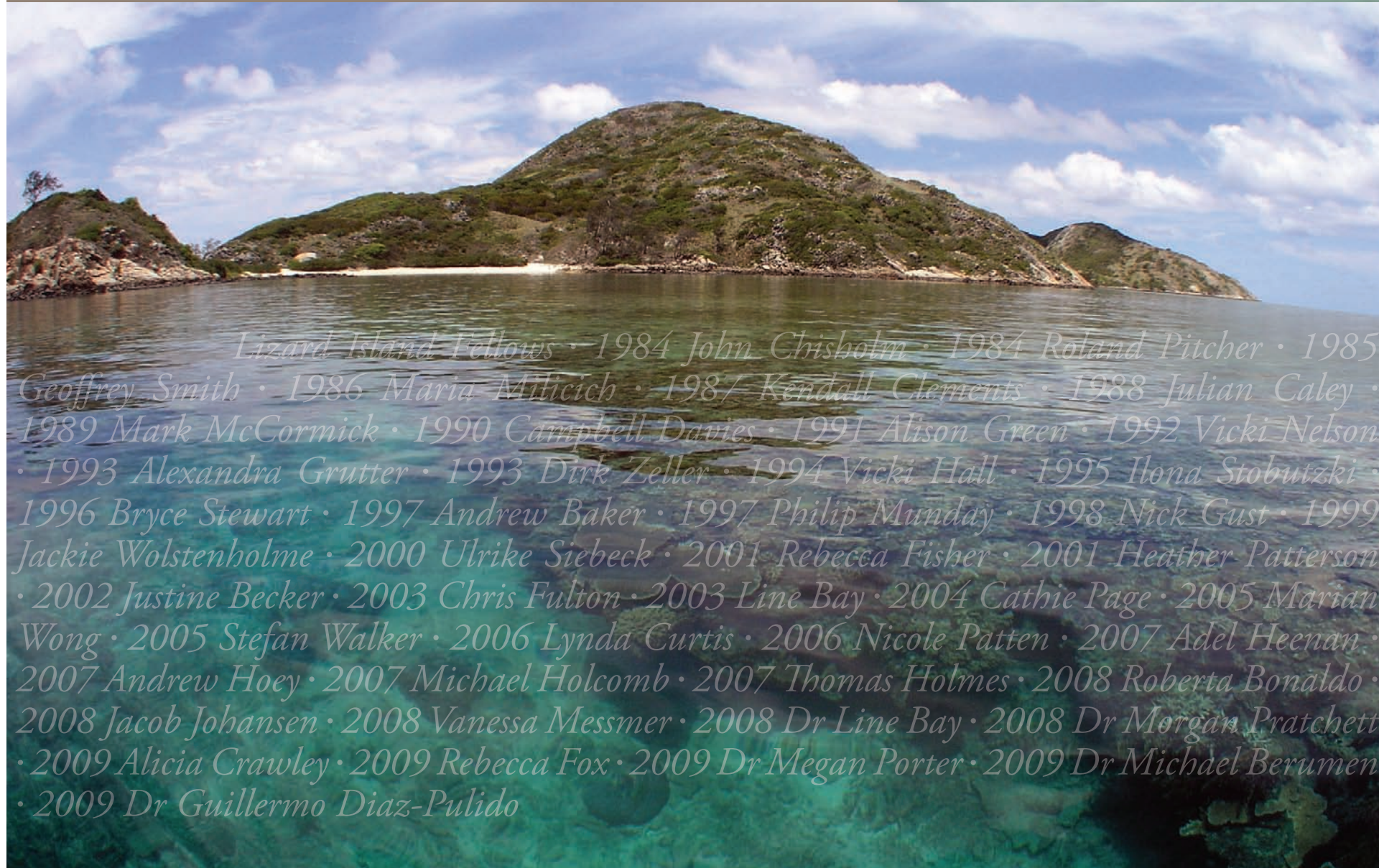
“The diversity, frequency and scale of human impacts on coral reefs are increasing to the extent that reefs are threatened globally”

“Research in support of reef management urgently needs to increase the scale of experiments, sampling and modeling to match the scale of impacts”

One thing is certain... the Australian Museum's Lizard Island Research Station and the Lizard Island Reef Research Foundation will continue to pursue with zeal this objective of more research and better research.

Another example of the incredible variety of life on the Great Barrier Reef. This is a *Spirobranchus giganteus* (commonly known as a christmas tree worm). They live in a tube and extend their tree-like appendages to collect food and for respiration. They occur in many different colours. Photo: Charlie Shuetrim

¹ Hughes, T.P. et al., 2003. Climate change, human impacts and the resilience of coral reefs. Science, 301: 929-933. Quotes from pp. 929 and 932.



Appendix 01

Recipients of fellowship awards

Note: JCU is James Cook University

1984 Lizard Island Doctoral Fellowship – John Chisholm (JCU) The ecology and productivity of corraline algae.

1984 Lizard Island Doctoral Fellowship – Roland Pitcher (Griffith University) The factors that influence the settlement of coral reef fish.

1985 Lizard Island Doctoral Fellowship – Geoffrey Smith (Griffith University) The relationship between feeding and nesting success in selected seabird populations around Lizard Island.

1986 Lizard Island Doctoral Fellowship – Maria Milicich (Griffith University) Light-traps: a novel technique for monitoring larval supply and replenishment of coral reef fish populations.

1987 Lizard Island Doctoral Fellowship – Kendall Clements (JCU) The role of herbivory in newly settled reef fishes.

1988 Lizard Island Doctoral Fellowship – Julian Caley (University of Sydney) The role that “disturbance” plays in the structure of biological reef communities together with the effect predators and competitors have on the abundance and distribution of species.

1989 Lizard Island Doctoral Fellowship – Mark McCormick (JCU) The factors that influence settlement and subsequent survival of mulld fish (i.e. mullet and related fish).

1990 Lizard Island Doctoral Fellowship – Campbell Davies (JCU) The demography of large reef fish such as coral trout and emperors.

1991 Lizard Island Doctoral Fellowship – Alison Green (JCU) The ecology, taxonomy and biogeography of the wrasses family of reef fishes.

1992 Lizard Island Doctoral Fellowship – Vicki Nelson (JCU) The demographics of reef crest corals – areas of fast growing corals although the reef itself grows only slowly in this region.

1993 Lizard Island Doctoral Fellowship – Alexandra Grutter (JCU) The benefits to cleaner wrasse of their cleaning behaviour and what are the benefits to their client fish.

1993 Lizard Island Doctoral Fellowship – Dirk Zeller (JCU) The large and small scale movement patterns of large reef fishes.

1994 Lizard Island Doctoral Fellowship – Vicki Hall (JCU) The level of natural damage to corals and the extent to which recovery occurs.

1995 Lizard Island Doctoral Fellowship – Ilona Stobutzki (JCU) The swimming and sensory capabilities of larval and juvenile fish.

1996 Lizard Island Doctoral Fellowship – Bryce Stewart (JCU) The causes of fish living where they do, using studies of factors influencing populations of predatory fish.

1997 Lizard Island Doctoral Fellowship – Philip Munday (JCU) The influences of coral type, coral availability and competition between goby species, on the settlement, growth and survivorship of coral gobies.

1997 Lizard Island Doctoral Fellowship – Andrew Baker (University of Miami) The genetic diversity of zooxanthellae living in stony corals on the Great Barrier Reef.

1998 Lizard Island Doctoral Fellowship – Nick Gust (JCU) The factors influencing sex change in parrotfishes.

1999 Lizard Island Doctoral Fellowship – Jackie Wolstenholme (JCU) The identification of different species of coral within the genus *Acropora* (which includes staghorn and plate corals).

2000 Lizard Island Doctoral Fellowship – Ulrike Siebeck (University of Queensland) The use of colour by coral reef fishes for camouflage and for signalling, both within and between species.

2001 Lizard Island Doctoral Fellowship – Heather Patterson (University of Sydney) The extent to which coral reefs rely on the retention of locally-produced larvae to seed fish populations.

2001 Lizard Island Doctoral Fellowship – Rebecca Fisher (JCU) The development of swimming ability in coral reef fishes from hatching to settlement.

2002 Lizard Island Doctoral Fellowship – Justine Becker (University of Queensland) The benefits of cleaner shrimp to their client fish.

2003 Lizard Island Doctoral Fellowship – Line Bay (JCU) The effects of thermal change on the evolution of geographic borders for the distribution of coral reef fish.

2003 Lizard Island Doctoral Fellowship – Chris Fulton (JCU) The influences of wave action on where fish live on coral reefs.

2004 Lizard Island Doctoral Fellowship – Cathie Page (JCU) The distribution of coral reef disease and its effect on coral fitness and mortality.

2005 Lizard Island Doctoral Fellowship – Stefan Walker (JCU) The lifetime reproductive potential of harem (i.e. living in a harem) reef fish.

2005 Lizard Island Doctoral Fellowship – Marian Wong (JCU) The influence of social and mating systems on the settlement and density of reef fish.

2006 Inaugural Ian Potter Doctoral Fellowship – Lynda Curtis (University of Queensland) The effects of blood parasites on the health of coral reef fishes.

2006 Lizard Island Doctoral Fellowship – Nicole Patten (Southern Cross University) The associations between viruses and reef-building corals.

2007 Ian Potter Doctoral Fellowship – Andrew Hoey (JCU) The species of herbivores necessary to resist change in the face of increasing disturbances and to regenerate coral reefs after disturbances.

2007 Lizard Island Doctoral Fellowship – Adel Heenan (University of Edinburgh) The capture and rearing (through aquaculture) of wild larvae to provide table fish and fish for the aquarium trade.

2007 Lizard Island Doctoral Fellowship – Michael Holcomb (MIT and Woods Hole Oceanographic Institution) The effects of ocean acidification on the rate at which corals build their skeletons.

2007 Lizard Island Doctoral Fellowship – Tom Holmes (JCU) Predator-prey interactions of coral reef fishes during the transitional period between larval and juvenile life stage.

2008 Ian Potter Doctoral Fellowship – Vanessa Messmer (JCU) The significance of the decline in the diversity of coral reef fishes.

2008 Lizard Island Doctoral Fellowship – Roberta Bonaldo (JCU) The effects of plant-eating fishes on benthic (i.e. sea bottom) community structures of coral reefs.

2008 Lizard Island Doctoral Fellowship – Jacob Johansen (JCU) The influence of habitat parameters on energy transfers in a plankton-eating fish.

2008 Inaugural Isobel Bennett Marine Biology Fellowship – Dr Line Bay (JCU) The adaptation of a common species of coral to climate change.

2008 Inaugural Sir John and Laurine Proud Fellowship – Dr Morgan Pratchett (JCU) The response of coral reef fishes to climate-induced coral bleaching.

2009 Ian Potter Doctoral Fellowship – Alicia Crawley (University of Queensland) The physiological and genetic changes in coral resulting from ocean acidification.

2009 Lizard Island Doctoral Fellowship – Rebecca Fox (JCU) The roles of the little-studied but ubiquitous rabbitfishes in coral reef ecosystems.

2009 Isobel Bennett Marine Biology Fellowship – Dr Megan Porter (University of Maryland) Physiological, ecological, and biodiversity studies of mantis shrimps, including larvae identified using genetic “bar-coding”.

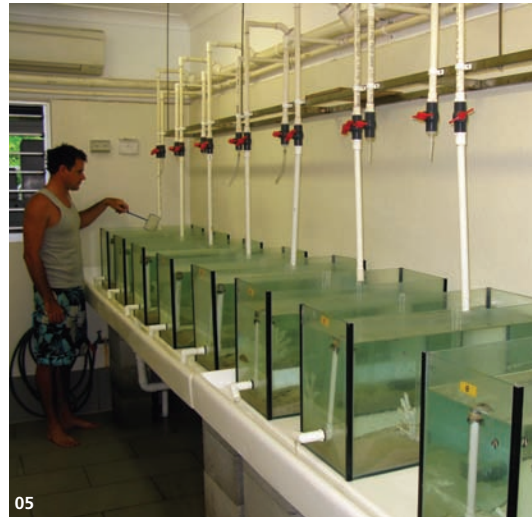
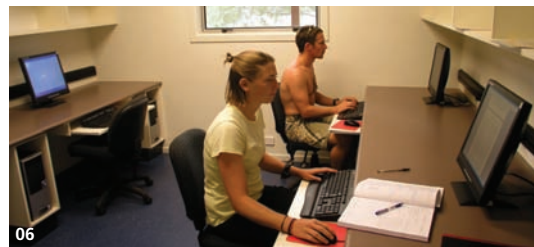
2009 Sir John and Laurine Proud Fellowship – Dr Michael Berumen (Woods Hole Oceanographic Institution) The relationship between quality of food and shelter available and the evolutionary “fitness” of coral reef fishes using a novel method of identifying parent/offspring relationships.

2009 Inaugural Yulgilbar Foundation Fellowship – Dr Guillermo Diaz-Pulido (University of Queensland) Crustose coralline algae holds coral reefs together – how sensitive is it to acidification of seawater?



Appendix 02
30th Anniversary
Development –
project details

This photo, taken in October 2008, shows the landscaping that is now enhancing the entrance to the Ian Potter Centre for Tropical Marine Research. *Photo: Charlie Shuetrim*



The 30th Anniversary Development is upgrading or refurbishing almost every facet of the Research Station. With a task of this magnitude and a budget now totalling \$4.75 million, the work has been scheduled over a number of years – commencing in 2005 and projected to finish in 2010. The major constraints on building work at Lizard Island are the climate and the research schedule – work can only be done from April to October as the other months are both the peak research season and very unreliable in terms of weather and cyclones.

2005 works

The first stage of the upgrade was done in 2005. This comprised a series of separate projects that were designed to enable LIRS to continue operating in a productive manner whilst major building works were undertaken in later years. The projects were:

- **Build a new Talbot House.** The existing building, almost 25 years old, was demolished and a new three bedroom building capable of housing eleven researchers was constructed.
- **Construct a general purpose work area (now known as the Beach Hut).** The proposed 2006 and 2007 works rendered all of the old laboratories (except for the Purves Lab) unavailable for the duration of the works. This new building was a low cost facility to provide work spaces that could be used by researchers and students in the short term and which, in the long term, will be a valuable addition to the Research Station.
- **Construct a new storage facility (known as Alison for its funding by Alison Hayward).** LIRS has extensive storage requirements for researchers' equipment and for materials used at the Station. The old store was no more than a timber and wire lean-to so this modern metal shed now provides excellent storage capabilities. Notably, all timber used for the internal fit-out was from materials recycled at LIRS.
- **Replace an old section of the workshop roof.** The replacement now means that work can proceed in all parts of the workshop in all weathers. The workshop is being used extensively for various facets of the upgrade programme.

2006 works

This was the major component of the upgrade – to demolish the 1977 era laboratory building and to construct the Kalkhoven Wing of the Ian Potter Centre for Tropical Marine Research. With a total cost of approximately \$1 million, this new building was completed on time and within budget. The new building contains the following facilities:

- **The Balnaves aquarium rooms.** Two light and temperature controlled aquarium rooms.
- **The Macquarie Group Foundation seminar room.** A fully-equipped education facility capable of holding up to fifty people.
- **The Kirby computer room.** This has broadband internet connection via satellite, multiple powerful computers donated by Australian Projects and wireless networking to enable researchers to connect via their laptops.
- **A reception facility and offices for the Directors.** The reception facility is used principally for briefings to researchers and students whilst the new offices for the Directors provide an effective work space for them.

01: Frank Talbot on the verandah of Talbot House in October 2006. Photo: Charlie Shuetrim

02: The new Talbot House. Photo: Charlie Shuetrim

03: The new storage shed – Alison. Photo: Charlie Shuetrim

04: Dr Mary Poteet and a group of students from the University of Texas at work in the Macquarie Group Foundation seminar room. Photo: Anne Hoggett and Lyle Vail

05: One of the Balnaves aquarium rooms. These two rooms allow control of both light and temperature for work that requires special environmental conditions. Photo: Anne Hoggett and Lyle Vail

06: The Kirby Computer Room houses the powerful desktop computers and ancillary equipment donated by Australian Projects. The wireless networking allows researchers to connect their laptops to the network from throughout the Ian Potter Centre for Tropical Marine Research. Photo: Anne Hoggett and Lyle Vail

07: Professor John Steffensen at work in the Purves Lab. He is measuring metabolic rates in fish. Photo: Anne Hoggett and Lyle Vail

08: Dr Jonathon Erez of the Hebrew University Jerusalem at work in the Thyne Reid Wing. He is part of an international team studying the effects of ocean acidification on coral reefs. Photo: Anne Hoggett and Lyle Vail

09: The new tractor displaying its capabilities on the fortnightly task of transporting fuel and materials from the barge that lands on the Resort beach. Photo: Anne Hoggett and Lyle Vail

01: The new housing constructed for the pumps that service the two new inlet lines for the aquarium.
Photo: Charlie Shuetrim

02: Installing the new inlet lines was physically demanding and time critical. The task had to be completed during the brief period of very low tides in July 2008. *Photo: Anne Hoggett and Lyle Vail*

03 and 04: Before and after: 1970s toilet versus the modern bathrooms and composting toilets that are in Kirby, Suntory and Talbot Houses. Loomis House also will be upgraded to this standard in 2009. *Photos: 1970s toilet: Australian Museum Archives. Suntory bathroom: Charlie Shuetrim*

05: Divers entering the water from one of the new boats funded by the Macquarie Group Foundation. These two new larger boats can each carry up to twelve people.
Photo: Charlie Shuetrim

06: This is Sam, one of the new breed of research boats. This one was funded by the Yulgilbar Foundation. Vanessa Messmer (in blue), the 2008 Ian Potter Doctoral Fellow, is driving the boat. *Photo: Anne Hoggett and Lyle Vail*

- **The Shuetrim library.** The new library is twice the size of the old one. It houses the scientific publications based on work at Lizard Island, plus other reference books and merchandise for sale to visitors on Station tours.
- **Service facilities.** These include laundry and food storage areas required to handle up to 7,000 user nights per annum plus snorkelling and dive gear for use by visitors to the Station.

2007 works

2007 saw the final stage of construction of new laboratories for LIRS.

- **Stage IV of the Purves Laboratory.** This stage has added a whole new laboratory to the Purves complex.
- **Thyne Reid Wing.** This is housed in the old block building that was constructed in 1984. The building was completely gutted and re-roofed. It was then fitted out to contain three laboratories and a microscope room.

Other upgrade achievements in 2007 included:

- Replacement of the old tractor with a new and more powerful tractor with funding from the Thyne Reid Foundation.
- The start of the phased programme to replace all of the old research vessels. Most of these have now been used to the extent that their hulls have become too thin for continued use. The new dinghies are all of a common design and include a range of innovations that will make them much more user friendly for the researchers. Three boats were purchased this year, two of which were funded by the Thyne Reid Foundation and the third from general 30th Anniversary funds.
- Upgrading the track from LIRS to the airport – with major assistance from Queensland Parks and Wildlife Service and from the new tractor.

2008 works

- Refurbishing Kirby and Suntory houses to replace aged fittings (e.g. louvres) that were no longer working properly and to bring them to the same standard as the new Talbot House.
- Commencing the updating of laboratory equipment which encompasses both state of the art equipment and increased quantities thereof to cater for the expanded use of the Research Station. Both the Thyne Reid Foundation and the Raymond E. Purves Foundation have funded this investment in laboratory equipment.
- Installing the plumbing and electrical infrastructure required for the expansion of the aquarium. This includes the doubling of the sea-water intake lines from a position near a reef that is approximately 200 metres offshore from the aquarium. The Vincent Fairfax Family Foundation has funded the expansion of the aquarium to result in a 50% increase in capacity.
- Replacing four research dinghies two of which were funded by the Yulgilbar Foundation, one by the Trust Company and one by the John Villiers Trust.
- Purchasing two new larger vessels with funding from Macquarie Group Foundation. These vessels are designed for transporting educational groups and for research projects with large numbers of people or large amounts of equipment.



Future stages – 2009 to 2010

There are still many individual components of the upgrade to be completed.

- Completing the aquarium extension.
- Extending Loomis house from one bedroom to three bedrooms and bringing it up to the standard of the other visitor houses.
- Installing an alternative energy system (almost certainly based on solar) that has the objective of reducing carbon emissions by more than 50%.
- Completing the purchase of new laboratory equipment.
- Completing the phased replacement of the old research vessels.
- Replacing or refitting the existing 6m catamaran *Kirsty K*.
- Replacing the old section of the maintenance workshop, currently the oldest building at the Station.
- Upgrading the dive compressors and associated equipment.



Appendix 03

Trustees and Patrons of Lizard Island Reef Research Foundation

LIRS in the early days. The original Trustees would marvel at LIRS today. We owe them a lot for their foresight in establishing LIRRF.
Photo: Australian Museum Archives

The initial prospectus for LIRRF in 1978 shows the officeholders as follows:

The Lizard Island Reef Research Foundation

TRUSTEES

JOHN SEYMOUR PROUD, B.E., M.I.M.M. Aust., (Chairman of Trustees), Chairman of Directors, Peko-Wallsend Limited, Director, C.S.R. Ltd., Fellow of the Senate of the University of Sydney

PROFESSOR DONALD THOMAS ANDERSON, Ph.D., D.Sc., F.R.S. Professor of Zoology (University of Sydney) Fellow the Royal Society.

KENNETH JOHN CAMPBELL BACK, M.Sc., Ph.D., (in his capacity as Vice-Chancellor of James Cook University of North Queensland).

LORD CATTO OF CAIRNCATTO, Chairman of Directors, Morgan Grenfell & Co. Ltd., London.

SIR GEORGE READ FISHER, C.M.G., M.I.M.M. Aust., Former President Mount Isa Mines Ltd.

ALEXANDER CHRISTY FREELEAGUS, C.B.E., A.M., A.E., B.A.L.L.B. Senior Partner, Henderson & Lahey, Attorneys & Solicitors, Brisbane.

NEVILLE GEORGE GREEN, LL.B., Senior Executive Partner, N.G.Green & Co., Attorneys & Solicitors, Sydney.

DESMOND JOHN GERALD GRIFFIN, M.Sc., Ph.D., Director, The Australian Museum (in his capacity as Director of The Australian Museum).

IAN KINLOCH MACGREGOR, Former Chairman, AMAX Inc., Chairman, Kuhn Loeb Lehman Brothers International Ltd., Deputy Chairman, British Leyland (UK.) Director, American Cyanamid, President, International Chamber of Commerce.

GILES WILLIS MEAD, Ph.D. Director Los Angeles County Museum, Los Angeles, California.

SIR ROBERT NORMAN, Kt., Director, Bank of New South Wales.

PROFESSOR MICHAEL GEORGE PITMAN, M.A., Ph.D. Professor of Biology (University of Sydney) (in his capacity as President of the Board of Trustees of The Australian Museum).

KEITH LEONARD SUTHERLAND, O.B.E., D.Sc., Ph.D., F.A.A., M.R.I.C., C.Chem., F.T.S., F.R.A.C.I., M.I.M.M. Aust. Chairman, NSW Science and Technology Council (in his capacity as a member of The Committee of Trustees of The Lizard Island Research Station).

PROFESSOR FRANK HAMILTON TALBOT, M.Sc., Ph.D., F.L.S., FR.Z.S. (N.S.W.) Director of Environmental Studies Macquarie University (in his capacity as a member of The Committee of Trustees of The Lizard Island Research Station).

SECRETARY, TREASURER, PUBLIC OFFICER

Andrew David Green, B.Ec., LL.B.

SOLICITORS AND ATTORNEYS

New South Wales

N.G. Green & Co., Suite 3710, Tower Building, Australia Square, Sydney, N.S.W.

Queensland

Henderson & Lahey, Estates House, 127 Creek Street, Brisbane, Queensland.

AUDITORS

Peat Marwick Mitchell & Co., Tower Building, Australia Square, Sydney, N.S.W.

BANKERS

Bank of New South Wales, The Wales House, 66 Pitt Street, Sydney, N.S.W.

INVESTMENT MANAGER AND CUSTODIAN OF SECURITIES

Wales Management Pty. Limited, (The Investment Manager), The Wales House, 66 Pitt Street, Sydney, N.S.W.

Bank of New South Wales Nominees Pty.Ltd., (The Custodian Trustee), The Wales House, 66 Pitt Street, Sydney, N.S.W. 2000.

The Directors of the Investment Manager and of the Custodian Trustee are all officers of the Bank of New South Wales.

Since then, the following people have also contributed their time and wisdom as Trustees of the Lizard Island Reef Research Foundation:

Professor Michael Archer AM
Dr Joe Baker
John Barraclough AM ++
George Bennett
Dr Penny Berents **
Jim Bildner **
Sir Roderick Carnegie
The Hon. Virginia Chadwick AO ++
Paul Connor
Kenneth Coles AM **
Jim Creer
Malvin Eutick
Belinda Gibson **
Professor Alistair Gilmour
Dr Barry Goldman
Andrew Green
Dr Ronnie Harding **
Trevor Haworth AM **
Alison Hayward
Frank Howarth PSM **
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Lucy Hughes Turnbull
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Vivian King **
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Kristine Klugman
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Bill Page-Hanify AM
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Fiona Playfair **
Heather Power **
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Associate Professor Stephan Schnierer
Michael Seyffer
David Shannon **
Graham Sherry OAM **
Charlie Shuetrim AM **
Julianna Walton

Nicola Ward
Dr Charles Warman AM ++
Patricia Watson
Professor L. Webb
Helen Wellings **
Brian Wiesener ++
Dr Robyn Williams AM
Professor Brian Wilson

** indicates current trustee August 2013

The Founder and Patrons of Lizard Island Reef Research Foundation are those people who have made extraordinary contributions. As at the date of this publication they are listed as follows:

Founder:

Sir John Proud ++

Patrons:

Lord Catto of Cairncatto ++
Andrew Green
Dr Des Griffin AM
Trevor Haworth AM
Raymond Kirby AO
Henry Loomis ++ and Jacqueline Loomis
The Ian Potter Foundation
Lady Proud ++
Robert Purves AM
Thyne Reid Foundation
Professor Frank Talbot AM
Dr Charles Warman AM ++
Brian Wiesener ++

++ indicates deceased



Appendix 04

Years 2010 to 2013

This Appendix provides an update
as of August 2013.

Dr. Joana Zanol Pinheiro da Silva
collecting coral rubble at Yonge
Reef, one of the outer barrier reefs.
This was part of the activities of the
August 2013 international polychaete
workshop held at LIRS.

Photo: Lyle Vail

Fellowships

The doctoral and post-doctoral fellowship programmes continue to produce excellent research outcomes. A new grant was introduced in 2012 – the Teakle Grant for research into sustainable fishing.

Listed below are the recipients of fellowships and grants in the years 2010 to 2013. (Note JCU is James Cook University).

2010 Ian Potter Doctoral Fellowship – Darren Coker (JCU)

Effects of climate-induced coral loss on coral reef fishes – the critical importance of live coral as habitat.

2010 Lizard Island Doctoral Fellowship – Chris Goatley (JCU)

The ecological role of sediments on coral reefs.

2010 Sir John and Laurine Proud Fellowship – Dr. Nichola Raihani (Zoological Society of London)

The evolution of punishment and cooperation in nature.

2010 Yulgilbar Fellowship – Dr. Maud Ferrari (University of California, Davis)

The effect of ocean acidification on predator-prey interactions in coral reef fishes.

2011 Ian Potter Doctoral Fellowship – Sandra Binning (Australian National University)

Shape up or ship out – can coral reef fish change their shape to suit their environment?

2011 Lizard Island Doctoral Fellowship – Joe Pollock (JCU)

White syndromes – a virulent group of coral diseases impacting Indo-Pacific coral reefs.

2011 Isobel Bennett Marine Biology Fellowship – Dr. Stefan Walker (JCU)

The evolution of dominance signalling and signal-receiver behaviour.

2011 Yulgilbar Fellowship – Dr. Chris Fulton (Australian National University)

How does climate influence seaweed patch dynamics on the Great Barrier Reef?

2011 Yulgilbar Fellowship – Jessica Stella (JCU)

Threats to coral-associated invertebrate diversity from climate change.

2011 Special Grant – Dr. Sarah Hamylton (University of Wollongong)

Modelling coral reef response to environmental change: a geospatial approach.

2012 Ian Potter Doctoral Fellowship – Oona Lönnstedt (JCU)

Predator-prey interactions and the importance of sensory cues in a changing world.

2012 Ian Potter Doctoral Fellowship – Dominique Roche (Australian National University)

Surf's up! How waves affect predator-prey interactions in coral reef fishes.

2012 Lizard Island Doctoral Fellowship – Justin Welsh (JCU)

The spatial ecology of coral reef fishes.

2012 Lizard Island Doctoral Fellowship – Sharon Wismer (University of Neuchatel)

Cognitive flexibility in bluestreak cleaner wrasse: environmental constraints?

2012 Isobel Bennett Marine Biology Fellowship – Dr. Vanessa Messmer (JCU)

Effects of climate change on reproduction, larval development and population growth of coral trout.

2012 Sir John and Laurine Proud Fellowship – Dr. Ashley Frisch (JCU)

Apex predators on coral reefs – do marine parks need sharks?

2012 Yulgilbar Fellowship – Dr. Shelby Temple (University of Bristol)

See coral reefs in a new light: communication and camouflage in the polarised light dimension.

2012 Teakle Grant

Dr. Timothy Clarke (Australian Institute of Marine Science)

Dr. Stephen Cooke (Carleton University, Canada)

Dr. Vanessa Messmer (JCU)

Dr. Andrew Tobin (Fishing and Fisheries Research Centre, JCU)

Professor Morgan Pratchett (JCU)

Interactive effects of climate change and fisheries capture on the physiology and behaviour of recreational fisheries species.

2013 Ian Potter Doctoral Fellowship – Martina Prazeres (University of Queensland)

Benthic foraminifera as a tool for detecting environmental and ecological changes on the Great Barrier Reef.

2013 Lizard Island Doctoral Fellowship – Hanne Thoen (University of Queensland)

Understanding the complex visual system of Mantis shrimps, a new form of colour processing?



2013 Lizard Island Doctoral Fellowship – Fabio Cortesi (University of Basel)

Ecological and molecular basis for colour polyphenism in *Pseudochromis fuscus*.

2013 Isobel Bennett Marine Biology Fellowship – Dr. Andrew Hoey (JCU)

Influence of macroalgal beds on the functional impact of herbivorous fishes.

2013 Sir John and Laurine Proud Fellowship – Dr. Jairo Rivera (JCU)

Novel method for controlling outbreak populations of *Acanthaster planci* (crown-of-thorns starfish).

2013 Yulgilbar Fellowship – Dr. Danielle Dixson (Georgia Institute of Technology)

Ability of obligate coral dwelling fishes to protect host corals from damage.

2013 Teakle Grant

Dr. Timothy Clarke (Australian Institute of Marine Science)

Dr. Stephen Cooke (Carleton University, Canada)

Dr. Andrew Tobin (Fishing and Fisheries Research Centre, JCU)

Professor Morgan Pratchett (JCU)

Dr. Vanessa Messmer (JCU)

Vulnerability and survival of fish released following fisheries encounters: towards lower post-release predation and more sustainable catch-and-release fishing.

Top left: Dr. Vanessa Messmer (2012 Isobel Bennett Marine Biology Fellow) conducts experiments with fish to determine how their metabolism will cope with increasing sea temperatures. Oxygen consumption of individual fish is measured in separate respirometer chambers that are immersed in the large tanks. *Photo: Lyle Vail*

Top right: Dr. Stephan Walker (2011 Isobel Bennett Marine Biology Fellow) studies fish behaviour in the aquarium to determine how fish communicate information about dominance within their societies. *Photo: Lyle Vail*

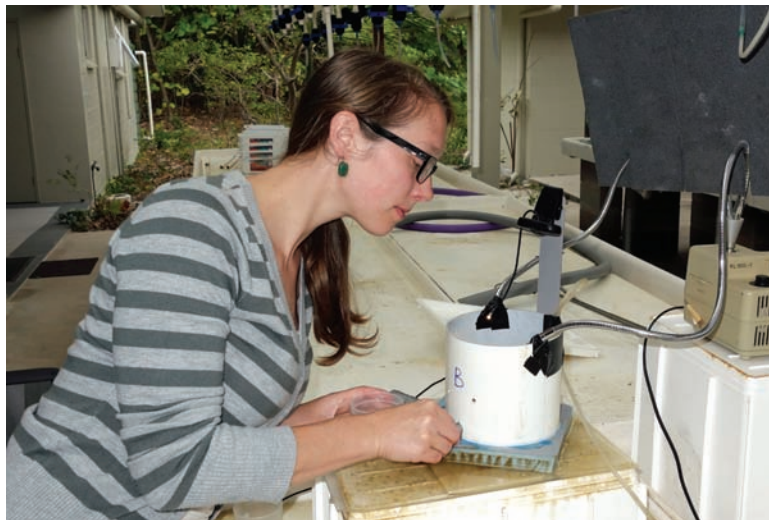
Bottom left: Hanne Thoen (2013 Lizard Island Doctoral Fellow) testing the spectral sensitivity of mantis shrimp. Their eyesight is better than sophisticated military imaging software. *Photo: Lyle Vail*

Bottom right: Sandra Binning (2011 Ian Potter Doctoral Fellow) is studying how adaptable fish are to differences in wave energy. Here she adjusts a raceway in which fish must swim at particular speeds and in which she can measure metabolic information. *Photo: Anne Hoggett*



Left: University of Bristol PhD student James Foster conducts experiments to determine polarisation vision in mantis shrimps. *Photo: Lyle Vail*

Right: Ninna Gagnon is part of an international team studying vision in marine animals. *Photo: Lyle Vail*



Wonderful research at Lizard Island

The earlier chapter in this book *“What have we learned”* details some of the primary research threads at Lizard Island. This research is going from strength to strength. In May 2013, a number of the trustees of the Australian Museum visited LIRS to see for themselves how the Station operated. Professor Merlin Crossley, who was one of the visiting Trustees, is also Dean of Science at the University of New South Wales. He was most impressed and commented:

“The Lizard Island Research Station would challenge most university departments in terms of both the quality and quantity of its annual haul of publications. It is no surprise to me that its contributions are known across the globe”.

The library at LIRS now houses more than 1,600 publications in the scientific literature based on work done wholly or in part at Lizard Island.

One of the highly productive and innovative areas of research at Lizard is that conducted by our doctoral and post-doctoral fellows. These are young scientists who are full of bright ideas and eager to pursue new lines of research. We have outlined below the work done by some of these recent fellows.

Lynda Curtis (2006 doctoral fellow)

Lynda investigated parasites in coral reef fishes and their effects on host fish physiology. She found that common external parasites that feed on the blood of reef fishes can transmit disease-causing blood parasites between fishes. This is similar to mosquitoes transmitting malaria between people but the mechanism is different – fish have to eat the “mosquito” to be infected by the pathogen. She also discovered the presence of a viral disease in fishes that has not been recorded before in Australia. Her study advances knowledge of the importance of cleaning associations in reef ecosystems, a long-term research thread at Lizard Island.

Andrew Hoey (2007 doctoral fellow)

Andrew investigated how plant-eating fishes structure seaweed communities in different habitats spanning the continental shelf. This is important because



removal of herbivorous fish in some parts of the world has resulted in a shift from a coral-dominated habitat to one dominated by fleshy seaweeds. In field experiments he found that a single species of surgeonfish was responsible for removing almost 95% of the seaweed. This provides strong evidence for the role of browsing fishes in limiting the distribution of seaweeds in coral reef environments. That a single species has such an important role over such a wide range of habitats is cautionary and should inform management.

Darren Coker (2010 doctoral fellow)

Darren researched the mechanistic linkages between coral habitat loss and subsequent changes in the abundance (and diversity) of fishes with an aim of increasing our knowledge about impacts of coral bleaching. He found that 320 fish species used 93 different species of coral for habitat. Research demonstrated the threat of disturbances to coral on fishes, especially since coral species most susceptible to disturbances (biological and physical) support the greatest number and diversity of fish species.

Dominique Roche (2012 doctoral fellow)

Dominique investigated the effects of wave energy on predator-prey interactions in coral reef fishes. He demonstrated that some juvenile fishes are more susceptible to predation in wavy conditions, suggesting that changing weather patterns on the Great Barrier Reef could have important consequences on the recruitment, distribution, and abundance of certain prey species. This research will help decision-makers identify fish species and locations on the GBR that are most sensitive to changes in wave regimes.

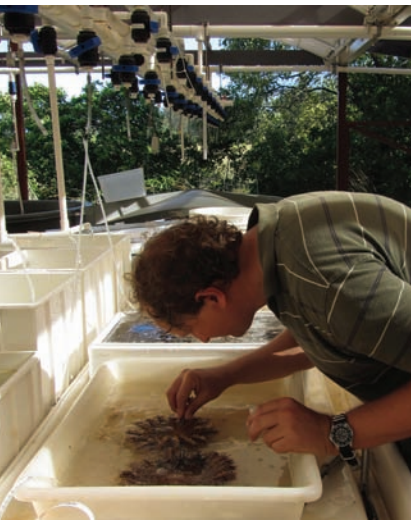
Oona Lönnstedt (2012 doctoral fellow)

Oona studied the interrelationships between coral reef fish predators and their prey and how they are affected by coral degradation. Her research has demonstrated that the sensory mechanisms used by prey fish to identify predator activity are severely impacted by coral degradation. Fish in bleached and dead coral habitats are more likely to fall prey to predators, which could have far-reaching implications for survival and recruitment of coral reef fishes in degraded habitats.



Left: Derek Sun (PhD student, University of Queensland) and his assistant Johanna Werminghausen return to LIRS with samples of fish parasites for analysis. The field experiment aims to determine the infection rate by parasites of juvenile reef fishes throughout the day and night. *Photo: Lyle Vail*

Right: Martina Prazeres (left, University of Queensland PhD student and 2013 Ian Potter Doctoral Fellow at Lizard Island) and assistant Anna Peach are conducting an aquarium experiment over several months to determine the effects of temperature, nutrients and light on single-celled organisms called foraminiferans. *Photo: Lyle Vail*



Left: Morgan Pratchett in the aquarium extension, extracting tissue samples from Crown of Thorns Starfish. *Photo: Charlie Shuetrim*

Right: First live test of the new method of killing Crown of Thorns Starfish. The diver is injecting a Crown of Thorns with just one dose of the new solution. *Photo: Lyle Vail*



**Prof. Morgan Pratchett (2008 post-doctoral fellow)
& Dr. Jairo Rivera (2013 post-doctoral fellow)**

Crown of Thorns Starfish (COTS) are part of the natural environment on coral reefs but population outbreaks cause much destruction. The Australian Institute of Marine Science estimates that COTS are responsible for the loss of 20% of the coral on the Great Barrier Reef since 1986. Population outbreaks occur periodically and during a severe outbreak there can be many COTS per square metre. In this situation they can eat almost all of the coral on a reef.

Morgan Pratchett and Jairo Rivera have been conducting tests to determine if it is disease that normally ends COTS outbreaks on the Great Barrier Reef. They found that the COTS naturally harbour *Vibrio* bacteria and that these bacteria are capable of quickly killing their host under certain conditions. From this discovery they found that the injection of a harmless protein mixture used to grow bacteria in the laboratory can kill the COTS.

They then conducted extensive research in the aquarium system at Lizard Island Research Station to ensure that killing starfish with their new protein mixture did not cause harm to any other sea life. When these tests were successful, they received approval from the Great Barrier Reef Marine Park Authority to conduct tests on reefs adjacent to the Lizard Island Research Station. These tests were successful with 100% mortality of the starfish injected only once with the new solution. This represents a major step forward in our ability to control COTS outbreaks. It is faster, easier and very much cheaper than the existing method. This is the first step in reducing the devastating effects of outbreaks on the Great Barrier Reef but significant investment is required to take this research to the next level. They hope to find an appropriate pathogen or disease that can be spread by starfish to kill all individuals in a local area.



Left: Loomis house upon completion. The materials used in all of the houses are designed for ease of maintenance in the harsh environment at LIRS. *Photo: Lyle Vail*

Right: Large tanks in the aquarium extension. These new aquarium facilities have greatly increased the amount of research that can be done and they also enable different kinds of research. *Photo: Lyle Vail*

30th Anniversary

2009 works

- The floorspace of the aquarium was increased by 50% and the seawater delivery system was completely overhauled. New pumps and inlet lines that were installed in 2008 handle the expanded aquarium facility with ease and provide much needed redundancy. The Vincent Fairfax Family Foundation funded this expansion of the aquarium.
- Loomis house was largely rebuilt and extended. It now provides accommodation for up to eight visitors in three bedrooms. This is the last of the four visitor houses to be upgraded.
- A new dinghy, funded by the John Villiers Trust, was acquired. This is the seventh new dinghy to be acquired under this upgrade programme. All of these dinghies are purpose designed to suit the needs of the researchers working around Lizard Island.
- Twenty new scuba tanks were acquired as a prelude to the complete upgrade of the dive facilities scheduled for 2010.
- Considerable additional laboratory equipment was purchased with funding provided by the Raymond E. Purves Foundation and the Thyne Reid Foundation.



Left: This photo shows the refurbished dive compressors in their new sound-proofed enclosure. The compressors were first installed at LIRS in the 1990s and are of such quality that it was preferable to refurbish them rather than buy new ones. *Photo: Lyle Vail*

Right: The new dinghy *Primrose* heading off on a research trip. All of the new dinghies purchased under the 30th Anniversary Development are of the same custom design, tailored to the needs of the researchers at LIRS. *Photo: Lyle Vail*



2010 works

- The maintenance workshop was substantially rebuilt on the same footprint as the original building. New storage systems have improved efficiency while ceiling fans and new windows have improved working conditions.
- The scuba filling system was upgraded at the same time as the workshop. The compressors were rebuilt and moved to reduce noise impacts. They are now connected to an air bank, allowing scuba tanks to be filled at any time. The compressors are now run only when power draw is low, which reduces fuel consumption.
- A new dinghy was purchased during the year, the eighth under this programme. It is named *Primrose* in honour of its donor, Lady Potter AC.
- The frame for a 30 kW solar power system was constructed in October in preparation for installation of the solar array in early 2011. Installation of the solar power system has been made possible by deferring some other upgrade projects, as the Federal Government programme that would have provided a \$200,000 subsidy towards this system was cancelled at short notice in 2009.
- The staged purchase of laboratory equipment continues, funded by the Raymond E. Purves Foundation and the Thyne Reid Foundation. Items purchased in 2010 include a laboratory oven, chemical storage cabinets, a set of sediment screens, and numerous small items.



2011 works

- The final major construction project of the 30th Anniversary Development was completed in 2011 when a new solar hybrid power system came online in late February. The 30 kW system comprises an array of 144 solar panels integrated with large battery bank and existing diesel generators. This system reduces the Station's CO₂ emissions due to power generation by about 65%.
- *Kirsty K* was extensively refitted. This vessel has held up very well over nine years of heavy use and the refit should see it last for a similar amount of time with normal maintenance and motor replacement.
- Two new dinghies were acquired. This brings the total of new dinghies to ten.
- The Station's most vital vehicle is the tractor. The existing tractor, funded by the Thyne Reid Foundation in 2005, was replaced with an identical new one after six years of excellent service. Replacing essential items of major equipment periodically ensures reliability of operations.
- This year, funds from the Thyne Reid Foundation were used to purchase underwater camera equipment, laboratory balances, an ice machine and other items.
- Transport and storage of petrol for outboard motors was improved with the purchase of four bulk stainless steel fuel containers. Two large containers (946 litres) are barged to Cairns for filling while two smaller ones (477 litres) are used on site for refuelling boats.

Completion of the solar installation. The inverters and battery bank are housed in secure rooms beneath this frame. *Photo: Tane Sinclair-Taylor*

30th Anniversary Development – Conclusion

The 30th Anniversary Development – seven years of intense effort in planning and construction - has now improved virtually every facility at LIRS including accommodation, laboratories, library, computer facilities, aquarium, diving and boating, workshop and power generation. We are most grateful to all of the people who have supported this initiative. It has laid the foundations for Lizard Island Research Station to continue as one of the world's leading tropical marine field research stations for many years to come.



01: Ken Coles presents the Patron certificate to Lady Potter AC at the annual lunch in Melbourne.
Photo: Anne Hoggett



02: Ian Reid accepts the Patron certificate on behalf of the Thyne Reid Foundation.
Photo: Ken Coles

03: Ken Coles and Rowena Danziger
Photo courtesy Ken Coles

04: Robert and Susan Maple-Brown
Photo courtesy Susan Maple-Brown

05: Vivian and Wendy King
Photo courtesy Vivian King

06: Michael and Catherine Batten
Photo courtesy Michael Batten

07: Paul and Lucie Slade
Photo courtesy Paul Slade

08: Jim and Nancy Bildner
Photo courtesy Jim Bildner

New patrons

Three new patrons have been appointed since the original publication of this history in 2009. The Trust Deed defines a Patron as “a person who has made a substantial contribution to the affairs of the Foundation which in the opinion of the Trustees warrants that person being elected a Patron of the Foundation”. There is no doubt that all new Patrons have contributed enormously to the LIRRF and to the research station.

The Ian Potter Foundation

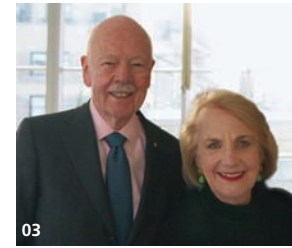
Announcement of The Ian Potter Foundation as a Patron was made in May 2010 at the LIRRF’s annual luncheon in Melbourne. The honour was graciously accepted by its Life Governor, Lady Potter AC. A donation of \$1.5 million by The Ian Potter Foundation to the 30th Anniversary Development was instrumental in obtaining matching funding from the Queensland Government. Together, these contributions ensured that the project could proceed as planned. In recognition of the Foundation’s critical support, the central research area at LIRS is now known as The Ian Potter Centre for Tropical Marine Research. The Ian Potter Foundation has also supported training for coral reef research through the Ian Potter Doctoral Fellowship at Lizard Island, now in its eighth year.

Thyne Reid Foundation

To celebrate recognition of the Thyne Reid Foundation as a Patron, a function was held at the Australian Museum in July 2010. Mr Ian Reid, Chairman of the Thyne Reid Foundation, was delighted to accept the honour on its behalf. The Thyne Reid Foundation is a major supporter of the 30th Anniversary Development. It has provided funds for a tractor with hydraulic implements, two boats (*Freya* and *Lili*), the refurbishment of a building to form three new laboratory rooms (now known as the Thyne Reid Wing) and laboratory equipment.

Andrew Green

Andrew retired from the Board of the LIRRF in June 2012 and was made a Patron at the LIRRF annual dinner shortly thereafter. Andrew was appointed as Secretary, Treasurer and Public Officer when the LIRRF was established in 1978 and provided a total of 34 years of unbroken service – a truly remarkable contribution.



Life members

The LIRRF established a new fundraising initiative in 2011 to address the increasing maintenance needs of LIRS resulting from all of the new facilities provided by the 30th Anniversary Development. The goal is to establish a substantial capital fund that will provide income to help maintain LIRS into the future. Life Members make a minimum donation of \$100,000 which can be spread over several years.

Peter Teakle became the inaugural Life Member in 2011. Peter has been involved with game fishing at Lizard Island for many years. As the owner of several large boats, he understands the necessity of maintaining such assets and the challenges of doing that in a marine environment. He also recognises the importance of LIRS in facilitating research that underpins environmental conservation, hence his generous donation. As well as becoming a Life Member, Peter has provided significant funding through his Teakle Foundation for the inaugural Peter Teakle Sustainable Fishing Research Grant to be awarded by the Australian Museum. As at the date of this publication, two such grants have been made.

Six couples who are long-term supporters of the LIRRF have also become Life Members, getting the programme off to a wonderful start. They are:

- Ken Coles AM (former Chairman) and Rowena Danziger AM.
- Robert Maple-Brown AO and Susan Maple-Brown AM.
- Vivian and Wendy King. Wendy is the daughter of Dr. Charles Warman AM, a former Trustee.
- Michael and Catherine Batten. Michael is the step-son of Sir John Proud, Founder of LIRRF.
- Paul and Lucie Slade. Paul Slade is Chairman of the Hermon Slade Raiatea Foundation that endowed the Isobel Bennett Marine Biology Fellowship at Lizard Island.
- Jim and Nancy Bildner. Jim has been a Trustee of LIRRF since 1998. They live in Manchester-by-the Sea, Massachusetts, USA.



Gail McCarthy at the Australian Museum in July 2013.
Photo: Stuart Humphreys

Changes to trustees and staff

There have been a number of changes to trustees and the Australian Museum support staff since the original publication of this history.

Ken Coles retired as Chairman of LIRRF in June 2012.

Ken has been a Trustee since 1991 and Chairman since 1994. His tenure has been truly transforming for LIRRF and LIRS. Ken's energy and enthusiasm have led to tremendous advances in the funding and facilities at LIRS. One of his most notable achievements was to initiate the fund raising to build two staff houses at LIRS. These were completed in 1997 and 2001 respectively. Prior to the construction of these new houses, the four full-time staff at LIRS were living in very sub-standard accommodation.

Ken is continuing as a Trustee of LIRRF and has volunteered to take responsibility for the life membership programme. Everyone involved with LIRRF and LIRS are truly fortunate to have had the opportunity of working with Ken over these many years and we thank him for all he has done.

David Shannon is now Chairman of LIRRF.

David has been a Trustee of LIRRF since 2005 and has taken on the role of Chairman since Ken Coles' retirement.

There have been several other changes for LIRRF and LIRS.

Paul Connor was appointed a LIRRF Trustee in 2011 as a nominee of the Australian Museum Trust. This appointment terminated in 2013 as he was transferred to other responsibilities as a member of the Trust.

Professor Lynne Madden was appointed a LIRRF Trustee in 2012. Lynne and her husband are enthusiastic supporters of the marine environment and philanthropy.

Helen Wellings was appointed a LIRRF Trustee in February 2013, nominated by the Australian Museum Trust in place of Paul Connor. She has been on the Australian Museum Trust since February 2011.

Belinda Gibson was appointed a LIRRF Trustee in May 2013, as the second nominee of the Australian Museum Trust. She has been on the Australian Museum Trust since February 2013.

Graham Sherry OAM was appointed a LIRRF Trustee in May 2013. Graham resides in Melbourne and will have special responsibility for maintaining and developing donor support in Victoria.

Marianne and Lance Pearce retired in June 2012 after a remarkable 24 years in their maintenance roles at LIRS. LIRS has achieved an enviable reputation among visiting scientists as a place where they can rely on the equipment working reliably. Marianne and Lance made an enormous contribution in this regard. To mark their wonderful service, a new boat, commissioned in 2013, has been named *L&M*. They live not too far away at Innisfail so we can be sure that we shall be seeing them again in the future. Stewart Pulbrook and Kim Demamiel have taken over the maintenance role.

Gail McCarthy has retired from her part-time role as administrative assistant to LIRRF. She fulfilled this role for 18 years in addition to her principal responsibility as Executive Assistant to the Director of the Australian Museum. Gail has done a tremendous job in looking after the records of LIRRF and we are most grateful for all of her work.



2012 Dinner for Members

A dinner for LIRRF Members in Sydney has been an annual event since 1994. The dinner in June 2012 was remarkable for the number of changes rung in and awards presented. At this fully-subscribed dinner at The Wharf Restaurant:

- Lance and Marianne Pearce were presented with a certificate by Catherine Livingstone, President of the Australian Museum Trust, honouring their retirement after 24 years of service at LIRS.
- Andrew Green was presented with a certificate by Ken Coles on behalf of the Foundation, announcing him as a Patron of the Foundation following his retirement after 34 years of service.
- Charlie Shuetrim was presented with a gift by Ken Coles on behalf of the Foundation and the Australian Museum for his success in leading the fundraising for the 30th Anniversary Development.
- David Shannon was introduced as the incoming Chairman of the Foundation by outgoing Chairman, Ken Coles.
- Ken Coles gave a moving speech that captivated the audience and was acknowledged with a standing ovation. Ken was presented with a gift by LIRS Directors Lyle Vail and Anne Hoggett on behalf of the Australian Museum and the Foundation, to mark the occasion of his retirement as Chairman after 18 years of service.



Top: Marianne and Lance Pearce sitting in the new boat *L&M* named in their honour. *Photo: Lyle Vail*



Middle: Andrew Green responding after the presentation of his Patron's certificate by Ken Coles. *Photo: Robert Coles*

Bottom: David Shannon addressing members and guests at the 2013 LIRRF dinner. *Photo: Charlie Shuetrim*

Intern programme

The volume of work done at LIRS (more than 8,000 visitor nights per annum) places enormous demands on the four full-time staff. To help with this, the Directors initiated an intern programme in 2013. A PhD candidate is invited to live at LIRS for several months on the basis that they provide 12 hours of work per week to help with the running of the Research Station. The rest of the time is theirs to pursue their studies. Initial indications are that this programme will be highly sought after and very successful.



Top: Russell Kelley (left) and Richard Fitzpatrick assisted with production of the Station's video.
Photo: Charlie Shuetrim

Far right: Richard Fitzpatrick filming at Lizard Island for the production of the new video.
Photo: Charlie Shuetrim

New video

A new 15 minute video presentation about work at LIRS was launched in July 2010. It is used almost daily to explain the workings of the Station to island visitors. It was directed by independent science communicator Russell Kelley and written by LIRS Directors, Lyle Vail and Anne Hoggett. Filming was done by several contributors including Digital Dimensions, Russell Kelley and Lyle Vail and narration is by Anne Hoggett.

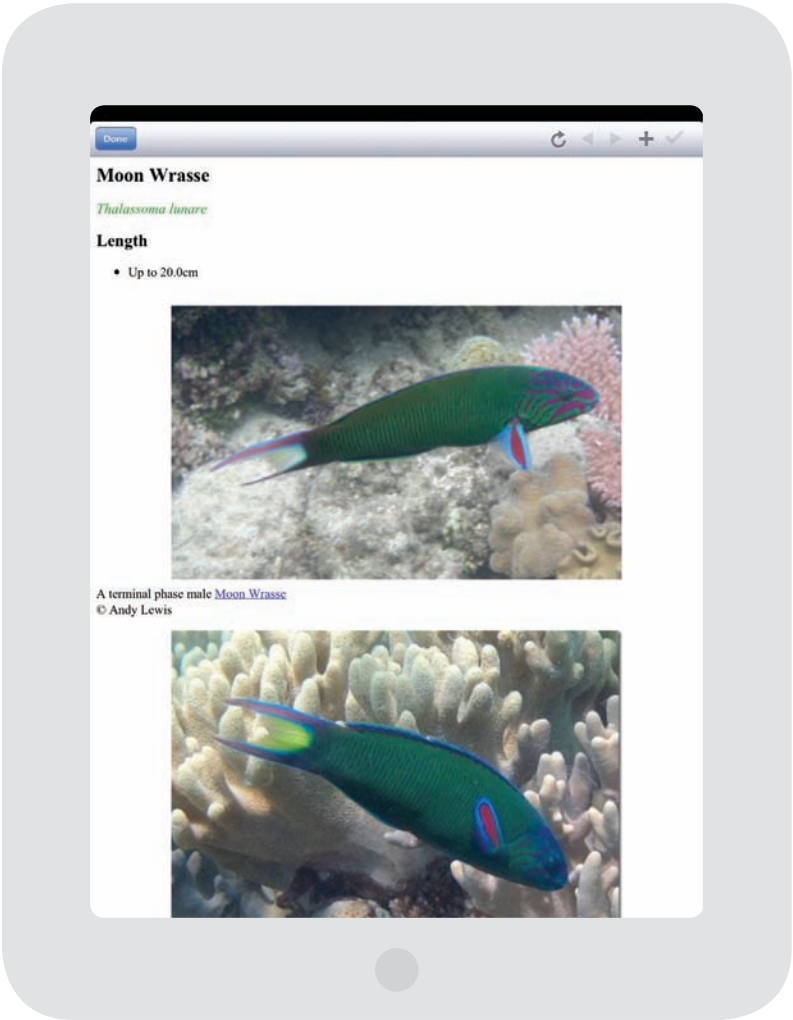
Field Guide

An online field guide is now available for Lizard Island. It is supported by mobile applications for both Apple and Android devices that can be used offline. This project has developed from a collaboration between LIRS and Gaia Guide with LIRS providing the data and the scientific expertise and Gaia Guide providing the user-friendly platform and the data-handling expertise.

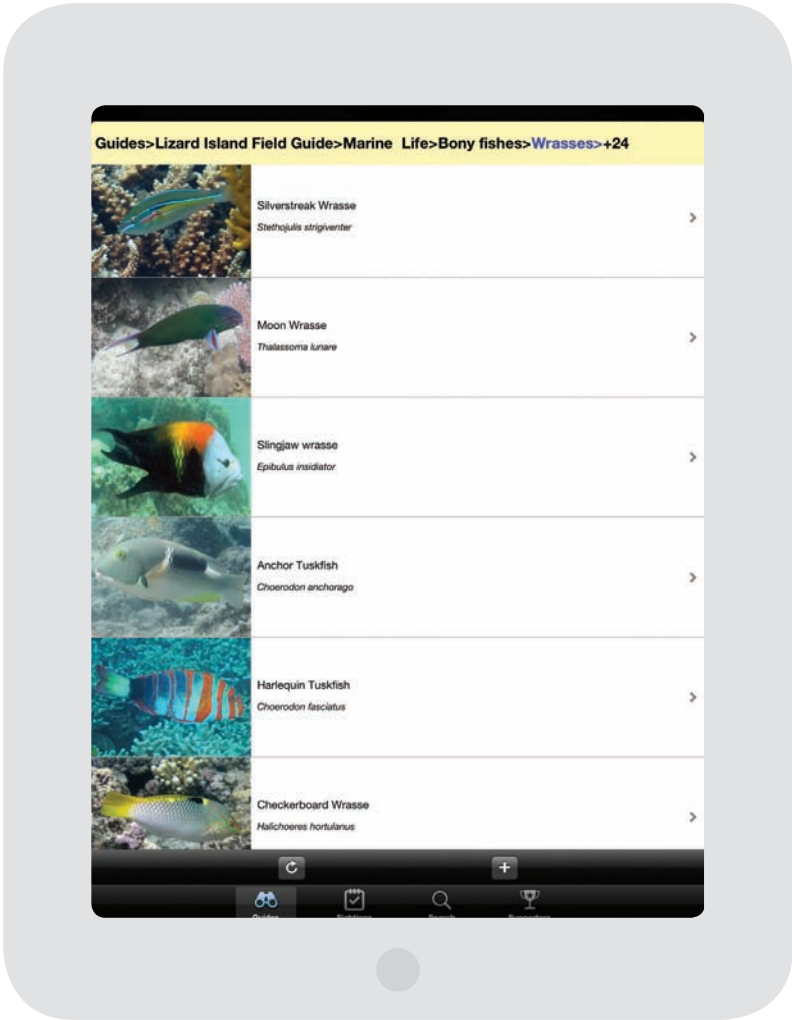
Lizard Island Field Guide enables users to identify and learn about local species, to record their own observations and photographs, and to submit that data to LIRS for possible inclusion in the Guide. It currently contains information on more than 850 local species. Most of them are commonly-encountered marine species. The Guide also includes most of the birds and reptiles on the island. We currently have records of more than 6,200 species of life at Lizard Island and more are discovered every year. We are constantly adding species to the field guide as photographs and information become available.

LIRS uses the field guide to monitor research activities at Lizard Island and to capture information that is published by visiting scientists, as well as things that might not be recorded otherwise, such as spawning events and observations of rare species or behaviours. The well-illustrated Guide has already proved its value to new researchers visiting LIRS for the first time. Lizard Island Field Guide shares data with the CSIRO initiative, Atlas of Living Australia. Lizard Island data thus enhances knowledge of Australia's biota and the field guide benefits from Australia-wide data including distribution maps. Lizard Island Field Guide is available free of charge to the general public for use on computers and on iPhone, iPad or Android devices. See www.gaiaguide.info or search for "Lizard Island" in the Android or iTunes App Stores.





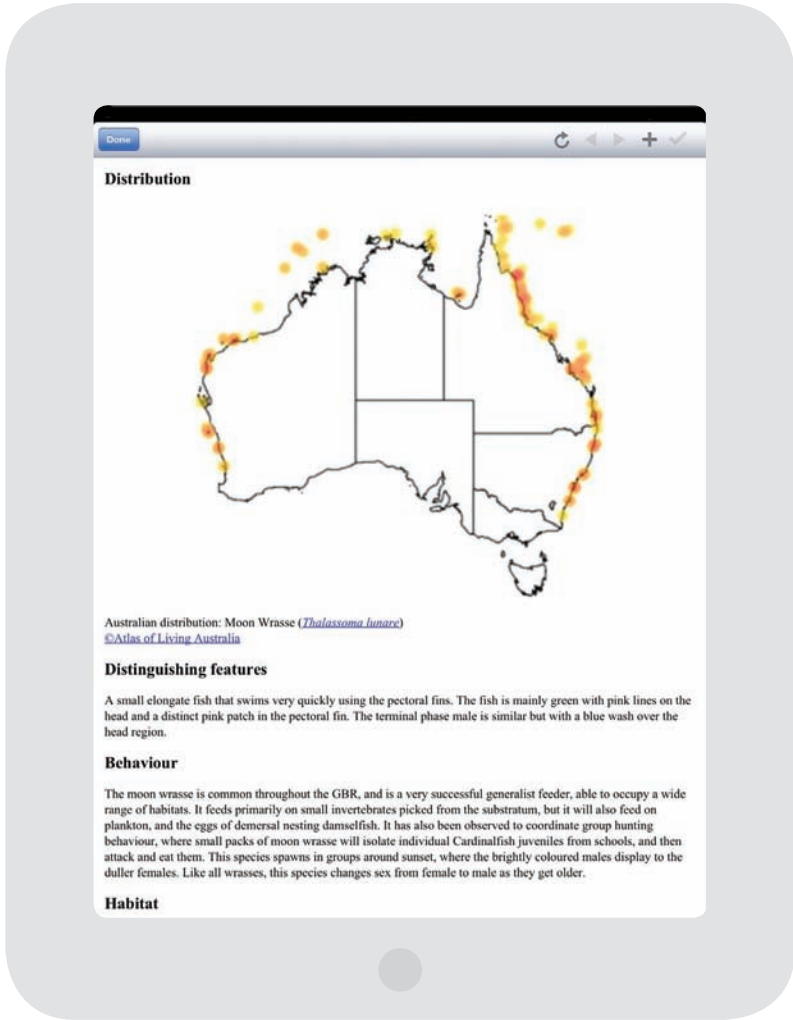
This page has details of the Moon Wrasse that is one of the 24 species of wrasses in the field guide. The user can scroll down to view all of the information about the Moon Wrasse.



The ribbon at the top of the page indicates where we are in the hierarchy of data. This display is:

- Wrasses (of which there are 24 species in the field guide – as indicated by the number 24)
- Within the category of bony fishes
- Within the category of marine life

The user can scroll down the page and view images of all 24 species of wrasses.



This is a continuation of the detailed display of the Moon Wrasse. It shows the distribution of the fish with other details about behaviour and habitat. At the bottom of the page (not shown in the image above) is a link to the field guide data base if the user has an internet connection.



Left: The 1st International Polychaete Conference took place at the Australian Museum in 1983. This photo shows members of a polychaete field trip to LIRS in 1983. Programme 3 in the LIRS Strategic Plan envisages a pilot biodiversity workshop. LIRRF is pleased to have been a major sponsor of this pilot workshop held at LIRS following the 11th International Polychaete Conference in August 2013. Sixteen polychaete experts spent two weeks at LIRS doing in-depth research into polychaetes in the environs of Lizard Island. *Photo: Pat Hutchings*

Right: A polychaete tubeworm about 3 cm long, extracted from its tube. Normally only the tentacles (on the right) protrude from the tube it has excavated into coral skeleton. *Photo: Gary Cranitch*



LIRS Strategic Plan

A widely advertised online survey was conducted in July 2011 to determine the opinions of LIRS users and other interested parties about how the Station is performing and to solicit ideas for future directions. Based on this survey and other inputs, a new 5 year Strategic Plan (2013-2017) has been developed. It has four programmes that are outlined below. Their achievement over the period to 2017 will ensure that LIRS continues to produce relevant scientific research and education of the highest quality, and that it engages fully with the wider community.

- **Programme 1, Sustainable Operations and Incremental Development**, ensures that LIRS operates effectively into the future with a small full-time staff while continuing to provide excellent research facilities.
- **Programme 2, Coral Reef Research**, maintains and expands on the existing Fellowships and Grants Programme and introduces two initiatives: an intern programme and a salaried postdoctoral position.
- **Programme 3, Biodiversity Hub**, adds value to the normal scientific activity hosted at LIRS by thoroughly documenting the organisms of the area through two initiatives: capturing data that would otherwise be lost and making it readily available online, and by filling knowledge gaps through a pilot biodiversity workshop.
- **Programme 4, Outreach**, will improve engagement with the public in the work of LIRS through media releases, internet interaction, and by establishing a partially-subsidised educational field trip for excellent Australian science students.

The partnership continues

The work of the Lizard Island Research Station and the support required from the Lizard Island Reef Research Foundation are now more challenging than ever before. Visiting scientists pay “bench fees” for the use of LIRS facilities. Most of the scientists are in academic institutions and dependent on grants. Bench fees are insufficient to cover LIRS operating and capital costs. The Australian Museum and LIRRF make up the gap. We need to continue and enhance donor funding. This must be accomplished in an unfavourable economic and political environment where government funding for the Australian Museum and academic research is in steady long-term decline.

The need to continue and expand research at Lizard Island has never been greater. The Great Barrier Reef with its associated sand, seagrass, mangrove and inter-reefal communities is one of the largest and most diverse ecosystems on the planet. It is immensely rich in undiscovered and unexplored life forms; many with amazing inter-dependencies and food chains; a wonderland of different modes of reproduction, communication, survival and adaption; inhabited by fearsome predators and by plants and animals that have formed surprising symbiotic, cooperative relationships.

We need to extend our understanding of this amazing place **(a)** because we humans are inherently curious about other life forms, especially those that are as diverse as those found on the reef; **(b)** because research in this wonderland is yielding information of enormous practical use and potential, including promising anti-cancer agents, neurotoxins, anti-inflammatory agents, ways to control bacterial infections, renewable food and energy sources, biological information-flow and how cells communicate with other cells for function, growth and destruction; and **(c)** because the reef is at risk as a result of human activity; we need to know the scientific basis and extent of that risk and how to conserve the area for future generations.

LIRS is widely regarded as Australia's premier coral reef field research station. Its facilities are used by leading marine scientists from all over the world because it is well equipped, because its primary focus is on research (rather than undergraduate coursework), because it is well-managed, and because it is well located close to the outer reef in the more pristine northern sector. Unfortunately its remote island location also makes it expensive to operate and maintain. Everything has to be brought by air or by barge from the mainland.

The Partnership continues – between the Australian Museum which owns and operates the LIRS facilities, the visiting scientists who use them, the staff who manage and maintain them, the generous LIRRF donors who make it all possible and the countless “silent partners” – the current and future generations on planet Earth who will benefit from the research at Lizard Island and its contribution to our knowledge and conservation of the reef.

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